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Design Defects

David G. Owen*

I. INTRODUCTION

The concept of design defectiveness lies at the heart of products liability law. A product's design concept predetermines the extent to which use of the product will result in human injury, and modern products liability law rests fundamentally on the premise that manufacturers are fairly held to answer in the courts for the basic safety of their products' designs. Yet judicial oversight of a manufacturer's design choices is a relatively new phenomenon. Design defect claims under any theory of liability were infrequently entertained by courts early in the twentieth century,¹ and only in recent decades have courts begun to adjudicate with any frequency the reasonableness of product designs in accident litigation.

Finding an acceptable definition for what constitutes a "defective" design is a difficult task. Elusive as an elf, the true meaning of "design defect" has largely escaped capture by court or commentator, and the search therefor leads inexorably to consternation and confusion. The quest for understanding design defectiveness perennially vexes courts² and accomplished products

* Carolina Distinguished Professor of Law, University of South Carolina. Another version of this article appears in DAVID G. OWEN, PRODUCTS LIABILITY LAW ch. 8 (2d ed. 2008), © Thomson/West 2008. Research and editorial help was provided by Karen Miller. The article is dedicated to Professor David Fischer whose scholarship on tort law generally, and products liability law in particular, has advanced these fields immeasurably.

1. For a small handful of early examples, see Fleming James, Jr., *Products Liability* (pt. 1), 34 TEX. L. REV. 44, 50 (1955).

2. For the views of Chief Justice Roger Traynor, who argued for, adopted, and explained strict products liability in tort, see *Escola v. Coca Cola Bottling Co.*, 150 P.2d 436, 461-68 (Cal. 1944) (Traynor, J., concurring), *Greenman v. Yuba Power Prods., Inc.*, 377 P.2d 897 (Cal. 1963), and Roger J. Traynor, *The Ways and Meanings of Defective Products and Strict Liability*, 32 TENN. L. REV. 363 (1965). Judicial confusion over design defectiveness was not just a phenomenon of early products liability law. From the 1970s, see, for example, *Phillips v. Kimwood Mach. Co.*, 525 P.2d 1033, 1035 (Or. 1974) ("courts continue to flounder while attempting to determine how one decides whether a product is 'in a defective condition unreasonably dangerous to the user'"). From the 1980s, see, for example, *Prentis v. Yale Mfg. Co.*, 365 N.W.2d 176, 182 (Mich. 1984) ("questions related to 'design defects' and the determination of when a product is defective, because of the nature of its design, appear to be the most agitated and controversial issues before the courts in the field of products liability"). From the 1990s, see, for example, *Denny v. Ford Motor Co.*, 662 N.E.2d 730, 739, 740 (N.Y. 1995) (Simons, J., dissenting) ("the word 'defect' has no clear legal meaning"). From the 2000s, see, for example, *Jarvis v. Ford Motor Co.* 283 F.3d 33, 63 (2d Cir. 2002) (N.Y. law) (noting "the unsettled nature of the law in

liability lawyers³ attempting to unravel design defect problems; delights law clerks,⁴ young associates,⁵ and law students⁶ furnishing them with an occasion to display their erudition; and provides fertile grist for law professors⁷

this area"); *Pritchett v. Cottrell, Inc.*, 512 F.3d 1057, 1063 (8th Cir. 2008) (Kan. and Mo. law) (“the determination of when a product is actionable because of the nature of its design” is one of “the most agitated controversial question[s]” that courts face in the field of products liability law”); *Blue v. Env’t Eng’g, Inc.*, 828 N.E.2d 1128, 1153 (Ill. 2005) (three judges specially concurring, one judge concurring in part and dissenting in part). See also Robert P. Murrian, *Products Liability – Tennessee’s Prudent Manufacturer Test*, 67 TENN. L. REV. 307 (2000) (article written by a magistrate judge).

3. For a small sampling of the large literature on design defectiveness written by the practicing bar, see, for example, Philip H. Corboy, *The Not-So-Quiet Revolution: Rebuilding Barriers to Jury Trial in the Proposed Restatement (Third) of Torts: Products Liability*, 61 TENN. L. REV. 1043, 1087-99 (1994); Warren Freedman, “Defect” in the Product: The Necessary Basis for Products Liability, 33 TENN. L. REV. 323 (1966); Paul Rheingold, *The Risk/Utility Test in Product Cases*, 18 TRIAL L.Q. 49 (Summer/Fall 1987) [hereinafter Rheingold, *Risk/Utility Test*]; Paul Rheingold, *What are the Consumer’s “Reasonable Expectations”?*, 22 BUS. LAW. 589 (1967); Victor E. Schwartz & Rochelle M. Tedesco, *The Re-Emergence of “Super Strict” Liability: Slaying the Dragon Again*, 71 U. CIN. L. REV. 917 (2003); John F. Vargo, *The Emperor’s New Clothes: The American Law Institute Adorns a “New Cloth” for Section 402A Products Liability Design Defects – A Survey of the States Reveals a Different Weave*, 26 U. MEM. L. REV. 493 (1996).

4. See, e.g., Peter J. Ausili, *Ramifications of Denny v. Ford Motor Co.*, 15 TOURO L. REV. 735 (1999) (law clerk to Eastern District of New York Judge Wexler); Elizabeth C. Price, *Toward a Unified Theory of Products Liability: Reviving the Causative Concept of Legal Fault*, 61 TENN. L. REV. 1277, 1319-25 (1994) (law clerk to Fifth Circuit Court of Appeals Judge King); Robert F. Thompson, *The Arkansas Products Liability Statute: What Does “Unreasonably Dangerous” Mean in Arkansas?*, 50 ARK. L. REV. 663 (1998) (law clerk to Eighth Circuit Court of Appeals Chief Judge Arnold); Frank J. Vandall & Joshua F. Vandall, *A Call for An Accurate Restatement (Third) of Torts: Design Defect*, 33 U. MEM. L. REV. 909 (2003) (Joshua Vandall law clerk to Chatham County Judge Ginsberg).

5. See, e.g., Schwartz & Tedesco, *supra* note 3 (Tedesco); Matthew R. Wilmot, *Baseball Bats in the High Tech Era: A Products Liability Look at New Technology, Aluminum Bats, and Manufacturer Liability*, 16 MARQ. SPORTS L. REV. 353 (2006).

6. The law reviews are filled with hundreds of student commentaries on the meaning of defectiveness in products liability law. Perhaps the most valuable student work was a two-part article, prepared by Richard Wilson for his LL.M. thesis under the supervision of Dean William Prosser and Professor Albert Ehrenzweig at the University of California, Berkeley. See Richard G. Wilson, *Products Liability* (pts. 1 & 2), 43 CAL. L. REV. 614, 809, 810-35 (1955) (exploring the meaning of product defectiveness).

7. For early excursions by the law professors into the quagmire of design defectiveness, see, for example, Reed Dickerson, *Products Liability: How Good Does a Product Have to Be?*, 42 IND. L.J. 301 (1967); James A. Henderson, Jr., *Judicial Review of Manufacturers’ Conscious Design Choices: The Limits of Adjudication*, 73

aspiring for the renown that accompanies discovery of the key to any riddle wrapped in a mystery inside an enigma.⁸

Just as strict liability in tort is the dominant liability theory in major products liability litigation, design defectiveness is the dominant claim in

COLUM. L. REV. 1531, 1534, 1538 (1973); Page Keeton, *Products Liability – Current Developments*, 40 TEX. L. REV. 193, 210 (1961) [hereinafter Keeton, *Current Developments*]; Page Keeton, *Products Liability: Liability Without Fault and the Requirement of a Defect*, 41 TEX. L. REV. 855 (1963) [hereinafter Keeton, *Liability Without Fault*]; John W. Wade, *Strict Tort Liability of Manufacturers*, 19 SW. L.J. 5 (1965) [hereinafter Wade, *Strict Tort Liability*]; John W. Wade, *On the Nature of Strict Tort Liability for Products*, 44 MISS. L.J. 825, 837-38 (1973) [hereinafter Wade, *On the Nature*] (setting forth his famous seven factors). At a very early date, Professor Karl Llewellyn referred to design defects in defining “defect” in Revised Uniform Sales Act § 1(b) cmt. b (2d draft 1941), cited in Richard G. Wilson, *Products Liability* (pt. 2), 43 CAL. L. REV. 809, 810 n.7 (1955).

For a sampling of recent additions to the ever-burgeoning literature on design defects from legal academics, see, for example, C. JOHN MILLER & RICHARD S. GOLDBERG, *PRODUCT LIABILITY* ch. 11 (2d ed. 2004) (British law); Mary J. Davis, *Design Defect Liability: In Search of a Standard of Responsibility*, 39 WAYNE L. REV. 1217 (1993); Michael D. Green, *The Schizophrenia of Risk-Benefit Analysis in Design Defect Litigation*, 48 VAND. L. REV. 609 (1995); James A. Henderson, Jr. & Aaron D. Twerski, *Closing the American Products Liability Frontier: The Rejection of Liability Without Defect*, 66 N.Y.U. L. REV. 1263 (1991); Douglas A. Kysar, *The Expectations of Consumers*, 103 COLUM. L. REV. 1700 (2003); Keith C. Miller, *Myth Surrenders to Reality: Design Defect Litigation in Iowa*, 51 DRAKE L. REV. 549 (2003); David G. Owen, *Toward a Proper Test for Design Defectiveness: “Micro-Balancing” Costs and Benefits*, 75 TEX. L. REV. 1661 (1997) [hereinafter Owen, *Toward a Proper Test*]; David G. Owen, *Defectiveness Restated: Exploding the “Strict” Products Liability Myth*, 1996 U. ILL. L. REV. 743 [hereinafter Owen, *Defectiveness Restated*]; Jerry J. Phillips, *The Unreasonably Unsafe Product and Strict Liability*, 72 CHI.-KENT L. REV. 129 (1996), reprinted in 72 TENN. L. REV. 833 (2005); Gerald F. Tietz, *Strict Products Liability, Design Defects and Corporate Decision-Making: Greater Deterrence Through Stricter Process*, 38 VILL. L. REV. 1361 (1993); Aaron D. Twerski, *Chasing the Illusory Pot of Gold at the End of the Rainbow: Negligence and Strict Liability in Design Defect Litigation*, 90 MARQ. L. REV. 7 (2006); Frank J. Vandall, *The Restatement (Third) of Torts, Products Liability, Section 2(b): Design Defect*, 68 TEMP. L. REV. 167 (1995); Vandall & Vandall, *supra* note 4; Richard W. Wright, *The Principles of Product Liability*, 26 REV. LITIG. 1067 (2007).

Professor David Fischer propitiously began his long career of distinguished legal scholarship with an insightful article on design defectiveness, published in this journal, David A. Fischer, *Products Liability – The Meaning of Defect*, 39 MO. L. REV. 339 (1974), followed five years later with another important design defect article, David A. Fischer, *Products Liability – Functionally Imposed Strict Liability*, 32 OKLA. L. REV. 93 (1979).

8. Design defectiveness in the 2000s may be somewhat less inscrutable than was Russia in the late 1930s, but Winston Churchill’s inimitable characterization nevertheless seems apt.

most major products liability cases.⁹ Manufacturer design determinations involve a multitude of safety-related choices, including decisions on the types and strengths of raw materials and component parts, the manner in which such materials and parts are combined, whether safety devices will be included, and the overall product concept. A frequent claim of design defectiveness is the absence of some type of adequate safety device, such as a sufficient housing surrounding a power lawnmower,¹⁰ a mechanical guard or electrical interlock cut-off device on a dangerous machine,¹¹ or a “safety” on a gun.¹² Much automotive products liability litigation challenges the design of motor vehicles, including the extent to which their designs are sufficiently “crashworthy” to provide their occupants adequate protection in the event of a crash.¹³ In addition to such typical design danger claims, numerous other forms of design hazards may give rise to claims of defectiveness – such as allergenic latex gloves, fabrics not treated with flame-retardant chemicals, drain cleaners comprised of unnecessarily caustic chemicals, products whose moving parts are made of metal too soft to last throughout the product’s useful life, tampons that are too absorbent, coffee that is too hot, raw asbestos

9. An insurance industry study of large claims (in excess of \$100,000) some time ago revealed that strict liability design defects was the principal claim in 75% of such cases. See LAWRENCE W. SOULAR, A STUDY OF LARGE PRODUCT LIABILITY CLAIMS CLOSED IN 1985 (1986) (a joint study of the Alliance of American Insurers and the American Insurance Association).

10. See, e.g., *Thibault v. Sears, Roebuck & Co.*, 395 A.2d 843 (N.H. 1978) (strict tort action against manufacturer of rotary lawn mower for injuries from slipping under mower that rear trailing guard could have prevented).

11. See, e.g., *Burke v. Spartanics, Ltd.*, 252 F.3d 131 (2d Cir. 2001) (N.Y. law) (no rear guard on metal shearing machine); *Gould v. Rexon Indus. Corp.*, No. 3:05-CV-374, 2006 WL 2301852, at *3 (N.D.N.Y. Aug. 8, 2006) (table saw designed with removable blade guard); *Daley v. Gemini Bakery Equip. Co.*, 643 N.Y.S.2d 106 (App. Div. 1996) (safety interlock on dough dividing machine would have turned machine off when door was opened); *Knitz v. Minster Mach. Co.*, No. L-84-125, 1987 WL 6486 (Ohio Ct. App. Feb. 09, 1987) (interlock gate guard on press would have prevented ram from descending on operator’s hand).

12. See, e.g., *Sturm, Ruger & Co. v. Day*, 594 P.2d 38 (Alaska 1979), *modified on other grounds*, 615 P.2d 621 (Alaska 1980); *Halliday v. Sturm, Ruger & Co.*, 792 A.2d 1145 (Md. 2002).

13. See, e.g., *Connelly v. Hyundai Motor Co.*, 351 F.3d 535 (1st Cir. 2003) (N.H. law) (child killed by deployment of front-seat airbag); *Gen. Motors Corp. v. McGee*, 837 So. 2d 1010 (Fla. Dist. Ct. App. 2002) (fuel tank vulnerable to impact, fuel leakage, and fire); *Shipler v. Gen. Motors Corp.*, 710 N.W.2d 807 (Neb. 2006) (passenger rendered quadriplegic when vehicle’s roof crushed inward in rollover accident). Automotive products liability litigation is treated in DAVID G. OWEN, PRODUCTS LIABILITY LAW ch. 17 (2d ed. 2008).

comprised of toxic fibers, and tell-tale mechanical heart valves that emit excessive noise.¹⁴

In the early stages of modern products liability law, courts commonly viewed the notion of product “defectiveness” as embracing a single principle applicable to any type of case.¹⁵ As products liability law has matured,¹⁶ however, most courts¹⁷ and commentators¹⁸ have come to understand that

14. *See, e.g.*, *Bravman v. Baxter Healthcare Corp.*, 984 F.2d 71 (2d Cir. 1993) (N.Y. law) (noisy mechanical heart valve); *Toner v. Lederle Labs.*, 828 F.2d 510 (9th Cir. 1987) (Idaho law) (DPT vaccine should have been formulated in safer manner); *Apels v. Murjani Int'l Ltd.*, No. 83-1546, 1986 WL 122176 (D. Kan. Aug. 27, 1986) (composition of blouse fabric, 80% cotton and 20% polyester, excessively flammable); *Drayton v. Jiffee Chem. Corp.*, 395 F. Supp. 1081 (N.D. Ohio 1975) (formulation of drain cleaner as 26% lye unnecessarily caustic), *modified*, 591 F.2d 352 (6th Cir. 1978); *Morson v. Superior Court*, 109 Cal. Rptr. 2d 343 (Ct. App. 2001) (same); *Arena v. Owens-Corning Fiberglas Corp.*, 74 Cal. Rptr. 2d 580 (Ct. App. 1998) (toxic raw asbestos dust inhaled by naval shipyard worker); *West v. Johnson & Johnson Prods., Inc.*, 220 Cal. Rptr. 437 (Ct. App. 1985) (extra-high absorbency tampons caused toxic shock syndrome); *Hilliard v. A.H. Robins Co.*, 196 Cal. Rptr. 117 (Ct. App. 1983) (Dalkon Shield IUD, with multifilament tail string, facilitated migration of bacteria into uterus); *Strothkamp v. Chesebrough-Pond's, Inc.*, No. 60645, 1993 WL 79239 (Mo. Ct. App. Mar. 23, 1993) (failure to childproof box of cotton swabs); *Boyer v. Empiregas, Inc. of Chillicothe*, 734 S.W.2d 828 (Mo. Ct. App. 1987) (inadequately odorized propane gas exploded); *Nadel v. Burger King Corp.*, 695 N.E.2d 1185 (Ohio Ct. App. 1997) (175° coffee caused second degree burns); *Green v. Smith & Nephew AHP, Inc.*, 629 N.W.2d 727 (Wis. 2001) (allergic reactions to latex gloves possessing excessive levels of proteins and other toxic chemical substances).

15. *See* OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, ch. 5. Some early commentators recognized that design and manufacturing defects were conceptually distinct (and warning defects to a lesser extent, because such defects were sometimes viewed as a subset of design defectiveness), but such commentators generally viewed the classification as having little or no doctrinal significance. *See, e.g.*, James, *supra* note 1, at 49 (“It is not suggested that this dichotomy [between design and manufacturing defects] has any automatic or uniform legal significance.”). *See generally* OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 6.2.

16. Although the distinctive nature of design, manufacturing, and warning defects was overlooked by many courts and commentators during the burst of excitement surrounding the adoption of strict products liability in tort, both the *First* and *Second Restatements of Torts* so divided the cases in the law of negligence. *See* RESTATEMENT (SECOND) OF TORTS § 388 (1965) (duty to warn); *id.* § 395 (manufacturing flaws); *id.* § 398 (dangerous design).

17. Some courts still appear to miss this point. *See, e.g.*, *Urena v. Biro Mfg. Co.*, 114 F.3d 359, 365 (2d Cir. 1997) (N.Y. law) (Plaintiff’s evidence that “design was unreasonably dangerous because it lacks adequate warnings and instructions was un rebutted. He therefore survives summary judgment on his design defect claim.”); *Sperry-New Holland v. Prestage*, 617 So. 2d 248 (Miss. 1993).

18. Some commentators also appear to miss this point. *See, e.g.*, Corboy, *supra* note 3, at 1089-92; Jerry J. Phillips, *Achilles’ Heel*, 61 TENN. L. REV. 1265, 1267-70 (1994); Price, *supra* note 4, at 1319-25; Marshall S. Shapo, *In Search of the Law of*

meaningful evaluation of the acceptability of a product's dangers logically turns on considerations that vary contextually depending upon whether the problem was one of manufacture, design, or the absence of sufficient warning.¹⁹ Early in the evolution of products liability law, observers recognized that determining how and why a design danger should or should not be characterized as "defective" was at once the most important and baffling problem in this entire field of law.²⁰ For this reason, much of the search for a general definition of "product defect" was in fact a search for the meaning of defectiveness in design,²¹ as explored below.

Determining how to evaluate the acceptability or defectiveness of a product's design is difficult in part because a product's design is the essence of what the manufacturer decides to make and sell. A manufacturing defect is truly a mistake, one that results from some fault in the production process whereby a particular product deviates from the manufacturer's own "blueprint" specifications of the intended and correct design. Quite to the contrary, a charge that a product is defective in design challenges those very specifications on the ground that the design engineers, in their conceptual rendition of the product, failed to take safety into adequate account. Consequently, challenging a product's design challenges the decision of the manufacturer's engineers and managers to develop and sell a product containing a particular type and level of danger. Thus, unlike a manufacturing defect claim, which implicates merely a single product unit, a design defect claim challenges the integrity of the entire product line and so pierces to the very core of the manufacturer's enterprise. For this reason, design defect claims are of greatest concern to manufacturers, since a judicial declaration that the design of a particular product is "defective" condemns the entire product line.

Judicial evaluations of manufacturer design decisions encounter other difficulties, too. Far more than in manufacturing and warning defect cases, design cases require courts to second-guess a manufacturer's analyses of consumer market preferences. Some commentators have challenged the propriety of courts displacing multi-faceted engineering and managerial determinations of this type with judicial fiat rendered in the litigation arena.²² Be that as it may, courts around the nation have come to adjudicate the sufficiency of product designs on a regular basis.

Products Liability: The ALI Restatement Project, 48 VAND. L. REV. 631, 659-60 (1995).

19. See OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 6.2.

20. For early law journal discussions of this point, see *supra* note 7.

21. See David G. Owen, *The Evolution of Products Liability Law*, 26 REV. LITIG. 955 (2007) [hereinafter Owen, *Evolution*].

22. See, e.g., Richard A. Epstein, *The Risks of Risk/Utility*, 48 OHIO ST. L.J. 469 (1987); Henderson, *supra* note 7, at 1534, 1538 (characterizing such decisions by manufacturers as "polycentric" and "managerial"); Peter Huber, *Safety and the Second Best: The Hazards of Public Risk Management in the Courts*, 85 COLUM. L. REV. 277 (1985).

This Article examines the tests of design defectiveness developed by the courts, particularly in applying the doctrine of *Restatement (Second) of Torts* § 402A. The *Third Restatement's* definition of design defectiveness is examined in Part VIII.²³

II. THEORIES AND TESTS OF LIABILITY

Manufacturers and other sellers²⁴ are subject to liability for defective design under each of the major theories of liability. Thus, as is true with respect to other types of defects, product suppliers are subject to liability in negligence, for negligently making and selling products that are defectively designed;²⁵ in implied warranty, for selling products that are not fit for their ordinary purposes, and hence “unmerchantable,” because they are defectively designed;²⁶ and in strict liability in tort for simply selling products that are defective in design.²⁷

Regardless of the theory of liability, whether a design is “defective” is typically the central issue in litigation associated with a product’s design. Indeed, the *Products Liability Restatement* proposes that liability in such cases be grounded solely on the notion of product defect rather than on tradi-

23. Other topics of particular interest in design defect litigation include: special considerations in design defect litigation concerning optional safety devices; drugs and medical devices; automotive crashworthiness; how a warning may affect a manufacturer’s duty of safe design; expert testimony and other considerations involved in proof of defect; product misuse; and certain limitations on design defect liability, such as obvious dangers, generic risks, state of the art, and product deterioration. These topics are examined in OWEN, *PRODUCTS LIABILITY LAW*, *supra* note 13, §§ 8.9, 8.10, 17.3, 6.2, 6.3, 6.4, 13.5, and ch. 10.

24. Some jurisdictions partially immunize retailers and other non-manufacturers from liability for design defectiveness and other forms of strict liability. See OWEN, *PRODUCTS LIABILITY LAW*, *supra* note 13, § 15.2.

25. See, e.g., *Calles v. Scripto-Tokai Corp.*, 864 N.E.2d 249, 263-64 (Ill. 2007) (utility lighter not child-resistant); *Shipler v. Gen. Motors Corp.*, 710 N.W.2d 807 (Neb. 2006) (negligent design of roof structure that collapsed in rollover accident); *Phillips v. Cricket Lighters*, 841 A.2d 1000 (Pa. 2003) (butane lighter not child-resistant).

26. See, e.g., *Smith v. DaimlerChrysler Corp.*, No. Civ. A. 94C-12-002JEB, 2002 WL 31814534 (Del. Super. Ct. Nov. 20, 2002) (automobile); *Haglund v. Philip Morris Inc.*, 847 N.E.2d 315, 322-23 (Mass. 2006) (cigarettes); *Denny v. Ford Motor Co.*, 662 N.E.2d 730 (N.Y. 1995) (Bronco II).

27. See, e.g., *Flock v. Scripto-Tokai Corp.*, 319 F.3d 231 (5th Cir. 2003) (Tex. law) (same); *Calles, v. Scripto-Tokai Corp.*, 864 N.E.2d 249, 263-64 (Ill. 2007) (utility lighter not child-resistant); *Vautour v. Body Masters Sports Indus.*, 784 A.2d 1178 (N.H. 2001) (leg press machine with fixed stops); *McCathern v. Toyota Motor Corp.*, 23 P.3d 320 (Or. 2001) (SUV rollover).

tional theories of liability such as negligence and strict liability in tort.²⁸ Strict liability in tort, of course, is defined principally in terms of a product's "defectiveness."²⁹ Yet proof of a defect in a product's design is just as important in cases brought in negligence inasmuch as a manufacturer hardly can be at fault for selling a product with a *safe* design, a design that is *not* defective.³⁰ Moreover, in the great majority of states, and even in most cases brought in the Empire State,³¹ proving that a product design is dangerously unmerchantable under UCC § 2-314 amounts to precisely the same thing as proving that the product is "defective" (or "unreasonably dangerous") under *Restatement (Second) of Torts* § 402A.³²

28. See RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2 cmt. n (1998) (recommending that, because design claims rest on a risk-utility assessment regardless of doctrinal label, courts should not risk inconsistent verdicts by submitting such claims to juries on different causes of action, whether negligence, implied warranty, or strict liability in tort). At least one state supreme court agrees. See *Wright v. Brooke Group Ltd.*, 652 N.W.2d 159, 169 (Iowa 2002) ("We question the need for or usefulness of *any* traditional doctrinal label in design defect cases because, as comment *n* points out, a court should not submit both a negligence claim and a strict liability claim based on the same design defect since both claims rest on an identical risk-utility evaluation. Moreover, to persist in using two names for the same claim only continues the dysfunction engendered by section 402A. Therefore, we prefer to label a claim based on a defective product design as a design defect claim without reference to strict liability or negligence.").

29. See OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 5.3.

30. See *id.* §§ 2.1, 5.9.

31. *Denny v. Ford Motor Co.*, 662 N.E.2d 730 (N.Y. 1995), held that a product not defectively designed for purposes of strict products liability in tort could nevertheless be unmerchantable for purposes of UCC § 2-314(2). Yet even *Denny* recognized that in most cases the two standards will produce precisely the same result: "As a practical matter, the distinction between the defect concepts in tort law and in implied warranty theory may have little or no effect in most cases." *Id.* at 738. On *Denny*, see OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 5.9.

32. Or under RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2(b) (1998). See *infra* Part VIII. Courts often recite the virtual or complete equivalence of the warranty and tort law standards of liability: "[T]o bring an action in implied warranty for personal injury a plaintiff is required to show product unmerchantability sufficient to avoid summary judgment on the issue of defectiveness in a tort strict products liability suit." *Larsen v. Pacesetter Sys., Inc.*, 837 P.2d 1273, 1284-85 (Haw. 1992), *amended by*, 843 P.2d 144 (Haw. 1992); see also *State Farm Fire & Cas. Co. v. Miller Elec. Co.*, 562 N.E.2d 589 (Ill. App. Ct. 1990); *Virgil v. Kash N' Karry Serv. Corp.*, 484 A.2d 652, 656 (Md. Ct. Spec. App. 1984):

To recover on either theory – implied warranty or strict liability – the plaintiff in a products liability case must satisfy three basics from an evidentiary standpoint: (1) the existence of a defect, (2) the attribution of the defect to the seller, and (3) a causal relation between the defect and the injury.

In considering the concept of design defectiveness, it is crucial to remember that a manufacturer's liability for harm from a product's design characteristics, even if labeled "strict," is not absolute. As the strict manufacturer liability principles of *Greenman v. Yuba Power Products, Inc.*³³ and *Restatement (Second) of Torts* § 402A spread across the nation in the 1960s and 1970s,³⁴ courts and commentators searched mightily for standards or "tests" of liability that would stop liability well short of absolute.³⁵ Although early test formulations generally failed to distinguish between the various forms of defect, most of the early cases struggling with the meaning of defectiveness involved dangers in design.³⁶ Consequently, the evolution of early strict liability tests generally involved a search for appropriate methods for separating product designs that were adequately safe from those that were not.

All courts judge the adequacy of a product's design upon one of two basic standards, or some combination thereof: (1) the "consumer expectations" test – whether the design meets the safety expectations of users and consumers, and/or (2) the "risk-utility" test – whether the safety benefits of designing away a foreseeable danger exceed the resulting costs. The following section examines § 402A's original test, the consumer expectations test. The fundamentals of the risk-utility test are then considered in Part IV, which explores the appropriate factors weighed in a risk-utility balance. Part V next inquires into the critical role of feasible design alternatives in risk-utility decision-making. The blending by some courts of the consumer expectations and risk-utility tests is investigated in Part VI; the Wade-Keeton prudent-seller hind-

See also *Gumbs v. Int'l Harvester, Inc.*, 718 F.2d 88 (3d Cir. 1983) (V.I. law); *accord* *Voelkel v. Gen. Motors Corp.*, 846 F. Supp. 1468, 1475-76 (D. Kan. 1994) (for implied warranty, strict products liability, and negligence). Their equivalence is stated by U.C.C. § 2-314, cmt. 7 (2003) ("When recovery is sought for injury to person or property, whether goods are merchantable is to be determined by applicable state products liability [tort] law."). *See* OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, §§ 4.3, 5.9.

33. 377 P.2d 897 (Cal. 1963).

34. *See* OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 5.2.

