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Aviation Crashworthiness: An Extrapolation in Warranty, Strict Liability and Negligence

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AVIATION "CRASHWORTHINESS": AN EXTRAPOLATION IN WARRANTY, STRICT LIABILITY AND NEGLIGENCE

In the past decade, products liability law has developed an amorphous basis for recovery against automobile manufacturers known as "crashworthiness" actions.[1] These suits result from defects in the design and construction of motor vehicles that enhance injuries after the occurrence of a collision.[2] Actionable injuries result when inertia hurls an occupant of a vehicle involved in a primary collision against an unsafe interior structure producing a harmful "second collision."[3] Injuries intensified by the uncrashworthy nature of the vehicle itself—its inability to withstand a collision and protect its occupants—are a basis for recovery against the manufacturer.[4] Many of these defects that produce second collision injuries or injuries resulting from the uncrashworthy nature of the automobile also cause injuries and fatalities in aircraft accidents.[5] Although crashworthiness actions have not been successfully asserted against aircraft manufacturers to date, an examination of the various theories of recovery employed against automobile manufacturers reveals that crashworthiness actions are a potential threat to the aircraft manufacturer as well.

Commentators on air safety frequently dismiss discussion of aviation crashworthiness suits reasoning that aviation accidents cannot be survived regardless of the safety precautions employed.[6] This peremptory dismissal is unwarranted. Although there were 194 passenger deaths in air carrier crashes and 1,322 deaths in general aviation accidents in the United States in 1971,[7] investigations revealed that deaths frequently resulted from uncrashworthy airplanes and second collisions rather than the initial im-

[1] *See* Annot., 42 A.L.R.3d 560 (1972).

[2] *Id.*

[3] Katz, *Negligence in Design: A Current Look*, 1965 INS. L.J. 5, 11 (1965).

[4] Annot., *supra* note 1, at 571-78.

[5] *Compare* Annot., *supra* note 1, *with* notes 6-9 *infra.*

[6] H. HAEKSTRA, SAFETY IN GENERAL AVIATION 72-77 (1971).

[7] Hotz, *Accident Rate Down, Fatalities Up*, AV. WEEK & SPACE TECHNOLOGY, Jan. 24, 1972, at 54.

pact of the crash. Statistics show that aviation accidents occur for the greater part during arrivals and departures at an airport[8] when the airplane is relatively close to the ground. Therefore, crashes occurring during arrivals and departures would not necessarily produce an impact fatal to all occupants. Hazards created by fire, toxic gasses released from burning upholstery, blocked exits, uprooted seats and lack of adequate seat belts constitute the major contributors to death in both large and small aircraft.[9]

The Federal Aviation Administration has recognized that market incentives alone are not sufficient to insure that the socially optimum degree of safety will be designed and built into the aircraft.[10] Under the Federal Aviation Act of 1958,[11] the Federal Aviation Administrator is given the duty to promulgate minimal standards of safety for all flights within the United States, its territories and possessions.[12] Comprehensive changes in the Administrator's regulations relating to the crashworthy standards of wide-bodied jets were a direct result of airline accident fatalities and injuries occuring from inadequate safety features or excessive flammability of cabin materials.[13] These rules only outline the minimal standards required for a certificate of airworthiness, they do not preclude a suit against the manufacturer based on crashworthiness. Amendments to Part 121 of the Certification and Operation Rules[14] require: the installation of interior emergency lighting to illuminate emergency exits for at least ten minutes during critical ambient conditions after an emergency landing,[15] the installment of both shoulder harnass and seat belt retention devices[16] and the installment of galley equipment that can be secured during

[8] V. LOWELL, AIRLINE SAFETY IS A MYTH 33-40 (1967).

[9] Nader, *Yes, It Is Safe to Fly, But Is It Safe to Crash?*, HOLIDAY, July, 1969, at 56-57.

[10] *See* Borcherding, *Liability in Law*, 60 AM. ECO. REV. 946 (Dec. 1970). The ideal state is reached when the marginal social value of resources devoted to accident prevention is equal to the marginal social benefits of the increased safety.

[11] Federal Aviation Act of 1958, 72 Stat. 731, *as amended*, 49 U.S.C. §§ 1301-1542 (1970).

[12] 49 U.S.C. § 1421(a) (1970).

[13] Woolsey, *FAA Adopts Tighter Safety Standards*, AV. WEEK & SPACE TECHNOLOGY, Mar. 6, 1972, at 23.

[14] Aeronautics and Space, 14 C.F.R. § 121 (1973).

[15] *Id.* at § 121.310(d)(3).

