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Design Liabilty and State of the Art: The United States and Europe at a Crossroads

Hans-Viggo von Hulsen

DESIGN LIABILITY AND STATE OF THE ART: THE UNITED STATES AND EUROPE AT A CROSSROADS*

HANS-VIGGO v. HÜLSEN†

INTRODUCTION

Viewed generally, the decade of the 1970's was one in which the American law of products liability showed signs of great uncertainty. Though the doctrine of so-called "strict tort liability" increasingly was adopted, the courts left significant questions to be resolved later on a case-by-case basis. For example, how "strict" was this liability to be? Would a manufacturer's exercise of reasonable care or even a high degree of prudence avoid "strict liability?" What role is to be played by a manufacturer's compliance with the applicable "state of the art?" Which defenses would be available? How would the new doctrine be applied at the trial level? These and a host of other questions were not conclusively answered during the last decade. There are signs that in the decade of the 1980's some uncertainty will continue.

The American common-law experience has been paralleled to some extent in Europe, where an attempt has been made to articulate products liability rules through a so-called "Draft Directive" devised by the Commission of the European Communities. While this European attempt to formulate products law has worthwhile objectives, certain Commission proposals seem to disregard lessons to be learned from years of a somewhat discouraging American experience in struggling to define the manufacturer's responsiblity.

Both the American and European efforts, continuing into this

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* This Article expands upon concepts first advanced by the author in v. Hülsen, *The Problems of New Development: Facts and Cases From the Motor Industry*, PROD. LIAB. INT'L, Jan. 1981, at 2; and v. Hülsen, *Neue Entwicklung zur Produzentenhaftung in den U.S.A.*, 1981 RECHT DER INTERNATIONALEN WIRTSCHAFT 1.

† Consultant, author and lecturer regarding the Commission of the European Communities Proposal for a Council Directive relating to the approximation of the laws, regulations, and administrative provisions of the Member States concerning liability for defective products; Head of Foreign Legal Section of Volkswagenwerk AG; Research Fellow, Max-Planck-Institute of Foreign and International Private Law, 1962-69; doctorate of law, University of Hamburg, 1973.

decade, have great significance. Desirable and necessary products are being sold on both sides of the ocean. Liability risks for American and European manufacturers are enormous. They obviously impact product availability, prices, jobs and international commerce in general. It is therefore important to dispel uncertainties about what the manufacturer's responsibility really is.

This Article focuses upon some of the legal considerations associated with the development and design of complex products. Various categories of design developments are identified, with particular attention to the realistic role of "state of the art" and time elements, as influential factors in formulating design liability. American and European approaches defining design responsibility are briefly surveyed to discern whether they properly recognize "fault" and "state of the art" considerations.

THE DEFECTIVE DESIGN ISSUE

Perhaps no products liability issue in the United States has stimulated more controversy than the problem of defining just what constitutes a "defect" under strict tort liability principles.[1]

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[1] *See* Birnbaum, *Unmasking the Test for Design Defect: From Negligence [to Warranty] to Strict Liability to Negligence*, 33 VAND. L. REV. 593, 597-602 (1980); Hoenig, *Product Designs and Strict Tort Liability: Is There a Better Approach?* 8 SW. U.L. REV. 109, 111 (1976); Phillips, *A Synopsis of the Developing Law of Products Liability*, 28 DRAKE L. REV. 317, 322-23 (1978).

Whether liability is predicated on negligence or strict products liability, a plaintiff must establish that the product was "defective" in some manner when it left the manufacturer's control. Browder v. Pittigrew, 541 S.W.2d 402, 404 (Tenn. 1976). Since the seminal case of Greenman v. Yuba Power Prods. Inc., 59 Cal. 2d 57, 377 P.2d 897, 27 Cal. Rptr. 697 (1962), courts and commentators alike have grappled with the problem of defining "defective product." *See, e.g.*, Weakley v. Fischbach & Moore, Inc., 515 F.2d 1260, 1267 (5th Cir. 1975); Lolie v. Ohio Brass Co., 502 F.2d 741, 744 (7th Cir. 1974); RESTATEMENT (SECOND) OF TORTS § 402A (1965). In *Greenman*, the California Supreme Court, without defining "defect," held that liability exists when the product "proves to have a defect that causes injury to a human being." 59 Cal. 2d at 62, 377 P.2d at 900, 27 Cal. Rptr. at 700. The Restatement of Torts, which states that a seller is liable for damages for a product which is "in a defective condition unreasonably dangerous to the user or consumer," RESTATEMENT (SECOND) OF TORTS § 402A (1965), defines "defective condition" as "a condition not contemplated by the ultimate consumer, which will be unreasonably dangerous to him." *Id.*, Comment g. The "unreasonably dangerous" standard was seized upon by many courts as the basis for recognizing strict tort liability for products without the need to establish privity. Wade, *On Product "Design Defects" and their Actionability*, 33 VAND. L. REV. 551, 555 (1980). Later variations on this standard were applied which utilized the reasonable expectations of the consumer to determine if a product was defective, reflecting some of the influence of contract law and breach of warranty. *See, e.g.*, Vincer v. Esther Williams All-Aluminum Swimming Pool Co., 69 Wis. 2d 326, 230 N.W.2d 794 (1975); Dickerson, *Products Liability: How Good Does A Product Have to Be?* 42 IND. L.J. 301, 305-07 (1967). Other courts adopted a variation that was more

While courts and commentators originally faced the problem of establishing standards of liability for mismanufactured products[2] or impurities in food,[3] the same standards are not easily transferred to issues of product design and failure to warn.[4] In manufacturing defect cases, the product, through mismanufacture or inadequate quality control, is faulty because it fails to meet the manufacturer's standards. Defects can be identified by reference to the manufac-

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reflective of tort law—whether a reasonably prudent manufacturer with knowledge of the defect would market the product. *E.g.*, Cepeda v. Cumberland Eng'r Co., 76 N.J. 152, 386 A.2d 816 (1978), *overruled on other grounds*, 81 N.J. 150, 404 A.2d 140 (1979); Phillips v. Kimwood Mach. Co., 269 Or. 581, 525 P.2d 1033 (1974). *See also* Keeton, *Product Liability and the Meaning of Defect*, 5 ST. MARY'S L.J. 30 (1973). Some courts, however, have rejected the Restatement definition of "unreasonably dangerous" as too closely akin to a negligence standard. *See* Caterpiller Tractor Co. v. Beck, 593 P.2d 871 (Alaska 1979); Cronin v. J.B.E. Olson Corp., 8 Cal. 3d 121, 501 P.2d 1153, 104 Cal. Rptr. 433 (1972). Recently, the California Supreme Court, in *Barker v. Lull Engineering Co.*, elaborated on its definition of design defect and proposed two alternatives: the first alternative is based upon ordinary consumer expectations, 20 Cal. 3d 413, 432, 573 P.2d 443, 455, 143 Cal. Rptr. 225, 237 (1978), the second alternative employs a risk-utility standard but places on the defendant the burden of proving that the merits of the design outweighed its dangers. 20 Cal. 3d 413, 432, 573 P.2d 443, 456, 143 Cal. Rptr. 225, 233 (1978); *see* note 10 and accompanying text *infra*.

[2] *See, e.g.*, McKee v. Brunswick Corp., 354 F.2d 577 (7th Cir. 1965); Holmquist v. Volkswagen of America, Inc., 261 N.W.2d 516 (Iowa Ct. App. 1977); Wyatt v. Winnebago Indus. 566 S.W.2d 276, 278 (Tenn. Ct. App. 1977); RESTATEMENT (SECOND) OF TORTS § 402A, Appendix (1965).

[3] Connell v. Norton Coca-Cola Bottling Co., 187 Kan. 393, 357 P.2d 804, 808 (1960); Le Blanc v. Louisiana Coca-Cola Bottling Co., 221 La. 919, 60 So. 2d 873, 875 (1952); Swift & Co. v. Wells, 201 Va. 213, 110 S.E.2d 203, 206 (1959). The Restatement standard, in its initial draft, applied only to food, *see* RESTATEMENT (SECOND) OF TORTS § 402A (prelim. draft no. 6, 1958), and stated that food products must be "in a condition dangerous to the consumer." *Id.* The final draft was changed to "defective condition unreasonably dangerous" as an assurance that the section would be interpreted to mean unwholesome food. AMERICAN LAW INSTITUTE, 1961 PROCEEDING 87-89. Later, when section 402A was expanded to include all defective products, this definition was not modified. *See* Wade, *On the Nature of Strict Tort Liability for Products*, 44 MISS. L.J. 825, 831 n.26 (1973).

[4] For the past 15 years, following the formulation of the Restatement standard, courts have struggled to reconcile what was intended as a standard for product mismanufacture or defective construction with the divergent considerations presented by design and duty to warn cases. MODEL UNIFORM PRODUCTS LIABILITY ACT, § 104 Analysis, *reprinted in* 44 Fed. Reg. 62,714, 62,722 (1979) [hereinafter cited as UPLA]. Although the failure to warn of a dangerous propensity has sometimes been characterized as a separate category of product defect, *see* 2 L. FRUMER & M. FRIEDMAN, PRODUCTS LIABILITY § 16 A [4][f][i] (1980), failure to warn has also been viewed as a type of design defect. Comment, *The Failure to Warn Defect After* Barker v. Lull Engineering Co.: *Preservation of the Limited Duty and Demise of the Knowledge Requirement Defense*, 14 U.S.F.L. REV. 309, 314 & n.38 (1980). Both design and failure to warn defects present similar problems regarding the extent to which the reasonableness of the manufacturer's behavior and state of the art factors can be excluded from the critical determination of whether a defect exists. *See* note 79 and accompanying text *infra*.

turer's own specifications for the product.[5] In design defect cases, however, the product is made as its manufacturer intended but the claimant's contention is that the entire product line is defective in some way. The reasonableness of the manufacturer's design choice clearly is in issue and the determination of "defect" becomes much more complex.[6] While scholarly debate has focused upon the proper role of "negligence" factors in a strict liability cause of action,[7] evidence of the manufacturer's "reasonableness" has been admissible in most cases by some variation of a risk/utility balancing test or one based upon the reasonable expectations of consumers.[8] With few exceptions, no court appears to have imposed true "strict liability" on manufacturers for design defect, despite much language in the cases to the contrary.[9] Instead, nearly all tests for

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[5] *See* Hoenig, *Product Designs and Strict Tort Liability: Is There a Better Approach?*, 8 SW. L. REV. 109, 118 (1976); Keeton, *Manufacturer's Liability: The Meaning of "Defect" in the Manufacture and Design of Products*, 20 SYRACUSE L. REV. 559, 562 (1969). It is a fairly easy matter to find strict liability in tort for manufacturing error, regardless of the particular test that is applied, since defectiveness is ascertained by reference to the intended condition of the product. *See* 2 L. FRUMER & M. FRIEDMAN, *supra* note 4, at § 16 A[4][f][i] n.5; Wade, *supra* note 3, at 828.

[6] Most courts and commentators have recognized that, in any viable definition of design defect, it is necessary to consider not only the product, but also the conduct of the manufacturer. *See* Chestnut v. Ford Motor Co., 445 F.2d 967, 971 (4th Cir. 1971); Dorsey v. Yoder Co., 331 F. Supp. 753, 758-60 (E.D. Pa. 1971), *aff'd sub nom.* Yoder Co. v. General Copper & Brass Co., 474 F.2d 1339 (3d Cir. 1973); Brady v. Melody Homes Mfg., 121 Ariz. 253, 589 P.2d 896, 902 (Ct. App. 1978); Wade, *supra* note 3, at 841. Some courts have stated that strict liability is an inappropriate standard for design cases. *E.g.*, Swartz v. General Motors Corp., 375 Mass. 628, 378 N.E.2d 61, 62 (1978); *see* UPLA, *reprinted in* 44 Fed. Reg. 62,714 (1979). *Cf.* Cline v. Prowler Indus. Inc., 418 A.2d 968, 974 (1980) (rejecting applicablity of strict liability in sales cases and holding that U.C.C. implied warranty provisions preempt the field). *But compare* Frericks v. General Motors Corp., 274 Md. 288, 336 A.2d 118 (1975) *and* Volkswagen of America, Inc. v. Young, 272 Md. 201, 321 A.2d 737, 747 (1974) *with* Phipps v. General Motors Corp., 278 Md. 337, 363 A.2d 955 (1976). One commentator has suggested that because of the complex policy considerations involved, the courts are not the proper forum for establishing standards for design safety, and has called for an end to "judicial coin-flipping." Henderson, *Judicial Review of Manufacturers' Conscious Design Choices: The Limits of Adjudication*, 73 COLUM. L. REV. 1531, 1558 (1973). *See also* Owens v. Allis-Chalmers Corp., 83 Mich. App. 74, 80, 268 N.W.2d 291, 294 (1978); Note, *Reforming the Law of Consumer Recovery and Enterprise Liability Through the Uniform Commercial Code*, 60 VA. L. REV. 1013 (1974).

[7] *Compare* Hoenig, *Product Design and Strict Tort Liability: Is There a Better Approach?*, 8 SW. L. REV. 109 (1976) *with* Twerski, *Corporations Face Dilemma in Rulings on Design v. Manufacturing Defects*, N.Y.L.J., March 2, 1981, at 4, col. 1.

[8] *See* notes 34-76 and accompanying text *infra*.

