

Ethical Issues in Aviation



Edited by Elizabeth A. Hoppe

ETHICAL ISSUES IN AVIATION

*Dedicated to the pioneering students who completed my first Aviation
Ethics course*

*Kathy Fosbinder
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Ethical Issues in Aviation

EDITED BY
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ASHGATE

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List of Abbreviations

A and P	Airframe and Powerplant
ACA	Atlantic Coast Airlines
AD	Airworthiness Directive
ADEA	Age Discrimination in Employment Act
AFA–CWA	Association of Flight Attendants–Communications Workers of America
AFGE	American Federation of Government Employees
AIT	Advanced Imaging Technology
ALJ	Office of Administrative Law Judges
ALPA	Air Line Pilots Association
ARB	Administrative Review Board
ASAP	Aviation Safety Action Program
ASI	Aviation Safety Inspector
ATC	Air Traffic Control
ATI	Anti-Trust Immunity
ATPC	Airline Tariff Publishers Company
AWAM	Association for Women in Aviation Maintenance
BFOQ	Bona Fide Occupation Qualification
CAB	Civil Aeronautics Board
CAL	Continental Airlines
CAMI	Civil Aeromedical Institute
CFI	Certified Flight Instructor
CRS	Child Restraint System
CMO	Certificate Management Office
CVR	Cockpit Voice Recorder
DHS	Department of Homeland Security
DOJ	Department of Justice
DOL	Department of Labor
DOT	Department of Transportation
ECA	European Cockpit Association
EEOC	Equal Employment Opportunity Commission
EETS	European Emissions Trading Scheme
EPA	Environmental Protective Agency
ERAU	Embry-Riddle Aeronautical University
ESOP	Employee Stock Ownership Plan
EWR	Newark Liberty International Airport
FAA	Federal Aviation Administration
FAIR	Canadian Federal Accountability Initiative for Reform

FAR	Federal Aviation Regulation
FBO	Fixed Base Operator
FOQA	Flight Operations Quality Assurance
GAO	General Accountability Office
GCRI	Georgetown Clinical Research Institute
GPS	Global Positioning System
IAC	Internal Assistance Capability
IATA	International Air Transport Association
ICAN	International Commission on Air Navigation
ICAO	International Civil Aviation Organization
IDB	Involuntary Denied Boarding
ILEAV	Inherently Low-Emission Airport Vehicle
IM	Instant Message
IOM	Institute of Medicine
IPCC	Intergovernmental Panel on Climate Change
LASP	Large Aircraft Security Proposal
LCA	Large Commercial Aircraft
LCC	Low Cost Carrier
MOU	Memorandum of Understanding
MSP	Minneapolis–St. Paul International Airport
MSPB	Merit Systems Protection Board
NATCA	National Air Traffic Controllers Association
NHTSA	National Highway Transportation Safety Administration
NIA	National Institute on Aging
NIH	National Institutes of Health
NIPP	National Infrastructure Protection Plan
NPRM	Notice of Proposed Rulemaking
NRC	National Research Council
NTSB	National Transportation Safety Board
OAHS	Oakland Aviation High School
OBAP	Organization of Black Aerospace Professionals (Formerly known as Organization of Black Airline Pilots)
OMP	O’Hare Modernization Project
ORD	Chicago O’Hare International Airport
OSC	Office of Special Counsel
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbons
PATCO	Professional Air Traffic Controllers Organization
PMI	Principal Maintenance Inspector
PAR	Profile Aging Ratio
PSG	Pacific Southwest Airlines
RPN	Responsible Purchasing Network
SARS	Severe Acute Respiratory Syndrome
SOC	Suburban O’Hare Commission

SOX	Sarbanes–Oxley Act
SWA	Southwest Airlines
TCAS	Traffic Alert, Collision Avoidance System
TSA	Transportation Security Administration
UFP	Ultrafine Particulate
USCCB	United States Council of Catholic Bishops
VDRP	Voluntary Disclosure Reporting Program
VFR	Visual Flight Rules
VOC	Volatile Organic Compound
WAI	Women in Aviation, International
WHO	World Health Organization
WPA	Whistleblower Protection Act
WTO	World Trade Organization
XDR TB	Extensively Drug Resistant Tuberculosis

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Foreword

Howard Putnam

Turbulence is inevitable but misery is optional in business and in life. Turbulent situations can be very painful personally and financially, especially when you stick to your ethics and integrity and do the right thing. I have experienced all of the above. However, there is much less traffic on the high road and the consequences and destinations are more rewarding for the long term when you adhere to your values and do what is right. Your legacy is your reputation.

My life has revolved around aviation which is a complex industry with the opportunity for unethical behavior in many directions. I grew up on an Iowa farm and my Dad taught me to fly a Piper J-3 Cub before I was old enough to solo. My parents gave me a lot of responsibility at an early age caring for animals and holding me accountable for operating tractors and farm equipment. Teamwork, ethical behavior and supporting our family and neighbors were our way of life. Money was always secondary.

I have always tried to abide by those principles. I started at age seventeen, after high school, loading bags at Midway Airport in Chicago. On my first shift, the supervisor was stealing jewelry and pharmaceuticals from passenger luggage while the rest of us loaded bags and cargo. Fortunately, he was caught on the second night by the manager and fired. My lessons in ethics in aviation and business had only just begun.

When Phil Guthrie (our CFO at Southwest Airlines) and I took on the challenge of restructuring financially strapped Braniff International Airways (a billion dollar company in revenue), we encountered unethical behavior on many fronts. Due to some questionable payment and accounting practices, we found we had only ten days of cash that was not transparent when we did our due diligence prior to accepting the challenge. Upon our arrival we encountered the FBI investigating the purchasing agent for jet fuel taking kickbacks, and he was terminated and prosecuted. We had a theft ring on the ramp which led to the termination of twenty-two employees. Another airline was being investigated by the Department of Justice for dirty tricks in falsifying reservations to hurt our revenue generation, along with alleged price fixing by a senior executive. When managements over expand, let costs and service get out of control, let their egos get in the way, and lose the trust of their stakeholders, including employees, you will see an organization fail.

We stayed the course for seven months, until we finally ran out of cash and had to restructure the airline (successfully) through chapter 11 bankruptcy over the next sixteen months. It flew again eight months later. It was a physically and

mentally draining experience; however, there was never one single lawsuit filed by stockholders, customers, or creditors throughout the process. Why? Our small team refused to deviate from our ethics and integrity, and we were totally open with the media, former employees, creditors, suppliers, etc. Harvard University even wrote a case study on the process as a teaching model. It is still taught today in many education venues, entitled: “The Ethics of Bankruptcy.”

If you as a student or business professional believe in core values that center around “Integrity, Honesty, and Accountability,” you must also be an example of them 24–7. Otherwise, your associates will quickly see you are not really serious about your reputation, building morale, increasing productivity, and improving the bottom line the right way.

This book provides a flight plan for you to successfully navigate through turbulence. Elizabeth A. Hoppe has assembled a group of talented authors with interesting backgrounds that touch many aspects of the aviation industry. It will provide a learning experience unequalled in any other publication I have read as it relates to applied ethics across aviation.

Howard Putnam is the former Group Vice President of Marketing, United Airlines; President and CEO of Southwest Airlines; Chairman and CEO Braniff International Airways; co-founder of several startup companies. Today, he is a speaker, advisor to business, and the author of *The Winds of Turbulence* published originally by HarperCollins. He has a MBA in Marketing from the University of Chicago and attended Harvard University’s Advanced Management Program. (www.howardputnam.com)

Preface

The field of applied ethics has been gaining wide attention in a variety of curriculums, and there is growing awareness of the need for ethical training in general. In the US well publicized ethical problems such as the Challenger disaster, the Ford Pinto case, and the collapse of corporations such as Enron, have highlighted the need to rethink the role of ethics in the workplace. The concept of applied ethics originated in the 1980s with a groundbreaking work in medicine: *Principles of Biomedical Ethics* (first published in 1979 by Oxford University Press). Due to the growing interest in applying ethics to medicine, new topics have developed and continue to emerge today. Business ethics books began to appear in the 1980s with engineering following in the 1990s. By opening up a new area in applied ethics, namely aviation ethics, this text will advance research possibilities in both ethics and aviation.

My first experience with the ethics of aviation arose in a 1996 course at DePaul University, *Business, Ethics, and Society*. In this class we discussed many types of business enterprises, but none of them stood out as did the aviation industry for the complexity of concerns and issues that arise in it. This industry is complex in comparison with many other businesses, especially in two major ways: first, it has a long history of being beholden to government regulations, and second, its primary focus is, or should be, safety. Because for decades US commercial aviation was viewed in the same manner as public utilities, it was highly regulated and controlled. With the Airline Deregulation Act of 1978, many came to view aviation as being like any other business. However, on the other side some experts have argued that the sudden switch to deregulation has led to disastrous results, especially since many airlines were unprepared for the change. Air Florida, for example, was a start up airline that ended up folding not long after a tragic accident that occurred on take-off from Washington DC.

One should note that this book is not intended as an exhaustive account of all ethical issues that arise in aviation. It will instead provide an overview of important topics focusing mostly on current issues and trends. But it also addresses some of the historical events that continue to affect the industry, such as the history of racial discrimination in the US, the PATCO strike of 1981, and the ValuJet 592 accident.

The text is divided into six parts and begins by addressing key theoretical concepts in both ethics and capitalism as they impact the field of aviation. Part II focuses on the business side of aviation, both international and domestic, including the regulation of air space, outsourcing manufacturing, and outsourcing maintenance, as well as airline ticket pricing. Part III provides an overview of issues in responsibility by examining FAA inspectors, pilots, flight attendants, and

the airlines themselves. In Part IV the authors examine different types of diversity issues that arise in the US, both from historical and contemporary grounds. This section includes discussions not only on race and gender but also the former Age 60 Rule. Moving to ground issues, Part V addresses airports, including land use and planning strategies, the past and future of air traffic control, and questions concerning the role of post 9/11 security. Finally, Part VI examines health, especially concerning pilots, and the impact of the industry on the environment.

The contributors to this volume include both academics who do research in the field as well as professionals who provide accounts of the ethical situations that one may encounter in the workplace. Because of the variety of viewpoints offered in this text the reader should be able to gain a broad understanding of the ethical dimensions of the aviation industry and in turn discover ways to overcome the challenges that one may face. The book does not offer a singular moral point of view or promote a specific policy. Instead it is my hope that it will serve as a springboard for further ethical discussion on the key issues that continue to confront and challenge aviation today.

Elizabeth A. Hoppe

April 2011

Reviews for *Ethical Issues in Aviation*

Ethical Issues in Aviation is an innovative and thought-provoking book that explores an important, but heretofore, neglected area of research. While the study of ethics has been applied in numerous other industries, its application to aviation is long overdue. For those who study aviation, this book is sure to provide multiple new perspectives on familiar issues. It was a treat to read about the business of aviation, safety, diversity, airport development, and environmental issues through an ethical lens.

Andrew R. Goetz , University of Denver, USA

Pilots face ethical issues every day on and off the job. How much sleep is enough? Am I fit for duty? Do I write up this maintenance problem and delay the flight? Is this route of flight which skirts the edge of severe turbulence legal and safe? Do we take extra fuel and leave behind passengers and bags? In order to push back on-time what corners are cut?

Add on top of this discrimination and contempt for women, and other tensions apply such as not being given all the information to make a decision, or the necessary training to perform correctly. Honesty, integrity, and morality play into all decisions.

Elizabeth Hoppe's book and a course in ethics could benefit every pilot. As the first female pilot at Aloha Airlines in the late 1970s, discrimination, deliberately inadequate training, and bullying were the norm. Also, experiencing a commercial airline accident as the First Officer on Aloha Airlines Flight 243, I lived and observed first hand many of the issues discussed throughout this book. I had a hard time putting the book down and wanted more chapters when it ended. I highly recommend this book for all aviation employees.

Madeline "Mimi" Tompkins, First Officer, Hawaiian Airlines

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PART I

Theoretical Frameworks

In the aviation industry a variety of ethical theories are utilized even without one necessarily being aware of it. For example, the rules and regulations that the FAA creates are based on a cost–benefit approach to decision-making. While on the surface this type of analysis is economic rather than moral, the ethics of consequentialism follows the same method for determining what is morally right and wrong. If the result of a decision is such that the negative outcome would outweigh the good, then one should not choose that action. Likewise, if a regulation is not cost effective, the FAA will not enforce it, such as the ongoing debate over the regulation of child restraint systems (CRSs).

Because of its cost–benefit approach, the FAA has determined that CRSs should not be required. One of the main rationales why child restraints are not mandatory is due to the FAA’s conclusion that “the increased safety risk to families who, if forced to purchase an extra airline ticket, might choose to drive. The risk to families is significantly greater on the roads than in airplanes, according to FAA and National Highway Traffic Safety Administration (NHTSA) statistics” (FAA 2006).

However, cases such as this one also reveal the complexity of ethical decision-making. To demonstrate such complexity, one only needs to examine the 2004 response on the CRS issue by the National Transportation Safety Board (NTSB) which argues against the FAA. Perhaps one of their most important points is that “basing the evaluation of relative worth of a requirement for appropriate child restraints solely on the number of historic injuries and deaths overlooks the fact that every lap-held child traveler lacks adequate protection” (NTSB 2004: 2). The NTSB also points out that items such as laptops and large objects need to be secured prior to take off and landing, especially since they could become projectiles that could in turn harm other passengers. Why are children under two not required to be secured as well? This case shows that ethics is much more than a matter of common sense. Regarding the question of regulating CRSs, we find two federal agencies arguing two opposing points.

In order to show the various ethical theories and dilemmas that may arise in aviation, the opening part of the book examines the theoretical frameworks, not only of ethics, but also of capitalism, in order to provide a way of assessing the merits and limitations of the industry. Chapter 1 by Mark H. Waymack investigates and critiques two forms of ethics that emphasize how we determine the choices we make: consequentialism, and deontology, or duty-based reasoning. Turning to

a focus on how to live an ethical life, Chapter 2 addresses rights-based reasoning, and virtue. Both consequentialist and deontological ethics focus on decision-making. Questions such as, are consequences what matter in ethics or should morality be based on universal laws, are important issues for the aviation industry. Waymack's analysis reveals the fundamental aspects of consequentialism in order to assess some of its main strengths and weaknesses. He follows this section with an account of Kantian deontology, the type of ethics that is concerned with adherence to universal moral laws rather than the consequences of an action. In Chapter 2 Waymack reveals two other directions that ethics may take: the question of fundamental rights and virtue ethics, a form of ethics which provides ways to develop a person's character. The hope is that a virtuous person would make good decisions and thus the focus should be on one's character rather than one's choices. Questions about rights include issues of whether or not rights are something natural or if they arise due to a contract made by people in society. Although Waymack points out that no ethical theory is perfect, he also argues against a skeptic who would assert that ethics is useless. Instead Waymack advocates for the value of studying ethics and provides a seven step reasoning process that utilizes the different ethical theories analyzed in Chapters 1 and 2.

The third and final chapter investigates historical and contemporary views of capitalism in order for the reader to reflect on its strengths and limitations. As any other industry, aviation is comprised of businesses that attempt to make profits. The point is to ask when the drive for profits crosses a line such that it becomes unethical. Nathan Ross first addresses historical proponents of capitalism, such as John Locke on property rights, David Hume's defense of luxury, and Adam Smith on the division of labor, in order to develop the merits of the capitalist system. Ross follows this analysis with an account of some of the main critics of capitalism, most notably the nineteenth-century theorist, Karl Marx and his critique of surplus labor value in which workers are exploited by the capitalist system that does not pay the workers according to the value of what they produce. Ross then ends the chapter with a discussion of two contemporary European critics, Georges Bataille and Jean Baudrillard. Some of the more troubling aspects of contemporary capitalism include overproduction and consumerism, both of which can be found in the aviation industry today especially in terms of the consumer's inability to have much of a say in their choices regarding ticketing, frequency of flights, routes, etc.

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Chapter 1

Ethical Theories Part I:

Dilemmas and Decision-Making

Mark H. Waymack

On February 12, 2009, Colgan Air (operating as Continental Connection) Flight 3407 crashed near its destination in Buffalo, NY, claiming all 50 lives on board. Since the crash occurred in wintry conditions, icing on the wings was a hypothesis that immediately came to many minds in explaining the crash. However, as the investigation methodically proceeded, what emerged was the story of a response to an impending stall that went contrary to pilot training. According to the Executive Summary of the NTSB's aircraft accident report:

The probable cause of this accident was the captain's inappropriate response to the activation of the stick shaker [the stick shaker warns a pilot of an impending wing aerodynamic stall], which led to an aerodynamic stall from which the airplane did not recover. Contributing to the accident were: (1) the flight crew's failure to monitor airspeed in relation to the rising position of the lowspeed cue, (2) the flight crew's failure to adhere to sterile cockpit procedures, (3) the captain's failure to effectively manage the flight, and (4) Colgan Air's inadequate procedures for airspeed selection and management during approaches in icing conditions (NTSB 2010: x).

Actions (or inactions) on the part of the first officer exacerbated the seriousness of the captain's incorrect actions, and succeeded only in accelerating the plane's trajectory into a doomed, fatal stall.

Behind these tragic bad choices in the final seconds of flight 3407, however, was a series of decisions and circumstances that led to this fatal accident. The NTSB notes that the captain had several FAA certificate disapprovals, both before and after his employment at Colgan Air, two of which he failed to admit on his Colgan Air application (NTSB 2010: 9–10). The NTSB also found that the air carrier's approach-to-stall training program did not adequately prepare pilots for an unexpected stall as well as how to recover from it (NTSB 2010: 153). Furthermore, the low first officer salary made it impractical for her to live in the Newark, NJ area (her base); she in fact lived at her parents' home near

Seattle, WA.¹ She had traveled from Seattle the day before, and then on the day of the accident spent part of the time sleeping on a couch in the crew room at the Newark Liberty International Airport (EWR). The captain also apparently spent some time sleeping on a couch in the crew room. Regarding the possibility of fatigue as a factor in this flight, the report states that “the pilots’ performance was likely impaired because of fatigue, but the extent of their impairment and the degree to which it contributed to the performance deficiencies that occurred during the flight cannot be conclusively determined” (NTSB 2010: 153). Although we cannot say to what extent fatigue directly led to the accident, we do know that it was not icing or mechanical failure that caused the fatal crash: it was pilot error. Also contributing to the flight deck errors were inadequate training, falsification or concealment of FAA certificate disapprovals, and sleep deprivation attributed, indirectly, to the first officer’s low salary.

Needless to say, the crash and its loss of life are deeply regrettable. Still, no means of transportation, ancient or modern, is entirely safe. We could just say, like an accident on the highway, bad things sometimes just happen. And that may be true in a sense. But when we step onto a commercial airplane, we, as passengers, are trusting in the good faith of the airline and in the qualifications of our flight crew. In this case, it looks as though both the crew and the company failed our trust. In many ways, the things that happened “ought not” to have happened. In particular, the captain, the first officer, and Colgan Air (and its contractor Continental Airlines), all made choices and worked in ways that unnecessarily contributed to the accident. And as there was a serious violation of trust, we shall argue they all also acted unethically.

It is one thing, however, to have an intuition about ethics, or in other words a gut reaction; yet as we all know too well, gut reactions can sometimes lead us astray. Indeed, flight 3407 captain’s gut reaction as the stick shaker activated was to apply a 37-pound pull force to the control column, a choice that caused the plane’s wing to stall (NTSB 2010: 82). It can also be quite another thing to clearly articulate and justify our moral judgments, actions, and conclusions. Yet without express deliberation and articulation, how can we, or others, be confident in our moral choices, and be assured that we are not simply working with prejudiced or misguided moral judgments?

1 According to a footnote in the NTSB report, “The CVR recorded the first officer stating, about 2030:02, that she earned a gross salary of \$15,800 during the previous year (her date of hire with the company was January 16, 2008) and that ‘I’m just lucky ’cause I have a husband that’s working.’ (The CVR recorded the captain stating that he earned a gross salary of about \$60,000 during the previous year.) About 2103:03, the first officer stated that her husband had earned more in one weekend of military drill exercises than she earned in an entire pay cycle.” (NTSB 2010: fn 37, 12).

An Overview of Ethical Theory

Moral decision-making can be a very difficult task; yet it is not a task that we can avoid. Our society has, in its own way, made this decision-making process even harder, for it is now composed of a number of different cultures that have disparate, and often conflicting, moral traditions. For example, Roman Catholicism strongly opposes abortion rights, whereas political liberalism, which emphasizes the rights of the individual, reserves abortion as the free choice of the pregnant woman. Not everyone can be morally right, when there is such fundamental disagreement. But how can we determine who is choosing wisely and who is choosing poorly? How can we know whether we are choosing correctly or if we are acting out of unjustified and narrow minded prejudice?

Suppose there were several people all arguing about how tall a certain tree is. A sensible tactic to take would certainly be to measure how tall it actually is. Now this requires two important steps. First, we must agree upon what the appropriate units of measure are. That is, against what standard are we going to measure the tree? And second, we must go through some process of applying the standard of measure to the tree; that is, doing the measuring. These two steps take the guessing out of the measurement and help ensure that everyone is most likely to agree to the correctness of the answer that we reach.

How can we translate this example to our difficulties in moral decision-making? Well, if we can rationally agree upon a standard of measurement and also agree on how to apply that standard to ethically difficult cases, then our difficulties should be largely dissolved. Unfortunately, the matter is not quite that simple. In the example of the tree, it was agreed by all that we were measuring the height of the tree. That is pretty straightforward. Feet, yards, meters may be different possible units of measure, but they are all commensurable, that is, they can all be translated into the terms of each other. But with moral arguments one of the serious difficulties we face is that we may often disagree over just what it is we think we ought to be measuring. It would be as though some people thought that what was important when measuring trees is their width, or the circumference of their trunks, or perhaps even the size of their leaves rather than their height.

There is, in fact, just this sort of disagreement in morality. Some people think that what ought to be measured are the consequences of an action. For example, would the action produce happiness, or would it cause pain or suffering? Other thinkers focus upon adherence to certain forms of law. Does the action conform to the law or principle that one should only do what one would be willing for everyone to do? Still other thinkers look to moral rights. Would a certain action promote or violate someone's moral rights? And some thinkers regard virtue or good character as the proper focus of moral evaluation.

In this chapter we will study two different theories that provide standards for moral reasoning, ones that offer relatively clear decision procedures. Such ethical theories are attempts to articulate clearly what the standard of measurement should be, why that is the appropriate standard, and how that standard or reasoning process

is to be applied in our moral decision-making. The theories we have chosen each pick out quite different features as the most important aspects to be measured; but we have chosen these because we think they each capture some important and plausible insights into what moral reasoning ought to be doing and how it ought to be judged. The two theories of ethical reasoning that we will discuss in this chapter are: (1) Consequentialist, or value-maximizing, and (2) Deontological, or duty-based reasoning.

Consequentialist Ethics

Consequentialist Reasoning

When we contemplate a case like that of flight 3407, some of the first things that come to mind are the consequences of our possible choices. If the captain had been honest on his job application, either he would not have been hired, or he might have received additional training. Thus, the accident might have been avoided. And further, if the airline had more closely enforced training requirements and also paid a more reasonable salary, the crew would have been technically better prepared as well as not sleep deprived.² Instead, the captain withheld information more than likely in order to be a better job candidate; both pilots chose to fly even when they probably did not have an adequate amount of sleep; and the airline chose to save money by requiring less training and paying wages that are hardly above the poverty line.

The consequentialist begins with the assumption that humans, as agents, are goal directed. That is, we are creatures who, in our actions, make choices with regard to striving for certain goals in order to produce certain results. Furthermore, we judge the correctness of these actions according to how effectively they produce the intended consequences. For example, we judge investment bankers according to their success at making large profits. We evaluate an automobile manufacturer by the product of its labor—does the car run smoothly, efficiently, and safely? And we critique chefs by the level of pleasure we receive from the meals they prepare. According to the consequentialist, moral judgments are in principle made no differently. We judge human actions to be morally right or wrong, morally good or bad, according to the consequences that those actions produce.

Our account of consequentialist ethics has thus far been somewhat vague. To say that the consequences are what matters does not tell us much. Two questions need to be brought forward: (1) consequences may be the essence of moral reasoning, but consequences for whom?, and (2) specifically what sort of consequences should we look for? What makes a good consequence good and a bad consequence bad?

2 Chapters 3 and 10 provide further discussions on pilot salaries.

Consequences for Whom?

Any action we perform is likely to have consequences for, or upon, many different people. In cases that involve the question of whether or not to follow proper procedures in aircraft maintenance, there will be consequences to the maintenance technician, the supervisor, and even the airline. And depending on the situation, the risk of significant harm to passengers and crew may greatly increase.³ Different moral theories, though, have given different answers to the question of who counts as morally important.

Consequences for the self: ethical egoism One possible answer is that it is the consequences to me that matter. This ethics of self-interest is also known as ethical egoism. What is morally right is the action that has beneficial consequences for me. This is an unsatisfactory answer for a number of reasons. But what are we to say of other persons? If we take this to mean that “everyone should do those and only those actions that are in their own self-interest,” then what are we to say to the other person when his or her interest conflicts with our own? Am I to maintain that you are morally wrong to pursue your self-interest when what you seek to do will harm my self-interest? Does it make sense to state that the same action would be morally right and morally wrong at the same time? If we try to apply this standard of right and wrong to flight 3407, we can easily see just how confused and useless it is. Should the pilots simply pursue their own self-interests? The self-interests of the passengers and crew, however, may well dictate a different course of action. One way out of that quagmire is to suggest that “everyone should pursue my self-interest.” But it is quite difficult to see what could make any one person (me) so special that the rest of the world’s population should spend its life trying to create the best consequences for that one individual (me, of course!).

Perhaps more damaging than these intellectual puzzles, however, is the question of what sort of life the ethical egoist is actually likely to live. Think of how we treat other persons whom we know are out only for their own interests. Knowing what motivates them (purely self-interest), we find we are unable to trust them, for they will be willing to lie, cheat, steal, or mislead us if doing so proves to be in their own self-interest. How many of us would be willing to fly if we thought that airlines found it ethically permissible for pilots to falsify documents whenever they thought it might serve their financial self-interest? Would we trust our car mechanics if we thought they would be willing to fake repair work or even sabotage our automobile in order to generate more revenue?

We surely all have some experience of such egoistic individuals and know that they do not make good friends. Indeed, they seem to lack an understanding of something that is important to what it is to be a friend. It is hard to see how the egoist could even have a real friendship. So the ethical egoist would have to live a life in which that person could trust no one and no one trusted them. The egoist

3 See, for example, Chapter 12 and the analysis of the ValuJet 592 accident.

could not have true friendships and could not divulge to anyone who they really are, for doing so would run counter to the egoist's self-interest. All in all, it would seem that the committed egoist would lead an isolated and impoverished life. If one truly thought that what matters in the end are consequences only to the self, then in order to live an emotionally rich and happy life, the first thing one should do is stop thinking and acting like an egoist!

Consequences for others: ethical altruism Another possible answer to the “for whom” question is that what counts are consequences for other persons. This means that in determining moral right and wrong, we look to how our actions will affect other persons—morally good actions have good consequences for others and morally bad actions have bad consequences for others. The interests of the self do not have any standing in the moral decision-making.

In its own peculiar way, this sort of theory runs the danger of being self-defeating. For an individual to act altruistically, there has to be another individual who accepts the benefit. But if everyone were morally good, altruistic persons, then who will be around to be the recipient of all these intended altruistic actions? Furthermore, while egoism may overemphasize the self-interested aspect of human nature, ethical altruism seems guilty of unrealistically underestimating the strength of individual self-interest.

Consequences for everyone Another suggestion, and one that is far more plausible than the preceding two, is that one should take into account the effects of one's actions upon everyone, one's self included. A well known example of this way of thinking is Utilitarianism, an ethical theory that we shall discuss more fully below. The basic idea of Utilitarianism is that one ought to promote the general happiness, that is, the happiness of everyone as a whole group.

One reason for the enduring appeal of ethical theories that emphasize the consequences for everyone, and not just for particular individuals, is that such theories emphasize impartiality, something that most of us think is very central to moral claims or demands. We may have personal reasons for pursuing self-interest. We may enjoy helping our close friends. But moral reasons raise the level of discussion—of reason-giving—to a higher level, a level of impartiality. We shall, therefore, focus our discussion upon consequential ethics that emphasize consequences to everyone.

What Consequences?

Another question that the consequentialist must answer is, “What sorts of consequences count, either as good or as bad?” Answers to this question have been enormously varied. One suggestion, though one that we should surely reject as reprehensible, is that one should seek to maximize the genetic “purity” of the population. Most consequentialists have in mind something far more sensible, such as maximizing human happiness or human fulfillment. Just what these terms

mean, however, can be a matter of great dispute. For example, is the enjoyment of playing poker to be considered as ethically valuable as the enjoyment of reading an artistic and uplifting piece of literature? Are the pleasures of physical sex just as morally important as the pleasures of studying philosophy?

Utilitarianism: A Well-known Form of Ethical Consequentialism

Having outlined some of the important kinds of questions that an ethical consequentialist must answer, let us now consider one of most well-known forms of consequential ethics that have been offered over the centuries: Utilitarianism.

According to Utilitarianism, the standard of moral right and wrong is the extent to which actions contribute to or detract from happiness. Utilitarian-type ideas have been around for millennia, but were first presented as a clearly thought out ethical theory in the late eighteenth century by Jeremy Bentham. One of Utilitarianism's most famous exponents is John Stuart Mill, who wrote in the nineteenth century.

As Mill states in Utilitarianism:

The creed which accepts as the foundation of morals, Utility, or the Greatest Happiness Principle, holds that actions are right in proportion as they tend to promote happiness, wrong as they tend to produce the reverse of happiness. By happiness is intended pleasure, and the absence of pain; by unhappiness, pain, and the privation of pleasure ... [P]leasure, and freedom from pain, are the only things desirable as ends; and that all desirable things (which are as numerous in the utilitarians as in any other scheme) are desirable either for the pleasure inherent in themselves, or as means to the promotion of pleasure and the prevention of pain ... [T]he happiness which forms the utilitarian standard of what is right conduct, is not the agent's own happiness, but that of all concerned. (Mill 1979: 6–7, 16)

These passages make several relevant points. First, what matters for Utilitarians is happiness and suffering. Happiness (pleasure) is good, and pain and suffering are bad. Second, it is the general happiness that is important. And third, actions are judged by their consequences, that is, by how much they contribute to, or detract from, the general happiness. The morally right action, under any given circumstance, will be that action which among all the possible choices most contributes or least detracts from the general happiness of everyone involved.

One point that should be emphasized is that many Utilitarians, particularly Mill, are adamant that human happiness should not be thought of simply in terms of physical, mindless pleasures. Many pleasures appeal to the “higher” aspects of human nature—our intellect and noble sentiments. These higher pleasures, according to Mill, deserve more consideration than the lower pleasures. As Mill maintains, “it is quite compatible with the principle of utility to recognize the fact that some kinds of pleasure are more desirable and more valuable than others. It would be absurd that ... the estimation of pleasures should be supposed to depend

on quantity alone” (Mill 1979: 8). Thus, Utilitarianism should not be construed as a moral philosophy of pleasure-seeking pigs, but as the moral philosophy of an intellectually and emotionally sophisticated human society.

For our purposes here, it is not necessary to ascertain what a true Utilitarian would demand in the case of flight 3407. But we can profitably consider how Utilitarians would argue about the case. Should the captain have revealed all of his certificate disapprovals on his application? Some Utilitarians might argue that the slim chance of failure needs to be realistically weighed against the very real outcome of inconvenience, loss of income, retribution, etc. But I suspect that most Utilitarians would give great weight to the numerous deaths that might occur in the event of a tragic failure on the part of the pilot. After all, dying in a crash is a much greater loss than a single person’s loss of an employment opportunity. Further, if the pilot made a tragic mistake, then the airline would surely be subject to expensive wrongful death lawsuits. Even when discounted by their low probability, these harms are so great that Utilitarianism may well recommend honesty in job applications, better training, and higher salaries. The costs involved here would be outweighed by the deaths prevented by a potential mistake.

One major difficulty that Utilitarianism faces is that it does not do a very good job of explaining or supporting our moral intuitions about human rights or justice. For example, suppose that society would be made enormously happy (or it might avoid great destruction) if a particular individual, who had done no wrong, were to be imprisoned or executed. Utilitarianism would seem committed to saying that the poor fellow ought to be made prisoner or executed. The reason of course is that the only ultimate standard in Utilitarianism is the general happiness. Since human rights and the rules of justice have no intrinsic moral value in Utilitarianism, they are valuable only insofar as they contribute to overall human happiness.

Now Utilitarians reply that we should not unjustly imprison someone, or violate their rights in some other way, because doing so breeds distrust and a contemptuous or callous attitude towards rights. When society takes that particular turn, each of us becomes at risk and we become apprehensive, defensive, and unhappy. We must be aware that our actions have consequences beyond the immediate participants. What we do or sanction in a particular instance may be read by others as a precedent for their behavior. Thus, if respect for the individual and his or her rights can be overlooked in one instance, it can be overlooked in other cases, including perhaps our own rights. Thus, society best promotes happiness when it chooses to respect human rights and the rules of justice as a matter of general policy. Though such a response may yield the intuitively correct moral answer when we ask about punishment of the innocent for the sake of society as a whole, it is not clear that Utilitarianism gives the right answer for the right reason. Respect for human agents still has no intrinsic moral value in the utilitarian system. At best, it respects human rights as a useful means to happiness.

A second major difficulty is that Utilitarianism seems to be built upon an impoverished view of human nature and human motivations. Our experience may convince us that we at times make decisions not simply upon the basis of which

actions will produce the most overall happiness. Rather, we look to other sorts of ends, goals, as well.

Strengths and Weaknesses of Consequential Ethics

There are several strengths to consequential theories of ethics. First, they appeal to a common sense experience—that people do things to accomplish things, to produce certain results. Moral reasoning, then, is simply one particular area of this kind of practical reasoning. A second strength is that consequential ethics appeals to a criterion of moral right and wrong that is a public criterion. Its primary focus is not on the inscrutable motives that individuals might have (or not have). It concerns the results of actions, results that we and others can observe and assess. Considering our opening case of flight 3407, a Utilitarian would probably argue that there are several ways in which narrow-minded decisions eventually caused considerable—and avoidable—harm to many persons. The pilot, the first officer, and the company all made choices that looked to serve their own particular interests at the expense of others: instead of considering the general welfare, each of them was thinking of their perceived individual best interests. Sadly, in the end they, as well as all of their passengers and one person on the ground, were on the losing side of the equation.

Nevertheless we might feel that consequentialist reasoning, while it captures something true about human nature and motivation, is not the whole story. Indeed, we might think that consequentialism, though an accurate description of much of human reasoning and motivation, is not an appropriate characterization of moral reasoning or motivation. Morality may have to do not with consequences, but with adhering to some moral rule, a moral law. With this suggestion in mind, we now turn our attention to deontological ethics.

Deontology Defined

We can easily imagine someone arguing that moral duty is not about convenience. It is not about saving money. It is not even about making people happy. It is simply about doing one's moral duty. Can a maintenance technician, in good conscience, sign a form that one believes contains false or highly misleading statements? Can a potential employee conceal pertinent information on the job application?

Deontological reasoning, as one can see, is quite different from a consequential one. Whereas consequential reasoning assesses actions according to their consequences, deontological reasoning assesses actions (or more properly, human agents), according to whether what is done accords with a universal rule of morality. Actions that accord with a universal rule or law of morality are ones that an agent ought to do, regardless of what the actual consequences might be. Actions or agents are morally right or good, therefore, not because of the results that they

actually produced, but because what they did reflects the standard of a universal moral law.

There are various deontological theories of ethics. One version, for example, is a “divine command ethic.” According to such a theory, what makes acts morally right or wrong is their conformity to moral laws laid down by God. Without a doubt though, the most well known and influential of deontological moralists is the German philosopher, Immanuel Kant (1724–1804).

Kantian Deontology

The core of Kant’s moral philosophy can be found in his short, but very dense work, *The Groundwork of the Metaphysic of Morals*. The fundamental principle of morality, for Kant, may be expressed in the universal and exceptionless command, “Act only on that maxim through which you can at the same time will that it should become a universal law” (Kant 1964: 88). In order to understand more clearly what Kant means by this phrase, let us consider how he arrived at this conclusion.

Step 1. What earns us a place among the community of moral agents is our possession of a rational will. Kant observes that (contrary to what classical Utilitarianism may believe) our ordinary moral intuitions tell us that moral evaluation centers upon the motives of the agent. We are held morally responsible for our intentions or motives that lead us to act in a certain way. When we reflect upon this philosophically, we can see that it makes sense, for responsibility requires that we should have had a choice. The world is a very complicated place, however, and much that happens is beyond our understanding or control. Hence, sometimes despite the best of intentions, what we do goes wrong—not because we meant to do wrong, but simply because things happened on which we could not have counted. This shows, as Kant believes, that we are mistaken to think that we should be held morally responsible for the actual consequences of our actions. What is within our control, and hence what we can and should be held responsible for, are our intentions, our motives. Moral mistakes therefore, reside in having immoral motives, not in producing bad outcomes. And only those who can make reasoned choices can really be said to have such intentions. Thus, motives are the center of morality and only beings that possess the ability to choose motives, that is, those who have a rational will, can be said to be morally responsible.

Step 2. Rational will is what we, as persons, really are. Who we really are, as persons, are not our physical bodies. For our body may change shape or lose some of its parts, and one can still be the same person. What really makes us who we are, therefore, is our mind, in particular our rational will. Thus, when Kant says we ought to respect other persons, he means that we should respect that persons have the capacity to make reasoned choices for themselves. To use a phrase suggested by Kant, persons are autonomous, that is, they are capable of placing their own rules or laws upon themselves. To ignore, overlook, or violate the ability of another person to make choices about how he or she shall live life is to disregard one’s innermost being. Kant often speaks of treating other persons not merely as means-

to-an-end but rather as ends-in-themselves. When we treat something merely as a means to an end, we treat it as a tool that has no intrinsic value, something that deserves no consideration as a thing in itself. But persons, according to Kant, have intrinsic value as beings in themselves. That is, our capacity to make rational choices for ourselves—what we will do, indeed, what kind of person we will be—is a capacity that has value for its own sake. This idea has been popularized as the principle of autonomy, one that states we ought to respect the capacity of other persons (as well as ourselves) to make personal choices for ourselves.

Step 3. What is true for one is true for all. Insofar as we are rational wills, we are essentially like one another. That means that what holds true for one of us, as a moral agent, will also hold true of all of us. For example, since we want others to respect our capacity to make choices for ourselves, we ought, by the simple law of transitivity, to respect that capacity in others. You must, therefore, keep in mind that what you are willing to allow yourself to do, you must (by the simplest of logic) allow all others to do as well. This is why Kant's ethics is sometimes spoken of as an ethics of universalization.

Steps 1–3 lead Kant to his Categorical Imperative, that is, a command that applies universally and without exception: “Act only on that maxim through which you can at the same time will that it should become a universal law” (Kant 1964: 88). As we can now see, this means that we should only adopt plans of action or ways of treating other persons that we would be willing for anyone or everyone to adopt.

A classic example concerns truth-telling. Suppose you are being questioned by the NTSB concerning an incident. You are aware that you cut a corner in a required procedure, though you are convinced what you did had nothing to do with the actual mishap. However, if you revealed your poor choice, you could well be reprimanded or perhaps even terminated. So it would seem to be in your interest to lie. According to Kant, your proposed “maxim” would be something like, “Can I tell a lie when it would be to my advantage?” But what would happen if everyone told such falsehoods when it would be convenient? Well, for one thing, falsehoods would become very prevalent, especially in circumstances like this one. And since everyone would feel allowed to lie in such circumstances, the NTSB would not expect you to tell the truth. Indeed, they would not expect anyone who might have knowingly done wrong to tell the truth when questioned. So the NTSB would not believe your lie. By willing the maxim, you also will the circumstances where your action would fail. Thus, Kant argues, your maxim, when universalized, becomes self-contradictory or self-defeating. Since you cannot successfully will that everyone do this, then you should not make an exception for yourself in this situation. Lying, for Kant, is thus always morally wrong, even if it is meant as a means to relieve suffering.

Clearly, in the case of flight 3407, the captain tells a lie on his job application. From a Kantian analysis, if the captain is willing to allow himself to lie, then to be consistent, he must allow everyone else to do the same. But, that means that Colgan Air would never believe what applicants state on their job applications,

because it would be in the interest of applicants to lie. So the captain's lie becomes self-defeating. Furthermore, how would the captain feel if he thought that the flight crew taking his family on a vacation had lied to get their jobs? We surely, would not want our own decision-making to be misled by such false information; so neither should we be willing to participate in misleading others in this way. Further, consider the case from Colgan Air's point of view. By hiring pilots at wages that are not really "living" wages, is it treating its pilots and crew as real persons, ends-in-themselves? Or it is not rather treating them merely as tools, cheap and expendable tools, to keep the airline functioning as cost effectively as possible?

Strengths and Weaknesses of Kantian Deontology

Kantian moral philosophy is particularly good at emphasizing the inherent dignity and worth of the moral agent. It calls into question Utilitarianism's assumption that happiness is the only ultimate value for persons. Instead, Kant highlights the value of being true to our innermost selves, meaning our nature as rational moral agents. From such an emphasis upon the dignity and value of the individual, Kant's philosophy is able to serve as a ground for strong claims to moral rights, for example, the right to be told the truth about YY or a right to ZZ.

There are, however, difficulties with Kantian moral philosophy. One difficulty that many commentators have pointed out is that the way Kant develops and applies the Categorical Imperative allows no room for exceptions. Thus, telling a lie is always morally forbidden, even when doing so could save the life of an entirely innocent individual. There can be no denying that this is something of a problem for Kantian thought. One avenue of response is to suggest that we should incorporate relevant details of the particular circumstances into the maxim that we universalize. When enough of the particular details are included, then we may be willing and able to will that everyone tell a lie in these particular circumstances.

Such a suggestion has appeal and can make the results of applying the Categorical Imperative more intuitively acceptable. But the danger of such a strategy is that we (and others) may then include so many specific details in our maxims that we can universalize almost anything, knowing that these particular circumstances will never arise again. In other words, we may stick to the letter of the Kantian Categorical Imperative, by universalizing our maxim; but at the same time we may violate the spirit of the imperative by rendering the universalization process so trivial as to be meaningless.

A second difficulty of the Kantian moral philosophy is that it gives us very little guidance on what to do when two or more moral duties conflict with one another. The Kantian formula seems to assume that there can never be a genuine moral dilemma. The application of the Categorical Imperative should always result in one and only one definitive moral answer. But can we not easily imagine cases where the moral duty to tell the truth will run counter to the moral duty to keep one's promises?

Consider the following example of management pressuring an airline technician. According to the NTSB (1999), on October 14, 1999 a DC-9-51 sustained a left outboard main (#1 main) wheel and tire assembly separation on takeoff. That wheel impacted and dislodged the airport's perimeter wall and impacted a vehicle on a nearby road. No injuries were reported. The flight landed without incident at its intended destination. The interior portion of the number one axle was examined and its internal threads were found intact. The anti-skid transducer adapter was found loosened inside the axle's threads and backed out 4½ turns. A gap was designed to exist between the adapter and the nut. The axle nut was found to contact the adapter when the adapter was backed out to the position as found (NTSB 1999).

The mechanics had installed the wheel in accordance with manual 32-40-1. That manual was reviewed, and the NTSB discovered that its steps did not caution mechanics to check for the proper depth of the adapter. Service Bulletin (SB) 32-111 was issued to incorporate a set screw method in lieu of safety wiring the anti-skid transducer in place. This particular aircraft's SB 32-111 modification was incorporated prior to its delivery to the airline. Subsequent to the incident, the manufacturer issued temporary service bulletins to the affected airplane's 32-40-01 maintenance manuals, cautioning mechanics to check the depth dimension of the transducer adapter with reference to the applicable technical data (NTSB 1999).

In response to this incident, one of the airline company's aviation technicians was dispatched to Chicago Midway Airport. When he arrived at the accident scene, both he and the NTSB removed the main wheel assembly to a hangar and secured the wheel. The technician subsequently received a phone call from his manager telling him not to assist the NTSB with the investigation. The NTSB ordered the technician to help with the investigation, and so he took the wheel apart, while at the same time being filmed by the NTSB. This technician found himself in the middle of a conflict between loyalty to his company and his responsibility to assist the NTSB in their investigation.⁴

Recognizing that there can be conflicting moral duties, some philosophers, such as W.D. Ross, have argued that deontological moral reasoning is the right kind of reasoning for morality; it is just that Kant was wrong to imagine that such reasoning can be reduced to any one value or one moral law. Rather, there are many basic moral obligations and duties. Unfortunately, among such philosophers there has been little or no agreement concerning what that list of duties is and what is their order of importance. As the list of duties grows longer and their ranking of relative importance more obscure, the less helpful such a moral theory becomes in addressing our difficult moral choices.

4 This example was provided by Taft E. Walker, a graduate of Lewis University receiving a BS in Aviation Maintenance Management in 2010. Among his many accomplishments, Mr. Walker was a director of maintenance at Northeast Aviation from 2007-09, and a technician with Northwest Airlines 1989-2007.

A third point to consider is that just as we complained that Utilitarianism had a rather impoverished view of what it means to be a human being, so too Kant's philosophy has an overly narrow view. The capacity for reasoned choice might well be an important aspect of what it means to be a moral agent; it might even be a requirement for being one. But it is not clear that such reasoned choice is all there is to being a moral agent or that it constitutes our innermost being as persons. Might it not be the case that one's feelings could be crucial to morality in a way that Kant cannot explain? Indeed, many philosophers have argued that the foundation for morality is not cold, analytical reason, but human sentiment; and that morality is best expressed in not adhering strictly to supposedly universal moral principles, but in caring for the individual person involved. Despite its philosophical problems, Kant's moral philosophy has gained wide respect, attention, and practical application. It does bring to our attention the importance of respecting other persons as persons, of not treating others merely as tools for our own convenience.

Both Utilitarianism and Kantianism offer reasonably clear decision procedures of making moral choices. In the next chapter, we will consider two other moral visions, ones that emphasize, not so much individual choices, as they do ways of living.

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Chapter 2

Ethical Theories Part II: Rights and Character

Mark H. Waymack

In Chapter 1 we considered the Utilitarian and Kantian approaches to ethics. Each of those theories offered a relatively clear decision procedure. In Utilitarianism the decision is based on the “greatest happiness” formula; whereas in Kantianism, it is the universalizability test of the Categorical Imperative. In this chapter we will consider two quite different approaches to moral reasoning: First we will examine a framework of fundamental rights, and second we will explore the idea of ethics as being about virtue—being the right kind of person—rather than it being primarily about specific decision-making.

Rights-Based Reasoning

We all know that there is a great deal of competition to become a commercial pilot for a major airline in the US. This has been true for many years, especially since the Airline Deregulation Act of 1978. More recently downturns in the commercial industry have only exacerbated the problem. Since there are far more qualified candidates for these few positions than there are openings, some method must be used to decide who is offered a position and who is not. As one might expect, the selection process seems to be that one applies for a position and, if qualified, is put on a list. As openings become available, the airline moves down this list one by one.

However, in at least one airline there existed a “backdoor policy” for hiring new pilots.¹ If someone was currently employed with the airline, and personally knew a potential job candidate, the employee could mention the pilot’s name to management, and those pilots would be hired ahead of persons who applied through the usual “front door.” The pilots with connections would be able to forego the normal testing procedures for new hires. On the surface this might seem like an innocuous method: some small favor is given to those already employed and to their personal friends. And as long as no one who is unqualified is hired, no one’s safety is endangered. However, is this policy fair to those who apply through the front door? Is it morally fair that they should be disadvantaged just because they

1 See *Garland v. USAir, Inc.* 1991. 767 F. Supp. 715, April 25.

do not have an insider connection? Furthermore, because of a history of racism and sexism in our country, commercial pilots hired in the past tended to be white males; and not surprisingly, the names being put forward in the above mentioned example all happened to be white males. So persons of color and women would seem to be at a significant disadvantage because of this informal policy. Many of us would suggest that this type of policy is fundamentally unjust. But how can a moral theory articulate such an issue?

According to a rights-based theory, the essence of morality is a set of moral rights which persons have. These moral rights belong to one as a member of the moral community, and they define what sorts of behavior toward each other are forbidden, permissible, or required. Rights, then, are the basis for claims concerning what persons may not do to one another, as well as what they must do for one another. The former, what we might call "rights of non-interference," are often termed negative rights. And the latter, rights defining what one must do for someone, are often termed positive rights.

For the rights-based theorist, therefore, moral evaluation centers upon whether certain actions conform to the rules of interaction prescribed by the rights of the individuals involved. Questions of motivation or consequences are not central, though they may prove to be relevant in some instances. Key questions that any rights-based theory must answer include: (1) what moral rights do we have, and (2) what is the philosophical grounding for those rights?

Natural Rights

Many moral and political philosophers have argued that persons have moral rights by nature. That is, our most fundamental moral rights are natural rights. John Locke, for example, held that we are all naturally endowed with the rights to life, liberty, and property. (Thomas Jefferson would change that list to life, liberty, and the pursuit of happiness.)

According to both Locke and Jefferson, since we live in a society, rather than as isolated individuals in a "state of nature," we must find ways to mutually limit or adapt our natural rights so that we may live peaceably together. This is done by means of a social contract. In order to foster mutual cooperation, we each must be willing to restrict or give up some of our natural rights. For example, while in a state of nature we might have an unlimited right to defend ourselves, as members of a society we yield many of those responsibilities to law enforcement agencies. Nevertheless, there are certain basic or fundamental natural rights which no society may legitimately ask its members to give up, such as the right to life. Other rights that we might insist upon, though by no means an exhaustive list, are the liberty to pursue our own career ambitions, liberty to pursue education, non-discrimination in housing and employment opportunities.

One difficulty that faces natural rights theorists is that it is hard, if not impossible, to agree upon what counts as "natural." Not only do different cultures have different conceptions of what is natural; different members of the same

society may have radically different views. Are homosexual practices unnatural? Do individuals have the right to engage in such practices? Or what does it mean to have a right to life? Should abortion and euthanasia be permissible or forbidden?

Contractarian Rights

To avoid some of the quagmire surrounding natural rights theories, some philosophers have emphasized the contractarian side of rights. A very influential contemporary proponent of such a view is the American philosopher John Rawls, whose theory may be found in his book, *A Theory of Justice* (1971). According to Rawls, principles of justice are not discovered in nature, nor are they grounded upon the calculus of Utilitarianism. Rather, to ascertain the principles of justice we should imagine ourselves as deciding upon the fundamental ground rules for society; but we must consider and decide upon these principles in a way that prevents us from showing any partiality to ourselves or to our family or friends. To do this, Rawls would have us imagine an Original Position.

In the Original Position, we do not know who we are. We do not know what position we will have in society—whether we will be rich or poor, religious or non-religious, young or old, healthy or unhealthy. In such a position, we are all equals, for persons in the Original Position have no social status or social privileges that might be used for their own benefit. Not knowing who we will be in this society, Rawls argues that we will agree upon principles of justice that will minimize the possibility of a truly bad outcome. We will, therefore, arrive at principles of justice that protect the least well off in our society, since we might be one of them. In this Original Position, Rawls believes we will all agree upon two fundamental principles of moral justice:

1. Each person is to have an equal right to the most extensive basic liberty compatible with a similar liberty for others.
2. Social and economic inequalities are to be arranged so that they are both (a) reasonably expected to be to everyone's advantage, and (b) attached to positions and offices open to all (Rawls, 1971: 60).

As we may see, this view differs markedly from a Utilitarian notion of moral justice. For as we may recall from Chapter 1, the Utilitarian's justification for rules of justice is the promotion of the general happiness. According to Rawls however, each of us, at least while in the Original Position, would be willing to forego the maximization of social happiness if doing so would promote basic liberties for all. Thus, the rights of the individual person, no matter what his or her station in life, cannot be violated or overridden simply to promote the happiness of others more effectively. Furthermore, the strong egalitarian nature of Rawls' theory holds that inequalities are allowed only insofar as they benefit the least well off.

Clearly from a justice point of view, the described backdoor hiring policy would be considered unfair and unjust. As another example, we might also consider how scarce gates or flight slots between busy and commercially attractive airports should be allocated between competing airlines. Or, what to do about slots that serve airports with only light traffic? Since airspace is public, might our society place a limited obligation upon airlines to serve airports that are not as commercially lucrative as the major hubs? There are also justice questions that arise in terms of how airlines charge passengers: does a ticket confer a right to free baggage? Not everyone carries the same quantity of baggage; some passengers carry almost none at all. Is it fair that they all be charged the same? Or should baggage be charged by the piece or the pound? Similarly, some passengers weigh substantially more than the next passenger. That translates into more jet fuel consumption (an expense), as well as taking up more seat space. Should such passengers be charged extra? But, of course, if the industry goes that route, would children and very small passengers get to pay less? All of these questions raise some issue of fairness.² Would Rawls justify charging more for overweight passengers? The way to approach that question from a Rawlsian perspective would be to ask what principle of justice would you choose if you did not know whether you are going to be fat, thin, or of average weight. My guess is that Rawls himself would probably have been against such price discrimination as it singles out a minority and treats them adversely.

In terms of weaknesses and strengths, one difficulty for Rawls is that he assumes that all persons will, if they place themselves in the Original Position, agree on the same principles of justice. But it is not clear why this must be the case. Not everyone is as risk averse as Rawls supposes. Some persons are willing to gamble, to risk losing for the sake of the possibility of a big win. This sort of individual might allow for inequalities in society that benefit the well-to-do but do not benefit the least well off. It is unclear what Rawls could say to such individuals. Perhaps the strongest feature of Rawls' theory is his account of the Original Position, for this gives us a method of reasoning whereby fair, impartial principles of justice might be settled upon.

Strengths and Weaknesses of Rights Theories

An important strength of these rights-based ethical theories is that they provide for the moral rights of the individual apart from the whims of society. Such rights do not depend upon the promotion of society's happiness, for using pleasure as the main criterion could create an unstable societal foundation. Rather, moral rights are founded upon much more enduring ground, such as the inherent nature of things or a compact that all rational persons would accept.

We may feel, however, that such a view of morality renders it essentially an adversarial contest—rights versus the interests of society or rights versus rights.

2 See Chapter 5 for an ethical analysis of airline pricing policies.

This may strike us as somehow lowering morality, as reducing it to conventions of behavior or ground rules of conduct, rather than revealing morality as an important and enriching aspect of being a person. Morality is not just a matter of following the rules, even if they are impartial rules. It is a matter of who we are as individual and social beings, and perhaps more importantly, our moral character. This is a key concern of virtue theorists, and it is to them that we now turn our attention.

Virtue-based Moral Theories

The ethical theories that we have discussed thus far each put forward some universal principle (or principles) for choosing and evaluating morally laden actions. Virtue theorists argue that this kind of approach to moral reasoning is mistaken in two very important ways. First, such universal principles are not reliable decision procedures for attaining the morally correct answer for particular cases. And indeed, often even if we wanted to work through the various possible outcomes, the moral law, or the possibilities from a justice point of view, there simply is not time. We must act promptly and deliberately. And second, the whole perspective that these theories take toward morality directs our attention away from the most fundamental center of morality, the character of the morally virtuous agent. According to the virtue theorist, we ought to return our attention to the true substance of morality, the virtues. Let us consider these points in somewhat more detail.

Virtue theorists ask us to look at the long history of moral theories that seek to reduce morality to a set of universal principles. Despite the large number of talented thinkers who, over thousands of years, have proposed various theories of this type, there has not been any one proposal that has garnered universal acceptance, even among the thinkers themselves. One reason is that universal principles, however thoughtfully applied, sometimes fail to yield the morally correct answer in specific situations. We may recall how the Utilitarian seems to have difficulty explaining why we should always be just and respect the rights of others. And Kant's theory, with its universal prohibition on lying, contrasts sharply with situations where our moral instincts tell us that lying, given our other choices, is the morally appropriate thing to do. Virtue theorists argue that, given this long train of theoretical failures, we should conclude that no theory based upon universal principles can yield a wholly satisfactory result. The reason is because morality cannot be reduced so neatly to universal principles; it is far too rich and complex a thing to be so reduced without significant loss. Imagine trying to reduce what makes a painting beautiful to a set of "universal principles of beautiful painting"! So it is not that we have not yet found the correct universalist theory of morality—it is that no such theory can ever be found.

Not only are these universalist theories prone to give the wrong answers in specific situations, they also misdirect our attention. These theories focus on abstract principles, whereas the true substance of morality is the virtues of the

moral agent. To borrow once more from our analogy to painting, imagine someone trying to show why a certain landscape painting by Claude Monet is beautiful by explaining to you the chemical structure of the oils or what percentage of the canvas is occupied by different colors. Something central to the appreciation of such a painting would be missing in this explanation—that special and extraordinary way in which the painting resonates and lingers in our perception. So in morality, it is not these universal rules which capture the core of morality; it is the virtuous character of the moral agent—his or her courage, justice, patience, benevolence, trustworthiness, etc. The virtue theorist would therefore have us focus our attention on developing the right kind of traits of character. Once we have developed or acquired a morally virtuous character, then we will be better able to see and do what is morally requisite in any given situation.

However, if one's character does not lend itself toward morally right actions, the result can be disastrous, especially in the aviation industry. The worst commercial air disaster occurred in 1977 when a Pan Am 747 and a KLM 747 collided in Tenerife, Canary Islands; an accident in which 583 people lost their lives. Like most tragedies, what happened must be described as the result of multiple contributing causal factors. The aircraft had been diverted to Tenerife because of a terrorist incident at the larger Las Palmas airport, and the smaller Tenerife facility was being stretched by the quantity and size of the equipment. Fog and light rain had enveloped the airport. And there were communication problems, both involving language and equipment. Investigators have generally agreed that at the crucial moment, KLM Captain Jacob van Zanten's impatience, overconfidence, and unquestioned authority amongst his crew, all played a significant role in the accident. In an important sense, then, it was van Zanten's character traits that precipitated the accident. If he had been more patient, if he had been more open-minded to ambiguity, if he had been willing to listen to his crew's input and questioning, the accident would not have happened.

Virtue and Action

Quite obviously, the center of any virtue theory of ethics must include an account of virtue and how such virtue translates into action. Virtues are admirable traits of character that dispose one to behave in a certain manner. The courageous woman acts courageously. The benevolent man does acts of kindness and charity. The just person does not cheat, steal, murder, etc. These qualities of character are developed in the individual through education, training, and exercise. Think of how one learns to play a musical instrument well. One cannot learn to play the piano, for example, just by reading books. One must practice. At first, the music one creates will be somewhat mechanical, with mistakes, and played only with focus and attention. But with practice and experience, the mechanics and finger movements become more automatic as they have become more "habitual." And as the fingers have "learned" through practice what they are supposed to do, and the notes are known by heart, the pianist becomes able to escape rote, or mechanical

playing, and instead creates something truly “musical.” Much the same can be said of the virtues. They are acquired through teaching and practice. And once firmly established, just like the fingers that can effortlessly find their correct places in a complex composition, the person with the moral virtues ingrained in their character will simply know what one should do in a given situation and will effortlessly perform appropriately. Once the virtues are a part of the individual’s character, they become directing or determining forces in how the individual acts.

Like our accomplished musician, the virtuous person can know, far more accurately than any abstract rule, what ought to be done in specific cases because through one’s virtuous character one is able both to perceive the morality of the situation and to act upon that perception. As the medieval philosopher, Thomas Aquinas, argues:

Since discourse on moral matters even in their universal aspects is subject to uncertainty and variation, it is all the more uncertain if one wishes to descend to bringing doctrine to bear on individual cases in specific detail, for this cannot be dealt with by either art or precedent, because the factors in individual cases are indeterminately variable. Therefore judgment concerning individual cases must be left to the *prudentia* [wisdom] of each person ... (Aquinas 1993).

Thus, perhaps the most important virtue, since in a sense all the other virtues depend upon it, is this *prudentia*, or wisdom.

In the field of aviation, we can imagine a number of virtues that would be of particular importance: benevolence, trustworthiness, compassion, courage, patience, humility, commitment, and practical wisdom. This is intended only as a partial list of virtues, for there are undoubtedly many other particular virtues that could be relevant in the aviation industry. A captain more patient than Jacob van Zanten, one with a touch more humility than arrogance, would have been more attentive to air traffic control instructions and would have fostered within the flight cabin an interpersonal dynamic where the crew would have been willing to be more assertive and more helpful. Instead, van Zanten’s brash arrogance appears to have been a significant contributing factor to the disaster.

Strengths and Weaknesses of Virtue Ethics

One glaring weakness of virtue theories of ethics is how to decide what counts as a virtue. One person’s virtue may well be another person’s vice. When we confront such a disagreement, the only answer that virtue theory seems to give is to look to the judgment of the virtuous person. But this is not very helpful, since our disagreement is precisely concerning who counts as the virtuous person!

A second difficulty is that while the formulas of the theories based upon universal principles, such as Utilitarianism or Kantianism, might yield mistaken answers on occasions, at least such theories offer a reasonably clear cut decision procedure. But with a virtue theory of ethics, it can be difficult to know sometimes

just how to translate virtuous traits of character into morally correct action in particular situations. In a more ideal world, we might simply be able to perceive clearly what morality asks of us; but in the real world, we are all too often in a moral quandary. Our problem is that we are very unsure of what we ought to do. How is virtue ethics supposed to help us here?