35. *See* OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 5.3. *Phillips v. Kimwood Machine Co.*, 525 P.2d 1033 (Or. 1974), may have said it best. Noting that the "courts continue to flounder while attempting to determine how one decides whether a product is 'in a defective condition unreasonably dangerous to the user,'" the court observed:

The problem with strict liability of products has been one of limitation. No one wants absolute liability where all the article has to do is to cause injury. To impose liability there has to be something about the article which makes it dangerously defective without regard to whether the manufacturer was or was not at fault for such condition. A test for unreasonable danger is therefore vital.

Id. at 1035-36.

36. *See* OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 5.3.

sight test, based on constructive knowledge of a product's design dangers, is explored in Part VII; and the *Products Liability Restatement's* treatment of the design defect concept is examined in Part VIII.

III. THE CONSUMER EXPECTATIONS TEST

The consumer expectations test was the first standard for evaluating design defectiveness, and it remains a persistent, if embattled, liability test in at least certain types of design defect cases in many states.³⁷ In searching for a test for design defectiveness, courts first turned to the definitions of the liability standard, "defective condition unreasonably dangerous," provided in the *Restatement* itself. *Restatement (Second) of Torts* § 402A comment g defines the first half of the liability standard, "defective condition," as follows:

The rule stated in this Section applies only where the product is, at the time it leaves the seller's hands, in a condition not contemplated by the ultimate consumer, which will be unreasonably dangerous to him.

Comment *i* defines the other half of the liability standard, "unreasonably dangerous":

The article sold must be 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.

Because "defective condition" and "unreasonably dangerous" are both defined as dangerous beyond a consumer's contemplations, most courts apply-

37. "The consumer expectations test for design defectiveness has become products liability's version of the rule against perpetuities: a doctrine nearly universally reviled but stubbornly and inexplicably persistent." Kysar, *supra* note 7, at 1701; see also John Neely Kennedy, *The Role of the Consumer Expectations Test Under Louisiana's Products Liability Tort Doctrine*, 69 TUL. L. REV. 117, 162 (1994); Rebecca Korzec, *Dashing Consumer Hopes: Strict Products Liability and the Demise of the Consumer Expectations Test*, 20 B.C. INT'L & COMP. L. REV. 227 (1997); Joseph W. Little, *The Place of Consumer Expectations in Product Strict Liability Actions for Defectively Designed Products*, 61 TENN. L. REV. 1189 (1994); William A. Masters, *The Consumer Expectation Test: A Concept in Search of Meaning*, 73 DEF. COUNS. J. 22 (2006); Jerry J. Phillips, *Consumer Expectations*, 53 S.C. L. REV. 1047 (2002); Schwartz & Tedesco, *supra* note 3; Ellen Wertheimer, *The Biter Bit Unknowable Dangers, the Third Restatement, and the Reinstatement of Liability Without Fault*, 70 BROOK. L. REV. 889 (2005). For citations to additional commentary, see OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 5.6 n.1.

ing § 402A in the 1960s and 1970s concluded that design defectiveness under § 402A should be tested according to a standard of product safety gauged by “consumer expectations.”³⁸

Roughly two centuries in the past, warranty law broke away from the tort law action of deceit and migrated to the law of contracts, a field of law that seeks at bottom to protect the reasonable expectations of the contracting parties.³⁹ Warranty law sensibly protects consumer expectations predictably generated by a manufacturer’s representations about its products, both express and implied.⁴⁰ When the Reporter for the *Restatement (Second) of Torts*, Dean William Prosser, was drafting § 402A in the late 1950s and early 1960s, virtually all of the scant case authority for strict manufacturer liability for injuries to remote consumers from the sale of defective products had been decided under the law of warranty. The strongest authority for the new tort doctrine was a long line of cases involving defective food products, a context in which the law has long protected consumer expectations with special vigilance. So it was only natural that Dean Prosser would define strict products liability in the same consumer expectations terms that supported the warranty law cases that served as his authority for the new tort doctrine. And it was also only natural for the courts, in beginning to apply the new doctrine to design defect cases in the early days of strict products liability in tort, to adopt the warranty-based definition of liability provided in the comments to § 402A.⁴¹

Although most modern courts have abandoned consumer expectations as the predominant test for design defectiveness,⁴² some courts still use this test

38. See *supra* note 37. For examples of early decisions defining § 402A’s “defective condition unreasonably dangerous” in the consumer expectations terms of comments g and i, see, for example, *Lunt v. Brady Mfg. Corp.*, 475 P.2d 964 (Ariz. Ct. App. 1970); *Rosignol v. Danbury Sch. of Aeronautics, Inc.*, 227 A.2d 418 (Conn. 1967); *Dunham v. Vaughan & Bushnell Mfg. Co.*, 247 N.E.2d 401 (Ill. 1969); *Vincer v. Esther Williams All-Aluminum Swimming Pool Co.*, 230 N.W.2d 794 (Wis. 1975).

39. See 1 A. CORBIN, CORBIN ON CONTRACTS 2 (1993 rev. ed.) (“the law of contracts attempts the realization of reasonable expectations”). On the warranty law background of strict products liability in tort, see OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 5.2.

40. See, e.g., *Denny v. Ford Motor Co.*, 662 N.E.2d 730, 736 (N.Y. 1995) (warranty law, originating in the law of contracts, “directs its attention to the purchaser’s disappointed expectations”); *Markle v. Mulholland’s Inc.*, 509 P.2d 529, 532, 534 (Or. 1973). See generally David G. Owen, *The Moral Foundations of Products Liability Law*, 68 NOTRE DAME L. REV. 427, 462-65 (1993) [hereinafter Owen, *Moral Foundations*]; Marshall S. Shapo, *A Representational Theory of Consumer Protection: Doctrine, Function and Legal Liability for Product Disappointment*, 60 VA. L. REV. 1109, 1370 (1974). On warranty law under the Uniform Commercial Code, see OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, ch. 4.

41. For an examination of this history, see OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, ch. 5.

42. See *id.*

in design defect cases⁴³ and some version of the test is statutory in a small number of states.⁴⁴ Although the consumer expectations standard was conventionally viewed as more protective to plaintiffs than the risk-utility standard,⁴⁵ courts have used the consumer expectations test most frequently to deny recovery to plaintiffs in cases involving obvious design hazards.⁴⁶

43. See, e.g., *Crump v. Versa Prods., Inc.*, 400 F.3d 1104, 1108 (8th Cir. 2005) (Mo. law) (“A product is ‘actionable if dangerous to an extent beyond that which would be contemplated by the ordinary consumer, who either purchases it or uses it, with the ordinary knowledge common to the community as to its characteristics.’”); *Liggett Group, Inc. v. Davis*, No. 4D04-3811, 2007 WL 2935236 (Fla. Dist. Ct. App. Oct. 10, 2007); *Calles v. Scripto-Tokai Corp.*, 864 N.E.2d 249, 256 (Ill. 2007) (explaining the consumer expectations prong of the Illinois two-pronged standard: “a plaintiff may prevail if he or she demonstrates that the product failed to perform as any ordinary consumer would expect”); *Griffin v. Suzuki Motor Corp.*, 124 P.3d 57, 63 (Kan. 2005) (while evidence on the feasibility of an alternative design may be considered, “the final test is one of consumer expectations”); *Donegal Mut. Ins. v. White Consol. Indus., Inc.*, 852 N.E.2d 215, 221 (Ohio Ct. App. 2006) (for consumer expectations standard of former statute, consumer does not expect setting an electric stove to self-clean mode will cause a fire); *Green v. Smith & Nephew AHP, Inc.*, 629 N.W.2d 727, 755 (Wis. 2001) (consumer expectations test appropriate for proof of latex glove’s defectiveness based on ordinary consumer’s ignorance that gloves could cause allergic reaction). See also *Wheeler v. John Deere Co.*, 935 F.2d 1090 (10th Cir. 1991) (Kan. law), which affirmed a judgment for a farm worker against the manufacturer of a combine for injuries to his arm which occurred when he reached into the combine’s auger to remove a residual buildup of grain. On the consumer expectations issue, plaintiff had ten other farm workers, each of whom had also lost portions of their arms in augers of this model combine, testify “as to unexpected danger when, in the process of manual cleanout, the auger suddenly was engaged while the engine was running.” *Id.* at 1095. Moreover, plaintiff’s expert in farm machinery design, a mechanical engineer, testified “that the combine was more dangerous than anticipated by ordinary consumers.” *Id.* at 1100. The court held that both forms of proof of consumer expectations were acceptable. For earlier cases, see, for example, *Lester v. Magic Chef, Inc.*, 641 P.2d 353 (Kan. 1982); *Rahmig v. Mosley Mach. Co.*, 412 N.W.2d 56 (Neb. 1987); *Woods v. Fruehauf Trailer Corp.*, 765 P.2d 770 (Okla. 1988).

44. A statute in North Dakota explicitly defines “unreasonably dangerous” in consumer contemplation terms. See *Endresen v. Scheels Hardware & Sports Shop, Inc.*, 560 N.W.2d 225, 233 (N.D. 1997). Statutes in Oregon and South Carolina embrace the consumer contemplations standard indirectly, by incorporating the comments to § 402A, including comment g and i. See *McCathern v. Toyota Motor Corp.*, 23 P.3d 320, 329-32 (Or. 2001). And a Tennessee statute defines “unreasonably dangerous” alternatively in both consumer contemplations and prudent manufacturer terms. See *Ray v. BIC Corp.*, 925 S.W.2d 527, 529 (Tenn. 1996). The statutes are: N.D. CENT. CODE § 28-01.3-01(4) (1993); OR. REV. STAT. § 30.920 (1979); S.C. CODE ANN. § 15-73-30 (1974); TENN. CODE ANN. § 29-28-102(8) (1978); see also UTAH CODE ANN. § 78-15-6(2) (1977) (setting forth a two-pronged test).

45. See, e.g., Phillips, *supra* note 18; Shapo, *supra* note 18. However, the plaintiff’s bar appears to recognize the weaknesses in the consumer expectations test. See

One of the few cases applying the consumer expectations standard to *allow* a design defect claim is *Jarke v. Jackson Products*,⁴⁷ which involved a welder's claim against the manufacturer of a welding mask. The plaintiff was injured while squatting beneath an object he was welding overhead, with his head cocked to one side, when some molten metal dropped from above onto his mask, rolled down to the mask's side rim, which channeled it into his ear. The complaint alleged that the mask was defectively designed (1) because it did not provide ear guards to protect a user's ears and (2) because the mask's overall configuration, including its side rim, could channel molten metal into a user's ears. Reasoning that the danger to a user's ears was obvious, the trial court granted the defendant manufacturer's motion for summary judgment, and the plaintiff appealed. Although the appellate court agreed that the obvious absence of an ear guard precluded a finding of design defectiveness under the consumer expectations test on that particular ground, it reversed and remanded on the issue of whether an ordinary person would understand that the mask's design itself created the means for molten slag to be channeled into a user's ear.⁴⁸

It will be recalled that the consumer expectations test is an *objective* test based on the average, normal, or "ordinary" expectations of a reasonable user or consumer.⁴⁹ Usually that person, whether a user or consumer, will be the

Frank J. Vandall, *The Restatement (Third) of Torts: Products Liability Section 2(b): The Reasonable Alternative Design Requirement*, 61 TENN. L. REV. 1407 (1994).

46. *See, e.g.*, *Bourne v. Marty Gilman, Inc.*, 452 F.3d 632 (7th Cir. 2006) (Ind. law) (risk that aluminum goalpost might snap and fall dangerously when Ball State students rushed on field and climbed on post to celebrate football victory); *Brown v. Sears, Roebuck & Co.*, 328 F.3d 1274, 1282-83 (10th Cir. 2003) (Utah law) (ordinary and prudent user would expect danger to toddler standing behind riding mower operated in reverse); *Crosswhite v. Jumpking, Inc.*, 411 F. Supp. 2d 1228, 1231 (D. Or. 2006) ("an ordinary consumer buys and uses a trampoline to jump on it, and a design that allows for such activity is exactly that which is contemplated by an ordinary consumer or user"); *Vineyard v. Empire Mach. Co.*, 581 P.2d 1152, 1155 (Ariz. Ct. App. 1978) (absence of rollover bar on large earth-moving scraper, which rolled over and crushed operator's leg, not a danger beyond consumer's expectations since its absence was "immediately evident"); *Menard v. Newhall*, 373 A.2d 505, 507 (Vt. 1977) (plaintiff's eye put out in BB gun fight: "A BB gun which is neither defectively designed nor manufactured is not dangerous beyond that which would be contemplated by the ordinary consumer A warning by the defendant Daisy that a BB gun, if fired at a person, could injure an eye, is nothing that even a seven-year-old child does not already know.").

47. 631 N.E.2d 233 (Ill. App. Ct. 1994).

48. *Id.* at 239.

49. Comment *i* is phrased in terms of the "ordinary" consumer "with the ordinary knowledge common to the community." *See, e.g.*, *Calles v. Scripto-Tokai Corp.*, 864 N.E.2d 249, 255 (Ill. 2007) ("Under the consumer-expectation test, a plaintiff must establish what an ordinary consumer purchasing the product would expect about the product and its safety. This is an objective standard based on the average, normal, or ordinary expectations of the reasonable person; it is not dependent upon the subjective

person placed at risk by the product's design danger.⁵⁰ However, purchasers and users sometimes control product risks to other persons. In such cases, when one person (such as a parent or a doctor) purchases a product with particular dangers or uses a product in a manner that injures a person under his or her control (such as the parent's child or the doctor's patient), the law normally looks to the expectations of the risk controller rather than to those of the victim.⁵¹

The utility of the consumer expectations test is severely compromised when design dangers are obvious.⁵² Because consumers acquire their safety and danger expectations most directly from a product's appearance, obvious dangers – such as the risk to human limbs from an unguarded power mower or industrial machine – are virtually always contemplated or expected by the user or consumer who thereby is necessarily unprotected by the consumer expectations test, no matter how probable and severe the likely danger nor how easy and cheap the means of avoiding it. In such cases, the buyer gets what he or she paid for, or the user engaged a danger that he or she expected, so that the risk of injury shifts to the buyer or user who chose to accept it,⁵³ or to a third-party victim who had no say in the matter at all.⁵⁴ Thus, while the consumer expectations test protects the autonomy of buyers and users by shielding them from unexpected harm, the flip side of this test requires users and consumers to be ever vigilant and take responsibility for the harmful consequences of their choices about risk. And a dire consequence of the consumer expectations test, unless its plain consequences are baldly ignored,⁵⁵ is

expectation of a particular consumer or user.”). *See generally* OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 5.6.

50. *See* OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 5.6.

51. *See, e.g., Calles*, 864 N.E.2d at 256 (plaintiff's 3-year-old daughter used utility lighter to start fire in which she died; because ordinary consumer of a lighter is an adult, the safety expectations about such a product “must be viewed from the point of view of the adult consumer”).

52. On obvious dangers generally, *see* OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 10.2.

53. Such as a teenager paralyzed from attempting a flip on a trampoline. *See Crosswhite v. Jumpking, Inc.*, 411 F. Supp. 2d 1228, 1231 (D. Or. 2006). But using the expectations of younger users becomes problematic. *See, e.g., Bunch v. Hoffinger Indus., Inc.*, 20 Cal. Rptr. 3d 780, 796 (Ct. App. 2004) (affirming jury award of \$12 million to child rendered quadriplegic after diving into shallow above-ground pool; “the danger of diving into a shallow aboveground pool is not open and obvious to an 11 year old as a matter of law”).

54. Such as a toddler run over by a riding lawn mower. *See Brown v. Sears, Roebuck & Co.*, 328 F.3d 1274, 1282-83 (10th Cir. 2003) (Utah law).

55. Courts do on occasion baldly disregard the logically inescapable impact of an obvious design danger on the consumer expectations test. *See, for example, Hansen v. New Holland North America, Inc.*, 574 N.W.2d 250 (Wis. Ct. App. 1997), where the plaintiff's hand was caught and injured in the mechanism of a hay baler while he was trying to cut away a buildup of hay on the rollers with a jackknife. The trial court

that it effectively rewards manufacturers for failing to adopt cost-effective measures to remedy obviously unnecessary dangers to human life and limb.⁵⁶ The failure of the consumer expectations test to deal adequately with the obvious danger problem profoundly weakens the usefulness of this test and effectively disqualifies it for principled use⁵⁷ as the sole basis for determining defects in design.⁵⁸

Another significant limitation on the usefulness of consumer expectations as a liability standard in design cases concerns the vagueness of a consumer's expectations concerning most complex designs.⁵⁹ For example, consumers comprehend that automobiles are not completely crashproof, but they have no meaningful expectations as to the extent to which a vehicle may be compromised in the event of a collision at substantial speeds. The consumer expectations test thus was held to be an invalid gauge of design defectiveness in one case where a large rock hit the wheel of a vehicle traveling on the highway,⁶⁰ in another where the driver's airbag deployed and broke her jaw

dismissed the plaintiff's design defect claim on the ground that the danger of placing one's hands near the moving mechanism presented an obvious danger which precluded recovery under the consumer expectations test. Reversing and remanding, the court held that the plaintiff had presented a jury question on whether an average user would have fully appreciated the risk:

[F]ocusing solely on the user's conduct will frustrate public policy considerations underlying product liability law. A danger that is open and obvious to a consumer is equally apparent to the manufacturer. Concentrating only on the user's conduct ignores the manufacturer's responsibility for producing that danger, and indeed creates an incentive for manufacturers to ensure that hazards are in fact open and obvious, possibly minimizing needed safeguards and exposure to liability for designing dangerous products.

Id. at 254.

56. *See, e.g.,* Chaney v. Hobart Int'l, Inc., 54 F. Supp. 2d 677, 681 (E.D. La. 1999) ("As dangerous as the meat grinder may have been without a feed pan guard, it was clearly 'not dangerous to an extent beyond that which would be contemplated by the ordinary user.' The possibility of injury is glaring.").

57. True, this test may be distorted to avoid the harsh results of its principled application. *See* Phillips, *supra* note 37, at 1049 (characterizing as "semantic" the consumer expectations test's foreclosure of relief to persons injured by obvious dangers).

58. *See id.* In switching from the consumer expectations test to the risk-utility standard in 1993, the Mississippi Supreme Court noted that its conversion to risk-utility permitted it to reject the patent danger rule which inhered in the consumer expectations test. *See* Sperry-New Holland v. Prestage, 617 So. 2d 248, 256 n.4 (Miss. 1993).

59. *See* W. PAGE KEETON, DAN B. DOBBS, ROBERT E. KEETON & DAVID G. OWEN, PROSSER AND KEETON ON THE LAW OF TORTS § 99, at 699 (5th ed. 1984). *But see* Phillips, *supra* note 37, at 1052-61 (consumer expectations can be based on risk-utility, informed by experts, as in the *Potter* case, discussed *infra* Part VI).

60. *Heaton v. Ford Motor Co.*, 435 P.2d 806 (Or. 1967).

in a low-speed collision,⁶¹ and in another where the passenger compartment collapsed in upon the driver's feet in a near head-on collision.⁶² In such cases, the ordinary user of a vehicle "simply has 'no idea' how it should perform in all [such] situations."⁶³ For this reason, some courts that use the consumer expectations test limit the applicability of the test to cases involving simple, rather than complex, product designs and accident mechanisms, as examined in detail below.⁶⁴

Some courts⁶⁵ and legislatures⁶⁶ are more generally blending the consumer expectations test with the risk-utility standard,⁶⁷ or replacing consumer expectations with risk-utility altogether, for determining design defectiveness.⁶⁸ Even in a risk-utility regime, however, consumer expectations may be considered together with the other evaluative factors⁶⁹ and occasionally can even be conclusive of design defect determinations.⁷⁰ In addition, the consumer expectations standard is still widely accepted as the most appropriate

61. *Pruitt v. Gen. Motors Corp.*, 86 Cal. Rptr. 2d 4 (Cal. Ct. App. 1999).

62. *Soule v. Gen. Motors Corp.*, 882 P.2d 298 (Cal. 1994).

63. *Id.* at 308.

64. *See infra* Part VI.

65. *See, e.g.*, *Potter v. Chi. Pneumatic Tool Co.*, 694 A.2d 1319, 1333 (Conn. 1997) ("a consumer's expectations may be viewed in light of various factors that balance the utility of the product's design with the magnitude of its risks" in cases of complex designs); *Delaney v. Deere & Co.*, 999 P.2d 930, 944 (Kan. 2000) (recognizing "the validity of risk/utility analysis as a guide in determining the expectations of consumers in complex cases"); *Vautour v. Body Masters Sports Indus.*, 784 A.2d 1178 (N.H. 2001) (consumer expectations defined in terms of risk-utility); *McCathern v. Toyota Motor Corp.*, 23 P.3d 320, 330-32 (Or. 2001) (risk-utility evidence may be required to prove consumer expectations); *Seattle-First Nat'l Bank v. Tabert*, 542 P.2d 774, 779 (Wash. 1975).

66. For example, in Tennessee (as formerly in Ohio), liability is alternatively defined in both consumer expectations and risk-utility terms. *See* TENN. CODE ANN. § 29-28-102(8) (1978). A Washington statute blends the consumer expectations and risk-utility tests by providing (1) that a design is not reasonably safe if it fails the risk-utility test, and (2) that the trier of fact shall also consider whether the product's dangers exceeded the contemplations of the ordinary consumer. *See* WASH. REV. CODE § 7.72.030(1)(a), (3) (1988).

67. *See infra* Part VI.

68. *See* OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, §§ 5.6, 5.7; *infra* parts IV-VI.

69. *See, e.g.*, *Nichols v. Union Underwear Co.*, 602 S.W.2d 429 (Ky. 1980); RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2 cmt. g (1998).

70. "Such expectations are often influenced by how products are portrayed and marketed and can have a significant impact on consumer behavior. Thus, although consumer expectations do not constitute an independent standard for judging the defectiveness of product designs, they may substantially influence or even be ultimately determinative on risk-utility balancing" RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2(b) cmt. g.

test for certain limited types of cases.⁷¹ Finally, the consumer expectations test still plays some role as a liability standard for design defectiveness in roughly half of all the American states,⁷² and a related standard, at least in name, exists in Europe.⁷³

IV. THE RISK-UTILITY TEST

The risk-utility test is the principal standard for judging the safety or defectiveness of a product's design.⁷⁴ While liability for design defects was

71. Most notably in cases involving contaminated food and defects in used products. See RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2 cmt. h; *id.* § 7 (food products); *id.* § 8 (used products). Note, however, that food product cases virtually always involve "manufacturing" rather than design defects, and that used product cases normally do as well.

72. See OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 5.6.

73. See the European Union Council Directive on the Approximation of the Laws, Regulations and Administrative Provisions of the Member States Concerning Liability for Defective Products, which provides in art. 6(1) as follows: "A product is defective when it does not provide the safety which a person is entitled to expect" Council Directive 85/374, art. 6, 1985 O.J. (L 210) 29. See generally GERAIN T HOWELLS, COMPARATIVE PRODUCT LIABILITY ch. 3 (1993); JANE STAPLETON, PRODUCT LIABILITY ch. 10 (1994). Note, however, that because this provision addresses the degree of safety a person is *entitled* to expect, the standard may be applied in risk-utility fashion. See also David G. Owen, *Strict Products Liability in America and Europe*, in Festschrift für Erwin Deutsch 305, 309-10 (Hans-Jürgen Ahrens, et al. eds., 1999); Jane Stapleton, *Products Liability in the United Kingdom: The Myths of Reform*, 34 TEX. INT'L L.J. 45 (1999); Jane Stapleton, *Products Liability Reform – Real or Illusory?*, 6 OXFORD J. LEGAL STUD. 392, 405 (1986). See OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 1.4.

74. On the risk-utility test, see Green, *supra* note 7; Miller, *supra* note 7; Keith Miller, *Design Defect Litigation in Iowa: The Myths of Strict Liability*, 40 DRAKE L. REV. 465 (1991); Owen, *Toward a Proper Test*, *supra* note 7; David G. Owen, *Risk-Utility Balancing in Design Defect Cases*, 30 U. MICH. J.L. REFORM 239 (1997) [hereinafter Owen, *Risk-Utility Balancing*]; Twerski, *supra* note 7; Barbara Ann White, *Risk-Utility Analysis and the Learned Hand Formula: A Hand that Helps or a Hand that Hides?*, 32 ARIZ. L. REV. 77 (1990). For a useful practitioner perspective, see Stephen G. Gilles, *United States v. Carroll Towing Co.: The Hand Formula's Home Port*, in TORTS STORIES 11 (Robert L. Rabin & Stephen D. Sugarman eds., 2003) [hereinafter Gilles, *Carroll Towing*]; Rheingold, *supra* note 3.

For economic perspectives on risk-utility analysis, see, for example, RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW §§ 6.1, 6.6 (7th ed. 2007); W. KIP VISCUSI, REFORMING PRODUCTS LIABILITY ch. 4 (1991) [hereinafter VISCUSI, REFORMING]; Epstein, *supra* note 22; Mark Geistfeld, *Reconciling Cost-Benefit Analysis with the Principle that Safety Matters More Than Money*, 76 N.Y.U. L. REV. 114 (2001); Stephen G. Gilles, *The Invisible Hand Formula*, 80 VA. L. REV. 1015, 1025 (1994) [hereinafter Gilles, *Invisible Hand*]; Alan Schwartz, *Proposals for Products Liability Reform: A Theoretical Synthesis*, 97 YALE L.J. 353, 384-88 (1988); W. Kip

more commonly based on the consumer expectations test in the 1960s and early 1970s, even during these early years some courts saw the wisdom of assessing design defectiveness according to whether the safety benefits of remedying a design danger were worth the costs.⁷⁵ As courts over the decades have turned away from the consumer expectations test in design danger cases,⁷⁶ they have substituted some form of a cost-benefit (“risk-utility,”

Viscusi, *Wading Through the Muddle of Risk-Utility Analysis*, 39 AM. U. L. REV. 573 (1990) [hereinafter Viscusi, *Wading*]; Mary Griffin, Note, *The Smoldering Issue in Cippolone v. Liggett Group, Inc.: Process Concerns in Determining Whether Cigarettes Are a Defectively Designed Product*, 73 CORNELL L. REV. 606 (1988); Kim D. Larsen, Note, *Strict Products Liability and the Risk-Utility Test for Design Defect: An Economic Analysis*, 84 COLUM. L. REV. 2045 (1984).

For general discussions of the risk-utility test in negligence and strict liability in tort, see OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, §§ 2.2, 5.7.

75. See, e.g., *Helicoid Gage Div. of Am. Chain & Cable Co. v. Howell*, 511 S.W.2d 573, 577 (Tex. App. 1974) (affirming verdict for plaintiff, where \$2.50 safety shield could have prevented burst pressure gauge from throwing piece of lens into plaintiff's eye):

To determine whether a product is unreasonably dangerous, . . . it is necessary to weigh the risk of harm against the utility of the product, considering whether safety devices would unreasonably raise the cost or diminish the utility of the product. The evidence at trial showed that shatterproof glass would have increased the cost of each gauge by approximately one dollar and would not have reduced the gauge's utility. Further, there was testimony that this injury would not have occurred had shatterproof glass been used.

See generally *Dorsey v. Yoder Co.*, 331 F. Supp. 753 (E.D. Pa. 1971), *aff'd*, 474 F.2d 1339 (3d Cir. 1973) (jury properly found that \$8,000 machine was defective for not being equipped with \$200-\$500 guard that would have protected operator's hand and arm from being caught and drawn into metal slitter machine); *McCormack v. Hanksraft Co.*, 154 N.W.2d 488 (Minn. 1967) (jury could find that vaporizer top could have been screwed cheaply and without diminishing vaporizer's usefulness onto top of container of hot water that scalded infant plaintiff). See also *Roach v. Kononen*, 525 P.2d 125 (Or. 1974), an action against Ford Motor Company for injuries from a crash occurring when the hood on a Ford automobile suddenly flew up and blocked the driver's vision. Plaintiff's expert testified that the hood could have been designed to permit substantially better visibility in such situations. Another witness testified that Ford was aware of only six or seven inadvertent hood openings occurring over a seven or eight year period. Ford's design engineer testified that the proposed design would require the addition of certain reinforcements to the hood and its hinges that would cost \$5 – \$10 per car. The jury returned a verdict for the defendant, and the court affirmed.