[9] UPLA § 104, Analysis, *reprinted in* 44 Fed. Reg. at 62,723; Henderson, *Manufacturers' Liability for Defective Design: A Proposed Statutory Reform*, 56 N.C.L. REV. 625, 634-35 (1978). *Cf.* Barker v. Lull Eng'r Co., 20 Cal. 3d 413, 573 P.2d 443, 143 Cal. Rptr. 225 (1978). In *Barker*, the court purported to reject negligence concepts in favor of a more pure

design defect determinations applied by United States courts require some consideration of existing scientific knowledge, technological feasibility and economic practicality at the time of manufacture.[10] Nevertheless, because many courts appear to instruct

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strict liability standard. It is doubtful, however, that *Barker* conclusively eliminates consideration of fault, and hence, does not appear to impose truly strict liability. *See id.* at 432, 573 P.2d at 456, 143 Cal. Rptr. at 238; Comment, *The Failure to Warn Defect After* Barker v. Lull Engineering Co.*: Preservation of the Limited Duty and Demise of the Knowledge Requirement Defense*, 14 U.S.F.L. REV. 309, 334 (1980). While recognizing that in design cases, as a practical matter, it is impossible to exclude considerations such as the feasibility of alternative safer designs, or risk/utility factors, the court sought to cut the ties to a negligence standard by shifting to the manufacturer the burden of proving that "on balance, the benefits of the challenged design outweigh the risk of danger inherent in such design." *Id.* at 432, 573 P.2d at 456-57, 143 Cal. Rptr. at 237-38. Shifting the burden of proof in this manner is inappropriate, both in view of established tort principles of liability, *see* Kalven, *Torts: The Quest for Appropriate Standards*, 53 CALIF. L. REV. 189 (1965), and because of the severe financial consequences that manufacturers face when an entire product line is challenged. UPLA, *reprinted in* 44 Fed. Reg. at 62,724. As to the financial consequences, see Gibson, *When Attorneys Prosper*, FORBES, Mar. 30, 1981, at 43-44. Therefore, the *Barker* approach has been criticized in commentary, *e.g.*, Birnbaum, *supra* note 1, at 644 n. 261, and only one other court appears to have adopted the California standard as of this writing. *See* Caterpillar Tractor Co. v. Beck, 593 P.2d 871 (Alaska 1979). In Pennsylvania, the highest court held that manufacturers are "guarantors" of the safety of their products, Azzarello v. Black Bros. Co., 480 Pa. 547, 559-60 n.12, 391 A.2d 1020, 1027 n.12 (1978). It remains to be seen whether the actual application of this statement by Pennsylvania courts will lean towards imposition of a very strict liability, or whether this merely amounts to a label used by the court to distinguish the more traditional cause of action in negligence.

[10] *See, e.g.*, Schell v. AMF, Inc., 567 F.2d 1259 (3d Cir. 1977); Dreisonstok v. Volkswagenwerk, A.G., 489 F.2d 1066, 1072-73 (4th Cir. 1974); Dorsey v. Yoder Co., 331 F. Supp. 753 (E.D. Pa. 1971), *aff'd sub nom.* Yoder Co. v. General Copper & Brass Co., 474 F.2d 1339 (3d Cir. 1973); Byrns v. Riddell, Inc., 113 Ariz. 264, 550 P.2d 1065 (1976); Aller v. Rodgers Mach. Mfg. Co., 268 N.W.2d 830 (Iowa 1978); Cepeda v. Cumberland Eng'r Co., 76 N.J. 152, 386 A.2d 816 (1978), *overruled on other grounds*, 81 N.J. 150, 404 A.2d 140 (1979); Phillips v. Kimwood Mach. Co., 269 Or. 485, 525 P.2d 1033 (1974); Seattle-First Nat'l Bank v. Tabert, 86 Wash. 2d 145, 542 P.2d 774 (1975). Evidence of the reasonableness of the manufacturer's design choice usually has been admissible in strict liability actions in one form or another. *E.g.*, Bruce v. Martin-Marietta Corp., 544 F.2d 442, 447 (10th Cir. 1976); Jeng v. Witters, 452 F. Supp. 1349, 1362 (M.D. Pa. 1978), *aff'd mem.*, 591 F.2d 1334 (3d Cir. 1979); Baker v. Chrysler Corp., 55 Cal. App. 3d 710, 127 Cal. Rptr. 745 (1976); Roach v. Kononen, 269 Or. 457, 525 P.2d 125 (1974); *see* 44 Fed. Reg. 62,723 (1979). Even though some courts and commentators insist that they are utilizing a strict liability approach for design defect cases, in reality, they often are employing a risk/utility balancing approach that necessarily considers the reasonableness of the design choice and some state of the art criteria. *See, e.g.*, Phillips v. Kimwood Mach. Co., 269 Or. 485, 493, 525 P.2d 1033, 1037 (1974); Birnbaum, *supra* note 1, at 619.

Outside the United States, also, proof of responsible and careful design behavior is relevant on the issue of liability in design cases. *See, e.g.*, Viney, *L'Application du Droit Commun de la Responsabilité aux Fabricants et Distributeurs de Produit*, LA RESPONSABILITE DES FABRICANTS ET DISTRIBUTEURS 69, 70-75 (Paris 1975). *See generally* H.D. Tebbens, INTERNATIONAL PRODUCT LIABILITY 52 (English law), 85-86 (French law) (1979); v. Hülsen, The Status of Product Liability—Proceedings of an International Colloquium in Cologne (1977);

juries to generally "consider" such factors without actually providing concrete guidelines for evaluating them,[11] results are often unpredictable and sometimes conflicting.[12] Judges and juries are uncertain as to how "strict" the manufacturer's liability for product design should be.[13] Attorneys find it difficult to advise their clients with certainty and often will refer to vague standards currently employed by the courts.[14] Since strict tort liability is, in part, based upon the concept of so-called "spreading the risk,"[15] and in-

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v. Hülsen, *The Definition of "Defect" in the Proposed EEC Directive*, 1978 QUALITY ASSURANCE 53.

[11] *See* Keeton, *Product Liability and the Automobile*, 9 FORUM 1, 2 (1973); Raleigh, *The "State of the Art" in Product Liability: A New Look at an Old "Defense,"* 4 OHIO N.U.L. REV. 249, 250-52 (1977); UPLA § 104, Analysis, 44 Fed. Reg. at 62,723 (1979).

[12] *See, e.g.*, Dawson v. Chrysler Corp., 630 F.2d 950 (3d Cir. 1980), *cert. denied*, 49 U.S.L.W. 3619 (Feb. 24, 1981); note 63 and accompanying text *infra*.

[13] For a discussion of the various standards applied in design defect cases, see Seattle-First Nat'l Bank v. Tabert, 86 Wash. 2d 145, 542 P.2d 774 (1975) (applies unreasonably dangerous standard). *See also* Phillips v. Kimwood Mach. Co., 269 Or. 485, 492, 525 P.2d 1033, 1038-39 (1974) (reasonably prudent manufacturer standard); Estate of Ryder v. Kelly-Springfield Tire Co., 91 Wash. 2d 111, 587 P.2d 160 (1978) (reasonable expectations of ordinary user); Jiminez v. Sears, Roebuck & Co., 4 Cal. 3d 379, 383, 482 P.2d 681, 684, 93 Cal. Rptr. 769, 772 (1971) (no one definition of defect has been accepted by courts).

[14] One commentator has summed up the problem in this manner:

> How frustrating it must be, indeed almost ludicrous, for designers and businessmen to be told by their lawyers that enormous responsibilities and costs are to be defined by such vagaries as "unreasonably dangerous," or the "average quality of like products," or the "reasonable expectations of consumers," or that a product must be "reasonably suitable for its intended use," or that the meaning of fault is different in each case, or that such risks revolve about some even more airy meaning of "defect" or notion of "ordinary care" which, in the end, may be only a function of the training, experience and emotions of jurors.

Raleigh, *The "State of the Art" in Product Liability: A New Look at an Old "Defense,"* 4 OHIO N.U.L. REV. 249, 250-51 (1977) (footnotes omitted).

[15] The risk-spreading rationale is premised on the assumption that the cost of product related injuries is more equitably borne by the manufacturer than by the injured consumer. The manufacturer is usually in a superior position to compute the probability of defect and absorb the costs by obtaining insurance or by raising prices. *See* United States v. Marathon Pipe Line Co., 589 F.2d 1305, 1309 (7th Cir. 1978); Greenman v. Yuba Power Prod. Inc., 59 Cal. 2d 57, 62-63, 377 P.2d 897, 900-01, 27 Cal. Rptr. 697, 700-01 (1962). *See generally* Calabresi, *Some Thoughts on Risk Distribution and the Law of Torts*, 70 YALE L.J. 499 (1961); Keeton, *Product Liability and the Meaning of Defect*, 5 ST. MARY'S L.J. 30, 35 (1973). Unlike manufacturing errors, which can be predicted with some degree of mathematical probability, a design element is not characterized by the failure of one piece out of possibly thousands to conform to a precise technical norm for the series. Therefore, the utility of the risk-spreading rationale in the area of design defect has been challenged. In Owen, *Rethinking the Policies of Strict Products Liability*, 33 VAND. L. REV. 681, 707 (1980), the author concludes, "Compensation and risk shifting should very probably be abandoned altogether as 'rationales' of social policy for products liability decision making. Such arguments are structurally inadequate as decisional tools, since they point in one

surance is one major mechanism for achieving such risk distribution, a climate of uncertainty can affect a vital ingredient of products liability claims resolution, the availability and affordability of insurance.[16] Indeed, increasing insurance rates reflect a deep concern that strict liability in the area of design defect or failure to warn is fostering legal tests which approach absolute liability.[17]

In order to meet the broad policy objective of promoting safe product design,[18] it is necessary for designers, manufacturers, and

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direction only—toward liability." *Id.*; *accord,* UPLA § 104, Analysis, 44 Fed. Reg. at 62,722. Indeed, risk spreading is already embodied in negligence theory, Hoenig, *supra* note 1, at 129-31, and Dean Prosser has called it merely a "make weight" argument for strict tort liability. Prosser, *The Fall of the Citadel (Strict Liability to the Consumer),* 50 MINN. L. REV. 791, 799-800 (1966).

[16] Because of the uncertainty of the standards applied in design defect cases, as well as the magnitude of the financial risk of having an entire product line declared defective, the ability of manufacturers to obtain insurance may be threatened. *See* U.S. DEP'T OF COMMERCE, INTERAGENCY TASK FORCE OF PRODUCT LIABILITY, FINAL REPORT OF THE INSURANCE STUDY (1977); *Product Liability Insurance, A Report of the Subcommittee on Capital, Investment and Business Opportunities of the Committee of Small Businesses,* H.R. REP. No. 95-997, 95th Cong., 2d Sess. 8-11 (1978). Product liability insurance and pending claims increased six-fold during the period from 1971 to 1976, according to one estimate. Bivins, *The Products Liability Crisis: Modest Proposals for Legislative Reform,* 11 AKRON L. REV. 595, 596 (1978). *See also* Raleigh, *The "State of the Art" in Product Liability: A New Look at an Old "Defense,"* 4 OHIO N.U.L. REV. 249, 251 n.11 (1977). *But see* O'Connell, *Expanding No-Fault Beyond Auto Insurance: Some Proposals,* 59 VA. L. REV. 749 (1973); Comment, *The State of the Art Defense in Products Liability: "Unreasonably Dangerous" to the Injured Consumer,* 18 DUQ. L. REV. 915, 915-16 (1980). Thus, insurance may either be too expensive or impossible to obtain. Birnbaum, *supra* note 1, at 644 n.261; Gibson, *When Lawyers Prosper,* Forbes, Mar. 30, 1981, at 43-44; Hoenig, *supra* note 1, at 130.

[17] There appears to be virtually unanimous agreement among courts and commentators that strict liability should not be synonymous with absolute liability, *see* Lartigue v. R.J. Reynolds Tobacco Co., 317 F.2d 19, 35-39 (5th Cir. 1963); Piercefield v. Remington Arms Co., 375 Mich. 85, 98-99, 133 N.W.2d 129, 135 (1965), and that the need to compensate victims is not in itself a sufficient ground for imposing liability, R. KEETON & J. O'CONNELL, BASIC PROTECTION FOR THE TRAFFIC VICTIM 242 (1965); Wade, *supra* note 3, at 828. *But cf.* Azzarello v. Black Bros. Co., 480 Pa. 547, 559-60 n.12, 391 A.2d 1020, 1027 n.12 (1978). For a discussion of an approach to compensation which does not consider fault, see O'Connell, *Elective No-Fault Liability by Contract—With or Without an Enabling Statute,* 1975 U. ILL. L.F. 59.

[18] A corollary to the risk-spreading rationale is that manufacturers may be induced to produce safer products because of the increased threat of liability. *See* Phillips v. Kimwood Mach. Co., 269 Or. 485, 503-04, 525 P.2d 1033, 1041-42 (1974). Indeed, the deterrence rationale has been categorized as the foremost social policy consideration: "The primary goal underlying [products liability] should be, not compensation, but the reduction of the incidence of injuries." Birnbaum, *supra* note 1, at 645. *See also* Bivins, *supra* note 16, at 603. The complexity of the social and legal considerations inherent in the formulation of a fair products liability standard may militate against the application of any single rationale in all cases. *See generally* Calabresi, *Optimal Deterrence and Accidents,* 84 YALE L.J. 656 (1975); Epstein, *Products Liability: The Search for Middle Ground,* 56 N.C.L. REV. 643 (1978);

engineers to have design standards that can be ascertained before the product reaches the market and before a product-related injury occurs. A prerequisite for any workable standard of responsibility for design is an understanding of the factors that go into a design choice and the recognition that no design is "perfect;" the design development must be viewed in the context of the considerations prevailing at the time of manufacture. Additionally, an appreciation of relevant factors prevailing at conceptual stages of development and critical time scales is especially necessary in the case of complex products.

DESIGN DEVELOPMENT CONSIDERATIONS AND TIME FACTORS

The design of any product evolves within the scientific, technological, and socio-economic environment existing at the time of the product's conception. Particularly in the case of complex products, the period of conception extends over several years. An example is the approximately 5-year conception period for the design of an automobile. The conception period of a complex product will be followed by a production period during which the product may be manufactured for perhaps five or ten years before replacement by a redesigned or new model. After this production period ends, the product will continue to be used by consumers. In the example of the automobile, continued use following purchase might well amount to twenty years or even more. In the case of capital goods like stamping machines, much longer periods of use occur.

During the "conception period" there exists a general state of technical and scientific knowledge, a complex of prevailing economic circumstances, and a certain degree of knowledge about risks associated with use of the product. The precautionary measures deemed necessary *at that time* to make the product as safe as possible will then be taken. During the "conception phase" the designers of an automobile, for example, will consider not only the existing state of scientific and technical knowledge but also weigh such factors as the cost of incorporating available technology, and consumer preferences in styling, convenience, and fuel economy.[19]

Lang, *Compensation of Victims—A Pious and Misleading Platitude*, 54 CALIF. L. REV. 1559 (1966).

[19] For an informative description of various considerations that play a part in the manufacturer's design choices, see O'Donnell, *Design Litigation and the State of the Art: Terminology, Practice and Reform*, 11 AKRON L. REV. 627 (1978).

The manufacturer's practical goal is to produce a safe automobile that will sell. After a design is finalized which meets these objectives, the automobile will go into serial production for some 5 to 10 years, to be replaced later by a new model.

The taking of precautionary measures to make the car as safe as possible within the technical and scientific knowledge prevailing during the conception phase may be illustrated by reference to two features generally found in the 1978 model automobile. One is so-called "dual circuit" brakes. This feature provides braking function via two circuits, thereby allowing significant braking to take place even if one braking circuit were to fail. If the vehicle possessed only one braking circuit, a failure in that circuit would result in loss of braking ability. The dual circuit design, therefore, provides an added car stopping function—a safety feature.

