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## Strict Products Liability, Design Defects and Corporate Decision-Making: Greater Deterrence through Stricter Process

Gerald F. Tietz

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## STRICT PRODUCTS LIABILITY, DESIGN DEFECTS AND CORPORATE DECISION-MAKING: GREATER DETERRENCE THROUGH STRICTER PROCESS

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## I. INTRODUCTION

THE longstanding debate surrounding strict products liability continues unabated.<sup>1</sup> Currently, Reporters for the *Restatement (Third) of Torts* have been appointed to draft the new black letter rules and have already produced several preliminary drafts.<sup>2</sup> There can be no doubt that the exchanges will intensify as the proponents of reform try to limit the scope of strict prod-

1. There has been a steady flow of legal commentary about strict products liability since the late 1970s, including numerous law review symposium issues dedicated solely to strict products liability concerns. See, e.g., Symposium, *Symposium on Civil Justice Reform*, 42 AM. U. L. REV. 1245 (1993) [hereinafter *Civil Justice Reform*]; Symposium, *Punitive Damage Awards in Product Liability Litigation: Strong Medicine or Poison Pill*, 39 VILL. L. REV. (forthcoming 1994); Symposium, *The Revision of Section 402A of the Restatement (Second) of Torts: Occasion for Reform of Product Liability Law?*, 10 TOURO L. REV. 1 (1993); Symposium, *Products Liability Law Symposium*, 17 SETON HALL L. REV. 505 (1987); Symposium, *Tort Reform Symposium*, 24 SAN DIEGO L. REV. 795 (1987); Symposium, *Tort Reform: Will it Advance Justice in the Civil System?*, 32 VILL. L. REV. 1211 (1987); Symposium, *The Passage of Time: The Implications For Product Liability*, 58 N.Y.U. L. REV. 733 (1983); see also Symposium, *Tort Reform Symposium Issue*, 64 DENV. U. L. REV. 613 (1988); Symposium, *Rethinking Tort and Environmental Liability Laws: Needs and Objectives of the Late 20th Century and Beyond*, 24 HOUS. L. REV. 1 (1987); Symposium, *Issues in Tort Reform*, 48 OHIO ST. L.J. 317 (1987).

2. See James A. Henderson, Jr. & Aaron D. Twerski, *Essay: Will a New Restatement Help Settle Troubled Waters: Reflections*, 42 AM. U. L. REV. 1257 (1993) [hereinafter Henderson & Twerski, *Reflections*] (discussing briefly how new restatement of products liability law will clarify controversial issues in products liability litigation).

ucts liability, especially as it applies to design and warning defects.<sup>3</sup> The onset of the American Law Institute's project to restate tort law in the *Restatement (Third) of Torts* will provide increased incentives for further and more heated debate. As critics of the current design defect doctrine assert their positions more forcefully, one should step back from the debate in order to examine indispensable considerations that have not been given adequate recognition, or that have been missing from the debate altogether.<sup>4</sup>

If the debate about the appropriate doctrine for determining manufacturer liability for defectively designed products is to be fully informed, participants must recognize the nature of corporate decision-making as it relates to product design. Legal commentators have too often minimized the extent of corporate

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3. Some judges and commentators would subject claims of design defects to a negligence standard. See, e.g., *Foley v. Clark Equip. Co.*, 523 A.2d 379, 391 (Pa. Super. Ct. 1987); Christina M. Moylan, Comment, *In Pursuit of the Appropriate Standard of Liability for Defective Product Designs*, 42 ME. L. REV. 453, 455 (1990). In their proposal for new black letter law and comments under § 402A, the recently appointed Reporters for the *Restatement (Third) of Torts* have already expressed their preference for imposing a negligence limitation on design defect liability. Henderson & Twerski, *Reflections*, *supra* note 2; see also James A. Henderson, Jr. & Aaron D. Twerski, *A Proposed Revision of Section 402A of the Restatement (Second) of Torts*, 77 CORNELL L. REV. 1512, 1514-26 (1992) [hereinafter Henderson & Twerski, *Proposed Revision*]; cf. Ellen Wertheimer, *Unknowable Dangers and the Death of Strict Products Liability: the Empire Strikes Back*, 60 U. CIN. L. REV. 1183 (1992) (arguing that negligence concepts have eroded strict products liability to such extent that it is no longer "strict" in doctrinal sense of concept). In addition, the most extreme of the reformers—those who advocate a return to contract as the governing body of law to regulate relations between suppliers and users of products—most likely will continue pressing their position in the continuing debate. See, e.g., PETER W. HUBER, *LIABILITY: THE LEGAL REVOLUTION AND ITS CONSEQUENCES* 18 (1988) [hereinafter HUBER, *THE LEGAL REVOLUTION*] ("[T]he answer is not to abandon contract . . . but to modernize it."). In the best of all possible marketplaces, i.e., where consumers are fully informed of all product design risks, the parties' choices are reflected in the contract terms and should arguably control their respective rights and obligations. Because such a marketplace is a virtual impossibility, however, one cannot seriously contemplate replacing strict product liability with contract law. For a discussion of the disparity between manufacturer and consumer knowledge of product design risks, see *infra* notes 41-79 and accompanying text. For a discussion of user knowledge in today's marketplace, see *infra* notes 61-78 and accompanying text.

4. The recently appointed Reporters of the new *Restatement* provide the most forceful criticism of the current design defect doctrine, particularly in regard to its potential impact. Henderson & Twerski, *Proposed Revision*, *supra* note 3, at 1526-46. Despite their understandable hesitancy toward discussing the project in advance, the appointed Reporters have already set forth their black letter proposal and comments for the new section 402A. See RESTATEMENT (THIRD) OF TORTS § 402A (Council Draft No. 1, Sept. 17, 1993); RESTATEMENT (THIRD) OF TORTS § 402A (Council Draft 1A, Jan. 4, 1994); Henderson & Twerski, *Reflections*, *supra* note 2, at 1257; Henderson & Twerski, *Proposed Revision*, *supra* note 3, at 1514-26.

knowledge concerning product design risks and the ability of corporations to eliminate those risks.<sup>5</sup> They have consistently downplayed, ignored or failed to recognize corporate decision-making in the design process—decision-making that consciously and inappropriately exposes consumers to serious design risks.<sup>6</sup> Courts, on the other hand, have been more willing than commentators to recognize the disparity of information and power between manufacturers and product users.<sup>7</sup> The courts have

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5. See, e.g., Richard A. Epstein, *The Unintended Revolution in Product Liability Law*, 10 CARDOZO L. REV. 2193, 2198 (1989) ("To assume that the manufacturer has perfect knowledge of the relevant risk is to beg just this question, and to drive the law into treating all cases of imperfect information as if the defendant had perfect information and the plaintiff had none."); David G. Owen, *Problems in Assessing Punitive Damages Against Manufacturers of Defective Products*, 49 U. CHI. L. REV. 1, 16, 20-26 (1982) [hereinafter Owen, *Problems in Assessing Punitive Damages*] (arguing that punishing manufacturers simply for being in business of manufacturing necessarily hazardous products is inappropriate); David G. Owen, *The Highly Blameworthy Manufacturer: Implications on Rules of Liability and Defense in Products Liability Actions*, 10 IND. L. REV. 769, 771 (1977) (arguing that it is possible to determine blameworthiness of manufacturers to establish appropriate liability standards); George L. Priest, *Strict Products Liability: The Original Intent*, 10 CARDOZO L. REV. 2301, 2337 (1989) (arguing that founders of § 402A failed to adequately constrain strict liability to manufacturing defect context); George L. Priest, *Modern Tort Law and its Reform*, 22 VAL. U. L. REV. 1, 11 (1987) ("The presumption that product- and service-providers are vastly superior to consumers in the power to prevent injuries . . . has generated many of the problems of modern law . . ."). But see David G. Owen, *Punitive Damages in Products Liability Litigation*, 74 MICH. L. REV. 1258, 1258 (1976) [hereinafter Owen, *Punitive Damages*] ("Through the processes of design, testing, inspection and collection of data on product safety performance in the field, the manufacturer has virtually exclusive access to much of the information necessary for effective control of dangers facing product consumers.").

6. For a discussion of commentators who have trivialized the importance of corporate decision-making in reducing design risks, see *supra* note 5 and accompanying text.

7. Courts have recognized the disparity of both knowledge and power between manufacturers and consumers. See, e.g., *Taggart v. Richards Medical Co.*, 677 F. Supp. 1102, 1104 (D. Colo. 1988). In *Taggart*, the court shifted the risk-benefit burden to defendants in design cases because:

the manufacturer is in the unique position of being better able to introduce evidence and provide information necessary to balance risks and benefits . . . [and is in] exclusive possession of information and knowledge necessary to establish the utility and benefits of the product to the public and the known risks of danger inherent in the product's design.

*Id.* (quoting William A. Trine, *Products Liability: Unreasonably Dangerous Versus Risk-Benefit Analysis*, 36 TRIAL TALK 348, 355 (1987)); see also *Caterpillar Tractor Co. v. Beck*, 593 P.2d 871, 886 (Alaska 1979) (shifting risk-benefit burden to defendant in design cases because "this allocation puts the burden of producing the relevant . . . evidence on the party who has the most access to and is the most familiar with such evidence"); *Dart v. Wiebe Mfg., Inc.*, 709 P.2d 876, 881-82 (Ariz. 1985) (stating that in design defect case, knowledge of product's defect imputed to manufacturer as of time of trial); *Escola v. Coca Cola Bottling Co.*, 150 P.2d 436, 443 (Cal. 1944) (Traynor, J., concurring) (explaining that in modern mass markets handicrafts have been replaced by complicated manufacturing

employed that reality in shaping legal doctrine.<sup>8</sup> Beyond the risk information disparity, however, is the reality that corporate decision-makers frequently and consciously choose risky product designs over safer ones when there is no cost or other justification for doing so.<sup>9</sup>

As a consequence of the excessive amount of product design injuries, courts can, and should, shape strict liability doctrine to provide enhanced deterrence, especially in the design context.<sup>10</sup> Courts and commentators generally agree that strict products liability creates incentives for manufacturers to ensure greater product safety.<sup>11</sup> Those same voices rarely acknowledge, however,

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processes that “are ordinarily either inaccessible to or beyond the ken of the general public [and so t]he consumer no longer has the means or skill enough to investigate for himself the soundness of a product”); *Rahmig v. Mosley Mach. Co.*, 412 N.W.2d 56, 81 (Neb. 1987) (requiring “that a plaintiff prove feasibility [of a safer, alternative design], as part of the plaintiff’s burden of proof in a case based on strict liability for design defect, weighs down the plaintiff with the onus to provide evidence of those matters which are usually within the knowledge of the manufacturer”); *Cepeda v. Cumberland Eng’g Co.*, 386 A.2d 816, 821 (N.J. 1978) (adopting rule “that knowledge of the dangerous potentiality of a machine design as reflected by the evidence at trial is imputable to the manufacturer”), *overruled by Suter v. San Angelo Foundry & Mach. Co.*, 406 A.2d 140 (N.J. 1979); *Henningsen v. Bloomfield Motors, Inc.*, 161 A.2d 69, 80, 83 (N.J. 1960) (comparing markets when consumers had more information to modern, mass markets where consumers are faced with complicated products that they have “neither the opportunity nor the capacity to inspect”); *Voss v. Black & Decker Mfg. Co.*, 450 N.E.2d 204, 207-08 (N.Y. 1983) (“A manufacturer is held liable regardless of his lack of actual knowledge of the condition of the product because he is in the superior position to discover any design defects and alter the design before making the product available to the public.”); *see also* Thomas A. Cowan, *Some Policy Bases of Products Liability*, 17 *STAN. L. REV.* 1077, 1087 (1965) (“To put the matter bluntly, a large proportion of mass products are consciously made as inferior as the traffic will bear and are advertised by conscious misrepresentation as far superior to their known quality.”).

8. The courts have incorporated two procedural devices into design-risk doctrine that implicitly recognize the information and power disparity between corporations and product users. First, the courts have imputed knowledge of the product’s risks to manufacturers—this is consistent with the information and power disparity. For a detailed discussion of the imputation of knowledge, see *infra* notes 306-39 and accompanying text. Second, the courts have shifted the risk-utility burden to manufacturers, which recognizes that the evidence needed to meet such a burden is peculiarly within the knowledge of the manufacturer. For a detailed discussion concerning the shift in the risk-utility burden, see *infra* notes 392-96 and accompanying text.

9. For an examination of conscious corporate decisions relating to specific product design risks, see *infra* notes 79-166 and accompanying text. For an analysis of the causes of this grossly culpable corporate decision-making, see *infra* notes 167-252 and accompanying text.

10. For a discussion of the aspects of corporate decision-making that mandate greater deterrence through strict liability, see *infra* notes 253-91 and accompanying text.

11. For a discussion of the judicial belief that modern consumers need pro-

that on balance deterrence of product injuries is preferable to post-accident compensation. In the application of design defect doctrine, there are numerous reasons why courts ought to regard compensation as the default mechanism and provide sufficient incentives for manufacturers to give accident prevention the priority it deserves.<sup>12</sup>

This Article ultimately suggests that courts should employ several procedural devices to create incentives for greater deterrence of product design injuries. These suggestions rest on two premises: (1) courts ought to fully recognize the extent to which manufacturers impose unjustified product design risks upon unsuspecting consumers;<sup>13</sup> and (2) courts can achieve the necessary greater deterrence through stricter process, thus avoiding the creation of additional doctrinal problems.<sup>14</sup>

Part II of this Article examines the differences between a manufacturing defect and a design defect in terms of knowledge of product risks.<sup>15</sup> While consumers have little or no information about either type of product risk,<sup>16</sup> manufacturers do have knowledge of design risks in all but the rarest of cases.<sup>17</sup>

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tection from product defects, and that tort law, including strict product liability, creates such protection, see *infra* notes 252-55, 292-94 and accompanying text. Conversely, for a discussion of cases that suggest negligence may serve as a better deterrent than strict liability, see *infra* note 295. For a discussion of commentators arguing that strict products liability creates enhanced incentives for product safety, see *infra* notes 283-87. For reference to a comment that ordinary negligence creates greater deterrence than strict products liability, see *infra* note 295.

12. For a discussion of the position that successful lawsuits represent a failure of the tort system's deterrence mechanism, see *infra* notes 284, 296. For a discussion of reasons why compensation ought to be regarded as the default mechanism of the tort system, see *infra* notes 287-91 and accompanying text.

13. For a broad sampling of cases where manufacturers imposed product design risks on product users who did not, and indeed could not, know of the risks, see *infra* notes 82-166 and accompanying text.

14. For a catalog of some of the outstanding problems regarding § 402A of the *Restatement (Second) of Torts*, see Henderson & Twerski, *Reflections, supra* note 2, at 1262 n.27.

15. For a discussion of the difference between manufacturing and design defects, see *infra* notes 31-78 and accompanying text.

16. For a discussion of why consumers lack information concerning design risks, see *infra* notes 61-78. For a discussion regarding consumer lack of information concerning manufacturing risks, see *infra* notes 31-40 and accompanying text. If manufacturers are not normally aware of manufacturing risks, one cannot expect that consumers are in a position to have knowledge of that risk information either.

17. See David G. Owen, *The Moral Foundations of Products Liability Law: Toward First Principles*, 68 NOTRE DAME L. REV. 427, 503 (1993) [hereinafter Owen, *Moral Foundations*] (arguing that in most cases of manufacturing defect there is fault because manufacturers fail to take adequate care commensurate with their

Part III of this Article examines specific instances of corporate decision-making in the design process, and demonstrates that manufacturers consciously choose risky designs over safer alternatives with full knowledge that the alternatives may involve no, or only minimal, additional costs.<sup>18</sup> Part III continues by examining several reasons why corporations often reject design safety: costs and marketing considerations;<sup>19</sup> inherent, and sometimes irrational, resistance to safety;<sup>20</sup> and lack of corporate accountability.<sup>21</sup> This section concludes with an analysis of general corporate nature and structure, including an examination of fragmented corporate decision-making and decision-making rationalizations.<sup>22</sup>

Part IV considers the need for deterrence against the backdrop of marketplace realities and the possibilities for stricter process. The realities of the marketplace are three-fold: (1) consumers are exposed to far too many mass risks from defectively designed products;<sup>23</sup> (2) current levels of manufacturer accountability for product design injuries are not sufficient;<sup>24</sup> and (3) compensation is the second best solution to product injuries because few claims are pursued relative to the multitude of injuries that occur, and because post-accident protection is really no protection at all.<sup>25</sup>

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knowledge of risks); Henderson & Twerski, *Proposed Revisions, supra* note 3, at 1516 ("The manufacturer's very knowledge that a predictable number of flawed products will enter the marketplace and cause injury lends to the harm an element of deliberate infliction."). For a discussion of manufacturer knowledge of design risk, see *infra* notes 41-58 and accompanying text.

18. For a discussion of specific instances where manufacturers have chosen risky designs over safer alternatives, see *infra* notes 82-166 and accompanying text.

19. For a discussion of how costs and marketing considerations factor into a corporation's decision to reject design safety, see *infra* notes 167-206 and accompanying text.

20. For a discussion concerning the manner in which a corporation's inherent and irrational resistance to safety precautions affect its decisions to reject design safety, see *infra* notes 207-20 and accompanying text.

21. For a discussion of how a lack of corporate accountability can affect a corporation's decision to reject design safety, see *infra* notes 221-31 and accompanying text.

22. For a discussion of fragmented corporate decision-making, see *infra* notes 232-42 and accompanying text. For a discussion of corporate decision-making rationalizations, see *infra* notes 243-52 and accompanying text.

23. For a discussion of the risks consumers face from defectively designed products, see *infra* notes 253-67 and accompanying text.

24. For a discussion of the lack of manufacturer accountability in the marketplace, see *infra* notes 268-73 and accompanying text.

25. For a discussion of why compensation is not the best solution for resolving product injuries, see *infra* notes 274-82 and accompanying text. For a



The possibilities for greater deterrence are based on the premise that strict products liability doctrine creates enhanced incentives for manufacturers to promote safety in product design. Both courts and commentators generally agree with this premise.<sup>26</sup> The empirical evidence, while not definitive, also gives reasonably strong support to this assumption.<sup>27</sup>

Finally, this Article suggests that there are three procedural devices that courts can utilize to create deterrence incentives in the product design process: (1) imputing knowledge of design risks to manufacturers;<sup>28</sup> (2) limiting the scope and application of the state-of-the-art concept;<sup>29</sup> and (3) shifting the risk-utility burden to the defendants i.e., the manufacturers.<sup>30</sup> Employed intelligently, these devices are likely to bring a needed measure of injury prevention to product use. Numerous courts have demonstrated the necessary awareness of manufacturer unaccountability in product design, and have attempted to create incentives for safety by applying these procedural devices in a thoughtful manner. Others, however, have failed on both counts. Perhaps a sharper awareness of the full extent of manufacturer culpability in product design will persuade those courts to move in the direction of procedural strictness.

## II. THE INFORMATION DISPARITY

### A. *Manufacturing Defects*

The flaws in products resulting from the manufacturing process may be classified as either materials defects or fabrication defects.<sup>31</sup> The former consist of the defects inherent in the materials used to construct component parts that are integrated into a finished product.<sup>32</sup> Fabrication defects, on the other hand,

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discussion of why post-accident protection really affords no protection, see *infra* notes 283-91 and accompanying text.

26. For a discussion of courts and commentators arguing that strict liability increases product safety, see *infra* notes 292-94, 296-97 and accompanying text.

27. For an examination of this empirical evidence, see *infra* notes 31-78 and accompanying text.

28. For a discussion of the imputation of knowledge theory, see *infra* notes 306-39 and accompanying text.

29. For a discussion of the state-of-the-art theory, see *infra* notes 340-91 and accompanying text.

30. For a discussion of shifting the risk-utility burden, see *infra* notes 392-467 and accompanying text.

31. W. PAGE KEETON ET AL., *PRODUCTS LIABILITY AND SAFETY—CASES AND MATERIALS* 244 (2d ed. 1989) (distinguishing between materials defects and fabrication defects).

32. See, e.g., *Keeler v. Richards Mfg. Co., Inc.*, 817 F.2d 1197 (5th Cir. 1987)

are flaws resulting from mistakes that are made by persons or machinery working on the product during the various stages of production.<sup>33</sup>

Corporations utilize quality control processes to detect design flaws and other irregularities before a product enters the marketplace. Corporations implement these quality control processes primarily by inspection procedures that consist of physical and other types of product examinations during the stages of production. Inspection procedures, however, add a major increment of cost to most products.<sup>34</sup> Consequently, corporations can only inspect a small sampling of the products produced and the individual components contained therein.<sup>35</sup>

Because manufacturing defects occur randomly,<sup>36</sup> and in-

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(involving surgical screw containing "debris" that made screw weaker than specified thereby causing screw to break while in plaintiff's hip); *Pouncey v. Ford Motor Co.*, 464 F.2d 957 (5th Cir. 1972) (involving "inclusions" i.e., non-metal impurities, existing in automobile radiator fan blade that weakened blade and caused it to break apart); *MacPherson v. Buick Motor Co.*, 111 N.E. 1050 (N.Y. 1916) (finding that spokes of automobile wheel were made of defective wood, which caused wheel to crumble).

33. *Jenkins v. General Motors Corp.*, 446 F.2d 377 (5th Cir. 1971) (involving manufacturer's failure to tighten nut sufficiently on car suspension system), *cert. denied*, 405 U.S. 922 (1972); *Ford Motor Co. v. Zahn*, 265 F.2d 729 (8th Cir. 1959) (ruling that any one of several kinds of human errors in production could result in failure to remove metal burr on ash tray that injured passenger's eye in automobile accident).

34. For a detailed discussion of how quality control procedures such as inspection increase overall product costs, see Cowan, *supra* note 7, at 1087.

35. Because inspection costs are so high, there is constant pressure on manufacturers to simplify inspection procedures. Cowan, *supra* note 7, at 1087. Consequently, cost pressures exist to inspect a smaller, rather than a larger, sampling of the product. *Id.* One should note, however, that even if a manufacturer were inclined for safety reasons—if not for financial reasons—to inspect every item constituting a finished product, certain types of inspection would require the destruction of an entire product. See *Pouncey v. Ford Motor Co.*, 464 F.2d 957 (5th Cir. 1972) (finding impurities in metal of automobile fan blade would require removing metal from each blade in order to examine it microscopically); *Pabon v. Hackensack Auto Sales, Inc.*, 164 A.2d 773 (N.J. Super. Ct. 1960) (finding that individual ballbearings would have to be destroyed in order to test their compliance with material specifications). Hence, inspection of every component of every product is simply not possible. Cowan, *supra* note 7, at 1090.