[16] *Id.* at § 121.311.

take-off and landing.[17] Also, all carry-on baggage must be placed beneath the seat unless an overhead enclosed space is provided.[18] Additional new rules are designed to expedite passenger escape after an accident, minimize the effects of the impact and eliminate fire hazards.[19] Adequate exits must also be provided that can be opened within ten seconds after the collapse of one or more of the landing gear legs[20] and escape routes from the wing area must be covered with slip-resistant surfaces.[21] Finally, all interior materials used for furnishing and decorating the passenger cabins and crew compartments must meet more rigid flammability standards.[22]

Interest in the safety features of aircraft operating in general aviation has not received the extensive consideration given commercial aircraft. Amendments to the federal air regulations in 1969, however, do require applicants for airworthiness certification to provide each occupant of an aircraft with protection from head injuries by installing either safety belts and shoulder harnasses, or safety belts plus an energy absorbing rest that would support arms, shoulders, head and spine or by eliminating all potentially injurious objects within the striking radius of the head and simultaneously installing safety belts.[23] The FAA has recently examined the problem of crashworthiness in small planes and is contemplating requiring interiors to be free of potential injury-causing devices and be equipped with shoulder harnasses.[24]

In the absence of precise judicial precedents or legislative expressions, crashworthinesss actions against aviation manufacturers derive their greatest support from cases involving automobile manufacturers. Jurisdictions have not uniformly decided crashworthiness suits, but many have imposed liability when the damages could have been avoided or mitigated if the manufacturer had utilized a vehicular design of different size, shape, construction or assembly.[25] This liability has been imposed regardless of whether

[17] *Id.* at § 121.576.

[18] *Id.* at § 121.589.

[19] *Id.* at § 121.310.

[20] *Id.*

[21] *Id.* at § 121.310(h)(2).

[22] *Id.* at § 121.312.

[23] Aeronautics and Space, 14 C.F.R. § 23.785 (1973).

[24] *See* 38 Fed. Reg. 2985 (1973).

[25] *See* Annot., *supra* note 1.

the injury producing defect caused the initial accident. In these situations, three theories have been successfully advanced to allow recovery: (i) breach of express and implied warranties, (ii) strict liability based on section 402A of the Restatement (2d) of Torts and (iii) negligence in design.

I. BREACH OF WARRANTY

A limited number of automobile crashworthiness actions have relied on breach of warranty theories.[26] The most successful of these theories is an action for breach of an express warranty. The Uniform Commercial Code provides that an express warranty will be deemed to have been given when any affirmation of fact or promise is made by the seller or any description of the goods or any sample or model is made a "basis of the bargain."[27] The Uniform Commercial Code thus interprets affirmations or representations made by the seller in advertisements, brochures or other media designed to induce a purchase of the product to be an express warranty. The seller is not required to use the word "warrant" or "guarantee" to create an express warranty,[28] but the affirmation or promise must become a "basis of the bargain"; *i.e.* the buyer must rely on the seller's statements. Recovery has been permitted in a second collision injury suit when alleged shatter-proof glass used in the windshield of a vehicle shattered in violation of an express warranty and caused severe injury to the purchaser.[29] Express warranties that the roof of an automobile was constructed of a solid sheet of metal were held breached when the purchaser was severely injured in a collision by a jagged seam in the roof

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[26] *See* Annot., *supra* note 1, at 578.

[27] UNIFORM COMMERCIAL CODE § 2-313(1).

(a) Any affirmation of fact or promise made by the seller to the buyer which relates to the goods and becomes part of the basis of the bargain creates an express warranty that the goods shall conform to the affirmation or promise.

(b) Any description of the goods which is made part of the bargain creates an express warranty that the goods shall conform to the description.

(c) Any sample or model which is made part of the basis of the bargain creates an express warranty that the whole of the goods shall conform to the sample or model.

[28] UNIFORM COMMERCIAL CODE § 2-313(2).

[29] Baxter v. Ford Motor Co., 179 Wash. 123, 35 P.2d 1090 (1934).

directly over the driver's seat of the vehicle.[30] It is significant to note that these breach of express warranty suits were the earliest crashworthiness actions maintained. Their success is attributable to the contractual nature of the warranty and the familiar remedy of recovery for consequential damages for breach of a significant term of the contract.

When no express warranty has been made, two possibilities exist for crashworthiness actions based on breach of an implied warranty: breach of an implied warranty of fitness for a particular purpose[31] and breach of an implied warranty of merchantability that the product is fit for the ordinary purpose for which the goods are used.[32] The breach of implied warranty of fitness for a particular purpose is brought under section 2-315 of the Uniform Commercial Code. Comment 1 under this section indicates that the creation of an implied warranty of fitness for a particular purpose is basically a question of fact.[33] Proof is required of the buyer's reliance on the manufacturer's skill in furnishing automobiles appropriate for the particular purpose of becoming involved in collisions, a rather onerous burden. Implied warranties for a particular purpose may arise when the seller has selected the goods sold to a buyer who has first expressed his particular needs or in situations when the seller has reason to know of the buyer's particular purpose from the surrounding circumstances.[34] Under this type of implied warranty, the basic factual issues will involve the degree of the seller's knowledge of the particular purpose involved and the degree of the buyer's reliance on the warranty.[35]

An action based on an implied warranty of merchantability that the product is fit for the ordinary purposes for which the goods

[30] Bahlman v. Hudson Motor Car Co., 290 Mich. 683, 288 N.W. 309 (1939).