A second illustrative system is the so-called "three-point" safety seat belt. This is a seat belt restraint device that provides both a lap belt restraint as well as an upper torso belt. It is referred to as a three-point system because its anchorage involves three points of attachment to the car. The upper torso belt and the lap belt are attached to each other and can be buckled simultaneously by a car occupant in one buckling action by inserting the strap tongue into a latching receptacle. The three-point belt is distinguishable from the so-called "two-point" seat belt of which the ordinary lap belt is an example. It also differs from the "four-point" belt restraint which was really two independent straps requiring two separate buckling actions (one across the lap and one across the torso). The three-point seat belt offers upper body restraint which the lap belt alone does not. Additionally, it offers upper and lower body restraint with one buckling action which the four-point system does not. In the 1980 car model, for example, the three-point safety belts are made available for the front outside seats in order to minimize the occupants' injuries even if an accident occurs despite the sophisticated braking system.

The incorporation of both the dual brake circuit system and the three-point safety belts at one time necessitated major redesigns of the vehicle structure. Therefore, it necessarily took some time after the very first car manufacturer commenced the design of such features until these safer solutions were incorporated into the series production cars released to the consumer. The normal process of a manufacturer with several model lines was to phase the newer devices or systems into its product lines in accor-

dance with cycles of redesign for the particular model. Thus, not all cars of one manufacturer would be equipped with the newer systems at the same time. A still further period of time would be required before all car models of all makes would be equipped with dual circuit brakes and three-point safety belts.

A very important factor is the necessary lead time for investment and "tooling up" in the industry. Obviously, it is technically and economically impossible for the automobile industry members and their suppliers to change production facilities for millions of vehicles and parts from one day to the next. Such efforts are expended in a continuous process extending over a reasonable time. This kind of a normal transition period occurs whenever a safety improvement is not externally prescribed by a clearly defined safety standard. The normal, nonmandated safety improvement results from a continuous scientific, technological and economic development and comes into being because the average consumer in the market place requires and accepts it. The average consumer of a 1978 car, for example, would undoubtedly reject a product that is outdated in terms of its safety features, such as a 1978 automobile with single circuit brakes only. However, the average consumer will also reject a futuristic, sophisticated technical system, which may offer some additional protection against more remote risks but for a markedly higher price.

An illustration of the "market rejection" phenomenon might be the "Anti-Skid Braking System" (ABS). This feature promotes braking function as well as minimizing skidding when brakes are applied. Currently, only a small market of affluent customers exists for ABS, which may be found in certain high-priced vehicles. However, this relatively small consuming market has a kind of pioneering function in the development process for it permits commencement of a more general technological advance. We are probably witnessing the genesis of a new transition period in which the future result may be that current braking systems without ABS features will be outdated in perhaps ten years.

The current state of the art quite often provides for a certain flexible margin of development in which variations of the new feature may nonetheless retain essential characteristics of the old system. For example, the safety function served by three-point seat belts may also be accomplished by two-point belts if the latter are augmented with an appropriate knee bar, as currently found on some vehicles. In this situation two-point belts are not outdated by

the three-point system but continue to remain within the state of the art. Except in the case of technical solutions mandated by standards, state of the art normally consists of several technical possibilities to solve a problem as well as a flexible margin of performance. Sometimes, newly designed products are associated with known side effects under certain conditions of use.[20] For example, a product may be highly necessary or desirable but a certain category of users will prove to have allergic reactions to it.[21] If such risks are known, an appropriate warning will be issued to minimize the risk of injury or to give the consumer a choice in deciding to accept the risk in order to gain the benefit of the product.[22] In some instances, however, it will be impossible at the time of development or manufacture to exclude injuries entirely by taking precautions against a *known danger*.[23] To illustrate, injuries from the sharp edge of a knife cannot be excluded without altering the utili-

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[20] Depending on the circumstances, there may be a duty to warn where the product seller has actual knowledge of adverse reactions or dangers from research reports or when constructive knowledge can be imputed on the basis of available scientific literature. This is particularly true in the pharmaceutical industry. *See* Dalke v. Upjohn Co., 555 F.2d 245, 248 (9th Cir. 1977); McEwen v. Ortho Pharmaceutical Corp., 270 Or. 375, 528 P.2d 522, 528-29 (1974).

[21] *See* Wade, *supra* note 3, at 845.

[22] Arguably, liability may nevertheless accrue if the dangerous characteristic could feasibly have been eliminated or where the inherent dangers of the product clearly outweigh its utility. *See* UPLA § 106, 44 Fed. Reg. at 62,722; RESTATEMENT (SECOND) OF TORTS § 402A, Comment j; L. FRUMER & M. FRIEDMAN, *supra* note 4, at § 16A [4][f][ii]; Wade, *supra* note 3, at 842. The sufficiency of the warning actually given may also be considered, and in some cases, adequate instructions must be provided in order to fulfill the duty to warn. *See* McCully v. Fuller Brush Co., 68 Wash. 2d 675, 415 P.2d 7 (1966).

[23] Comment k to section 402A of the Restatement of Torts discusses "unavoidably unsafe products" and states in pertinent part:

> There are some products which, in the present state of human knowledge, are quite incapable of being made safe for their intended and ordinary use. . . . Such a product, properly prepared, and accompanied by proper directions and warning, is not defective, nor is it *unreasonably* dangerous . . . . The seller of such products . . . is not to be held to strict liability for unfortunate consequences . . . merely because he has undertaken to supply the public with an apparently useful and desirable product, attendant with a known but apparently reasonable risk.

RESTATEMENT (SECOND) OF TORTS § 402A, Comment k (1965). The Comment k approach has been followed by most courts. *See, e.g.*, Dalke v. Upjohn Co., 555 F.2d 245 (9th Cir. 1977) (tooth discoloration from tetracycline); Chambers v. G.D. Searle & Co., 441 F. Supp. 377 (D. Md. 1975), *aff'd*, 567 F.2d 269 (1976) (stroke allegedly from birth control pills); Coffer v. Standard Brands, Inc., 30 N.C. App. 134, 226 S.E.2d 534 (1976) (shell in nuts); Moore v. Underwood Memorial Hosp., 147 N.J. Super. 252, 371 A.2d 105 (1977) (serum hepatitis contracted from blood supplied). *But see* Cunningham v. MacNeal Memorial Hosp., 47 Ill. 2d 443, 266 N.E.2d 897 (1970), *subsequently overruled* by ILL. ANN. STAT. ch. 91, §§ 181-84 (Supp. 1979).

tarian aspect of the product.[24] Another example is a medication against cancer that causes known side effects. The risk has to be accepted because of the overwhelming utility of the product.[25] As future scientific development occurs, however, the side effects may be diminished or excluded.

A further category of product development is one where the design is associated with an *unknown* and *scientifically undetectable* danger, hazard or side effect. This category is known as "development risks."[26] Identification of this consideration is most important in trying to gauge the appropriate standard of a manufacturer's design liability.

To summarize, products in actual use which have caused injury because of some design characteristic may fall into one of five categories: (1) "traditional design" produced when that concept was the exclusive technical solution, even though possible new designs were being planned or discussed in scientific literature; (2) "traditional design" produced during the transition period when *some* models of *some* manufacturers had abandoned the traditional design in favor of an advanced design; (3) "traditional design" produced after the expiration of a reasonable transition period; (4) designs (whether "traditional" or "advanced") having known but unavoidable dangers or side effects which are nevertheless acceptable because of the utility of the product even with the risk; and (5) designs whose side effects or dangers were unknown and scientifi-

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[24] It also should be noted that the Comment k duty to warn does not exist where the product's dangers are a matter of common knowledge (liquor or cigarettes, for example) or where the danger is perfectly apparent to the user. *E.g.*, Ward v. Hobart Mfg. Co., 450 F.2d 1176 (5th Cir. 1971) (meat grinder); Garrett v. Nissen Corp., 84 N.M. 16, 498 P.2d 1359 (1972) (trampoline); *see* Wade, *supra* note 3, at 842.

[25] Examples of high risk products which have been exempted from strict liability treatment because of their benefit to society are certain drugs, *see* Basko v. Sterling Drug, Inc., 416 F.2d 417, 425-26 (2d Cir. 1969), and blood, *see* Hines v. St. Joseph's Hosp., 86 N.M. 763, 765, 527 P.2d 1075, 1076 (Ct. App.), *cert. denied*, 87 N.M. 111, 529 P.2d 1232 (1974).

Although the Comment k exemption, *see* note 23 *supra*, is typically used for medical products, there are indications that courts may extend the exception to other products as well. *See* Borel v. Fibreboard Paper Prods. Corp., 493 F.2d 1076, 1091 (5th Cir. 1973), *cert. denied*, 419 U.S. 869 (1974) (asbestos); Wade, *supra* note 3, at 844.

[26] In contrast to the situation where the product seller knew or had reason to know of the product's dangers or where he expressly warranted the product's safety, courts have indicated that no such duty exists when the risk was unknowable in light of the scientific and technological knowledge available at the time of manufacture. *See* Love v. Wolf, 226 Cal. App. 2d 378, 38 Cal. Rptr. 183 (1964); Cochran v. Brooke, 243 Or. 89, 409 P.2d 904, (1966); UPLA, Analysis § 106, 44 Fed. Reg. at 62,727-28 (1979); Owles, *What Does Development Risk Really Mean? How It Differs From the State of the Art*, [1980] PROD. LIAB. INT'L 199-200.

cally undetectable at the time of manufacture, so-called "development risks."

DESIGN LIABILITY UNDER EXISTING LAW IN THE UNITED STATES

In spite of some statements by several courts and the urgings of some commentators, strict liability in the area of product design has generally continued to weigh the "reasonableness" of the manufacturer's design choice or behavior.[27] Thus, under present law in many jurisdictions, manufacturers should only be held liable where the injury was caused by a design characteristic that was outdated when the product was put into circulation (category 3 above).[28] This follows directly from the general product liability principle that the claimant must prove that the product was defective at the time it was put into circulation.[29] Under this principle, proof of responsible and careful design behavior continues to be involved in strict liability actions either as a part of the plaintiff's prima facie case[30] in the form of an alleged absence of care, or as a valid topic

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[27] *See* notes 9 & 10 and accompanying text *supra.*

[28] Significantly, in duty to warn, as in design defect cases, United States courts have continued to apply negligence principles, even after the adoption of strict liability. *See* UPLA § 107, Analysis, 44 Fed. Reg. at 62, 729-30; L. FRUMER & M. FRIEDMAN, PRODUCTS LIABILITY § 8.01 (1980); Note, *Standards of Product Seller Responsibility Under the Product Liability Act,* 49 U. CIN. L. REV. 119, 126 (1980).

[29] A products liability claimant must prove: (1) that a defect exists; (2) that the defect was present at the time the product was put into circulation; and (3) that the defect proximately caused the damage. 1 R. HURSH, AMERICAN LAW OF PRODUCTS LIABILITY § 1:2 (1961). *See also* Piercefield v. Remington Arms Co., 375 Mich. 85, 98-99, 133 N.W.2d 129, 135 (1965). It has been pointed out that, since an adverse judgment in effect holds that an entire product line is defective, traditional tort law principles should be retained in the area of design defects by placing the burden of proof on the claimant. *See* Kalven, *Torts: The Quest for Appropriate Standards,* 53 CALIF. L. REV. 189, 202 (1965). *But cf.* Barker v. Lull Eng'r Co., 20 Cal. 3d 413, 431, 573 P.2d 443, 455, 143 Cal. Rptr. 225, 237 (1978) (overall burden of proof remains on plaintiff, but defendant has to prove advantages outweigh risks) note 16 *supra; accord,* Caterpillar Tractor Co. v. Beck, 593 P.2d 871, 885-86 (Alaska 1979).

[30] For a discussion of state of the art evidence in products liability cases, see Phillips, *The Standard for Determining Defectiveness in Product Liability,* 46 U. CIN. L. REV. 101 (1977); Weinberger, *The State of the Art and Products Liability,* 28 DEFENSE L.J. 303 (1979); Comment, *The State of the Art Defense in Products Liability: "Unreasonably Dangerous" to the Injured Consumer,* 18 DUQ. L. REV. 915 (1980). State of the art evidence has been recognized as essential in some jurisdictions as part of the claimant's prima facie case on the issue of design defect. *See* Huddell v. Levin, 537 F.2d 726 (3d Cir. 1976); Baker v. Chrysler Corp., 55 Cal. App. 3d 710, 127 Cal. Rptr. 745 (Ct. App. 1976); Owens v. Allis-Chalmers Corp., 83 Mich. App. 74, 268 N.W.2d 291 (1978); Wilson v. Piper Aircraft Corp., 282 Or. 61, 577 P.2d 1322 (1978). In *Owens,* the court stated that in order for the case to be submitted to the jury, the following factors must be presented by the plaintiff:

(1) That the particular design was not in conformity with industry design

for the defense.[31] The various design defect tests applied by a majority of courts often require the consideration of factors such as available scientific knowledge, technical feasibility and economic practicality.[32] The degree of objectivity and the qualitative depth of the inquiry in actual practice, however, varies, depending upon the court's particular test for design defect. In some jurisdictions, liability may be expanded into categories 1 and 2 above. It is worthwhile to identify some of the major tests in order to discern the influence of state of the art factors.[33]

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standards, design guidelines established by an authoritative voluntary association, or design criteria set by legislative or other governmental regulation; or

(2) That the design choice of the manufacturer carries with it a latent risk of injury and the manufacturer has not adequately communicated the nature of that risk to potential users of the product.

83 Mich. App. at 81, 268 N.W.2d at 294-95. *See also* Polk v. Ford Motor Co., 529 F.2d 259, 266 (8th Cir.), *cert. denied,* 426 U.S. 907 (1976); Spurlin v. General Motors Corp., 528 F.2d 612, 615 (5th Cir. 1976); Vroman v. Sears, Roebuck & Co., 387 F.2d 732, 737 (6th Cir. 1967); George v. Morgan Constr. Co., 389 F. Supp. 253, 262-64 (E.D. Pa. 1975); Olson v. Arctic Enterprises, Inc., 349 F. Supp. 761, 765 (D.N.D. 1972); Lewis v. Bucyrus—Erie, Inc., [1980] PROD. LIAB. REP. (CCH) ¶ 8784; Kerns v. Engelke, [1978-1979] PROD. LIAB. REP. (CCH) ¶ 8068.