36. For a discussion of fabrication and quality control in the manufacturing process, see KEETON ET AL., *supra* note 31, at 53. "Randomly" can mean both occurring with statistical unpredictability and also occurring in different forms, i.e., with no predictability of the exact kind of manufacturing flaw that will appear in the finished product. With regard to the kind of flaw that occurs, a manufacturer may gain knowledge of such flaws through the notice it receives from, for example, lawsuits. Otherwise, a manufacturer fairly can be said to have no knowledge of product flaws such as loose bolts or radiator fans constructed of impure metal. See *Pouncey*, 464 F.2d at 957; *Jenkins v. General Motors Corp.*, 446 F.2d 377 (5th Cir. 1971).

spection is necessarily limited to a sampling of the entire production output,<sup>37</sup> manufacturers only have actual knowledge of the specific flaws discovered in the inspection process.<sup>38</sup> Moreover, manufacturers purposefully choose a level of quality control adequate to reduce to an acceptable minimum the number of products not conforming to the producer's specifications.<sup>39</sup> The typical producer who implements a minimum quality control program does not make a conscious choice about specific risks in specific products that it knows will cause user injury.<sup>40</sup> Therefore, one cannot assert that producers consciously choose to flood the marketplace with entire product lines containing manufacturing defects that will likely cause human injury. This is not necessarily true, however, in the context of design defect.

## B. DESIGN DEFECTS

### 1. *Manufacturer Knowledge*

Design defects contrast starkly with manufacturing defects in terms of conscious decision-making. Manufacturers make production choices for the purpose of making the end product conform to product specifications as closely as possible. To

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37. For a discussion of the sampling procedures used to inspect products, see Cowan, *supra* note 7, at 1090.

38. Manufacturers also have indirect knowledge of product risks generally. They know that by choosing to inspect a limited sampling of final products, rather than every item off the product line, a certain percentage of production defects will not be detected in the inspection process. See generally Cowan, *supra* note 7, at 1090-92. Moreover, they know that those flawed products will enter the marketplace and in some cases cause injuries to humans. *Id.* Under negligence theory, the manufacturer is liable only if its inspection, i.e., sampling, choice is unreasonable. *Id.* at 1091. In the true sense of strict liability, however, the defective product that enters the marketplace and causes personal injury creates liability regardless of whether the manufacturer's quality control choices were reasonable. *Id.* at 1091-92.

39. Commentators have asserted that the purpose of quality control is to maximize profits, not to create better quality. See Cowan, *supra* note 7, at 1090. Even if this is true, however, producers still have an interest in the reputation of their products—such as their reputation for quality and dependability.

40. Because manufacturers have an interest in selling all items produced in a product line, their interests are best served by insuring that most of the items meet their specifications. If items do not satisfy these specifications, buyers will return them for an exchange. Hence, a minimum quality control program would, at the very least, serve this goal. Even a modicum of quality control will uncover some of the items of a product line that otherwise would enter the marketplace with manufacturing defects. Moreover, even in the extreme and unlikely scenario in which a producer consciously chooses to implement no quality control, it is unlikely that every item within the product line will contain manufacturing defects because many of those defects are caused randomly by human errors in the production process.

“choose” to have production defects in the finished product would defeat the purposes of setting product specifications. Producers therefore “choose” manufacturing defects only in the indirect sense that they implement quality control procedures knowing that a few items of the finished product line will enter the marketplace with production flaws.<sup>41</sup>

In the design context, manufacturers make numerous and complex design decisions. Some of the decisions are general, such as the overall concept of the product;<sup>42</sup> but most of the decisions are very specific, such as the choices of color,<sup>43</sup> strength of component parts,<sup>44</sup> safety features,<sup>45</sup> and the size of particular pieces contained in the product.<sup>46</sup> These choices have direct

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41. In terms of risk allocation, this process is different in degree, but perhaps not in kind, from making conscious design choices that create known risks for product users. See Cowan, *supra* note 7, at 1087-92. The difference, however, is significant. In the design context, the manufacturer has chosen a specific known risk that is inherent in every item of the product line. In the vast majority of such cases, these design risks could be eliminated by alternative design choices. By contrast, manufacturing defects are not chosen in any direct sense and, in fact, are not desired. See KEETON ET AL., *supra* note 31. Manufacturing defects affect only a small percentage of an entire product line, and defeat the purposes of setting product specifications. The purposes behind product specifications are defeated to a greater extent the higher the frequency with which the manufacturing defects occur. For a discussion of manufacturing defects in this context, see *supra* notes 35-40 and accompanying text. But see Owen, *Moral Foundations*, *supra* note 17, at 503 (arguing that great majority of manufacturing defect cases have fault basis, i.e., conscious failure to invest adequately in research, production or communication); Henderson & Twerski, *Proposed Revisions*, *supra* note 3, at 1516 (“The manufacturers very knowledge that a predictable number of flawed products will enter the marketplace and cause injury lends to the harm an element of deliberate infliction.”).

42. See *Grimshaw v. Ford Motor Co.*, 174 Cal. Rptr. 348 (Cal. Ct. App. 1981) (stating initial concept to build car that weighed less than 2,000 pounds and could sell at retail for less than \$2,000).

43. *Mickle v. Blackmon*, 166 S.E.2d 173 (S.C. 1969) (involving manufacturer that chose white, rather than black, plastic for gear shift knob knowing that white plastic posed a specific risk that black plastic did not—the risk of deterioration).

44. *Green v. Denney*, 742 P.2d 639 (Or. Ct. App. 1987) (holding that roof supports were not strong enough to protect passengers of car from forces to which roof was subjected).

45. *Pike v. Frank G. Hough Co.*, 85 Cal. Rptr. 629 (Cal. 1970) (stating that omission of rear view mirrors on earth-moving machine kept operator from seeing around “blind spot” where plaintiff’s decedent was standing); *Turner v. General Motors Corp.*, 514 S.W.2d 497 (Tex. Civ. App. 1974) (holding that failure to incorporate roll bar into car roof rendered car unreasonably dangerous).

46. *Richelman v. Kewanee Mach. & Conveyer Co.*, 375 N.E.2d 885 (Ill. App. Ct. 1978) (finding that design engineer fixed size of openings between guard bars on farm machinery based on own large shoe size, knowing that persons with shoe sizes smaller than his would also be using machinery).

safety ramifications of which the producer is aware.<sup>47</sup>

There are three important aspects of the design process that furnish manufacturers direct and specific knowledge of design risks: (1) choice of materials; (2) expertise and experience about the interaction of the product and the user; and (3) knowledge acquired through testing. These categories overlap to some degree and there may be other categories not specifically included within these three.<sup>48</sup> The purpose of this examination, however, is not to quantify all the discreet sources of manufacturer knowledge of design risks. The purpose is, rather, to describe generally the broad and direct access producers have to knowledge of design risks inherent in products and design risks that result directly from their conscious design choices.<sup>49</sup> Without exaggeration, one can confidently assert that manufacturer knowledge of design risks is practically exclusive.

The choice of materials is a major source of a producer's knowledge of the design risks inherent in its products. Materials chosen for a product design must have the properties necessary to perform the desired function(s) without presenting unnecessary dangers to users. Manufacturers, as experts, determine product specifications, including the properties of the different materials incorporated into the finished product.<sup>50</sup> Manufactur-

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47. See Cowan, *supra* note 7, at 1088 (“[M]odern mass producers allocate risks of injury from defective products among themselves and their customers. This allocation is deliberate.”). Some design choices may present safety risks not apparent until after testing is completed. Manufacturers often possess only a generalized knowledge of design risks that becomes more specific and complete as a result of testing. See *Grimshaw v. Ford Motor Co.*, 174 Cal. Rptr. 348, 360 (Cal. Ct. App. 1981) (stating that Ford’s own pre-marketing testing revealed that placement of gas tank so close to rear bumper posed risk of gas tank rupture not present on modified or reinforced test vehicles).

48. See, e.g., *Nissen Trampoline Co. v. Terre Haute First Nat’l Bank*, 358 N.E.2d 974 (Ind. 1976) (finding that manufacturer of aqua diver trampoline knew, by virtue of its own tests, that interaction of user and product could result in kind of accident that caused plaintiff’s injury).

49. See Owen, *Punitive Damages*, *supra* note 5, at 1258 (“Through the processes of design, testing, inspection and collection of data on product safety performance in the field, the manufacturer has virtually exclusive access to much of the information necessary for effective control of dangers facing product consumers”); *Foley v. Clark Equipment*, 523 A.2d 379, 391 (Pa. Super. Ct. 1987) (stating that “design defects result from deliberate and documentable decisions on the part of manufacturers”).

50. See *Feldman v. Lederle Lab.*, 479 A.2d 374, 386-87 (N.J. 1984). The court held the manufacturer to the standard of an expert, which included having knowledge of “arts, materials and processes” related to production of its products. *Id.* at 386. The court also noted that the standard may require manufacturers to “seek out information concerning the public’s use of its own product.” *Id.* at 387.

ers know the properties of most materials,<sup>51</sup> and can test to gain the necessary knowledge concerning any other materials incorporated into the finished product.<sup>52</sup> Thus, it is surprising to see producers—knowing of the serious risks accompanying their decisions—make so many seemingly inappropriate choices concerning raw materials to be used in constructing their products.<sup>53</sup>

A manufacturer's expertise also comprises knowledge about the interaction between its products and the users of its products. Because products are designed for particular purposes, manufacturers know the circumstances under which, and the specific manner in which, their products are likely to be applied.<sup>54</sup>

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51. See *Green v. Denney*, 742 P.2d 639 (Or. Ct. App. 1987) (involving roof supports that manufacturer knew were weak); *First Nat'l Bank v. Nor-Am Agric. Prod., Inc.*, 537 P.2d 682, 688 (N.M. Ct. App.) (finding that company knew that eating animals fed with their grain had deleterious effect on consumers), *cert. denied*, 536 P.2d 1085 (N.M. 1975); *Mickle v. Blackmon*, 166 S.E.2d 173 (S.C. 1969) (involving manufacturer that knew of deteriorating quality of white plastic used in gear shift knob).

52. See *West v. Johnson & Johnson Prods., Inc.*, 220 Cal. Rptr. 437, 454 (Cal. Ct. App.), *cert. denied*, 479 U.S. 824 (1986) (involving manufacturer that should have "initiated an 'adequate appropriate testing program'" after receiving numerous consumer complaints regarding product). For a discussion of manufacturer testing of products, see *infra* notes 55-58 and accompanying text.

53. *O'Gilvie v. International Playtex, Inc.*, 821 F.2d 1438, 1446 (10th Cir. 1987) (involving tampon manufacturer that chose material with higher absorbency than was necessary to meet its own standards, knowing that such level of absorbency posed serious risks of toxic shock syndrome to users); *Greenman v. Yuba Power Prods., Inc.*, 377 P.2d 897, 899 (Cal. 1963) (involving woodworking machine constructed with screws that were inadequate to hold machine together during operation, and finding that manufacturer had either actual knowledge of risk or had inadequately tested device); *McGee v. Cessna Aircraft Co.*, 188 Cal. Rptr. 542, 547 (Cal. Ct. App. 1983) (finding that aluminum fire wall fittings on Cessna airplane could resist flame penetration only 10 to 40 seconds, and not 15 minutes as required by federal regulations); *Grimshaw v. Ford Motor Co.*, 174 Cal. Rptr. 348, 384-85 (Cal. Ct. App. 1981) (finding ample evidence that Ford's management made conscious choices in designing Pinto that it knew posed serious risks to users); *Tetuan v. A. H. Robins Co.*, 738 P.2d 1210, 1240 (Kan. 1987) (finding that manufacturer of intrauterine device marketed it knowing that string attached to it could cause life-threatening infections to users); *Green v. Denney*, 742 P.2d 639, 642 (Or. Ct. App. 1987) (finding that auto maker chose roof supports for Ford Pinto that it knew were not strong enough); *Mickle v. Blackmon*, 166 S.E.2d 173, 188 (S.C. 1969) (involving auto maker that chose plastic for gear shift knob when it knew that such knob would deteriorate in sunlight and pose risk of serious injuries to car passengers). For a more complete examination of the intrauterine device in *Tetuan* and the manufacturer's design and marketing choices consciously disregarding the safety of users, see MORTON MINTZ, *AT ANY COST—CORPORATE GREED, WOMEN, AND THE DALKON SHIELD* (1985).

54. *Camacho v. Honda Motor Co.*, 741 P.2d 1240, 1243 (Colo. 1987) (finding that manufacturers are responsible for anticipating applications of products outside of their "intended use," i.e., motor vehicle accidents, and therefore are liable for failing to take adequate precautions to protect motorcycle passengers from risks of accident); *Ellsworth v. Sherne Lingerie, Inc.*, 495 A.2d 348, 357 (Md. 1985) (holding that producer of flannel nightgown was deemed to know

In addition to their expertise about materials, and their expertise about the interaction of users and products, manufacturers receive important information about design risks from product testing.<sup>55</sup> In a narrow, technical sense, product testing

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that users would sometimes wear gown inside out, thus enhancing flammability risk of protruding pockets); *McCormack v. Hanksraft Co., Inc.*, 154 N.W.2d 488, 496-98 (Minn. 1967) (finding that manufacturer of steam vaporizer, knowing product would be used in childrens' bedrooms, failed to seal water/steam container to avoid accidental tipping of vaporizer by child); *Micallef v. Miehle Co.*, 348 N.E.2d 571, 573-74 (N.Y. 1976) (involving plaintiff that was injured when he reached into printing press to remove foreign substance, a practice common in industry, which should have prompted manufacturer to install available safety device); *Knitz v. Minster Mach. Co.*, 432 N.E.2d 814, 819 (Ohio 1982) (involving plaintiff that accidentally activated foot switch on industrial press, and holding that foot pedal could have been designed to guard against accidental activation), *cert. denied*, 459 U.S. 857 (1982); *Lewis v. Coffing Hoist Div., Duff-Norton Co.*, 528 A.2d 590 (Pa. 1987) (involving overhead crane operator who accidentally pushed wrong button on control box causing crane's load to fall on him, and suggesting that manufacturer knew that control box could have been designed to protect against accidental activation). *But see Venezia v. Miller Brewing Co.*, 626 F.2d 188, 190-91 (1st Cir. 1980) (holding that producer could not know, i.e., foresee, that eight-year-old child would throw beer bottle against tree).

Manufacturers also gain knowledge of product defects by the reports received about product usage. *See, e.g., Palmer v. A.H. Robins Co., Inc.*, 684 P.2d 187, 197 (Colo. 1984) (involving manufacturer of intrauterine devices that received reports of spontaneous septic abortions and other serious difficulties experienced by users). These reports enable manufacturers to eliminate product risks retrospectively by redesigning their products. *Id.* at 218. In *Palmer*, although the manufacturer knew of the dangers caused by the multi-filament wick in its intrauterine device, it took no steps to redesign the product. *Id.* at 196.

55. For a discussion recognizing that manufacturers receive important design risk information through testing, see Owen, *Punitive Damages*, *supra* note 5, at 1258. This is not to say that producers always, or even frequently, use testing results to eliminate known design risks prior to marketing products. There are numerous instances in which manufacturers have ignored their own or industry-wide testing that clearly revealed the existence of serious risks to users of their products. *See Dorsey v. Honda Motor Co.*, 655 F.2d 650, 652-53 (5th Cir. 1981) (finding that Honda's own tests indicated danger to front passengers due to small size and inadequate strength of Honda AN 600, yet Honda still marketed car in United States without correcting design risks in accordance with recommendations made by Honda engineers), *cert. denied*, 459 U.S. 880 (1982); *Cipollone v. Liggett Group, Inc.*, 683 F. Supp. 1487, 1491 (D.N.J. 1988) (finding that defendant's own studies and testing indicated serious health risks from smoking but that defendant had concealed results from public); *Grimshaw v. Ford Motor Co.*, 174 Cal. Rptr. 348, 384-85 (Cal. Ct. App. 1981) (finding that Ford's own crash tests indicated danger to Pinto passengers from low-impact rear-end collision, but Ford put Pinto into marketplace without modification of dangerous design); *Palmer*, 684 P.2d at 196-97 (finding that manufacturer's own testing revealed risk of deadly infection inherent in design of string attached to its intrauterine device, but manufacturer continued to market product for almost three years after learning of such risks); *Wolmer v. Chrysler Corp.*, 474 So. 2d 834, 837 (Fla. Dist. Ct. App. 1985) (finding that Chrysler conducted crash tests that revealed danger to passengers of Plymouth Volare from low-impact rear-

includes engineering or mechanical testing, such as testing materials for strength and other properties,<sup>56</sup> or testing the manner in which particular components of the finished product will function.<sup>57</sup> In a broader sense, testing includes, for example, studies and reports depicting the risks of illness and disease inherent in particular product designs.<sup>58</sup> Testing in its broadest sense provides with near certainty the information about design risks that may not always be available to producers through their expertise about materials or through their expertise about the expected interaction of product and user. Altogether, these three aspects of the design process provide manufacturers specific knowledge of design risks unavailable to the average product user.

## 2. *User Knowledge*

In all but the exceptional case, manufacturers are aware of and control product risks created by their conscious design choices.<sup>59</sup> By contrast, users rarely possess much, if any, knowledge of design risks inherent in the products they use.<sup>60</sup> There

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end collision, yet Chrysler placed vehicle in market without modification of dangerous design).

56. See *Palmer*, 684 P.2d at 196-97 (involving manufacturer that tested string of intratracheal device for specific property of "wicking," i.e., whether fluid and/or bacteria would travel up string).

57. See *Grimshaw*, 174 Cal. Rptr. at 384-85 (discussing Ford's testing procedures concerning susceptibility of Pinto gas tank to puncture and resultant combustibility due to presence of gasoline with tank located at various positions in rear of vehicle).

58. Manufacturers not only have a duty to perform their own tests and studies, but they also have a duty as experts to be aware of reports and studies performed by others that are available in the world of expert knowledge. See *O'Gilvie*, 821 F.2d at 1446 (finding that manufacturer of tampons was aware of studies and medical reports indicating that its choice of material for tampons posed risk of fatal illness to users).

59. See *Owen*, *Moral Foundations*, *supra* note 17, at 469-70 ("In sum, the manufacturer's initial power over product safety—risk control—is enormous; by comparison, the consumer's initial control of product risk is almost trivial.").

60. *Id.*; see also 1 AMERICAN LAW INSTITUTE, ENTERPRISE RESPONSIBILITY FOR PERSONAL INJURY: THE INSTITUTIONAL FRAMEWORK 225, 262 (1991) [hereinafter ENTERPRISE RESPONSIBILITY] (stating that individuals tend to underestimate more substantial risks inherent in products, at least in part due to imperfect product risk information); David P. Griffith, Note, *Products Liability-Negligence Presumed: An Evolution*, 67 TEX. L. REV. 851, 874 (1989) (explaining that product users have no more basis to protect themselves from hidden product risks than do intermediate sellers). One can reasonably conclude that consumers have no more knowledge concerning manufacturing risks than they do concerning design risks. However, because this Article focuses on design risks—including the discrepancy between consumer and producer knowledge—consumer knowledge, or the lack thereof, is outside of the scope of this Article.



are at least six reasons why consumers fail to fully appreciate such design risks.

First, consumers are by definition product users, not designers.<sup>61</sup> They do not participate in the design or production of products, and they cannot normally possess information relating to design risks inherent in those products.<sup>62</sup> They also do not participate in specific manufacturing decisions, such as the choice of materials to be utilized in each product.<sup>63</sup> In addition, they are not privy to the manufacturers' expectations about product use and the inevitable interaction between product and user.<sup>64</sup> Moreover, they possess no information concerning product testing that would inform them of inherent design risks.<sup>65</sup>

61. In the workplace, where a significant number of product injuries occur, there may be a certain level of sophistication regarding the products used. This sophistication arises either by virtue of skill and training required for particular positions, or as a result of on-the-job experience. See ENTERPRISE RESPONSIBILITY, *supra* note 60, at 226, 235; see also JAMES E. BEASLEY, PRODUCTS LIABILITY AND THE UNREASONABLY DANGEROUS REQUIREMENT 88-89 (1981). Nonetheless, in most such cases the producer, as designer of the product, has superior knowledge about the product's inherent risks and therefore has superior ability to minimize or eliminate the risks. See *Micallef v. Miehle Co.*, 348 N.E.2d 571, 577 (N.Y. 1976).

62. The most prominent exception to the general rule that users possess no knowledge of design risks exists in cases involving workplace injuries. See, e.g., *Green v. Sanitary Scale Co.*, 431 F.2d 371, 374 (3d Cir. 1970) (finding that employee of supermarket assumed risk of using meat grinding machine that caused injury). Users in the workplace have typically attained a certain level of sophistication due to special training, skill or on-the-job experience. See, e.g., *Bartkewich v. Billenger*, 247 A.2d 603, 605 (Pa. 1968) (holding that employee should have known not to reach into glass breaking machine). For a discussion of other means to educate consumers, see *infra* notes 68-70.

63. For a discussion of choice of materials in product liability cases, see *supra* note 51.

64. For a discussion of manufacturer knowledge, see *supra* notes 41-58 and accompanying text.

65. See Thomas V. Harris, *Enhanced Injury Theory: An Analytic Framework*, 62 N.C. L. REV. 643, 675 (1984) (stating that "consumers have no . . . ability to analyze even obvious design [defects]"). Consumers have access to information about some products from sources other than manufacturers. Various consumer reporting magazines, such as Consumer Reports, and consumer organizations, such as Public Citizen, publish general product information about selected products—including, on occasion, results of selected tests. Nonetheless, even the most diligent consumer, a consumer who reads all consumer product information available in the public domain, is not able to discover a significant amount of product information concerning design risks. Customarily, producers do not disclose such information. See DAVID LUBAN, LAWYERS AND JUSTICE, AN ETHICAL STUDY 206-13 (1988) (explaining how corporations are able to hide facts from consumers in context of Ford Pinto case); see also Gary T. Schwartz, *The Myth of the Ford Pinto Case*, 43 RUTGERS L. REV. 1013, 1045-46 (1991) [hereinafter Schwartz, *Pinto Case*] (same).

Second, consumers are laypersons, not experts.<sup>66</sup> As such, they cannot be expected to appreciate fully design risks hidden within the complexities of modern products.<sup>67</sup>

The third factor underlying consumer failure to appreciate the risks inherent in products is associated with consumers' assumptions about product safety. Because product users are typically not knowledgeable about specific product risks, they tend to assume that, in general, products are safe for normal use.<sup>68</sup>

66. Even ordinary consumers, as users of products, acquire a modicum of expertise about ordinary products that they employ in their daily lives. This expertise is usually limited, however, and does not ordinarily amount to a full understanding of the risks inherent, and often hidden, in product design. *Singer v. Walker*, 250 N.Y.S.2d 216 (N.Y. App. Div. 1964) (involving hammer labeled "unbreakable" that chipped and blinded infant), *aff'd sub nom. Longines-Wittnauer Watch Co. v. Barnes & Reinecke, Inc.*, 209 N.E.2d 68 (N.Y. 1965), *and cert. denied sub nom. Estwing Mfg. Co., Inc. v. Singer*, 382 U.S. 905 (1965).