At the minimum virtue ethics does redirect our attention to the particularity of moral situations—particular individuals face particular choices in particular circumstances. Ethics based solely upon universal principles may sometimes run roughshod over some of the awkward details of those peculiar situations. Furthermore, virtue ethics does seem to be right in suggesting that the central importance of moral character has somehow been lost in these principle-based theories. A sense of moral integrity, of moral conscience, is really quite important to our moral experience. Thus, while we might refrain from being swept off our feet by virtue theories of ethics, they do shed light on aspects of our moral experience that tend to be overlooked by those theories that focus upon the search for universal principles of morality.

A Practical Decision Model: The Seven Step Reasoning Process

Unlike some areas of philosophy, ethics by its nature is supposed to be practical. To an extent far greater than in many careers, those who work in the aviation industry—whether in the pilot’s seat, in maintenance, in aircraft design, air traffic control, or airport management—hold in their hands and in their behavior the safety and lives of millions of individuals every year, passengers as well as crew. Sometimes our moral duty is quite clear, and what we might need is a sort of motivational reminder. Other times there may be conflicting goods and conflicting duties, in which case we may need to do some investigation and further deliberation. To facilitate that kind of deliberation, we offer a seven step process here. We do not pretend it is a simple, foolproof moral calculus; but we hope that it can be a method for bringing important moral considerations out into the open for deliberation:

1. How would you describe the moral problem? In other words, why does it seem to be a “moral” problem?
2. What are your available choices/options?
3. Who would each of those choices affect, and how would they be affected?
4. Would you be willing to “universalize” your choice?
5. Are there moral rights at issue? How might those rights create an obligation for you?
6. If those persons closest to you knew what you were doing, would you be proud of your choice or ashamed?
7. All things considered, then, what will you do?

Once again, like learning to play a musical instrument, this seven step method may sound overly mechanical. But working through these steps can be a very helpful exercise. And do remember that even the best of musicians still take time to deliberately practice the fundamentals. Furthermore, explicitly working through these sorts of questions can also help us to articulate our moral thinking in a way that we can share with others and thereby explain and justify what sorts of choices we will make.

Conclusion

Chapters 1 and 2 have reviewed four of the most important ways in which moral reasoning has been described by philosophers. Needless to say, there are many other possible explanations that various philosophers have offered. The four that we have considered, however, have long histories of discussion and support. In the course of our examination, we have pointed out the strong points of each theory, but we have also noted where each theory fails to be satisfactory. Indeed, in some sense each of these theories is flawed.

A skeptic might here argue that the most proper inference from all of this is that, if the best of the theories are flawed, then the most justified conclusion is that there is no real moral truth. For if there was, is it not more likely that philosophers would have discovered what it is by now? And if they had discovered it, surely most perceptive, intelligent people would have recognized it as the truth.

I believe that our response to the skeptic should be something like this: we have found something that attracts us in each of these moral theories, some insight that strikes us right, should count as evidence that morality is not something that we simply make up as we please. It is not a hoax. An analogy may help here. Think of two or more different artists painting the “same” scene. It is unlikely that any of them will paint it exactly alike. Nor should the differences in the paintings be attributed to the lack of skill on the part of the artists to portray the scene “correctly.” Nor should we infer from the differences in the execution of the paintings that there is no reality to the landscape that they are depicting. Rather, we should think of each different painting as a view from one perspective, highlighting some particular aspect that others might not have seen or chosen. Hence, each painting can show us something about the landscape that might have escaped the inattentive or inexperienced eye.

We can think of moral theories in the same way. Each philosopher is writing from a different perspective and may thus choose to emphasize features in his perception that do not figure the same way in the view of someone else. But we can use these characterizations of morality to enrich our own perspective, our own understanding of what morality is and what it is to be a moral agent. That a theory is flawed, therefore, does not necessarily make it entirely false or useless. Quite the contrary, each of these theories, as we shall see, can be both insightful

and useful in trying to see and come to grips with the complexity of morality in the area of aviation.

Finally, for those still not convinced of the usefulness of ethics, keep in mind the variety of ethics codes that exist within the aviation industry.³ Codes of ethics can never, of course, replace individual responsibility and individual judgment. But they can be of great use in articulating the moral values and responsibilities that are central to a given profession. Hence, any student and every working professional should be completely familiar with the codes of ethics that define the moral character of their chosen profession.

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3 See Appendix II for examples of aviation industry codes.

Chapter 3

Capitalism and its Critics

Nathan Ross

The previous two chapters presented different theories regarding how we can determine moral right and wrong. However, we might ask whether these theories can be applied to aviation without some further analysis. Regardless of our best intentions, our decisions in the business place must also take account of economic realities, and often economic considerations play a crucial role in shaping how we reconcile our ethical ideals with the world around us. Thus, this chapter will investigate the question of how capitalism functions and whether it is possible to pursue ethical goals within a capitalist context.

Capitalism is a form of economic activity in which the resources needed to produce valuable goods and services are privately owned by individuals or groups whose main goal is to make a profit. In present times, capitalism often coexists with a certain degree of state oversight. For example, on the way to work you might ride a bus that is owned and operated by a state funded agency that is not out to make a profit. Even with the Airline Deregulation Act of 1978, US aviation continues to be highly regulated by the government, especially in an effort to promote safety.

However, prior to the seventeenth century, in Europe capitalism was virtually non-existent, and in many parts of the world it emerged much later than in others. Two factors stood for a long time in the way of capitalism: first, resources such as land and everything that can be gained from it were the property of the nobility or the church, or were simply considered common property, and could not be readily bought and sold by those seeking a profit. Most people worked the land and paid heavy taxes to the nobility, while merchants existed only at the margins of society. Secondly, capitalism could not develop if individuals did not have the legal right to sell their labor power on the free market. In a society that permits slavery, for example, individuals do not have the right to buy and sell labor based on free, contractual agreements, but can be forced to labor based on threats or hereditary privilege. Thus two fundamental reforms stand at the birth of any capitalist economy: the privatization of land and resources, and the abolition of slave labor.

As long as capitalism has existed, philosophers have debated whether it represents an ethical form of society. Does capitalism improve the lives of all people, or does it benefit only the wealthy few? Do we actually benefit from the luxuries that capitalism provides, or do these luxuries rob us of our freedom and sense of community? Can we pursue happiness and ethical goals within a capitalist society, or does the profit motive always get in the way? These questions have

emerged repeatedly over the last four centuries in ever more complex forms. This chapter will examine the different stances that philosophers have taken both for and against capitalism in dealing with these questions. The goal of this chapter is to give you, the reader, some of the tools needed to think critically about the meaning of capitalism, how it works, and how we can deal with the problems that it introduces.

Historical Theories of Capitalism

John Locke (1632–1704)

The highly influential English philosopher, John Locke, paved the way for modern capitalism with his theory of private property. What gives a person the right to own something? Is it better to live in a society where resources are held in common or one where resources are subject to private ownership? In solving these questions, Locke takes two premises as starting points: that we were given the earth to make the best use of it that we can; and that we have an innate right of ownership over our own bodies (Locke 1963). He then demonstrates that just as we own our bodies, we “own” our activities, the things we expend our time and energy doing. Thus he argues that we should have the right to own objects if it is the case that we have “mixed our activity with them,” i.e. if we have spent our time and effort to remove objects from their natural state and make them in some way more useful to human enjoyment. For example, if I take the time to climb a tree and pick an apple off of it, then if someone takes the apple without my permission, this person is taking from me not just the apple, but the time that I spent picking the apple. Locke argues that just as surely as we have the innate right of ownership over our bodies, we should be considered as having the innate right to own things if they are the result of our labor. Further, Locke contends that such ownership is better for society as a whole, because people will work harder if they hope to profit from their work by owning the fruit of their labor. When resources are shared in common, they tend to go underdeveloped and no person takes responsibility for cultivating them to their highest degree. But when they are privately owned, the owner will seek to extract as much use from them as possible.

In order for this defense of private property to stand, Locke must also argue that society as a whole, and not just a few enterprising individuals, will benefit from this kind of private ownership. The property owner will work harder to improve his or her resources, Locke claims. In doing so, the owner will cultivate more useful products than he or she can use, and will seek to trade these products on the market with those offered by other cultivators. The end result will be that both parties benefit from the productivity of the other. Thus Locke claims that the productivity of all members of society, though it might be driven by self-seeking motivations, will contribute to the “common stock” of products that are available for trade and sale. As this common stock grows larger, everyone who

has something to contribute will be able to acquire more. With this idea, Locke formulates for the first time one of the most incisive defenses of capitalist industry. His insight is that private ownership is essential to wealth creation, and that wealth creation can benefit everyone who participates in the market.

There are, however, a few critical questions that we can raise about Locke's theory, especially if we seek to apply it to contemporary society. This theory rests on the assumption that all things gain value by being transformed from their natural state into one that conforms to human usage. This is certainly true with many examples that Locke gives: a plowed field lends more grain than a wild patch of land. But in light of modern ecological concerns, Locke's assumption seems to lose some of its validity. Today we recognize a distinct value in clean air and water, which in nature are available in abundance, but which can be robbed of their value by the effect of human industry. The question can be raised whether value is always the result of industrial cultivation, or whether there is not also value to be found in things in their natural state. In Part VI on Health and the Environment three of the chapters will address the problems that aircraft pose on the environment. For example, in Chapter 25 Steven Kolmes addresses the issue of persistent contrails and the environmental concerns associated with them, especially in terms of the heat trapping effect that may contribute to climate change. Because of environmental concerns, it seems that not everything transformed by human hands is beneficial to society.

Secondly, we might raise a critical question as to how Locke's theory of property could apply to contemporary debates regarding intellectual property. Most of Locke's analyses involve examples of the physical cultivation of a natural resource. But many current contentious debates regarding property rights focus on less tangible kinds of products, such as the melody to a song or the configuration software. Does Locke's conception of property cover these cases, and does his theory justify these kinds of property rights? A Lockian minded person might claim that a songwriter will work harder and write better songs if one believes that one's ideas will be protected and will stand to profit from them. But intellectual creation is different from physical labor in important ways. The artist or inventor relies heavily on the prior inventions of others, and the creative process itself seems to depend on the fluid exchange of ideas. In writing his plays, Shakespeare often made use of plots that had already been used by other playwrights. As an example from the aviation industry, the Boeing Company's Intellectual Property Management group licenses the use of proprietary information. Because airlines require the use of products and services to help maintain their aircraft, manufacturers such as Boeing may need to provide airlines with information that would otherwise be considered proprietary in nature (Boeing 2010). Thus the question of intellectual property is an important aspect of aircraft manufacturing. Locke's argument that private ownership leads to greater industry and a greater "common stock" of goods cannot be applied to intellectual property without some further analysis of how intellectual creation is different from physical labor.

David Hume (1711–1776)

The Scottish philosopher, David Hume, made equally significant contributions in thinking about the issue of luxury. A capitalist society produces increasing productivity and wealth, at least in the hands of some, and so the question becomes: how does this increasing wealth actually benefit human beings? Does it merely give us momentary satisfaction, or does it really lead to a better society? Hume was confronted with a series of critics, in religion as well as philosophy, who believed that the new luxuries of capitalist society were corrupting it, making people more selfish, and less focused on the common good. But Hume, a great lover of the fine things in life, believed that this view of luxury falsely blames economic progress for some occasional human failures.

He argues in his writings on luxury and commerce that luxury does not weaken, but strengthens, society (Hume 2003). This leads Hume to his famous “store-house” argument, which can be explained as follows: Hume makes a distinction between two different kinds of labor, necessary and unnecessary labor. The former is the time that we spend to procure the things that we absolutely need to survive; the latter is the labor that we spend to procure things that we do not need but desire, which is to say, luxuries. In some less developed, pre-capitalist societies, nearly all work is “necessary labor” and once this labor is done, people turn to rest and relaxation. In a developed, industrial society, by contrast, necessary labor only makes up a small portion of the total productivity of society, and the rest of the labor is unnecessary.

It might seem as if the society with only necessary labor is better off, because people have less to distract them, but history has shown that industrial societies are more powerful and more capable of sustaining themselves in the face of adversity. Hume gives the reasons for this: in the society where all labor is necessary labor, if there is a crisis, such as a war or natural disaster, people do not have any extra labor power on which to fall back. In the industrial society, by contrast, where most labor power is not necessary, there is a “store-house” of labor that can be redirected to dealing with the pressing crisis and turned into necessary labor. Thus Hume demonstrates that though the production of luxury might distract us from the necessities of life, it also gives us a safety net for dealing with contingencies that might arise. It seems in retrospect that Hume was struggling to find an explanation for why industrial societies, such as Great Britain, were so effective in imposing their form of society on other, non-industrial societies, such as those of the new world, and his answer is that industrial progress, although it is driven by the desire for greater luxury, ultimately strengthens the military might of a society.

Hume argues further that luxury is not necessarily to blame when people neglect the common good and become selfish. His view is that learning to enjoy more sophisticated pleasures does not make a person more likely to engage in excessive pleasures that harm someone else. Hume does not by any means think that luxury is the only good thing in life: he places far more value on things like love for family, courage in defending one’s community, and wit and intelligence

in conversation. But his point is that luxury does not by itself cause one to neglect these virtues. We can enjoy luxuries when we have the wealth to do so, without becoming more selfish, but luxury ceases to be positive when we pursue it at the cost of these more important things. Hume writes: “When luxury ceases to be innocent, it ceases to be beneficial” (Hume 2003: 113). His point can be illustrated as follows: having an expensive car does not make me more likely to neglect my children. But if I cannot afford the car, and spend money that would go to my child’s education on the car, then the luxury represented by the car ceases to be beyond reproach.

The Concorde SST (and other related supersonic programs) can be seen as an example of luxury causing more harm than good and thereby being discontinued. In detailing the SST projects, R.E.G. Davies states that:

The completely imaginary notion that the average airline passenger would pay an exorbitant price to save two or three hours across the Atlantic was a fallacy matched by the almost criminal deception in the apparent ignorance of (or a deliberate avoidance of) the magnitude of world-wide first-class air travel as a proportion of the whole. (Davies 1994: 125)

Because the luxury of flying on the Concorde was outweighed by the exorbitant costs as well as its negative impact on the environment, the program was finally terminated. This example then shows the ways in which luxury can be overridden by other factors such as the high operating costs and potential harmful impact on the environment. The Concorde example reinforces Hume’s argument which is inspired by the idea that we can have an affluent society without neglecting the value of people and human relationships. His “store-house” argument even supports the view that the greater affluence afforded by private industry will lead to a stronger society more capable of dealing with adversity.

But Hume’s philosophy does not provide an adequate solution to one of the greatest problems faced by these more affluent societies: inequality. As societies grow more affluent through private industry, some benefit more than others, and the luxuries of which Hume speaks are not evenly distributed. But Hume’s most famous student, Adam Smith, saw this problem more clearly and sought to show that even if the benefits of capitalism are disproportionate, the affluence is good for society as a whole.

Adam Smith (1723–1790)

Adam Smith inherited from his teacher, David Hume, a deep respect for the benefits of the industrial revolution. In his famous text, *The Wealth of Nations*, Smith seeks to describe the developments that lead to greater affluence, and he defends the idea that capitalism is good for everyone, even if it leads to inequalities (Smith 1981). For Smith, one of the central advantages of a capitalist economy is that it provides the owners of resources with the incentive to use them in the most productive

manner possible. This leads to the birth of an industrial system of production, in which producers constantly seek to increase the productivity and efficiency of the labor process. Smith argues that one of the central innovations of such an industrial system arises due to the increased division of labor. He cites how a handful of workers in a pin factory can produce thousands of pins if they divide up their labor process so that each person in the factory is only doing a very small part of producing a single pin. This division of labor allows the workers to focus on one very minute, simple task, giving them greater dexterity and saving them the time that goes along with transitioning from one task to another. Thus Smith sees the skilled labor of the craftsman being replaced with the unskilled labor of the assembly line worker, and he welcomes this change as it will lead to unleashing great productive forces that will vastly enrich society. While the factory owner promotes such a division of labor out of the desire to make more money, Smith argues that the capitalist is inadvertently enriching all of society by flooding the market with cheaper commodities. In an industrial, capitalist society, the poorest worker lives in greater material comfort than the king of a tribal society, as Smith contends, because goods simply become more affordable as they become easier to produce.

While Smith (1981) is a great champion of the division of labor in industrial production, he also sees ethical problems in it. When workers confine themselves to a single, unskilled task within the productive process, their work is more productive, but it also impoverishes their mental life and character. In industrial societies the workers become unhealthy, unable to solve problems and unable to think about what they are doing. The consequences of this impoverishment of the industrial laborer's activity will be a large number of citizens incapable of scrutinizing their government or participating in the defense of society. He worries that such a working class will be fodder for authoritarian regimes that take advantage of their lazy habits of mind. As a solution to this problem, Smith proposes limiting child labor and introducing mandatory schooling (a solution thankfully heeded in most of the industrial nations).

Prominent Critics of Capitalism

A central tenet of Locke, Hume, and Smith is the idea that all of society benefits from private ownership of resources and from more advanced means of production introduced by private investors. The German philosopher and economist Karl Marx rejected their views, and developed a critique of capitalism suggesting that only select individuals, not all of society, benefit from capitalism. He argues that class conflict between the working class and the investing class, which is definitely not a harmony of interests that enriches everyone, is the underlying law of capitalist societies. He develops this critique through a detailed analysis of economic realities in capitalist societies along with a careful critique of the views of prior economists.

Karl Marx (1818–1883)

Any economist would agree that capitalism is motivated by the desire to enrich capital through profits. But Marx's theory is innovative in his explanation of how capitalism is profitable, namely by means of surplus labor value. Marx analyzes the difference between two basic economic activities: selling in order to buy (C-M-C), and buying in order to sell (M-C-M). In the first instance, a person has a commodity, and sells it in order to get the money to buy other commodities. In the second instance a person has money, and invests it in a commodity in order to make more money by selling the commodity. For Marx, these are two separate activities with different motivations. C-M-C plays the valuable role of allowing people to circulate different types of commodities in society. Some people have too much of one thing and others too much of another. But those who invest in commodities in order to sell them do so in order to make money from their investment. Thus the formula for capital is M-C-M. Marx's interest is to study how this kind of investment can be analyzed and systematically understood. How is it possible for people to invest in a commodity that by its very nature generates value for the investor? In some cases, one might buy land or gold or oil. But in these cases, the profitability of the investment depends on the law of supply and demand. In order to make money from an investment in land, I must hope that due to increasing demand, the land will become more valuable. Though this kind of investment is common, it is not for Marx the overriding type of investment.

Rather Marx argues that there is only one commodity on the market that, by its very nature, can generate a profit for the capitalist, and this commodity is human labor power. Marx argues that labor creates a certain average amount of value equal to its quantity (a pair of shoes and three shirts are equivalent in value because they both represent the same total amount of labor time). But the laborer is paid not according to the value of what is produced, but according to the cost of living in a given social context. This means for Marx that it becomes possible to systematically pay workers less than the value that their labor actually embodies. The most consistent and most viable way to invest in a commodity is to invest in the labor power that produces the commodity. Marx calls this way of making profits surplus labor value, and he argues that this demonstrates that the profitability of capitalist enterprise is predicated upon the systematic and growing exploitation of laborers. For Marx, unlike Smith, capitalism is not a "rising tide that raises all ships," but a system of ownership that is founded on the exploitation of workers by investors. He argues that capitalist development does not tend to improve the lives of the workers, as Smith did, but tends towards an ever increasing gap between the wealth of capital and the poverty of workers. Marx's point about surplus labor is perhaps best illustrated in the aviation industry with airline pilot and crew member

starting salaries. Especially since the airline industry was deregulated in 1978, pilot salaries and benefits have been decreasing (see for example, Chapter 10).¹

But Marx believed that because of this fundamental injustice in capitalism, it was preparing the way for a new, post-capitalist form of society. Capitalism was drawing more and more workers into dense, urban environments, where they were exposed to other workers and able to perceive their common plight. He thus envisioned the need for a worker's revolution resulting in the workers seizing ownership of the means of production and designing a new form of society in which workers must not work to generate a surplus labor value for capitalist profits. He called this post-capitalist form of society a "realm of freedom" because he believed it would combine the productivity promoted by capitalist industry with shorter working days and more time for non-labor related activities.

Twentieth Century Critics

In the twentieth century, capitalism continued to develop and take on forms of which its early proponents and critics could not have conceived. Theorists have referred to this later stage of capitalism as "late-capitalism," "post-industrial society" or "consumer society." One of the central issues in twentieth-century capitalism is that of overproduction. While Locke and Smith were largely concerned with understanding how resources and labor could be used in the most productive way, they did not fully envision that this process of increasing productivity would lead to the potential for over productivity. If a business creates so great a number of commodities that they cannot be sold, then this excess productivity will present the business with just as much wasted labor as outdated or inefficient labor. Thus businesses in the modern world have the need not only to regulate the production process, but also to regulate the consumption process. They do so through advertising, which manufactures demand, through branding, which establishes the desirability of a commodity by linking it with a well known image, and through the design of increasingly seductive commercial spaces. This process of regulating consumption is familiar to anyone who lives in a late-capitalist society. But it entails new philosophical issues that were not seized on by earlier theorists of capitalism.

Georges Bataille (1897–1962) One of the most significant analyses of this aspect of modern capitalism is the French philosopher Georges Bataille. He proposes a "Copernican revolution" in economic thought: instead of considering the central problem for economics to be the process of creating wealth, he suggests that we study the way that wealth is expended. His argument is that human life is continually confronted with an excess of wealth (beginning with biological

1 The ethical implications of low pilot wages are also discussed in Chapter 1 with the case of Continental Connection Flight 3407. Chapter 1, Footnote 1 discusses the NTSB's note that on the CVR the first officer remarked that her 2008 salary was \$15,800.

energy) that cannot all be stored and used to increase wealth. This excess wealth is doomed to waste. But he argues that the way in which people waste wealth has a rational purpose.

He studies the phenomenon of “potlatch” in native American societies as a model for this rational expenditure of excess wealth: potlatch rituals involve families or chiefs throwing lavish feasts in which they give away or destroy a great deal of wealth in an attempt to establish social status. Bataille studies these rituals as a model for how wasting, giving away, consuming, or sacrificing can all be done with a higher goal in mind: namely, to distinguish oneself in the eyes of others. Bataille suggests that potlatch behavior is deeply embedded in all human economies, but that capitalist society, because of its emphasis on productivity and commodification, cannot perceive the ways in which potlatch shapes our behavior. If we cannot recognize the need to waste, consume, and give in a meaningful way, he suggests that we are doomed to do so in a destructive and deeply unethical way.

He considers the wars of the twentieth century as well as the massive arms races of the post-war era as examples of a fatal necessity in capitalism: if a society cannot use its wealth for growth and does not recognize the value in pure luxury, it will seek to waste its wealth in lavish expenditures on defense and war. War is similar to a potlatch not just in its wastefulness, but also in its fundamental motivation to elevate one group or country over another in status. He thinks that recognizing the need for pure luxury and unconditional charity on an international scale will be the only way that wealthy nations can divert a scenario of all out war and global stratification between the wealthy nations and the utterly destitute ones.

Jean Baudrillard (1929–2007) Following Bataille’s theory of potlatch, the French theorist Jean Baudrillard develops a theory of consumer behavior in modern capitalism that points towards the economic necessity of consumption. Because of the extreme development of productivity in modern capitalism, Baudrillard argues that society must develop increasingly powerful strategies for promoting intense consumption of commodities. He argues that consumption is promoted and organized by treating commodities as “signs” that are related to each other like signs in a language (Baudrillard 1981). Just as there is no natural relationship between objects and the words that represent them, so too there is no intrinsic relation between what we purchase and what our needs are. We choose commodities not because of how they relate to our inherent needs or wants, but because they are a way that we communicate with other people in society. Advertising gives us associations that allow us to connect their products with the ideals that we aspire to communicate about ourselves, and products are developed which can hardly be consumed in isolation, but instead require us to buy even more products.

The result is that consumers are not sovereign in making their choices and never attain a point of satisfaction, but are engaged in a never ending cycle of consumer behavior. Just as Marx had argued that workers are exploited for their surplus

labor power, Baudrillard argues that consumers are increasingly robbed of any possibility for pleasure by the demand for consumption to keep flowing. Although commercial aviation is a service industry, a parallel exists in that consumers have almost no say in the services and costs associated with air travel. In Chapter 5 Joseph Schwieterman addresses the cost of air travel, and potential ethical lapses such as collusion between airlines. Based on his account, it is readily apparent that the consumers are not sovereign.

Baudrillard argues that unlike the workers whom Marx believes will perceive their common exploitation; consumers are isolated from each other, passive and detached in relation to the organization of consumer society (Baudrillard 1975). Thus Baudrillard seems to question the possibility of a thoroughgoing revolution of modern consumers against the economic system that organizes their behavior. However one might wonder whether Baudrillard might join Bataille in championing the pursuit of “pure luxury,” unproductive moments of enjoyment, as an act of resistance against the denial of pleasure in modern capitalism.

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PART II

The Business of Aviation

As with other for-profit enterprises in the US, the aviation industry attempts to produce profits and does so while decreasing costs in an effort to optimize income. But since the Airline Deregulation Act of 1978, airlines have struggled to maintain profits; most startup airlines have come and gone, and employee salaries and work conditions are ongoing topics of debate. This part addresses some of the business aspects of the industry with Part III focusing on the responsibility of both the individuals and the corporations involved.

Chapter 4 considers a key international issue in aviation, namely the question of freedom of the skies and national sovereignty. Dawna Rhoades investigates the history behind the debate over international regulation as well as provides us with the current state of the matter. Since the early aviation conventions, such as Paris and Chicago, the question of who rules the skies has yet not been settled, especially in terms of national sovereignty. A key topic of debate concerns cabotage in which non-US airlines would be allowed to fly domestic routes. In other words, one of the current dilemmas under the Freedoms of the Air regards the eighth freedom, or “the right to transport passengers, cargo and mail within the territory of a State which is not the aircraft’s State of registration” (Table 4.1).

Moving to questions of airline pricing in the US, Chapter 5 by Joseph Schwieterman addresses the ethical issues that confront both airline pricing personnel and the consumers who purchase the tickets. While at first glance it may appear that the ethics of airline pricing is a topic only for airline management to address, Schwieterman also reveals the ways in which consumers at times may behave unethically, such as taking advantage of bereavement fares, cancelling flights for medical reasons when those reasons are only secondary, not completing all segments of a trip in order to save money, etc. In terms of the airlines, several potential ethical issues may arise, such as collusion, predatory pricing, retaliation, and overbooking flights. His point then is that each party must learn from their past mistakes and respect the needs of the other, lest both sides stumble over a variety of ethical impediments.

Chapters 6 and 7 deal with two different issues involving outsourcing: manufacturing and maintenance. In Chapter 6 Alan MacPherson argues for the need as well as the benefits of outsourcing commercial aircraft manufacturing, especially in terms of the Boeing 787, a project which perhaps would not have gone into production were it not for the fact of risk-sharing that in turn helped cut costs at Boeing. Additionally MacPherson shows the ways in which outsourcing

can have long term benefits, even to those who may feel most threatened by it. Chapter 7 provides a union perspective on the reasons why the outsourcing of maintenance to third party vendors leads to a decrease in safety. Despite the fact that the airline industry appears to be quite safe, especially given the decrease in the number of fatal aircraft accidents over recent years, Ludwig argues that with outsourcing there is less oversight. With less oversight, the level of safety becomes a question.

Chapter 4

Who Governs International Aviation?

Dawna L. Rhoades, Ph.D.

On April 30, 2007, the US and the European Union signed a multilateral “open skies” agreement that was over 60 years in the making. Unlike the first open skies agreement signed in 1992 between the US and the Netherlands which was a single page in length, the US–EU agreement runs 88 pages, a clear indication of the complexity of the issues and the relationship (European Commission 2010). The story of the struggle to reach a consensus on the regulation of international air transportation across the Atlantic and around the world has pitted philosophy against national sovereignty and economic self-interest. The struggle has been waged in hundreds of bilateral treaty meetings and has involved individual airlines, airline trade associations, and air carrier labor unions. The stakes in this struggle have been high. Airlines have historically been treated as a special case in international business because nations reserve the right to use their airline fleets in times of national crisis to transport troops and supplies, thus making them vital to national security. Air transportation is also closely linked to economic growth and directly or indirectly provides thousands of jobs. Finally, air transportation represents the best in technology and modern achievement. For many countries, their airline truly “carries the flag” around the globe, symbolizing that nation’s membership in cutting edge industry. Yet, the struggle over international transportation is not over. In Europe, the new agreement is seen as merely a “milestone on the road toward a deeper transatlantic partnership” (Straus 2007). The “ultimate objective of the EU is to create a transatlantic Open Aviation Area: a single air transport market between the EU and the US with free flows of investment and no restrictions on air service, including access to the domestic markets of both parties” (European Commission 2010). To understand why this concept remains so elusive, it is necessary to go back to the beginning of aviation itself.

Background

The history of manned flight began on December 17, 1903 with the 12 second flight of Orville Wright. Five years later these aviation pioneers would be working on aircraft for the US Army. Other pioneers and governments would also begin to explore the applications of the airplane to warfare as aviation daredevils thrilled crowds and set new records—crossing the English Channel (1909), crossing the

Atlantic (1911), and landing on ships, water, and, of course, grassy fields around the world (Rhoades 2008).

Early Conventions

The first international conference on aviation took place in Paris only seven years after the first manned flight, but the winds of war were already blowing on the European continent. This conference would involve 19 European nations and establish the key terminology of aviation, but it would not resolve the fundamental question of who controlled (and who regulated) the skies. One group favored the concept of a free sky, similar to the freedom of the seas model that had been debated for many years. The other side in the Paris debate was led by the British who argued that a nation had the right to control the air above its landmass and regulate entry as well as all other aeronautical activities into and within that airspace. Delegates left this conference without agreement on this fundamental question.

The British Aerial Navigation Act of 1911 settled the matter in the United Kingdom by declaring that the Home Secretary had the right to regulate all aviation activities within the airspace above Britain. Other nations quickly followed suit as the continent prepared for war (Sochor 1990). Following the end of World War I, a separate convention was held in Paris concurrent with the Peace Conference that produced the Convention Relating to the Regulation of Aerial Navigation. This Convention affirmed the right of national governments to sovereignty over their airspace while calling for: 1) national registration of aircraft, 2) rules for airworthiness and certification, 3) regulation of pilots, and 4) restrictions on the movement of military aircraft. The International Commission on Air Navigation (ICAN) was established in Paris to continue work on international aviation legal matters. Only 26 nations would ratify the Convention with the most notable exceptions being the US and Russia (Sochor 1990, Kane 1998).

While the international community continued to struggle over questions about aviation, domestic development was also beginning to diverge. Although the airplane held a special fascination for many people and had gained a place in the military arsenal during World War I, it struggled to find a market among the traveling public. It was freight, particularly mail, that paid the bills for early airlines that competed for access to government contracts to deliver this service. In the US, the Postal Service would play a significant role in shaping the industry by encouraging consolidation, safety, reliability, and continental reach. This informal guidance was critical as the industry struggled with what would become one of its greatest enemies, economic crisis. The Great Depression triggered by the stock market crash of 1929 would lead to financial instability in the airline industry and endanger its survival. However, in 1932 charges would be made that the Postmaster General violated US laws against graft and collusion in using government airmail contracts to “shape” the industry. Beginning in 1938, postal rates would be the responsibility of the newly created Civil Aeronautics Board

(CAB). Meanwhile European governments took a more direct route to shaping a stable aviation industry, government ownership. Eventually, most nations would develop a single large government owned, national flag carrier with operations centered in their capital city.

World War II represents a watershed in aviation development. During the war, a number of key innovations took place that would eventually make commercial passenger aviation a reality. These included radar, turbojet engines, pressurized cabins, and newer, lighter construction materials. As the world looked to life after war, a second aviation conference took place in Chicago in 1944. The Chicago Conference and the resulting Convention still have a major influence on matters of international aviation. The Chicago Conference would create the International Civil Aviation Organization (ICAO), headquartered in Montreal, Canada to develop the standards and practices of international aviation. Representatives of all nations involved in international aviation would become members in ICAO. ICAO would be governed by a council representing general members from three categories. This council would be responsible for the day-to-day business and report to the General Assembly convened every three years. Eventually ICAO would adopt 18 annexes to the ICAO Convention outlining the standards that govern everything from personnel licensing to aeronautical telecommunications to transport of dangerous goods. Its members would be expected to adhere to these standards unless there was a compelling reason (usually financial) why the standards could not be implemented. They would then be expected to file an exception with ICAO. It should be noted here that nothing prevents a country from adopting standards that exceed those adopted by ICAO (see Sochor 1990 for a history of ICAO and the annexes).

Like the 1910 Paris Conference, Chicago also took up the issue of freedom of the skies and national sovereignty. In Chicago, the US argued the side of “open skies” asking that the delegates “not dally with the thought of creating great blocs of closed air, thereby tracing in the sky the conditions of future war” (Sochor 1990: 8). Their chief ally in the war, Great Britain, would continue to argue for tight regulation and national control. Once again, there would be no agreement on the issue of international aviation regulation. While the public debate focused on philosophical issues, the private talks centered on raw political and economic issues. The British would raise the possibility of creating a Commonwealth airline with exclusive rights to land in any territory flying the British flag (Sochor 1990). This ploy and the fact that World War II had not yet been won by the allies would be enough to counter the undeniable strength of the US. It was clear even in 1944 that the US would emerge from World War II with its manufacturing and aviation industries intact while the airlines and aviation infrastructure in Europe would be devastated by years of war. Opening European markets to the US would have almost certainly given US firms an insurmountable advantage. Of course it was not clear in 1944 that after the war the US would emerge as the economic and political leader of the West or that the “flag that never set” on the British Empire would be lowered in colony after colony beginning in the late 1950s, leaving many countries

who were NOT in Chicago to decide their own aeronautical fate rather than the dictate of their former colonial ruler. These former colonies would struggle for decades to create viable, national carriers, refusing to relinquish air rights to other nations even if they could not exercise those rights for technological or financial reasons (see Abeyratne 1998 and Rhoades 2008 for a further discussion of the problems faced in developing nations).

International airlines were quick to realize the opportunities that no broad agreement on international aviation offered to them and met after the close of the Chicago Conference to establish the International Air Transport Association (IATA). IATA would officially be classified as a “trade association” and did work over the coming years to set standards for interlining (transfer between carriers), carryon baggage, fund transfers, etc., but it would also gain a great deal of power over routes and fares in the vacuum caused by the failure in Chicago. Without a multilateral, international body regulating the terms of international aviation, nations would have to fall back on the time honored mechanism governing international relations between nations, the treaty.

Bilateral Air Service Agreements

In 1946, the two key aviation nations of the Atlantic, the US and Great Britain, met in Bermuda to discuss aviation issues. The resulting bilateral treaty called the Bermuda Agreement would become the model for future treaties. It would establish four key features of such agreements: 1) designated routes with possible size and frequency restrictions, 2) carrier designation, 3) reciprocity of rights, and 4) separation of passenger from cargo rights. This agreement would also give IATA the right to establish airline and air cargo rates for the international system, in effect allowing airlines to collude to set the fares and rates that would be charged by all member airlines. These bilateral agreements would remain in effect until the parties adopted a new agreement or renounced the existing one, an action that would halt air travel between the two countries involved.

The British government formally notified the US in 1976 that it was terminating Bermuda I (the 1946 agreement) because it felt that the original agreement gave US carriers a disproportionate share of air traffic. The British were particularly concerned with US fifth freedom rights (see Table 4.1). Fifth freedom rights were viewed as direct competition for a national flag carrier as they allowed a foreign carrier to pick up and transport passengers from a non-home country to a third nation. Following the negotiations, a new agreement, Bermuda II, would govern air traffic between the US and Britain. It would be far more restrictive than the previous agreement and would provoke a major policy debate within the US.

Table 4.1 The freedoms of the air

Freedom	Description
First	The right to fly over the territory of a contracting State without landing
Second	The right to land on the territory of a contracting State for non-commercial purposes
Third	The right to transport passengers, cargo, and mail from the State of registration of the aircraft to another State and set them down there
Fourth	The right to take on board passengers, cargo, and mail in another contracting State and to transport them to the State of registration of the aircraft
Fifth	The right to transport passengers, cargo, and mail between two other States as a continuation of, or as a preliminary to, the operation of the third or fourth freedoms
Sixth	The right to take on board passengers, cargo, and mail in one State and to transport them to a third State after a stopover in the aircraft's State of registration and vice versa
Seventh	The right to transport passengers, cargo, and mail between two other States on a service which does not touch the aircraft's country of registration
Eighth	The right to transport passengers, cargo, and mail within the territory of a State which is not the aircraft's State of registration (full cabotage)
Ninth	The right to interrupt a service

Deregulation and Liberalization

Within the US, economists had been discussing the question of industry deregulation since the 1960s. The whole transport sector had received particular attention because of its role in linking together suppliers and manufacturers, buyers and sellers. The airline industry became the first mode of transportation to be deregulated with the passage of the Airline Deregulation Act of 1978. This same year the US Congress passed the Policy for the Conduct of International Air Transportation which declared the US intention to “trade competitive opportunities rather than restrictions” in the area of aviation in an effort to expand competition and reduce fares (95th Congress 1978). In a further move, CAB would issue an order to IATA asking them to “show cause” why they should not be viewed as an illegal cartel under US laws and informing US airlines that must withdraw from any rate (fare) setting activities. The International Air Transportation Competition Act of 1979 would set out three goals for US policy: 1) multiple carrier designation with no restriction on size and frequency, 2) fares set by market forces, and 3) the elimination of discriminatory practices such as exclusive airport contracts and government user fees that favored domestic over foreign carriers. It should be noted that the new US notion of open skies would not be totally open; there would be no access to US domestic markets for foreign carriers (called cabotage or eighth freedom).

To gain international support for their liberalized aviation policies, the US used two levers of persuasion. The first lever was to reward the airlines of nations willing to sign the so called open skies agreement with immunity from antitrust laws designed to prevent collusion. Anti-Trust Immunity (ATI) would allow

a foreign carrier to coordinate prices, schedules, and marketing with their US alliance partners. The second lever would punish nations unwilling to enter open skies agreements by attempting to divert traffic from their country to surrounding countries. The Encirclement Strategy was based on the belief that by signing open skies agreements with surrounding countries, one could lower fares to these countries and cause consumers to bypass higher fare, restricted markets. Two countries targeted by this strategy were the UK and Japan, the gateway destinations to Europe and Asia for US consumers. Over time deregulation did lower the fares of US carriers, placing growing pressure on European carriers to violate IATA established fares. Eventually the rate setting system of IATA did collapse allowing the “market” to determine fares. US policy was less successful in forcing the UK and Japan to embrace open skies (Toh 1998).

A New Era?

Unlike the US, the nations of Europe decided to deregulate their markets in a slower, more deliberative fashion. In a series of three packages, the aviation market was opened up with the final step coming into effect on April 1, 1997. As of this date an air carrier established in any one of the European Union countries could fly anywhere within the EU, including between cities within a member nation (cabotage). From the European perspective, this Single European Sky now meant that US fifth freedom rights in Europe were cabotage and a growing number of airlines and associations began calling for a change in US–EU policy that would grant similar rights in the US domestic market. As the European Cockpit Association (ECA) noted, the April 2007 agreement “extends US 5th freedom rights to fly between any city pair in the EU, except those in the same Member State whilst affording EU airlines no access to the US domestic market.” Further, this agreement might have the effect of removing protection from their home EU market without granting equivalent access to the US market (ECA 2007). Thus, the Europeans began pushing hard for an agreement that would extend the Single Sky across the Atlantic soon after the full implementation of the third package.

The US has strongly resisted efforts to include cabotage or modified fifth freedom for EU carriers. While the Europeans could threaten to terminate the existing bilateral treaties, throwing transatlantic flight into question, they were not willing to take this step and agreed to the 2008 treaty, however, they insisted on Article 21 which set a clear timetable for revisiting the treaty with Second Stage talks beginning May 2008. The Second Stage talks ended with an agreement on March 25, 2010 which is currently up before the European Council and Parliament for approval (European Commission 2010). Again, there is no cabotage or modified fifth freedom, but the US has agreed to further open up the “Fly America” program whereby the US government had required all travel paid by the government itself to take place on US carriers (European Commission 2010a). The battle for freedom of the skies continues!

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Chapter 5

Making Prices Right: Challenges Facing Airline Managers and Consumers

Joseph Schwieterman

In coffee shops, around the water coolers, and especially in airport waiting areas, the talk about airfare pricing strategies has become a US national pastime. Some consumers take great pride in their ability to find the best deals, and their stories about rising and falling airfares abound. Many consumers express great frustration over the contemporary state of airline pricing, considering it unnecessarily complex and restrictive, while others marvel at its intricacies and sophistication. And the airlines, ever mindful of profit, loss, and bottom lines, constantly adjust their fares and number of seats offered at various prices.

Regardless of viewpoint everyone associated with the buying and selling of air travel is also often involved in the navigation of vexing ethical issues. Travelers who want to spend as little as possible to reach their destination at a desirable time find their interests diametrically opposed to those of the airlines' revenue-management departments, which seek to maximize revenues. Although both buyers and sellers have learned to play the game to their maximum advantage, the rules of engagement seem to be constantly changing. As in a game of chess, each player tries to anticipate the next move of the other.

Some of the ethical questions that emerge in these transactions have clear answers, while others are more ambiguous. Are carriers guilty of "bait and switch" tactics when they advertise low fares that quickly sell out? Is it ethical for large airlines to undercut the prices of smaller "startup" airlines that have yet to gain a foothold in a market? In markets in which there is little competition, can airlines set prices so high that they violate the public trust? Buyers of air travel also confront ethical challenges. Is it unethical to regularly be a no-show for flights and then claim a refund? Should travelers be able to end their journey before reaching the destination shown on their ticket without notifying the airline and paying any applicable difference in fare? Is it unethical for travelers to present a "medical waiver," entitling them to a full refund on an otherwise nonrefundable fare, when their illness—even though it is real—is only a secondary factor in their decision not to travel? Issues of ethics also crop up between employees buying airline tickets and employers paying for them. Is it right for employers to collect the frequent flyer points earned by employees on business trips for company use?

If an employee selects a more expensive flight partially to accumulate frequent flyer points, does this constitute an ethical breach? What if the difference is only a few dollars?

Not all of these questions have easy answers. To offer perspective on them, let us consider the dual functions of market pricing and capacity control within revenue management departments. The sections below consider the moral hazards that both airline management and consumers may face when making decisions about airfares.

The Evolution of Airline Pricing

For the first sixty years of commercial flight in the US, most airlines had relatively small “tariff” departments to handle pricing issues. In general carriers changed their fares infrequently, thereby limiting their need for staff devoted solely to pricing. To raise or lower fares, carriers needed to apply and receive permission from the federal government. Starting in 1940 this process was handled by CAB, an authority of appointed officials that originally operated as a unit under the Department of Commerce. Tariff departments typically worked closely with the company’s regulatory affairs specialists to prepare “petitions” for authorization to change fares. CAB often held public hearings, reviewed testimony, and conducted analysis before making a ruling—a process that could take months.

As airlines learned to “play the game” with regulators, however, it was not always clear whether federal oversight was helping or hurting consumers.¹ By the late 1960s, there were complaints that CAB was acting more to protect carriers from competition than to shield consumers from high fares (see especially, Peltzman 1998). Some observers pointed to the existence of lower fares on intrastate routes, i.e., routes confined within a single state, where CAB regulation did not apply, to support their contention that regulation was keeping fares artificially high.²

By the early 1970s, the airlines were clamoring for more flexibility in pricing their services. With airlines becoming larger, the demand for travel growing, and computerized reservation systems rapidly improving, airlines were eager to expand. Fare changes could now be sent electronically to the Airline Tariff

1 The most critical factor affecting CAB rulings about price changes was the cost of providing airline service, including the cost associated with labor, fuel, and aircraft equipment. Since cost escalation could be passed on to the consumers, airlines often had little incentive to control their costs. Also, since airlines could not compete on the basis of price, carriers turned to providing amenities, such as comfortable seating configurations and food service, as well providing more attractive schedules to attract passengers.

2 As a general rule state governments had a greater willingness to grant airlines latitude over pricing decisions than the federal government. This allowed carriers such as Southwest Airlines and Pacific Southwest Airlines (PSG) to aggressively expand in intrastate markets prior to deregulation.

Publishers Company (ATPC), a centralized clearinghouse managed by the major airlines, which quickly disseminated this information to computerized reservation systems. Carriers had great incentive to experiment with steeply discounted fares that could attract new customers to fill seats that would otherwise go unused.

This opportunity came when CAB authorized the introduction of steeply discounted “excursion” fares in the early- to mid-1970s. “Discover America” and “Super Savers” fares proved particularly popular, providing a tremendous savings to passengers able to meet a Saturday night minimum stay and seven day advance purchase requirement. Business travelers had great difficulty meeting the restrictions, allowing carriers to offer these discounts without much “dilution” of existing revenue. In the process, airlines also began limiting the number of seats available to be sold at discounted prices on flights.

Growing pressure to unleash the airline industry from federal regulation culminated in the Airline Deregulation Act of 1978. Under deregulation, carriers moved quickly to exercise their freedom, developing vast hub-and-spoke systems and boosting the frequency of flights on key routes. The largest airlines also developed intricate fare structures with different fares for different kind of travelers. For most carriers, however, the early years of deregulation were quite turbulent. Airline managers found themselves grossly ill-equipped to handle the growing complexity in pricing and marketing. Smaller pricing actions sometimes escalated into full-scale fare wars, hampering the industry’s bottom line.³

By the mid-1980s, the airlines had learned from their past mistakes and were becoming much more adept at managing their prices. In the late 1980s, they had created “revenue management departments,” consolidating pricing departments with departments devoted to “capacity control,” i.e., managing an airline’s seat inventory. At the same time, computer programs allowed them to limit pricing actions to markets that met specified criteria, such as those with particular market shares, passenger volumes, flight distances, and competitive characteristics. With staffs of several hundred, revenue management departments became the “nerve center” of the airline industry’s marketing efforts.

The Complexity Behind Determining Airfares

When thinking about airfares, one should not associate them with particular flights but with travel between particular cities (or stations) on the airline’s route network. Airline prices apply to specific combinations of origins and destinations, often called city pairs or markets. Market pricing departments typically divide analytical

3 In one particularly notable example, Pan Am Airways introduced a \$99 fare on its domestic network in 1983. Although Pan Am was oriented principally to international routes and had few domestic flights, a “domino effect” occurred as carriers matched and extended the discounts to new markets. Within a few days a full-flown “\$99 sale” was underway throughout the country.

responsibilities into two categories: market pricing and system pricing. Market analysts monitor prices within specific city pairs, and are only loosely concerned with the broader effects throughout the network of their individual decisions. System analysts, conversely, are responsible for coordinating pricing actions among city pairs.

Airlines also invest heavily in capacity control systems to optimize the number of seats they can sell at various prices. Relying heavily on statistical analysis, these systems assign seats to various “booking classes” (or buckets) that regulate the number of tickets sold at various prices. Highly priced fares, such as full fare tickets, are typically assigned to booking classes that are generously available while discounted fares are usually limited to a smaller number of seats, which are often depleted weeks before the departure date.

The largest airlines employ two types of analysts to manage this process. Capacity-control analysts have responsibility for allocating seats to booking classes, taking into account a flight’s history, the day of week, and the strength of bookings. Space planning personnel have responsibility for determining the extent to which flights should be oversold (or “overbooked”) based on their inherent uncertainty as to the number of passengers that will actually check in for the flight. When a ticket is sold, a message is transmitted to the airline’s capacity control system to decrease the number of seats available in the applicable booking class, information that is then sent to computer reservation systems throughout the world. Unlike pricing personnel, who rarely interact with independent travel agents (as published prices are not negotiable), capacity-control analysts regularly make exceptions to booking class limits when preferred clients express a need for additional seat inventory.

Ethical Issues Facing the Airlines

Personnel in these various departments must navigate many difficult ethical issues. Where there is little competition, such as in markets too small to support more than one airline, a carrier can engage in monopolistic pricing. Although there is nothing illegal about charging high prices—and there is certainly no evidence to suggest that airlines as a whole have earned abnormally high rates of return in recent years—high fares are sensitive issues in many smaller and mid-size communities, whose economies depend on affordable air service. As a general rule concerns over monopolistic pricing tend to be greater for business travelers than pleasure travelers, who tend to be more flexible, more willing to divert to a more distant airport or take a less convenient flight. Pleasure travelers are more apt to shift to other modes of transportation—or not travel at all—if fares are high, thereby limiting the ability of airlines to capitalize on the absence of competition.

Hubs and High Fares

Concerns over monopolistic pricing are common at large airports in which a local hub airline is so dominant that it can command premium prices for passengers originating or terminating in that city. Minneapolis–St. Paul International Airport (MSP) is frequently cited as an example of this situation, owing to the fact that Delta Airlines, due to its merger with Northwest Airlines, accounts for about 80 percent of all arriving and departing flights. For travel between East Coast cities to MSP, where one airline is the sole provider of nonstop service, for example, the carrier typically has fares that are significantly higher than other airlines. On some occasions, its one-way fare from Boston to Minneapolis is higher than it is for travel all the way across the country. Some critics have called such airports “fortress hubs” because they seem impenetrable to discount competition.

The criticism directed at airlines for such pricing practices has been fueled in part by the US General Accountability Office (GAO), whose studies show that travelers flying from certain airports pay much higher fares than those flying from other airports. One study coined the term “pocket of pain” (typically mid-size cities with relatively little price competition) to refer to places that suffer from a relative lack of competition. The Business Travel Coalition has been particularly vocal about these issues, and has even called for the federal government to bring back price regulation in certain circumstances.

Nevertheless, it should be emphasized that many hubs would not be viable without the ability for airlines to charge premiums for the nonstop flights these facilities provide. Moreover, the presence of a large hub in a community is generally considered a major asset among civic boosters, even when this means that local passengers pay higher fares as a result.⁴

Collusion

In airline markets collusion can occur when two carriers explicitly agree to raise fares, or when one airline effectively “signals” another about its desire that both do so. There is nothing illegal about raising fares in the hope that competitors will match them, but it is illegal for one carrier to communicate these hopes directly with another, or to make statements to this effect through a third party, such as the news media.

The risk of cartel-like behavior is facilitated by the fact that most airlines process most fare changes through the ATPC, the central clearinghouse, which allows them to see almost instantaneously the pricing actions of competitors. Some have alleged that the ATPC has created a “cozy” environment among the major airlines. The potential for collusion is also amplified by the industry’s practice

4 Smaller cities that function as major hubs, such as Charlotte, North Carolina, Memphis, Tennessee, and Salt Lake City, Utah, enjoy a quality of service far surpassing that of most other cities of their size, making them attractive places to conduct business.

of adhering to standard “mileage based” fare structures on domestic routes. First introduced by American Airlines in 1983, mileage based fares helped standardize price structures across markets and regions, thus bringing greater stability to the day-to-day pricing environment. At the same time it created a tool that could be used to foster cartel-like behavior by establishing a standard set of prices for the industry.

Many observers, however, fail to distinguish between pricing coordination of fares and collusion. There are compelling economic arguments why some degree of pricing coordination is necessary for the industry to remain viable, and why the public benefits when airlines can make investments in an environment of pricing stability.⁵ Moreover, airfares have been trending downward for years when adjusted for inflation and the cost of jet fuel. As a result of these gradually declining fares, bankruptcies remain a distressingly common occurrence. Nevertheless, allegations of collusion have given rise to lawsuits, federal investigations, and embarrassing mishaps that have elevated the public’s cynicism about airline pricing practices.

By 1994 all major airlines had entered into a consent decree with the US Department of Justice (DOJ) to suspend certain practices that could facilitate cartel-like behavior.⁶ Until the agreement was forged, it was common for airlines to announce fare increases that had not yet taken effect, making them mere “proposals.” Airlines would “file” to raise fares, and if competitors did not match them, they could postpone the date that those fare increases took effect, hoping that the competitor would eventually have a change of heart. In effect the airlines could send a signal to competitors that it was “ready to raise fares anytime.” Critics argued that this technique provided carriers a risk free way to solicit industry-wide fare increases, and as part of the consent decree, airlines agreed to discontinue this practice.

Retaliatory Pricing Actions

Other types of actions have similarly cast the industry in a negative light. On some occasions, when a carrier opted not to match a nationwide increase announced by another airline, the latter would reportedly announce a “sale” in the competitor’s hub in retaliation (Nomani 1990). The purpose of the “sale” was apparently to show a carrier that its refusal to match a price increase came at a heavy price. Such allegations captured headlines in 1990 when an executive at Northwest Airlines testified to federal authorities about an internal memo he had written that likened pricing to an “atomic bomb” that airlines must threaten to use when a competitor did things to hamper the pricing environment. Apparently the metaphor was intended to suggest that an airline must be prepared to retaliate against an unruly

5 Lester Telser of the University of Chicago has been a particularly prominent proponent of this idea. (See Telser 1987.)

6 Department of Justice 1994.

competitor, even if such action would mean mutually assured destruction in the form of extreme discounting.

As part of the consent decree, airlines adopted the practice of having all fare increases take effect instantaneously. Until other airlines match these increases, the airline raising fares must accept the fact that it will be noncompetitive. In this new environment, airlines tend to implement fare increases when ticketing volume is lowest, such as on weekends, thereby minimizing the revenue loss if other carriers do not immediately match. Another result is a more strenuous work schedule for pricing analysts. Once essentially working a normal Monday through Friday schedule, revenue management departments now work extended hours, and even weekends, partially to assure that enough personnel are on hand to match fare increases, lest their competitors rescind these increases out of concern over being noncompetitive.

In major markets the risk of collusion seems much lower today than it was years ago. The pricing practices followed by most low-cost carriers (LCCs), such as Southwest Airlines, tend to be relatively independent of the actions of major carriers. LCCs follow pricing strategies that are almost completely uncoordinated with the rest of the industry. Moreover airlines are increasingly ignoring traditional mileage based fare structures and turning to unpublished fares, which are not systematically publicized to competitors. In some markets, pricing is at times akin to a free for all in which carriers have difficulty keeping track of all the pricing strategies of competitors.

Predatory Pricing

Another ethical issue that arises is the potential for predatory pricing, or the practice of lowering fares with the hope of driving competitors out of a market (or out of business entirely).⁷ Among the ways that airlines can—at least in theory—do this, is by matching or undercutting the fares of a relatively weak startup airline and “dumping” new capacity into that market, which can render the profitable operation of the startup carrier nearly impossible. Yet another way to undermine a new entrant is to offer special incentives, such as “bonus” frequent flyer points, to consumers that the startup carriers cannot effectively match.

Economists are skeptical as to whether predatory pricing has ever materially changed the competitive landscape of US aviation. Southwest Airlines, for example, has never been driven out of a market due to the actions of competitors. Yet there have been several high profile instances where allegations of such behavior have cast the industry in an unfavorable light. Delta Airlines is alleged to have successfully driven AirTran out of Mobile, Alabama, by vigorously matching fares and offering generous frequent flyer bonuses as well as travel agent

7 This practice has special significance in the airline business since carriers can quickly enter and exit markets, giving incumbents an incentive to develop a reputation for vigorously defending their market share in order to deter entry.

incentives. (AirTran later returned to Mobile.) Frontier Airlines made similar allegations about United Airlines in Denver, and there have also been complaints directed at American Airlines for vigorous efforts to prevent discount competitors from expanding at Love Field in Dallas out of concern over its hub at Dallas–Fort Worth International Airport.

Few of these types of allegations have ever culminated in major penalties or legal rulings against the airlines. Out of concern over pricing practices, however, the US Department of Transportation (DOT) issued guidelines in 1998 for airlines to follow in order to avoid triggering a departmental antitrust investigation (Murphy 1998). These guidelines set limits on the number of seats a larger airline could make available at the price of the smaller “startup” airline as well as the number of additional seats it could add when a new competitor launches service. The standards also stipulate that airlines refrain from offering frequent flyer bonuses as a means of implicitly undercutting the prices of new competitors.

The increasingly prolific fees charged for various airline amenities and services, such as checked baggage, assigned seats, and onboard beverages, are also sparking debate. These fees, together with fuel surcharges sometimes added to the price of tickets, have raised accusations of airlines practicing “gotcha” marketing, i.e., ploys to extract money from unsuspecting customers who see little choice but to pay them. Nonetheless, airlines have defended these fees by presenting evidence demonstrating that such fees have a sound economic basis. Public opposition to them, in turn, appears to be softening. Just as airlines anticipated charging for checked baggage has dramatically reduced the financial burden associated with handling bags, largely because travelers now go to great lengths to bring their luggage onboard. Still, DOT now requires airlines to be more forthright in alerting consumers to the presence of special fees than they have in the past. The push to “unbundled” pricing by offering a basic fare, and then “selling convenience” through special fees, however, will surely persist, thereby raising new ethical questions.

Issues in Capacity-Control

For years airlines have been accused of “bait and switch” strategies, i.e., advertising low prices but making them exceptionally hard to obtain. Although the significance of this problem should not be understated, marketing considerations tend to discourage airlines from doing so. Since low airfares tend to be matched by competitors, airlines that do not offer seats at advertised prices often face significant losses in business. “Bait and switch” was arguably a bigger problem when the primary source of information about fares was television and newspaper advertising. Before online search tools became available, passengers often had great difficulty determining when and where the lowest fares were available. Today, search engines at sites such as Expedia and Orbitz.com allow consumers to quickly locate the most attractive prices.

To remain compliant with federal law, airlines need to offer at least a handful of seats on every flight and at advertised prices. The tendency for the most highly discounted seats to be quickly depleted on flights during peak travel times, however, has generated many complaints. Similarly, many passengers voice great frustration over their difficulty in finding available seats to redeem frequent flyer points, which are also managed through capacity control systems. On numerous occasions, airlines have been sued for allegedly denying account holders reasonable use of their award mileage. As a compromise move, airlines now typically offer two types of awards: a “premium” award that is readily available and a “saver” award that is capacity controlled. Nevertheless, the difficulty of redeeming frequent flyer credit remains a lightning rod issue among flyers.

Overbooking Flights

Space planning personnel face a different set of problems. Their work is directed heavily at minimizing the consequences of travelers who are “no-shows” for flights. Some no-shows are attributable to intentional acts of travelers who want to “hedge their bet,” but many others are no-shows because of factors beyond their control, such as missed flight connections. Although the no-show (or “booking turnover”) problem has dogged transportation companies for more than a century, it was not until the early 1980s that carriers added cancellation penalties to discounted tickets to reduce the severity of problem.

For space planning personnel, many of the most vexing ethical issues revolve around how to plan for and handle involuntary denied boardings (IDBs), i.e., ticketed passengers who have not volunteered to surrender their seats but are nevertheless denied transportation due to overbooking. Until the late 1990s, consumers seemed relatively satisfied with policies regarding IDBs: typically, there were enough volunteers willing to accept travel vouchers (typically free round trip tickets) to keep IDBs to a minimum. In the early 2000s, however, sentiment shifted against the airlines. Airlines became less generous in compensating bumped passengers, and declining airfares made the free travel vouchers seem less valuable. Moreover, as the number of empty seats diminished, it became more difficult to accommodate “bumped” passengers on the next flight.

IDBs in the early 2000s, growing numbers of consumer groups alleged that the airlines had become callous and greedy. Some called for federal intervention to assure that bumped passengers were adequately compensated. Opponents of such intervention argued that airlines vigorously competed on the basis of the experience they provided travelers, which gave them an incentive to treat IDBs fairly. Regulation, they argued, would ultimately drive up ticket prices, either by requiring the airlines to make greater recompense for IDBs or by the airlines passing along the costs of seats going unused due to less overbooking. DOT took action in 2008, mandating that airlines substantially increase their reparation for IDBs. Passengers who are rescheduled to arrive at their destinations on domestic

trips more than two hours after their originally rescheduled time, for example, are eligible for up to \$800 in compensation.

Sadly, airline employees working in space planning departments have been known to commit ethical lapses for purely personal reasons. Some have opened up seats in sold out booking classes to benefit friends or family; others have closed down flights for sale to abet their own “standby” travel, hoping to ensure that an empty seat would be available. Fortunately, airlines now have computer programs to detect such acts.

Ethical Issues Facing Consumers

Some of the above examples might lead one to think that consumers are merely innocent victims of the airline industry’s pricing policies. However, consumers buying airfares can sometimes find themselves on the edge of an ethical precipice. Some have exploited “hidden city” discounts, i.e., the ability to buy tickets to a distant city where a low fare is available without the intention of traveling to that city. For example, a consumer might buy a ticket from Cleveland to Las Vegas but leave the airport when changing planes in Denver, taking advantage of the fact that buying a ticket to Las Vegas was cheaper than buying a ticket to Denver. Courts have ruled that this practice violates the contract the consumer entered with the carrier. In a few instances airlines have successfully required passengers to pay the difference in fare.

The practice of “bracketing” is sometimes used to circumvent an airline’s Saturday-night minimum stay requirement for discount fares. By purchasing several roundtrip tickets at once, with each flight staggered to meet the Saturday-stay requirements, a customer skirts the minimum stay rule without ever staying over a weekend. The courts have ruled that this, too, breaches the customer’s contract with a carrier. In this case it violates the stipulation that travelers must finish using one ticket before beginning to use another. This gives airlines the right to collect additional fees from travelers caught engaging in this practice. Consumers need to decide for themselves the extent to which they consider the above practices to be serious ethical violations. At a minimum they should understand that travelers using these practices are operating on the fringes of ethical behavior and that the courts have routinely sided with the airlines.

Unfortunately some consumers engage in more flagrant forms of airfare abuse. Airline personnel constantly do battle with consumers who use deception (or try outright intimidation) to gain access to fares for which they are not entitled, including “bereavement fares” reserved for people traveling due to the death of a family member or a friend. Parents lie about the age of their children so that they are able to bring a child on their lap without paying. This problem has compelled several airlines to implement cumbersome programs to identify the age of toddlers prior to issuing a boarding pass. Another common deception is presenting medical waiver forms from doctors indicating that their patient should be entitled to a

refund on a nonrefundable ticket when in fact the patient's health problems were either grossly overstated or had nothing to do with the patient's decision not to travel.