76. For examples of movements away from consumer expectations toward risk-utility, see, for example, *Potter v. Chi. Pneumatic Tool Co.*, 694 A.2d 1319 (Conn. 1997) (redefining consumer expectations in risk-utility terms); *Banks v. ICI Ams., Inc.*, 450 S.E.2d 671 (Ga. 1994) (switching from consumer expectations to risk-utility); *Delaney v. Deere & Co.*, 999 P.2d 930, 944 (Kan. 2000) (recognizing “the validity of risk/utility analysis as a guide in determining the expectations of consumers in

“risk-benefit,” or “benefit-risk”) standard of liability, which is the liability standard for design defectiveness adopted by the *Restatement (Third) of Torts: Products Liability*.⁷⁷ By the turn of the new millennium, despite the tenacity of consumer expectations in a decreasing number of jurisdictions,⁷⁸ the risk-utility test had become America’s dominant test for design defectiveness.⁷⁹

complex cases”); *Nichols v. Union Underwear Co.*, 602 S.W.2d 429 (Ky. 1980); *St. Germain v. Husqvarna Corp.*, 544 A.2d 1283, 1286 (Me. 1988); *Vautour v. Body Masters Sports Indus.*, 784 A.2d 1178 (N.H. 2001) (consumer expectations defined in risk-utility terms); *Hickey v. Otis Elevator Co.*, 840 N.E.2d 637, 640 n.1 (Ohio Ct. App. 2005) (noting the Ohio legislature’s repeal of the consumer expectations test earlier that year); *McCathern v. Toyota Motor Corp.*, 23 P.3d 320, 330-32 (Or. 2001) (risk-utility evidence may be required to prove consumer expectations); *Seattle-First Nat’l Bank v. Tabert*, 542 P.2d 774, 779 (Wash. 1975). In *Sperry-New Holland v. Prestage*, 617 So. 2d 248, 255-56 (Miss. 1993), noting its own movement away from the consumer expectations test, the court switched to risk-utility for design defect determinations, observing that the switch to risk-utility “has become the trend in most federal and state jurisdictions” because it “best protects both the manufacturer and the consumer.”

77. For the prevalence of the risk-utility test in design defect cases, see RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2, Reporters’ Notes to cmt. d (1998). See generally *infra* Part VIII.

78. See *Kysar*, *supra* note 7, at 1701 (characterizing the consumer expectations test as “stubbornly and inexplicably persistent”); see also *Phillips*, *supra* note 37.

79. See, e.g., *In re Methyl Tertiary Butyl Ether Prods. Liab. Litig.*, 175 F. Supp. 2d 593, 623 (S.D.N.Y. 2001) (Cal., Fla., Ill., and N.Y. law) (“Courts have generally utilized the ‘risk-utility balancing’ test to determine whether a product is defectively designed.”); *Warner Fruehauf Trailer Co. v. Boston*, 654 A.2d 1272, 1276 (D.C. 1995) (“In design defect cases, most jurisdictions decide [strict liability in tort] by applying some form of a risk-utility balancing test.”); *Banks v. ICI Ams., Inc.*, 450 S.E.2d 671 (Ga. 1994); *Wright v. Brooke Group Ltd.*, 652 N.W.2d 159 (Iowa 2002) (adopting RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2(b)); *Sperry-New Holland v. Prestage*, 617 So. 2d 248, 255 (Miss. 1993) (“Risk-utility has become the trend in most federal and state jurisdictions.”); *Bass v. Air Prods. & Chems., Inc.*, No. ESX-L-694-99, 2006 WL 1419375, at *11 (N.J. Super. Ct. App. Div. May 25, 2006) (“A standard of evaluation that has gained prominence in common law design defect claims is based on a comparison of the utility of the product with the risk of injury that it poses.”); *Ford Motor Co. v. Miles*, 967 S.W.2d 377, 386 (Tex. 1998) (Owen, J., concurring) (instruction conflicted with “the risk versus utility analysis that lies at the core of products liability design defect law”). The dominance of the risk-utility test for determining design defectiveness has been clear for some time. See *Foley v. Clark Equip. Co.*, 523 A.2d 379, 388 (Pa. Super. Ct. 1987) (“Although various tests for design defectiveness have been proposed, there is general agreement among legal scholars that any evaluation of design defectiveness must invariably include some form of a risk/utility analysis Most courts employ a version of this balancing process in analyzing allegations of design defects.”).

A. Fundamentals of Cost-Benefit Analysis; The Hand Formula

Risk-utility (cost-benefit) analysis is widely used to define liability for design defectiveness in both negligence⁸⁰ and strict liability in tort.⁸¹ An analytical technique explicitly relied upon by Benjamin Franklin and Oliver Wendell Holmes,⁸² cost-benefit analysis is as old as rational thought. All deliberative decisions involve a weighing of the advantages (benefits) and disadvantages (costs) of a contemplated course of action.⁸³ Whether a particular design danger is “unreasonable” (that is, “defective”) involves “a balancing of the probability and seriousness of harm against the costs of taking precautions. Relevant factors to be considered include the availability of alternative designs, the cost and feasibility of adopting alternative designs, and the frequency or infrequency of injury resulting from the design.”⁸⁴ In addition, courts and scholars increasingly recognize the importance of including a product’s warnings and instructions, which serve to reduce the foreseeable risks of a design, as an important factor in design defect risk-utility analysis.⁸⁵

80. See OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 2.2.

81. *Id.* § 5.7.

82. See, e.g., Letter from Benjamin Franklin to Joseph Priestly (Sept. 19, 1772), reprinted in EDWARD M. GRAMLICH, BENEFIT-COST ANALYSIS OF GOVERNMENT PROGRAMS 1-2 (1981) (suggesting, as aid to rendering difficult decisions, that one list and consider “all the reasons pro and con” and contemplate “where the balance lies”). Franklin said:

[T]hrough the weight of reasons cannot be taken with the precision of algebraic quantities, yet when each is thus considered, separately and comparatively, and the whole lies before me, I think I can judge better, and am less liable to make a rash step, and in fact I have found great advantage from this kind of equation, in what may be called moral or prudential algebra.

Id. at 2. See also Oliver Wendell Holmes, Jr., *The Path of the Law*, 10 HARV. L. REV. 457, 474 (1897) (advising that “for everything we have to give up something else, and we are taught to set the advantage we gain against the other advantage we lose”).

83. See Harold P. Green, Cost-Risk-Benefit Assessment and the Law: Introduction and Perspective, 45 GEO. WASH. L. REV. 901, 903-04 (1977); Richard A. Merrill, *Risk-Benefit Decisionmaking by the Food and Drug Administration*, 45 GEO. WASH. L. REV. 994, 996 (1977) (“Risk-benefit analysis . . . includes any technique for making choices that explicitly or implicitly attempts to measure the potential adverse consequences of an activity and to predict its benefits. In its most refined form, such an analysis may make use of refined mathematical methods for calculating risks and benefits, attempting to assign uniform values, usually in dollars, to all factors, including human lives.”).

84. *Raney v. Honeywell, Inc.*, 540 F.2d 932, 935 (8th Cir. 1976) (Iowa law).

85. See *Hansen v. Sunnyside Prods., Inc.*, 65 Cal. Rptr. 2d 266 (Ct. App. 1997) (design defectiveness of household cleaner):

We do not think that the risk to the consumer of the design of many household products can be rationally evaluated without considering the

A product's design is "defective" under a risk-utility test if the costs of avoiding a particular hazard are foreseeably less than the resulting safety benefits. In other words, if the costs of a precaution were foreseeably less than the precaution's safety benefits, a product designed without the precaution is defective under the cost-benefit ("risk-utility") standard of liability.⁸⁶ Costs and benefits should be limited to those that are foreseeable,⁸⁷ and both should be calculated for the entire product line⁸⁸ for some substantial period of time.⁸⁹ The risk-utility test for establishing design defectiveness is unaffected by whether the underlying theory of recovery is negligence, strict liability in tort,⁹⁰ or even implied warranty,⁹¹ because the appropriate balance

product's warnings. Thus, for example, what is the risk of the design of a power saw, or other power tools or equipment, without considering the product's directions and warnings? We dare say that the risk would be astronomically, and irrationally, high. The same could be said about common garden pesticides, or even the household microwave oven. [W]ere we to ask jurors to evaluate the risks of the design of many household products without considering their directions or warnings, the practical result would be the withdrawal from the market of many useful products that are dangerous in the abstract but safe when used as directed.

Id. at 276 n.9, 278 (noting that Dean John Wade "expressly lists consideration of warnings or instructions as a factor relevant to the determination of whether a product is unreasonably dangerous," referring to Dean Wade's factor number six, discussed below). See generally RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2(b) cmt. f (1998) (among "broad range of factors" relevant to design defectiveness are "the instructions and warnings accompanying the product"). See also *id.* at cmt. l.

86. See, e.g., *Warner Fruehauf Trailer Co. v. Boston*, 654 A.2d 1272, 1276 (D.C. 1995) (plaintiff must show "that the magnitude of the danger from the product outweighed the costs of avoiding the danger"). On the formulation of such a test, see Owen, *Toward a Proper Test*, *supra* note 7, at 1686-90.

87. See, e.g., *Coleman v. Cintas Sales Corp.*, 40 S.W.3d 544, 549 (Tex. App. 2001) (employee uniforms need not be flame retardant when there is no foreseeable risk that they will be exposed to fire); RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2(b) cmt. a (design may be defective "only when risks are reasonably foreseeable").

88. Courts should guard against the tendency of juries to narrowly compare the individuated costs of precaution and safety benefits of the particular accident in the case at hand which, of course, is never the proper form of cost-benefit calculation for establishing design defectiveness.

89. The period selected, whether one year or the projected lifetime of the product line, generally should not matter provided it is large enough to establish a standard rate and that both costs and benefits are measured over the same period.

90. See, e.g., *Banks v. ICI Ams., Inc.*, 450 S.E.2d 671, 674 n.3 (Ga. 1994) ("the determination of whether a product was defective (involving the reasonableness of a manufacturer's design decision), which is a basic inquiry for strict liability purposes, generally will overlap the determination of whether the manufacturer's conduct was reasonable, which is a basic inquiry for negligence purposes"); *Phillips v. Kimwood Mach. Co.*, 525 P.2d 1033, 1039 (Or. 1974) ("It is necessary to remember that whether the doctrine of negligence . . . or strict liability is being used to impose liability, the

between a particular design feature's safety, costs, and effect on product utility remains the same.⁹²

The cost-benefit test,⁹³ in balancing the safety benefits of avoiding a particular risk against the avoidance costs ("burdens"), is especially well suited to establishing the safety or defectiveness of a product design.⁹⁴ The type and degree of design safety required in any situation depends upon the type, likelihood, and amount of harm (viewed together as the magnitude of the risk)

same process is going on in each instance, i.e., weighing the utility of the article against the risk of its use."). *See also* *Ackerman v. Am. Cyanamid Co.*, 586 N.W.2d 208, 220 (Iowa 1998) ("a growing number of courts and commentators have found that, in cases in which the plaintiff's injury is caused by an alleged defect in the design of a product, there is no practical difference between theories of negligence and strict liability"); *Foley v. Clark Equip. Co.*, 523 A.2d 379, 388-89 (Pa. Super. Ct. 1987) ("The risk/utility analysis is nothing more than a detailed version of the balancing process used in evaluating reasonable care in negligence cases. . . . Because strict liability and negligence employ the same balancing process to assess liability, proof sufficient to establish liability under one theory will in most instances be sufficient under the other.").

Note, however, that many courts formerly distinguished strict liability from negligence on the basis of the *foreseeability* of the costs and benefits of improving the product's design safety, and a few still do. *See, e.g.*, *Blue v. Envtl. Eng'g, Inc.*, 828 N.E.2d 1128, 1152, 1153 (Ill. 2005) (Fitzgerald, J., concurring) ("In negligence, foreseeability of harm is a fact question, whereas, in strict liability, a product's propensity to inflict harm is assumed."). Because most courts and commentators now believe that a plaintiff must establish the foreseeability of harm (manufacturers rarely challenge the foreseeability of precautionary costs) in "strict" tort actions as well as in negligence, cost-benefit (risk-utility) analysis should normally be identical in both contexts. The foreseeability issue is addressed in the discussion of the so-called Wade-Keeton constructive knowledge test, *infra* Part VII, and is further examined in the "state of the art" context in OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 10.4.

91. *See, e.g.*, *Gregory v. Cincinnati Inc.*, 538 N.W.2d 325, 329 (Mich. 1995). The application of tort-like risk-utility principles to implied warranty claims is widely accepted. *See* U.C.C. § 2-314 cmt. 7 (2003); OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 4.3. *But see* *Denny v. Ford Motor Co.*, 662 N.E.2d 730 (N.Y. 1995).

92. At least in the absence of a manufacturer's specific safety representations, which may give rise to specific consumer expectations protectable in warranty. *See, e.g.*, *Denny*, 662 N.E.2d 730 (rollover of Bronco II); *Leichtamer v. Am. Motors Corp.*, 424 N.E.2d 568 (Ohio 1981) (pitch-over of Jeep). *See generally* Shapo, *supra* note 40.

93. Although the "risk-utility" term has been gaining ground in recent years over the more traditional "risk-benefit" phraseology, "cost-benefit" is the preferable term. *See* Owen, *Toward a Proper Test*, *supra* note 7, at 1692. The terms are used interchangeably here.

94. Courts have found the risk-benefit test most helpful in making design defectiveness determinations and only marginally helpful in warning cases. In manufacturing flaw cases decided in strict tort, this method of analysis has been virtually ignored.

that a particular burden of precaution (of a particular cost) may be expected to prevent.⁹⁵ If the risk posed by the design of a product in a certain manner is great, greater precautions must be taken to avert the risk; if the risk is small, less precaution is required. This principle of balance, inherent in tort law generally, is sometimes referred to as the “calculus of risk.”

The most celebrated formulation of the risk-benefit test was provided by Judge Learned Hand in *United States v. Carroll Towing Co.*⁹⁶ In *Carroll Towing*, Judge Hand reasoned that ascertaining an appropriate level of precaution is normally a function of three factors: the burden of taking precautions to avoid a risk of harm, on the one side, balanced against the likelihood of harm of a particular magnitude, on the other. Negligence is implied if an actor fails to adopt a precaution of less magnitude than the harm it is likely to prevent. Judge Hand expressed this concept algebraically: negligence is suggested if $B < P \times L$, where B is the burden or cost of adopting precautions against accidental loss that foreseeably might result if B is not undertaken, P is the increased probability of loss if B is not undertaken, and L is the probable magnitude (expected cost) of such loss if it does occur. This is the so-called “Hand formula.”⁹⁷ If the formula is supplemented with a symbol for the implication (\Rightarrow) of negligence (N), the full formula becomes: $B < P \times L \Rightarrow N$. Applied to negligence determinations in the products liability context, the Hand formula may be explained as follows: if the cost of adopting a particular safety precaution (B) is less than the safety gains expected to result therefrom ($P \times L$), the manufacturer’s failure to adopt the precaution implies its negligence ($\Rightarrow N$).

By substituting “defect” for “negligence” (D for N), the Hand formula converts comfortably to the “strict” products liability task of determining

95. For example, if the risk at issue concerns the possible failure of an automobile’s steering, brakes, or tires at highway speeds, or the possibility that a punch press ram may unexpectedly depress upon an operator’s hand, the manufacturer must employ the utmost precautions to avert the risk. Yet, if the risk is relatively minimal, reasonably appearing to involve at most the risk of minor harm to person or property – scratches, stains, or the harmless malfunction of the product – then a manufacturer need apply only minimal precautions to reduce such risks.

96. 159 F.2d 169, 173 (2d Cir. 1947). Hand first employed this approach in *Conway v. O’Brien*, 111 F.2d 611 (2d Cir. 1940), *rev’d on other grounds*, 312 U.S. 492 (1941), and subsequently reexamined it in *Moisan v. Loftus*, 178 F.2d 148, 149 (2d Cir. 1949). The *Carroll Towing* case is examined in the negligence context in OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 2.2, and the strict liability in tort context in *id.* § 5.7.

97. Perhaps the most helpful accounts of *Carroll Towing* and the Hand formula are Gilles, *Carroll Towing*, *supra* note 74, and Gilles, *Invisible Hand*, *supra* note 74. For other treatments, see *supra* note 79.

design defectiveness.⁹⁸ So reformulated, the defectiveness “equation” may be stated as follows:

$$B < P \times L \Rightarrow D$$

In cost-benefit terms, the formula looks like this:

$$(\text{Accident Prevention}) \text{ Costs} < (\text{Safety}) \text{ Benefits} \Rightarrow \text{Defect}$$

In short, a product’s design is defective if the safety benefits of an untaken design precaution⁹⁹ foreseeably exceed its costs.¹⁰⁰

Based on certain imprecise language in some early scholarly explorations into the meaning of product defectiveness,¹⁰¹ most appellate courts formulate the risk-utility test more broadly in terms of whether a *product’s* risks are greater than its benefits or utility.¹⁰² While such a formulation may appear harmless at first glance, it is logically misleading and in fact conflicts with how the law actually is applied. As discussed below,¹⁰³ the proper issue almost always litigated in trial courtrooms is the narrow “*micro-balance*” of pros and cons of a manufacturer’s failure to adopt some particular design *feature* that would have prevented the plaintiff’s harm – that is, whether the costs of changing the design in some particular (“micro”) manner would have been worth the resulting safety benefits.¹⁰⁴ Courts could avoid considerable

98. See OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 5.7. See generally Owen, *Toward a Proper Test*, *supra* note 7, at 1684-86.

99. For Mark Grady’s insightful analysis of untaken precautions, see Mark F. Grady, *Untaken Precautions*, 18 J. LEGAL STUD. 139 (1989); Mark F. Grady, *A New Positive Economic Theory of Negligence*, 92 YALE L.J. 799, 815, 814-17 (1983).

100. In addition to dollar costs, “costs” here broadly includes any diminished usefulness or diminished safety that may result from the particular precaution. See Owen, *Toward a Proper Test*, *supra* note 7, at 1690.

101. See Keeton, *Current Developments*, *supra* note 7, at 210; Wade, *On the Nature*, *supra* note 7, at 837 (first two factors framed in global terms). See generally Owen, *Toward a Proper Test*, *supra* note 7, at 1683 n.74.

102. See Owen, *Risk-Utility Balancing*, *supra* note 74 (surveying risk-utility tests among states).

103. See *infra* Part V.

104. RICHARD J. HEAFEY & DON M. KENNEDY, PRODUCT LIABILITY: WINNING STRATEGIES AND TECHNIQUES §§ 4.04, 4.05, at 4-9 (1994) (characterizing the manufacturer’s choice to forego a reasonable alternative design as “the heart of the plaintiff’s case”); John Prather Brown, *Toward an Economic Theory of Liability*, 2 J. LEGAL STUD. 323, 342 (1973). See also Rheingold, *Risk/Utility Test*, *supra* note 3, at 50 (“The usual and proper approach for a plaintiff in a design defect case is to present evidence on an alternative design which the jury can find should have been adopted for the product in question.”).

confusion by formulating the risk-utility standard according to the proper cost-benefit terms of the Hand formula.¹⁰⁵

The Hand defectiveness formula succinctly captures the commonsense idea that a product's design is unacceptably dangerous if it contains a danger that might cost-effectively (and practicably) be removed. More basically, the Hand formula requires manufacturers, in designing products, to consider risks of injury to consumers and bystanders and weigh the interests of those parties fairly in relation to their own interest in maximizing profits.¹⁰⁶ In designing products in particular ways, manufacturers properly consider such factors as their usefulness, cost, and profitability. Yet the Hand formula ensures that manufacturers, in legislating for consumers a particular mix of a product's cost and benefits, include in the balance a proportionate consideration of the various hazards in the product's particular design. It may be true, of course, that manufacturers should give safety a greater weight than cold cost-benefit analysis might suggest, since individual consumers have little voice in the collective tradeoffs forced upon them.¹⁰⁷ Yet, the risk-utility test has the elasticity to absorb refinements of this type, demanding only that a manufacturer adopt design precautions proportionate to the magnitude of the expected risk. This simple yet fundamental principle of defectiveness, which ties the measure of precaution to the measure of risk, thus grounds the design safety obligations of a manufacturer in both fairness and utility.

B. *Burdens, Benefits, and Utility; the Wade Factors*

In applying the risk-utility test, courts almost always properly restrict their analysis to the narrow costs and benefits of some particular untaken design precaution, as mentioned above and discussed in detail below.¹⁰⁸ Not infrequently, however, appellate courts open a Pandora's Box by formulating the risk-utility calculus more widely. For example, in *Banks v. ICI Americas, Inc.*,¹⁰⁹ in adopting a risk-benefit test for evaluating design defectiveness, the Georgia Supreme Court remarked: "no finite set of factors can be considered comprehensive or applicable under every factual circumstance, since such matters must necessarily vary according to the unique facts of each case. Such diverse matters as competing cost trade-offs, tactical market decisions, product development and research/testing demands, the idiosyncrasies of individual corporate management styles, and federal and other regulatory

105. See Owen, *Risk-Utility Balancing*, *supra* note 74.

106. See David G. Owen, *Philosophical Foundations of Fault in Tort Law*, in *PHILOSOPHICAL FOUNDATIONS OF TORT LAW* 201, 214-15 (David G. Owen ed., 1995); Owen, *Moral Foundations*, *supra* note 40. The basic economics of this perspective are explained in Judge Richard A. Posner's classic essay, *A Theory of Negligence*, 1 J. LEGAL STUD. 29 (1972).

107. See Geistfeld, *supra* note 74.

108. See *infra* Part V.

109. 450 S.E.2d 671 (Ga. 1994).

restrictions” can properly enter into the determination of the “reasonableness” of the manufacturer’s design determination.¹¹⁰ The court offered the following “non-exhaustive list of general factors,” beginning with what might be labeled “risk factors”:

the usefulness of the product; the gravity and severity of the danger...; the likelihood of that danger; the avoidability of the danger, i.e., the user’s knowledge of the product, publicity surrounding the danger, or the efficacy of warnings, as well as common knowledge and the expectation of danger; the user’s ability to avoid danger; the state of the art . . . ; the ability to eliminate danger without impairing the usefulness of the product or making it too expensive; and the feasibility of spreading the loss in the setting of the product’s price or by purchasing insurance.¹¹¹

The court then listed the “[a]lternative safe design factors” also pertinent to the issue: “the feasibility of an alternative design; the availability of an effective substitute for the product which meets the same need but is safer; the financial cost of the improved design; and the adverse effects from the alternative.”¹¹² Finally, the court set forth “benefit factors” that may also be considered in the balancing test: “the appearance and aesthetic attractiveness of the product; its utility for multiple uses; the convenience and extent of its use, especially in light of the period of time it could be used [safely]; and the collateral safety of a feature other than the one that harmed the plaintiff.”¹¹³

No doubt many (perhaps most) of the factors from this long list¹¹⁴ should be considered by manufacturers making fully informed design decisions about their products. And most of the listed factors will surely be legitimate issues in different kinds of design cases confronting courts over time. Indeed, the Georgia court’s “alternative safe design” factors *usually* will be important for both manufacturers making design decisions and courts adjudicating the safety or defectiveness of particular designs after product accidents have occurred, as discussed below.¹¹⁵ But such a wide and open-ended catalogue of factors provides little help for adjudicating the design defect issue in particular cases,¹¹⁶ and a practicable “test” for design defectiveness must be formulated far more narrowly in terms of the particular types of costs and benefits normally at issue in typical design defect cases.

110. *Id.* at 675.

111. *Id.* at n.6.

112. *Id.*

113. *Id.*

114. Thirty-three, by one count.

115. *See infra* Part V.

116. For an effort, see *Moore v. ECI Mgmt.*, 542 S.E.2d 115 (Ga. Ct. App. 2000) (applying multi-factor risk-utility test to washer/dryer design defect claim).

Over-broad formulations of risk-utility analysis for design defect decisionmaking are traceable to a widely quoted set of liability factors proposed in an early, influential article written by Dean John Wade,¹¹⁷ *On the Nature of Strict Tort Liability for Products*.¹¹⁸ Dean Wade proposed that a court¹¹⁹ consider the following list of factors:

- (1) The usefulness and desirability of the product – its utility to the user and to the public as a whole.
- (2) The safety aspects of the product – the likelihood that it will cause injury, and the probable seriousness of the injury.
- (3) The availability of a substitute product which would meet the same need and not be as unsafe.
- (4) The manufacturer's ability to eliminate the unsafe character of the product without impairing its usefulness or making it too expensive to maintain its utility.
- (5) The user's ability to avoid danger by the exercise of care in the use of the product.
- (6) The user's anticipated awareness of the dangers inherent in the product and their avoidability, because of general public knowledge of the obvious condition of the product, or of the existence of suitable warnings or instructions.
- (7) The feasibility, on the part of the manufacturer, of spreading the loss by setting the price of the product or carrying liability insurance.

Searching for some guidance in the murky sea of design defectiveness, appellate courts quickly grasped onto the Wade factors for use in ascertaining

117. Indeed, the *Banks* court's first list of factors, the risk factors, was largely a restatement of Dean Wade's seven factors.

118. Wade, *On the Nature*, *supra* note 7, at 837-38.

119. But Dean Wade believed that a court should *not* instruct the jury on the factors. *Id.* at 840. Courts largely have agreed. *See, e.g.*, *Fiorino v. Sears Roebuck & Co.*, 707 A.2d 1053, 1057-58 (N.J. Super. Ct. App. Div. 1998) (including factor seven in jury instruction is reversible error because it improperly introduces insurance into case). *But see, e.g.*, *Potter v. Chi. Pneumatic Tool Co.*, 694 A.2d 1319 (Conn. 1997) (in risk-utility balancing, jury may consider Wade factors among others); *Turner v. Gen. Motors Corp.*, 584 S.W.2d 844, 848-49 (Tex. 1979).

defects in design,¹²⁰ saying that these factors were somehow relevant to design defect cases.¹²¹ However, while courts across the continent have authoritatively *quoted* these six or seven¹²² factors for decades, only infrequently do courts actually try to *apply* the factors in assessing whether a particular product was defective in design. Even more rarely has an application of these factors actually *helped* a court determine design defectiveness;¹²³ more typically, a court attempting to apply the factors has become ensnared in one of their many traps.¹²⁴

Despite some early favorable commentary on the Wade factor approach,¹²⁵ commentators now view most of the Wade factors as problematic.¹²⁶ The first factor, the utility of the product, has been criticized on

120. *See, e.g.*, *Cepeda v. Cumberland Eng'g Co.*, 386 A.2d 816 (N.J. 1978), *overruled in part on other grounds by Suter v. San Angelo Foundry & Mach. Co.*, 406 A.2d 140 (N.J. 1979); *Roach v. Kononen*, 525 P.2d 125, 129 (Or. 1974) (“We agree that these factors should be considered by a court before submitting a design defect case to the jury. Also, proof of these factors bears on the jury’s determination of whether or not a given design is defective.”).

For an inspired reduction of the Wade and other factors, see John E. Montgomery & David G. Owen, *Reflections on the Theory and Administration of Strict Tort Liability for Defective Products*, 27 S.C. L. REV. 803, 818 (1976) (proposing four elegantly crafted factors).

121. For more recent recitations of the Wade factors, see, for example, *Akee v. Dow Chem. Co.*, 272 F. Supp. 2d 1112, 1132 (D. Haw. 2003); *LaBelle v. Philip Morris, Inc.*, 243 F. Supp. 2d 508, 515 n.4 (D.S.C. 2001); *Barton v. Adams Rental, Inc.*, 938 P.2d 532, 537 (Colo. 1997); *Potter v. Chicago Pneumatic Tool Co.*, 694 A.2d 1319, 1333-34; *Calles v. Scripto-Tokai Corp.*, 864 N.E.2d 249, 264-69 (Ill. 2007); *Wortel v. Somerset Indus.*, 770 N.E.2d 1211, 1218 (Ill. App. Ct. 2002); *Smith v. Mack Trucks, Inc.*, 819 So. 2d 1258, 1263 (Miss. 2002); *Bass v. Air Prods. & Chems., Inc.*, No. ESX-L-694-99, 2006 WL 1419375, at *12 (N.J. Super. Ct. App. Div. May 25, 2006); *Denny v. Ford Motor Co.*, 662 N.E.2d 730, 735 (N.Y. 1995); *Brown v. Crown Equip. Corp.*, 181 S.W.3d 268, 282-83 (Tenn. 2005); *Ray v. BIC Corp.*, 925 S.W.2d 527, 533 n.10 (Tenn. 1996).

122. Many courts have left out the seventh factor, loss-spreading, as discussed below.

123. *Monahan v. Toro Co.*, 856 F. Supp. 955 (E.D. Pa. 1994) (astute application of factors).

124. *See, e.g.*, *Johansen v. Makita U.S.A., Inc.*, 607 A.2d 637, 645 (N.J. 1992) (court should have instructed jury not to consider evidence of plaintiff’s lack of care in deciding question of product defect, because fifth factor pertained only to users generally, not to particular plaintiff’s conduct); *cf. Murphy v. Playtex Family Prods. Corp.*, 176 F. Supp. 2d 473, 490-91 (D. Md. 2001), *aff’d*, 69 F. App’x 140 (4th Cir. 2003) (the court valiantly tried to apply the factors, yet ended up basing its determination on the reasonableness of the defendant’s actions).

125. *See, e.g.*, Montgomery & Owen, *supra* note 120.

