CHAPTER 4
AIR CRASH LITIGATION:
THE LIABILITY ENVIRONMENT IN WHICH THE NTSB OPERATES

Just as aircraft and the systems in which they operate continue to grow in complexity, so too does the legal system within which claims related to air crashes are contested. This complexity has important implications for the NTSB's operations and procedures, particularly the ones that rely on the party process. Isolating the NTSB from the litigation environment is virtually impossible as long as the NTSB relies on the party process to conduct its major investigations and the litigation and resolution of claims substantially depends on NTSB findings.

This chapter discusses the liability environment in which the NTSB operates and evaluates the increasingly partisan role of parties to its investigations. This chapter also considers to what extent the NTSB's "probable cause" finding carries weight in air crash litigation, and whether this finding serves the Safety Board's statutory goal of improving air safety.

The stated mission of the NTSB is to investigate the facts, circumstances, and probable cause of an accident and make recommendations to prevent similar accidents from happening in the future. NTSB investigations occur in an environment surrounded by the aviation liability and claims process. The specter of dozens, if not hundreds, of lawsuits appears as soon as the magnitude of the tragedy becomes apparent. The parties likely to be named to assist in the NTSB investigation are also the most likely to be named defendants in the civil litigation that inevitably follows a major accident.

The investigation process, as important as it is to the safety of the flying public, has unintentionally also become important to the establishment of legal fault and blame. Separating the NTSB investigative process from the litigation process is a well-intentioned idea that is of limited practical utility given the importance of one process to the other. Few limits remain on the use of NTSB reports in civil litigation. As a consequence, NTSB final accident reports,

considered by all sides to be the "roadmaps to liability," figure prominently in court proceedings.

The party process always presents inherent conflicts of interest for entities that are both parties to an investigation and "parties defendant" in related litigation. RAND has found, at least with some accidents, that the party system is potentially unreliable and party representatives may act to further various interests beyond prevention of a similar accident. While certain parties are uniquely able to provide essential information about matters such as aircraft design or airline operations, there are limits to the effectiveness or integrity of the party system in certain kinds of complex accidents.

The most controversial element of the NTSB investigation process is the *statement of probable cause* set forth in the final accident report. Within the NTSB environment, this statement reflects the cumulative fact-finding efforts and analysis in the NTSB investigative process. However, probable cause statements reverberate far beyond the halls of the NTSB, significantly influencing the means for assigning legal fault and blame. Suggestions for improving the accident investigation process are in part to curtail the finger-pointing often associated with the NTSB's determination of probable cause. Many aviation professionals propose, for example, rigorous analytical techniques that examine the complex events that may have caused an accident, which they assert would provide more useful information than focusing on a single probable cause.

CHARACTERISTICS OF AIR CRASH LITIGATION

In 1988, the RAND Institute for Civil Justice (ICJ) published an unprecedented study of air crash litigation and victim compensation. The three-year Aviation Accident Study gathered data that for the first time permitted analysis of litigation outcomes and litigant behavior in difficult cases (King and Smith, 1988a, p. 2). The survey used in the study was derived from the files of insurance carriers and defense lawyers pertaining to the 25 major accidents (aircraft with more than 60 seats or accidents resulting in more than five deaths) involving U.S. carriers from 1970 to 1984. These accidents resulted in 2,228 deaths,

although the analysis took account of only 2,113 claims for which some kind of economic loss could be calculated.

The complexity of aviation accident litigation has evolved as the industry itself has evolved. Early airliners carried only about 60 passengers and were far less technically complex than today's aircraft, some of which can transport 400 or more passengers. For airline passengers, air travel has matured from an adventurous activity that carried with it a certain amount of risk to an everyday event, integral to commerce and leisure, that involves minimal risk. Because airline travel is now so commonplace, juries are inclined to assume that accidents are caused by negligence (Kreindler, 1998, pp. 1–2).

As the perception of the risk involved with air travel has changed, significant changes in the law (including the emergence of the doctrine of *strict liability* in tort law) have created new theories of liability and altered the balance between claimants and aircraft manufacturers or airline operators.

The 1988 RAND study demonstrated that most aviation lawsuits filed in response to major commercial aviation disasters are wrongful death actions for economic and noneconomic damages resulting from the death of a spouse or close family member. In nearly all commercial aviation disasters there are few, if any, survivors among the passengers and crew. Claims, therefore, are primarily for wrongful death and only rarely for personal injuries (King and Smith, 1988a). The complexity of modern aviation makes it difficult to know exactly which entities to sue when an accident occurs, a situation that has resulted in suits against multiple defendants, such as all parties involved in manufacturing, operating, and regulating the aircraft in question (King and Smith, 1988a, p. 8).

Lawsuits can be brought in either state or federal courts, depending on the plaintiff lawyer's assessment of which jurisdiction is more likely to award large damages or whether punitive damages are available. In the federal court system, cases pending in different jurisdictions are combined for pretrial proceedings. When this occurs, a small group of attorney specialists, who have significant collective expertise and clout in negotiating on behalf of potentially dozens of

claimants, is appointed to the plaintiffs' steering committee (King and Smith, 1988a, p. 12).

The claims examined in the 1988 RAND study also revealed that aviation litigation is costly, time-consuming, and more likely than other types of litigation to be resolved with a trial. Of the 2,113 potential claims during the period between 1970 and 1984, actual claims were filed for all but two, and lawsuits were filed in two-thirds of these cases. Although 86 percent of those cases were settled before trial, a higher percentage of aviation cases proceeded to trial (14 percent) than cases for other types of civil litigation (5 percent of which proceed to trial), including other types of personal injury litigation.

Insurance carriers generally took the lead in settling aviation claims by contacting families, handling their claims, and hiring local defense counsel to litigate claims that were not settled. In addition, the RAND study showed that aviation litigation became more contentious over time; the number of claims filed during this 14-year period was unprecedented. These trends are significant for the NTSB. With more at stake, the importance of the outcome of the NTSB investigation to the potential liability of the defendants becomes evident.

The stated position of insurers following an accident is spelled out in a Funding Agreement.[1] In most major commercial aviation litigation, the insurance company that has assumed most of the risk for the airline takes the lead in controlling the case and handling claims. Typically, however, multiple defendants are named in the lawsuits. In virtually all cases studied in the 1988 report, the airline in question was sued, but the aircraft manufacturer, engine manufacturer, airport

[1]A *funding agreement* is an agreement between persons and/or entities potentially liable for damages to one or more claimants whereby the parties agree to share in the payment to settle a judgment. A funding agreement is intended to expedite the resolution of claims. Such arrangements require each party to recognize its potential liability based on its own preliminary investigation or participation in the NTSB process. Early in an investigation, there may not be sufficient information to justify a final commitment to specific dollar amounts, or specific percentages of settlements or judgments (Confidential interview with a leading aviation insurance executive, December 6, 1999; King and Smith, 1988a, pp. 8–9; Hilliard, 1996; Hunt, Irvine, and Stoll, 1986).

authority, or government agencies, such as the FAA or the U.S. Weather Service, were also named as defendants. After the airline, the aircraft manufacturer was the second most frequently named defendant. Commercial air crash litigation is unique in that it exposes the defendants--most often the airline or the aircraft manufacturer--to the risk of being held liable for many deaths. In addition to imposing multimillion dollar jury awards, such litigation is usually highly publicized, exposing defendants to adverse publicity that could jeopardize their competitive business positions.

The high-stakes nature of this kind of litigation is intensified by the demographic makeup of air passengers. The 1988 RAND study determined that air crash victims differ from the general U.S. population in ways that translate into higher compensation for their deaths (Kakalik et al., 1988, p. 86). For example, based on the data collected from 1970 to 1984, air crash victims were predominantly married men in their prime earning years (age 30 to 59). Many were highly paid professionals or executives with incomes nearly twice the U.S. average. In addition, roughly 40 percent of the claims involved multiple deaths in the same family.

THE CHANGING FACE OF AVIATION LITIGATION

The 1988 RAND study has not been updated, nor has any subsequent published research delved further into the subject of air crash litigation and victim compensation. For example, there has been no reported examination of the correlation between the length of an NTSB investigation and delays in resolving aviation victim claims. Because the information needed to update the research is proprietary and belongs to a handful of aviation insurers and defense law firms, any discussion of the changing nature of airline accident litigation is limited to anecdotal information from attorneys and insurance executives willing to share their experiences and insights.

For the present study, RAND conducted confidential interviews with plaintiff and defense lawyers involved with litigation related to recent major commercial aviation accidents and insurance executives who have

handled such claims. These interviews reveal some important trends in aviation litigation, which are discussed in the following sections.

Fewer Early Settlements

Very few, if any, claims for compensation are now settled without the involvement of a lawyer. Generally, the airline's insurance company takes the lead in negotiating and paying compensation on behalf of all potential defendants (Whalen, 1998). This process begins shortly after the accident occurs, after the insurer contacts the family members of deceased passengers. Although no statistics are available to support this, defense lawyers and insurance executives agree that in today's litigious climate few of these initial contacts would lead directly to settlements. The increased cohesiveness of family support groups gives the victims' families access to information about the legal process and seems to play a part in reducing the number of settlements that can be achieved without the participation of a plaintiff's attorney.

In an earlier era, surviving family members were typically represented by their family lawyers who were not necessarily experts in the complexities of aviation litigation. Now, however, such family advisors are more likely to simply help claimants find lawyers who do specialize in aviation cases. The engagement of a specialist reduces the likelihood of early settlement and may ultimately result in payment of higher compensation to claimants.

In addition, at least one family support group is usually formed after a major commercial aviation accident. Such groups provide essential support and counseling for grieving family members through the Internet or other channels of communication. Family support groups also facilitate communication among claimants about the prospects for legal action against an airline or other possible defendants and they enable families to exchange information about plaintiffs' attorneys. In some instances, such communication has promoted groups of claimants to seek collective representation, thereby seriously diminishing the likelihood of early individual settlements without legal action.

Fact-Finding Through Litigation

One of the principal motivating factors behind claimants seeking recourse through the tort system is their simple desire to "find out what happened" (Hensler, 1998, pp. 159–160). Nowhere is this motivation more prevalent than among surviving family members of victims of a major commercial air crash.

Several factors contribute to the zeal with which air crash claimants seek knowledge of the factual circumstances of the accident through the civil litigation process. First, and possibly most important, claimants are specifically barred from participation as parties in the NTSB accident investigation. Plaintiffs and their attorneys are prohibited from observing the collection of physical evidence, the testing of component parts, and any other aspect of a complex investigation that may take many months or years to complete.[2] Nor do plaintiffs' experts contribute to or participate in the NTSB investigation.

On the other hand, the defendants (the airline, the aircraft or component manufacturer, air traffic controllers, or others) are extensively involved in every aspect of the NTSB process, serving on groups organized by the NTSB to determine the facts of the accident. Often, the very parties who are defendants in a related legal action conduct critical tests for the NTSB, leading to charges that the results of such tests are biased and untrustworthy. Additionally, in some instances, NTSB investigations can take up to two or more years to complete only to result in inconclusive or incomplete findings about the probable cause of an accident. In these circumstances, civil litigation, with the promise of extensive discovery, remains the only other avenue by which family members may uncover "what happened" to cause the accident.