67. *Escola v. Coca Cola Bottling Co.*, 150 P.2d 436, 443 (Cal. 1944) (Traynor, J., concurring) ("The consumer no longer has means or skill enough to investigate for himself the soundness of a product, even when it is not contained in a sealed package . . ."); *Micallef v. Miehle Co.*, 348 N.E.2d 571, 577 (N.Y. 1976). According to the *Micallef* court:

Advances in the technologies of materials, of processes, of operational means have put it almost entirely out of the reach of the consumer to comprehend why or how the article operates, and thus even farther out of his reach to detect when there may be a defect or a danger present in its design or manufacture.

*Micallef*, 348 N.E.2d at 577.

68. Consumers possess knowledge concerning gross product risks from their common sense, i.e., consumers know that a large American car is safer than a small Honda. *See Dorsey v. Honda Motor Co.*, 655 F.2d 650, 655 (5th Cir. 1981). Consumers also learn through experience that particular product uses are inherently risky, even if such risks do not render the product defective in every instance. *See Shetterly v. Crown Controls Corp.*, 719 F. Supp. 385 (W.D. Pa. 1989) (stating that employees learned through training and on-the-job experience that they had to operate pallet moving trucks from side, not front, to avoid injuries, and holding as matter of law that product was not defective), *aff'd*, 898 F.2d 142 (3rd Cir. 1990).

There is a tendency for product users to overestimate low-probability risks, and to underestimate the more substantial risks from product use. *See ENTERPRISE RESPONSIBILITY*, *supra* note 60, at 225. However, people do not generally condition their use and application of products on an assumption that inherent dangers in the product are likely to injure them. While drivers generally assume that excessive speed is dangerous and chefs generally assume that the sharpness of knives poses a danger, neither category of user employs the product generally assuming that serious or life-threatening inherent risks are likely to materialize. Thus, there may be different levels of use and expectation, including more or less information about products, that condition the risk attitudes of particular users. *See Marshall S. Shapo, A Representational Theory of Consumer Protection: Doctrine, Function and Legal Liability for Product Disappointment*, 60 VA. L. REV. 1109, 1129 (1974) (discussing effect that manufacturers' product claims have on consumers' information base concerning products manufacturers are representing). Nonetheless, each user assumes safety, not injury, within the particular environment of "normal" use.

Courts have correctly recognized that users may, and usually do, rely on the presence of products in the marketplace as a sign that such products are safe.<sup>69</sup> Advertising and consumer expectations of governmental regulation have a tendency to provide product users with a false sense of security and often put consumers off their guard during product use.<sup>70</sup>

The fourth reason consumers possess relatively little knowledge of design risks is that these risks are usually not apparent to the typical non-expert user.<sup>71</sup> If producers fail to disseminate risk information into the marketplace, consumers are not likely to

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69. *Greenman v. Yuba Power Prods. Inc.*, 377 P.2d 897, 901 (Cal. 1962) ("Implicit in the machine's presence on the market, however, was a representation that it would safely do the jobs for which it was built."); *Rahmig v. Mosley Mach. Co.*, 412 N.W.2d 56, 75 (Neb. 1987) (stating that "there was justified expectation that, with the [product's] power running and its controls in the 'up' position, it was safe to enter the [product's] cutting chamber or discharge chute to remove sheared metal"); *Salvador v. Atlantic Steel Boiler Co.*, 319 A.2d 903, 907 (Pa. 1974) ("Our courts have determined that a manufacturer by marketing and advertising his product impliedly represents that it is safe for its intended use.").

70. *See Kociemba v. G.D. Searle & Co.*, 707 F. Supp. 1517, 1526-27 (D. Minn. 1989). In *Kociemba*, a physician who prescribed Searle's IUD testified that he was misled by Searle's promotional literature that failed to alert the reader to the possibility of pelvic inflammatory disease. *Id.* at 1526. This omission occurred despite recommendation by the FDA advisory committee that such reference be included in Searle's literature. *Id.* The physician further testified that had he known of the great risk of pelvic inflammatory disease, he would not have prescribed the IUD for patients who had never borne children, and "probably not [for] any women." *Id.*; *see also Anson v. American Motors Corp.*, 747 P.2d 581, 587-89 (Ariz. Ct. App. 1987) (holding that plaintiffs' allegations that manufacturer's misrepresentations induced them to buy Jeep that manufacturer knew was dangerous and defective presented factual question for jury); *Palmer v. A.H. Robbins Co.*, 684 P.2d 187, 196 (Colo. 1984) (stating that physician recommended defendant's intrauterine device "specifically [relying] on promotional claims made by Robins as to the safety and effectiveness" of device); *McCormack v. Hanksraft Co.*, 154 N.W.2d 488, 492 (Minn. 1967) (stating that consumer specifically selected defendant's vaporizer "relying upon defendant's prior representations contained in . . . [defendant's product] booklet accompanying . . . [previous vaporizer consumer had owned] that its vaporizers were 'safe' and 'practically foolproof,' as well as advertisements representing them to be 'tip-proof'").

71. *O'Gilvie v. International Playtex, Inc.*, 821 F.2d 1438, 1446 (10th Cir. 1987) (finding that high absorbency tampon fibers provided an increased risk of contracting toxic shock syndrome); *Exum v. General Elec. Co.*, 819 F.2d 1158 (D.C. Cir. 1987) (finding that design of commercial deep fryer may have increased risk of serious injury to user while it was being emptied); *Grimshaw v. Ford Motor Co.*, 174 Cal. Rptr. 348, 360 (Cal. Ct. App. 1981) (holding that gas tank in Ford Pinto was placed in position that left it with less "crush space" than any other American automobile); *Palmer*, 684 P.2d at 196 (finding that tailstring of IUD provided pathway for bacteria into uterus and could lead to infection); *McCormack v. Hanksraft Co.*, 154 N.W.2d 488, 495 (Minn. 1967) (stating that design of vaporizer allowed scalding water to pour out of machine when machine was tipped); *Toliver v. General Motors Corp.*, 482 So. 2d 213, 214

ever obtain such information.<sup>72</sup>

The high cost of product risk information is the fifth reason product users know little about product risks. While design risk information is expensive for producers, it is far more costly for consumers.<sup>73</sup> Producers obtain a portion of their risk information from tests and studies, which are often both costly and time-consuming. If these tests and studies are expensive for producers, however, they are prohibitively so for consumers.<sup>74</sup> No consumer can afford, in money or time, the costs of testing each consumer product he or she uses.<sup>75</sup> These cost barriers essentially force consumers to rely on the risk information conveyed to them by the manufacturer. This fact leads directly into the sixth and final reason underlying consumer ignorance of product design risks.

The first five reasons behind consumer ignorance of product risks focus on the consumer rather than the manufacturer; they explain why consumers are not likely to discover design risk information in the public domain or on their own initiative. The sixth and final rationale, however, implicates the manufacturer more

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(Miss. 1985) (holding that gas tank in Chevrolet Vega was inadequately designed to withstand punctures in rear-end collisions).

72. Design risk information is generally not made available to the public until after numerous users have been injured. For further discussion concerning consumer knowledge of design risks, see *supra* note 59-78 and accompanying text.

73. See Steven P. Croley & Jon D. Hanson, *Rescuing the Revolution: The Revived Case for Enterprise Liability*, 91 MICH. L. REV. 683, 737, 770-71 (1993) [hereinafter Croley & Hanson, *Rescuing the Revolution*] (discussing Landes and Posner article and explaining high cost of consumer information); Jon D. Hanson & Kyle D. Logue, *The First-Party Insurance Externality: An Economic Justification for Enterprise Liability*, 76 CORNELL L. REV. 129, 174-80 (1990) (analyzing implications of imperfect consumer information); William M. Landes & Richard A. Posner, *A Positive Economic Analysis of Products Liability*, 14 J. LEGAL STUD. 535, 544 (1985) (arguing that high cost of obtaining information often outweighs benefit to consumer); John A. Siliciano, *Corporate Behavior and the Social Efficacy of Tort Law*, 85 MICH. L. REV. 1823-24 (1987) ("In reality . . . few consumers are willing or able to bear the high costs of fully informing themselves about all the relative safety hazards posed by competing products."); see also W. KIP VISCUSI, *REFORMING PRODUCTS LIABILITY* 64-65 (1991) (discussing consumer awareness of risk in various scenarios and concluding that "the chief inadequacy of the market is inadequate risk information"); W. Kip Viscusi, *Toward a Diminished Role for Tort Liability: Social Insurance, Government Regulation, and Contemporary Risks to Health and Safety*, 6 YALE J. ON REG. 65, 81-82 (1989) (discussing market incentives for product users to obtain risk information).

74. A manufacturer's information costs are much lower than a consumer's information costs due to a multiplicity of factors: (1) producers often retain their own expert employees and facilities for testing; (2) producers can test their products during the discreet design stages; and (3) producers do not need to break a finished product into its component parts prior to testing.

75. For a discussion of consumer costs incurred in obtaining risk information, see *supra* notes 73-74.

directly. Simply stated, manufacturers often fail to share their design risk information with consumers.<sup>76</sup> They frequently do not even share such information with other relevant parties, such as administrative agencies.<sup>77</sup> Although this appears harsh and irresponsible, producers could not remain competitive if they disclosed information concerning serious risks inherent in their products.<sup>78</sup> Unfortunately, this lack of communication only serves to exacerbate the information disparity between producers and consumers.

### III. SAFETY AND CORPORATE DECISION-MAKING

#### A. *Design Risks*

Although producers know of design risks in their products, the reality of the marketplace is that these producers consciously leave such risks in their products. During the last several decades, the marketplace has been flooded with products containing inherent risks; these risks are a direct result of conscious design choices by manufacturers. In almost every case, these design choices are accompanied by producer knowledge of the specific

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76. See *O'Gilvie v. International Playtex, Inc.*, 821 F.2d 1438, 1446 (10th Cir. 1987) (finding that Playtex disregarded medical reports linking high-absorbency fibers and toxic shock syndrome and continued to advertise high absorbency of its tampons); *Sturm, Ruger & Co., Inc. v. Day*, 594 P.2d 38, 47 (Alaska 1979) (finding that manufacturer marketed gun despite knowledge by top company officials that it was defectively designed and had injured users), *overruled sub nom. Dura Corp. v. Harned*, 703 P.2d 396 (Alaska 1985). Manufacturers also exacerbate the risk information disparity by lulling consumers into a false sense of product safety. See *Anson v. American Motors Corp.*, 747 P.2d 581, 587 (Ariz. Ct. App. 1987) (stating that AMC made continuing representations regarding ruggedness and safety of their jeep and denied presence of any defects in design of jeep until Federal Trade Commission required them to place warning stickers on vehicles); *McCormack v. Hanksraft Co.*, 154 N.W.2d 488, 495 (Minn. 1967) (involving manufacturer that failed to disclose risk information concerning lack of seal on steam container in its vaporizer despite knowledge that product would be used in childrens' bedrooms).

77. *Batteast v. Wyeth Labs., Inc.*, 526 N.E.2d 428, 437 (Ill. App. Ct. 1988) (holding that Wyeth failed to warn doctors that risks such as intoxication and death, circulatory failure and respiratory arrest, toxic synergism, and tonic and clonic convulsions were related to use of its product), *rev'd*, 560 N.E.2d 315 (1990); *Tetuan v. A.H. Robins Co.*, 738 P.2d 1210, 1218 (Kan. 1987) (holding that literature provided by Robins failed to note that string attached to Dalkon Shield could cause "wicking" infection).

78. See RUSSEL B. STEVENSON, JR., *CORPORATIONS AND INFORMATION: SECRECY, ACCESS, AND DISCLOSURE* 118-19 (1980) (arguing that despite fact that "[f]irms generally have readily available all the data on product quality that would be of interest to buyers," manufacturers keep product information from consumers in order to protect their competitive position in market, and markets are not really free and open, but controlled by oligopoly maintained in large part with assistance of consumer ignorance).

risks that their design choices pose to users.<sup>79</sup> An examination of a variety of products will demonstrate the great frequency with which producers make design choices in conscious disregard of user safety.<sup>80</sup> This examination will also show that, after making such choices, producers consciously conceal risk information that, if disclosed, would foster consumer safety and prevent a substantial number of product related injuries.<sup>81</sup>

### 1. *Motor Vehicles*

Passenger-car, truck, school bus and motorcycle cases provide dramatic instances of design defects chosen deliberately and consciously in disregard of user safety.<sup>82</sup> Design choices concerning gas tank location and safety, which manufacturers knew posed a direct threat of fire in the passenger compartment, have been documented for several models of vehicles produced by different manufacturers.<sup>83</sup> One automobile manufacturer marketed vehi-

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79. For a detailed discussion concerning manufacturer knowledge of design defects, see *supra* notes 41-58 and accompanying text.

80. See *Pawlak v. Brown*, 430 So. 2d 1346, 1351 (La. Ct. App. 1983) (stating that Honda knew driver or passenger of its ATC-90 three-wheel motorcycle could easily and inadvertently accelerate vehicle to its maximum speed, but failed to warn purchasers of this design problem).

81. *Id.*

82. For a discussion of cases documenting instances of design defects that were deliberately and consciously disregarded by manufacturers, see *infra* note 83.

83. See *Grimshaw v. Ford Motor Co.*, 174 Cal. Rptr. 348, 384 (Cal. Ct. App. 1981). In *Grimshaw*, the court found that Ford knew from its own pre-marketing crash tests that Pinto drivers were likely to suffer serious injuries or death from gas tank ruptures that commonly occurred in 20 to 30 mile-per-hour collisions. *Id.* The *Grimshaw* court also found that Ford could have eliminated the risk of rupture at a minimal cost—as little as \$11 per car. *Id.* The court characterized Ford's "institutional mentality" to be one of "callous indifference to public safety" constituting a "'conscious disregard' of the probability of injury" to consumers. *Id.*; see also *Ford Motor Co. v. Durrill*, 714 S.W.2d 329, 336-38 (Tex. Ct. App. 1986). In *Durrill*, the court found that Ford had used the same fuel tank system in its Mustang II that it had used in its Pinto. *Durrill*, 714 S.W.2d at 336-38. Thus, Ford had the same knowledge of fuel tank risks and the same relatively low cost of correcting them as in the Pinto case. *Id.* at 338. Rather than correcting the problem, however, Ford chose to save more than \$200,000,000 over three years by delaying modifications to the fuel tank system in the Mustang II. *Id.* Although the plaintiff owned both a Pinto and a Mustang II, he received a recall notice from Ford concerning only the problems present in the Pinto. *Id.* at 337. The plaintiff inquired about the Mustang II, but was assured by the dealership that the Mustang did not have the same problems as the Pinto. *Id.*; see also *Wolmer v. Chrysler Corp.*, 474 So. 2d 834, 837 (Fla. Dist. Ct. App. 1985) (finding that Chrysler knew from its own crash tests that its 1977 Plymouth Volare station wagon posed a serious risk of gas tank explosion due to two design defects in fuel tank system, but that Chrysler had nonetheless marketed vehicle without modification or warning to consumers), *quashed*, 499 So. 2d 823 (Fla.

cles knowing that the design of the brake system posed a high risk of total brake failure.<sup>84</sup> Another marketed a small, insubstantial vehicle that its own testing indicated was rendered particularly dangerous by specific, easy to correct design flaws.<sup>85</sup> One manufacturer chose material for a gear shift knob that it knew would deteriorate, thereby posing a risk of passengers being impaled on the gear shift lever during accidents or collisions.<sup>86</sup> Another manufacturer consciously terminated a testing program on auto roll-over protection even though it knew that at least one of its models posed a risk of serious injury or death because of inade-

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1986); *Toyota Motor Co. v. Moll*, 438 So. 2d 192, 194-95 (Fla. Dist. Ct. App. 1983) (finding that Toyota knew as early as 1966 that fuel system still used in its 1973 Corona posed threat of serious injury and that by 1973 Toyota had eliminated those features in every model except the Corona, yet Toyota offered no explanation why it had not made similar changes in 1973 Corona); *Foster v. American Motors Corp.*, No. Civ.A. 86-1434, 1988 WL 48055 (Wash. Ct. App. 1988) (finding that AMC's own crash tests indicated serious problems with fuel tank system in 1971 Gremlin, but AMC made no changes in system and gave no warnings to consumers for more than five years after learning about problem), *aff'd*, 423 N.W.2d 881 (Wash. 1988). A Dateline NBC broadcast indicated that General Motors marketed trucks containing gas tanks located outside of the frame rail despite the fact that their own safety tests showed that "in fatal fire side collisions, the fire rates for GMC/CK pickup trucks are generally higher than other pickup trucks." *Dateline NBC: Waiting to Explode?* (NBC television broadcast, Nov. 11, 1992). The rates were actually twice as high. *Id.* Clarence Ditlow, Executive Director of the Center for Auto Safety, said, "these pickups are rolling firebombs. They're the worst fire hazard we have seen in our history as an auto safety group." *Id.* In a recent case against General Motors involving these combustible trucks, a jury awarded a plaintiff \$105 million dollars. Martin Tolchin, *G.M. Pickup Case Is Taken over by the Secretary of Transportation*, N.Y. TIMES, Nov. 19, 1993, at A18.

84. *Hasson v. Ford Motor Co.*, 185 Cal. Rptr. 654, 661-63 (Cal. 1982), *cert. dismissed*, 459 U.S. 1190 (1983). Although Ford knew of the serious brake problem present in its 1966 Lincoln Continental, and had even recalled all 1966 models for the same problem, it failed to warn owners of the problem or issue a recall for the 1966 model. *Id.* One of the reasons behind Ford's decision not to inform owners was that it had been advertising the 1966 model as virtually maintenance free. *Id.* at 663. Despite Ford's concerns, a relatively simple and inexpensive solution was available and, in fact, was incorporated in the 1967 model Lincoln Continental. *Id.* at 661.

85. *Dorsey v. Honda Motor Co.*, 655 F.2d 650, 653-55 (5th Cir. 1981), *cert. denied*, 459 U.S. 880 (1982). The *Dorsey* court stated that Honda knew from pre-marketing crash tests that its 1971 Honda AN 600 presented specific, serious risks to front passengers. *Id.* Nonetheless, Honda ignored recommendations from an independent testing company to correct the problems before marketing the vehicle. *Id.*

86. *Mickle v. Blackmon*, 166 S.E.2d 173, 187-88 (S.C. 1969). In *Mickle*, Ford chose a white plastic material for the gear shift ball on its 1949 models knowing both that the plastic would deteriorate in sunlight—exposing passengers to the danger of being impaled on the gear shift—and that there was a black material available that would not deteriorate under such conditions. *Id.* In fact, Ford used the safer, more durable black material in its 1950 models. *Id.*

quate roof supports.<sup>87</sup> General Motors was aware of a flawed computer chip in a 1988 Chevrolet truck even before marketing the vehicle, yet it neglected to change the chip or warn drivers of the potential problem created by the flaw—sudden engine failure.<sup>88</sup> Volkswagen AG designed the front seats of its 1971 Beetle without utilizing “readily available and inexpensive technology” that would have prevented the seats from hurling front passengers into the back seat upon severe impact.<sup>89</sup> In a case involving allegations that Jeeps tended to roll over and were improperly equipped with an inadequate roll bar, the court found there to be a question of fact whether American Motors had known of the alleged defects for more than ten years and had fraudulently concealed the information from the public.<sup>90</sup> The Chrysler Corporation ignored available, relatively inexpensive technology in designing the frame of its 1974 Dodge Monaco; as constructed, the frame exposed drivers to a risk of serious injury upon side impact.<sup>91</sup> A manufacturer of semi-trailers failed to provide a mechanism for limiting the movement of meat hanging in refrig-

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87. *Turner v. General Motors Corp.*, 514 S.W.2d 497, 499 (Tex. Ct. App. 1974). In *Turner*, a GM test engineer suggested that a roll-bar could be incorporated into the design of the 1969 Chevrolet Impala “hardtop sedan.” *Id.* The engineer stated that the safety precaution could be implemented relatively inexpensively, but advised the company that it could not pass on the cost to consumers because it could not charge consumers for safety devices they could not see. *Id.* In addition to Chevrolet’s actions, there was evidence that the entire auto industry was similarly culpable. *Id.* at 507.

88. *General Motors Corp. v. Johnston*, 592 So. 2d 1054, 1060 (Ala. 1992). In *Johnston*, GM’s failure to warn consumers about a faulty computer chip and its failure to issue a recall saved approximately \$42 million—600,000 vehicles at roughly \$70 per vehicle. *Id.* at 1061. Instead of announcing a recall, GM silently notified dealers to replace the computer chip only after customer complaints directly implicated the chip. *Id.*

89. *Crispin v. Volkswagenwerk AG*, 591 A.2d 966, 970-71 (N.J. Super. Ct. App. Div. 1991) (stating that Volkswagen also knew that wearing seatbelt would mitigate “ejection” effect but failed to advise front passengers to wear them).

90. *Anson v. American Motors Corp.*, 747 P.2d 581, 582, 586, 589 (Ariz. Ct. App. 1987) (involving tests and studies allegedly indicating that American Motors knew of two defects in its Jeep CJ, but allegedly continued to represent vehicle as rugged and safe, and never warned public of vehicle’s design risks).

91. *Dawson v. Chrysler Corp.*, 630 F.2d 950, 954, 958 (3d. Cir. 1980), *cert. denied*, 450 U.S. 959 (1981). The Monaco design featured a frame that was not continuous along the sides. *Id.* at 958. Thus, the driver had no protection from side impact. *Id.* Chrysler’s rationale for exposing drivers to this risk was apparently to reduce the car’s weight by 200 to 250 pounds, and to reduce costs by approximately \$300 per vehicle. *Id.* Similarly, against the advice of two high-level managers, General Motors used a “wasp-waisted” frame that created a similar risk to passengers riding in 1958 models. RALPH NADER & WILLIAM TAYLOR, *THE BIG BOYS: POWER AND POSITION IN AMERICAN BUSINESS* 71 (1986). General Motors learned of numerous serious injuries caused by the design and corrected the defect in its 1961 models. *Id.* at 72.



erated trailers despite industry-wide knowledge that such trailers were especially unstable on the highways.<sup>92</sup> A bus manufacturer failed to place a handhold within reaching distance of one of the forward-facing seats; a passenger in that seat could therefore not secure him or herself in the event of sharp turns or sudden stops.<sup>93</sup> Finally, Honda's own testing—which occurred almost 10 years before a user of a Honda motorcycle was injured—indicated the safety value of protective bars on motorcycles, yet Honda failed to incorporate such a feature into the design of its consumer motorcycles.<sup>94</sup>

## 2. *Intrauterine Devices*

Instances where corporate decisions have perpetuated design risks—despite knowledge of those risks—that resulted in personal injuries are especially flagrant in the field of intrauterine devices (IUDs). The sad history of choices made by IUD manufacturers despite knowledge of risks inherent in their products is documented in thousands of lawsuits.<sup>95</sup> The majority of this litigation, however, has been against one manufacturer—A.H. Robins Com-

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92. *Mitchell v. Fruehauf Corp.*, 568 F.2d 1139, 1143-45 (5th Cir. 1978) (noting that defendant's expert conceded both seriousness of risk posed by unrestricted movement of hanging meat and feasibility of restricting such movement).