126. *See, e.g.*, RICHARD ALLEN EPSTEIN, SIMPLE RULES FOR A COMPLEX WORLD 239-45 (1995); VISCUSI, REFORMING, *supra* note 74, at 62-86; Epstein, *supra* note 22; Green, *supra* note 7, at 615-16; Viscusi, *Wading*, *supra* note 74.

political grounds for allowing courts to second-guess the market as to the desirability of different kinds of products. In particular, this factor seems to reflect “the fallacy that ‘essentials’ provide utility whereas ‘luxuries’ do not.”¹²⁷ Factor two, on the other hand, which embraces the P x L (risk of harm) side of the Hand formula discussed above, is vital to intelligent cost-benefit decisionmaking.¹²⁸

The third factor, the availability of a substitute product, is difficult to interpret. If it is read narrowly to mean the availability of a substitute design feature, then it properly introduces the necessarily central question in design defect analysis of the availability of a feasible and otherwise reasonable alternative design feature, a crucial issue discussed below.¹²⁹ If, on the other hand, this factor is interpreted literally, as Dean Wade probably intended it,¹³⁰ the availability of substitute “products” falls victim to the flaw infecting the first factor by inviting a judge or jury to engage in social engineering of the highest (and most dubious) order. Factor four, the manufacturer’s ability to eliminate the risk without unduly sacrificing price or utility, properly raises the relevant issues of the costs and benefits of altering the chosen design to eliminate the risk. Indeed, factors two and four together form the heart of proper cost-benefit analysis in design defect litigation.

Factor five, the user’s ability to avoid the risk, importantly introduces the issue of consumer responsibility into the matrix. Its only fault lies in its tendency to mislead courts, and especially juries, into confusing the proper issue of how users generally may act, on the one hand, with the improper issue of whether the particular plaintiff behaved appropriately in using the particular product in the manner that led to the accident, on the other.¹³¹ The sixth factor, the user’s awareness of the danger and avoidance techniques, is problematic. Its most reasonable interpretation appears to be subjective, which then introduces the plaintiff’s conduct into the prima facie case of design defectiveness, rather than leaving it as an affirmative defense where it more properly belongs. If, on the other hand, this factor is interpreted with some strain as a broader inquiry into the extent to which consumers generally may be expected to comprehend a product’s dangers, it would fit nicely with (although should precede) factor five, which in combination would present

127. Viscusi, *Wading*, *supra* note 74, at 582.

128. *See id.* at 583.

129. *See infra* Part V.

130. This interpretation springs from the need to differentiate factor three from factor four which appears to cover the feasible alternative design issue.

131. *See, e.g., Johansen v. Makita U.S.A., Inc.*, 607 A.2d 637, 645-46 (N.J. 1992) (court should have instructed jury not to consider evidence of plaintiff’s lack of care in deciding the question of product defect, because the fifth factor pertained only to users generally, not to particular plaintiff’s conduct). While irrelevant to duty, the propriety of the particular user’s conduct is relevant to the misconduct defenses. *See OWEN, PRODUCTS LIABILITY LAW, supra* note 13, ch. 13.

the important issues on the proper allocation of responsibility for product accidents between manufacturers and users.

The final Wade factor, number seven, is especially problematic as a factor for design liability decisionmaking. As a rationale for a generalized doctrine of strict tort liability for manufacturers, “loss-spreading” (“insurance” by another name) has been viewed in recent decades with increasing skepticism.¹³² If the strict products liability litigation system is to serve as a substitute for private and social insurance, it must force people to buy types and levels of insurance that many neither need nor want, and at excessive cost. By so requiring consumers to pay higher prices for products as a form of product accident insurance, loss-spreading may be seen as both unfair¹³³ and inefficient.¹³⁴ Poor people pay regressively unfair premiums (or “taxes,” when the tort system substitutes for social welfare insurance) for this form of insurance,¹³⁵ and the litigation method for determining whether particular accidents are covered by the system (whether a product is “defective,” whether jurisdiction is proper, whether any defenses apply, etc.) is exceedingly time-consuming, enervating, and expensive. For the most serious accidents, where a victim’s compensation needs are immediate and immense, it may take five or even ten years to complete the litigation compensation process. And in the end, the victim may lose the case and end up with no compensation whatsoever. In short, design defect liability is a poor means for society to spread the losses that result from product accidents.

As a factor for helping assess whether *particular* products are defective, loss-spreading is even more seriously flawed, because it will *always* point toward liability: a finding of design defectiveness resulting in a judgment for the plaintiff will always spread the plaintiff’s loss, at least among the shareholders of the manufacturer.¹³⁶ But the rationale for properly limiting a man-

132. On the nature and problems of loss-spreading as a products liability rationale, see OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 5.4.

133. *See, e.g.*, Owen, *Moral Foundations*, *supra* note 40, at 484-93.

134. *See, e.g.*, George L. Priest, *The Current Insurance Crisis and Modern Tort Law*, 96 YALE L.J. 1521 (1987); Viscusi, *Wading*, *supra* note 74, at 584-91.

135. George Priest explains that the level of insurance “premiums” manufacturers add to product prices regressively penalizes the poor who stand to gain far less in damages for lost earnings than wealthy victims who pay the same premium for much higher coverage. *See, e.g.*, Priest, *supra* note 134, at 1558-60.

136. *See* David G. Owen, *Products Liability: Principles of Justice for the 21st Century*, 11 PACE L. REV. 63, 71-72 (1990); Gary T. Schwartz, *Foreward: Understanding Products Liability*, 67 CAL. L. REV. 435, 445 (1979):

[T]he loss-spreading criterion, when offered as a rationale for any tort law rule, seems inherently unstable, since it is in a basic sense promiscuous. If loss spreading is deemed the law’s fundamental purpose, a compensation right should accordingly be extended to the victim of every serious accident, without regard to the involvement in that accident of any product. Yet tort law as we know it is “tort law” instead of a compensation program exactly because it is selective – that is, because the liability rules it

ufacturer's liability to designs that are defective is to distinguish between products whose design dangers are acceptable from those that are not,¹³⁷ as previously discussed. Including loss-spreading, or any other factor that always weighs on the same side of the scales, can only subvert the process of fair and rational adjudication of design defectiveness.¹³⁸ As a result, this seventh, loss-spreading factor sometimes is excluded from the list as inappropriate.¹³⁹

It is understandable that in the early days of modern products liability courts looked for guidance to the Wade factors which had an aura of logic, fairness, and commonsense. Indeed, modern products liability law has absorbed many of Dean Wade's factors in a variety of ways. But modern design defect jurisprudence has moved well beyond the place it was when Dean Wade conceived it at the time § 402A was just getting off the ground. Indeed, modern courts rarely do little more than pay lip service to the Wade factors, which are now well past their prime. Typically, a court will recite the factors and then move on to a far more narrow and appropriate cost-benefit analysis of some particular design feature offered by the plaintiff as a safer and preferred alternative design.¹⁴⁰ In short, the design defect bus long ago left the "catalogue of factors" station and now rides comfortably on the wheels of costs and benefits of alternative designs.¹⁴¹

C. *The Products Liability Restatement*

The *Products Liability Restatement* explicitly adopts risk-utility balancing as the test for design defectiveness.¹⁴² In essence, § 2(b) of the *Third Restatement* classifies a design as defective if the plaintiff suffered a foreseeable injury that could have been prevented by a reasonable alternative de-

fashions exclude recovery for some accident victims while permitting recovery for others.

137. See James Henderson's classic rock-tub metaphor, in James A. Henderson, Jr., *Should a "Process Defense" Be Recognized in Product Design Cases?*, 56 N.Y.U. L. REV. 585, 601-03 (1981).

138. See Owen, *Moral Foundations*, *supra* note 40, at 492-93; David G. Owen, *Rethinking the Policies of Strict Products Liability*, 33 VAND. L. REV. 681, 703-07 (1980).

139. See, e.g., *Nunnally v. R.J. Reynolds Tobacco Co.*, 869 So. 2d 373, 380 (Miss. 2004).

140. See, e.g., *In re September 11 Litig.*, 280 F. Supp. 2d 279, 312-13 (S.D.N.Y. 2003); *Barton v. Adams Rental, Inc.*, 938 P.2d 532, 537 (Colo. 1997); *Nunnally*, 869 So. 2d at 380; *Brooks v. Beech Aircraft Corp.*, 902 P.2d 54, 61 n.2 (N.M. 1995); *Denny v. Ford Motor Co.*, 662 N.E.2d 730, 735 (N.Y. 1995); *Irion v. Sun Lighting, Inc.*, No. M2002-00766-COA-R3-CV, 2004 WL 746823, at *7 (Tenn. Ct. App. Apr. 7, 2004).

141. See *infra* Part V.

142. See OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 6.5.

sign.¹⁴³ Section 2(b) thus “adopts a reasonableness (‘risk-utility balancing’) test as the standard for judging the defectiveness of product designs.”¹⁴⁴ Numerous factors may be relevant to “whether an alternative design is reasonable and whether its omission renders a product not reasonably safe” under § 2(b), including the likelihood and seriousness of foreseeable harm from the chosen design, warnings accompanying the product,¹⁴⁵ and the relative costs and benefits of the alternative design relative to the chosen design.¹⁴⁶ Finally, it is important to note that while the *Restatement* rejects consumer expectations as an independent basis for ascertaining the defectiveness of product designs, it includes consumer expectations as a factor in the calculus of risk-utility considerations.¹⁴⁷ The *Third Restatement’s* treatment of these and other aspects of design defectiveness is explored in greater depth below.¹⁴⁸

V. PROOF OF A REASONABLE ALTERNATIVE DESIGN

Just as design defectiveness lies at the center of products liability law,¹⁴⁹ cost-benefit analysis of an alternative design lies at the heart of design defectiveness.¹⁵⁰ As examined earlier,¹⁵¹ design defectiveness is usually best resolved by risk-utility analysis, the purpose of which is to determine “whether the risk of injury might have been reduced or avoided if the manufacturer had

143. *See id.* The *Restatement* addresses the special, narrow category of generically dangerous products that may possess a manifestly unreasonable design in comment e. *See OWEN, PRODUCTS LIABILITY LAW, supra* note 13, § 10.3.

144. RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2(b) cmt. d (1998).

145. *Id.* cmt. f.

146. Including the effects the alternative design feature would likely have on production costs, product longevity, maintenance, repair, aesthetics, and “the range of consumer choice.” *Id.*

147. *See id.* cmt. g.

148. *See infra* Part VIII.

149. *See supra* Part I.

150. *See, e.g., Jones v. NordicTrack, Inc., 550 S.E.2d 101, 103 (Ga. 2001)* (“The ‘heart’ of a design defect case is the reasonableness of selecting from among alternative product designs and adopting the safest feasible one. [Hence, the question in such cases is] whether the defendant failed to adopt a reasonable alternative design which would have reduced the foreseeable risks of harm presented by the product.”). *See also Ford Motor Co. v. Miles, 967 S.W.2d 377, 386 (Tex. 1998)* (Owen, J., concurring) (examining “the risk versus utility analysis that lies at the core of products liability design defect law”).

151. *See supra* Part IV; *see also* RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 1 cmt. a (1998); *id.* § 2(b) cmt. d. The *Third Restatement* approach to design defectiveness, which requires the plaintiff in design defect cases to prove that a “reasonable alternative design” would have prevented the injury, is examined in OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 6.5; *infra* Part VIII.

used a feasible alternative design.”¹⁵² In the words of the late Gary T. Schwartz, a leading tort law scholar, “one simply cannot talk meaningfully about a risk-benefit defect until and unless one has identified some design alternative (including any design omission) that can serve as the basis for a risk-benefit analysis.”¹⁵³

Throughout the twentieth century, the great majority of design defect cases have involved proof by the plaintiff of a feasible alternative design – proof of some practicable, cost-effective, untaken design precaution that would have prevented the plaintiff’s harm.¹⁵⁴ For example, the cases include a manifold that exploded, where the resulting fire could have been contained by chamber walls made of copper or brass, instead of steel;¹⁵⁵ a commercial coffee urn that exploded, where the explosion could have been prevented by a simple reducing valve;¹⁵⁶ a tractor steering wheel made of rubber and fiber that broke in the driver’s hands, where a rim made of wood or metal would not have broken;¹⁵⁷ a vaporizer that overheated and caught fire when the water boiled away, where the fire could have been prevented by a simple cutoff device;¹⁵⁸ a moving metal mechanism under the arm-rest of a lawn chair that amputated a user’s finger, where a simple housing could have shielded the mechanism;¹⁵⁹ a drain cleaner comprised of chemicals that were highly corrosive to human skin, where a change in the chemical formulation would have made it much safer and actually improved its efficacy at cleaning drains;¹⁶⁰ a Dalkon Shield IUD that had a multi-filament tail string, facilitating migration of bacteria into the uterus, where a single filament would have minimized the risk;¹⁶¹ an industrial machine with a sharp edge that cut a worker, where the sharp edge served no purpose and could easily have been rounded smooth,¹⁶²

152. *McCarthy v. Olin Corp.*, 119 F.3d 148, 155 (2d Cir. 1997) (N.Y. law).

153. Schwartz, *supra* note 136, at 468. One of the most prominent tort law scholars of the late twentieth century, Gary Schwartz was a professor at UCLA, an adviser for the *Restatement (Third) of Torts: Products Liability* and the initial Reporter for the *Restatement (Third) of Torts: Liability for Physical and Emotional Harm (Basic Principles)*. Most other products liability commentators agree with Professor Schwartz’s assertion quoted in the text. See, e.g., Green, *supra* note 7; Henderson & Twerski, *supra* note 7; Owen, *Defectiveness Restated*, *supra* note 7, at 774-75.

154. See Dix W. Noel, *Manufacturer’s Negligence of Design or Directions for Use of a Product*, 71 YALE L.J. 816, 820 (1962).

155. *Air Reduction Co. v. Phila. Storage Battery Co.*, 14 F.2d 734, 736-37 (3d Cir. 1926).

156. *Muller v. A.B. Kirschbaum Co.*, 148 A. 851 (Pa. 1930).

157. *Goullon v. Ford Motor Co.*, 44 F.2d 310 (6th Cir. 1930) (Ky. law).

158. *Lindroth v. Walgreen Co.*, 87 N.E.2d 307 (Ill. App. Ct. 1949), *aff’d*, 94 N.E.2d 847 (Ill. 1950).

159. *Matthews v. Lawnlite Co.*, 88 So. 2d 299 (Fla. 1956).

160. *Drayton v. Jiffee Chem. Corp.*, 395 F. Supp. 1081 (N.D. Ohio 1975), *judgment modified on other grounds*, 591 F.2d 352 (6th Cir. 1978).

161. *Hilliard v. A.H. Robins Co.*, 196 Cal. Rptr. 117 (Ct. App. 1983).

162. *Stazenski v. Tennant Co.*, 617 So. 2d 344 (Fla. Dist. Ct. App. 1993).

a small Playskool play block that asphyxiated a baby, where slightly increasing the size of the cylindrical block would have made it too big to swallow;¹⁶³ and a truck liftgate equipped with a single hydraulic cylinder that was prone to collapse unexpectedly, where the addition of a second cylinder would have eliminated the risk.¹⁶⁴

Without affirmative proof of a feasible design alternative, a plaintiff usually cannot establish that a product's design is defective. Put otherwise, there typically is nothing wrong with a product that simply possesses inherent dangers that cannot feasibly be designed away.¹⁶⁵ For example, in *Blissenbach v. Yanko*,¹⁶⁶ a child was injured by scalding water from a hot water vaporizer when it tipped over, causing the lid to fall off the top of the container. The plaintiff alleged that the manufacturer's failure to secure the lid to the container was a negligent design, but the manufacturer defended on the ground that the lid was left unattached in order to provide a "natural safety valve" for the release of steam if the aperture for discharging medicated vapor became clogged.¹⁶⁷ In part because the plaintiff made no proof of a feasible alternative design method for releasing steam, the plaintiff's verdict was reversed on appeal.¹⁶⁸ *McCormack v. Hanks Craft Co.*¹⁶⁹ was another vaporizer tip-over case decided on similar facts except that the plaintiff's experts established that the danger "could have been eradicated by the adoption of any one of several practical and inexpensive alternative designs which utilized simple and well known techniques to secure the top to the jar to the inside of the plastic top so it could screw onto the jar and the putting of two or three small holes in the top, which would take care of any danger that steam would build up inside the jar." Based on proof of such a feasible alternative design, the *McCormack* court affirmed a verdict for the plaintiff.

Recognizing the central role of an alternative design to design defectiveness, many courts, perhaps most,¹⁷⁰ hold that proof of a feasible design alternative is generally, or always, a necessary element of design defectiveness: "[i]n order to prove defectiveness, the plaintiff must prove that a safer, practical, alternative design was available to the manufacturer."¹⁷¹ Most

163. *Metzgar v. Playskool Inc.*, 30 F.3d 459 (3d Cir. 1994) (Pa. law).

164. *Warner Fruehauf Trailer Co. v. Boston*, 654 A.2d 1272 (D.C. 1995).

165. See OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, §§ 6.2, 10.3.

166. 107 N.E.2d 409 (Ohio Ct. App. 1951).

167. *Id.* at 411.

168. See Noel, *supra* note 154, at 823.

169. 154 N.W.2d 488, 495 (Minn. 1967).

170. See *Hernandez v. Tokai Corp.*, 2 S.W.3d 251 (Tex. 1999) (asserting that most states make proof of a reasonable alternative design a prerequisite to a determination of design defectiveness).

171. *Gen. Motors Corp. v. Edwards*, 482 So. 2d 1176, 1191 (Ala. 1985), *overruled on other grounds by* *Schwartz v. Volvo N. Am. Corp.*, 554 So. 2d 927 (Ala. 1989); *accord* *Wankier v. Crown Equip. Corp.*, 353 F.3d 862 (10th Cir. 2003) (Utah law) (trial court's failure to instruct jury on plaintiff's duty to establish safer alterna-

courts properly hold that the plaintiff has the burden of proof on this issue,¹⁷² and if a plaintiff fails to present sufficient evidence on this point, a design defect claim ordinarily will fail.¹⁷³ In some states, statutes require plaintiffs

tive design was reversible error); *Clinton v. Brown & Williamson Holdings, Inc.*, 498 F. Supp. 2d 639, 646 (S.D.N.Y. 2007) (“proof of a feasible alternative design is a required element of a prima facie design defect claim under New York law”); *Bagley v. Mazda Motor Corp.*, 864 So. 2d 301 (Ala. 2003); *Parish v. Jumpking, Inc.*, 719 N.W.2d 540, 543 (Iowa 2006); *Toyota Motor Corp. v. Gregory*, 136 S.W.3d 35, 42 (Ky. 2004); *Williams v. Bennett*, 921 So. 2d 1269, 1275 (Miss. 2006) (“demonstrating a feasible alternative design as proof of a design defect is elemental to a claimant’s prima facie case”); *AlliedSignal, Inc. v. Moran*, 231 S.W.3d 16, 28-29 (Tex. App. 2007).

For an exhaustive (if increasingly dated) collection of authority on the extent of each state’s commitment to a feasible alternative design requirement in design defect cases, see RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2(b), Reporters’ Note to cmt. d (1998). The Reporters’ Note indicates that a large majority of courts, either expressly or by implication, require the plaintiff in a design defect case to prove a feasible alternative design. The cases on this point in many jurisdictions are jumbled and inconsistent, with the result that some commentators have interpreted them quite differently as generally not requiring such proof. See, e.g., Howard Klemme, *Comments to the Reporters and Selected Members of the Consultative Group, Restatement of Torts (Third): Products Liability*, 61 TENN. L. REV. 1173 (1994); Shapo, *supra* note 18, at 668-71; Vandall, *supra* note 45; Vargo, *supra* note 3. As a matter of practical jurisprudence, the Reporters appear correct in their view that, in most states, the plaintiff appropriately will face a dismissal or directed verdict in most design defect cases in the absence of proof of a feasible alternative design.

172. Despite a contrary rule in California and a small number of other states, the plaintiff logically and fairly has the burden of proof on the feasibility and cost-effectiveness of the alternative design. See RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2(b) cmt. f; KEETON, DOBBS, KEETON & OWEN, *supra* note 59, § 99; Schwartz, *supra* note 136, at 466-67; John W. Wade, *On Product “Design Defects” and Their Actionability*, 33 VAND. L. REV. 551, 573 (1980) (criticizing cases that shift the burden of proof to the defendant).

173. “Since plaintiff failed to present evidence that there was a safe and reasonably feasible alternative to defendants’ product, the trial court properly concluded that there was no issue of design defect for the jury to determine.” *Macri v. Ames McDonough Co.*, 512 A.2d 548, 551 (N.J. Super. Ct. App. Div. 1986) (hammer that chipped). See also *Smith v. Louisville Ladder Co.*, 237 F.3d 515 (5th Cir. 2001) (Tex. law); *Hollister v. Dayton Hudson Corp.*, 201 F.3d 731 (6th Cir. 2000) (Mich. law) (negligence and implied warranty; state has no doctrine of strict liability in tort); *Whitted v. Gen. Motors Corp.*, 58 F.3d 1200, 1206 (7th Cir. 1995) (Ind. law) (summary judgment on strict liability design defect claim was proper where plaintiff failed to prove a safer, more practicable, better product design that was cost-effective); *Warner Fruehauf Trailer Co. v. Boston*, 654 A.2d 1272 (D.C. 1995); *Kallio v. Ford Motor Co.*, 407 N.W.2d 92, 96 (Minn. 1987); *Williams v. Bennett*, 921 So. 2d 1269, 1277 (Miss. 2006); *Rix v. Gen. Motors Corp.*, 723 P.2d 195, 202 (Mont. 1986); *Lewis v. Am. Cyanamid Co.*, 715 A.2d 967 (N.J. 1998); *Smith v. Keller Ladder Co.*, 645 A.2d 1269 (N.J. Super. Ct. App. Div. 1994) (ladder expert performed no risk-utility

to prove a feasible alternative design, either in every case or with some limited exceptions.¹⁷⁴ Other states that employ a risk-utility test implicitly require such proof in most design defect cases.¹⁷⁵ And a number of jurisdictions – sometimes noting the value of proof of a feasible alternative design, other times observing how difficult and costly a requirement of such proof would be for plaintiffs – explicitly reject any idea that proof of an alternative design is a necessary element of a plaintiff’s design defect case.¹⁷⁶

analysis and offered no evidence of reasonably feasible alternative design, offering only conclusory testimony that design was defective; prima facie design defect case requires plaintiff to prove availability of technically feasible, alternative practical design that would have reduced or prevented plaintiff’s harm); *Scarangella v. Thomas Built Buses, Inc.*, 717 N.E.2d 679 (N.Y. 1999); *Voss v. Black & Decker Mfg. Co.*, 450 N.E.2d 204 (N.Y. 1983); *Wilson v. Piper Aircraft Corp.*, 577 P.2d 1322, 1326-27 (Or. 1978).

174. Statutes in at least seven states require proof of a feasible alternative design to establish liability in all or most design defect cases. See LA. REV. STAT. ANN. § 9:2800.56 (1988); MISS. CODE ANN. § 11-1-63(f)(ii) (2004); N.J. STAT. ANN. § 2A:58C-3a(1) (1987); N.C. GEN. STAT. § 99B-6(1) (1996); OHIO REV. CODE ANN. § 2307.75(F) (2001 reenactment); TEX. CIV. PRAC. & REM. CODE ANN. § 82.005(1) (1993); WASH. REV. CODE §§ 7.72.030(1)(a), (3) (1988). See, e.g., *Williams v. Bennett*, 921 So. 2d 1269, 1274 (Miss. 2006); *Honda of Am. Mfg., Inc. v. Norman* 104 S.W.3d 600 (Tex. App. 2003). Washington’s statute ambiguously provides for the jury to consider such proof together with a consumer’s safety contemplations. See *Couch v. Mine Safety Appliances Co.*, 728 P.2d 585 (Wash. 1986). Statutes in New Jersey and North Carolina make exceptions for cases for egregiously dangerous products. Illinois had such a provision that was part of a broad tort reform act that was held unconstitutional. See *Best v. Taylor Mach. Works*, 689 N.E.2d 1057 (Ill. 1997).

175. See, e.g., RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2(b), Reporters’ Notes to cmt. d (including Arizona, Florida, Kansas, Kentucky, Maine, Missouri, New Hampshire, New Mexico, South Carolina, and Virginia in this list).

176. See, e.g., *Boerner v. Brown & Williamson Tobacco Corp.*, 260 F.3d 837 (8th Cir. 2001) (Ark. law); *Barton v. Adams Rental, Inc.*, 938 P.2d 532, 537 n.7 (Colo. 1997) (such evidence “may be a factor in the risk-benefit analysis”); *Potter v. Chi. Pneumatic Tool Co.*, 694 A.2d 1319, 1334 (Conn. 1997) (“The availability of a feasible alternative design is a factor that the plaintiff may, rather than must, prove in order to establish that a product’s risks outweigh its utility.”); *Delaney v. Deere and Co.*, 999 P.2d 930, 944 (Kan. 2000); *Smith v. Brown & Williamson Tobacco Corp.*, No. WD 65542, 2007 WL 2175034, at *29 (Mo. Ct. App. July 31, 2007) (proof of alternative design may be introduced but is not required); *Rahmig v. Mosley Mach. Co.*, 412 N.W.2d 56 (Neb. 1987) (such evidence important but unnecessary under consumer expectations test); *Vautour v. Body Masters Sports Indus.*, 784 A.2d 1178, 1183 (N.H. 2001) (“while proof of an alternative design is relevant in a design defect case, it should be neither a controlling factor nor an essential element that must be proved in every case”); *McCathern v. Toyota Motor Corp.*, 23 P.3d 320, 331 (Or. 2001) (such evidence not always necessary); *Potter v. Ford Motor Co.*, 213 S.W.3d 264, 269-70 (Tenn. Ct. App. 2006) (evidence of alternative design “will always be highly relevant and probative of the issue of whether a product was defective or unreasonably dangerous,” but it is not required). See Note, *Just What You’d Expect:*

A. Risk-Utility Analysis of an Alternative Design

Although the risk-utility issue in design defect cases is frequently framed vaguely in terms of a balance between the risks and benefits of the “product,” the true cost-benefit issue litigated in almost every case is much narrower – whether the safety benefits of altering the product’s design in a particular manner would foreseeably have exceeded the costs of the alteration.¹⁷⁷ Risk-utility analysis is focused, in other words, on the costs and benefits of the specific alternative design feature proposed by the plaintiff. The relevant *benefits* of a proposed alternative design are limited to the aggregate safety benefits to people suffering injury and property damage in accidents of a similar type to that which harmed the plaintiff.¹⁷⁸ But the *costs* of an alternative design feature more diversely may include: (1) the monetary costs of adopting the alternative design for all such products; (2) any loss of usefulness in the product that the design alteration may cause; and (3) any new dangers that the design feature may introduce.

The risk-utility (cost-benefit) issue often is conceptually quite simple: whether the aggregate dollar costs of adding some safety feature proposed by the plaintiff is or is not outweighed by the aggregate benefit of preventing foreseeable accidents like that which injured the plaintiff. So, if an alternative safety feature would be expensive to adopt, and if it would be unlikely to produce substantial safety benefits, it is not required.¹⁷⁹ But a manufacturer will fail the risk-utility test if it does not adopt a relatively inexpensive safety feature that could appreciably improve a product’s safety, such as incorporating a child-resistant feature in a utility lighter for less than 5¢ per lighter;¹⁸⁰ installing a \$2.50 shield made of shatterproof glass over a pressure gauge to protect a person’s eyes;¹⁸¹ including a \$3 shield to cover the rear of a power

Professor Henderson’s Redesign of Products Liability, 111 HARV. L. REV. 2366, 2373 (1998) (requiring alternative design proof places a “potentially insurmountable stumbling block in the way of those injured by badly designed products”).

177. See Owen, *Toward a Proper Test*, *supra* note 7, at 1690; *supra* Part IV; *supra* text accompanying notes 112-16.

178. Thus, a manufacturer may not introduce evidence of the collateral social benefits from the production of cigarettes, such as profits, employment, benefits to suppliers of goods and services, tax revenues paid, and charitable contributions made to the community. See *Cipollone v. Liggett Group, Inc.*, 644 F. Supp. 283, 286 (D.N.J. 1986); RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2(b) cmt. f (1998); Wright, *supra* note 7, at 1081; Griffin, *supra* note 74, at 616-19.

179. See RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2(b) cmt. f (noting that a court should consider “the likely effects of the alternative design on production costs”).

180. *Flock v. Scripto-Tokai Corp.*, 319 F.3d 231, 240 (5th Cir. 2003) (Tex. law) (at a total out-of-pocket cost to the company of \$500,000).