[31] UNIFORM COMMERCIAL CODE § 2-315.

[32] UNIFORM COMMERCIAL CODE § 2-314.

[33] UNIFORM COMMERCIAL CODE § 2-315, comment 1. Whether or not this warranty arises in any individual case is basically a question of fact to be determined by the circumstances of the contracting. Under this section the buyer need not bring home to the seller actual knowledge of the particular purpose for which the goods are intended or of his reliance on the seller's skill and judgment, if the circumstances are such that the seller has reason to realize the purpose intended or that the reliance exists. The buyer, of course, must actually be relying on the seller.

[34] 3 M. BENDER'S UNIFORM COMMERCIAL CODE SERVICE, SALES AND BULK TRANSFERS UNDER UCC § 7.02[3] (1972).

[35] *Id.*

are used is the usual warranty involved in a products liability suit.[36] Section 2-314 of the Uniform Commercial Code contains six examples clarifying the meaning of "merchantable."[37] The example most frequently used states that: "Goods to be merchantable must be at least such as are fit for the ordinary purposes for which such goods are used."[38] This interpretation of "merchantable" was applied in *Friend v. General Motors*[39] to permit recovery against the manufacturer in a crashworthiness action. In *Friend,* seats secured by only one bolt collapsed when the truck left the highway and struck a culvert. The impact of the vehicle against the culvert moved the load in the rear of the truck forward and caused the seats to fold over and injure the driver and his passenger. A Georgia statute[40] reciting that the manufacturer of a motor vehicle impliedly warranted that it was merchantable, reasonably suited to the use intended and free of known but undisclosed and latent defects provided a presumption of merchantability that facilitated plaintiff's burden of proof. The resolution of a crashworthiness suit brought under an implied warranty of merchantability depends to a great extent on whether automobile collisions constitute an ordinary purpose for which the goods are used. This determination is indigenous to any particular jurisdiction and is somewhat related to the "intended use" of the vehicle discussed later in this note.[41]

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[36] *See* R. FRUMER & M. FRIEDMAN, PRODUCTS LIABILITY § 16.04[2][d] (1960).

[37] UNIFORM COMMERCIAL CODE § 2-314(2).

Goods to be merchantable must be at least such as

(a) pass without objection in the trade under the contract description; and

(b) in the case of fungible goods, are of fair average quality within the description; and

(c) are fit for the ordinary purposes for which such goods are used; and

(d) run, within the variations permitted by the agreement, of even kind, quality and quantity within each unit and among all units involved; and

(e) are adequately contained, packaged, and labeled as the agreement may require; and

(f) conform to the promises or affirmations of fact made on the container or label if any.

[38] *Id.* at (c).

[39] Friend v. General Motors Corporation, 118 Ga. App. 763, 165 S.E.2d 734 (1968), *cert. denied,* 225 Ga. 290, 167 S.E.2d 926 (1968).

[40] Ga. Laws § 96-307 (repealed 1957).

[41] *See* notes 69-82 *infra.*

Actions based on express or implied warranties must comply with the particular jurisdiction's requirement of privity of contract.[42] Traditionally, privity was required in actions based on warranty because it was believed that one who made representations to effectuate a sale should not be held responsible for resultant losses sustained by a stranger to whom the affirmations were not made.[43] When the express warranty has been conveyed to the public through mass advertising techniques, however, the traditional view of the privity requirement is less convincing. Nevertheless, several jurisdictions[44] have refused to permit recovery in crashworthiness suits based on warranty theories when the injured party was not in privity of contract with the manufacturer or seller of the vehicle.

As a practical matter, it is difficult to base a second collision action on implied warranties because most sales contracts for new cars limit the extent of these warranties to the replacement of defective parts.[45] The disclaimer is subject to deletion from the contract,[46] however, if it can be proved unconscionable in view of the circumstances surrounding the sale. To be effective, disclaimers of warranty must be clear and unambiguous;[47] moreover, a disclaimer will not be effective unless it is likely to come to the buyer's attention before the completion of the sale.[48] Also, disclaimers of warranty or of liability for negligence bind only the parties to the transaction.[49]

The success of a crashworthiness action against a producer of an aircraft based on breach of express or implied warranties depends principally on the type of warranty and the jurisdiction involved. Actions based on a breach of an express warranty of a safety aspect of the aircraft would be the most likely to succeed if there were the requisite privity of contract. Actions based on

[42] 1 L. KREINDLER, AVIATION ACCIDENT LAW § 7.03[2] (1971).