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[2] In *Graham v. Teledyne-Continental Motors,* 805 F.2d 1386 (9th Cir. 1986), the court upheld the refusal of the NTSB to permit a representative of the pilot's estate to participate in or observe the NTSB's testing and disassembly of the engines involved in a fatal GA accident.

Contested Liability

In many, if not most, aviation accident cases, the defendants offer to stipulate to liability in exchange for an agreement by the plaintiff to waive punitive damage claims. Such offers are usually made when the NTSB investigation is concluded and the determination of probable cause, backed by extensive factual findings, makes it evident that the defendant is unlikely to escape liability. Conversely, the NTSB findings may suggest that an accident was not caused by sufficient misconduct to support an award of punitive damages.

In the absence of a liability contest, the only issue to be resolved through litigation is the amount of compensation to be paid. However, buoyed by claimants who are more interested in determining "what happened" than in immediate compensation, some plaintiffs' lawyers are now more willing to refuse to accept such stipulations of liability. This strategy affords litigants the opportunity to engage in extensive discovery and possibly find different (and more damaging) facts than were uncovered by the NTSB investigation.

At a minimum, the threat of extensive discovery--which can require the production of a considerable amount of documentation and the interrogation of top-level corporate executives--provides plaintiffs with additional leverage when it comes to settlements. If a case goes to trial, evidence of the defendants' wrongdoing is likely to produce higher jury awards than if the evidence is limited to economic valuation of the compensation claim.

Escalating Jury Awards and Insurance Settlements

Recent settlements and jury awards illustrate the high stakes and high visibility surrounding aviation accident litigation.

- More than $1 billion was paid in total compensation and litigation expenses with respect to deaths and injuries in the 25 aviation accidents considered in the 1988 RAND study--an average of $42 million per accident. Today, jet aircraft carrying 150 passengers or more are insured for an average of $500 million to $1 billion, the anticipated payout in the event of a single catastrophic accident.

- Twenty-one claims stemming from the 1994 crash of American Eagle Flight 4124 in Roselawn, Indiana, were settled in federal district court in Chicago in 1997 for more than $110 million.
- A state court jury in Cook County, Illinois, awarded $28.2 million to the surviving widow of a 71-year-old man killed in the crash of United Airlines Flight 232 in Sioux City, Iowa, in 1989. The widow was also injured in the crash. The damages were primarily awarded on the basis of the pain and suffering of the plaintiff, as well as for the wrongful death and suffering of her elderly husband. Several plaintiff and defense lawyers interviewed by RAND pointed to this case as evidence that juries are more willing than in the past to award high levels of damages in cases involving senior citizens, especially when pain and suffering during the crash sequence can be demonstrated.

Another indication of the rising cost of major commercial aviation accidents is the aggregate sums paid by insurers to cover hull losses and liability. As indicated in Figure 4.1, worldwide hull and liability losses for major commercial accidents have risen dramatically since 1980, escalating from approximately $500 million in 1980 to almost $2 billion in 1998 (Airclaims, LLP, 1998).

The Use of NTSB Materials in Civil Litigation

Since the inception of the NTSB as an independent investigative organization, efforts have been made to prevent the agency's work product--including opinions and conclusions regarding the cause of aviation accidents and other transportation mishaps--from being used in civil litigation. In most aviation accident cases, one or more of the litigants seeks to introduce some part of the NTSB's work into evidence, usually to establish facts that are uniquely within the possession of the on-scene investigator or to offer "factual findings" as a possible foundation for determining legal fault and liability (Kreindler, 1998, p. 19-4).

Litigants may attempt to introduce into evidence NTSB factual reports and summaries, data compilations, photographs, flight and

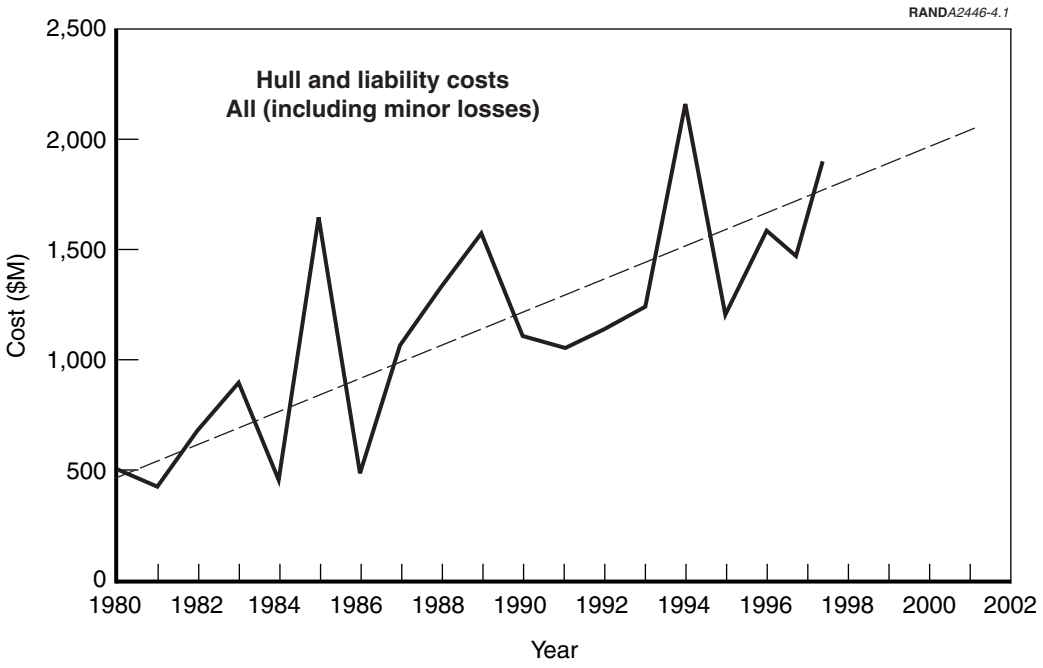

Figure 4.1--Worldwide Hull and Liability Costs, 1980 to 2002

maintenance records, or CVR and FDR transcripts, or obtain the testimony of NTSB investigative personnel (Miller, Winter 1981, pp. 279–284; Atwood, 1987).

Section 701(e) of the Federal Aviation Act of 1958 (49 U.S.C. 1441[e]) and Section 304(c) of the Independent Safety Board Act of 1974 (49 U.S.C. 1903[c]) preclude the use or admission into evidence of any NTSB report "relating to any accident or the investigation thereof," in "any suit or action for damages growing out of any matter mentioned in such report." Current regulations limit the testimony of Safety Board employees to the factual information obtained during the course of an investigation, including evaluations embodied in their accident reports.

Investigators are prohibited from testifying in court; such testimony is available only through depositions or written interrogatories. Because NTSB employees are authorized to testify only once in connection with an accident investigation, all interested parties must attend that single deposition, no matter how many lawsuits have been filed. Consistent with these provisions, NTSB employees are

forbidden to use an NTSB Accident Report for any purpose during their testimony.[3]

Several justifications support the limitations on using NTSB materials in civil litigation. Although the legislative history of this provision is sparse, the apparent congressional intent of 49 U.S.C. 1441(e) was to ensure that the NTSB (and its predecessor agencies) did not supplant the role of the judge and jury in determining the cause of accidents and to encourage accurate and independent accident investigation by keeping the NTSB apart from any determination of liability (Kreindler, 1998, §19.01[1]; Campbell, 1996).[4] In addition, it was assumed that witnesses would not disclose facts completely and honestly to investigators unless they were guaranteed confidentiality. Finally, the NTSB's limited resources would be drained if investigators spent too much of their time testifying in civil damage suits.

Whereas the basic rationale for limiting the use of NTSB reports within the context of litigation remains valid, such well-intentioned designs to isolate the NTSB from the litigation environment ultimately have limited utility. As described by a former general counsel of the NTSB, these rules are intended to strike a balance between the legitimate needs of litigants to discover factual information within the exclusive control of NTSB personnel and the need of the NTSB to conserve its resources and avoid the "entanglement of its prestige and neutrality in litigation" (Campbell, 1996, p. 12). However, the NTSB's findings regarding the probable cause of a major commercial aviation accident are ultimately so important to the determination of legal fault that such neutrality is difficult, if not impossible, to maintain.

These issues pose a fundamental question: How much of the NTSB's data can be used to help prove a claim or to defend or impeach a witness? As detailed in Chapter 2, the NTSB develops two types of reports: a detailed "factual file" containing Working Group factual reports, test results, testimony from hearings, and other data (which is

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[3] 49 CFR 835.3 and 835.5.

[4] *Universal Airline, Inc. v. Eastern Air Lines, Inc.*, 188 F.2d 993 (D.C. Cir. 1951); *Lobel v. American Airlines, Inc.*, 192 F.2d 217 (2d Cir. 1951).

sometimes very extensive) collected by investigators; and the NTSB Blue Book report containing facts, analysis, findings, and a statement of probable cause.

The earliest interpretations of 49 U.S.C. §1441(e) held that written reports could not be admitted into evidence, but judges could compel investigators to *testify* to the facts surrounding an accident and the on-site investigation.[5] *Lobel v. American Airlines, Inc.,* and numerous cases thereafter, held that admission of an investigator's factual report is permissible in so far as the report "contained no opinions or conclusions about possible causes of the accident or defendant's negligence."[6,7]

Rejecting a literal interpretation of the precursor to §1441(e), the *Lobel* court found that the intention of the provision was to guard against the introduction into evidence of agency views on "matters which are within the functions of courts and juries to decide." More recent decisions have held that the statute only excludes conclusions regarding the probable cause of an accident, approving the general admissibility of the rest of an NTSB "Blue Book."[8]

Although the predominate view allows for the general admissibility of all materials produced by the NTSB other than conclusions or opinions as to probable cause, a minority of courts have interpreted §1441(e) as an absolute bar to admission of any part of an NTSB report, other than a "Factual Accident Report."[9] In the *Sioux City* litigation, the plaintiffs sought to introduce at trial the entire NTSB "Aircraft Accident Report" containing a compilation of all the factual information uncovered in the

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[5]*Universal Airline, Inc. v. Eastern Air Lines, Inc.,* 188 F.2d 993 (D.C. Cir. 1951).

[6]*Lobel v. American Airlines, Inc.,* 192 F.2d 217 (2d Cir. 1951).

[7]*Berguido v. Eastern Air Lines, Inc.,* 317 F.2d 628 (3rd Cir. 1963); *Fidelity & Casualty Co. of New York v. Frank,* 214 F.Supp. 803 (D CT 1963); *American Airlines, Inc. v. U.S.,* 418 F.2d 180 (5th Cir. 1969).

[8]In re Air Crash Disaster at Stapleton International Airport, Denver, Colorado, on November 15, 1987, 720 F.Supp. 1493 (D. CO 1989); in re Air Crash Disaster at Charlotte, North Carolina, on July 2, 1984, 982 F.Supp 1071 (D. S.C. 1996).