181. *Helicoid Gage Div. of Am. Chain & Cable Co. v. Howell*, 511 S.W.2d 573 (Tex. App. 1974).

mower;¹⁸² making a \$5 – \$10 alteration to a car's engine hood shape to provide the driver with visibility if an improperly latched hood flies open while driving,¹⁸³ or adding an automatic shut-off feature that might cost as little as \$5 to a water heater in case it overheats.¹⁸⁴ Because the cost of a safety improvement is weighed against the risk of harm it should prevent, even safety features that substantially raise a product's cost and price will sometimes be required. If a guard costing \$200 to \$500 will protect an operator against a substantial risk of losing a hand and arm in an \$8,000 machine, the cost of safety may be worth the benefit.¹⁸⁵ And even if adding a child-proof device to a disposable butane cigarette lighter increases its cost by as much as 60% – 75%, raising its price to that extent may be worth the benefit of substantially reducing the massive accident costs regularly caused by children playing with lighters not equipped with such a device.¹⁸⁶

In addition to the actual dollar costs of enhancing a product's safety, risk-utility analysis of a plaintiff's proposed alternative design requires consideration of another significant cost – any reduction in the product's usefulness. Adding a guard to a punch press may help to keep out hands, but it may preclude the operator from feeding large sheets of metal into the press and may slow down production. Child-proofing tops of medicines and household cleansers will reduce the number of small children poisoned by such products, but childproof designs may make such products useless to older persons whose hands are weakened by arthritis. Adding flame repellent chemicals to fabrics used for clothing will protect against fabric fire injuries, but such chemicals may decrease a fabric's comfort and durability, may make it more difficult to wash out odors, and may make the fabric more prone to wrinkle and more difficult to dry. Many hazards are serious enough that sacrificing a little product usefulness in exchange for greater safety makes good sense. But people buy and use products to help them with their labors and to give

182. *S. Austin Drive-In Theatre v. Thomison*, 421 S.W.2d 933 (Tex. App. 1967).

183. *Roach v. Kononen*, 525 P.2d 125 (Or. 1974).

184. *A.O. Smith Corp. v. Settlement Inv. Mgmt.*, No. 2-04-270-CV, 2006 WL 176815, at *3 (Tex. App. Jan. 26, 2006) (\$9,000 commercial water heater overheated and caused fire).

185. *See Dorsey v. Yoder Co.*, 331 F. Supp. 753 (E.D. Pa. 1971), *aff'd*, 474 F.2d 1339 (3d Cir. 1973). *See also A.O. Smith Corp.*, 2006 WL 176815, at *2 (shut-off feature might have cost as much as \$200).

186. *See Griggs v. BIC Corp.*, 981 F.2d 1429 (3d Cir. 1992) (Pa. law) (in early 1980s, increase of \$.60-\$.75 per lighter then costing under \$1 apiece; 120 people killed and 750 persons injured in such fires at annual national cost of \$300-375 million); *cf. Todd v. Societe BIC, S.A. (Todd II)*, 9 F.3d 1216, 1221 n.† (7th Cir. 1993) (Ill. law) (Easterbrook, J.) (noting CPSC estimates that childproofing lighters would raise their unit market price by only \$.15-\$.20 cents, but also noting the elusiveness of such statistics).

them satisfaction,¹⁸⁷ so that sacrifices in a product's utility are important costs that must be carefully evaluated in assessing the costs and benefits of an alternative design.¹⁸⁸

Another important (though less common) cost in the risk-utility evaluation of a plaintiff's proposed alternative design is the possibility that it may introduce *new* dangers into the product. That is, in eliminating one set of dangers, the change in design proposed by the plaintiff may create new types of dangers not present in the manufacturer's chosen design. For example, seatbelts and airbags of various designs protect the safety of many occupants in certain collisions, but in other situations both seatbelts and airbags may cause more harm than good.¹⁸⁹ Guarding motorboat propellers presents another example. *Fitzpatrick v. Madonna*¹⁹⁰ was one of a number of cases involving claims by swimmers injured or killed by motorboat propellers alleging that the propellers should have been shrouded with a guard. The benefit of such guards would be the large number of swimmers saved from harm. But such devices are not without their costs, including reduced speed, reduced fuel efficiency, and reduced maneuverability. In addition, propeller guards introduce a number of new risks, such as increasing the size of the motor that can hit and injure swimmers and creating a trap in which human limbs may become wedged near the moving propeller blades.¹⁹¹ Any such new dangers that a proposed alternative design is likely to create are important costs which must be balanced against the alternative design's safety ben-

187. Satisfaction may come from the senses, as from a pleasurable taste, or smell, or touch; a motorcyclist's pleasure of feeling the rushing air through an open design of a motorcycle helmet might be worth the slightly increased dangers. And satisfaction may be aesthetic, such as the pleasure experienced by an owner of an especially sleek, small sports car that may be much less safe than larger cars. Assuming in both situations that the additional risks are widely known and appreciated, or fully disclosed to buyers, a trier of fact might well conclude that the benefits of the dangers exceed the risks. Indeed, such dangers may properly be viewed as "inherent" in the design. See OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 10.3.

188. See, e.g., RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2(b) cmt. f (1998) ("evidence of the magnitude and probability of foreseeable harm may be offset by evidence that the proposed alternative design would reduce the efficiency and utility of the product"); *BIC Pen Corp. v. Carter*, 171 S.W.3d 657, 672 (Tex. App. 2005) (concluding, however, that a few complaints of reduced utility do not rise to the level of "substantial" impairment required under statute to overcome benefits of child-proof lighter's safer alternative design).

189. See, e.g., *Connelly v. Hyundai Motor Co.*, 351 F.3d 535, 541 (1st Cir. 2003) (N.H. law) (jury entitled to find that design of aggressive front seat airbag was not defective "because . . . on balance, the benefit to the public of including the overly aggressive airbag system in the Sonata outweighed the danger caused by the airbag system (because the system saved many more lives than it took)").

190. 623 A.2d 322 (Pa. Super. Ct. 1993).

191. *Id.* at 325.

efits,¹⁹² such that the ultimate safety function in the calculus becomes the overall (net) safety *improvement* in the alternative design.

Costs and benefits of differing alternative designs vary considerably with the type of product, type of danger, and available methods for reducing risk. But the basic risk-utility issue remains the same: whether the product reasonably could have been designed more safely so as to prevent the plaintiff's harm without unduly increasing the product's cost, decreasing its utility, or introducing other hazards. The *Products Liability Restatement* addresses the relevant balance of costs and benefits in ascertaining a product's design defectiveness in terms of whether an alternative design is "reasonable" – whether the safety advantages of the alternative design are on balance worth its risks and other disadvantages.¹⁹³

B. The "Feasibility" of an Alternative Design

An "alternative" design implies a reasonable choice between available designs. A safety feature that a plaintiff claims a product should have carried can fairly be considered a design "alternative" only if there was a practical means by which a manufacturer reasonably could have adopted such a safety feature at the time the product was designed and sold. Thus, the plaintiff must prove that the alternative design, offered to show that the manufacturer's chosen design was defective, was "feasible."¹⁹⁴ Because the feasibil-

192. See, e.g., *Crespo v. Chrysler Corp.*, 75 F. Supp. 2d 225, 228 (S.D.N.Y. 1999) ("This requirement that the alternative design be not only feasible but also safer for the relevant users is vital, for otherwise a plaintiff could recover simply by showing that a product could feasibly and without loss of utility be designed in such a way as to avoid injury to him alone even though the change would inflict injury on numerous others – an absurd position."); *Phatak v. United Chair Co.*, 756 A.2d 690, 695 (Pa. Super. Ct. 2000) (automobile resembling tank "might make its occupants safer, but if in so doing it creates an unacceptable hazard to other motorists or pedestrians, the risk-utility is negative and the product design feature should be thought of as a negative, not a positive."); *A.O. Smith Corp. v. Settlement Inv. Mgmt.*, No. 2-04-270-CV, 2006 WL 176815, at *4 (Tex. App. Jan. 26, 2006) ("the alternative design also must not impose an equal or greater risk of harm under other circumstances"). See RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2(b) cmt. f (1998):

When evaluating the reasonableness of a design alternative, the overall safety of the product must be considered. It is not sufficient that the alternative design would have reduced or prevented the harm suffered by the plaintiff if it would also have introduced into the product other dangers of equal or greater magnitude.

193. See RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2(b) cmt. f.

194. See, e.g., *Wankier v. Crown Equip. Corp.*, 353 F.3d 862 (10th Cir. 2003) (Utah law) (plaintiff must prove "safer, feasible, alternative design"); *Jeter v. Brown & Williamson Tobacco Corp.*, 294 F. Supp. 2d 681, 686 (W.D. Pa. 2003) ("[p]laintiff must present a feasible alternative design"); *Rypkema v. Time Mfg. Co.*, 263 F. Supp. 2d 687, 692 (S.D.N.Y. 2003) ("Under New York law, in a design defect case a plain-

ity of an alternative design suggests that the design feature proposed by plaintiff was technologically and commercially practicable, feasibility is often bound up in the issue of “state of the art.”¹⁹⁵ Feasibility requires at least technological capability,¹⁹⁶ but it normally is viewed more broadly to include cost, commercial practicability (including practicable availability of materials and components), and even the likelihood of consumer acceptance.¹⁹⁷ Viewed in this expanded fashion, “feasibility” really means “reasonableness,” as reflected in the *Products Liability Restatement* definition of a design defect in terms of the availability of a “reasonable alternative design.”¹⁹⁸ All signifi-

tiff is required to prove the existence of a feasible alternative which would have prevented the accident.”); Warner Fruehauf Trailer Co. v. Boston, 654 A.2d 1272, 1278 (D.C. 1995) (“In order to determine whether a safer design that would have prevented the injury should have been used, the trier of fact ordinarily must consider whether any safer alternative designs were commercially feasible.”); AlliedSignal, Inc. v. Moran, 231 S.W.3d 16, 28-29 (Tex. App. 2007) (alternative design must “substantially reduce the risk of injury and be both economically and technologically feasible”).

195. See, e.g., Robinson v. Audi Nsu Auto Union AG, 739 F.2d 1481, 1485-86 (10th Cir. 1984) (Okla. law) (“plaintiff could use state-of-the-art evidence to try to show the feasibility of other safer alternatives”); Potter v. Chi. Pneumatic Tool Co., 694 A.2d 1319, 1344-49 (Conn. 1997); Cavanaugh v. Skil Corp., 751 A.2d 518, 523 (N.J. 2000) (“the absence of both a practical and technically feasible alternative device is a necessary predicate to barring liability under the state-of-the-art defense”); Lancaster Silo & Block Co. v. N. Propane Gas Co., 427 N.Y.S.2d 1009, 1016 (App. Div. 1980) (“state of the art sets the parameters of feasibility”); Boatland of Houston, Inc. v. Bailey, 609 S.W.2d 743, 748 (Tex. 1980) (state-of-the-art evidence “important in determining whether a safer design was feasible”). On state of the art, see OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 10.4.

196. See, e.g., Martin v. Michelin N. Am., Inc., 92 F. Supp. 2d 745, 754 (E.D. Tenn. 2000) (feasibility defined in terms of what manufacturer could have known under existing state of technological and scientific art at the time of manufacture).

197. See, e.g., Glover v. BIC Corp., 6 F.3d 1318 (9th Cir. 1993) (practicability means economic feasibility in terms of cost, overall design, and operation); Oberst v. Int’l Harvester Co., 640 F.2d 863 (7th Cir. 1980) (Ill. law); Troja v. Black & Decker Mfg. Co., 488 A.2d 516 (Md. Ct. Spec. App. 1985); Rix v. Gen. Motors Corp., 723 P.2d 195 (Mont. 1986).

An expert witness’s mere concept of an alternative design, if it has never been developed, does not satisfy the feasibility requirement. See, e.g., Allen v. Minnstar, Inc., 8 F.3d 1470 (10th Cir. 1993) (Utah law) (speculative prototype for motorboat propeller guard does not satisfy requirement that alternative design be practicable and available); Ballarini v. Clark Equip. Co., 841 F. Supp. 662 (E.D. Pa. 1993) (interlock device that would disable forklift when operator forgets to apply parking brake before dismounting).

198. “A product . . . is defective in design when the foreseeable risks of harm posed by the product could have been reduced or avoided by the adoption of a reasonable alternative design . . . and the omission of the alternative design renders the product not reasonably safe.” RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2(b) (1998).

cant disadvantages of a proposed alternative design are properly embraced within the feasibility concept, including any increased cost, decreased utility, and increased dangers of other types.¹⁹⁹

An early case that viewed feasibility in this broader sense was *Wilson v. Piper Aircraft Corp.*²⁰⁰ *Wilson* involved the crash of a small plane, possibly due to carburetor icing, a condition that could not have occurred if the plane's engine had been equipped with a fuel-injection rather than carburetor system. Although fuel injection systems were available at the time, some 80% – 90% of small airplanes used carbureted engines that had various advantages and were approved by the FAA. Reversing jury verdicts for the plaintiffs, the court observed that the plaintiff in a design defect case must establish the availability of an "alternative, safer design, practicable under the circumstances," meaning that the alternative design must be feasible "in terms of cost, practicality and technological possibility."²⁰¹ The appellate court concluded that the trial court should not submit a design case to a jury unless the jury reasonably may find that the proposed alternative design is "not only technically feasible but also practicable in terms of cost and the over-all design and operation of the product."²⁰²

The cost-benefit approach for evaluating proposed alternative designs may be logical and straight-forward, but the actual process of balancing the variety of intangible considerations involved in safety, cost, and utility trade-offs involves a complex conceptual balance which is as much political as it is "factual." Accordingly, the risk-utility balance determination, assuming the plaintiff has offered credible evidence for an alternative balance, almost always raises an issue of fact for jury determination.²⁰³

C. Focusing the Risk–Utility Test on the Proposed Alternative Design

A particularly nettlesome aspect of defining the risk-utility standard for design defectiveness is deciding precisely what to balance against what.²⁰⁴ Many courts have purported to lean heavily on Dean Wade's famous seven

199. See, e.g., *Hagans v. Oliver Mach. Co.*, 576 F.2d 97 (5th Cir. 1978) (Tex. law) (multi-purpose table circular saw equipped with removable, rather than permanent, blade guard); *Monahan v. Toro Co.*, 856 F. Supp. 955 (E.D. Pa. 1994) (lawn tractor rolled over on steep slope; adding roll-bar and altering center of gravity might diminish utility); *Caterpillar, Inc. v. Shears*, 911 S.W.2d 379 (Tex. 1995) (front-end loader equipped with detachable rather than permanent rollover protective structure ("ROPS") was not defective; permanent structure was not "feasible" because it would have destroyed multi-purpose nature of loader).

200. 577 P.2d 1322 (Or. 1978).

201. *Id.* at 1326.

202. *Id.* at 1327.

203. See *id.* at 1327 nn.3 & 5.

204. Extensively examined in Owen, *Toward a Proper Test*, *supra* note 7; Owen, *Risk-Utility Balancing*, *supra* note 74.

factors, as discussed in the previous section, and some of the problems with relying on such an open-ended catalogue of possibly relevant considerations were there examined. A similar problem, also previously noted, arises out of the overly broad way in which many courts phrase the risk-utility balance for design defectiveness – in terms of weighing the risks and utility of the “product” or the product’s “design.”²⁰⁵ The process of design defect litigation would be rendered more comprehensible if courts were to formulate the risk-utility test more narrowly to correspond to the issues actually litigated in courtrooms across the nation.²⁰⁶ Nevertheless, trial judges and lawyers seem to understand what the appellate judges mean when they speak of balancing

205. See, e.g., *Soule v. Gen. Motors Corp.*, 882 P.2d 298, 308 (Cal. 1994) (indicating that no design defect exists if “the benefits of the . . . design outweigh the risk of danger inherent in such design”) (quoting *Barker v. Lull Eng’g Co.*, 573 P.2d 443, 454 (Cal. 1978)); *Armentrout v. FMC Corp.*, 842 P.2d 175, 182 (Colo. 1992) (holding that jury was properly instructed that a product is defective in design “if it creates a risk of harm to persons which is not outweighed by the benefits to be achieved from such design”); *Banks v. ICI Ams., Inc.*, 450 S.E.2d 671, 673 (Ga. 1994) (describing a consensus among jurisdictions that, in determining design defectiveness, “the risks inherent in a product design are weighed against the utility or benefit derived from the product”); *Wagatsuma v. Patch*, 879 P.2d 572, 584 (Haw. Ct. App. 1994) (stating that there is no design defect if “the benefits of the design outweigh the risk of danger inherent in that design”); *Guiggey v. Bombardier*, 615 A.2d 1169, 1172 (Me. 1992) (“To determine whether a product is defectively dangerous, we balance the danger presented by the product against its utility.”); *Halliday v. Sturm, Ruger & Co.*, 792 A.2d 1145, 1150 (Md. 2002) (“The risk-utility test . . . regards a product as defective and unreasonably dangerous . . . if the danger presented by the product outweighs its utility.”); *Haberkorn v. Chrysler Corp.*, 533 N.W.2d 373, 380 (Mich. Ct. App. 1995) (“In determining whether a defect exists, the trier of fact must balance the risk of harm occasioned by the design against the design’s utility.”); *Sperry-New Holland v. Prestage*, 617 So. 2d 248, 254 (Miss. 1993) (concluding that a design is defective if “the utility of the product is outweighed by the danger that the product creates”); *Roberts v. Rich Foods, Inc.*, 654 A.2d 1365, 1371 (N.J. 1995) (characterizing *O’Brien* test for a product defective in design as whether “its risks outweighed its utility”); *Denny v. Ford Motor Co.*, 662 N.E.2d 730, 735-36 (N.Y. 1995) (stating that ascertaining defectiveness requires “a weighing of the product’s benefits against its risks” and “a weighing of the product’s dangers against its over-all advantages”); *Hoyt v. Vitek, Inc.*, 894 P.2d 1225, 1231 (Or. Ct. App. 1995) (determining defectiveness “by balancing the product’s utility against the magnitude of the risk associated with its use”); *Caterpillar, Inc. v. Shears*, 911 S.W.2d 379, 384 (Tex. 1995) (determining design defectiveness “requires balancing the utility of the product against the risks involved in its use”).

206. An example of a court focusing on the proper, narrow issue is *Colon v. BIC USA, Inc.*, 199 F. Supp. 2d 53, 91 n.32 (S.D.N.Y. 2001) (test of lighters defective in design because of their bright color is whether “the risk of bright color outweighs the utility of using a bright color compared to the risk versus utility of using a dull color”). The proper balance is explained in Owen, *Toward a Proper Test*, *supra* note 7; Owen, *Risk-Utility Balancing*, *supra* note 74.

the risks and utility of a product whose design is challenged by a plaintiff in a products liability case.²⁰⁷

In a design defect case, two distinct designs in a sense are separately on trial: (1) the manufacturer's chosen design and (2) the alternative design proposed by the plaintiff that allegedly would have prevented the plaintiff's harm. The propriety of the first (chosen) design would seem to be the more important issue in such a case, and to a real extent it is: the "defectiveness" (*vel non*) of the chosen design remains the ultimate issue in the trial. Yet, the chosen design is no more than that – the ultimate legal determination that merely characterizes, but provides no guidelines for establishing, the outcome of a case. What typically is far more significant in the adjudication process is the second (alternative) design – more specifically, the reasons for and against the manufacturer's failure to adopt it. This is the design decision normally and properly at issue in the trial which lies at the heart of nearly every design defect case, requiring particularized cost-benefit proof by the parties and evaluative processing by the judge and jury. Although the propriety of the manufacturer's chosen design remains of ultimate consequential interest in terms of legal outcome, it ordinarily is determinable only indirectly by evaluating the costs and benefits of the untaken design precaution proposed by the plaintiff.

Thus, regardless of how broadly appellate courts may formulate the risk-utility test, design defectiveness litigation almost invariably focuses on the costs and benefits related directly to a solution of the particular design problem asserted by the plaintiff. That is, the design defect issue actually litigated is a *micro*-balance of the pros and cons of the manufacturer's failure to adopt some design feature that would have prevented the plaintiff's harm – the balance of the safety benefits from changing the design in some particular manner weighed against the various costs of adopting the safety feature.²⁰⁸ Most

207. However, courts in at least a couple of states, most notably New Jersey, appear to believe in the propriety of both broad and narrow forms of risk-utility balancing in design defect cases. *See, e.g., Lewis v. Am. Cyanamid Co.*, 715 A.2d 967, 980 (N.J. 1998) ("A plaintiff must prove either that the product's risks outweighed its utility or that the product could have been designed in an alternative manner so as to minimize or eliminate the risk of harm. Plaintiffs who assert that the product could have been designed more safely must prove under a risk-utility analysis the existence of an alternative design that is both practical and feasible."). New Jersey's statutory exception to the feasible alternative design requirement, for "egregiously unsafe or ultrahazardous" products and those with "little or no usefulness," suggests approval of broad risk-utility balancing in this narrow class of cases. *See* N.J. STAT. ANN. § 2A:58C-3(b) (1987).

208. *See, e.g., HEAFEY & KENNEDY, supra* note 104, § 4.04, at 4-9 (characterizing the manufacturer's choice to forego a reasonable alternative design as "the heart of the plaintiff's case"). *See also* Rheingold, *Risk/Utility Test, supra* note 3, at 50 ("The usual and proper approach for a plaintiff in a design defect case is to present evidence on an alternative design which the jury can find should have been adopted for the product in question."). This is the manner in which design defectiveness is defined in

simply, the risk-utility balance truly at issue in design defect litigation is whether the safety benefits of an alternative design feature would have been worth the resulting costs.²⁰⁹ More fully formulated, a product's design is defective if the safety benefits of the plaintiff's proposed alternative design features foreseeably would have exceeded the resulting costs, including any diminished usefulness or diminished safety.²¹⁰

When the risk-utility test normally applicable to design defectiveness is properly defined in terms of the costs and benefits of adopting the alternative design feature proposed by the plaintiff, it fails to catch a limited class of unavoidably dangerous products – exploding cigars, lawn darts that are deadly sharp, and possibly guns, cigarettes, and alcohol whose inherent dangers cannot be designed away and which on balance arguably cause more social harm than good. The difficult problem here is whether the law properly may impose product category liability for inherently dangerous products,²¹¹ an important issue examined elsewhere.²¹² A number of courts,²¹³ at least two

RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2 cmts. d, f (1998), and it reflects more generally how courts and lawyers actually proceed in assessing liability under the Hand formula. One scholar has noted that a plaintiff's attorney will try to find some act which, if the defendant had taken it, would have significantly reduced the probability of the accident at low cost [such] that the increment in the expected loss was greater than the cost of avoidance [and the defendant's attorney tries to show] that the expected benefits of the proposed act were, in fact, less than the costs of undertaking it. [The decision maker is then] asked to compare the incremental expected benefits with the incremental costs. Brown, *supra* note 104, at 334-35.

209. "In sum, an alternative design is reasonable if its marginal benefits exceed its marginal costs." RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2(b), Reporters' Note to cmt. f.

210. See Owen, *Toward a Proper Test*, *supra* note 7, at 1690.

211. As mentioned in the text, the classic examples are cigarettes, certain guns, and alcoholic beverages. See also RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2 cmts. d & e, illus. 5 (exploding cigar). For a range of views on the appropriateness of using broad-based risk-utility analysis to find cigarettes defectively designed, see the three separate opinions, each concurring and dissenting, in *Horton v. American Tobacco Co.*, 667 So. 2d 1289 (Miss. 1995) (compare opinion of Hawkins, C.J., arguing that risk-utility analysis is inappropriate in such cases and noting that liability has been denied by every prior decision, with the opinions of Lee, P.J., and McRae, J., arguing that cigarette manufacturers properly may be held liable under a risk-utility test). For a case holding that the absence of an alternative design to hollow-point bullets, used in a shooting spree on a passenger train, precluded a finding of design defectiveness under the risk-utility test because the purpose of the hollow points was to make the bullets kill especially effectively, see *McCarthy v. Olin Corp.*, 119 F.3d 148 (2d Cir. 1997) (N.Y. law) (2-1 decision, Calabresi, J., dissenting).

212. See OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 10.3.

213. See, e.g., *Armentrout v. FMC Corp.*, 842 P.2d 175, 185 n.8 (Colo. 1992) (en banc); *Kallio v. Ford Motor Co.*, 407 N.W.2d 92, 97 n.8 (Minn. 1987); *Rix v. Gen. Motors Corp.*, 723 P.2d 195, 201 (Mont. 1986); *Wilson v. Piper Aircraft Corp.*, 577 P.2d 1322, 1328 n.5 (Or. 1978).

state legislatures,²¹⁴ and the *Products Liability Restatement*,²¹⁵ all require plaintiffs in design cases to prove a feasible alternative design as a general rule but provide a special exception for a very small category of egregiously dangerous products which possess little redeeming value, a quite reasonable approach to a difficult problem.

VI. COMBINING CONSUMER EXPECTATIONS AND RISK-UTILITY

Evolving separately from the law of warranty and the law of negligence, the consumer expectations and risk-utility tests for design defectiveness developed largely as rival standards for design defect liability. Thus, for much of modern products liability law, most courts determined design defectiveness exclusively by one test and refused to recognize the validity of the other. More recently, however, reflecting the combined warranty-tort heritage of products liability law, and because of inadequacies in consumer expectations as an exclusive standard,²¹⁶ many courts have begun to blend the two tests in one way or another. The two principal approaches for blending the two standards are: (1) defining one test in terms of the other or (2) establishing each as separate liability “prongs,”²¹⁷ either one of which may independently support a design defect finding. Some jurisdictions that embrace the two-pronged approach have narrowed the applicability of the consumer expectations prong to product designs viewed as “simple.”

A. Defining One Test in Terms of the Other

Quite early in the development of modern products liability law, Judge Minor Wisdom recognized how the two basic liability tests might be viewed as partners in evaluating product dangers. In *Welch v. Outboard Marine*

214. New Jersey’s statute provides that the plaintiff must prove a feasible alternative design or that the product was especially hazardous or practically useless. *See* N.J. STAT. ANN. § 2A:58C-3(b) (1987). North Carolina’s statute provides that the plaintiff must prove a feasible alternative design or “that a reasonable person, aware of the relevant facts, would not use or consume a product of this design.” *See* N.C. GEN. STAT. § 99B-6(a)(2) (1996).

215. *See* RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2(b) cmt. e (1998) (entitled “Design defects: possibility of manifestly unreasonable design,” which notes that a court might choose to abandon the alternative design requirement in special cases where “the extremely high degree of danger posed by [a product’s] use or consumption so substantially outweighs its negligible social utility that no rational, reasonable person, fully aware of the relevant facts, would choose to use, or to allow children to use, the product”).

216. *See* Schwartz, *supra* note 136, at 471-82; *see also supra* Part III.

217. In *Barker v. Lull Engineering Co.*, 573 P.2d 443, 456 (Cal. 1978), the court aptly referred to the use of two alternative bases of liability as the “two-pronged definition of design defect.” *See* Schwartz, *supra* note 136, at 436.

Corp.,²¹⁸ the operator of a power lawn mower was injured when a piece of wire was thrown back from the mower, injuring his ankle. Plaintiff sued, asserting that the mower was defectively designed because it lacked a guard plate hinged to the back. The trial court instructed the jury that it could find the mower defectively designed if “a reasonable man would not sell the product if he knew the risks involved. To put it another way, a product is unreasonably dangerous if it is dangerous to an extent beyond which would be contemplated by the ordinary consumer.”²¹⁹ The jury gave a verdict for the defendant, and the plaintiff appealed, complaining that the instruction confused the jury by giving them two contradictory definitions of the liability standard. Affirming a judgment on the verdict, Judge Wisdom observed no inconsistency between the reasonable seller and reasonable buyer tests which he viewed as merely “two sides of the same standard.”²²⁰ Although this two-sides-of-the-same-coin perspective failed to achieve much of a judicial following, it was recognized by some courts and commentators as a novel but sound approach that appropriately reflected the hybrid evolution of strict manufacturer liability from warranty and tort.²²¹ Developing Judge Wisdom’s concept further, commentators recommended interpreting the *Welch* definition not as a single liability “coin” or standard, but as a bifurcated test that would provide recovery *either* if a product failed a risk-benefit test *or* if the product’s dangers exceeded consumer expectations.²²²

One year later, in 1974, the Supreme Court of Oregon entered the search for a design defect test in *Phillips v. Kimwood Machine Co.*,²²³ a case involving the design of an industrial sanding machine that ejected a piece of fiberboard back at the operator.²²⁴ Although the Oregon court had previously adopted the consumer expectations test for ascertaining design defectiveness in *Heaton v. Ford Motor Co.*,²²⁵ it had been troubled in that case with the vagueness of a consumer’s safety expectations in view of the kinds of engineering tradeoffs between costs and benefits unknown to consumers that inhere in design decisionmaking.²²⁶ In the process of switching from a consumer expectations test to risk-utility,²²⁷ the *Phillips* court reiterated Judge

218. 481 F.2d 252 (5th Cir. 1973) (La. law).

219. *Id.* at 253-54.

220. “A product is defective and unreasonably dangerous when a reasonable seller would not sell the product if he knew of the risks involved or if the risks are greater than a reasonable buyer would expect.” *Id.* at 254.

221. *See, e.g., Phillips v. Kimwood Mach. Co.*, 525 P.2d 1033, 1036-37 (Or. 1974); Montgomery & Owen, *supra* note 120, at 843-45.