[31] In cases where state of the art evidence is not used by plaintiffs in establishing defectiveness, some states permit the use of state of the art evidence as an absolute defense, *e.g.,* ARIZ. REV. STAT. §§ 12-683(1) (Supp. 1980); IND. STAT. ANN. tit. 34, §§ 4-20 A4(b)(4) (Burns. Supp. 1980). In some jurisdictions, however, compliance with state of the art standards merely establishes a rebuttable presumption of nonliability. *See* Turner v. Manning, Maxwell & Moore, Inc., 216 Va. 245, 217 S.E.2d 863, 868 (1975); COLO. REV. STAT. §§ 13-21-403 (1)(a) (Supp. 1980); UTAH CODE ANN. § 78-15-6(3) (1977). *See also* H.B. 188, N.J. Legis., 1980 Sess. § 7(2) (1980); H.B. 993, N.C. Legis., 1979 Sess. § 99B-7(d) (1979); H.B. 373, Tex. Legis., 1979 Sess. § 1 (1979). Even under the *Barker* approach, *see* note 9 *supra,* risk/utility balancing will be most relevant, although the burden is shifted to the defendant.

[32] Most courts agree that "a manufacturer is not obligated to adopt only those features which represent the ultimate in safety or design," Garst v. General Motors Corp., 207 Kan. 2, 484 P.2d 47, 61 (1971); *see* Marker v. Universal Oil Products Co., 250 F.2d 603 (10th Cir. 1957), nor must he design the safest possible product. Weakley v. Fischback & Moore, Inc., 515 F.2d 1260, 1267 (5th Cir. 1975); *see* Raleigh, *supra* note 17, at 264-65. Even in jurisdictions where knowledge of the defect is said to be imputed to a manufacturer, in most cases the standard that will be applied is the state of the art existing at the time of manufacture: "There is scant evidence, then, from which to conclude that courts are, in effect, evaluating products on the basis of what alternative designs are feasible or what risks were knowable, at the time of trial rather than at the time of marketing." U.S. DEP'T OF COMM., INTERAGENCY TASK FORCE ON PRODUCT LIABILITY 110 (1976) (Vol. IV of the Report of the Legal Study); *see* D. OWLES, THE DEVELOPMENT OF PRODUCT LIABILITY IN THE UNITED STATES 19-20 (1978). *But cf.* Cepeda v. Cumberland Eng'r Co., 76 N.J. 152, 172, 386 A.2d 816, 825 (1978); Keeton, *supra* note 15, at 568 (knowledge of defect at time of trial imputed to the manufacturer).

[33] Apart from the varying degrees of objectivity with which state of the art evidence is applied, there also has been the problem of defining what is meant by state of the art. Depending on the viewpoint of the speaker, state of the art may mean the most advanced

STATE OF THE ART AS AN ELEMENT IN ALL DESIGN DEFECT TESTS

The Reasonably Prudent Manufacturer Test

Many decisions have adopted the standard that a product design is defective only if a reasonably prudent manufacturer, being fully aware of the risk, would not have put the product on the market.[34] The reasonable manufacturer test, unrealistically construed, might permit a plaintiff to establish a prima facie case merely by showing that the designers theoretically were capable of producing a possibly safer alternative design.[35] Several recent cases, however, indicate that a more realistic application of the test will prevail. Thus the courts view the determinative inquiry as being whether it would have been practical, in terms of cost and product function-

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conceptual possibility, or the custom of the industry. O'Connell, *supra* note 13, at 659; Raleigh, *supra* note 17, at 259. Legislatively defined standards are a third alternative. *See* Dawson v. Chrysler Corp., 630 F.2d at 958; 122 CONG. REC. 13,346 (1976) (remarks of Sen. Taft); Raleigh, *supra* note 18, at 259; Comment, *The State of the Art Defense in Products Liability: "Unreasonably Dangerous" to the Injured Consumer*, 18 DUQ. L. REV. 915, 922 (1980). State of the art, as used in this article, refers to the technical and scientific knowledge available to the manufacturer at the time of manufacture, to be applied, however, only in light of a balance between practical safety and economic considerations. *See* Owles, *supra* note 26, at 175. *See generally* Weinberger, *The State of the Art and Products Liability*, 28 DEFENSE L.J. 303 (1979); *see also* Raleigh, *supra* note 16, at 267.

[34] *See, e.g.*, Phillips v. Kimwood Mach. Co., 269 Or. 485, 494, 525 P.2d 1033, 1037 (1974); Nichols v. Union Underwear, [1980] PROD. SAFETY & LIAB. REP. (BNA) 501 (Ky.); Weems v. CBS Imports Corp., [1980] 2 PROD. LIAB. REP. (CCH) ¶ 8781 (Or.). In *Nichols*, the Kentucky Supreme Court noted that for design defect cases "the inquiry is to be made from the perspective of a product manufacturer of similar products fully apprised of the condition and tendencies of the product when put into the stream of commerce." The Wade-Keeton test of the reasonably prudent manufacturer differs from a negligence test in that it imputes knowledge of the product's danger to the manufacturer. Wade, *supra* note 3, at 839-40 (imputes knowledge at the time of manufacture); Keeton, *Manufacturer's Liability: The Meaning of "Defect" in the Manufacture and Design of Products*, 20 SYRACUSE L. REV. 559, 568 (1969) (imputes scienter at time of trial). Moreover, unlike a negligence action, where the determination of due care is a matter for the jury, the court, applying the reasonably prudent manufacturer test, should undertake an initial consideration of risk-utility factors before submitting the case to the jury. Wade, *supra* note 3, at 838. Dean Wade has pointed out the reasons that make an initial weighing by the judge necessary in design cases:

> [W]hen it is not just the single article which is to be classed as unsafe because something went wrong in the making of it, but a whole group or class or type . . . may be unsafe because of the nature of the design. . . . [P]olicy issues become very important and the factors which were enumerated above must be collected and carefully weighed. It is here that the court—whether trial or appellate—does consider these issues in deciding whether to submit the case to the jury.

Id. See also 44 Fed. Reg. at 62,723.

[35] Birnbaum, *supra* note 1, at 627-28. *See also* 141 South Main, Inc. v. Magic Fingers, Inc., 49 Ill. App. 3d 724, 728, 364 N.E.2d 605, 608 (1977) (questioning whether feasibility of safer alternative design was an essential element of plaintiff's prima facie case).

ability, to adopt the alternative design.[36] *Wilson v. Piper Aircraft Corp.*,[37] for example, involved a fatal airplane crash allegedly caused by engine failure due to carburetor icing. In support of their assertion that the aircraft's design was dangerously defective, the plaintiffs had offered evidence that at the time of the plane's manufacture fuel-injected engines were available which were less susceptible to icing than carbureted engines.[38] Reversing a substantial jury award for the plaintiffs, the Oregon Supreme Court held that, as a matter of law, the plaintiffs had not produced sufficient evidence of design defect to establish a prima facie case.[39] In fields such as aeronautic design, where a jury's common knowledge is limited, the court held it necessary for plaintiff to offer more than mere evidence of technical possibility;[40] the effect of such a design change on the "cost, economy of operation, maintenance requirements, overall performance, or safety in respects other than susceptibility to icing" must also be presented.[41] Similarly, in *Hagans v. Oliver Machinery Co.*,[42] the plaintiff alleged that a removable safety device on an industrial saw was a defective design feature because a permanently attached guard was available at the time of manufacture.[43] Holding that the district court should have granted a directed verdict for the defendant, the Fifth Circuit em-

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[36] *See* Lewis v. Bucyrus-Erie, Inc., [1980] 2 PROD. LIAB. REP. (CCH) ¶ 8784; Dreisonstok v. Volkswagenwerk, A.G., 489 F.2d 1066, 1072-73 (4th Cir. 1974); Garst v. General Motors Corp., 207 Kan. 2, 484 P.2d 47, 61 (1971); Lamon v. McDonnell Douglas Corp., 91 Wash. 2d 345, 588 P.2d 1346 (1979). For a discussion of recent cases and the rationale for determining the practicality of alternative designs, see Billheimer, *Seller's Liability for Defective Design—The Measure of Responsibility*, 37 WASH. & LEE L. REV. 237, 242 (1980); Lorenz, *Die Haftung des Produzenten für "Design Defects" in den U.S.A.*: (1980) RIW/AWD 609; Raleigh, *supra* note 15, at 254-55; Twerski & Weinstein, *A Critique of the Uniform Product Liability Law—A Push to Judgment*, 28 DRAKE L. REV. 221, 229 (1979). Olson v. Arctic Enterprises, Inc., 349 F. Supp. 761 (D.N.D. 1972), illustrates the concern for practical considerations in design cases. In *Olson*, the plaintiff argued that if the defendant had used rubber, instead of metal tracks, his injuries would have been prevented or reduced. The court found that the alternative design was not feasible because at the time of manufacture, the industry had not yet developed a type of rubber that could withstand cold and stress without being subject to premature failure. *Id.* at 765.

[37] 282 Or. 61, 577 P.2d 1322 (1978) (en banc).

[38] 577 P.2d at 1324.

[39] *Id.* at 1325. The court also rejected the defendant's assertion that compliance with FAA standards should mandate dismissal of the suit, since the FAA design standards are intended to be minimum standards only. *Id.* at 1324-25; *see* 49 U.S.C. § 1421(a)(1) (1976).

[40] 577 P.2d at 1327.

[41] *Id.*

[42] 576 F.2d 97 (5th Cir. 1978).

[43] *Id.* at 100.

phasized the necessity of considering the effect of proposed design changes on the product's functionability: "The evidence is overwhelming that permanent attachment of the blade guard assembly would seriously impair the usefulness of the defendant's product. Texas law does not require a manufacturer to destroy the utility of his product in order to make it safe."[44]

In jurisdictions that have adopted the reasonably prudent manufacturer test, knowledge of the product's defect is imputed to the manufacturer.[45] There is some danger here, from an evidentiary standpoint, that a kind of hindsight inquiry would be made which tampers with the principle that a manufacturer's responsibility ought to be judged at the time the product was made. In other words, if the question is whether a reasonably prudent manufacturer would not have marketed the product had he earlier been aware of the risk, evidence of later developments, such as alternate designs unavailable at the time of manufacture, might be used to identify the risk which is imputed to the maker's knowledge.[46] However, such later developments may have been impractical, overly costly or unknown at the time the product was conceived. In effect, the manufacturer might be judged not by the real state of the art at the time of manufacture but by a hindsight application of a development that was only futuristic at the critical period. For example, in the period where single circuit brakes were normally available, a dual circuit system may not have been ready for production purposes. Yet, in a case brought ten years later involving alleged failure of the older design, imputing backwards to the manufacturer mere knowledge of the risk of not having dual

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[44] *Id.* at 101. The court emphasized that a manufacturer must balance safety concerns "with the realities of a competitive market place." *Id.* If the defendant had manufactured the saw with a permanently attached blade guard, the product would not have been useful for many functions that could be accomplished on saws produced by competitors. *Id.*

[45] *See* note 34 *supra.*

[46] A recent topic of heated debate has been the admissibility of evidence of post-manufacture design change in products cases to prove "defect." *See* Caprara v. Chrysler Corp., 52 N.Y.2d 114, 417 N.E.2d 545, 436 N.Y.S.2d 251 (1981); Warner v. Upjohn, [1980] PROD. SAFETY & LIAB. Rep. (BNA) 628; Ault v. International Harvester Co., 13 Cal. 3d 113, 528 P.2d 1148, 117 Cal. Rptr. 812 (1975); Chart v. General Motors Corp., 80 Wis. 2d 91, 258 N.W.2d 680 (1977); UPLA § 107, Analysis, *reprinted in* 44 Fed. Reg. at 62,729-30. Commentators are divided over the fairness of holding manufacturers liable for dangerous characteristics that were unknowable at the time of manufacture. *Compare* Birnbaum, *supra* note 1, at 627, 648 *with* Twerski, *Corporations Face Dilemma in Rulings on Design v. Manufacturing Defects,* N.Y.L.J., Mar. 2, 1981, at 6, col. 2. It is apparent that a hindsight analysis may effectively eliminate defenses based upon state of the art factors and, therefore, is a further step in the direction of absolute liability.

circuit brakes might introduce to the jury a "false" state of the art factor. Because of this danger, as well as others, the legal standard for determining "defectiveness" is critical. Therefore, it appears vital under this test that mere evidence of possible alternative designs be deemed insufficient unless there is also a qualitative consideration of the practicality and feasibility of those alternatives.[47] One may logically conclude that, if design liability is not to become absolute and the jury is to properly consider real state of the art factors at the time of manufacture, the plaintiff must be required to demonstrate the prior practicality and feasibility of his proposed design alternative.

The Consumer Expectations Test

Some courts measure liability for design defect by using the safety expectations of ordinary consumers as an appropriate legal yardstick, either alone[48] or in combination with a risk/utility balancing.[49] Under this analysis, which is based upon the famous sec-

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[47] The majority view regards state of the art evidence as relevant in establishing the extent of the manufacturer's duty in the area of product design. O'Donnell, *Design Litigation and the State of the Art: Terminology, Practice and Reform,* 11 AKRON L. REV. 627, 646 (1978). Since the practical implications for a manufacturer when a design is held to be defective are considerable, the evidence to support the claim should be substantial. Plaintiffs should not be able to prove their allegations by mere verbal statements. *See, e.g.,* Blohm v. Cardwell Mfg. Co., 380 F.2d 341 (10th Cir. 1967); Self v. General Motors Corp., 42 Cal. App. 3d 1, 116 Cal. Rtpr. 575 (1974). Nevertheless, courts have been criticized for applying lax evidentiary standards, which unduly benefit claimants in products liability cases, *see* O'Donnell, *supra,* at 646, and for permitting plaintiff's technological experts to focus upon a narrow factor such as the availability of an alternative design. Donaher, Piehler, Twerski, Weinstein, *The Technological Expert in Products Liability Litigation,* 52 TEX. L. REV. 1303, 1311-12 (1974). Indeed, some courts have allowed cases to be submitted to the jury on the assumption that the expert's testimony is sufficient to create an issue of fact regardless of what the expert may have conceded during his testimony. *See, e.g.,* Melia v. Ford Motor Co., 534 F.2d 795 (8th Cir. 1976); Spurling v. General Motors Corp., 528 F.2d 612 (5th Cir. 1976); Nanda v. Ford Motor Co., 509 F.2d 213 (7th Cir. 1974); Self v. General Motors Corp., 42 Cal. App. 3d 1, 116 Cal. Rptr. 575 (1974). Since there may be a tendency of juries to apply post-accident hindsight to the facts, the court should "apply its screening function carefully." 44 Fed. Reg. at 62,723; *see* Owens v. Allis-Chalmers Corp., 83 Mich. App. 74, 268 N.W.2d 291 (1978); Wade, *supra* note 3, at 837-38.