93. *Campbell v. General Motors Corp.*, 184 Cal. Rptr. 891, 895-99 (Cal. 1982) (finding that plaintiff's un rebutted testimony that lack of any handhold or handrail within her reach caused her to be propelled from her seat satisfied plaintiff's prima facie burden in strict design liability case). *Contra McClellan v. Chicago Transit Auth.*, 340 N.E.2d 61, 63 (Ill. App. Ct. 1975) (holding that testimony of passengers injured on bus lacking similar handrail was insufficient to prove any design defect).

94. *Camacho v. Honda Motor Co.*, 741 P.2d 1240, 1242 (Colo. 1987). Although Honda did not incorporate protective bars on motorcycles manufactured and sold commercially in the United States, it did offer optional "bumpers" on motorcycles sold to police agencies in Japan. *Id.* at 1242 n.4. The optional "bumpers" consisted of tubular steel pipes attached to the frames of motorcycles. *Id.*

95. *See Palmer v. A.H. Robins Co.*, 684 P.2d 187, 196-97 (Colo. 1984) (finding that manufacturer's own test revealed risk of deadly infection inherent in design of intrauterine device, but manufacturer continued to market product despite such knowledge); *Tetuan v. A.H. Robins Co.*, 738 P.2d 1210, 1240 (Kan. 1987) (finding that manufacturer of intrauterine device marketed it knowing that string attached to device could cause life-threatening infections to users because of wicking problem). For a more complete history of the process by which the A.H. Robins Company deliberately misled the medical profession, the FDA and users of its Dalkon Shield, see MINTZ, *supra* note 53. Existing evidence suggests that the Robins Company destroyed evidence that would have incriminated its corporate officials. *See Tetuan*, 738 P.2d at 1224, 1240 (involving associate corporate counsel that testified he was ordered to destroy documents, but saved approximately 10 for use as evidence).

pany.<sup>96</sup> Regarding this corporation's extensive and conscious disregard for human life and safety, one court commented that no court "has [ever] . . . been presented with corporate misconduct of such gravity and duration."<sup>97</sup>

Although A.H. Robins' fraud and misrepresentation are the best known aspects of this infamous history, the conscious design choice to utilize a life-threatening tail string demonstrates the manufacturer's deliberate disregard for human life.<sup>98</sup> The A.H. Robins Corporation (hereinafter Robins) purchased the Dalkon Shield from its developers in June of 1970.<sup>99</sup> Within days of the purchase, and prior to marketing the device, Robins learned that the tail string might have serious "wicking" problems that could present a serious risk of cervical infection.<sup>100</sup> Robins began to market the shield in January of 1971 before conducting further testing on the tail string.<sup>101</sup> Between the time Robins first marketed the device in January of 1971 and the date it took the device off the market in June of 1974, Robins' own testing, as well as other reports, confirmed the "wicking" problem and the associated risk of cervical infection.<sup>102</sup> Nonetheless, Robins neither altered the design of the string nor communicated to users or physicians its knowledge of the risk presented to users.<sup>103</sup>

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96. For a discussion of IUD litigation involving one particular defendant in numerous lawsuits, see *supra* note 95.

97. *Tetuan*, 738 P.2d at 1239.

98. *Id.* at 1221. The tail string, alternatively referred to as a withdrawal string, is attached to the shield and "descends from the uterus through the cervix and permits the user to ensure the device is in place." *Id.*

99. *Palmer*, 684 P.2d at 195. The Dalkon Corporation invented the shield in 1968; it retained all rights in the shield until 1970. *Id.*

100. *Tetuan*, 738 P.2d at 1221-22; *Palmer*, 684 P.2d at 196. "Wicking" is a term of art used to describe the movement of bacteria along the string from the vagina into the uterus, thereby causing infection. *Palmer*, 684 P.2d at 196.

101. *Palmer*, 684 P.2d at 195. In fact, Robins claimed that the shield prevented pregnancy "without producing any general effects on the body." *Id.* at 195-96.

102. *Id.* at 196-97; *Tetuan*, 738 P.2d at 1221-24.

103. *Tetuan*, 738 P.2d at 1240. Robins continued to insist that the Dalkon Shield was safe as late as October of 1984. *Id.* at 1221.

Although a majority of the IUD claims have been brought against Robins, other IUD manufacturers have confronted similar cases. See, e.g., *Adams v. G.D. Searle & Co.*, 576 So. 2d 728 (Fla. Dist. Ct. App. 1991). In *Adams*, the plaintiff alleged that the manufacturer—G.D. Searle & Company—made a conscious choice to subject its users to serious health risks rather than redesign the device after it had learned of the problem and a corresponding viable solution. *Id.* at 729, 732-33. The *Adams* court reversed summary judgment on plaintiff's design defect claim stating that the plaintiff's allegations presented a question for the jury: did Searle know of the problem inherent in the withdrawal string of its IUD at least two years before plaintiff used it? *Id.* at 734. The court determined

### 3. *Tampons*

The tampon cases illustrate two significant types of manufacturer knowledge that were consciously ignored in the choice of product design.<sup>104</sup> First, one manufacturer—International Playtex Incorporated—disregarded studies and reports linking toxic shock syndrome to high-absorbency tampon fibers, and incorporated extra high-absorbency fibers into its product.<sup>105</sup> In fact, International Playtex used a higher absorbency than was even necessary for its own standard of extra effectiveness.<sup>106</sup>

A second manufacturer—Johnson & Johnson Products, Incorporated—chose to disregard clinical and scientific information that it knew, as an expert, required further testing.<sup>107</sup> Although the company's initial testing indicated a clear need for further study and research, it marketed the tampon before such addi-

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that Searle knew of a safer alternative material for the string, and that Searle had successfully used the safer material in another IUD. *Id.* at 732-33; *see also* *Kociemba v. G.D. Searle & Co.*, 707 F. Supp. 1517, 1525-26, 1537 (D. Minn. 1989). In *Kociemba*, the court stated that Searle had misled physicians and users of its IUD through misleading statements made to prescribing physicians and by failing to include in its promotional literature information recommended by an FDA advisory committee. *Id.* at 1526. Searle was fully aware of these FDA recommendations. *Id.* The court also ruled that the jury could have found that "responsibility for this conduct was shared throughout defendant's corporate hierarchy, and that the conduct continued for over ten years." *Id.* at 1537.

104. *See* *O'Gilvie v. International Playtex, Inc.*, 821 F.2d 1438, 1446 (10th Cir. 1987) (finding that manufacturer knew of risks of toxic shock syndrome associated with high-absorbency fibers, but that defendant still used such material); *West v. Johnson & Johnson Prods., Inc.*, 220 Cal. Rptr. 437, 443, 454 (Cal. Ct. App.) (stating that manufacturer, as expert, knew or should have known of strain of bacteria that posed risk of toxic shock syndrome, and that manufacturer had received numerous reports of problems with its tampon but had failed to test adequately for relationship between its high-absorbency tampon and toxic shock), *cert. denied*, 479 U.S. 824 (1986).

105. *O'Gilvie*, 821 F.2d at 1446 (stating that manufacturer emphasized extra high-absorbency in its marketing to distinguish its product from those of its competitors, even though it knew of increased risk it was creating and that its competitors were reducing the absorbency level of their fibers for precisely these safety reasons).

106. *Id.*

107. *West*, 220 Cal. Rptr. at 443-47. In *West*, the manufacturer continued to market its tampon without any testing despite an increasing number of complaints from users and physicians. *Id.* at 445. In addition, the company received scientific information indicating that tampons caused increased bacterial activity in the vagina, greater risk of infection and decreased ability of the body's natural defence system to combat infection. *Id.* at 444-45. Despite this knowledge, the company ignored both user complaints and scientific information. *Id.* at 447. Moreover, the company still refused to perform any testing—testing that experts indicated was essential and would have revealed the need to re-design the product. *Id.*

tional measures were performed.<sup>108</sup> Even after Johnson & Johnson received a large number of serious complaints from users, it refused to conduct any further tests or follow-up studies to determine whether its tampons were related in any way to vaginal infection.<sup>109</sup> The manufacturer deliberately chose to avoid “knowing,” in any precise or definitive way, what its own test results had preliminarily indicated—and what user complaints subsequently confirmed—could be serious health risks posed by its design choices.<sup>110</sup>

#### 4. *Television Sets*

Corporate decision-makers have also perpetuated design risks in less life threatening contexts. For example, Admiral Corporation—a manufacturer of televisions—knew from its own pre-marketing testing that its product posed a serious risk of igniting.<sup>111</sup> The risk of fire was caused by improper insulating materials within the televisions. Admiral had decided to utilize paper and wax as insulation even though such materials were known to be wholly unsuitable.<sup>112</sup> Admiral knew that the insulating materials would be exposed to temperatures higher than the safe heat level established by professional standards.<sup>113</sup> Nonetheless, even after receiving numerous reports that Admiral’s television sets had ignited—including fires that occurred after sets had been turned off and fires that occurred in retail showrooms—it continued to market the model without redesign.<sup>114</sup>

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108. *Id.* at 443-44, 448 (noting that initial testing was performed by Personal Products Company (PPC), a wholly-owned subsidiary of Johnson & Johnson).

109. *Id.* at 445 (noting that between 1975 and 1980, Johnson & Johnson received at least 150 complaints of “more serious” nature).

110. *Id.* at 448. For further discussion of the relationship between tampons and serious health effects, see Mark B. Hutton et al., *Tampons and Toxic Shock Syndrome: Failure in Corporate Risk Management*, TRIAL, Feb. 1988, at 54.

111. *Gillham v. Admiral Corp.*, 523 F.2d 102, 105 (6th Cir. 1975), *cert. denied*, 424 U.S. 913 (1976). The risk of fire stemmed from Admiral’s design of a horizontal output transformer incorporated into its television sets. *Id.*

112. *Id.* at 105-06.

113. *Id.* (stating that safer insulating materials were available long before Admiral had designed its defective sets, and that other manufacturers were using these safer materials in their sets).

114. *Id.* at 106-07. Both the Electronic Service Manager and Admiral Corporation’s President were aware of the problem but took no action of any kind to remedy the situation. *Id.* at 106. Despite the existence of abundant knowledge at the highest corporate levels, Admiral neither redesigned its sets nor warned users. *Id.* This continued for more than nine years, during which time the defect injured numerous consumers. *Id.* at 107.

5. *Flammable Fabrics*

Corporate knowledge of design defects in flammable fabrics encompasses two areas: (1) alternative feasible design; and (2) the degree of flammability of specific fabrics. The first area of corporate knowledge concerns the availability of a commercially feasible safer fabric. In *McCourt v. J.C. Penney Co.*,<sup>115</sup> a child was burned when the football jersey she was wearing ignited.<sup>116</sup> The manufacturer denied that the child's jersey could have been made from an alternative, available less flammable fabric.<sup>117</sup> The manufacturer contended that because an alternative fabric was not "wash and wear," it was not commercially feasible.<sup>118</sup> Pages from the defendant's own catalogue, however, displayed clothing made from the safer fabric and promoted therein as "wash and wear."<sup>119</sup> Another manufacturer marketed children's pajamas made of highly flammable cotton flannelette.<sup>120</sup> A child wearing a pair of the pajamas was severely injured when they caught fire and quickly burned.<sup>121</sup> Although flame retardant chemicals were available during the relevant time period, the manufacturer had not treated the pajamas with such retardants.<sup>122</sup> Moreover, testimony showed that if fabric manufacturers had desired, they could have applied flame retardants to their fabrics.<sup>123</sup> In addition, evidence was presented that British law had required the treatment of cotton flannelette pajamas with flame retardants since the 1950s.<sup>124</sup>

The second area of corporate knowledge in which manufacturers have special knowledge of design defects concerns the degree of flammability of specific fabrics. One authority notes that while most fabrics are combustible, great differences exist in the ease of ignition, rate of burning and intensity of flame.<sup>125</sup> Most

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115. 734 P.2d 696, 697 (Nev. 1987).

116. *Id.*

117. *Id.*

118. *Id.*

119. *Id.* at 698.

120. *Gryc v. Dayton-Hudson Corp.*, 297 N.W.2d 727, 729 (Minn.), *cert. denied sub nom.*, *Riegel Textile Corp. v. Gryc*, 449 U.S. 921 (1980).

121. *Id.*

122. *Id.*

123. *Id.* at 731.

124. *Id.*

125. 3A LOUIS R. FRUMER & MELVIN I. FRIEDMAN, *PRODUCTS LIABILITY* § 54.04[1][b] (1993) (noting additionally that, "nevertheless, well defined standard methods of testing and comparison for fabric flammability are established which are recognized by law").

consumers are understandably unaware of these differences.<sup>126</sup> Manufacturers, however, cannot claim the same ignorance. The court in *Gryc v. Dayton-Hudson Corp.*<sup>127</sup> found that garment manufacturers were uniquely aware of the highly flammable nature of cotton flannelette.<sup>128</sup> The manufacturer in *Gryc* maintained that its fabric was not defective because it met federal flammability standards.<sup>129</sup> The court rejected this view, however, and found that the federal flammability standard was at best a minimum requirement formulated by the textile industry.<sup>130</sup> In addition, the manufacturer knew that unreasonably dangerous fabrics had passed the federal flammability test in the past.<sup>131</sup> In fact, the defendant manufacturer acknowledged in an intracompany memo the danger of severe burn injuries created by the highly flammable nature of its cotton flannelette.<sup>132</sup> In the memo, a corporate official conceded that the company was "sitting on top of a powder keg as regards our flannelette being so flammable."<sup>133</sup>

## 6. Industrial/Heavy Equipment

The most common design defect in industrial equipment is a lack of necessary safety features. The cases present a wide variety of design defects, all of which could have been eliminated if the manufacturer had utilized available, safer designs or safety features that did not unduly interfere with operation of the equipment.<sup>134</sup> Numerous examples of products lacking such safety features are presented in cases involving: the lack of a rear view

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126. *Id.* Textile fires injure thousands of consumers each year. *Id.* The author notes, however, that, "[t]oday there is no excuse for this type of accident. Despite the fact that natural and synthetic fibers, except for fiber glass asbestos and certain metallic fibers, burn, they can generally be made into perfectly safe fabrics." *Id.*

127. 297 N.W.2d 727 (Minn. 1980).

128. *Id.* at 731, 739. In a similar case, a woman was burned when her nightgown caught fire while she was leaning over a stove. *Ellsworth v. Sherne Lingerie, Inc.*, 495 A.2d 348, 351 (Md. 1985). The nightgown manufacturer contended that the nightgown's fabric was safe for use in adult sleepwear, despite the fabric manufacturer's warning on its shipping invoice that the fabric did not meet flammability standards for children's sleepwear. *Id.*

129. *Gryc*, 297 N.W.2d at 730.

130. *Id.* at 734.

131. *Id.* Interestingly, a pair of pajamas fabricated from newspaper passed the Federal flammability test within an acceptable 48% margin of safety. *Id.*

132. *Id.*

133. *Id.*

134. For a discussion of cases involving design defects that could have been eliminated had the manufacturer utilized safer, available designs or features, see *infra* notes 135-45 and accompanying text.

mirror on an earth mover enabling the operator to see persons in the "blind spot" to the rear and side of the machine;<sup>135</sup> the lack of a shield over a sprocket and drive chain on a power mower;<sup>136</sup> the lack of a siphon on a commercial deep fryer, the absence of which significantly increased the risk of being severely burned while emptying the fryer;<sup>137</sup> the lack of a protective shield on a farm conveyer;<sup>138</sup> the lack of a roll-over protection system on a piece of earth moving equipment;<sup>139</sup> the lack of a protective shield over the buttons on a remote control box used to operate an overhead crane;<sup>140</sup> the lack of a barrier to prevent an industrial press operator's hands from entering a dangerous area of the press;<sup>141</sup> the lack of a foot pedal guard to prevent inadvertent tripping;<sup>142</sup> the lack of safety guards on a paper shredder and conveyer system;<sup>143</sup> the lack of a safety latch or other safety feature on the footrest of an X-ray table;<sup>144</sup> and the lack of an interlock system on a heavy duty scrap metal shear.<sup>145</sup>

Experts who design industrial equipment know how their products are going to be used, and augment their expertise by conducting on-site studies concerning the interaction between workers and machinery.<sup>146</sup> Although workers may garner some knowledge about industrial equipment risks through work-place

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135. *Pike v. Frank G. Hough Co.*, 467 P.2d 229, 232 (Cal. 1970).

136. *South Austin Drive-In Theatre v. Thomison*, 421 S.W.2d 933, 945 (Tex. Ct. App. 1967).

137. *Exum v. General Elec. Co.*, 819 F.2d 1158, 1160-61 (D.C. Cir. 1987).

138. *Calkins v. Sandven*, 129 N.W.2d 1, 4-5 (Iowa 1964).

139. *Caterpillar Tractor Co. v. Beck*, 593 P.2d 871, 874-75 (Alaska 1979) (involving manufacturer's failure to equip front-end loader with roll-over protection shield); *Cremeans v. International Harvester Co.*, 452 N.E.2d 1281, 1282 (Ohio 1983) (reversing summary judgment and holding that case presented jury question on whether crawler tractor was defective without roll over protection that was feasible and would have added only \$1,000 to tractor's cost); *Caterpillar Tractor Co. v. Donahue*, 674 P.2d 1276, 1279 (Wyo. 1983) (involving front-end loader that had fiberglass cab with no roll-over protection structure).

140. *Lewis v. Coffing Hoist Div., Duff-Norton Co.*, 528 A.2d 590, 591 (Pa. 1987).

141. *Knitz v. Minster Mach. Co.*, 432 N.E.2d 814, 819 (Ohio), *cert. denied*, 459 U.S. 857 (1982); *Micallef v. Miehle Co.*, 348 N.E.2d 571, 573 (N.Y. 1976).

142. *Knitz*, 432 N.E.2d at 819.

143. *Dart v. Weibe Mfg., Inc.*, 709 P.2d 876, 877 (Ariz. 1985).

144. *Ontai v. Straub Clinic and Hosp. Inc.*, 659 P.2d 734, 740 (Haw. 1983).

145. *Rahmig v. Mosley Mach. Co.*, 412 N.W.2d 56, 64-65 (Neb. 1987) (finding that safety device would have cost only \$300 to \$400 on machine that sold for more than \$200,000).

146. *Shetterly v. Crown Controls Corp.*, 719 F. Supp. 385, 390 (W.D. Pa. 1989) (involving manufacturer that equipped its trucks with "coast control device" after observing that truck operators were altering braking system themselves).

experience,<sup>147</sup> manufacturers—as experts—continue to have a greater knowledge of design risks than the employees who operate the machinery.<sup>148</sup>

Users of all the aforementioned products had little or no ability to know of the dangerous and deadly risks inherent in those products. Despite some commentary to the contrary, it is clear that most design risks consciously chosen by producers are not obvious, or even accessible, to product users.<sup>149</sup>

### 7. Other Consumer Products

A manufacturer's knowledge of design risks and its failure to eliminate those risks despite the fact that it could do so at minimal cost, is typical decision-making behavior with respect to a wide variety of consumer products.<sup>150</sup> One manufacturer marketed a handgun that presented a danger of accidental discharge due to defectively designed safety and loading notches.<sup>151</sup> Despite "top company official" knowledge of the defect and of previous injuries suffered by other users, the manufacturer continued to market the handgun without modifying the design.<sup>152</sup> An alternative, safer design would have cost only \$1.93 per gun.<sup>153</sup>

Similarly, an electric lawn mower manufacturer marketed its mower without a "deadman's switch."<sup>154</sup> The manufacturer knew

147. JAMES E. BEASLEY, PRODUCTS LIABILITY AND THE UNREASONABLY DANGEROUS REQUIREMENT 88-89 (1981) ("Workmen gradually learn of the dangers involved in the machinery they must use to make a living and come to 'expect' [those] dangers."). For a discussion concerning the sophistication workers may garner from operating industrial equipment, see *supra* notes 61-62, 68 and accompanying text.

148. See, e.g., *Micallef v. Miehle Co.*, 348 N.E.2d 571, 577 (N.Y. Ct. App. 1976) (noting that "it is often only the manufacturer who can fairly be said to know and to understand when an article is suitably designed and safely made for its intended purpose").

149. James A. Henderson, Jr., *Judicial Review of Manufacturers' Conscious Design Choices: The Limits of Adjudication*, 73 COLUM. L. REV. 1531, 1549 (1973) (stating that "risks generated by conscious choices, unlike those generated by inadvertent design errors, are more likely to be obvious to users and consumers of the products").

150. For a discussion of how corporate decision-making affects design risks inherent in a variety of consumer products, see *infra* notes 151-66 and accompanying text.

151. *Sturm, Ruger & Co., v. Day*, 594 P.2d 38, 43 (Alaska 1979), *modified*, 615 P.2d 621 (1980), *cert. denied*, 454 U.S. 894 (1981).

152. *Id.* at 47.

153. *Id.*

154. *Burch v. Sears, Roebuck & Co.*, 467 A.2d 615, 618 (Pa. Super. Ct. 1983). A "deadman's switch" is a safety device that automatically turns off a mower when the user releases the control mechanism. *Id.*



that such a device could have been incorporated into the mower at a cost of \$5 per mower, but argued, inter alia, that the safety advantages might be offset by consumers tying the control mechanism in the "on" position.<sup>155</sup>

In *Voss v. Black & Decker Manufacturing Company*,<sup>156</sup> the plaintiff was injured by a power hand-saw containing a movable guard that failed to meet even minimum Underwriters Laboratory safety standards.<sup>157</sup> The manufacturer easily could have met, or even exceeded, the mandatory minimum design safety standards.<sup>158</sup> It chose instead, however, to avoid cost increases at the expense of potential injury to product users.

Another manufacturer advertised its steam vaporizers as "safe . . . [and] practically foolproof."<sup>159</sup> Despite this claim, however, the manufacturer knew that the vaporizer was not "tip-proof" and if tipped would emit scalding hot water.<sup>160</sup> Prior to plaintiff's injury, at least ten to twelve other children had been badly burned in a similar manner.<sup>161</sup> Nonetheless, the manufacturer refused to redesign the vaporizer, despite the availability of inexpensive alternative designs that would have prevented the injuries.<sup>162</sup>

In another case involving a consumer product, a plaintiff was injured when a can of drain-cleaning product exploded in her face.<sup>163</sup> The manufacturer was fully aware of the caustic ingredients in its product, and also of the importance of controlling the

155. *Id.* at 619.

156. 450 N.E.2d 204 (N.Y. 1983).

157. *Id.* at 206.

158. *Id.*

159. *McCormack v. Hanksraft Co.*, 154 N.W.2d 488, 495 (Minn. 1967).

160. *Id.*

161. *Id.* According to the *McCormack* court:

Defendant's officers realized that the vaporizers would be primarily used in the treatment of children and usually would be unattended. They had knowledge that the water in the jar got scalding hot; that this water would cause third-degree burns on a small child; that the water in the jar would gush out instantaneously if the unit were tipped over; that the unit was not 'tip-proof'; that the combination of the unsecured top and the hot water in the jar was dangerous because of the possibility that a child might tip it over during operation; and that, prior to plaintiff's injury, at least 10 to 12 children had been burned in this manner.