[43] *Id.* at § 7.03[1] (1971).

[44] *See* Murphy v. Plymouth Motor Corp., 3 Wash.2d 180, 100 P.2d 30 (1940); Chanin v. Chevrolet Motor Co., 89 F.2d 889 (7th Cir. 1937); Dyson v. General Motors Corporation, 298 F. Supp. 1064 (E.D. Pa. 1969); Shumard v. General Motors Corporation, 270 F. Supp. 311 (S.D. Ohio 1967).

[45] 1 L. KREINDLER, AVIATION ACCIDENT LAW § 7.03[4] (1971).

[46] UNIFORM COMMERCIAL CODE §§ 2-316, 2-719, and 2-719, comment 1.

[47] 1 L. KREINDLER, AVIATION ACCIDENT LAW § 7.03[4] (1971).

[48] *Id.*

[49] *Id.*

an implied warranty of merchantability will offer a strong basis for recovery if the requisite privity is found and the jurisdiction considers an uncrashworthy plane an unmerchantable product; *i.e.* it is not fit for the ordinary purpose for which aircraft are normally used. The implied warranty of fitness for a particular purpose will succeed only if the requisite facts showing the seller's knowledge of the particular purpose involved and the buyer's reliance on the seller's selection of the aircraft to meet that particular purpose are adequately proven. Implied warranty actions of fitness for a particular purpose are somewhat unrealistic in the context of buyers and sellers of aircraft, but express warranty and implied warranty of merchantability actions have a strong legal basis.

II. STRICT LIABILITY IN TORT

Crashworthiness suits have also been maintained on concepts of strict liability in tort under section 402A of the Restatement (2d) of Torts.[50] The elements of proof required to sustain an action brought under this section are: (i) defective product unreasonably dangerous, (ii) existence of the defect when the product left the manufacturer, (iii) injury and (iv) cause in fact.[51] In theory, a person who is in the business of selling specific products should be held strictly liable when the product reaches the consumer without a substantial change from the condition in which it was sold and injury results from an unreasonably dangerous defect created before the product left the hands of the seller.[52]

The decisive issue in strict liability suits is whether there is

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[50] RESTATEMENT (SECOND) OF TORTS § 402A (1965).

402A. Special Liability of Seller of Product for Physical Harm to User or Consumer.

(1) One who sells any product in a defective condition unreasonably dangerour to the user or consumer or to his property is subject to liability for physical harm thereby caused to the ultimate user or consumer, or to his property, if

(a) the seller is engaged in the business of selling such product, and

(b) it is expected to and does reach the consumer or user without substantial change in the condition in which it is sold.

(2) The rule stated in subsection (1) applies although

(a) the seller has exercised all possible care in the preparation and sale of his product, and

(b) the user or consumer has not bought the product from or entered into any contractual relation with the other.

[51] *Id.*

[52] 1 L. KREINDLER, AVIATION ACCIDENT LAW § 7.04[1] (1971).

"a defective product unreasonably dangerous."[53] The criteria for answering this issue are similar to those used in determing whether a particular conduct is negligent.[54] Recovery against the manufacturer of a vehicle for enhanced injuries caused by collapse of the roof of a vehicle when it overturned was permitted under the Pennsylvania law of both negligence and strict liability.[55] The federal district court for the Eastern District of Pennsylvania explained that the essence of the issues was practically identical in determining the possible liability of the manufacturer under general negligence principles and under the strict liability concepts of section 402A of the Restatement. The primary issue of whether the manufacturer should have designed the roof of its hard-top model to support the weight of the automobile when overturned was considered within guidelines established by the exercise of due care and the care required to avoid creating an unreasonably dangerous product. In conjunction with this primary issue, two sub-issues were considered: (i) whether, for purposes of negligence, the manufacturer was under any legal obligation to provide protection against this kind of hazard when considering the foreseeability of the risk and (ii) whether, under section 402A, rollover accidents are within the contemplated normal use of the product. Reasoning that accidents are commonplace and should thus be considered a foreseeable misuse incident to the normal and intended use of the motor vehicle, the Pennsylvania court refused to view narrowly the scope of the manufacturer's duty or the contemplated use of the product. Other courts, however, have declined to find the manufacturer liable in similar cases.[56]

The final determination of whether a defective product is unreasonably dangerous cannot be easily concluded by application of a precise rule. A flexible standard that affords a balancing between the utility of the risk and its magnitude produces a more equitable result for both the manufacturer and the injured party.[57] Factors that are helpful in making this determination are: (i) the usefulness and desirability of the product, (ii) availability of sub-

[53] *See* Wade, *Strict Tort Liability of Manufacturers*, 19 Sw. L. J. 5, 17 (1965).

