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Promoting General Aviation Safety: A Revision of Pilot Negligence Law

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PROMOTING GENERAL AVIATION SAFETY: A REVISION OF PILOT NEGLIGENCE LAW

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I. INTRODUCTION

THE 747 captain turned his ship onto the departure runway at Tenerife and began the takeoff roll. Unbeknownst to him, another 747 was taxiing in the mist down the runway. The planes collided at 150 miles per hour. Five hundred and seventy-seven people died.[1]

Although the causes of serious aviation incidents take many forms, the foremost cause is pilot negligence. A pilot may, for example, ignore regulations or fail to exercise due care. Sometimes, however, there is no lack of care, but rather a lapse in judgment or a separate instrumentality that causes the pilot to err. Nevertheless, pilot negligence, while not the only cause, is a significant contributor to aviation accidents.

General aviation encompasses a great diversity of pilots, aircraft, and operations. Therefore, issues of aviation safety cannot focus entirely on large aircraft and revenue carriers. Moreover, as in other endeavors, negligence law seeks to enhance safety in general aviation. The variety of aviation issues and the role of tort law in improving safety, in general, requires a close scrutiny of the interaction between general aviation and pilot negligence law.

Consequently, the concept of pilot negligence should

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[1] James Reason, *The Psychopathology of Everyday Slips*, THE SCIENCES, Sept.-Oct. 1984, at 45.

be revised to integrate the tenets of flying and flight safety. General aviation is now a large and mature enterprise, but development of aviation law demonstrates that courts lack the basic understanding of the fundamentals of aviation and their proper application to pilot liability. One important issue involves how the law of negligence influences pilots to maintain high levels of safety to avoid injury. Law may accomplish this goal through principles of psychology. If pilot negligence law, by design, appropriately distributes liability in aircraft accident litigation, and pilots recognize the distribution as equitable, then pilots attribute blameworthiness to certain conduct, and consequently avoid that conduct. Thus, it is worthwhile to evaluate how well certain aspects of present negligence law define the bases of pilot liability. These aspects include negligence *per se*, the negligence standard of care, liability for pilot mistakes and poor judgment that are not negligent, *res ipsa loquitur*, and statutory aviation strict liability.

The attribution theory of psychology is a link between pilots and negligence law that may enhance flight safety. The cornerstone of the theory is that a person attributes responsibility for an outcome to a preceding event when the person discerns a causal connection between the two.[2] The whole of a person's past experience and attitudes affects the way the person makes attributions.[3] In the realm of pilot negligence, the event is some action or omission by the pilot of the accident aircraft, and the outcome is legal liability. If the attributor is a pilot, then expertise in aviation colors the attribution. Hence, if pilot negligence law imposes liability in a manner consistent with pilots' views of aviation, then negligence law reinforces safety-oriented attitudes of pilots.

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[2] Jos Jaspers, *Attribution Theory and Research: The State of the Art*, *in* ATTRIBUTION THEORY AND RESEARCH: CONCEPTUAL, DEVELOPMENTAL AND SOCIAL DIMENSIONS 3, 4 (Jos Jaspers et al. eds., 1983).

[3] Icek Azjen & Martin Fishbein, *Relevance and Availability in the Attribution Process*, *in* ATTRIBUTION THEORY AND RESEARCH: CONCEPTUAL, DEVELOPMENTAL AND SOCIAL DIMENSIONS 63, 69 (Jos Jaspers et al. eds., 1983).

Because some of pilots' safety attitudes derive from aviation regulation, a study of pilot negligence law must address negligence *per se*. The Federal Aviation Administration (FAA) addresses safety issues in two ways. First, the Federal Aviation Regulations (FARs) promulgated by the FAA to address, among other things, safety issues are regulatory and demand compliance.[4] Documentary safety literature published by the FAA in the Airman's Information Manual (AIM) explains to pilots the application of FARs in various situations. In addition, supplementary advisory circulars provide valuable information on safety.[5] All of these documents require consideration under pilot negligence law.

When the FARs are not applicable to a situation, the law must judge a pilot's actions based on a second aspect of negligence law: the generalized standard of care. Flying is a very specialized activity, and the standard of care for pilots should reflect this fact. The generic standard of care, however, contains no informed definitions of the care or expertise required for the proper operation of air vehicles. A plethora of data, though, is available regarding aircraft accidents and their causes.[6] Lessons learned from past accidents are beneficial to fashioning a proper standard of care in pilot negligence law.

Pilot negligence law must also recognize that pilot negligence is not the sole cause of all aircraft accidents. Although pilot mistakes and poor judgment may cause aircraft accidents, this type of human error does not constitute negligent behavior. Nonetheless, if a pilot has been negligent in causing a mistake, then reducing the negligent conduct enhances aviation safety. Specifically, there may be pilots other than the accident aircraft pilot who could be legally responsible for the mistake in question. Thus, pilot negligence law must also address these individuals.

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4 Wood v. United States, 14 Av. Cas. (CCH) 17,821, 17,823 (C.D. Cal. 1977).

5 *In re* N-500L Cases, 691 F.2d 15, 28 (1st Cir. 1982).

6 *See, e.g.*, NTSB ANNUAL REVIEW OF ACCIDENT DATA (published annually).

An additional aspect of negligence law that bears on pilot liability is the doctrine of *res ipsa loquitur*. Certainly, *res ipsa loquitur* is applied in American negligence law because it is quite useful. General aviation, however, is a special form of human endeavor, and it requires properly tailored legal rules. Here, the issue is whether *res ipsa loquitur*, a general negligence rule, has a role in the special category of pilot negligence. As with the pilot's standard of care, past aircraft accidents provide the answer.

Finally, the law relating to pilot's actions must address the issue of aviation strict liability. The early history of aviation law still affects present pilot negligence law. At the same time, technology and necessity have changed the nature of flying. Hence, legal attitudes toward flying that are half a century old are now vestigial. It is time to decide whether to condemn those attitudes to history.

In all, many facets of pilot negligence law may benefit from an educated overhaul. The initial step is to gather the tools for the job, beginning with a hypothesis to form a bridge between pilot negligence law and greater flight safety. When combined with data regarding past aircraft accidents, such a hypothesis will provide a useful evaluation of the various bases for pilot liability.

II. HYPOTHESIS: IF NEGLIGENCE LAW CLOSELY PARALLELS SKILLED PILOTS' VIEWS OF AVIATION, THEN NEGLIGENCE LAW ENHANCES AVIATION SAFETY

If aviation negligence law accurately conforms to the nature and diversity of general aviation, then the law induces pilots to be safe. The basis of this principle is that all aircraft accidents are traceable to some form of human error. Therefore, all accidents are avoidable if human error is removed. As Tom Wolfe stated, "[t]here are no *accidents* and no fatal flaws in the machines; there are only pilots with the wrong stuff."[7] Aviation law can diminish pilot error by using psychological attribution theory to make pilots aware that they are the source of human error, and therefore, they can control and eliminate the error. Specifically, the theory appeals to the attributional functions of control, self-esteem, and self-presentation in pilots.[8] Negligence law tailored to these functions may induce safe and nonerroneous conduct.

Generally, attribution theory suggests that an individual's perceptions of the causal relations between events and their effects influences how that individual adjusts behavior to achieve desired results. In particular, an individual perceives effects as being modifiable if the individual sees the triggering event as emanating from the individual's personal free will.[9] Each perceived event adds information to an individual's beliefs. These personal beliefs are internally consistent within the individual, and the individual revises beliefs in an orderly fashion upon the receipt of new attributional information.[10] Thus, the world surrounding an individual influences the individual's behavior.

Personal attributions manifest themselves through three functions that maintain an individual's positive self-perception, and each has an application to pilots. First, the control function posits that an individual has a basic motivation to exert control over the physical and social world around him or her.[11] By perceiving a link between an event and its results, an individual attributes the result to the event. Although an individual may attribute a result to either a person or surrounding circumstances, a personal attribution is more likely than a situational attri-

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[7] TOM WOLFE, THE RIGHT STUFF 27 (1979).

[8] Miles Hewstone, *Attribution Theory and Common-Sense Explanations: An Introductory Overview*, *in* ATTRIBUTION THEORY 1, 17 (Miles Hewstone ed., 1983).

[9] John Monohan, *Abolish the Insanity Defense?—Not Yet*, 26 RUTGERS L. REV. 719, 721 (1973).

[10] Azjen & Fishbein, *supra* note 3, at 69.

[11] Hewstone, *supra* note 8, at 17.

bution.[12] Also, personal attributions are prevalent because persons are viewed as the "prototype of origins."[13] Further, people typically do not see chance as an attributional category.[14] Thus, an individual's motivation to control is a motivation to create results by personal action because causal actions originate in persons, and not in situations or chance.

If pilots perceive that they can control their liability, then they have a motivation to do so. General aviation pilots as a group already have a more internalized locus of control than non-pilots.[15] That is, pilots feel more personally responsible for their acts.[16] If pilots, however, perceive aviation negligence law as arbitrary and unrelated to flying, then pilots do not attribute liability to themselves, but instead to situations or chance. On the other hand, if the rules of aviation negligence law are rational, as perceived by pilots, then pilots attribute liability to their own actions. Hence, pilot negligence law that relates closely to pilot perceptions of aviation increases safety.

The second attributional function that affects pilots is the self-esteem function. An individual is motivated to protect the individual's self-impression.[17] Thus, personal success leads to positive feelings such as pride, and failure leads to shame.[18] Overall, the self-esteem function leads an individual to act in the individual's best interest.

The Health Belief Model illustrates the self-esteem function at work. "The model postulates that an individual's decision to undertake health-related actions is governed by specific health beliefs: namely, the patient's

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[12] *Id.* at 3.

[13] *Id.*

[14] Gurnek Bains, *Explanations and the Need for Control*, *in* ATTRIBUTION THEORY 126, 129 (Miles Hewstone ed., 1983).

[15] C.E. Melton, *Human Error in Aviation: Deliberate, Inadvertent or Reflecting Expertise*, *in* BUSINESS AVIATION SAFETY 13 (1991).

[16] *Id.*

[17] Hewstone, *supra* note 8, at 17.

[18] J. Richard Eiser, *From Attributions to Behaviour*, *in* ATTRIBUTION THEORY 160, 165 (Miles Hewstone ed., 1983).

perceived vulnerability to, and perceived severity of, a particular illness, and his or her perception of efficacy, costs and benefits involved in the recommended health action."[19] The Health Belief Model is a method of analyzing a present situation, a future situation, and the costs and benefits of the various paths between the two. For instance, a patient with heart disease might face a choice of undergoing a bypass operation, which encompasses the risks of surgery and yet the prospects of a longer life. The patient also has the option of doing nothing. Likewise, actions that a person may take to reach a desired self-impression have different costs and benefits, though the goal of better self-impression remains the same.

The Health Belief Model has an analogy in general aviation. A clear goal in aviation is safety because safe aerial operations are useful, predictable and routine. Hence, most pilots take personal pride in being safe. All pilots are aware that an error can cause a serious accident. If an accident leads to litigation, the opportunity arises to judge a pilot's degree of safety. If pilots perceive such judgments as irrational, then there is no motivation to improve self-esteem; the severity of the problem is high, vulnerability is insurmountable, and the costs are infinite. If pilot negligence law, however, is closely tuned to aviation, then the Health Belief Model predicts that safety problems are treatable. A realistic and understandable safety standard is attainable because vulnerability costs are finite. Therefore, pilots are inclined to enhance safety if there is a rational aviation liability system with which they can comply.

The third attributional function is that of self-presentation. Under this function, an individual attributes responsibility for results of an event in terms of social responsibility rather than objective causation.[20] Natu-

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[19] Jennifer King, *Attribution Theory and the Health Belief Model*, *in* ATTRIBUTION THEORY 170, 171 (Miles Hewstone ed., 1983).