222. Montgomery & Owen, *supra* note 120, at 845 n.147.

223. 525 P.2d 1033.

224. The claimed design defect was the absence of teeth on the machine that could have prevented regurgitation of the boards. *Id.* at 1035.

225. 435 P.2d 806 (Or. 1967).

226. *See id.* at 809.

227. *Phillips*, 525 P.2d at 1036.

Wisdom's view in *Welch* that the two tests may be the same "because a seller acting reasonably would be selling the same product which a reasonable consumer believes he is purchasing."²²⁸ The Oregon court's assertion that buyers and sellers have the same safety expectations ignores its important criticism in *Heaton* that consumer expectations fail to provide a meaningful safety gauge for complex designs, but the court may have repeated the equivalency of the two tests as window-dressing for its switch away from the problematic consumer expectations test to the more felicitous risk-utility standard for design defect determinations. Be that as it may, by collapsing consumer expectations into risk-utility, *Phillips* abandoned the consumer expectations test in favor of risk-utility.

The following year, the Supreme Court of Washington decided *Seattle-First National Bank v. Tabert*,²²⁹ a crashworthiness case involving the structural integrity of a snub-nosed Volkswagen van. A husband and wife were killed when the front of their van collapsed back upon them when it struck the rear of a flatbed truck. Reversing a summary judgment for the defendants, the court defined design defect liability under § 402A in terms of an ordinary consumer's reasonable safety expectations.²³⁰ Observing that an ordinary consumer "evaluates a product in terms of safety, recognizing that virtually no product is or can be made absolutely safe,"²³¹ the *Tabert* court expressly folded the consumer expectations test into risk-utility analysis, stating that the reasonable expectations of ordinary consumers include the cost and feasibility of avoiding the risk.²³² Because the plaintiff's expert in his affidavit properly applied risk-utility analysis to the weakness of the vehicle's forward structure, the plaintiff had presented a question of fact for the jury.²³³

By defining the design defect test in terms of consumer expectations, and then "determining" consumer expectations in terms of the costs and benefits of eliminating or minimizing the danger, the *Tabert* court blended the two

228. *Id.* at 1037. The court continued: "That is to say, a manufacturer who would be negligent in marketing a given product, considering its risks, would necessarily be marketing a product which fell below the reasonable expectations of consumers who purchase it. The foreseeable uses to which a product could be put would be the same in the minds of both the seller and the buyer unless one of the parties was not acting reasonably." *Id.* Note, however, the *Phillips* court also curiously remarked that the two tests "are not necessarily different standards." *Id.* at 1036.

229. 542 P.2d 774 (Wash. 1975).

230. *Id.* at 779.

231. *Id.*

232. Noting that "[t]he purchaser of a Volkswagen cannot reasonably expect the same degree of safety as would the buyer of the much more expensive Cadillac," the court remarked that a number of factors must be considered in determining an ordinary consumer's reasonable expectations: "The relative cost of the product, the gravity of the potential harm from the claimed defect and the cost and feasibility of eliminating or minimizing the risk may be relevant in a particular case." *Id.*

233. *See id.* at 779-80.

tests of design defectiveness. But how the blend should operate is not made clear. While the court states that risk-utility factors are determinants of consumer expectations, it retains consumer expectations as the formal test of liability. At this early stage in the development of design defect theory, it is likely that the court was simply feeling its way and had not worked through precisely how the two standards relate to one another. It may be that the court was thinking that in crashworthiness and other complex design cases consumers only have a right to expect that a vehicle be reasonably designed according to the cost-benefit calculations of reasonable engineers. Yet by leaving room for “other factors” in other situations, the court implicitly left open the possibility of applying a pure consumer expectations test in other contexts, perhaps in cases involving simple designs.

Whatever the *Tabert* court may actually have had in mind, in 1981 the Washington state legislature enacted a statute ambiguously basing liability for design dangers on the costs and benefits of a feasible alternative design *and* on the safety contemplations of an ordinary consumer.²³⁴ A subsequent Washington decision interpreted the statute to mean that a plaintiff could prevail on *either* basis, which amounts to a two-pronged approach for defining design defectiveness,²³⁵ a dubious interpretation of the statute which narrowly avoided being overruled in a 1999 en banc decision.²³⁶

Courts in most other jurisdictions largely ignored the *Welch* and *Tabert* approach combining the consumer expectations and risk-utility tests in some amorphous manner,²³⁷ and the idea of mixing the two approaches to design defectiveness (or finding them equivalent) lay dormant during the 1980s²³⁸ as the consumer expectations test gradually lost ground to risk-utility in their battle for supremacy as independent tests of design defectiveness. Then, as if awakening like Rip Van Winkle from a lengthy slumber, courts in a small number of states in the 1990s resurrected the nearly defunct idea that the two

234. *See Couch v. Mine Safety Appliances Co.*, 728 P.2d 585 (Wash. 1986); WASH. REV. CODE § 7.72.030(1)(a), (3) (1988).

235. *Falk v. Keene Corp.*, 782 P.2d 974, 977-80 (Wash. 1989). *Falk's* interpretation of the statutory standard converts it into a *Barker* standard, discussed *infra* Part VI.B.

236. *Soproni v. Polygon Apt. Partners*, 971 P.2d 500 (Wash. 1999) (5-4 decision); *cf. Eriksen v. Mobay Corp.*, 41 P.3d 488, 494 (Wash. Ct. App. 2002) (asserting unequivocally that a plaintiff may establish design defect liability by statute on either risk-utility or consumer expectations).

237. *But see Potter v. Chi. Pneumatic Tool Co.*, 694 A.2d 1319 (Conn. 1997), discussed *supra* text accompanying notes 247-54; *McCathern v. Toyota Motor Corp.*, 985 P.2d 804 (Or. Ct. App. 1999), *aff'd*, 23 P.3d 320, 330-32 (Or. 2001).

238. Or nearly dormant. *Robinson v. Reed-Prentice Div. of Package Mach. Co.*, 403 N.E.2d 440, 443 (N.Y. 1980) (“a defectively designed product is one which, at the time it leaves the seller’s hands, is in a condition not reasonably contemplated by the ultimate consumer and is unreasonably dangerous for its intended use; that is one whose utility does not outweigh the danger inherent in its introduction into the stream of commerce”).

independent design defect standards are equivalent,²³⁹ merely representing “two sides of the same coin.”²⁴⁰

The most notable decision in the 1990s to embrace the equivalency notion is *Potter v. Chicago Pneumatic Tool Co.*,²⁴¹ decided by the Supreme Court of Connecticut in 1997. This was a case brought by workers at a shipyard against the manufacturers of pneumatic hand tools for injuries the workers claimed were caused by excessive vibration of the tools. Although the consumer expectations test was “well established in Connecticut strict products liability decisions,”²⁴² the court was nevertheless troubled by the vagueness problem in consumer expectations concerning the safety of complex designs. Following jurisdictions like Washington “that have modified their formulation of the consumer expectation test by incorporating risk-utility factors into the ordinary consumer expectation analysis,”²⁴³ the *Potter* court adopted the *Tabert* court’s reformulation of the consumer expectations test in risk-utility terms for the complex design situation,²⁴⁴ as further discussed below. The *Potter* court observed that this “modified formulation” of the consumer expectations test “would establish the product’s risk and utility, and the inquiry would then be whether a reasonable consumer would consider

239. In *Ray v. BIC Corp.*, 925 S.W.2d 527, 531 (Tenn. 1996), noting the error in viewing the two tests as equivalent, the court “decline[d] to weave the two tests into one.” Even Oregon, which asserted in *Phillips* the equivalence of the two tests, now understands the naivete of that view. See *McCathern v. Toyota Motor Corp.*, 23 P.3d 320, 330-32 (Or. 2001). Yet the fact that the equivalency notion is now largely discredited does not mean that courts do not occasionally muddle the developing products liability jurisprudence by dragging this obsolete notion from obscurity. See, e.g., *Jackson v. Bomag GmbH*, 638 N.Y.S.2d 819, 821 (App. Div. 1996).

240. The quote is from *Ray v. BIC Corp.*, 925 S.W.2d at 530, which itself was quoting *Estate of Ryder v. Kelly-Springfield Tire Co.*, 587 P.2d 160, 164 (Wash. 1978). It is important to note, however, that the Tennessee court merely noted this approach and criticized it as incorrect and obsolete. *Ray*, 925 S.W.2d at 531. Subsequent decisions resting on the idea include *Potter v. Chicago Pneumatic Tool Co.*, 694 A.2d 1319 (Conn. 1997), and *Bragg v. Hi-Ranger, Inc.*, 462 S.E.2d 321, 328 (S.C. Ct. App. 1995) (“[W]e balance the utility of the risk inherent in the design of the product with the magnitude of the risk to determine the reasonableness of the manufacturer’s action in designing the product. This ‘balancing act’ is also relevant to the determination that the product, as designed, is unreasonably dangerous in its failure to conform to the ordinary user’s expectations.”). See also the confusing discussion of the relationship between consumer expectations and risk-utility in *Flemister v. General Motors Corp.*, 723 So. 2d 25 (Ala. 1998), in which consumer expectations appear to be redefined in risk-utility terms, and risk-utility appears to trump consumer expectations.

241. 694 A.2d 1319.

242. *Id.* at 1330.

243. *Id.* at 1333.

244. *Id.*

the product design unreasonably dangerous.”²⁴⁵ Also moving the liability standard from consumer expectations to a balance of costs and benefits, other courts have followed *Potter*’s approach of redefining the consumer expectations test in risk-utility terms, at least in cases involving complex designs.²⁴⁶

The *Potter* court and others following its approach of defining consumer expectations in risk-utility terms are obviously conflicted about abandoning consumer expectations altogether in favor of risk-utility as the basis for design defect liability, often because they accept the now-suspect view that the consumer expectations test protects consumer interests better than the risk-utility test.²⁴⁷ These courts have recognized, if reluctantly, the need to turn to a true risk-utility test for evaluating the safety of complex designs in order to provide a determinate standard for liability decisions. As discussed below, however, much may be said for completely breaking with consumer expectations as an independent test for evaluating the safety of product designs, particularly complex ones, and switching to risk-utility as the exclusive liability standard for most such cases.²⁴⁸

B. Two Liability “Prongs” – The Barker Approach

A more forthright and intelligible approach for accommodating the warranty and tort law foundations of strict manufacturer liability, which acknowledges the separate value of each, holds a manufacturer accountable for breaching its duties under either one by recognizing two independent bases or “prongs” of liability. By such a “two-pronged” approach to design defectiveness, a plaintiff injured by a product may establish a design defect if the design hazard fails *either* (1) a consumer expectations test *or* (2) a risk-utility

245. *Id.* In determining what a consumer reasonably would expect, the court noted that a jury should consider most of the Wade risk-utility factors, discussed *supra* Part IV. *Potter*, 694 A.2d at 1333 n.15.

246. *See, e.g.*, *Delaney v. Deere & Co.*, 999 P.2d 930, 944 (Kan. 2000) (recognizing “the validity of risk/utility analysis as a guide in determining the expectations of consumers in complex cases”); *Vautour v. Body Masters Sports Indus.*, 784 A.2d 1178 (N.H. 2001) (consumer expectations defined in terms of risk-utility); *McCathern v. Toyota Motor Corp.*, 23 P.3d 320, 330-32 (Or. 2001) (risk-utility evidence may be required to prove consumer expectations). *But see* *Pritchett v. Cottrell, Inc.*, 512 F.3d 1057, 1064 (8th Cir. 2008) (Mo. law) (while Missouri formally follows the consumer expectations test, the ultimate issue is whether a product is “unreasonably dangerous,” such that litigants may argue “that the utility of a design outweighs its risks, or that consumer expectations were violated, or any other theory of unreasonable dangerousness supported by the evidence”).

247. For difficulties the consumer expectations test causes plaintiffs, see *supra* Part III.

248. The consumer expectations standard still may be a useful liability test for simple product failures, discussed below, and it serves well in certain other specialized contexts. *See* RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2 cmt. h (1998); *id.* § 7 (food); *id.* § 8(b) (used products).

test. This approach has logical appeal because it protects the essential interests furthered by each test: contract law's protection of the expectations of buyers and sellers in their private bargains, and tort law's protection of the public welfare by requiring sellers to accord due respect to the safety interests of persons foreseeably endangered by defective products.²⁴⁹

Barker v. Lull Engineering Co.,²⁵⁰ decided by the California Supreme Court in 1978, was the first judicial formulation of an explicitly two-pronged definition of design defectiveness. The plaintiff, while operating a high-lift loader manufactured by the defendant, was struck by a piece of lumber when he leaped from the vehicle as his load began to shift. Plaintiff's strict liability in tort claim alleged that the loader's design was deficient because it was not equipped with stabilizing outriggers, a seatbelt, a roll bar, or an automatic locking device on the leveling lever, and was deficient in certain other respects as well. The trial court instructed the jury that strict liability for defective design is "based on a finding that the product was unreasonably dangerous," the jury found for the defendant, and the plaintiff appealed. Reversing because of errors in the design defect instruction, the Supreme Court of California adopted a two-pronged test for defects in design:

[A] trial judge may properly instruct the jury that a product is defective in design (1) if the plaintiff demonstrates that the product failed to perform as safely as an ordinary consumer would expect when used in an intended or reasonably foreseeable manner, or (2) if the plaintiff proves that the product's design proximately caused his injury and the defendant fails to prove, in light of the relevant factors, that on balance the benefits of the challenged design outweigh the risk of danger inherent in such design.²⁵¹

Among other factors relevant to the risk-utility prong of this test, the court listed the likelihood and gravity of danger posed by the challenged design, "the mechanical feasibility of a safer alternative design, the financial cost of an improved design, and the adverse consequences to the product and to the consumer that would result from an alternative design."²⁵²

As for the burden of proof, the *Barker* court left it on the plaintiff for the consumer expectations prong but shifted it to the manufacturer for the risk-utility prong.²⁵³ Observing that the doctrine of strict manufacturer liability in

249. Scholarly support for such an explicitly two-pronged approach originated in *Montgomery & Owen*, *supra* note 120, at 843-45.

250. 573 P.2d 443 (Cal. 1978).

251. *Id.* at 457-58.

252. *Id.* at 455.

253. *Id.* ("Once the plaintiff makes a prima facie showing that the injury was proximately caused by the product's design, the burden should appropriately shift to the defendant to prove, in light of the relevant factors, that the product is not defective."). *See also id.* at 456.

tort was designed to relieve injured plaintiffs of “the onerous evidentiary burdens” of proving a manufacturer’s negligence, the court explained the shift in the burden of proof by noting that most risk-benefit evidence on the feasibility and cost of alternative designs involves “technical matters peculiarly within the knowledge of the manufacturer.”²⁵⁴

While at least a couple of courts explicitly rejected *Barker*’s two-pronged definition of design defect,²⁵⁵ a handful of states explicitly adopted it.²⁵⁶ One state that followed this approach is Washington, which has a confusing statutory definition of design defectiveness. The statute separately provides that a product design may be considered defective on a finding of the cost-effectiveness of a feasible alternative design and for violating the safety contemplations of an ordinary consumer, but the statute fails to state whether the two design defect standards are independent or whether one will trump the other.²⁵⁷ As mentioned earlier, the Washington Supreme Court interpreted this statute as establishing a two-pronged standard,²⁵⁸ a questionable interpretation which narrowly escaped reversal a decade later.²⁵⁹ Unlike

254. *Id.*

255. *See, e.g.*, *Kallio v. Ford Motor Co.*, 407 N.W.2d 92, 95 (Minn. 1987); *Lester v. Magic Chef, Inc.*, 641 P.2d 353 (Kan. 1982). While the Kansas court flatly rejected the *Barker* two-pronged approach in favor of the consumer expectations test in *Lester*, risk-utility evidence has crept back into that state’s method for determining defects in design. *See Delaney v. Deere & Co.*, 999 P.2d 930, 944 (Kan. 2000) (recognizing “the validity of risk/utility analysis as a guide in determining the expectations of consumers in complex cases”).

256. *See Rivera Pomales v. Bridgestone Firestone, Inc.*, 217 F.R.D. 290, 295 (D.P.R. 2003); *Caterpillar Tractor Co. v. Beck*, 593 P.2d 871 (Alaska 1979); *Ontai v. Straub Clinic & Hosp., Inc.*, 659 P.2d 734 (Haw. 1983); *Lamkin v. Towner*, 563 N.E.2d 449 (Ill. 1990); *Knitz v. Minster Mach. Co.*, 432 N.E.2d 814 (Ohio 1982), *superseded by statute*, OHIO REV. CODE ANN. § 2307.75(B)(5) (2004); *see also Dart v. Wiebe Mfg., Inc.*, 709 P.2d 876 (Ariz. 1985); *Liggett Group, Inc. v. Davis*, No. 4D04-3811, 2007 WL 2935236, at *9 (Fla. Dist. Ct. App. Oct. 10, 2007) (Warner, J., concurring) (standard jury instruction defines design defect alternatively in terms of consumer expectations or risk-utility); *Mikolajczyk v. Ford Motor Co.*, 870 N.E.2d 885, 902 (Ill. App. Ct. 2007) (“the law of Illinois remains that a plaintiff may prove a strict liability design defect by *either* the consumer expectations test or the risk-utility test”).

257. On this issue, see WASH. REV. CODE § 7.72.030(1)(a), (3) (1988).

258. *See Falk v. Keene Corp.*, 782 P.2d 974, 977-80 (Wash. 1989). *See also* *Bruns v. PACCAR, Inc.*, 890 P.2d 469 (Wash. Ct. App. 1995).

259. *See Soproni v. Polygon Apt. Partners*, 971 P.2d 500 (Wash. 1999) (5-4 decision). Recent decisions unquestioningly accept the two-pronged standard. *See, e.g.*, *Spokane Sch. Dist. No. 81 v. Nw. Bldg. Sys., Inc.*, No. CV-04-0078-MWL, 2006 WL 696282, at *9 (E.D. Wash. Mar. 13, 2006) (“Two alternative tests may be used to establish that a product was not reasonably safe as designed: the risk-utility test and the consumer expectations test.”); *Thongchoom v. Graco Children’s Prods., Inc.*, 71 P.3d 214, 217 (Wash. Ct. App. 2003).

Washington's ambiguous legislation, statutes enacted in Tennessee²⁶⁰ and Ohio²⁶¹ clearly provide *Barker*-like, two-pronged standards for design defectiveness, though Ohio subsequently abandoned the two-pronged standard in favor of a multifaceted risk-utility approach.²⁶²

A few courts have danced around the issue, seemingly adopting the *Barker* two-pronged approach, but without saying so explicitly.²⁶³ A number of jurisdictions follow a de facto *Barker* approach, variously applying the consumer expectations and risk-utility tests in different cases,²⁶⁴ sometimes without a satisfactory explanation as to why one test is applied in one situation and the other test in some other.²⁶⁵ And the *Potter* approach, which con-

260. See TENN. CODE ANN. § 29-28-102(8) (1978), defining an “unreasonably dangerous” product as “a product [that] is dangerous to an extent beyond that which would be contemplated by the ordinary consumer who purchases it, [or a product that] because of its dangerous condition would not be put on the market by a reasonably prudent manufacturer or seller assuming that [the manufacturer or seller] knew of its dangerous condition.” See, e.g., *Ray v. BIC Corp.*, 925 S.W.2d 527 (Tenn. 1996) (declining to weave the two standards into one, and holding that the prudent manufacturer prong requires risk-utility analysis).

261. OHIO REV. CODE ANN. § 2307.75(A) (as reenacted in 2001).

262. Ohio adopted *Barker*'s two-pronged definition of design defectiveness judicially in the 1980s and legislatively in the 1990s, but a 2004 statute (effective 2005) adopted a multi-factor risk-utility test for design defectiveness that deleted consumer expectations as a separate basis of liability but included it as one factor in the risk-utility determination. See OHIO REV. CODE ANN. § 2307.75(B)(5) (2004).

263. See, e.g., *Dart v. Wiebe Mfg., Inc.*, 709 P.2d 876 (Ariz. 1985); *Ortho Pharm. Corp. v. Heath*, 722 P.2d 410 (Colo. 1986) (by implication), *overruled on other grounds by Armentrout v. FMC Corp.*, 842 P.2d 175 (Colo. 1992); cf. *Bredberg v. Pepsico, Inc.*, 551 N.W.2d 321, 325 n.3 (Iowa 1996) (pattern jury instruction appearing to present both standards as alternative tests); *Phipps v. Gen. Motors Corp.*, 363 A.2d 955, 957-63 (Md. 1976); *Baughn v. Honda Motor Co.*, 727 P.2d 655, 660 (Wash. 1986) (applying “consumer expectations test with a risk-utility base”). Colorado courts appear now to have interpreted *Ortho* as joining the *Barker* camp. See, e.g., *Bartholic v. Scripto-Tokai Corp.*, 140 F. Supp. 2d 1098 (D. Colo. 2000).

264. See, e.g., *Halliday v. Sturm, Ruger & Co.*, 792 A.2d 1145, 1153 (Md. 2002) (consumer expectations test applies to design cases unless product malfunctions, in which case risk-utility test applies). This is now the de facto approach to design cases in New York whose courts apply a consumer expectations test to implied warranty claims and a risk-utility test to claims for strict liability in tort. See, e.g., *Castro v. QVC Network, Inc.*, 139 F.3d 114, 118 (2d Cir. 1998) (N.Y. law) (Calabresi, J.) (“The imposition of strict liability for an alleged design ‘defect’ is determined by a risk-utility standard. The notion of ‘defect’ in a U.C.C.-based breach of warranty claim focuses, instead, on consumer expectations.”); *Denny v. Ford Motor Co.*, 662 N.E.2d 730 (N.Y. 1995).

265. See, e.g., *Warner Fruehauf Trailer Co. v. Boston*, 654 A.2d 1272, 1276 (D.C. 1995) (truck liftgate suddenly collapsed because it had only one, rather than two, hydraulic cylinders). In *Warner*, following what it said was the majority approach, the court used a risk-utility test for the design defect determination in the case before

flates consumer expectations and risk-utility, is itself a variation on the *Barker* two-pronged standard. While some of these decisions may be faulted for failing clearly to specify when and how the two separate tests should be applied, the courts still are feeling their way in the seemingly never-ending search for an ideal test for design defectiveness. And there may be real value in the idea of intelligently combining, in some manner or another, both standards of liability.²⁶⁶

A small number of jurisdictions adopting *Barker's* two-pronged approach for defining design defects also followed that decision's reversal of the burden of proof.²⁶⁷ However, most courts adopting a two-pronged approach rejected this change in the balance of litigation responsibility and continue to require the plaintiff to prove the feasibility and cost-effectiveness of the alternative design, together with other components of the risk-utility analysis.²⁶⁸ At a superficial level, *Barker's* shift in the burden of proof seems fair and reasonable because at least some information on cost-benefit tradeoffs is likely to reside in the defendant's files. Yet it hardly seems unfair to require the plaintiff to offer and prove a hypothesis as to how, specifically, a product ought to have been more safely designed. And, requiring a defendant

it, "[g]iven the type of product," but observed that consumer expectations test is also frequently used. *See also* Bragg v. Hi-Ranger, Inc., 462 S.E.2d 321, 328 (S.C. Ct. App. 1995).

266. *See, e.g.,* Kennedy, *supra* note 37, at 162-63 (1994) ("it will be prudent in some cases to employ the consumer expectation test in conjunction with the risk-utility balancing test in the form of a 'risk-utility consumer expectation test.' . . . given the complexity of products and products liability tort litigation today; the moral, social, economic, and jurisprudential values sought to be advanced by tort liability; and the superiority of the risk-utility balancing test in serving these interests and in resolving many of the tough issues presented in most products liability disputes").

267. *See, e.g.,* Quintana-Ruiz v. Hyundai Motor Corp., 303 F.3d 62 (1st Cir. 2002) (P.R. law); Caterpillar Tractor Co. v. Beck, 593 P.2d 871 (Alaska 1979); Ortho Pharm. Corp. v. Heath, 722 P.2d 410 (Colo. 1986); Ontai v. Straub Clinic & Hosp., Inc., 659 P.2d 734 (Haw. 1983); Lamkin v. Towner, 563 N.E.2d 449 (Ill. 1990).

Colorado and Illinois both eventually reconsidered and rejected the burden shift. *See* Armentrout v. FMC Corp., 842 P.2d 175, 183 (Colo. 1992); Blue v. Env'tl. Eng'g, Inc., 828 N.E.2d 1128, 1142-44 (Ill. 2005). In *Soule v. General Motors Corp.*, 882 P.2d 298, 311 n.8 (Cal. 1994), the California Supreme Court revisited and reaffirmed *Barker's* shift in the burden of proof.

268. Except for Alaska, Hawaii, and Puerto Rico, courts in other states have rejected *Barker's* second-prong shift in the burden of proof. *See, e.g.,* Armentrout, 842 P.2d 175 (overruling prior case); Blue, 828 N.E.2d at 1142-44 (disapproving prior case); Hayes v. Ariens Co., 462 N.E.2d 273 (Mass. 1984), *overruled in part on other grounds* by Vassallo v. Baxter Healthcare Corp., 696 N.E.2d 909 (Mass. 1998); Kallio v. Ford Motor Co., 407 N.W.2d 92 (Minn. 1987); Cremeans v. Int'l Harvester Co., 452 N.E.2d 1281 (Ohio 1983); Wilson v. Piper Aircraft Corp., 579 P.2d 1287 (Or. 1978) (en banc). *See also* Dart v. Wiebe Mfg., Inc., 709 P.2d 876 (Ariz. 1985) (en banc) (by implication); Ray v. BIC Corp., 925 S.W.2d 527, 532 (Tenn. 1996) (labeling *Barker's* shift in the burden of proof "aberrant").

to prove why it did not adopt any of an infinite number of potential alternative designs unfairly requires it to prove a negative. For these and other reasons, leading commentators reasonably view *Barker's* shift in the burden of proof as simply wrong.²⁶⁹

Putting aside the troublesome shift in the burden of proof on the risk-utility prong, *Barker's* basic two-pronged approach to defining design defects makes good sense in many respects. And it is far more forthright and intelligible than artful definitions of consumer expectations and risk-utility in terms of one another. In addition to simple clarity, an advantage of the two-pronged approach is that each test shores up the weaknesses of the other. When used alone as the exclusive test of design defectiveness, both the consumer expectations and risk-utility tests must be expanded past their fair limits to provide liability in some cases where it is appropriate. Thus, plaintiffs are helped by the two-pronged approach because they get to bite the apple on both sides. But this test also provides benefits for defendants and the courts. Defendants may be advantaged by the paring down of both tests to their leanest forms, where the proofs may be clearer and results more predictable from each test. And courts will benefit in the same respect from the improvement in logic and clarity from narrowing down the tests to permit them to establish proper norms of responsibility for their own particular realms. Despite the benefits of such a lean, two-pronged definitional approach, such a standard must be shaped carefully around the inherent weaknesses of the consumer expectations test – its indeterminacy in evaluating complex designs and its bar to claims involving obvious dangers that could easily have been designed away.

C. *Complex vs. Simple Designs – The Soule Approach*

From the very earliest days of modern products liability law, courts and commentators turned to the risk-utility test to avoid applying the consumer expectations test to cases involving vague expectations concerning complex designs.²⁷⁰ In one early design defect case, *Heaton v. Ford Motor Co.*,²⁷¹ the driver of a pickup truck hit a 5– or 6–inch rock, damaging the wheel, which caused the truck to leave the road and tip over. In making a claim for design

269. “The rule places an enormous burden on the concept of a ‘product design that proximately causes injury,’ a burden which the concept seems ill-equipped to handle People fall off ladders all the time, and the fact that ladders are both high and in some general way unstable enables these falls to occur. Does it or doesn’t it follow that in every case of a person’s falling off a ladder, the ladder’s design proximately causes the fall?” Schwartz, *supra* note 136, at 466-67. See also KEETON, DOBBS, KEETON & OWEN, *supra* note 59, at 702; Wade, *supra* note 172, at 573.

270. See, e.g., Wade, *On the Nature*, *supra* note 7, at 829 (criticizing use of consumer expectations test in cases where “the consumer would not know what to expect, because he would have no idea how safe the product could be made”).