[48] *E.g.,* Balido v. Improved Mach., Inc., 29 Cal. App. 3d 633, 640, 105 Cal Rptr. 890, 895 (1973); Aller v. Rodgers Mach. Mfg. Co., 268 N.W.2d 830, 840-41 (Iowa 1978); Meyers v. Meyers, 81 Wash. 2d 533, 503 P.2d 59 (1972). *Cf.* Two Rivers Co. v. Curtiss Breeding Serv., 624 F.2d 1242 (5th Cir. 1980) (custom as indicative of ordinary consumer expectations).

[49] Because of the fear that manufacturers might escape without liability for faulty designs where consumer expectations fall below the state of the art, some courts use consumer expectations as a threshold standard, with risk/utility balancing available as an alternative test. Caterpillar Tractor Co. v. Beck, 593 P.2d 871 (Alaska 1979); Barker v. Lull Eng'r Co.,

tion 402A of the Restatement of Torts, state of the art evidence is relevant on the issue of whether the product is "dangerous to an extent beyond that which would be contemplated by the ordinary consumer who purchases it, with the ordinary knowledge common to the community as to its characteristics."[50] A car with dual circuit brakes, for example, made when dual circuit brakes were simply not practicable or feasible to introduce into series production, could not have been expected to be possessed by the ordinary consumer. If design guilt were imposed under such circumstances the test would be imposing an absolute liability which no court currently sanctions.[51] Logically, an ordinary consumer cannot expect more safety than was technically and economically feasible at the time when the product was marketed. Thus, for example, in *Bruce v. Martin-Marietta Corp.*,[52] the court held that plaintiffs could not prove that the reasonable consumer "would expect a plane made in 1952 to have the safety features of one made in 1970."[53]

Consumer expectations should never induce courts to exact a higher standard from designers and engineers than is possible within the state of the art. Nevertheless, although the consumer expectations test is phrased in objective terms, it is questionable whether objectivity is achieved in practice.[54] Arguably, the test

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20 Cal. 3d 413, 573 P.2d 443, 143 Cal. Rptr. 225 (1978). Several courts fuse consumer expectations and risk/utility balancing into a single test. *See, e.g.*, Aller v. Rodgers Mach. Mfg. Co., 268 N.W.2d 830, 835-36 (Iowa 1978); Estate of Ryder v. Kelly-Springfield Tire Co., 91 Wash. 2d 111, 118, 587 P.2d 160, 164 (1978); Seattle-First Nat'l Bank v. Tabert, 86 Wash. 2d 145, 154, 542 P.2d 774, 779 (1975). One commentator suggests that employing this approach in product design cases combines conceptually dissimilar standards, thereby inviting "error and confusion." Birnbaum, *supra* note 1, at 617.

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

[51] Even where courts apply the *Barker* test, there probably would not be liability under these circumstances. *See* note 10 *supra*.

[52] 544 F.2d 442 (10th Cir. 1976). In *Bruce*, passengers and relatives of deceased passengers who were injured or killed in an airplane crash instituted suit against the manufacturer of the airplane and an intermediate seller. *Id.* at 444. The plaintiffs alleged that the defendants failed to design or maintain the plane in crashworthy condition—specifically they alleged inadequate seat fastenings and lack of protection against fire. *Id.* The Tenth Circuit, in affirming summary judgment for the defendants, declared that the plaintiffs' affidavit in which it was stated that "18 years after the manufacture and sale of the plane safer passenger seats were in use" in the industry was irrelevant for determining liability. *Id.* at 447.

[53] *Id.*

[54] The drafters of the Model Uniform Product Liability Act have stated that "[t]he consumer expectations test takes subjectivity to its most extreme end. Each trier of fact is likely to have a different understanding of abstract consumer expectations. Moreover, most consumers are not familiar with the details of the manufacturing process and cannot abstractly evaluate conscious design alternatives." 44 Fed. Reg. at 62,724. Dean Wade, *supra*

raises the possibility of arbitrary and inconsistent verdicts because of the likelihood that jurors, without instruction as to the proper significance of state of the art factors, may apply hindsight to evaluate what consumer expectations might have been at the time of the injury.[55]

Risk/Utility Balancing

One test used by some courts is a weighing of so-called "risk/utility factors."[56] The inquiry, in effect, is whether the utilitarian features or advantages of a particular design outweigh the dangers inherent in that design. In risk/utility weighing, the outcome may depend upon the importance attributed to the weighing factors. While the basic concept is accepted that the dangerous characteris-

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note 3, at 829, also has questioned the suitability of the consumer expectations test for design defect cases: "In many situations, particularly involving design matters, the consumer would not know what to expect, because he would have no idea how safe the product could be made." *Id. See also* Turner v. General Motors Corp., 584 S.W.2d 844, 851 (Tex. 1979); Green, *Strict Liability Under Sections 402A and 402B: A Decade of Litigation,* 54 TEX. L. REV. 1185 (1976). To compound the problem, it is not always clear whether the consumer's expectations are to be determined objectively by reference to community knowledge, or subjectively, by referring to the specialized knowledge of the consumer who sustained the injury. *See* Young v. Tide Craft, Inc., 270 S.C. 453, 471-72, 242 S.E.2d 671, 680 (1978) (subjective standard); Vincer v. Esther Williams All-Aluminum Swimming Pool Co., 69 Wisc. 2d 326, 332, 230 N.W.2d 794, 798-99 (1975) (objective standard). *See also* UTAH CODE ANN. § 78-15-6 (2) (1977) (implies use of subjective standard).

One commentator has described the "haphazard subjectivity" which is inherently a part of the consumer expectations test:

> When the defect is latent and the product complicated in design (as most products now seem to be), it cannot be said with any certainty that consumers know what to expect because they usually do not know how safely the product could or should have been made. If this proposition is true, . . . [h]ow, then, can jurors charged under a consumer expectations test make a determination of whether to impose liability? In all probability, they guess.

Birnbaum, *supra* note 1, at 614 (footnote omitted). *See also* Montgomery & Owen, *Reflections on the Theory and Administration of Strict Liability for Defective Products,* 27 S.C.L. REV. 803, 823 (1976).

[55] Different juries are free to evaluate consumer expectations on a case-by-case basis, each applying its own interpretation of what dangers would have been contemplated by consumers. Inconsistent verdicts regarding the same product design obviously can result. *Compare, e.g.,* Nichols v. Union Underwear, [1980] PROD. SAFETY & LIAB. REP. (BNA) 501, 503 (Ky.) *with* Weems v. CBS Imports Corp., [1980] 2 PROD. LIAB. REP. (CCH) ¶ 8781 (Or.).

[56] Dean Wade suggests the following risk/utility factors: the usefulness of the product; the likelihood it will cause harm; the availability of alternative designs; the ability of the manufacturer to eliminate the dangerous aspect of the product without damaging its utility; the ability of the user to prevent harm by exercising due care; the user's knowledge of the inherent dangers and the ability of the manufacturer to spread the loss by increasing the price.

tics of a product design must be balanced against its utility, the list of possible weighing factors differs among jurisdictions.[57] Thus, while juries in California[58] and Alaska[59] may be instructed to consider whether a proposed safer design might be unreasonably dangerous under other conditions, New Jersey courts have been silent regarding this point.[60] The suggestion has also been made that it is inappropriate for the trial judge to list specific factors to be considered when instructing the jury on risk/utility balancing.[61]

The difficulty of employing the risk/utility test in a manner which would provide objectivity and legal certainty to society is illustrated by the case of *Dawson v. Chrysler Corp.*[62] In *Dawson,* the plaintiff's automobile slid off a rain-soaked highway and struck a steel pole at a forty-five degree angle with such force that the automobile "literally wrapped itself around the pole."[63] The driver was crushed when the pole ripped through the body of the vehicle, pinning him between the seat and windshield.[64] At trial, the plaintiff alleged that the vehicle's design was defective because the frame did not have rigid structural reinforcements around the front and rear doors.[65] The defendant's experts established, in addition to compliance with federal safety standards, that the automobile involved was stronger than comparable vehicles of other manufacturers, and that its frame design would be safer than the alternative proposed by the plaintiff in most crashes.[66] Neverthe-

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[57] Wade, *supra* note 3, at 837-38.

[58] *See* Barker v. Lull Eng'r Co., 20 Cal. 3d 413, 433-34, 573 P.2d 443, 457-58, 143 Cal. Rptr. 225, 239-40 (1978).

[59] *See* Caterpillar Tractor Co. v. Beck, 593 P.2d 871 (Alaska 1979).

[60] *See* Cepeda v. Cumberland Eng'r Co., 76 N.J. 152, 386 A.2d 816 (1978) (applying Wade-Keeton factors); Suter v. San Angelo Foundry & Mach. Co., 81 N.J. 150, 406 A.2d 140 (1979). In *Suter,* although risk/utility factors had been offered in evidence at trial, the judge failed to instruct the jury as to their applicability to a finding of liability. *See id.* at 165, 406 A.2d at 147; Birnbaum, *supra,* note 1 at 626.

[61] Turner v. General Motors Corp., 584 S.W.2d 844, 851 (Tex. 1979); Wade, *supra* note 3, at 840. Dean Wade compares the strict liability factors with the Restatement analysis of negligence, in which risk-utility factors are identified. While these factors may be profitably used by judges, students, and commentators, they ordinarily should not be referred to in the instructions to the jury, unless one of the factors has special significance in light of the facts of the case. Wade, *supra* note 3, at 840.

[62] 630 F.2d 950 (3d Cir. 1980), *cert. denied,* 49 U.S.L.W. 3619 (U.S. Feb. 23, 1981).

[63] *Id.* at 953-54.

[64] *Id.* at 954.

[65] *Id.*

[66] *Id.* Chrysler's experts also testified that the design suggested by the plaintiff would add approximately $300 more to the cost of the vehicle and would add 200 to 250 pounds to the weight of the car. *Id.*

less, the jury returned a verdict of over two million dollars, which the Third Circuit reluctantly upheld, "with uneasiness regarding the consequences of our decision and the decisions of other courts throughout the country in cases of this kind."[67] While the *Dawson* jury, left with the task of weighing risk/utility factors, found that Chrysler should have produced a more rigid frame, this finding could conflict with a finding in another case that the same frame design was too rigid. As the Third Circuit opinion observed:

> In effect, this permits individual juries applying varying laws in different jurisdictions to set nationwide automobile safety standards and to impose on automobile manufacturers conflicting requirements. It would be difficult for members of the industry to alter their design and production behavior in response to jury verdicts in such cases, because their response might well be at variance with what some other jury decides is a defective design. Under these circumstances, the law imposes on the industry the responsibility of insuring vast numbers of persons involved in automobile accidents.[68]

While it cannot be denied that compensation for victims of product defects is a desirable social goal, the question becomes to what extent we should be willing to punish responsible design behavior in an entire industry in favor of the goal of individual compensation. A rationale of risk spreading, while arguably workable in the context of a mechanical defect, goes too far when applied to areas of design defects since the potential for liability appears to be limitless.[69] As has been pointed out by several commentators, the determination of such complex policy issues may even be beyond the function or ability of the judicial system.[70] It is nevertheless apparent that by submitting risk/utility factors to juries without an initial weighing by the judge, United States courts, in effect, permit the fact finder to redesign by hindsight entire product lines according to the unique circumstances surrounding individual injuries. The remarks of the *Dawson* court that the present arrange-

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[67] *Id.* at 962.

[68] *Id. See generally* Raleigh, *supra* note 18.

[69] *See* note 17 and accompanying text *supra*. The risk-spreading rationale as applied to design defect cases "provides no stopping point short of absolute liability." 44 Fed. Reg. at 62,722 (1979). Since an entire product line is impugned in design cases, the implementation of a predictable design standard based on fault would provide a better incentive to manufacturers to design safer products and supply some necessary stability in this area of products liability.

[70] *See* note 5 *supra*.

ment is not clearly "fair or efficient"[71] amounts to an attack on the present form of design claim resolution. The court's statement appears to have been prompted by the inability of the risk/utility weighing process to reach consistent and objective evaluations of product designs and, further, by the possible adverse impact of a case-by-case approach upon "other national social and economic goals" such as the requirement to produce a car that is heavier with less fuel efficiency, which might result from plaintiff Dawson's proposed redesign.[72]

Much of the problem appears to stem from the failure of courts to accord definitive and proper weight to the industry's state of the art at the time of manufacture as the basis for determining defect in a product's design.[73] An approach which considers the practical technological feasibility of allegedly safer alternatives[74] properly should be applied by the judge in the determination of whether the plaintiff has made out a prima facie case. Since many decisions hold a product design to be defective only if an ordinarily prudent company would not have marketed the product,[75] state of the art is an important implied consideration. A manufacturer would have been imprudent if his product was behind the state of the art. As stated by one court, "the distinction between so-called strict liability and negligence is of no practical significance" in design claims, because "in either event the standard required is reasonable care."[76] The latter standard, at least

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[71] 630 F.2d at 963.

[72] *Id.* at 962; *see* note 66 *supra.*

[73] For a discussion of the role of state of the art evidence in product liability litigation, *see* notes 30 & 31 *supra.*

[74] "State of the art" has received varying definitions, depending upon the viewpoint of the speaker. Claimants in product liability actions typically argue that state of the art encompasses the most advanced conceptual possibility in product design, without regard to practicality. Defendants, on the other hand, have urged that customary industry practice is the proper state of the art standard. The definition of state of the art employed in this Article falls between these two extremes, and considers both the feasibility and the practicality of proposed safer alternative designs. *See* note 33 *supra.*

[75] *See* note 34 *supra.*

[76] Nichols v. Union Underwear, 1980 PROD. SAFETY & LIAB. REP. (BNA) 501 (Ky.). The *Nichols* court made the following enlightened statements with respect to design defects:

> We think it apparent that when the claim asserted is against a manufacturer for deficient design of its product the distinction between the so-called strict liability principle and negligence is of no practical significance so far as the standard of conduct required of the defendant is concerned. In either event the standard required is reasonable care. Thus, the fact finder in a design case must decide whether the manufacturer that placed in commerce the product made according to an intended design acted prudently.

implicitly, involves consideration of the state of art. Thus, virtually all the American design defect tests would involve looking into the scientific knowledge, technical feasibility and economic practicality of the design when manufactured. The problem, however, is that the degree of objectivity and quality of this inquiry varies in actual practice.