[9]In re Air Crash Disaster at Sioux City, Iowa, on July 19, 1989, 780 F.Supp. 1207 (N.D. IL 1991); in re Air Crash Disaster Near Roselawn, Indiana, on October 31, 1994, 1997 WL 572896 (N.D. IL 1997).

investigation, along with an analysis of the factual data and numerous conclusions about alternative or competing theories of causation. The court held that "the unequivocal wording of sections 1441(e) and 1903(c) appears to leave no room for creative interpretation. The language on its face states an absolute bar to the use of NTSB reports in the present action." The decision did not specifically address the admissibility of factual accident reports, although other courts have read *Sioux City* as an absolute bar to *any* reports generated by NTSB employees.[10]

In an effort to clarify the confusion over the admissibility of reports generated by the NTSB, on December 17, 1998, the NTSB issued amendments to 49 C.F.R. Part 835. The amendments attempt to clarify the use of Safety Board reports in litigation. As amended, the new regulation defines "Board accident report" and "factual accident report" as follows:

- **Board accident report** refers to the report containing the Safety Board's determinations, including the probable cause of an accident, issued either as a narrative report or in a computer format ("briefs" of accidents). Pursuant to section 701(e) of the Federal Aviation Act of 1958 (FA Act), and section 304c of the Independent Safety Board Act of 1974 (49 U.S.C. 1154[b]) (Safety Act), no part of a Safety Board accident report may be admitted as evidence or used in any suit or action for damages growing out of any matter mentioned in such reports.
- **Factual accident report** refers to the report containing the results of the investigator's investigation of an accident. The board does not object to, and there is no statutory bar to, admission in litigation of factual accident reports. In the case of a major investigation, group chairman factual reports (see Chapter 3 for more information) are factual accident reports.

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[10] *Daniels v. Tew Mac Aero Servs.,* 675 A.2d 984 (ME 1996*); Trans States Airlines v. Pratt & Whitney Canada, Inc.,* 1995 U.S. Dist. LEXIS 1641 (N.D. IL, 1995).

These amendments attempt to create a clear line between factual investigators' reports and reports containing the Safety Board's conclusions. The provisions seem to indicate that an investigator's opinions and conclusions contained in the factual accident report will not be barred by the statute, although an NTSB employee will only be allowed to *testify* as to factual information (Stern, Winter/Spring 1999).

A recent decision by the U.S. Court of Appeals for the District of Columbia Circuit may go even further toward resolving the issue of the use of NTSB Accident Reports in litigation. In *Chiron Corp. and Perseptive Biosystems, Inc. v. National Transportation Safety Board,* 198 F.3d 935 (D.C. Cir. 1999), parties to an NTSB investigation sought to obtain information about cargo being carried aboard a Federal Express flight when the NTSB decided not to share such information. The petitioners claimed that they were entitled to such material because the factual portion of the NTSB Accident Report might eventually be admitted as evidence in a lawsuit that Federal Express had filed against them.

As an initial matter, the D.C. circuit court rejected the premise that the NTSB report itself would be admissible in a civil lawsuit. The court found that Congress had explicitly provided that "no part of a report of the Board, related to an accident or an investigation of an accident, may be admitted into evidence or used in a civil action for damages resulting from a matter mentioned in the report (49 U.S.C. §1154[b])."

Siding with decisions from the Fifth, Ninth, and Tenth Circuits, the D.C. circuit court held that "under the plain terms of the statute, NTSB reports are inadmissible in civil litigation."[11] Finding prior judicial distinctions between "factual findings" and "reports of the Board" to be "judicial mislabeling," the court determined that the amended NTSB regulations had clarified the permissible use of the two types of materials. Given accident victims' unquestionable access to

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[11]198 F.3d at 941; *Campbell v. Keystone Aerial Surveys, Inc.,* 138 F.3d 1996 (5th Cir. 1998); *Thomas Brooks v. Burnett,* 920 F.2d 634 (10th Cir. 1990); *Benna v. Reeder Flying Serv., Inc.,* 578 F.2d 269 (9th Cir. 1978).

necessary factual information, the D.C. circuit court held that the courts no longer needed to employ an "exception" to the statute to protect parties in litigation.

NTSB reports have also been barred from use as evidence because of the "hearsay" nature of the materials or testimony. Typically, *hearsay* is defined as "an out of court statement offered to prove the truth of the matter asserted therein." However, Federal Rules of Evidence (FRE) 803(8) provides an exception to the hearsay rule for "public records and reports" setting forth "factual findings resulting from an investigation made pursuant to authority granted by law, unless the sources of information . . . indicate lack of trustworthiness."

In interpreting the hearsay rule, courts questioned whether "factual findings" included "opinions or conclusions." This "arbitrary distinction" was considered by the U.S. Supreme Court in *Beech Aircraft Corp. v. Rainey,* a case concerning the admissibility of evaluative opinions contained in a Judge Advocate General's report as to the cause of the crash of a Navy aircraft.[12] The Court held that the foundation for such a distinction between fact and opinion was questionable, particularly in the context of an aviation accident investigation, where factual findings might often include conclusions or opinions that flow from an investigation by reasonable inference. The "trustworthiness" inquiry, and not an artificial distinction between fact and opinion, was determined to be the primary safeguard against the admission of unreliable evidence.

Under the scheme adopted by the NTSB, the distinction between "fact" and "opinion" forms the basis for decisions regarding the use and admissibility of NTSB reports.[13] The Court's semantic analysis of FRE 803(8) in *Beech Aircraft* should serve as a warning against the false belief that the differentiation between fact and opinion is particularly meaningful:

> It has frequently been remarked that the distinction between statements of fact and opinion is, at best, one of degree; "All statements in language are statements of opinion, i.e.,

[12]488 U.S. 153 (1988).

[13]See 49 CFR 835.2 and 835.3.

> statements of mental processes or perceptions. So-called statements of fact are only more specific statements of opinion. . . .” Surely this “factual finding” could also be characterized as an opinion, which the investigator presumably arrived at on the basis of clues contained in the airplane wreckage. Rather than inquiring that we draw some inevitably arbitrary line between the various shades of fact/opinion that invariably will be present in investigatory reports, we believe the Rule instructs us--as its plain language states--to admit reports . . . setting forth . . . factual findings. The Rule’s limitations and safeguards lie elsewhere. . . .[14]

Four major factors govern consideration of the trustworthiness of government investigative reports, such as NTSB Accident Reports:

- the timeliness of the investigation
- the investigator’s skill or experience
- whether a hearing was held and the level at which it was conducted
- possible bias and motivation problems, such as whether the report was prepared with a view to litigation.[15]

If any portion of an NTSB report passes this inquiry and falls outside the limitations of §1441(e), it should be found to be admissible, provided it is not found to be prejudicial or irrelevant to the proceedings.

Disputes about the admissibility of NTSB materials are common. In fact, almost every recent case involving a major commercial aviation accident has involved some preliminary disputes about the use of NTSB reports before or during trial.[16] Although these exclusionary provisions lie at the core of the NTSB’s effort to remain outside the fray of civil litigation, the NTSB rarely gets directly involved in the struggles over admission of its reports. For example, the NTSB has never filed an *amicus* brief with any court seeking a strict interpretation of §1441(e). Ironically, it would appear that the U.S. Department of Justice,

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[14]488 U.S. 153 (1988) at 168-169.

[15]Fed R. Evid 803(8) and related commentary.

[16]In re Air Crash Disaster at Sioux City, Iowa, on July 19, 1989, 780 F.Supp. 1207 (ND IL 1991); in re Air Crash Disaster near Roselawn, Indiana, on October 31, 1994, 1997 WL 572896 (N.D. IL 1997); in re Air Crash Disaster at Charlotte, North Carolina, on July 2, 1984, 982 F.Supp 1071 (D. S.C. 1996).

representing the interests of the FAA (a frequent defendant in air crash cases), often seeks broad admissibility rulings for NTSB materials.[17]

Although NTSB investigators are frequently called upon to testify in civil proceedings, they are prohibited from giving expert or opinion testimony of any kind. Statements made by the NTSB's general counsel and top investigators imply that the NTSB attempts to maintain this distinction because offering testimony of opinion may erode its impartial posture toward the parties in litigation. NTSB policy allows NTSB counsel to accompany an employee to a deposition only once; after this initial deposition, employees are "on their own" (Campbell, March 1999). It is fair to say that sophisticated private lawyers representing parties in high-stakes aviation litigation make every attempt to exploit this situation, hoping to cross the thin, if not indefinable, line between factual and opinion testimony.[18]

NTSB Reports Are "Roadmaps to Liability"

The scheme of regulation that controls the use of NTSB reports in litigation, as well as the permissible testimony of NTSB employees, was devised to reduce or eliminate the NTSB's entanglement with private litigation. However, RAND's examination of this proposition has demonstrated that prior regulations have been of dubious value. As detailed earlier in this chapter, NTSB Accident Reports, factual reports, and other documents have been regularly admitted into evidence in private litigation for a variety of purposes.[19]

NTSB employees are frequently called upon to testify about the nature and extent of their investigations, often providing the only information that is available about the on-site investigation, the condition of the wreckage, component test results, and other critical

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[17]Confidential interview with Department of Justice attorney, Civil Division, Torts Branch, September 1998.

[18]Confidential interviews with plaintiffs' aviation attorneys, September 1998 and June 1999.

[19]It should be noted that the reports and submissions of any of the parties participating in an investigation, including possible defendants such as the airline, aircraft or component manufacturer, or the FAA, are admissible at trial as party admissions under FRE 1007 and related state evidence rules.

issues. Given the difficulty of clearly distinguishing "fact" from "opinion," it is not surprising that the attorney for one side may press an NTSB witness to testify to "fact" and that the attorney for the other side may object on the ground that the question calls for "opinion."

Because NTSB materials are commonly used in litigation, these reports are increasingly important to the outcome of high-stakes aviation cases. It remains to be seen whether the revised NTSB regulations, combined with much stricter judicial interpretation of the statutory prohibition on the use of NTSB Accident Reports in litigation, reduce litigants' reliance on these materials to any meaningful degree. Numerous lawyers, for both the plaintiff and the defense, refer to the NTSB Accident Reports as "roadmaps to liability." In this sense, admissibility of the reports as evidence at trial is secondary to the quantity and value of the information they contain. The facts, analysis, findings, and statement of probable cause set forth in NTSB "Blue Books" provide indispensable guidance about who might be at fault in an accident and why.

For plaintiff lawyers, whose clients have been excluded from the investigation process, the Accident Report and related factual materials tell them where to begin their own investigation in preparation for litigation. For instance, the Accident Report suggests areas of inquiry to pursue and expert witnesses to call, and helps plaintiffs' attorneys evaluate the merits of the case against particular defendants.