[20] Hewstone, *supra* note 8, at 17; Sally Lloyd-Bostock, *Attributions of Cause and Responsibility as Social Phenomena*, *in* ATTRIBUTION THEORY AND RESEARCH: CONCEP-

rally, social and moral attitudes, which are independent of the physical world, influence how an individual attributes responsibility.[21] For example, as children develop, they gradually assimilate the rules established by the community. Those rules, like the laws of physics, become constraints on behavior.[22] Thus, attributions inherently include moral responsibility and blame.[23]

Self-presentation is not wholly individualized and subjective, however, because with moral blame comes societal punishment. The individual in a community with certain social and moral standards observes that "acts are not evaluated in accordance with motive or intention, but in terms of their objective consequences and their conformity with established rules."[24] Next, the individual observes that punishment follows the act and consequently attributes the punishment to the wrong.[25] Ultimately, an individual objectively evaluates the magnitude of the wrong by measuring the severity of the punishment.[26] Legal rules and punishments also influence how an individual interprets the social world.[27] Thus, legal rules provide an objective conception of the social responsibility of members of a community.

The self-presentation function has direct application to pilot negligence law. For the most part, pilots are very safety conscious, both in their approach to primary training and continuing education. Moreover, the aviation community possesses vast practical knowledge that has

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TUAL, DEVELOPMENTAL AND SOCIAL DIMENSIONS 261, 268 (Jos Jaspers et al. eds., 1983).

21 Frank D. Fincham, *Developmental Dimensions of Attribution Theory*, *in* ATTRIBUTION THEORY AND RESEARCH: CONCEPTUAL, DEVELOPMENTAL AND SOCIAL DIMENSIONS 117, 149 (Jos Jaspers et al. eds., 1983).

22 *Id.*

23 Mansur Lalljee & Robert P. Abelson, *The Organization of Explanations*, *in* ATTRIBUTION THEORY 65, 65 (Miles Hewstone ed., 1983).

24 Fincham, *supra* note 21, at 149.

25 Serge Moscovici & Miles Hewstone, *Social Representations and Social Explanations: From the 'Naive' to the 'Amateur' Scientist*, *in* ATTRIBUTION THEORY 98, 123-24 (Miles Hewstone ed., 1983).

26 Fincham, *supra* note 21, at 149.

27 Lloyd-Bostock, *supra* note 20, at 289.

led to generally accepted rules and practices. Necessarily, pilot negligence law is also a part of those rules. Yet if aviation law is closely related to aviation rules gleaned from experience, and if such tort rules are known to pilots, then pilots easily integrate them into the larger array of rules and practices. Hence, because the pilot community encourages safety, a body of aviation negligence law that parallels these concerns reinforces and enhances safety.

In summary, attribution theory suggests that a system of pilot negligence law that reflects the factors that contribute to aircraft accidents, as opposed to a system that merely applies general negligence principles, better deters unsafe conduct and results in increased flight safety. First, negligence law that fairly judges pilot conduct motivates pilots to take more control of the safety of their flying. Pilots have a high locus of control; improved negligence law enhances that control by giving pilots the assurance that they are judged from a position of aviation knowledge. Second, improved pilot negligence law provides pilots with more accurate information, which pilots use to act in their best interest and avoid legal liability. Finally, improved pilot negligence law exerts more effective social pressure on pilots to act safely. "The only practical and acceptable solution lies in enhanced education and persuasion . . . to imbue pilots with mature attitudes toward flying."[28] Indeed, if negligence law is a last resort to compensate a victim for the wrongful acts of another, certainly avoiding accidents altogether is the preferable result.

Therefore, investigation into the realities of general aviation accidents is mandatory. The investigation must focus on the roles of pilots in aircraft accidents. Consequently, liability of the manufacturer, owner, or operator of an aircraft involved in an accident is not ger-

[28] Melton, *supra* note 15, at 20.

mane. Although non-pilot aviation liability involves intriguing issues, it is not appropriate to this analysis.

III. APPLICATION OF THE HYPOTHESIS TO PILOT NEGLIGENCE LAW

A. PILOT DISREGARD OF SAFETY PRACTICES: THE FEDERAL AVIATION REGULATIONS AND NEGLIGENCE *PER SE*

At the outset, many safety practices already exist in the FARs, and a pilot's violation of an FAR should be negligence *per se*. The doctrine of negligence *per se* is well established, and courts apply it in aviation cases. Significantly, the FARs are replete with rules directly related to general aviation safety. Hence, application of negligence *per se* in general aviation is appropriate. Like all doctrines, though, particular limits should define its boundaries in the pilot negligence context. In this way the doctrine is consistent with the control and self-presentation functions of attribution theory.

The basic elements of negligence *per se* are straightforward. The doctrine applies to any statute enacted to enhance safety, that is, enacted to protect a particular group of persons from a particular kind of harm.[29] By prescribing a special level of conduct, a safety statute defines the duty of care in those instances in which the statute applies and establishes a causal relationship between conduct and harm.[30] In addition, the heightened duty under negligence *per se* includes a requirement to take necessary precautions to prevent injury; one in control of a situation must protect others who are unable to protect themselves.[31]

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29 United States Aviation Underwriters, Inc. v. National Ins. Underwriters, 344 N.W.2d 532, 534 (Wis. Ct. App. 1984).

30 Gatenby v. Altoona Aviation Corp., 268 F. Supp. 599, 606 (W.D. Pa. 1967).

31 Florida Freight Terminals, Inc. v. Cabanas, 354 So. 2d 1222, 1225 (Fla. Dist. Ct. App. 1978).

1. FAR Safety Regulations

Safety regulations pertaining to general aviation are located in at least three parts of the FARs. The first is 14 C.F.R. Part 91, which governs the operation of aircraft operated within the United States.[32] Part 91 includes many major flight rules such as the use of alcohol or drugs by pilots; required preflight action; right-of-way rules; visual flight rules; instrument flight rules; equipment, instrument, and certificate requirements; special flight operations; maintenance; large and turbine-powered multiengine airplanes; equipment and operating requirements for large and transport category aircraft; foreign aircraft operations and operations of U.S.-registered civil aircraft outside of the United States; operating noise limits; and waivers.[33] Most of the rules in Part 91 relate directly to proper actions and conduct while in flight, promoting the goal of ensuring flight safety.

Safety regulations are also located in Part 61, which prescribes the requirements for pilot certificates and ratings, and the privileges and limitations incident to each.[34] Each pilot certificate or rating has specific minimum requirements. For instance, Part 61 defines different types of pilot certificates, including student pilot, recreational pilot, private pilot, commercial pilot, airline transport pilot, pilots qualified to operate multiengine aircraft (multiengine rating), and pilots qualified to fly solely by reference to aircraft instruments (instrument rating).[35] Most types of pilot certificates have different ratings for particular aircraft categories, such as fixed wing, rotary wing, glider, and free balloon, and some of the categories are further divided into class ratings, such as single engine and multiengine.[36] For each certificate, category rating, and class rating that a pilot desires, the pilot must

[32] 14 C.F.R. § 91.1 (1992).
[33] *Id.* pt. 91.
[34] *Id.* § 61.1.
[35] *Id.* pt. 61.
[36] *Id.*

meet specific eligibility requirements and demonstrate a minimum level of knowledge and proficiency.[37] All of these requirements are commensurate with the privileges of the particular certificate or rating; greater authority and responsibility come only with greater skill. Hence, every requirement specified in Part 61 is designed to increase the safety of flight.

Beyond initial certification requirements, Part 61 also demands a prescribed level of recent flight experience. First, a pilot may not act as pilot in command of an aircraft carrying passengers unless the pilot has made three takeoffs and three landings within the past ninety days in an aircraft of the same category, class, and, if required, type.[38] In addition, if the pilot flies at night, the takeoffs and landings must have been completed at night.[39]

Moreover, instrument flight rules cover the flight, the pilot must have at least six hours of instrument flight time in the preceding six months, including at least six instrument approaches to airports or an instrument competency check.[40] Lastly, Part 61 requires a pilot to complete a flight review within the preceding two years.[41] It is the responsibility of the individual pilot to meet all of the foregoing requirements.[42] Clearly, each step of the recent experience criteria is aimed at ensuring proficiency in the operation of aircraft and the avoidance of accidents.

Finally, Part 67 contains requirements for airman medical certificates. Most pilot certificates require the holder to possess a valid medical certificate.[43] Furthermore, no person with a medical deficiency may act as a pilot.[44] There are express requirements relating to general

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[37] *See, e.g.*, *id.* §§ 61.123, 61.175, 61.127.

[38] *Id.* § 61.57(c).

[39] *Id.* § 61.57(d).

[40] *Id.* § 61.57(e).

[41] *Id.* § 61.56(c).

[42] *See, e.g.*, *id.* § 91.103 (requiring the pilot to be familiar with all aspects of the flight).

[43] *See, e.g.*, *id.* §§ 61.83(c), 61.103(c), 61.123(c), 61.151(e).

[44] *Id.* § 61.53.

health, vision, hearing acuity, mental and neurologic health, cardiovascular health, and alcohol or drug dependence for each type of medial certificate.[45] Again, these requirements attempt to maximize flight safety.

2. *FAR Negligence* Per Se

Because the clear purpose of the FARs is to foster safety, violation of most of the FARs should constitute negligence *per se*. Courts hold that FARs are equivalent to law.[46] Moreover, some legal rules appropriately expand the scope of FARs. There are, however, some prudent limits that, if enforced by the courts, would aid the regulations' intended purpose of enhancing safety and avoid embroiling pilot defendants in legal battles over regulatory construction.

The primary reason to apply negligence *per se* is that FARs hold a high status. The FARs have the force and effect of law.[47] FARs can be dispositive in a pilot negligence case because a violation of an FAR amounts to a breach of a legally imposed duty.[48] Therefore, any FAR that qualifies as a safety regulation provides a foundation for negligence *per se*.

Thus, courts have found a variety of FARs to be safety regulations and Parts 91 and 61 to be springboards for negligence *per se*. For example, Part 91 regulations that invoke the doctrine include section 91.103, which requires a pilot to be familiar with all available information concerning the flight;[49] section 91.155, which requires a pilot operating under visual flight rules to maintain minimum visibility and distances from clouds;[50] and section 91.113, which requires a pilot to follow air traffic right-of-way rules.[51] Also, others argue that failure to maintain in-

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[45] *See e.g.*, *id.* §§ 67.13, 67.15, 67.17.
[46] Wood v. United States, 14 Av. Cas. (CCH) 17,821, 17,823 (C.D. Cal. 1977).
[47] *Id.*
[48] Florida v. Cabanas, 354 So. 2d 1222, 1225 (Fla. Dist. Ct. App. 1978).
[49] *Id.*
[50] Gatenby v. Altoona Aviation Corp., 268 F. Supp. 599, 606 (W.D. Pa. 1967).
[51] United States Aviation Underwriters, Inc. v. National Ins. Underwriters, 344

strument qualifications under section 61.57(e) qualifies as negligence *per se*.[52] Hence, virtually any FAR that involves the operation of aircraft, and not merely administrative procedure, is a safety regulation under the doctrine.

Furthermore, two ancillary legal rules support the application of negligence *per se* in the interest of safety. The first is the presumption that a pilot knows, and will comply with, the FARs. For example, an air traffic controller has a right to assume that pilots are aware of, and will abide by, all applicable FARs.[53] This implies that pilots know their airborne duties. Such a presumption furthers safety interests because the controller has a separate job to perform, and policing presumably qualified pilots should not be a part of that job. In addition, if everyone, pilots and controllers, knows and follows the FARs, then there is predictability in the actions of all. Therefore, the presumption of knowledge and compliance is appropriate.

The second rule helps to sort out the obligations of pilots and air traffic controllers. The *Wood v. United States* decision may stand for the proposition that when an issue of whether the pilot or the controller violated a regulation exists, then the responsibility for unfortunate consequences lies with the pilot.[54] In that case, the controller issued takeoff clearance to a pilot for a flight under visual flight rules. Thereafter, the pilot had a duty to keep the aircraft in visual meteorological flight conditions, i.e. out of the clouds.[55] In so holding, the court relied on section 91.3(a),[56] which states that "[t]he pilot in command of an aircraft is directly responsible for, and is the final author-

N.W.2d 532, 534-35 (Wis. Ct. App. 1984). When this case was decided, 14 C.F.R. § 91.113 was codified at 14 C.F.R. § 91.67.

[52] Norwest Capital Management & Trust Co. v. United States, 828 F.2d 1330, 1347 (8th Cir. 1987) (dissenting opinion).

[53] Wood v. United States, 14 Av. Cas. (CCH) 17, 821, 17,823 (C.D. Cal. 1977).