Ethical issues also emerge when consumers exploit obvious errors made in pricing. Stories about passengers purchasing fares filed entirely by mistake (some of which are priced at only a few dollars for an international trip) are part of modern day air travel folklore. In some instances, thousands of fares have been sold before a conscientious buyer or travel agent has notified the airline of the mistake. Legally an airline has the right to rescind a transaction when a fare was processed in error, but they often pay a heavy price in the form of negative publicity this generates.

Similarly when fares are fully refundable, some consumers routinely "rescind" their purchase by being a no-show and then claiming a refund. Some passengers, in fact, purchase several tickets for the same trip in order to keep their travel options open. This is particularly true for Southwest and a few other airlines that allow the value of unused tickets to be applied to future flights without a penalty. Many travelers in these situations see little incentive to notify the airline of their changing travel plans. A half-century ago, the railroads bore the brunt of this problem. Business travelers often purchased Pullman sleeping car tickets as a backup while intending to use them if their flights were cancelled due to inclement weather, causing some "sold out" trains to depart half empty.

Whether or not the act of intentionally being a no-show constitutes a major ethical breach depends on the assumptions one makes about the ability for airlines to effectively "space plan." The consequences of having no-shows are greater on trips involving small planes (which are not as amenable to effective space planning as large planes), on long trips (especially transoceanic flights), and on trips during the busiest travel periods, when demand is strong. A passenger who is a no-show at the peak of a holiday season is likely to prevent a seat from being resold. Failing to take simple steps to cancel a reservation negatively impacts both the airlines and the environment (in the form of wasted fuel). Ultimately, it also costs the consumer—either in the pocketbook or through lost opportunities to buy tickets on flights that depart with empty seats.

Even less defensible is the fraud that consumers commit in their quest to accumulate frequent flyer points. The strategies used to defraud the airlines are too numerous and complex to summarize here—many consumers seem to have few qualms about being dishonest when the prize is a free flight. But one of the most common unethical practices involves checking in for a flight and then failing to board and claiming a refund, which can confound accounting systems and result in unearned mileage being awarded. Another common ploy involves defrauding credit card companies offering mileage credit for purchases. Consumers have been known to make large purchases on credit cards and later asking for refunds in the manner that "tricks" the credit card company so that the mileage earned from the purchase is never rescinded. Some airlines have found it necessary to create "vice squads" to identify the most flagrant abuses of their frequent flyer programs.

Others have developed computer programs to search out defrauders, such as those with tickets to board several flights at almost exactly the same time.

Reaching the Destination

Consumers and airline managers must ultimately decide for themselves where to draw the line on these and other ethical issues. Herb Kellerher once humorously said, “if the Wright brothers were alive today, Orville would have to fire Wilbur to cut costs.” For the airlines, the battle for survival not only means cutting costs but also finding new revenue, which assures that new ethical questions will emerge.

Global alliances between airlines hold great promise for improving service but also often require that carriers receive antitrust immunity to coordinate their services, a practice that is known to stir up debate. The expanding practice of “code-sharing”—listing flights operated by another airline as one’s own—will also be challenged by competitors. Meanwhile, another round of airline mergers raises concern about whether there will be adequate competition in markets too small to attract low cost carriers. The success of the Delta Airlines–Northwest Airlines and America West–US Airways mergers, make further consolidation seem inevitable. Some carriers, such as United and Continental, are in the process of merging. Opinions about whether the efficiency gains from such consolidation—and the financial stability that it could provide to the industry—outweigh the anti-competitive effects will continue to rage. Both sides in the debate will be tempted to provide misleading testimonials of the associated benefits and costs to win public support, leaving it up to the public to sort out the fact from the fiction.

Technology will push companies toward the boundaries of ethical behavior. Some firms use software that masquerades as consumers to “scrape” the computer reservation systems of rivals, collecting vast amounts of competitive intelligence about prices and flight availability. In some instances these programs have brought rival web sites to a virtual standstill. Travel sites like Expedia, Orbitz.com, and Travelocity find their state-of-the-art “search engines” exploited by consumers in some instances. After using these sites to find the best airfares, many consumers divert to the web sites of individual airlines to circumvent the booking fee. Although this might be defensible in many instances—to some extent, it merely reflects the benefits of “shopping around”—it is more ethically troublesome when the “consumer” is a travel agent or organization that profits from the sale of tickets.

Dramatic increases in fuel costs, meanwhile, have encouraged airlines to impose new kinds of fees or increase existing ones. Surcharges for checked baggage, changing a reservation, and making reservations at a ticket counter remain thorny issues. Most major carriers deserve credit for being upfront about these fees. When they catch consumers by surprise, however, the fees can raise difficult questions about pricing transparency.

The consumer/traveler and revenue-management personnel of airlines, in a sense, are in a chaotic dance, each trying to anticipate the other. As they attempt

to find their rhythm, each party must learn from their past mistakes and respect the needs of the other, while preparing for some fancy footwork, lest they stumble over ethical impediments blocking their way.

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Chapter 6

Outsourcing Under Systems Integration: The Long Run Benefits for Boeing and Other Aircraft Producers

Alan MacPherson

The outsourcing of airframe production by major aerospace companies has attracted substantial academic and policy attention in recent years, though often from a negative perspective (e.g., employment losses, internal skills erosion, technology outflows). The present author has long been a critic of systems integration from a political economy standpoint (see Pritchard and MacPherson 2007). Nevertheless, international risk-sharing agreements for new aircraft programs are here to stay—especially in the large commercial aircraft (LCA) segment of the market (i.e., jets that can seat 100 passengers or more). The LCA market is a duopoly shared by Airbus and Boeing, both of whom have started to outsource airframe production at unprecedented levels.

The airframe for the Boeing 787 is close to 80 percent outsourced, whereas subcontracting levels for the Airbus A350 are expected to reach at least 50 percent. By now, in fact, all four of the world's major commercial aircraft companies have committed themselves to launch structures that hinge upon risk-sharing, systems integration, and foreign outsourcing. Airbus, Boeing, Bombardier, and Embraer have fully embraced this approach across all of their recent aircraft programs. Record pre-production orders for the Boeing 787 suggest that this approach is both technologically and financially profitable.

The purpose of this chapter is to outline some of the long range benefits of outsourcing under systems integration. The ultimate advantage is that design, development, and production costs can be dramatically reduced for the outsourcer, even though total costs may actually rise (Hickie 2006). The inflation of total costs is not a problem for the systems integrator because some of these extra costs are absorbed by foreign governments that opt to subsidize their domestic aerospace suppliers (Hayward 2005).

Recent History

In the early 2000s, Boeing's commercial aircraft division faced the prospect of massive downscaling in light of stiff competition from Airbus. A lack of internal

investment in new aircraft programs was also a problem. Although a downswing in global demand in the immediate post-9/11 period did not help any commercial aircraft company, newer product families from Airbus were killing the Boeing 757 and 767 models long before 9/11. Boeing seemed unwilling or unable to create a new program to follow the 777, which was around 30 percent outsourced in terms of the airframe. After two program cancellations (i.e., the Sonic Cruiser and a stretched version of the 747), Boeing came up with the 7E7 concept (now dubbed 787). Launched in 2004 this program arguably sets the global standard for supply chain management, international risk-sharing, and the use of foreign government subsidies to defray some of the costs of airframe design, development, and production.

Outsourcing on the 787 program signaled a profound change in Boeing's corporate philosophy with respect to three dimensions of strategic management. First, risk-sharing partners would not be participating on a build-to-print basis (i.e., the traditional subcontracting relationship). Instead, they would design, develop, and manufacture airframe components on the basis of Boeing's performance and quality parameters (Hamilton 2007). Detailed aspects of component design would be handled by suppliers—not by Boeing. Second, risk-sharing partners in Japan, Italy, and the US were being asked to self-fund the design and development tasks for specific structures (e.g., wings in Japan, fuselage barrels in Italy). Around 35 percent of the airframe was allocated to three Japanese corporations for the production of the wing and center wing box. Fuji, Mitsubishi, and Kawasaki are the main Japanese partners on the 787 program, though none of these firms had produced composite wings for a large passenger jet before. Working closely with Japan's Toray (a global leader in composites), the three Japanese "heavies" were essentially funding over one third of Boeing's launch costs for the 787 (with help from Japanese government subsidies). Third, risk-sharing partners would not get paid until the 787 started to generate sales—thus reducing Boeing's financial exposure on the project. In one fell swoop, Boeing dramatically cut its launch costs, distributed commercial risk across a global network of partners, and gained access to the technological and engineering prowess of several foreign companies.

When Boeing confirmed the 787 launch in 2004, the company already had the internal expertise to build the entire airframe, including the all-composite wing. Although Boeing did not have large scale autoclaves to cure the 787 wing in 2004, neither did any of the three Japanese heavies. Nevertheless, the transfer of wing design and development to Japan came as a major surprise to many US and foreign commercial aviation analysts at the time (see Fingleton 2005). So, why did Boeing do this? After all, the wing and center wing box are critical parts of any airframe. The answer is that Boeing had lost interest in the manufacturing side of airframe construction, and instead wished to concentrate on design concepts and systems integration. This has given Boeing an enormous cost advantage over Airbus, though Airbus appears to have followed Boeing's approach under its 2007 restructuring initiative, Power8. Under the plan Airbus slashed around 10,000 jobs, as well as boosted outsourcing levels for all future models (Pritchard

and MacPherson 2007). The 2008 Power8 Plus program extends the original one through 2012, but does not intend to cut more jobs (Domain-b 2008).

The disadvantages of high levels of outsourcing have been well documented in the contemporary literature on strategic management (e.g., Rothaermel et al. 2006, Dankbar 2007). Negative employment effects have received particular attention, along with internal skills erosion. But is this necessarily the case in the commercial aircraft industry?

Employment Effects

It is widely assumed in some academic circles that outsourcing kills jobs, if only because this practice entails a shift from in-house production to externalized work. But a potentially serious problem with this equation is that other variables may also be at play. For example, if total production grows dramatically under an outsourcing regime (which seems likely for the 787), then employment levels at Boeing's commercial aircraft division may actually start to grow during the ramp-up phase.

Boeing has cut over 25,000 jobs since 2001, with most of these cuts taking place prior to the launch of the 787 program. Were all 25,000 of these jobs outsourced? Keep in mind that Boeing has an aging workforce, and that some of these job losses were the result of attrition. Also note that most of these job cuts were introduced during the market downturn that immediately followed the 9/11 terrorist attacks on New York City and the Pentagon. The commercial aircraft industry has always been cyclical on the demand front, with much of this cyclicity being reinforced by the fact that airframes typically last for 30 years or more (Pritchard 2001). Some of Boeing's job cuts were also the result of production line closures for models that had reached the end of their life cycles (e.g., the 757). In light of increased process automation (i.e., capital intensification), it is unlikely that Boeing will ever need a workforce anything near as large as it was in the previous century.

The widely hypothesized link between domestic employment losses and foreign outsourcing needs to be tempered by a series of covariates, including retirements, process innovation, demand conditions, the shuttering of older product lines, and occupational shifts stemming from new skill requirements. In the case of the 787, for example, the move toward composite materials has reduced the need for machinists with metalworking skills (e.g., riveting, welding). Keep in mind that the 787 airframe is around 50 percent composite, compared to 12 percent on the 777 (Boeing Commercial Airplanes 2007). As the 787 program gains momentum, moreover, it is likely that non-metalworking jobs will be created in fields such as sales, marketing, finance, and modular assembly. It would take a careful longitudinal study to assess the nature of these substitution effects in terms of total employment, wage levels, or job quality. To the best of my knowledge, such a study remains to be conducted at the firm level.

A further problem with the stylized relationship between employment losses and outsourcing is that it would take a company level study to estimate the hypothesized correlation with any reasonable degree of accuracy. It seems unlikely that any aircraft manufacturer would be willing to participate in such a study. My point, then, is that students of industrial organization have thus far failed to specify the employment effects of outsourcing via direct observation at the level of individual firms. I would contend that econometric studies are incapable of separating outsourcing-related employment losses from other effects. Although good econometric models can be devised, data to test them would be hard to find.

Another dimension of the employment debate concerns the retention of professional jobs in occupations such as applied research, concept design, flight testing, and supply chain management. Many of Boeing's more influential stakeholders would likely have aborted the 787 initiative in 2004 had Boeing failed to proceed under a risk-sharing approach. With design and development costs in excess of \$10 billion, along with expected profit margins of below 10 percent, Boeing's Board of Directors could easily have scuttled the 787 program had a massive cost containment initiative not been developed. Cancellation of the 787 program would have left Boeing with a shrinking share of the world market for large passenger jets and would presumably have spurred new rounds of job cuts in skilled occupations.

From an employment perspective, then, outsourcing under systems integration may represent a better option than the alternative approach based on limited subcontracting (e.g., the 777). Boeing's senior management has made it abundantly clear that the long run viability of US commercial aircraft production depends upon a globalized approach toward input sourcing. A return to the old days of self-funded aircraft programs with build-to-print subcontracting relationships is not in the cards.

Export and Innovation Effects

When fully ramped-up, 787 output could run as high as 10–14 units per month (Hamilton 2007). This production rate is unprecedented for a twin-aisle passenger jet. Judging by Boeing's performance on earlier aircraft programs, over 70 percent of total output may go to foreign markets. With expected export sales of roughly 100 units per year, the 787 is projected to become a multi-billion dollar component of the US industrial base. Hard estimates of future export earnings are difficult to predict at this stage because customers typically negotiate deep discounts on list prices. Nevertheless, there is little doubt that the 787 will further solidify Boeing's position as the nation's largest single exporter of durable goods. Although the foreign content of these exports will be much higher than for the 777 or previous models, these exports will still generate important streams of foreign income.

With an expected market of 3,500 units spread over 20 years (\$400 billion in sales), revenues from the 787 program will be substantial (Boeing Commercial

Airplanes 2007). Confirmed orders had surpassed 700 units several months before the 787 roll-out on July 8, 2007 (7/8/07), which is a world record for a large passenger jet (with 847 orders through July 2010). Perhaps not surprisingly, foreign governments that have subsidized their domestic aerospace suppliers on the 787 program will no doubt pressure their own domestic airlines to buy 787s (i.e., a form of compensatory trade).

A major reason for the anticipated export success of the 787 is that this aircraft defines new operating standards, notably in terms of fuel efficiency (a 20 percent reduction over older models), ease of maintenance (composites do not corrode), and passenger comfort (better air circulation, bigger windows). Some of these improvements have been made possible by the engagement of centrally coordinated producer networks, with each partner offering specific sets of engineering competencies (e.g., Fuji in Japan, Alenia in Italy, Vought in the US). The net result is accelerated innovation, assisted in large part by the use of common design and engineering software by all structure partners (i.e., CATIA v5 suite). Once the learning curves for globalized design and development have been mastered, moreover, one might speculate that a future 797 or 737 replacement could be introduced under a shorter cycle time.

Conventional wisdom holds that the shift from build-to-print subcontracting to externally sourced design and development activity raises technological concerns with respect to the long-run innovation capability of the systems integrator (see Dankbar 2007). It has been argued, for example, that this process allows tribal knowledge to migrate down the supply chain, leaving the outsourcer with a diminished set of core competencies. But this problem does not seem to be happening with either Airbus or Boeing, both of whom have recently boosted their R&D spending despite growing levels of outsourcing. The 787 and A350 models have set new technological standards for large passenger jets, giving a basis for new rounds of incremental innovation on future aircraft programs. In short there seems to be little evidence that systems integrators will become less innovative as a result of outsourcing. If anything, in fact, the opposite may be closer to the truth because final products are shaped by networks of innovators rather than by one firm alone.

Policy Issues

Embraer was the first commercial aircraft manufacturer to produce passenger jets under systems integration. Boeing opted for partial integration on the 777, but moved to near total systems integration on the 787. Bombardier's C-Series regional jet is slated to be produced in a similar fashion, whereas the Airbus A350 is likely to be around 50 percent outsourced. Intricate nests of domestic and foreign public subsidies are layered across all of these aircraft programs (Hayward 2005). For example, the UK government has agreed to subsidize British suppliers for the development of an all-composite wing for Bombardier's C-Series. These

types of agreements usually contravene the subsidy codes laid down by the World Trade Organization (WTO), and have fuelled much of the current WTO dispute between Boeing and Airbus regarding launch funding. Such agreements also irritate labor unions in those nations that outsource globally to capture foreign financial incentives. But should anything be done about this issue?

From a political economy perspective, the crux of the matter is that foreign outsourcing under systems integration cuts local, regional, or national levels of value-added activity. This in turn reduces the economic benefits that might otherwise accrue to those regions that host final assembly. In blunt terms, however, the only policy instrument that could reverse this trend would be a subsidy to neutralize the financial paybacks from foreign outsourcing. Such a subsidy would need to be enormous, and would doubtless unleash new rounds of WTO trade disputes. Notwithstanding the fact that the US government has no desire to expand its existing array of direct or indirect industrial subsidies, companies such as Boeing might still prefer to outsource because this strategy generates dividends in terms of technology access, cycle time reduction, and risk-containment. There is no evidence that Boeing sought federal subsidies on the 787 program, though the state of Washington did provide substantial tax breaks in its effort to keep assembly work in Everett.

In some respects, then, the opponents of foreign outsourcing have locked themselves into an obsolete conception of what *should* be done, notably with regard to the maximization of domestic value-added activity. There are mercantilist undertones to this view of the economy that defy the logic of international comparative advantage. This being said, useful policy interventions could be considered to sustain the viability of US commercial aircraft production. Such efforts might include infrastructural investments to support the logistics of bringing aircraft parts to Everett from globally dispersed locations, as well as further investments in higher education or worker training to ensure that Boeing has ready access to a technically proficient labor pool. More broadly, the FAA needs to widen its range of technical expertise so that composite airframes can be flight-certified on a timely and reliable basis. This is important because composites are fast becoming the materials of choice among the world's leading airframers.

From a theoretical stance, the motives that have pushed Boeing to such a high level of systems integration can be explained by elements of the transaction cost approach *plus* the resource-based theory of external sourcing. But neither theory is adequate on its own. From a transaction cost standpoint, the global dispersal of launch funding under risk-sharing agreements brings significant cost savings to Boeing. At the same time, however, Boeing has been able to access the technological resources of foreign companies that possess unique assets (e.g., Toray for composites). The *make or buy* decision is no longer about cost-containment alone. Sometimes the goal is to access the knowledge base of global leaders in specific technology domains. In this regard Boeing has done a first class job of tying up some of the world's major players in the field of composite

structures, leaving Airbus with the difficult task of finding comparable suppliers for its A350 program.

A final issue in the outsourcing debate concerns *technology transfer*. Companies such as Airbus and Boeing must supply their external partners with both tacit and codified knowledge, thus introducing the possibility that network members might at some point become competitors. How likely is this scenario? Although the jury is still out on this issue, there is little doubt that decades of Western technology transfer under industrial offset agreements have endowed nations such as China and Japan with the technical and engineering capacity to produce regional jets (Pritchard 2001, Pritchard and MacPherson 2007). Whether or not these nations have the appetite to enter the LCA market remains to be seen.

Conclusion

The commercial aircraft industry has entered a new phase of business organization that involves globally decentralized design and production, systems integration, and risk-sharing partnerships to cut launch costs for new aircraft programs. All four of the world's major producers of commercial aircraft have adopted this business model. The downsides of this approach have been extensively documented in the aerospace management literature (e.g., Hayward 2005, Hickie 2006). Positive spins are hard to find outside the public relations statements that come from the airframers themselves, which is why this chapter was commissioned in the first place. Some of the more important advantages of international outsourcing include reduced launch costs, access to foreign technology in specialized areas, better sales performance as a result of incremental innovations from external suppliers, and the preservation of skilled jobs in regions that might otherwise lose these jobs altogether.

Outside the military domain, companies such as Airbus and Boeing are no longer interested in metal bending, tube construction, or the highly detailed work of subassembly design. The world's other major airframers have also lost interest in these tasks. In this regard there is an evolutionary dynamic to the commercial aircraft industry that closely resembles ongoing structural changes in the organization of most advanced market economies. Specifically, production is giving way to more strategic tasks such as concept development, research, marketing, and product testing. It would be nice to see a Boeing 797 with a 100 percent US content label. But those days are long gone. My own nationalistic sentiments would be satisfied if a 797 or 737 replacement were labeled with the following message: "conceived in the US, manufactured abroad, and assembled at the conception point."

Postscript by the Editor

In the time that has passed since Alan MacPherson wrote this chapter, Boeing has encountered several problems which in turn have led to an over 2½ year delay in the delivery of the first 787 aircraft, leading some to rename the “Dreamliner”, the “Delayliner.” These delays may be the main reason why the number of net orders is down. As an example, Boeing’s 2010 Orders and Deliveries for the 787 (through August 17) lists a 2010 gross order of 28 with a change of –32 leading to a net order of –4 (Boeing Company 2010).

Major problems with the supply chain led to Boeing’s 2008 purchase of Vought Industries’ share in the Italian-American fuselage builder, Global Aeronautica. According to Boeing Vice President and the 787 General Manager, Pat Shanahan, “all three partners in this transaction—Boeing, Vought, and Alenia—believe these changes will enable the 787 team to continue to overcome supply-chain challenges of the program” (Mecham 2008). With Boeing even acknowledging the problem, it may seem that MacPherson’s argument in favor of outsourcing has been weakened by these turn of events.

However, as MacPherson points out: “once the learning curves for globalized design and development have been mastered, moreover, one might speculate that a future 797 or 737 replacement could be introduced under a shorter cycle time” (see page 69). His point can be applied to the current situation with the 787. In other words, globalized design is a new concept, and once the problems have been ironed out, then future projects could be completed in less time than the 787. Perhaps more importantly because the majority of the customers are global, Boeing itself needs to find ways to continue to think globally in order to generate the largest number of sales.

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Chapter 7

Outsourcing Maintenance: A Union Perspective

Ted Ludwig

Today's world economy has created a culture of outsourcing which benefits large corporations by reducing their labor costs. Corporations contract other companies, or third party vendors, to provide labor and benefits at a lower cost, thus saving the corporation money and improving the return to investors. While this may be an economically sound business plan, I contend that it should not be utilized in certain sectors of the economy. The aviation industry is one of those sectors.

Aircraft maintenance has been one of the areas that corporations, especially airlines, have outsourced to third party vendors, located in the US as well as abroad. Commercial aviation has pushed as much maintenance as possible to third party vendors in the hope of saving on labor costs. The following argument is based on the commercial airline industry, as it affects the greatest number of people in our society. Airlines claim that having aircraft maintenance performed by third party vendors is just as safe and reliable as maintenance performed "in house" at the airlines' own maintenance department, using federally licensed aircraft technicians. However, aircraft maintenance that is contracted to the lowest bidder is not conducive to a *safe* maintenance program. Once an airline has its maintenance performed by third party vendors, it dismantles the infrastructure needed to perform heavy, overhaul checks, which are the most important part of aircraft maintenance. The airline is no longer capable of pulling the work back in-house if the vendor is performing poorly. Once the maintenance work is performed outside of the airline's hangars, their technicians can no longer ensure that the aircraft are being maintained to federal standards.

Outsourcing and FAA Oversight

Airline technicians are licensed by the FAA after two years of schooling. All maintenance performed on commercial aircraft is regulated by the FAA to ensure that the aircraft we fly on are maintained to safety standards. Because there are more aircraft being repaired than there are FAA inspectors, the agency relies on the airline to follow its own maintenance program that has been reviewed and certified by the agency. An airline's program lays out in detail how the airline will perform the maintenance on their aircraft. Due to these programs, the FAA only needs to

perform spot checks, or inspections, inside the carrier's maintenance facility; thus minimizing the need for inspectors.

This system has worked properly for decades. But in the era of low cost carriers, it can no longer work as designed. The low cost carriers outsource the majority of their maintenance to the lowest third party bidder. They are called "low cost" for a reason. In order to be competitive, the major airlines have followed suit with their maintenance programs in order to save money. However, these maintenance programs are not designed to have the majority of their maintenance done by a third party vendor. So, the major airlines have revamped their programs in order to maintain compliance with the FAA.

These program changes make sense on paper. But the truth is that the level of safety has been reduced significantly since the airlines began outsourcing their maintenance, and even today safety standards are continuing to deteriorate. There are two reasons for this: 1) not enough FAA inspectors have been hired to spot check the thousands of third party repair facilities that have sprung up around the world, and 2) the majority of the airlines' licensed technicians have been eliminated. The FAA has admitted they cannot spot check every vendor each year, let alone ascertain that the unlicensed technicians hired by the outside vendors are performing to federal standards.

Although the FAA relies on the individual carriers to perform their aircraft maintenance using the certified program, the problem is that, with outsourcing the airline has to ensure that every one of its vendors is operating properly. The airline signs a contract with the vendor who in turn states that its work will remain compliant with the maintenance program certified by the FAA. So, this means that the "cost driven" airline is like the fox watching the hen house. When it comes to maintaining on-time performance within very tight operating budgets, how much effort is actually placed on making sure the migrant worker from the Philippines working on the aircraft in Singapore is doing repairs within the FAA certified maintenance program? The vendor has to keep its costs down, or else it risks losing the airline's contract. So, the vendor will perform the bare minimum needed to satisfy the airline's maintenance program, with lower paid, non-union, unlicensed technicians. So who is watching to make sure federal standards that have kept us flying safe for decades, are being met?

Specific Issues with Overseas Outsourcing

Because the FAA does not have the staff to do a yearly walk through inspection of all domestic vendors, when aircraft repairs are performed abroad, the problem is compounded. For instance, all licensed aircraft technicians who work at airports across the US are fingerprinted, and their names are run through a ten year background check to ensure that these technicians are who they say they are and not someone set on doing harm to the passengers flying on the aircraft. But, when

aircraft maintenance is outsourced to overseas vendors, there is no background check or fingerprinting of the technicians.

Aircraft sent to overseas vendors generally require a “heavy check,” or what would be better understood as an “overhaul.” This may take up to eight weeks to accomplish because of the degree the aircraft has to be disassembled and inspected. Every nook and cranny is exposed to potential threats of terrorism. Terrorists could plant explosives inside the walls of the planes they have worked on, all set to detonate on the same day at the same time. For example, during a terrorist raid in the Philippines, investigators discovered a plan to blow up ten commercial aircraft over the ocean at once.

When aircraft maintenance is kept within the air carrier, control of who gets access to the aircraft, and the quality of the maintenance performed can be guaranteed. Once the maintenance is sent to an overseas vendor, the security and quality can no longer be controlled, let alone guaranteed. Because there are few unions in Asia, where most aircraft are outsourced, working conditions can be extremely hazardous compared to US standards. There is no Occupational Safety and Health Administration (OSHA) or Environmental Protective Agency (EPA) to protect the workers so that they are able to perform their jobs safely. The lack of standards is in large part why companies often prefer outsourcing work to overseas vendors; it is cheap and the workers are expendable.

Overseas vendors utilize a handful of skilled technicians to supervise the work of hundreds of laborers. The skilled technicians are supposed to be the ones to guarantee that the air carrier’s maintenance program is followed, at least on paper. Meanwhile the laborers do the hazardous work, such as sanding toxic paint, spraying carcinogenic cleaning solvents, and so on. Much like laborers that travel to America from Mexico, workers from other third world countries will travel to these vendor sites. They are often not documented, nor citizens of the vendor country, and more than likely not able to understand written English. These workers cannot speak up about working conditions or improper maintenance for fear of losing their jobs. In addition, if one cannot understand the manual, then one is also unable to report improper maintenance. As one can readily see, there are very few controls on the overseas vendors.

The Benefits of Licensed, Union Technicians

Hopefully the reader can understand my concern for the rapid race to outsource maintenance to the lowest bidder, whether here or abroad. The truth is, a licensed aircraft technician is trained and entrusted to comply with all Federal Aviation Regulations (FARs) and is to report any maintenance that is not performed under these regulations. This system works wonderfully when all aircraft technicians are licensed by the FAA and work under a union contract. This contract is very instrumental in ensuring that our commercial aircraft are maintained properly. But

to the reader, this claim may sound rather one-sided, especially coming from a union represented, licensed aircraft technician.

However, in a real life scenario, the reason why a licensed aircraft technician would be able to prevent an unserviceable aircraft from leaving the gate and taking off full of passengers is because the union protects the technician from reprisals. This type of scenario has arisen over and over in my 25 year aviation career. Licensed aircraft technicians working at a non-union vendor, who have refused to sign off on repairs not done according to regulations, have often found themselves blacklisted. Some have even been terminated for “performance related issues” when they, in good conscience, would not sign for an improper repair. This type of situation corrupts the standards of the technicians who end up failing to uphold their licenses.

Only a licensed technician can sign off a repair on an aircraft. If the manager is not licensed, that person leans on a licensed technician, especially one who has an inherent fear of being terminated, to sign off, or “pencil-whip” the illegal repair. Naturally, the technician that puts up the least resistance ends up pencil-whipping the improper maintenance. The chance of pencil-whipping magnifies itself when using an overseas vendor. When a union is present, even the most intimidated technician can refuse to sign for an illegal repair; because that employee knows that union representation is only a phone call away. I have seen many times when a union representative has been required to intervene on the tarmac to prevent the aircraft from leaving the gate in an unserviceable condition.

The union involvement in commercial aviation maintenance is more important now than ever before. The industry has been faltering economically for many years, and cuts have been made everywhere in order to revive the industry to its former profitability. These cuts have caused maintenance to be outsourced to the lowest bidder. That in itself is an unsettling fact. But add to it air carriers that have cut staff to the bare bones while at the same time being responsible for monitoring the hundreds of vendors they have contracts with, and the situation becomes scary. With the FAA unable to keep up with outsourced aircraft repairs, and air carriers operating under extremely tight budgets in a highly competitive, cut-throat industry, unions are the only insurance that maintenance will be performed to the same standards that have kept the flying public safe for all these years.

I am not saying that management will purposely put the flying public in harm’s way, but the airlines have an incredible amount of pressure to maintain on-time performance, and this pressure may often lead to the violation of the technician’s role to abide by one’s license. Technicians are *responsible* and *liable* for that aircraft when they sign it off. Although rare, *liability* can result in jail time for not following the FARs. Their *responsibility* is to maintain a properly functioning aircraft that in turn will ensure the passengers safety as they travel. Flying is not natural for humans. It is a very mechanical process that allows several tons of metal to lift off the ground. If one part of the process is not functioning, the result could be catastrophic.

If the aircraft technicians only needed to abide by turn-times or vendor contract times as they performed maintenance, safety would be compromised. The licensed aircraft technician has an attachment to the aircraft or even the part that one repairs and signs off. The technician takes ownership of that product and ensures that it is done properly under federal regulations. But to an unlicensed vendor technician the work performed is simply another job to do because that person does not take ownership of either the aircraft or the part. It does not matter if the repair is done per regulations, as long as it passes through one's department within the time limits. There is no liability or responsibility placed on the unlicensed technician. It is all born by the vendor company, which is allegedly working under the air carrier's maintenance program, certified by the FAA. So who really is responsible and liable and taking ownership for the aircraft you are flying on? Is it the unlicensed, non-union vendor technician, or the vendor company, or the air carrier, or the FAA? No one really has to take ownership.

The circumstances that have resulted from outsourcing aircraft maintenance are not conducive for continued safe air travel. Because of the over-engineering that goes into the design of aircraft, it will be some time before these circumstances will show that effect. We have had a very safe travel industry for many years and that is not because of chance. Rather, licensed technicians have maintained the system by following FAA regulations. Thus, it is important to note that in the past, union workers were the ones dedicated to making sure these regulations are upheld. Now the air carrier has removed this work from the union employees. The reader may want to consider why.

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PART III

Issues in Responsibility

While the previous part focused on the business side of aviation, this one investigates the individual players in order to examine some of the key issues in responsibility. It begins with Chapter 8 and an analysis of whistleblowing both in its ethical dimensions as well as its legal aspects. Regarding the moral side of whistleblowing, questions arise as to when it is the right thing to do and how it impacts both the employer and employees involved. Turning to the legislative side, the authors Bruce Hoover and Jiao Ma investigate the ways in which aviation industry employees are legally protected. In particular they examine two statutes that aim at protecting whistleblowers in the aviation industry: the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (AIR-21) and the Sarbanes–Oxley Act.

The subsequent chapters on responsibility deal with specific areas of the industry: FAA inspectors, pilots, flight attendants, and corporations respectively. Chapter 9 by Gerardo Martinez provides an account of the ethical responsibilities of FAA inspectors followed by a brief examination of possible ethical lapses that may arise. In Chapter 10 Elizabeth A. Hoppe takes a closer look at one of those lapses, namely, regulatory capture. Capture occurs when a regulating body, such as the FAA, works so closely with a regulated entity that the agency ends up elevating the interests of the airline over what should be the FAA's main concern, namely safety.

In Chapter 11 Robert Lavender addresses the lack of pilot unity in the deregulated era. While management has adapted to new ways of doing business, pilots have lagged behind due to the mentality of the regulated era in which pilot salaries and job outlooks were rather secure. As for a solution, Lavender argues in favor of compensation balancing in order to reduce internal competition. He maintains that if pilots continue to be hired into or between networks by individual carriers, compensation differentials between the top and the bottom of seniority lists must be reduced. Otherwise tensions will continue to develop and unity among pilots will become unachievable.

Moving on to the topic of flight attendants, Gail L. Bigelow in Chapter 12 provides her perspectives on the responsibilities of flight attendants, especially in a post-9/11 era. In tracing out the basic duties that a flight attendant should follow, she also notes the ways in which ethical dilemmas may arise, such as whether or not to report possible safety issues. Bigelow also discusses passenger responsibilities and some of the more trying situations, such as parents flying with

young children. In light of 9/11 she reveals the way in which the profession has changed in that it is more focused on questions of terrorism and whether or not certain passengers should be considered more suspect than others. By providing us with an overview of how complex the role of the flight attendant actually is, her chapter also indirectly shows us the ways in which flight attendants can be taken for granted and thereby undervalued.

Chapter 13 concerns the 1996 crash of ValuJet 592 and the question of corporate responsibility. Kenny Frank first analyses some of the key aspects of the NTSB report which states that the probable cause of the accident was due to a fire caused by oxygen canisters being transported as cargo. But Frank shows us that the NTSB report may be incomplete, and he reviews anonymous witness accounts which claim that the wiring was faulty and thereby could have been the main source of the onboard fire. In the end Frank shows us that whatever may be the actual cause of the crash, the real issue is the corporate responsibility, or lack thereof, of ValuJet to ensure the safety of its passengers and crew.

Chapter 8

Whistleblowing in Aviation

Bruce Hoover and Jiao Ma

Never let your sense of morals get in the way of doing what's right.

Isaac Asimov, novelist

Whistleblowing can be defined as the voluntary release of non-public information, as a moral protest, by a member or former member of an organization outside the normal channels of communication to an appropriate audience about illegal and/or immoral conduct in the organization that is opposed in some significant way to the public interest (Boatright 1993: 133). Whistleblowers act in good faith and in the public interest to raise concerns about suspected impropriety within their place of employment. Whistleblowing is commonly distinguished as internal or external (Louw 2008). The former is defined as following recognized procedures within an organization with the intention of resolving a problem internally. It is commonly required in law to exhaust the internal avenues before steps are taken externally.

Similar to a siren or fire alarm, whistleblowing alerts people to pay attention to what is happening or about to happen and take action immediately. Workers who “blow the whistle” on prohibited or unlawful practices they discover during their employment can play an important role in enforcing federal laws. However, these whistleblowers also risk reprisals from their employers, sometimes being demoted, reassigned, or fired. Table 8.1 provides some examples of well-known whistleblowing cases across different industries in the US.

Moral Dilemmas

Moral conflict is immediately brought to bear when an individual considers the possibility of blowing the whistle on their own organization. An understanding of why there is such a moral conflict and a perspective for thinking about how to resolve the conflict are important. An individual contemplating an act of whistleblowing should ask him or herself what good will result and what bad will result if he or she carries out the act. Air carriers are confronted with multiple regulatory and economic challenges in today's environment. They can ill afford whistleblower claims.

Table 8.1 Well-known US cases of whistleblowing

Case	Year	Industry
The Pentagon Papers	1971	Military and Politics
B.F. Goodrich & Air Force A7-D Brake Problem (“Aircraft Brake Scandal”)	1968	Manufacturing—Wheel and Brake
Deep Throat	1972	Politics
Silkwood and Kerr McGee	1974	Nuclear Energy
Hughes Microelectronics Hybrid Microchips Test	Mid 1980s	Manufacturing—Micro Electronics
Roger Boisjoly and Space Shuttle <i>Challenger</i>	1986	Aerospace
Jeffrey S. Wigand and Tobacco	1996	Tobacco
Enron, Watkins, Ceconi and others	2001	Energy
WorldCom	2002	Telecommunications
Alderson, HCA Inc. and Medicare fraud	2003	Healthcare
San Diego	2003	Local Government
Rost and Pfizer	2003	Pharmaceutical
Schering-Plough Corp.	2004	Pharmaceutical
Fishbein and the NIH	2005	Federal Research

The Nature of Whistleblowing

Whistleblowing is considered a vital tool for promoting individual responsibility and organizational accountability (Louw 2008). However, it does not extend to the following: (1) acts motivated by bad faith (e.g., a disgruntled employee attempts to damage an organization’s image), (2) prematurely uncovering matters that should primarily be handled internally and are not matters of public concerns to begin with, (3) involving structures of authority that are not recognized in law, and (4) engaging in whistleblowing on mere suspicion instead of demonstrable evidence.

Whistleblowing, by its very nature, is perceived as “rocking the boat.” Indeed, it is designed to wake up the silence of “affairs as usual.” Thus, whistleblowers are consequently portrayed as disloyal troublemakers and stigmatized and shunned accordingly by both employer and co-workers (Erlen 1999, Johnstone 2004). Whistleblowing is often suggested to be used as a last resort; after all other avenues have been exhausted in an attempt to remedy the situation, since morally justifiable actions come with risks and do not guarantee morally desirable outcomes (Johnstone 2004).

Perception and Reception of Whistleblowers

Although whistleblowers are commonly motivated by their professional conscience, the image of the whistleblower remains tainted as a “rogue” and “troublemaker.” Protected in theory the whistleblower often remains unprotected from reprisal practices (Louw 2008). Since childhood we learned that being a tattletale is bad. The same attitude toward tattletales holds true for adults. A whistleblower, a tattletale in the professional environment, often receives a negative response from co-workers and even neighbors. In a recent famous whistleblowing case, a full criminal investigation was launched to look into the spending habits of former privacy commissioner George Radwanski and a number of his subordinates. Radwanski threatened to end the career of the “rat who squealed to the MPs [Members of Parliament]” if he ever found out who it was (Louw 2008).

Paradoxes of whistleblowing The act of whistleblowing sets off alarms. A voice is raised and action follows. The elements of whistleblowing—dissent, violation of loyalty, and accusation—create a unique atmosphere of bitterness and discontent.

Dissent Differences in opinion against the majority become very public. The dissent may be focused on negligence. There is a conflict for the whistleblower. Do I conform or do I stick my neck out? The latter presents great risk.

Breach of loyalty An air carrier mechanic who blows the whistle on his/her own team may be seen to violate loyalty to the group. The conflict arises between loyalty to work colleagues and loyalty to the public interest. The whistleblower is an insider. One alternative that may provide a level of perceived safety is for the whistleblower to exit the work place, secure a job elsewhere, and then blow the whistle. Keeping their job is difficult during this alarming action.

Accusation To charge others of wrongdoing arouses superiors and may lead to strong reactions. Negligence, endangerment, or abuse may be the stimulus. Accusation signals specific persons or groups of employees as responsible for threats to public safety. The alarm may address a safety defect in a specific aircraft that threatens or will shortly threaten passengers. Whistleblowers must have identified a specific, concrete risk, rather than some prediction or vague concern. Often the danger is kept secret by the organization, or a few individuals within it. The whistleblower may wish to reveal the secret for publicity, self-aggrandizement or revenge for perceived injustices in the workplace.

Impact of Whistleblowing

The stakes in whistleblowing are high. A nurse who alleges that physicians enrich themselves through unnecessary prostate surgery; the engineers who disclose safety defects in the braking systems of a fleet of new commercial passenger-

carrying aircraft; the Defense Department official who alerts members of Congress to greed and overspending. All of these individuals know that they pose a threat to those whom they denounce and that their own careers may be at risk. Canadian Federal Accountability Initiative for Reform (FAIR) describes eight phases of the typical experience of whistleblowers and how they find themselves compelled to speak out and the consequences for them and the rest of us: (1) awareness → (2) the decision of conscience → (3) raising concerns internally → (4) facing the initial reprisals → (5) the decision to commit fully → (6) going public and the consequences → (7) the war of attrition → (8) the endgame (FAIR 2009).

Whistleblowers are often profoundly affected by their decisions and actions. For example, in the famous mid-1980s Hughes Microelectronics whistleblowing case, following job losses, one whistleblower and her husband had to file for bankruptcy and their marriage eventually broke up. The other whistleblower was on welfare for a year before she could find another job. However, both of them felt they were right in taking the action. After the final settlement, one of them commented that despite the toll it has taken, it was the right thing to do (Bowyer 2000).

A study of whistleblowers in the US found that:

- 100 percent were fired and most were not able to find new jobs
- 90 percent reported emotional stress, depression, and anxiety
- 80 percent suffered physical deterioration
- 54 percent were harassed by peers at work
- 17 percent lost their homes
- 15 percent were subsequently divorced
- 10 percent attempted suicide (Haines 2004).

A study of whistleblowing nurses revealed that the majority of them suffered from significant physical and emotional health problems (70 percent and 94 percent, respectively), including lethargy, sleep disturbance, headaches, backaches, weight loss or gain, increased substance use (e.g., drug, alcohol, smoking), gastrointestinal problems, cardiac symptoms, anger, anxiety, depression, disillusionment, fear, poor self-esteem, and a breakdown of personal relationships (i.e., separation and divorces). The impact of whistleblowing spreads far beyond the working environment of those indirectly involved (Leyland 2007). For example, among 77 children of the whistleblowers, 60 of them were adversely affected (e.g., family relocation) (Lennane 1993).

Upon exhausting all avenues available to correct a problem with no response from the employer, there is an inherent conflict between an employee's loyalty to the organization and the employee's potential legal and ethical obligation to report apparently fraudulent activities to the proper authorities (Clarke 1999). The potential significant financial gain for the whistleblower further complicates the matter. It is recommended that an employee seeks the advice of competent legal counsel before acting on the whistleblowing option.

Legislation on Whistleblowing

Whistleblower lawsuits (a.k.a., *qui tam* lawsuits) are filed under the False Claims Act and allow private citizens, whether affiliated with the government or not, to bring lawsuits on behalf of the government (thus the Latin term *qui tam*) against companies that have allegedly engaged in fraudulent activities. The government can decide to join the lawsuit or let the person who filed it see it through. In either situation, the person who filed it may receive up to 25 or 30 percent of whatever is recovered. The bulk of the damages will be reimbursed to the US government. The False Claims Act upholds a citizen's right to file claims against offenders—and protects an employee from retaliation for blowing the whistle against an employer that submitted a false government claim (e.g., making false or fraudulent claims about the quality of the goods or services a US government contractor has agreed to provide). Since its amendment in 1986, according to the Justice Department (DOJ), by 1997 the government has recovered more than three billion dollars in civil fraud actions, with more than one billion dollars attributed to 153 whistleblower cases (Blechman 1997).

OSHA's Whistleblower Protection Program

Whistleblower protection is a patchwork of laws that are often confusing to the aviation employee. The Department of Labor (DOL) is charged with enforcing the federal laws protecting corporate whistleblowers at publicly traded companies. Since the whistleblower program began in 1970, the number of statutes for which the DOL's OSHA is responsible for enforcing has increased—recent additions in 2008 bring the total to 17 such statues (GAO 2009). Table 8.2 shows the current list of statutes.

Statutes in the OSHA Whistleblower Protection Program have different focus and target user populations. Some of them address the protection of federal employees (e.g., Whistleblower Protection Act of 1989) and others address corporate employees (e.g., Sarbanes-Oxley Act (SOX)). The Whistleblower Protection Act of 1989 created the Office of Special Counsel (OSC),¹ charged with investigating complaints from persons who work for the government. Corporate whistleblower statutes and regulations aim at providing a legal prohibition against discharging, demoting, suspending, threatening, harassing, or in another manner discriminating against any employee with respect to the employee's compensation, terms, conditions, or privileges of employment because the employee engaged in certain protected conduct (Klein 2004).

1 The OSC is an independent investigative and prosecutorial agency and operates as a secure channel for disclosures of whistleblower complaints. Its primary mission is to safeguard the merit system in federal employment by protecting federal employees and applicants from prohibited personnel practices, especially retaliation for whistleblowing.

Table 8.2 Statutes included in OSHA's whistleblower protection program

Agency and statute	Year of enactment of whistleblower provision
Department of Energy	
Energy Reorganization Act	1978
Department of Transportation	
International Safe Container Act	1977
Federal Railroad Safety Act	1980
Surface Transportation Assistance Act	1983
Pipeline Safety Improvement Act	2002
National Transit Systems Security Act	2007
Environmental Protection Agency	
Federal Water Pollution Control Act	1972
Safe Drinking Water Act	1974
Solid Waste Disposal Act	1976
Toxic Substances Control Act	1976
Clean Air Act	1977
Comprehensive Environmental Response, Compensation, and Liability Act	1980
Asbestos Hazard Emergency Response Act	1986
Federal Aviation Administration	
Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (AIR-21)	2000
Department of Labor	
Occupational Safety and Health Act	1970
Securities and Exchange Commission	
Sarbanes-Oxley Act	2002
Consumer Product Safety Commission	
Consumer Product Safety Improvement Act	2008

Whistleblower Protection for Employees in the Aviation Industry

The FAA offers a Whistleblower Protection Program that provides protection from discrimination for air carrier industry employees (FAR Part 121 and 135, but not 91 operations) who report information related to air carrier safety. The two statutes that aim at protecting whistleblowers in the aviation industry are Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (AIR-21) and SOX.

In the eight years since Congress enacted significant new protections for whistleblowers in the airline industry, more than 202 AIR–21 cases have gone before the Office of Administrative Law Judges (ALJ), some of which have resulted in significant recoveries in favor of employees (DOL 2009). In 2000 Congress passed The Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (AIR–21) to protect employees who expose air carrier safety violations. Under AIR–21, Section 519, employees who believe they have suffered adverse action for reporting air safety violations can file a complaint with the OSHA within 90 days of the date on which the discriminatory decision has been made and communicated to the employee. After 90 days have elapsed, an employee may still file the complaint with an OSHA office, but the OSHA Area Director may dismiss the complaint as untimely. The FAA may still investigate the safety information provided by the employee. More recently air carriers have become subject to the whistleblower protection provisions contained in SOX, which imposes criminal penalties for retaliation against whistleblowers.

Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (AIR–21)

There are joint responsibilities of the FAA and OSHA under the AIR–21 program. A prevailing plaintiff is entitled to reinstatement, back pay, compensatory damages, and attorney’s fees and costs.

Covered employers Employees of air carriers, their contractors, and their subcontractors, are protected from retaliation, discharge or otherwise being discriminated against for providing information relating to air carrier safety violations to their employer or to the federal government. This includes information filed, testified, or assisted in a proceeding against the employer relating to any violation or alleged violation of any order, regulation, or standard of the FAA or any other federal law relating to air carrier safety. AIR–21’s prohibition against retaliation applies broadly. It applies to air carriers, which includes any “citizen of the United States undertaking by any means, directly or indirectly, to provide air transportation,” 49 USC §40102(a)(2) and to contractors and subcontractors of air carriers. A “contractor” is defined as any “company that performs safety-sensitive functions by contract for an air carrier” 49 USC §42121(e). It is important to note that if a person is used by an air carrier certificate holder or an air carrier that does not hold a certificate, that person may still be considered an “air carrier employee” for the purposes of whistleblower protection.

Protected conduct Employees who report air safety violations in the following manners are engaging in conduct which is protected by AIR–21: (1) providing information to the employer or the federal government relating to any violation or alleged violation of any federal air safety statute or regulation, (2) filing a proceeding relating to a violation or alleged violation of air safety rules, (3) testifying in such a proceeding, or (4) assisting or participating in such a proceeding.

Generally it is not difficult for a complainant to establish that he or she engaged in protected conduct. For example, DOL decisions have held that the following activities are protected: (1) alerting the FAA that an aircraft was being flown past its maintenance threshold, (2) reporting to a supervisor that some aircraft parts in warehouse bins did not contain the FAA-required serviceable tag, and (3) alleging to management that maintenance records were falsified.

The FAA's Advisory Circular on the subject notes "air carrier safety is any safety concern that you believe, in good faith, is a violation of an FAA regulation, order, or standard or any other Federal law that implicates the safety and security of air carriers. The safety information you report must be related to air carrier safety (not personal safety)" (USDOT 2004). The FAA publication provides examples of information related to air carrier safety (USDOT 2004: 2). These may include:

- Falsification of records
- Noncompliance with flight and rest requirements
- Improper maintenance practices
- Security breaches
- Inadequate compliance with training requirements
- Use of suspected unapproved aircraft parts
- Improper manufacturing procedures
- Crewmember medical qualifications
- Improper production of aircraft parts
- Instruction not to document aircraft maintenance discrepancies.

If a worker is an employee of a US air carrier, its contractor, or its subcontractor, this law protects the worker against discrimination by their employer for reporting air safety information. An employer cannot discriminate against the employee because the employee provided, caused to be provided, or are about to provide to the employer or federal government information that relates to any violation or alleged violation of any order, regulation, or standard of the FAA or any other provision of federal law that relates to air carrier safety. Also, an employer cannot discriminate against employees because they filed, caused to be filed, or are about to file a proceeding that relates to any violation or alleged violation of any order, regulation, or standard of the FAA or any other provision of federal law that relates to air carrier safety.

Adverse action Almost any action taken by an employer which has a negative effect on the employee's terms, conditions, or privileges of employment, amounts to adverse action. This includes intimidating, threatening, retraining, coercing, blacklisting, or discharging an employee. DOL authority construing similar whistleblower protection statutes indicates that adverse action also includes demotion, reduction in salary, failure to hire, harassment, transfer to a less desirable position, and even a change of office location.

OSHA investigation Within 60 days of the filing of a complaint, OSHA must investigate the complaint and determine whether the employer violated §519.² The employer has 20 days to submit to OSHA a response to the complaint. If OSHA finds that the complaint has merit, the secretary will issue a preliminary order requiring the employer to: (1) take affirmative action to abate the violation, (2) reinstate the plaintiff to his or her former position, (3) provide the plaintiff with back pay, and (4) provide compensatory damages to the plaintiff.

Hearing before an ALJ Hearings are held before the DOL ALJs and are conducted de novo, i.e., the ALJ disregards OSHA's findings. The rules of evidence applied in hearings before ALJs are somewhat more liberal than are the federal rules of evidence. ALJs apply a broad scope of relevance, and hearsay evidence is not automatically excluded. In addition to reinstatement, back pay, and compensatory damages, a prevailing party is entitled to attorney's fees and costs. Within 60 days of the issuance of the ALJ's decision, either party can file a petition for review before the DOL's Administrative Review Board (ARB). The ARB is authorized to award the same type of relief that an ALJ may award.

Settlements The DOL will not automatically dismiss a claim that has been settled by the parties. Instead, the settlement will be reviewed to ensure that it is fair, adequate, and reasonable. The DOL is concerned primarily with "gag provisions," i.e., provisions that might hinder a plaintiff from raising concerns.

FAA procedures and enforcement An employee of an air carrier, contractor, or subcontractor may contact an FAA aviation safety inspector (ASI) with information regarding a violation or an alleged violation of an FAA order, regulation, or standard, or any other provision of federal law relating to air carrier safety. The employee may also request whistleblower protection by the DOL. In order for ASIs to adequately advise employees of their rights, inspectors should immediately advise them of the Whistleblower Protection Program and for a personal remedy that they should contact DOL/OSHA as soon as possible (not later than 90 days after the discrimination event).

ASIs may conduct an investigation The ASIs will contact the complainant, ask if they have any additional supporting evidence or can tell the ASI where to look. The ASI will then interview company personnel involved and/or other persons that may have knowledge. The ASI should only investigate the safety issues and not reveal that they are investigating a whistleblower complaint. The FAA inspector will collect evidence and make copies of all relevant information and will take

² Procedures for the Handling of Discrimination Complaints under Section 519 of the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century are found in Title 29 CFR Part 1979.

appropriate enforcement and/or corrective action, or the inspector will close out with no action.³

In addition to the remedies that the DOL is authorized to provide to a prevailing plaintiff, a carrier who violates §519 of AIR-21, which is administered by both the DOL and the FAA, may also be subject to an FAA civil penalty. When a complaint is filed under AIR-21, OSHA will provide the FAA with a copy of the complaint and the FAA will investigate safety issues related to it. A memorandum of understanding (MOU) between the FAA and the DOL provides that the two agencies will share all information they obtain relating to complaints of discrimination and will keep each other informed of the status of any administrative or judicial proceeding associated with the complaint. The FAA has the responsibility to investigate complaints related to air carrier safety and has authority under the FAA's statute to enforce air safety regulations and issue sanctions for noncompliance with these regulations. FAA enforcement action may include certificate suspension or revocation and the imposition of civil penalties. Additionally, the FAA may issue civil penalties to US air carriers, contractors, or subcontractors for discrimination in violation of the Whistleblower Protection Program.⁴

It is very important that each complaint be thoroughly investigated. The FAA still has to investigate the safety issues regardless of whether the complaint is filed in a timely manner or not (i.e., over 90 days). OSHA may dismiss the complaint of discrimination as untimely, but may under certain circumstances (i.e., the complainant has a valid reason for not submitting the complaint within 90 days), accept the complaint.⁵

3 It should be noted that FAA Order 2150.3, Compliance and Enforcement Program, Chapter 13, contains FAA policy and procedures for providing immunity from enforcement action, in some cases, to persons who provide information about violations. Information regarding regulatory violations occasionally is offered to an FAA ASI or attorney along with a request that, in exchange for the information, the person making the offer be granted "immunity from prosecution" for his or her participation in the violations. The phrase "immunity from prosecution" ordinarily refers only to criminal matters (DOT FAA Order 8900.1 2007).

4 The FAA may impose a civil penalty after the Secretary of Labor's order of a finding of a violation of 49 USC 42121 becomes final. This civil penalty is in addition to any enforcement action the FAA may impose for safety violations as well as any abatement action OSHA may impose concerning a finding of discrimination. The FAA will receive a copy of the Secretary of Labor's order when it becomes final (i.e., all appeals by either party are exhausted). The FAA may then issue the civil penalty for a violation based upon the finding by DOL, in addition to any FAA safety investigation enforcement action the FAA may have previously taken (see 49 USC §46301).

5 Complainants must realize records are retained. All records associated with whistleblower investigations must be kept for three years after the investigation is closed.

Figure 8.1 illustrates the process of whistleblowing in aviation.

Whistleblower Protection Provisions of SOX

In addition to the whistleblower protection provisions of AIR-21, many carriers are subject to the whistleblower protection provisions in SOX: Section 806 of SOX creates a federal civil right of action on behalf of any employee of a publicly traded company who is subject to discrimination in retaliation for reporting corporate fraud or accounting abuses.

Criminal provisions In contrast to the civil remedies created by §806,⁶ the criminal provisions of §1107 are not limited to the actions of publicly traded companies, nor are they restricted in scope to matters involving corporate fraud or accounting abuses. Section 1107 of SOX imposes criminal penalties on any individual who “knowingly, with the intent to retaliate, takes any action harmful to any person, including interference with the lawful employment or livelihood of any person, for providing to a law enforcement officer any truthful information relating to the commission or possible commission of any federal offense” (US Congress 2002).

TSA’s Whistleblower Protection Program

The Transportation Security Administration (TSA) announced an agreement with the American Federation of Government Employees (AFGE) to enhance whistleblower protection for airport screeners. Instead of being sent to the OSC for investigation, the whistleblowing TSA screener can file an appeal with the Merit Systems Protection Board (MSPB) offering an additional layer of protection. MSPB is an independent, quasi-judicial agency in the executive branch, whose three members review and adjudicate individual employee appeal cases (Wilson 2008).

US Aviation Whistleblowing Case Examples

Whether the Employee of the Subsidiary is a Covered “Employee”

Stacy M. Platone worked as an airline pilot union communications specialist. On April 2003 Platone filed a complaint with the DOL under Section 806 of the Corporate and Criminal Fraud Accountability Act of 2002, Title VIII of SOX. She alleged that Atlantic Coast Airlines Holdings, Inc. violated the employee protection

6 Procedures for the Handling of Discrimination Complaints under Section 806 of the Corporate and Criminal Fraud Accountability Act of 2002 are noted within Title 29 CFR Part 1980.

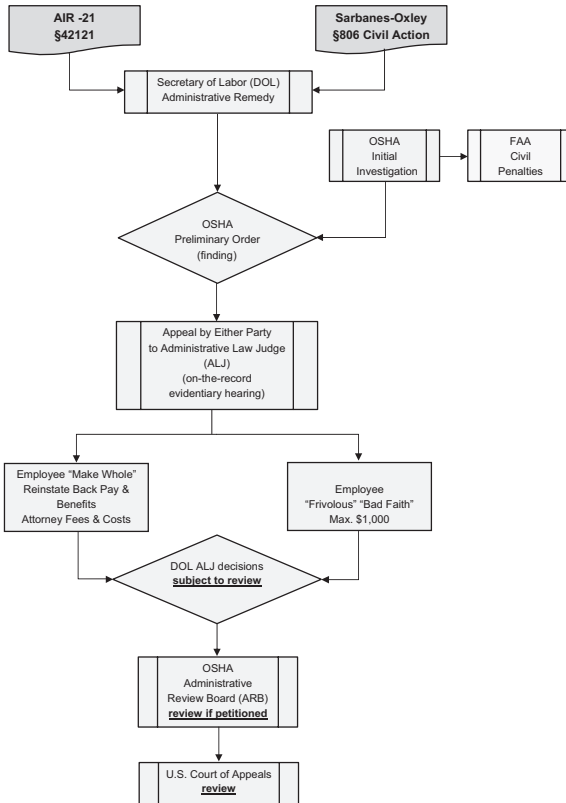


Figure 8.1 Aviation whistleblowing process chart

provision of the Act when it suspended her and later terminated her employment effective March 19, 2003. After a hearing, an ALJ issued an April 30, 2004 recommended decision finding that Platone had engaged in a protected activity and that her suspension and termination were causally related to this activity. The first inquiry—whether the employee of the subsidiary is a covered “employee” under SOX—has been consistently answered in the affirmative. For example, in *Platone v. Atlantic Coast Airlines (ACA) Holdings, Inc.* 2003–SOX–27 (ALJ April 30, 2004) an ALJ held that an employee of a non-publicly traded subsidiary was a covered “employee” where the company’s parent/holding company was publicly traded. The ALJ in *Platone* reasoned that, under the facts of the case, the holding company was the alter ego of the subsidiary and that it certainly had the ability to affect the complainant’s employment. In a supplemental decision dated July 13, 2004 the ALJ recommended awarding Platone damages, costs, and attorney fees. ACA Holdings timely appealed the ALJ’s decisions to the DOL’s ARB. Because the ALJ erred as a matter of law in finding that Platone had engaged

in protected activity, the ARB declined to adopt the April 30 and July 13, 2004 recommended decisions and denied Platone's complaint (*Platone v. US Dept of Labor*, No. 07-1635).

DOL Slaps Airline in Whistleblower Case

An ALJ, Anne Beytin Torkington, found there was "ample proof" Alaska Airlines managers pressured Carroll Sievers and others at the airline's Portland facility to get planes back into service after they had raised legitimate concerns (*Sievers v. Alaska Airlines, Inc.*, 2004-AIR-00028). The ALJ found Sievers' work to be "competent and aggressive," as well as "reasonable, genuinely motivated by concern for safety, and an activity protected" under the federal whistleblower law. The ALJ ordered Alaska to pay Sievers \$534,000 for past and future lost wages and \$50,000 for emotional distress. Alaska appealed the decision. The ARB (Case No. 05-109) reversed the ALJ decision on January 30, 2008. The ARB found that "Seviars did not demonstrate that protected activity contributed to the termination. Rather, the weight of the evidence demonstrates that Alaska terminated Sievers because of timecard fraud." The ARB denied Seviars' complaint.

FAA Manager Files Whistleblower Disclosure with the OSC June 2002

Is there a need to reform and amend the Whistleblower Protection Act of 1989 (WPA)? Rejecting repeated, explicit congressional intent, the Federal Circuit Court of Appeals ruled in *Willis v. Department of Agriculture* (141 F.3rd 1139 (Fed. Cir. 1998)), a disclosure made as part of an employee's normal job duties is not protected.

Gabe Bruno, a 20-plus-year FAA employee, was assigned responsibility for oversight of the ValuJet-AirTran merger following the tragic 1996 ValuJet accident that killed all 110 on board. Mr Bruno was to implement necessary oversight to prevent recurrence of the tragedy. Mr Bruno filed an official whistleblower disclosure with the OSC in June 2002, citing the oversight problems with AirTran and the cancellation of a mechanics reexamination program. In May 2001 the FAA reassigned Mr Bruno from his management position as a result of his expressed concerns to supervisors. According to existing case law, Mr Bruno's whistleblowing does not qualify as protected speech because his disclosures were made "during the course of his job duties." The resulting FAA "security investigation" could therefore not be successfully challenged as retaliatory. The case was settled in the summer of 2005 with Mr Bruno losing his job at the FAA in a "nuisance settlement."