STATE OF THE ART INFLUENCES UPON "UNAVOIDABLY DANGEROUS" PRODUCTS AND "DEVELOPMENT RISKS"

Two other design categories appear to naturally militate against liability because of state of art influences. First, in the case of "unavoidably dangerous" designs, liability is excluded for those useful products known to be unavoidably dangerous but which cannot be designed safer when made.[77] Here state of the art at time of manufacture precludes a safer design. Thus, if the necessary warnings have been given, liability is excluded. Second, state of the art influences are found in the category of so-called "development risks" where liability is denied because the product was associated with an *unknown* and *scientifically undetectable* danger at the time it was made.[78]

The development risk category should reach the same result of no liability regardless of which design test is employed.[79] Develop-

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Id.

[77] *See* RESTATEMENT (SECOND) OF TORTS § 402A, Comment k.

[78] *See* Owles, *What Does Development Risk Really Mean? How It Differs From the State of the Art*, 1980 PROD. LIAB. INT'L 199-200. Owles, however, does not clearly distinguish between "unreasonably dangerous products," where a risk is known but no feasible means exists to avoid it, and "development risk," where the risk is unknown and undetectable. In the United States, generally, this distinction is not clearly drawn, and development risk situations appear to be discussed under the label of unavoidably dangerous products.

[79] Regardless of the test applied by the court, state of the art considerations should preclude design liability where the product's dangers are unknown and scientifically undetectable at the time of production. Basic considerations of fairness dictate that liability should not be found where no safer alternative was practicably feasible at the time the product was marketed, *see* discussion of "Design Development Considerations and Time Factors" *supra*. These considerations logically should compel the same result regardless of whether the danger was "unavoidable" or "undetectable." In either case, the practical constraint upon the manufacturer is the same: he could not have acted more reasonably under the circumstances. This conclusion is viable under the consumer expectations test because nobody objectively can expect safer products than are scientifically feasible. Similarly, both the reasonably prudent manufacturer standard and the risk/utility analysis should exclude liability for development risk because the practical feasibility of a safer design must be considered in either test. If, however, this critical weighing factor were to be disregarded by the judge in some cases, development risk liability could be the result.

ment risk has been addressed perhaps more frequently by courts in cases where the question raised was whether a manufacturer has a duty to warn against the unknown.[80] One such case in Illinois involved a suit commenced on behalf of a child who was born disfigured due to an unknown side effect of a drug administered to the mother during delivery.[81] Plaintiff claimed strict liability for failure of the drug manufacturer to warn of the potential hazard. The Illinois Supreme Court stated that liability "for failure to warn of a danger which would be impossible to know based on the present state of human knowledge would make the manufacturer the virtual insurer of the product, a position rejected by this court."[82] The Illinois court thereby joined the American mainstream of decisions on development risk cases.[83] Guiding the court's result was its opinion that liability for failure to warn "should be based on

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[80] *See* note 20 *supra.*

[81] Woodill v. Parke Davis & Co., 1980 PROD. SAFETY & LIAB. REP. (BNA) 205 (Ill.). In *Woodill,* the suit was brought on behalf of a child who was born disfigured, allegedly because of an unknown side effect of a drug administered to the mother during delivery. The complaint, based on strict liability, charged the drug manufacturer with failure to give adequate warnings of the potential hazard. *Id.* The Illinois Supeme Court, without expressly saying so, made it the basis of its decision that the unknown side effect made the drug not defective as a matter of law. As stated by that court:

> To hold the manufacturer liable for failure to warn of a danger which would be impossible to know based on the present state of human knowledge would make the manufacturer the virtual insurer of the product, a position rejected by this court. . . . [W]here liability is framed by the manufacturer's duty to warn adequately of dangers which may arise from the use of a drug, that liability should be based on there being some manner in which to know of the danger.

Id. The Illinois Supeme Court thus made itself part of the mainstream of U.S. court decisions, which predicate the manufacturer's duty to warn upon the foreseeability of the risk and the seriousness of the potential harm. *See* note 83 *infra.*

[82] *Id.* at 207.

[83] The majority of American courts have refused to find that a duty to warn exists in cases where the risk was not discoverable within existing scientific knowledge. UPLA § 106, Analysis, 44 Fed. Reg. at 62,728, states:

> With the exception of one Illinois decision, "Cunningham v. MacNeal Memorial Hosp.," 47 Ill. 2d 443, 266 N.E.2d 897 (1970), *subsequently overruled* by "Ill. Ann. Stat." ch. 91, Sections 181-84 (Supp. 1979), this approach has been followed by the common law courts throughout the United States. *See, e.g.,* "Moore v. Underwood Memorial Hosp.," 147 N.J. Super. 252, 371 A.2d 105 (1977) (serum hepatitis contracted from blood supplied); "Dalke v. Upjohn Co.," 555 F.2d 245 (9th Cir. 1977) (tooth discoloration from tetracycline); "Chambers v. G.D. Searle & Co.," 441 F. Supp. 377 (D. Md. 1975) (stroke allegedly from birth control pills); "Coffer v. Standard Brands, Inc.," 30 N.C. App. 134, 226 S.E.2d 534 (1976) (shell in nuts); "Hines v. St. Joseph's Hospital," 86 N.M. 763, 527 P.2d 1075 (1974) (blood transfusion).

there being some manner in which to know of the danger."[84]

THE MODEL UNIFORM PRODUCT LIABILITY ACT

In recognition of the "uncertainties in the tort litigation" system, the Model Uniform Products Liability Act (UPLA)[85] rejects a strict liability standard for design defect and failure to warn cases.[86] The cost of product injuries will be borne by the manufacturer only upon a showing of fault or blameworthiness.[87] Specifically rejecting the consumer expectations test on the ground that it "takes subjectivity to its most extreme end," the UPLA adopts a risk/utility standard for determining whether a design is "unreasonably unsafe."[88] Unlike the risk/utility tests employed by some

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[84] Woodill v. Parke Davis & Co., 1980 PROD. SAFETY & LIAB. REP. (BNA) 205 (Ill.).

[85] United States Dep't of Commerce, UPLA *reprinted in* 44 Fed. Reg. 62,714 (1979).

[86] Analysis of § 104, at 62,722. The drafters found that strict liability was appropriate in only two types of product cases: manufacturing defect and breach of express warranty. Unlike these areas, in which damages can be predicted and absorbed by the liability insurance system, design defect and duty-to-warn involve uncertain standards which place entire product lines in jeopardy. *Id.*

[87] *See* 44 Fed. Reg. at 62,722. The drafters of the UPLA emphasize that:

> Product liability law is a branch of the law of torts. . . . Tort law is not a compensation system similar to Social Security or Worker Compensation. A product seller should not, through the medium of tort law, be asked to pay merely because its product caused an injury. If a social judgment is made that product sellers are to bear the costs of all injuries caused by their products, it would be far more efficient to make purchasers of products third-party beneficiaries of product sellers' insurance policies as is the case with other compensation systems. . . . In contrast, product liability law, with its full tort law recovery, reflects the social judgment that liability should be imposed only when it is fair to hold the individual product seller responsible for the injury.

44 Fed. Reg. at 62,715.

[88] *Id.* at 62,721. The judge must make a preliminary determination of whether the plaintiff introduced proof from which a jury reasonably could find, by a preponderance of the evidence, that the product was "unreasonably unsafe in design," UPLA § 104[2], or "unreasonably unsafe because adequate warnings or instructions were not provided," UPLA § 104[3]. 44 Fed. Reg. at 62,721. "The dangers of the trier of fact introducing hindsight into the risk-utility analysis make it imperative for the court to apply its screening function carefully." Analysis of § 104, *id.* at 62,723; *see* Owens v. Allis-Chalmers Corp., 83 Mich. App. 74, 268 N.W.2d 291 (1978). The UPLA lists the following factors which the jury may utilize in making an evaluation, once the initial weighing has been made by the judge:

> (a) Any warnings and instructions provided with the product,
> (b) The technological and practical feasibility of a product designed and manufactured so as to have prevented claimant's harm while substantially serving the likely user's expected needs;
> (c) The effect of any proposed alternative design on the usefulness of the product;
> (d) The comparative costs of producing, distributing, selling, using, and maintaining the product as designed and as alternately designed; and
> (e) The new or additional harms that might have resulted if the product had been

courts, however, the UPLA standard definitively identifies the influence of state of the art by clearly providing for consideration of the economic, scientific, and technological factors which contribute to any product design.[89] Thus, under the UPLA's balancing, the claimant must prove that the risk and the seriousness of the potential injury outweighed both the manufacturer's burden in designing a product that would not have caused the injury, and the adverse effect that proposed alternatives would have had on the product's utility.[90] Conversely, if the manufacturer's proof shows that it was not within practical technological feasibility to incorporate a safer design or provide warnings or instructions that would have prevented the harm, there will be no liability for design defect or failure to warn.[91] Significantly, the UPLA requires the judge to make the initial determination as to whether the plaintiff has introduced sufficient evidence for the case to reach the jury.[92] Moreover, only the knowledge that "was reasonably feasible for use in light of economic practicality *at the time of manufacture*" can be considered.[93] Because a qualitative state of the art inquiry is clearly man-

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so alternatively designed.
44 Fed. Reg. at 62,721.

[89] One factor which the jury may consider is state of the art evidence. 44 Fed. Reg. at 62,723. In design cases, such evidence includes: the technological and practical feasibility of producing a product which would have "prevented [the] claimant's harm while substantially serving the likely user's expected needs;" the effect of the alternative design on the product's usefulness; "costs of producing, distributing, selling, using, and maintaining the product" as compared to allegedly safer designs; and the harms which might have occurred had the alternative design been produced. § 104[B][2][b] to [e], 44 Fed. Reg. at 62,721. Probative state of the art evidence in duty-to-warn cases includes: the ability of the manufacturer to recognize the product's danger and the "technological and practical feasibility" of giving a warning. *Id.* § 104 [c][2][a] & [c]. In short, the claimant bears the burden of proving that "in light of a balance of practical, objective factors," the manufacturer should bear the cost of the injury. UPLA § 104, Analysis, 44 Fed. Reg. at 62,724.

[90] UPLA § 104, Analysis, 44 Fed. Reg. at 62,724.

[91] *See* note 89 *supra*. The UPLA definition of "practical technological feasibility" undertakes to resolve the controversy between consumer groups and product sellers over the role of state of the art in defining product "defect." UPLA § 107, Analysis, 44 Fed. Reg. at 62,729. Feasibility would require more than mere compliance with industry custom, thus alleviating the fear that manufacturers might be absolved of liability if the entire industry lagged behind in development. *Id.* at 62,730. Determining "feasibility," however, would also require the consideration of economic concerns "such as the ability of a product seller to price a product so that it is competitive . . . ." *Id.* The UPLA further provides that compliance with state of the art standards formulated by a legislative or administrative body would preclude a finding of design defect unless the claimant proves "that a reasonably prudent product seller would and could have taken additional precautions." *Id.* at 62,730-31.

[92] *See* note 88 *supra*.

[93] UPLA § 106, 44 Fed. Reg. at 62,727. This emphasis on practicality at the time of

dated, the UPLA provisions for design defect and failure to warn provide a more practical, objective standard which will permit manufacturers to anticipate the risk of liability for design defect, and thus serve as an incentive for responsible design behavior.[94] It remains to be seen whether the states will uniformly adopt this approach, which nevertheless seems to offer the prospect of stability as an alternative to the shifting and contradictory standards currently existing under American case law. Even if the states do not adopt the UPLA, their courts can nevertheless adopt the UPLA approach to requiring state of art evaluation via evolution of the common law. If the importance of state of the art is openly and properly recognized, as opposed to a mere implicit recognition, the various existing design tests described earlier will be much improved.

THE EUROPEAN COMMUNITY'S APPROACH

The articulation of common law design liability in the United States may be compared with the parallel effort being attempted in the European community[95] through a so-called "Draft Direc-

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manufacture carries over into the drafters' interpretation of the phrase "incapable of being made safe," which applies "when the danger cannot be avoided without seriously impairing the product's usefulness." *Id.* Section 106 follows the RESTATEMENT (SECOND) OF TORTS, § 402A, Comment k (1965); *see* note 20 *supra.* Under section 104[c], additionally, the jury would be charged "to place itself in the manufacturer's position at the time the product was manufactured . . . . [T]he duty to provide adequate warnings and instructions cannot go beyond the technological and other information that was reasonably available at the time of manufacture." 44 Fed. Reg. at 62,724. This view is in accord with a majority of United States courts. *See* Robbins v. Farmers Union Grain Terminal Ass'n, 552 F.2d 788 (8th Cir. 1977).

[94] UPLA § 106, Analysis, 44 Fed. Reg. at 62,727-28. The drafters suggest that sound policy dictates that products liability law should encourage research and development by manufacturers "without unleashing unreasonably unsafe products on the public." *Id.* at 62,728.

[95] In recent years, several European organizations have attempted to coordinate international developments in products liability law. In 1972, the Hague Conference on Private International Law adopted a convention on the issue of conflict of laws in product liability cases. Conférence de La Haye de droit international privé, Artes et documents de la douziéme session 2 au 21 octobre 1972, Tome III, Responsabilité du fait des produits, Acte final 246-50 (1974); *see* Reese, *Further Comments on the Hague Convention on the Law Applicable to Products Liability,* 8 GA. J. INT'L COMP. L. 311 (1978). Other European organizations have proposed measures to harmonize the substantive laws of their member nations in the area of products liability. In 1970, the Council of Europe, *see* 87 U.N.T.S. 103 (1951), formed a committee to prepare a draft to unify existing products liability law. It was completed in 1977. *European Convention on Products Liability in Regard to Personal Injury and Death,* [1977] Europ. T.S. 91, *reprinted in* 16 INT'L LEGAL MAT'LS 7 (1977) [hereinafter cited as *European Convention*]. It should be noted that the European Convention is

tive" proposed by the Commission of the European Communities.[96] In the European proposal a strict liability or "liability irrespective of fault" is being urged, but it is one in which state of the art factors, for example, are not being fully recognized or applied. There are major deficiencies in the Directive's provision of liability for development risks, in its definition of design defect, in its reliance on risk distribution as a rationale for design liability and in its failure to gear liability to the state of the art prevailing at the time of production. These deficiencies are of significance not only to European manufacturers but also to American producers who export their products to Europe. For example, an American manufacturer might be haled into a European court and saddled with a strict liability without fault for a design development risk unknown and undetectable to it at the time of manufacture. It is, therefore, desirable to briefly review the Directive's problem areas with a view to remedying them.