271. 435 P.2d 806 (Or. 1967).

defectiveness under § 402A, the plaintiff introduced no risk-utility evidence of the costs or feasibility of designing a stronger wheel but relied exclusively upon the consumer expectations test to prove his case. Affirming a non-suit against the plaintiff, the Oregon Supreme Court ruled that the jury, without evidence on the costs and benefits of designing the wheel more strongly, did not have the necessary tools to render a principled decision: without such data, the jury could only speculate on the reasonableness of the wheel's design.²⁷² Put otherwise, the complexity of the engineering trade-offs involved in the wheel's design rendered consumer expectations unsuitable as a test of its adequacy. Instead, the risk-utility test's factors of feasibility, costs, and benefits were needed to ascertain the sufficiency of the design. Several years later, the Oregon courts took the final plunge by abandoning the consumer expectations test in favor of a risk-utility test requiring proof of a feasible alternative design.²⁷³

After the California Supreme Court decided *Barker* in 1979, other courts began to view consumer expectations and risk-utility as compatible rather than mutually exclusive ways to define a defect in design.²⁷⁴ Some courts that followed *Barker* in adopting a two-pronged test for design defectiveness began to limit the consumer expectations prong to contexts where consumers have meaningful expectations concerning product safety. For example, rather

272. "Where the jury has no experiential basis for knowing this, the record must supply a basis. In the absence of either common experience or evidence, any verdict would, in effect, be the jury's opinion of how strong the product *should* be. Such an opinion by the jury would be formed without the benefit of data concerning the cost or feasibility of designing and building stronger products. Without reference to relevant factual data, the jury has no special qualifications for deciding what is reasonable." *Id.* at 809.

273. *See, e.g.*, *Roach v. Kononen*, 525 P.2d 125 (Or. 1974); *Phillips v. Kimwood Mach. Co.*, 525 P.2d 1033 (Or. 1974); *Wilson v. Piper Aircraft Corp.*, 577 P.2d 1322 (Or. 1978), *reh'g denied*, 579 P.2d 1287 (Or. 1978); *Willamette Essential Oils v. Herrold & Jensen Implement Co.*, 683 P.2d 1374 (Or. Ct. App. 1984); *Wood v. Ford Motor Co.*, 691 P.2d 495 (Or. Ct. App. 1984). In 1979, the Oregon legislature essentially adopted RESTATEMENT (SECOND) OF TORTS § 402A (1965), including its comments defining "defective" and "unreasonably dangerous" in consumer contemplation terms. *See* OR. REV. STAT. § 30.920(3) (1979). While at least one Oregon court interpreted the statute to require use of the consumer expectations test alone, *Burns v. Gen. Motors Corp.*, 891 P.2d 1354 (Or. Ct. App. 1995), the resiliency of the risk-utility test has been illustrated by subsequent decisions reintroducing risk-utility analysis as a basis for design defectiveness in complex cases. *See, e.g.*, *McCathern v. Toyota Motor Corp.*, 23 P.3d 320, 330-32 (Or. 2001) (risk-utility evidence may be required to prove consumer expectations).

274. *See, e.g.*, *Biosera, Inc. v. Forma Scientific, Inc.*, 941 P.2d 284, 287 (Colo. Ct. App. 1996) ("[W]e conclude that the two tests are not mutually exclusive. Rather, a court should review each to determine if it is an appropriate standard for judging the dangerous nature of the product at issue."), *aff'd on other grounds*, 960 P.2d 108 (Colo. 1998).

than abandoning the consumer expectations test altogether, the Supreme Court of Arizona, in a 1985 decision that adopted the *Barker* two-pronged approach, limited the consumer expectations test to cases where such expectations are well-defined, requiring the risk-utility test in cases where consumer expectations are vague.²⁷⁵ The next year, the Supreme Court of Colorado adopted the *Barker* two-pronged test,²⁷⁶ observing the following year that the consumer expectations test was inappropriate for judging the adequacy of complex designs.²⁷⁷

By the 1990s, it had become quite clear that the consumer expectations test was a poor gauge for ascertaining the adequacy of complex designs. In *Soule v. General Motors Corp.*,²⁷⁸ the California Supreme Court in 1994 squarely confronted the vagueness problem inherent in *Barker*'s consumer expectations prong. The plaintiff's ankles were fractured when the Chevrolet Camaro she was driving collided with another vehicle at a closing speed of 50 – 60 miles per hour. She sued the manufacturer, asserting that the design of her automobile was defective because the left front wheel broke free, collapsed rearward, and smashed the toe pan and floorboard into her feet. In particular, she claimed that the configuration of the car's frame, and the bracket attaching the wheel assembly to it, were defectively designed because they did not limit the wheel's rearward travel in the event the bracket should fail. At trial, the parties disagreed on the angle and force of the impact and the extent to which the toe pan had actually deformed. Design defectiveness and causation were addressed by numerous experts on biomechanics, metallurgy, orthopedics, design engineering, crash-test simulation, and other matters. The plaintiff's experts, relying on crash tests, metallurgical analysis, and other evidence, explained how the damage to her car would have been minimized had it been properly designed. The defendant's experts attempted to refute these claims and explained how the plaintiff's ankle injuries were caused by the force of the collision and her failure to wear a seatbelt rather than any defect in the car. The trial court instructed the jury on the consumer expectations test, and the jury returned a verdict for the plaintiff.

On appeal, an important question was whether the trial court erred in instructing the jury on the consumer expectations test in a case in which the common experience of product users does not provide a basis for determining how safely the product should have performed. The intermediate appellate

275. *Dart v. Wiebe Mfg., Inc.*, 709 P.2d 876 (Ariz. 1985).

276. *See Ortho Pharm. Corp. v. Heath*, 722 P.2d 410 (Colo. 1986) (by implication), *overruled on other grounds by Armentrout v. FMC Corp.*, 842 P.2d 175 (Colo. 1992).

277. *See Camacho v. Honda Motor Co.*, 741 P.2d 1240, 1246-47 (Colo. 1987) (“exclusive reliance upon consumer expectations is a particularly inappropriate means of determining [defectiveness] where both the unreasonableness of the danger in the design defect and the efficacy of alternative designs in achieving a reasonable degree of safety must be defined primarily by technical, scientific information”).

278. 882 P.2d 298 (Cal. 1994).

court affirmed the judgment for the plaintiff, and the defendant appealed to the California Supreme Court. Reversing, the Supreme Court held that the trial court erred in instructing the jury on the consumer expectations test on the facts of the case.²⁷⁹ The court noted that it previously had explained, in *Barker v. Lull Engineering Co.*,²⁸⁰ that a proper assessment of the costs, benefits, and practicality inherent in appropriate design defect determinations requires risk-utility balancing rather than a gauge of consumer expectations.²⁸¹ The court there had cited automotive crashworthiness litigation as an example of the kind of complex case in which the feasibility, costs, and benefits of particular designs are “implicit” in an evaluation of the quality of the manufacturer’s design decision.²⁸² Distinguishing a case in which it had held that consumer expectations were a proper test for judging the design adequacy of a bus without a “grab bar” in easy reach of the plaintiff’s seat,²⁸³ the *Soule* court reasoned that the particular safety issue in that case was a matter of common understanding. Thus, the consumer expectations test of *Barker*’s first prong is appropriate, and expert testimony on defectiveness would invade the province of the jury, in cases involving simple product safety issues about which consumers and jurors have a common understanding of widely accepted minimum safety expectations.²⁸⁴

The court reasoned further, however, that cases involving complex products often involve risks of injury that do not intelligibly engage the reasonable minimum safety expectations of consumers.²⁸⁵ Thus, in automotive crashworthiness situations, consumers typically have “no idea” how safely their vehicles should have performed in the particular circumstances of a crash. In such cases, “the jury must consider the manufacturer’s evidence of competing design considerations, and the issue of design defect cannot fairly be resolved by standardless reference to the ‘expectations’ of an ‘ordinary consumer.’”²⁸⁶ Because safety performance mechanisms in such cases typically are complex, and consumer safety expectations are commensurably vague, juries must turn to “the balancing of risks and benefits required by the

279. *Id.* at 307-08.

280. 573 P.2d 443 (Cal. 1978).

281. *Soule*, 882 P.2d at 305.

282. *Barker*, 573 P.2d at 456.

283. *Campbell v. Gen. Motors Corp.*, 649 P.2d 224 (Cal. 1982).

284. As examples, the *Soule* court pointed to situations where a car explodes while sitting at a stoplight, experiences sudden steering or brake failure as it leaves the dealership, or rolls over and catches fire in a two-mile-per-hour collision. 882 P.2d at 308 n.3. Thus, the consumer expectations test of *Barker*’s first prong must be reserved “for cases in which the *everyday experience* of the product’s users permits a conclusion that the product’s design violated minimum safety assumptions, and is thus defective *regardless of expert opinion about the merits of the design.*” *Id.* at 308.

285. *Id.*

286. *Id.*

second prong of *Barker*.²⁸⁷ The *Soule* court thus concluded that the jury should *not* have been instructed on the consumer expectations test because the plaintiff's design defect theory involved complex technical and mechanical issues.²⁸⁸

Soule's allocation of the consumer expectations and risk-utility tests to their best uses – the former to designs involving simple safety issues (where expert testimony may be improper) and the latter to designs involving complex cost-benefit tradeoffs (where expert testimony is required) – seemingly makes good sense.²⁸⁹ Yet, this selection of defect tests on whether a product is “simple” or “complex” can result in serious mischief if it is used to deprive plaintiffs of a right to employ the risk-utility test in cases where a simple risk is obvious, such as a lighter not equipped with a simple child-proof design.²⁹⁰ Courts dividing design defect tests along *Soule* lines will need to make cau-

287. *Id.* at 308-09.

288. “An ordinary consumer of automobiles cannot reasonably expect that a car’s frame, suspension, or interior will be designed to remain intact in any and all accidents. Nor would ordinary experience and understanding inform such a consumer how safely an automobile’s design should perform under the esoteric circumstances of the collision at issue here. Indeed, both parties assumed that quite complicated design considerations were at issue, and that expert testimony was necessary to illuminate these matters. Therefore, injection of ordinary consumer expectations into the design defect equation was improper.” *Id.* at 310. Nevertheless, because of the voluminous evidence presented on the costs and benefits of the Camaro’s design, the court saw no reason to believe that the jury ignored the risk-utility issue and only relied upon the consumer expectations test. *Id.* at 311. Accordingly, the court held that the trial court’s error in instructing the jury on the consumer expectations prong was harmless. *Id.*

289. See Kennedy, *supra* note 37.

290. Compare *Todd v. Societe Bic, S.A.*, 21 F.3d 1402 (7th Cir. 1994) (Ill. law) (holding that Illinois would use consumer expectations prong of its two-pronged test in judging design of simple products with obvious risks; a disposable butane cigarette lighter, not equipped with a child-proof design, is not defective because consumers expect it to ignite when activated), with *Robins v. Kroger Co.*, 80 S.W.3d 641 (Tex. App. 2002) (seller of lighter without child-proof design not entitled to summary judgment on risk-utility test that included consumer expectations as one factor in the balance).

Courts in Michigan, and formerly in Illinois, have sometimes slipped into this beastly trap. See, e.g., *Miles v. S.C. Johnson & Son, Inc.*, No. 00 C 3278, 2002 WL 1303131 (N.D. Ill. June 12, 2002) (obvious danger to young child who eats crystal Drano drain cleaner); *Bates v. Richland Sales Corp.*, 803 N.E.2d 977 (Ill. App. Ct. 2004) (risk from removing loader’s roll bar). Compare *Mills v. Curioni, Inc.*, 238 F. Supp. 2d 876, 892 (E.D. Mich. 2002) (“It is only when a ‘simple tool’ is involved that the ‘open and obvious danger’ rule will relieve a manufacturer of liability on a design defect claim.”), with *Cacevic v. Simplimatic Eng’g Co.*, 617 N.W.2d 386, 392 (Mich. Ct. App. 2000) (concluding that “the open and obvious danger doctrine [does not] apply to obviate a manufacturer’s duty in a case alleging defective design of a simple product”).

tious allowances for these types of cases to avoid resurrecting the patent danger rule, which now is properly defunct.²⁹¹ Many courts have adopted *Soule's* approach of applying design defect tests based on the complexity or simplicity of a product's design,²⁹² while others have rejected the complex vs. simple product approach outright.²⁹³

Courts that have defined consumer expectations in terms of risk-utility,²⁹⁴ discussed above, have effectively chosen to follow the *Barker–Soule*

291. See OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 10.2.

292. See, e.g., *Quintana-Ruiz v. Hyundai Motor Corp.*, 303 F.3d 62, 77 (1st Cir. 2002) (P.R. law) (“the rule that consumer expectations cannot be the basis of liability in a case involving complex technical matters” precludes use of this test in airbag design defect case); *Morson v. Superior Court*, 109 Cal. Rptr. 2d 343, 350-51 (Ct. App. 2001) (consumer expectations test inappropriate to determine design defectiveness of latex gloves that could trigger harmful allergic reactions in persons with non-existent, dormant, or minor allergic conditions); *Biosera, Inc. v. Forma Scientific, Inc.*, 941 P.2d 284 (Colo. Ct. App. 1996), *aff'd on other grounds*, 960 P.2d 108 (Colo. 1998); *Potter v. Chi. Pneumatic Tool Co.*, 694 A.2d 1319, 1333-34 (Conn. 1997); *Force v. Ford Motor Co.*, 879 So. 2d 103, 110 (Fla. Dist. Ct. App. 2004) (“there may indeed be products that are too complex for a logical application of the consumer-expectation standard”); *Bates v. Richland Sales Corp.*, 803 N.E.2d 977 (Ill. App. Ct. 2004); *Ray v. BIC Corp.*, 925 S.W.2d 527, 533 (Tenn. 1996) (“the consumer expectation test will be inapplicable, by definition, to certain products about which an ordinary consumer can have no expectation”). See also *Coffey v. Dowley Mfg., Inc.*, 187 F. Supp. 2d 958, 969 (M.D. Tenn. 2002), *aff'd*, 89 F. App'x 927 (6th Cir. 2003) (although “technically applicable to all cases,” consumer expectations test may be inadequate when product complex); *Gen. Motors Corp. v. Farnsworth*, 965 P.2d 1209, 1221 (Alaska 1998) (passenger in car submarined under lap belt; consumers could form expectations concerning lap belt design); *Camacho v. Honda Motor Co.*, 741 P.2d 1240, 1246-47 (Colo. 1987); cases cited *infra* note 299.

293. See, e.g., *Calles v. Scripto-Tokai Corp.*, 864 N.E.2d 249, 259 (Ill. 2007) (rejecting “simple product” exception to risk-utility test in case where 3-year-old killed in fire she started with utility lighter that was not equipped with child-resistant safety device, and noting that the effect of such an exception would be to relieve manufacturers of design responsibility for obvious dangers); *Jackson v. Gen. Motors Corp.*, 60 S.W.3d 800 (Tenn. 2001) (refusing to limit consumer expectations prong of two-pronged statutory design defect standard to simple product designs).

294. See, e.g., *Delaney v. Deere & Co.*, 999 P.2d 930, 944 (Kan. 2000) (recognizing “the validity of risk/utility analysis as a guide in determining the expectations of consumers in complex cases”); *Vautour v. Body Masters Sports Indus.*, 784 A.2d 1178 (N.H. 2001) (consumer expectations defined in terms of risk-utility); *McCathern v. Toyota Motor Corp.*, 23 P.3d 320, 330-32 (Or. 2001) (risk-utility evidence may be required to prove consumer expectations); *Seattle-First Nat'l Bank v. Tabert*, 542 P.2d 774, 779 (Wash. 1975). *But see Pritchett v. Cottrell, Inc.*, 512 F.3d 1057, 1064 (8th Cir. 2008) (Mo. law) (while Missouri formally follows the consumer expectations test, the ultimate issue is whether a product is “unreasonably dangerous,” such that litigants may argue “that the utility of a design outweighs its risks, or that consumer expectations were violated, or any other theory of unreasonable dangerousness supported by the evidence”); cases cited *supra* note 292.

approach, if by a crooked path. The Connecticut Supreme Court's experience in *Potter v. Chicago Pneumatic Tool Co.*²⁹⁵ is a good example. There, reasoning that "a consumer's expectations may be viewed in light of various factors that balance the utility of the product's design with the magnitude of its risks,"²⁹⁶ the court materially altered Connecticut's design defect jurisprudence. Holding that this risk-utility formulation of a "modified consumer expectation test" should be used for complex design cases, the court concluded, citing *Soule*, that the "ordinary consumer expectation test" should be reserved for use "when the everyday experience of the particular product's users permits the inference that the product did not meet minimum safety expectations."²⁹⁷ In so doing, *Potter* effectively established its own version of a two-pronged *Barker-Soule* test – with the first prong being an "ordinary" consumer expectations test, limited to simple design cases, and the second prong being a risk-utility test (window-dressed as a "modified" consumer expectation test), for application in complex cases. *Potter*'s basic result is sound, but tying the risk-utility prong to consumer expectations sows seeds of confusion for future design defect litigation. Yet *Potter* also contains an important insight: that risk-utility analysis should be turned to when "ordinary" consumer expectations fail to provide a rational basis for recovery.²⁹⁸

As cost-benefit analysis gathers strength around the globe as the dominant method for judging whether a product's design is adequately safe,²⁹⁹ courts and legislatures continue to search for ways to accommodate consumer expectations without banishing it altogether from design defect determinations.³⁰⁰ Even the *Products Liability Restatement*, though assigning con-

295. 694 A.2d 1319.

296. *Id.* at 1333.

297. *Id.* (emphasis added).

298. As, presumably, in obvious danger cases. *Potter* emphasized that only the risk-utility test (dubbed the "modified consumer expectations test"), not the ("ordinary") consumer expectation test, should be used in cases where the consumer expectations test does not provide relief:

[T]he jury should engage in the risk-utility balancing required by our modified consumer expectation test when the particular facts do not reasonably permit the inference that the product did not meet the safety expectations of the ordinary consumer. Furthermore, instructions based on the ordinary consumer expectation test would not be appropriate when, as a matter of law, there is insufficient evidence to support a jury verdict under that test. In such circumstances, the jury should be instructed solely on the modified consumer expectation test we have articulated today.

Id. at 1334.

299. This trend is not limited to the United States. See OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 1.4.

300. See, e.g., *Pritchett v. Cottrell, Inc.*, 512 F.3d 1057, 1064 (8th Cir. 2008) (Mo. law) (though Missouri formally follows consumer expectations test, ultimate issue is whether product is "unreasonably dangerous," so that litigants may argue "that the utility of a design outweighs its risks, or that consumer expectations were violated, or

sumer expectations to a secondary position as a mere factor in the risk-utility balance, recognizes that consumer expectations may play an important (sometimes decisive) role in assessing design defectiveness.³⁰¹ The approach of some courts in defining consumer expectations and risk-utility in terms of one another may accommodate both perspectives but does so through a sleight of hand that muddies products liability jurisprudence. The *Barker* two-pronged test for design defectiveness achieves the same objectives, more clearly and intelligibly, but the burden of proof should be left on plaintiffs for both prongs. Moreover, the consumer expectations prong should be limited to simple design dangers, as in *Soule* and *Potter*, except that the risk-utility prong should be retained for use in simple design cases in which the risks are obvious. Combining the consumer expectations and risk-utility tests along these lines may provide an optimal standard for judging design defectiveness.³⁰²

VII. CONSTRUCTIVE KNOWLEDGE – THE WADE–KEETON TEST

In holding manufacturers responsible for defects in design, courts and commentators have always sought to avoid absolute liability, recognizing that the concepts of design safety and design danger are matters of degree involving trade-offs between a product's usefulness, cost, and safety.³⁰³ The idea of a design defect, in other words, has long been understood to rest on the idea of reasonable balance.³⁰⁴ Because negligence itself is grounded on both reasonableness and balance, one is led to inquire whether and how negligence and strict liability may differ in design defect litigation. Accordingly, in the 1960s, products liability scholars began to search for a way to define

any other theory of unreasonable dangerousness supported by the evidence"); *Glenn v. Overhead Door Corp.*, 935 So. 2d 1074, 1081 (Miss. Ct. App. 2006) ("the Products Liability Act requires the manufacturer's product to pass both the risk-utility and the consumer expectations tests"); MISS. CODE ANN. § 11-1-63(b) (2004).

301. See *infra* Part VIII.

302. Such a test might look something like the following:

A simple product design is defective if it fails to perform as safely as an ordinary consumer fairly would expect, and any design is defective if it reasonably should have been designed more safely in a way that would have prevented the plaintiff's injuries. A product reasonably should have been designed more safely if the foreseeable safety benefits of an untaken design precaution clearly exceeded its foreseeable costs, including any diminished usefulness or safety.

The liability standard suggested here limits design defect determinations to situations where a manufacturer's cost-benefit decisions are "clearly" wrong in order to maximize the range of product diversity and, hence, consumer choice among a wide range of products with differing, yet acceptable, balances of cost, utility, and safety.

303. See OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, §§ 5.3, 5.5.

304. See, e.g., Owen, *Defectiveness Restated*, *supra* note 7, at 754-61.

strict liability for selling products with defects in design (and warnings) in a manner that distinguished the strict liability standard from mere negligence.

Other than Dean Prosser, the two most prominent tort law scholars in the 1960s who shared a special interest in products liability law were Dean Page Keeton of the University of Texas and Dean John Wade of Vanderbilt University. As modern products liability law was just beginning to emerge in the 1960s, the two deans, both advisers to the American Law Institute's *Restatement (Second) of Torts* which was then in progress, offered separate versions of a similar definition of product defectiveness that distinguished negligence-based responsibility from liability called "strict" in a fundamental way. At the time, courts and commentators were just beginning to feel their way around the new precept of holding manufacturers of defective products "strictly" accountable for injuries to remote consumers.³⁰⁵ Little thought was being devoted to how the new field might be divided up, for purposes of the standard of liability, according to different types of defect.³⁰⁶ Thus, as with most other scholars of the day, the search by Deans Keeton and Wade for an appropriate "test" of strict liability was a search for a single liability standard that alone would embrace most products liability problems of the day.³⁰⁷

The test developed by Deans Keeton and Wade, which in time became known as the "Wade-Keeton" test³⁰⁸ quite simply was a negligence test stripped of scienter.³⁰⁹ That is, both scholars proposed defining defectiveness in terms of whether a manufacturer or other seller with full knowledge of its product's dangerous condition would be negligent in selling it in that condition. By requiring a seller to know its product's risks, commensurately relieving an injured plaintiff of the burden of proving the foreseeability of those risks, this test imposes on the seller "constructive knowledge" of any dangers its products may possess.³¹⁰

305. See Owen, *Evolution*, *supra* note 21.

306. See OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 6.2. This is not to say that certain scholars of the day did not perceive a great divide between manufacturing and design defects, for they did. See, e.g., Keeton, *Liability Without Fault*, *supra* note 7, at 859.

307. Especially in the 1960s, the case law was quite limited, and, like other scholars of the time, both Deans Keeton and Wade drew on various examples of defects in manufacturing, design, and warning.

308. See, e.g., *Privette v. CSX Transp., Inc.*, 79 F. App'x 879, 889 (6th Cir. 2003) (Tenn. law) (referring to this liability standard more fully as "the Wade-Keeton prudent manufacturer test"); *Brooks v. Beech Aircraft Corp.*, 902 P.2d 54, 63 (N.M. 1995); Richard L. Cupp, Jr. & Danielle Polage, *The Rhetoric of Strict Liability Versus Negligence: An Empirical Analysis*, 77 N.Y.U. L. REV. 874, 884 (2002).

309. See, e.g., Wade, *On the Nature*, *supra* note 7, at 834-35. The Wade-Keeton test is examined from a state-of-the-art perspective in OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 10.4.

310. See, e.g., *Phillips v. Kimwood Mach. Co.*, 525 P.2d 1033 (Or. 1974).

In 1961, two years before Judge Roger Traynor penned his opinion in *Greenman v. Yuba Power Products, Inc.*,³¹¹ three years before Dean William Prosser submitted to the ALI his draft of *Restatement (Second) of Torts* § 402A applicable to products generally,³¹² and four years before Dean Wade first offered a similar proposal, Dean Page Keeton authored a little article in the *Texas Law Review* in which he first articulated a liability test for product defects that was truly strict. At the conclusion of the article in which he examined the various techniques by which courts were holding manufacturers accountable for injuries from defective products,³¹³ Dean Keeton proposed that a product should not be considered defective “if a reasonable man with full knowledge of all the properties and the danger therein, would continue to market the product because the utility of its use outweighs the danger.”³¹⁴ Two years later, Dean Keeton hinted at this test in another article in the *Texas Law Review*,³¹⁵ and then, in 1964, in an article exploring the nature of strict products liability,³¹⁶ he explained that courts had imposed strict manufacturer liability when “the product was so dangerous to the user in the condition that it was in that a reasonable man would not have sold it in such condition with knowledge of such a condition and appreciation of the danger. The manufacturer would have been negligent except for his excusable ignorance of the danger.”³¹⁷ In numerous other articles, from 1966 to at least 1980, Dean Keeton recommended and refined his test of design defectiveness. In his later articles, he emphasized that a design’s risks should be determined at the date of trial, which of course imposes constructive knowledge on the manufacturer at the time of first design and sale: “a product is defectively designed [if] the magnitude of the danger in fact of the design as it is proved to be at the trial outweighs the utility of the design.”³¹⁸

311. 377 P.2d 897 (Cal. 1963).

312. The ALI approved § 402A when Dean Prosser presented it in final form, applicable to products generally, in 1964. See OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 5.3.

313. Keeton, *Current Developments*, *supra* note 7.

314. *Id.* at 210. “This is close to a negligence test but not the same [because] excusable ignorance of a defect or the properties of a product is immaterial. . . .” *Id.* In his full discussion, Dean Keeton mistakenly confuses the negative and positive formulations of the standard.

315. Keeton, *Liability Without Fault*, *supra* note 7, at 867-68.

316. Page Keeton, *Products Liability – The Nature and Extent of Strict Liability*, 1964 U. ILL. L. F. 693, 702.

317. *Id.*

318. W. Page Keeton, *Products Liability – Design Hazards and the Meaning of Defect*, 10 CUMB. L. REV. 293, 314-15 (1979). In this article, Dean Keeton noted that his test differs from negligence primarily because, as proposed, the danger in fact as proven at trial determines whether a product is good or bad. . . . When the negligence of the defendant is in issue, it is perceivable danger at the time the product was designed that is the basis for weighing danger against utility. Therefore, a clear difference between proof of negligence and proof of defect as a basis for recovery is appar-

In 1965, in an article³¹⁹ in which he cited both of Dean Keeton's Texas articles,³²⁰ Dean John Wade offered a similar strict liability test for ascertaining whether a product is unreasonably dangerous: "assuming that the defendant had knowledge of the condition of the product, would he then have been acting unreasonably in placing it on the market?"³²¹ Further, Dean Wade remarked: "If the test is equivalent to that of whether a reasonable prudent man would put it on the market if he knew of the dangers of this particular article, then the elements for determining negligence are relevant. We have here again the problem of balancing the utility of the risk against the magnitude of the risk."³²² In his famous 1973 article in the *Mississippi Law Journal*,³²³ Dean Wade restated his version of the test:

The simplest and easiest way [to define defectiveness] is to assume that the defendant knew of the dangerous condition of the product and ask whether he was then negligent in putting it on the market or supplying it to someone else. In other words, the scienter is supplied as a matter of law, and there is no need for the plaintiff to prove its existence as a matter of fact. Once given this notice of the dangerous condition of the chattel, the question then becomes whether the defendant was negligent. . . . Another way of saying this is to ask whether the magnitude of the risk created by the dangerous condition of the product was outweighed by the social utility attained by putting it out in this fashion.³²⁴

ent. *Id.* at 314-15. In a footnote, Dean Keeton pointed out that the difference between the two tests was the requirement for negligence that the danger be foreseeable, whereas, under his "strict" liability test, "it is irrelevant that the defendant did not know or had no reason to know of the danger." *Id.* at 315 n.87.

319. Wade, *Strict Tort Liability*, *supra* note 7. The article arose out of a products liability symposium the year before in Dallas, Texas where both deans presented papers.

320. *Id.* at 12, 13 n.45.

321. *Id.* at 15.

322. *Id.* at 17.

323. Wade, *On the Nature*, *supra* note 7.

324. *Id.* at 834-35. Dean Wade also recommended how the jury might be instructed on this test:

A [product] is not duly safe if it is so likely to be harmful to person [or property] that a reasonable prudent manufacturer [supplier], who had actual knowledge of its harmful character would not place it on the market. It is not necessary to find that this defendant had knowledge of the harmful character of the [product] in order to determine that it was not duly safe.

Id. at 839-40.

Just why the “Wade–Keeton” test was labeled precisely as it was is shrouded in the mists of time,³²⁵ but its name is surely backwards. Not only does it appear to have been invented by Dean Keeton in 1961,³²⁶ four years before Dean Wade first proposed it, but Dean Keeton spread the theory far and wide. Dean Wade, who appears to have borrowed the idea for the test from Dean Keeton,³²⁷ may have offered the test in the law journals merely twice, in 1965 and 1973.³²⁸ By contrast, Dean Keeton proposed and explained the test in law journals and his products liability casebook at least a dozen times, from 1961 at least to 1980.³²⁹

Be that as it may, a number of courts, themselves searching for a basis by which to distinguish strict liability design claims (and warning claims) from those in negligence, picked up quite early on the Wade–Keeton hindsight test (sometimes referred to as the prudent-manufacturer test).³³⁰ Per-

325. The dual origins of the test were noted at least as early as 1974, *see* Phillips v. Kimwood Mach. Co., 525 P.2d 1033, 1036 n.6 (Or. 1974), and the “Wade–Keeton” moniker appeared in print no later than 1978. *See* Cepeda v. Cumberland Eng’g Co., Inc., 386 A.2d 816, 829 (N.J. 1978); *see also* Sheila L. Birnbaum, *Unmasking the Test for Design Defect: From Negligence [to Warranty] to Strict Liability to Negligence*, 33 VAND. L. REV. 593, 619 n.125 (1980).