Conclusions

Anyone may find oneself in a position of making a difficult decision between one's conscience and what one is told to do by one's boss. Fortunately most of us do not have to agonize over critical issues. Whistleblowing occurs when an individual within an organization openly accuses others, usually colleagues, of professional wrongdoing through a mechanism with the federal government or through a public medium. Such action requires ethical justification, which may be found in stopping harm to the public, issues of safety, or opening people's eyes to similar wrongdoing. If the good outweighs the bad, it may be permissible; whether it is obligatory depends on federal law and the degree of negative repercussions the whistleblower is most likely to undergo. Organizations, such as air carriers, provide employees with internal mechanisms for listening and responding to their concerns. If we are to have a just society, it must protect, to the degree feasible, individuals who blow the whistle in good faith.

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Chapter 9

Ethics and FAA Inspectors

Gerardo Martinez

I, (name), do solemnly swear (or affirm) that I will support and defend the Constitution of the United States against all enemies, foreign and domestic; that I will bear true faith and allegiance to the same; that I take this obligation freely, without any mental reservation or purpose of evasion; and that I will well and faithfully discharge the duties of the office on which I am about to enter.

So help me God

This is the oath of office that all FAA ASIs take when they are first hired. It means that we accept full responsibility for doing the best job possible, to the best of our abilities, all of the time. Who we work for, ultimately, is you, the public. We ensure the public's safety and we are charged to regulate the industry in a fair and ethical manner. We represent the Federal Executive Branch of the government. We work closely with industry, which includes manufacturers, operators, repair stations and small corporate aviation departments, schools, and various other entities, such as museums, aviation associations, clubs, and individuals.

The FAA assigns ASIs from three specialties (Operations, Maintenance, and Avionics) to each operator. Based on the size and complexity of the airline, we can assign anywhere from three to more than a hundred ASIs to an operator. Each inspector has a responsibility to ensure safety and adherence to FARs:

- We have the authority granted by Congress to stop an operation or punish an operator or airman who violates one or more of these regulations.
- We have the authority to revoke or suspend certificates, including the certificates of pilots, mechanics, and operators.

Inspectors oversee the carrier's entire system, visit locations where they operate, review and approve their policies and procedures. These reviews include, but are not limited to training, maintenance programs, content and presentation of instructions, check lists, routes, dispatch, scheduling, maintenance control, weight and balance programs and anything else that an operator would need to safely operate.

The FAA Inspector: Responsibility and Authority

To accomplish our goals we need an experienced and educated team of employees. Our ASIs often come from the industry, where they already have been exposed to the aviation skill sets that the FAA requires. Each of our employees must undergo a very thorough background investigation, which covers moral character, financial responsibility, criminal records, educational credentials, work history, military records, and reputation. We also have financial disclosure and conflict of interest requirements. Because we hire from the industry, our employees have for the most part, vast amounts of experience and ties to former employers. We require those new hires to divest themselves of any financial ties to a carrier or employer regulated by the FAA.

Our ethics rules require that we annually sign and submit for review a financial disclosure report. We must list investments we hold, real estate, stocks, bonds, and any travel reimbursements we have received (other than government travel) for each year. The rules basically prohibit ASIs from using the public trust for personal financial gain. The FAA has significant public safety responsibilities, and we must discharge our responsibilities effectively, vigorously, and evenhandedly. We cannot do so if we have interest in the companies we oversee.

If inspectors or their spouses have employment or previous employment with an airline, or an operator then special rules apply to them:

- Previously earned pensions and are understood to be something one is entitled to, but one still has to report them.
- Re-employment rights must be disclosed.
- Flight privileges must also be disclosed and in some instances pre-approved.
- FAA employees are prohibited from owning stocks or other interest in airlines or aircraft manufacturing companies or even in companies predominantly in the business of supplying aircraft components, goods, services, or parts to the airlines or the aviation industry.

For example, we cannot own stock in Boeing, General Dynamics, General Electric, Goodrich, Honeywell, Lockheed Martin, Northrop Grumman, Raytheon, Rockwell Collins, Textron Inc, United Technologies, or any of the airlines. Even owning one of these stocks will require either divestiture or electing not to work for the FAA.

Our close oversight of operators means that we often end up being privy to what can be considered insider information. We find out what the operator is planning to do in the near term or long term, where it expects to extend operations, where managers plan to shrink operations, what markets the carrier plans to expand to, what fleets the carrier anticipates will be used in the future, what fleet types and sizes they hope to obtain, what fleet types and sizes they intend to get rid of, and much more. It is vital that we guard this proprietary information closely.

Ethical Lapses

Have there been ethical lapses among inspectors? The answer is yes. Fortunately I am aware of only a small handful. Most are quickly and severely punished. I know of one instance where an ASI created a consulting firm, then suggested that an operator hire this consulting firm to help write the carrier's compliance manual. The final product would be submitted to the FAA for review and final approval. The only problem was that the ASI was the FAA official who would review the final product. He was terminated.

Another case involved an airframe and powerplant (A and P) school. The ASI who had oversight responsibility for the school was enticed to work for them. The school was investigated after the military noticed that a large amount of military mechanics were returning as civilian certificated A and P mechanics, all in record time. The FAA investigated and discovered that there was no humanly possible way to test the amount and quantities of mechanics that the school was processing. The operators of this school eventually faced criminal charges, and all of its graduates had their certificates revoked but were offered the chance to retest for them. There were a lot of innocent victims in that episode.

Capture

In *The Regulatory Craft*, author Malcolm K. Sparrow describes something that can happen to regulatory agencies (Sparrow 2000). He calls it "Capture." Capture as described by Sparrow means that the relationship between a regulator and the regulated entity becomes so close that the regulator ends up identifying with the party he or she is supposed to be overseeing (Sparrow 2000). Capture happens when one loses sight of who one works for, and the fear of damaging one's relationship with the party one is supposed to be regulating, causes one to lose sight of one's responsibilities. We are not robots; we end up working with people whom we regulate, sometimes for years. An ASI can experience an interaction with a floor mechanic, and then later interact with her or him when the ASI becomes a supervisor, followed by manager, and later a director.

But it is possible that capture could be neutralized by proper interaction and oversight. An ASI who has a good professional relationship with the above mentioned director can be effective, and the parties can agree to disagree if they have to. The danger occurs when the relationship becomes so close that the regulator ends up not wanting to fulfill his or her duties and responsibilities for fear of somehow damaging the relationship with the regulated entity.

Conclusion

The bottom line is that ethical behavior has to be at the forefront of our interactions with all of our audiences: the public, the industry, each other, and above all, the

parties we regulate. We cannot forget our primary task, which is to ensure the public's safety and regulate the industry in a fair and ethical manner. What does "ethical manner" mean? It means maintaining a professional distance that allows interaction AND objective oversight. It means remembering our duty to serve the public and maintain the public's trust. And, above all, it means avoiding such a close relationship that "capture" becomes preferable to oversight.

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Chapter 10

The Danger of Capture in the FAA

Elizabeth A. Hoppe

In the previous half of this chapter, Gerardo Martinez provided an overview of the ethical responsibilities of FAA safety inspectors. Although for the most part, inspectors stand by the oaths they take, as Martinez has pointed out, ethical lapses can occur. One of the key issues for those working in the regulatory field is Malcolm Sparrow's concept of capture (2000). This half of the chapter will investigate the report, *Managing Risks in Civil Aviation* (Stimpson et al. 2008) in order to see instances in which capture may have occurred within the FAA as well as why it is necessary to find ways to overcome the problem. Additionally I will address to what extent capture should be considered an ethical issue.

The report is based on an April 3, 2008 hearing of the House Committee on Transportation and Infrastructure chaired by James L. Oberstar. One of the concerns was safety at Southwest Airlines and possible lapses in FAA oversight. According to the executive summary:

The central issue running throughout the April 2008 congressional hearings, and all the attendant publicity, was whether the FAA had succumbed to excessively cozy relationships with the airlines, routinely failed to take proper enforcement action, and allowed non-compliant airlines to escape penalties by using the voluntary disclosure programs without fixing their underlying safety problems (Stimpson 2008: 3).

The purpose of the review team was not meant to be investigative but rather to examine the FAA's safety culture and safety management and make recommendations regarding the agency's regulatory effectiveness. It should be noted that the report "found the FAA's aviation safety staff to be unambiguously committed to its core mission of safety." Despite this positive assessment of the FAA, the report also found the variation in regulatory ideologies to create issues when it comes to regulatory decision-making (Stimpson 2008: 5). For the purposes of this half of the chapter, I will focus on the concept of capture in order to examine the ethical dimensions of the problems that can arise in the decision-making process.

Why the FAA is Prone to Capture

Since the FAA's charter was amended in 1996, its sole focus has been on safety. But because the FAA works so closely with the regulated entities that it oversees, the concern is whether or not the interests of the regulated entity, such as an airline, can be elevated above the agency's core mission of safety. According to the independent review team, one particular feature of the FAA increases the risk of capture. "The inspection teams are mostly organized around *airlines*, rather than cutting across multiple airlines and organizing around some other dimension, like geography, or type of plane" (Stimpson 2008: 36). Rather than deal with multiple corporations, the majority of FAA inspectors are assigned to a specific Certificate Management Office (CMO) that deals with only one airline and often for many years.

The Southwest Airlines Incident

The independent review team investigated the Southwest Airlines incident in order to determine what had transpired between the airline and the FAA inspectors. The congressional hearing on safety at Southwest Airlines arose "based on whistleblower complaints received from FAA inspectors, into allegations that Southwest Airlines, with FAA complicity, had allowed at least 117 of its planes to fly in violation of regulations" (Stimpson 2008: 14). The situation arose in March of 2007 when "Southwest Airlines had reported to the FAA that it had violated an Airworthiness Directive (AD 2004-18-06) mandating fuselage inspections for structural cracks on its fleet of Boeing 737s" (Stimpson 2008: 14). Ever since the 1997 Mineta commission's recommendations, airlines have been encouraged to self-disclose violations under the Voluntary Disclosure Reporting Program (VDRP) because that way they could avoid penalties and would therefore be more willing to report safety issues to the FAA.¹ Because an aircraft violating an AD should be grounded until it becomes compliant, one would think that the affected Southwest aircraft would have been grounded. However, the FAA Principal Maintenance Inspector (PMI) who was notified of the breach "agreed with the airline's proposal to rectify the matter within ten days, and did not require that the 46 affected Boeing 737s be withdrawn from service." When the planes were finally inspected, five of them had the type of fuselage cracks that would be subject to the above mentioned AD (Stimpson 2008: 14).

The question is why the PMI would allow the aircraft to continue to fly when it seemed obvious that they should have been grounded. The report notes that dating

1 See for example Stimpson 2008: 21. Other voluntary disclosure programs include Flight Operations Quality Assurance (FOQA), which makes available digital flight data generated during normal operations, and the Aviation Safety Action Program (ASAP) in which employees report safety information. (Stimpson 2008: 30)

back to 2003 at least one inspector raised concerns about Southwest's compliance with ADs but could not persuade his superiors to conduct reviews. In examining the history of the problem at the Southwest CMO, the independent review team found that the FAA viewed this situation as a matter of personality conflicts. They also noted that efforts such as team building only made the schisms worse. However, the review team found that the matter was not one of personality conflicts, but rather the fact that the CMO was divided by deeply incompatible beliefs about regulatory methods (Stimpson 2008: 25). According to the team, genuine harm arises in a regulatory agency "where differences of professional opinion rise to the level of competing ideologies, or fundamentally irreconcilable beliefs about *who we are and how we operate*" (Stimpson 2008: 38). In their observation, the review team found a wide range of regulatory ideologies within the FAA, most notably at the Southwest CMO which had turned into a bitter feud. However, they also report that most FAA offices were harmonious, professional, and mutually supportive.

Possible Ways to Avoid Capture

Because long term relationships may enhance the risk of capture, one idea would be a mandated rotation every 3 to 5 years. However, the review team also addresses the countervailing value in accumulating knowledge about an airline's operations over time. Thus, the team suggests that the FAA schedule Flight Standards Service Internal Assistance Capability (IAC) reviews for offices that have a management team in place for more than 5 years (Stimpson 2008: 6, 43). This type of review would help alleviate the problem of capture as well as prevent the need for mandatory rotations. Of course, if the IAC reported that a team should be broken up, then the FAA could act on those findings.

Another possibility is to change the focus on carrier-specific offices. According to the review team, the justification for this type of organizational structure is that each carrier is unique. "The benefit of a carrier-specific structure, for the FAA, is that CMO managers and inspection teams, working full time on one carrier become expert in the unique operations of that one airline" (Stimpson 2008: 55). However, as the review team points out several times in their report, the risk of capture is greatly increased by this type of arrangement between the FAA and the regulated entity it oversees. The review team also shows that this model can create inconsistencies and inefficiencies. One example they give involves a repair station that is used by three different airlines. Three separate CMOs would be obliged to send some of its staff there and each inspection team would impose slightly different standards on the same facility. One solution would be for inspectors to work on the same type of aircraft but for multiple carriers (Stimpson 2008: 56). While the review team does not propose a specific recommendation on this issue, their suggestion to work for multiple carriers would help reduce the risk of capture.

Capture and Ethical Decision-making

In the end one may want to question the extent to which the danger of capture is an ethical issue. If the inspector is unintentionally advancing the interests of the carrier, should that inspector be blamed if an incident occurs? What if one is completely unaware that one has been affected by capture? While intentions may be difficult to gauge in this situation, one area of ethics that is impacted by capture is consequentialist ethics. In consequentialism one's intentions are not as significant as the end results of one's actions. Thus, inspectors should be thinking in terms of the consequences of their decisions regarding the entities that they regulate.

However, it appears that the PMI at the Southwest CMO was thinking of consequences when he stated: "I permitted unairworthy SWA aircraft to operate in revenue service, and I was wrong to do so. However, politically, I felt that grounding the SWA aircraft would have negative consequences for the FAA" (Stimpson 2008: 25). Based on this comment, it appears that the PMI was engaged in a form of consequentialist thinking (see Chapter 1). However, if we are following consequentialism in this case, the question becomes who really benefits from this decision? It appears that the safety of the flying public should be taken into consideration more than the relationship between SWA and the FAA.

While the report of the independent review team shows ways in which the FAA can improve its approach to safety as well as avoid capture, a recent case involving Northwest Airlines may call into question the extent to which the FAA can remain independent of the entities that it regulates. Regarding Northwest Airlines: "the report by the Transportation Department's inspector general's office confirmed many of the accusations brought by a Twin Cities-based whistleblower both in 2005 and in 2008, who alleged a cozy relationship between FAA managers and the airlines they are charged with inspecting" (Lowy and Moylan 2010). This statement mirrors ones made by the independent review team's assessment of the relationship between SWA and the FAA CMO. FAA inspector Mark Lund was concerned with several items including maintenance errors that were eventually caught and addressed, inadequate training for workers who replaced those who went on strike in 2005, and poor documentation of aircraft repairs. It is also important to note that his memo concluded with the statement: "the situation at Northwest 'jeopardizes life or property'" (Lowy and Moylan 2010).

The danger of regulatory capture appears to be a continuing problem at the FAA. While the 2008 review team found that everyone who works at the agency is unequivocally concerned with safety, safety gets compromised when an inspector is focused on maintaining a good relationship between the FAA and the airline it regulates. In the case of Northwest Airlines, "the FAA initiated a national review of safety order compliance at major airlines in 2008, and found 14 instances in a four-month period in which Northwest didn't comply with safety orders, one of the highest of all the airlines reviewed," the Inspector General's report said. In addition there were eight more instances in which Northwest did not carry out

safety orders in the budget year ending on September 30, 2009 (Lowy and Moylan 2010). Based on these examples it appears that the FAA could be doing much more to ensure safety. In the end perhaps the FAA should rethink which consequences it prioritizes, since the good of the majority should outweigh the good of a CMO's relationship with an airline.

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Chapter 11

Learning to Compete Wisely: A Primer in Creating Pilot Unity

Robert J. Lavender

Loyalty to petrified opinion never yet broke a chain or freed a human soul.

Mark Twain

The January 2004 issue of *Air Line Pilot Magazine* contained one of the most important articles to grace its pages since 1978. In it, three ALPA national committee chairmen explain that pilots see the airline industry much differently than do airline managers. While the pilots still think of themselves as working for individual companies, management sees “the entire airline system as a single network. They view each of the separate companies as a combined whole, able to move ... flying opportunities ... across a vast global network.” Meanwhile, “pilots ... have no ability to shift to either the vagaries of the market or management’s whims [because] ... we are trapped in our individual silos” (ALPA 2004: 15). This article may be the foundation for a change that is long overdue.

On its face the ALPA article, “Dare mighty things,” is about “scope,” meaning the contractual provisions that limit a company’s ability to transport product with pilots who are not on the company’s pilot seniority list. But it concerns management’s ability to cause pilots “to compete with each other and work for less.” In broader terms, the chairmen are affirming the need of the piloting profession to strategically adapt to the competitiveness of the deregulated environment. It is this simple: pilots are relying on “old thinking,” and they have not learned to compete wisely. On the other side, airline managers are using new thinking to survive by forging strategic economic alliances—a concept that was unknown prior to passage of the Airline Deregulation Act of 1978. The result is that, to an increasing extent, airline companies are no longer competing with each other; they are competing with forces such as “labor.” In the quest for survival the airlines have become economically more unified than labor, and they are leveraging that unity. Indeed, airline companies have learned to cooperate among themselves and so must pilots, that is, if they wish to unite rather than compete with each other.

Pilots have lost the competitive advantage in dealing with their newly-networked companies because, unlike the airlines, pilots continue to adhere to a “regulated” and anachronistic form of business with each other. Their reliance on tradition not only prevents pilots from negotiating optimally but denies them access to free market principles that could otherwise be employed to their benefit. The way to fix it is to first understand it.

The Compensatory Benchmark: Junior Pilots Rule

Pilots are at a strategic disadvantage in the bargaining process because they benchmark the relative value of services rendered far differently than airline managers. While pilots use seniority and the captain's hourly rate of pay as the references for relative value among pilots, managers to a significant extent use the lowest paid, similarly skilled pilot to determine the standard for value or, "who will work for how much."

The reason for this distinction is that in the pre-1978 regulated economic environment, references for wages and tariffs were routinely established according to the high-cost leader in the market and were disassociated from the law of supply and demand. For instance, if labor costs rose at Delta, the company would routinely apply for and receive government approval to raise tariffs to protect their profit margin. As employees at other companies demanded and received comparable wages, their companies would, in turn, do the same. The government controlled almost every economic facet of doing business, even down to the kind of meals that were served on flights. There was simply no incentive to be the low-cost "leader" and, in fact, it was the *high-cost* leader that drove the market.

In this "macro" economic airline setting, a "micro" wage environment quite naturally evolved. Among pilots, the high-cost leader was the captain's position, and this became the benchmark for technically constructing wage differentials among pilots. Not only did the captain's position become the physical connection for wages (i.e., other crew members get a percentage of captain's pay), but it became an almost sacred standard by which to determine who deserves what. Unfortunately, in the competitive environment the benchmark for wages and tariffs is generally determined according to the *low-cost* leader, with the consumer ultimately determining the relative value of services. And while the airline companies themselves have learned over the last 26 years to factor this free market function into their tariffs, the pilots have ignored its application in the waging process.

The incontrovertible fact is that in the free market, with other things being equal, it is the lowest paid, similarly skilled competitor or provider of services that drives the market. By not acting on the fact that they too are now part of a competitive "pilot marketplace," pilots ensure themselves of over-focusing on the wrong end of the seniority spectrum in their quest to improve things. Just like customers, pilots will ultimately seek out the best deal regardless of where it comes from. As long as there are available skilled pilots in the same marketplace (i.e., furloughed pilots, commuter pilots, and even "junior" pilots on the same seniority list), who are working for far less money and/or under less desirable conditions, managers know that they can always stimulate competitive pressure and disunity within that marketplace. This strategy is not corrupt; it is simply the way the company has learned to do business with its external customers and competitors, and it is the way they now do business internally as well.

In short, pilots have arrived at a point where managers can actually make a better offer to so-called junior pilots than the pilots themselves can or will. It is the implicit threat of this occurring that has reduced pilot bargaining strength in recent years. Incredibly, pilots have not made one substantive change in the way they do business with each other in spite of the huge economic changes that have occurred in their external operating environment. The sooner they figure this out, the sooner they will be able break away from the constraints of the non-competitive economic environment and begin to establish new standards for unity and negotiation.

Membership and Unity: The Shallow Relationship

Pilot assumptions about membership and unity are rooted in the stability of the regulated (pre-1978) airline marketplace. In those days tight government control over the industry ensured that there was little competition either between companies or between employees. This lack of competition, in turn, ensured that the airline employee career path was far more stable than it is today, and for pilots, astonishingly predictable. A pilot was hired almost exclusively between the ages of 23 and 30, and, though one might suffer through periods of furlough, it was realistically expected that one would move through the ranks at one company and retire at age 60.

Working conditions were negotiated on the basis of this demographic predictability. Vacation accrual, for instance, fit with the idea that pilots started young and as they aged and needed more vacation, they received it. Likewise salary structures evolved such that as their families and expenses grew, the pilots would be moving up the ladder and able to earn more pay. Even if these compensatory issues were not consciously negotiated to achieve these specific results, they fit the situation and became part and parcel of the “system” of compensation for pilots. It could be said that there was a match between crew member demographics and economics.

In this stable, non-competitive, and non-invasive environment, the pilot sense of unity came to be. Since pilots shared a consistent and virtually unalterable view of the career path, they came to share remarkably similar views on how to enhance it. Not only did pilots “see” things the same way as other pilots at their own companies, they saw things the same way as pilots at other companies, a fact that was reflected in the uniformity of demands and agreements throughout the industry. This common perspective was a product of the economic times and it culminated in a superficial but practical form of unity among pilots industry wide.

Subsequent to 1978 the effects of the Airline Deregulation Act began to appear and competitive pressures began to affect not only airline companies but pilots as well. As older pilots were turned out of jobs because of strikes and corporate failures, they had to look for employment. Lamentably the uniform system of compensation that worked satisfactorily under stable and non-competitive

conditions did not serve them well in the free market. Many pilots were in their forties and fifties with families and kids in college. They often lost not only their wages but their retirement funds as well. They then faced the prospect of going to work at starting salaries devised in a completely different economic setting. Frequently, they could not afford to work for “new-hire” wages and, when given the opportunity, some crossed picket lines to take non-union positions that paid more than what was available under “industry standard” contracts.

A poignant example of this type of situation occurred during the Continental pilot strike (1983–85) where approximately 450 unemployed former Braniff pilots crossed the picket line and helped keep the airline flying.¹ Their choices were to: 1) Try and start another career, 2) Start anew at another airline for thirteen hundred dollars per month, or 3) Go to work as captains at Continental for forty-three thousand per year—peanuts!—but much better than they could achieve at an “industry standard” company. These were the alternatives offered up to them by our “regulated” compensatory system ... alternatives that created true competitors of former union “brothers.”² However, in today’s climate, instead of 1,000 pilots on the street looking for work, there are now approximately 8,000, with more likely to come. By virtue of their inaction pilots have enabled internal competition so paralyzing that it will forever “dilute [their] bargaining strength” unless something is done. The “Dare” article was right on target (ALPA 2004). Pilots should know that creating unity is no longer a matter of rhetoric and encouragement; it is an economic process that must be followed.

The Process of Unity

Whereas in the old days membership and a common perspective on career advancement were the basis for unity, this situation is no longer true. Pilot induced factors such as multi-tiered pay levels (i.e., “A, B, and C scales”) ensure conflicting perspectives and priorities within both the profession and individual pilot groups. The steep variance in perspectives causes disunity and belies what otherwise appears to be a solid membership. Experienced pilots know that what seems to be reliable under peacetime conditions will appear much different under conditions of stress when individual self-preservation begins to emerge. A pilot who has been economically “damaged” in the past as the result of a strike, lengthy furlough, pay reduction, etc., may well support union objectives but may well *not* view a work

1 Many of these pilots justified crossing the Continental (CAL) picket lines because they felt that the Eastern pilots had refused to integrate them into their seniority list when Eastern purchased some of the failing Braniff’s aircraft and South American route structure. True or not, this is a prime example of the internal competition created when pilots fail to “network” with each other in a manner similar to what the airlines are doing.

2 This is not to justify crossing picket lines. It is to sensitize pilots to the realities of the “free market.”

stoppage as a viable personal option. Since a mounting number of pilots fall into this category these days, multiple viewpoints and reduced bargaining leverage is assured.

Disunity among pilots exists largely because the wage differential (“gap”) across the seniority spectrum is too great and cannot be justified on the basis of “supply and demand”—a concept unimportant to pilots prior to 1978. Unlike the old days today’s “junior” pilots are often seasoned veterans of military, commuter, and major airline background. Their experience *and* history must be factored into the compensation equation if natural economic unity is to be established. If the wage gap among equally talented employees grows too wide, a company can, and ultimately, will court junior employees with sometimes valid promises of improved compensation, if they will but replace their senior counterparts.³ Companies, acting as “customers,” will determine the relative value of pilot services and gravitate to the lowest bidder. Again, this idea is not unethical; it is simply the competitive process at work and it is already evident in many companies as they eliminate higher paid “senior” employees in favor of lower paid “new-hires.”⁴ Pilots would do well to take charge of their internal processes if they wish to reduce this form of competition.⁵

As stated earlier, while airline companies have modified their business systems and relationships to accommodate the effects of competition, pilots have not. Therefore, the technical subcomponents of compensation (i.e., cash, retirement, vacation, working conditions, longevity, etc.) which drive the human “process” of unity have not properly evolved. As the “Dare” article recognized, the profession *is* internally competitive. Pilots see things very differently depending on seniority position and personal history, and they can be readily divided by management through overtures to “special interest” groups or segments of the seniority list. The result is that pilots now have to rely on “crisis” unity rather than “natural” economic unity to achieve their goals.

Crisis v. Natural Unity

Crisis unity is generally defined as an “alliance of individuals or parties for which there may be little prevailing or natural affinity.” It occurs when disparate parties

3 In fact the implicit threat of this happening has already effectively stopped pilots from doing anything that would give the company such an opportunity. This is exactly the scenario that occurred at Continental when furloughed pilots who felt that they had been betrayed by working pilots began crossing the picket lines to go back to work. The “crossing over” was eventually dampened when the union agreed to pay furloughed pilots the same strike pay as all the other pilots—a perfect lesson in reducing pilot competition.

4 See Chapter 3 for a further discussion of capitalism.

5 See Woerth, 2004: 5. “Management ... immediately began trying to replace its currently employed pilots with pilots willing to work for less.”

perceive a common threat and act in unison to resist. This type of unity has been the mainstay of the piloting profession for years now and seems to be in a perpetual state of evolution with diminishing effects. Crisis unity serves a purpose in some circumstances but has important deficiencies: It is generally short-term, it is reactive, and it requires tremendous emotional energy to create and maintain. Most importantly, its success is largely dependent on the actions of the external threat. Thus, a discerning management may “end the crisis” and diffuse the threat by making attractive proposals and offers to limited segments of the workforce. A prime example of this occurred when companies offered up the “A, B, and C scales” to pilot groups, effectively “buying off” a limited segment of the seniority list and destroying any possibility of natural economic unity for years to come. This is how the “race to the bottom” works (ALPA 2004: 15). Unfortunately, the piloting profession has been especially vulnerable to this kind of tactic.

Unlike crisis unity, natural economic unity does not occur in response to an outside threat. Rather, it is a result of an internally negotiated “system” of compensation that naturally leads to shared perspectives on the issues. This in turn leads to the establishment of common priorities and the universal “will” that creates bargaining leverage. Just as in the pre-1978 era, natural unity occurs when pilots “see” things the same way. Nowadays, however, they cannot rely on superficial government induced unity, they need to get serious and create it for themselves.

While many pilots may be surprised to hear that they have little economic “affinity” for each other, this is frequently the situation. It is caused by the wide gaps that exist across the spectrum of the seniority list in terms of compensation, personal history, and quality of life. While the magnitude of these gaps varies between groups, the principle is not difficult to comprehend. When pilots prepare to negotiate on scheduling issues, for instance, they must consider the needs of the constituency. But who is that? Is it the pilot that flies afternoon out-and-backs ten days a month, or is the pilot that flies four legs in the middle of the night all month with minimum days off? Is it the pilot with five weeks of vacation or the pilot with two weeks? Such questions presented far less of a dilemma for negotiators in the pre-competitive world, but the problem is very real when the constituency no longer fits the traditional demographic model mentioned earlier in this article. Older but highly experienced new hire pilots *will* become competitors if their needs, their history, and their skills go unappreciated.

The “workload gap” problem has been complicated by other serious matters such as the “retirement gap.” For instance, it is now a very real fact that many pilots who planned on retiring with adequate funds will not be able to do so. It is likely that these “gap” issues will continue to weaken the pilots’ collective will unless there is a change in course. Allusions to attaining negotiating quality unity under these conditions are hype, and if pilots do not fill the gaps, management will. Management will do it with calculated free market overtures to impressionable segments of the pilot marketplace that will create the illusion (and, at times, the reality) of improvement for those willing to abide. This is textbook market

behavior, and it works with any workforce (or other market entity) that exposes itself.

The Fixes

The real hope for creating true or natural, unity among pilots lies in the modification of compensatory components that currently induce internal competition. Stronger and more reliable membership will follow. The examples cited of salary, retirement, vacation, and scheduling “gaps” are among those components. Each negotiated issue has a meaningful effect on how a pilot sees his or her situation relative to others. If pilots desire unity that is widespread and self sustaining, they must systematically create it. Otherwise, a self interest mentality will continue to dominate their condition and open it to further exploitation.

If, as the ALPA article states, pilots would benefit from “access [to] the entire network during the course of an airline career” (ALPA 2004: 15), they must unite both on the need for such access and how to modify their pay system to accommodate it. In the past, finding agreement on the need for something akin to a national seniority list would not have been easy. History has shown that pilots at financially strong carriers have had little interest in such an idea while pilots at failing carriers thought it was great—“silo” thinking for sure. Now, however, more pilots are beginning to “see” things the same way by virtue of the common realities they face. Therefore, the need to unite on network access is a given and will not be discussed further in this article.

Finding a Solution in Compensation Balancing

Agreement on how to modify the pilot pay system is another matter. The essential suggestion in this chapter is that if pilots continue to be hired into or between networks by individual carriers, compensation *differentials* between the top and the bottom of seniority lists must be reduced. Current differentials simply cannot be sustained without causing significant economic tension between pilots.⁶ The fact is that an accomplished, but, junior pilot who perceives a significant differential between his actual and potential level of pay will “naturally” compete for the higher pay. While such competition was not a factor in the regulated environment, it is a main threat to pilot unity in the “free” market. This is the essence of the 2004 ALPA article, and such gaps are particularly exploitable at a time when airline managers can move assets around or reconfigure networks almost at will.

6 Examples of this kind of tension can be seen in workforces with ESOP plans where some employees have been awarded significant shares of stock in their company and other employees almost nothing. Varying perspectives based on levels of ownership has resulted in disunity.

It is extremely important to know that reducing pay *differentials* (“compensation balancing”) does not equate to reducing the average pay an airline pilot earns during a career. A pilot who earns more at the beginning and less at the end of a career will average the same pay as under the conventional system, but the potential for competition among pilots will be reduced.⁷ An advantage now is that compensation balancing need not adversely affect currently working pilots. Conceivably, a “blended” system may be implemented wherein pilots moving “across the network” would be hired with a contractual expectation of higher starting levels of compensation and lower ending levels. However, the intent of this paragraph is not to exclude the possibility of reallocating some benefits as a means of increasing unity at both the crewforce and professional levels. Just as companies engage in give and take in order to create their alliances, so must pilots if they wish to compete wisely and effectively. This is a transition process that pilots must explore.

Specific questions about where to “draw the line” on modifying compensation differentials are beyond the scope of this chapter but are of high priority. As stated previously, each component of the pay system should be evaluated according to how it affects overall pilot unity.⁸ This is where pilots will dispense with conventional notions about “fairness” in their pay system and “loyalty” to employers, and truly manage their system of compensation to enhance professional harmony. These traditional concepts along with “seniority” have redefined meanings in the free market.

Rethinking Seniority

Seniority as a *political* concept will not be affected by the proposals herein. However, regardless of how pilots decide to reduce internal competition, their notion of seniority as an *economic* factor must be altered. Here is why. In most of the labor world the term “seniority” essentially means “first hired, last fired.” Indeed, in some unionized environments, such as the National Football League, it has virtually no meaning; that is, if you are not good enough to make the team, it does not matter when you were hired. Similarly in some electrical locals work is allocated on a “first in, first out” basis; again, seniority has limited and indirect

7 The whole point behind reducing competition and increasing unity is to ultimately increase pilot leverage at the bargaining table. This is exactly how the carriers are responding to the free market. They are reducing competition, unifying, and gaining leverage that may be used competitively against labor and other market entities (vendors, creditors, etc.).

8 For instance, should pilots reduce top end vacation time and increase “junior” vacation time in order to accommodate newly hired veteran pilots? Each compensatory component should be so evaluated.

economic implications. For almost all workers seniority is a simple political concept that protects against managerial favoritism, and it works well.⁹

However, in the noncompetitive airline business where the high cost leader ruled, “seniority,” especially in the pilot mind, morphed into a form of economic supremacy unknown elsewhere in the commercial world. It came to mean something like, “I got here first, so I deserve overwhelming advantage in pay, vacation, working conditions, and everything else. But don’t worry ‘new-hire pilot,’ you will get here someday.” This attitude worked fine in the predictable airline world. But, in the highly competitive, high turnover, networked, deregulated world, it does not. Many pilots will simply never “get there.” For pilots to use seniority to justify vast economic supremacy these days would be similar to a company using its date of incorporation to justify higher ticket prices. Just as consumers and competitors in the airline marketplace would ignore such a marketing strategy, so will “competing” pilots ultimately ignore seniority as a justification for vast differentials in their marketplace.

None of this is to suggest that everyone should get paid the same salary; rather pilots would be wise to acknowledge that their current system is not rooted in economic reality and never has been. The “A, B, and C” pay scales, the unbalanced Employee Stock Ownership Plans (ESOPs) of the past, and even the pay differentials between aircraft types are proof of that. The test for pilots will be to abandon their cultural, seniority driven sense of entitlement and create a version of their pay system that reduces intra-profession competition. The upside for enhancing unity and negotiating strength is significant.

Summary

The main title of this chapter, “Learning to Compete Wisely,” is intended to imply that competing in the current environment is not an option. The only question for pilots is, with whom are they going to compete; each other or some other force? The subtitle, “A Primer in Creating Pilot Unity,” prompts pilots to know that if they decide to unify rather than compete internally, they must set the internal economic stage to do it. They must give up historical, simplistic notions about what it takes to create unity, and they must reconfigure internal economic relationships to remove obstacles.

Fortunately, as indicated, most of the changes necessary to improve the pilots’ situation seem particularly painless. For instance, the adoption of a retirement at age 65, or even older, has tremendous positive implications, not only for many pilots, but potentially for their employers and their pension plans as well. Importantly, this change is in harmony with reasonable trends occurring in US

9 Longevity, on the other hand, *is* an economic concept with pay tied to experience. Even this concept, however, has been distorted and misused in some contracts to the point of being counterproductive.

society today. Similarly, “compensation balancing” addresses issues associated with devising a national “networking” system for pilots, but not at the expense of the pilots if properly implemented.

Last, it is vitally important that pilots do not limit their thinking to how these ideas affect just “me.” The creation of unity is not about vacation, cash, longevity, seniority, or individual working conditions. It concerns how all of these issues fit together to advance the needs of the entire profession. It is interesting to consider the prospect of pilots creating a system for themselves that will “reap the benefits and counter the dangers of our increasingly interdependent world.” (ALPA 2004: 16). The beauty of creating natural economic unity is that it ultimately takes much of the worry, effort, and emotion out of the equation. It is simply there when you need it. To the extent that unity causes pilots to see things the same way; it is a liberating endeavor.

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Chapter 12

Ethics in Aviation from the Perspective of a Flight Attendant

Gail L. Bigelow

Flight attendants assigned to flight duty are responsible for performing or assisting in the performance of all safety, passenger service, and cabin preparation duties. The application of these duties requires flight attendants to be responsible for handling passenger carry-on items, as required in order to secure the cabin for take-off and landing. Flight attendants are responsible for fulfilling certain FAA requirements and company and operational requirements. Thus, the purpose of this chapter is for the reader to gain an overall understanding of the ethical role played by flight attendants, especially in relation to the FAA, passengers, labor relations, safety, and security.

The Responsibilities of Flight Attendants

The flight attendant profession is a largely unsupervised job. Most of the time a flight attendant spends at work is on the aircraft or at a layover destination. Although there is a chain of command (i.e., Captain, First Officer, First Flight Attendant, etc.), flight attendants are basically responsible for themselves. The way they conduct themselves, their level of integrity and personal ethics are highly visible to the traveling public, and reflect not only on themselves, but on their carrier and all of the other flight attendants in the industry. Since the inception of the flight attendant role in the 1930s, the position has been one that has sparked curiosity and watchful attention; it is no wonder that carriers hold flight attendants to the highest standards of performance.

It probably does not occur to most flight attendants that a good part of their day involves practicing ethics. But from the time we check in until the end of our debriefing, we are faced with choices which amount in no small measure to ethical decisions. Take, for example, checking in. At one carrier, flight attendants are required to check in one hour prior to departure. Failure to do so results in points assessed for being late. Accumulating 12 points can result in termination, so there is strong incentive to avoid attendance related issues. Flight attendants at one carrier check in by scanning their ID cards at a computer. If for some reason the scanner does not work, they can call crew scheduling and ask them to be shown as checked in. Consider the case of a flight attendant running late and not even at

the airport. Why not call crew scheduling and tell them the computer scanner is not working and then ask to be checked in? What does it hurt? The carrier knows that the flight attendant plans to cover the trip, and one can thereby avoid the attendance points. Aside from the potential disciplinary action a flight attendant might incur for such an infraction, the deceit itself is damaging. When one chooses to walk a fraudulent path and escapes detection, the risk is that path will become a thoroughfare to additional ongoing and unethical choices. It is not surprising, therefore, that one instance of intentional dishonesty, a display of ethical failing, can result in termination of employment.

Demands on the Flight Crew

Company policy might require that flight attendants conduct a pre-flight briefing covering their safety positions and their responsibilities in the event of an emergency. Flight attendants, together with pilots, might be required to conduct a pre-flight briefing which covers such issues as projected flight time, enroute weather and emergency communication procedures, just to name a few. These crewmembers have an ethical duty to each other, certainly, but also to their customers, to conduct these briefings. But today's world of aviation is all about saving time, being on time, and giving time to the customer. Crewmembers are pulled in many different directions by the demands placed upon them, even as resources disappear. Choices, sometimes not the proper ones, are made in an effort to save time.

In the midst of what will end up being a 13-hour duty day on the last day of a three day trip, a flight attendant notices that something in the cabin has broken—nothing big, nothing that would endanger anyone or affect the integrity of flight. The flight attendant knows that if he or she writes it up, as one is supposed to do, and then turns it into the flight deck, upon arrival at the next stop (one of say, five or six stops that day), the flight deck will be required to call out a mechanic in order to have the broken item looked at and either repaired or put on the minimum equipment list. This issue will result in a delay of at least minutes, but probably longer. Either way the flight attendant is ready to go home. One makes a choice—one decides to write it up on the way to the home domicile, so the flight will not incur a delay enroute. In some cases, this sort of unethical action is encouraged by other crew members. Even pilots have been known to say “are you sure you want to tell me about that right now?” Training supervisors have been known to give a wink and a nod when they tell flight attendants that they must write up any cabin discrepancy as soon as they become aware of it. The unspoken message to flight attendants is: consider your actions and how they affect the carrier's on-time performance.

Multiple choices are made each day. It is another long flight, perhaps trans-continental and almost a full load. However, the last row of seats is empty. Do the flight attendants look for customers who could use additional room and offer them

the row, or do they block the seats so that they and their fellow crew members can sit in these rows after the service is finished?

Speaking of the service, the Inflight Service Guide requires three beverage carts, but after the flight attendants pass through twice, the passengers seem to be satiated. Does the crew do the third cart because it is a service requirement or skip it? It depends on their sense of obligation. Recycle? What a hassle, but the carrier requires it—do it or not? Pour beverages or hand out cans? The carrier's policy is strict on this—pour—it saves money. But, really, if you think about it, most people really would prefer a full can, so why not just skip a step and give them what they want at the outset?

All of these actions, or inactions, require flight attendants to perform a gut check of their personal and professional ethics. If they work with the same crew each flight, it is possible that the crew has, without realizing it, made a group gut check and has become automated in their approach to their jobs and customer service. Such automation may or may not include unethical decisions.

By the nature of bidding for flying on a monthly basis, rearranging trips by trading with other flight attendants, and reassignment by crew scheduling, it is not uncommon to fly with several different flight attendants during a multiple day trip. Each time the group dynamic changes, the gut check of one's ethics is performed, whether one realizes it or not. "I usually just hand out cans, how about you?" becomes a test of the newcomer's sense of responsibility.

Pertinent FAA Regulations

The FARs are detailed and strict regarding the ability of a certificate holder (airline company) to operate an aircraft under part 121 (revenue flying). Some of those regulations, and the resulting ethical responsibilities of flight attendants and customers alike, will be discussed in this section. The first and foremost FAR requires that flight attendants be on board the aircraft in the first place. It specifically stipulates that airplanes having a maximum seating capacity of more than nine but less than 51 passengers have one flight attendant. As the seating capacity rises, so does the number of flight attendants needed in order for the certificate holder to operate that aircraft. Certificate holders must "prove" that the number of flight attendants assigned is able to evacuate each aircraft within 90 seconds (depending on the number of emergency exits) before being allowed to use that aircraft for revenue flying.

The FAA requires that all flight attendants be registered and that while on duty they have accessible to them their registration card and flight attendant manual. There are multiple federal regulations which flight attendants are obliged to educate the public about and do their best to enforce while on board. The flight attendant manual is a compilation of almost all of the procedures for both emergency and standard operations. There are extensive instructions for medical emergencies and on the operation of all emergency equipment. Manual revisions, including

emergency interim bulletins (new procedures or FAA directives that are issued between substantial manual revisions), are required to be read, and inserted into the flight attendant manual within a certain number of days of receipt. Failure to do so, or error in insertions/deletions such as missing pages, duplicate pages or out of date material, are the personal responsibility of the flight attendant. This task is conducted largely on one's own time, either at home or at a layover point. Does the flight attendant read each word of the revision, scan for obvious changes, or just add the pages where they belong, snap the manual shut, and stick it back in the flight bag? It depends on his or her sense of obligation to know and understand what is in his or her manual.

Domestic and international flights are randomly chosen by the FAA for inspection. Inspectors arrive at the aircraft without advance notification. Flight attendants are required to produce both their registration cards and manuals for inspection. A violation of a FAR pertaining to a flight attendant, whether it is a manual violation, or a violation of a regulation which the flight attendant is directly responsible for enforcing, can result in up to a \$10,000 personal fine against the flight attendant. It would seem that the prospect of a \$10,000 financial hit would be the motivator that would keep flight attendants in line with regard to the regulations, but there is more to it as we will discuss below.

Flight Attendants and Safety

Flight attendants, as a rule, are caretakers who have a strong sense of personal and professional ethics. It is out of the ordinary to come across a flight attendant who has little or no regard for their customers and fellow crew members or who is ethically or professionally lazy. Much of what is involved in a flight attendant's day revolves around concern for the safety and integrity of the flight. Although customer service is secondary to safety, flight attendants are, for the most part, conscientious about all of their inflight duties and do not take kindly to other fellow flight attendants who may not be as dedicated to upholding the tradition of the capable, caring, nurturing flight attendant.

That smiling flight attendant who hands you a cup of coffee may also be the person who saves your life. Flight attendants train thoroughly to be able to fight fires, resuscitate passengers, evacuate aircraft in the worst conditions, and operate state-of-the-art equipment which assists in accomplishing these tasks. In addition, since 9/11 flight attendants are scrupulously trained to observe each and every passenger who boards a flight and evaluate them—are they a potential threat to the safety of the flight? In training, flight attendants are offered sophisticated courses in self defense and taught how to disable a passenger who may be significantly larger than themselves, handcuff them, and turn them over to the police upon landing. In short, while on duty, flight attendants must act as doctors, nurses, psychologists, teachers, parents, and police officers. They must be able to tenderly comfort a crying child traveling between divorced parents in one moment, aggressively fight

a fire a moment later, and then resuscitate a passenger in the very next moment. Obviously it would be a bizarre flight in which all of these examples occurred at the same time, but it could happen, and flight attendants are trained to be alert and responsive when what “could” happen does in fact arise.

Federal regulations require that flight attendants monitor all carryon baggage, and that they strictly enforce the stowing of that baggage on board the aircraft. In the post 9/11 rush to patrol items carried onto an aircraft, the TSA temporarily accomplished that for which flight attendants had lobbied for years—more baggage checked and less on board. When, in 2008, oil prices surged, airlines began charging for checked luggage. This new procedure abruptly ended the customer’s momentary flirtation with checking their luggage. Space in an aircraft cabin is once again at a premium, and competition for overhead bin space on a full flight, particularly to a vacation destination, has become fierce. What does not fit in the overhead, either must be stowed beneath a seat or checked. Passengers can be very creative in finding areas in the cabin to tuck their personal belongings. Flight attendants, often worn out by arguing with customers regarding carryon luggage and its stowage, might be tempted to turn a blind eye to a bag stowed at a bulkhead or behind a row of seats, but for their ethical duty to the safety of their fellow crew members and their customers. Improperly stowed luggage, in an accident or rapid decompression, can become a deadly projectile.

In some cases the problem concerns the type of item that a passenger decides to carry on board. As an example during a night commercial domestic flight in the pre-9/11 era, a passenger in the first row of coach seating rang the call button and told the flight attendant that something had scurried over his leg. The flight attendant looked around but did not see anything. About fifteen minutes later the same passenger rang the call button and told the flight attendant, “something is on the plane.” Because most of the passengers were sleeping, the flight attendant got out a flashlight and found a hedgehog sitting in the middle of the aisle near the first class cabin. She decided not to use the PA system and instead asked the first class cabin if anyone had lost a critter. One woman immediately woke up and said it was her pet hedgehog. The woman had brought the hedgehog on board by carrying it in her purse and had not informed anyone of the animal. Because no one complained about the matter, the flight attendant decided not to report it. However, this type of situation could become dangerous, especially if someone smuggles onboard something more harmful.¹

Passenger Responsibilities

The above example shows that passengers have shared ethical responsibilities. For example, flight attendants are required to speak directly to passengers seated in exit rows to ascertain whether they would, in the event of an emergency, be capable

1 See Chapter 25 on the dangers of invasive species and emergent diseases.

and willing to open that exit. Determination of this ability includes whether or not they need personal assistive devices to move about, whether they speak English, and so can follow the commands of the flight crew in the event of an emergency, and whether or not the individual passenger is indeed willing to assist in such a fashion. Exit row seating is typically more comfortable than other rows because the seat pitch (distance between the edge of one seat to the seatback of the seat in front of it) is longer, thereby allowing significantly more legroom. For that reason many savvy travelers, particularly business women and men, request these seats. These travelers carry an ethical obligation to not only respond honestly to the questioning flight attendant, but also to read the information in the card printed specifically for those rows, to understand that information and actually to look at the window exit they would be required to operate should an emergency occur. Often the flight attendant will be addressing a row of heads bent down to their reading material, and the flight attendant will need to be insistent in questioning the passengers. When a customer requests exit row seating, a cooperative effort between the customer and the flight crew is born. The customer is, in effect, promising that in the event of an emergency, he or she will open that exit and begin passenger egress through that hatch. By choosing those seats, the customer accepts an ethical obligation toward one's fellow passengers and the flight crew.

Seating considerations and related decent conduct are not limited to where and how adult passengers are accommodated. Once a child has reached its second birthday, the FAA requires that they occupy a seat of their own and not be held on the parent's lap. It is not atypical for a parent to attempt to avoid the price of a ticket for a child who has just passed that date by lying when questioned about the child's age. These particular seating issues are supposed to be worked out prior to boarding. Because children do come in various sizes and weights at two years and a few months, it is not difficult to understand a flight attendant's reluctance to challenge a parent. Nevertheless, it must be done.

Flight attendants have long held the opinion that any child, whether two months or two years should be in their own restraint system. The G forces at play during a rapid (emergency) descent are substantial, and if combined with turbulent air, it could become impossible for a parent, even in their most protective moment, to hold on to a child. Severe injury or even death is not out of the realm of possibility. Customers informed of these facts are not often enthusiastic in their response to the flight attendant. While the flight attendant may make a professional ethical decision on whether or not to educate the passenger as to the reasons for the rule, it really is not his or her decision to make regarding whether or not to enforce it.

The FAA is exacting in its regulations surrounding the use of child restraint systems (CRSs) used on board an aircraft. Such seats must bear certain labels in order to be approved for use, and booster seats, vest-type, harness-type, or lap held child restraint systems are strictly prohibited. Here again, there is a need for cooperation between the customer and the flight attendant. Parents, especially those new to their role or unused to traveling with small children, can be very spirited in their defense of their chosen CRS. Often they cannot understand why

having their infant strapped to their body is not the safest way to fly. The boarding process, almost never a calm or unhurried affair these days, is not the best time to come between the lion and her cub. Unfortunately, the mandated and ethical responsibility requires a show down. Faced with the oft heard declaration that the “flight attendant on the last flight let us use it,” one can understand why a flight attendant might adopt a slightly forbidding countenance as he or she insists that the federal regulation be enforced.

Post 9/11 regulations dictate that passengers may not congregate around the flight deck door while waiting to use the lavatory. Do they cooperate, or does their sense of privilege override their sense of ethics? For example, upon observing the economy class passengers deplaning before him and his fellow first class cabin passengers, one man opened an emergency hatch and slid down the chute! Of course, he was promptly arrested.

Labor Relations

Since the industry was deregulated in 1978, airline companies have co-existed in what amounts to a dog-eat-dog environment. Constantly spying on one another to determine competitor’s ticket prices, boarding procedures, inflight service, prices for buy on board items, seat pitch, aisle width, charges for checked baggage or premium seats in the cabin and who knows what else, airline management is demanding in their expectations of all of their employees. Their “front-line” employees—those who spend the most time with their customers—are at the eye of the storm. One would think that given the impact flight attendants have on creating loyal customers, companies would be, if not solicitous, at least mindful of the need to keep the flight attendants happy. Yet flight attendants to this day have to fight just to keep what they have gained during their seventy plus year history. Breaking new ground is almost unheard of.

Prior to the FAA mandated crew rest regulations, flight attendant crews at unorganized carriers were required to work ridiculously long hours. Without an authority holding them in check, companies could and did keep flight attendants on duty until they were simply too exhausted to continue. After years of lobbying on behalf of all flight attendants, the largest flight attendant union in the world, the Association of Flight Attendants-Communication Workers of America (AFA-CWA), succeeded in getting crew rest provisions passed, despite vigorous anti-regulation pressure from the airline consortiums.

Trade unionism is strong in the airline industry. Even with carrier efforts and some successes to outsource labor, the majority of flight attendants remain committed to the union model. Most of today’s major carriers have organized flight attendant work forces. One exception is Delta Airlines. The effort by Delta management to defeat organization of its flight attendants is legendary. In both the 2001 and 2008 organizing drives at Delta, management was accused of using heavy handed tactics to crush the proposal to organize, including a 2008 bulletin

posted in the flight attendant crew room advising flight attendants they should just rip up and toss away their ballots. By this suppression of voter turnout, Delta kept the flight attendants from unionizing since not voting at all counted as a “NO.” AFA-CWA organizers can attest to the fact that Delta flight attendants whispered to them that they had cast their vote. A free and fair election would not require that employees whisper that they have voted.

The plight of the flight attendant at unorganized carriers remains the worst, but their organized sisters and brothers in today’s aviation world are not on Easy Street either. Unprotected by OSHA, yet required to work long hours in an unhealthy cabin environment, with dry and unpredictable cabin air quality, exposed to extreme doses of radiation, jet fuels, and oils, and an array of germs and communicable diseases, flight attendants are today’s canaries of the skies.² Without a voice to move their issues forward, they are dependent on the benevolence, indeed the ethical behavior, of their management.

Flight attendant labor relations are managed by the Railway Labor Act. Contracts do not expire, instead they become amendable. Thus, a management team bent on rejecting improvements in a contract can drag out negotiations for years. The “what the market will bear” mentality of most airline management teams practically insures that where contract negotiations do take place, they will be long and acrimonious. Company attempts to capture back improvements in pension plans, sick leave days, family leave days, vacation days, insurance benefits, and hours of service rules ignore their ethical responsibility to adequately recognize by compensation the importance of those front line employees, and their impact on customer loyalty.

At more progressive carriers, usually those with a long history of organized labor, a more cooperative tone exists. Rather than go head to head on every issue, management and labor are learning to team up to fight the competition. While management is still intent on getting back as much as it can in dollar-based benefits and rules, they are more willing to give on areas that do not immediately affect their bottom line. While this does not go far enough to keep flight attendant compensation packages at a par with the cost of living, it can help to provide flexibility in quality of life, which offers rewards of its own.

Post 9/11 Issues

There is no question that 9/11 caused a profound collision between the present working world and that previously experienced by flight attendants. Overnight the flight attendant’s primary job changed, dramatically and forever. Behind the friendly greeting at the cabin door or at row six or mid-cabin during boarding is

2 In the early days of coal mining, canaries were sent down into the shafts with the men. A canary dying indicated that toxic fumes were present and served as an early warning system for the men to immediately leave the mine.



a flight attendant's careful analysis. Is this passenger a threat to the safety of this flight? Is he or she wearing the clothes, reading the book, or exhibiting the behavior that causes this flight attendant concern? But except for this passenger's ethnicity, would the flight attendant be concerned? Should that passenger be questioned, challenged, or not? A passenger's extended time in a lavatory no longer raises just the concern regarding the possibility of fighting an inflight fire due to an illicit smoke and discarded cigarette, but is he or she building a bomb? An unclaimed bag no longer invokes a search in order to return the item to a grateful passenger, but rather a careful and exact examination of the bag to determine whether or not it might be a camouflaged explosive. A call from the flight deck is no longer about a pilot asking for yet another cup of coffee, but a request for the flight attendant to literally guard the flight deck door and the integrity of the flight deck as the pilot exits to use the lavatory. The call to the flight deck for the captain or first officer to come out and convince the troublemaker in seat 20D to knock it off is no longer possible. The flight crew is locked into its tiny space, inaccessible during normal operations, and in complete lockdown if any serious trouble arises in the cabin.

Flight attendants can no longer afford not to be suspicious. While 9/11 may be a distant memory to many, every day a flight attendant reports to work, he or she is thinking about it. As one flight attendant put it "it is difficult to be vigilant and gregarious at the same time." More and more often, flight attendants are required to do a gut check of their personal and professional ethics as their responsibility for the integrity, the very safety, of the cabin experience rests on their shoulders alone.

Final Thoughts

In this increasingly challenging airline environment it is clear that a sense of personal and professional ethics is desirable for all participants. It is so easy to look around and witness inappropriate behavior. Whether it is airline management's honesty in its labor relations, labor's ethical responsibility to one another and to the customer or the customer's recognition of and compliance with the rules of the road, so to speak, it is becoming more imperative than ever that everyone act in an ethical manner and treat each other with respect.

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Chapter 13

ValuJet 592 and Corporate Responsibility

Kenny Frank

On May 11, 1996 a ValuJet DC-9-32, registration number N904VJ, crashed into the Florida Everglades exactly ten minutes after its departure from Miami International Airport. The loss of 110 innocent lives sparked one of the most dedicated investigations ever performed by the NTSB, and it also became one of the highest media covered disasters in US aviation history. On May 13 only two days after the accident, the public first heard about the oxygen generators which were loaded in the forward cargo compartment of the aircraft destined for Atlanta. The NTSB investigation later concluded that the probable cause of the crash of flight 592 was a result of the ignition of one or more of these oxygen canisters. It is speculated that SabreTech, ValuJet's contract maintenance provider, improperly labeled and stored these generators as empty but in reality were actually full. For much of the public and the media following the accident, they felt relief in knowing the cause of this terrible disaster. However, some believed that this investigation was cut short. Many questions remained unanswered regarding ValuJet's questionable rapid expansion and maintenance procedures in the months prior to the accident. Some of these issues even sparked the FAA to begin an investigation of ValuJet. This chapter will develop both theories of the NTSB and those who believe something else brought down the DC-9 on that sunny Florida afternoon.

The Accident Investigation and the NTSB Report

The crash of 592 sparked a major recovery effort by the NTSB, FBI, local authorities, and volunteers. For months they slowly searched the Florida Everglades, battling off snakes, alligators, extreme heat, and blood-borne diseases in an attempt to recover all available wreckage, remains, and any information supporting the investigation. As a result of their efforts, a total of 90 percent of the aircraft was recovered, none being larger than the size of the main landing gear. The first interest of the NTSB centered on the 50–60 oxygen generators that were loaded in the forward cargo bin. SabreTech removed the canisters from other ValuJet aircraft months before the accident due to their upcoming expiration, and the airline requested that the canisters be shipped back to ValuJet's maintenance facility in Atlanta upon cleaning out SabreTech's facilities.

These types of canisters are commonly installed on passenger aircraft to provide a source of oxygen in the case of an emergency or loss of cabin pressure. Typically, “an oxygen canister contains a sodium chlorate pellet or cylinder and an igniter. The igniter can be triggered by friction or impact. It generates enough heat to start the sodium chlorate reaction, and then the heat of the reaction sustains itself. The sodium chlorate does not burn—its decomposition just happens to give off lots of heat and lots of oxygen” (How Stuff Works.com 2000). The canisters used on the DC-9 contained spring-loaded igniters secured by a safety device commonly known as a retaining pin. One end of the pin is inserted into the canister to prevent ignition, and the other end has a long cord which attaches to the oxygen masks located in the overhead compartments. In an emergency a passenger will pull down on the mask and as a result the pin is pulled out of the canister. With the pin removed, the spring-loaded igniter will strike the canister which in turn creates a chemical reaction that produces oxygen. The amount of heat that these generators produce is what makes them extremely dangerous and considered as hazardous materials.

On November 6 and 7, 1996 the NTSB conducted a series of five tests at the FAA’s Fire Facility to test their theory on the likelihood that an oxygen canister started the fire that caused the crash of 592. The first two tests each involved one box with 28 generators and the next three tests contained five boxes with 24 generators in each box. All tests were done in a controlled environment and ranged from sitting them on a metal floor, to being arranged in the cargo bin similar to the accident aircraft. All retaining pins were manually removed from the generators, which require 1–4 lbs. of pressure. The first test was unable to produce a fire, only minor smoke generation. The second test resulted in a fire and within 10 minutes produced heat up to 2,000° F. In the third test the five boxes were placed on the floor but the test was unable to produce a fire, only minor smoke. The fourth test performed was similar to the third, and fire was produced with temperatures reaching almost 3,000° F in 16 minutes. In the fifth and final test, two boxes were placed atop a main gear tire pressurized to 50 psi, the other three boxes were placed around the tire, and luggage was stacked around them. In 11 minutes 30 seconds the temperatures reached 3,200° F, and in 16 minutes the main tire ruptured.

By the end of November, 1996, seven months after the accident, it was determined that ValuJet’s contract maintenance provider, SabreTech, was at fault for mislabeling the generators as empty when in fact they could have possibly been full. This evidence was supported by the fact that recovered areas of the cargo compartment indicated signs of a fire, and also the Cockpit Voice Recorder (CVR) which showed evidence of smoke and fire prior to the crash. The NTSB determined that the smoke and fire crippled the aircraft and incapacitated the flight crew, resulting in an uncontrollable descent into the Everglades (NTSB 1997: 53–54).

Another Possible Cause

In the months and even years following the crash, several other theories regarding the crash of 592 began to surface. One major counterargument to the NTSB report is that this accident was not caused by an ignited oxygen generator, but rather an electrical failure within the aircraft due to poor up-keep—notably not by the outside vendor SabreTech—but by ValuJet itself. The accident compelled several anonymous sources to come forward and share their experiences and information on aircraft 904VJ as well as the condition of the entire ValuJet DC-9 Fleet.

After going public in 1994, ValuJet grew rapidly and became one of the fastest growing airlines to make a profit in aviation history. Their fleet composed mostly of DC-9s many of which were nearly thirty years old. Because these aircraft cost a fraction of what it would for a new aircraft, they would give ValuJet a better chance of turning a profit in its early years. By ValuJet using a business model to operate less expensive aircraft, which included utilizing the aircraft as much as possible, the airline was able to gross \$21 million dollars in 1994, only one year after going public. This huge profit allowed ValuJet the opportunity to place orders on 50 brand new MD-85 jets in order to expand their future fleet.

A common phrase heard in the aviation industry is: “A plane not in the air is a plane not making money.” While this concept of utilizing an aircraft as much as possible has proved profitable for many airlines, with it comes great responsibility. As an aircraft increases its hours on its flight time, engines, and overall structure, it is equally important that it gets time on the ground for routine maintenance inspections to ensure its safety and airworthiness. As passenger loads and destinations increased for ValuJet in its early years, the DC-9s became the work horse of the airline, with each aircraft working many flight legs each day. At the time of the accident, aircraft 904VJ was approximately 27-years-old and had logged 68,395 hours (Aviation Safety 2006). It was originally purchased in 1969 by Delta Air Lines, and later sold to ValuJet in 1993.