[54] *Id.*

[55] 298 F. Supp. 1064 (E.D. Pa. 1969).

[56] *See* Annot., *supra* note 1, at 583.

[57] *See* note 53 *supra.*

stitutes, (iii) likelihood of injury and its probable seriousness, (iv) obviousness of the danger, (v) common knowledge and normal public expectation of the danger, (vi) avoidability of the injury by care in the use of the product and (vii) ability to eliminate the danger without seriously impairing the usefulness of the product or making it too expensive.[58]

If a jurisdiction has adopted section 402A of the Restatement (2d) of Torts[59] and follows an expansive view of a manufacturer's duty that would permit a finding that an uncrashworthy airplane is a "defective product unreasonably dangerous," then strict liability could be an effective basis for aviation crashworthiness actions. Strict liability is preferable to warranty actions because no contract is involved; therefore, disclaimers[60] and privity requirements[61] are not applicable. Strict liability has been applied to remote purchasers, users, consumers, passengers and even bystanders.[62] Also, under section 402A, contributory negligence is not a defense to recovery although a voluntary and unreasonable encounter of a known danger is considered an assumption of the risk that may serve as a defense to recovery.[63] One of the primary reasons for imposing strict liability is to insure that costs of injuries resulting from defective products are born by the manufacturer who placed the products on the market rather than the injured persons who are powerless to protect themselves.[64] Aviation crashworthiness situations illustrate the fulfillment of this purpose because in no other situation imaginable is the injured passenger so helpless and the designer and manufacturer so influential in preventing injuries.

III. NEGLIGENCE IN DESIGN

Crashworthiness suits based on negligence in design have been

[58] *Id.*

[59] *See* Maloney, *Current Trends In Aviation Products Law*, 36 J. AIR L. & COM. 514, n.35A (1970), for analysis of strict liability jurisdictions.

[60] Vandermark v. Ford Motor Co., 61 Cal.2d 256, 37 Cal. Rptr. 896, 391 P.2d 168 (1964); Haley v. Merit Chevrolet, Inc., 67 Ill. App.2d 19, 214 N.E.2d 347 (1966); Arrow Transportation Co. v. Freuhauf Corp., 289 F. Supp. 170 (D. Ore. 1968).

[61] 1 L. KREINDLER, AVIATION ACCIDENT LAW § 7.04[4] (1971).

[62] *Id.* at § 7.04[3].

[63] *See* Annot., 46 A.L.R.3d 240 (1972).

[64] 1 L. KREINDLER, AVIATION ACCIDENT LAW § 7.04[1] (1971).

argued with frequent success.[65] Applying this theory, a plaintiff can recover by proving four factors: (i) a duty of the manufacturer to use due care in design to make the vehicle reasonably safe when involved in collisions, (ii) breach of this duty, (iii) harm suffered by the plaintiff and (iv) causation between the breach of the duty and the harm incurred.[66] Courts in several jurisdictions, however, have refused to recognize a manufacturer's duty as a matter of law and favor instead the court's reasoning in *Evans v. General Motors Corporation.*[67] The Seventh Circuit in *Evans* declared that a duty to guard against collisions can only be established by the legislature and not by the courts. The facts in *Evans* involved a negligent design suit in which plaintiff claimed that the use of "X" frames[68] in automobile construction is a breach of the manufacturer's duty to provide protection from vehicle collapse in lateral collisions. Finding for the manufacturer, the Seventh Circuit relied on *Campo v. Scofield*[69] and held that the manufacturer was not obligated to make accident proof vehicles or take precautions against the obvious dangers of automobile collisions.[70] A manufacturer has a duty to design his product to be reasonably fit for the purposes for which it was made; the Seventh Circuit took a restrictive view of this purpose stating:

> The intended purpose of an automobile does not include its participation in collisions with other objects despite the manufacturer's ability to foresee the possibility that such collisions might occur.[71]

The majority rejected plaintiff's theory requiring General Motors to foresee the possibility of broadside collisions and design accordingly. Inferentially, the majority accepted General Motor's theory that only required it to design vehicles that are reasonably fit for the purpose for which they were made, without hidden defects rendering them dangerous to persons properly using them.

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[65] *See* Annot., 46 A.L.R.3d 240 (1972).

[66] W. PROSSER, LAW OF TORTS § 30 (4th ed. 1971).

[67] 359 F.2d 822 (7th Cir. 1966).

[68] More recent automobiles were constructed with perimeter frames that could better withstand the impact of a lateral collision and thus better protect the occupants.

[69] 301 N.Y. 468, 95 N.E.2d 802, 804 (1950).

