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And What If It Catches on Fire: The FAA's Ineffectual Stance on Post-Crash Fire Prevention in Airline Accidents

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AND WHAT IF IT CATCHES ON FIRE?: THE FAA'S INEFFECTUAL STANCE ON POST-CRASH FIRE PREVENTION IN AIRLINE ACCIDENTS

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I. INTRODUCTION

FIRE IS the curse of the airline industry.[1] Fire safety became a key Federal Aviation Administration (FAA) issue in part because of the 1983 Air Canada crash of Flight 797 in Cincinnati in which twenty-three lives were lost. Many of the victims died from breathing "toxic fumes emitted by burning cabin material."[2] All forty-one passengers aboard Flight 797 survived the emergency landing.[3] When fire engulfed the plane, however, twenty-three people perished within one minute from inhaling toxic fumes released by burning seats, walls, and fabrics.[4] The airline industry has made progress since 1983 in the areas of fire prevention and safety, but there is still much room for improvement.[5] Chances are that as long as the Discretionary Function Exception (DFE) protects the FAA from liability for refusing to make these changes, only minimal improvements will be required.

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[1] David Nolan, *Airline Safety: The Shocking Truth*, DISCOVER, Oct. 1986, at 30.

[2] Linda Kanamine, *Tragedy Renews Call for Fire Safety*, USA TODAY, Dec. 4, 1990, at 11A.

[3] Edward Dolnick, *Aviation Safety Changes May Cut Injuries in Airplane Fires*, BOSTON GLOBE, Sept. 5, 1983.

[4] *Id.* The majority of those who died were asphyxiated by a lethal combination of hydrogen cyanide, carbon monoxide, and other poisonous gases released by burning seat cushions. *Id.*

[5] NATIONAL TRANSP. SAFETY BD., U.S. AIR CARRIER ACCIDENTS INVOLVING FIRE 1965 THROUGH 1974 AND FACTORS AFFECTING THE STATISTICS, Rpt. No. NTSB-AAS-77-1 (1977) [hereinafter U.S. AIR CARRIER ACCIDENTS 1965-1974].

Research has proven that many plane crashes are survivable.[6] In fact, a study by the National Transportation Safety Board (NTSB) of fatal airline accidents from 1969 through the middle of 1983 showed that sixty percent of passengers aboard survived the crash.[7] Nonetheless, two times as many passengers perish from fire and smoke as from the actual impact of the crash.[8]

This comment will discuss the history of the FAA in developing, implementing, and policing compliance of the airline industry with fire safety requirements. The FAA has not only failed to foster development of safety precaution technology, but also has chosen to ignore the technologies available to make air travel safer for the airline passenger. The FAA has a duty to ensure the safety of the traveling public by requiring that aircraft meet certain standards. How it enforces those requirements is entirely within the discretion of the FAA and is a decision which is protected under the Federal Tort Claims Act (FTCA) Discretionary Function Exception. The FAA chooses to allow manufacturers total control of testing during the manufacturing process and has taken such a hands-off approach that often not even a spot-check occurs. The DFE allows the FAA to shirk its duty and avoid liability for injuries incurred in airplane accidents, laying the responsibility at the feet of the manufacturer.

The government defines in the Federal Aviation Regulations (FARs) the important standards for the airline industry, but the FAA has done little to develop new regulations governing fire precautions and even less to enforce the regulations that have been implemented.[9] Proposals have been set forth by various agencies, including the Aviation Safety Institute and Association of Flight Attendants, for increased fire prevention and evacuation time in post-crash

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[6] Nolan, *supra* note 1, at 30. The chances of surviving a low-impact crash today are no better than they were three decades ago, and may even be worse. *Id.*

[7] *Id.*

[8] *Id.*

[9] Philip M. Foss & Robert D. Tepper, *Fire Safety in Transport Category Aircraft: Litigating a Post-Crash or In-Flight Aircraft Fire*, 49 J. AIR L. & COM. 801, 819 (1984).

fires.[10] Few proposals are adopted and even those few are not required on older aircraft until the plane undergoes a major renovation, allowing the airlines years, in some instances, to implement the required changes.[11]

Despite the statistics, the FAA asserts that it is reluctant to impose new safety requirements on the airline industry until the effects of smoke and toxicity in aircraft fatalities are certain.[12] The financial costs of making the improvements, however, play an obvious role in the airline industry's decision not to make improvements. One estimation is that over a ten year period, settlements for crash fatalities will average $10 million; improvements to prevent those deaths would cost $75 million.[13] Clearly the costs to the airlines outweigh the benefits, especially considering the present financial state of the airline industry.

Furthermore, the Discretionary Function Exception of the FTCA[14] exempts the FAA from any liability for failing to enforce compliance with safety requirements.[15] Section 2680 of the United States Code[16] allows an exemption for any government employee exercising discretion in taking a

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[10] Kanamine, *supra* note 2, at 11A.

[11] *Id.*

[12] Marjorie Sun, *Airplane Fire Safety Debate Rekindled; Critics Charge the FAA is Still Dragging its Feet in Requiring Stiffer Standards*, SCIENCE, July 1, 1983, at 35.

[13] Nolan, *supra* note 1, at 30.

[14] 28 U.S.C. § 1346(b)(1988). Waiver of sovereign immunity is allowed

> for injury or loss of property, or personal injury or death caused by the negligent or wrongful act or omission of any employee of the Government while acting within the scope of his office or employment, under circumstances where the United States, if a private person, would be liable to the claimant in accordance with the law of the place where the act or omission occurred.

Id.

[15] United States v. S.A. Empresa De Viacao Aerea Rio Grandense, 467 U.S. 797, 821 (1984) [hereinafter *Varig Airlines*] (holding that the duty to ensure that an aircraft conforms to FAA safety regulations lies with the manufacturer and operator, while the FAA retains responsibility for policing compliance).

[16] 28 U.S.C. § 2680(a) (1988).

policy-based action.[17] This exception applies even in cases where the employee has abused that discretion.[18]

There are several options available to enhance airline safety and to decrease the chances that a plane will ignite when it crashes. The agency response, however, is that the costs of implementing these precautions and renovating the whole fleet far outweigh the benefits of lives saved. This comment will focus on what the FAA has done or not done to fulfill its duty to promote flight safety and whether the DFE should apply to those situations in which the government undertakes to ensure the safety of the public. By exploring the means by which the FAA currently regulates the industry and what could be done to further ensure fire safety, the comment will argue for a higher standard for the government and a narrower reading of the Discretionary Function Exception in instances where safety is a consideration. Holding the government liable would force the FAA to observe a higher standard in enforcing compliance with safety regulations.

II. HISTORY OF FIRE SAFETY IN THE AIRLINE INDUSTRY

One of the first American jet airliner fire disasters occurred in 1961 when a United DC-8 veered off the runway at Denver and burned. Sixteen passengers died.[19] The FAA has promised action since the 1961 crash in Denver, yet relatively little has been done to deal with the dangers

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[17] *Id.* The § 2680(a) exception reads in part:

> The provisions of this chapter and § 1346(b) of this title shall not apply to—(a) Any claim based upon an act or omission of an employee of the Government, exercising due care, in the execution of a statute or regulation, whether or not such statute or regulation be valid, or based upon the exercise or performance or the failure to exercise or perform a discretionary function or duty on the part of a federal agency or an employee of the Government, whether or not the discretion involved be abused.

Id.

[18] *Id.*

[19] Nolan, *supra* note 1, at 30.

associated with the toxicity of flammable aircraft interior materials.[20]

> Eleven years after the Denver accident, two accidents in Chicago, twelve days apart, claimed fifty-three lives, thirty-seven of them persons who survived the impact only to perish in the post-crash fires. The FAA promised action at that time. Five years later, sixteen years after the Denver accident, a DC-9 en route to Atlanta crashed on a highway. Of the forty-three persons who survived the impact, twenty died from fire or asphyxia. Once again the FAA promised action. Nineteen years after the Denver accident, seven years after the Chicago accidents, and three years after the Atlanta accident, we have new promises of more studies from the FAA with no timetable for completion.[21]

A. INTERIOR MATERIALS

1. Prior to 1970

Statistics for the period from 1955 to 1974 show that the percentage of fire-related accidents to total accidents indicated an upward trend in fire accident potential.[22] From 1964 to 1977, 39% of the 1162 deaths resulting from aircraft accidents were attributable to fire.[23] In these accidents, the usual cause of death was not fire, but rather asphyxiation by smoke and toxic fumes.[24] A number of aircraft fires in the early 1960s prompted proposals for more stringent standards to reduce the flammability of cabin materials.[25] Prior to the 1960s, cabin materials were re-

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[20] *Id.*

[21] *Id.* (quoting former NTSB chairman James King); *see also* U.S. AIR CARRIER ACCIDENTS 1965-1974, *supra* note 5, at 8.

[22] U.S. AIR CARRIER ACCIDENTS 1965-1974, *supra* note 5, at 8 (stating that although the likelihood of an accident had decreased, the chances of fire being a factor when an accident did occur had increased).

[23] *See* Sun, *supra* note 12; *see also* Foss & Tepper, *supra* note 9, at 801.

[24] Foss & Tepper, *supra* note 9, at 801. Synergism, the combining of toxic gases, is lethal to humans and is an aspect of post-crash fire that cannot be ignored. Many fatalities can be attributed to inhalation of the smoke and toxic fumes emitted by burning cabin materials. Although the effects of synergism on humans are not known absolutely, the theory is that exposure to a combination of gases is more hazardous than being exposed to the gases individually. *Id.* at 819-820.