While it is not uncommon that commercial aircraft are used for many years and can be sold from airline to airline, it is important to remember that technology and advancements in the aviation industry are made with each new aircraft that comes off the assembly line. Many materials that were once used to produce aircraft have since been discarded and replaced with newer, safer, more cost effective ones. In ValuJet’s case, aircraft 904VJ and most of the DC-9s in the fleet were wired with a material known as Poly Vinyl Chloride, which was first produced in 1950 and used only until 1979. Today this wire does not meet the specifications of the FARs, nor is it installed on any passenger aircraft. The reason it was discontinued is because of its major disadvantages. In terms of its negative characteristics, the wire is “heavy, thick, chafing, aging, flammable, [and it] burns readily, produces smoke, gasses, and hydrochloric acid” (Types of Wire 2006).

This wire relates closely with Kapton, which was determined to be a supporting cause of the Swiss Air 111 crash in 1998. During its flight from New York to Geneva, Switzerland, a fire began in an area directly above the cockpit. When

laboratory tests were performed on the Kapton wire, investigators discovered that once the wire shorted and set on fire, the insulation within the wire reacted like a stick of dynamite. This wire not only burns itself, but it will quickly ignite other wires around it, easily causing an uncontrollable fire within minutes. Investigators concluded that in the case of SwissAir 111 some sort of wire shortage occurred with the in-flight entertainment system located directly above the cockpit. The Kapton wires surrounding the unit ignited, and the fire quickly became uncontrollable. While the flight crew did everything they could to try to extinguish the fire, severe smoke inhalation quickly overtook them. The aircraft was lost in the Atlantic Ocean just off the coast of Nova Scotia, and all 229 on board were killed.

Going beyond the wire that was installed on the DC-9, ValuJet's N904VJ was known to many that worked on the aircraft as a mechanical disaster. Anonymous sources claimed that mechanics were constantly monitoring this aircraft for its continuous electrical problems. Interviews of the ValuJet mechanics by the NTSB revealed startling facts about the aircraft. In the six months prior to the accident, N904VJ "received six write-ups for partial electrical power losses" (Aviation Today 1998). It is also important to note that a major electrical failure was reported in the cockpit right before they reported smoke. A ValuJet mechanic also told CNN that "hours before the ValuJet plane crashed, mechanics found an electrical problem in the cockpit area" (CNN 1996). The problem was centered on a hydraulic pump that continuously tripped a circuit breaker behind the pilot's seat, and it was discovered before the plane departed Atlanta for Miami on the flight prior to 592. Some reports show that the problem was not fixed, and it was noted that it would be fixed in the near future. After the crash investigators discovered that the circuit breaker area contained soot deposits (CNN 1996). According to the NTSB, the circuit breaker had been repaired in Atlanta. While enroute from Atlanta to Miami, the public address system stopped functioning, but once on the ground, it began to work again. Upon arrival at the gate in Miami, a SabreTech mechanic met the aircraft at the request of the captain to inspect the PA system. While working in the electronics bay under the cockpit, he found that the PA amplifier was loose in its mount, so he repaired it and made a log book entry.

After review of the CVR, the report determined that the aircraft pushed back from the gate at 13:42 (also known as 1:42 pm). The crew proceeded to run through their usual check lists and soon began to taxi. At 13:43 the electrical panel was set. After an ATC hold, the aircraft finally began its takeoff at 14:03, 20 minutes after it left the gate. At 14:07, the crew turned on the radar to review the weather. At 14:10 a noise was heard and 4 seconds later, the electrical bus went out (AirDisaster.com). In that one long minute the aircraft lost all of its electrical power and encountered smoke and fire in both the cockpit and cabin. The CVR stopped recording 50 seconds before the aircraft impacted the ground due to the electrical failure (CNN 1996).

On May 14, 1996 an anonymous caller spoke with FAA inspector Jim Cole. The caller stated that he was maintenance personnel at ValuJet, and he had concerns about the maintenance that was being performed by the company. It was

his opinion that the airline hid many things from the FAA, including the recycling of parts, shortage of wire, and the condition of several aircraft. He stated that “Aircraft 901–940, and 930–940 needed to be “re-wired,” specifically number 904 (N904VJ). “The caller also said that 904 was delayed 40 minutes on its flight from Atlanta to Miami due to electrical problems” (Cole 1996). As a result the mechanic “bypassed two circuit breakers behind the captain’s seat and [said] that the 904’s wiring was notoriously bad” (Cole 1996). He also referred to the fact that personnel did not like to work on 904 because of the fact that any time they had to move wires under the cockpit, the wires would break and short out. These problems also included PA amplifiers, fuel flow transmitters, and on the day of the crash, wiring and circuit breakers shorting out. If the circuits really had been jumped, it would be impossible to shut off certain circuits individually. The witness alone had replaced six black box transmitters in the previous 30 days. He finally stated that many of the maintenance problems were not logged, and the filing system used by ValuJet prevented the FAA from seeing the actual cause of the accident.

Ethical Considerations

In the case of the anonymous sources many pieces of information support their theory. It is possible that as ValuJet quickly grew, the airline was forced to make rash decisions in relation to their expansion. This accident very well could have started from the improper monitoring of maintenance by ValuJet, and its unethical methods with respect to human lives. It is possible that everything was normal on the aircraft since no problems were reported by the any of the crew members during taxi or departure. At 14:10:03 the sound of a chirp followed by a beep is heard by the pilots on the public address/interphone channel. Four seconds after the noise was heard, they began to lose all electrical power. Even the pilots themselves stated at 14:10:15: “We got some electrical problem” (NTSB 1997: 170–171). The NTSB claimed that the noise heard by the pilots was that of the main tire exploding. The possibility remains that the noise could have been due to a wire arc or some type of other electrical explosion. If in fact one or more of the circuit breakers were jumped prior to the flight, this type of scenario could cause an extreme electrical failure. It could have taken place in the electrical bay located directly under the floor of the cockpit, reacting with the jumped circuits and cracked bundled wires which started a chain reaction. If the power put through the wire was too strong, it would have no circuit breaker to protect the wire, and as a result the wire would most likely short and split in half. If the circuit was jumped, there would be no way to turn it off, and the live wire could have reacted with the flammable insulation and other wires that were installed on the aircraft. As the fire grew, it would have spread thick smoke created by the burning wires into the cabin and cockpit areas, and begun to eat away at the cargo bin and control

cables. The CVR soon shut off, and the DC-9 went into an uncontrolled descent toward the Everglades.

This theory greatly differs from that of the NTSB. More importantly, it now moves the blame from SabreTech, completely onto ValuJet. The NTSB Report also contains some questionable items. One is the claim that the sound on the CVR is that of the main tire exploding. Aircraft tires have been known to be extremely durable and hard to puncture, which means that the fire would have needed to reach extreme temperatures. When this tire was recovered, it contained several rips and tears including an X-shape tear showing that the tire exploded outwardly. It is quite possible that all of the damage to the tire occurred on impact. But if it did in fact rupture due to the fire, this supports both the oxygen generator and wire theories.

Of the 28 pieces of oxygen generators recovered, nine had evidence of indentations on their percussion caps showing they had been ignited. Some speculated that these occurred during the flight, but they could have been depleted when mechanics removed them from the other aircraft. In the NTSB laboratory tests, all oxygen generators used were full. However, in regard to the accident itself, it remains undetermined if all, some, or even any of the generators were full. Also in the testing all pins were manually pulled to start the ignition of the generators. No tests were performed to dislodge the pins by shaking or rattling the canisters in the same way that they would have been in the forward cargo hold.

If this other theory were found to be true, the ethical issue behind this accident directly relates to ValuJet's corporate responsibility rather than SabreTech who became the scapegoat. During the NTSB investigation they interviewed a ValuJet Senior Vice President who served the company from June 1994 until he retired in February 1996, three months prior to the accident. He had been responsible for both flight operations and maintenance. In his interview "he told Safety Board investigators that when he joined ValuJet, the air carrier was operating 13 airplanes. He said that although he had expected the company to be running smoothly, when he began his new job he found a number of discrepancies, included maintenance records that were 'not in great shape' and 'lots of sloppiness due to rapid growth'" (NTSB 1997: 58–59). Being a fast paced growing airline, they may have tried to cut costs in any way they could; this includes not buying parts that were necessary for the safety of their fleet.

ValuJet would have known that their 30-year-old airplanes had dangerous wiring, and a more recent incident supports this point. After re-emerging as AirTran, one of the previous ValuJet DC-9s had an in-flight fire on August 8, 2000. "The cabin crew reported dense smoke, and could barely see each other" (King 2000: 1). "They also saw smoke and sparks coming from the area in front of the flight attendant's jump seat" (King 2000: 1). No one was hurt, and the plane landed safely. The fire was caused by a bad relay and wire arcing; five other bad relays were discovered in other DC-9s.

The crash of ValuJet 592 was both devastating and eye opening to much of the aviation industry. The rapid growth of ValuJet came to a halt, and their reputation

was so damaged that they were forced to re-emerge as AirTran to change the now tarnished name they once wore with pride. While ValuJet basked in the glory of success, they soon realized their own demise after the crash. With airline expansion there arises great responsibility in regard to safety. Many times airlines can be torn between ensuring that their aircraft were safe and putting them in the air to make a profit. In ValuJet's case they wanted to be successful, but in the crash of 592, safety was lost in the balance.

In the end it is irrelevant whether the true cause of the accident was due to the oxygen canisters or faulty wiring. For, ultimately, the true responsibility falls on ValuJet. They had an ethical responsibility to ensure that their success was dependent on not only themselves, but any person or company who supported them. On that sunny Florida afternoon ethical responsibility was left by the way side, and as a result, ValuJet may never be remembered for their success but only for their failure.

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PART IV

Diversity in Aviation

Out of all of the issues addressed in this text perhaps the one that most applies to US society is the question of diversity. Racial and gender issues have accompanied the birth of the US, and the insights of the following four chapters reveal the depth and complexity of the topic today. But additionally this subject is no longer viewed only in terms of divisions between white and black, or male and female since other factors play a role in determining what counts as diversity. In particular in the aviation industry one of the key debates has focused on the question of age discrimination. Thus, not only do the following chapters address questions regarding race and gender, but the final chapter examines the topic of pilot age limits.

This part of the book is unique in that it deals not only contemporary issues but also the early days of aviation. Chapter 14, which addresses the history of racial discrimination against black pilots, allows the reader to readily see why racial discrimination continues to play a role in US aviation. Flint Whitlock first examines early black aviators in order to show the ways in which they were able to overcome racial barriers. Some of the key areas of focus are Bessie Coleman's path to gaining a pilot license and acceptance, the Tuskegee Airmen of World War II, and the fight Marlon Green faced on his way to becoming a pilot for Continental Airlines.

Chapter 15 then turns to contemporary issues by examining the gender and racial barriers that confront pilots today. Some problems include a lack of role models, a lack of exposure to aviation careers, cost, prejudice, etc. As James E. Sulton, III points out, people have different learning styles, and by employing a variety of learning techniques, anyone should be able to become a pilot. However, with the lack of mentors and role models, especially in flight training, the possibility of successful motivation for women and minorities is greatly minimized. Thus, Sulton shows us not only the reasons why the majority of pilots continue to be white as well as male, he also indicates some of the solutions to the barriers that continue to confront the aviation industry.

After examining barriers for pilots, Chapter 16 addresses the ways in which diversity opportunities in aircraft maintenance can be improved. Almost mirroring the problems associated with flight training, maintenance is another field that tends to dissuade women and minorities from entering. Similar problems, such as the lack of mentors and role models, plague the maintenance field. In addition maintenance is not usually considered a desirable career choice. Because of these issues, Paul

Foster addresses several ways in which diversity can be improved, beginning early on with the education of children and instilling in them an interest in the subject, especially by promoting respect, understanding, and professionalism.

Finally Chapter 17 investigates the historical and political background behind the Age 60 Rule and why it was finally changed to 65. Michael Oksner first provides the historical context for the Rule in order to show that it was never really an issue of pilot health. Instead the situation was based on factors such as economics rather than scientific evidence. He analyzes different studies in order to uncover flaws in the rationale for the Rule. As Oksner contends, throughout the entire Age 60 Rule era the FAA never collected meaningful data even when mandated by the Congress. In examining ICAO and their move to an age 65 retirement age, Oksner shows how the tide changed in the US, especially with FAA Administrator, Marion Blakey, announcing in 2007 that the time had come to change this rule.

Chapter 14

Racial Discrimination Against Pilots: An Historical Perspective

Flint Whitlock

Perhaps the ethical issue that has had the most lasting impact in the US concerns discrimination. Blatant racial discrimination in the domestic airline industry was rampant for many decades and continues to arise today. Although the first commercial flight with a black pilot took place between Tampa and St Petersburg, Florida in 1914, the first African-American flight crew member did not take his seat in the cockpit of a regularly scheduled major airliner until fifty years later. From the very beginning, aviation was a “white man’s game.” Persons of color were discouraged from pursuing a career in aviation for a variety of reasons, perhaps not the least of which was white America’s perception of blacks as being incapable of learning the highly complex skills necessary to fly. Even after this perception was proven to be groundless, the airlines were still afraid that bigoted white passengers would boycott any carrier that employed black pilots.

This chapter provides historical background regarding racial discrimination against US pilots of African descent, with Chapter 14 continuing the topic by providing the reasons why both gender and racial discrimination continue to exist and more importantly how they can be overcome. In examining the historical context of several prominent African-American aviators, this chapter also reveals those pioneers who dispelled the prejudicial attitudes of white America. It covers the early years of aviation through the formation of the Organization of Black Airline Pilots (OBAP), and from this analysis one can readily discern why the early struggles of Bessie Coleman and other important aviators is far from over.

Bessie Coleman and Some Other Early African-American Pilots

One of the first persons of African descent to prove that blacks could fly just as well as whites was a woman, Bessie Coleman. She became the first American Negro to be issued an international pilot’s license. Born into poverty in 1892 in Atlanta, Texas, the ambitious Coleman graduated from high school and attended one semester at the Colored Agricultural and Normal University (now Langston University) in Langston, Oklahoma. A lack of finances forced her to drop out of college, and she moved to Chicago in 1915. There, while working as a beautician, she saw a newsreel about aviation and began to dream about a career in the skies.

Her brother, who had been a soldier with the American Expeditionary Force in France during World War I, told her stories about French women learning to fly. As a result of her brother's prodding, Bessie decided that anything French women could do, she could do better.

She applied to numerous flight schools across the US, but due to her race and gender, no one was willing to admit her. She found a better paying job, taught herself French, and began saving up for a move to France. After talking several sponsors into funding her dream, the gutsy young woman sailed for Paris in November 1920. Within seven months, she had completed the ten-month course at the *Ecole d'Aviation des Frères Caudron* (Caudron Brothers' Flying School) in Le Crotoy, the Somme, where she quickly learned to do loops, barrel rolls, and spins in a Nieuport over the cratered battlefields that had been the scene of years of ferocious fighting. She received her license on June 15, 1921—the only woman out of the sixty candidates to graduate from the *Fédération Aéronautique Internationale* during a six-month period.

After returning to the US, Coleman hoped to open the first African-American flight school and make her living in aviation, but the racial barriers were too high. Becoming a barnstormer—an aerial daredevil and stunt flier—seemed to offer her a way to fly and make money. She flew in her first air show in Garden City, New York, in 1922; her beauty, style, and grace helped her become a celebrity. She not only broke down gender barriers but also racial ones, refusing to perform in Texas unless black and white spectators were allowed to enter the air show grounds through the same admission gate; the stands themselves remained segregated, however. Her career was cut tragically short on April 30, 1926, when her mechanic, testing a JN4D “Jenny” from the front seat, lost control causing the plane to flip and throwing Coleman from the plane to her death. But fortunately her legacy did not die with her. Because of her example several Bessie Coleman Aero Clubs were established, and they helped hundreds of African-Americans learn to fly (Hardesty 2008).¹

Some of the other early black aviators to gain fame include Hubert Julian, born in either 1897 or 1900, and nicknamed “The Black Eagle.” Two years after Charles A. Lindbergh's historic 1927 trans-Atlantic flight, Julian duplicated the feat. In 1931 he then became the first black pilot to make a transcontinental flight across the US. He later trained with the famed Tuskegee Airmen during World War II but was discharged from the service before graduation (Hardesty 2008).²

Charles Alfred “Chief” Anderson, born in Bridgeport, Pennsylvania in 1907, became one of the most important persons in the history of black aviation. Anderson had fallen in love with flying as a youngster and at twenty tried to sign up for flying lessons but found that no flight school would take a Negro student. Undiscouraged he sought out individual pilots willing to give him private lessons.

1 Information on Bessie Coleman can be found at www.centennialofflight.gov, and also www.BessieColeman.com.

2 For more information see: www.fact-index.com/hubert_julian.

In August 1929 he soloed and received his private pilot's license. Shortly thereafter Anderson made the acquaintance of Ernst Bühl, a German Air Force pilot in World War I, who had come to the US and operated an airport near Philadelphia. Seeing Anderson's prowess in the cockpit, Bühl gave the black pilot further instruction and helped him earn his commercial and air-transport pilot's license in 1932—the first Negro to receive such a license. In 1933 and 1934 to promote the idea of flight to the Negro population, Anderson made several long-distance flights around the country and, with Dr Albert Forsythe (a black physician from Atlantic City, New Jersey, whom he had taught to fly), made a transcontinental flight in 1934. The two also set many other firsts, such as piloting the first flight to land on the island of Nassau, Bahamas, and the first Negro pilots to make an international flight (Atlantic City to Montreal).

World War II and the Tuskegee Airmen

In 1939 the federal government began creating flight schools at colleges around the country in order to train pilots in the event the US might be drawn into the growing world conflict. However, as none of these flight schools were established at black colleges, a student at the all-Negro Howard University in Washington, DC sued the government, and Anderson was subsequently hired to head Howard's civilian pilot training program. Training programs, such as the one at Howard, paved the way to help overcome the blatant racial discrimination prevalent in the US.

Perhaps the most important flight-training program began in 1940 at Tuskegee Institute, a black college in Tuskegee, Alabama with Anderson chosen to head the program. In April 1941 Eleanor Roosevelt, the wife of President Franklin D. Roosevelt, visited the institute. Impressed with the array of planes lining nearby Moton Field, she asked Anderson if Negroes were really capable of flying such machines. He answered in the affirmative and invited the First Lady to go for a ride with him in a Piper Cub. Horrified, the Secret Service agents tried to talk her out of it, but to no avail. When the Secret Service called President Roosevelt in a panic to inform him of her impending venture, he replied: "If she wants to do it, there's nothing we can do to stop her." The ride went off without a hitch, and shortly after Mrs. Roosevelt's return to Washington, the decision was made in September 1941 to form the first Negro Air Corps at Tuskegee. The Army Air Corps also established a technical training school for Negroes at Chanute Field, in central Illinois (Hardesty 2008).³

One of the biggest boosts to the aviation dreams of African-American pilots came during World War II. Although racial segregation was strictly enforced in the US military until 1948, World War II did much to establish the competency of African-American pilots. The all-black 99th Pursuit Squadron, famously known as the "Tuskegee Airmen," compiled one of the most stellar combat records of

3 Also see: www.afa.org/magazine/July1998/0798 integrate.

any unit within the US Air Force. Captain Benjamin O. Davis, a 1936 graduate of the US Military Academy at West Point, New York, and the first black Army Air Corps officer to solo, was one of the original thirteen cadets in the Tuskegee program, and earned his pilot's wings in March 1942. The 99th Pursuit Squadron became one of the most storied units in US military history. The unit was deployed to North Africa in April 1943, where its aircraft supported the Allies in the Mediterranean Theater of Operations. The squadron compiled an outstanding record in just four months, and Davis was promoted to colonel and assigned to the all-Negro 332nd Fighter Group, flying P-47 "Thunderbolts" and later the P-51 "Mustangs" in escort of American bombers hitting Nazi targets from Italy to Berlin. Under the umbrella of 332nd Fighter Group were the 99th, 100th, 301st, and 302nd Fighter Squadrons. The squadron and group took part in the invasions of Sicily and Italy, with the pilots of the 332nd flying 15,533 sorties and shooting down 111 enemy aircraft, including three of the super-fast German ME-262 jet fighters. The group also accounted for 150 German aircraft on the ground, 950 railcars, trucks and other motor vehicles, and one German Navy destroyer. One-hundred-fifty Distinguished Flying Crosses were earned by members of the group, along with 744 Air Medals, 14 Bronze Stars, and eight Purple Hearts. 66 Tuskegee Airmen lost their lives during the war, and another 32 were downed and taken prisoner (Hardesty 2008).⁴

The Tuskegee Airmen, with pilots such as Davis and Daniel "Chappie" James, proved to the world that black warriors could be just as good—if not better—than any white fighters, including those of Hitler's "Master Race." While it is impossible to prove whether or not the Tuskegee Airmen were directly responsible for desegregating America's armed forces, one could argue that their magnificent contributions to the war effort certainly aided the cause of integration.

Discrimination in Commercial Aviation after WWII

Despite the advances made by the Tuskegee Airmen, a racially divided US was not yet ready for black pilots to fly mostly white passengers traveling on commercial airliners. Instead they were forced to pick up "odd jobs" if they wanted to pursue their love of flying. For example, August H. "Augie" Martin, who had trained pilots in World War II, could only find work flying for low-paying, low-prestige, non-scheduled airlines. In 1949 he finally became a captain, but not with a US-based airline. El Al, the newly formed national airline of the new Jewish state of Israel, hired him. He later worked as a test pilot for Lockheed. Finally, in 1955 he was hired by Seaboard and Western Air (later Seaboard World), a cargo carrier that was eventually acquired by Flying Tigers. Martin was killed in 1968 when his

4 For more information, see the following: www.blackwings.com; www.africanamericans.com/99thPursuitSquadron; www.nasaui.ited.uidaho.edu; www.fatheryan.org; www.wpafb.af.mil; www.acepilots.com.

plane crashed while on a mercy flight delivering emergency medical supplies to war-torn Nigeria.⁵

On February 5, 1957 Perry H. Young, Jr. became the first black American pilot generally credited with carrying passengers on a commercial flight. At the controls of a twelve-passenger New York Airways helicopter, Young, who had been a flight instructor at Tuskegee during the war, made the nine minute trip from LaGuardia Airport to Idlewild. Like Orville Wright's flight in 1903, Young's journey was short, but its historic implications were enormous (*New York Times* 1998). Nor were airlines eager to integrate the passenger cabin. It was not until 1958 that the New England regional carrier Mohawk Airlines became the first airline to hire a black flight attendant—Ruth Carol Taylor (*Jet* 1997).

In 1957 Marlon D. Green, a black Air Force pilot from Arkansas, resigned his military commission to pursue his dream of becoming a commercial airline pilot, but despite over 3,000 hours experience in multi-engine aircraft, he found the doors to the cockpit barred to him. He spent months knocking on the doors of every airline in the country to no avail. One airline executive even told him to his face that no matter how qualified he was he would never be hired because of his race. Only one airline—Denver-based Continental—even gave Green a flight test and that was only because he had purposely failed to submit a photograph of himself and had not checked “Negro” on the application form in the space marked “Race.” Although he had more than twice the number of hours as the other applicants (all white), all of them were hired by Continental except for Green.

Convinced that he had been the victim of racial discrimination, Green chose to pursue the matter through the courts, but the Denver District Court threw out his complaint against the airline. The Colorado Supreme Court also sided with the carrier, citing case law that said a state could not impose regulations on a carrier engaged in interstate commerce. A unanimous decision by the US Supreme Court in 1963, however, overturned the Colorado judgment and ruled that Continental had discriminated against Green solely because he was black and ordered the airline, which received federal funds for carrying mail, to admit Green to its next training class. The airline dragged its feet but finally hired Green in 1965 during the turbulent years of the Civil Rights Movement. Green flew for Continental for fourteen years and retired in 1979. His landmark victory in the US Supreme Court also opened the door for other African-American pilots (Whitlock 2009). It should also be noted that William DeShazor, a black, former US Marine Corps pilot, was offered a job by TWA in 1963, but he committed suicide in February 1964, before he completed his commercial pilot training (*Poughkeepsie Journal* 1964). Also, David Harris, a black pilot who was hired by American Airlines on December 3, 1964, after Green's Supreme Court victory, actually flew before Green took to the air for Continental (Whitlock 2009).

5 See www.faa.gov/education.

The Organization of Black Airline Pilots

After Green, Elra “Doc” Ward was hired by Continental in 1968, followed by Ron Jennings. Gradually other airlines began allowing black pilots into the cockpit. In 1976 Ben Thomas, a black pilot flying for Eastern, saw the success of two groups—Black Wings and Tuskegee Airmen, Inc.—and decided that African-American airline pilots needed an organization of their own. As a result, he created OBAP (now known as the Organization of Black Aerospace Professionals). At that time, only 80 black pilots were employed by US passenger airlines and freight carriers. The mission of OBAP was to prepare young blacks and other minorities for a career in aviation and to ensure that the airlines engaged in fair employment practices. OBAP also worked with the Smithsonian’s National Air and Space Museum in Washington, DC to create the “Black Wings” exhibit, which opened in 1982. The exhibit, which continues to grow and evolve, showcases the often overlooked contributions of blacks to the field of aviation.

Ten years after OBAP’s founding, nearly 400 African-American pilots were flying commercially. By 2006 that number had jumped to 674, including 14 female pilots. Of course the percentage of black pilots is still miniscule compared to the more than 71,000 pilots working for US carriers. As the OBAP website points out:

The struggle to expand African-American pilot presence in the faces of unfair hiring/retention practices continues to be an uphill effort, and promises to become increasingly difficult as the generation of black pilots (hired in the 60s) has already begun to reach retirement age. Additionally, the military, which serves as a traditional source of airline pilots, especially black pilots, is rapidly being downsized (www.obap.org).

While changes in the law and hiring practices over the past half-century have eliminated most of the blatant, overt manifestations of discrimination in the airline industry that once kept women and minorities out of the cockpits and passenger cabins, other forms of bias continue to plague the field. They may be subtle and less visible, but they are no less pernicious to the cause of equality and civil rights. In the next chapter James E. Sulton, III will address some of the problems and solutions with overcoming racial and gender barriers in flight training.

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Chapter 15

Gender and Racial Barriers in Flight Training

James E. Sulton, III

“The presence of white men in key aviation jobs ... is the legacy of both explicit discrimination in hiring and an internal culture that from the beginning of commercial aviation gave heavy emphasis to the masculine nature of flying” (Hansen and Oster 1997: 114). Flight training began with Orville and Wilbur Wright in 1910 at their flight school in Montgomery, Alabama. While other inventors of “flying machines” were challenging the control they exerted over the flying market, the Wright brothers needed pilots to demonstrate the brothers’ aircraft. They developed a touring company that conducted flying exhibitions and lessons to promote sales. The lessons required brief explanations of the operation of aircraft and were the beginning of aviation education. At this time there were fewer than ten fully qualified aviators in the world—most of whom were white men (Ennels 2002).

The introduction of women represented the first sign of diversity in the industry. In 1910, Baroness Raymonde de la Roche became the first woman in the world to earn a pilot license after being trained in Chalones, France. And as a previously mentioned in Chapter 13, in 1921 Bessie Coleman traveled to Paris, France in search of flight training and became the first African-American—male or female—to earn an international pilot license. A female captain for a major US commercial airline, however, was not seen until 1986 when American Airlines provided Beverly Bass with captain’s stripes. Despite these accomplishments, the aviation industry remains overwhelming white and male.

Today, flight training and aviation education are conducted at flight schools located at airports known as Fixed Based Operators (FBOs), institutions of higher education, and high schools. These organizations share a common interest in advancing the education of those who wish to participate in the industry. For example, Embry-Riddle Aeronautical University (ERAU) describes its curriculum as covering “the operation, engineering, research, manufacturing, marketing, and management of modern aircraft and the systems that support them” (ERAU 2007). The mission of Oakland Aviation High School (OAHS) in California serves the community by providing the technical skills necessary for a successful career in aviation and business (OAHS 2009). Institutions of aviation education should be especially sensitive to the needs of women and minorities to ensure their success and to take advantage of this historically underutilized source of pilots.

In order for more women and minorities to successfully become pilots, the obstacles confronting them must be addressed and eliminated. The principal concerns in this regard are a lack of exposure to aviation careers and a dearth of role models within the industry (Sharp 1994). In 2008 of the 93,202 instructor pilots in the US, 6,293 (6.7 percent) were women (FAA 2008). Moreover of the 146,838 Airline Transport rated pilots 5,657 (3.9 percent) were women. As a result there have been few role models to inspire women and minorities to pursue an advanced flight rating, which also exacerbates the paucity of underrepresented groups in aviation.

Flight Instruction of Women and Minorities

Having suitable flight instructors is regarded as the most critical element of the flight-training process (Eichenberger 1990; FAA 2007b; Rodwell 2003). They should be “well qualified technically, possess the desired teaching skills and motivation, and demonstrate the ability to implement these (flight) skills” (Rodwell 2003: 239). The profession is primarily dominated by white male pilots with relatively little experience and whose long term goals are centered on other facets of the industry including the airlines and corporate aviation (Eichenberger 1990; Rodwell 2003; FAA 2007a).

The FAA provides flight instructors with one of the greatest tasks in the industry: full responsibility for student flight training. Operating in this role, the flight instructor’s responsibility is to train pilots in all necessary areas of knowledge and skills in order for them to safely operate an aircraft. This training includes flying, judgment, and decision-making skills (FAA 2007b). Because instructors forge a direct link between aspiring flight students and their careers as pilots, they are the crux of the learning process and become natural role models. As role models, flight instructors are at the highest level of importance because their behavior shapes that of their students. When the instructors exhibit poor discipline and haphazard procedures, their students are likely to follow suit, which results in a poorly trained pilot who becomes a detriment to the aviation industry (Frazier 2001).

Women and minorities are underrepresented as flight instructors, pilots, and aviation career-oriented role models resulting in a lack of their presence in flight training programs. The FAA’s 2008 data indicates that 6.7 percent of Certified Flight Instructors (CFIs) were women (FAA 2008). These figures have been historically low, and the trend continues today.

Table 14.1¹ depicts the disproportionate representation of women flight instructors as compared with men for the last ten years. In 1999, of the 84,722 total flight instructors, only 5,028 (5.9 percent) were women. By 2008 the total number

1 The data in this table are from “2006 U.S. Civil Airmen Statistics,” by the FAA retrieved November 20, 2009 from https://www.faa.gov/data_statistics/aviation_data_statistics/civil_airmen_statistics/2006/.

of women flight instructors increased 26.4 percent to 6,293 in 2008. However, they still only represent 6.7 percent of the total number of flight instructors.

Table 14.1 Flight instructors 1999–2008

Gender	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Women	5,028	5,193	5,386	5,667	5,811	5,970	6,067	6,158	6,202	6,293
Men	79,694	80,931	82,875	86,089	87,816	89,596	90,555	91,343	85,973	86,909
Total	84,722	86,124	88,261	91,756	93,627	95,566	96,622	97,501	92,175	93,202

Varying Learning Styles

The operation of a sophisticated aircraft relies on the performance of a team of professionals. Differences in gender and cognitive processes result in variations of learning styles. An understanding of these differences and preferences, with appropriate consideration of learning theories, will provide for effective teaching and learning in aviation (Bye and Henley 2003). As such effective training efforts will consider learning style and characteristics of the learner (Henley and Bye 2003).

Learning is a lifelong process requiring different methodological approaches as one continues to age. Adults tend to approach learning differently than children. Adults want and need to learn for self-fulfillment or societal advancement. This propels them through the learning process. Children, however, are often forced to learn in a structured educational setting by parents or legal requirements. Therefore, children's desire for learning and educational needs differ from adults because of the immediate need for critical knowledge.

As a result of this discrepancy in wants and needs, different learning characteristics become evident. These critical differences have resulted in two types of learning models: pedagogy and andragogy. Pedagogy is a didactic, traditional, or teacher-directed, method of learning. This is the most widely used form of instruction for adolescent learners. While this approach is effective for educating youth, instruction of adult learners requires a different approach. Andragogy is "a set of core adult learning principles that apply to all adult learning situations," and has been the basis for instructional design of adult education programs for the past three decades (Knowles, Holton, and Swanson 1998: 64).

There are four crucial assumptions about the characteristics of adult learners. First, adult learners shift from being entirely dependent on the instructor for guidance to being self-directed. Second, they are exposed to many experiences that result in invaluable resources for teaching and learning. Third, they become concerned more with why learning is necessary and how it can be applied to

their personal lives. Finally, adult learners see education as a necessary tool for achieving their full potential in life (Knowles et al. 1998).

Recent studies suggest that aviation students relate significantly more to the andragogical model than students of other disciplines (Brady et al. 2001). Furthermore, students involved in collegiate aviation programs differ from some other college students. The primary distinction is that aviation students are not actively looking for a career; rather they have found one and are taking the necessary steps to accomplish their clearly identified and specific career goal. Thus, aviation educators should utilize adult education learning strategies and methodologies to provide effective instruction to aviation students (Brady et al. 2001).

In addition to utilizing adult education learning strategies, aviation educators should develop strategies that meet the needs of women and minority flight students because their learning styles differ from those of white males. Women flight students require more confidence in the airplane, more hours before they are ready for a solo flight, and usually display a stronger fear of maneuvers—stalls, spins, and unusual attitudes in an airplane. Although only a small percentage of women choose to pursue pilot career paths—fewer still who are of color—they share the same motivation: the challenge and excitement of flying (Sitler 1998).

Learning Motivation

In aviation, certification and ratings are required to become a pilot. As pilots progress through the training and education process, they only pursue the learning requirements needed to achieve the necessary skills and ratings that will allow them to reach their ultimate goal of becoming an aviation professional. This results in the application of their learning to more immediate and relevant life circumstances that will satisfy a specific need or accomplish a goal such as becoming a career pilot (Knowles et al. 1998).

When considering the motivation of women and minorities in white male dominated arenas, inter-group perceptions often are critical factors. Some minority students perceive success in primary and secondary school as “acting white” and may view academic success as being in opposition to their societal norms (Fordham 1988; Fordham and Ogbu 1986; Ogbu 1992). A recent study describes harassment by minorities against others “who have the temerity to take their studies seriously. According to the poisonous logic of the harassers, any attempt at acquiring knowledge is a form of ‘acting white’” (Austen-Smith and Fryer 2005: 551). This perception results in the purposeful academic under achievement of minority male and female students in a wide array of educational paths, especially those paths that are highly technical.

To enhance the motivation of women and minorities in flight-training, aviation educators and flight-training instructors must anticipate the challenges of participating in the white male dominated realm of aviation: exposure to stereotypes, prejudice, discrimination, and self-perceptions of inferiority.

Moreover, these challenges should be utilized in the context of learning to identify desired outcomes and establish task-based goals that include career objectives (Kaplan and Maehr 1999).

Women and minorities can be motivated by career goals and have strong sentiments of pride and resiliency. However, women and minorities are not receiving adequate counseling on viable career options (including aviation), resulting in a lack of motivation in their educational efforts beyond high school (Fleezanis 2001). And because many flight hours are required for pilot certification, women and minorities must identify aviation as a viable career option early in their education process in order to compete successfully for aviation jobs.

Historical and Current Barriers Faced by Women and Minorities

As addressed more fully in the previous chapter, the end of World War II changed the roles of organizations aimed at enhancing diversity in aviation—such as the WASPS and Ninety-Nines—and marked a new era of discrimination in flight training. None of the women or minorities who flew in the war were hired by major airlines as pilots. Instead, minority men were hired into service jobs—including ground handlers and skycaps—while women were forced to fill roles as flight attendants or aircraft cabin cleaners. The only successful agents of change were court battles and the struggles of the Civil Rights Movement, which slowly created more opportunities in the cockpit for women and minorities (Hansen and Oster 1997).

Discrimination against women and minorities in the cockpit continues today. Airlines and the military maintain employment policies that have explicitly or implicitly barred underrepresented groups from jobs as pilots (Hansen and Oster 1997). Moreover, despite their abilities, women and minorities will likely face discrimination as they pursue their goals in this science-based industry (Shalala 2007). One such example is Lt. Colonel Beverly Armstrong's struggle for equality in the US Air Force. She experienced this discrimination first hand and recently prevailed after nearly 15 years of litigation. "It's not just me. The Air Force and airlines continue to exclude us [African-American women] from these positions by attacking [our] skills and questioning [our] abilities," she said (Lt. Colonel Beverly Armstrong, Personal Communication, November 23, 2007).

Discrimination in Collegiate Aviation Programs

Racial prejudice and discrimination continue to exclude women and minorities from educational opportunities and contribute to stereotyping. One of the consequences of this unfair treatment is its adverse effect on career opportunities and professional advancement:

The power of stereotypes lies in their function of justifying social relations. For example, stereotypes about Whites being overly organized and Mexicans and Blacks being stupid, lazy, and violent, work to positively uphold beliefs about White superiority and the right to dominance, while serving as negative reminders of the naturalness and necessity for racial subordination. Stereotypes solidify racial dichotomy wherein White is good and non-White is bad. Racialized stereotypes remind students, faculty, staff, and administrators that people of color are the abnormal, the marginal, because they stand to contrast Whites, who are naturally the norm, the center (Allen and Solorzano 2000: 21).

Therefore, as women and minorities pursue college degrees, they are held to lower expectations, are rarely encouraged to participate in fields traditionally dominated by white men, and appropriate flight training strategies are not applied.

Additional challenges arise when colleges and universities make cosmetic attempts to avoid discrimination and prejudice. These are most clearly exemplified by implementing diversity education plans with many shortcomings, which often include celebrations that lead to little change within educational communities. Rather than focusing on superficial events, educators should design programs that, at a minimum, are progressive, helpful for all students, and promote social justice (Nieto 2002). When this is accomplished in collegiate aviation education programs, women and minorities likely will experience additional opportunities for successful pursuit of their career goals.

Another example of discrimination is what is known as the “good ole boy” network. This creates a glass ceiling for women and minorities pursuing a collegiate aviation education. “Women must constantly break through this network of predominantly white men and their attitudes toward women—that is, women do not belong in the cockpit, they cannot do the job as well as (white) men, etc,” (Luedtke 1993: 70). The glass ceiling in aviation is an unfortunate metaphor for barriers that block women and other underrepresented groups from achievement. This barrier is ubiquitous in aviation (especially in pilot and management capacities) as white men continue to dominate the industry (Hansen and Oster 1997).

Prejudice within collegiate aviation programs has resulted in wasted talents and skills of women and minorities. This has and will continue to hamper the ability of the US to compete on a global scale as the country fails to utilize a much needed resource (Singer 2006). Moreover, historical exclusions of women and minorities from careers in aviation have resulted in current imbalances of their presence in the industry. This problem can be remedied by enlarging the pool of qualified candidates by including underrepresented groups through recruitment efforts (Hansen and Oster 1997).

Current Barriers Faced by African-American Women

Barriers to the participation of African-American women in flight-training include the high cost of training, absence of role models, lack of available aviation career information, and an alienating climate that makes African-American women feel unwelcome in the industry. In order to enhance the presence of African-American women in flight-training programs, these barriers can be eliminated.

Cost

Many potential pilots are prevented from enrolling, or drop out of flight training programs, because of excessive costs. Scholarships are difficult to obtain and many students worry that few or no jobs will be available upon course completion (Whitnah 1998). Furthermore, in a collegiate environment, flight training can add more than \$7,500 annually to the regular cost of post-secondary education (Hansen and Oster 1997). With average annual tuition costs of private four-year colleges exceeding \$23,000 and nearing \$6,200 for public four year colleges (College Board 2007), any additional flight training costs would only further hinder the participation of African-American women. Should they opt for flight training at FBOs, their expected costs will range between \$5,000 and \$9,000 for a private pilot certification (Aircraft Owners and Pilots Association 2007).

Lack of Role Models and Mentors

In addition to the high costs of flight training, African-American female pilots are at a unique disadvantage due to a lack of role models and mentors who can provide needed industry support. African-American women have traditionally been underrepresented as flight instructors and have fewer opportunities to explore their interests in this exciting field. As a result, there have been few role models and mentors for underrepresented groups of African-American female pilots in succeeding generations (Sharp 1994). Role models and mentors have been “identified as an important component in the training process particularly for women and minority groups” (Turney 2004: 224). Furthermore, women and minorities continue to be underrepresented as faculty members in science based programs and are rarely seen as role models or mentors in these programs (Black Issues in Higher Education 2004a; 2004b). Because one of the greatest benefits of having an appropriate representation of women and minorities on faculties is to provide mentors, motivators, and role models, underrepresented groups are again without a valuable resource (Loque 1994).

Lack of Available Information

Without access to role models and mentors, potential African-American women pilots are forced to search for information on their own. Airlines do

not regularly publish this type of information (Hansen and Oster 1997). In fact published information describing the hiring process, selection criteria, and roles of professional pilots is scarce and contributes to the unawareness of careers in aviation (Fessenden 2002). By contrast, white men often have family members or colleagues in the aviation industry, providing them with easy access to career information. Their resources provide crucial career information and professional guidance.

Unwelcoming Environment

When African-American women gain access to the aviation industry despite the previously mentioned barriers, they often are subjected to an unwelcoming environment that is dominated by white men. The environment often includes attitudes, behavior, language, and actions that are meant to deter their participation. This has caused many to leave without accomplishing their goals and has contributed to the further exclusion of underrepresented groups from careers as pilots (Turney 2004).

Conclusion

Aviation is an essential component of the current and future global marketplace. To maintain its competitive edge, the US must create additional opportunities for all of its citizens to participate fully in the field of aviation. Eliminating the barriers women and minorities encounter in pursuing their careers as pilots is an important first step.

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Chapter 16

Diversity Recruiting in Aviation Maintenance

Paul Foster

Imagine a typical day at a major airport in the US, such as Los Angeles International Airport. Normally, you will see minorities working in the following positions: Blacks (males) can normally be found working as Skycaps; blacks (females) generally are working the security checkpoints; females in general dominate the ticket counters for most airlines. Hispanics (males) are generally working in the catering services, while the females can be found in housekeeping, cleaning aircraft for the next flight. Asians (females) are usually found working the food service areas in the airport terminal. As one gets closer to the aircraft, the ethnicity of the employees begins to change. One sees individuals in uniforms such as flight attendants who are typically female; however, there are some males working as flight attendants, who are often mistaken as pilots. Other individuals found in uniform are pilots, who are typically white male. If you happen to look out the window onto the ramp area, you will notice individuals working around the aircraft, and, again, the majority of these workers are white male, with a spattering of other ethnicities including a few females.

Hansen and Oster (1997) have noted that aviation occupations, although changing, do not mirror the diversity of the overall American work force. Although aviation employees as a group are not dramatically different in sex, race, and ethnic makeup from all employees, the representation of women and racial minorities varies substantially from occupation to occupation. Hansen and Oster have also noted that pilots and senior managers continue to be predominantly white and male, and aviation maintenance technicians are less likely to be white than are pilots and managers but are still mostly men.

As a major training ground for aviation maintenance technicians, the US Air Force's aviation-related work force is noticeably more diverse than the civilian aviation work force. Minorities and women are better represented in military aviation specialties than they used to be, but with the exception of minority male technicians, their presence in these jobs is small and still significantly lagging their representation in the overall population. The argument can be made that the aviation culture should represent the nation's culture and not continue to represent the twentieth century male (white) dominated culture. Encouraging minorities from all backgrounds to consider aviation careers will enable the industry to draw

from a much larger pool of prospective students and, eventually, have a dramatic effect on diversity in the aviation work force.

Minorities in Aviation Maintenance

The findings from 1993 FAA research indicate that a critical shortage of aviation maintenance professionals will be upon us before most of the current high school students will be available for employment. This shortage is the result of a large number of retirements, a large number of experienced mechanics leaving for higher paying jobs or transferring to other occupations, and fewer entrants from the military. If enough mechanics are not available to make repairs, airlines will be forced to park the planes that would normally fly.

Aviation maintenance training programs need only look to the under-represented population of minorities to find their future generations of students. Currently, this population is virtually untapped by aviation technical schools. The prospective students need to be made aware of the potential for excellent careers, which can be achieved by attending aviation technical programs. Given adequate preparation, females have proven to be excellent employees in various aviation occupations. The Federal Glass Ceiling Commission (1995) found that 57 percent of the working population was comprised of female, minority, or both. One would think that the number of females in aviation would match that figure.

In a study that examined how sex stereotyping creates and maintains barriers for women who wish to enter male-dominated fields of employment (Ruble, Cohen, and Ruble 1984) concluded that sex stereotyping does exist, and it operates in ways that limit the employment possibilities and advancement of women in the work force. Regardless of the color of their skin, Douglas (1991) also noted that women had to overcome several obstacles. First and foremost, they were not wanted. The most difficult prejudice for them to overcome was not the fact that feminine mechanical aptitude lacked social acceptance but, rather, the notion that women belonged in the home.

Statistics compiled by the FAA suggest that women are making significant strides toward greater representation in several aviation careers. However, these statistics also suggest that the representation of women among the ranks of certified mechanics remains very low. Estimates from December 31, 1995 to December 31, 2000 placed the number of active female aircraft mechanics between 3,914 and 5,047. Although this is a dramatic increase over the number of active female mechanics a decade ago, it represents slightly more than 1 percent of the number of active mechanics in the work force.

Recent declining enrollments by all populations in aviation technical programs have also been linked to the poor professional status of aviation maintenance careers. Aviation's use of the term mechanic does not project exciting thoughts among young minorities and their families. Phillips (2000) notes that although that perception may be changing, the word mechanic still has some negative

connotations attached to it, and youth and their parents do not always view blue collar employment as very desirable. Fiorino (2000) notes that the industry's problem (challenge) is to remove the stigma of the aviation mechanic. Fiorino recommends that the industry moves away from the grease monkey mentality to one that portrays the professionalism and career potential represented by air carrier and other aviation pursuits. It is important for technical education institutions to instill within their students the pride and ethical roots of this emerging new professionalism, and for minority parents to encourage their young children to consider aviation maintenance as a viable career option.

Douglas (1991) noted several women encountered difficulties in learning certain specialties because of their lack of experience with tools and machinery prior to attending military technical schools. She notes that the military had not anticipated this situation and did not make any curriculum adjustments to compensate. The military's attitude, as viewed by Douglas, was that women would have to adjust to the existing standards the same way men did, whatever the consequences. She noted that this did affect the participation of women, as some dropped out of the specialty, and others were discouraged from even trying.

Without exception all maintenance schools have subliminal and covert barriers to learning for women. Baty (1999) notes that traditional maintenance training institutions and the industrial workplace have been wholly male; women in these environments have fewer, if any designated facilities to support their involvement as maintenance professionals. Baty claims that rest room facilities were generally makeshift or were located at greater distances from the workplace or classroom, and often lack adequate accommodations such as lockers, showers, and other important considerations.

Aviation Organizations

Despite these tragedies there are organizations attempting to recruit and retain minorities in aviation. They are Minority Pilot Association/Academy, Women in Aviation International (WAI), the International Black Aerospace Council, the Organization of Black Aerospace Professionals (formerly known as the Organization of Black Airline Pilots, Inc. (OBAP), and Negro Airman International, which primarily recruit pilots. Louque (1994: 16) notes that the support group environment generated within minority organizations has resulted in a dramatic increase in the recruitment and retention success rate of minorities in traditionally white male dominated fields. Schrieber (2001) affirms this concept noting that African-Americans are highly responsive to organizations and efforts that give back to the community, viewing such efforts as a gateway to mutual respect, rather than an attempt to exploit the market solely as a revenue opportunity.

Baty (1999) noted that the WAI organization boasts having more than 100 females from three aviation programs: aeronautical technology, flight, and administration. Louque supports the concept of critical mass (1994: 19), explaining that the more minorities enrolled in a program, the more minorities

the program can attract. The Association for Women in Aviation Maintenance (AWAM) is a non-profit organization formed for the purpose of championing women's professional growth and enrichment in the aviation maintenance fields by providing opportunities for sharing information and networking, education, fostering a sense of community, and increasing public awareness of women in the industry (Baty 1999).

Issues in Hiring and Retention

Adams (2000) notes that mechanics have long been the airline industry's backbone, invisible to passengers yet indispensable to their flight. In 2000 the government had accused two major airlines of unsafe maintenance practices. Across the industry many mechanics are leaving their employers and sometimes the profession for better paying jobs and better hours. Neither the military nor private schools that train mechanics are able to meet the demand. Phillips (2000) supports this position because he notes there has not been the significant increase in enrollment needed to meet projections for the number of mechanics that will be required in the next five years and beyond.

During the mid-1970s, following the Vietnam War, many military mechanics filled jobs in the civilian work force. A factor, noted by Phillips (2000), affecting both airplane and helicopter operators, is the impending retirement of Vietnam-era technicians, whose nearly 40 years of knowledge and experience cannot easily be replaced. As a result, general aviation operators are attempting to increase wages and benefits in order to retain these employees. Drucker (1999) indicates, however, that manual workers who have been working for 40 years are physically and mentally tired long before they reach traditional retirement age. Phillips (2000) predicts that many experienced professionals who are now in their 50s and 60s, therefore, can be expected to retire soon. He anticipates that their retirement may not be as gradual or planned as the industry might like, but their departure from the work force is expected to create a need for another 4,500 aviation mechanics per year for the next 10 years. Although no one is forecasting a mass retirement, Phillips states that many aviation mechanics are eligible, and the rate of retirement is expected to be higher than normal.

Adams (2000) warns that if attrition does not slow and more new mechanics are not trained, the result will be flight delays and late packages and aircraft sitting on the ground. Another area of interest noted by Adams is when other industries siphon off valued airline mechanics' skills. She noted that in 1998, aviation maintenance schools graduated 4,510 men and women with mechanics certificates, but only 3,338 took aviation jobs. One-fourth of the graduates were snapped up by other industries—often offering better starting pay and hours—such as power companies, electronics firms, the railroad and auto industries, and amusement parks. Adams stressed that these non-aviation industries recognize the technical skills an aviation mechanic or technician possesses, and are willing to pay superior wages. Adams notes the reason they need these skilled aviation

mechanics or technicians is to maintain sophisticated arcade rides, elevators, and electronic business systems.

Publicity and marketing involves public relations and communications skills, which are used to reach the largest possible audience of persons qualified for and interested in aviation maintenance as a career. Recruitment committees will need to approach publicity and marketing towards minorities with great care because Henry (1995) indicates that stereotypes, misperceptions, and myths are more prevalent in special marketing, such as ethnic or minority marketing, than almost any other field. He also warns that the images perpetuated by public relations have not fared very favorably and that it is important to realize the effects such depictions have had on minorities' self-respect, self-esteem, self-concept, and self-identity.

Many blacks had displayed a keen desire to take to the air, but as in other aspects of American life, their dreams of wide-scale involvement in aviation were met with continued indifference or hostility. This is supported by Hardesty and Pisano (1983) who note that despite blacks' growing interest in aviation, flying in the late 1930s presented familiar frustrations for blacks: hostile and unpredictable receptions at established airfields, segregated facilities, the refusal of some airports to service aircraft flown by blacks, and the feeling of alienation from the aviation community as a whole.

Aviation maintenance training institutions and the industrial workplace traditionally have been made up mostly of white males; while minorities in these environments have fewer, if any, designated organizations to support their involvement as maintenance professionals. Fowler (1992) noted unequal expectations for minority students because his research found that from kindergarten on, they are expected to be neither technical nor scientific. They are not encouraged to do science experiments in elementary school, and they are not encouraged to take physics in high school. Leach and Roberts (1988) suggested that there was a need to upgrade basic skills of women and minority students and to provide the academic support needed for success in high tech occupational training programs. They found three reasons women had problems articulating through technical programs: recruitment, academic readiness, and retention.

The 1993 FAA study showed that the lack of qualified women and minorities in the hiring pool may be primarily a result of their lack of awareness of the diversity of lucrative aviation career opportunities open to them. The FAA 1993 Research Committee reported that additional barriers to pursuing nontraditional aviation careers are the lack of mentoring programs, management training, and opportunities for career development. Mentoring is a key step to managing cultural change within the university and creating an alignment with its values and strategic direction. The mentoring process links existing and new programs in a manner that promotes overall professional growth throughout the aviation industry (Galbraith and Cohen 1995). The lack of mentors could be offset by the recruitment of more minority faculty members. Schrieber (2001) notes that mentoring programs have proven to be highly effective in assuring the long-term success and retention

of a diverse work force. In such programs Schrieber notes that established and successful executives agree to mentor younger employees of their own ethnic background. Schrieber recommends assigning majority and minority mentors to advise and assist minority employees in functioning successfully with members of the traditional work force, and further recommends making successful mentoring a significant objective in performance appraisals.

Minorities in Higher Education

The hiring of minority faculty may provide some relief for the problem of mentoring up-and-coming minority students; however, Louque (1994) found that there would not be a large pool of minority professors until more bright, young minorities are attracted to the field. Opp and Smith (1995) found that with the exception of American Indian students, all minority groups are under-represented in colleges when compared to their proportional representation in the overall US population. Nettles and Perna (1997) noted that African-Americans comprised only 4.9 percent of America's college and university teaching faculty, a considerable underrepresentation relative to their 12.5 percent share of the US population and nearly one-half their 9.6 percent share of students enrolled in higher education. Dilworth (1984) reported that within the Black community, people recognized and valued the significant contribution African-American teachers have made progress, as these teachers have inspired their students to become physicians, lawyers, engineers, and other professionals. It is also felt that African-American teachers are needed to inspire African-American students in integrated schools.

McKenzie (1984) advocated that teachers' attitudes about themselves, their careers, their schools and assignments, and their students must be positive. He further stated that educators should feel good about being teachers and members of an honorable profession, not just believe that they are serving time with the students. Black teachers need to be prepared to go beyond the call of duty in urban schools, or in any area where African-American students are in need. Not only does one need to teach, but one also needs to serve as counselor, therapist of sorts (listener), surrogate parent, spiritual advisor, nurse, custodian, lay engineer, police person, and role model. There lies a challenge for the Black teacher: to be at all times in all places the kind of person students respect, appreciate, and admire. In short, teachers teach when they are not teaching.

Another barrier for minority students and maintenance professionals, as noted by Douglas (1991), has been the display of materials with offensive racial and sexual overtones, and outright hostility and harassment. The display or use of sexually or racially offensive material is a form of harassment causing people to feel threatened, humiliated, patronized, or deliberately excluded. Douglas also notes that in many cases, it creates an intimidating or threatening environment. The creation of an intimidating or offensive atmosphere can cause intense stress. It is both demeaning and depressing, often leading to an uncomfortable atmosphere

with adverse effects on health and even to resignation. These attitudes, repeatedly expressed, eventually distort students' perceptions until stereotypes and myths about all minorities, and women are accepted as reality. Words are not value neutral. They express concepts and ideas. Words reflect society's standards. If colorphobia is one of its most powerful standards, then emotionally laden racist words easily reinforce and perpetuate stereotypes.

Recruitment Process

Because of their historic exclusion from much of aviation, blacks and women have less of an aviation tradition than white men; so voluntary programs are less apt to attract them without special recruitment efforts. The FAA 1993 Research Committee reported that individuals from underrepresented groups needed to know that aviation offers career opportunities to which they can aspire. Schrieber (2001) notes that the types of media people consume differ significantly by multicultural group. He writes that Hispanic-Americans are more heavily focused on TV; African-Americans concentrate mainly on radio; and Asian-Pacific-Americans center mostly on print.

Hansen and Oster (1997) note that enlarging the pool of people interested in and qualified for aviation careers can address two concerns simultaneously. It can increase the number of minorities and women available for employment. It can also forestall any future supply problems by ensuring that the nation's increasingly diverse work force is being fully utilized by the aviation industry. Henry (1995) states that in the recruiting process, it is essential to determine the audience and be selective in how to communicate to them. In defining the audience, Henry notes that it may be necessary to segment it into submarkets or several audiences. He further emphasizes that it is imperative to identify your market and understand what you want to accomplish from publicity exposure in the media in order to reach that market. Schrieber (2001) affirms that building a solid relationship with African-American consumers requires a targeted media approach. He notes that marketers must make commitments to broadcast and print media that offer a special relevance to the African-American community, rather than hoping to succeed by just throwing media weight at them or incorporating African-American consumers in broad-based media plans. Schrieber also notes that marketing messages targeted to African-Americans required an elevated level of cultural awareness, otherwise the messages risk reinforcing ethnic stereotypes and alienating the very consumers they are intended to persuade.

One of the major concerns associated with the mission of an educational institution is the recruiting, selection, and admission of qualified students. The recruitment process, according to Higgins and Hollander (1987), is implemented through search committees, advertising, interviewing, and having full awareness of legal parameters created by various civil rights laws and regulations. Adhering to a recruitment process develops and strengthens public relations, communication

skills, investigations, and writing. Schrieber (2001) summarizes that remarkable results can be achieved in multicultural campaigns when the right questions are asked and the right marketing plans and methodologies are put in place.

Recruitment involves public relations and communication skills. This is accomplished through advertising. Higgins and Hollander (1987) state that the purpose of advertising is to reach the largest possible audience of persons qualified for and interested in the major course of study. Bornheimer (1973) notes that one of the most common methods of recruitment for educational institutions is to have faculty members, department chairpersons, or deans attend career days at high schools. Rodriguez (1986) found that a majority of the respondents in his study developed an interest in aviation between the ages of 10 and 20 years and nearly all of the respondents felt confident in their ability to succeed in the discipline they were pursuing.

Henry (1995) noted that when a special market must be reached in order to accomplish the objective of the marketing public relations program, it is important to involve a professional who is knowledgeable and experienced in the language, culture, and nuances of that audience. Visits from minority faculty members to prospective groups may be invaluable to the possible recruitment of minorities into aviation maintenance. Eiff (1991) found that males and females agreed that career selection was most influenced by visiting potential job sites, followed by career education programs, programs by industrial representatives, and individual counseling or discussion. She also found that females were significantly more influenced by females than males. She believed that female role modeling and career influences are important in encouraging women to pursue nontraditional career opportunities.

Nieto (2000) emphasizes that US society comprises many cultures and many subgroups, each of which attaches special meanings to certain words, phrases, gestures, and expressions. Nieto also notes that minority students and teachers from the same background are often on the same wavelength simply because they have an insider's understanding of cultural meanings and, therefore, they do not have to figure out the verbal and nonverbal messages they are sending. Henry (1995) makes the claim that it is possible that a recruiting session could be destroyed because someone misunderstands a word or gesture, even though there was no intention of causing offense. In general positive communication will be ensured if everyone maintains a professional posture and respects others as professionals. The communication styles, according to Nieto, are only the tip of the iceberg, but they help to point out the sometimes subtle ways that culture, if not understood, can interfere with learning.

The underrepresentation of women and minorities in aviation maintenance careers has been a problem confronting the aviation industry throughout its history. A white male dominated occupation; aviation maintenance has resisted encroachment despite national trends and pressures to include greater numbers of women and minorities in all occupational fields of aviation. Despite repeated efforts by the industry to institute minority recruitment programs, a great void

remains between employment equity and the number of women and minorities employed in the field of aviation.

What Should *We* Do?

We all live in the same world. The challenge facing us is to decide how to recruit women and minorities in a way that promotes respect, understanding, and professionalism. Of course there are no easy answers, but we can focus on some possible solutions that were mentioned in this chapter. These possible solutions are categorized as follows: primary/secondary schools; aviation maintenance schools; aviation industry; and professional associations. In order to encourage the participation of women and minorities in aviation maintenance careers, there is a need for early exposure to the opportunities in aviation maintenance while they are still in primary and/or secondary school.

Primary/Secondary Schools

Primary/Secondary Schools should provide career information to women and minorities during the latter stages of primary education and throughout secondary education. There is a significant lack of awareness and promotion of aviation career fields, particularly the aviation maintenance occupations, in elementary and secondary schools. Finnegan (2000) noted that aviation must do a much better job of selling itself to the younger generation. He claims that if we do not attract kids by the time they are in high school, we will probably lose them completely. Fiorino (2000) supports this idea, noting that there used to be a mystique about working with airplanes, now the romance is in computer technology.

Encourage counselors, teachers, recruiters, and administrators to promote the investigation of nontraditional careers, such as aircraft maintenance. Such an investigation could increase the number of women and minorities seeking nontraditional careers. Increasing the number of women and minorities could help bring into balance the gender and ethnicity inequity of the aviation work force and assist in the reduction of stereotypical barriers that may still exist.

In order to shape a well-qualified, diverse pool of aviation maintenance professionals, all segments of the youth population must be exposed to opportunities in aviation maintenance. A number of career awareness activities can be utilized to provide that early exposure young people need in order to make educated career choice decisions. The career awareness activities could range from short-term exposure events, such as field trips, to long-term activities, such as mentoring and internships.

Aviation Maintenance Schools

Aviation maintenance technician schools should develop programs to publicize career opportunities in aviation maintenance aimed specifically to attract more women and minorities to the field. One barrier faced by females, in primary and secondary schools, is the lack of encouragement to investigate or consider nontraditional careers. This lack of encouragement reinforces psychological and cultural barriers concerning nontraditional occupations and furthers the lack of information concerning these careers. The awareness program can begin with feature articles about women and minorities in the aviation maintenance workplace. Increasing the numbers in training eventually would result in a greater number of minorities and women qualified to pursue professional careers in aviation maintenance. These increased numbers would help bring into balance the sex inequity of the aviation maintenance work force and would assist in the gradual reduction of the stereotypical barriers that presently exist.

Aviation Industry

The aviation industry could work aggressively to increase the pool of qualified applicants from underrepresented groups by establishing internships with historically black colleges and universities and other schools and colleges with large minority enrollments. Minority and female role modeling and career influences are important in encouraging women and minorities to pursue nontraditional career opportunities. Women employed in diverse areas of the aerospace industry have proven to be outstanding professionals. Nevertheless, female representation in various aviation career facets has remained disproportionately low. The reason for the perpetuation of this imbalance can be attributed to few females preparing for a nontraditional career in aviation.