The Proposed Draft Directive

Apparently disregarding the American experience in struggling to articulate a strict liability for design and failure to warn, the European Commission proposes a strict liability across-the-board, without distinction between design and manufacturing defect claims, and even includes liability for development risks.[97] The

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not meant to supplant the existing national legal systems in Member countries, but merely gives plaintiffs a supplementary right of action. European Convention, art. 12. *But cf.* 39 CAMBRIDGE L.J. 263, 265-66 (1980) (article 10 of the Convention prohibits ratifying states from adopting rules derogating from the Convention even if the rules are more favorable to plaintiffs). In addition to the Council of Europe, the European Economic Community (E.E.C.), *see* 298 U.N.T.S. 11 (1957), has proposed a directive similar to the European Convention on liability for defective products. *See* note 96 *infra.*

[96] *Proposal for a Council Directive relating to the approximation of the laws, regulations, and administrative provisions of the Member States concerning liability for defective products,* 19 O.J. EUR. COMM. (no. C271) 3-4 (1979) [hereinafter cited as E.E.C. Directive]. An earlier version, published in 1976, is reprinted in Orban, *Product Liability: A Comparative Legal Restatement—Foreign National Law and the EEC Directive,* 8 GA. J. INT'L & COMP. L. 342, 396-406 (1978). This Article focuses on the E.E.C. Directive. For a discussion of the similarities and differences between the E.E.C. Directives and the European Convention, see H. TEBBENS, INTERNATIONAL PRODUCT LIABILITY 143-61 (1979). Unlike the European Convention, the E.E.C. Directive is not a voluntary standard, but derives from the "mandatory supranational authority of the EEC" to harmonize the laws of its member states. *Treaty Establishing the European Economic Community,* Mar. 25, 1957, Preamble, cl. 1, 298 U.N.T.S. 11, 14; Orban, *supra,* at 374.

[97] *See* E.E.C. Directive, *supra* note 96, art. 1(2), 4. In contrast, the majority of jurisdictions in the United States have not extended liability to development risks and have limited

Commission's reasons for its approach are stated in certain "whereas" clauses in the proposed Directive:[98]

> [A]n equal and adequate protection of the consumer can be achieved only through the introduction of liability irrespective of fault on the part of the producers of the article which was defective and caused the damage . . . .
> [L]iability on the part of the producer irrespective of fault ensures an appropriate solution to this problem in an age of increasing technicality, because he can include the expenditure which he incurs to cover this liability in his production costs when calculating the price and therefore divide it among all consumers of products which are of the same type but free from defects . . . .
> [L]iability cannot be excluded for those products which at the time when the producer put them into circulation could not have been regarded as defective according to the state of science and technology ("development risks"), since otherwise the consumer would be subjected without protection to the risk that the defectiveness of a product is discovered only during use.
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> . . . .
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> [T]o protect the person and property of the consumer, it is necessary, in determining the defectiveness of a product, to concentrate not on the fact that it is unfit for use but on the fact that it is unsafe; whereas this can only be a question of safety which objectively one is entitled to expect.
>
> . . . .
>
> [S]ince products age in the course of time, higher safety standards are developed and the state of science and technology progresses, it would be unreasonable to make the producer liable for an unlimited period for the defectiveness of his products . . . .[99]

It appears from the foregoing rationales that the Commission proposal has mistakenly understated the positive influence that fault principles play in achieving safer products,[100] overemphasized risk

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liability for design defects to those products whose safety features have not complied with the state of the art existing at the time of production. *See* note 26 and accompanying text *supra; see also* H. TEBBENS, INTERNATIONAL PRODUCTS LIABILITY 147-48, 161. Under the proposed Directive, however, liability for development risks exists "even if the article could not have been regarded as defective in the light of the scientific and technological development at the time when . . . put . . . into circulation." E.E.C. Directive, *supra* note 96, art. 1 (2).

[98] E.E.C. Directive, *supra* note 96, Preamble.

[99] *Id.*

[100] American case law demonstrates that negligence factors cannot be excluded in design defect and duty to warn cases. *See* note 9 *supra; see also* 47 Deutscher Juristentag in Neue Juristische Wochenschrift 2045, 2047 (1968) (the influential Deutsche Juristentag opposed the introduction of strict liability for development risks and was divided on the issue

spreading as applied to design cases,[101] over-reacted by imposing liability for "development risks,"[102] and omitted a true consideration of "state of the art" criteria.[103]

A Consideration of Risk Spreading and Fault Principles in Design Defect Litigation

The rationales suffer from a fundamental deficiency. The major goal stated in the "whereas" clauses is to achieve improved consumer protection by stressing the needs for safety and enlarging the consumer's ability to sue for damages.[104] While consumer pro-

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of strict liability as applied to manufacturing and design defects). It is significant that the UPLA has also rejected the imposition of strict liability in these areas. *See* 44 Fed. Reg. at 62,722.

[101] Risk spreading is only one factor to be considered among the complex social policy issues surrounding product liability. To the extent that risk-spreading theory inhibits design innovation, it must be viewed with caution. The introduction of strict liability as proposed in the Directive may prove to be detrimental to consumers by causing an increase in costs for damage compensation without affording victims of product related injuries better financial protection. von Hülsen, *The Status of Product Liability de lege lata and de lege ferenda in the Federal Republic of Germany and in Europe as seen by Industry*, in PRODUCT LIABILITY IN AIR AND SPACE TRANSPORTATION 41 (K.H. Böckstiegel ed. 1978). It also may lead to a fatalistic approach on the part of manufacturers in designing new products and provide less incentive to manufacturers to improve product design. *Id.*

[102] Article 1 of the proposed Directive includes development risks within the imposition of strict liability. Proposed E.E.C. Directive, *supra* note 96, art. 1(2). The E.E.C. Memorandum states:

> If these extremely rare cases of damages [development risks] were to be excluded from the producer's liability, the consumer would have to bear the risk of unknown defects. Here also only the principle of liability irrespective of fault can lead to a universally acceptable solution . . . .

E.E.C. Memorandum, para. 2 (1976).

[103] *See* notes 119-127 and accompanying text *infra*.

[104] The proposed Directive's preamble sets forth three main reasons for the need to unify the laws of Member States on products liability: one, to avoid unfair competition among producers in member countries resulting from differences in severity of product liability laws; two, to protect the free movement of goods among the members of the Common Market; three, to form a "common market for consumers" with equal protection against damages caused by defective products. Proposed E.E.C. Directive, Preamble. In the Explanatory Memorandum, the drafters note that consumer protection varies considerably as between the member nations and, in the majority, the consumer may be without protection if he is required to prove fault. *See* Proposed E.E.C. Directive, Memorandum, para. 1 (1976). Although the validity of the stated reasons given for the necessity for uniformity has been questioned, *see* Storm, *Introduction* to ASSOCIATION EUROPEENNE D'ETUDES JURIDIQUES ET FISCALES, PRODUCT LIABILITY IN EUROPE 20-21 (1975); VON HÜLSEN, *supra* note 101, at 38-39, there is disparity in the treatment of products liability law in the Member States, *see* H. TEBBENS, INTERNATIONAL PRODUCT LIABILITY 47-118 (1979), and some commentators favor some form of harmonization. *See, e.g.*, STORM, *supra*, at 19; Fleming, *Draft Convention on Products Liability (Council of Europe)*, 23 AM. J. COMP. L. 729, 729 (1975); Hanotiau, *The*

tection is certainly worth every endeavor, the "whereas" clauses quoted above actually raise fundamental questions as to whether the assumed premises on which the Directive is based are correct. Therefore, serious doubt exists that the goal is being achieved. Fundamental questions remain:

> (1) To what extent does a very strict products liability law provide incentives to improve safety?
> (2) Are higher burdens of manufacturer's liability really in the general interest and, if so, what level of burden should be imposed?
> (3) What principles, other than a mere desire to compensate injured persons, justify imposing the costs of damages on other persons who have behaved in a lawful and socially desirable manner?

Before these questions are answered, it must be noted that there are major factual differences between industrial manufacture and the design process.[105] The process of mass manufacture is a highly mechanized operation, as illustrated by the use of industrial robots and automatic welding. Failures and failure rates are calculable by reference to probabilities. In general, the growth of mechanization coupled with selective quality control methods based upon accepted mathematical laws permits, in most cases, the achievement of a high probability of defect-free production. The design process, on the other hand, has been and continues to be a creative activity, dependent, for the most part, upon individual value judgments. "Design" is *not* a mechanized process and, therefore, its outcome is much less calculable.[106]

Council of Europe Convention on Products Liability, 8 GA. J. INT'L & COMP. L. 325, 340 (1978).

[105] *See* notes 5, 6 & 17 and accompanying text *supra*.

[106] One theoretical basis for risk spreading in strict liability rests on the premise that the manufacturer can minimize the sum of two variables: cost of injury and cost of injury avoidance. Holford, *The Limits of Strict Liability for Product Design and Manufacture*, 52 TEX. L. REV. 81, 84 (1973). In the design area, however, the second variable is not easily achieved:

> It includes not one, but many variables, of which the dollar cost of altering the finished product may be the least significant. In the case of an automobile design change to achieve greater safety, for example, the costs may involve sacrifices, not only in price, but also in style and utility . . . . The manufacturer must . . . consider the cost of investment necessary to produce desired changes. . . . If, for example, an entire plant must be abandoned before its construction costs have been recovered, the expense may prevent the desired change. Finally, the manufacturer must consider the cost of gathering the information necessary to calculate the other costs.

Id. at 85 (footnote omitted).

Apart from the failure to make this necessary factual distinction, another major deficiency of the rationales stated in the Directive may be discerned. The "whereas" clauses, surprisingly, fail to mention that the design, manufacture, and distribution of products is not only a lawful and highly desirable activity but a general basis for modern man's existence. The traditional law of civilization is that lawful and responsible conduct by one person will not be punished by his obligation to pay compensation to another. This legal principle encourages socially desirable and beneficial behavior while discouraging unlawful behavior via the mechanism of the injured person's right to claim damages from the wrongdoer or tortfeasor. These dynamics function in the products liability field as well.[107]

The Draft Directive deviates from the basic approach. Instead of stating a rationale that encourages responsible design behavior, it emphasizes the theory of risk spreading.[108] While a risk-spreading rationale arguably has some value in connection with manufacturing defects which, by their nature are calculable, it is a totally insufficient basis for imposing a strict liability for design errors and development risks.[109]

The risk-spreading rationale appears to be so highly regarded because, upon first impression, it seems like an intelligent and purely economic approach to the problem of compensating injured persons. Indeed, it was mentioned in the California case which first adopted strict liability.[110] It is apparent upon closer evaluation, however, that "risk spreading" is an inappropriate rationale to apply to design activities.[111] The serious limitations of risk spreading

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[107] *See* Schwartz, *Introduction to Student Forum on the Model Uniform Product Liability Act*, 49 U. CIN. L. REV. 113, 115 (1980). Professor Schwartz stated:

> Product Liability Law, of course, is a branch of the law of torts. Tort law shifts the cost of an accident from a claimant to a defendant when the latter is deemed "responsible" for the claimant's injuries. Any party that drafts a product liability law has the burden to define that responsibility in terms that all can understand. Product liability should indicate why a particular product seller is sufficiently responsible that it, as opposed to society in general or the injured party, should bear the cost of that injury.

Id.

[108] *See* E.E.C. Directive, *supra* note 97, Preamble.

[109] *See* note 106 and accompanying text *supra*.

[110] *See* Greenman v. Yuba Power Prods., Inc., 59 Cal. 2d 57, 63, 377 P.2d 897, 901, 27 Cal. Rptr. 697, 701 (1962).

[111] Design cases do not involve the failure of one part out of many other identical parts to conform to the precise specifications set for that part. Rather, a design claim charges that a manufacturer's value judgment for the entire line of parts was wrong. *See* notes 5, 6 & 106

as an ultimate rationale for strict liability in design cases are evident from the very concept itself.[112] Moreover, if compensation by "spreading the risk" is the main objective, the theory would be equally valid in justifying compensation for all injuries caused by all products even if they were not defective.[113] This is because the manufacturer is the superior risk bearer regardless of the defectiveness of its product. Why, then, consider it as a selective rationale for defective products only?

To illustrate, the Commission's Explanatory Memorandum to the Proposed Directive clarifies that *known but unavoidable side effects* would create no liability if a proper warning was given.[114] However, in one of the "whereas" clauses liability would be imposed for *unknown side effects*—development risk liability.[115] If compensation via risk spreading is the key, why distinguish between the two circumstances? In both cases the person is injured while using the product and in both cases the manufacturer is the superior risk bearer. Yet liability is imposed in one situation and excluded in the other. Obviously, risk spreading does not adequately explain the difference in result.

In fact, risk spreading is a somewhat dangerous rationale to emphasize in the "whereas" clauses because judges who later have to construe the Directive will look to the underlying rationale contained therein to fathom just how strict the liability should be.

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and accompanying text *supra*.

[112] The risk spreading justification for the imposition of strict liability is that the manufacturer is the superior risk bearer because of his ability to obtain insurance and to spread the cost among consumers. *See* Proposed E.E.C. Directive, Preamble. In the area of design defects, however, the magnitude of the potential liability raises the question of whether a manufacturer can afford to insure himself even if insurance is available. *See* Gibson, *When Lawyers Prosper*, Forbes, Mar. 30, 1981, at 43; Hoenig, *Product Designs and Strict Tort Liability: Is There a Better Approach?*, 8 SW. U.L. REV. 109, 130 (1976). The small manufacturer may not be in a position to bear the costs of liability insurance with the result that he may be forced out of business. Thibault v. Sears, Roebuck & Co., 118 N.H. 802, 395 A.2d 843, 846 (1978). *See also* Henderson, *Manufacturers' Liability for Defective Product Design: A Proposed Statutory Reform*, 56 N.C.L. REV. 625, 627 & n.16 (1978).

[113] *See* Epstein, *Products Liability: The Search for the Middle Ground*, 56 N.C.L. REV. 643, 659-60 (1978); Hoenig, *supra* note 112, at 130. As Professor Epstein notes:

> If redistribution [of costs] is desired there is no reason why the law should retain the requirements of causation and product defect; to the extent that any defendant can rely upon those requirements to defeat a plaintiff's cause of action, this "policy" of tort law will be defeated. . . . One might as well say that any judgment for the defendant frustrates that policy.

Id. at 659-60.

[114] E.E.C. Memorandum, para. 13 (1976).

[115] *See* text accompanying note 99 *supra*.