*Id.*

162. Thomas F. Lambert, Jr., *Suing For Safety*, TRIAL, Nov. 1983, at 48, 49. The manufacturer refused to implement the alternative feasible designs even after there were more than one hundred similar claims pending with its insurer.

*Id.*

163. *Moore v. Jewel Tea Co.*, 253 N.E.2d 636, 638 (Ill. App. Ct. 1969), *aff'd*, 263 N.E.2d 103 (Ill. 1970).

pressure inside the can.<sup>164</sup> Nonetheless, the manufacturer used the can that caused the injury without accurately determining its properties or its capacity to withstand pressure.<sup>165</sup> In addition, the manufacturer had notice of prior explosions yet failed to warn the public of the dangers involved in handling the product despite the fact that it submitted such warnings to its own employees.<sup>166</sup>

## B. *Rejecting Safety*

### 1. *Costs and Marketing*

Although manufacturers are often aware of design risks inherent in their products, they consciously implement “risky” designs over safer feasible alternatives.<sup>167</sup> There appear to be two primary reasons why manufacturers elect these riskier alternatives in the face of such knowledge: (1) direct cost factors; and (2) marketing strategies.<sup>168</sup>

Cost factors are an integral part of the design process that producers must consider in performing their cost-benefit analysis.<sup>169</sup> Because manufacturers are not held to an absolute stan-

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164. *Id.* Defendants admitted using a flip-top lid—which would have acted as a safety valve—on their other products both before and after the can in question was manufactured, but failed to use it on the can containing the product that injured plaintiff. *Id.* at 646.

165. *Id.* at 649.

166. *Id.*

167. For a discussion of design risks, see *supra* notes 79-166. The purpose of the immediate discussion is not to determine the amount of safety that producers are required to incorporate into their designs. See Owen, *Problems in Assessing Punitive Damages*, *supra* note 5, at 34 (“[A]ll we can fairly ask of management and its engineers . . . is that safety considerations not be deliberately excluded or shunted far to the rear in deciding on the total design mix involved.”). Whatever courts (and juries) ultimately demand of producers by way of safety accountability, determining the standard and the process by which to impose that accountability must begin with an understanding of the nature of corporate decision-making as it pertains to product design.

168. Marketing strategies comprise the sales corollary of the cost components of product design, which together constitute two aspects of profit determination. For example, when Honda chose not to correct three defects inherent in the design of its small sub-compact AN 600, it may have been responding arbitrarily to its perception of market demand for the car. *Dorsey v. Honda Motor Co.*, 655 F.2d 650 (5th Cir. 1981) (making decision not to alter design of automobile despite knowledge that there were feasible, safer alternative designs available). If Honda had strengthened the weak, light-weight and defective components, it would have added substantial weight to the car, thereby reducing its gas mileage considerably. *Id.* Although safer designs would have entailed minimal increases in Honda’s production costs, the choice was not made to promote cost savings; rather, the choice was made on the basis of beating the competition with better gas mileage. *Id.*

169. See *Grimshaw v. Ford Motor Co.*, 174 Cal. Rptr. 348 (Cal. Ct. App.

dard of liability,<sup>170</sup> courts expect a certain degree of calculated risk in products that producers may justify on the basis of a cost-benefit analysis.<sup>171</sup> Far too often, however, producers readily accept unnecessary dangers in product design in an effort to lower overall production costs. One of the most graphic examples of this grossly culpable behavior is the cost-benefit analysis made by the Ford Motor Company in the design of the Pinto.<sup>172</sup>

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1981). In *Grimshaw*, the court found that Ford's Pinto could have been made relatively safe at an increased cost of approximately \$15 per vehicle. *Id.* at 361. Nonetheless, Ford deferred the corrective measures to save these minimal costs and enhance profits. *Id.* Ford essentially discarded consumer safety in its cost-benefit computation. *Id.*; see also *Helicoid Gage Div. of Am. Chain & Cable Co. v. Howell*, 511 S.W.2d 573 (Tex. Ct. App. 1974). In *Howell*, the plaintiff was injured by an exploding pressure gage. *Id.* at 575. The court noted that the gage could have been manufactured with shatterproof glass without compromising the instrument's utility and at an increased cost of only one dollar per unit. *Id.* at 577. In addition, the court found that the manufacturer could have constructed a safety shield around the gage at a cost of \$2.50 per gage. *Id.* Cases such as *Howell* and *Grimshaw* indicate that, unfortunately, manufacturers do not necessarily weigh consumer risks heavily in their cost-benefit calculations.

170. See, e.g., *Phillips v. Kimwood Mach. Co.*, 525 P.2d 1033, 1036 (Or. 1974) ("No one wants absolute liability where all the article has to do is to cause injury."); see also *Barker v. Lull Eng'g Co.*, 573 P.2d 443, 456 (Cal. 1978) ("[W]e believe that the test for defective design . . . subjects a manufacturer to liability . . . while stopping short of making the manufacturer an insurer for all injuries . . ."); *Azzarello v. Black Bros. Co.*, 391 A.2d 1020, 1024 (Pa. 1978) ("While this expansion of the supplier's responsibility . . . has placed the supplier in the role of a guarantor of his product's safety, it was not intended to make him an insurer of all injuries caused by the product.").

171. See *Phillips*, 525 P.2d at 1038. According to the *Phillips* court: The manner of injury may be so fortuitous and the chances of injury occurring so remote that it is reasonable to sell the product despite the danger. In design cases the utility of the article may be so great, and the change of design necessary to alleviate the danger in question may so impair such utility, that it is reasonable to market the product as it is, even though the possibility of injury exists and was realized at the time of the sale.

*Id.*

172. See *Grimshaw*, 174 Cal. Rptr. at 360. The design of the Ford Pinto also presented a significant marketing dilemma not directly related to Ford's cost analysis of the gas tank design/location problem. *Id.* The Pinto was a "rush" project so that "styling preceded engineering and dictated engineering design to a greater degree than usual." *Id.* at 360. Ford was especially concerned about challenging the foreign competition in the small car market. *Id.*; see also *Dorsey v. Honda Motor Co.*, 655 F.2d 650, 652-53 (5th Cir. 1981) (involving manufacturer of small, lightweight automobile that exported its cars to meet demand for low-priced, economical car in spite of negative test results); FRANCIS T. CULLEN ET AL., CORPORATE CRIME UNDER ATTACK 159-60 (1987) (discussing how Ford moved quickly to market Pinto before Volkswagen and Japanese manufacturers monopolized small-car market). Thus, Ford was determined to get the Pinto on the market as soon as possible. *Grimshaw*, 174 Cal. Rptr. at 360. The merger of marketing and cost factors was evident in the choice not to add protective members around the gas tank. *Id.* at 361. Ford had arbitrarily determined that the car would weigh no more than 2,000 pounds. *Id.* Once the car had been

Ford knew from its own pre-marketing testing that the Pinto gas tank was subject to two serious problems upon rear impact.<sup>173</sup> First, the gas tank neck was susceptible to being torn away and causing gasoline to spill.<sup>174</sup> Second, the gas tank was susceptible to being propelled forward against the differential housing, where protruding bolts could rupture the tank and cause gasoline to spill.<sup>175</sup> Before Ford commenced production of the Pinto, it knew the exact cost of several inexpensive remedies to each of the design hazards.<sup>176</sup> One commentator has asserted that for a total of \$5.08 per car, Ford could have altered the Pinto's design to render it reasonably safe.<sup>177</sup>

In an internal Ford memorandum ruled inadmissible during the *Grimshaw* trial, Ford made cost-benefit calculations concerning gas tank integrity in roll-over situations.<sup>178</sup> Using the number of anticipated deaths and injuries that would occur over the ex-

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designed—before preliminary engineering studies had been performed—adding “fixes” to the fuel tank might have increased the weight above the arbitrary 2,000 pound limit. *Id.* at 360; see also Frank Camps, *Warning an Auto Company About an Unsafe Design*, in WHISTLE-BLOWING! 119, 120 (Alan F. Westin ed., 1981) (stating that former Ford design and test engineer asserted that because of arbitrary 2,000 pound and \$2,000 limits applied to design of Ford's Pinto, management would not allow correction of design deficiencies revealed by testing).

173. *Grimshaw*, 174 Cal. Rptr. at 360; CULLEN ET AL., *supra* note 172, at 161. According to Cullen, internal company documents revealed that “Ford has crash-tested the Pinto at a top-secret site more than 40 times and . . . every test made over 25 mph without special structural alteration of the car has resulted in a ruptured fuel tank.” CULLEN ET AL., *supra* note 172, at 161. Cullen also noted that eight of these tests were performed prior to actual marketing of the Pinto. *Id.*

174. *Grimshaw*, 174 Cal. Rptr. at 360; CULLEN ET AL., *supra* note 172, at 161 (noting that “all that was needed to ignite the fuel and to create an inferno was a spark from steel against steel or from steel against pavement”).

175. *Grimshaw*, 174 Cal. Rptr. at 360; CULLEN ET AL., *supra* note 172, at 161 (noting again that only spark was needed to ignite spilled gasoline).

176. *Grimshaw*, 174 Cal. Rptr. at 360-61. Ford had calculated what each of the design “fixes” would cost. *Id.* at 361. One modification that would have enhanced the integrity of the fuel tank system would have cost as little as \$1.80, while the most expensive single “fix” would have cost only \$9.95. *Id.* In all likelihood, however, one single “fix” alone would not have eliminated the Pinto's problems. *Id.* Rather, a package of “fixes” costing approximately \$15.30 would have made the tank safe in a 34-38 mile per hour rear end collision with a much larger vehicle. *Id.* As marketed, however, the Pinto's fuel tank would not withstand a similar collision occurring at only 20 miles per hour. *Id.*

177. For a discussion of the costs that Ford would have incurred if it had redesigned the Pinto to accommodate safety concerns, see CULLEN ET AL., *supra* note 172, at 162 (noting that Ford knew that lining gas tank of Pinto with rubber bladder would have cost only \$5.08 per car).

178. See KEETON ET AL., *supra* note 31, at 840-41. The memorandum related to fuel tank integrity during situational roll-overs rather than during rear end collisions. *Id.*; see also CULLEN ET AL., *supra* note 172, at 162-63 (including chart, relating to leakage in fuel systems during automobile roll-over, that Ford

pected life of the models involved, Ford calculated the total amount of liability it expected to incur. Ford then compared that total with the net savings that would be generated, at eleven dollars per car, by not correcting the hazard. Its total savings would have been almost ninety million dollars.<sup>179</sup> There was testimony in *Grimshaw* that Ford made similar cost-benefit calculations regarding the Pinto gas tank rupturing in rear-end collisions.<sup>180</sup> To reduce costs, Ford never corrected the problem until it issued a major recall in May, 1978, at least seven years after it first learned of the hazards.<sup>181</sup>

Despite the dramatic illustrations provided by the memoranda surrounding the Pinto design, the Ford Motor Company is not unique among auto manufacturers in failing to weigh passenger safety adequately in cost-benefit calculations.<sup>182</sup> Nor is the

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used to lobby against more stringent federal fuel-leakage standards); Schwartz, *Pinto Case*, *supra* note 65, at 1021.

179. See CULLEN ET AL., *supra* note 172, at 162-63; KEETON ET AL., *supra* note 31, at 840-41; Schwartz, *Pinto Case*, *supra* note 65, at 1020.

180. *Grimshaw*, 174 Cal. Rptr. at 361-62 (discussing testimony suggesting that management decided to proceed with marketing of Pinto despite knowledge of defects in fuel tank system).

181. STUART L. HILLS, CORPORATE VIOLENCE: INJURY AND DEATH FOR PROFIT 27 (1987) (stating that “[s]eventy or more people [would have burned] to death in those cars every year for many years to come” if Ford had not issued recall in 1978). For further discussion of the Ford Pinto cases, see HILLS, *supra*, at 28-29; CULLEN ET AL., *supra* note 172, at 165-66; KEETON ET AL., *supra* note 31, at 840-41; Schwartz, *Pinto Case*, *supra* note 65, at 1028-33.

182. HILLS, *supra* note 181, at 29 (stating that “Ford was just the only company careless enough to let such an embarrassing calculation slip into public records”); Schwartz, *Pinto Case*, *supra* note 65, at 1028 (stating that other car manufacturers besides Ford created same or similar fuel tank defects in their small cars). For a discussion concerning defects in other consumer products, see *supra* notes 150-66 and accompanying text.

In reviewing Ford's appeal on the award of punitive damages to the plaintiff, the *Grimshaw* court examined several corporate memoranda admitted into evidence by the trial court. *Grimshaw*, 174 Cal. Rptr. at 361. The records included reports—such as crash test results showing the vulnerability of the Pinto's fuel tank design—that were forwarded up the corporate chain of command. *Id.* Another memo reported on design changes that were needed to meet anticipated federal standards on fuel system integrity and on the cost savings associated with the deferral of such changes. *Id.* at 361-62. The court found that one could reasonably infer that Ford deferred corrective measures to save money and enhance corporate profits. *Id.* at 370. A document called the Chiara memorandum detailed the costs of two safer fuel tank designs, one at an estimated cost of ten dollars per car, and the other at an estimated cost of five dollars per car. *Id.* In addition, a memorandum containing arguably the most dramatic information—the Grush Saunby report—was excluded from evidence. *Id.* at 376. The Grush Saunby report documented Ford's cost-benefit analysis based on vehicle roll-over, not on rear-end collision. *Id.* The report is a harsh reminder of the starkest balancing of human lives against corporate profits. *Id.*

auto industry unique among producers in general.<sup>183</sup> Courts recognize that many, if not most, design choices require safety trade-offs in light of cost factors.<sup>184</sup> Such trade-offs and their accompanying risks, however, are made unilaterally by producers. Moreover, users are not participants in the creation of product risks, and rarely have any of the knowledge required to cope with such risks.

Producers also create design risks by means of marketing choices that are not, at least directly, cost-based.<sup>185</sup> Ford chose a white plastic material for a gear shift knob when it knew that such material was subject to potentially dangerous deterioration not readily apparent to users of the vehicle.<sup>186</sup> It is apparent that Ford's decision to use the white plastic was not directly cost-driven because a black material that did not deteriorate under the same conditions was available at an equivalent cost.<sup>187</sup> The evidence produced at trial suggested that the plaintiff would have sustained less severe injuries had the protective knob not shattered.<sup>188</sup> Nonetheless, the court never articulated Ford's reasons for choosing the white as opposed to black material. One can speculate, however, that the choice was made for a reason other than the cost of materials—most likely for marketing purposes.

Similarly, marketing pressures, having little to do with direct cost savings, were apparently the reason why the A.H. Robins Company decided not to conduct necessary testing and studies on its IUDs; such pressures also drove the company's decision not to replace the Dalkon Shield's defective tailstring prior to placing

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183. See HILLS, *supra* note 181, at 6 (discussing other industries that have made cost-benefit analyses similar to those made by automobile industry). For a more detailed discussion of specific industries that have made conscious design decisions against safety concerns, see *supra* notes 95-149 and accompanying text.

184. For a discussion of the effects of costs and marketing on design choices, see *supra*, note 167-68 and accompanying text.

185. For a discussion of the effects of costs and marketing on design choices, see *supra* note 167-68 and accompanying text.

186. *Mickle v. Blackmon*, 166 S.E.2d 173, 188 (S.C. 1969). The gear shift knob deteriorated via gradual hairline cracks that destroyed its protective quality, thereby subjecting passengers to the risk of being impaled on the gear shift lever during collisions. *Id.* Even assuming a user would notice the hairline cracks, the court noted that he or she would not necessarily appreciate the gravity of the safety hazard. *Id.*

187. *Id.* at 187-88. For reasons not apparent and unrelated to the instant lawsuit, Ford substituted the alternative black material for the white material in vehicles produced one year later than the model in which plaintiff was injured. *Id.*

188. *Id.*

the product on the market.<sup>189</sup> Robins treated the marketing of the Dalkon Shield as a rush project and decided to move ahead quickly.<sup>190</sup> In the process, Robins ignored the warnings of two company physicians that the product was not nearly as effective as it had been reported.<sup>191</sup> Even after Robins' own testing verified the "wicking" problem inherent in the tailstring and the obvious risk of intrauterine infection, Robins' director of pharmaceutical research determined that no alterations would be made to the shield.<sup>192</sup>

Competition and related marketing strategies were also the major factors driving the Honda Motor Company's design choices concerning its Honda AN 600.<sup>193</sup> The AN 600 was a small, light-weight automobile that achieved excellent gas mileage.<sup>194</sup> It was designed to meet societal demand for a low-priced, economical car.<sup>195</sup> Honda's marketing strategy was revealed in part by its

189. *Tetuan v. A.H. Robins Co.*, 730 P.2d 1210, 1217 (Kan. 1987). "[T]he total costs for labor, overhead, materials, and freight amounted to only \$.30 for each Dalkon Shield." *Id.* The Shield was to be sold for \$4.35 per unit. *Id.* Substituting a different tailstring, like the one used on other IUDs at the time, could not conceivably have added significantly to the cost of the Dalkon Shield. *Palmer v. A.H. Robins Co.*, 684 P.2d 187, 195 (Colo. 1984). Of course, pre-marketing testing and other studies could have increased the cost per IUD. *Id.* Robins knew, however, exactly where to focus its research. *Id.* Before marketing its IUD, Robins knew that its tail string was a likely cause of infection in the female reproductive system. *Id.* at 196. Its own data collection later verified that the vast preponderance of septic abortions caused by reproductive infections in all IUD users were caused by the Dalkon Shield. *Tetuan*, 738 P.2d at 1219; *Palmer*, 684 P.2d at 199-200.

190. *Tetuan*, 738 P.2d at 1217. An intra-office memo filed by a Robins physician noted that the company taking the Dalkon Shield must act quickly and "distribute much merchandise and really make an inroad in 'the next [eight] months.'" *Id.* The physician was concerned that other manufacturers might have been working on improvements for their intrauterine devices. *Id.* Three days after the memo was filed, A.H. Robins purchased the rights to the Dalkon Shield. *Id.*

191. *Id.* Despite the warnings from two physicians at Robins concerning the falsity of the 1.1% pregnancy rate asserted by the developer of the Dalkon Shield, Robins touted the shield's pregnancy rate as 1.1% during its entire period on the market. *Id.* at 1217, 1240. In addition, neither of two intracompany memos warning that the pregnancy rate claim was false were "revealed to those Robins' personnel responsible for marketing the shield." *Palmer*, 684 P.2d at 195.

192. *Palmer*, 684 P.2d at 196. For a discussion of the "wicking" problem and intrauterine infection, see *supra* notes 95-103 and accompanying text.

193. *Dorsey v. Honda Motor Co.*, 655 F.2d 650, 652 (5th Cir. 1981). For a discussion of the effects of costs and marketing on design choices, see *supra*, note 167-68 and accompanying text.

194. *Dorsey*, 655 F.2d at 652.

195. *Id.* Plaintiff testified at trial that he had in fact chosen the Honda AN 600 because it was economical and offered exceptional gas mileage. *Id.* at 653.

posture at trial.<sup>196</sup> It argued that the purchaser of a small car cannot “complain if he [or she] is injured as a consequence of the design characteristic—small size—that he [or she] sought.”<sup>197</sup> Evidence presented at trial, however, suggested several defective aspects of the car not related to the vehicle’s small size but still related to Honda’s marketing strategy.<sup>198</sup> Honda could have utilized stronger materials in the roof-support pillars, the seat assembly system and the seat belt without changing the size of the vehicle in any manner.<sup>199</sup> Admittedly, however, two of these changes presumably would have added weight to the car and reduced its gas mileage.<sup>200</sup> Thus, similar to Ford’s actions concerning the Pinto, Honda consciously disregarded safety to further its marketing plan.<sup>201</sup>

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196. *Id.* at 654.

197. *Id.* The trial judge was persuaded by this argument, at least with respect to punitive damages, and granted judgment n.o.v. for Honda on the punitive damages award. *Id.* The court of appeals disagreed, however, and found that the record presented an adequate basis upon which the jury could find that Honda committed a willful breach of its duty to plaintiff regarding several particular design choices other than its decision to create a small vehicle. *Id.* at 655, 657.

198. *Id.* at 655. The court ruled that there was evidence to support a finding of defective seat assembly, of a weak and defective pillar separating the windshield from the driver’s window, and of an overly elastic and hence defective seatbelt design. *Id.*

199. *Id.* at 654-655.

200. *Id.* at 653. The AN 600 weighed approximately 1,356 pounds. *Id.* Compare this to the weight of the Ford Pinto, which was approximately 2,000 pounds. See *Grimshaw v. Ford Motor Co.*, 174 Cal. Rptr. 348, 360 (Cal. Ct. App. 1981). Presumably, Honda could have used stronger seat belt material without adding any noticeable weight to the AN 600.

Honda’s own pre-marketing testing revealed the hazards posed by the weak roof-support pillar. *Dorsey*, 655 F.2d at 653. Despite this information, Honda ignored the test results and an employee’s recommendation to eliminate the danger. *Id.* Plaintiff’s experts, however, testified that it was possible to strengthen the vehicle, as Honda’s employee had recommended, without enlarging the size of the car. *Id.* at 654.

201. See *Dorsey*, 655 F.2d at 653; *Grimshaw*, 174 Cal. Rptr. at 360; see also *Hasson v. Ford Motor Co.*, 650 P.2d 1171 (Cal. 1982). *Hasson* provides another dramatic example of a situation in which a producer made marketing decisions to the detriment of safety concerns. *Id.* at 1180. In *Hasson*, evidence indicated that Ford was aware of serious problems with the braking on its 1966 Lincoln Continental. *Id.* In addition, trial testimony indicated that Ford had adopted a marketing strategy for the Lincoln Continental that included advertising that the car was substantially service-free. *Id.* As a consequence, Ford refused both to warn about the defect and to correct the problem by means of an available modification to the system. *Id.* Modifying the system would have required a recall, which would have undermined the advertising image of a service-free vehicle. *Id.* Subsequently, for the model year 1967, Ford made the modified braking system standard equipment on the Continental. *Id.* at 1178. Ford had known of the problem since at least 1965, when it issued a recall on the 1965 model in order to make the necessary corrections. *Id.*



Oldsmobile has also made safety trade-offs in favor of pursuing established marketing plans.<sup>202</sup> At one time, Oldsmobile used a sharply-pointed hood ornament—the well-known Oldsmobile rocket—as a company logo and source of valuable commercial identification.<sup>203</sup> Safety-conscious managers expressed concerns that the ornaments were at just the right height to put out a child's eye.<sup>204</sup> Nonetheless, Oldsmobile continued to utilize the sharp pointed object as a hood ornament on its automobiles.<sup>205</sup> The company allegedly redesigned the ornament only under the threat of safety legislation.<sup>206</sup>

## 2. *Resistance to Safety*

Cost analyses and marketing factors are the more obvious, and presumptively rational, reasons why producers consciously choose product risks over design safety. In addition to these rational factors, however, there also appears to be an irrational component driving corporate resistance to safety.<sup>207</sup> Corpora-

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202. For a detailed discussion concerning the safety trade-offs made by Oldsmobile, see NADER & TAYLOR, *supra* note 91, at 72.