Aviation maintenance organizations and professional associations should develop in-service training programs for counselors, teachers, recruiters, and administrators to encourage them to discuss aviation career options. Although certain aviation occupations, such as being a professional pilot, are relatively well known and respected, counselors typically make little aviation career information available to students. The aviation maintenance profession is not only less well known; it is also usually considered less attractive by persons with even a rudimentary knowledge of the air transportation industry. This lack of awareness and promotion of aviation maintenance may hinder student interest in an aviation maintenance career. Lack of such information serves as a barrier to entry into such careers. This is particularly disadvantageous for minorities and women who may not have aviation maintenance role models. If these students are not aware of the attractiveness and rewards of a career field, it is unlikely that they will gravitate toward it. Counselors, teachers, and recruiters need to encourage young women and minorities to consider nontraditional career options and help them in the investigation of these paths.

Professional Aviation Associations

Professional aviation associations should establish mentor groups within aviation maintenance organizations. Mentoring is a key step to managing cultural change within an organization and creating an alignment with its values and strategic direction. The mentoring process links existing and new programs in a manner that promotes overall professional growth throughout the aviation industry (Galbraith and Cohen 1995). The lack of mentors could be offset by the recruitment of more minority faculty members. Schrieber (2001) notes that mentoring programs have proven to be highly effective in assuring the long-term success and retention of a diverse work force. In such programs Schrieber notes that established and successful executives agree to mentor younger employees of their own ethnic background. Schrieber recommends assigning majority and minority mentors to advise and assist minority employees in functioning successfully with members of the traditional work force. Schrieber further recommends making successful mentoring a significant objective in performance appraisals.

Conclusion

These undertakings could be accomplished through good counseling techniques and exposure to representatives from aviation maintenance, and through programs using mentoring, job shadowing, and sponsorship. These programs would be effective because they unite potential aviation maintenance technicians with role models and introduce students to the career environment.

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Chapter 17

Safety, Economic Favoritism, or Age Discrimination? The Story Behind the FAA's Age 60 Rule

Michael Oksner

FAR 121.383, the FAA Age 60 Rule (the Rule), is one of the most debated and contested acts of federal governance ever, and for good reason. The Rule states: “No certificate holder may use the services of any person as a pilot on an airplane engaged in operations under this part if that person has reached his 60th birthday. No person may serve as a pilot on an airplane engaged in operations under this part if that person has reached his 60th birthday.” There is a great deal of evidence that the Rule was never intended as a safety measure, never supported with any rational basis, and no attempt was ever made by the FAA to generate the data that would either support or refute this policy. Yet it persisted for almost five decades, surviving numerous challenges by individuals, organizations, court appeals, and stymied Congressional efforts seeking change. What follows is a condensed overview of a questionable retirement policy once mandated by the federal government.¹

Historical Background

Prior to 1958 pilot retirement plans were imposed by the airline and not through the working agreement. In 1958 three pilots from American, Western, and TWA

1 Most of the information contained herein was the product of a Petition for Exemption (*Butler 2002*) litigated by Atty Anthony P. X. Bothwell representing petitioners seeking waivers from the Rule. This petition is the most thorough documentation of what transpired through the life of the Rule, without which much of the information herein would never have seen daylight. The Butler Court of Appeals ruled in favor of the FAA, and the Supreme Court denied the plaintiff's request for review. The wealth of information contained in the Butler filing was very influential in moving the Congress to change the age to 65. Atty Bothwell was retained for follow-on suits: (*Oksner v Blakey 2009*), and currently (*Adams v the US Government*), claiming violations of the Federal Tort Claims Act. Much of the information contained in the publication was the product of research done by Captain Samuel Woolsey who spent his post airline life gathering, dissecting, and analyzing the evidence from both sides of the debate on the Rule.

Airlines respectively grieved their airlines' policy of forced retirement. In all three cases a "neutral" was used to break the deadlock in the grievance board. All three neutrals ruled in favor of the pilots and ordered the pilots returned to work with seniority. Western and TWA complied, but American refused which led, in part, to a strike over the 1958 Christmas Holidays (Butler 2002: 9).

Shortly after the conclusion of the American strike the CEO, Maj. General C. R. Smith, sent a personal letter, dated February 5, 1959, from his Park Avenue residence in New York, to Lt. General Elwood "Pete" Quesada, the first Administrator of the newly formed FAA. The letter begins: "Dear Pete: During the course of our recent negotiations with the pilot's association we found it unwilling to agree to the company's policy concerning retirement of air line pilots at age 60." The final sentence concludes: "It may be necessary for the regulatory agency to fix some suitable age (sic) for retirement." Quesada and Smith had worked closely together during World War II as officers with the Army Air Corps in Europe. This letter was typed at Smith's residence, not on American Airlines stationery, as a personal request. Prior to the Smith letter there was no interest in the issue of older pilots expressed by either the new FAA or its predecessor, the Civil Aeronautics Administration. A concurrent FAA memo on the proficiency of older pilots states in part: "Ability to perform adequately under realistic flight conditions would seem to be a reasonable test of adequacy of at least the psychomotor functions of airline pilots" (Butler 2002: 9-10).

In follow up correspondence Smith provided Quesada with training statistics for pilots going through transition training on the new Boeing 707. Smith reports that it takes longer for older pilots to make this transition than "... especially selected ..." younger pilots. It would seem intuitive that Korean War veterans with jet aircraft experience would have an easier time adjusting to the higher speeds, slow engine response times, and wider turn radiuses, of the new jet than the WWII veteran who never flew in jet aircraft. There is no record of any discussion about safety or health related concerns, rather the issue was with the higher costs of training the older pilots.²

On June 3, 1959 Quesada convened a hand-picked panel to discuss capping the retirement age for pilots. Based on the Smith training data, the panel concluded that no pilot be allowed to transition to jets past age 55 and that all airline pilots be retired before age 60. In October FAA in-house lawyers advised Quesada that the training data would not support an age rule and that "scientific or factual justification" of the Rule was not possible.³ Undaunted, a determined Quesada announced on December 5, 1959 that the Age 60 Rule would go into effect on

2 Letter from C.R. Smith to "Pete," dated April 30, 1959, with a note in the upper right corner; "Mail to home address," and also stating "containing results of the 707 training program" (See *Butler v FAA* 2002: 10-11).

3 Memorandum from Dr H.L. Reighardt, Federal Air Surgeon, October 9, 1959. The memo further stated: "...most comments had to do with reasons why the subject material itself was inappropriate and indefensible" (In *Butler v FAA* 2002: 12).

March 15, 1960. Quesada resigned as Administrator the following January and assumed a position on the Board of Directors at American Airlines.

As discussed above the FAA had no hard evidence to support a forced retirement Rule. Rather they justified the Rule on the basis that the incidence of disease among humans begins to accelerate somewhere between ages 55 and 65, and age 60 was a reasonable age to assume that commercial pilots become too risky for safe cockpit operations in large passenger aircraft. Court challenges began immediately, initially by ALPA. On April 28, 1960 the US Court of Appeals, 2nd Circuit, ruled that the Rule was not discriminatory and “The Administrator did not act unreasonably in placing greater limitations on the certificates of pilots flying planes carrying large numbers of passengers who have no opportunity to select a pilot of their own choice.”⁴

Having established the legitimacy of the Rule, the hurdle facing pilots seeking waivers under the provisions of FAR 121.383, the Age 60 Rule, would prove impossible to surmount. Court challenges in 1978–79 by pilots seeking waivers raised questions about the FAA retirement policy that led to a Congressional inquiry with the intention of modifying or eliminating the Rule.⁵ Concurrently, following the deregulation of the airline industry in 1978, ALPA reversed their stance on the Rule from seeking change to supporting the Rule. With ALPA and the FAA now aligned against change, the effort was watered down to a Congress mandated study to determine if there is a relationship between the incidence of disease and aging pilots.

The Relationship Between Age and Health

The way to determine if there is a direct correlation between aging and the incidence of medical catastrophic failure would be to collect and analyze relevant data, which in 1959 FAA lawyers advised did not exist at that time. Beginning in 1960 the FAA attempted to collect relevant data on two fronts; the internal Georgetown Clinical Research Institute (GCRI) (no relation to Georgetown University), and the National Institutes of Health (NIH) sponsored Lovelace Foundation Study of Physiologic and Psychologic Aging in Pilots. The GCRI study, primarily focused on Air Traffic Controllers, was terminated in 1966 with no useable data, no statistical design for analysis for data, and no analysis despite excessive cost overruns.⁶

The Lovelace group recommended a program that would use the most exacting techniques available to produce a “Profile Aging Ratio” (PAR) that could replace the arbitrary age Rule with individual testing. By 1968 the Lovelace research

4 Air Line Pilots Association, *Intl v Elwood R. Quesada*, argued April 8, 1960, decided April 21, 1960 (See *Butler v FAA 2002: 16–17*).

5 Hearings before the House Select Committee on Aging 1979.

6 US House Committee on government Operations, *Better Management Needed of Medical Research on Aging*, House Report No. 2080, September 26, 1966.

found results favorable to the health and fitness of older pilots that troubled some individuals within the FAA. A memo from the FAA's Federal Air Surgeon to the Lovelace Foundation states in part:

It is generally accepted that the impetus for initiating your study (and ours) was the adoption of the 60-year rule with the resulting pressure to develop a means of selecting pilots who might be able to fly beyond the age of 60 ... Instead of a primary concern with the upper age bracket—selecting those who are above the average 60 year old with the idea of allowing them to fly past this age—we should [instead] concern ourselves with selecting out those in the lower age group who measure below average (Butler 2002: 30).

It becomes apparent from this letter that certain members of the FAA did not want to alter the retirement age; rather they would refine the methods to better eliminate sub-par younger pilots. This obfuscates the original mandate to replace an arbitrary age limit with a physiological profile that would permit determining qualified pilots who might remain in their cockpits as long as they satisfy medical standards.

There were numerous opportunities to study aging with older pilots but perhaps the most comprehensive was assigned to the NIH by the Congress in 1981.⁷ The NIH tasked the National Institute on Aging (NIA), which in turn contracted the Institute of Medicine (IOM) of the National Academy of Sciences, to collect the relevant data and conduct the study. The resulting IOM study was reviewed by an 18 member panel of experts assembled by the NIA which concluded; “there is no convincing medical evidence to support age 60, or any other specific age, for mandatory pilot retirement” (Butler 2002: 20). The NIA Panel expressed strong dissatisfaction over the fact that the FAA had: 1) never collected relevant data, 2) the alleged data was not available, and 3) some data that might be relevant (gathered for other purposes) was never analyzed for the purposes of this study (Butler 2002: 20). The Panel recommended that, 1) the Rule remain in place, but 2) waivers be issued to certain pilots to develop the missing relevant data, and 3) FAR Part 135 commuter operations be brought under the Part 121 umbrella.

The FAA initially agreed to all of these recommendations, but in 1983 they withdrew the notice that it would comply, by alluding to “retirement and insurance plans which conform to retirement at age 60,” while asserting that safety was the reason (Butler 2002: 23). Members of the NIA panel expressed strong disagreement and disappointment with the FAA's response and the lack of follow through on their findings and recommendations (See Butler 2002: 21–22). The NIA report mirrors the findings of the “neutral” in the Western Airlines grievance, the Lovelace study, and the FAA's lawyers, that there exists no evidence to support a medical rationale for a forced retirement age at any age.

⁷ Public Law 96–171 enacted Dec. 29, 1979, directed the NIH to conduct a study concerning mandatory age retirement for pilots.

The NIA panel cited data from a 1977 pilot accident study that showed a dramatic increase in accident rates beginning precisely at age 60 (Butler 2002: 19). This is to be the first of many flawed and misrepresented studies used by the FAA to support retaining the Rule. The statistical methodology in question correlates accidents per hours of flight with the age of the pilots involved (i.e., 4.5 accidents per 100,000 flight hours). When airline pilot statistics are included in any such study, this super-safe cohort is eliminated at age 60 by the Rule causing the appearance of a dramatic increase in accident rates after age 60. If the airline pilot population is left out of the study data, the accident rate actually decreases with ages well past 60. The FAA withdrawal from the panel's recommendations in 1983 relied on a more recent study of aviation accident rates using the known misleading methodology to once again allege that based on the current data they would not tamper with the Rule (Golaszewski 1983). This study was rejected and publication refused by the FAA, yet they continued to reference it for many years thereafter whenever called upon to defend the Age 60 Rule (See Butler 2002: 46–47).

Following the FAA's refusal to comply with the NIA recommendations, Dr Stanley Mohler wrote to the FAA Federal Air Surgeon, Dr Frank Austin: "The Age 60 Rule is an operational rule, FAR 121. Today there is no medical basis for the Rule ... If the operations people want to continue to fight for the Rule, let them make their own case, as there is no longer a medical basis for it." Austin pencils the following onto Mohler's letter: "I believe this and Adm. (Donald D.) Engen (the FAA Administrator) believes this. He wants to keep the Age 60 Rule now. I will support the admiral in his position. When it can be done—age 60 will be eliminated (I think!) It's an ECONOMIC Issue! (Butler 2002: 42–43)."

The Age Discrimination Act and the Fight for Waivers

In 1967 the Congress passed the Age Discrimination in Employment Act (ADEA) that protects individuals who are 40 years of age or older from employment discrimination based on age. Certain occupations might be deemed a Bona Fide Occupation Qualification (BFOQ) that allows employers to ignore the ADEA if age is determined to be reasonably necessary to the normal operation of the particular business. The DOL, the original overseer of the ADEA, determined that the Rule satisfied BFOQ criteria and did not challenge the FAA's allegations that older pilots compromised airline safety. ADEA enforcement was later handed over to the Equal Employment Opportunity Commission (EEOC).

Representatives from the EEOC were included on the 1981 NIA Panel and submitted comments in support of the ensuing FAA NPRM to accept the NIA Panel recommendations. EEOC Chairman Clarence Thomas testified before the House Select Committee on Aging in 1985 that in the EEOC's opinion the FAA should adhere to the NIA Panel recommendations, concurring with NIA Director T. Franklin Williams' testimony at the same hearings. Thomas followed up with a

letter to Adm. Engen urging the FAA to grant a petition by 39 pilots for exemptions from the Age 60 Rule so they could participate in a controlled study envisioned by the NIA Panel.

Since then the EEOC continued to petition the FAA and the Congress to either justify the Rule with empirical evidence or eliminate it. For example, in 1993 EEOC Chairman Tony Gallegos submitted comments: “The Age 60 Rule should be lifted by the FAA. Medical and proficiency tests on an individual basis are effective and non-discriminatory ways to assure that commercial pilots maintain the highest standards of safety at all”⁸ (Butler 2002: fn 272, 68–9). The letter reiterates the arguments of many other experts that medical technology exists to replace a blanket age rule with individual testing to allow qualified pilots the option to fly past 60. The EEOC had success against corporations with court findings that “the FAA’s Age 60 Rule did not establish a BFOQ as a matter law.”⁹ The FAA, however, remained aloof by maintaining that as the regulatory agency responsible for safe air carrier operations, they do not have to adhere to the ADEA when mandating safety rules, with the courts siding with the FAA.

In 1988 Captain Melvin Aman, et al., were denied waivers to fly past 60 by the FAA and, per prescribed procedure, appealed to the US Court of Appeals. The petition cited the recommendations of a six member panel “with impressive qualifications in the fields of cardiology, aerospace medicine and neuropsychology” (Aman 1988). The panel devised a battery of tests for assessing the fitness of pilots over age 60 that coupled with “existing operational tests required by the FAA and the airlines (such as flight simulator testing), provided an adequate basis for exempting some older pilots from the Age Sixty Rule” (Aman 1988). Petitioners also assert; “... that an exemption must be granted because older pilots who satisfy the protocol and existing operational tests are safer than the average pilot because performance improves with experience” (Aman 1988). However, the Aman court finds that no amount or form of testing is sufficient to overturn the Rule or cause waivers to be issued. On the issue of experience the Court finds:

The FAA failed to set forth a sufficient factual or legal basis for its rejection of the petitioners’ claim that older pilots’ edge in experience offsets any undetected physical losses. We therefore vacate the denial of the exemptions and remand to the FAA for further proceedings to provide findings and explanations addressing the deficiencies we have noted and for other appropriate proceedings not inconsistent with this order (Aman 1988).

8 Comments by Tony E. Gallegos, Chairman, EEOC submitted “in response to notices published in the Federal Register soliciting comments about whether the [FAA] should initiate rulemaking about its [Age 60 Rule]” October 14, 1993 (See Butler 2002: fn 272, 68–9, also Exhibit II).

9 Other cases include: *EEOC v Boeing*, also Rockwell Intl., Grumman Corp, Lockheed, McDonnell Douglas, and Exxon-Mobil.

There is no record of an FAA reply to the Aman remand regarding the benefit gained by the experience of older pilots.

Two years later the same court hears another appeal by pilots denied waivers by the FAA.¹⁰ This majority decision finds evidence from both sides “somewhat flawed” (Baker et al. 1990). The “flawed” evidence from the FAA is, once again, the debunked, unpublished, Flight Time Study of 1983. The majority admonishes the FAA: “The FAA should not take this as a signal that the age sixty rule is sacrosanct and untouchable. Obviously, there is a great body of opinion that the time has come to move on. The agency must give serious attention to this opinion” (Baker et al. 1990). In a scathing dissent, Judge Herbert Will argues in part:

Pilots with tens of thousands of hours of flight time ... suddenly are grounded on their sixtieth birthdays, even though the day before they were flying, without restrictions, and were acknowledged to be qualified and, ironically, are still deemed qualified to pilot planes with thirty passengers or less ... The pilots have plausibly alleged that the FAA’s distinctions and exemption practices are inconsistent.¹¹

Further Studies

Probably as a consequence of the Baker decision finding that: “Obviously, there is a great body of opinion that the time has come to move on” the FAA commissioned Hilton Systems, Inc. to perform studies in consideration of whether to initiate rulemaking on the Age 60 Rule (Butler 2002: 23). Hilton Consolidated Database research finds: “The data for all the various groups of pilots were remarkably consistent in showing a modest decrease in accident rate with age ... Our analysis provided no support for the hypothesis that the pilots of scheduled air carriers had increased accident rates as they neared age 60” (Butler 2002: 40). Since the findings hardly support a 60-and-out policy, the FAA then asked the Hilton team to conduct further analysis to determine an age where accident rates might affect safe cockpit operations. In response the Hilton team reports: “Taken together, these [new] analyses give a hint, and a hint only, of an increase in accident rate for Class III pilots older than 63 years of age. This suggests that one could cautiously increase the retirement age to 63” (Butler 2002: 26). The Hilton Consolidated Database Study carefully avoided mixing airline pilot data with Class III general aviation data to prevent the contrived increase in accident rates as a consequence of the Age 60 Rule. Additional Hilton Systems tests showed that advanced simulator

10 *John H. Baker, et al. v. FAA*. 1990. U. S. Court of Appeals, 7th Circuit. Argued May 7, 1990, Decided October 31, 1990.

11 Baker 1990. Dissent by Judge Will.

testing was a valid, accurate, predictor of pilot performance in the cockpit and could be used to determine the pilot's ability to operate aircraft regardless of age.¹²

The early 90s were a very active, turbulent, period in the history of the Rule. A series of aircraft accidents in the early 1990s involving commuter aircraft prompted the NTSB to recommend that the demarcation for part 121 and part 135 commercial passenger operations be modified from the current 29 passenger threshold to 9 passenger aircraft. In 1993 the FAA issued a NPRM "that would require certain commuter operators that now conduct operations under part 135 to conduct those operations under part 121 (the "Commuter Rule"). Public hearings and written comments were considered which argued pro and con regarding the necessity of an age rule with the new part 121 inductees" (Butler 2002: 48). Although the majority of comments were in favor of changing, or even eliminating, the Rule, the FAA dismissed support for individual testing. "While science does not dictate the Age of 60, that age is within the age range during which sharp increases in disease mortality and morbidity occur" (DOT 1996).

A second Flight Time Study was published in 1991 using the same methodology as the 1983 version (never officially accepted by the FAA and debunked in both the Aman and Baker cases). Yet the FAA relied on these findings to justify not changing the retirement age as recommended in the Hilton Consolidated Database Study (Butler 2002). Discussion about the relative importance of experience versus age related medical decline, improved medical technology, the multi-crew concept, and "Suggested Protocol for Gathering Additional Data" were all put aside for the time being because "valid selection tests did not exist" (DOT 1996). There was also a brief comment regarding the economic impact on carriers and pilots if the Rule were to change, but since the Rule was not going to be amended at this time, the FAA had not evaluated "the economic impact of a proposed change" (DOT 1996). The FAA acknowledged a recent proposed change on the maximum age for pilots in Europe that would allow pilots to operate up to age 65 as long as one crewmember was under age 60, to be effective July 1999 (DOT 1996).¹³

ICAO and the Growing Debate on the Rule

Recognition of the recommended European pilot age limits led to a discussion of exceptions allowed by the agency to the Age 60 Rule. The agency allowed foreign first officers to fly into US airspace older than 60 per ICAO standards which establish a maximum age for the Pilot in Command of 60, however it merely

12 Age 60 Project: Experimental Evaluation of Pilot Performance, Hilton Systems Technical Report January 1993.

13 In addition, the Joint Aviation Authorities (JAA) in Europe has proposed to harmonize the European rule to allow pilots who have not reached the age of 65 to operate in multi-pilot operations, provided no more than one pilot in the cockpit is over the age of 60.

“recommends” a limit of 60 for the First Officer. The FAA allowed foreign first officers over age 60 to operate within US airspace per the ICAO standards but would not allow domestic first officers the same opportunity.¹⁴ In fact the FAA did issue waivers in the early 90s to captains of certain international cargo carriers to allow named captains past age 60 to operate aircraft into US airspace.¹⁵

In 1995 the FAA passed the “Commuter Rule” “that would require certain commuter operators that now conduct operations under part 135 to conduct those operations under part 121 (Butler 2002: 48). A great deal of discussion regarding the Rule arose during the rulemaking process for the proposed commuter policy changes. The FAA, in their final analysis, issued waivers to commuter pilots over age 60 to fly until the end of 1999 to moderate the economic hardship imposed on both the carrier and their older pilots. This announced policy decision ironically fulfilled all of the recommendations put forward by the NIA Panel in 1981 but later rejected: 1) to retain the age rule in part 121 operations, 2) to allow certain pilots to fly past age 60 to develop the missing data, and 3) part 121 operations be extended to part 135 carriers. So the FAA authorized foreign first officers (and some captains) to operate in US airspace past age 60, and accorded the same privilege to pilots of domestic commuter operations, while still refusing to issue a single waiver to pilots with similar credentials and health while piloting part 121 aircraft with 30 or more seats.

On March 10, 1995 the ICAO Air Navigation Commission requested member States “to complete a questionnaire on the age limits in their current licensing regulations, on envisaged changes, on the operational and medical requirements applicable when an age in excess of 60 years is allowed ...” (ICAO 1996). In summary:

65.2 percent of respondents operate with a de facto age limit of 64–65 years. Also in states with no upper age limits the operational age limit is kept lower by established airline policies and may be as low as 55. No state has experienced any particular operational problems caused by older pilots. There is no question that a majority of states prefer to have an upper age limit. It may seem reasonable for the ICAO to consider increasing the upper age limit.¹⁶

Brazil, China, France, Lebanon, Uganda, and the US were among the countries that refused overflights by pilots older than 60. However the US did relax this

14 “If foreign airlines operate in the U.S., the FAA requires that the carrier adhere to the ICAO standard” DOT 1996.

15 One example is an “extension for compliance with FAA Bulletin Number HBAAT 92–06” issued to 13 B747 captains for CorseAir until October 31, 1993, dated January 6, 1993 which permits the named captains to operate in US airspace past their 60th birthday (also Cargolux, and Icelandic Air).

16 ICAO 1996.: excerpts from Section 5. Discussion.

policy for first officers, applying the 60 limit to the pilot in command and no age limits to the first officer.

In 2005 ICAO published the findings of an upper age limit survey which finds 83 percent of member states supported upward movement in the retirement age (ICAO 2005). ICAO then asked the states to comment on changing the age standard. Responses resulted with the adaptation of the European standard, of one pilot between ages 60 and 65 in multi-piloted aircraft as long as the other pilot is under age 60, as the international standard effective November 23, 2006 (ICAO 2005).

In 2001 Senator Frank Murkowski led an effort to alleviate a severe pilot shortage by relaxing the age 60 ceiling. Some relief appeared to be on the horizon until Senator Jim Jeffords chose to leave the Republican Party and become an Independent, leaving the Democrats to assume leadership. The Democratic leadership did not support the change, and thus the effort dissolved. In 2003 Senator James M. Inhofe authored a bill to up the age limit to 65. This time the bill for change reached the Senate floor for a vote. However, in the post 9/11 operating environment airlines had suffered severe economic trauma. Almost every airline had furloughed some of their junior pilots, and there was no relief in sight. Tremendous lobbying by certain carriers and unions persuaded US Senators to not consider changing the Rule at this time, and the proposed bill was defeated.¹⁷

In 2001 representatives from the FAA appeared before the Senate Committee on Commerce, Science, and Transportation to testify regarding the Age 60 Rule and to report on a four part study produced by the FAA's Civil Aeromedical Institute (CAMI), as requested by the Senate Appropriations Committee in 1999.¹⁸ Report one was a bibliography of relevant literature. Report number two was a rehash of a study conducted by Northwestern University in 1999 and reported in the *Chicago Tribune* (Schmeltzer 1999, Butler 2002: 27–28). Both the CAMI and the Northwestern studies refer to the same data which delineates the number of accidents and incidents that occurred in individual ages from 23 to 73 for airline pilots operating under part 121 from January 1, 1990 until June 11, 1999.¹⁹ The data shows that there were nine incidents and/or accidents that occurred with pilots aged 60–73, yet the CAMI discussion ignores the data for this cohort of the study in their second report. Of the 450 accidents and incidents reported during the study period, no part 121 pilot older than 59 was identified with an accident.

Report number four was designed and directed by the Senate Appropriations Committee as the defining study to determine if the Rule might be changed to 63 per

17 Senator Inhofe proposed age 65 legislation again in 2006 and 2007 with no success.

18 Statement of L. Nicholas Lacey, Director of Flight Standards Service, FAA, and Federal Air Surgeon Jon Jordan, before the Senate Committee on Commerce, Science, and Transportation, on the Age 60 Rule, March 13, 2001.

19 Data for airline pilots past age 60 is provided by those issued waivers per the Commuter Rule of 1995.

the Hilton Systems recommendations. For unknown reasons the instructions from the Appropriations Committee inexplicably replicated the flawed methodology of the prior Booze and Flight Time Studies. These instructions require the CAMI to comingle data for airline pilots with non commercial pilots (as well as “Class I or Class II medical certificates”) that will knowingly alter, upward, the accident rates at ages 60 and above. The CAMI, well aware of this flawed, dishonest, methodology, sent this report, without protest or comment, to the Senate.

FAA officers reported to the Senate that the combined studies did not support changing the Rule. The following January Federal Air Surgeon, Dr Jordan, published a clarification for report number four that does not appear in the CAMI testimony of March 2001. In the January 2002 Aviation Medical Report Jordan states:

The fourth report in the CAMI series examined accident rates under 14 CFR, part 121 and 14 CFR, part 135 (air taxi regulations) for professional pilots holding air transport or commercial pilot and Class I or II medical certificates for the period 1988–1997. An overall “U”-shaped trend was found, with pilots aged 60–63 having a statistically higher accident rate than pilots aged 55–59. However, all of the accidents involving pilots over 60 occurred in Part 135 operations. Pilots flying under Part 135-regulated operations have historically had a higher accident rate and this difference could have influenced the overall distribution when the data are combined. Therefore, no definitive conclusions about the relationship of age to accident rates for pilots engaged in commercial operations can be drawn solely on the basis of the study (Jordan 2002).

Was this omission intentional? Report four’s methodology created quite a stir among the medical community resulting in the CAMI producing a “Final Report” which cleaned up the data search and found; “The trend was best described by a linear (straight-line) rather than a quadratic (“U”-shaped) function reported in previous studies on pilot age and accident rates ... On the other hand, the null hypothesis of no difference in accident rates for the 55–59 and 60–63 age groups could not be rejected. That is, the accident rate for these two age groups appeared to be statistically the same.”²⁰ The combined findings from reports number two and four reveal zero accidents for airline pilots ages 60–71, and probably through age 73 as the FAA does not refer to any accidents in this oldest cohort in their reports. Had this knowledge been revealed at the Senate hearings, the Murkowski age bill may have resulted in a different outcome.

20 Methodological Issues in the Study of Airplane Accident Rates by Pilot Age: effects of Accident and Pilot Inclusion Criteria and Analytic Strategy; Dr Dana Broach, CAMI, Final Report, May 2004.

The New Rule

On January 30, 2007 the FAA Administrator, Marion Blakey, addressed the National Press Association announcing that “it’s time to close the book on Age 60. The retirement age for airline pilots needs to be raised. So, the FAA will propose a new rule to allow pilots to fly until they are 65.” Through this announcement Blakey finally answered the Aman Court Remand to explain why experience does not outweigh the alleged effects of aging: “...the fact of the matter is that there’s a heckuva lot of experience behind those captain stripes, and we shouldn’t have to lose it as early as we do. I want our older captains to be around longer to help the younger pilots rising up through the ranks” (Blakey 2007). She praised the few hundred pilots allowed to fly past 60 with an impeccable safety record, when the Commuter Rule was implemented. As she stated:

Under our current rules, we will have captains older than 60 carrying Americans on foreign carriers originating overseas, from countries such as Canada, Australia, Israel, Japan, about three dozen countries overall. They’ll be coming here, picking up Americans, and then flying them elsewhere. So you have to ask: It’s safe to fly with foreign pilots on our shores, but it’s not safe with our own? [In closing, Blakey concludes with] We’re moving forward because it’s a change whose time has come. The objections of the past don’t cut it anymore. This is the right thing to do. Experience counts, it’s an added margin of safety, and at the end of the day, that is what counts. Isn’t it? (Blakey 2007).

Per the Administration Procedures Act, Blakey would issue a NPRM so the public, the industry, and individual pilots would have the opportunity to comment before making a final decision, albeit a foregone conclusion. With this speech Blakey argued for every pilot who petitioned for a waiver, for the medical professionals who had advocated individual testing in lieu of firing every experienced pilot whose sole reason for leaving was the celebration of their sixtieth birthday.

Blakey clearly states that we were expunging the most experienced pilots, very likely reducing the level of safety in doing so. Although the first to make such an admission while still acting as Administrator, she was not the first to admit that the Rule was an economic favor and not a medical necessity. Former Administrators Adm. Donald D. Engen, T. Allan McArtor, and David Hinson have publicly admitted that the Rule was an economic issue though only after they left office.²¹ Yet Blakey never issued a waiver following her speech even though she, or any of her predecessors, could have done so if it was “in the public interest.”

We may never know what covert power perpetuated the Age 60 Rule. It certainly was not medically warranted. There is no accident data that indicts older pilots are the problem, in fact quite the opposite is true. Throughout the entire Age 60 Rule era the FAA refused to collect meaningful data even when mandated by

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the Congress or the Courts. Rather they went out of their way to obfuscate the facts with contrived studies that were acknowledged as flawed by FAA officials. The Congress and the Courts failed in their oversight to require the agency to remain within the law when enforcing this regulation. When the Congress finally did away with the Rule, the ensuing law contained no medical provisos. Nor did the FAA, nor the Federal Air Surgeon, suggest, much less insist on, changes to existing medical exams for the newly created older pilot population.²² Had the Congress not intervened, the FAA would have squandered another year's worth of pilot experience, retired on their sixtieth birthdays, before wallowing through the bureaucratic NPRM process to a foregone conclusion. There is no medical evidence that age 65 warrants forced retirement. Eventually we will do away with any age restrictions unless some medical or operational evidence dictates caution. That evidence does not exist today. The conduct of certain FAA officials enforcing the Age 60 Rule as a medical necessity, with a hidden agenda, lacks moral or ethical standards expected of persons in a position of power.

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PART V

Airports, ATC, and Security

This section addresses some of the key issues that arise on the ground: airports, air traffic control, and security. Fields such as ATC and security have taken on ever changing roles, especially in light of 9/11, and along with these developments the ethical dimensions have grown more complex.

The first two chapters examine pertinent issues involving airport usage and expansion. Chapter 18 by Brian Ohm focuses on land use issues. He examines important court cases that show the complexity of determining “land” use for aircraft flying over private properties. As Ohm states, these cases present interesting insights into the balancing act engaged in by the courts as they evaluate the correct course of action for resolving conflicts that arise between airports and non-aviation related land uses. Such cases recognize the importance to society of a properly functioning aviation system. While Joseph Ryan’s chapter addresses a more specific issue, namely Chicago O’Hare’s modernization project, his topic on the politics associated with the plan reveals the larger picture of how politics can shape decisions that are not necessarily supported by those with expertise. According to Ryan, aviation experts often do not decide on the best location for runways and are limited to the constraints that politics and public debate dictates.

Chapters 20–21 examine the past and future of air traffic control respectively. Chapter 20 provides the reader with an analysis of the 1981 air traffic controllers’ strike in which all striking employees were fired. Michael Nolan’s account gives us insight into the complexity of the situation by examining different key groups involved. In addition to President Ronald Reagan and the controllers, other significant players include the FAA’s involvement as well as military personnel who took over some of the controller positions. Experts have acknowledged that unions in the US have had less power since this strike, and thus it is important to examine its ethical dimensions. Addressing the future, Chapter 21 provides an overview of some of the key issues for ATC in a post-9/11 world. Bill Parrot argues that with the industry’s unquestioned commitment to safety, adequate oversight and focused supervision will continue to be essential. By highlighting the ever increasing importance of technology, Parrot also claims that human factors related to the ATC model will continue to occupy center stage with daunting challenges for the future. Additional points, including morale problems within the controller workforce, will demand increased vigilance on the FAA in its efforts to promote safety.

This part ends with the topic that has perhaps been the most subject to debate since 9/11. In Chapter 22 Robert Mark explores some of the possible limitations of the TSA especially in terms of its risk assessment methods that are meant to assess threats to security and provide plans to alleviate those threats. The task of the TSA is to promote excellence in security in the hope that the traveling public may be as safe as possible. In discussing the 2009 and 2010 GAO reports, Mark points out that the TSA has been criticized for its lack of a viable risk plan. While the TSA has made progress in determining risks, it still has yet to create a comprehensive plan that includes analysis of threats, vulnerabilities, and consequences. The ethical issue becomes whether or not TSA as an organization is fulfilling its vision of providing excellence in transportation security.

Chapter 18

There Goes the Neighborhood: Conflicts Associated with the Location and Operation of Airports

Brian W. Ohm

Issues related to the use of land often focus on separating incompatible land uses. It should be fairly obvious that airports (and their associated aviation activities) are going to present some unique land use compatibility challenges. Communities view airports as important for the economic vitality of the area. Landowners located near airports, however, have the fundamental right to use and enjoy their land without unreasonable interference. Aviation activities associated with airports can interfere with the use and enjoyment of neighboring lands, especially when those lands are used for residential purposes. Neighboring land owners can also do things on their land that can impact the aviation operations of airports.

In the US, conflicts over land use compatibility often are left to the courts to resolve. Over the last century, the conflict between airports and adjacent non-airport uses has resulted in hundreds of court cases. This chapter provides an overview of a few of the most significant ones. The cases present interesting insights into the balancing act engaged in by the courts as they evaluate what is the right (or wrong) course of action for resolving conflicts that arise between airports and non-aviation related land uses located near airports. These cases recognize the importance to society of a properly functioning aviation system. Within that context, the courts have struggled to provide guidance for when aviation activities cross the line and constitute an unreasonable interference with a land owner's property rights.

Redefining American Property Law: What do Landowners Near an Airport Own?

American principles of property ownership are based on the judge-made, or common law, traditions of England. These traditions were developed centuries before the Wright Brothers made their historic first flight at Kitty Hawk, North Carolina. Until the advent of modern aviation, property law in the US followed the principle that when someone owned land they were entitled to absolute and undisturbed possession of it including everything below the surface and the

airspace above the surface to the ends of the universe. The Latin phrase for this concept is "*cujus est solum ejus est usque ad coelum.*" Someone who interfered with those rights, like a person operating an airplane, could be liable for trespass. Aviation, therefore, posed a direct challenge to the historical notion of what it meant to "own" land in the US.

With the passage of the Air Commerce Act of 1926, the US Congress declared that the US Government, as opposed to the governments of the individual states, had exclusive control over US airspace. It was not clear, however, how this declaration fitted with the ancient doctrine of land ownership. This conflict ultimately made it to the US Supreme Court for resolution. In the 1946 decision *United States v. Causby*, 328 U.S. 256, the Supreme Court first attempted to integrate aviation into American property law.

The facts of the case illustrate the challenges posed by aviation to the use and enjoyment of adjacent lands. In 1928 early aviators established an airfield about eight miles from Greensboro, North Carolina. In 1934 the Causby family purchased 2.8 acres about one-third of a mile from the airport. Located on the property were a dwelling house and various outbuildings which were mainly used for raising chickens. The end of the airport's northwest-southeast runway was 2,220 feet from the Causby barn and 2,275 feet from their house. The path of glide to this runway—100 feet wide and 1,200 feet long—passed directly over the Causby property. The 30 to 1 safe path of glide angle to the northwest-southeast runway of the airport passed directly over their property at 83 feet, which was 67 feet above the house, 63 feet above the barn, and 18 feet above the highest tree. Due to prevailing winds, this runway was used about four percent of the time in taking off and about seven percent of the time in landing.

In April, 1942 the airport was taken over by the Greensboro-High Point Municipal Airport Authority for operation as a municipal airport. That same year the US Government also obtained the right to use the airport. Military bombers, transports, and fighters, which started to fly over the land in May 1942, created a greater disturbance for the Causby family than previous activity at the airport because the planes were larger and made a louder noise, flights were more frequent, and the glare from the lights on the planes brightly lit up the Causby property at night. The noise and light from the military planes frightened their chickens causing them to fly against buildings. About 150 chickens died as a result. Egg production also fell off. As a result, the Causbys gave up their chicken business. This noise and glare also disturbed the Causby family's sleep, frightened them, and made them nervous. Although there were no airplane accidents on their property, there were several accidents near the airport and close to the Causby property.

The Causbys sued the federal government, the operator of the military flights. At issue was whether the operation of the aircraft constituted a taking of property under the Fifth Amendment to the US Constitution. The Fifth Amendment prohibits the taking of private property without the payment of just compensation. For example, the government must pay property owners when it takes someone's land

to build a highway. The question in this case was: did the government similarly need to compensate property owners for flights that passed over their properties?

In its opinion, the US Supreme Court recognized that the “airplane is part of the modern environment of life” and declared that the ancient doctrine extending ownership of the land to the periphery of the universe had no place in the modern world. The Court acknowledged that the air is a public highway. If the ancient doctrine were in place, the Court concluded that every flight would subject the operator to countless trespass suits. In a few sentences, the US Supreme Court reduced private ownership of the airways by placing at least part of the airways under public ownership, thereby rewriting the law of property that had been embedded for centuries. One can only imagine the mess that would have ensued if the Court had decided otherwise, thereby encouraging hundreds, if not thousands, of trespass lawsuits against airplane operators.

Yet, while the Court announced this general rule of public ownership of the airways, the Court also recognized limits to the rule. According to the Court, a landowner must have exclusive control of the immediate reaches of the enveloping atmosphere. The landowner owns at least as much of the space above the ground as one can occupy or use in connection with the land. Otherwise buildings could not be erected, trees could not be planted, and even fences could not be run. If, by reason of the frequency and altitude of the flights, landowners cannot use their land for any purpose, they would suffer a complete loss similar to if the government had entered upon the surface of the land and taken exclusive possession of it. The Court opined that this type of interference with the enjoyment and use of the land would be unreasonable. It would be similar to the government taking an easement to the land. In light of the level of interference with the *Causby*'s enjoyment of their property, the Court agreed that an avigational easement (an easement allowing the use of air rights above someone's property) had been taken by the government requiring compensation. It is interesting to note that the Court did not view the interference strictly as a trespass. Rather, the Court viewed it as the physical acquisition of an easement which allowed the aviation activities to continue.

The Court in the *Causby* case, however, did not provide any bright line formula for how low and how frequent flights must be to significantly interfere with someone property to constitute a taking. (Note that the Court did not require that Congress compensate private land owners for taking their property rights when the Court declared that the airways were public highways. In the Court's opinion, this interference with property rights was not unreasonable. From a practical standpoint, it would have been difficult to figure out how to compensate land owners.) It was also not clear in the rapidly developing field of aviation—where the federal government controlled the airways, private companies operated the airlines, and local governments began to own many of the airports—who should be responsible for paying for the acquisition of avigational easements.

Who Pays Compensation to the Property Owners?

With the beginning of the jet age in the 1950s, noise became an even more prominent issue creating conflicts between airports and their neighbors. This was a factor in the next significant aviation case decided by the US Supreme Court, *Griggs v. Allegheny County*, 369 U.S. 84, in 1962.

The case involved residential property, owned by the Griggs, near the Greater Pittsburgh Airport, owned by Allegheny County in Pennsylvania. The slope gradient of the approach area to one of the runways left a clearance of 11.36 feet between the bottom of the glide angle and the Griggs' chimney. The planes taking off from the runway observed regular flight patterns ranging from 30 feet to 300 feet over the Griggs' residence. On landings, the planes were within 53 feet to 153 feet. On take-off, the noise of the planes was comparable "to the noise of a riveting machine or steam hammer." During these flights it was often impossible for people in the house to converse or to talk on the telephone. The Griggs were frequently unable to sleep even with ear plugs and sleeping pills. The windows of their home would frequently rattle and at times plaster fell down from the walls and ceilings. Their house was so close to the runways or path of glide that the spokesperson for the members of the ALPA admitted: "If we had engine failure we would have no course but to plow into your house."

Following the rationale of the *Causby* case, the Court agreed that the interference with private property interests was so great as to constitute the taking of an avigational easement. However, a central issue in the *Griggs* case was who should pay for the taking of the easement? Paying for these easements could cost millions of dollars. The *Causby* case involved wartime flights where the US military was the operator. The *Causby* case seemed to indicate that it should be the operators of the airplanes who are liable. Allegheny County argued that the operators of the flights—in this case private airline companies—should pay for the taking of the easement. The Court in *Griggs* disagreed with Allegheny County.

Allegheny County also argued that the US Government should be liable for the taking of the easement. After all, it was the federal government that claimed the responsibility for creating the national aviation system and placed the airspace in the public realm. Again, the Court disagreed with Allegheny County. According to the Court, Allegheny County, the promoter, owner, and lessor of the airport, was the entity responsible for taking the avigational easement. The Court analogized the situation to a county that designed and constructed a bridge. The county would not have a usable bridge unless it had at least an easement over the land necessary for the approaches to the bridge. Likewise, a county that wants its airport to be usable should be in the same position of needing to pay for the avigational easements. Airports, like bridges, serve a public use for which the public (through the government) must pay when there is an unreasonable interference with the use and enjoyment of someone's land.

Who can Regulate Noise?

The *Griggs* case highlights the fact that the authority for attempting to deal with airports and their associated activities is split between the federal government and state and local governments. While the federal government, using its authority to regulate interstate commerce, gave itself broad authority to control the use of navigable airspace, the control of airports (and the liability associated with the operation of airports) was left to the states and local municipalities.

With the continued expansion of aviation activities in the 1960s, conflicts over noise within adjacent neighborhoods increased. The federal government began to take action on the issue with the passage of the Aircraft Noise Abatement Act of 1968 and the Noise Control Act of 1972. Some local governments also began to regulate airport operations in an effort to protect surrounding neighborhoods from noise. After all, the local government had to deal most directly with the messy political reality of angry constituents concerned about airport noise.

However, in a 1973 United States Supreme Court decision, *City of Burbank v. Lockheed Air Terminal, Inc.*, 411 U.S. 624, the Court limited the authority of local governments to enact noise control ordinances that applied to privately owned airports. In its *Burbank* decision, the Supreme Court invalidated the City of Burbank's noise control ordinance on the grounds that the Noise Control Act of 1972 preempted the local ordinance. Federal preemption of state and local law arises out of the clause of the US Constitution that declares that the Constitution, and the laws of the US, shall be the supreme law of the land that states and local governments must follow. The Court concluded that the federal government's effort to balance safety and efficiency in the air transportation system required a "uniform and exclusive" system of federal regulations, rather than a cluster of uncoordinated local ordinances regulating aircraft noise.

An important part of the facts in the case was that the airport at issue, the Hollywood-Burbank Airport, was privately owned. The Court noted that many airports are municipally owned and thereby created the "proprietor exception" drawing a distinction between local governments exercising control as proprietors of airports and local governments that did not own airports. As proprietors of airports, local governments could, for example, set limits on the hours of operation of noisier aircraft. While local governments could not place limitations on the hours of operation to reduce noise at an airport the local government did not own, they could legitimately regulate land use around airports to limit the encroachment of noise-sensitive residential development around airports. As airport operators, local governments were therefore not totally foreclosed from trying to address land use compatibility issues. This seemed to add some relief given the holding in the *Griggs* case whereby local governments that owned airports were the entities responsible for paying compensation for unreasonable interferences with the property rights of neighboring land owners. These cases helped encourage local governments to be proactive in trying to address land use compatibility issues around their airports.

Protecting Airports from Incompatible Uses

In addition to protecting noise-sensitive residential development from airports, local governments also often adopt height limitations around airports in an attempt to protect airports from tall structures that might interfere with the operations of the airport. A 2006 case decided by the Supreme Court of Nevada entitled *McCarran International Airport v. Sisolak*, 137 P.3d 1110, however, presents a new twist in thinking about these types of restrictions. While the applicability of the case is limited to the State of Nevada, the case presents an interesting interpretation of the *Causby* and *Griggs* cases.

Following the decision in the *Causby* case, the Congress redefined “navigable airspace” based on the rule prescribed by the then existing Civil Aeronautics Authority that the minimum safe altitude of flight was 1,000 feet over congested areas and 500 feet over non-congested areas, except where necessary for take-off or landing. Since 500 feet was the downward reach of navigable airspace, the space below that was private while the space above was public.

The *McCarran* case involved a landowner’s claim to have a property interest in the airspace up to 500 feet near McCarran International Airport serving Las Vegas. During the 1980s, Steve Sisolak bought three adjacent parcels of land for investment purposes, which were each zoned for the development of a hotel, a casino, or apartments. The parcels lie 5,191 feet from the west end of runway at the county-owned McCarran International Airport. When Sisolak purchased the property, a county ordinance was in effect that regulated the height of structures in the vicinity of all public use airports. According to the county, the purpose of the ordinance was to prevent the establishment of obstructions that would pose air navigation hazards that could reduce the size of the areas available for the landing, takeoff, and maneuvering of aircraft, thus tending to destroy or impair the utility and capacity of public use airports and the public investment in those airports.

In 1990 McCarran Airport began expanding and upgrading the runway at issue for use by commercial jet aircraft. As a result, the county enacted two ordinances that further affected Sisolak’s property. The first ordinance placed Sisolak’s property in the precision instrument runway approach zone, which subjected the property to a 50 to 1 slope restriction (limiting an owner’s use of airspace one foot above ground level for every 50 feet from the runway). On Sisolak’s property, this ordinance resulted in an actual height restriction between 41 and 51 feet. The ordinance also required that a property owner notify the FAA of proposed construction and provided that the Clark County Planning Commissioners held final authority to grant variances from the height restrictions. The second ordinance designated the Sisolak’s property a critical departure area and placed it under an 80 to 1 slope restriction resulting in height restrictions of 3 to 10 feet above ground level. The ordinance provided for a variance procedure similar to that in the first ordinance.

In 2000 a developer submitted proposed building plans to the FAA and the County for approval. The developer wanted to build the “Forbidden City,” a

four-story, 600-room resort hotel and casino and requested a variance from the height restrictions to build up to 70 feet. The FAA granted a variance allowing the building of Forbidden City up to a height of 66 feet. The FAA concluded that such a building would not constitute an airport obstruction. The Planning Commission also approved the proposal. However, the approval lapsed because the developer failed to commence construction within the required one-year period. Sisolak did not complete the sale, and no other variance applications were submitted.

Shortly after the attempted sale, Sisolak filed a lawsuit against the County claiming the height restrictions constituted a taking of his property under the US and Nevada Constitutions. Sisolak asserted that, under state and federal law, he had a property interest in the airspace up to the 500 feet definition of “navigable airspace” by the federal government. He argued that the County, by passing various ordinances, denied him the use of the airspace above the property by appropriating it for public use, which constituted a per se taking. Claiming that the occupancy of his airspace substantially decreased the value of his land, Sisolak demanded just compensation. The evidence indicated that some flights did fly over Sisolak’s property at an altitude lower than 500 feet.

Relying on the US Supreme Court’s decisions in *Causby* and *Griggs*, the Nevada Supreme Court agreed that Sisolak has a protected property interest up to 500 feet. Public ownership of navigable airspace begins at 500 feet. Below 500 feet the landowner retains exclusive rights. The county height limitation ordinances resulted in the permanent physical invasion of airspace and excluded the landowner from being able to use that airspace.

Again, while the direct impact of this case is limited to Nevada, it does have local governments thinking about the potential need to provide compensation to property owners whose uses of land are restricted by height limitations around airports owned by local governments. Does the case signal a new trend that other states will follow? Will it be necessary to compensate land owners who can only build low buildings because an airport is nearby?

Parting Considerations

All of the above cases deal with basic issues of “fairness” related to the costs of operating the aviation system in the US. In the eyes of the courts, we do not want individuals living near airports to bear an unfair burden of the costs of living near airports which are needed for economically thriving communities. To make the world fairer for these land owners, we provide some level of compensation to assuage the burden. While the *Griggs* case places responsibility for providing compensation on the owner of airports, it is interesting to think about where the compensation really comes from. Even though the federal government is not responsible under *Griggs* for providing compensation, for years the federal government has provided grants to airport owners for land acquisition around airports. Even though the airlines are not responsible for paying compensation

under *Griggs*, the costs of acquiring land and aviation easements around airports will be reflected in the lease rates that airlines pay to airport owners. The airlines pass these costs on to the passengers—the airport users. Since 1992 airports have also been allowed to collect passenger facility charges from passengers as part of the ticket price for commercial airlines. In the end, these funding mechanisms attempt to spread the costs of operating the nation's aviation system among a broader public rather than placing an unfair burden on a few land owners located near airports. Query whether the *McCarran* case presents the landowner with an unexpected windfall or whether the landowner is indeed unreasonably burdened by a location close to an airport.

Over a century after the first aircraft flight, one might expect that society would have resolved all the issues related to compatibility issues related to airplanes, airports and non-aviation related land uses. As we have seen, however, the issue continues to evolve.

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Chapter 19

Chicago O'Hare and the Politics of Airport Expansion

Joseph Ryan

While the previous chapter addressed legal questions surrounding airports and land use, this one focuses more specifically on Chicago O'Hare International Airport (ORD) in order to show the ways in which politics often plays a major role in decisions affecting airports. In Chicago the whole nation is impacted by the labyrinth of connecting flights that make up hub and spoke airline operations. This is why it can be so much more perplexing that it is not for lack of land, will, or money that Chicago air travel remains one of the most delay plagued in the country.

After more than two decades of forcing flight caps to reduce chronic delays at an overrun ORD, in 1990 the federal government finally tried to cut through a decades-long political logjam that threatened air travel nationally. DOT Secretary Samuel Skinner said that for Chicago to keep the economic development riches that come with being the nation's airline hub and to keep planes running on time nationally, the city needed to expand ORD and build a third airport. The billions of dollars needed to complete the task would be available. Still, no dirt was moved, and no concrete was poured.

Two years later Samuel Mitchell, a frustrated president of the Chicagoland Chamber of Commerce, and a mayor of a small town neighboring the mammoth airport, probably summed up the stifling debate—and reason for inaction—most precisely when yet another plan to expand ORD was proposed: “We simply cannot afford to jeopardize (O'Hare's) future by trading away O'Hare's viability to appease a vocal minority of people who want to limit O'Hare's future.” But, in rebuttal: “The quality of life, the value of property and the emotional well-being of people are more important than getting a few thousand more planes into the air,” stated Elk Grove Village President Charles Zettek, chairman of the 12 member Suburban O'Hare Commission (SOC), which had at least a decade of fighting expansion under its belt at the time (*Chicago Tribune* 1992).

Thus the argument went round and round for decades. In such debates, far away from the direct logic in an air traffic control tower or a jetliner's flight deck, aviation policy is created. Aviation experts often do not decide on the best location for runways, but they are forever limited to directing the planes or flying them in the constraints that politics and public debate dictates. This is as true for Chicago's giant ORD as it is for the specs of tiny landing strips dotting the country.

Meanwhile, flyers, pilots, and air traffic controllers struggle daily with the molasses-like operations in Chicago that only a never-ending political stalemate could enforce on the masses. Unfortunately as well, the only way for such a logjam to be broken is for one side to completely dominate the other—a massacre of sorts that costs buckets of cash and barrels of time while sapping the public’s will and trust on all sides.

The History of the Battle

The fabled battle over ORD within the political structure of Illinois dates back to the period commercial aviation was just getting its wings. But it became most pronounced, and had the most impact on the public, as the industry boomed in the late 1960s and onward. Through it all the argument over the region’s air travel system has centered on common “not in my backyard” (NIMBY) fundamentals played out through an ever changing political dynamic. The clearest way to see this is to examine Chicago’s biggest failed aviation plan: a third Chicago airport coupled with a new ORD runway.

The federal proposal came as Chicago was wrapping up a \$1 billion project to expand terminals and other non-runway facilities at ORD. That massive project was considered window dressing, a sign of Chicago’s defeat by suburban interests that opposed earlier efforts to spend the money on more runways. Federal authorities and many local politicians saw a new airport and modest ORD expansion as the best answer. It would reduce congestion at Chicago’s Midway International Airport, which has runways and terminals too small to safely handle the increasing traffic. The addition of a lone runway at ORD would be a cost-effective way to reduce delays as the third airport was being built.

Too many questions and opposing interests, however, still remained for the plan to take off. On two fronts the plan was sure to meet doom despite its purported nationwide benefit. On one end Chicago Mayor Richard Daley seemed insistent on maintaining near-total control of the region’s flights—and all the prestige and tax dollars that go along with it. On the other end suburbs around ORD were vehemently opposed, as always, to any expansion of ORD, with an increase in jet noise being their principal argument.

In 1992 a federally-supported committee composed of Indiana, Illinois, and Chicago interests came up with a proposal for the third airport location: Lake Calumet in an economically depressed strip of Chicago’s south side. The vote of the committee was split evenly by geographic interests, but Indiana, despite having the readily expandable Gary airport within an hour’s drive of downtown Chicago, lost out for lack of seats. The Lake Calumet airport would cost at least \$11 billion and take 20 years to completed. If work started then, it theoretically could have been taking flights by 2012.

Yet, from the beginning it faced numerous political hurdles. Area residents were instinctively opposed to the plan and began forming grassroots opposition

groups with names such as No Urban Airport. Midway supporters were concerned because the plan would reduce flights at that southwest side airport, hemmed in by congested urban neighborhoods, because of airspace conflicts with a new Lake Calumet airport. But the big blow came with opposition from a strong contingent of northwest suburban towns whose leaders suspected a Lake Calumet airport would come with a new runway at O'Hare, costing them homes and businesses and potentially increasing jet noise and pollution.

This coalition could likely have been easily dismissed by Daley as a conglomerate of whiny NIMBYs standing in the way of progress, but the northwest suburban group had friends in high places. For one the suburban towns made up one of the largest vote-getting regions for Governor Jim Edgar. At the same time Illinois House Republican leader Lee Daniels and venerable Senate Republican leader James "Pate" Philip supported the suburban communities and stood to benefit politically from the suburbs-versus-Chicago brawl.

While Edgar initially signed on to Lake Calumet in exchange for suburban say in Chicago airport operations under a deal with Daley, the plan never got off the ground because of political disputes over representation on the authority. Critics charged that Daley was unwilling to concede as much control as he first let on. By the time Philip assumed control of the Senate in 1993, and after much lobbying against Lake Calumet by Edgar's suburban friends, Daley threw in the towel. He needed buy-in from the state, and he would not get it under Edgar and Philip. Daley would go on to spend the next decade laying careful plans for a radical expansion of ORD while killing a competing proposal to build a third airport in the far south suburbs.

The opposition to Lake Calumet by the northwest suburban ORD foes left many perplexed, but it highlighted the deep distrust that grew from years of battling with Chicago interests. Because of DOT's position that a new runway should be built at ORD in addition to a third airport, the SOC believed they had good reason to expect they would ultimately lose if Daley won Lake Calumet. Plus, at about the same time the 4,000-member Chicagoland Chamber of Commerce was lobbying for new runways at ORD. Business leaders claimed ORD was responsible for 180,000 jobs and that failure to increase flights and reduce delays would cost billions of dollars a year in economic development. The move revealed a division in suburban attitudes toward airport expansion. The businesses wanted it, but the homeowners did not. In fact 18 nearby suburbs voted 2 to 1 in 1991 to oppose new runways.

At one point in the debate Daley offered a pledge to not build new runways at ORD in exchange for the suburbs' much needed support of Lake Calumet. The SOC balked. When Lake Calumet was declared dead, the push for ORD expansion only grew that much stronger, leading Mitchell to blame the suburbs. "They've brought the house down on their own heads," the Chicagoland Chamber of Commerce president was quoted in news reports at the time.

As the years ticked by, Daley slowly began chipping away at his opposition. Since the SOC's stand against expansion was based on the noise issue, Daley

formed his own group in 1996 and used it to hand out \$130 million to soundproof thousands of homes and dozens of schools. Many members, mostly those furthest from ORD, fled the SOC for Daley's new O'Hare Noise Compatibility Commission. The suburbs closest to ORD chastised the deserters, saying they had pocketed hush money. Regardless, the SOC and their allies leading the state continued to hold Daley's feet to the fire. When Daley proposed using 365 acres of abandoned military land near ORD in 1996 for a large business park and a new hotel, a move sure to bring in suburban jobs and development, SOC leaders said it was a secret move to expand ORD. Daley retorted to reporters: "You can't put a runway in the middle of a hotel" (*Chicago Sun-Times* 1996).

The O'Hare Modernization Plan (OMP)

The public debate between the suburbs and Chicago shifted in style with the latest, and so far most successful, attempt at expanding O'Hare to meet demand and reduce delays. Still, it was cold hard politics that ultimately mattered to its chance at success.

In the summer of 2001 Daley unveiled a massive O'Hare expansion plan that dwarfed those the SOC successfully fought off since the 1970s. The proposal came as delays reached an all time high at the once praised "World's Busiest Airport." In 2000 about one in four flights was delayed, and the airport was over capacity about 3½ hours a day in good weather and 8 hours a day in bad weather. Meanwhile, the FAA projected demand at ORD to increase 18 percent by 2011 with capacity only rising 12 percent via technology upgrades.

Daley's new airport design was presented as the only solution to the region's, as well as the nation's, aviation problems even though a decade earlier he had argued that a massive third airport was also required. Daley remained cool, if not outright opposed, to a new third airport in south suburban Peotone, one supported by northwest suburban officials hoping to stave off O'Hare increases. The proposal was gaining steam politically at the time, but Daley could not control a Peotone airport like he could a Lake Calumet airport.

The \$7.5 billion OMP he championed as the solution would transform one of the nation's busiest airports from a hectic layout of seven runways, six of which intersect, to one of eight, more parallel landing strips. The project included the building of four new runways, the extension of two existing runways, and the destruction of three. Also included in the plan's final phase was a new terminal on the airport's western side. For the FAA the runway additions and extensions were projected to reduce average delays from 18 minutes per flight to 8 minutes while also increasing flights from just under 1 million to 1.2 million a year.

The Opposition to the OMP

Opposition to the new expansion plan was vigorous but never as strong as it was back in the 1970s, 1980s, and 1990s. Daley's noise commission eroded support for SOC from outlying suburbs. Moreover, Illinois Governor George Ryan proved not to be as beholden to his campaign pledge to oppose O'Hare expansion as his predecessor, Edgar. Still northwest suburban officials hunkered down in the SOC to gear up for battle. On their side they counted Philip, the state senate president, US Senator Peter Fitzgerald, and Congressman Henry Hyde in their corner.

For the core members, Bensenville and Elk Grove, much was at stake in this political, social, and legal conflict. Bensenville stood to lose more than 600 homes and businesses for land needed around the new runways. A small cemetery of about 1,200 plots in the village was targeted for takeover and demolition. Elk Grove would lose a couple dozen warehouses in its industrial park, and the mayor there also feared a new western highway to the airport—brought by more air travel—would gut his downtown and business district.

In the beginning, the SOC ramped up pressure to build a new airport in Peotone as the only solution. The coalition of suburbs near ORD was soon spending millions of dollars to help the Peotone airport idea get off the ground. The SOC expressed no sympathy for the small bands of farmers and south suburban residents that would be affected by the noise and pollution of a new airport in their town.

Meanwhile, the argument against expansion by the SOC shifted from one over noise to one focused on the merits of the project. Since Chicago and the federal government had spent nearly \$500 million soundproofing homes, and because jets were now quieter, the traditional arguments about noise fell on deaf ears. The SOC also apparently became sensitive to being labeled NIMBYs or being seen as standing in the way of reducing the delays that hundreds of thousands of residents had to endure. Instead, in the years after the introduction of Daley's large expansion plan, opponents took to trying to show it would waste billions of dollars and not solve delay or capacity issues. This has at times put suburban opponents in the odd position of complaining that the expansion project would not increase capacity enough at ORD. Of course even if it did increase capacity significantly, the suburbs would still oppose the project. "If we can only get 1.2 million flights, is it worth spending another \$6 billion or \$13 billion for?" questioned Elk Grove Village Mayor Craig Johnson as the FAA was reviewing Daley's plan in 2002 (*Daily Herald* 2002).