Without the availability of this "roadmap," plaintiffs' lawyers might be forced to commence their investigation into the cause of an accident with limited resources, forcing them to essentially "reinvent" the investigation that has already been exhaustively conducted by the NTSB. This very disparity between the availability of evidence on the side of the plaintiffs (who were not at the crash scene) and the defendants who may have access to information about the aircraft, has caused some courts to take note of the social benefits to be achieved by admitting NTSB reports into evidence, promoting the efficient resolution

of claims and holding down costs for civil litigants with limited funds (Kreindler, 1998, p. 19-5).[20]

EVALUATING THE PARTY PROCESS

Through the party process, the NTSB leverages its own resources by calling upon outside expertise to assist in determining the cause of an accident. Under this system "persons, government agencies, companies, and associations whose employees, functions, activities, or products were involved in the accident," are specifically included in the investigations, along with others who "can provide qualified technical personnel."[21]

The party system is essential to the NTSB investigative process. Without the input and expertise of the parties it is unlikely that the NTSB would have the technical capability to determine the cause of complex aviation accidents (Goglia, September 15–16, 1998). During the field investigation and throughout the fact-finding process, party representatives play a significant role in evaluating physical evidence from the crash and developing a complete and accurate factual record of the accident. This record serves as the basis for the NTSB's determination of probable cause (National Transportation Safety Board, 1998a; Pangia, 1995).[22]

The Role of Parties

The purpose of the party system is to allow those with specialized knowledge to aid in the investigation. Generally, this means aircraft owners and operators, airframe manufacturers, engine and component manufacturers, the FAA, and union representatives. According to NTSB regulations, no party to the investigation "shall be represented by any person who also represents claimants or insurers"; that is, "persons who have interests beyond the safety objective of the investigation."[23] This provision has been interpreted to bar injured passengers, the estates of

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[20]Also, *Gibson v. National Transportation Safety Board,* 118 F.3d 1312 (9th Cir. 1997).

[21]49 C.F.R. 831.11(a).

[22]Also, confidential interviews with NTSB IICs, December 1998.

[23]49 C.F.R. 831.11.

deceased passengers, or insurance companies from party status. This common interpretation of the rule does not, however, take into account the fact that parties (as defendants) can become "claimants" against each other.

Participants in a Safety Board investigation must have qualifications that relate to specific factual information or skills that would not otherwise be available to the Safety Board. Party representatives are assigned to the appropriate Working Groups and are expected to remain with the investigation until it is completed or until released by the group chairman or the IIC. In complex cases, accredited representatives can be involved with an investigation for months or even years. Working Group members help develop the findings of fact relevant to their areas of expertise and help write the group chairman's factual report.

Party representatives to NTSB investigations are required to sign a written declaration stating that participation is not "on behalf of either claimants or insurers" and that "participation is not for the purposes of preparing for litigation." Nevertheless, it is acknowledged in this declaration that any information obtained may ultimately be used in litigation. Further, the declaration states "it is understood . . . that this form is not intended to prevent the undersigned from participating in litigation arising out of the accident" or to require the declarant to disclose privileged communications with counsel.[24] These rules are designed to be sufficiently stringent to ensure that the safety mission of the NTSB is the only focus of an investigation. Party representatives are required to be responsive to NTSB investigators and staff and may lose their party status, and be expelled from the investigation, if they do not comply with their assigned duties or if they conduct themselves "in a manner prejudicial to the investigation" (National Transportation Safety Board, 1998a).[25]

Despite the intent of the NTSB party rules, the letter and spirit of this mandate are sometimes violated. The exclusion of claimants and the restrictions against litigation may help investigators focus on

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[24]The Party Pledge is shown in Appendix C of this report.

[25]Also, 49 C.F.R. 831.11(a)(1).

fact-finding during the critical early phase at the crash site.[26] However, technical experts representing and employed by the potential defendants may be motivated to influence the investigative outcome from the very outset, or may be induced to do so by the "lawyers behind the door" (Arslanian, September 1998).

The "lawyering" of NTSB investigations puts the integrity of the entire investigative process at risk. Although the practice is specifically excluded by regulation, it is no secret that lawyers for the parties closely track the ongoing investigation. Attorneys, some of whom have substantial experience in cases involving complex accidents, may attempt to shape the story of the tragedy to reflect their client's point of view.

Safety Board investigators and other party participants report that a productive synergy exists during the first few days of an investigation, but then rapidly dissipates once the parties' (defendants') legal departments get "cranked up." It has been obvious to investigators at recent crash sites that party representatives are being "debriefed" by their attorneys during the initial working phases of the investigation, often in the same hotel or other facility where the NTSB's work is taking place (Goglia, September 15–16, 1998).[27]

Some party representatives conscientiously pursue their responsibilities with the motivation of preventing future accidents. However, others contend they have little choice but to respond to the dictates of corporate managers who are equally, if not more concerned, about the potential liability and corporate image problems associated with a major plane crash.[28] Even though the Safety Board's own regulations declare that accident investigations are "fact-finding proceedings with no formal issues and no adverse parties," and that they are "not conducted for the purpose of determining the rights or

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[26]Confidential interviews with NTSB IICs, December 1998.

[27]Also, confidential interviews with aviation insurance executives, December 1998; confidential interviews with aviation defense lawyers, July 1998 and January 1999.

[28]Confidential interviews with party representatives, USAir Flight 427, September 1998; confidential interviews with party representatives, United Flight 585, December 1998.

liabilities of any person," in the case of major commercial aviation accidents, the NTSB investigation is, in practice, the starting point for the assignment of fault.[29]

The involvement of insurers in the investigative process poses similar questions about conflict of interest. Despite clear restrictions on their participation, the NTSB has routinely granted insurance company representatives access to accident scenes because the costs of salvage recovery and wreckage removal are usually covered by an airline's liability insurance policy (Flight Safety Foundation, December 1994; Miller, Winter 1981).[30]

Insurance representatives arrive on the scene almost as soon as NTSB investigators, offering their assistance and cooperation, and at the same time obtaining almost immediate access to the crash site, access that is not available to any other party or claimant. In confidential interviews, senior NTSB investigators readily admit that, despite NTSB regulations, they are "happy to have the insurers show up." The insurers offset costs and provide necessary support to the investigation, including heavy machinery, communications equipment, computers, and accommodations.[31] The insurers, their investigators, and their lawyers immediately develop theories of causation, upon which they base a preliminary "funding agreement" to allocate payment of compensation to victims. These theories also provide a foundation to begin developing litigation defense strategies (Mathews, September 15-16, 1998).[32]

To many plaintiffs' attorneys and surviving family members, this special access afforded insurance investigators and their lawyers is particularly disturbing. Families who are dealing with the immediate tragedy have no way to obtain information about the cause of the accident, other than through NTSB family briefings and other public

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[29]49 C.F.R. 831.4.

[30]Confidential interviews with aviation insurance executives, December 1998; confidential interviews with NTSB investigators, November-December 1998.

[31]Confidential interviews with NTSB IICs, December 1998.

[32]Also, confidential interviews with NTSB investigators, November-December 1998; confidential interviews with aviation insurance executives, December 1998.

information efforts. Yet, at the same time, attorneys for the parties readily obtain extensive information through their party representatives or from insurance investigators. In practice, company representatives and their lawyers conduct a parallel investigation that shadows the work of the NTSB, providing extensive preparation for civil litigation. Family members view this as more than just an unfair strategic advantage; it leads directly to distrust of the NTSB investigative process.[33]

The Role of Parties in Fact-Finding

Party representatives are also involved in the inspection and testing of physical evidence. This phase of the fact-finding process can take months, even years, to complete. NTSB investigators have exclusive authority to decide the way in which any testing will be conducted, including the type of test and who will witness it. Participation in such activities is limited to the relevant parties; again, claimants have no role, even as observers.[34]

Frequently, aircraft parts must be examined at the manufacturer's facility, where unique test equipment and analytical tools are available.[35] Manufacturers and airlines maintain their own accident investigation departments, employing skilled investigators in many disciplines. Parties to the investigation are encouraged to submit their interpretations of findings to the NTSB (National Transportation Safety Board, 1998a).[36] These submissions, which can include theories about probable cause and proposed safety recommendations, are often timed to

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[33]Meeting with 15 family representatives, Washington, D.C., December 1998; submission of Gail Dunham; submission of Maureen and Ken Dobert, CT-43 families, January 21, 1999. RAND held a meeting in Washington, D.C., with victims' families during which several representatives submitted material to the research team. "CT-43 families" is a group title denoting the victims' families following the crash of an Air Force CT-43 transport plane in Croatia.

[34]*Graham v. Teledyne-Continental Motors*, 805 F.2d 1386 (9th Cir. 1986).

[35]For example, Boeing Commercial Aircraft maintains test facilities and equipment valued at more than $500 million, much of it uniquely capable of analyzing Boeing aircraft or component parts.

[36]Also, 49 C.F.R. 831.14(a).

persuade NTSB investigators to regard the merits of one causation theory over another.

The conflicts of interest inherent in the party process inevitably cast doubt on the accuracy of equipment testing or any other "neutral" fact-finding performed under the aegis of party representatives. Such suspicion is heightened by the technical complexity of modern jet aircraft that is the subject of the NTSB's most difficult and time-consuming investigations, and by the difficulty of independent verification of party submittals.

Clearly, an airline or manufacturer knows more about the engineering, design, or operation of its own aircraft than any NTSB investigator, no matter how experienced. The motivation for parties to withhold information that might be relevant to the cause of the accident, or to deflect attention from an area of possible culpability, is obvious. The question is whether, in fact, this occurs.

RAND researchers collected much anecdotal evidence suggesting that full disclosure of relevant information by parties during major investigations cannot always be assured. For example, representatives of an aerospace company insisted that the company's only interest was in finding the cause of an accident so that safety improvements could be implemented as soon as possible; liability was declared to be of no concern. However, NTSB investigators reported instances of misrepresentation and outright lying by the company's party participants, uncovered only because of the NTSB staff's extensive knowledge.

In another case, one party representative in the investigation of TWA Flight 800 attempted to remove parts from the wreckage reconstruction site; a criminal investigation of this episode is now pending.[37] In addition, much of the evidence and expertise resides with parties who may be reluctant to be forthcoming. Senior NTSB

[37]An airline representative assigned to assist in the crash investigation was indicted for removing materials from the site where the plane was being reconstructed. The NTSB considered various sanctions against the airline, including its removal as a party to the investigation, but no such action was taken (confidential interview with NTSB senior official, February 1999).

investigators concur that parties may eventually convey critical information if asked the right questions, but that sometimes information is not volunteered. This emphasizes the importance of adequately training NTSB investigators to ensure that they ask the right questions during an investigation.

Critics of the party process also claim that parties use NTSB investigations to point the "finger of blame" at each other in an effort to deflect future liability (Fredrick, 1996).[38] Divisiveness along party lines is considered almost inevitable, particularly in major investigations, but it corrodes the purpose of the parties' involvement, which is to help the NTSB determine the probable cause of the accident and make safety recommendations to prevent a similar occurrence. "Litigation jockeying" can lengthen investigations by forcing NTSB investigators to seriously consider "purposeful misinformation" provided by one party or another in order to gain advantage in the battle to avoid the assignment of fault and blame.[39]

Family Representation in Investigations

For family members whose loved ones have perished in an aviation disaster, no issue is more frustrating than their exclusion from the party process. According to family members, conflicts of interest seem to be inherent in a system that allows those who may have been responsible, at least in part, for causing an accident to participate in the investigation.