[25] U.S. AIR CARRIER ACCIDENTS 1965-1974, *supra* note 5, at 21.

quired to be at least flash-resistant. The other interior materials, however, such as upholstery, carpet, floor, wall and ceiling panels, and furnishings had only to be flame resistant.[26] Although proposals were made during the mid to late 1960s, no regulations were adopted at that time for either the reduction of flammability of cabin materials or for smoke emission standards.[27] When the amendments for reduction of flammability of cabin materials were finally adopted, the airline industry claimed that some of the specified materials were unavailable and thus the standards were relaxed.[28] The unhurried pace of the government in implementing and enforcing the minimum safety standards left a total lack of regulation in the area of smoke emissions[29] and more importantly, allowed flight in the 1960s by aircraft which merely complied with flight safety standards adopted in the 1940s.[30]

2. Post 1970

In the mid 1970s the FAA attempted to rectify the problem. The FAA proposed three regulatory actions that would prove to have a significant impact on interior flammability and smoke emission attributes.[31] First, FARs governing cabin interior materials were amended to require that three years after the effective date of the amendment, self-extinguishing materials would be installed on all aircraft.[32] Secondly, the FAA proposed research to obtain information on the possibility of establishing minimum standards for the toxic fumes emitted from burning cabin materials.[33] Finally, the FAA issued a proposal in 1975 es-

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[26] *Id.* at 20. Flash-resistant is defined as "not susceptible to burning violently when ignited." 14 C.F.R. § 1.1 (1993). Flame-resistant is defined as "not susceptible to combustion to the point of propagating a flame, beyond safe limits, after the ignition source is removed." 14 C.F.R. § 1.1 (1993).

[27] U.S. AIR CARRIER ACCIDENTS 1965-1974, *supra* note 5, at 21.

[28] *Id.*

[29] *Id.*

[30] U.S. AIR CARRIER ACCIDENTS 1965-1974, *supra* note 5, at 22.

[31] *Id.*

[32] *Id.*

[33] *Id.*

tablishing smoke density standards for emissions from burning cabin materials.[34] To date, both smoke density standards and minimum smoke emission standards are in place.[35] In spite of these improvements, however, fires continue to cause the deaths of many airline passengers in otherwise survivable accidents.[36]

B. SAFER COMMITTEE REPORT

In 1978, the Special Aviation Fire and Explosion Reduction Committee (SAFER) was formed to "examine the factors affecting the ability of the aircraft cabin occupant to survive in the post-crash environment and the range of solutions available."[37] The SAFER investigation concentrated on three problem areas in the airline industry. The research involved development of less toxic, less flammable cabin materials that emit fewer fumes, the creation of jet fuel additives which make fuel less likely to mist and thus decrease the chances of a fireball, and finally, furtherance of understanding the nature of post-crash and inflight fires by the development of mathematical models.[38] The primary focus of the committee, however, was on survival of a post-crash fire and whether the problems of fuel spillage and cabin material flammability adversely affect a passenger's chances of escaping.[39] The results of the SAFER study found that in those survivable accidents where post-crash fires occurred, a large percentage of the fatalities could be

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[34] *Id.* at 23.

[35] 14 C.F.R. §§ 25.851, 25.1181, 25.1207, 25.1451 (1994).

[36] Foss & Tepper, *supra* note 9, at 801. "Survivable crash" is defined as "one in which seats remain bolted to the fuselage, seat belts function properly and passengers are not hit by flying metal or other debris." Twenty percent of all fatalities in "survivable" air crashes are caused by subsequent fire or smoke, and 80% of all air accidents are survivable. John M. Broder & Paul Houston, *Fire-Resistance of Damaged Planes is Vigorously Debated Safety Issue*, L.A. TIMES, Sept. 1, 1988, at 18.

[37] Implementation of SAFER Propulsion System Recommendations, 49 Fed. Reg. 38,078 (1984) [hereinafter SAFER Report].

[38] *Id.*

[39] *Id.*

attributed to the fire.[40] Spilled fuel proved to be the primary cause of post-crash fire.[41] Consequently the committee centered its efforts on discovering means of controlling fire and explosion in order to enhance a passenger's chance of escape from a burning aircraft.[42]

The Committee recommended that the FAA require the airlines to provide fuel tank vent protection during ground fires[43] and to explore means of maximizing fuel supply shut off in likely post-crash fire situations.[44] More importantly, the SAFER committee recommended improvement and standardization of investigations into aircraft accidents and enhancement of materials which prevent the spread of post-crash fires.[45] The recommendations of the SAFER Committee spurred the FAA to consider for use in aircraft seat cushions fire-blocking materials designed to retard ignition and delay involvement of the cushion with the fire.[46]

C. AVIATION SAFETY RESEARCH ACT

1. *FAA Has Been Less Than Diligent in Research & Development*

It was not until 1988, when the Aviation Safety Research Act (the Act) was passed, that the FAA was required to re-

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[40] 1 FED. AVIATION ADMIN., DEPT. OF TRANSP. FINAL REPORT OF THE SPECIAL AVIATION FIRE AND EXPLOSION REDUCTION (SAFER) ADVISORY COMMITTEE 1 (June 26, 1980) [hereinafter FINAL SAFER REPORT].

[41] *Id.* at 12-13 (noting that in-flight cabin fires producing fatal injuries were determined to be relatively rare events).

[42] *Id.*

[43] *Id.*

[44] *Id.* The SAFER Committee also recommended that the FAA look into the use of self-contained smoke masks, gloves, clothing or other items of personal protection for crew members to allow better supervision of evacuation procedures. FINAL SAFER REPORT, *supra* note 40, at 18.

[45] FINAL SAFER REPORT, *supra* note 40, at 18-19.

[46] *See* Foss & Tepper, *supra* note 9, at 807. These features save lives by reducing smoke and toxic fumes from burning cabin materials and by giving passengers an extra one-and-one-half minutes to evacuate the burning aircraft. Katherine Foran, *Pilots and Luck Made All the Difference*, NEWSDAY, July 21, 1989, at 16. Fire-blocking seat covers are required on planes with passenger capacity of 30 or more. Laura Parker, *In Wake of Delta Crash, a Renewed Look at Airliner Cabin Safety*, WASH. POST, Sept. 13, 1988, at A25.

search the topic of fire safety.[47] Because the FAA has made no notable effort to better understand and alleviate the toxic threat of a post-crash fire situation,[48] concentrating instead on the areas of "improvement" and "orderly development,"[49] the Act designated that $21 million of the safety research funds should be directed to safety projects and that the remaining $21 million should be concentrated on long term research projects.[50] The change increased the funding for long term research from two percent to fifteen percent of the available funds.[51]

The committee drafting the Act took the position that although significant progress has been made since 1980 in the implementation of less flammable seat covers and seat cushions, the FAA remains seriously deficient in its understanding of the "hazards of human exposure to toxic gases in aircraft fires."[52] The Act forces the FAA to take action by calling for improved research in such areas as less flamma-

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[47] Aviation Safety Research Act of 1988, H.R. REP. No. 894, 100th Cong., 2d Sess. 5 (1988), *reprinted in* 1988 U.S.C.C.A.N. 4079, 4080 [hereinafter Research Act].

> Section 312(b) of the Federal Aviation Act of 1958 (49 U.S.C. § 1353(b)) is amended as follows: The Administrator shall undertake or supervise research to develop technologies and to conduct data analyses for predicting the effects of aircraft design, maintenance, testing, wear, and fatigue on the life of aircraft and on air safety, to develop methods of analyzing and improving aircraft maintenance technology and practices (including nondestructive evaluation of aircraft structures), to assess the fire and smoke resistance of aircraft materials, to develop improved fire and smoke resistant materials for aircraft interiors, to develop and improve fire and smoke containment systems for in-flight aircraft fires, and to develop advanced aircraft fuels with low flammability and technologies for containment of aircraft fuels for the purpose of minimizing post-crash fire hazards.

Id. at 1-2.

[48] *Id.* at 8 (citing the SAFER Committee's investigation which obtained incomplete information on the dangers of human inhalation of synergized gases emitted from burning fuel or interior materials). The Committee also noted that although the actual effect of the fumes is not known, the potential threat is real. *Id.*

[49] *Id.* at 6.

[50] *Id.* at 18.

[51] *Id.* at 4. A long-term research project is defined as "a discrete project in the aviation research plan . . . which is unlikely to result in a final rulemaking action within 5 years or in initial installation of operational equipment within 10 years, after the date of the commencement of such project." *Id.* at 5.

[52] Research Act, *supra* note 47, at 8.

ble cabin materials, jet fuel additives to make fuel less flammable, and systems to contain fire.[53]

2. *Passenger Safety Takes Precedence over Economic Considerations*

It is a widely held belief that the FAA looks to short term rather than long term results in the area of fire safety and that if implementing safety precautions is "too expensive to be practical," then the FAA will forego implementation.[54] Passenger safety is a priority and the fact that a certain standard of safety is difficult or costly to achieve is not recognized by the drafters of the Act as a valid excuse for allowing passengers to die.[55] The FAA makes premature decisions regarding the implementation of fire safety precautions by asserting that the improvements are too costly before conducting research on the matter.[56] The cost-benefit analysis should be done when the improvements are known, not when they are simply speculative.[57] The fact that certain improvements have already been made has no bearing on whether new technology should be developed and the financial burden is not an acceptable reason to impede research.[58]

III. DISCRETIONARY FUNCTION EXCEPTION

The FTCA does not provide a blanket waiver to the government of tort liability, but rather retains governmental immunity through exceptions such as section 2680(a), which extends immunity to actions taken in the exercise of

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[53] Research Act, *supra* note 47, at 8-9; *see also* Parker, *supra* note 46 for a discussion of proposals made to improve crashworthiness of aircraft and decrease likelihood of post-crash fires.

[54] Research Act, *supra* note 47, at 12.