[70] 359 F.2d at 824.

[71] *Id.* at 825.

The dissent in *Evans*[72] criticized the majority because its opinion did not affirmatively state what an automobile manufacturer's duty is in regard to design. The dissenting justice succinctly stated his view of the manufacturer's duty:

> The manufacturer's duty [is] to use such care in designing its automobiles that reasonable protection is given purchasers against death and injury from accidents which are expected and foreseeable yet unavoidable by the purchaser despite careful use.[73]

The expansive concept of the manufacturer's duty, voiced by the dissent in *Evans,* was followed two years later by the Eighth Circuit in another crashworthiness suit, *Larsen v. General Motors Corporation.*[74] The Eighth Circuit in *Larsen* reasoned that the manufacturer's duty of design was to use reasonable care under the circumstances to so design its product, not to make it accident or fool-proof, but to make it safe for the use for which it is intended.[75] According to *Larsen,* this duty includes a duty to design the product so that it will fairly meet any emergency during use that can reasonably be anticipated.[76] The manufacturer under the *Larsen* rationale, however, is not an insurer that his product is incapable of producing injury because of its design. Rather, *Larsen* stands for the proposition that the issue of permitting recovery for a design defect that enhances or causes injury without causing the accident depends specifically on the proper interpretation of "intended use."[77] The expanded interpretation of "intended use" employed in the *Larsen* case is based on three factors: (i) automobiles are made for use on highways, (ii) their "intended use" cannot be carried out without encountering impacts and (iii) the manufacturer should not be allowed to say that he does not intend his product to be involved in collisions when he can easily foresee that the probability of involvement is high.[78]

The rationale of *Larsen,* represents a current trend and has been applied in diverse fact situations. Recovery has been permitted for

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[72] *Id.*

[73] *Id.* at 827.

[74] 391 F.2d 495 (8th Cir. 1968).

[75] 391 F.2d at 500.

[76] *Id.*

[77] 391 F.2d at 501.

[78] *Id.* at 502.

the absence of rear guards on large trucks that could prevent injury to occupants of smaller vehicles if they were to run beneath the truck's wheels.[79] Other cases have acknowledged the manufacturer's liability for sharply protruding ashtrays,[80] seat collapse caused by shifting cargo,[81] failure to use proper seat lock mechanisms on a split bench seat,[82] use of defective material as a safety knob on a gear shift lever[83] and dangerous placement and explosive nature of gas tanks.[84]

The reasoning of the *Evans* decision, although in the minority, is also well substantiated. The Montana Supreme Court in *Ford v. Rupple*[85] denied recovery for second collision injuries reasoning that the manufacturer did not owe a duty of reasonable care in design to passengers in an automobile that went out of control when side-swiped. The Montana court discussed both the *Evans*

[79] Mieher v. Brown, 2 CCH 1972 PROD. LIAB. REP. ¶ 6752 (1972).

[80] Ford Motor Co. v. Zahn, 265 F.2d 729 (8th Cir. 1959). An automobile guest's action was sustained against the manufacturer of the automobile for loss of sight in one eye as a result of plaintiff's slamming his head against the dashboard and an allegedly defective ashtray when the driver had to stop suddenly to avoid striking another vehicle.

[81] Friend v. General Motors Corporation, 118 Ga. App. 763, 165 S.E.2d 734 (1968). The decision to permit recovery was based predominantly on an issue of merchantability, but the court discussed the "use intended" as meaning the use for which the article was manufactured and commonly intended by the manufacturer. Thus, without expressly acknowledging it, the court relied on the expansive viewpoint of the manufacturer's duty that served as a basis of the *Larsen* decision.

[82] Noonan v. Buick, 211 So.2d 54 (1968). The complaint alleged that while the owner was driving his automobile his three year old son grabbed the steering wheel causing the automobile to skid and that the driver's seat suddenly catapulted him forward and upward causing his head to strike the frame and roof of the automobile rendering him unconscious and resulting in an accident. The court held that the complaint stated a cause of action for negligent manufacture of an automobile.

[83] Mickle v. Blackmon, 252 S.C. 202, 166 S.E.2d 173 (1969). An automobile manufacturer was found to know that many users of his product will be involved in collisions and that the incidence and extent of the injury to them will be frequently determined by the placement, design and construction of such interior components as shafts, levers, knobs, handles etc. The automobile manufacturer owes a duty of care to reasonably minimize the risk of death or serious injury to collision victims who, quite predictably, will upon impact be thrown against the interior of the automobile.

[84] Bremier v. Volkswagen of America, 340 F. Supp. 949 (D.C. 1972). The court refused to give a summary judgment in favor of the defendant manufacturer. Allegations that an automobile manufacturer defectively designed the fuel system of an automobile and failed to give proper warning of the defect did not involve such patent defects as would preclude recovery under a law absolving the manufacturer from liability for negligent design when the defect is patent.