[54] *Id.*

[55] *Id.*

[56] *Id.*

ity as to, the operation of that aircraft."[57] This rule is appropriate because, as between pilot and controller, the pilot is the one actually in the aircraft and consequently is in the best position to judge the correct course of action with respect to that aircraft. Therefore, the burden of avoiding a regulatory violation rests with the pilot.

3. *Limits on Pilot Negligence* Per Se

At the same time, pilot negligence *per se* should be prudently limited to avoid unfairness and unnecessary confusion. Specifically, plaintiffs in negligence *per se* cases must prove all the elements of negligence; a statute defines the duty, but the plaintiff must also show causation and damages.[58] Also, courts must strictly construe the FARs because they contain several examples of potentially conflicting regulations.[59]

The act of a FAR violation must meet the elements of a negligence cause of action. As with other allegedly negligent acts, the FAR violation must proximately cause injury.[60] Further, proximate causation is generally a question for the jury.[61] Thus, pilot negligence *per se* is part of an element of a negligence claim, not a shorter path to liability.

Moreover, negligence *per se* should only apply when the specific FAR sufficiently puts a pilot on notice of what constitutes a violation. Because of the potential misinterpretation by the ultimate users of an FAR, courts should not extend the FAR beyond the plain meaning of its terms.[62] Although the FARs presumably guide pilots and

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[57] 14 C.F.R. § 91.3(a) (1992).

[58] Annau v. Schutte, 535 P.2d 1095, 1098 (Idaho 1975).

[59] *See, e.g.*, 14 C.F.R. § 61.56(c) (flight reviews); *id.* § 61.51(c)(2) (logging flight time); *id.* § 61.97(a) (awareness of AIM); *id.* § 61.105(a) (awareness of AIM) (1992).

[60] *Annau*, 535 P.2d at 1098.

[61] *Id.*

[62] Upper Valley Aviation, Inc. v. Fryer, 392 S.W.2d 737, 741-42 (Tex. Civ. App.—Corpus Christi 1965, writ ref'd n.r.e.).

others in aviation, confusing and conflicting regulations exist.

There are at least three examples of such confusing regulations. The first example is the requirement for annual flight reviews. Presently, each pilot must complete a flight review within the preceding twenty-four calendar months.[63]

> [A]fter August 31, 1993 [though], each recreational pilot who has logged fewer than 400 hours of flight time as a pilot and each non-instrument-rated private pilot, other than a glider-rated private pilot, who has logged fewer than 400 hours of flight time as a pilot must have [completed a flight review] since the beginning of the 12th calendar month before the month in which that pilot acts as pilot-in-command of an aircraft.[64]

This regulation, however, does not resolve the situation of a pilot who holds a commercial pilot certificate for one category of aircraft and a private pilot certificate for another category. This regulation obviously compels pilots to obtain periodic outside reviews of their flying skills to maintain flight safety, yet, upon reading the regulation, one has no idea what to do in some situations.

The second example concerns the recording of flight time as pilot in command. Conceptually, every manned air vehicle has a pilot in command. Section 91.3 supports this concept by placing authority and responsibility with the pilot in command.[65] Section 61.51(c)(2), however, states that only recreational, private, and commercial pilots may log time as pilot in command in their logbooks.[66] The section implicitly excludes student pilots.[67] The regulations, however, permit a student pilot to fly as the sole occupant of an aircraft.[68] Thus, if a student pilot is the

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[63] 14 C.F.R. § 61.56(c) (1992).

[64] *Id.* § 61.56(d).

[65] *Id.* § 91.3.

[66] *Id.* § 61.51(c)(2).

[67] *Id.* § 61.51(c).

[68] *Id.* §§ 61.87, 61.89.

sole occupant of an aircraft, then that flight will never be recorded anywhere as having a pilot in command.

Required awareness of the AIM is the third example. Applicants for recreational or private pilot certificates must have knowledge of the use of the AIM.[69] Curiously, the FARs list no such requirement for applicants of commercial or airline transport certificates. Furthermore, the private pilot requirement literally applies only to airplane and rotorcraft certificates, not glider, airship, or free balloon certificates.[70] The AIM is an important document because it describes the rules and procedures for American aviation.[71] Given this fact, surely the FARs do not mean to imply that the individuals in airline cockpits need not know anything about the airspace system in which they fly. Hence, some FARs are ambiguous.

The foregoing examples show that a pilot who is earnestly attempting to comply with the FARs may confront confusion. Complying with recent experience requirements, recording flight time, or even becoming a pilot can present problems. In the context of judging a pilot's actions, it is unfair to hold a pilot liable for not understanding an incomprehensible rule. Therefore, courts should strictly construe FARs to limit negligence *per se*.

In addition to strict construction, courts must alleviate the rigidity of negligence *per se* in emergency situations. In the first instance, the FARs permit violations. In an inflight emergency, the pilot may deviate from any rule of Part 91 to the extent required to meet the emergency.[72] Accordingly, in an emergency situation, a violation of a FAR should only be evidence of negligence.[73] Moreover, the "sudden emergency" doctrine from ordinary negligence law should apply in aviation cases because the external forces in a situation may bear on the question of

[69] *Id.* §§ 61.97(a), 61.105(a).

[70] *Id.* § 61.105.

[71] FAA, AIRMAN'S INFORMATION MANUAL 1 (1992).

[72] 14 C.F.R. § 91.3(b) (1992); Bolick v. Sunbird Airlines, Inc., 386 S.E.2d 76, 78 (N.C. Ct. App. 1989), *aff'd*, 396 S.E.2d 323 (N.C. 1990).

[73] Travelers Ins. Co. v. Riggs, 671 F.2d 810, 817 (4th Cir. 1982).

whether the pilot breached a duty of care.[74] Thus, in an emergency the pilot would only be required to exercise due care under the circumstances. That is, when "one who through no fault of his own, is confronted with a sudden peril and does things which afterward may seem to have been improper or foolish is not negligent if he does what a prudent man would or might do under the circumstances."[75] In all, the FAR violation must flow not from the circumstances of the situation but from an unwarranted disregard of the FARs.

In summary, negligence *per se* should apply to pilot negligence because the FARs' primary role is safety, and negligence *per se* is useful in motivating pilots via the control and self-presentation functions of attribution theory. In its basic application, a legal rule requiring compliance with the FARs ensures behavior that the FAA deems safe. Of course, negligence *per se* must have certain limits to be equitable, such as strict construction and the "sudden emergency" doctrine. If designed in this way, negligence *per se* will motivate pilots to control their acts, as well as any potential liability, by merely knowing and following the rules. If the FARs are clear and understandable, then so are the safe practices contained therein. Also, compliance with the rules of general aviation is the societal norm in general aviation. Pilots are indoctrinated toward safety, and thus pilots feel a social responsibility to conform to the aviation community, including compliance with the FARs. Hence, the pilot negligence *per se* doctrine benefits all in the form of safer aviation.

B. Pilot Disregard of the Airman's Information Manual and Other Federal Aviation Administration Safety Literature

The FARs are not the only source of guidance in general aviation. The AIM and advisory circulars, also pub-

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[74] *Bolick*, 386 S.E.2d at 79.

[75] Chapman v. United States, 194 F.2d 974, 978 (5th Cir.), *cert. denied*, 344 U.S. 821 (1972).

lished by the FAA, provide rules for air safety, and violation of them should be either evidence of pilot negligence or negligence *per se*. These documents are sources of nonregulatory information regarding aviation in the United States.[76] As such, they are directly relevant to the standard of care as it relates to pilots. Indeed, the AIM and advisory circulars provide the same motivations for pilot control of conduct as well as pilot conformity with the societal norms of aviation.

The AIM is the major documentary source about flying, as it contains the fundamental information required to fly in the United States.[77] In addition, the AIM describes how the FARs apply to various situations.[78] The chapters of the AIM include detailed descriptions of navigation aids, airport visual aids, airspace, air traffic control, emergency procedures, safety of flight issues, aviation physiology, and aeronautical publications.[79] Thus, the AIM provides a comprehensive source of information for pilots.

Advisory circulars supplement the material presented in the AIM. Advisory circulars inform the aviation public of nonregulatory materials of interest.[80] The FAA issues advisory circulars with a numbering system that corresponds to the subject areas of the FARs.[81] Examples of advisory circulars include the *Pilot's Handbook of Aeronautical Knowledge* (AC 61-23B),[82] *Aviation Weather For Pilots and Flight Operations Personnel* (EA-AC 00-6A),[83] *Aviation Weather Services* (AC 00-45C),[84] and the *Aviation Instructor's Handbook* (AC 60-14).[85] In short, the advisory circular system is the

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76 FAA, *supra* note 71, at 1.

77 *Id.*

78 *In re* N-500L Cases, 691 F.2d 15, 28 (1st Cir. 1982).

79 FAA, *supra* note 71, at 7-14.

80 *Id.* at 2.

81 *Id.*

82 FAA, PILOT'S HANDBOOK OF AERONAUTICAL KNOWLEDGE (1980).

83 FAA, AVIATION WEATHER FOR PILOTS AND FLIGHT OPERATIONS PERSONNEL (1975).

84 FAA, AVIATION WEATHER SERVICES (1985).

85 FAA, AVIATION INSTRUCTOR'S HANDBOOK (1977).

FAA's set of pilot safety literature.

Considering the wealth and importance of the safety information contained in the AIM and advisory circulars, violation of their precepts should be at the least evidence of negligence. The AIM and advisory circulars are evidence of customary flying practices and are thus evidence of the standard of care.[86] Because flying is a very specialized activity, courts must look to extra-legal references such as the AIM and advisory circulars to ascertain whether a particular pilot acted negligently. The AIM and advisory circulars are the natural choice because, aside from the FARs, they constitute the most authoritative source of material on aviation safety. Hence, the information contained in the AIM and advisory circulars should be a foundation for determining pilot negligence.

Beyond just evidence, the violation of a principle in the AIM or an advisory circular should be negligence *per se*. First, if a court has no sources other than the AIM or advisory circulars to determine the appropriate standard of care, then the court has no independent legal basis for establishing the standard of care and will no doubt follow the FAA's documented standards without question. Further, there is authority for the proposition that pilots are obliged to follow the strictures of the AIM.[87] Also, in requiring that applicants for private pilot certificates be familiar with the AIM and advisory circulars, the FARs require those pilots to know and follow them.[88] As described above, this provision of the FARs strictly applies only to private pilot airplane and rotorcraft certificates. This restriction is illogical. Therefore, the AIM and advisory circulars partly define the standard of care in pilot negligence cases, and violation of either should be negligence *per se*.

Logically, the limitations of the negligence *per se* doc-

[86] Mallen v. United States, 506 F. Supp. 728, 735 (N.D. Ga. 1979); *accord In re* N-500L Cases, 691 F.2d 15, 28 (1st Cir. 1982).

[87] Barbosa v. United States, 811 F.2d 1444, 1446 (11th Cir. 1987).

[88] Rodriguez v. United States, 823 F.2d 735, 739 (3d Cir. 1987).

trine with respect to FAR violations should also apply to violations of the AIM and advisory circulars. First, the rule allegedly violated must be one intended to protect particular persons from particular harm. Next, the violation must be the proximate cause of the injury. Also, strict construction is required to avoid innocent misinterpretation as a basis for liability. Lastly, courts should relax negligence *per se* in emergency situations.

Exactly as in the FARs, pilots can internalize the practice of following the AIM and advisory circulars to enhance control and self-presentation. It is an easy task to apply widely available documentary information into everyday flying practices. In addition, the motivation toward greater control already exists in pilots. Therefore, pilots can easily satisfy their desires for control by following the published rules. Additionally, safe practices inherent in the AIM and advisory circulars reinforce the safety-oriented norm of the aviation community. For pilots, conforming to the documents is tantamount to conforming to the societal norm, and therefore compliance with them permits pilots to hold themselves out as safe. Hence, pilot negligence *per se* should also encompass the AIM and advisory circulars.