[55] *Id.* If the FAA were fulfilling its duty to ensure the safety of air passengers, it would strive toward the creation of a totally fire-resistant cabin, or at least the development of materials which would retard fire long enough to allow passengers five to ten minutes to escape a burning plane. The FAA should work toward this goal regardless of short term gains, with its focus on potential new technologies. *Id.*

[56] *Id.*

[57] *Id.*

[58] *Id.*

a discretionary duty.[59] Although the FTCA waives sovereign immunity to a limited extent, the intent of the act was not to subject the government to "novel and unprecedented liabilities."[60] Rather, the DFE exemption of the FTCA protects the Government from any "liability that would seriously handicap efficient government operations."[61] Specifically, Congress intended the exemption to protect decisions of government employees which are judgment-based or made in consideration of public policy.[62]

A. THE *GAUBERT* TWO-STEP ANALYSIS TO DETERMINE THE SCOPE OF THE DFE

1. Does the Conduct Involve Judgment?

Generally, a policy-based decision is one that establishes, promulgates or repeals a regulation.[63] In order to determine whether a policy judgment has been made, it must first be determined whether the act or omission of the government employee involved an element of judgment.[64] The focus should be on whether the decision maker considered public policy in making his judgment.[65] If the government employee is merely applying mandated standards, then his activity is not policy-based and thus not protected by the DFE.[66] A decision is discretionary when there are no

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[59] 28 U.S.C. § 2680(a) (1988); *see also* C.R.S. v. United States, 11 F.3d 791, 795 (8th Cir. 1993).

[60] Richard B. Sorenson, *Use of the FTCA Discretionary Function Exception in Sonic Boom and Low Overflight Litigation*, 33 A.F. L. REV. 137, 138 (1990). The legislative history of the Discretionary Function Exception reveals a Congressional intention to disallow suits against the government which inhibit the formulation of political, economic, and social policy. Mitchell E.F. Plave, Comment, United States v. Varig Airlines: *The Supreme Court Narrows the Scope of Government Liability Under the Federal Tort Claims Act*, 51 J. AIR L. & COM. 197, 203 (1985).

[61] Sorenson, *supra* note 60, at 138 *quoting* United States v. Muniz, 374 U.S. 150, 163 (1963); *see also supra* note 17 for a discussion of § 2680(a).

[62] Walter H. Boone, *Tort Liability—Governmental Immunity—Discretionary Function Exception to Federal Tort Claims Act is Not Applicable When Regulatory Acts are Mandated by Statute, Regulation or Policy*, 59 MISS. L.J. 607 (1989).

[63] Garbarino v. United States, 666 F.2d 1061, 1065 (6th Cir. 1981).

[64] United States v. Gaubert, 499 U.S. 315, 322 (1991); *see also* Myers v. United States, 17 F.3d 890, 895 (6th Cir. 1993); *C.R.S.*, 11 F.3d at 795.

[65] Griffin v. United States, 500 F.2d 1059, 1064 (3d Cir. 1974).

[66] Barton v. United States, 609 F.2d 977, 979 (10th Cir. 1979).

mandatory regulations or policies for an agency to follow in making its decision.[67] To fall within the scope of the DFE, the directive must set out clear and specific guidelines to direct the employee's actions.[68]

2. Is the Conduct Protected by the DFE?

If the action involves an element of choice, it must be determined whether the government action falls within the protection of the DFE. The second phase of the analysis is a determination of whether the actions are based on considerations of social, economic, or political policy.[69] The DFE will only immunize the actions of a government employee if that choice furthers the purposes of a regulatory regime that gives an employee such discretion.[70] It is not necessary that the employee have consciously considered these policy factors, but rather that he could have—if the decision is "susceptible to policy analysis."[71]

In a cost-benefit analysis, the decision maker must be free to choose a course of action in the best interest of basic government policy.[72] Freedom from liability is necessary to ensure this independence of action.[73] A balancing of safety considerations against those of economics is legitimate, but cost efficiency alone is insufficient to justify protection from immunity. The government's action must be of the type intended to be protected by the DFE.[74]

3. DFE Does Not Extend to Negligent Actions

In order to ensure the safety of those affected by the decision, however, the protection of the exemption extends only to harms arising from the non-negligent implementa-

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[67] *C.R.S.*, 11 F.3d at 796.
[68] *Id.* at 799-800.
[69] *Gaubert*, 499 U.S. at 323.
[70] *Id.* at 324-25; *see also Griffin*, 500 F.2d at 1066.
[71] *C.R.S.*, 11 F.3d at 796 (quoting *Gaubert*, 499 U.S. at 325-26).
[72] Slagle v. United States, 612 F.2d 1157, 1162 (9th Cir. 1980).
[73] *Id.*
[74] *C.R.S.*, 11 F.3d at 802.

tion of a decision imposed by statute.[75] When a statutorily authorized action is implemented with due care by a government employee, that action falls within the scope of protection offered by the DFE.[76] The protection does not extend, however, to violations of statutes, regulation or policy, and should not extend to negligent implementation of a discretionary decision.[77] The FAA has never been held liable in the negligent issuance of an airworthiness certificate, most likely because the issuance of certificates of that type has traditionally been treated as discretionary action.[78]

The three objectives of the exemption are to ensure continuation of certain governmental activities without threat of disruption by damage suits, to prevent opening the United States to liability for frivolous or excessive claims, and to prevent the extension of the FTCA to cover suits for which the claimants have alternative remedies available.[79] In order to determine when a government employee falls within the protection of the DFE, the focus is on the nature of his conduct and whether that conduct falls within the ambit of that which Congress intended to protect.[80] A course of action which is not a direct result of an employee's personal judgment, but rather is prescribed by stat-

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[75] Boone, *supra* note 62, at 607. If the government can show that there were policy judgments involved in a certification decision, they may rebut allegations of negligence; but proof that the certification process involves a more routine and less discretionary application of objective requirements may subject the government to liability. *Id.*

[76] *Id.*

[77] John W. Bagby & Gary L. Gittings, *The Elusive Discretionary Function Exception from Government Tort Liability: The Narrowing Scope of Federal Liability*, 30 AM. BUS. L.J. 223, 232-34 (1992).

[78] Lawrence v. United States, 381 F.2d 989, 991 (9th Cir. 1967); United States v. Morrell, 331 F.2d 498, 502 (10th Cir. 1964), *cert. denied*, 379 U.S. 879 (1964); Chournos v. United States, 193 F.2d 321, 323-34 (10th Cir. 1951), *cert. denied*, 343 U.S. 977 (1952).

[79] Sorenson, *supra* note 60, at 138.

[80] *Id.* at 140; *see also Varig Airlines*, 467 U.S. at 813. The DFE is not a blanket exclusion from liability for all acts of government employees, but protects only those decisions based on choice. The choice must be "grounded in social, economic, [or] political policy" or must represent a "policy judgment." *Gaubert*, 499 U.S. at 335 (Scalia, J., concurring).

ute or regulation is not protected by the DFE.[81] A violation of statutory mandates, even by the United States itself, will not be protected by the DFE.[82] The exemption allows the making of policy-based decisions by government employees without any fear of judicial second-guessing.[83]

B. Applying the DFE to Governmental Public Safety Measures

1. *Dalehite: The Beginning*

The DFE is the source of much controversy.[84] The most important decision in a long line of cases construing the DFE is *Dalehite v. United States.*[85] In *Dalehite* the Court held that the government was not responsible for fatalities or injuries resulting from an explosion of fertilizer when the government had retained control of supervising the storage of the product.[86] The DFE protects government employees from liability for deliberate policy decisions when the action is not mandated by statute, even when the decisions are in direct contradiction to the demands and desires of the public.[87]

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[81] Sorenson, *supra* note 60, at 140; *see also* Berkovitz v. United States, 486 U.S. 531, 536-37 (1988). A discretionary act must be the product of the judgment of the actor and be based on policy concerns. Sorenson, *supra* note 60, at 140-41. The purpose of the DFE is to protect a government official acting in reliance on basic governmental policies. Bagby & Gittings, *supra* note 77, at 228. The ability of the actor to make a choice between action is key in determining if an action is protected. Bagby & Gittings, *supra* note 77, at 232-33. The focus is not on the subjective intent of the actor, but rather on whether the decision and resulting actions can be justified as based on policy. *Gaubert*, 499 U.S. at 325.

[82] *Gaubert*, 499 U.S. at 324.

[83] *Berkovitz*, 486 U.S. at 536-37.

[84] Sorenson, *supra* note 60, at 138-41. There have been many attempts to discredit *Dalehite*, but *Varig Airlines* affirmed that the decision in *Dalehite* is still the controlling word when it comes to the DFE. *Id.* at 140.

[85] 346 U.S. 15 (1953).

[86] *Id.* at 15.

[87] Bagby & Gittings, *supra* note 77, at 223; *see also* Gaubert, 499 U.S. 315 (addressing the question of extending the DFE to lower level regulators' decisions in their implementation of policies established by statute). Actions which further the policies which lie behind a regulation are protected actions within the DFE. *Gaubert*, 499 U.S. at 324. If a directive leaves an employee no room to choose one action over another in furtherance of his decision, then that decision is not discretionary. *Id.* at 322. "Policy discretion often requires an assessment of the practicability or feasibil-

Presumably this broad protection functions to bar suit against a government agency such as the FAA for choosing not to require stringent fire safety measures on aircraft. The exception focuses on the chilling effect that liability would have on policy decision makers.[88] Once the government makes a policy-based decision protected by the exception, it has a duty to those who will rely on the decision for their safety to proceed with due care in implementing the decision.[89]

2. *Indian Towing: Governmental Liability*

Indian Towing Co. v. United States[90] illustrates the scope of this duty.[91] In *Indian Towing* the government was held to the same standard of care to which an individual would be held for voluntarily undertaking the maintenance of a lighthouse.[92] The Court found that once the government had made the initial decision to maintain lighthouse services, failure to provide maintenance and upkeep to the lighthouse made the government subject to liability under the FTCA.[93] The decision in *Indian Towing* reinforces the principle that once the government allows the public to rely on the protection it offers through its regulatory agencies, it must use due care to ensure that the protection works. If it fails to do so, the government is liable under the FTCA.[94]

This decision represents one side of the debate occurring presently in the courts over the extent to which the govern-

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ity, including the consideration of budgetary constraints, of a proposed course of action and an assignment of priorities or commitment of resources" and that assessment includes a "conscious weighing, balancing or trading off of competing factors to evaluate how the public interest will best be served." Bagby, *supra* note 77, at 253.