[85] 504 P.2d 686 (1972).

and *Larsen* theories before deciding that as a matter of law no duty exists to use reasonable care in designing an automobile to prevent subjecting passengers to an unreasonable risk of injury in the event of a head-on collision. The court in *Ford* also noted that the possibility of crashes is within a zone of abstract forseeability that is not actionable. The court acknowledged that if recovery were permitted in these cases it would create an undefined area of nonliability; *i.e.* it is foreseeable that cars will be driven into water, but it is dubious that a manufacturer would ever be held liable for injuries sustained because of his vehicle's inability to float.[86] Decisions consistent with *Evans* have denied the existence of a duty to construct vehicles that will maintain their structural integrity when involved in high speed collisions,[87] will be fireproof[88] or will protect the driver by providing a collapsible steering wheel.[89]

Relying on established products liability law, courts frequently classify a defect as patent or latent before deciding the manufac-

[86] 504 P.2d at 690. The court acknowledged that cases applying the *Larsen* principle under common law negligence standards recite that collisions with or without the fault of the user are clearly foreseeable in normal use and will result in injury producing impacts and that the "second collision" between the passenger and the interior of the automobile are also foreseable. Hence, duty and liability on the manufacturer in the event of faulty design. After having established the principle of liability, however, they immediately retreat into undefined sanctuaries of qualification that dilute the principle and add no help to its application. For example, it excludes the collision with water that is as foreseeable as any and occurs more frequently than some and could enhance the danger of the automobile's use.

[87] Willis v. Chrysler Corp., 264 F. Supp. 1010 (S.D. Tex. 1967). The court granted defendant's motion for summary judgment stating that the manufacturer had no duty to design an automobile that could withstand a high speed collision and maintain its structural integrity.

[88] Schumard v. General Motors Corp., 270 F. Supp. 311 (S.D. Ohio 1967). This case involved an action against an automobile manufacturer for the death of plaintiff's decedent when the automobile in which he was riding erupted into flames after a collision. The court held that automobile manufacturers had no duty to design vehicles to be fireproof and prevent injury to occupants when these automobiles are involved in collisions with other objects.

[89] McClung v. Ford Motor Company, 333 F. Supp. 17 (S.D. W.Va. 1971). Plaintiff was injured in a collision as a result of an impact between himself and the steering column and steering wheel. Plaintiff based his action on the manufacturer's negligence in designing a vehicle that had a rigid steering wheel, rigid steering column, unpadded steering wheel and horn rim and that the car did not have a shoulder harness or seat lock on the rear portion of the driver's seat to hold it in position. The court granted summary judgment for the manufacturer stating that the complaint did not, under West Virginia law, state a claim on which relief could be given.

turer's duty to the injured party.[90] A large body of case law exists holding that sellers and manufacturers are not liable when the dangers are obvious and known to the user or are a matter of common knowledge.[91] The rationale adopted in *Burkhard v. Short*[92] illustrates the tendency of courts to follow the *Evans* rule when patent defects are involved but to follow the *Larsen* rule of duty when latent defects are involved. In making this patent-latent distinction, courts take judicial notice of the size, weight and structure of the product. Accordingly, a Wisconsin court refused recovery in a crashworthiness action brought by the purchaser of a Volkswagen[93] holding that purchasers of Volkswagens must realize the injurious consequences of head-on collisions with larger vehicles, *i.e.* the patent nature of the vehicle's inability to withstand collisions prevents recovery.

A plaintiff bringing an aviation crashworthiness action based on negligence in design of the aircraft will logically be compelled to prove the same elements required in a similar suit against an automobile manufacturer. The particular jurisdiction's view of the manufacturer's duty as a matter of law will be the most important consideration in achieving recovery. Jurisdictions following the *Evans* restrictive view will not permit recovery because the aircraft manufacturer only has a duty to design the aircraft to be reasonably fit for the purpose for which it was made which does not include crashes. The manufacturer will not in the absence of legislative mandate be required to make the plane accident proof, fool-proof or otherwise capable of withstanding collisions. In jurisdictions that follow the expansive view of the manufacturer's duty set out in *Larsen,* however, recovery in negligent design suits will be more probable. This view of the duty will include an obligation to design the product so that it will fairly meet any emergency during use that can reasonably be anticipated. The manufacturer will be responsible for protecting the passenger against death and injury from accidents that are expected and foreseeable yet unavoidable. Aircraft are designed to be flown at great speeds and high altitudes.

[90] W. PROSSER, LAW OF TORTS § 96 at 649 (4th ed. 1971).

[91] *Id.* at nn.82-84.