The National Air Disaster Alliance/Foundation, which claims to represent more than 1,300 family members and survivors, contends that the "independence of the NTSB has been compromised by the airline industry and their dominance and control of the investigation process" (Dunham, December 4, 1998, p. 72). Some family members believe that they should have the right to participate in an accident investigation to the

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[38]The investigation of the crash of American Eagle Flight 4184 reveals precisely the kind of "litigation jockeying" that has thrown the viability of the party process into doubt.

[39]Confidential interviews with NTSB senior investigators, November–December 1998.

same extent as aviation insurers and defense lawyers, who appear to play such a visible, albeit unauthorized, role in the investigation process.[40]

Families argue that defense lawyers, through their access to party participants, obtain confidential information (such as medical histories and psychological profiles) about family members that is later used against the claimants in civil litigation. The perceived adversarial nature of the investigative process, in which parties are trying to avoid blame, is the foundation for their claim that a place for family representatives in the party system must be defined.

From the plaintiffs' perspective, the importance of NTSB investigative efforts cannot be overemphasized. In individual and group interviews on this subject, lawyers who represent air crash victims repeatedly voiced their frustration.[41] The following comments prepared for public dissemination by a leading plaintiffs' trial attorney convey the general concern (Clifford, April 14, 1999):

> [I]t has been the practice of the NTSB to exclude victims and the experts retained by the victims . . . from taking part in the investigation . . . [while] at the same time . . . the NTSB almost always allows the airline and manufacturers of transportation products to [do so]. . . . Thus although the NTSB is defined as an independent agency, it allows the input and hands-on aid of the defendants into its investigation of transportation accidents but denies the victims from having any input into the investigation and hands-on access to the investigative materials until the investigation is completed. The NTSB has . . . assert[ed] that the Board's factual report[s] of an air accident investigation, which contain many of the facts collected in the investigation, are readily available upon request in the agency's public docket. . . .[H]owever . . . representatives for the airline and aircraft manufacturing defendants are still allowed to participate in the investigation as it goes on while the plaintiffs have to wait and wait for months at a time to gain access to the "fruits of the investigation." Thus the defendants have a significant head start in preparing their defense to these cases. This puts the victims at a severe disadvantage from the very beginning. . . . For the victims, the NTSB investigation

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[40]Meeting with 15 family representatives, Washington, D.C., December 1998.

[41]Confidential interviews with plaintiffs' attorneys, September 1998 to April 1999.

> often turns into an extended ordeal in which these victims' efforts to discover the cause of the accident are thwarted by the consistent denial of the NTSB to allow representatives of the victims--their expert witnesses--from being present during the initial investigation and any subsequent testing of component parts. This leads to an immediate suspicion among the victims as to the credibility of the investigation.

Families and plaintiffs' attorneys also complain that the NTSB's long delays in completing recent high-profile investigations, such as USAir Flight 427 and TWA Flight 800, are unnecessarily prolonging the resolution of lawsuits and claims. Courts are ordering the postponement of discovery and in some cases declining to set trial dates until the NTSB investigation is completed.[42]

Unresolved investigations have resulted in the collapse of funding agreements, preventing insurers from settling compensation claims. This prolongation of litigation imposes a painful burden on surviving families struggling to overcome their losses and to regain personal and financial stability.

Family members (and plaintiff lawyers on their behalf) want to participate in the NTSB party system and assume a role equal to the parties whose negligence or misdeeds may have caused the accident. They argue this would make investigations more open and honest, counter-balancing the conflicts of interest that, from their point of view, characterize the party process. They contend that the families' basic constitutional rights of due process are being violated when they are denied access to important information about the progress of the investigation (Dunham, 1998).[43] Family advocates assert that they have a

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[42]The litigation of claims in cases involving the crash of TWA Flight 800 and USAir Flight 427 have been significantly delayed pending the completion of the respective NTSB investigations. In the case of USAir Flight 427, the NTSB investigation took more than four years to complete. The final hearing on the NTSB Accident Report took place on March 23, 1999, but the federal district court in the Western District of Pennsylvania, where several cases are pending, indicated that no trial dates would be set until nine months following the issuance of the NTSB's Final Report, which finally occurred in August 1999. The release of the NTSB's final report on TWA Flight 800 was expected no sooner than June 2000, almost four years after the accident occurred.

[43]However, in the case of *Graham v. Teledyne-Continental Motors,* 805 F.2d 1386 (9th Cir. 1986), the court rejected arguments that denying the pilot's estate access to the NTSB engine teardown resulted in the

special interest in finding out what caused the accident and preventing it from happening again, and they argue that, in the interests of fairness and justice, family members or their representatives should be given formal status in the inquiry.[44]

Despite the emotional appeal of families' arguments, there are well-grounded objections to their direct or indirect participation in the party process. The central objection is the potential dilution of the goal of accomplishing an unbiased technical examination of an accident's cause. The NTSB, and in turn the IIC, is charged with selecting professionals from government agencies, companies, and associations whose special skills or knowledge are likely to contribute to the development of relevant evidence (Miller, Winter 1981).

Private litigants have never been permitted to be parties to NTSB investigations of major commercial air crashes. Airlines, manufacturers, and even NTSB staff argue forcefully that family members and plaintiff lawyers have no inherent special expertise that could help to solve the accident. Instead, staffers complain about having to "chase down" unsubstantiated causation theories offered by families and other outsiders, dissipating scarce budgetary and human resources. Furthermore, selecting family representatives to serve in a party capacity would be difficult. Even within family support groups, differing opinions among many families on key matters concerning a crash have led to feuds and ill will.

In addition, many families choose not to be part of an organized group. Designating one or more lawyers to serve as party representatives could lead to objectionable (and illegal) solicitation of clients in order to secure such a preferred position.

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kind of deprivation of evidence that would constitute a denial of due process with respect to related civil litigation. The court noted that if the appellant's claim were sustained on constitutional grounds that it would be difficult to exclude others from the investigation, a problem that would be "infinitely multiplied" in a crash involving a major airliner.

[44]Meeting with 15 family representatives, Washington, D.C., December, 1998.

Proposals to Extend the Parties' Role to the Analysis Phase of the Investigation

When the fact-finding portion of an investigation is completed, the IIC and NTSB technical staff begin the task of analysis and production of the Final Report--the document that is submitted for approval to the five Board members.

Parties are allowed and, in fact, encouraged to make written submissions to the NTSB of findings, conclusions, probable cause, and recommendations that they believe should be drawn from the factual record; such party submissions become part of the public docket of the investigation. These written submissions are the formal tool by which the parties participate in the Safety Board's analytical process (Benzon, March 29, 1994, pp. 64-65). No statute or rule specifically prohibits more direct party involvement in this process; rather, the Safety Board has historically assumed that direct party participation in this phase of the process could jeopardize the independence of the Safety Board's final product.

Many of the companies and organizations frequently named as parties in major investigations have sought to have more input into the NTSB's Final Report, including the written analysis, probable cause findings, and safety recommendations. ALPA and Boeing, among others, contend that the Safety Board's rules and investigative procedures should be revised to expand the role of parties during the analysis portion of the investigation (Hagy, March 29, 1994, p. 169).[45] From their point of view, excluding the parties from this critical phase contradicts the very purpose of the party system--to enhance the technical competency of the investigative effort.

Parties cite numerous instances in which an NTSB Final Report has contained (in their view) erroneous findings and conclusions, often contrary to the findings contained in the initial Working Group factual reports. The parties attribute such "mistakes" to the perceived inadequacies of NTSB staff working without the benefit of party participation. In addition, party participants are seeking the

[45]Also, confidential interviews with Boeing senior executives, December 1998 and January 1999.

opportunity to review and comment on the draft Final Report and proposed recommendations prior to the completion of the investigation. They argue that expanding their participation in the NTSB's work would create a better product, enhance acceptance of safety recommendations, and reduce the number of petitions for reconsideration that add to the NTSB's workload (Broderick, 1998).[46]

Proponents of granting parties a participatory role in the analysis phase base their position on two suppositions: (1) that the party system is the only way for the NTSB to acquire the technical expertise it needs to accurately determine the cause of a major aviation accident and (2) that parties are sufficiently free of bias and conflict of interest to eliminate the risks inherent in extending their influence. RAND's research does not support either of these suppositions. Rather, it points toward a need to enhance the party system in certain situations. As Chapter 6 discusses, many resources that are free of the self-interest that stems from the parties' conflicting roles are available outside the party system to supplement the NTSB's technical ability and expertise.

Whereas the mission of the NTSB is narrowly defined to determine probable cause and prevent future accidents, parties are inevitably concerned with broad issues of corporate responsibility and liability. In trying to avoid fault, or the perception of fault, those participating in NTSB investigations must navigate a complex matrix of overlapping responsibilities.[47] Allowing the parties to directly influence the final process by which the NTSB reaches its conclusions and recommendations is likely to exacerbate these conflicts.

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[46]Also, confidential interviews with Boeing Commercial Aircraft senior executives, December 1998; confidential interviews with Airbus senior executives, Toulouse, France, September 1998.

[47]The frequency with which information about investigations is leaked to the media is symptomatic of conflicting party roles. NTSB officials express real concern that some interested parties, if granted access to the later analytical stages of the investigation, would leak sensitive information, inviting pressure from families, politicians, business interests, and others for the NTSB to alter its proposed conclusions and recommendations.

Although its role should not be expanded beyond fact-finding, the party system can and should remain a key component of the NTSB investigation process. Parties provide unique and essential information about aircraft design and manufacture or airline operations. However, as with any complex system, the party process has its own "failure mode." Recent major aviation accident investigations reveal that in some circumstances the effectiveness and integrity of the party system is limited. Investigations such as those surrounding the crash of TWA Flight 800, USAir Flight 427, and American Eagle Flight 4184, in which the central stakeholders in the accidents jockey with each other and the NTSB to avoid responsibility and blame, highlight limitations of the party process.

Regardless of the number of deaths involved (which ranged from 68 to 227), each of these accident investigations shared the following five characteristics:

- Fleet design or operations were implicated in the accident.
- Each involved complex systems failures.
- Each generated costly product liability claims related to design defects.
- Sales, market share, and the competitive position of one or more parties were significantly threatened.
- The resulting NTSB investigations lasted two or more years.

As discussed in Chapter 3, these traits are characteristic of the kinds of accidents the NTSB will likely be called upon to investigate with greater frequency in the future. The shortcomings (and in some instances outright failure) of the party system in such cases underscore the urgent need to expand the resources available to the NTSB.

Enhancing the Party Process

Although the evidence is anecdotal, it is possible that the party system has contributed to a widespread perception that the NTSB has been "politicized." This term has different meanings among stakeholders, but the gist is similar: that NTSB investigative outcomes are not entirely derived from the agency's independent technical analyses of the factual circumstances of an accident. The criticism extends to NTSB safety

recommendations. While nobody charges direct political interference with NTSB decisions, critics imply that some special interest groups exercise inordinate influence over NTSB investigations and outcomes.