C. Pilot Disregard of Ordinary Care in General: What Should the Standard of Care Be?

A pilot, like anyone else, is capable of acting negligently. Negligence law imposes a duty of ordinary care upon all persons, and measures alleged negligence against this standard. One must consider, however, the specialized circumstances surrounding an aircraft accident along with the general duty to use ordinary care. Accordingly, useful and rational bases for defining pilots' duty of care are necessary. Such bases exist in the National Transportation Safety Board (NTSB) aircraft accident data collected since 1969 and take the form of data on total pilot experience, experience in the type of aircraft involved in the accident, and pilot certification. By applying the lessons learned from aircraft accidents to shape measurements of pilot conduct, legal liability closely matches pilots' operational experiences. In turn, pilots have a clear, realistic, and attainable standard of care they can internalize.

Unfortunately, tort law prefers a simple, global, objective standard for measuring the reasonableness of pilot conduct, instead of a standard that is as specialized as the activity. The duty is one of ordinary care under the circumstances.[89] Some justification exists for this standard, such as that suggested by Prosser and Keeton:

> The whole theory of negligence presupposes some uniform standard of behavior. Yet the infinite variety of situations which may arise makes it impossible to fix definite rules in advance for all conceivable human conduct. The utmost that can be done is to devise something in the nature of a formula, the application of which in each particular case must be left to the jury, or to the court. The standard of conduct which the community demands must be an external and objective one, rather than the individual judgment, good or bad, of the particular actor; and it must be, so far as possible, the same for all persons, since the law can have no favorites. At the same time, it must make proper allowance for the risk apparent to the actor, for his capacity to meet it, and for the circumstances under which he must act.[90]

In addition, there seems to be a major fear that any elaboration on the basic negligence standard somehow invalidates the ordinary rules of negligence.[91]

Jury instructions, however, never seem to be as simple as "ordinary care under the circumstances." Consider, for example:

> Negligence is the doing of some act which a reasonably prudent person would not do, or the failure to do some-

[89] Galindo v. TMT Transport, Inc., 733 P.2d 631, 632 (Ariz. 1986); DiCenzo v. Izawa, 723 P.2d 171, 179 (Haw. 1986).

[90] *Galindo*, 733 P.2d at 632-33 (quoting W. PAGE KEETON ET AL., PROSSER AND KEETON ON THE LAW OF TORTS § 32, at 173 (5th ed. 1984)).

[91] *DiCenzo*, 723 P.2d at 180.

> thing which a reasonably prudent person would do, under the circumstances shown by the evidence. It is the failure to use ordinary care.
>
> Ordinary care is that care which persons of ordinary prudence would, under the circumstances shown by the evidence, exercise in the management of their own affairs in order to avoid injury or damage to themselves or their property, or to the persons or property of others.
>
> Ordinary care is not an absolute term, but a relative one. That is to say, in deciding whether ordinary care was exercised in a given case, the conduct in question must be considered in the light of all the surrounding circumstances, as shown by the evidence.[92]

The simple, objective standard seems to be cast off. Prosser and Keeton make allowances for apparent risk, capacity of the actor, and circumstances. Likewise, the jury instruction above mentions the "surrounding circumstances" three times. Consequently, although courts and commentators profess an all-encompassing negligence standard, the standard tends to be situation-specific.

The current standard of care in pilot negligence cases is the same regarding care and circumstances. Pilots have a duty to exercise ordinary care, based on common law principles of negligence.[93] Still, ordinary care in pilot negligence cases depends on the surrounding circumstances. Again, circumstances creep into the analysis and make each case unique.

By acknowledging the existence of circumstances, courts must ultimately address the circumstance of pilot experience. A court may refuse to inject pilot experience into the standard of care, but still must regard it as a circumstance. *T-Craft Aero Club, Inc. v. Blough*[94] provides an example:

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[92] *Id.* at 178 (quoting RESTATMENT (SECOND) OF TORTS § 283 (1965)).

[93] Hayes v. United States, 899 F.2d 438, 443 (5th Cir. 1990); Mackey v. Miller, 273 S.E.2d 550, 552 (Va. 1981); Todd v. Weikle, 376 A.2d 104, 109 (Md. Ct. Spec. App. 1977); Rennekamp v. Blair, 101 A.2d 669, 670 (Pa. 1954) (applying West Virginia law).

[94] 642 P.2d 70 (Idaho Ct. App. 1982).

> Blough next challenges the standard of care applied by the trial court. She contends that the court used the standard of an experienced pilot exercising ordinary care, rather than the standard of a student pilot exercising ordinary care. The argument suggests that there are separate standards for experienced pilots and student pilots. This premise is incorrect. There is only one standard—ordinary care. The degree of experience is a factor to be considered, along with other circumstances, in applying the standard.[95]

Thus, the *Blough* court rejected a different standard of care, but nonetheless considered pilot experience to be a factor.

Conversely, the court in *Surface v. Johnson*[96] implicitly adopted a variable standard of care in a pilot negligence case. Fred Johnson, defendant's decedent, was a student pilot who died in the crash of his airplane. The court said that:

> it is clear that Johnson was negligent in even undertaking the flight in question. In so doing, Johnson was not only guilty of simple negligence, but . . . of culpable and wanton negligence in undertaking a night flight far beyond the level of his experience and training over mountainous terrain in extremely bad weather. He knowingly undertook the same flight that Perdue [Johnson's flight instructor], a far more qualified and experienced pilot, had declined to take in Johnson's plane because of existing conditions.[97]

Here, the court assigned a higher degree of negligence to Johnson only by virtue of his lack of experience. Yet, the question remains whether Perdue, an experienced pilot, would have been negligent or wantonly negligent in attempting the same flight. Because the court did not say that anyone who attempted this flight would have been wantonly negligent, the answer apparently is that a pilot like Perdue would have been simply negligent. There-

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[95] *Id.* at 72.

[96] 214 S.E.2d 152 (Va. 1975).

[97] *Id.* at 154-55.

fore, the *Surface* court implied that it would recognize a variable standard of care in pilot negligence cases.

The court in *Heath v. Swift Wings, Inc.*[98] seemed to combine the two foregoing formulae. First, the court held that "[t]he trial court improperly introduced a subjective standard of care into the definition of negligence by referring to the 'ordinary care, and caution, which an ordinary prudent pilot *having the same training and experience as Fred Heath*, would have used in the same or similar circumstances.' "[99] Then, the court acknowledged

> that one who engages in a business, occupation, or profession must exercise the requisite degree of learning, skill, and ability of that calling with reasonable and ordinary care, [and, f]urthermore, the specialist within a profession may be held to a standard of care greater than that required of the general practitioner.[100]

This rule presents three different reasonably prudent persons: the ordinary person, the professional, and the professional specialist. While the *Heath* court settled for the ordinary person, the ordinary person standard does not address reality because the ordinary person knows little about flying, just as the ordinary person knows little about law or medicine. The best pigeonhole for pilots might be the second tier, that of one in a skilled calling, although many pilots do not receive compensation for flying. A pilot, such as a flight instructor, may even fit into the specialist class. However, to not address the pilot experience issue at all is to ignore the phrase "under the circumstances."

Ultimately, the *Heath* court leaves us in suspense. "The plaintiff is entitled to an instruction holding Fred Heath to the objective minimum standard of care applicable to all pilots."[101] The contours of the objective minimum standard are left to the imagination of the reader. Accepting

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98 252 S.E.2d 526 (N.C. App. Ct. 1979).
99 *Id.* at 529 (quoting plaintiff assignment of error No. 4).
100 *Id.*
101 *Id.*

the challenge, the following is an imaginative attempt to define those minima.

An appropriate minimum standard for judging pilots as trained specialists must flow from a rational examination of the widely diverse population of those pilots. Certainly pilots must conform to a higher standard of care commensurate with their expertise in aviation. After all, negligence law dictates that lawyers, as legal specialists, must exercise the same skill, prudence, and diligence as ordinary lawyers, not ordinary persons.[102] Although this standard of care for pilots must be higher than simple ordinary care, it must be practical when applied to pilots with a few hours' experience as well as to pilots with thousands of hours logged. With this in mind, objectivity compels a study of pilots' propensity for aircraft accidents with respect to total flying experience, total experience in the particular type of aircraft involved in the accident, and level of pilot certification. The result will be an "objective minimum standard of care applicable to all pilots."[103]

The first study compares accidents with total flight time of the pilots in command of the accident aircraft. The following tables summarize the total number of accidents in each range of total flight time, corrected to reflect the various sizes of the experience intervals.[104]

Pilot Experience, Hours	Corrected Total, All Accidents[105]
0-50	5492.0
50-100	5202.0
100-500	2421.5
500-1000	899.0
1000-5000	256.4
5000-10,000	57.4

Pilot experience unknown in 3.1% of accidents.

[102] Neel v. Magana, Olney, Levy, Cathcart & Gelfand, 491 P.2d 421, 422-23 (Cal. 1971) (en banc).

[103] *Heath*, 252 S.E.2d at 529.

[104] *See infra* Appendix A for an explanation of data analysis.

[105] ANNUAL REVIEW OF AIRCRAFT ACCIDENT DATA, U.S. GENERAL AVIATION, CALENDAR YEAR 1988 30 (1991) [hereinafter ARAAD, followed by the year];

Pilot Experience, Hours	Corrected Total, Fatal Accidents[106]
0-50	351.0
50-100	448.0
100-500	251.6
500-1000	93.2
1000-5000	24.7
5000-10,000	6.0

Pilot experience unknown in 6.6% of accidents.

The data show two significant trends. First, accidents drop sharply after 100 hours of total experience. Second, at each succeeding interval after 100 hours, decreases in corrected accidents are successively greater. The 100-500 hour accident figures decline from the 50-100 hour figures by 53.5% and 44.0% for total and fatal accidents, respectively. Likewise, the percent changes from 100-500 hours to 500-1000 hours are 62.9% for total accidents and 63.0% for fatal accidents. The percent reductions progressively increase with higher levels of pilot experience.

Although all of the decreases in accidents are large, the objective minimum standard should be set at 500 hours. The progressively larger accident decreases would justify placing the standard at any point over 100 hours, even 10,000 hours. Standards higher than 500 hours, however, would be unrealistic because few pilots possess that much experience.[107] In practice, therefore, a very high standard

ARAAD 1987 29 (1989); ARAAD 1986 29 (1988); ARAAD 1985 29 (1987); ARAAD 1984 29 (1987); ARAAD 1983 28 (1987); ARAAD 1982 28 (1986); ARAAD 1981 27 (1984); ARAAD 1980 25 (1984); ARAAD 1979 99 (1981); ARAAD 1978 97 (1980); ARAAD 1977 100 (1978); ARAAD 1976 89 (1978); ARAAD 1975 86 (1977); ARAAD 1974 87 (1976); ARAAD 1973 91 (1975); ARAAD 1972 91 (1974); ARAAD 1970 15 (1974); ARAAD 1969 14 (1971).

106 ARAAD 1979 99 (1981); ARAAD 1978 97 (1980); ARAAD 1977 100 (1978); ARAAD 1976 87 (1978); ARAAD 1975 86 (1977); ARAAD 1974 87 (1976); ARAAD 1973 91 (1975); ARAAD 1972 91 (1974); ARAAD 1970 15 (1974); ARAAD 1969 14 (1971).

107 *See, e.g.*, U.S. BUREAU OF THE CENSUS, STATISTICAL ABSTRACT OF THE UNITED STATES: 1992 629 (112th ed. 1991) (stating that almost half of the pilot certificates held in the United States are student or private certificates).

would require the training of student pilots to the level of airline captain before permitting them to fly solo. On the other hand, setting the standard very low, such as at 100 hours, is similarly unpalatable. A pilot with 100 hours experience is barely qualified to carry passengers. The FARs require forty hours just to apply for an airplane private pilot certificate.[108] Also, 100 hours may be only a few months' flying experience.[109] Lastly, setting a low standard would be admitting that flying is dangerous, and consequently, high accident rates are inevitable. This logic contravenes the hypothesis that all accidents are preventable, and that pilots can control how many accidents they prevent. It also contradicts the FAA's opinion that private pilots with less than 400 hours need annual, rather than biennial, flight reviews to maintain proficiency.[110] Hence, according to statistics of total accidents versus pilot experience, the minimum standard should be the ordinarily prudent pilot with 500 hours of flight time.

The next study compares the numbers of total and fatal accidents to pilot experience in aircraft type, to see whether more specialized experience reduces accidents. The following tables summarize the NTSB data.

Pilot Time in Type, Hours	Corrected Total, All Accidents, 1969-1979[111]
0-50	16000.0
50-100	5984.0
100-500	1495.0
500-1000	338.9
1000-3000	72.2

Pilot experience unknown in 5.2% of accidents.