[88] Sea-Land Serv., Inc. v. United States, 919 F.2d 888, 890 (3d Cir. 1990), *cert. denied*, 500 U.S. 941 (1991).

[89] Caplan v. United States, 877 F.2d 1314, 1316 (6th Cir. 1989).

[90] 350 U.S. 61 (1955).

[91] *Berkovitz*, 486 U.S. at 538.

[92] *Id.*

[93] *Indian Towing*, 350 U.S. at 69. If an activity does not fall within the DFE, voluntary undertaking of that activity will subject the government to tort liability for its conduct. Osborne M. Reynolds, Jr., *The Discretionary Function Exception of the Federal Tort Claims Act: Time for Reconsideration*, 42 OKLA. L. REV. 459, 467 (1989).

[94] *See Indian Towing*, 350 U.S. at 69.

ment can be held liable when it undertakes to ensure the general well-being of the public.[95] Although the government has a statutory duty to promote flight safety and to enact regulatory changes to ensure passenger safety, the level of responsibility this duty actually entails is unclear.[96] Arguably, the duty to promote flight safety encompasses the assurance of the well-being of the public. Regardless, the Secretary can delegate practically his entire duty of policing compliance to the manufacturer, thus creating a self-policing industry.[97] This delegation falls within the scope of the DFE. The problem is that with a spot-checking system conducted by the airline industry, if it is conducted at all, the chances of the manufactured goods being of premium quality are slim.[98] Given the FAA's immunity from liability for any injuries due to faulty manufacturing, chances are even better that the FAA is not monitoring the airline industry very closely and thus is failing to use due care in exercising its duty.

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[95] Arney v. United States, 479 F.2d 653, 658 (9th Cir. 1973). There is a split in authority regarding the government's liability for improper issuance of airworthiness certificates to aircraft which do not meet minimum standards, with some courts holding the government liable and other courts finding no liability for harm caused by the government's negligent inspection. *See* Rapp v. Eastern Air Lines, Inc., 264 F. Supp. 673, *vacated*, Frankenfield v. United States, 521 F.2d 1398 (3d Cir. 1970).

[96] 5 Av. L. Rep. (CCH) ¶ 10,205 (1990). The Administrator of the FAA has the responsibility for the promotion of flight safety and the implementation of regulatory changes which will assure passenger safety. *Id.* This responsibility extends to all aircraft which operate in the United States. *Id.*

[97] Garbarino v. United States, 666 F.2d 1061, 1065 (6th Cir. 1981); Waymire v. United States, 629 F. Supp. 1396, 1440-41 (D. Kan. 1986). When the government delegates to other entities its responsibility for periodic inspection for the duration of the life of an aircraft that delegation is a discretionary decision protected within the scope of the DFE. *Waymire*, 629 F. Supp at 1401.

The Secretary of the FAA is also held to a duty to "perform his powers in a way that best tends to reduce or eliminate the possibility or recurrence of accidents in air transportation." 49 U.S.C. § 44701(c) (1994). In carrying out this function, the Secretary must also "conduct or supervise research to develop a better understanding of the relationship between human factors and aviation accidents and between human factors and air safety . . . [and] to identify innovative and effective corrective measures for human errors which adversely affect air safety." 49 U.S.C. § 44505(b) (1994).

[98] Johnson v. American Airlines, Inc., 745 F.2d 988 (5th Cir. 1984), *cert. denied*, 472 U.S. 1027 (1985).

C. The DFE As Applied to Negligent Action by the Government

In *Varig Airlines*[99] the Court found that although the FAA is responsible for monitoring compliance of the airline industry with safety regulations, the manufacturer holds the primary responsibility for ensuring that an aircraft complies with FAA safety regulations.[100] *Varig Airlines* consolidated two certification cases in which the FAA had allegedly failed to check specific items in the course of certifying the aircraft. In one case, an inflight fire occurred in a lavatory waste receptacle which did not meet standard regulations. In the second case, a gasoline heater that was not in compliance with federal regulations caught fire. The Court held that the DFE applied in both cases.[101]

A strong argument can be made that when the FAA undertakes to ensure compliance with its safety regulations, it is evaluating the manufacturing procedures of aircraft companies. Where a governmental agency is involved in evaluation as opposed to policy formulation, this conduct is not immune from liability.[102] Consequently, the government's failure to detect the problems and subsequent issuance of a compliance certificate should not and would not be protected. The DFE was not intended to encompass negligent acts of government employees simply because those employees relied on policy considerations in acting.[103] To insulate the government so thoroughly from liability goes beyond allowing freedom to make policy and borders on granting permission to conduct operations negligently.

The difference between the two cases evaluated in *Varig Airlines* was that in the case of the waste receptacle, the agency had failed to inspect at all. In the case of the heater, however, the FAA had inspected, but failed to detect a defect. The Court's apparent indifference to this factual dis-

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[99] 467 U.S. 797 (1984).
[100] *Id.* at 816.
[101] *Id.* at 820.
[102] Ayala v. United States, 980 F.2d 1342, 1349-50 (10th Cir. 1992).
[103] Boone, *supra* note 62.

tinction made the DFE appear to apply to even a negligent inspection.[104]

The Court held that the DFE was "plainly intended to encompass the discretionary acts of the Government acting in its role as a regulator of the conduct of private individuals."[105] As a result, the FAA was free from liability when fire broke out on a plane which the FAA had certified as in compliance with minimum safety standards.[106] The smoke and fumes from a lavatory fire killed 124 of the 135 passengers aboard the plane. Fortunately for the FAA, this is exactly the type of situation covered by the DFE. Even if the FAA did issue the certificate of compliance negligently, a cause of action based upon that negligent behavior is precluded by the DFE.[107] The FAA has such broad discretion under the DFE that it may choose to check aircraft thoroughly, cursorily, or not at all in policing compliance with safety precautions.[108]

D. Spot Checking to Ensure Compliance

The FAA's system of "spot-checking" airplanes to ensure conformance was formulated under the auspices of the authority of the courts.[109] The system falls within the protection of the DFE because it is a decision grounded in the policy determination of a government agency of the best way to accommodate the goal of air transportation safety and the reality of finite agency resources.[110] The FAA is al-

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[104] *Id.*

[105] *Varig Airlines*, 467 U.S. at 813-14.

[106] *Id.* at 815-16.

[107] *Id.*

[108] Proctor v. United States, 622 F. Supp. 10, 12 (C.D. Cal. 1984). The Secretary is allowed broad discretion by Congress to create and activate programs to ensure deference by aircraft manufacturers to safety requirements. *Berkovitz*, 486 U.S. at 537. Section 1423 of title 49 of the U.S.C. gives the Secretary power to issue type certificates for aircraft. 49 U.S.C. app. § 1423(a)(1) (1988). Additionally, the Secretary must either perform or require the manufacturer to perform testing during the manufacturing process. These tests prove to the FAA that the manufacturer is in compliance with safety standards. 49 U.S.C. app. § 1423(a)(2) (1988).

[109] *Proctor*, 622 F. Supp. at 12; *see also Berkovitz*, 486 U.S. at 537.

[110] *Varig Airlines*, 467 U.S. at 798. The rule is "if a government official in performing his statutory duties must act without reliance upon a fixed or readily ascertain-

lowed to balance safety considerations against those of economic feasibility.[111] According to the FAA, that equation proves in favor, not of uniform inspection of every plane, but rather of a system of random checking, the timing of which is governed by the individual circumstances of each situation.[112] These lax standards are permitted because agency judgment lies behind the FAA's decision to forego inspection.[113]

1. *Decision to Spot Check is Discretionary*

According to the courts, "[t]he FAA's implementation of a mechanism for compliance review is plainly discretionary activity of the nature and quality protected by section 2680(a)."[114] The FAA made a policy decision to place the primary responsibility for safety compliance with the airplane manufacturer and in *Varig Airlines* the Court concluded that the decision was a valid one. The ultimate responsibility for aircraft safety, and the commensurate liability for aircraft accidents resulting from a breach of that duty, rests with the aircraft manufacturer rather than with the government.[115]

2. *Burden is on the Applicant to Show Compliance*

The court in *Varig Airlines* stated:

> By regulation the FAA has made the applicant itself responsible for conducting all inspections and tests necessary to determine that the aircraft comports with FAA airworthiness

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able standard, the decision he makes is discretionary and within the exception of the [FTCA]." Barton v. United States, 609 F.2d 977, 979 (10th Cir. 1979). The exception protects the ability of a government employee to choose a course of action based on his assessment of what is best. Dalehite v. United States, 346 U.S. 15, 33 (1953).

[111] Boone, *supra* note 62.

[112] *Id.*

[113] *Id.*

[114] *Varig Airlines*, 467 U.S. at 819-20 (holding that an agency determination of how to best oversee safety procedures is basic discretionary regulatory authority); see 49 U.S.C. app. § 2680(c) (1988).

[115] *Varig Airlines*, 467 U.S. at 815; Waymire v. United States, 629 F. Supp. 1396, 1402 (D. Kan. 1986); Proctor v. United States, 622 F. Supp. 10, 12 (C.D. Cal. 1984).