Some NTSB technical staff members, including a number of senior investigators and division heads, believe the five politically appointed NTSB Board members are prone to overreact to pressures from influential outside interests, such as aircraft manufacturers or family groups, which degrades their confidence in the work of the technical staff. On the other hand, family advocates and plaintiffs' attorneys believe that the technical staff, lacking adequate resources and expertise, is vulnerable to influence, and to even deceit and misinformation, from the parties (manufacturers, airlines, and ALPA, in particular). Meanwhile, stakeholders in the aviation industry assert that the NTSB Board members, driven by the media, public opinion, and political ambition, lean toward "politically correct" decisions with respect to findings of probable cause, even if those findings are contrary to the facts uncovered in the investigation.

It is clear is that the safety of the flying public depends to a significant degree on the ability of NTSB investigators to independently ascertain the cause of major aviation accidents and on the willingness of the NTSB Board members to take all necessary actions dictated by those findings. To the extent that the party system impinges on the NTSB's ability to carry out its mission, or its perceived ability to do so, its role should be constrained and the NTSB's independent capabilities should be enhanced.

The left-hand side of Figure 4.2 presents a diagram of the existing party process model, with party participants providing most of the outside technical expertise available to NTSB investigators. Currently, the NTSB use of experts outside the party process is limited; party members are usually consulted prior to the use of outside experts, and they are also given an opportunity to review and revise work assignments.

The diagram on the right-hand side of Figure 4.2 presents a notional view of a new party process model, with expanded use of other

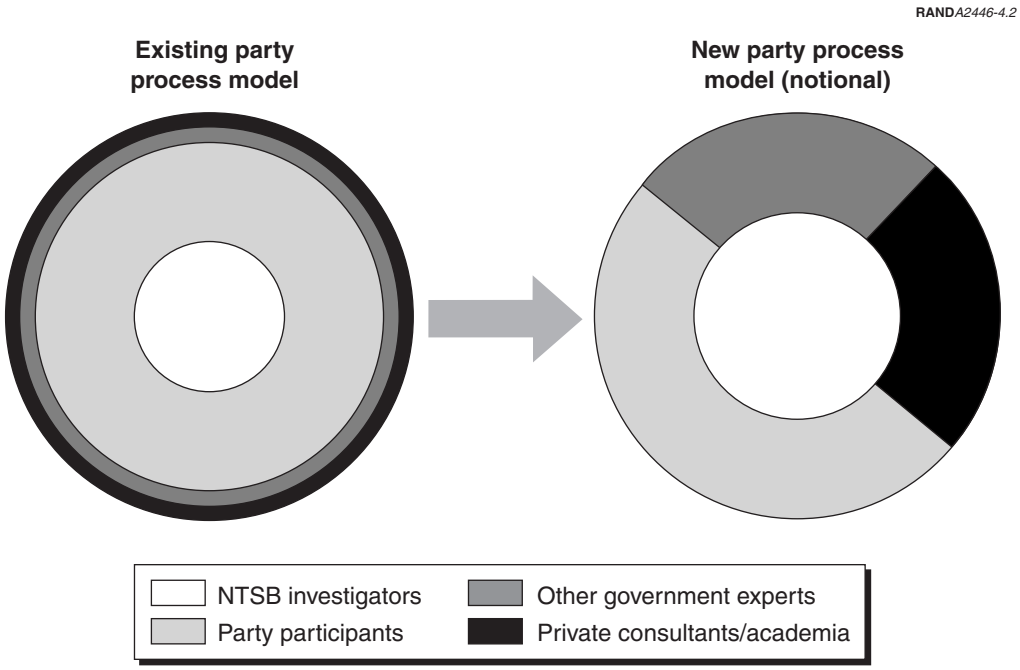

Figure 4.2--Existing and Notional Party Process Models

government experts, private consultants, and scholars. Here the role of outside experts is more expansive. In this notional model, the NTSB would access experts it deems necessary to conduct certain tests, analyses, and reviews without first consulting party members.

The goal of enhancing the party process should be to assure that the NTSB can access nationally and internationally recognized experts and expert teams when senior managers see the need for their assistance. Chapter 6 integrates this concept of an enhanced party process with the concept of a revised investigative model based on multidisciplinary teams. The use of "knowledge management" to speed access to expertise is also discussed in Chapter 6.

DETERMINING PROBABLE CAUSE

By statute, the Safety Board's fundamental objective is to investigate accidents and "to establish the facts, circumstances, and cause or probable cause" thereof, exclusively for the purpose of

preventing similar occurrences.[48] As straightforward as this objective may seem, the determination of probable cause has proven to involve a complicated entanglement of science and law, defying clear definition or direction.

A genuine confusion exists at times, both within the NTSB and in the aviation community as a whole, as to whether the Safety Board is to determine "what happened" or "why it happened" and whether there is a difference between the two levels of inquiry. Recent accident investigations have demonstrated how difficult it is for the NTSB to remain focused on its narrowly defined mission amid a legal environment in which the fundamental goal is to assign fault and blame, all of which raises the following questions:

- Is a safety-oriented investigation as demanding about uncovering the facts as a judge and jury, or the jury process (Miller, Winter 1981, pp. 266–268)?
- Is the accident investigation process, characterized by rigorous technical analysis and careful documentation, different from the kind of adversarial fact-finding process that is fundamental to the civil justice system?
- What have been the consequences of imposing terms relating to legal proof on an investigative process that is managed by engineers and scientists?

In order to understand what "probable cause" is supposed to mean in the accident investigation context, it is worthwhile to examine the term's origin. The renowned evidence scholar, Professor W. H. Wigmore, first sought to define the term "probable cause" as it related to the duties of early accident investigation agencies (Miller, Winter 1981, pp. 267–268). The term has been applied in various contexts and is explicitly mentioned in the Fourth Amendment to the U.S. Constitution: "No warrants shall issue, but upon *probable cause*" [emphasis added]. Here the term refers to the quantum of evidence necessary for a reasonable person to believe that an accused individual had committed a crime.

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[48] 49 U.S.C. 1131(a).

When removed from the arena of criminal law, the term "probable cause" can be used to describe the level of inquiry appropriate to a safety investigation--conditions or events that *most likely* or *probably* caused the accident to occur, although historically the term has little to do with cause and effect of matters related to technology. The term "probable cause" may have been employed to differentiate the work findings of accident investigators from the findings of lawyers in litigation (Miller, Winter 1981). However, this important distinction seems lost on many of today's stakeholders, including the news media, which when failing to distinguish between the safety-related purpose of an NTSB investigation and the objectives of civil litigation simply view the NTSB's determination of probable cause as the means to assign fault and blame (Quinn, Fall 1995).

According to the statutes and rules that govern the NTSB, a finding of "probable cause" is required to solve an accident and support the issuance of safety recommendations. Despite the confusion that has surrounded this term almost since its inception, no more specific definition has emerged, either through regulatory or judicial interpretation. The NTSB's *Investigator's Manual* defines "probable cause" as the condition(s) and/or event(s) or the collective sequence of conditions and/or events that "most probably caused the accident to occur." The *Manual* goes on to explain that had the condition or event been prevented, the accident would not have occurred.

Efforts to refine the definition of probable cause to reflect the more complex nature of aviation accident investigations, as well as to minimize confusion with the objectives of civil litigation, have repeatedly been rebuffed at the highest levels of the NTSB (Miller, Winter 1981).[49] At the same time, courts have not addressed the interpretation of probable cause when considering the procedural

[49]Miller discusses attempts to revise the "probable cause" terminology in the early history of the NTSB. The reluctance of the Safety Board to revamp the agency's probable cause mandate in the context of more recent criticism is chronicled later in this chapter.

questions related to legal challenges to the NTSB's authority or discretionary decisionmaking.[50]

Within the legal system, various measures of proof are employed to denote the level of certainty required for the imposition of criminal or civil liability. Evidence "beyond a reasonable doubt," the highest standard, is required for criminal conviction. Many jurisdictions have adopted the somewhat lower measure of "clear and convincing" evidence to support the award of punitive damages in civil cases. A "preponderance of the evidence," loosely figured at 51 percent of certainty, is all that is generally required to support a finding of negligence or other civil liability and the award of compensatory damages.

Instead of employing a similar determination standard for the NTSB's findings, the term "probable" seems to take on different meanings depending on the severity of the accident and the public visibility of the agency's proceedings. The "hotter" the investigation, the more certainty is demanded within the NTSB and by the parties and other stakeholders. At times, "probable cause" is equated with the legal standards of "clear and convincing" evidence or proof "beyond a reasonable doubt."

Attempting to chase a moving standard impacts the NTSB's ability to complete its investigations in a timely fashion. Truth and certainty are always elusive goals, but in the discipline of accident investigation, the search depends on the analysis of highly complex systems, the testing of damaged components, the replication of unusual flight conditions, and recovery or even reconstruction of wreckage. In the face

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[50]The absence of judicial reflection on the meaning of "probable cause" in the context of aviation (or any other mode of transportation) accident investigation is attributable to two factors. First, NTSB findings of probable cause and related safety recommendations are not subject to review under the Administrative Procedures Act, thus eliminating the opportunity for judicial review of the agency's actions under the "abuse of discretion" or other standard. Second, most of the litigation challenging NTSB decisionmaking has related to the agency's refusal to designate various individuals or companies as parties to an NTSB investigation or to the permitted use of NTSB materials in civil litigation. In that context, the statutorily defined mission of the NTSB to determine probable cause has not been subject to close examination. See, for example, *Graham v. Teledyne-Continental Motors,* p. 1389, for a general discussion of the NTSB's mission and authorizing statute.

of such daunting tasks, NTSB investigators can lose sight of the fact that their central function is to demonstrate that certain events or conditions "probably" caused the accident.

The adversarial legal process, with the extensive discovery process it affords, is perhaps better suited for developing the quantum of evidence necessary to establish cause, award compensation, and impose sanctions. If the NTSB's only mission is the efficient and expeditious search for the cause of an accident in order to make reasonable safety recommendations, there may be limits as to how far an investigator should go to definitively "prove" how an accident occurred.

The crash of USAir Flight 427 illustrates the danger of interpreting "probable cause" to be the equivalent of conclusive proof. This investigation proved to be one of the most difficult in NTSB history. While mechanical failure of the rudder mechanism was identified early in the investigation as a potential cause of the accident, securing proof of the exact failure mode was complicated by the total destruction of the aircraft, the inability to duplicate the conditions of the accident, and by the limited data about the flight available from an FDR that recorded fewer than a dozen technical parameters.

Nonetheless, Boeing Aircraft, one of the principal parties to the Flight 427 investigation, asserted that the Safety Board must determine "whether there are *conclusive* facts and evidence to support any theory before that theory [a deflection of the rudder] can be identified as the 'probable cause'" [emphasis added].