108 14 C.F.R. § 61.109 (1992).

109 *See, e.g.*, the 30-day guaranteed instrument rating course offered by American Flyers, Addison, Texas. An instrument rating requires 40 hours of instrument time. 14 C.F.R. § 61.65(e)(2) (1992).

110 *See* 14 C.F.R. § 61.56 (1992).

111 ARAAD 1979 99 (1981); ARAAD 1978 97 (1980); ARAAD 1977 100 (1978); ARAAD 1976 89 (1978); ARAAD 1975 86 (1977); ARAAD 1974 91 (1976);

Pilot Time in Type, Hours	Corrected Total, All Accidents, 1982-1988[112]
0-50	5559.0
50-100	2434.0
100-500	659.9
500-1000	160.8
1000-5000	23.8
5000-10,000	2.0

Pilot experience unknown in 13.4% of accidents.

Pilot Time in Type, Hours	Corrected Total, Fatal Accidents, 1969-1979[113]
0-50	1949.0
50-100	829.0
100-500	195.8
500-1000	44.0
1000-3000	9.3

Pilot experience unknown in 26.3% of accidents.

The trends in the data are similar to those relating accidents to total experience. At each interval of greater experience in aircraft type, the number of accidents significantly declines, and the reductions grow toward the bottom of each table. Percent reductions in accidents from 0-50 hours to 50-100 hours vary between 56% and 62%, and subsequent reductions range from 73% to 92% between each interval.

ARAAD 1973 87 (1975); ARAAD 1972 91 (1974); ARAAD 1970 15 (1974); ARAAD 1969 14 (1971); *see infra* Appendix A for data analysis.

[112] ARAAD 1988 30 (1991); ARAAD 1987 29 (1989); ARAAD 1986 29 (1988); ARAAD 1985 29 (1987); ARAAD 1984 29 (1987); ARAAD 1983 28 (1987); ARAAD 1982 28 (1986); *see infra* Appendix A for data analysis.

[113] ARAAD 1979 99 (1981); ARAAD 1978 97 (1980); ARAAD 1977 100 (1980); ARAAD 1976 87 (1978); ARAAD 1975 86 (1977); ARAAD 1974 87 (1976); ARAAD 1973 91 (1975); ARAAD 1972 91 (1974); ARAAD 1970 15 (1974); ARAAD 1969 14 (1971); *see infra* Appendix A for data analysis.

The data indicate that the minimum standard of care should be set at 100 hours of time in type. Pilots at the high end of the 50-100 hour group are involved in far fewer than half the number of accidents as pilots with less than fifty hours in type. Next, pilots with 100 hours in type are also at the lower end of the 100-500 hour group, which has more than three-quarters less propensity toward accidents than the 50-100 hour group. Also, the assignment of 100 hours is probably realistic in terms of the flight experience of any particular pilot. Hypothetically, for instance, the ordinary 500 hour pilot would have experience spread over five types of aircraft. Hence, the objective minimum standard should be the ordinarily prudent pilot with 100 hours of experience in the type of aircraft involved in the accident.

The final study relates accidents to the pilot certificate held by the pilot in command of the accident aircraft. Holding a pilot certificate signifies two things. First, it shows that the pilot has at least a certain amount of total experience. In powered airplanes, for instance, a private pilot has at least forty hours,[114] a commercial pilot has at least 250 hours,[115] and an airline transport pilot has at least 1500 hours.[116] A certificate also denotes that the holder demonstrated the requisite levels of knowledge and proficiency during the pilot's FAA flight test.[117] The table below shows how this circumstance compares with aircraft accidents.

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[114] 14 C.F.R. § 61.113(a) (1992).
[115] *Id.* § 61.129(b).
[116] *Id.* § 61.155(b)(2).
[117] *See, e.g.*, *id.* §§ 61.013(e), 61.123(3), 61.167(a).

Pilot Certificate	Percent of Fatal or Serious Accidents[118]
Student	7.7
Private	44.6
Commercial	27.0
Airline Transport	3.7
Private with Instructor Rating	0.1
Commercial with Instructor Rating	11.9
Airline Transport/Instructor	3.1
None	1.4
Unknown	0.5
	100.0

The data show that the minimum standard should be the ordinary private pilot. Most of the accidents in the period involved either a private or a commercial pilot. The distribution between the two is roughly equal; the Commercial and Commercial with Instructor Rating categories total 38.9%, which is comparable to 44.6% for the Private category. Hence, there is no need to consider using commercial pilot skills in the minimum pilot standard because there are nearly as many accidents with commercial pilots as with private pilots. Moreover, although airline transport pilots have far fewer accidents, they probably comprise a very small fraction of the pilot population. Likewise, a student pilot standard is not proper because student pilots are not even qualified to carry passengers.[119] Thus, the objective minimum standard should be the ordinarily prudent private pilot.

In conclusion, analysis of NTSB general aviation accident data indicates that the objective minimum standard to apply in pilot negligence cases should be the degree of

[118] ARAAD 1979 102 (1981); ARAAD 1978 100 (1980); ARAAD 1977 103 (1978); ARAAD 1976 92 (1978); ARAAD 1975 89 (1977); ARAAD 1974 90 (1976); ARAAD 1973 94 (1975); ARAAD 1974 94 (1976); *see infra* Appendix A for data analysis.

[119] 14 C.F.R. § 61.89(a)(1) (1992).

care exercised by an ordinarily prudent private pilot with 500 hours of total flight experience and 100 hours experience in the accident aircraft type. Pilots with 500 hours total and 100 in type are substantially less likely to be involved in aviation accidents than less experienced pilots. Also, while actual experience bears directly upon accident propensity, the additional flying skill of commercial pilots over private pilots does not. Further, this standard supports the control function of attribution theory. The standard is within the comprehension, and likely within the grasp, of most pilots.

Thus, if a particular pilot possesses less experience, then that pilot will be on notice that he or she must sharpen his or her airmanship skills to the legally acceptable level. Likewise, a pilot with superior experience will know that the skills to be especially safe in the air are present, and the capacity to exceed the threshold of legal negligence exists. Of course, expert testimony would educate jurors on the skills and knowledge of the standard pilot. Therefore, the law should base general aviation pilot negligence determinations on this standard.

D. Liability for Pilot Mistakes and Poor Judgment

Pilot negligence law must also account for the remaining accidents that result from pilot error in the form of mistakes and poor judgment. Imposing liability for mistakes and poor judgment does not fit within the tort law policy of deterring culpable conduct. Mistakes infer actions that result in unintended, unforeseeable results, rather than actions without regard for others' safety. Despite that, to forego consideration of accidents caused by mistakes and poor judgment is to ignore the hypothesis that human fault is always present in aircraft accidents. The question, then, is what are the other human agencies that contribute to pilot error. There are three pilot-candidates. The first is the flight instructor who provided the initial flight training to the pilot of the accident aircraft. The second is the check airman who issued the accident pilot's certificate. The third is the flight instructor who conducted the accident pilot's most recent recurrent training.

The pilot's primary flight instructor may have potential liability because the skills that the pilot learned initially are vital to the pilot's exercise of safe practices. Many aspects of flying have no counterparts in everyday activities, so the beginning student's knowledge base is small. To become an airplane private pilot, for example, a person must complete a course of instruction on such topics as navigation, weather, aeronautical weather reports and forecasts, high-density airport operations, collision avoidance procedures, radio communications, and aerodynamics.[120] Above all, though, a student pilot learns the fundamental skill of proper judgment.

> In aviation, judgment is the ability to make sound decisions both on the ground and in the air. It is the most important single attribute of a safe pilot. . . . A responsible attitude, adequate knowledge, and the skills developed through experience are the ingredients required for good decision making.[121]

Accordingly, most of aviation is unfamiliar to the new student. Thus, proper initial training is necessary to flight safety.

However, holding a pilot's primary flight instructor liable for the pilot's mistakes or poor judgment is not a suitable rule. The pilot's initial instruction may be years or decades distant, requiring a stretch of the causation chain. Next, the pilot in command rule of section 91.3 clearly dictates that any pilot not aboard the aircraft does not have ultimate responsibility for that aircraft.[122] Lastly, a rule imposing liability on a flight instructor for another's lapse of judgment does not reconcile with the control function of attribution theory because the flight instructor is not present to exert any control over the accident air-

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[120] 14 C.F.R. § 61.105(a) (1992).

[121] FAA, MANUAL OF FLIGHT 11-15 (1985).

[122] 14 C.F.R. § 91.3 (1992).

craft or pilot. Hence, pilot negligence law should not assess liability against a primary flight instructor for the mistakes or poor judgment of the instructor's former student.

The second candidate is the pilot's check airman. A prerequisite of any pilot certificate or rating, except student pilot, is the successful completion of an oral and flight test.[123] The test, given by an FAA inspector or examiner, focuses on procedures and maneuvers required by the flight proficiency provisions pertaining to that certificate.[124] As the FARs specify, either FAA inspectors, who are FAA employees, or designated examiners, who are qualified members of the pilot community, may conduct flight tests.[125] These individuals are known collectively as check airmen. Thus, when a check airman evaluates a pilot applicant, the check airman essentially certifies that, at the moment in time of the test, the applicant possesses skills at the levels required for the certificate or rating sought.

Clearly, check airmen are analogous to primary flight instructors with respect to liability if the pilot applicant is later involved in an aircraft accident. Like flight instructors, check airmen could be temporally distant. Also, the pilot in command rule does not change with the addition of greater privileges to the accident pilot's certificate.[126] Finally, check airmen have no means of control over potential accidents, and are at the mercy of the future competency of pilot applicants. Therefore, pilot negligence law should not impose liability on a check airman for the mistakes or poor judgment of a past flight test applicant.

Chronologically, the third candidate in the sequence of evaluators of the pilot of the accident aircraft is the flight instructor who conducted the pilot's most recent recurrent training. Each pilot must successfully complete a bi-

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[123] *Id.* § 61.103(e); *see also id.* §§ 61.96(e), 61.167(a).

[124] *Id.* § 61.103(e); *see also id.* §§ 61.96(e), 61.123(e), 61.167(a).

[125] *Id.* § 61.103(e); *see also id.* §§ 61.96(e), 61.123(e), 61.167(a).

[126] *Id.* § 91.3.

ennial flight review to act as a pilot in command.[127] The flight review consists of a review of the flight rules of Part 91 and a review of the flight maneuvers and procedures that the administrator of the review feels are necessary to ascertain the pilot's competency.[128] Although any person designated by the FAA may conduct flight reviews, flight instructors usually administer them.[129]

A flight instructor could rightfully be liable for negligently conducting a flight review. A biennial flight review is a very minimal continuing training requirement. The competency standard, that the pilot "demonstrate the safe exercise of the privileges of the pilot certificate,"[130] is vague. Moreover, nowhere does the regulation state that the pilot and flight instructor must actually fly together. Without any specific requirements for flight reviews, a flight instructor could possibly conduct a cursory review and send off an obviously deficient pilot. In such a case, it would be reasonable to hold the flight instructor liable for contributing to an accident.

Despite the case of patent instructor neglect, though, assessing liability for mistakes and poor judgment in inadequate recurrent training is unsuitable because evidence has shown that mistakes are directly proportional to expertise.

> [T]he mental errors that lead to horrendous accidents are indistinguishable in nature from the trivial, absentminded slips and lapses of everyday life.
>
> These findings underscore a crucial point about absentminded errors: they are characteristic of highly skilled activities—a problem of the expert, not the beginner. That seems to run contrary to common sense, since people expend a great deal of effort to acquire skills so that they will not make mistakes. Yet, paradoxically, the probability of making an absentminded error increases with proficiency at a particular task. The more skilled we become at an ac-

[127] *Id.* § 61.56(c).
[128] *Id.* § 61.56(a).
[129] *Id.* § 61.56(b)(1).
[130] *Id.* § 61.56(a)(2).

tivity, the fewer demands it makes upon consciousness.[131]

In fact, the author of the above quotation began by describing the 747 collision at Tenerife as an example of a terrible blunder by a skilled person.[132] As the example shows, flying is a very specialized activity, and pilots are susceptible to the same lapses as other specialists.