> requirements. The applicant submits to the FAA the designs, drawings, test reports, and computations necessary to show that the aircraft sought to be certified satisfies FAA regulations. In the course of the type certification process, the manufacturer . . . conducts both ground and flight tests. FAA employees or their representatives then review the data submitted by the applicant and make such inspections or tests as they deem necessary to ascertain compliance with the regulations. If the FAA finds that the proposed aircraft design comports with minimum safety standards, it signifies its approval by issuing a type certificate.[116]

If there was a specific and mandatory regulation governing this review process conducted by the FAA, then the duties of the agents would be clear and violation or negligent performance of those duties would not be sheltered from liability by the DFE.[117]

In the certification process the manufacturer has the responsibility of determining what safety issues to examine.[118] This responsibility includes deciding "to dismiss a potential fault or problem on the basis of risk analysis, by showing that a failure or combination of failures is so 'extremely improbable' that it doesn't have to be guarded against."[119] The FAA is unique in the extent to which it has delegated risk analysis to the manufacturers. This delegation places the responsibility for policing compliance with certification requirements in the hands of the applicant for certification, thus placing the burden on the manufacturer to ensure the safety of the flying public. Arguably, this burden is a shared one between manufacturers and the FAA. The question is how much of the burden the FAA actually bears.[120]

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[116] *Varig Airlines*, 467 U.S. at 805-06.

[117] *See* C.R.S. v. United States, 11 F.3d 791, 799 (8th Cir. 1993).

[118] A Thorough Critique of Certification of Transport Category Aircraft by the Federal Aviation Administration, H.R. REP. No. 924, 96th Cong., 2d Sess. 20 (1980).

[119] *Id.* The manufacturer does a "failure mode and effect analysis" (FMEA) to determine which failures are to be assumed, examined, and guarded against, and which are to be deemed "extremely improbable" and dismissed. The FAA has defined "extremely improbable" as one chance in a billion. *Id.* at 21.

[120] *Id.*

3. Decision That Potential Failure is "Extremely Improbable"

When an applicant elects to treat a potential failure as extremely improbable, this decision is basic and regulatory.[121] With the FAA's responsibility of assuring compliance of aircraft with safety regulations comes the role of reviewing the basic assumptions, calculations, and methods of the manufacturer in his analysis.[122] The FAA plays a limited role in the analytical process and there is question about whether it even performs this role effectively.[123] In other words, the FAA has no idea what standards were used in the manufacturer's conclusions and thus is poorly equipped to make a determination of whether the analysis is reliable.[124] Since the analysis may never be submitted to the FAA, the chances are great that the agency may never see, not to mention approve, the aircraft's compliance, or lack thereof, with safety standards.[125] Any FAR which contains an option to show compliance through extreme improbability is a loophole for a manufacturer and the FAA has delegated away its ability to close the hole or even to know if the option is being exercised.[126] Nonetheless, when an accident occurs, the manufacturer bears the responsibility for the failure because the FAA is protected within the circle of the DFE.

E. *BERKOVITZ*: THE EXCEPTION NARROWS

A more recent case has begun to turn the tables on the government in the area of sovereign immunity. In *United States v. Berkovitz*[127] the Court specifically rejected the notion that the DFE is a blanket preclusion against liability for any and all acts arising from regulatory actions by government agencies.[128] By defining the focus of the DFE as dis-

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[121] *Id.* at 22.
[122] *Id.*
[123] *Id.* at 21.
[124] *Id.* at 22.
[125] *Id.* at 21.
[126] *Id.*
[127] 486 U.S. 531 (1988).
[128] *Id.* at 538.

cretionary acts of regulators, as opposed to all acts of regulators, the Court opened the government to liability in tort where previously it had been exempted.[129] According to the Court, whether the DFE applies depends on whether there was a legitimate exercise of policy decision-making by the government employee.[130]

The Court, relying on *Varig Airlines*, held that while some regulatory decisions involve policy decision-making and discretionary judgment, not all do.[131] Since the FAA's responsibilities did not require "spot-checking" every aircraft, according to *Varig Airlines*, it is within the discretion of the agency to decide when and where to inspect.[132] The Court in *Berkovitz* made clear, however, that both the wording of the statute and its legislative history indicate that federal agencies can be liable for their regulatory acts.[133]

By comparing the regulatory scheme in *Berkovitz* governing the release of polio vaccines to the spot-checking scheme in *Varig Airlines* to police conformance with safety regulations, the Court found that if there is any leeway for discretion by the acting official in making policy judgments, then decisions of the official in the exercise of that judgment fall within the scope of the DFE.[134] If the actions are prescribed by statute, however, as in *Berkovitz*, they are not protected by the exemption.[135] In the spirit of this decision, if statutes regulate the standards with which a manufacturer must comply before the FAA can issue a type certificate, the FAA's issuance of that certificate would not lie within the protection of the DFE.[136]

The Court has vested the airlines with the power to determine the safest manner of operation.[137] Implicit in that

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[129] *Id.* at 539.
[130] *Id.*
[131] *Id.* at 537.
[132] *Berkovitz*, 486 U.S. at 537.
[133] *Id.* at 538.
[134] *Id.* at 546.
[135] *Id.* at 547.
[136] *Id.* at 546.
[137] Johnson v. American Airlines, 745 F.2d 988, 993 (5th Cir. 1984), *cert. denied*, 472 U.S. 1027 (1985).

power is the ability to employ broad discretion in choosing the mode of operation.[138] If actions are prescribed by statute, however, and the FAA fails to comply with the regulations in making their decisions, the DFE will not and should not protect their negligence.[139]

IV. CURRENT STANDARDS FOR FIRE SAFETY FEATURES

A. Research and Development

To date, the effectiveness of the FAA in developing and implementing new technologies for fire safety is questionable. According to Donald D. Engen, the Administrator of the FAA in 1985:

> The FAA has explored and continues to explore concepts that can be implemented to decrease the potential hazards from an inflight fire. Examples of such improvements are more fire-resistant seat cushions, cargo liners, interior cabin materials, handheld fire extinguishers, including the requirement for two Halon 1211 units, the requirement for an automatic extinguisher in each lavatory trash bin, and a smoke detector for each lavatory. Improved crew fire-fighting training and smoke evacuation testing are other safety improvements that will minimize inflight fire threat.[140]

A 1985 crash in Manchester, England, influenced the FAA to adopt more stringent standards for fire safety,[141] and "in 1985, the agency required installation of smoke detectors in lavatories and galley areas and automatic fire extinguishers

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[138] *Id.*

[139] *Gaubert*, 499 U.S. at 324-25.

[140] S. Rep. No. 464, 99th Cong., 2d Sess. 40 (1985) (statement of Donald D. Engen, Administrator of the FAA). The FAA labels inflight fires "infrequent," "rare," and "unique." Based on the nature of these fires, the FAA asserts that passengers are the safest when the crew is allowed to respond to the fire and land the plane as quickly as possible. Interference by passengers, even in accordance with instructions given by crewmembers, would delay the landing and endanger the safety of all the occupants of the plane. *Id.*

[141] *See* Kanamine, *supra* note 2, at 11A. In the 1985 Manchester, England, accident, a 737 caught fire on take-off. The plane was engulfed in flames in less than thirty seconds and fifty-five of 131 passengers died. *See* Nolan, *supra* note 1, at 44.

in lavatory trash bins."[142] In 1987, cabin safety was further enhanced when the FAA required commercial airlines to install two new features: floor lighting along the aisles leading to the exits in cabins and seats covers manufactured in a fire-blocking material.[143] Additionally, the walls, ceilings, storage bins and other large surface areas on all planes built after August, 1988, must be constructed with more heat resistant materials.[144]

Despite these improvements, there were calls in 1993 for additional research to investigate the fire and smoke resistance of aircraft materials and to produce more resistant materials for aircraft interiors if necessary.[145] Also suggested for study are means of improving fire and smoke containment systems in the event of an in-flight aircraft fire, methods to stimulate the production of low flammability fuels by use of additives, and the enhancement of available technologies for containment of aircraft fuels which would serve to minimize post-crash fire hazards.[146] The similarity between the fire safety problems in 1993 and those of ten years ago is striking. Obviously the research and development for this period has been particularly inadequate.[147]

The FAA's ineffectiveness over the past decade in making the skies safe from fire is attributed in some instances to regulatory policy decisions of and governmental budget constraints on the DOT which bear no relation to the FAA.[148] Cutbacks in technical staff and the resulting failure to keep pace with technological advancements have been targeted as the unavoidable consequences of the restraints, and have also adversely affected agency training programs and long range comprehensive planning.[149]

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[142] *See* Parker, *supra* note 46, at A25.

[143] *See* Foran, *supra* note 46, at 16.

[144] *See* Kanamine, *supra* note 2, at 5A.

[145] 49 U.S.C. app. § 1353 (1988) (repealed).

[146] *Id.*

[147] S. REP. No. 698, 100th Cong., 2d Sess. 61 (1988).

[148] *Id.* at 60.

[149] *Id.*

B. CURRENT SAFETY STANDARDS

The FARs for transport category aircraft require a minimum number of hand fire extinguishers in the passenger compartments.[150] The extinguishers must be easily located and evenly distributed throughout the compartment, with at least one in the cockpit, one in every cargo or baggage compartment, and one in each galley.[151] The extinguishing agent in all extinguishers must be of the amount and nature tailored to the types of fire most likely to occur where the extinguisher is used.[152]

Built-in fire extinguishers are required on all aircraft. One extinguisher is required in all paper and waste receptacles in each lavatory in order to counter a fire as quickly as possible.[153] The goal is to keep crew response time to a minimum in the event of a fire.[154] The agent used in the extinguishers must be safe in the case of discharge for both the occupants of the plane and for the structural components,[155] and should be of a volume sufficient to control any fire likely to occur in the area.[156]

Materials used for the interior of the plane are required, at a minimum, to be flash-resistant.[157] The large surface areas of the plane, such as ceilings, walls, and floor and seat coverings are required to be flame resistant.[158] Moreover, the trash and waste receptacles must be constructed of fire-resistance material and must be self-contained in order to

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[150] 14 C.F.R. § 25.851(a) (1994) (requiring anywhere from one to eight hand fire extinguishers, depending on the passenger capacity of the aircraft). *See also* 14 C.F.R. § 135.155(a),(b),(c) (1994).