203. For further discussion of Oldsmobile's decision to utilize the rocket as a hood ornament despite the danger it presented, see NADER & TAYLOR, *supra* note 91, at 72.

204. For further discussion of the safety concerns expressed by Oldsmobile managers, see NADER & TAYLOR, *supra* note 91, at 72.

205. For further discussion of Oldsmobile's refusal to mitigate the dangers presented by its hood ornament, see NADER & TAYLOR, *supra* note 91, at 72.

206. For further discussion of why Oldsmobile eventually decided to alter the design of its dangerous hood ornament, see NADER & TAYLOR, *supra* note 91, at 72-73.

207. The previously discussed cases suggest that manufacturers chose product risks over readily available, feasible, safer designs solely in order to save production costs with little or no consideration given to avoiding reasonably certain future liability costs. *Grimshaw v. Ford Motor Co.*, 174 Cal. Rptr. 348 (Cal. Ct. App. 1981); *Palmer v. A.H. Robins Co.*, 684 P.2d 187 (Colo. 1984); *Tetuan v. A.H. Robins Co.*, 738 P.2d 1210 (Kan. 1987); *McCormack v. Hanksraft Co.*, 154 N.W.2d 488 (Minn. 1967). For further discussion of these cases, see *supra* notes 95-103, 159-166 and accompanying text. This behavior contradicts the common wisdom about manufacturer behavior that is embodied in Judge Hand's formula set forth in *United States v. Carroll Towing Co.*, 159 F.2d 169, 173 (2d. Cir. 1947). Judge Hand's formula traditionally assumes that manufacturers will invest in safety up to the point at which the incremental safety costs equal the resulting savings of future liability costs. See James A. Henderson, Jr., *Product Liability and the Passage of Time: The Imprisonment of Corporate Rationality*, 58 N.Y.U. L. Rev. 765, 766 (1983) (exploring question of whether liability system discourages manufacturers from reaching socially optimal decisions regarding product safety because such decisions expose corporate management and their companies to greater liability than suboptimal decisions). This arguably irrational decision-making, however, may have a rational explanation. Corporate managers may believe that the so-called "reasonably certain future liability costs" can be defeated either by the litigation process—on the

tions tend to view the notion of safety, separate from considerations of specific safety costs, as incompatible with their quest for profits.<sup>208</sup> Managers reject safety even before considering the "larger picture."<sup>209</sup> There is ample evidence suggesting that corporations instinctively oppose new safety devices rather than attempt to incorporate them into their cost and marketing schemes.<sup>210</sup> General Motors apparently tried to thwart or delay the requirement of rear window stoplamps despite studies by the National Highway Traffic Safety Administration indicating that the lamps could sharply reduce rear-end accidents.<sup>211</sup> General Motors allegedly even committed "serious research funds" in an

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merits or procedurally—or at least postponed long enough so that the short-term use of funds saved is greater than the long-term inflated monetary cost of liability obligations. For further discussion of these potential rationales, see *infra* notes 394-96 and accompanying text.

208. See DAVID R. SIMON & D. STANLEY EITZEN, *ELITE DEVIANCE* 239 (1986). There appears to be a mentality among corporate leaders that any corporate goals other than maximizing profits will destroy industry and society along with it. *Id.* According to economist Milton Friedman: "Few trends could so thoroughly undermine the very foundations of our free society as the acceptance by corporate officials of a social responsibility other than to make as much money for their stockholders as possible." *Id.*

209. See HILLS, *supra* note 181, at 190-91. According to Hills: "Although large corporations may have other goals—enhanced prestige and power, increased market shares, product diversification into potentially competing industries, growth and stability, or other short-range goals—the long-run profitability of the corporation is ultimately the most basic and over-riding goal." *Id.* at 190. Alfred P. Sloan, former president of General Motors, responded to a request by the Dupont Corporation to use safety glass in G.M. cars by stating:

I am trying to protect the interest of stockholders of General Motors and the corporation's operating position—it is not my responsibility to sell safety glass . . . You can say perhaps that I am selfish, but business is selfish. We are not a charitable institution—we are trying to make a profit for our stockholders.

JAMES W. COLEMAN, *THE CRIMINAL ELITE* 40 (1985). This statement reflects the general corporate attitude toward safety. It is not possible to know whether Mr. Sloan gave any thought to promoting safety by incorporating safety glass in G.M. automobiles, but it is likely that he did not. Unfortunately, the attitude that "safety doesn't sell" is fairly prevalent among producers. HILLS, *supra* note 181, at 191 (noting that this conviction has needlessly destroyed countless lives through death and crippling injuries); see also CULLEN ET AL., *supra* note 172, at 158 (statement of Lee Iacocca to then President Nixon on Watergate Tapes indicating that he doesn't believe public is interested in auto safety).

210. HILLS, *supra* note 181, at 191 (noting that "in some instances [manufacturers actually have] lobbied to prevent safety regulations that threatened corporate profits"); see also CULLEN ET AL., *supra* note 172, at 155-59 (discussing conversation between then President Nixon, Henry Ford II and Lee Iacocca in which latter two auto executives attempted to persuade Mr. Nixon to support their opposition to auto safety generally).

211. For further discussion concerning GM's attempt to prevent regulations mandating rear window stoplamps, see NADER & TAYLOR, *supra* note 91, at 109-10.

attempt to disprove the efficacy of the lamps.<sup>212</sup> General Motors' resistance to mandated safety is also well-documented in the development of passenger air bags. Despite being an early leader in air bag research and technology, General Motors steadfastly opposed federal airbag requirements when other manufacturers, and safety and insurance organizations, were encouraging their development and use.<sup>213</sup> When the Reagan administration indicated generally its hostility toward federal regulation, General Motors discontinued its air bag development project despite earlier assertions by a president of General Motors that all 1975 General Motors passenger vehicles could have been equipped with air bags.<sup>214</sup>

There is further evidence of General Motors' early opposition to automobile safety in general. In the mid 1950s, Ford decided to market a safety package in its cars. General Motors not only refused to offer its own competitive safety package, but pressured Ford to cease its safety marketing.<sup>215</sup> Similarly, Ford Motor Company successfully blocked for seven years the effective date of a federal standard that regulated fire safety in motor vehicles during front and rear end collisions.<sup>216</sup>

Outside of the automobile manufacturing context, corporate resistance to safety is also evident in the production of consumer goods. For example, the Hanksraft Company strongly resisted

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212. For further discussion of the steps taken by GM to disprove the efficacy of rear window stoplamps, see NADER & TAYLOR, *supra* note 91, at 110.

213. NADER & TAYLOR, *supra* note 91, at 136. While General Motors was opposing air bag deployment, *three* of its own internal consumer polls indicated very strong consumer demand for air bags even though consumers were aware of their cost. *Id.*

214. *Id.* at 137-41. H. Ross Perot, a board member of General Motors during the air bag development era, charged that "[a]t GM board of directors meetings, we never discussed safety as a safety problem. It was always discussed as a legal problem. To hear Smith on the air-bag thing was nauseating." *Id.* at 507.

215. MARSHALL B. CLINARD & PETER C. YEAGER, *CORPORATE CRIME* 259 (1980) (noting that in 1956 Ford sold approximately 200,000 more automobiles because of its optional safety package, but that General Motors successfully pressured Ford into dropping its safety-based advertising scheme within six months).

216. See HILLS, *supra* note 181, at 22-26 (examining means Ford used to stall implementation of fire safety standard). Re-tooling the Ford Pinto to meet the proposed standard would have cost \$2,000,000. *Id.* at 23. Ford knew of the problem before marketing the Pinto and also knew that inexpensive modifications to the original design would have solved the problem. *Id.* The original design could have included the modifications at little additional cost. *Id.* For a more detailed discussion concerning the Ford Pinto cases, see *supra* notes 83, 172-81 and accompanying text.

safety recommendations concerning its steam vaporizer.<sup>217</sup> Hanksraft's liability insurance carrier suggested that it implement a simple and inexpensive redesign to its vaporizer, a product that was obviously and dangerously defective.<sup>218</sup> The insurance carrier made this recommendation at a time when more than 100 personal injury claims were pending against Hanksraft.<sup>219</sup> Nonetheless, Hanksraft refused, the carrier eventually canceled the coverage, and Hanksraft subsequently redesigned the product.<sup>220</sup>

### 3. *Accountability*

Corporate resistance to safety is substantially due to the absence of a sense of social accountability. As Blackstone observed, corporations have no souls.<sup>221</sup> If this is true, then perhaps it is unreasonable to expect corporations to act as responsibly—and be held as socially accountable—as individual persons.<sup>222</sup> According to economist Milton Friedman, the business corporation has one and only one social responsibility: to make as much money for shareholders as possible.<sup>223</sup> To be fair to Professor

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217. *McCormack v. Hanksraft Co.*, 154 N.W.2d 488 (Minn. 1967).

218. Lambert, *supra* note 162, at 49 (stating that Hanksraft, "with icy indifference to the serious risks to infant users of its household product, refused to take its liability carrier's advice to recall and redesign its loose-lidded vaporizer").

219. For a more detailed discussion of the grossly culpable conduct exhibited by Hanksraft in regard to its steam vaporizer, see Lambert, *supra* note 162, at 49.

220. Lambert, *supra* note 162, at 49 (stating that only after insurance company refused to continue coverage "did Hanksraft stir itself to redeem and correct the faulty design of its product"); see also *Camacho v. Honda Motor Co.*, 741 P.2d 1240, 1242-43 (Colo. 1987) (stating that Honda's own testing and research informed its engineers of simple, relatively inexpensive safety feature Honda failed to use on its motorcycles, and that Honda asserted that obviousness of danger superseded any obligation it had to make products reasonably safe); *The National Commission on Product Safety, 1970: Hearing before the Senate Comm. on Commerce*, 91st Cong., 2nd Sess. 23-89 (1970) [hereinafter FINAL REPORT] (final report presented to President and Congress finding need for federal role in development and execution of methods to protect American consumer).

221. RUSSELL B. STEVENSON, *CORPORATIONS AND INFORMATION* xi (1980) (citing BLACKSTONE, *COMMENTARIES* 477 (9th ed. 1783)).

222. See William Hazlitt, *On Corporate Bodies*, in *THE BIG BOYS: POWER AND POSITION IN AMERICAN BUSINESS* 516 (Ralph Nader & William Taylor eds., 1986). In an essay composed in 1824, William Hazlitt stated that "[c]orporate bodies are more corrupt and profligate than individuals, because they have more power to do mischief, and are less amenable to disgrace or punishment. They feel neither shame, remorse, gratitude, nor good-will." *Id.*

223. See SIMON & EITZEN, *supra* note 208, at 239. According to Milton Friedman:

There is one and only one social responsibility of business—to use its

Friedman, however, his exhortation to corporations to maximize profits is accompanied by a caveat to observe the "rules of the game" and to not engage in deception or fraud.<sup>224</sup> Nonetheless, the "rules of the game" are frequently not observed in the context of design defects.<sup>225</sup>

Why corporations act with insufficient safety accountability may be explained in part by the difference between individual and corporate notions of responsibility.<sup>226</sup> Persons who as individuals recognize fundamental responsibility in a particular situation seem to have little difficulty ignoring that sense of responsibility when they encounter the same situation as a corporate representative.<sup>227</sup> The pressures on corporate decision-makers to maximize profits play a major role in their decision to engage in behavior that they as non-corporate individuals would find reprehensible.<sup>228</sup> This "double persona" of corporate decision-makers

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resources and engage in activities designed to increase its profits so long as it stays within the rules of the game . . . [and] engages in open and free competition, without deception or fraud . . . Few trends could so thoroughly undermine the very foundation of our free society as the acceptance by corporate officials of a social responsibility other than to make as much money for their stockholders as possible.

*Id.*

224. *Id.*

225. Because Professor Friedman's concept of the "rules of the game" includes a prohibition against deception, it would appear that when a manufacturer markets a product with knowledge both of its dangerous design and of the likelihood that the user will not know or discover such danger, the manufacturer has violated the prohibition against deception. For a discussion of numerous design defect cases where manufacturers have violated this prohibition, see *supra* notes 82-166 and accompanying text. For further discussion of Professor Friedman's views, see *supra* note 223.

226. Russell B. Stevenson, *Corporations and Social Responsibility: In Search of the Corporate Soul*, 42 GEO. WASH. L. REV. 709, 716 (1974). In testimony before a Senate sub-committee dealing with proposed oil pollution legislation, a shipping trade lobbyist argued that to impose liability on a shipping company for an oil spill caused by an unmarked, submerged obstruction would violate basic notions of fairness. *Id.* When asked whether it would be more fair to impose these costs on the people along nearby beaches, the lobbyist replied:

Under that set of circumstances, while I haven't an official position, speaking personally I can understand the implications of your question that there is some merit in requiring the ship to bear the cost of cleaning it up. I again qualify this by only answering your question from a personal standpoint on the basis of pure logic and common sense rather than what our official position is on this.

*Id.* The lobbyist later notified the sub-committee that the "official position" was that the shipper should not be liable. *Id.*

227. *Id.*

228. HILLS, *supra* note 181, at 190 (noting that long-run profitability is corporation's most basic and over-riding goal). Some of those pressures include the uncertainty of competitive markets, "fluctuating sales, increasing costs for safety and health measures, consumer and environmental concerns [and] gov-

may partially explain how corporate decision-makers can justify raising the typical disingenuous defenses in tobacco and asbestos litigation.<sup>229</sup> One must look to corporate organization and structure in order to understand how corporate decision-makers, who obviously are not evil in general,<sup>230</sup> rationalize such apparent and sometimes shocking antipathy toward consumer safety.<sup>231</sup>

### C. Corporate Nature and Structure

#### 1. Fragmented Decision-Making

High level management personnel seem to operate in a world far removed from both intra-corporate and market-place reality, the latter characterized by injuries and deaths resulting from defective products. Internally, managers seem to have little knowledge of specific operating-level decisions.<sup>232</sup> Externally,

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ernmental regulations." *Id.* A former president of General Motors essentially admitted that his corporate persona sometimes makes decisions that his non-corporate persona might regard as irresponsible. *Id.* at 191.

229. *Borel v. Fibreboard Paper Prods. Corp.*, 493 F.2d 1076, 1092-93 (5th Cir. 1973). Despite ample evidence that asbestos causes serious respiratory illness and that asbestos manufacturers never performed any testing after receiving such evidence, the manufacturer in *Borel* took the position that it could not have known about the dangers to industrial insulation workers and therefore could not have warned of the risks. *Id.* The manufacturer in *Borel* then assumed a highly inconsistent posture—implicitly refuting its earlier argument—stating that it had no duty to warn of the dangers because they were obvious to the plaintiff. *Id.* at 1093. The courts have confronted similar inconsistencies in tobacco litigation. See *Cipollone v. Liggett Group, Inc.*, 683 F. Supp. 1487, 1492 (D.N.J. 1988). The tobacco companies have raised trial defenses concerning the risks associated with smoking that are even more patently disingenuous than arguments asserted by asbestos manufacturers. *Id.* Despite arguing that the information asserting a link between smoking and lung cancer is deficient, unreliable and without scientific or medical basis, tobacco companies argue that plaintiffs are contributorily negligent for not relying on such information. *Id.* The companies then argue that a plaintiff's particular type of lung cancer was not caused by smoking even though they previously asserted that smoking causes no type of lung cancer. *Id.*

230. See Alan F. Westin, *What Can and Should Be Done to Protect Whistle Blowers in Industry*, in *WHISTLE-BLOWERS!* 131, 137 (Alan F. Westin ed., 1981). According to Westin: "Few business executives deliberately seek for turn out cars that are defective . . . . The real problem has been the frame of reference of business decisions and the reward structure of companies." *Id.* In the same context, the editor asserts that management, too "driven by the demand for profits," will sweep aside even serious engineering doubts about product safety. *Id.*

231. See Stevenson, *supra* note 226, at 144 (arguing that Professor Friedman's admonition for corporations to play by rules of game refers to both legal rules and ethical customs, and that measured by that standard "corporations are far too often guilty of breaches of precisely those legal and ethical norms by which Friedman suggests they should be guided").

232. See John J. Coffee, Jr., *Beyond the Shut-Eyed Sentry: Toward a Theoretical View of Corporate Misconduct and an Effective Legal Response*, 63 VA. L. REV. 1099, 1133 (1977) (stating that some of reasons why top management is so isolated

they seem to deal only with:

financial symbols and models in abstract terms, leaving them incapable of thinking in human terms or grasping human conditions. They think vertically, are organized vertically, and are so locked up in a homogenized pyramid, which requires them to be infallible, that they can never say they blew it. So they have little opportunity to learn and grow. They are often surrounded by sycophants.<sup>233</sup>

Corporate managers obviously take the capitalist credo seriously and are therefore obliged to maximize corporate profits.<sup>234</sup> Apparently, however, pressures to maximize profits cause these managers both to ignore Professor Friedman's caveat to "play by the rules of the game,"<sup>235</sup> and to detach themselves from the "consequences of their actions [that] we would expect from an individual possessed of an ordinary conscience."<sup>236</sup>

At all levels, corporate decision-makers operate in a detached manner, communicating effectively only with immediate subordinates and superiors. Beyond the isolation that comes from the rigid vertical organization in many corporations,<sup>237</sup> further isola-

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from operations include "decentralized corporate structure, a hierarchical command system that required orders and responses to travel along narrow linear channels of communication, and a technical orientation of those at operational levels that made them inattentive to both the signs and risks of illegality"). Generally, corporate CEOs seem surprised or shocked when they learn by chance, for example, of the harsh conditions of the migrant workers in their orange groves or of the miners in the company mines. NADER & TAYLOR, *supra* note 91, at 518-19. Many CEOs at General Motors reaped favorable publicity regarding the General Motors Cancer Research Foundation at a time when, presumably unknown to top management, its own wood-model shop workers were experiencing a rate of cancer 50% higher than the general Detroit population. *Id.* Even though both General Motors and the employee union were given this information, neither acted to investigate or study the problem until after the Detroit News publicized it. *Id.*; see also HILLS, *supra* note 181, at 195. Hills states that numerous small steps in the hierarchy of corporate decision-making diffuse responsibility because high-level managers are not easily identifiable as those persons directly responsible for short cuts in product safety. HILLS, *supra* note 181, at 195. Hills also notes that middle-level managers often filter information that flows upwards to make their departments look good, and thus, top management may have only partial information concerning the product safety decisions made by middle- and lower-level management. *Id.*

233. NADER & TAYLOR, *supra* note 91, at 525 (quoting Sidney Harman, former Undersecretary of Commerce).

234. For a more detailed discussion concerning management efforts to maximize profits despite safety issues, see *supra* note 223.

235. SIMON & EITZEN, *supra* note 208, at 239.

236. Stevenson, *supra* note 226, at 145.

237. For a discussion of the problems created by rigid vertical organiza-

tion occurs as a result of selectivity in the communication process that causes subordinates to filter out the negative and emphasize only the positive in their reports to supervisors.<sup>238</sup> Professor Coffee emphasizes that while the filtering mechanism operates within all organizations, business corporations seem to be the only organizations that have no institutional mechanism by which to break down informational blockages.<sup>239</sup>

Despite the communication difficulties inherent in business organizations, not all poor intra-corporate communication is inadvertent. Much intra-corporate communication, or lack thereof, cannot be explained merely as the result of inherent but non-intentional blocking mechanisms. Corporations often make deliberate changes in the supervisory structure to achieve legally or morally questionable decisions.<sup>240</sup> Similarly, high level managers may deliberately keep one department in the dark about product risk information identified by another department.<sup>241</sup> Moreover, when management receives unfavorable product risk information, it may not only fail to take corrective action, but may also reprimand

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tional structures, see *supra* notes 230-31 and accompanying text. Isolating corporate decision-makers diffuses decision-making responsibility and results in an inability to attribute decisions/blame to a particular individual or individuals within the corporation. See, e.g., *Ford Motor Co. v. Durrill*, 714 S.W.2d 329, 334 (Tex. Ct. App. 1986) (holding Ford accountable for gross negligence because case involved complex company decisions made by Ford management that could not be imputed to individual engineer, manager or division).

238. For further discussion of the effects of isolating corporate decision-making, see Coffee, *supra* note 232, at 1131-32.

239. For further discussion concerning corporate inability to break down internal informational impediments, see Coffee, *supra* 232, at 1132-33.

240. For further discussion of how corporations manipulate internal supervisory structures, see Coffee, *supra* note 232, at 1134-35.

241. See *Dorsey v. Honda Motor Co.*, 655 F.2d 650, 653 (5th Cir. 1981) (finding that management of Honda ignored design engineer's warnings of design risks and did not correct defects or, presumably, did not convey information to marketing personnel); *Palmer v. A.H. Robins Co.*, 684 P.2d 187, 195 (Colo. 1984) (involving corporate medical executive that received two intra-company memos about Dalkon Shield's higher than reported failure risk, but kept information from marketing personnel); Westin, *supra* note 230, at 10-11 (stating that development director at Firestone Tire warned top management that tires posed safety risk at high mileage, but management failed to share information and continued to assert that their tires were "completely safe"); see also Clayton P. Gillette & James E. Krier, *Risks, Courts, and Agencies*, 138 U. PA. L. REV. 1027, 1038 (1990) (stating that producers often do not have much information about risk, and if they do, do not share it with consumers or employees); Westin, *supra* note 230, at 11 (stating that asbestos manufacturers kept risks from employees, discharged medical consultant who warned about such risks and suppressed information available in 1930s and 1940s about such risks). For a general discussion concerning the lack of communication within corporations, see *supra* notes 232-40 and accompanying text.



mand the bearer of the unpleasant information.<sup>242</sup> Regardless of whether a corporation's communication barriers are intentional or accidental, such impediments inevitably result in fragmented decision-making to the detriment of innocent consumers.

## 2. *Decision-Making Rationalizations*

Several reasons have been offered to explain why corporate decision-makers so consciously and willingly favor design hazards instead of safer alternatives.<sup>243</sup> The corporate structure fragments responsibility into a hierarchy that allows an individual decision-maker to rationalize his or her low-level decision-making, even if indirectly risk-related, on the grounds that it does not directly cause any risk to materialize.<sup>244</sup> High-level decision-makers, on the other hand, must resort to a different rationalization because their decisions more directly and significantly relate to the creation of user risk.<sup>245</sup> Thus, high-level managers rationalize, or cover, their high-level decisions by indicating to lower-level personnel that they are not interested in knowing unnecessary details.<sup>246</sup>

Decision-makers also utilize several other mechanisms of rationalization to support their decisions. One rationalization technique is to deny that there are any "injuries" caused by design choices and assert instead that there are only unfortunate, ran-

242. For reports of corporations "shooting the messenger" that bears unfavorable product risk information, see generally Westin, *supra* note 230. Westin discusses several reports of severe reprimands, including loss of employment, against persons who raise honest concerns about product defects. *Id.* at 52.