Citing language used by the NTSB in its report on the investigation of the crash of United Airlines Flight 585 (a 1991 crash of another Boeing 737-200 in Colorado Springs that had similarities to the USAir accident), Boeing contended that evidence of rudder failure had to be "conclusive" and "decisive" (Boeing Commercial Airplane Company, September, 30, 1997, pp. 53-54).[51] Nevertheless, useful and important

[51]When the Accident Report on United Airlines Flight 585 was issued, the NTSB was not able to determine the probable cause of the accident. At the time, Flight 585 was the only unsolved mystery in the history of NTSB investigations of major aviation accidents. Although there was some evidence of rudder deflection, there was also evidence of extreme weather conditions. Further research has substantially ruled out

safety recommendations could have been made on the basis of something less than "conclusive" proof as to the precise failure mode of the 737 rudder.[52] Uncertainty of how much analysis is needed to reach a point of conclusive proof is one of the many dilemmas that contributed to the crisis atmosphere within the NTSB as the investigation of USAir Flight 427 drew to a close.

Pressure to produce a high level of certainty can also come from within the Safety Board itself. Numerous NTSB investigators have bluntly stated that the more controversial the investigation, the higher the level of proof demanded by the NTSB Board members before securing a majority vote for approval of the staff report and related probable cause finding. This scrutiny has been ascribed to the continual and direct lobbying of NTSB Board members by particular stakeholders and parties long after the docketing of the parties' final written submissions.

The investigation of USAir Flight 427 has proven to be a prime example of the heightened proof that Safety Board members may demand before taking action that could be controversial. The NTSB technical staff believed that sufficient evidence existed to conclude that the crash of USAir Flight 427 was caused by the defective rudder design of the Boeing 737, even though the precise failure mode of the Power Control Unit (PCU) servovalve could not be convincingly replicated. Senior NTSB investigators have suggested that certain members of the

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such weather phenomena as the cause of the Colorado Springs accident. As part of the Accident Report on USAir Flight 427, the NTSB concluded that the crash of UA Flight 585 was also due to rudder reversal most likely caused by a jam of the main rudder Power Control Unit (PCU) servovalve.

[52]The safety issues addressed in the Accident Report on USAir Flight 427 cite Boeing 737 rudder malfunctions, including rudder reversals, the adequacy of the 737 rudder design system, unusual attitude training for air carrier pilots, and FDR parameters. As a result of the USAir Flight 427 accident, the NTSB issued a total of 17 safety recommendations to the FAA in October 1996 and February 1997 regarding operation of the Boeing 737 rudder system and unusual attitude recovery procedures. In addition, as a result of the USAir Flight 427 and UA Flight 585 accidents, the Safety Board issued three recommendations to the FAA in February 1995 regarding the need to increase the number of FDR parameters. An additional 10 recommendations were issued on the date of the Board's final hearing on the USAir Flight 427 Accident Report (National Transportation Board, March 24, 1999).

Safety Board demanded proof "beyond a reasonable doubt" that the rudder, not pilot error, caused this accident, as well as a definitive demonstration of the failure mode of the rudder mechanism. In confidential interviews, senior NTSB staff suggested that the investigation could have been completed in half the time if it were not for the demand by the parties and some Safety Board members for absolute proof of a rudder deflection.

Figure 4.3 illustrates the relationship between the characteristics of an investigation and the likely influence of the NTSB's recommendations. A review of many of the Safety Board's most recent major aviation accident investigations reveals a number of additional factors that tend to "raise the temperature" with respect to the exactitude of the probable cause statement. These factors include the following:

- multiple accidents involving a particular type of aircraft
- a history of incidents similar to the circumstances of the suspected cause of the accident
- a large number of deaths

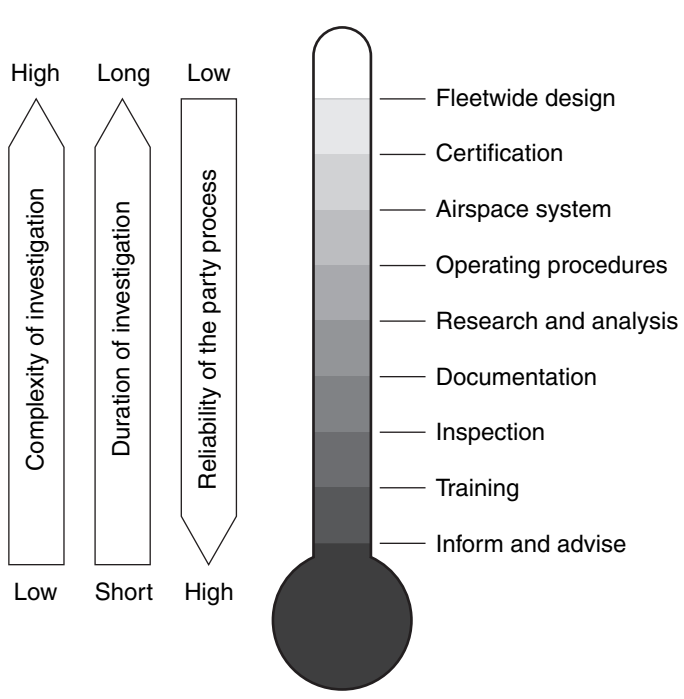

Figure 4.3--The Investigative Scale

- a large number of parties
- a first-time accident suggesting a previously unknown operational failure
- heightened media interest
- intense family involvement
- political pressure from Congress and/or the White House.

As these factors mount, so do the demands on the NTSB to "get it right." A finding of probable cause so obviously suggests blame and fault that, rightly or wrongly, it sets off a series of complicated events that exceed the boundaries of an NTSB investigation. In this environment, the NTSB must conform to the standard of proof appropriate to the mission of the agency--that is, issue a determination of what "probably" caused the accident.

The Primacy of the Probable Cause Finding

Arguably, the most important outcome of an investigation is the Safety Board's probable cause finding. This statement represents the fulfillment of the NTSB's mission and reflects the cumulative fact-finding and analytical work of its technical staff.

Adoption of the probable cause statement by the five-member Safety Board is viewed as a vote of confidence in the work of the investigators. However, a finding of probable cause has repercussions that are felt well beyond the NTSB. Any person or entity found to have "caused" an accident will be considered by the public and the media to be at fault or responsible for the wrongdoing. In terms of the assignment of fault and blame for a major aviation accident, the NTSB's probable cause finding is "the whole ballgame."[53]

A finding of probable cause may set off a chain reaction of regulatory activity. Safety recommendations based on the finding are forwarded to the FAA, which must provide a formal written response to

[53]Almost every individual interviewed by RAND, no matter his or her association or relationship to the accident investigation process, used this term. The universal use of this wording was remarkable, but also serves to underscore the significance with which the NTSB process is regarded by all the various stakeholders affected by the NTSB's investigation of major aviation accidents.

the NTSB within 90 days. The response must indicate whether the FAA intends to adopt the recommendations, in whole or in part, and if it does not intend to do so, it must state the reason why.[54]

Among its options, the FAA may consider incorporating the safety recommendations into Federal Aviation Regulations (FARs), which cover every facet of civil aviation. Such regulatory action is a complex process, requiring the FAA to evaluate the economic impact of the NTSB recommendations, including the costs and benefits of implementation. Public and private hearings regarding the proposed action may be held, often with the participation of the Aviation Rulemaking Advisory Committee (ARAC), an industry advisory group established by the FAA to assist in the regulatory process. The Administrative Procedures Act requires that every federal rule first be issued as a "proposed rule" and that time be provided for public review and comment ("How an FAA Rule Is Changed," April 1998).

Alternatively, the FAA may issue airworthiness directives, service bulletins, or advisory circulars that require the recipient to order repairs, maintenance, or inspections of aircraft; change airline operations; alter flight rules or airport operations; or take other various actions. Implementing such operational changes may have an adverse effect on an airline's profits or may even damage the competitive position of an aircraft manufacturer or airline.[55]

NTSB safety recommendations can also put at risk the continued certification of an aircraft or a component part, and may even jeopardize the right of an airline to carry passengers. Certification becomes an issue when the cause of an accident is attributed to faulty design or manufacture, calling into question the safety of an entire fleet of airplanes, not just the particular plane involved in the accident. The withdrawal of certification requires action by the FAA,

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[54]49 U.S.C. 1135(a).

[55]Airbus has successfully touted the relatively low number of air service directives that have been issued against the Airbus 319 and Airbus 320 compared with the Boeing 737 as a means of increasing sales and market share in the "single aisle" aircraft category (confidential interview with senior aviation industry executive, March 1999).

even though the NTSB's finding of probable cause may point directly to improper certification by the FAA in the first place.

For an aircraft manufacturer, the consequences of decertification are incalculable, jeopardizing future sales and inevitably requiring extensive modifications before the aircraft can be brought back into service.[56] Although a safety recommendation of this magnitude carries dramatic consequences, the NTSB has pointed to defective design and the FAA's failure to properly certify an airplane as the probable cause of several recent major accidents.[57]

It is important to note that the applicable FARs, as well as the rules contained in flight and air traffic control manuals, airworthiness directives, and even advisory circulars, are admissible in civil litigation arising out of airplane accidents. They are viewed by the courts as "strong, impartial, and authoritative evidence of the proper standard of care under the circumstances" (Kreindler, 1998, pp. 10, 22-23).

In many jurisdictions, the violation of air safety regulations constitutes negligence *per se*.[58] As a consequence, safety recommendations issued by the NTSB often amount to nothing short of the

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[56]Confidential interviews with senior executives of Airbus Industrie, Toulouse, France, September 1998, regarding the impact of the NTSB's investigation of the crash of American Eagle Flight 4184 and the subsequent warning that the the ATR-72 was unsafe to fly in certain icing conditions.

[57]Defective design and improper certification were deemed to be the probable causes of the crash of American Eagle Flight 4184 (improper wing design and deicing equipment of the ATR-72) and Comair Flight 3272 (Embraer 120). The NTSB did not specifically state that improper design of the Boeing 737 rudder and related PCU was the cause of the crash of USAir Flight 427 or United Airlines Flight 585.

[58]For a discussion of the applicable principles governing negligence per se, see Restatement (Second) of Torts §288B(1)(1965): "The unexcused violation of a legislative enactment or an administrative regulation which is adopted by the court as defining the standard of conduct of a reasonable man, is negligence in itself"; §286: "The court may adopt as the standard of conduct of a reasonable man the requirements of a legislative enactment or an administrative regulation. . . ."; and §§285-288C, Section 285, comment b, states that although the doctrine applies to administrative regulations that define and establish a standard of conduct, "cases will be comparatively infrequent in which administrative regulations can be construed to have such an effect."

standard of care required of *all* airline operators, manufacturers, service providers, or other stakeholders engaged in commercial aviation.

Beyond the regulatory impact, a finding of probable cause by the NTSB is very significant for the civil litigation associated with a major commercial aviation accident. Stakeholders on all sides describe the importance of the NTSB Blue Book and the probable cause determination in the same terms: These findings provide the "roadmap to liability." Claimants and defendants wait many months, and sometimes several years, for the NTSB to articulate the probable cause of the accident. After the NTSB investigation is completed, the restraints that have been placed on court proceedings are removed and the claimants and their lawyers move quickly to pursue the theories of liability that are outlined in the NTSB report.

It must be noted again that determination of potential liability is *not* the NTSB's mission. NTSB investigative procedures are designed to develop information for the purpose of accident prevention, and *not* to find information to assess blame. Although the rules explicitly state that NTSB investigations are not conducted for the purpose of determining the rights or liabilities of any person, the findings and conclusions of the NTSB are nevertheless such a powerful and persuasive statement of what took place to cause the accident that conclusions about liability are inevitable.