Since risk spreading theory tends towards a liability for all damages that can mathematically be spread by superior risk bearers, it has a built-in inertia towards absolute liability.[116] It is common opinion, however, that absolute liability is to be avoided.[117]

Some other rationale, therefore, must be articulated to justify liability for a manufacturer's design choices. That other rationale can only be based upon some fault principle. In other words, there must be some yardstick for objectively measuring the appropriateness of a design decision so as to blame the manufacturer and make him pay for damages because the decision was a wrong one. A rationale based upon fault or objective blameworthiness has the advantage of offering a much more powerful incentive to design responsibility than a strict liability tending towards absolute liability. This is because the responsible manufacturer will be rewarded by a finding of no liability while the irresponsible one will be punished. Under a form of strict liability that approximates the absolute, both manufacturers will be punished when injury occurs. Therefore, we can conclude that a strict liability based solely upon risk spreading, as opposed to fault, actually discourages safer or more responsible designs.[118]

Another deficiency in the Draft Directive is the inadequate treatment of state of the art as an influential factor in gauging design responsibility. When the Commission says in the last "whereas" clause quoted above[119] that it would be unreasonable to make the producer liable for an unlimited period "because the state of science and technology progresses," there appears to be some hint that a retrospective, hindsight form of design liability should not be imposed. However, upon closer scrutiny, this hint of a restriction upon the extent of liability is really not based on state of the art considerations. The primary purpose behind this "whereas" clause is merely to justify an appropriate period of time beyond which there is claims exclusion—a kind of statute of limitations.[120] The Directive's proposed period for this purpose is ten

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[116] *See* Owen, *supra* note 15, at 707; Schwartz *supra* note 108, at 117.

[117] *See* note 17 and accompanying text *supra.*

[118] *See* note 101 *supra.*

[119] *See* text accompanying note 99 *supra.*

[120] The E.E.C. draft contains two time limitation periods. Article 8 allows a claimant to bring suit within three years of the date of damage or injury or when he "should reasonably have become aware of the damage, the defect and the identity of the producer." E.E.C. Draft Directive, art. 8. This is a relatively flexible standard favorable to a claimant, but it may hamper litigation because of its vagueness. *See* H. TEBBENS, *supra* note 96, at 152. The

years.[121] Thus, within the prescribed 10-year period, a product design could still be declared defective by a retroactive or hindsight test which relies upon technical solutions that only became known *after* manufacture but within the 10-year period. If the "whereas" clause is misinterpreted in this way, state of the art considerations obviously will not be given their proper role in restricting liability.[122] Statements made by the Commission in various parts of the Explanatory Memoranda, to the effect that a liability by hindsight should not be imposed, do not remedy the potential for misinterpretation deriving from the "whereas" clauses, since the latter are an integral part of the Draft Directive, while the Explanatory Memoranda are not.

A more substantial hint that state of the art has a logical role to play is the amended definition of "defect" contained in article 4 of the Directive. The amendment had added the portions which are italicized:

> A product is defective when, *being used for the purpose for which it is apparently intended,* it does not provide for persons or property the safety which a person is entitled to expect, *taking*

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second time limitation extinguishes the liability of a producer if an action is not brought within ten years from the date in which the product was first marketed. E.E.C. Draft Directive, art. 9. The drafters specifically noted that this provision was necessary to protect producers from "development risks" so that "an inordinately high risk" would not be imposed. *See* E.E.C. Directive, Memorandum, para. 28 (1976).

In line with a desire to facilitate the availability of insurance, the E.E.C. draft contains maximum monetary recoveries with a provision for periodic revision of the amounts recoverable. *See* E.E.C. Draft Directive, art. 7. *But cf.* E. KLINGMÜLLER, *Insurance Law and Product Liability* in PRODUCT LIABILITY IN AIR AND SPACE TRANSPORTATION 55, 65 (1978) (draft does not remove all the difficulties in calculating reasonable insurance premiums to meet actual market conditions).

[121] E.E.C. Directive, *supra* note 96, art. 9.

[122] That the imposition of a hindsight liability was not the intent of the Commission is shown by the Explanatory Memorandum which accompanied the 1976 version of the Draft Directive. E.E.C. Directive Memorandum, para. 13. The Memorandum indicates that under some circumstances the consumer bears a part of the risk. For example, when the consumer elects to use a drug that may cause an allergic reaction, the producer is liable "only where he has failed to point out such generally known risks in presenting his product . . . ." *Id.* Similarly, a person who chooses to use a worn product "runs a higher risk than someone who uses a brand new product" and "is not entitled to expect the same degree of safety . . . ." *Id.* In both of the foregoing examples, the Memorandum indicates that there will be no liability unless the defect existed when the product was first marketed. Moreover, the same considerations preclude liability "where safety regulations are tightened up after a product has been put into circulation," *id.*, or where post-manufacture design changes have been made, Official Commission Document, Com (79) 415 (1979), at 4. The consumer who then chooses to use such a product "does so at his own risk." E.E.C. Memorandum, para. 13 (1976).

> *into account all the circumstances, including the presentation and the time at which it was put into circulation.*[123]

Despite the supplementary language, article 4 continues to use one definition for manufacturing and design defects as well as for defective warnings and instructions.[124] It also continues to emphasize the consumer expectations test, a legal standard that is imprecise and subjective.[125] The words embodying the expectations test should be replaced with something indicating a more objective standard, for example, "legitimate safety requirements."

The amended portion at least declares that courts deciding design issues must take into account all the circumstances at the time the product was put into circulation. The only way this may be understood properly is to read into it the relevance of technical feasibility and economic practicability at the time the product is circulated. It would appear, therefore, that a product complying with the state of the art is not defective under article 4 of the Directive.[126] It may be said that the article 4 definition, as to design defects, approaches the rationale of objective blameworthiness.

The article 4 definition would also appear to cover the pertinence of scientific knowledge at the time of manufacture. Thus, if the product was made at a time when the risk was undetectable in light of the scientific knowledge then prevailing, there should be no finding of defect. The definition of defect may be said, therefore, to exclude liability for development risks. The serious problem is that this rationale conflicts with the statement in the "whereas" clauses that liability for development risks is not at all excluded from the Draft Directive.[127] This significant conflict has been noted by the British House of Lords.[128]

The Commission's intention to impose liability for dangerous aspects of products scientifically undetectable at the time the product was circulated stems from the Commission's attempt to

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[123] E.E.C. Directive, *supra* note 96, art. 4 (1979) (emphasis added.)

[124] *See id.* Since the definition of defect must be read in light of the accompanying explanatory reports to be fully understood, uniformity of application may not occur. H. TEBBENS, *supra* note 96, at 150.

[125] *See* notes 54 & 55 and accompanying text *supra*. *See also* H. TEBBENS, *supra* note 96, at 150.

[126] *See also* note 122 *supra*.

[127] *Compare* E.E.C. Directive, *supra* note 96, art. 4 (1979) *with id.*, Preamble.

[128] House of Lords Select Committee on the European Communities Liability for Defective Products (50th Report), Apr. 22, 1980; 2 PROD. LIAB. INT'L §§ 31-36, at 152-53 (1980). *See generally* 39 CAMBRIDGE L.J. 263 (1980).

characterize development risks as yet another form of product defect. The result is an irreconcilable conflict with the article 4 attempt to define design defect.[129] The Commission probably should have stated forthrightly that manufacturers' liability is being extended beyond defective products even to development risks for reasons of consumer protection. That this is indeed the Commission's intention is seen from a 1976 Explanatory Memorandum.[130] In fact, however, the Directive's article 1, paragraph 2 goes even further by stating that "[t]he producer shall be liable even if the article could not have been regarded as defective in the light of the scientific and technological development at the time when he put the article into circulation."[131] Article 1 may very well mean that a product design will be regarded as improper some years later when the state of the art has changed in the normal course of advancing technology. Taken literally, article 1, paragraph 2 therefore imposes a retroactive liability upon the manufacturer who complied with the state of the art at the time of manufacture. This contravenes the article 4 definition of defect, which obligates the court to take into account all circumstances at the time of circulation.[132]

Even if courts were to cure the inconsistency between the two provisions by only applying article 1, paragraph 2 to really undetectable development risks, the position taken in article 1 is inconsistent with general principles of products liability for defective products. It is unjustified and unfair because it constitutes an order to avoid the unavoidable. As shown above, even the risk-spreading rationale does not provide a basis for support.[133] Article 1's imposition of liability is also anti-innovative, since it stifles the incentive to develop new products. This is precisely the reason why the United States Government does not propose a liability for development risks in the Uniform Product Liability Act[134] and why American courts consistently reject such a liability.[135] For European industry, in particular, the matter is critical in light of industrial competition posed by Japan. European industry must stay

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[129] It should be noted that article 4 continues to use one single definition for manufacturing and design defects, as well as for "defective" warnings and instructions. *See* note 124 *supra*.

[130] *See* E.E.C. Memorandum, para. 2 (1976); note 102 *supra*.

[131] E.E.C. Directive, *supra* note 96, art. 1 (2) (1979) (emphasis added).

[132] E.E.C. Directive, *supra* note 96, art. 4 (1979); text accompanying note 124 *supra*.

[133] *See* notes 101, 106-113 and accompanying text *supra*.

[134] Note 86 *supra*.

[135] Note 26 *supra*.

competitive by innovating and maintaining a technological lead. A strict liability that later punishes a European manufacturer, despite its compliance with the state of the art of the time, frustrates the objective of promoting new development and puts the European manufacturer at a disadvantage. Japan, for example, is not at all likely to introduce liability for development risks.[136] Indeed, Japan does not even impose strict liability for design defects. Thus, a failure to give proper weight to state of the art factors may have an effect on prices, jobs, and international commerce that extends beyond the products liability arena.

One may well ask, however, what remedy then is available for the consumer who is injured by a product which only many years later proves to be dangerous? The answer to this question is the same as it has always been. Where consumers have no possibility to recover for damages they sustain, society so far has protected such persons by providing financial aid within a framework of ever-expanding social security.[137] This is already the appropriate and operative answer in Europe to "development risks."[138]

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[136] For a comparative analysis of products liability law in Japan and other countries, see Orban, *supra* note 96.

[137] It has been suggested that victims of damages caused by defective products should be compensated through social security benefits with a disallowance of subrogation against non-negligent manufacturers. *See* von Hülsen, *The Status of Product Liability de lege lata and de lege ferenda in the Federal Republic of Germany and in Europe as seen by Industry*, in PRODUCT LIABILITY IN AIR AND SPACE TRANSPORTATION 45 (K.H. Böckstiegel ed. 1978). For recent trends in this direction, see ASSOCIATION EUROPEENNE D'ETUDES JURIDIQUES ET FISCALES, PRODUCTS LIABILITY IN EUROPE 21, 50-51, 98-99 (1975). For the argument that national health insurance might alleviate the "product liability crisis" in America, see Orban, *supra* note 96, at 394-95.

Alternatively, if social policy mandates that compensation be provided for victims of design and development risks, other means are possible with a less drastic impact on design innovation. *See* O'Connell, *Elective No-Fault Liability by Contract—With or Without an Enabling Statute*, 1975 U. ILL. L.F. 59, 62-65; *see also* Keeton, *Products Liability*, 50 F.R.D. 338, 340 (1971). For a discussion of New Zealand's accident compensation plan, see Orban, *supra* note 96.

[138] The European Social Security system has, at times, been supplemented by further legislative action. As a result of the thalidomide experience, for example, special legislation was enacted in West Germany imposing liability on the pharmaceutical industry which sets a maximum amount of recovery per claimant per year. *See* Gesetz Zur Neuordnunz des Arzneimittelrechtes (Revised Pharmaceutical Law), Aug. 24, 1976, Bundesgesetzblatt (BGB) I 2445 (W.Ger.). *See also* H. TEBBENS, *supra* note 96, at 139-41. The creation of a special fund for development risks has been suggested by the European Parliament. Resolution of the European Parliament Apr. 26, 1979; *see* v. Hülsen, 1979 RIW/AWD, at 376. *See also* Massam, 1 PROD. LIAB. INT'L 162, 165 (1980), who favors a general fund for all product related injuries.

Repair of the Draft Directive

Among the changes that should be made in the Draft Directive are the following:

Article 1, paragraph 2 should exclude liability for development risks where the solution is and should be social security assistance. If the future indicates that something more is required, the creation of a special fund may be considered, as was suggested by the European Parliament.[139] Additionally, a definition of development risk must be devised which avoids confusion or potential conflict with the definition of design defects. Such a definition should cover only the instances where unacceptably dangerous aspects of a product were scientifically undetectable.

The definition of design defect must be phrased more objectively. The interests of consumers and manufacturers are better served by a standard of responsibility that provides the greatest legal certainty without becoming inflexible. In this respect the expectations test currently proposed promotes uncertainty and should be deleted. As has been demonstrated above, the most important factor to be considered in article 4's definition is the state of the art prevailing at the time a product was circulated. This should either be expressly mentioned in article 4 itself or a further "whereas" clause should be added to the official text of the Draft Directive perhaps along the following lines:

> Whereas the safety to be provided by the design of products and by necessary instructions and warnings shall be established in the light of the scientific knowledge, technical feasibility and economic practicability prevailing at the time the product was put into circulation.

Additionally, the "whereas" clause dealing with the risk-distribution rationale should be limited to manufacturing defects only.

If the foregoing changes are made to the "whereas" clauses, then, and only then, will the error in attempting to have one single definition for manufacturing, design and warning or instruction defects be partially remedied.

CONCLUSION

In the aftermath of the American development of strict tort liability there still remains some confusion about the rightful role

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[139] *See* note 138 *supra.*

of state of the art as a major factor that should properly influence the scope and extent of design liability. When the various evolved tests of product design liability are analyzed, it is seen that they either explicitly or implicitly refer to state of the art criteria to some extent. The best approach to date, however, is the explicit and objective proposal of the Model Uniform Product Liability Act where the relevant scientific, economic and technological factors at the time of manufacture must be considered. A standard of liability that is oriented around state of the art criteria is fair, promotes responsible behavior and product development, encourages research, and balances the need of the injured consumer to be compensated against the actual culpability of the manufacturer, as measured at the critical time of manufacture.

The parallel effort in Europe to state properly a law of products liability through a proposed Draft Directive, however, falls short of its goal primarily because it fails to accord state of the art its proper role in product design claims resolution. Incredibly, the Directive would even impose liability for development risks, though technically and scientifically undetectable at the time of manufacture. If the Directive is going to responsibly meet the true objectives of products law, rather than merely act to compensate the injured, it will require a number of changes. Among the foremost is the recognition that design liability must be based upon fault and limited by state of the art factors prevailing at the time of manufacture.