[151] 14 C.F.R. § 25.851(a).

[152] *Id.*

[153] 14 C.F.R. § 25.854. The statute sets forth the requirement for smoke detector systems in each lavatory and for built-in fire extinguishers for each disposal receptacle used for towels, paper or waste, located within the lavatory. The extinguisher must be fashioned to automatically discharge into each container upon occurrence of a fire in that receptacle. *See also* 14 C.F.R. § 121.308(b).

[154] 14 C.F.R. § 25.854.

[155] 14 C.F.R. § 25.851(b).

[156] 14 C.F.R. § 25.854.

[157] 14 C.F.R. § 121.215(b).

[158] 14 C.F.R.§ 121.215(c); *see also supra* note 26 for a discussion of flash resistant and flame resistant.

contain and suffocate any fire which occurs in the receptacles.[159]

Smoke detectors were not required on aircraft until 1986.[160] The present regulations require a detector system in each lavatory with a warning light and audible warning connected to the cockpit in order to give warning in case of fire.[161] The detectors must be manufactured and installed to withstand vibration, inertia and all other stress to which they will be subjected during flight, and to do so without failure.[162] They must continue to operate despite contact with any type of fluid to which they might be exposed,[163] and there must be a sufficient number of fire detectors in each compartment of the plane to ensure detection of a fire in that area.[164]

C. Full-Scale Testing of Aircraft

"Full-scales" are another safety precaution implemented by the FAA to assure fire safety on every newly manufactured aircraft.[165] Federal regulations require that a plane loaded to capacity must be able to be evacuated, with only emergency lighting and half the exits available, within ninety seconds.[166] "Full-scales" are criticized as "carefully

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[159] 14 C.F.R. § 25.853(f). Fire resistant is defined as the "capacity to withstand the heat associated with fire at least as well as aluminum alloy" and "the capacity to perform the intended functions under the heat and other conditions likely to occur when there is a fire at the place concerned." 14 C.F.R. § 1.1. These materials must meet the requirements "upon the first substantially complete replacement of the cabin interior prior to August 20, 1988." 14 C.F.R. § 121.312(a)(3).

[160] 14 C.F.R. § 25.854(a); 14 C.F.R. § 121.308(a). The smoke detectors would act in conjunction with the extinguishers to allow detection of fire and any necessary actions to prevent rekindling. 14 C.F.R. § 25.854.

[161] 14 C.F.R. § 25.854(a); 14 C.F.R. § 121.308(a).

[162] 14 C.F.R. § 121.275.

[163] *Id.*

[164] 14 C.F.R. § 121.273.

[165] *See* Nolan, *supra* note 1, at 30.

[166] *Id.* When US Air Flight 1493 crashed at Los Angeles International Airport in 1991, the plane was evacuated in less than two minutes, with only four of six exits available, but not everyone got out in time. Sheryl Stolberg, *Crash Raises Questions on Jet Evacuation*, L.A. Times, Feb. 11, 1991, at A1.

rehearsed shams"[167] which perpetuate a "phony 90-second standard."[168]

Investigations indicate that the tests are administered under conditions not representative of the circumstances in an actual crash.[169] For example, the employees who perform the test are given two days of training prior to the actual experiment and the volunteers who participate have been trained as well.[170] Moreover, although the tests are executed in the dark, there are no children or elderly passengers[171] and there is no smoke or element of shock present in the tests. Even so, the participants "barely make it."[172] "Barely" making it, even after careful rehearsal and under better than actual conditions, means that only seven of ninety seconds remain at the end of the test.[173]

This information leads to the conclusion that the tests the FAA and the airline industry are offering as proof of fire safety are seriously flawed and only successfully carried out after days of training and with prior knowledge by the participants of which exits are available for use.[174] Under actual crash conditions, the likelihood of evacuation of a plane occurring in less than ninety seconds is little to none.[175] Nonetheless, these tests are offered as proof of the quality of evacuation procedures.[176]

The 1991 disaster at LAX in Los Angeles highlights the shortcomings of these procedures: there were thirty-four

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[167] *See* Nolan, *supra* note 1, at 44.

[168] Glenn F. Bunting, *USAir Jetliner Lacked Latest in Fire Safety*, L.A. TIMES, Feb. 6, 1991, at B1.

[169] *Id.*

[170] *Id.*

[171] *Id.*

[172] *Id.* (quoting Ralph Nader).

[173] *See* Nolan, *supra* note 1, at 44.

[174] *Id.* In a 1973 evacuation test, video cameras were aimed at the exits that would be working during the trial run. Although the participants in the test were not forewarned of which doors would be operable, the cameras allowed them to go directly to the working exits, alleviating the need to check doors. There was no danger, as there would be in an actual disaster, that exits might be inoperable and that passengers might be forced to try several before finding an escape. *Id.*

[175] *Id.*

[176] *Id.*

total deaths in the accident, eighteen of which were attributable to smoke inhalation.[177] Of the eighteen people who were asphyxiated, only one was not headed for an exit.[178] Six bodies were found face down, seven were in the aisle facing the direction of the rear exit, and four were found only a few feet from the right wing exit.[179] These deaths occurred on a plane which had not been refurbished with new fire blocking interior cabin materials,[180] whose purpose is to extend the amount of time a passenger has to exit the aircraft before toxic fumes overtake him.[181] The materials were not required to be installed by the airline at the time of the accident.[182] The jet was not outfitted with the most advanced fire retardant wall and ceiling panels which might have allowed the passengers a few extra seconds to escape the burning plane and thus saved their lives.[183]

The FAA mandates that the airline industry comply with certain standards and then allows the fulfillment of those requirements to go unconfirmed. The agency has a policy that manufacturers must comply with safety standards, and where a government activity involves safety considerations under an established policy, as opposed to balancing those considerations against competing policy factors, the DFE does not apply.[184] When the FAA requires compliance with certain standards and reviews to ensure compliance, activity in violation of that policy will not be sheltered from liability.[185]

V. PROPOSALS MADE TO INCREASE FIRE SAFETY

The NTSB is responsible for many of the proposals for more advanced fire safety precautions which the FAA con-

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[177] *See* Bunting, *supra* note 167, at B1.
[178] *Id.* The passenger was found still buckled into his seat. *Id.*
[179] *Id.*
[180] *Id.*
[181] *Id.*
[182] *Id.*
[183] *Id.*
[184] C.R.S. v. United States, 11 F.3d 791, 797 (8th Cir. 1993).
[185] *Id.*

siders.[186] The FAA is under no duty to adopt the proposals, but if it chooses not to, it must provide "conclusive evidence" as to why the preventive measure is either unnecessary or impractical.[187] Advanced safety measures which have been submitted to the FAA for further research include visco-modified fuel systems to prevent the fuel from misting upon impact, thereby reducing the chances of an explosion and resulting fireball.[188] Other proposals set forth by groups such as the non-profit Aviation Safety Institute and the Association of Flight Attendants are for improvements such as a passenger smoke hood or breathing device, automatic water sprinkler systems, and disconnect fuel lines.[189] Furthermore, there have been calls for increased aisle space and removal of seats for more accessible exits, flame-resistant walls and windows, and a halon-based fire suppression system that would flood the plane and suffocate a fire.[190]

A. Proposals For Fireproofing Cabin Interiors

The cabin walls, floors, and other interior materials must be made highly fire resistant if the passengers are to be given a chance to escape a post-crash fire.

1. Intumescent Paint on the Underside of the Plane

There is an intumescent paint available which prevents the melting of the skin when applied to the underside of the plane.[191] The paint expands when exposed to heat and forms a thick insulating layer which prevents the flames

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[186] *Oversight of the FAA: Hearing before the Subcomm. on Aviation of the Senate Comm. on Commerce, Science and Transportation*, S. Rep. No. 660, 100th Cong., 2d Sess., pt. 2, at 72-73 (1988) (statement of Hon. T. Allan McArtor, Administrator of FAA).

[187] *Id.*

[188] *Id.* at 104.

[189] *See* Kanamine, *supra* note 2, at 11A.

[190] *Id.*; *see also* Occupant Protection Standards for Commuter Category Aircraft, 58 Fed. Reg. 38028 (1993); Lee Dye, *Fleeing the Flames*, L.A. Times, Mar. 4, 1991, at B3; Jaclyn Fierman, *A Firefighting Polymer Is Winning FAA Favor*, Fortune, Dec. 10, 1984, at 128; Nolan, *supra* note 1, at 42; James Ott, *Water Spray System Studies to Improve Crash Survivability*, Aviation Wk. & Space Tech., May 6, 1991, at 29.

[191] Nolan, *supra* note 1, at 40.

from entering the cabin so quickly, thus allowing the passengers more time to exit the burning aircraft.[192] The FAA cites the results of testing as inconclusive and has refused to require the paint.[193]

2. Fire Resistant Cabin Interiors

Since 1957, all cabin interiors which are totally refurbished must be furnished with materials meeting stringent flammability standards.[194] When amendments were passed in 1986 requiring updated fire safety features, however, the FAA granted the airline industry a grace period of two years before manufacturers were required to comply with new flammability standards for newly built aircraft.[195] "Replacement" of interior materials does not include the replacement of refurbished decorative materials, provided the interior materials are placed in the same plane from which they were taken.[196] If, on the other hand, materials are removed and replaced in a rotational manner (removing them from one plane and refurbishing and installing them on another plane) this process will qualify as replacement and have to meet the stricter flammability requirements.[197]

Beginning in August 1990, the FAA required the installation of advanced fire safe ceilings and walls by airline manufacturers in all newly crafted planes.[198] The major renovation rule continued to apply to those aircraft currently in service.[199] The FAA also conducted tests on a material which would increase the flame-resistance of the windows by twenty-five per cent, but, according to the agency, the flame resistant windows were not strong enough to withstand impact.[200]

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[192] *Id.*

[193] *Id.*

[194] 14 C.F.R. § 121.312 (1994).