At the same time the battle over whether the expansion project would work led to nearly every facet of the plan being called into question—leaving most average citizens thinking that the truth had been somehow lost or co-opted in the debate. Opponents of expansion hired several aviation consultants who argued the new parallel runway configuration would not reduce delays and was simply not safe. "The bottom line," said aviation consultant Mary Schiavo, a former FAA inspector general, "is the runway configuration is very dangerous. It's too close. It is literally a tragedy waiting to happen" (*Daily Herald* 2002). The National

Air Traffic Controllers Association (NATCA) also stepped into the fray, at first denouncing the new plans. Suburban opponents touted this as proof the expansion plan was flawed, but after some debate with the FAA and Chicago, the union changed its mind and found the project workable. The later opinion got much less media coverage and even less acknowledgement by suburban opponents.

The Real Issues Behind the OMP

While both sides said they were debating the merits of the OMP, shifting political alliances revealed the true issues that motivated opposition or support—and it appeared to have little to do with whether the \$7.5 billion project would work or not. Daley scored a coup just before the state legislature approved his plan in the spring of 2003.

DuPage County Board President Bob Schillerstrom and US House Speaker Dennis Hastert jumped onto the OMP wagon when Daley agreed to support a western access highway to the airport. “My constituents in the far western suburbs,” Hastert said at the time, “want to make sure they can get to O’Hare ... park their car ... and want to make sure their jet takes off on time.” It was not until 2008 that the various transportation agencies started aggressively planning for the western access highway. The move by Hastert and Schillerstrom, a long-time expansion opponent, was only part of the political equation. But it cut the SOC at the heart as suburb after suburb left the organization, eventually leaving just Elk Grove and Bensenville as its main members. Even Des Plaines, which stood to lose some industrial park land, switched sides and supported expansion to the chagrin of Bensenville and Elk Grove.

Another significant shift in power came when Rod Blagojevich was elected governor in 2002, and Chicago Democrat Emil Jones Jr. ascended to the senate presidency, pushing aside Philip. Moreover Oswego Republican Tom Cross was elected House Republican leader, and Frank Watson, from southern Illinois, was elected Senate Republican leader. Neither opposed the expansion of ORD. By the legislative session of 2003 OMP supporters held all of the power in the state capital. On August 7, 2003 Blagojevich signed the O’Hare Modernization Act, allowing the city to forcibly take suburban land for the ORD expansion. “This legislation benefits the entire state of Illinois, every town, every city, every citizen,” Blagojevich declared at the time, not acknowledging the thousands of residents directly displaced by the expansion. “By expanding O’Hare, all of us are lifted, all of us benefit” (*Daily Herald* 2003).

The FAA gave final approval to the project in 2005.

But there was one last political blow to effectively extinguish the flame of opposition. After several years of fighting the project in various state and federal courts, spending millions of dollars on attorneys’ fees and public campaigns, Bensenville Mayor John Geils was voted out of office in the spring of 2009 as he sought his seventh term. The new mayor, Frank Soto, also told residents he

opposed ORD expansion, but argued the time and money spent to fight it was a waste. It would be better, he said, to spend their resources limiting the damages and ensuring a big payoff from Chicago. The payday came that autumn in the form of a settlement with Chicago for \$36 million. Demolition of Bensenville homes started the following spring.

Seeing the writing on the wall after the election of Soto, veteran Elk Grove Village Mayor Craig Johnson gave up the fight in April of 2009. He claimed victory when the state tossed out one option for the western access road that he claimed could have gutted his town's main business thoroughfare. Johnson said at the time he still felt he was right in standing up to Chicago. "Someday you might look back and say, 'those two little mayors were right,'" he said (*Chicago Sun-Times* 2009).

And with that went all of main opposition to Chicago's expansion efforts. OMP supporters finally dominated and eliminated leaders of the opposition. In just under a decade, opponents of expansion went from controlling the Illinois governor's mansion, the Illinois Senate, and a US Senate seat, to not even having the support of local mayors who stood to lose scores of homes and businesses to the bulldozers.

The only question left, then, was whether the project might collapse under its own weight. The expansion's tab had grown since its proposal from about \$7.5 billion to more than \$15 billion. The cost has left the city scrambling for funding. With the airline industry hitting the skids during much of 2001–2010, airline CEOs were unwilling to put up the cash for a second phase of construction that Chicago had counted on.

As of this writing, it still remained unclear if or when or at what cost the expansion plans would finally be completed. Still the bulldozers kept churning, and the concrete continued to be poured. The city did successfully lay the first new runway at ORD since the 1970s, albeit two years behind the original schedule of the umpteenth proposal. And the FAA has put nearly \$800 million on the table for expansion, the largest such federal investment in US history. Yet, the real substantial cuts in money-sucking delays and increases in flights were not projected to materialize until the yet-to-be-funded second phase that calls for two new runways, a runway extension, a western terminal, and a third control tower. Mayor Daley, though, has said there is only one quality needed to get these kinds of massive projects completed. In the summer of 2008 as he stared down his final few opponents and faced questions about whether the project would succeed, he declared: "You have to have vision" (*Daily Herald* 2008).

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Chapter 20

The Ethical Dimensions of the 1981 PATCO Strike

Michael S. Nolan

On August 3, 1981 more than 12,000 air traffic controllers, all members of the Professional Air Traffic Controllers Organization (PATCO), illegally conducted a work stoppage (strike) that has had profound implications for both aviation and the labor movement in the US. The actions taken that year reverberate throughout the nation to this day. In response to the walkout of the air traffic controllers, then-president Ronald Reagan stated that the striking controllers were in violation of federal law, and that they had 48 hours to return to work or they would be fired. Most of the controllers did not return to work and were subsequently fired. I was one of them.

There are many misunderstandings, both in the aviation community and elsewhere, concerning the reasoning behind many actions taken by both the government and the union, but little investigation into the overall ethical situation faced by controllers, union representatives, and FAA management. Many of these situations are glossed over during discussions of the strike, but they deserve to at least be considered and discussed.

In retrospect the PATCO strike of 1981 was a watershed event that needs to be fully understood for its impact in American politics and labor relations. Most people reading about, inconvenienced by, or peripherally related to the strike, thought it was just about money. From the controllers' perspective, it concerned removing themselves, their job, and their employer from restrictions imposed by being civil service employees (a goal that replacement controllers eventually achieved). From the FAA and government perspective it was a chance to redistribute the balance of power between unions and their employees. Almost everyone agrees that the PATCO strike of 1981 changed the course of union/management relations that exist to this day.

In 1980 Ronald Reagan was elected US president. Much of his platform was based upon a return to "better days." Americans were felt to be weary of the ineffectual, liberal politics of the past. Reagan's 1980 campaign slogan, "Let's Make America Great Again" expressed the spirit of the times. Although he had been active in union politics early in his acting career, Reagan had changed his views since then and based his campaign on opposition to many union activities and politics. The PATCO strike would be the first opportunity for Reagan to

publicly display his resolve, both to citizens of the US and to others watching this new president during one of his first confrontations.

During labor's heyday in the middle of the 20th century, American workers struck frequently and effectively. According to the DOL's Bureau of Labor Statistics, between 1950 and 1980, the US averaged more than 300 major work stoppages (each involving at least 1,000 workers) per year. But between 1982 and 2000 the annual average was 46. In the 21st century the average number of major strikes has been less than 30 per year, less than a tenth of what it was in the late 1970s (DOL 2010). Since the PATCO strike union membership has fallen by close to 40 percent. Experts agree that the organized labor movement in the US has not been the same since this strike.

For employers, however, the strike permitted them to regain "control" of the situation. When firing the air traffic controllers, Reagan legitimized a little-used union busting tactic of replacing strikers with "permanent replacements." According to US labor law, employers are not permitted to fire workers for striking, but they do have the right to "permanently replace" them. Labor historian, Joseph McCartin of Georgetown University, states that in the 1950s and 1960s, there was only one documented use of permanent replacements for about every 80 major work stoppages (2006: 217). Yet in the decade after the PATCO strike, there was one documented use of permanent replacements for every seven work stoppages.

McCartin also notes that, prior to the PATCO strike, it was generally not considered acceptable for employers to replace striking workers, even though the law gave employers the right to do so. Kathleen Schalch quotes McCartin as saying, "any kind of worker, it seemed, was vulnerable to replacement if they went out on strike, and the psychological impact of that, I think, was huge," Schalch (2006). "The loss of the strike as a weapon for American workers has some rather profound, long-range consequences." According to Schalch:

When PATCO went on strike in 1981, Ken Moffet was the chief federal mediator. He says the union wanted a shorter work week and higher pay. Moffet says the strikers believed if they were gone, the safety of the flying public would be at risk. But that wasn't entirely the case. Moffet calls the strike a 'calamity,' not just for the fired air traffic controllers, but for unions everywhere. Back in 1981, labor negotiations centered on the size of workers' raises. Subsequently, management began going after all unions for concessions and laying people off, he says (Schalch 2006).

Unions and Federal Employees

Prior to the 1960s most federal employees in this country were prohibited from joining labor unions with the right to collectively bargain wages and working conditions. This restriction was lifted by President Kennedy in 1962. In 1968 PATCO was created. Prior to its formation, controllers were eligible to join

a number of representative organizations that included both controllers and supervisors/managers. PATCO membership was limited to working air traffic controllers, not supervisory or management personnel. Among other government unions it had participated in a number of quasi-job actions over the years in an effort to win increased benefits for members. During that time it was common practice to “slow down” activities, or “work to rule” which was essentially the same thing. Employee “sick-outs,” union organized activities where employees called in sick were somewhat common. Wildcat strikes, which are limited to local areas and assumed not to be sponsored by the national union, also occurred with increasing frequency.

In 1970 New York letter carriers, (also federal government employees), staged an illegal strike that eventually spread across the country. Before settling about a month later, the Nixon administration had mobilized the US Army to perform some unionized mail carrier functions. Afterward the Postal Reorganization Act of 1970 was passed, in some ways due to the strike. This act abolished the Post Office Department and created the US Postal Service, a corporation-like independent agency of the federal government, giving postal employees rights and benefits similar to those desired by the air traffic controllers. All of this activity came to a head in the late 1970s when the two most active and militant unions in the federal government, those representing the postal workers and the air traffic controllers, began negotiations with their respective employers.

President Reagan and the PATCO Strike

Just after the election of Ronald Reagan in 1980 the letter carriers were again threatening to strike, demanding more autonomy and workplace changes. This potential job action coincided with the air traffic controllers’ increasing demands for workplace changes and organizational autonomy similar to those rights won by the postal workers a decade before. The union representing the postal workers was much larger, and a strike potentially more disruptive to the country. Each union was looking towards the other, wondering and hoping that the other would go first. Neither was certain of the ensuing response of the Reagan administration. Whichever union went on strike would become the first domestic test of this new president.

In retrospect the outcome was not so surprising. Reagan had campaigned on toughness. He would “stand up” to challenges, both foreign and domestic. He did not believe in “politics as usual.” The question in many peoples’ minds, both in the US, and possibly more importantly outside the US was, did he really mean it? What we now know to be historic negotiations with the leadership of the now defunct Soviet Union was to begin soon and the Reagan administration, which had campaigned against weakness in negotiations, did not want to send the wrong message to the Soviets.

Within the FAA and the aviation community, it had been known for years that in the 1980s contract negotiations between PATCO and the FAA would be contentious. Newly hired trainees undergoing training at the FAA's training academy in Oklahoma City were being told by instructors in the late 1970s that a strike was inevitable and that they should be prepared. Shortly thereafter, labor negotiations began between the FAA and PATCO. The union representatives, negotiating simply from the limited perspective of their issues and constituents, looked only at the issues related to air traffic control. Air traffic controllers felt that the newly elected Reagan administration would look favorably upon their demands, as PATCO had been the only major union to publicly lend their support to the Republican candidate in the recent presidential campaign.

The administration however was looking at the larger picture of overall labor negotiations and presidential image. Negotiators did not want to place the federal government at a perceived disadvantage when their counterparts were negotiating with the larger postal workers union. And administration officials were very cognizant of the image that the Reagan administration was sending to America and the rest of the world (particularly the Soviet leadership) concerning their resolve and negotiating tactics. Reagan has stated in his memoirs that he was aware that PATCO had been one of the few unions to support his presidential bid. "I supported unions and the rights of workers to organize and bargain collectively," he wrote, "but no president could tolerate an illegal strike by federal employees" (Reagan 1990: 282).

PATCO was negotiating for a reduced work week, a \$10,000 pay increase, and a better benefits package for retirement. The FAA essentially stated that these items were non-negotiable. Civil service employment rules covered these matters, and they did not have the authority to negotiate in these areas. Contract negotiations with the FAA eventually stalled. PATCO threatened to go on strike early in the summer, but did not receive enough votes from the rank and file. A majority of controllers who worked at large, busy facilities voted yes but were outnumbered by controllers from smaller facilities who voted no. At the same time the postal employees threatened a strike but voted to continue negotiations waiting to see what happened to the air traffic controllers.

During this time period every controller was warned individually by their supervisors that a strike was illegal and that they might be fired as a result of participating in an illegal job action. In early August PATCO held another strike vote, but the procedure was weighted to give more representation to the busier, and felt by many to be the more "important," facilities. The vote was tabulated and on August 3, 1981 about 13,000 PATCO members went on strike in violation of federal law and the oath that they had taken upon accepting their jobs. Other government unions, particularly teachers and public safety workers, had occasionally declared strikes and very seldom were the strikers actually fired.

In the case of the air traffic controllers, President Reagan declared the strike a "peril to national safety" and ordered the controllers back to work or they would be summarily dismissed. In both public notices and private communication to each

controller, the Reagan administration warned that a strike by federal employees was illegal, and that anyone who did not return to work within 48 hours would be terminated. The majority of the controller workforce refused to return to work and was dismissed en masse on August 5 with no public hearing or procedure. The striking controllers were replaced by controllers, supervisors, and staff personnel not participating in the strike. The FAA had inflated the ranks of managers in the years leading to the strike in preparation for it. Military controllers were transferred to civilian facilities to supplement the workforce. Hiring of new controllers was accelerated.

The fired controllers were initially banned from any federal employment for life. The total ban on federal employment was lifted about one year later, but strikers were still restricted from ever being rehired by the FAA. Ironically many gained federal employment with the US Postal Service. In 1993 President Clinton ended the prohibition on rehiring fired striking air traffic controllers. Over the next decade fewer than 1,000 were rehired. The controllers who remained at work, as well as their replacements, worked extended workweeks for a number of years, and air traffic was restricted at many major US airports.

During the summer of 1987 increasingly disaffected controllers formed a new union, the National Air Traffic Controllers Association (NATCA) which was certified as the sole bargaining unit for air traffic controllers employed by the FAA. Part of NATCA's charter is a prohibition against conducting illegal strikes.

In retrospect the PATCO strike marked the turning point where many workers in this country lost the ability to wield their most potent weapon: the strike. Between 1947 and 1980, the Bureau of Labor Statistics annually reported at least 180 strikes involving more than 1,000 workers each. Since the PATCO strike, the number of such strikes has never reached even half of that level. Strikes by federal employees were illegal, but PATCO mistakenly figured that the nation could not survive for long without air traffic controllers. McCartin states:

In the years after 1981, a number of prominent private sector employers followed Reagan's lead and permanently replaced their own strikers. The stiffened resistance to collective bargaining that became evident in the 1980s accelerated organized labor's decline. They would be wise to ponder an even more deeply rooted problem facing labor today—one highlighted by this week's painful anniversary. Since 1981 the strike has nearly disappeared from labor's arsenal. Unless unions can recover that weapon, they may not reverse their slumping membership figures. (McCartin 2006)

Ethical Considerations

The short-term ramifications of the strike have been widely discussed. But what were its ethical dimensions of the strike? Many decisions needed to be made by both individuals and organizations. Controllers, managers, union representatives,

elected officials—all had to make defensible ethical decisions. In general these decisions include the following:

Employees

Illegal strikes had been conducted in the past with little or no repercussions. There are many “illegal” activities on the books in this country that are selectively or rarely if ever enforced. Should this action have been one of those situations? Should employees hold the nation “hostage” in order for their demands to be met? Are there any other alternatives for employees in this type of situation?

Union Leadership

The union leaders knew the potential consequences of a strike. They also allowed the employees to vote to strike. Then again the union was trying to achieve better salaries and benefits for their employees.

The Federal Government

Although FAA management officially opposed the strike, at the local level managers were less opposed to, and in many cases, supported it since benefits won by the controllers would be conferred upon them as well. At the FAA Academy, with full knowledge of the administrators, union representatives were advising trainees of the upcoming strike years before it occurred. In the author’s personal experience, during the summer of 1981 he was “advised” by his supervisor that a strike was illegal. After signing a document to that effect, the supervisor shook the author’s hand and said: “Good luck, I hope it works.”

The Reagan administration made the members of PATCO an “example” to the rest of the nation, when apparently the demands being made were obviously not that excessive. PATCO was attempting to improve work conditions and pay. In addition, within five years of the strike, virtually every demand made by PATCO was granted by the FAA.

Finally, concerning the federal government, another question is whether or not the employees were basically led to strike by their own government. During the 1980 presidential campaign, it appears Reagan was going to support the ATC workers’ cause. In a letter to Robert Poli, then president of PATCO, dated October 20, 1980, Reagan stated:

I have been briefed by members of my staff as to the deplorable state of our nation’s air traffic control system. They have told me that too few people working unreasonable hours with obsolete equipment has placed the nation’s air travelers in unwarranted danger. In an area so clearly related to public safety the Carter administration has failed to act responsibly.

You can rest assured that if I am elected President, I will take whatever steps are necessary to provide our air traffic controllers with the most modern equipment available and to adjust staff levels and work days so that they are commensurate with achieving a maximum degree of public safety.

I pledge to you that my administration will work very closely with you to bring about a spirit of cooperation between the President and the air traffic controllers (Hearings before the House 1981: 85).

Military

Out of all the players perhaps the involvement of the military is the ethical consideration that is the most overlooked. The military appears to have been used to “make a political point” and/or to break the union. Without the use of military controllers, it is generally agreed that the striking controllers would have had to be re-hired.

Other Organizations

Other aviation related unions and professional organizations could have easily stepped in and forced an end to the strike. By tacitly agreeing to the actions of the federal government, other unions, particularly that for pilots, made it possible for the strike to be broken. A simple statement by the pilots that they would not fly, or a statement to the effect that the strike had led to unsafe conditions would have forced the FAA to renegotiate. The pilots’ union did no such thing. Was this an ethical violation of what a union stands for? Unions are supposed to band together to protect the rights of all, not the individual.

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Chapter 21

Air Traffic Control: A Critical System in Transition

Bill Parrot

While the previous chapter reflected on the PATCO strike of 1981, this one addresses the future of ATC and the main challenges it faces. As with many industries in post-9/11 America, aviation transportation has undergone a metamorphosis of epic proportions. The US air traffic control system has seen and will continue to experience significant modification, evolution, and structural redesign as a most critical and integral part of the aviation industry. External influences coupled with internal pressures will combine to shape these discernible changes resulting in a leaner, more efficient, and hopefully safer ATC operation. Pursuant to the industry's unquestioned commitment to safety, adequate oversight and focused supervision will continue to be absolutely essential.

Geopolitical influences dominated by Middle East instability, extremely volatile oil prices, and the War on Terror most certainly will continue to affect all aspects of commercial aviation. Financially strapped airlines have consolidated and downsized to cope with unsustainable overhead charges. Economic priorities shaping federal budgets, within the context of extensive military operations in Iraq, Afghanistan, and worldwide have placed significant pressure upon all federal departments to streamline, reorganize, and cut costs dramatically. In addition to these explicit domestic constraints, the FAA must continue to comply with international agreements formulated through ICAO specific to international air traffic control procedures. With the FAA budget under intense scrutiny, the air traffic control system has and will continue to experience wide reaching budgetary reductions and adjustments.

Labor management relations between the FAA and air traffic controllers have descended to a new low as a result of these mandated changes. Pressure to reduce controllers' salaries mainly through the elimination of incentive pay, efforts to increase productivity primarily through increased controller time on position, and a newly introduced two-tier wage scale for all new hire controllers have resulted in an extremely strained relationship between the FAA and the controllers' union, NATCA. Without the authority to call for a work stoppage in the form of a strike, NATCA's only recourse during a negotiation's impasse concerns efforts to educate the traveling public and airline officials as to the critical state of the ATC system. Of late little sympathy has been forthcoming from airline employees, already reeling from numerous draconian pay cuts and work rule concessions. Additionally, the

traveling public's interest rarely rises to a fever pitch in these types of disputes, absent cataclysmic delays nationwide or a viable perception of real compromises in air safety.

Privatization and Technology

For more than a decade the debate over the privatization of the air traffic control system has lingered as a grave concern for the career controller population. Private contractors have already assumed management responsibilities at several visual flight rules (VFR) tower facilities nationwide, resulting in significant cost savings for the FAA air traffic managers. Special interest groups have fervently argued both sides of the issue seeking to garner public support for their specific agendas. Additionally, political leaders regularly rally to their respective constituencies in pursuit of a greater public awareness. Privatized European and Canadian air traffic models stand in stark contrast to the US system while serving as the backdrop upon which the debate continues. As long as budget constraints drive the cost cutting bottom line for the FAA, privatization will be a significant part of the future of air traffic management in this country.

Technological advances both in the ATC facilities and the cockpits of our air carrier aircraft, have added a new dimension to the air traffic controller job description. Airborne traffic alert, collision avoidance system (TCAS) equipment mandates that the cockpit crew maneuver the aircraft away from an intruder potentially violating their airspace without guidance from ATC. In this scenario onboard technology overrides any ATC authority or assistance. New hardware recently introduced into the enroute centers (Air Route Traffic Control Centers) has essentially eliminated the need for a third controller at each radar position during peak traffic periods. This same equipment will eventually set the stage for "free flight," a new millennium air traffic management concept wherein every aircraft receives clearance directly to its destination with the ATC system in a standby mode to alleviate down line conflicts. Increasingly, technology advancements seek to reduce the level of decision-making performed by human beings on both sides of the aviation equation.

Issues in a Deregulated Environment

Deregulation of the US commercial airline industry in 1978 permanently eliminated CAB, previously tasked with approving new routes, establishing ticket prices and thereby formulating airline behavior nationwide. This significant development introduced a dramatically higher level of uncertainty related to airline business decisions and overall marketing strategies. Individual airlines selected city pairs between which to fly with relatively no regulatory authority dictating fares, frequency, or duration of service.

“Hub and spoke” became the darling of the era amongst airline planners maximizing the daily utilization of their aircraft. Busy hub airports were virtually saturated by peaks of traffic designed to squeeze that last bit of additional competitive advantage from the airline business model. “Complexes” of connecting passengers flooded terminals and created congested ramps with taxiing aircraft. ATC facilities, especially control towers at the busiest airports, found themselves inundated with traffic during selected periods throughout the business day. Adverse weather, in the form of summer thunderstorms with damaging winds and hail, or winter snowstorms closing busy runways with snow plows and deicing equipment, proved to be devastating for these peak traffic periods causing logistical nightmares for airline operations planners. Increased numbers of weather-related diversions to alternate airports during peak arrival periods would paralyze an airline major hub operation. ATC’s workload would at times become substantially unmanageable.

More recently the FAA’s best efforts to encourage more rational domestic flight schedules by the air carriers in an “unregulated” environment have managed to garner some level of cooperation amongst the major players, thereby alleviating some strain on the system. While the unprecedented levels of uncertainty in the recent past have been somewhat mitigated today by technological advances, more realistic flight scheduling and voluntary downsizing at the legacy air carriers, the ATC system continues to operate at peak levels amidst the unending search for improved efficiency and flexibility.

These peak traffic levels have primarily been the by-product of airline behavior and economic decisions. Air carrier scheduling and equipment purchase moves have served to exacerbate an already complex air transportation model. Most major air carriers have ceded much of their short haul domestic market to the regional carriers through partnerships and alliances. Regional carriers typically operate smaller 50–70 seat jet aircraft into cities previously served by aircraft accommodating 100–150 passengers. With consumer demand representing the major impetus for change, this trend towards an even larger aircraft fleet eventually will affect an additional burden upon the airspace grid.

Looking Toward the Future

Projections of ever increasing passenger travel in the next decade highlight the enormous dilemma facing the FAA’s air traffic managers. With a finite amount of airspace and limited concrete at the busy terminals, new strategies will be necessary to meet the demand. Recently instituted programs including reduced vertical separation minima, permitting aircraft to utilize previously unusable cruise altitudes at the higher flight levels, coupled with technologically advanced ground and airborne radar displays will extract additional capacity from the system. Additional software and hardware innovations will be required to bring the concept of “free flight” to fruition and expand upon successes realized with

Global Positioning System (GPS) satellite navigation. Increasingly, technology will determine the rate at which the system's capacity may be expanded.

Human factors related to the air traffic model will continue to occupy center stage with daunting challenges for the future. Heavy pressure related to system capacity, brought to bear upon FAA decision-makers by operators fighting for survival, in Chapter 11 bankruptcy must be addressed within the broad context of overall safety. As hardware/software breakthroughs seek to increase productivity, the human interface will be modified and adjusted. Controller pilot communications will necessarily become more automated for efficiency and thereby require a reduced level of human interaction. Predictable morale problems within the controller workforce, directly attributable to the new two tier wage scale and reduced incentive pay, will demand increased vigilance on the part of FAA management.

At some point, perhaps, budget constraints and management policies, seeking to do "more with less", may prove to be causal factors in an aircraft accident. While ultimately attributed to aircrew error exacerbated by unrelated conversations in the cockpit at a critical moment during takeoff preparations, the NTSB's search for probable cause in the August 2006 air carrier accident at Lexington's Blue Grass Airport served to highlight negatively the minimal air traffic controller staffing at the Lexington tower facility (NTSB 2007). Tragic events such as this one serve to redirect public attention to real controller grievances specific to manpower and training.

Additionally, significant pressures to reduce controller compensation and benefits may significantly alter the quality of new hire applicants entering the ATC hiring process. Deep cuts in wages and job related economic incentives will necessarily complicate the FAA's sincere efforts to attract self-motivated, qualified candidates.

At present the air traffic control system derives much of its success, characterized by an exemplary safety record, from multiple layers of redundancy. Controller pilot responsibilities and cross checks combined with improved technology will continue to improve situational awareness while ensuring a safe and relatively smooth operation. As elevated burdens upon the system arise, these redundant layers of error avoidance will be increasingly tested while accommodating the ever expanding travel demands of the new millennium.

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Chapter 22

The TSA and Risk Management: Are We Safer Today?

Robert P. Mark

New Yorkers often stand as a national litmus test of just how tough Americans can be in a crisis.¹ The weeks and months after 9/11 showed us that even they have their limits, although most found a place to bury those days. In just a few seconds on Monday, April 27, 2009, however, thousands were brought face-to-face with the reality of another large jet again circling Manhattan when the Air Force flew a 747 down low near the island for a photo shoot that had not been made public in advance. With an F16 in tow, who could blame anyone who was instantly transported back to September 11, 2001? Apparently several government agencies knew about the flight. They somehow failed to share that information with the people of New York. The Air Force and the White House seem to have taken the brunt of the finger pointing (Associated Press 2009). Lost in the conversation however, was any mention of where the Department of Homeland Security's (DHS) multi-billion dollar TSA was during the planning of the flight. What were they thinking? Or perhaps more importantly, were they thinking about the millions of citizens around New York at all?

The TSA was created in order to enhance security in the transportation sector in light of the terrorist attacks of September 11, 2001. Within a year after 9/11 the TSA “assumed responsibility for security at the nation’s airports and deployed a Federal workforce to meet Congressional deadlines for screening all commercial airline passengers and baggage” (TSA 2010). Additionally the TSA is responsible for other transportation sectors as well but perhaps because of 9/11 it is most well-known for its efforts in securing air travel. Based on this responsibility, the TSA’s vision statement claims that it “will continuously set the standard for excellence in transportation security through its people, processes, and technology” (TSA 2010).

But one question is how the TSA is able to provide excellence in security any better than the federal government delivered in the past? Because it is not possible to protect all sectors of the transportation industry from all possible

¹ This chapter is reprinted courtesy of *Jetwhine.com* and is a reworking of the following three articles that I wrote: Knives on the plane (April 29, 2009); A Boston tea party for the TSA (February 22, 2009); and TSA is after general aviation this time (October 16, 2008).

threats, the TSA relies on a risk management approach to determine its safety protocols. According to the US GAO, this type of approach “entails a continuous process of managing risk through a series of actions, including setting strategic goals and objectives, assessing risk, evaluating alternatives, selecting initiatives to undertake, and implementing and monitoring those initiatives” (US GAO, 2009: 2). As the GAO report states, in 2006 the DHS issued the National Infrastructure Protection Plan (NIPP), and the TSA was named the primary federal agency for coordinating protection efforts (US GAO 2009). The NIPP also established a 6-step plan to assess risks and determine goals and requirements. The six steps include: 1) setting security goals, 2) identifying assets, systems, networks, and functions, 3) assessing risks (through consequences, vulnerabilities, and threats, 4) prioritizing, 5) implementing protective programs, and 6) measuring effectiveness. Risk assessment is supposed to involve combining threat information, known vulnerabilities, and potential consequences of a terrorist attack or other hazard (see US GAO 2009: 11).

While the purpose of the TSA is to ensure safety for all travelers, the question is whether or not the traveling public is any safer than it was prior to 9/11. Are the risk assessment policies working to enhance safety? While we could perhaps all agree that commercial aviation cannot be made 100 percent safe and secure, the issue is if the TSA is fulfilling its vision. In the following sections we will first examine the US GAO 2009 and 2010 reports that question some aspects of the TSA’s approach to security. We will then explore some of the problems with security on commercial aircraft. The bottom line is that the TSA needs a solid risk mitigation system to identify and prioritize the actions the agency takes tied together with regular evaluations to make sure the situations have not changed.

The GAO’s Assessments of the TSA

In both 2009 and 2010 the GAO released reports that both questioned the effectiveness of the TSA’s risk management program, at least when it comes to assessing real transportation risks in a comprehensive manner.

2009 Report

This report highlights a problem in the TSA’s risk assessment in that the TSA does not fully address its own comprehensive plan. The GAO claims that risk assessment is key to following the other five steps and that “without comprehensive risk assessments, TSA cannot ensure that its priorities, protective programs, and measurements of effectiveness are risk-informed, steps four through six of the NIPP” (US GAO 2009: 13). According to the NIPP, in order to have a credible risk assessment program, it needs to consider all three factors: threat, vulnerability, and consequences. The three concepts are defined as follows: “Threat is an indication of the likelihood that a specific type of attack will be initiated against a specific

target or class of targets. Vulnerability is the probability that a particular attempted attack will succeed against a particular target or class of targets. Consequence is the effect of a successful attack” (US GAO 2010: 5–6). The GAO shows that in the aviation sector, the TSA has only reviewed one of the three areas. For example, regarding no-fly lists and current airport threats, the TSA has assessed threat, but not vulnerability or consequences (see chart in US GAO 2009: 16).

2010 Report

In the 2010 report the GAO continued to address the relationship between the level of security and the risk management framework that the DHS is supposed to utilize. Regarding risk assessment, the new report reiterates a key problem described in the 2009 report. Namely, TSA has taken action to improve its risk management assessment program, but it could be doing more in order to determine how resources should be allocated. According to the TSA itself, it discontinued one of its programs regarding the transportation sector risk analysis because it had difficulties in determining the likelihood of terrorist threats (US GAO 2010: 6). But although terrorism by its nature is difficult to predict, nevertheless the TSA has not yet used comprehensive risk assessment. For example, GAO reviewed 19 assessment activities that included aviation as well as the five other major transportation sectors. According to GAO’s findings, “while these 19 assessment activities were not necessarily designed to provide risk information on all three components of risk, eight provided information on threat, 11 on vulnerability, and two on consequence” (US GAO 2010: 7). But as both the 2009 and 2010 reports point out, risk management involves assessing each of the three elements and then combining them together into a single analysis. Thus, it can be called into question whether the TSA is living up to its vision which is to set a standard in excellence.

In examining aviation security, the GAO reports that in 2009 the TSA had reviewed risks to airport perimeters and access controls. However, for 87 percent of the nation’s 450 commercial airports, the TSA had not conducted vulnerability or consequence assessments (US GAO 2010: 8). According to the report, the TSA should be completing the more comprehensive risk assessment by the end of 2010 (GAO 2010: 8). The GAO also states that while the TSA did finish a strategic plan in 2008 regarding passenger screening technologies, the agency did not incorporate other key risk principles, such as a cost-benefit analysis or performance measures (GAO 2010: 8–9).

TSA’s Large Aircraft Security Proposal (LASP)

Some of the TSA’s approaches to security in the aviation industry help to verify the GAO’s assessment that the agency may not be fully addressing risk management. One of the agency’s NPRMs under the Bush Administration, LASP (for aircraft weighing over 12,500 pounds), would have created general aviation security

procedures that would be at the level of those of the commercial airline industry. Without properly considering the historical differences between the two segments, TSA's proposal would have potentially imposed severe and highly unnecessary financial burdens, a one-size-fits-all form of security on an industry that survives through its ability to be hundreds of different things to the thousands of people who use business and general aviation. Aviation blogger Max Trescott states:

The LASP proposal appears premised on the public misconception that "if it has wings, it must be dangerous." Yet every crash of a small airplane with a building has left virtually no damage on the building. In fact, the government's own tests have conclusively shown that an aircraft used as a missile against a nuclear power plant would not result in any release of radiation. Nonetheless, the TSA wants to bring "Security Theater," at your expense, to small planes and airports everywhere (Trescott 2009).

Ultimately the LASP proposal was not approved. Anecdotally, one senior official in Senator Dick Durbin's office, suggests that the over 7,000 comments received about the LASP probably stunned the then leaderless TSA. But there is much more to aviation security than beating up on business aviation, at least I hope so.

Questioning the Success of TSA's Risk Management

Billions of tax dollars have been spent keeping the American flying public safe, or at least making the American public *think* they are safer than they were on 9/11. Just take a look at the junk—even weapons—the TSA personnel confiscate from airline passengers in a given week, and we could possibly all agree that some good has been done since 2002. Then again, they also confiscate many so-called dangerous items; such as water bottles, tubes of toothpaste, and hair gel, simply because the tubes are larger than three ounces. A transoceanic terrorist plot was uncovered in 2006 that supposedly involved using bottles of liquid to detonate bombs on multiple commercial aircraft traveling from the UK to the US (Webster et al. 2006). But while this plot led the TSA to determine that passengers should no longer carry liquid bottles over 3 ounces, the agency also decided that little bottles (3 ounces or less) were acceptable to bring on board.²

Several examples could be used to highlight the potential problems with the TSA's risk assessment program. I will highlight two: knives onboard aircraft and instant messaging (IM).

2 See the TSA brochure 3-1-1 for carry-ons. 2010. Available at: www.tsa.gov.

Knives on a Plane

Imagine my surprise in 2009 when aboard an American Airlines B777 I was offered a metal knife and fork to eat my meal. Notably this happened within ten feet from the secure cockpit door we have always been told not to congregate lest we be thought to be potential wrongdoers. Until this flight I had thought that everyone for the most part had their weapons already confiscated before they entered the cabin. Now the airlines were giving potential weapons back. I spoke to two of the flight attendants who were rather angry about this policy change in the TSA guidelines. There was no fanfare about the rearming of passengers either, no news releases. “The stuff just showed back up one day when I came to work,” one attendant told me.

What happened in TSA’s risk assessment process that made them decide that 7½ years after 9/11, rounded metal knives on board were no longer a risk, but toothpaste is? The three ounce rule exists to make people *feel* safe, not because it *is* safe. TSA also allows pointy metal scissors, up to four inches, in carry-on bags.³ Box cutters are not acceptable, but four inch blades are? In talking with the flight attendants, I discovered not only that they do not support the transport of blades, knives, and tubes, but also they connect the dots in a way that the TSA may have not. The flight attendants’ questions suggest that they think the removal of the tubes may be inadequate because ten people with ten small tubes each can meet up on an airplane and concoct something terrible if they so desire.

Instant Messages

I told one flight attendant that I was unsure what made me angrier: that someone at the TSA had arbitrarily decided that sharp scissors were acceptable and toothpaste was not, or that most of us probably did not know that the TSA had decided to change the policy. Then she told me what really scared her on the airplane—wireless internet access. Her reasoning was simple. With wireless people onboard the aircraft can easily instant message (IM) each other and coordinate almost any action they want, like bringing all the tubes together in one part of the cabin, or “grabbing the flight attendants in First Class when they come around the corner.” When I thought about wireless previously, my only concern had been about catching up on my email.

I once told others that the TSA operated as if it was on autopilot, and the idea was meant to be tongue in cheek. Now I think I had it right. Why did the GAO not suggest the TSA talk to the people actually operating the airplanes to gather data *before* they made any of these questionable decisions? How different might flying be today if they had done so?

3 See the list of prohibited items at: <http://www.tsa.gov/travelers/airtravel/prohibited/permitted-prohibited-items.shtm>.

Recent Developments in Passenger Screening

In 2007 I jokingly imagined what would happen if someone got caught with potentially lethal underwear. On December 25, 2009 a passenger on Northwest Airlines flight 253 from Amsterdam to Detroit, attempted to detonate plastic explosives that he carried in his underwear (Charles 2009). In the GAO's analysis of the incident, they reported on "continuing challenges in implementing the use of the terrorist watchlist to screen individuals and determine if they pose a threat to aviation security, as well as how aspects of this process contributed to the December 25 attempted attack" (US GAO 2010: 17). One of the problems addressed by GAO is that "because, in part, the alleged attacker was not nominated for inclusion on the government's consolidated terrorist screening database, federal agencies responsible for screening activities missed several opportunities to identify him and possibly take action" (US GAO 2010: 17).

The 2010 GAO report also suggests that challenges remain with the deployment of advanced imaging technology (AIT) (US GAO 2010: 20–21). In response to the December 25 attack, the TSA increased the planned deployment of AITs from 878 to 1,800 units as well as using them as primary rather than secondary screening measures. However, "while officials said AITs performed as well as physical pat downs in operational tests, it remains unclear whether the AIT would have detected the weapon used in the December 2009 incident based on the preliminary information we have received" (US GAO 2010: 20–21). As of the time of writing this chapter, the GAO is currently assessing TSA's operational testing of the AIT. Once again it could be argued that the TSA creates solutions to security threats without adequately addressing all aspects of risk management.

Conclusion

Even though the Obama administration finally appointed a new TSA administrator, John Pistole, in June 2010, will this appointment make us any safer? As I mentioned earlier in the chapter, the TSA needs a viable risk assessment plan in order to create a safer transportation sector. One person will not single-handedly resolve the limitations of the TSA. Everyone knows, or should know, that traveling is not 100 percent safe, but if the vision of the TSA is to provide excellence in aviation security, then it needs to focus on a more comprehensive risk assessment plan—combined with some old-fashioned common sense—so that resources will be allocated in the most efficient and productive ways possible.

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PART VI

Health and the Environment

This final part examines a variety of issues concerning health, especially regarding pilots, followed by investigations into the impact of aircraft on the environment. The first topic regarding pilot health is discussed in Chapter 23 by Warren Jensen. Through his analysis we find that health related issues are more complex than may initially appear. He first points out that when it comes to safety we can only minimize risk; we cannot eliminate it. One of the key challenges for aviation employees is to determine which conditions fall within acceptable risk and which do not. Much responsibility belongs to the pilots themselves to assess their medical states and consider to what extent they may be impacted by the treatments they are undergoing. Jensen also shows that different sectors of the aviation industry treat medical readiness differently. Unlike civil aviation, the military setting is controlled by a commanding authority thereby removing some of the pilot's discretion. Ultimately, as Jensen maintains, in many areas of aviation, minimizing risk is the combination of guidance, in the form of information, rules, and procedures, coupled with good decision-making.

Chapter 24 addresses questions of health and environmental concerns in general aviation. Robert Breidenthal focuses on two main concerns: aviation gasoline, also known as avgas, and noise pollution. Concerning avgas one of the main issues is that it is comprised of tetra-ethyl lead, which is a well-known toxin that causes neurological damage in children. Lead has been eliminated from automobiles (except for some racing fuels). Why does it continue to be utilized in some general aviation aircraft? The chapter also focuses on aircraft noise, primarily from poorly muffled engine exhaust and propellers with sonic tips. As Breidenthal claims, neither of these pollutants is essential for flight. For Breidenthal the main issue behind the lack of change in policy is economic. In a society in which the polluter does not have to pay for the damage, it is cheaper for them to pollute. In aviation an additional complication is due to liability laws since a death in a Cessna pays out much more than a death in a Chevrolet automobile. Any change in our pollution regulations depends on the EPA, and Breidenthal points out that this agency is subject to the whim of both political appointees and temptations from lobbyists.

The final two chapters of this text are devoted to the impact of commercial aviation on the environment. While Chapter 25 addresses issues that arise in flight, Chapter 26 concerns the impact of aircraft on the ground, including pollution, invasive species, and emergent diseases. In the former chapter Kolmes focuses

on two key environmental concerns: greenhouse gas emissions and persistent contrails. While discussing the ways in which people can offset their carbon emissions, Kolmes demonstrates that this solution is insufficient. If one tries to help the environment by buying energy efficient cars, light bulbs, etc. that person will still create a negative impact on the environment by flying around the world much at all. Because of this problem, Kolmes investigates other alternatives, such as traveling by rail for short trips, increasing aircraft fuel efficiency, and making ATC more efficient as well. He then shows us how persistent contrails impact the environment. Basically, persistent contrails are long cirrus clouds, and post 9/11 studies reveal that they dissipate after ten hours, much longer than previously thought. While it remains uncertain to what extent they may contribute to climate change, these contrails may be more difficult to eliminate than greenhouse gases. Kolmes provides alternatives, such as flying at lower levels and changing daily flight schedules so that the possibility of forming persistent contrails is diminished.

In the follow up chapter Kolmes begins by examining problems of ground level pollution arising at airports, such as water pollution involved in aircraft de-icing. He states that significant reductions in water pollution due to aircraft de-icing can be achieved with appropriate investment in modernized treatment facilities and techniques. In addition to water quality, airports are also among the most significant sources of local air pollution. Kolmes claims that several solutions could help lessen the amount of air pollution, such as single engine taxiing, using newer aircraft, policy options, etc. By revealing how aircraft contribute to problems with invasive species and emergent diseases, Kolmes further reveals the complexity of issues that arise on the ground. As Kolmes states, often the most devastating effect of invasive species is when they attack agricultural activities. With the number of passengers increasing, the amount of inspectors lag behind, which in turn allows more invasive species to enter the US. The final issue concerns ill passengers who may carry potentially harmful diseases onboard. Kolmes focuses on SARS, avian influenza, and tuberculosis in order to examine possible ways to prevent the spread of such diseases via air travel. Because of these various factors at play, Kolmes claims that air travel management needs to control them as best it can.

Chapter 23

Ethical Issues in Aviation Medicine

Warren Jensen

Proper risk management in the aviation industry requires personnel in safety-sensitive positions to be mentally and physically capable of performing complex operations. It obligates individuals to self-evaluate their physical and mental state prior to duty. When considering other factors, including the potential for significant consequences, these decisions can be difficult or perhaps even made improperly. Aviation professionals are frequently required to assess their ability to perform when faced with illness, medication and alcohol use, fatigue, stress, and other potentially distracting influences in their lives.

Professional aviators are medically screened every six to twelve months, depending upon their responsibilities. While these exams look at their current state of health and screen for conditions that could impact their ability to perform in the future, many conditions can alter their performance between these required medical screenings that do not require medical consultation. The process of evaluating their current medical state and making the appropriate decisions can be easy, difficult, or maddeningly unclear. A discussion of the ethical basis of these decisions is thereby an appropriate aid for determining the correct course of action.

Acceptable Risk

Choices in life represent situations that have inherent risks. Water that comes from the tap is not sterilized, distilled water, but has impurities that (hopefully) meet standards to minimize the risk of disease. In the world of safety culture, the elimination of risk is not possible, so we must strive to identify and minimize risk. The process to medically evaluate pilots is not a thorough or exhaustive medical screening as much as a conscientious review and evaluation of the conditions that would lead to an incapacitation or impairment of the individual.

The concept of acceptable risk considers that some risk is inherent to medical conditions that may exist in spite of due diligence on the part of the pilot and their medical examiners. For example, pilots at a certain age may experience heart disease leading to a heart attack without symptoms or medical evidence prior to the event. While this is a low percentage occurrence, it is also considered to have an unforeseeable and unintended negative effect. It is a risk to the safety of operations, but it is considered an acceptable risk.

Other conditions, such as a head injury with loss of consciousness, have the potential for incapacitation following recovery from the injury. With proper and timely medical evaluations, the potential for risk can be identified, but not completely eliminated. If pilots meet current medical standards, they return to flight duty, even though their risk of incapacitation may be greater than individuals who have not had the same type of injury. The increased risk due to the prior injury has been determined to be a very low percentage event, similar to the inherent acceptable risk in individuals without a significant medical history, described above. With the knowledge that humans naturally have the potential for infrequent, but foreseeable, unintended medical events, they may be medically certified.

FARs were, and continue to be, created to maintain standards for the purpose of managing identifiable risks. Aviation medicine standards provide rules and guidelines for the purpose of identifying, characterizing, and managing risks due to human physiologic performance. This process leads to considerable discussion regarding the criteria that would constitute an acceptable level of risk of impairment for individuals in safety-sensitive positions. Specifically, the challenge faced by pilots, controllers, and their managers is often: “Does this condition, and its associated (and potential) performance problems, fall within an acceptable level of risk?”

Civilian Aviation

In the civilian aviation industry, individuals are guided by FAR 61.53, titled “Prohibition on operations during medical deficiency” that states: “An individual cannot act as pilot in command ... while that person knows or has reason to know of any medical condition ... or is taking any medication that would make that person unable to meet the requirements for the medical certificate necessary for the pilot operation” (FAR 61.53(a) 1 and 2). The responsibility rests with the pilot to determine if their condition meets aviation medical standards, namely the ability to hold an appropriate FAA medical certificate. The quality of this decision is based on the pilot’s ability to assess their medical state, how they will be impacted by their problems and treatments, as well as knowledge of the applicable regulations. All of this information must be weighed to determine the pilot’s readiness to perform safety-sensitive duties.

Basic guidance regarding medical conditions that affect human performance and flight safety is provided during initial flight training and through FAA publications. Rule-based decision guidance regarding some medical conditions, medications, and alcohol is found in the FARs and the Aeronautical Information Manual. An example of the rule-based decision process would be the drug and alcohol regulation, published in FAR Part 91.17.

Part 91.17 (a) reads that no individual may act or attempt to act as a crewmember of a civil aircraft:

1. Within 8 hours after the consumption of any alcoholic beverage
2. While under the influence of alcohol
3. While using any drug that affects a person's faculties in any way contrary to safety, or
4. While having .04 percent by weight or more alcohol in the blood.

In 91.17(a) 1, the rule is stated for an 8 hour limit, but it is a criterion in addition to statements 2, 3, and 4. While statements 2, 3, and 4 appear to be rules, unless pilots can correctly assess their performance or blood alcohol level, these rules appear to be intended more for enforcement than ethical decision-making.

Not all medications or medical conditions have clear guidance or rule based decision aids. Medical evaluations and information regarding "non-rule based" conditions may not be readily available, or are limited by cost, convenience, or availability. While we have excellent guidance from the aviation regulatory agencies and support organization, there is a gap in the information chain for most pilots and air traffic controllers trying to assess the risks based on their current medical condition. Can we quantify the risk to the safety of air traffic if a controller is working with seasonal allergies? What is the risk to safety if the controller has taken over-the-counter medications? How many days should a pilot be removed from flight duty following abdominal surgery? How are these questions answered?

In spite of efforts to provide guidance to pilots, many questions still exist regarding the risk evaluation of foreseeable, but unintended, problems due to medical conditions. Other organizations take a different approach to address these questions, using different regulations and support structures.

Military Applications

In military aviation settings, the issue of medical readiness-to-perform is controlled by a commanding authority, removing some of the pilot's discretion. The duty of a military flight surgeon is to evaluate pilots who have consulted physicians and/or experienced a medical condition prior to their return to flight duty. This requirement is clearly stated and offers little room for interpretation. The relationship of the flight surgeon and their unit is a fine line of promoting the health, performance, and safety of the pilots, while identifying conditions that represent unacceptable risk in this demanding aspect of aviation.

Even with this level of control, decisional errors still occur, and tend to be related to the interpretation of acceptable risk. The following example demonstrates differing assessments of an injury, the power of conflicting priorities, and how they influence the determination of acceptable risk.

As a new flight surgeon in the unit, I was asked by the wing commander to see the lieutenant colonel in flight ops to "evaluate his hand." The lieutenant colonel was wearing a brace for what he insisted was a "minor crack in a bone" on his

dominant hand. The obvious swelling and deformity of his hand lead to me think otherwise, and I was told the lieutenant colonel had been flying with this injury for several days.

When questioned about the injury, the lieutenant colonel insisted that the injury did not need flight surgeon clearance, as his assessment was that the injury was minor and did not have the potential to affect his performance. Upon evaluation, the hand was exquisitely tender to pressure, finger motion was limited, and grip strength decreased. In my opinion, the lieutenant colonel had failed to report an obviously disqualifying condition and violated regulations to report for evaluation after the injury and prior to the resumption of flight duty.

When confronted with this information, the lieutenant colonel agreed to report to the clinic for evaluation, but on the condition he could fly that afternoon prior to the clinic visit. The reasoning for his request was that he was involved in a training exercise that afternoon (Jensen 1998).

In the military model, using flight medicine consultations has clear advantages, but it remains dependent upon the quality of decision-making of the personnel involved. In many areas of aviation minimizing risk is the combination of guidance, in the form of information, rules, and procedures, coupled with good decision-making.

The Nature of Fatigue and Stress

Some conditions that have a significant impact on human performance are not generally considered an injury or illness. Fatigue and psychological stress can affect decision-making performance when operators begin to change their risk assessments and/or choose to deviate from standard operating procedures (Campbell and Bagshaw 2002). Stress and fatigue have also been known to affect the ability of the human operator to monitor the quality of one's performance. For these reasons, fatigue and stress not only impact the quality of performance but also the ability to assess it.

Most individuals find it difficult to assess the performance effects of stress and fatigue. A review of Aviation Safety Reporting system data indicated that 20 percent of safety reports cited crew fatigue to be a factor (Masters and Kohn 1996). Stress and fatigue are common occurrences in the aviation professional and, while their effects are often appreciated retrospectively, ethical decision-making requires that we understand these risks in real-time situations.

We were preparing for our last leg after a long day with many delays. We knew we were tired, but I had done this before so we prepared for another flight. After I lost my place on the checklist for the second time, I realized my experience taught me the wrong lesson. Even though I had done this before, I wasn't capable as I needed to be. I cancelled the flight, got some sleep, and we arrived the next

morning. The hardest part of the decision wasn't recognizing fatigue symptoms; it was realizing its effect on me (Jensen 2006).

In professional aviation, rule-based decision-making is aided by duty time regulations, limiting the amount of flight time before a required rest period. Due to the nature of fatigue, individuals can be at risk for fatigue-related errors even though they are in compliance with crew duty time regulations.

The nature of fatigue and stress is such that they are difficult factors in self-evaluation and in predicting performance degradation. The onset can be very subtle but has a significant impact on performance. Often humans approach fatigue and stress with the attitude that perseverance can overcome its effects. This paradigm has been successful in the past, but can lead to poor assumptions and significant errors in the future.

Ethical Issues in Aviation Medicine Decision-Making

Most discussions of ethical issues in aviation medicine are quick to point to cases of clear violations, or in which obvious, correct choices, did not occur. In this author's experience, however, many aviation medical questions can be resolved with available guidance. Without access to sufficient information/resources, decision-making becomes much more difficult.

As mentioned above, civilian pilots hold the primary responsibility to determine their capability to fly. When trying to determine the potential adverse risks due to their medical condition, pilots must have the ability to determine the foreseeable adverse risks to safety. Symptoms of medical problems are often viewed as raw data that can be difficult to interpret. It is difficult to objectively evaluate a medical condition when it is perceived by the individual to be mild, the symptoms are vague, or when it is unclear as to whether or not a more thorough evaluation is needed.

When an individual possesses an incomplete understanding of a medical condition, or their prior experience leads them to believe that their condition does not or will not impact their ability to perform, realistic appraisal of acceptable risk is often incorrect. The issue may very well indicate the need for additional education. (e.g., a current popular acne medication is prohibited due to color vision alterations.) It is also seen that individuals may misapply prior experience (i.e., vicarious learning) to determine their ability to perform.

Even when seeking medical advice, pilots may find that physicians are unfamiliar with aviation medicine and applicable federal regulations and may be unable to correctly advise the pilots. Adding to the confusion, patients can experience differing opinions regarding the diagnosis or the changing recommendations of medical research. "Less than 48 hours after FAA learned the anti-smoking medicine Chantix might lead to safety problems, it ordered pilots and air traffic controllers to stop taking it immediately" (FAA 2008a).

The concept of respect in ethical decision-making refers to the principle of treating others befitting the dignity and worth of a person (Pantakar et al. 2005). When pilots and air traffic controllers fail to report a disqualifying condition, violate crew rest or alcohol policies, or use a prohibited medication, it shows a lack of respect for themselves, their colleagues, passengers, and others. Often, the decision-maker does not perceive one's particular circumstance as an unacceptable risk. Even when pilots are aware of the rule that would prohibit them from flight duty, they may reason that they are still following the intent of the rule to avoid unacceptable risk.

Some individuals fail to report medical conditions when they feel those conditions should not disqualify them from flight. Their intention is to bypass what they view as the onerous nature of the regulatory agencies and the review process. The lack of respect individuals have for the process of medical review can lead them to violate ethical principles by not disclosing potentially disqualifying medical conditions. This concern can even lead individuals to fail to list conditions that are acceptable, due to their perceptions that they would be disqualified without recourse.

Pilots' interpretation of their symptoms can be biased by their desire to meet their personal and professional goals. The case of the lieutenant colonel with the hand fracture demonstrated egoism on the part of the pilot, with his intention to continue flying in spite of his duty to report a disqualifying injury. He was able to justify his decision because his assessment of the injury led him to believe that he was fulfilling the intention of reporting regulation (since he felt the injury did not represent an increased risk to himself, others or the assets of the Air Force). While the decision to fly may have been self-serving, the pilot justified the decision as he was also training others, which he considered his duty. In essence, this pilot was debating the principle of double effect (Pantakar et al. 2005) where he was debating that his ethical duty to provide training as opposed to the potential negative effect of the hand injury.

While "calling in sick" may be a common issue in the workplace today, the opposite pressures are often true for pilots. Balancing family, work schedules, and outside interests, as well as maintaining the reputation as a reliable professional, can place pilots in the double effect principle. The issue may become even more difficult if a disqualifying condition now leads to job/income instability.

Conclusion

Ethical decision-making is critical in the safety-sensitive professions of aviation. These decisions are attempts by individuals to balance duty to their careers, employers, and families, while showing respect for themselves and others. The impressive safety record of the aviation industry is evidence that many difficult, but correct decisions are made every day. Proper training of safety-sensitive workers in ethical decision-making is an important step in their training. Patankar stated it

well when he wrote “it is the moral obligation of the decision-makers to exercise due diligence in foreseeing the harmful side effects of a morally permissible action” (Patankar et al. 2005: 5). Pilots and air traffic controllers must remain alert and prepared to make proper decisions regarding their health and performance.

Examples of Ethical Challenges

Example 1

J.S. is a 45 year old captain who was preparing for bed one evening when he had an onset of chest pressure, nausea, and shortness of breath. He stated the symptoms were mild and unassociated with activity, emotion, or eating. He noted he was sweating and feeling anxious about the pain when he informed his wife of his symptoms. She insisted he be evaluated in the emergency room, and they left immediately for the hospital.

While en route to the hospital, he noted his chest pressure and other symptoms began to resolve. When they arrived at the hospital parking lot, he felt completely normal. At this point, he refused to enter the hospital for an evaluation. He told his wife that his symptoms were completely gone, and therefore they were unlikely to be caused by heart disease. He reasoned that he had no risk factors for heart disease, such as smoking, family history of heart disease, high blood pressure, obesity, diabetes, or elevated cholesterol. He attributed his previous symptoms to overeating and wanted to go home.

His wife was unhappy with his decision and reasoned that he needed to be evaluated to be medically qualified to fly. He felt his medical certification was not in question because he had not been diagnosed with a disqualifying condition, and he felt fine. He said he had no intention to seek medical evaluation unless his symptoms returned. The ride home was very quiet.

Example 2

A student pilot failed to report his use of Adderall and the diagnosis of Attention Deficit/Hyperactivity Disorder on his application for a medical certificate. He maintains that the condition and medication do not interfere with his ability to perform piloting duties. He reasons that he has no other medical problems, his grades in school were adequate, he had an unrestricted driver’s license, and his doctor stated he had no restrictions on his activity. While the student pilot is intent on listing reasons why his medical certificate should be granted, it does not negate the problem of failing to report the medical condition on the application. The application states “Do you now have or have you ever had any of the following conditions?” and “Do you currently use any medication?” It is clear that the competing goals of treating his ADHD and pursuing an aviation career have led to this ethical challenge.

Example 3

A commercial pilot had an accidental, traumatic amputation of his index finger. Following surgical repair of his hand, six months of physical therapy, and a consultation with his aviation medical examiner, he was issued a new medical certificate. His medical examiner forwarded the application to the FAA with the only notes regarding “a successful surgical repair” and “no abnormalities” on his physical exam. No mention was made of the finger amputation and other injuries to the hand.

In this case the pilot appropriately sought renewal of his medical certificate following his injury, but the certificate was issued inappropriately by the medical examiner. While the pilot’s injury was not necessarily disqualifying, the inadequate documentation forwarded to the governing body was misleading, not allowing them to make an adequate evaluation of his condition. Normally, a pilot would undergo a flight test to see if the injury resulted in an impairment that would compromise safety. It appears the pilot upheld his ethical duty to report the condition and present himself for evaluation, but the medical examiner improperly reported the injury in an attempt to bypass the standard evaluation procedure.

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Chapter 24

Environmental Concerns in General Aviation: Avgas and Noise Pollution

Robert E. Breidenthal

Compared to the automobile, light aircraft have a relatively small environmental impact. An automobile requires a continuous road for the entire length of a journey, while a small airplane only needs a short runway at the beginning and at the end. Roads are bad news for the environment, breaking up habitat into smaller pieces and thereby reducing the diversity of species per unit of habitat. While general aviation aircraft are less damaging than cars, they emit two sources of pollution that dwarf those of the automobile. Aviation gasoline, or avgas, contains tetra-ethyl lead, a toxin that causes brain damage in children. Lead has been removed from automotive fuel, except for some racing fuel. The second pollutant is excessive aircraft noise, primarily from a poorly muffled engine exhaust and a propeller with sonic tips. Neither of these pollutants is essential for flight. The technological solutions are straightforward, but expensive. In a society in which the polluter does not have to pay for the damage, it is cheaper for them to pollute. The legal system also discourages improvements to aircraft because of liability laws.

Automobiles v. Aircraft

On a long trip most people now travel by commercial airline. On shorter ones the automobile is preferred. With the development of relatively clean automobile engines, it is tempting to think that the most damaging environmental impact of the automobile is disappearing. However, one major deleterious influence of the automobile is not from its emissions, but rather from its roads. Roads tend to persist for a long time. For example, one can still find Roman roads in Europe.

A new road has a major effect on the environment. As a network of roads penetrates into an area, the natural habitat is fragmented. It turns out that the number of viable species per unit area of habitat depends on the size of the contiguous habitat (MacArthur and Wilson 1967). As the pieces are fragmented, fewer critters per unit area can survive in the remaining habitat. The effect of fragmentation is surprisingly strong. It may preferentially affect the large predators, who might require more area. An elegant experiment by Robert Paine showed that the removal of a predator dramatically reduces the number of species (Mills et al. 1993). For a quarter of a century he repeatedly removed starfish from an inter-tidal slope of

rock off of the coast of Washington State to see what would happen to the other species in the area. When this “keystone species” starfish predator was eliminated, the rock was overrun with mussels, to the essential exclusion of all other species. Paine demonstrated that the predator was necessary to achieve a rich diversity of life. Because a road network fragments the habitat, the number of species is reduced.

In contrast an airplane only requires one runway at the origin and another one at the destination point. The combined lengths of the runways might only be a mile, even though the trip is two orders of magnitude longer. Also the runways do not form a continuous swath, cutting off migration routes as a road can. From this viewpoint an airplane clearly has a much smaller impact on the environment than a car. It is not just a coincidence that photographers and hunters in search of large native animals frequently fly to their destination. While general aviation may have less environmental impact per vehicle than the automobile, there is plenty of room for improvement. The two major sources of pollution are lead from avgas and noise.

Lead

Tetra-ethyl lead was added to gasoline in the 1930s to raise the octane rating of the fuel, corresponding to a reduction in the tendency of the engine to knock. This allowed the compression ratio of the engine to be increased, thereby improving the fuel economy and efficiency of the engine. A measure of the resistance of a fuel to knock is its octane rating. By adding side branches to the originally linear hydrocarbon molecules, the octane rating of the fuel can be increased. However this comes at the cost of additional refinement, which is more expensive than simply adding tetra-ethyl lead.

It turns out that lead is a toxin that damages the neurological system of children. Lead dust from car exhaust contaminated the environment, especially the big cities. Brain function and the IQs of children exposed to lead are reduced, so much so that Claire Patterson asserted in the 1970s that urban centers were unfit for children (McGrayne 2002). However, even at moderate lead burdens, the brain damage is pain-free and difficult to detect. How can one determine if a child is not as smart as he or she would have otherwise been without the lead? Only a statistical study of the correlation between blood lead level and IQ reveals the damage. Patterson showed that there was no safe threshold. Child IQ began to fall with even miniscule concentrations of lead in the blood.