Furthermore, public access is guaranteed, with a few exceptions, to all communications, documents, or reports received by the NTSB. As was described earlier in this chapter, most of the factual information and analysis developed by the Safety Board, other than the probable cause statement, is usually admissible as evidence despite rules designed to isolate the NTSB from the litigation process. Although plaintiffs' attorneys must independently establish the fundamental elements of their case--negligence and causation--through their own discovery and fact-finding, the NTSB Accident Report inevitably points the way.

The NTSB report is not, however, a complete substitute for traditional methods of discovery and the proper development of evidence. In fact, litigation subsequent to several recent major accidents

uncovered significant causal factors overlooked by the NTSB. Plaintiffs' lawyers must provide the basis for punitive damages by showing that the defendant demonstrated gross negligence or flagrant, unconscionable conduct.[59] The NTSB's only task is to uncover the defect or faulty procedure that caused the accident; assessing the defendant's degree of culpability for wrongdoing is the task of the civil justice system.

While the NTSB report might enlighten claimants (and their lawyers) who have been barred from participating in the investigation, the finding of probable cause may overlook other contributory factors that prove to be as persuasive, if not more, in establishing liability before a judge and jury.[60] When the NTSB holds a governmental entity (such as the FAA) responsible for an accident, claimants will seek evidence of culpable conduct by other potential defendants, thus allowing them to circumvent the federal government's bar against the award of punitive damages.

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[59]In the case of air crashes occurring outside the United States, claimants must be able to demonstrate that the air carrier engaged in "willful misconduct" to escape the limits on recovery imposed by the Warsaw Convention, or prove that a party other than the airline, such as the manufacturer or maintenance service, was at fault. This will likely be the case with respect to the crash of TWA Flight 800, in which TWA's potential liability will be limited to approximately $140,000 per claimant (per current drawing rights under the Warsaw Convention, as amended), unless willful misconduct on the part of TWA can be proven.

[60]In the litigation resulting from the crash of American Eagle Flight 4184 (*in re* Air Crash Disaster Near Roselawn, Indiana, on October 31, 1994, N.D.IL), plaintiffs counsel were prepared to present extensive evidence establishing the negligence of the American Eagle pilots for failing to maintain a sterile cockpit during the "hold" imposed by air traffic control prior to clearing the plane for landing at Chicago O'Hare International Airport. It was during this period that the icing conditions that precipitated the crash were experienced. The NTSB determined that the probable cause of the Roselawn crash was (1) the failure of the manufacturer to disclose to operators information previously known about the effects of freezing precipitation on the stability and control characteristics of the aircraft, and (2) the failure of the French Directorate General for Civil Aviation and the FAA to take corrective action to assure the airworthiness of the ATR-72 in icing conditions. Misconduct by the flight crew was not part of the Board's probable cause determination. Although the litigation was settled before trial, the issue of flight crew misconduct is the basis for ATR's motion for reconsideration of the NTSB's findings and conclusions currently pending before the Board.

The NTSB's finding of probable cause sets off a chain reaction of events in the litigation arena. Among other things, defendants may admit to liability rather than contest or retry the issues of fault in court. The risk of, and costs associated with, extensive discovery, a lengthy trial, the possibility of an adverse jury verdict, the potential award of punitive damages, and the attendant adverse publicity may compel defendants to concede liability and work toward the settlement of individual compensation claims. Any parties to the investigation who are also defendants would know just how strong a case might be made against them in the litigation setting.

From the perspective of insurers, the NTSB's findings may call for an adjustment of the funding agreement that has financed claimant settlements up to that time. This is especially likely if more than one insurer has been involved with the accident. For example, if one insurance company insured the air carrier and another insured the airplane manufacturer, the release of NTSB findings may prompt one party or another to acknowledge liability and the insurers to alter the funding agreement accordingly. Although such an adjustment might not immediately impact the process of settling compensation claims with plaintiffs and their lawyers, a dispute among the parties and their insurers about the validity of the NTSB probable cause findings could result in subsequent litigation of the respective liabilities of the parties to the funding agreement.

Accepting responsibility for causing a major aviation accident, or for appearing to have been the cause, can be imposed through other forms than just civil litigation. If anything, the "court of public opinion" can impose sanctions equal to, if not more onerous than, any jury verdict. A finding of probable cause against an airline or manufacturer can result in significant loss of business and damage to a company's reputation. News of such important action can have an impact on a traveler's choice of airline, and it can instantly affect stock prices and corporate profits. If an aircraft or airline is labeled unsafe, sales and market share could plummet.

In countries other than the United States, where wrongful conduct is more commonly punished and deterred by criminal sanction rather than

by the award of civil damages, a finding of probable cause can translate into potential corporate criminal liability (Wald, July 14, 1999).[61]

A stakeholder found to be at fault may have to bear the cost of uninsured expenses, such as outlays for a lengthy NTSB investigation (including tests required by the NTSB) or a punitive damage award, which could be many millions of dollars. A finding of probable cause pointing toward unsafe operations, poor maintenance practices, or a poorly designed aircraft can raise the cost of liability insurance, significantly cutting into corporate profits or causing airline ticket prices to rise. Ultimately, the loss of public confidence in the safety of the air transportation system could slow industry growth and negatively impact the domestic and international economies.

Restructuring the Probable Cause Finding

Given the controversy generated by a finding of probable cause, it is not surprising that stakeholders have suggested reforms to the process. In fact, eagerness to reform or to at least refine the NTSB's statutory mandate to determine probable cause is almost as old as the NTSB itself (Miller, Winter 1981, pp. 289–291; Miller, Spring 1998). For example, some stakeholders have suggested that different terminology would not lend itself so easily to sound bites and simplified labels. Words such as "findings," "significant factors," or "causal factors" might remove the contentiousness surrounding "probable cause" without detracting from the significance of the process from a safety standpoint (Lederer, March 1992).[62]

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[61]The Boeing Company has already been indicted in France as a result of the crash of TWA Flight 800, even though, as of this writing, the NTSB has not concluded its investigation. On July 13, 1999, SabreTech, the aviation maintenance company responsible for the improper handling of oxygen generators that exploded and caused the crash of Valujet Flight 592, was indicted by Florida authorities on 110 counts of third-degree murder and manslaughter. A federal grand jury also indicted the company and three of its employees for improper handling of hazardous materials. These were the first criminal charges brought in an airline accident in the United States.

[62]The same point was made at a RAND roundtable of government aviation officials in Washington, D.C., in October 1998.

Stakeholders have proposed a variety of other reforms as well, ranging from eliminating the NTSB's responsibility to determine probable cause to suggesting that the NTSB merely list causal factors in alphabetical or chronological order. Semantics aside, aviation safety specialists contend that the emphasis on a single "cause" is misplaced, leading to inadequate understanding of the many causal factors that come together to bring about a particular accident (Snowdon and Johnson, 1998).[63]

Accident prevention is cited as the most important reason for *expanding* the NTSB's findings. Those seeking useful information to prevent future accidents roundly criticize the finger-pointing that accompanies the NTSB's determination of probable cause. This criticism is directed to the Safety Board's process of rendering the final decision and to the actual label of "probable cause" itself. Analysts of complex systems contend that major aviation accidents are not the result of a single failure of one component, but are the product of complex interactions among people, machines, and the environment that must be understood by both investigators and stakeholders (Luxhoj, Arendt, and Horton, October 15, 1997).

The NTSB's emphasis on probable cause has been criticized as being overly accusatory in many cases, oftentimes implicating the performance of the flight crew as the only cause of an accident. The ALPA has been particularly critical of the NTSB approach, charging that so long as the probable cause is pilot error, the inducement to invest in system improvements will be limited (Steenblik, June 1992). ALPA claims that issues such as training, airline management, facilities, weather, air traffic control, or crew resource management frequently receive little, if any, attention from the NTSB.

In accordance with NTSB procedures, probable cause is summarized at the beginning of the Final Report, but contributory causes are relegated to accompanying volumes of technical material. Other investigative

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[63]This article by Snowdon and Johnson notes how important it is for aircraft designers to be aware of alternative hypotheses for aircraft failures and the entire set of contextual factors that surround major failures.

bodies treat this information much differently. For example, the Transportation Safety Board of Canada (TSB) is required to render "cause-related findings," but is not required to make a definitive probable cause(s) determination. The TSB is, however, permitted to make findings on unrelated matters that identify safety deficiencies. The U.S. Air Force applies the "all cause" concept, identifying all factors that "substantially contributed to or caused" a military aircraft accident, unless there is "clear and convincing" evidence sufficient to support a single cause. In the Air Force scheme, a substantially contributing or causal factor is one that played an important role, either directly or indirectly, in the sequence of events that led to the accident. Any conclusion about such substantially contributing or causal factors must be based on "substantial evidence," defined as "more than a trace of evidence," such that a reasonable person would accept as adequate to support a conclusion.

Table 4.1 contains descriptions of the types of causal determinations made by various aviation accident investigative agencies. Definitions of cause determinants can be found in the accident investigation manuals of the respective agencies.

The NTSB has historically resisted the notion of altering its statutory mandate to determine probable cause. In 1994, as part of the Safety Board's Aviation Accident Symposium, several party stakeholders recommended that the Safety Board change its approach to probable cause. The Safety Board officially rejected those industry recommendations, stating that a chronological listing of factors or causes would "diminish the impact of key occurrences in the accident, therefore reduc[ing] the safety potential of the investigation" (National Transportation Safety Board, March 29, 1994b, p. 9). The NTSB instead agreed to consider the wording of the probable cause statement on a case-by-case basis. NTSB Board members and senior staff have also expressed concern that eliminating the probable cause determination would undermine the foundation for related safety recommendations.[64]

[64]Confidential interviews with senior NTSB staff and Board members, October–November 1998.

Table 4.1

Cause-Related Determinations by Various Investigative Agencies

Investigative Body	Determination of Causation
NTSB	Probable cause
NASA	Dominant root cause
U.S. Air Force	All causes/probable cause only if "clear and convincing" evidence
International Civil Aviation Organization (ICAO)	All causes, including secondary causes
Bureau Enquetes-Accidents (BEA), France	All causes
Transportation Safety Board (TSB), Canada	Cause-related findings/identify safety deficiencies
Bureau of Air Safety Investigation (BASI), Australia	All causes

The factual findings and analytical conclusions of the NTSB are authoritative statements, and the statement of probable cause carries considerable weight in the aviation community. Because the NTSB lacks regulatory or enforcement authority, the influential and highly public pronouncement of probable cause is one way for the agency to play a central role in aviation safety. In that context, probable cause serves to carry out important policy goals and should be retained. However, identifying all causal factors material to the cause of an accident would improve the quality of the NTSB's output. The probable cause statement should be more than a simplistic conclusion; it should serve as a signpost guiding future aviation safety goals.

Adoption of a more sophisticated approach to the formulation of probable cause would provide more consistency and substance to the end product of the NTSB investigative process.