[195] *Id.*

[196] *Id.*

[197] *Id.*

[198] *See* Bunting, *supra* note 167, at B1.

[199] *See supra* notes 193-96 and accompanying text for a discussion of the major renovation rule.

[200] Nolan, *supra* note 1, at 40.

3. *Flame Resistant Seat Cushions*

It is only within the last decade that seat cushion requirements have been upgraded to prevent rapid ignition and propagation of flame from seat to seat.[201] Prior to 1983, flames would devour the cushions, emitting thick black smoke and toxic fumes, such as carbon monoxide, which are potentially fatal to humans.[202] Research indicates that rapid spread of fire from cushion to cushion contributes significantly to the suffusion of fire throughout the cabin.[203] The smoldering of the foam which comprises the seat cushions produces various results, all extremely hazardous to the occupants of the plane—thick black smoke, intense heat, formation of toxic fumes, and exhaustion of the oxygen supply.[204]

4. *Seat Spacing*

A quick and easy method of increasing the evacuation rate by up to fifteen percent would be to remove a seat in front of the wing exit, thus providing approximately twenty inches of additional space.[205] The spacing between seat rows, or "pitch," has steadily decreased from thirty-four in-

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[201] *See* Sun, *supra* note 12, at 35.

[202] *See* Nolan, *supra* note 1, at 40; *see also* Flammability Requirements for Aircraft Seat Cushions, 49 Fed. Reg. 43,188, 43,191 (1984) (codified at 14 C.F.R. § 25.853), setting forth a 1984 National Bureau of Standards test which included all world aircraft accidents where fire was a factor in fatalities. The test summarizes the benefits of a fire-blocking seat material, finding that there are fire blocking alternatives for which likely benefits clearly exceed likely costs. *Id.*

[203] *FAA Calls for New Seat Requirements for Commuter Category Aircraft*, THE WKLY. OF BUS. AVIATION, July 26, 1993, at 34. A DuPont neoprene foam called Vonar has been developed and is available which is much less flammable than urethane and there is also a fabric called Norfab which slows the penetration of heat to the cushion and also emits fewer toxic fumes and less smoke than conventional fabrics. *See* Nolan, *supra* note 1, at 41; *see also* Sun, *supra* note 12, at 35, 36. As of 1983, the FAA still had made no recommendations for new products for seat cushions. The airline industry has attempted to delay implementation of any new fabrics because they are too heavy. *See* Nolan, *supra* note 1, at 41.

[204] Foss & Tepper, *supra* note 9, at 818. Burning foam can deplete oxygen levels substantially in a short period of time, creating conditions that are often fatal. Additionally, the temperatures produced by burning plastic often reach up to 900 degrees centigrade, a temperature which although producing only a small layer of smoke, is also fatal. *Id.* at 818, 819.

[205] *See* Stolberg, *supra* note 165, at A1.

ches to the current standard of twenty-nine inches as the airlines have struggled to make ends meet by squeezing in more and more customers.[206] Proposals have been made to remove exit aisle seats completely in order to allow extra space in an evacuation, but none have been adopted.[207]

B. PROPOSALS FOR AUTOMATIC EXTINGUISHING SYSTEMS

1. Water Spray System

In the event of a fire, an automatic water spray system ejects a very fine mist diffused throughout the cabin.[208] The mist deters the spread of fire and decreases the amount of smoke and intensity of the heat in the cabin, thus allowing for a substantial increase in evacuation time for passengers in a post-crash fire.[209] The obvious benefit of the water spray system is the reduction in fire-related fatalities.[210] The incremental increase in weight is a key issue[211] and the argument that the increased weight disadvantage is overshadowed by the number of lives saved is not likely to influence the industry.[212] The focus of the airline carriers is so narrowly trained on cost reduction and strict cost-benefit analysis that most of the current research on water spray systems is concentrated in the area of weight reduction.[213] Another potential problem is the possibility of the fuselage breaking into pieces during a crash.[214] Crumbling of the structure of the plane's fuselage on impact could obviously dismantle the entire system by damaging command apparatus and rupturing tubing.[215] A trigger

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[206] *See* Nolan, *supra* note 1, at 43.

[207] *See* Stolberg, *supra* note 165, at A1.

[208] Ott, *supra* note 189, at 29.

[209] *Id.* One proposed system is comprised of a number of watertanks connected to a series of nozzles throughout the cabin. In the event of a fire, a fine mist is discharged from as many as 120 nozzles in a narrow body aircraft. Sam Elliott, *Damping Down the Fires*, FLIGHT INT'L, Feb. 11, 1992, at 46.

[210] *Id.*

[211] Ott, *supra* note 189, at 29.

[212] Elliott, *supra* note 208, at 46.

[213] *Id.*

[214] *Id.*

[215] *Id.*

system designed to cause discharge automatically upon damage to the operating system could overcome this problem.[216]

2. *Halon-Based Flood Systems*

Investigations by the FAA into automated extinguisher systems similar to lavatory receptacle systems have proved fruitless.[217] Although systems are available and some are even in use in engine compartments and lavatories aboard commuter planes, no system is required to extinguish a fire in the passenger compartment.[218] The system functions by flooding the compartment with halon gas upon detection of any potential eruption, immediately quenching the fire.[219] The weight is prohibitive—the system weighs 2000 pounds—but the advantages overshadow the costs.[220] Another potential drawback of the system is its potential effect on the ozone.[221] The airline industry, however, is concerned primarily with the costs of outfitting a plane with the Halon suppression system.[222] Finally, the effectiveness of the system in a high impact accident is questionable.[223] It is possible that if the fuselage breaks apart the system would also be destroyed and the gas would escape.[224]

C. Proposals For Fire-Resistant Breathing Devices

The oxygen mask allows in ambient air and is no protection in a smoke-filled compartment, because the wearer continues to breathe toxic fumes.[225] A smoke hood, on the

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[216] *Id.*

[217] Dye, *supra* note 189, at B3.

[218] *Id.*

[219] *Id.*

[220] Nolan, *supra* note 1, at 53.

[221] Dye, *supra* note 189, at B3.

[222] *Id.* It costs $7000 to outfit a bus, so the costs to put the system in a plane would be substantial. *Id.*

[223] *Id.*

[224] *Id.*

[225] Parker, *supra* note 46, at A25. The oxygen mask cannot protect a passenger from smoke and toxic fumes; it only provides sufficient oxygen to allow a passenger to breathe at very high altitudes. Dye, *supra* note 189, at B3.

other hand, is a plastic bag which is slipped over the passenger's head.[226] Cinching the thick, fire resistant bag closed around the neck shuts out toxic fumes.[227] The idea was proposed in 1969, but was withdrawn in the midst of vigorous protests by air carriers that the hoods would actually hamper evacuation time.[228] The airlines maintained that the time passengers would spend trying to get the hoods on would be better spent trying to evacuate the plane[229] and that people would be overcome with smoke while struggling with the hoods.[230]

The smoke hoods would be an inexpensive solution to the problem of evacuation time, but the FAA has refused to experiment with the device.[231] At a cost of $400 each, adding smoke hoods on flights would increase the price of an average ticket by less than fifty cents.[232]

D. Fuel System Improvements

Evacuation may be more severely impeded by explosions of fuel tanks after the crash than by the actual fire.[233] The fire is intensified by the explosion, thus increasing smoke, fire, and toxic fumes and making safe evacuation less likely.[234] There are means to prevent these explosions and to delay spread of post-crash fire, such as vent flame arresters and surge tank explosion suppression systems.[235] These devices will prevent explosion resulting from ground fire in an undamaged fuel system.[236] There is also a process by which fuel traveling from tank to engine can be shut off if

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[226] Dye, *supra* note 189, at B3.

[227] *Id.*

[228] Nolan, *supra* note 1, at 43.

[229] *Id.*

[230] Dye, *supra* note 189, at B3.

[231] *Id.*

[232] *Id.*

[233] *Implementation of SAFER Propulsion System Recommendations*, 49 Fed. Reg. 38,078 (1984). A passenger may be overcome by the toxic smoke from burning fuel in as little as a few seconds. S. Rep. No. 660, *supra* note 185, at 104.

[234] S. Rep. No. 660, *supra* note 185, at 104.

[235] *Id.*

[236] *Implementation of SAFER Propulsion System Recommendations*, 49 Fed. Reg. 38,078, 38,079 (1984).

necessary in an accident,[237] and a fuel additive which makes the kerosene less flammable by preventing the fuel from forming the highly flammable mist.[238]

VI. CONCLUSION

The means to prevent fire in the event of an airplane accident exist and in some cases have been available for years. Because of the lax attitude of the FAA in enforcing safety precautions, the industry can choose to ignore the available technologies and suffer no repercussions.[239] In the absence of action by the FAA, it is the responsibility of the legislature to provide the flying public with the security and safety which it expects.[240] If in doing so Congress strips away a portion of the FAA's immunity, such are the consequences of the FAA's languid approach to fulfilling its duty to ensure the safety of airline passengers. The impact of cases

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[237] *Id.* The FAA is also examining reinforced fuel tanks designed to withstand impact without rupturing and "breakaway" fuel lines capable of self-sealing to prevent the leakage of highly flammable jet fuel. Broder & Houston, *supra* note 36, at 18. A fuel tank shutoff system is currently being employed in some airplanes and with little effort could be installed on all aircraft. *Implementation of SAFER Propulsion System Recommendations*, 49 Fed. Reg. 38,078, 38,079 (1984). The breakaway fuel lines are designed to provide a shutoff valve capable of activation from the cockpit in the event of emergency conditions and the lines would self-seal upon impact. S. REP. NO. 660, *supra* note 185, at 99. Many manufacturers oppose the fittings, however, and consider the risk of a breakaway fuel line that breaks away in turbulence, shutting off the flow of fuel to the engines, to be a greater risk to commercial aviation than the chance of a line breaking after a crash. Parker, *supra* note 46, at A25.