243. In all but the rarest of cases there is at least one, safer, practicable alternative to a hazardous design. Exceptional cases do exist, however, in which particular design risks apparently could not have been eliminated by practicable means. See *Bernal v. Richard Wolf Medical Instruments Corp.*, 272 Cal. Rptr. 41, 46 (Cal. Ct. App. 1990) (involving strong evidence that surgical instrument was made with "best steel available, but had inherent dangers no human skill or knowledge has yet been able to eliminate"); *Garst v. General Motors Corp.*, 484 P.2d 47, 62-63 (Kan. 1971) (holding that there was no substantial competent evidence upon which jury could find manufacturer negligent in designing braking and steering systems of earthmover because both systems were standard with no better alternative device available).

244. See *HILLS*, *supra* note 181, at 194 (characterizing this mechanism of rationalization as "denial of responsibility").

245. *Id.* at 195 ("In this bureaucratic labyrinth, it is often difficult to find any specific individual at higher executive levels on whom to place the responsibility for short-cuts in product safety . . .").

246. *Id.* (noting that high-level managers are often opposed to learning true sordid details, yet simultaneously hold low-level managers responsible for failing to meet production deadlines or profit margins).

dom accidents.<sup>247</sup> Decision-makers can also deny that there are any true “victims” in a particular case.<sup>248</sup> In addition, they often shift the blame to the accusers i.e., the regulatory agencies,<sup>249</sup> “consumerism people,” the courts or plaintiffs’ lawyers.<sup>250</sup> Finally, one must also recognize that decision-makers often appeal to “higher loyalties.”<sup>251</sup>

In light of the above, the California Supreme Court aptly noted that “[t]he technological revolution has created a society containing dangers to the individual never before contem-

247. *Id.* at 196 (stating that by focusing on their lack of intent to injure anyone, and on uncertainty and randomness surrounding “accidents,” managers can rationalize their decisions on ground that injuries occur in natural order of life and are not any one person’s fault).

248. Corporate decision-makers can deny the existence of design defect “victims” by blaming the individual victims for their own injuries. The tobacco companies deny that cigarettes cause lung cancer, but also assert as a defense the smoker’s knowledge of the risks that the tobacco companies claim do not exist. See *Cipollone v. Liggett Group, Inc.*, 683 F. Supp. 1487, 1492 (D.N.J. 1988). Despite arguing that the evidence establishing a link between smoking and lung cancer is deficient, unreliable and without scientific or medical basis, tobacco companies argue that plaintiffs are contributorily negligent for not relying on such information. *Id.* The tobacco companies also argue that a plaintiff’s particular type of lung cancer was not caused by smoking even though they have previously asserted that smoking does not cause lung cancer, period. *Id.* At least one asbestos manufacturer has asserted a similar position. *Borel v. Fibreboard Paper Prods. Corp.*, 493 F.2d 1076, 1092-93 (5th Cir. 1973). Despite ample evidence that asbestos causes serious respiratory illness and that asbestos manufacturers never performed any testing of these risks after receiving such evidence, the manufacturer in *Borel* claimed that it could not have known about the dangers to industrial insulation workers and therefore could not have warned of the risks. *Id.* at 1093. The manufacturer in *Borel* then assumed a highly inconsistent posture—implicitly refuting its earlier argument—stating that it had no duty to warn of the dangers of asbestos because such dangers were obvious to the plaintiff. *Id.* Nonetheless, the manufacturer also claimed that because the risks of disease from exposure to asbestos were not known, there could be no “victims” because nobody intended to cause—nor actually did cause—lung disease in persons working with asbestos or asbestos products. *Id.* These cases present an interesting line of argument to say the least.

249. The targets of the blame are typically governmental agencies. HILLS, *supra* note 181, at 198-99.

250. The blame, however, is also often shifted to safety or environmental “crusaders,” such as Ralph Nader. CULLEN ET AL., *supra* note 172, at 154-55 (discussing how General Motors hired detectives to investigate Nader in hopes of discrediting him and how such investigation eventually became public, staining GM’s reputation); HUBER, *THE LEGAL REVOLUTION*, *supra* note 3, at 9, 12, 26 (noting that increasing ranks of plaintiff’s lawyers and judicial system’s propensity for generous awards have led to increase of tort suits filed).

251. HILLS, *supra* note 181, at 199. Some corporate decision makers adhere to the notion that the “moral superiority of [the] system of free enterprise” carries with it a license to ignore other moral values while pursuing the corporate goal—maximizing profits for shareholders. *Id.*

plated.”<sup>252</sup> For courts to establish the appropriate legal relationship between producers and product users, they must focus more closely on the context in which users are confronted with products containing dangerous defects of which they have little or no knowledge. Both the nature of the design and marketing processes and manufacturers’ conscious choices to reject safety in favor of risks confirm that product users require heightened protection from dangerous product design.

#### IV. THE NEED FOR DETERRENCE

##### A. *Marketplace Reality*

##### 1. *Mass Risks*

The courts that first recognized the need to protect product users from the new risks inherent in mass markets did not have the benefit of numerous appellate decisions documenting corporate decision-making (in design defect cases) that consciously placed the life and health of product users in serious jeopardy.<sup>253</sup> Nonetheless, judges writing early products liability opinions understood enough about mass marketing and corporate decision-making to recognize both that manufacturers generally could foresee the design risks they were creating<sup>254</sup> and that consumers, who could not appreciate those risks, needed enhanced protection from complex products in mass markets.<sup>255</sup>

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252. *Barker v. Lull Eng’g Co.*, 573 P.2d 443, 457 (Cal. 1978).

253. See Croley & Hanson, *Rescuing the Revolution*, *supra* note 73, at 606-12 (presenting overview of focus of “first generation” of strict products liability jurists and scholars on protecting product users from new level of risks associated with mass product markets).

254. See, e.g., *MacPherson v. Buick Motor Co.*, 111 N.E. 1050, 1053 (N.Y. 1916). In *MacPherson*, Judge Cardozo recognized that Buick, as a result of its design and manufacture of the vehicle in question, was familiar with the vehicle’s characteristics and attributes, and therefore knew of the risks it posed to users. *Id.*

255. See, e.g., *Escola v. Coca Cola Bottling Co.*, 150 P.2d 436, 440-43 (Cal. 1944) (Traynor, J., concurring). In his concurring opinion in *Escola*, Justice Traynor emphasized the need for greater product safety, and recognized that mass production had disrupted the balance of safety that once existed when products were fewer, simpler, and better understood by the average consumer. *Id.* The post-Traynor California Supreme Court has adhered to the principles espoused by Traynor and fashioned product liability doctrine emphasizing consumer safety. See *Barker v. Lull Eng’g Co.*, 573 P.2d 443, 457 (Cal. 1978). In *Barker*, the court stated:

The technological revolution has created a society that contains dangers to the individual never before contemplated. The individual must face the threat to life and limb not only from the car on the street or highway but from a massive array of hazardous mechanisms and products. The radical change from a comparatively safe, largely agricul-

Undoubtedly, modern consumers face product risks on an unprecedented scale.<sup>256</sup> These mass risks are characterized in substantial part by the great disparity between producers and consumers in terms of knowledge and power over product risks. The information disparity rests primarily on the reality that manufacturers are experts concerning their products.<sup>257</sup> In the design context, their expertise about product materials, about the interaction between the product and user, and about product testing alerts manufacturers to essentially all product design risks.<sup>258</sup> The power to eliminate, or at least mitigate, most product risks without undue expense accompanies producer awareness of those risks.<sup>259</sup> As has been demonstrated previously,

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tural, society to this industrial unsafe one has been reflected in the decisions that formerly tied liability to the fault of a tortfeasor but now are more concerned with the safety of the individual who suffers the loss.

*Id.*; see also *Azzarello v. Black Bros. Co.*, 391 A.2d 1020, 1023-24 (Pa. 1978) (stating that "sophisticated and complex industrial society with its proliferation of new products and vast changes in the private enterprise system," including "giant corporate structures," requires that consumers be protected and that courts need no longer protect an "emerging manufacturing industry"); RESTATEMENT (SECOND) OF TORTS § 402A cmt. c (1977) (stating that "the consumer of [defective products] is entitled to the maximum of protection at the hands of someone, and the proper persons to afford it are those who market the products"). According to comment j of § 402A:

The basis for the rule is the ancient one of the special responsibility for the safety of the public undertaken by one who enters into the business of supplying human beings with products which may endanger the safety of their persons and property, and the forced reliance upon that undertaking on the part of those who purchase such goods.

RESTATEMENT (SECOND) OF TORTS § 402A cmt. j (1977). For an expanded discussion of the "first generation's" recognition of the information gap between consumers and producers, and producer exploitation of that gap, see generally *Croley & Hanson, Rescuing the Revolution*, *supra* note 73.

256. *Barker*, 573 P.2d at 557 (noting that modern technological revolution has forced consumers to confront increasing levels of danger).

257. For a discussion about the disparity between producer and consumer knowledge concerning product risks, see *supra* notes 41-78 and accompanying text.

258. *Feldman v. Lederle Lab.*, 479 A.2d 374, 388 (N.J. 1984) (noting that manufacturer is in superior position to know about product technology and materials). For a discussion of the superior risk information possessed by manufacturers, see *supra* notes 48-58 and accompanying text.

If manufacturers fail to consider carefully the three essential elements of product design with user safety in mind, they may not actually be aware of a particular product risk. The point is simple: manufacturers can acquire knowledge of all product design risks if they incur the costs of obtaining the information. Consumers, on the other hand, can rarely, if ever, obtain the same amount of product safety information without incurring far greater costs than manufacturers would incur. For further discussion of the relative costs of safety information for manufacturers and consumers, see *supra* note 78 and accompanying text.

259. FINAL REPORT, *supra* note 220, at 39. According to this report:

however, manufacturers too frequently exploit their superior risk information and power, and fail to take reasonable steps to eliminate product risks.<sup>260</sup>

There are numerous reasons why product users do not have adequate information about product design risks.<sup>261</sup> Aside from the fact that consumers are generally not considered product experts—unlike manufacturers—<sup>262</sup>they do not participate in product design.<sup>263</sup> Consumers assume, for better or for worse, that products are safe and fit for reasonable use.<sup>264</sup> Furthermore, con-

Manufacturers have it in their power to design, build, and market products in ways that will reduce if not eliminate most unreasonable and unnecessary hazards. Manufacturers are best able to take the longest strides to safety in the least time. The capacity of individual manufacturers to devise safety programs, without undue extra cost, has been demonstrated repeatedly in the course of our short history: in safety glass, double-insulated power tools, baffles on rotary mowers, noncombustible TV transformers, and releases on wringer washers.

*Id.*; see also *Caterpillar Tractor Co. v. Beck*, 593 P.2d 871, 891 (Alaska 1979) (explaining that one of three policies underlying strict products liability is to place cost of accidents on manufacturers because they are in best position to prevent accidents); Robert A. Prentice & Mark E. Roszkowski, "Tort Reform" and the Liability "Revolution": *Defending Strict Liability in Tort for Defective Products*, 27 *GONZ. L. REV.* 251, 282-85 (1992) (discussing efficacy of changing product designs, as compared to changing human behavior, in order to achieve greater product safety).

260. For a discussion of cases involving manufacturers that failed to take reasonable steps to eliminate product design risks, see *supra* notes 82-166 and accompanying text.

261. For a discussion of additional reasons suggesting why consumers lack adequate information concerning design risks, see *supra* notes 61-78 and accompanying text. The courts have also indicated that they recognize that consumers do not have realistic access to product safety information. *Caterpillar Tractor Co.*, 593 P.2d at 891 ("[R]esponsibility for placing the defective product on the market should not be shifted to those [consumers] in no position to realistically assess the danger."); *Suter v. San Angelo Foundry & Mach. Co.*, 406 A.2d 140, 149 (N.J. 1979) (citing *Santor v. A & M Karagheusian, Inc.*, 207 A.2d 305, 311 (N.J. 1965) (stating that doctrine of strict products liability "stems from the reality of the relationship between manufacturers of products and the consuming public" and that "the great mass of the purchasing public has neither adequate knowledge nor sufficient opportunity to determine if articles bought or used are defective"); *Henningsen v. Bloomfield Motors, Inc.*, 161 A.2d 69, 83 (N.J. 1960) ("Under modern conditions the ordinary layman, on responding to the importing of colorful advertising, has neither the opportunity nor the capacity to inspect or to determine the fitness of an automobile for use."). For a general discussion concerning consumer lack of adequate information, see Prentice & Roszkowski, *supra* note 259, at 287-97.

262. For a discussion of the disparity between the levels of sophistication between producers and consumers, see *supra* notes 59-60 and accompanying text.

263. For a more detailed discussion of consumers' inherent lack of information regarding design safety, see *supra* notes 61-65 and accompanying text.

264. For a discussion of the safety assumptions made by consumers when they purchase and use products, see *supra* notes 68-70 and accompanying text.

sumers are at a significant disadvantage because most design risks are not obvious upon ordinary inspection,<sup>265</sup> and the cost of risk information is prohibitively high for ordinary consumers.<sup>266</sup> Finally, and perhaps most disturbing, manufacturers do not readily or often share necessary risk information with the consuming public.<sup>267</sup>

## 2. *Manufacturer Accountability*

As has been discussed previously, manufacturer accountability for design risks is limited by a weak sense of responsibility exhibited by corporate actors as compared to individuals acting in their own private capacities.<sup>268</sup> There are several apparent explanations for this moral dissonance.<sup>269</sup> One notable explanation is that individual actors have little ability to avoid direct responsibility for their actions. They represent the sole entity potentially responsible for the challenged act. By contrast, the corporate actor typically operates through a chain of responsibility and is usually not the decision-maker with the ultimate say concerning specific decisions. In addition, corporate individuals are rarely the named defendants charged with responsibility for a challenged act; the corporate entity generally assumes this role.

Corporate individuals also have the luxury and ability to rely on "rationalizations" for their irresponsibility; individual actors are in a different situation.<sup>270</sup> A corporate individual's position in the decision-making chain allows him or her to pass his or her moral and legal responsibility up the chain of command.<sup>271</sup> As these corporate individuals respond to the pressures to become

265. For a more detailed discussion concerning whether design risks are readily apparent to typical non-expert users, see *supra* notes 71-72 and accompanying text.

266. For a more detailed discussion of the high cost of product risk information, see *supra* notes 73-75 and accompanying text.

267. For a discussion of the lack of exchanging of information that occurs between manufacturers and consumers, see *supra* notes 76-78 and accompanying text.

268. For a more detailed discussion of manufacturer accountability, see *supra* notes 221-25 and accompanying text. For a discussion of the disparity between corporate and individual notions of accountability, see *supra* notes 226-31 and accompanying text.

269. For a discussion of the explanations behind corporate dissonance, see *supra* note 267.

270. For a general discussion of corporate decision-making rationalizations, see *supra* notes 243-52 and accompanying text.

271. For a discussion concerning how information gets filtered between high- and low-level managers in vertical organizations, see *supra* notes 232-33, 239 and accompanying text.

“team players,” they can avoid both direct responsibility and a sense of direct responsibility.<sup>272</sup> Mindful that their decisions are always reviewed by superiors in the decision-making chain, corporate individuals can rationalize their decisions on the grounds that they will not be the ultimate or principle cause of any untoward happenings, such as product injuries.<sup>273</sup>

### 3. *Compensation as Second Best*<sup>274</sup>

#### a. Many Injuries, Few Claims

Product design is plagued by a conscious disregard for consumer safety.<sup>275</sup> Each year, more than thirty million Americans suffer a product-related injury,<sup>276</sup> and more than seventy-five thousand of those accident victims die from their injuries.<sup>277</sup> In fact, approximately half of all Americans incur a serious tort problem during their lifetimes.<sup>278</sup> The costs of these injuries are as-

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272. For a discussion of how corporate pressures exacerbate the filtering of information in vertical organizations, see *supra* notes 232-33 and accompanying text.

273. For a discussion of the corporate decision-making process, see *supra* notes 232-33, 239 and accompanying text.

274. This heading was suggested by the title of an article written by Peter W. Huber. Peter W. Huber, *Safety and the Second Best: The Hazards of Public Risk Management in the Courts*, 85 COLUM. L. REV. 277 (1985) [hereinafter Huber, *Hazards of Public Risk Management*].

275. Manufacturers make design choices that create serious risks to product users despite powerful evidence that safer alternative designs were available “without undue extra cost.” FINAL REPORT, *supra* note 220, at 39. For a discussion of several—among countless—instances of these “wrong” choices involving motor vehicles, intrauterine devices, tampons, television sets, flammable fabrics, industrial/heavy equipment and a wide variety of other consumer products, see *supra* notes 82-166 and accompanying text. For another analysis of myriad products involving manufacturers that have made unacceptable design choices that created unreasonable product hazards, see FINAL REPORT, *supra* note 220, at 10-34.

276. Prentice & Roszowski, *supra* note 259, at 257. Congress' Final Report on Product Safety, using older data, reported that 20,000,000 Americans are injured in home accidents involving consumer products, of which 30,000 are killed and 110,000 are permanently disabled. FINAL REPORT, *supra* note 220, at 37.

277. Prentice & Roszowski, *supra* note 259, at 257. Included in the 75,000 accident victims that die each year is the number who die specifically in automobile accidents. *Id.* Obviously, however, many product-related injuries are not caused by defects in the product. Nonetheless, a significant number of these injuries and deaths could be eliminated if manufacturers paid more attention to product hazards. FINAL REPORT, *supra* note 220, at 37. An examination of any catalog of defective products reveals that a significant number of the injuries and deaths resulting from use of those products could have been eliminated by completely reasonable design changes. For a discussion of these defective products, see *supra* notes 82-166 and accompanying text.

278. Richard L. Abel, *The Real Tort Crisis—Too Few Claims*, 48 OHIO ST. L.J.

tronomical. Emergency room treatment alone, for all non-auto product accidents, costs ten billion dollars annually.<sup>279</sup> Auto accidents, which kill more than forty-five thousand and injure 1.7 million persons annually, cost almost forty-seven billion dollars.<sup>280</sup> Moreover, additional costs exist—such as long term medical care, wage losses and individual pain and suffering—that are practically incalculable.

Despite evidence of abundant product-related accidents each year, only a few of those injured ever actually bring suit. As few as three percent of all persons injured in non-work, non-auto settings ever file legal claims.<sup>281</sup> There is evidence that as few as seven percent of consumers with product problems even consult an attorney; in fact, only ten percent of consumers injured by products each year even consider filing suit.<sup>282</sup>

#### b. Ex Post Protection

Creating incentives for safety is one of the most important

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443, 447 (1987) [hereinafter Abel, *Tort Crisis*] (citing BARBARA A. CURRAN, *THE LEGAL NEEDS OF THE PUBLIC: THE FINAL REPORT OF A NATIONAL SURVEY* 117 (1977)). In another study reported by Abel, 44 of 1,000 persons had suffered at least two weeks of incapacity from an injury during the preceding 12 months. *Id.* Again, however, not all of these injuries were caused by defective products.

279. For further discussion concerning emergency room costs directly attributed to automobile accidents, see Prentice and Roszowski, *supra* note 259, at 257.

280. Prentice & Roszowski, *supra* note 259, at 257-58 (noting also that 14% of auto accidents involve defective vehicles); see also Owen, *Moral Foundations*, *supra* note 17, at 461 n.131 (suggesting that consumer product injuries often involve causal factors, such as misuse or abuse of product, other than product defect).

281. Prentice & Roszowski, *supra* note 259, at 258. In the medical malpractice context, there exists data indicating that fewer than 10% of patients injured by a physician's negligence ever bring legal claims. *Id.*; see also Abel, *Tort Crisis*, *supra* note 278, at 448 (stating that one medical malpractice study indicated that fewer than 6.7% of patients injured by physician's negligence ever bring lawsuit).

282. Prentice & Roszowski, *supra* note 259, at 259. For a general discussion of why a great proportion of potential tort claimants never initiate the recovery processes, thus precluding the possibility of being compensated for their injuries, see Abel, *Tort Crisis*, *supra* note 278, at 448-52; Marc Galanter, *Reading the Landscape of Disputes: What We Know and Don't Know (And Think We Know) About Our Allegedly Contentious and Litigious Society*, 31 *UCLA L. REV.* 4, 13-18 (1983) (discussing several reasons parties do not bring legal action including: injuries are unperceived; gain is too low or cost is too high; parties would rather avoid trouble by resigning or severing relations; and disputes are sometimes heard in non-judicial fora); Prentice & Roszowski, *supra* note 259, at 255-59. For an in-depth discussion of "access bias" in the judicial system that keeps plaintiffs from pursuing injury claims, see Gillette & Krier, *supra* note 241, at 1044-88 (discussing access bias arising from "the interplay of legal doctrine, the structure of litigation, and the nature of public risk").



policies underlying strict products liability law.<sup>283</sup> Manufacturers are obligated to design their products for optimum safety,<sup>284</sup> i.e., "to assure that unnecessary risks of injury are eliminated."<sup>285</sup> An injured plaintiff is only entitled to recover when a producer fails to meet its primary duty of eliminating unnecessary product risks.<sup>286</sup> Thus, compensation is actually a default mechanism in

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283. Prentice & Roszkowski, *supra* note 259, at 273; *see also* Howard C. Klemme, *The Enterprise Liability Theory of Torts*, 47 U. COLO. L. REV. 153, 177 (1976) (stating that cost distribution of enterprise liability theory is expected to prevent tort-like losses). Of all the factors involved in creating product injuries, human behavior is the one least susceptible to change; the factor most susceptible to correction in the direction of greater product safety is the ability of manufacturers to design safer products "without undue extra cost." FINAL REPORT, *supra* note 220, at 39-40. According to Abel:

Tort liability is not equally powerful in shaping all behavior. It has the greatest effect on profit-seeking enterprises engaged in repetitive activities and operating in competitive markets. Therefore, it probably has little impact on automobile drivers, whose behavior is rarely deliberative and who, in any case, tend to endanger themselves as much as others (so that self-preservation is the strongest incentive to safety).

Richard L. Abel, *The Crisis Is Injuries*, in NEW DIRECTIONS IN LIABILITY LAW 37 (Walter Olson ed., 1988); *see also* H.W. HEINRICH ET AL., INDUSTRIAL ACCIDENT PREVENTION: A SAFETY MANAGEMENT APPROACH 57 (5th ed. 1980) ("In the same breath it can be truthfully said that although worker failure causes the most accidents, mechanical guarding and engineering revision are nevertheless important factors in preventing the most accidents.")