[92] 28 Ohio App.2d 141, 275 N.E.2d 632 (1971). A manufacturer owes no duty to a passenger injured by contact with an obviously unpadded dashboard that could have been made safer by padding or recessing it.

[93] Enders v. Volks Wagen-Werk, 2 CCH 1972 PROD. LIAB. REP. ¶ 5930 (1968).

Prior experience has shown that this "intended use" cannot be carried out without a certain percentage of accidents; the manufacturer should not be allowed to claim that he did not intend the aircraft to be involved in crashes when it could easily be foreseen.

Manufacturers of the smaller aircraft employed in general aviation could be subjected to liability in negligent crashworthiness actions under the *Larsen* rationale more frequently than the manufacturers of larger commercial craft. The majority of aviation accidents and deaths result from crashes of small aircraft[94]; therefore, their involvement in collisions can more easily be foreseen. The patent-latent distinction becomes important in general aviation situations also. Since World War I, the increased danger of flying smaller aircraft has been recognized.[95] It is a well known fact that the human body can withstand the impact of a crash if it is protected by a structure that reduces the impact and distributes its force.[96] Thus, one of the first premises of air safety is that the larger and heavier hull structures protect the passengers by better absorbing and distributing the shock of the impact. Analogy can easily be made to automobile cases denying liability when a patent defect, the size and weight of the vehicle, prevents recovery.[97]

IV. CONCLUSION

Regardless of whether a crashworthiness suit is maintained on concepts of warranty, strict liability or negligence, the question of the manufacturer's duty inheres either directly or indirectly. Implied warranty suits indirectly rely on the manufacturer's duty when considering whether a product is merchantable or fit for a particular purpose. The crucial determination of whether a product is defective or unreasonably dangerous in terms of strict liability can only be made within established parameters of the duty owed by manufacturers and suppliers to consumers. The crashworthiness actions based on negligence in design directly and openly focus on the manufacturer's duty. In affirming an expansive view of the duty owed by a manufacturer to his consumer, an Illinois appellate court cited the rationale of *Larsen v. General Motors* as the most

[94] J. WARFORD, GENERAL AVIATION: WHO SHOULD PAY (1971).

[95] *See* note 9 *supra.*

[96] *Id.*

[97] *See* note 93 *supra.*

cogent and reasoned approach to the difficult problem of the design defect:

> To hold otherwise . . . would permit the manufacturer in the face of the high incidence of injuries sustained by those injured in . . . accidents, to fill the passenger compartment with all sorts of sharp protrusions and gimcracks capable of producing severe injuries or death and which serve no other purpose than eye appeal and then survey the resulting misery with the complacent knowledge that since these items of hardware did not initiate the chain of events, it was secure from responsibility.[98]

Although this mandate was directed to the automobile industry, the same rationale should apply to the manufacturers of aircraft. To charge the manufacturer of an automobile with a duty to guard against collision-enhanced injuries, but to refuse to charge manufacturers of aircraft with the same duty presents an anamolous result in light of both the relevant facts and applicable law. There is no basis for distinguishing between automobiles and aircraft when considering the manufacturer's liability for design enhanced injuries. Although it is true that an automobile only moves within a two-dimensional zone, the fact that the operation of an aircraft involves a third altitudinal dimension should not relieve aviation manufacturers of the duty to make their aircraft as safe as possible. If anything, the additional dimension of altitude, with its attendent dangers, should serve to increase the duty owed by producers of aircraft. It cannot be denied that general aviation is more analagous to the automobile situation than commercial aviation. The size and structure of small planes is comparable to the construction of present day automobiles. Also, the federal regulations applicable to general aviation and the automobile industry are less stringent than those applicable to commercial aviation. The promulgators of federal air regulations have recently taken great care to minimize injuries and deaths resulting from crashes of large aircraft. Thus, it is conceivable that producers of large aircraft would not have breached the duty owed to prospective passengers if they were in full compliance with the appropriate federal directives. Nevertheless, aviation crashworthiness actions should not be summarily precluded against the manufacturer of either small or large aircraft

[98] Mieher v. Brown, 2 CCH 1972 PROD. LIAB. REP. ¶ 6752 at 11,273 (1972).

on the basis of an absence of a duty or on the dimensions of the use of the product.

Finally, social necessity demands the existence of crashworthiness or second collision actions against aviation manufacturers. Otherwise, passengers are helpless to protect themselves against injuries sustained during aviation disasters. Aviation manufacturers are also in a position to allocate equally the costs incurred from research and testing required to improve the safety aspects of their aircraft. In the absence of crashworthiness actions, tighter federal aviation regulations for general aviation or legislation firmly establishing the manufacturer's duty to employ the safest design possible, those who find it necessary or convenient to travel in air traffic are at the mercy of the manufacturer and his negligently designed "gimcrack" encrusted aircraft.

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