326. Keeton, *Current Developments*, *supra* note 7, at 210.

327. It should be noted that Dean Wade reported that, at the time he wrote his Southwestern Law Journal article in 1964-65, he had not even read Dean Keeton’s 1961 Texas article. *See* John W. Wade, *On the Effect in Product Liability of Knowledge Unavailable Prior to Marketing*, 58 N.Y.U. L. REV. 734, 761 (1983) (“Postscript: An Excursus on the ‘Wade-Keeton’ Approach”). By 1983, Dean Wade must have forgotten that he cited both of Dean Keeton’s 1961 and 1962 Texas articles in his own article in the Southwestern Law Journal. *See* Wade, *Strict Tort Liability*, *supra* note 7, at 12, 13 n.45.

328. My research on this point was not exhaustive and may have missed Dean Wade’s endorsement of the test somewhere else.

329. In addition to Dean Keeton’s articles cited elsewhere in this section, *see*, for example, W. PAGE KEETON, DAVID G. OWEN & JOHN E. MONTGOMERY, PRODUCTS LIABILITY AND SAFETY 245 n.1 (1980); W. Page Keeton, *The Meaning of Defect in Products Liability Law – A Review of Basic Principles*, 45 MO. L. REV. 579, 592 (1980); Page Keeton, *Product Liability and the Meaning of Defect*, 5 ST. MARY’S L.J. 30, 37-38 (1973) [Keeton, *Meaning of Defect*]; Page Keeton, *Products Liability – Drugs and Cosmetics*, 25 VAND. L. REV. 131, 144 (1972); W. Page Keeton, *Product Liability – Inadequacy of Information*, 48 TEX. L. REV. 398, 402-03 (1970); Page Keeton, *Manufacturer’s Liability: The Meaning of “Defect” in the Manufacture and Design of Products*, 20 SYRACUSE L. REV. 559, 568 (1969) [hereinafter Keeton, *Manufacturer’s Liability*]; Page Keeton, *Some Observations About the Strict Liability of the Maker of Prescription Drugs: The Aftermath of MER/29*, 56 CAL. L. REV. 149, 158 (1968); Page Keeton, *Products Liability – Some Observations About Allocation of Risks*, 64 MICH. L. REV. 1329, 1336 (1966).

330. Early examples include *Dorsey v. Yoder Co.*, 331 F. Supp. 753, 759-60 (E.D. Pa. 1971), *aff’d*, 474 F.2d 1339 (3d Cir. 1973), *Cepeda v. Cumberland Engineering Co.*, 386 A.2d 816, 829 (N.J. 1978), and *Phillips v. Kimwood Machine Co.*, 525 P.2d

haps the first such case was *Dorsey v. Yoder Co.*,³³¹ in which the court stated that the proper test for strict products liability in tort is “whether a reasonable manufacturer would continue to market his product in the same condition as he sold it to the plaintiff with knowledge of the potential dangerous consequences the trial just revealed.”³³² More prominently, in *Phillips v. Kimwood Machine Co.*,³³³ the Supreme Court of Oregon embraced the test in 1974. A worker injured when a commercial sanding machine ejected a fiberboard sheet sued the manufacturer for failing either to warn of the danger or equip the machine with an inexpensive line of metal teeth that would have prevented the expulsion without interference with the functioning of the machine. Reversing a summary judgment for the manufacturer, the court formulated the test in the following terms:

A dangerously defective article would be one which a reasonable person would not put into the stream of commerce *if he had knowledge of its harmful character*. The test, therefore, is whether the seller would be negligent if he sold the article *knowing of the risk involved*. Strict liability imposes what amounts to constructive knowledge of the condition of the product.³³⁴

By the 1980s, however, courts and commentators began to question the fairness and logic of imposing strict liability for design defectiveness,³³⁵ and the only other truly strict test of products liability, the consumer expectations test, had already begun its decline.³³⁶ Recognizing the problems in forcing truly strict liability on manufacturers for dangers in design, Dean Wade and

1033, 1036 (Or. 1974). See generally *Dart v. Wiebe Mfg., Inc.*, 709 P.2d 876 (Ariz. 1985).

331. 331 F. Supp. 753 (E.D. Pa. 1971).

332. *Id.* at 759-60 (emphasis omitted) (citing Keeton, *Manufacturer's Liability*, *supra* note 329, at 568).

333. 525 P.2d 1033 (Or. 1974).

334. *Id.* at 1036. The court noted further that “[t]he advantage of describing a dangerous defect in the manner of Wade and Keeton is that it preserves the use of familiar terms and thought processes with which courts, lawyers, and jurors customarily deal.” *Id.* at 1037. Moreover,

[w]hile apparently judging the seller’s conduct, the test set out above would actually be a characterization of the product by a jury. If the manufacturer was not acting reasonably in selling the product, knowing of the risks involved, then the product would be dangerously defective when sold and the manufacturer would be subject to liability.

Id.; see Dominick R. Vetri, *Products Liability: The Developing Framework for Analysis*, 54 OR. L. REV. 293, 299 (1975).

335. See OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 5.4; *supra* Parts I, IV.

336. See OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, §§ 5.4, 5.6; *supra* Parts III, IV.

Dean Keeton, in the early 1980s, both repudiated the test(s) that bore their names: Dean Wade claimed that he never meant what he had said,³³⁷ and Dean Keeton admitted that he no longer believed what he had said.³³⁸ The *Products Liability Restatement*, adopting a negligence-type risk-utility standard of liability, based on risks that are *foreseeable* at the time of sale, explicitly rejects the Wade–Keeton test and notes with pith: “[t]he idea has not worn well with time.”³³⁹

Despite the rejection of the Wade–Keeton test by the scholars who gave it birth, courts continued to adopt the test after its “official” demise in the early 1980s,³⁴⁰ and some have continued rotely to restate the test,³⁴¹ and even proudly to reaffirm allegiance to it while knowing it has died.³⁴² While one

337. See Wade, *supra* note 327, at 761.

338. See KEETON, DOBBS, KEETON & OWEN, *supra* note 59, at 697-98 n.21.

339. See RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB., Reporters’ Note to § 2 cmt. 1 (1998).

340. See, e.g., *Sternhagen v. Dow Co.*, 935 P.2d 1139, 1147 (Mont. 1997) (adopting Wade–Keeton constructive knowledge test for strict products liability, and holding that “knowledge of any undiscovered or undiscoverable dangers should be imputed to the manufacturer”).

341. See, e.g., *Clinton v. Brown & Williamson Holdings, Inc.*, 498 F. Supp. 2d 639, 645 (S.D.N.Y. 2007); *Murphy v. Playtex Family Prods. Corp.*, 176 F. Supp. 2d 473, 484 (D. Md. 2001), *aff’d*, 69 F. App’x 140 (4th Cir. 2003) (test for design defectiveness is “whether a manufacturer, knowing the risks inherent in his product, acted reasonably in putting it on the market.”); *Golonka v. Gen. Motors Corp.*, 65 P.3d 956, 963-64 (Ariz. Ct. App. 2003) (applying hindsight test); *Blue v. Env’tl. Eng’g, Inc.*, 828 N.E.2d 1128, 1153 (Ill. 2005) (Fitzgerald, J., specially concurring) (“liability in strict liability cases rests on whether a prudent manufacturer, if it were aware of dangers involved in using its products as those dangers are known from hindsight, would have placed the product into the stream of commerce; the plaintiff need not prove that the danger was foreseeable”); *Sternhagen*, 935 P.2d at 1144 (“Strict liability imposes what amounts to constructive knowledge of the condition of the product.”); *Denny v. Ford Motor Co.*, 662 N.E.2d 730, 735 (N.Y. 1995) (“the New York standard for determining the existence of a design defect has required an assessment of whether ‘if the design defect were known at the time of manufacture, a reasonable person would conclude that the utility of the product did not outweigh the risk inherent in marketing a product designed in that manner’”) (citing *Voss v. Black & Decker Mfg. Co.*, 450 N.E.2d 204 (N.Y. 1983)); *Leary v. Syracuse Model Neighborhood Corp.*, 799 N.Y.S.2d 867, 873 (App. Div. 2005); *Brown v. Crown Equip.*, 181 S.W.3d 268, 281-82 (Tenn. 2005) (stating hindsight test, now ensconced in statutory form); *Sipes v. Gen. Motors Corp.*, 946 S.W.2d 143, 156 (Tex. App. 1997) (“Under strict liability, one may impute to the manufacturer constructive knowledge of the hazardous condition of the product.”). See also *Sperry-New Holland v. Prestage*, 617 So. 2d 248, 254-55 (Miss. 1993).

342. See *Brooks v. Beech Aircraft Corp.*, 902 P.2d 54, 63 (N.M. 1995), recognizing that the Wade–Keeton test is now a misnomer, but reaffirming it where the facts did not show a true advancement in the technological state of the art:

state legislature reversed the judicial adoption of the Wade–Keeton test,³⁴³ another appears to have affirmatively adopted it,³⁴⁴ and one wonders at its staying power in scattered decisions across the nation. The ghost of the Wade–Keeton test continues to haunt judicial halls, but its time has come and gone.

VIII. DESIGN DEFECTS IN THE THIRD RESTATEMENT

Effectively repealing § 402A of the *Restatement (Second) of Torts*, the *Restatement (Third) of Torts: Products Liability* substantially restructures the principles of responsibility for selling products containing defects in design.³⁴⁵ Rather than using doctrinal labels of “strict” liability and “negligence,” the *Products Liability Restatement* provides separate “functional” definitions of liability for each of the three forms of defect, including defects in design. Sections 1 and 2 set forth the basic principles of a seller’s liability for design defectiveness. Section 3 provides a special rule of circumstantial evidence for proof of product defect in cases where direct evidence of the cause of an accident is unavailable but where circumstances suggest the probability that a product defect caused the harm;³⁴⁶ and § 4 addresses the effect

[I]n those hypothetical instances in which technology known at the time of trial and technology knowable at the time of distribution differ – and outside of academic rationale we find little to suggest the existence in practice of unknowable design considerations – it is more fair that the manufacturers and suppliers who have profited from the sale of the product bear the risk of loss.

The standard New Mexico jury instruction adopts the Wade–Keeton test from Keeton, *Meaning of Defect*, *supra* note 329, at 37-38. See *Brooks*, 902 P.2d at 62.

343. In 1979, the Oregon legislature abolished the Wade–Keeton test adopted by that state’s Supreme Court in *Phillips v. Kimwood Machine Co.*, 525 P.2d 1033 (Or. 1974), by legislatively adopting RESTATEMENT (SECOND) OF TORTS § 402A (1965), including its comments which define defectiveness in consumer contemplation terms. See OR. REV. STAT. § 30.920 (1979); *Burns v. Gen. Motors Corp.*, 891 P.2d 1354 (Or. Ct. App. 1995) (statute inconsistent with instruction on *Phillips*’ reasonable manufacturer test); see also *McCathern v. Toyota Motor Corp.*, 23 P.3d 320, 331 (Or. 2001).

344. See TENN. CODE ANN. § 29-28-102(8) (1978). *But see* TENN. CODE ANN. § 29-28-105 (1978). See also *Brown v. Crown Equip.*, 181 S.W.3d 268, 281-82 (Tenn. 2005) (stating Wade–Keeton hindsight test); *Irion v. Sun Lighting, Inc.*, No. M2002-00766-COA-R3-CV, 2004 WL 746823 (Tenn. Ct. App. Apr. 7, 2004) (same).

345. For an overview of the entire *Restatement (Third) of Torts: Products Liability*, see OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 6.5.

346. Although § 3 usually applies to accidents caused by manufacturing defects, it may apply to defects in design. See *Estate of Edward W. Knoster v. Ford Motor Co.*, 200 F. App’x 106, 113-14 (3d Cir. 2006) (N.J. law) (sudden acceleration accident; New Jersey recognizes the application of § 3 in design defect cases); *Rudd v. Gen. Motors Corp.*, 127 F. Supp. 2d 1330, 1340 (M.D. Ala. 2001) (pickup truck’s fan blade

on liability of compliance or noncompliance with product safety statutes and regulations.³⁴⁷ Design defects in prescription drug and medical device cases receive separate treatment in the *Third Restatement*.³⁴⁸

A. Design Defects in §§ 1 and 2

Section 1 of the *Products Liability Restatement* establishes the basic liability principle of products liability: one who sells “a defective product is subject to liability for harm to persons or property caused by the defect.” Section 2, basing liability on the three separate types of defect, provides in subsection (b) that a product “is defective in design when the foreseeable risks of harm posed by the product could have been reduced or avoided by the adoption of a reasonable alternative design by the seller or other distributor, or a predecessor in the commercial chain of distribution, and the omission of the alternative design renders the product not reasonably safe.” Stripped to its essence, § 2(b) provides:

[A product] is defective in design when the foreseeable risks of harm posed by the product could have been reduced or avoided by the adoption of a reasonable alternative design . . . and the omission of the alternative design renders the product not reasonably safe.

Paraphrased, § 2(b) provides:

A product is defective in design if its foreseeable risks could have been avoided by a reasonable alternative design, the omission of which renders the product not reasonably safe.

Converted to the active voice, § 2(b) means:

A product is defective in design if the seller could have reduced the foreseeable risk that harmed the plaintiff by adopting a reasonable

broke due to fatigue fracture; such fractures might result from selection of low-strength alloy for use in constructing fan); RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 3 cmt. b (1998). Section 3 of the *Restatement* and the “malfunction theory” are addressed in OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 7.4.

347. The effect of a manufacturer’s compliance and noncompliance with safety statutes and regulations is addressed in OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 14.3 (compliance); *id.* § 2.4 (noncompliance, negligence); *id.* § 6.4 (noncompliance, strict liability).

348. See RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 6(c). Design defects in prescription drugs and medical devices are examined in OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, § 8.10.

alternative design, the omission of which renders the product not reasonably safe.³⁴⁹

By requiring that an alternative design be "reasonable," and basing a manufacturer's liability on its failure to adopt such an alternative design only if it renders the product "not reasonably safe," the *Third Restatement* rejects absolute safety in favor of optimality: "[s]ociety does not benefit from products that are excessively safe . . . any more than it benefits from products that are too risky. Society benefits most when the right, or optimal, amount of product safety is achieved."³⁵⁰ The risk-utility balance prescribed in § 2(b) for design defect determinations ordinarily resolves into a negligence-style³⁵¹ evaluation of the foreseeable³⁵² costs and benefits of the manufacturer's decision to forego an alternative design:

349. For a more complete linguistic deconstruction of § 2(b), see Owen, *Defectiveness Restated*, *supra* note 7, at 766-77.

350. RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2 cmt. a.

Some sort of independent assessment of advantages and disadvantages, to which some attach the label 'risk-utility balancing,' is necessary. . . . [T]he various trade-offs need to be considered in determining whether accident costs are more fairly and efficiently borne by accident victims, on the one hand, or, on the other hand, by consumers generally through the mechanism of higher product prices attributable to liability costs imposed by courts on product sellers.

Id.

351. Assessment of a product design in most instances requires a comparison between an alternative design and the product design that caused the injury, undertaken from the viewpoint of a reasonable person. That approach is also used in administering the traditional reasonableness standard in negligence. See RESTATEMENT (SECOND) OF TORTS § 283, cmt. c. The policy reasons that support use of a reasonable-person perspective in connection with the general negligence standard also support its use in the products liability context.

Id. cmt. d. See also *id.* § 1 cmt. a.

352. In the black-letter definition of design defectiveness in § 2(b), set forth above, the *Third Restatement* limits a seller's responsibility to risks that are "foreseeable," an important limitation explained in comment a:

Most courts agree that, for the liability system to be fair and efficient, the balancing of risks and benefits in judging product design and marketing must be done in light of the knowledge of risks and risk-avoidance techniques reasonably attainable at the time of distribution. To hold a manufacturer liable for a risk that was not foreseeable when the product was marketed might foster increased manufacturer investment in safety. But such investment by definition would be a matter of guesswork. Furthermore, manufacturers may persuasively ask to be judged by a normative behavior standard to which it is reasonably possible for manufacturers to conform. For these reasons, Subsections (b) and (c) speak of products being defective only when risks are reasonably foreseeable.

Subsection (b) adopts a reasonableness (“risk-utility balancing”) test as the standard for judging the defectiveness of product designs. More specifically, the test is whether a reasonable alternative design would, at reasonable cost, have reduced the foreseeable risks of harm posed by the product and, if so, whether [its] omission . . . rendered the product not reasonably safe.³⁵³

In making the relevant cost-benefit assessment, “[a] broad range of factors may be considered in determining whether an alternative design is reasonable and whether its omission renders a product not reasonably safe.”³⁵⁴ The balance includes a wide variety of design considerations that often conflict with one another: the foreseeable risks of harm, consumer expectations, usefulness, cost, longevity, responsibility for maintenance, aesthetics, marketability, and other advantages and disadvantages of the chosen and alternative designs.³⁵⁵ A judge or jury must evaluate these factors with respect to both the accident product as designed and the alternative design feature put forward by the plaintiff. A product’s design is “not reasonably safe,” and is hence “defective,” if a comparison between the accident product *without* the plaintiff’s proposed safety feature and the alternative product *with* the proposed safety feature demonstrates that the balance of costs and benefits of the alternative design is better than the balance of these same factors in the chosen design that resulted in the accident.³⁵⁶ And the converse is also true: if the balance of competing design considerations in the accident product without the proposed safety feature was as good as or better than the balance in the proposed alternative design, then the accident product’s design will be deemed “reasonably safe” and “nondefective.”³⁵⁷ In short, “the requirement of Subsection (b) that a product is defective in design if the foreseeable risks of harm could have been reduced by a reasonable alternative design is based on the common-sense notion that liability for harm caused by product designs should attach only when harm is reasonably preventable.”³⁵⁸

B. Consumer Expectations

One of the most controversial aspects of the *Third Restatement’s* definition of design defect concerns the elimination of consumer expectations as an

353. *Id.* § 2 cmt. d.

354. *Id.* cmt. f.

355. *See id.*

356. The plaintiff, of course, must also prove causation – that the alternative product would have prevented or reduced his harm. *See id.* §§ 1, 2 cmts. f, q, 15. Causation is treated generally in §§ 15 and 16 of the *Restatement*. *See also* OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, ch. 11.

357. A “better balance” definition of defective design is proposed in Owen, *Defectiveness Restated*, *supra* note 7, at 775.

358. RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2 cmt. f (1998).

independent test of liability and the relegation of those expectations to mere “factor” status in the list of risk-utility considerations.³⁵⁹ Comment *g* declares: “Under Subsection (b), consumer expectations do not constitute an independent standard for judging the defectiveness of product designs.”³⁶⁰ Although not determinative in most cases, if consumer safety expectations are implicated by a particular design, they factor into an evaluation of whether the manufacturer should have adopted a reasonable alternative design.³⁶¹ Moreover, the *Restatement* makes clear that manufacturers and other sellers may not use consumer expectations as a defense when a product contains substantial hazards, even if obvious, which may reasonably be designed away.³⁶²

359. See, e.g., Phillips, *supra* note 18; Marshall S. Shapo, *A New Legislation: Remarks on the Draft Restatement of Products Liability*, 30 U. MICH. J.L. REFORM 215 (1997); Shapo, *supra* note 18; Frank J. Vandall, *Constructing a Roof Before the Foundation Is Prepared: The Restatement (Third) of Torts: Products Liability Design Defect*, 30 U. MICH. J.L. REFORM 261 (1997); Vargo, *supra* note 3, at 557.

360. RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2 cmt. g.

361. See *id.*:

[C]onsumer expectations do not play a determinative role in determining defectiveness. See Comment *h*. Consumer expectations, standing alone, do not take into account whether the proposed alternative design could be implemented at reasonable cost, or whether an alternative design would provide greater overall safety. Nevertheless, consumer expectations about product performance and the dangers attendant to product use affect how risks are perceived and relate to foreseeability and frequency of the risks of harm, both of which are relevant under Subsection (b). See Comment *f*. Such expectations are often influenced by how products are portrayed and marketed and can have a significant impact on consumer behavior. Thus, although consumer expectations do not constitute an independent standard for judging the defectiveness of product designs, they may substantially influence or even be ultimately determinative on risk-utility balancing in judging whether the omission of a proposed alternative design renders the product not reasonably safe.

362.

Subsection (b) likewise rejects conformance to consumer expectations as a defense. The mere fact that a risk presented by a product design is open and obvious, or generally known, and that the product thus satisfies expectations, does not prevent a finding that the design is defective. . . . [W]hile disappointment of consumer expectations may not serve as an independent basis for allowing recovery under Subsection (b), neither may conformance with consumer expectations serve as an independent basis for denying recovery. Such expectations may be relevant in both contexts, but in neither are they controlling.

Id.

C. Special Design Defect Issues

1. Inherently Dangerous Products

While proof of a reasonable alternative design is normally required to establish a design defect under § 2(b), inherent risks in certain products by their very nature cannot be designed away. Ordinarily, there can be no recovery for injuries from the “design” of such products because the plaintiff cannot prove the availability of a reasonable alternative design.³⁶³ The *Second Restatement* immunized sellers of such products from design defect liability, listing as examples ordinary sugar (which can cause diabetes), castor oil (used by Mussolini as an instrument of torture), “good whiskey,” “good tobacco,” “good butter” (containing cholesterol which can lead to heart attacks), eggs and strawberries (to which some people are allergic), and prescription drugs, such as the Pasteur vaccine for rabies (which sometimes causes severe adverse reactions).³⁶⁴ The *Third Restatement* takes a similar position, providing that “[c]ommon and widely distributed products such as alcoholic beverages, firearms, and above-ground swimming pools may be found to be defective” in design only if the plaintiff proves a reasonable alternative design under subsection 2(b).³⁶⁵

Noticeably absent in the *Third Restatement* from the special list of generically dangerous products protected from judicial scrutiny are tobacco products (cigarettes, in particular), which just narrowly missed the boat. Yet “tobacco” was in fact on the list of protected products in the *Proposed Final Draft* of the *Third Restatement*, sandwiched between alcoholic beverages and firearms. At the final meeting of the American Law Institute on the *Third Restatement*, after five years of intense debate over thousands of particulars, during the closing moments of final discussion a member moved from the floor to strike “tobacco” from the short list of examples of protected products. Noting the increasing national crescendo of legal and political attacks against cigarette manufacturers then in progress, he argued that the American Law Institute should not go on record as providing favored treatment for this product. The unscheduled motion caught almost everyone by surprise, and, after a brief debate in which the Reporters explained again that the court decisions to

363. *Id.* cmt. d.

364. See RESTATEMENT (SECOND) OF TORTS § 402A cmts. i, j, and k (1965), discussed in OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, §§ 6.2, 10.3.

365. RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. cmt. d (1998). In the absence of normal proof of a design or other defect, the comment notes that “courts have not imposed liability for categories of products that are generally available and widely used and consumed, even if they pose substantial risks of harm. Instead, courts generally have concluded that legislatures and administrative agencies can, more appropriately than courts, consider the desirability of commercial distribution of some categories of widely used and consumed, but nevertheless dangerous, products.” *Id.*

date supported leaving tobacco within the protected category,³⁶⁶ the motion to strike “tobacco” carried by a whisker. Thus, the *Restatement (Third) of Torts: Products Liability* takes no explicit position on whether sellers should be liable for the inherent dangers contained in tobacco products.³⁶⁷

Comment *e* to § 2 of the *Third Restatement* addresses the related, controversial issue of whether courts should hold manufacturers liable for selling products with inherent risks so serious that they may be viewed as possessing “manifestly unreasonable designs.”³⁶⁸ Such products fortunately now are rare, but, in former times, lawn darts, highly flammable hula skirts, and similarly hazardous products containing substantial threats to safety but little social utility were no strangers to the market. There is a paucity of cases on the topic of whether courts should second-guess the market with respect to such manifestly unreasonable designs,³⁶⁹ but comment *e* adopts dicta from a small number of cases suggesting that a manufacturer might properly be subject to liability for harm from selling a product if “the extremely high degree of danger posed by its use or consumption so substantially outweighs its negligible social utility that no rational, reasonable person, fully aware of the relevant facts, would choose to use, or to allow children to use, the product.”³⁷⁰ The broader issue of products with inherent risks is examined elsewhere in greater depth.³⁷¹

2. Obvious Dangers and Misuse

Two major issues of design defectiveness involve whether a product should be characterized as defectively designed if its dangers are obvious or result from product misuse and alteration. On these important issues,³⁷² the *Products Liability Restatement* follows well-accepted judicial norms. The obviousness of a danger is relevant to design defectiveness because the ob-

366. The decisions still consider cigarettes inherently dangerous and so largely immune from challenge for being defectively designed. See, e.g., *Clinton v. Brown & Williamson Holdings, Inc.*, 498 F. Supp. 2d 639, 648 (S.D.N.Y. 2007) (cigarette design defect claims are “exactly the type of claim that [the] alternative feasible design requirement was meant to disallow”).

367. For a discussion of issues surrounding products containing inherent risks, including cigarettes, see OWEN, *PRODUCTS LIABILITY LAW*, *supra* note 13, § 10.3.

368. This issue lies closely beside the problem of design defect liability for alcohol, certain types of guns, and cigarettes, but the *Restatement* segregates those products (except tobacco) in comment *d* and separately classifies this topic in comment *e*.

369. RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2 Reporters’ Note to cmt. *e* (1998).

370. *Id.* § 2 cmt. *e*.

371. See OWEN, *PRODUCTS LIABILITY LAW*, *supra* note 13, §§ 6.2, 10.3.

372. A seller’s liability for obvious dangers is examined in OWEN, *PRODUCTS LIABILITY LAW*, *supra* note 13, § 10.2; the role of product misuse is treated in § 13.5; and product alteration is treated in § 12.3.

vious nature of the danger gives warning to persons who confront it so that they are likely to act to protect themselves.³⁷³ But the *Third Restatement* summarily rejects the long-discredited patent-danger rule which barred recovery altogether in such cases.³⁷⁴

When people use and abuse products unreasonably and unforeseeably, courts generally relieve sellers of at least partial responsibility for resulting harm.³⁷⁵ Products cannot be designed to be perfectly safe for every use, and so the doctrines of product misuse and alteration provide important limitations on liability for the sale of defective products. In general, manufacturers and other sellers have no duty to design against unintended uses, misuses, and alterations that cannot be foreseen, but the converse is also true: sellers must adopt reasonable design precautions against product uses and abuses that they reasonably should foresee.³⁷⁶ Further, third-party misuse raises principles of intervening and superseding causation that may bar liability altogether if a misuse was unforeseeable,³⁷⁷ and principles of comparative responsibility generally reduce a manufacturer's responsibility proportionately to the user's fault in putting a product to an improper type or extent of use.³⁷⁸ The *Third Restatement* adopts these widespread principles on the role of product alteration and misuse.³⁷⁹

IX. CONCLUSION

In figuring liability for accidents caused by defective products, the issue of greatest fundamental importance is the concept of design defectiveness. Challenging a manufacturer's vision of how its products should be conceived, the very idea of a design "defect" displays the awesome power of modern products liability law. Behind design defectiveness lies the premise that law appropriately may require manufacturers to give fair consideration to product safety, as well as to a product's usefulness and cost. Yet fair safety is a much

373. RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2 cmt. d (1998).

374. *Id.*

375. "Product sellers . . . are not required to foresee and take precautions against every conceivable mode of use and abuse to which their products might be put. Increasing the costs of designing and marketing products in order to avoid the consequences of unreasonable modes of use is not required." *Id.* § 2 cmt. m.

376. See OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, §§ 12.3, 13.5.

377. See *id.* § 12.3 (intervening and superseding causation).

378. See *id.* § 13.5 (misuse).

379. See RESTATEMENT (THIRD) OF TORTS: PRODS. LIAB. § 2 cmt. m (1998) (foreseeability of risk); *id.* § 2 cmt. p (misuse, modification, and alteration); *id.* § 15 (legal causation); *id.* § 17 (apportionment of responsibility). Damages apportionment, treated generally in § 17 as an issue of comparative responsibility, is addressed thoroughly in its own *Restatement*. See RESTATEMENT (THIRD) OF TORTS: APPORTIONMENT OF LIABILITY (2000). On user misconduct defenses generally, see OWEN, PRODUCTS LIABILITY LAW, *supra* note 13, ch. 13.

richer idea than perfect safety, leading courts and legislatures on a perpetual search, not unlike Diogenes, for the true meaning of a defect in design – of when particular designs are too dangerous, and when they are safe enough. Through a variety of windows on the deepest mysteries of products liability, a study of design defectiveness reveals the aspirations, limits, and pragmatics of this dynamic field of law.