[238] *See* Fierman, *supra* note 189, at 128. Two fuel additives are available which are designed to prevent a highly flammable kerosene mist from forming when a plane crashes. One is Avgard and the other is FM-9. *See* Nolan, *supra* note 1, at 42. Both additives operate to prevent fuel from misting upon impact by using methods which change the molecular structure of the fuel and keep it in the form of large droplets. *See* Fierman, *supra* note 189, at 128; Nolan, *supra* note 1, at 39.

[239] *See* Nolan, *supra* note 1, at 30; *see also supra* notes 185-237 and accompanying text for a discussion of proposed safety changes and the FAA's lack of responsiveness.

[240] Sam Fulwood III, *Panel to Push FAA for Better Safety in Burning Aircraft*, L.A. TIMES, Apr. 12, 1991, at A42. "Our government is teetering on the brink of criminal negligence because it fails to require that planes contain the safest materials." *Id.* Legislators have promised strong action against the FAA to force quick implementation of new safety regulations. These regulations are intended to give air travelers more time to evacuate a burning airplane. *Id. But see supra* notes 59-138 and accompanying text discussing the Discretionary Function Exception.

such as *Berkovitz* is uncertain. On the one hand, the decision may lead to a more cautious FAA and more thorough inspection of aircraft before certification.[241] On the other hand, the agency may feel compelled to abandon, or greatly curtail, its role as guardian of public safety.[242]

The FAA has gone so far as to admit its leniency in requiring every feasible fire safety precaution[243] and as recently as 1991 promised to enact new regulations that would allow improvements such as additional space around the emergency exits.[244] True to form, however, the FAA allowed the airlines a delay in implementation and there are still thousands of planes flying without the most advanced safety technology. In all likelihood those planes will continue to operate dangerously until there is a major renovation of their interiors.[245] It is entirely possible that in 1997 some planes will be flying without the most advanced technology.[246]

The predictable reaction of the industry to any pressure from the FAA would be to protest the requirements and appeal for delays and relaxation of standards. Their typical argument is unavailability of materials or prohibitive cost.[247] Delays granted to the airline industry to install the fire safety interiors demonstrate the FAA's unwillingness to crack down on safety standards. They are acting more as a management consultant than a regulatory agency, with their chief concern being cost-effectiveness rather than safety.[248] "They want to impose as little cost as possible on the carriers . . . . Basically, the industry is running the program."[249]

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[241] Boone, *supra* note 62, at 607.

[242] *Id.*

[243] *See* Fulwood, *supra* note 239, at A42.

[244] *Id.*

[245] *See* Kanamine, *supra* note 2, at 11A.

[246] Fulwood, *supra* note 239, at A42.

[247] Broder & Houston, *supra* note 36, at 18.

[248] Nolan, *supra* note 1, at 48.

[249] Bunting, *supra* note 167, at B1 (quoting Chris Witkowski, Director of Aviation Consumer Action Project).

The immunization of the government from liability for harm inflicted directly or indirectly as a result of agency decision making seems to have set in motion a trend toward the relaxation of responsibility by government officials in carrying out their duties.[250] A disaster flowing from circumstances over which the government has control is a danger against which the public cannot protect itself.[251] When the negligence or carelessness of a government official can be clothed in public policy or language of discretion to unjustly escape liability, the public victim is left with no recourse against the cause of his injury. Consequently, the possibility of escape from liability has lured the government to use the FTCA and its DFE exemption to defend against cases where the official exercised a less than reasonable standard of care in performing his duties.[252]

If a government officer acts without due care for the well-being of the public, there is no legitimate excuse for allowing that action to fall within the scope of the DFE.[253] Good policy dictates that we cannot allow officials to carry out their duties carelessly, no matter what the balance of economics against safety.[254]

The FAA's response to this criticism is that chances are almost 100% that a flight will take place without incident. Given these statistics, the costs, both economically and in terms of manpower, to provide substantial measures of safety beyond those already in place are unacceptable.[255]

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[250] *See* Dalehite v. United States, 346 U.S. 15, 50 (1953) (Jackson, J., dissenting).

[251] *Id.* at 48.

[252] *Id.* at 50. There is a distinguishable difference between a discretionary decision which is properly implemented and protected by the DFE and one which is negligently executed through non-discretionary activities. Bagby & Gittings, *supra* note 77, at 246. *Dalehite* clearly sets out the boundaries for protection of efforts in furtherance of policy-based decisions. Nonetheless, if the actions are negligent, they should not be protected. *Id.*

[253] *Dalehite*, 346 U.S. at 60 (Jackson, J., dissenting).

[254] *Id.* at 58.

[255] Donald D. Engen, *The FAA and Airline Safety*, MIAMI HERALD, Sept. 1, 1985, at 1E (Engen was the Administrator of the FAA at this point). The FAA asserts that there are no documented deaths attributable to inflight fires aboard U.S. carriers and that inflight fires which actually develop into a danger to the passengers are rare. S. REP. No. 464, 99th Cong., 2d Sess. 40 (1985).

The ratio is hundreds of millions of dollars to a few lives, and in the view of the FAA, the costs outweigh the benefits.[256] If the improvements save thirty lives over a fifteen year period,[257] the costs of the programs are six times the benefits, according to the FAA.[258] The fiscal considerations are key, and "if it's cheaper to kill you than to fix it, they'll kill you."[259]

The FAA has "insisted that it would be 'extraordinarily expensive' for airlines to equip their entire fleets with state-of-the-art, flame-resistant interiors."[260] The government estimates a cost of $4.7 billion over twenty years to revamp the entire American fleet, including lost revenues and remodeling expenses.[261] The cost of crashworthiness improvements must be considered in light of what the airlines do spend money on—$1.5 million per plane in 1984 to improve the paint jobs and interiors and $8 million on honey-roasted peanuts.[262] The most effective improvements are those the airlines consider to be the least valuable, opting instead for an attractive public relations program to put the public's

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[256] *See* Broder & Houston, *supra* note 36, at 18. The primary aim of the FAA is to make sure that the cost of improving flight safety is equalled or exceeded by the financial benefit of providing the improvements. S. REP. No. 464, 99th Cong., 2d Sess. 39 (1985) (statement of Donald D. Engen, Administrator). Safety standards set down by the FAA are such that money-conscious executives can shave safety measures up to a point where they are still functioning within regulatory limits, but are not necessarily operating safely. S. REP. No. 25, 100th Cong., 2d Sess. 136 (1987) (statement of Capt. Henry A. Duffy).

[257] Broder & Houston, *supra* note 36, at 18.

[258] *Id.* The costs of the program are $6 million per life, and the FAA assigns the value to a life at only $1 million. *Id.*

[259] Nolan, *supra* note 1, at 50 (quoting Harry Robertson, an aviation crash survivability expert).

[260] Fulwood, *supra* note 239, at A42.

[261] *Id.* Estimating that a life is worth $500,000 and that there will be 80 deaths every 10 years, 20 of which can be prevented by improved fire safety precautions, the cost to the industry of not making the improvements is $10 million, or $1 million per year. The cost over a ten year period of making the improvements to save those 20 lives, however, is $20 million for new seats, $2 million for new upholstery, $5 million for extra fuel, and $50 million revenue loss if seats were removed to allow better egress. The total cost of over $75 million to outfit the planes with improved fire blocking materials far outweighs the $10 million it would cost to let the 20 people die. Therefore, a good business decision would be not to make the improvements. Nolan, *supra* note 1, at 50-51.

[262] Nolan, *supra* note 1, at 53.

mind at ease about the safety of flying.[263] All of the improvements which would reduce fatalities in the event of an accident and post-crash fire—smoke hood, fuel additives and flame arresters—are considered too costly by the airline industry.[264] The absurdity of the FAA's whole argument is that what the airlines term an "industry cost" is in fact passed on through ticket prices to the paying passenger.[265] The airlines refuse to pay for precautions which would in fact cost them little or nothing.

Economic factors cannot prevail when the government has undertaken the role of ensuring the general well-being of the public. In the case of the FAA, the DFE allows for too much attention to fiscal matters with too little liability for the harm which occurs as a result of ignoring safety concerns.[266]

A less flexible standard whereby the FAA is held responsible for the decisions it makes concerning public safety will prevent the hands-off approach that the FAA has thus far adopted. By requiring the FAA to adopt a policy which must be adhered to when reviewing manufacturer compliance with safety measures, the legislature will ensure that the actions of the FAA in promoting flight safety will be performed with due care.[267] The courts' measurement of the actions of the agency against the prescribed procedures will be outside the realm of judicial "second-guessing" and thus will not violate the spirit or the letter of the DFE.[268]

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[263] *See* Broder & Houston, *supra* note 36, at 18.

[264] *Id.*

[265] S. REP. No. 464, 99th Cong., 2d Sess. 38 (1985) (statement of Donald D. Engen).

[266] *Id.* at 58.

[267] *See* C.R.S. v. United States, 11 F.3d 791, 797 (8th Cir. 1993).

[268] *Varig Airlines*, 467 U.S. at 814.