Therefore, mandating higher levels of recurrent training does not increase flight instructor control over future nonnegligent mistakes of other pilots. The evidence suggests that, for a flight instructor to reduce mistakes and poor judgment, the instructor would have to decrease the proficiency of the pilot. This remedy is illogical because it contradicts the NTSB data showing that safety increases with experience. Hence, holding a flight instructor, as an administrator of recurrent training, liable for the mistakes and poor judgment of the accident pilot is inappropriate.

On the whole, attribution theory cannot apply to pilot negligence law to avert aircraft accidents caused by mistakes and poor judgment because no individuals are properly liable for the pilot mistakes or poor judgment that cause aircraft accidents. The accident aircraft's pilot is not liable because such conduct is not a negligent breach of his or her duty of care. The only foundation of liability in this case would be strict liability. Strict liability, however, contravenes the hypothesis because attribution theory focuses on how a person consciously influences the physical world, not on a person's unintended actions. Beyond that, the pilot's primary flight instructor or check airman should not be liable due to temporal distance and inability to control the circumstances of the unfortunate flight. Finally, imposing liability on a flight instructor who conducts recurrent training is unfair and unworkable because of the direct relation between pilot proficiency and propensity for mistakes. Accordingly, the only airman

[131] Reason, *supra* note 1, at 48.
[132] *Id.* at 45.

who should be answerable for an aircraft accident is the accident pilot alone.

E. *Res Ipsa Loquitur* in Pilot Negligence Cases

The NTSB accident data suggests that *res ipsa loquitur* is not an appropriate theory to apply in general aviation pilot negligence cases. First, the data shows that aircraft accidents normally occur without negligence on the part of the pilot. Placing responsibility where it does not belong discourages the control function of attribution theory. Also, the issue of the defendant pilot's control of the instrumentality is more amorphous in aviation cases, either because the conduct of several individuals bears on the question of negligence or because others' conduct is completely irrelevant. Further, an improper use of the instrumental control requirement is inconsistent with the self-esteem function. Hence, the nature of aviation compels disposal of *res ipsa loquitur* in pilot negligence cases.

The elements of common law *res ipsa loquitur* are well established.

> [T]here are three conditions for the application of the doctrine: "(1) the accident must be of a kind which ordinarily does not occur in the absence of someone's negligence; (2) it must be caused by an agency or instrumentality within the exclusive control of the defendant; [and] (3) it must not have been due to any voluntary action or contribution on the part of the plaintiff."[133]

Moreover, *res ipsa loquitur* has permeated pilot negligence law. For instance, the court in *Todd v. Weikle*[134] opined that "[i]n the absence of statutory authority, the rules of law governing aviation cases are the same as those governing ordinary negligence actions,"[135] making *res ipsa loquitur* applicable to aviation accidents. In contrast, the

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[133] Newing v. Cheatham, 540 P.2d 33, 39 (Cal. 1975) (quoting Ybarra v. Spangard, 154 P.2d 687, 689 (Cal. 1944)).

[134] 376 A.2d 104 (Md. Ct. Spec. App. 1977).

[135] *Id.* at 109.

court in *Surface v. Johnson*[136] took the opposite view. "We decline to draw such inferences [of negligence] from the mere happening of the crash, for it is a matter of common knowledge that an aircraft may fall or crash in the absence of negligence or fault on the part of its pilot."[137] Although the Virginia Supreme Court made this statement in dicta, later decisions interpret it to mean not that aircraft may crash without negligence, but rather that *res ipsa loquitur* does not apply to aircraft accidents.[138] As these cases show, different courts reach opposite conclusions on the same question. Apparently, courts make both decisions with a lack of evidence of which is the rational choice. The NTSB accident data and the FARs provide helpful information in this regard.

Accident data serves to explain the proper disposition of the first element of *res ipsa loquitur*. The issue is whether pilot negligence normally causes injuries in aircraft accidents. The NTSB accident data illuminate this issue. Between 1982 and 1986, there were 8721 fatal aircraft accidents involving U.S. registered aircraft.[139] The NTSB determined that 89.4 percent of these accidents were broadly due, at least partially, to pilot error.[140] However, only 26.3 percent of accidents attributed to pilot error resulted from negligent or culpable conduct on the part of the pilot.[141] Accordingly, only 23.4 percent of all the fatal accidents occurring during the period occurred because of pilot negligence.

Hence, *res ipsa loquitur* is not appropriate to pilot negligence cases because most aircraft accidents occur without pilot negligence. The accident data show that, when a fatal aircraft accident was partially due to pilot error, there

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136 214 S.E.2d 152 (Va. 1975).

137 *Id.* at 154.

138 Travelers Ins. Co. v. Riggs, 671 F.2d 810, 815 (4th Cir. 1982).

139 ARAAD 1986 31 (1988); ARAAD 1985 34 (1987); ARAAD 1984 34 (1987); ARAAD 1983 37 (1987); ARAAD 1982 37 (1986).

140 *Id.*

141 ARAAD 1986 86-150 (1988); ARAAD 1985 177-233 (1987); ARAAD 1984 179-231 (1987); ARAAD 1983 202-247 (1987); ARAAD 1982 205-245 (1986).

is less than one chance in three that pilot negligence caused the accident. Furthermore, in any fatal accident, chances are less than one in four that pilot negligence caused the injuries. There is no place for inferences of pilot negligence in a tort system wherein proof is based on a preponderance of the evidence. Even considering potential analytical error, the data analysis would need an error margin of over 100 percent for pilot negligence to be more probable than not. Putting responsibility where it does not probably belong discourages the principle that pilots may control the consequences of accidents and litigation. Thus, aircraft accidents *do* normally happen in the absence of pilot negligence, and the first element of *res ipsa loquitur* does not apply.

The second element of *res ipsa loquitur*, that of exclusive control of the agency or instrumentality by the defendant, also raises issues particular to pilot negligence. Plainly, this element addresses whether it was indeed the defendant who breached a duty of care, and not some other, possibly unknown, individual. In general aviation, this issue particularly arises in two situations: when it is not certain that the defendant pilot was actually flying the aircraft, and when the defendant was not aboard the aircraft.

The first scenario appears when the accident aircraft has two sets of flight controls. In many general aviation aircraft, two occupants have before them, within convenient reach, the mechanical controls necessary to operate the aircraft. Consequently, when such an aircraft crashes and all aboard perish, a question emerges as to who flew the aircraft. Although the pilot in command customarily occupies a particular seat, the conclusion that the pilot in command was flying at the time of impact does not automatically follow.

Nonetheless, courts have fashioned rules to apply to this situation. If the front seat occupants were both pilots, then the issue of control is not ascertainable.

> Regardless of which one of the decedents may have been operating the plane the other could have taken some ac-

> tion which precipitated the difficulty. Any conclusion we draw must be based upon surmise and conjecture. . . . The finding of negligence is immaterial until we can determine the identity of the person to be charged with responsibility for the negligence.[142]

However, when only one pilot is within reach of the controls, then there may be a presumption that the pilot was actually in control of the aircraft. The fact that a passenger occupies a seat provided with controls does not, by itself, mean that the aircraft was not under the exclusive control of the pilot.[143] Hence, legal rules exist to address the issue of dual aircraft controls.

A more obvious issue regarding the second element arises when the pilot defendant was not aboard the aircraft when it crashed. The court in *LeJeune v. Collard*[144] addressed this issue. LeJeune was a student pilot who crashed while flying solo. Collard, LeJeune's flight instructor, was on the ground at the time of the accident. The court held that

> [t]he doctrine of *res ipsa loquitur* has no application in this case because of the fact that the accident might have occurred through the negligence of the pilot, LeJeune. . . . The air plane and the resultant unfortunate accident was [sic] under the control and knowledge of the plaintiff and not the defendant.[145]

Thus, the significant question in this type of case is whether the defendant could possibly have exercised control over the instrumentality. If not, *res ipsa loquitur* cannot apply.

While the foregoing rules regarding the second element of *res ipsa loquitur* are reasonable and equitable, they are superseded by the FARs. "The pilot in command of an aircraft is directly responsible for . . . the operation of

[142] Mitchell v. Eyre, 12 Av. Cas. (CCH) 17,880, 17,883-84 (Neb. 1973).

[143] Ayer v. Boyle, 37 Cal. App. 3d 882, 829 (Cal. Ct. App. 1974); *accord* Newing v. Cheatham, 540 P.2d at 33, 41 (Cal. 1975).

[144] 44 So. 2d 504 (La. Ct. App. 1950).

[145] *Id.* at 508-09.

that aircraft."[146] Again, the FARs have the force and effect of law.[147] The Supreme Court of Minnesota eloquently explained this provision:

> The civil air regulations do not, and cannot, establish rules for the imposition of liability. However, they do impose duties and responsibilities which, in effect, specify the standard of care that is imposed upon the pilot in command, which, in turn, is employed by common-law negligence principles in defining negligence. Thus, the rule applicable to aircraft is that if the aircraft is operated in a negligent manner the pilot in command is negligent regardless of whether or not he is at the controls at the time—at least in the absence of extenuating circumstances such as sudden illness. This surely imposes a high duty and heavy burden upon the pilot in command of aircraft. However, the duty is commensurate with the skills required and the perils incurred. We take judicial notice of the difference between air traffic and travel by rail, highway, and canal. The speed, the variable three-dimensional movement of aircraft in flight, the complexity of instrumentation and controls, the necessity for constant vigilance, and the ever-present threat of disaster in case of accident all require higher skills, greater precautions, and heavier responsibilities to constitute due care in the operation of aircraft than in the operation of land or water vehicles. These considerations make it appropriate that the pilot in command have complete authority to control the operation of the aircraft in flight and that he have corresponding responsibility.[148]

Accordingly, the one and only pilot in command of an aircraft is responsible regardless of whether the pilot in command was manipulating the controls at the time of the accident. Further, the pilot-in-command rule logically excludes any pilots not present in the accident aircraft. Hence, judicial massaging of the second element of *res ipsa loquitur* is both unnecessary and improper.

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[146] 14 C.F.R. § 91.3 (1992).

[147] Wood v. United States, 14 Av. Cas. (CCH) 17,821, 17,823 (C.D. Cal. 1977).

[148] Lange v. Nelson-Ryan Flight Serv., Inc., 108 N.W.2d 428, 432-33 (Minn. 1961).

Also, the pilot-in-command rule is consistent with the attribution hypothesis. An obvious consequence of a pilot taking to the air is control of an aircraft. The pilot-in-command rule puts responsibility and authority in the same place as control, with the pilot. The rule additionally supports the self-esteem function. Under the Health Belief Model, pilots tend to act in their own best interest. The pilot-in-command rule tells pilots that their best interest is to act to the benefit of flight safety. Therefore, the pilot-in-command rule should dominate over the second element of *res ipsa loquitur*.

In summary, *res ipsa loquitur* is not an appropriate doctrine for pilot negligence actions. Actual accident data supports the conclusion that aircraft accidents normally occur in the absence of pilot negligence. Besides, the second element of the doctrine is effectively bypassed in the face of the pilot-in-command rule. Hence, the only sensible solution is to remove *res ipsa loquitur* from the field of pilot negligence law.

F. Strict Liability in General Aviation

The final principle bearing on pilot negligence law is aviation strict liability. This concept emerged during the infancy of aviation, when flying was more thrilling than practical. Yet, strict liability lives on today. Nevertheless, strict liability should be stricken for three reasons. First, the original justification for strict liability departed long ago. Second, strict liability works to make state law internally inconsistent. Third, strict liability contravenes attribution theory, and thus reduces safety.

Unlike the deep traditions of American law, aviating began in this century mostly as a diversionary sport.

> In the early days of aviation, the cases and treatises were replete with references to the hazards of "aeroplanes." The following assessment is typical: "[E]ven the best constructed and maintained aeroplane is so incapable of complete control that flying creates a risk that the plane even though carefully constructed, maintained and operated,

may crash to the injury of persons, structures and chattels on the land over which the flight is made." RESTATEMENT (FIRST) OF TORTS, § 520, comment b (1938). As colorfully stated in Prosser and Keeton on Torts, § 78, at 556 (5th ed. 1984): "Flying was of course regarded at first as a questionable and highly dangerous enterprise, the province exclusively of venturesome fools."[149]

In 1922 the Commission on Uniform Laws proposed the Uniform Aeronautics Act, which made aircraft owners strictly liable for all ground damage caused by aircraft.[150] Additionally, the First Restatement of Torts regarded aviation as an ultrahazardous activity.