It is a fascinating story to see the response of the US Environmental Protection Agency (EPA) to this tragedy. The official government position was that the ambient lead concentration was just below that which caused brain damage. In other words, there was no problem. As discussed below, the EPA is in the business of defending polluters. The public can tolerate subtle but real brain damage for a long time. Fortunately the introduction of the automotive catalytic converter to

lower NOx and hydrocarbon emissions forced the elimination of tetra-ethyl lead from auto fuel. Lead would have ruined the converter.

Even though lead is no longer in auto fuel, it still lingers in aviation gasoline, known as 100 octane, low-lead avgas. Most aircraft piston engines were originally designed with a relatively low compression ratio to run on fuel with a lower octane rating. A leaded fuel with a high octane rating is overkill for them. However, some higher compression engines cannot operate on lower octane fuels. Because it is impractical to supply several different types of fuels at each airport, the industry has standardized a single fuel that works for essentially all gasoline piston engines, 100 low-lead avgas.

Once something is established in certified aircraft, it is difficult to change. Safety and liability issues discourage change within the FAA and throughout the industry. Without effective feedback from those who suffer the damage, the pace of change is glacial. So lead remains in standard avgas.

There are a few current alternatives. It is possible to burn automobile fuel in some airplane engines. However, this requires a special "Supplemental Type Certificate" permit, and such fuel is not universally available. The quality of automobile fuel is not as high as avgas, so that impurities such as water can be problematic. There can be issues with vapor pressure as well. Finally, some auto gas contains ethanol, which is not compatible with some rubber tubing and gaskets on aircraft. Aircraft diesel engines have been developed in Germany that can operate on jet fuel. They offer improved fuel economy, although the engine is relatively heavy, and the conversion to a new engine is expensive. New combustion technology and engine management systems may one day permit operation of high compression gasoline engines with a lower grade of fuel. This would allow a lower grade of avgas to be run in higher compression engines. Turbine engines use jet fuel, essentially kerosene, which like diesel fuel, is free of lead. However, small turbine engines are not as efficient as piston engines of the same power class. So jet engines are not a viable replacement for piston engines in small aircraft.

In the future the EPA may compel general aviation to switch from 100 LL to a lead-free fuel with a lower octane rating. This shift would be expensive for those with high-compression engines. They would need to modify their engines or else add an octane-enhancing component to their fuel, ensuring that it is well mixed. The engine modifications might include a reduction in compression ratio and/or an engine management system that detects the onset of knock and adjusts the engine timing to avoid it. A different fuel injection system may improve mixing of fuel and air, also inhibiting knock.

Given what we now know about the dangers of lead pollution, one might think that leaded fuel could quickly disappear, even in the absence of government edict. Victims of lead pollution would sue to get the lead removed from the fuel. It would be so expensive to use leaded fuel that aircraft owners would immediately switch to a lead-free fuel, modifying their equipment as necessary. Alas, the system does not work that way. The EPA is in the business of issuing pollution permits, both explicit and implicit. As long as a polluter's emissions are below the officially

approved levels, the polluter has a government license to pollute. The injured party would find little recourse in court. Under our current laws the tort system does not really apply to pollution. Even if you had access to a courtroom, you would need to convince a jury that there was injury. We have seen that the neurological damage from lead exposure is subtle, not like a broken arm. To whom do you compare the victim? It is hard to prove in court.

Noise

There are strict regulations on the noise from large commercial aircraft. Boeing and Airbus must meet the acoustic requirements of the FAA in order to certify their aircraft. Some airports have even tighter limits, such as for quiet night operations. As a consequence a great effort has been made to meet these requirements. The noise from large jet engines has been reduced to such an extent that during the approach to landing, some aircraft make more noise from their landing gear and flaps hanging out in the breeze than from their engines.

In contrast to the large commercial jets, there are essentially no such requirements for general aviation. Interior noise is typically so great that headsets must be worn to prevent hearing damage from long-term exposure. Many aviators even use noise-canceling headsets to further attenuate the sound. Exterior noise levels are also high. Typically a light airplane must be quite high for the noise to be insignificant on the ground. The main culprit is usually an inadequate engine muffler. In some cases, the speed of the propeller tips is excessive. If the Mach number of the propeller tip approaches one, shock waves strongly radiate noise in the plane of the propeller disk.

Of course it is possible to use a better engine muffler. There have been dramatic improvements in muffler design in the last half-century. Modern motorcycle mufflers are remarkably small and light. One only has to be a near a loud, customized motorcycle to appreciate modern commercial mufflers. Propellers can be designed and operated to minimize the tip Mach number and its associated noise. However, it costs money to develop and to certify improved equipment. There can be a small engine performance penalty from additional exhaust backpressure. If a muffler is retrofitted on an existing aircraft, there is the additional installation expense.

A more subtle cost is the risk that such a retrofit will expose all involved parties in a lawsuit when an aircraft of that type suffers an accident, whether that particular aircraft was retrofitted or not. Attorneys have successfully argued in court that a vendor must have been making an inferior product if it needed to be upgraded in some other aircraft. For all of these reasons there is a perverse disincentive to improve a certified aircraft. There is no age limit for an aircraft to pass its annual inspection. Even when an aluminum structure reaches the end of its fatigue life, in principle it can be replaced with new. While rust is an issue, steel tubing has practically an infinite fatigue life. An old airplane can fly for a long time. Because

the cost of a new airplane is so high, old airplanes are kept in service for a long time.

Aviation Liability

New airplanes have become very expensive, in part because of new liability risk. The average settlement for an aviation fatality is approaching two million dollars per person. In contrast the average settlement for an automobile fatality is much less. In the US a death in a Cessna is different than a death in a Chevrolet. If the same court decisions applied to automobiles, the US could hardly afford an automobile industry. This is a peculiar weakness in our usually admirable tort system. Perhaps 80 percent of all general aviation accidents are attributable to pilot error. Maintained by third parties, the machine may have left the factory forty years earlier. Having nothing to do with the accident, the manufacturer was nonetheless subjected to a lawsuit because of its deep pockets. Manufacturers frequently settled out of court to mitigate the risks of an unfavorable verdict. It reached the point that Cessna completely shut down its piston production lines for a decade, until a new law limited the maximum period for which the manufacturer could be held accountable. Ironically, Cessna's aircraft enjoy the best safety record in the industry.

Faced with this situation, rational strategies for an aviation manufacturer are to either raise the price of its product to cover future anticipated lawsuits, or reduce its assets so that it is no longer an attractive financial target for a lawsuit.

These perverse liability costs make it more difficult to address the pollution issues discussed above. Old aircraft are not replaced, because new ones are so expensive. Old aircraft are not upgraded, because the upgrades are so expensive. New aircraft may not benefit from the latest improvements, because such improvements imply that the existing fleet needed improvement and was therefore defective. Investment in new technology is discouraged because of the high parasitic costs.

Solutions

By spending some money on research and development, these pollution problems almost certainly have technical solutions. We know how to avoid knock and how to design a good muffler. There will be additional costs associated with the transition to a lead-free fuel and to new mufflers. The efficiency of the engine may be slightly reduced, resulting in less performance and higher operating costs. An improved muffler might weigh more. So it will cost aviators more money, at least initially. Someone always pays the cost of pollution. The question is who. In the present system, the general public pays, as it is subjected to lead and noise exposure. However, in an ethical world, it would be the polluter. Not only is that

ethical and fair, but it provides an economic incentive to reduce the pollution to an optimally low value. The optimum is automatically found by the self-interest of the polluter, at the balance point between the incremental reduction in the cost of damage and the incremental increase in the cost of the aircraft. Note that the economically optimal level of pollution is not in general zero. For example, some uses of lead may be sufficiently beneficial to justify the damage. It is difficult to imagine a practical piston engine with exactly zero noise emissions.

The issues are more legal than technical. Under current law, the polluter has an implicit or explicit license from the EPA to pollute. So any change in our pollution regulations depends on changes within the EPA. That is to say, they are subject to the whim of political appointees and the temptations from lobbyists. Contrast that with scientific evidence presented in court, where a jury decides who was damaged, by whom, and by how much. While our tort system is the natural mechanism to decide issues of pollution damages and compensation, it seems unlikely that the EPA and major polluters would allow the EPA to disappear. The EPA is the friend of the status quo polluter.

Even if pollution issues were resolved in court, there is room for improvement. For example, many judges are technically illiterate. They have been to law school, but never studied thermodynamics or vorticity. As a consequence, they allow into court outrageous technical evidence from unscrupulous expert witnesses. This degrades the court system, imposing a high cost on society. Instead of deserving plaintiffs receiving fair compensation, so that polluters and shoddy manufacturers are punished, our current system does not punish polluters and delays improvements in aviation. With better judges, our courts would throw out junk lawsuits that raise the cost of aircraft while simultaneously lowering their quality. In a typical trial each side presents their set of technical expert witnesses, some of whom make outrageous statements. Since neither the judge nor the jury may be technically competent, the testimony of such experts cannot be fairly evaluated by the jury. Without an effective feedback system, these disreputable expert witnesses are free to repeat their performance with impunity in subsequent trials. It has developed into a lucrative business for them.

Justice would be better served if there were some kind of feedback system for the performance of expert witnesses. One kind of feedback system has been developed in the medical community. A neurosurgeon, Jeffrey Segal, founded a membership-based organization, Medical Justice, which attempts to defeat frivolous lawsuits by filing countersuits against them (Segal and Sacopulos 2007). This organization uses the collective opinion of specialist medical societies to evaluate expert witness testimony in lawsuits. In a 2001 case the Seventh Circuit Court of Appeals decided that such societies had the power to police their own membership. Some of these societies now have panels to review the quality of expert testimony. If testimony contradicts what a panel would regard as reasonable, that testimony may be considered an ethical violation, resulting in possible expulsion of that witness from that society. This would presumably inhibit the employment prospects of that individual as an expert witness in future trials. Another approach used by Medical

Justice is a patient–physician contract, requiring both sides in a legitimate dispute to restrict their technical witnesses to those experts who successfully maintain their membership in such societies.

In the aeronautics field there are also specialty societies, such as the American Institute of Aeronautics and Astronautics. Perhaps the aviation industry should adopt the medical model. While most aeronautical trials involve aircraft accidents, other issues such as patent and pollution matters may also be addressed in courts filled with expert witnesses.

General aviation aircraft cause a relatively small impact on the environment. However, there is room for improvement. It seems the ultimate solution to pollution is a revision of our legal system.

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Chapter 25

Greenhouse Gas Emissions, Persistent Contrails, and Commercial Aviation

Steven A. Kolmes

Commercial aviation is an extraordinarily complex human venture that has environmental ramifications that are infrequently examined. This chapter brings together a number of the ways in which commercial aviation has an environmental impact on the atmosphere. It will discuss the procedures and technologies that are candidates for reducing the impacts of commercial aviation on the atmosphere including greenhouse gas emissions and persistent contrails.

Carbon Footprints and Ways to Offset Them

We live in a world where increasing atmospheric levels of greenhouse gases, primarily carbon dioxide, are forcing global climate change and posing a threat to humanity's social and economic stability. It is vital that people begin to evaluate the greenhouse gas footprint (often shortened to "carbon footprint") of their activities, in order to modify them and diminish our greenhouse gas emissions. Our growing scientific understanding, combined with a number of easily accessible web-based resources, allow people to consider how their lifestyle could be altered to come more into line with a goal of climatic stability. Some things are intuitive, like driving smaller vehicles, using mass transit more, living in (and hence heating and cooling) a smaller house. Other things may not be immediately obvious, like eating less meat (especially feedlot beef which consumes many calories of fossil fuel, and an enormous amount of water, for each calorie of food produced). But even if a person lives in a modest sized home, buys ENERGY STAR[®]-rated high efficiency appliances and compact fluorescent light bulbs, drives a small biodiesel, hybrid gas-electric, or electric car, if they fly around the world much at all (even giving lectures on environmental sustainability), unless they take mitigating action, they will have a huge deleterious carbon footprint, because of both fossil fuel use and other factors involved in commercial air travel.

What can be done to derive the benefits of commercial aviation without making an excessive contribution to greenhouse gas emissions? Numerous individuals and businesses have decided to mitigate their global climate change impact associated with air travel by purchasing carbon offsets. Carbon offsets work by having individuals or businesses, (1) calculate the greenhouse gas emissions from their

use of air travel (or other activities), and (2) purchase sufficient carbon offsets to “zero out” the greenhouse gas contribution. This is done by providing funds for activities that reduce atmospheric greenhouse gas levels, such as reforestation projects, wind power, methane emission abatement, or energy efficiency projects. A considerable number of organizations allow travelers to compute and purchase carbon offsets.

Several comparisons of processes and programs for a number of carbon offset providers have been compiled. The Tufts Climate Initiative has analyzed offset quality and percentage of cost devoted to offsets (rather than administration or profits) at a report entitled *Voluntary Offsets for Air Travel Carbon Emissions* (Tufts 2007).¹ One of the most effective and responsible companies is AgCert from Ireland (<http://www.agcert.com>)² which is unusual in focusing entirely on agriculturally-based projects, many using methane or nitrogen dioxide abatement offsets, to compensate for the greenhouse gas impacts of CO₂ emissions. Methane especially is molecule-for-molecule an even more effective greenhouse gas than CO₂ and is released in large quantities on farms from poorly handled animal waste lagoons or heaps. AgCert is largely a wholesale entity providing offsets to businesses and other large organizations, but is moving towards the consumer market as well. They say of themselves:

According to the Intergovernmental Panel on Climate Change (IPCC) 2001 report on Mitigation and the PEW Center on Global Climate Change, agriculture contributes to approximately 20 percent of global anthropogenic greenhouse gas emissions. AgCert™ reduces greenhouse gas emissions on livestock farms by implementing practice changes in Animal Waste Management Systems.

NativeEnergy from the US, majority-owned by Native Americans, gives this statement and example project:

Currently, all website purchases support 100 percent Renewable Energy Wind. We will customize offset portfolios for large orders, offsets for businesses, or

1 Ecobusinesslinks.com has produced an analysis available online at http://www.ecobusinesslinks.com/carbon_offset_wind_credits_carbon_reduction.htm. A report entitled “A Consumer’s Guide to Retail Carbon Offset Providers” is available in pdf form from the web site of Clean Air-Cool Planet at <http://www.cleanair-coolplanet.org/ConsumersGuidetoCarbonOffsets.pdf>. The report especially directs readers to “tier one” carbon offset providers.

2 Other responsible companies that provide retail or wholesale offsets include: The German organization Atmosfair at <https://www.atmosfair.de/index.php?id=5&L=3> which funds a wide variety of renewable energy projects worldwide; Carbon Neutral Company (<http://www.carbonneutral.com/>) co2balance (<http://www.co2balance.com/>) and Climate Care (<http://www.climatecare.org/>), all from the UK, fund projects running the gamut from renewable energy to rainforest restoration; Climate Trust (<http://www.climatetrust.org/>) from the US, invests in renewable energy, including things like traffic signal optimization to reduce fuel use, carpool matching by internet, and other activities.

organizations. The Renewable Wind project that *NativeEnergy* is currently supporting is: The Greensburg Wind Farm, Greensburg, KS, USA. (<http://www.nativeenergy.com/>)

In terms of the travel industry, Sustainable Travel International, essentially a new sort of “travel agent” selling only carbon offsets, lists partners including Continental Airlines, American Express, Starwood Hotels, Marriott Hotels and Resorts, and many others (http://www.sustainabletravelinternational.org/documents/op_carbonoffsets.html).³ A program of carbon offsets provided by the Conservation Fund, and called the Go Zero[®] program, has partnered with Travelocity.com to enable individuals to offset the carbon dioxide emissions associated with travel (<http://www.conservationfund.org/gozero>). Go Zero[®] operates by measuring and then offsetting carbon dioxide emissions by planting trees. TerraPass[®] has partnered with Expedia.com to provide offsets for tickets purchased through them (<http://www.terrapass.com/flight/index.html>). TerraPass[®] provides funding for projects like small dairy farmers installing digesters to prevent methane emissions and helping wind power plants expand.⁴

It may well be that in the future most online booking of airline tickets will automatically ask the purchaser if they want to pay an additional fee to offset the carbon emissions of their travel. Along with the examples already mentioned, JAL makes offsets available via The CarbonNeutral Company and Recycle One, Inc.; Delta works with the Conservation Fund; British Airways led the way in offering voluntary offsets in 2005 and manages its own carbon offset program (but was criticized by a British government report in 2007 as “risible” for the very small scale of the efforts involved); SAS works with the CarbonNeutral Company, and Shenzhen Airlines became the first Chinese airline to offer carbon offsets in 2010. Although a growing list of airlines offers travelers voluntary programs for carbon offsets, they still represent a minority of companies in the industry.

Greenhouse Gases and Commercial Aviation

What amount of greenhouse gases does flying in a commercial aircraft actually produce, and are there really better alternative forms of transportation in terms of emissions? To give an idea of the scale of the carbon footprint of commercial air travel, an example TerraPass emissions report is given below:

3 It also works with Conservation International, ClimateCare, and the Bonneville Power Administration Green Tag program, to invest in renewable energy projects.

4 Businesses wishing to calculate their greenhouse gas emissions have several alternative set of tools available, one comprehensive approach is available at a website operated by the World Resources Institute (<http://www.ghgprotocol.org/templates/GHG5/layout.asp?MenuID=849>). It provides copyrighted spreadsheets that automatically calculate carbon emissions when detailed air travel data are input.

Seattle to Newark round trip
Personal emissions: 1,867 lbs CO₂
Miles flown: 4,787 miles
Personal fuel use: 95 gallons (TerraPass)

Riding the same distance in a typical bus would produce roughly one quarter as much CO₂, while a train trip would produce considerably less. The value for CO₂ production due to this one round trip by air travel is not far off the amount that a person would generate driving a small car a typical distance over the course of a year. For comparison, you can save roughly 2,000 lb of personal CO₂ emissions annually by driving a fuel efficient car weighing 2,000 lb, instead of a medium sized 4,000 lb SUV. However, one long round trip flight to another city across a continent or an ocean, and you have fully lost the carbon emission benefit gained by an entire year of environmentally responsible personal vehicle selection. Two round trip flights of that duration cost the entire benefit gained from forsaking a 4,000 lb SUV and commuting by bicycle for a year.

Duration of flight matters to the CO₂ emitted per km, because the large amounts of CO₂ emitted during takeoff and landing make short flights proportionally worse overall. For example, an Airbus A320-200 uses 0.425 kilowatt hours per second-kilometer (kwh/s-km) on a 300 km route, but only 0.248 kwh/s-km over a 1,200 km route (Janic 2003). For contrast, a high speed rail line uses between 0.106 and 0.141 kwh/s-km for travel (over distances of 200 km and 1,200 km respectively (Janic 2003). Aggravating the lesser efficiency for shorter flights is the fact that air traffic control inefficiencies (because of using ground-based navigation points instead of direct routes) increase the distance traveled by a factor of 1.15 for short flights and only 1.05 for long flights (Peeters and Williams 2009). At any distance, traveling by high speed train has a smaller energetic cost than a commercial flight, but this is especially pronounced over the shorter distances where the potential of substituting rail travel for air travel might be greatest. Amtrak/Acela express train service in the Northeastern US works with some carriers developing an air/rail codeshare and efforts to smooth transfer from rail to air are already operating. In Germany, Deutsche Bahn (the national railroad) allows international travelers from more than 80 airlines to travel on a connecting railway line (NESCAUM 2003). There is also the intriguing possibility of using more high speed rail links directly between European airports to replace shorter and therefore more carbon intensive flights, helping to mitigate some of the negative climatic impacts of interurban travel (NESCAUM 2003).

The National Research Council (NRC) estimates that domestic air transportation in the US accounts for 7 percent of domestic energy use for transportation (needless to say the percentage is much higher for international travel) (NRC 2010a). They also note that few large cities in the US are within 500 miles of one another compared to the spacing of cities in the EU and Japan, so high speed light rail will not be as viable an alternative to reduce the energy expended on commercial aviation within the US, and we must look to reduced demand or

increased efficiency rather than switching to alternative modes of transportation. As the NRC notes in a companion volume in on limiting future climate change:

Domestic air transportation currently accounts for about 12 percent of US passenger miles and ~3 percent of total US GHG emissions. Technological advances coupled with a highly competitive airline industry have prompted air carriers to steadily improve (by ~1–2 percent per year) the energy efficiency of their fleets and their operations during the past 40 years. New aircraft entering the fleet today, such as the Boeing 787, use about 20 percent less fuel per seat-mile than the aircraft they are replacing. Airline fleet turnover should thus over time lead to continued gains in aircraft energy efficiency. At the same time however, domestic airline passenger traffic is forecast to grow by between 2 to 3 percent per year over the next two decades, which is likely to offset the technological efficiency gains. Additional efficiency improvements can be found in navigation and control technology and changes in air traffic management practices. For instance, more direct routing and reduced taxiing and idling at airports represent potentially important areas of opportunity for future energy savings ... (NRC 2010b).

Changes in aircraft pose interesting environmental questions as well. The double-decker A380 is the biggest passenger airliner in the world, and according to calculations published in *The Economist* (2006) the versions of the A380 with four Trent 900 engines, despite the engines being individually as fuel efficient as any currently available, produce as many CO₂ emissions as a 14 km long line of cars on a highway far below the airliner. If the 1,500 A380s envisioned by Airbus were ever in operation, *The Economist* reports that they would be producing as much CO₂ as 5 million automobiles. According to *The Economist*, IATA states that both an automobile and an airliner use 3.5 liters per 100 passenger-km of travel. However, those calculations are based on a fully loaded airliner and one person occupying an automobile; they ignore the potential CO₂ per passenger-km savings from having more than one person in a car, and they ignore the fact that trips by airliner in general are a great deal longer than trips that are feasible by automobile.

How to Reduce Aviation's Impact

Air travel frees us to move as never before in human history, but at a real greenhouse gas cost we must acknowledge and incorporate into planning a future of responsible commercial air operations. Huge aircraft might operate at either higher or lower levels of greenhouse gas emissions compared to their smaller alternatives, depending on a variety of design and operational factors discussed in more detail below. However, from an environmental perspective it is not clear that “bigger is better” in terms of aircraft. A focus on changes that increase fuel efficiency per passenger would be a more environmentally responsible perspective

for the commercial airline industry than a perspective based on designing the largest or fastest commercial airliners possible. With recent increases in the cost of aviation fuel, the impetus towards efficiency ought to be easier to accept by corporate officers principally concerned with profitability, as well as those with environmental concerns. The Boeing 787 Dreamliner, built largely of composite materials and with new engine designs, will supposedly use approximately 20 percent less fuel than a comparably sized conventional passenger aircraft.

Greenhouse gas emissions from commercial aviation are still only a small fraction of total anthropogenic emissions, but the share of greenhouse gases contributed by aviation is growing rapidly. The IPCC in a 1999 report requested by ICAO estimated that about 3.5 percent of all anthropogenic climate change was accounted for by commercial aviation. By 2050 the IPCC has projected that commercial air travel would account for between 3 and 7 percent of anthropogenic climate change. A report from the Tyndall Centre for Climate Change Research at Manchester, projected that for the UK, increases in aviation and maritime operations could overcome all of the efforts made by other industrial sectors to reduce greenhouse gas emissions intended to bring the UK into accord with its Kyoto Protocol targets (Bows et al. 2006). Aviation CO₂ emissions have been growing faster in the UK than any other source of greenhouse gases. The UK's CO₂ emissions in 1990 were estimated at 171 to 175 million tons, with that number falling in the 1990s as coal was used less and heavy industry reduced, but by 2004 the numbers had risen again to 172 to 177 million tons. With aviation and maritime operations excluded, the emissions over the same period would have fallen by 4 percent to 161 to 155 million tons. The Tyndall Centre estimates that at a 6.4 percent annual growth rate in aviation (its average for the 1990s), over the next half century this growth would offset by itself all reductions in carbon emissions planned by the British government to reach Kyoto Protocol goals (Bows et al. 2006). The UK aviation industry's emission of carbon in 2004 was estimated at 9.8 million tons, and it is projected to rise to 16 to 21 million tons by 2030. Between 1990 and 2004, the number of people using airports in the UK rose by 120 percent.

The EU is bringing the aviation sector into the already operating European Emissions Trading Scheme (EETS) in 2012, which will effectively serve as an indirect carbon emissions tax on airlines, and various sources project ticket price increases in the range of 3 percent to 7 percent. A number of different scenarios for the commercial aviation sector have been analyzed that would allow the EU to meet its carbon emission reductions goals, and while this appears to be possible under the auspices of the EETS, it will be a challenging goal to achieve (Bows et al. 2009). This will favor more carbon efficient airlines over less careful competitors or ones with less efficient equipment. In terms of commercial air travel, in some ways the EETS will be correcting an historical peculiarity. Consumer choices about how they will travel have been tipped towards aviation by an invisible subsidy, as a result of the Chicago Convention of 1944, which banned taxes on commercial aviation fuel used for international air travel. Recent attempts by the

EU to reverse this ban have failed. Especially in the case of low-cost carriers, which have competed with ground transportation for customers taking short or moderate distance trips, the lack of fuel taxes have moved more travelers into the air and away from trains and other modes of transportation (Nilsson 2009).

What other possible avenues for reducing the carbon emissions of commercial air travel exist? IPCC and IATA both point to improved air traffic control as a means to significantly reduce the CO₂ emissions associated with commercial air operations. International agreement to centralize air traffic control into a more efficient set of fewer entities, to straighten routes of air travel, and to avoid delays on takeoffs and landings would significantly reduce the fuel consumed per km of travel. *The Economist* (2006) reports that IATA estimates a 12 percent reduction in carbon emissions from commercial air operations by changes such as consolidating the 35 separate European national bodies responsible for air traffic control into one international organization. The IPCC (1999) estimates that improved air traffic control could reduce airline carbon emissions by 6 to 12 percent, and that operational improvements (optimizing speed, reducing additional weight, improving load factors, reducing nonessential fuel onboard, limiting use of auxiliary power units, and reducing taxiing) would allow an additional 2 to 6 percent in carbon emission savings. In late 2006 Virgin Atlantic began experimenting with procedures for having its aircraft towed to “starting grids” close to runways, and is hoping to achieve very considerable savings in greenhouse gas emissions by the combination of towing aircraft and reducing the period of time that the engines are operating prior to takeoff. There are probably many other simple opportunities for greenhouse gas emission savings that have not yet occurred to anyone in the airline industry, but which undoubtedly will.

Other aircraft emissions, while not as significant as CO₂, are nonetheless also greenhouse gases. Oxides of nitrogen (usually referred to as NO_x, initially principally NO, but this is converted to NO₂ in the atmosphere) undergo a complex series of chemical reactions in the atmosphere that can increase O₃ levels (worsening global warming) and decrease CH₄ levels (reducing global warming) (Lee and Raper 2003). The overall effect of these simultaneous changes in O₃ and CH₄ levels remains to be elucidated, but it would be naïve to assume that they will simply cancel one another out or neatly compensate for CO₂ emissions. Water in vapor form is also emitted in aircraft exhaust gases, although calculations indicate that the direct effects of this water vapor on climate change are small. Other effects of water vapor are discussed in a separate section below (Lee and Raper 2003). There are also soot and sulfate particles in aircraft exhaust which may also have implications for climate change, although these are likely to be less significant than the influence of CO₂ and NO_x in the exhaust streams.⁵ The carbon offsets discussed previously do not attempt to incorporate information about the climate effects of the less significant exhaust gases. Precisely computing the overall climatic impact

5 Lee, D. and Raper, D. 2003; IPCC. 1999.

of the mixture of gases in commercial aviation emissions is a challenging problem to which much attention is being paid (Peeters and Williams 2009).

Technological advances have reduced the fuel consumption rates of commercial aircraft by over one half since the 1960s, and further fuel efficiency should be possible by increasing core thermal efficiency, increasing aerodynamic efficiency of the airframes and engine nacelle inlet section, and by reducing aircraft and engine weight by increasingly using new materials (Lee 2003). Use of extended fly-by-wire and eventual fly-by-light (fiber optic) technology could improve aircraft fuel efficiency by 1 to 3 percent, and active center of gravity control could provide another 1 to 2 percent in savings (Lee 2003). There is a powerful environmental impetus to aircraft manufacturers investing in research to make these improvements, and this impetus is consistent with the economic advantages of reduced fuel use in a world with decreasing fossil fuel supplies. More speculative environmental benefits from technological advances might be made by producing sulfur-free kerosene for fuel from biomass using the Fischer-Tropsch synthesis process, or by developing hydrogen powered aircraft, although the latter could also exacerbate the environmental impacts of contrails discussed later (Lee 2003).

The possibility of using biofuels to power commercial aircraft in order to mitigate their greenhouse gas effects is real but fraught with complexities. The two biofuels most suitable to the task would be biodiesel or FT Kerosene, and deciding whether or not the use of farmland to make fuel would have a positive impact compared to the use of fossil fuel is far from straightforward (Upham et al. 2009). In theory, biofuels, which combust to release CO₂ that was recently in the atmosphere, and which can again be removed from the atmosphere by the next season of crop growth, is quite different from fossil fuels, which release long-sequestered carbon into the atmosphere. However, farming for biofuels can replace farming for food, and various aspects of biofuel production have their own environmental impacts. The critical question about the usefulness of biofuels may be twofold, what sort of land is being used to produce them (Fargione et al. 2008), and what sort of dietary decisions are people willing to make to free croplands for use in fuel production without diminishing human food supplies (Kolmes 2008).

Ethical Considerations

Finally, this topic calls for a brief comment about ethical reservations. In concert with a thorough attempt to reduce carbon emissions in every other way possible, purchasing carbon offsets allows a concerned person to mitigate the carbon emissions unavoidable in their domestic or business life. The carbon offsets ought to be a last resort, not a first thought, and consumer attention is called for to make certain that the offsetting activities being funded are authentically ones that would not have taken place had the carbon offset not been purchased (the principal of additionality). Lacking a prior effort to otherwise reduce carbon

emissions as far as possible, the purchase of carbon offsets amounts to a form of environmental indulgences, permission to continue emitting excessive quantities of environmentally damaging greenhouse gases without guilt. History shows that the purchases of indulgences by the wealthy are not a strategy that tends to be widely acceptable in society. In the last century Mahatma Gandhi taught that we must become the change we wish to see in the world, and I can think of no attribute of human life today where this is more true than in reducing greenhouse gas emissions.

This position is consistent with the US Conference of Catholic Bishops (USCCB), taken after the IPCC “Third Assessment Report” was released.⁶ They stated in their 2001 Pastoral letter:

According to reports of the IPCC, significant delays in addressing climate change may compound the problem and make future remedies more difficult, painful, and costly. On the other hand, the impact of prudent actions today can potentially improve the situation over time, avoiding more sweeping action in the future (USCCB 2001: 6).

Defined as the ability to exercise moral responsibility for the care of the environment. Stewardship requires a careful protection of the environment, and calls us to use our intelligence to discover the earth’s productive potential and the many different ways in which human needs can be satisfied ... True stewardship requires changes in human actions—both in moral behavior and in technical advancement (USCCB 2001: 8).

The common good calls us to extend our concern to future generations. Climate change poses the question “what does our generation owe to generations yet unborn”? (USCCB 2001: 9).

The “Scientific Basis, Summary for Policy Makers” of the IPCC’s “Fourth Assessment Report” (2007)⁷ was addressed by the chairman of the USCCB’s international policy committee. He said in a letter sent to congressional leaders, the IPCC “has outlined more clearly and compellingly than ever before the case for serious and urgent action to address the potential consequences of climate change as well as highlighting the dangers and costs of inaction.” These documents make the movement towards carbon offsets something we must view from the perspective of the totality of an individual or company’s travel decisions. We must do more than offset negative impacts of our actions; we must above all attempt to reduce those negative impacts. We can neither afford inaction nor the privatization of the commons implied by carbon offsets unpaired with other actions.

6 Available at http://www.ipcc.ch/publications_and_data/publications_and_data_reports.htm.

7 Available at: <http://ipcc-wg1.ucar.edu/wg1/wg1-report.html>.

Persistent Contrails

Unlike other forms of commercial transportation, aviation poses a second threat to global climatic stability through the formation of persistent contrails. At 33,000 to 35,000 feet in altitude, the only clouds naturally present are cirrus clouds. Commercial jetliners fly at this altitude and release exhaust that includes water vapor. From 10 to 20 percent of the time, a commercial jetliner will be flying through conditions of atmospheric humidity and temperature that produce ice crystal formation in the exhaust, and a visible contrail forms in the condensation nuclei (soot and sulfate particles) that are also present in the engine exhaust stream. It may even be that the condensation nuclei from aircraft exhaust could lead to the formation of cirrus clouds considerably later, when atmospheric conditions of temperature and humidity have changed (Lee and Raper 2003). Contrails are essentially linear cirrus clouds, and they are more persistent than was previously thought. Contrails are sometimes short lived, but under some atmospheric conditions (atmospheric supersaturation with respect to ice) they can spread and last for long periods of time (Lee and Raper 2003).

Researchers used satellite pictures collected during the aircraft grounding after 9/11 as what they called a “tarnished golden opportunity” to collect critical data on contrail persistence (Travis et al. 2002). Contrails left by six military aircraft flying through an area west of Washington, DC, spread out over several hours to cover 20,456 square kilometers. The contrails dissipated after 10 hours. The area they flew through is normally traversed by 70 to 80 jetliners an hour. On a typical day there would be an upper atmospheric cloud layer generated by aircraft that lasted all day. Unequivocal proof that aircraft generate cirrus clouds on a large scale has proven difficult to obtain, in part because of the complexity of the global climate system, but despite the technical difficulties involved evidence for a correlation between high air traffic density and high cloud amounts is slowly emerging, and an extensive recent review of this literature is available (Lee 2009).

Contrails that form cirrus clouds or that add to already existing cirrus clouds have a small daytime shading effect (blocking sunlight) and a larger heat-trapping effect (blocking heat loss from the earth by re-radiation) (Lee 2009). The shading effect only operates during daylight hours while the heat trapping effect operates all night as well. Contrails are therefore contributors to global warming. However, the precise amount that contrails contribute to global warming is uncertain. Different modeling approaches produce different estimates.⁸ Contrails could produce a radiative forcing resulting in a range of 0.2 to 0.3° C per decade, which would constitute a significant contribution to climate change (Minnis et al. 2004). We will probably see more contrails in the sky as time goes on unless some fundamental changes take place in commercial aviation.

While persistent contrails are an issue that we know we have to pay attention to, they might be less resistant to being reduced than are greenhouse gas emissions.

8 Ponater et al. 2002; Minnis et al. 1999; Minnis et al. 2004; and Raper, L. 2003.

If jetliners flew at no more than 31,000 feet in the summer and no more than 24,000 feet in the winter (when contrails form more readily) they would burn slightly more fuel and emit slightly under 4 percent more CO₂, but they would produce many fewer persistent contrails (Williams et al. 2002). This contrail reduction also depends on latitude and other factors, so contrail avoidance plans would need to be very carefully developed to be effective (Gierens et al. 2008). However, this restriction would also reduce air space capacity in some areas, and require additional controller resources with flights restricted to a smaller airspace. It might also make it appreciably more difficult to provide turbulence-free flights. Such tradeoffs warrant serious consideration as we look for multiple approaches to reducing global climate change.

Night flights and winter flights disproportionately impact global climate because of different effects on cirrus cloud formation. Night flights account for only 25 percent of daily air traffic, but may account for 60 to 80 percent of the warming impact of commercial aviation because they lack the partial warming offset provided to contrails formed during the day by their blocking sunlight from reaching the earth's surface (Stuber et al. 2006). Winter flights account for only 22 percent of annual flights but they may account for up to 50 percent of the warming impact of commercial aviation because of the greater tendency for contrails to form in winter (Stuber et al. 2006). It may be that modifications of daily flight schedules could reduce the warming impact of commercial aviation, although issues of airport capacity and passenger travel schedules considerably complicate this possibility. If fewer flights were to take place in late afternoon or evening, and more early morning flights took advantage of the partial contrail warming offset available due to shading effects, the global climate change impacts of contrails might be reduced to some degree (Duda 2008).

Conclusion

Commercial aircraft both provide a vital component of our transportation sector, and have a negative impact on the atmosphere in several ways. The 2007 *Fourth Assessment Report* of the IPCC estimated that aviation accounts for between 2 percent and 8 percent of the radiative forcing driving global climate change, and numerous researchers are continuing to attempt to refine our understanding of exactly what effect commercial aviation has had and will have on the global climate (Lee 2009).

A variety of potential mitigation actions have been proposed to help control the negative aspects of air travel, ranging from aircraft technical improvements, to carbon offsets, to changes in flight scheduling, to broader societal responses such as emissions trading schemes (Staniland 2009) like the one adopted by the EU. Challenging trade-offs exist, for example more efficient engines will probably produce lower exhaust temperatures as they emit the same amount of water vapor, suggesting that they will form contrails at higher air temperatures and over a large

altitude range (Fahey et al. 1999, Shumann 2000), and exacerbate the issue of persistent contrails while simultaneously reducing greenhouse gas emissions due to greater fuel efficiency. The development of high bypass-ratio turbofan engines to increase fuel efficiency has produced increased NO_x formation, so improving performance in terms of one pollutant can come at the cost of a second pollutant. Decisions may end up having to be made on the basis of the atmospheric residency time of different pollutants (much longer for CO₂ than for NO_x) (Lee 2009). Concepts like combining wing and fuselage into a blended wing body design, or developing ultra-high capacity aircraft to enjoy economies of scale, or increased use of composite materials, all have their own challenges in terms of economics and existing aviation infrastructure design (Peeters et al. 2009). Very careful consideration of economic and environmental trade-offs will have to take place in order to make efforts to mitigate the climate impact of air travel effective.

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Chapter 26

Ground-level Pollution, Invasive Species, and Emergent Diseases

Steven A. Kolmes

This chapter follows upon the previous one by bringing together a number of ways that commercial aviation has an environmental impact on ground-level, whether from air pollution near airports, water pollution due to de-icing, the spread of invasive species, or emergent diseases. These considerations deal with the local areas around airports, and also at times with much broader geographic areas where commercial aviation can have a discernible impact.

De-icing Aircraft, Runway De-icing and Anti-icing, and Other Water Pollution Issues

Regarding airports, one of the principle environmental concerns is the quality of run-off water, with the main challenge being pollution from aircraft and runway anti-icing and de-icing operations at northern facilities during the winter months. Runway anti-icing and de-icing is a more tractable problem than aircraft de-icing, both because there is a greater variety of chemicals available that are safe for use on runways than there are for aircraft, and also because the runway management is done by the airport operators themselves as opposed to the multiple airport tenants individually making decisions about aircraft de-icing. While airports can use relatively benign materials like potassium acetate or calcium magnesium acetate on runways, ethylene-glycol and propylene-glycol based materials are widely used on aircraft (GAO 2000). Ethylene-glycol is both more effective as a de-icer, and more toxic to humans, with three ounces constituting a lethal dose and smaller amounts producing kidney damage. Propylene-glycol is less toxic to humans, but both these materials pose a threat to quality of both surface water and ground water (Holtzman 1997). In addition to the direct toxicity of de-icing chemicals, biodegradation of these materials in freshwater diminishes the dissolved oxygen (DO) level in the water, greatly reducing water quality and potentially killing fish and other aquatic organisms. Techniques to reduce the impact of de-icing chemicals include vacuum sweeper trucks, storm water drainage systems, de-icing pads, and tanks or ponds to store glycol-rich waste so that it can be released during periods of high water flow and have its environmental impact reduced by dilution (GAO 2000). Some airports like Denver International have facilities to collect

and recycle glycols on the airport grounds. The EPA (2000) estimates that prior to 1990, and the implementation of the Phase I Storm Water Discharge Permits, there were approximately 28 million gallons of 50 percent concentration aircraft de-icing fluid released annually to US surface waters. This has already been reduced to 21 million gallons annually, with an estimate of eventually reaching 17 million gallons annually when all of the airport storm water permits will have been fully implemented. The EPA projects that if all US airports could reach 70 percent efficiency in collecting aircraft de-icing fluid, surface water discharges could be reduced down to 4 million gallons annually (EPA 2000). Significant reductions in water pollution due to aircraft de-icing can be achieved with appropriate investment in modernized treatment facilities and techniques.

Second after de-icing chemicals as a concern for airport generated water pollution is fuel spills. These can be due to leaks, improper fueling connections, or poorly monitored storage tanks (GAO 2000). Fuel spills can contaminate either soil or groundwater, or both. This is, in fact, exactly the same environmental issue that plagues gasoline stations for automobiles or boats.

Ground Level Air Pollution at and Near Airports

Airports are among the most significant sources of local air pollution. Airplanes on the ground at airports emit literally hundreds of millions of pounds of toxic air pollutants annually. Idling and taxiing planes emit volatile organic compounds (VOCs) and oxides of nitrogen (NO_x) which are precursors of ozone, a major health-related air pollutant that interferes with lung function. John F. Kennedy International Airport is the second largest emitter of VOCs in New York City, and LaGuardia is among the major NO_x sources. Chicago's Midway Airport has been identified as a major source of the carcinogens benzene and formaldehyde (Holtzman 1997). 30 of the nation's 50 largest airports are in ozone nonattainment areas, where air quality is considered substandard for human health. Other airport pollution includes unburnt hydrocarbons, particulate matter, and carbon monoxide. Aircraft typically account for the majority (45–85 percent) of total airport air pollutant emissions. However, not all airport pollution is from aircraft. Ground access vehicles and ground service vehicles emit VOCs and NO_x , as do the airplanes to which they are providing access and services (Holtzman 1997). In one study of three airports in the Northeast (Logan International, Bradley International, Manchester Airport) 85 percent of airport NO_x came from aircraft, and auxiliary power units and ground service equipment emitted 15 percent of aviation related NO_x (NESCAUM and CCAP 2003). Ground access vehicles such as taxis and buses have been reported in some instances to emit almost as much NO_x and more VOCs than the actual airport operations (Holtzman 1997).

Toxic plume contamination from jet engines stretches 12 miles long for approaches to airports, and 6 miles long for take-offs (Donaldson 1970). Many homes, schools, churches, day care facilities, etc. are within that distance and

beneath the plumes of our urban airports. Airports contribute highly variable proportions of the total air pollutants present in the counties housing them. In the preliminary estimates reported in one study of US airports and their surroundings (Ratcliff 2007), the average proportion of NO_x in the surrounding counties due to airports was 1.73 percent, but for five airports their NO_x contribution was from 10 percent to over 30 percent of the NO_x produced in the surrounding county. A very similar story exists for airport contributions to oxides of sulfur (SO_x) and production of dangerously small particulate matter that can lodge deep in human lungs (PM 2.5). At the Santa Monica Airport, a small single runway general aviation facility, ground level ultrafine particulates (UFPs) produced by aircraft were measured; elevations of UFPs were increased 10-fold at 100 meters downwind, and increased by 2.5-fold at 660 meters downwind. These elevated UFP concentrations pose a health threat to occupants of a large downwind residential neighborhood (Hu et al. 2009). Airports are not all equivalent, small ones as well as large ones can impact surrounding communities, and they are not the only contributors to air pollution in their vicinities, but they are real contributors nonetheless.

Airport personnel can be exposed to a variety of pollutants, and among these the genotoxic effects of Polycyclic Aromatic Hydrocarbons (PAHs) have been studied. PAHs are greatest in concentration outside on the airport apron, but still occur in elevated levels in terminals and office spaces. Genetic damage due to PAH exposure among airport personnel has been documented (Cavallo et al. 2006). Airport personnel may face a greater risk from pollutants associated with air travel than do even frequent travelers.

Nationally the implementation of stringent control measures is reducing air pollution from most economic sectors, but increasing air travel and lack of stringent controls on aircraft engines means that this is one economic sector whose contribution to air pollution is increasing (NESCAUM and CCAP 2003). Several measures could reduce airport pollution. Single engine taxiing, possible with some aircraft, saves fuel and reduces emissions, but it could be hazardous under some conditions (e.g., wet runways) (NESCAUM and CCAP 2003). Newer airplane engines pollute significantly less than older ones, and replacing airplanes when economically feasible can reduce pollution. Replacing gasoline or diesel ground service equipment with electric vehicles or ones that run on compressed natural gas or liquid propane could significantly reduce pollution and potentially save airports money in the long run (NESCAUM and CCAP 2003). An FAA pilot project called the Inherently Low-Emission Airport Vehicle Pilot Program (ILEAV), beginning in 2000, provided financial incentives to selected airports, and was an exploration of possibilities as well as an example of providing financial incentives for this sort of transition (NESCAUM and CCAP 2003). Some airports were able to make much greater emissions reductions than others, with factors such as a larger proportion of airport-owned ground equipment facilitating the implementation of the grant (ILEAV 2006).

Other policy options with the potential to reduce airport pollution include cap-and-trade programs or the purchase of emissions credits, as already discussed for

the EU in the EETS, variable landing fees such as those used in Switzerland and Sweden where the landing fees are emissions-based, and voluntary agreements at the local level to reduce emissions from aircraft taxi and gate operations (NESCAUM and CCAP 2003).

Technological options with the potential to reduce airport pollution include increases in jet engine efficiency, and specifically designed systems by GE, Pratt and Whitney, and others that reduce NO_x emissions. However, these new systems tend to produce more carbon monoxide and unburnt hydrocarbon pollution and use more fuel than earlier designs (NESCAUM and CCAP 2003). As already discussed, at this time there are trade-offs in reducing NO_x and CO_2 emissions. Research is underway to further clean the emissions of jet engines, and doubtless the potential for a great deal of technological progress on this front remains. Improved aerodynamic design and new aircraft body materials also have potential to make contributions to pollution reduction. A study published in the UK in 2000 categorized potential improvements in aircraft technology in terms of both their contribution to pollution reduction and how far in the future such improvements might be, and strategies like lean pre-mixed pre-vaporized combustion technologies to reduce NO_x , use of composite materials in aircraft bodies, blended wing bodies, micro-electro mechanical systems, and others were highlighted as having strong potential (Arthur D. Little Ltd. 2000).

Commercial Air Travel and Invasive Species

Air passenger baggage is a pathway for non-indigenous invasive species to spread from one part of the world to another. An unintended consequence of increasing human mobility, invasive species are responsible for significant economic and biotic loss by replacing native species and spreading out of control numerically in habitats that lack their normal predators, pathogens, and competitors. Often the most devastating effect of invasive species is when they attack agricultural activities. Invasive species transported by commercial aviation tend to be small hidden “hitch-hikers;” insects and arachnids are prominent among them. I will focus on an especially important and well documented problem of those insect invaders that have appeared on commercial flights. Analysis of records of invasive insect species intercepted as they entered the US show that the great majority arrive with air passengers (85 percent) with far less at border stations (14 percent) or by sea (under 1 percent) (McCullough et al. 2006). A review in an entomology journal indicated that between 1984 and 2000, there were 290,101 invasive insect interceptions recorded from air baggage at US airports (Liebhold et al. 2006). Many of these insects were found in fruit, most commonly mangoes but also included were guava and citrus, among other fruits. Less commonly they entered the US in leaf material, seeds, or other plant parts. There were 316 countries of origin, most commonly from countries with developing economies (including Nigeria, El Salvador, Haiti, Vietnam, the Philippines, the Dominican Republic,

India, and others). Flies, beetles, moths, thrips, planthoppers, and other destructive invasive species have been recorded.

Insects that have caused significant agricultural disruption at times when they have become temporarily established in the US, such as the Mediterranean fruit fly, have been intercepted repeatedly and frequently over a period of years. Other less heralded invasive species have reached the US, like the emerald ash borer, which is presently consuming forests in twelve Midwestern states and two Canadian provinces, a change from its eastern Asian diet. Major points of interception for incoming invasive species include New York, Honolulu, Miami, Los Angeles, and a number of other airports. The number of invasive insects intercepted annually has held approximately steady over the years as domestic passenger enplanements have risen, suggesting that the lack of increase in numbers of inspectors has limited the rate of interceptions (Liebhold 2006).

Climatically similar but geographically distant airports are connected by flights posing the greatest risk of transporting an invasive species capable of establishing itself at its destination (Tatem et al. 2007). Analysis has shown that climatic similarities of distant airports in the Northern Hemisphere are generally greatest in the period from June-August when commercial air travel peaks, and also when potentially disruptive insect species are at their highest population levels and fruit and other plant material is ripe for transport. This timing would be offset by six months for movement of invasive species between Southern Hemisphere locations. However, specific instances of more complicated patterns of high-risk climatic similarity exist (like that of the Hawaiian islands with high climatic similarity that switches over a several month period to sequentially match East Asia, Central America, and the Caribbean). It may be that the strict fumigation procedures already used in Australia and New Zealand will eventually have to be put in place at airports in the US as travel back and forth to regions with developing economies increases.

Global Spread of Emergent Diseases by Commercial Aviation

Commercial air travel can rapidly spread diseases by transporting infected people long distances so rapidly that, given the incubation period for diseases, their most serious symptoms have not become apparent yet during their travel period, and by retaining a large number of people in very close proximity to one another, sharing very limited restroom facilities and breathing recycled air. Several diseases have come to the fore as worthy of special concern in terms of air travel: severe acute respiratory syndrome (SARS), extensively drug resistant tuberculosis (XDR TB), and the possibility of a variant of the avian influenza (H5N1) emerging that allows easy human-to-human transmission. These diseases have all emerged as threats because of a global environment characterized by areas of overcrowding and poverty, very high density farming of animals to supply a rapidly growing global hunger for meat, and the overuse or poor implementation of antibiotic

therapies. These are not diseases we simply found, but to some extent our actions and lifestyles created them, and their threat to us is real.

Analysis of data for the typical spread of influenza in the US annually from 1996–2005 found that commercial air travel in November (mostly around Thanksgiving) was a significant predictor of influenza spread. The timing of influenza mortality was related significantly to international airline travel. The air travel restrictions after September 11, 2001, resulted in a delayed and prolonged influenza season (Brownstein et al. 2006). An analysis of several scenarios for travel restrictions as a tool for delaying the spread of a pandemic influenza indicate that airline restrictions would do little to slow the spread of the disease unless most air travel were to cease almost immediately after the beginning of epidemic spread was detected. Interventions to reduce local spread of the epidemic were found to be more effective, but nonetheless would do little to delay the disease spread compared to the time needed to develop stocks of a vaccine (Cooper et al. 2006). Both the CDC and the IATA have developed guidelines and fact sheets¹ for how to deal with an outbreak of H5N1 avian influenza should it ever mutate to spread rapidly from person to person, but given the preceding analyses, the lack of such a mutation is the only positive condition on which to hope.

SARS is a viral disease first reported in Asia in 2003. It was responsible for hundreds of deaths and thousands of infections in Asia, but did not spread around the world as it was initially feared it might rapidly do. SARS transmission from person to person on international flights has been documented after some instances of an infected individual taking a commercial flight, but not in others (Olsen et al. 2003, Breugelmans et al. 2004). It is likely that the exact stage of the disease's incubation and course are crucial to the risk level involved for fellow passengers. When a highly infectious individual is on board an aircraft, proximity within a few rows of their seat considerably increases risk of transmission, but more distantly seated passengers are still at risk as well. Prevention of the spread of SARS might be greatly facilitated if contact information for passengers after their flights was more complete (the researchers cited in the endnotes could not find all the passengers to contact after the flights). Some technologies like the infrared scanners employed in Singapore and elsewhere to detect passengers with a fever as they walk through might also be of significant use.

More recently, the possibility of widespread transmission of XDR TB via commercial aviation arose, after an infected individual was prevented by weak public health measures in the US from boarding a flight to Europe and then returning. The infected person took long flights on Air France/Delta, and Czech, and neither US domestic nor international procedures were sufficient to impede his travel and prevent widespread exposure of fellow travelers. Hundreds of individuals were potentially exposed to XDR TB, a disease with such widespread drug resistance that few treatment options exist, and for which the mortality risk

1 <http://www.cdc.gov/flu/avian/>; http://www.iata.org.pressroom/facts_figures/fact_sheets/avian_flu.htm

to infected individuals is very high.² In the US 49 cases of XDR TB were reported between 1993 and 2006, but elsewhere in the world where people live in especially crowded conditions with poor sanitation, XDR TB is much more common. A World Health Organization (WHO) 2006 report on tuberculosis and air travel provides a detailed discussion of risk factors, with flights longer than 8 hours considered the circumstance of greatest risk. Of a number of potential instances for transmission of non-XDR TB on commercial aircraft, the WHO could identify only two instances where it looked like TB transmission had occurred, once from a crew member to other crew members, and once from a passenger to nearby passengers. In both of these cases, close proximity and long exposure times were involved. (This report also cites instances where other diseases, meningococcal disease and SARS, were apparently transmitted on commercial aircraft. The report also addresses the importance of ventilation during ground delays, and cites an instance of an influenza outbreak due to a 3 hour ground delay during which the ventilation system did not operate and passengers received no supply of outside air (WHO 2006). A similar report has been produced in the EU (European Centre 2009).)

Other than preventing someone with an infectious disease from boarding a commercial aircraft, what can be done in an increasingly crowded and globalized world to prevent the spread of disease from one region to another? Increasing cabin ventilation in regions with disease outbreaks would reduce the risk of disease transmission. Older assumptions that flights needed to be of long duration and passenger proximities needed to be within two rows of an infected individual for transmission of any disease were disproven in 2003 when a single passenger with SARS on a three hour flight infected at least 22 fellow passengers as far as seven rows of seats away. Although normal cabin ventilation is probably adequate for a typical flight, analysis shows that increasing ventilation would help protect passengers during an outbreak, although it would increase fuel demand (Mangili et al. 2005). In addition, increased efforts to disinfect aircraft (including the parts of the ventilation system that are normally inaccessible), insisting that all commercial aircraft begin to have HEPA filtered ventilation systems, and various speculative but interesting techniques for using volatile organic compounds or smaller lipophilic compounds associated with early stages of disease infection³ to screen passengers provide techniques that might someday reduce the chance of disease transmission about commercial flights.

2 <http://www.cdc.gov/tb/pubs/tbfactsheets/xdrtb.htm>; <http://www.cdc.gov/tb/xdr/tb/travellerfactsheet1.htm>; WHO, 2006.

3 UK Government Foresight Project 2006.

Conclusions

Ground-level environmental impacts of commercial aviation are varied, and can affect airport personnel, neighbors, and broader geographic regions. Everything from emergent human diseases to invasive species, to particulate pollutants, need to be considered, and management of air travel needs to control all of these factors as best it can. Commercial air travel ushered in an unprecedented mobility for people, and along with that there are new challenges to consider and face.

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Appendix I:

Additional Resources

I. Texts

General Interest

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Health and the Environment

For an extensive list of references on the environment see the end of Chapters 24 and 25.

II. Videos (DVD)

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- The Best of Airline, Vols. 1 and 2*. 2006. BCI Studio. 210 minutes.
- Capitalism: A Love Story*. 2010, dir. Michael Moore. 127 minutes.
- The Crash of Flight 191*. 2004. History Channel. 70 minutes.
- Flight 007*. 2005. History Channel. 50 minutes.
- Flight Attendant School—Episodes 1–18*. 2007. Discovery Communications (The Travel Channel).
- Frontline: Flying Cheap*. 2010. PSB. 60 minutes.
- Inside American Airlines*. 2003. NBC. 110 minutes.
- Investigative Reports: The Planes that Fell to Earth*. 2000. A&E Home Video. 50 minutes.
- Mayday: Air Disasters*. 2003, dirs. Greg Lanning and Bryn Higgins. E1 Entertainment. 312 minutes (6 episodes).
- Nova: Crash of Flight 111*. 2004. PBS. 60 minutes.
- Nova: The Deadliest Plane Crash*. 2007. PBS. 56 minutes.
- Rage in the Air*. 1999. A&E Home Video. 50 minutes.

III. Important Websites

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| Aircraft Owners and Pilots Association (AOPA) | www.aopa.org |
| Association of Flight Attendants (AFA-CWA) | www.afanet.org |
| Air Line Pilots Association (ALPA) | www.alpa.org |
| Airbus | www.airbus.com |
| American Association of Airport Executives (AAAE) | www.aaae.org |
| Aviation Today | www.aviationtoday.com |
| The Boeing Company | www.boeing.com |

Federal Aviation Administration (FAA)	www.faa.gov
Flight Safety Foundation (FSF)	flightsafety.org
General Aviation Manufacturers Association (GAMA)	www.gama.aero/
Intergovernmental Panel on Climate Change (IPCC)	www.ipcc.ch
International Civil Aviation Organization (ICAO)	www.icao.int
International Air Transport Association (IATA)	www.iata.org
International Aviation Safety Association	www.iasa.com.au
National Air Traffic Controllers Association (NATCA)	www.natca.org
National Business Aviation Association (NBAA)	www.nbaa.org
National Transportation Safety Board (NTSB)	www.nts.gov
Organization of Black Aerospace Professionals (OBAP)	www.obap.org
Smithsonian National Air and Space Museum (NASM)	www.nasm.si.edu
Transport Canada	www.tc.gc.ca
Transportation Safety Board of Canada (TSB)	www.tsb.gc.ca
Women in Aviation, International (WAI)	www.wai.org

Appendix II: Sample Ethics Codes

Maintenance Code

The Aircraft Mechanic's Creed	Applicable Regulations
UPON MY HONOR I swear that I shall hold in sacred trust the rights and privileges conferred upon me as a certified mechanic.	65.81; 65.85; 65.87; 659.95
Knowing full well that the safety and lives of others are dependent upon my skill and judgment , I shall never knowingly subject others to risks which I would not be willing to assume for myself, or for those dear to me.	43.5(a) 43.13(b)
IN DISCHARGING this trust, I pledge myself never to undertake work or approve work which I feel to be beyond the limits of my knowledge nor shall I allow any non-certified superior to persuade me to approve aircraft or equipment as airworthy against my better judgment, nor shall I permit my judgment to be influenced by money or other personal gain, nor shall I pass as airworthy aircraft or equipment about which I am in doubt either as a result of direct inspection or uncertainty regarding the ability of others who have worked on it to accomplish their work satisfactorily.	43.3(b)(d) 43.12 43.13(a) 43.13(b)
I REALIZE the grave responsibility, which is mine as a certified airman, to exercise my judgment on the airworthiness of aircraft and equipment.	43.7(b); 65.81; 65.85; 65.87; 659.95
I, therefore, pledge unyielding adherence to these precepts for the advancement of aviation and for the dignity vocation.	

This creed was written by Jerry Lederer (1903–2004), Founder, Flight Safety Foundation and is reprinted by permission of the foundation.

Reference

Flight Safety Foundation. 2002. Jerry Lederer: Mr. Aviation Safety. *Flight Safety Foundation Digest*. Special Edition, August–September, 44.

Pilot Codes

The following Pilot's Code was written by Jerome Lederer, 1951, Founder, Flight Safety Foundation. It is reprinted by permission of the foundation.

- As a professional pilot, I recognize my obligations:
 - To the public, which trusts its safety to my skill and judgment;
 - To my fellow pilots, who mutually depend upon me to follow established good practice;
 - To my crewmembers, who look to me to exercise my best judgment and leadership;
 - To my co-workers, who constantly are striving for greater achievements and general overall improvement in aviation; and
 - To my organization, which entrusts me, in the conduct of my flights, with moral and economic responsibilities.
- To discharge these obligations, I will at all times observe the highest standards of my profession.
- I will never knowingly jeopardize the safety of a flight by undertaking a risk to satisfy personal desires nor will I fly when my mental or physical condition might lead to additional risk.
- I will use all means at my disposal to assure the safety of every flight both as to my assigned duties and those of my fellow crewmen.
- I will continue to keep abreast of aviation developments so that my judgment, which largely depends on such knowledge, may be of the highest order.
- My deportment both on duty and off reflects my respect for my profession and for my country, and it shall be such as to bring credit to both.
- I pledge adherence to these principles for the advancement of aviation and for the advancement of my profession.

To review a second pilot code of ethics, visit ALPA at: <http://www.alpa.org/Home/WhoWeAre/CodeofEthics/tabid/2262/Default.aspx>

Reference

Flight Safety Foundation. 2002. Jerry Lederer: Mr. Aviation Safety. *Flight Safety Foundation Digest*. Special Edition, August-September, 45.



Boeing Code of Conduct

The Boeing Code of Conduct outlines expected behaviors for all Boeing employees. Boeing will conduct its business fairly, impartially, in an ethical and proper manner, and in full compliance with all applicable laws and regulations. In conducting its business, integrity must underlie all company relationships, including those with customers, suppliers, communities and among employees. The highest standards of ethical business conduct are required of Boeing employees in the performance of their company responsibilities. Employees will not engage in conduct or activity that may raise questions as to the company's honesty, impartiality, reputation or otherwise cause embarrassment to the company.

Employees will ensure that:

- They do not engage in any activity that might create a conflict of interest for the company or for themselves individually.
- They do not take advantage of their Boeing position to seek personal gain through the inappropriate use of Boeing or non-public information or abuse of their position. This includes not engaging in insider trading.
- They will follow all restrictions on use and disclosure of information. This includes following all requirements for protecting Boeing information and ensuring that non-Boeing proprietary information is used and disclosed only as authorized by the owner of the information or as otherwise permitted by law.
- They observe that fair dealing is the foundation for all of our transactions and interactions.
- They will protect all company, customer and supplier assets and use them only for appropriate company approved activities.
- Without exception, they will comply with all applicable laws, rules and regulations.
- They will promptly report any illegal or unethical conduct to management or other appropriate authorities (i.e., Ethics, Law, Security, EEO).

Every employee has the responsibility to ask questions, seek guidance and report suspected violations of this Code of Conduct. Retaliation against employees who come forward to raise genuine concerns will not be tolerated.

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