> An activity is ultrahazardous if it necessarily involves a risk of serious harm to the person, land or chattels of others which cannot be eliminated by the exercise of the utmost care, and is not a matter of common usage.[151]

Thus, based on the points quoted above, the Restatement commented that "aviation in its present stage of development is ultrahazardous."[152] Through 1938, then, the law regarded aviation as an uncommon activity, full of unmitigable risk.

This attitude persisted notwithstanding the advance of technology. Ultimately, twenty-three states adopted the Uniform Aeronautics Act.[153] Moreover, the Second Restatement of Torts allotted a section to aviation strict liability:

> If physical harm to land or to persons or chattels on the ground is caused by the ascent, descent or flight of aircraft, or by the dropping or falling of an object from the aircraft, the operator of the aircraft is subject to liability for the harm, even though he has exercised the utmost care to prevent it, and the owner of the aircraft is subject to similar liability if he has authorized or permitted the

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[149] Crosby v. Cox Aircraft Co., 746 P.2d 1198, 1200 (Wash. 1987) (citations omitted).

[150] *Id.*

[151] RESTATEMENT (FIRST) OF TORTS § 520 (1938).

[152] *Id.* cmt. b.

[153] *Crosby*, 746 P.2d at 1200.

operation.[154]

Thus, even in the years following moon landings and supersonic transports, some did not consider aviation as an everyday activity.

This view has been largely rejected though. By 1943, the Commission on Uniform Laws regarded the Uniform Aeronautics Act as obsolete.[155] Today, there are apparently only five states with aviation strict liability statutes in force: Delaware,[156] Hawaii,[157] Minnesota,[158] New Jersey,[159] and South Carolina.[160] Also, these statutes apply only to aircraft owners; pilots are liable only for damages caused by their own negligence.[161] Strict liability, however, is still relevant to pilot negligence because many pilots own their aircraft, and the second Restatement still professes the doctrine against operators. Thus, strict liability provides another theory in litigation against pilots.

Nevertheless, the justification for strict liability is defunct. The NTSB accident records clearly show that general aviation is not ultrahazardous. While accumulating 628,396,321 flight hours over twenty years, there have been only 12,411 fatal general aviation aircraft accidents.[162] These figures reduce to a rate of 1.98 fatal accidents per 100,000 flight hours. Statistically, an individual would have to be airborne for 5.76 *years* before dying in a general aviation aircraft accident. Moreover, the fatal accident rate for air carrier operations is even lower.[163]

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[154] RESTATEMENT (SECOND) OF TORTS § 520A (1977).

[155] *Crosby*, 746 P.2d at 1200.

[156] DEL. CODE ANN. tit. 2, § 305 (1990).

[157] HAW. REV. STAT. § 263-5 (1991).

[158] MINN. STAT. ANN. § 360.012 (West 1991).

[159] N.J. STAT. ANN. § 6:2-7 (West 1991).

[160] S.C. CODE ANN. § 55-3-60 (Law. Co-op. 1991).

[161] *Crosby*, 746 P.2d at 1200.

[162] ARAAD 1988 3 (1991); ARAAD 1986 3 (1988); ARAAD 1981 2 (1984); ARAAD 1978 2 (1980); ARAAD 1976 2 (1976); ARAAD 1974 3 (1978); ARAAD 1973 2-3 (1975); ARAAD 1972 3 (1974); ARAAD 1970 II (1974).

[163] *Rate of Carrier Accidents Reduced Sharply in 1980*, 14 AVIATION WK. & SPACE TECH., Jan. 26, 1981, at 80.

Therefore, aviation is no longer just a pastime for a few venturesome fools.

Next, state statutes that impose strict liability conflict with state common law. New Jersey is one of the states that hangs onto strict liability.[164] However, under New Jersey law, violations of the FARs are only evidence of negligence.[165] Thus, if a pilot is the owner of the accident aircraft, and the pilot violated a safety regulation contained in the FARs, then the pilot is not necessarily liable in negligence for ignoring safety regulations, but definitely is liable under the strict liability statute. Presumably, the statute is in place because the state legislature considers aircraft unsafe. Yet, when a pilot/owner violates a regulation enacted to increase safety, there is no negligence as a matter of law. Because this conflict cannot be resolved, strict liability is not appropriate for pilot negligence law.

Additionally, strict liability contravenes attribution theory. Pilot negligence rules should provide realistic and achievable goals within the locus of control of pilots. In contrast, strict liability targets individuals regardless of whether the blameworthy agents were within the loci of control of those individuals. Hence, strict liability offers no incentives to eliminate negligent conduct.

To summarize, aviation strict liability is not a viable legal principle. From any viewpoint, general aviation is no longer an uncommon and hazardous activity. State common law recognizes this fact, but statutory strict liability does not. Furthermore, strict liability contributes nothing to the quest for greater safety, but tends the other way, to keep aviation dangerous. Hence, it is an antiquated doctrine that needs a funeral.

IV. CONCLUSION

Alterations to pilot negligence law are necessary to mir-

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[164] N.J. STAT. ANN. § 6:2-7 (West 1991).
[165] Rodriguez v. United States, 823 F.2d 735, 739-40 (3d Cir. 1987).

ror general aviation practice and to decrease accidents. Pilot negligence law should retain negligence *per se* and the standard of the ordinarily prudent pilot but in modified forms. Conversely, pilot negligence law should discard *res ipsa loquitur*, liability of instructors and check airmen for the mistakes or poor judgment of other pilots, and statutory strict liability.

It is clear that negligence *per se* should apply to all FARs that concern the actual operation of aircraft. All operational regulations enhance safety. Greater safety means fewer accidents and personal injuries. Pilot negligence *per se* should not, however, be limitless. The FARs rightfully give the pilot in command the option to deviate from the FARs in time of emergency. Also, a rule of strict construction should predominate. Overall, if everyone knows and follows the FARs, flight safety benefits.

Likewise, pilot negligence *per se* should expand to encompass the AIM and advisory circulars. The AIM and advisory circulars are terrific sources of prudent and approved safety practices. Moreover, they are potentially incorporated by reference into the FARs. Thus, the expansion of negligence *per se* to these publications will further increase safety.

Next, in any general aviation pilot negligence case, the legal standard of care should be the ordinarily prudent private pilot who has 500 hours total experience and 100 hours in type. Pilots having at least this level of skill are substantially less prone to aircraft accidents. Beyond that, this standard of care is precisely defined and is not so high as to be out of the reach of most pilots. If all pilots were to fly as well as the minimum standard, accident probability would diminish.

Pilot skill notwithstanding, *res ipsa loquitur* is not an appropriate method of determining breach of duty. History shows that aircraft accidents simply do not usually occur as a result of pilot negligence. Further, the FARs implicitly reject the doctrine by shouldering the pilot in command with the responsibility for the flight. In short, *res* *ipsa loquitur* does not fit within the realities of general aviation. Therefore, courts should dispose of the doctrine in pilot negligence cases.

Similarly, pilot negligence law should abandon any concept of finding liability for the mistakes or poor judgment of the accident pilot. First, the pilot should not be liable in the absence of negligence. Moreover, flight instructors and check airmen, who were outside the cockpit but nonetheless may be responsible for contributing to the pilot error, cannot be liable. They have no control over the errant actions, cannot predict the future years distant and cannot eliminate absentminded lapses by closer scrutiny of students and applicants. The best solution to combat mistakes and poor judgment is for pilots to pay attention in the air. No alternate theory of liability will change that duty.

Last, aviation strict liability is an anachronism. Aviation has evolved from a pioneering adventure into a legitimate instrument of travel and commerce. Evidently, it evolved more quickly than the law. In addition, strict liability does not promote flight safety because it is only a reaction to all the miscues of pilots. The attribution theory hypothesis supposes that pilots can modify their behavior to avoid accidents. In contrast, strict liability acts as a reactive punishment, not a proactive motivator. As such, pilots could well believe that exercise of the utmost care does not prevent imposition of liability. Hence, no motivation exists to associate care with nonliability. Consequently, strict liability in pilot negligence law changes the results of litigation but not pilots' attitudes regarding safety.

Finally, what went wrong in the 747 collision at Tenerife? During the six years preceding the incident, the captain of the departing aircraft worked principally as an instructor in flight simulators. To save time and costs, simulator controllers never instructed pilots to hold on the runway. When the fateful time came, the captain did not wait for his takeoff clearance. He performed with skill and expertise, in a way he had practiced many times. Unfortunately, his actions were not appropriate to the situation.[166]

The goals of pilots and the law include greater personal safety in general aviation. Pilots achieve safety through the wisdom of experience. Aviation has accrued a great deal of experience over the past decades. Therefore, the legal system would be wise to tap into it.

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166 Reason, *supra* note 1, at 49.

APPENDIX A: ACCIDENT DATA ANALYSIS

A substantial amount of information is available for studying general aviation aircraft accidents. The NTSB compiles and publishes data in statistical reports. I categorized the sources of error that result in general aviation accidents and analyzed the statistical data in the hope of discerning patterns or relationships among the accidents. Also, I reduced data to study accidents as a function of total hours flown by general aviation aircraft, accidents as a function of overall pilot experience, accidents as a function of pilot experience with the make and model of the accident aircraft, accidents as a function of the certification of the pilot and accidents as categorized by the causes and factors contributing to those accidents. Although the analyses are somewhat imperfect, they provide interesting and important information.

NTSB accident data are very useful in the study of general aviation accidents. The NTSB publishes annual compilations of general aviation accident data. The reported accidents include all those involving U.S. registered civil aircraft not engaged in air carrier revenue operations.[167] An accident occurs when, as a result of the operation of an aircraft, a person receives serious or fatal injuries, or an aircraft receives substantial damage.[168] Each annual review contains various statistical data in tabular formats for accidents occurring during that calendar year. Data categories include kinds of aircraft, such as fixed or rotary wing, and kinds of flying, such as personal or business, as well as data for all operations.[169] The reports also furnish accident causes and contributing factors.[170]

This study utilizes accident data from the twenty calendar years 1969 through 1988. There are several reasons for using this block of years. First, 1988 is the most recent published year. Next, twenty years is a substantial time

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[167] ARAAD 1985 1 (1987). This definition is typical of all the reports.

[168] ARAAD 1985 58 (1991).

[169] *See, e.g.*, ARAAD 1988 4 (1991).

[170] *See, e.g.*, *id.* at 61-72.

interval; during those years, general aviation aircraft flew over 628 million flight hours.[171] Also, the NTSB changed the standard definition of aircraft accident in 1968, making previous data incompatible.[172] Finally, the data from year to year is very consistent. For instance, a total of 74,655 accidents occurred during the twenty year period.[173] The average number of accidents per year is 3733, and the standard deviation is only 806.[174] Likewise, 12,411 fatal accidents occurred during the period, yielding an average of 621 per year with a standard deviation of 100.[175] Hence, the years 1969 through 1988 comprise an adequate group of data.

Unfortunately, not all of the data are usable all of the time. The NTSB changed its reporting format several times over the years, eliminating some forms of data and adding others. As a result, some of the reports do not provide the information required for this study. The consequence is that many of the specific analyses use only a portion of the calendar years of the entire span. All adjustments made are detailed below.

Also, the statistics for each year contain some accidents that are due to sabotage or attempted suicide. The per-

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171 ARAAD 1988 5 (1991); ARAAD 1987 5 (1989); ARAAD 1986 5 (1988); ARAAD 1976 2 (1978); ARAAD 1974 3 (1976); ARAAD 1973 3 (1975); ARAAD 1972 3 (1974); ARAAD 1970 II (1974).

172 ARAAD 1969 vii (1971).

173 ARAAD 1988 3 (1991); ARAAD 1986 3 (1988); ARAAD 1981 2 (1984); ARAAD 1978 2 (1980); ARAAD 1976 2 (1978); ARAAD 1974 3 (1976); ARAAD 1973 3 (1975); ARAAD 1972 3 (1974); ARAAD 1970 II (1974).

174 Standard deviation measures the dispersion of statistical samples about the samples' arithmetic mean. Samples of similar data generally form a bell-shaped "normal" curve of distributions about the mean. In such a case, 68% of the samples lie within one standard deviation of the mean, and 95% lie within two standard deviations of the mean. For more discussion of standard deviation, see OVID W. ESHBACH & MOTT SOUDERS, HANDBOOK OF ENGINEERING FUNDAMENTALS 245-47 (1975); HERMAN J. LOETHER & DONALD G. MCTAVISH, DESCRIPTIVE AND INFERENTIAL STATISTICS: AN INTRODUCTION 149-53 (1980); *see infra* Appendix B for the calculation of the average numbers of accidents and standard deviation.

175 ARAAD 1988 3 (1991); ARAAD 1986 3 (1988); ARAAD 1981 2 (1984); ARAAD 1978 2 (1980); ARAAD 1976 2 (1978); ARAAD 1974 3 (1976); ARAAD 1973 3 (1975); ARAAD 1972 3 (1974); ARAAD 1970 II (1974); *see infra* Appendix B for this calculation.

centage of accidents due to suicide or sabotage, however, is small. Since 1974, such acts account for only .035% of the accident total.[176] Hence, suicide and sabotage are not sufficiently common to affect the analyses.

Where possible, this study focuses on accidents resulting in serious or fatal injuries. The NTSB utilizes four categories of injury: fatal, serious, minor, and none.[177] This is known as the accident's injury index and refers to the most serious personal injury sustained in the accident.[178] A fatal injury is an injury that results in death within 30 days of the accident.[179] A serious injury is

> [a]ny injury which 1) requires hospitalization for more than 48 hours, commencing within 7 days from the date the injury was received; 2) results in a fracture of any bone (except simple fractures of fingers, toes, or nose); 3) involves lacerations which cause severe hemorrhages, nerve, muscle, or tendon damage; 4) involves injury to any internal organ; or 5) involves second- or third-degree burns, or any burns affecting more than 5 percent of body surface.[180]

This study does not use accidents involving only minor injuries.

The first analysis studies all accidents involving general aviation aircraft, utilizing data from all twenty calendar years. Each annual report contains data on total hours flown, total number of accidents total number of serious accidents and total number of fatal accidents.[181] For each year, calculations determine the percentage of total accidents that are fatal accidents and the percentage of total accidents that are either serious or fatal. In addition, calculations determine accident rates for total accidents, fatal accidents and serious or fatal accidents. The accident

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[176] ARAAD 1988 18 (1991); ARAAD 1983 31 (1987); ARAAD 1979 23 (1981); ARAAD 1975 15 (1977).

[177] ARAAD 1988 21 (1991).

[178] *Id.* at 58.

[179] *Id.*

[180] *Id.* at 59.

[181] *See, e.g.*, *id.* at 3-5.

rates are based on numbers of occurrences per 100,000 flight hours.[182] This analysis is useful in obtaining a global view of the statistics and for discerning trends in general aviation safety.

The next study analyzes the relation between aircraft accidents and the total flight experience of the pilot in command of the accident aircraft. This study uses data from all compilations except 1971, which is not available. It includes data for accidents of all types and data for all fatal accidents.[183] The tabular format of the annual reviews presents numbers of accidents for pilots within certain ranges of experience, for example, 0-50 hours, 50-100 hours and so on.[184]

The experience intervals are not all the same size, but a correction allows comparison of them. The number of accidents attributable to a given experience interval is divided by the number of fifty hour sub-intervals contained in the experience interval. For example, the number of accidents occurring in the 100-500 hour interval is divided by 8, because 500 minus 100 equals 400, and 400 divided by 50 equals 8. This correction assumes, of course, that pilot experience levels and accidents are evenly distributed within the intervals.

Also, the last experience interval, those pilots with greater than 10,000 hours' experience, is not usable. The interval is not bounded on its upper end. Thus, there is no ascertainable number of fifty hour intervals to divide into the number of accidents. However, the number of accidents in this group, and probably the number of pilots, are small.

The total flight experience analysis has some limitations. First, it requires the assumption of even distribution of pilots and accidents throughout an experience interval. Unfortunately, the NTSB data are not more il-

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[182] Accident rates are typically based on 100,000 flight hours. *See, e.g.*, ARAAD 1988 4 (1991); *see infra* Appendix B for detailed data.

[183] *See, e.g.*, ARAAD 1988 30, 39 (1991).

[184] *See, e.g.*, *id.*

lustrative. Second, the group of pilots with more than 10,000 hours is unbounded and hence unusable. Third, there is no way to determine how many pilots are in any given group of experience. Thus, it is impossible to determine what percentage of pilots in a group are involved in accidents. Fourth, no data shows how much flight time each group amasses during a given year, rendering the calculation of accident rates impossible. Finally, the experience of the pilot in command for some accidents is unreported, so the data set is facially incomplete.

The data analysis also explores relations between aircraft accidents and time in type of the pilot in command.[185] Like the total experience analysis, data are available for both total and fatal accidents but are more limited. Fatal accident data are published for the years 1969 through 1979 only, and the last unbounded interval begins at 3000 hours. Data on total accidents by time in type are available for all the years except 1980 and 1981. The more recent annual data are usable up to 10,000 hours. The data reduction is identical to the total experience analysis, except that the bounded intervals for the earlier years end at 3000 hours. Consequently, this analysis has the same limitations as the accidents versus total experience analysis.

Next is the analysis regarding aircraft accidents in terms of the type of pilot certificate held by the pilot in command. Based on the FARs, the NTSB data sets recognize seven discreet types of pilot certificate: student pilot, private pilot, commercial pilot, airline transport pilot, private pilot and certified flight instructor, commercial pilot and certified flight instructor, and airline transport pilot and certified flight instructor.[186] The annual data available for this study runs from 1971 to 1979; no data are reported after 1979; and the 1969 and 1970 data are not presented in a comparable format.

The pilot certificate study has three limitations. First,

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[185] *See, e.g.*, *id.*

[186] *See, e.g.*, ARAAD 1979 102 (1982).

less than half of the twenty years of accident reviews are usable. Second, the certificate of the pilot of the accident aircraft is unknown in a small percentage of cases. Third, the total numbers of pilots holding each type of certificate are unknown and probably not ascertainable due to turnover of pilots from year to year. Hence, it is impossible to determine the accident propensities of different types of pilots.

The last analysis studies the types of pilot error that caused or contributed to the accidents during the period. The NTSB assigns to each accident probable causes and contributing factors.[187]

> The objective is to ascertain those cause and effect relationships in the accident sequence about which something can be done to prevent recurrence of the type of accident under consideration. Accordingly, for statistical purposes, where two or more causes exist in an accident, each is recorded and no attempt is made to establish a primary cause. . . . The term "factor" is used, in general, to denote those elements of an accident that further explain or supplement the probable cause(s). . . .[188]

For the years 1982 through 1986, the NTSB utilizes a detailed and comprehensive categorization of causes and factors.[189] This categorization uses several echelons of causes and factors, the major headings being aircraft, environment, human performance, and direct underlying cause factors.[190]

Regrettably, the other annual reports are not so useful. Data before 1982 are reported in completely different and unmanageable formats, and, after 1986, statistics on fatal accidents are neither segregated from total accidents nor separated in terms of pilot mistake or disregard. In contrast, the format of the 1982 through 1986 data allows an analysis of causes and factors in serious and fatal acci-

[187] *See, e.g.*, ARRAD 1988 61-72 (1991).
[188] ARAAD 1983 173 (1987).
[189] *See, e.g.*, *id.* at 180-247.
[190] *Id.*

dents. Thus, for the years 1982 through 1986, the study explores the prevalence of pilot negligence in accidents resulting in serious or fatal injuries.

Extracting evidence of pilot negligence from causes and factors is a substantial effort. The goal is to separate the listed causes and factors into those that indicate pilot disregard from those that indicate poor judgment or mistakes. Pilot disregard of safe practices include those causes that actually state that the pilot disregarded something. Also included are pilot tasks poorly performed on the ground, such as flight planning, when the pilot has plenty of time to do the task properly. Additionally, accidents that a pilot could avoid by canceling the flight altogether show pilot disregard, such as when the pilot takes off into bad weather. Lastly, pilot disregard includes violations of the FARs. Overall, when deciding whether to place a cause or factor in the pilot disregard set or not, I tried to be as objective as possible.

Once the major separation is complete, data reduction is similar to the other analyses. The first step is to determine, for those accidents in which at least one cause or factor is attributed to human performance, the percentage of fatal accidents that are due, at least in part, to pilot disregard. Then, by applying that percentage to the percentage of all fatal accidents blamed on pilot error, it is possible to discern the percentage of all fatal accidents that are arguably due to pilot negligence.

Although finding the prevalence of pilot negligence is a significant result, the analysis is necessarily imprecise. Each annual listing of human performance causes and factors is approximately fifty pages long and contains hundreds of subcategories of human error. Each of those subcategories is either of the misjudgment class or the disregard class. For many, it is difficult to determine the proper classification because many subcategory descriptions are short, general, and not self-explanatory. Consequently, the results of this particular study are, at best, a gross estimate of the prevalence of pilot negligence in general aviation accidents.

Overall, the NTSB data do not yield complete answers to the questions relevant here, but are nevertheless illuminating. Information relating to total accidents and total hours flown by general aviation aircraft is consistently available. Information on accidents versus pilot total experience and experience in type is likewise available, but restricted due to lack of data concerning the distribution of the pilot population. Information regarding accidents as a function of pilot certificate is similarly restricted. Finally, the most important analysis, that of measuring pilot negligence in aircraft accidents, is really an educated guess. Still, the NTSB data are the best available and do provide answers to significant questions.

APPENDIX B: ANNUAL ACCIDENT TOTALS

Year	Total Hours Flown	Total Accidents	Total Accident Rate/100k Hours
1969	25,350,675	4767	18.80
1970	26,030,414	4712	18.10
1971	25,512,000	4648	18.22
1972	26,974,000	4256	15.77
1973	30,048,000	4255	14.16
1974	32,474,608	4425	13.63
1975	34,164,993	4237	12.40
1976	36,127,631	4193	11.61
1977	31,578,000	4286	13.57
1978	34,887,000	4494	12.88
1979	38,641,000	3825	9.90
1980	36,402,000	3597	9.88
1981	36,803,000	3502	9.52
1982	32,095,000	3233	10.07
1983	31,048,000	3075	9.90
1984	31,510,000	3010	9.55
1985	30,590,000	2741	8.96
1986	29,318,000	2581	8.80
1987	29,208,000	2464	8.44
1988	29,634,000	2354	7.94
Total	628,396,321	74655	
Average	31,419,816	3732.75	11.88
s		806.21	

s = standard deviation

Year	Total Fatal Accidents	Fatal Accident Rate/100k Hours	Precent of Total Accidents
1969	647	2.55	13.6
1970	641	2.42	13.6
1971	661	2.59	14.2
1972	695	2.58	16.3
1973	723	2.41	17.0
1974	729	2.25	16.5
1975	675	1.98	15.9
1976	695	1.92	16.6
1977	702	2.22	16.4
1978	793	2.27	17.7
1979	638	1.65	16.7
1980	622	1.70	17.3
1981	654	1.78	18.7
1982	591	1.84	18.3
1983	555	1.79	18.1
1984	543	1.72	18.0
1985	498	1.63	18.2
1986	471	1.61	18.3
1987	431	1.44	17.5
1988	447	1.51	19.0
Total	12411		
Average	620.55	1.98	16.6
s	100.38		

Year	Total Serious or Fatal Accidents	Serious or Fatal Rate/ 100k Hours	Percent of Total Accidents
1969	1038	4.10	21.6
1970	1029	3.95	21.8
1971	1070	4.19	23.0
1972	1081	4.01	25.4
1973	1118	3.72	26.3
1974	1161	3.58	26.2
1975	1094	3.20	25.8
1976	1117	3.09	26.6
1977	1126	3.57	26.3
1978	1251	3.59	27.8
1979	1012	2.62	26.5
1980	1022	2.81	28.7
1980	1003	2.73	28.6
1982	929	2.90	28.7
1983	874	2.82	28.4
1984	891	2.83	29.6
1985	804	2.63	29.3
1986	789	2.69	30.6
1987	721	2.47	29.3
1988	735	2.48	30.6
Total	19865		
Average	993.25	3.16	26.6
s	148.41		