284. *See* *Barker v. Lull Eng'g Co.*, 573 P.2d 443, 455 (Cal. 1978) (explaining that optimum safety can be found by utilizing risk-benefit analysis). In the design context, optimum safety is that amount of safety that results from balancing the risk-benefit factors used by most jurisdictions to test whether a product is defective in design. *Id.*; *see also* Henderson & Twerski, *Proposed Revision*, *supra* note 3, at 1531 ("An overwhelming consensus [of jurisdictions] favors some sort of risk-utility balancing test to judge the adequacy of product design and marketing." (footnote omitted)); John W. Wade, *On the Nature of Strict Tort Liability for Products*, 44 Miss. L.J. 825, 837-38 (1973) [hereinafter Wade, *Strict Tort Liability*] (listing relevant risk-benefit factors). Courts do not demand absolute safety; they only demand safety that is technologically and economically feasible, and that will not seriously undermine the usefulness of the product. *Barker*, 573 P.2d at 455; *see also* Stephen D. Sugarman, *Doing Away With Tort Law*, 73 CAL. L. REV. 555, 559 n.3 (1985) (stating that "some risks, because of the benefits they create, are socially acceptable").

285. FINAL REPORT, *supra* note 220, at 40; *see also* *Barker*, 573 P.2d at 454 (stating that manufacturer's duty is to eliminate "excessive preventable danger" in challenged product design or, stated alternatively, to eliminate, or mitigate, risk of danger up to point at which benefits of design outweigh risk of danger). For further discussion of the duty imposed on manufacturers to optimize safety, *see supra* note 284.

286. Because manufacturers are not obligated to eliminate all product risks, but only those deemed not risk-beneficial, products will contain some risks that will occasionally cause injury not legally worthy of compensation. *See* GUIDO CALABRESI, THE COSTS OF ACCIDENTS 27, 68 (1970) ("Most activities can be carried out safely enough or be sufficiently reduced in frequency so that there is a point at which their worth outweighs the costs of the accidents they cause.").

the tort recovery system.<sup>287</sup>

Compensation is a "second best" mechanism for eliminating product risks for several reasons. First, producers have the knowledge and ability to eliminate, "without undue extra cost . . . most unreasonable and unnecessary [product] hazards."<sup>288</sup> Second, the vast majority of persons injured by defectively designed products never invoke the tort recovery system.<sup>289</sup> Third, individual corporate actors participating in product design respond to corporate pressures and find ways to subvert their innate sense of moral responsibility.<sup>290</sup> Finally, and perhaps most importantly, an award of compensation frustrates the primary goal of eliminating injuries caused by defectively designed products.<sup>291</sup>

## B. Greater Deterrence

### 1. The Deterrent Effect

Since the birth of strict products liability, courts have assumed that the doctrine would create greater manufacturer incentives to produce safe products than would ordinary negligence.<sup>292</sup>

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287. See Sugarman, *supra* note 284, at 565 (arguing that successful lawsuits represent failure in tort system's deterrence mechanism). *But see* CALEBRESI, *supra* note 286, at 27 (arguing that after-the-fact compensation, although second in time, is not "secondary" in any significant sense, and that "the way we provide for accident victims after the accident is crucially important and that the real societal costs of accidents can be reduced as significantly here as by taking measures to avoid accidents in the first place").

288. See FINAL REPORT, *supra* note 220, at 39. For a more in-depth discussion concerning manufacturer knowledge of design risks, see *supra* notes 255-67 and accompanying text.

289. For a further discussion concerning the disproportionately few number of cases commenced by parties injured by defectively designed products, see *supra* notes 281-82.

290. For a detailed discussion of several ways in which corporate individuals avoid and rationalize responsibility for defectively designed products that cause injury, see *supra* notes 268-73 and accompanying text.

291. HUBER, THE LEGAL REVOLUTION, *supra* note 3, at 17-18. Even Peter Huber, who advocates a return to contract and the elimination of tort as the basic relationship between producer and consumer, recognizes that compensation represents a default mechanism that is triggered after manufacturers have failed to protect against product hazards. *Id.*; see also FINAL REPORT, *supra* note 220, at 40 ("The law has tended in recent years to place full responsibility for injuries attributable to defective products upon the manufacturer. But beyond his liability for damages, a producer owes society-at-large the duty to assure that unnecessary risks of injury are eliminated.").

292. See, e.g., *Escola v. Coca Cola Bottling Co.*, 150 P.2d 436, 440-42 (Cal. 1944). The *Escola* court stated that:

[E]ven if there is no negligence, however, public policy demands that responsibility be fixed wherever it will most effectively reduce the hazards to life and health inherent in defective products that reach the market. It is evident that the manufacturer can anticipate some hazards

Generally, courts have continued to voice their commitment to this belief.<sup>293</sup> Some courts have explicitly recognized that a plaintiff's burden of proof in ordinary negligence cases frustrates manufacturer safety incentives.<sup>294</sup> A few courts, however, have expressed reservations concerning whether strict products liability provides greater deterrence incentives than does negligence.<sup>295</sup> Although the courts are fairly consistent, there appears

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and guard against the recurrence of others, as the public cannot . . . . It is to the public interest to discourage the marketing of products having defects that are a menace to the public . . . . It is to the public interest to prevent injury to the public from any defective goods by the imposition of civil liability generally.

*Id.* (Traynor, J., concurring).

293. *See, e.g.*, *Shanks v. Upjohn Co.*, 835 P.2d 1189, 1196 (Alaska 1992) (stating that it is "consistent with the purposes underlying strict products liability that manufacturers should be deterred from marketing certain products"); *Brown v. Superior Court*, 751 P.2d 470, 474, 478 (Cal. 1988) (stating that one of fundamental policies underlying strict products liability is "public interest to discourage the marketing of defective products," and one of "fundamental reasons underlying the imposition of strict liability [is] to deter manufacturers from marketing products that are unsafe"); *Barker v. Lull Eng'g Co.*, 573 P.2d 443, 454, 457 (Cal. 1978) (holding that emphasis in determining strict liability for design defects is preventability of danger, and that switch from fault-based to strict liability represents new focus on "safety of the individual who suffers the loss"); *Phipps v. General Motors Corp.*, 363 A.2d 955, 963 (Md. 1976) (noting that "consumer of products is entitled to 'maximum of protection at the hands of someone, and the proper persons to afford it are those who market the products'") (quoting RESTATEMENT (SECOND) OF TORTS § 402A cmt. c (1973)); *O'Brien v. Muskin Corp.*, 463 A.2d 298, 303 (N.J. 1983) (noting that manufacturer has duty not to place defective products on market); *Beshada v. Johns-Manville Prods. Corp.*, 447 A.2d 539, 548 (N.J. 1982) ("By imposing on manufacturers the costs of failure to discover hazards, we create an incentive for them to invest more actively in safety research."); *Azzarello v. Black Bros. Co.*, 391 A.2d 1020, 1023-24, 1027 (Pa. 1978) (noting that modern mass markets dictate that consumer, not manufacturer, must be protected, and that "seller must provide every element necessary to make products safe for use"); *Turner v. General Motors Corp.*, 584 S.W.2d 844, 853 (Tex. 1979) (noting that "underlying policy and purpose of strict liability" is "public interest in human safety") (Campbell, J., concurring); *see also* WALTER H. BECKHAM, JR. ET AL., TOWARDS A JURISPRUDENCE OF INJURY: THE CONTINUING CREATION OF A SYSTEM OF SUBSTANTIVE JUSTICE IN AMERICAN TORT LAW 4-3 to -8 (1984) (Special Committee on Tort Liability System report to American Bar Association).

294. *See, e.g.*, *Phipps*, 363 A.2d at 963 (stating that proof problems may cause plaintiffs to bear loss despite fact that manufacturer is in better position to take precautions and protect against defect); *O'Brien*, 463 A.2d at 303 (same); *Barker*, 573 P.2d at 454-57 (same).

295. *Foley v. Clark Equip. Co.*, 523 A.2d 379, 391 (Pa. Super. Ct. 1987). According to the *Foley* court:

[T]o the extent that a primary purpose of products liability law is to encourage the design of safer products and thereby reduce the incidence of injuries, a negligence standard that would reward the careful manufacturer and penalize the careless is more likely to achieve that purpose. A greater incentive to design safer products will result from a fault system where resources devoted to careful and safe design will pay

to be more debate among commentators and other authorities concerning the deterrent effects of strict products liability. Nonetheless, a strong preponderance of the commentary suggests that the tort recovery system generally,<sup>296</sup> and strict liability specifi-

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dividends in the form of fewer claims and lower insurance premiums for the manufacturer with a good design safety record.

*Id.* Similarly, the *Phillips* court stated that:

Where a defendant's product is adjudged by a jury to be dangerously defective, imposition of liability on the manufacturer will cause him to take some steps (or at least make calculations) to improve his product. Although such inducement may not be any greater under a system of strict liability than under a system of negligence recovery, it is certainly greater than if the liability was imposed on another party simply because that other party was a better risk distributor. We suspect that, in the final analysis, the imposition of liability has a beneficial effect on manufacturers of defective products both in the care they take and in the warning they give.

*Phillips v. Kimwood Mach. Co.*, 525 P.2d 1033, 1041-42 (Or. 1974).

296. See generally Steven P. Croley & Jon D. Hanson, *What Liability Crisis? An Alternative Explanation for Recent Events in Products Liability*, 8 YALE J. ON REG. 1, 84-90 (1991) [hereinafter Croley & Hanson, *Liability Crisis*] (explaining withdrawal of consumer products and services); Richard A. Epstein, *Products Liability as an Insurance Market*, 14 J. LEGAL STUD. 645, 648 (1985) [hereinafter Epstein, *Insurance Market*] (discussing how tort system can make certain types of risk uninsurable and thus certain types of products unmarketable); Anita Johnson, *Products Liability "Reform": A Hazard to Consumers*, 56 N.C. L. REV. 677, 692 (1978) (concluding that common law of products liability should continue to base liability on fault because it maximizes incentives to design and manufacture safe products); Klemme, *supra* note 283, at 186-90 (stating that enterprise liability theory "seeks to encourage as much prevention of tort-like losses as is economically feasible"); Lambert, *supra* note 162, at 48 (stating that "one of the most practical measures for cutting down accidents and injuries in the field of product failure is a successful lawsuit against the supplier of the flawed product" and that "[h]ere, as well as elsewhere in Tort law, immunity breeds irresponsibility while liability induces the taking of preventive vigilance"); Ralph Nader & Joseph A. Page, *Automobile Design and the Judicial Process*, 55 CAL. L. REV. 645, 673-77 (1967) (advocating more judicial involvement in controlling automobile design); Stephen P. Teret & Michael Jacobs, *Prevention and Torts: The Role of Litigation in Injury Control*, 17 LAW, MED. & HEALTH CARE 17, 17-20 (1989) (emphasizing importance of preventive effects of products liability suits and citing examples of air bag and rear shoulder harness litigation); W. Kip Viscusi, *Toward a Diminished Role for Tort Liability: Social Insurance, Government Regulation, and Contemporary Risks to Health and Safety*, 6 YALE J. ON REG. 65, 82 (1989) ("Tort damages awards . . . create incentives for producers to control risks. Firms can internalize damages payments as part of . . . production costs. Even when firms insure against liability risks, they have an incentive to reduce risky behavior because their insurance premiums often reflect the long-term risks generated by their operations."). But see FINAL REPORT, *supra* note 220, at 39 ("Despite its humanitarian adaptations to meet the challenge of product-caused injuries, the common law puts no reliable restraint upon product hazards."); HUBER, THE LEGAL REVOLUTION, *supra* note 3, at 169-71 (asserting that increases in product safety are result of technological and scientific advances and that strict liability doctrine deters rather than encourages safety); Richard L. Abel, *A Critique of Torts*, 37 UCLA L. REV. 785, 806-19, 826 (1990) [hereinafter Abel, *Critique of Torts*] (discussing reasons why tort law based on fault cannot efficiently promote safety but that strict liability "en-

cally, fosters greater product safety.<sup>297</sup>

Empirical data supports the argument that product liability law contributes both directly and indirectly to product safety.<sup>298</sup>

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courages research on safety"); James A. Henderson & Theodore Eisenberg, *The Quiet Revolution in Products Liability: An Empirical Study of Legal Change*, 37 UCLA L. REV. 479 (1990) (discussing changes in judicial decision-making that favor defendants in products liability cases); George L. Priest, *The Insurance Crisis and Modern Tort Law*, 96 YALE L.J. 1521 (1987) [hereinafter Priest, *Insurance Crisis*] (describing views that tort recovery system, and especially strict product liability, does not significantly enhance product safety); Sugarman, *supra* note 284, at 559-617 (arguing that costs of tort system outweigh its benefits).

297. Abel, *Critique of Torts*, *supra* note 296, at 826; Sheila L. Birnbaum, *Unmasking the Test for Design Defect: From Negligence [to Warranty] to Strict Liability to Negligence*, 33 VAND. L. REV. 593, 596 (1980) (noting that strict liability imposes economic incentive on manufacturers to develop "most effective quality control systems attainable"); Croley & Hanson, *Liability Crisis*, *supra* note 296, at 8-9; Prentice & Roszowski, *supra* note 259, at 272-302 (defending strict liability in tort for defective products because it provides strong incentive to design and manufacture safe products). For an argument that negligence theory creates more incentives for product safety than strict product liability, see Birnbaum, *supra*, at 645; Johnson, *supra* note 296, at 692; Wertheimer, *supra* note 3, at 1186 n.8.

Assuming arguendo that negligence theory rewards greater manufacturer due care and that strict liability doctrine effectively makes manufacturer efforts irrelevant to a liability determination, risk-utility balancing in the design context still preserves the theoretical negligence incentives lost under "pure" strict liability. Under risk-utility balancing, a product is defective only if the trade-offs, including weighing the alternative designs and their incremental costs against additional costs imposed on the product and their detrimental impact on the product's utility, are not reasonable from a safety perspective. Hence, the manufacturer's search for and implementation of greater safety may be afforded great weight in the jury's examination of design trade-offs. Moreover, if strict liability eases the plaintiffs' burden, manufacturers must anticipate the likelihood that plaintiffs will prevail more frequently than they would in ordinary negligence cases. See *Barker v. Lull Eng'g Co.*, 573 P.2d 443, 455 (Cal. 1978) (stating that shifting risk-benefit burden to defendant in strict liability defective design case makes plaintiff's burden easier still); *Escola v. Coca-Cola Bottling Co.*, 150 P.2d 436, 441 (Cal. 1944) (Traynor, J., concurring) (noting that absent requirement that plaintiff prove negligence, liability is strict). Under this scenario, manufacturers will have additional incentives to factor litigation costs—including larger potential judgments—into their calculations when determining how much to invest in safety.

298. GEORGE EADS & PETER REUTER, *DESIGNING SAFER PRODUCTS: CORPORATE RESPONSES TO PRODUCT LIABILITY LAW AND REGULATION* vii (1983). A Rand Corporation study concluded that "of all the various external social pressures product liability has the greatest influence on product design decisions." *Id.* Another study of automobile design safety concluded:

Our most frequent conclusion was that liability was a contributing factor in achieving safety improvements. By this we mean that liability worked in conjunction with other factors to produce safety improvements. Interestingly, our cases suggest that the indirect effect of liability on consumer demand—operating through adverse publicity about a product's safety and a manufacturer's reputation—is often the most significant contribution of liability to safety. The direct financial costs of liability are usually a relatively minor factor, at least from the perspective of large manufacturers.

Although the manufacturing sector has made a concerted effort to deny any such effect, the same conclusion may be drawn from information emanating directly from producers.<sup>299</sup> There is little doubt that product liability litigation has forced manufacturers to withdraw numerous defectively designed products from the market.<sup>300</sup> In addition to actual product removal from the marketplace, products liability litigation has also compelled manufacturers to redesign numerous products for greater

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John D. Graham, *Product Liability and Motor Vehicle Safety*, in *THE LIABILITY MAZE: THE IMPACT OF LIABILITY LAW ON SAFETY AND INNOVATION* 120, 180-82 (Peter Huber & Robert Litan eds., 1991).

299. See W. PAGE KEETON ET AL., *PRODUCTS LIABILITY AND SAFETY—CASES AND MATERIALS* 1033-34 (2d ed. 1989). When risk managers of Fortune 1000 corporations were surveyed on the impact of products liability litigation and insurance practices, they reported, inter alia, the following: (1) over 35% had improved their product warnings and/or instructions; (2) over 30% had improved the safety of their designs; (3) almost 25% had stopped producing a product or a service, or had recalled a product, within the previous 3 years; and (4) 65% had established formal safety objectives. *Id.* In general, the report concluded that strict products liability caused improvement in product safety, product use and warning labels and manufacturing quality. *Id.* The Conference Board, which had made the survey that was funded almost exclusively by the business community, was apparently dissatisfied with the results of the first study. *Id.* Thus, the Conference Board conducted another study surveying CEOs rather than risk managers. *Id.* Not surprisingly, the second study undercut the conclusions of the first study in several important respects. *Id.* Courts have also seen similar attempts to undercut an industry insider's opinion that products liability has a significant impact on product safety. See *Knitz v. Minster Mach. Co.*, 432 N.E.2d 814 (Ohio 1982) (involving research assistant of one of judges writing per curiam opinion that spoke with corporate employee who indicated that company had ceased to manufacture product due to products liability lawsuits; yet counsel for company later stated that decision had been made based more on "competitive climate than on liability concerns").

300. See Tom Christoffel, *The Role of Law in Reducing Injury*, 17 *LAW, MED. & HEALTH CARE* 7, 12 (1989). The Corvair and Pinto automobiles, the Dalkon Shield IUD, Playtex brand tampons, the Firestone 500 tire, three-wheeled child size ATVs, the Bork-Shiley heart valve, hot water vaporizers and BB guns without mechanisms warning that the guns are loaded are all defectively designed products that have been forced off the market by product liability litigation and its consequences. *Id.* George Priest has argued that products are forced off the market more by uncertainties in the insurance market than by the excessively risky nature of the products. Priest, *Insurance Crisis*, *supra* note 296, at 1564-70. For a persuasive argument refuting Priest's assertion, see Croley & Hanson, *Liability Crisis*, *supra* note 296, at 12-111. Priest has conceded, however, that "the prospect of liability judgments affects design and production decisions of all manufacturers, foreign and domestic, that sell to U.S. consumers." George L. Priest, *Products Liability Law and the Accident Rate*, in *LIABILITY: PERSPECTIVES AND POLICY* 184, 184 (Robert E. Litan & Clifford W. Winston eds., 1988). Peter Huber has argued that technological and scientific advances, rather than product liability doctrine and litigation, have been the cause of greater product safety. See HUBER, *THE LEGAL REVOLUTION*, *supra* note 3, at 207. For a discussion refuting Huber's argument, see Prentice and Roszowski, *supra* note 259, at 275-85.

safety.<sup>301</sup>

Strict products liability litigation also inevitably impacts other aspects of the product design-manufacturing-marketing process. Negative publicity concerning allegedly dangerous products leads, even if indirectly, to safer products.<sup>302</sup> The fact that juries evaluate the profit-cost-safety tradeoffs embodied in the product's design, in hindsight,<sup>303</sup> causes manufacturers to "at least make calculations" to improve product safety.<sup>304</sup>

Although there is little "conclusive evidence . . . that a certain number of injuries and deaths from defective products have been averted by litigation . . . it seems reasonable . . . to assume that a measure of risk deterrence is directly attributable to the effect of product liability litigation."<sup>305</sup> Until dispositive data exists dis-

301. See, e.g., Lambert, *supra* note 162, at 49 (discussing redesign of hot water vaporizers, Drano and Liquid Plumer brand drain cleaners, and Remington Mohawk 500 rifle); Prentice & Roszkowski, *supra* note 259, at 280 (discussing redesign of tractor gas caps); Teret & Jacobs, *supra* note 296, at 18-19 (discussing redesign of rear seat belt in automobile). There is also persuasive evidence that product liability litigation has caused manufacturers to improve product use instructions and warning labels. Lambert, *supra* note 162, at 48, 52-53.

302. Prentice & Roszkowski, *supra* note 259, at 280-81. Negative publicity leads to safer products for several reasons: (1) it allows competitors to take advantage of a producer's safety problem; (2) it causes the producer seriously to consider remedying the problem; (3) it provides consumers with information concerning which products to avoid; (4) it causes an increase in the price of the defective product, which causes sales of such product to decline; and (5) it alerts government agencies to product risk information. *Id.*

303. See *Barker v. Lull Eng'g Co.*, 573 P.2d 443, 454 (Cal. 1978) ("[A] product may be found defective in design . . . if through hindsight the jury determines that the product's design embodies 'excessive preventable danger,' or, in other words, if the jury finds that the risk of danger inherent in the challenged design outweighs the benefits of such design.") (citation omitted).

304. *Phillips v. Kimwood Mach. Co.*, 525 P.2d 1033, 1041 (Or. 1974); see also Prentice & Roszkowski, *supra* note 259, at 277-79 (stating that because of Pinto fiasco at Ford, company has instituted much closer working relationship between safety engineers and in-house attorneys).

305. Seminar paper of Dawn Fink, third year student at Temple Law School (1992-1993) (on file with author). One must distinguish the conclusion that strict liability enhances product safety, on the one hand, from the conclusion—not being made here—that strict liability enhances product safety *efficiently*. The debates and comments discussing how efficiently aspects of tort compensation operate, and whether a reformed tort compensation system or other societal mechanism would operate more efficiently, are too extensive to explore in this Article. For a list of articles addressing this issue, see *supra* note 296. According to Richard Abel, "even a strict liability system with a one hundred percent claims rate (an empirical impossibility) remains seriously flawed." Abel, *Critique of Torts*, *supra* note 296, at 829; Richard J. Pierce, Jr., *Encouraging Safety: The Limits of Tort Law and Governmental Regulation*, 33 VAND. L. REV. 1281 (1980) (proposing new federal safety superagency with power to regulate product safety broadly); Sugarman, *supra* note 284, at 269-70 (advocating elimination of tort compensation system except for intentional torts, and replacing it with combination of compensation through social insurance and employee-benefit systems, and de-

proving the safety benefits of strict products liability, and/or until an effective, public, administrative mechanism supplants the common-law solution to product injuries, courts must give preference to prevention and regard compensation as the second best solution.

## 2. *Deterrence Through Process*

### a. Imputing Risk Knowledge

Courts can create greater deterrence in design defect cases in several ways. The most obvious is to impute knowledge of product risks to defendants.<sup>306</sup> Courts have in fact done this for many years, and continue to do so in many jurisdictions.<sup>307</sup> Some com-

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terrence exclusively through administrative agencies). *But see* David G. Owen, *Deterrence and Desert in Tort: A Comment*, 73 CAL. L. REV. 665, 675 (1985) ("Yet the day of such major social welfare changes [i.e., separating compensation, to be provided by a public welfare system, from deterrence, to be provided by the public regulatory sector] in our system is, I think, a long way off.").

306. *See* James A. Henderson, Jr., *Coping with the Time Dimension in Products Liability*, 69 CAL. L. REV. 919, 928-29 (1981) (stating that liability is strict to extent that knowledge of design hazards that are known at time of trial is imputed to manufacturer) [hereinafter Henderson, *Coping with the Time Dimension*]; Wade, *Strict Tort Liability*, *supra* note 284, at 834-35. The knowledge that is imputed to manufacturers is the knowledge of product danger revealed as of the time of trial. *Id.* at 834-35. This knowledge is imputed back either to the time of manufacture or the time when the product was first placed in the stream of commerce. *Id.* In either case, the imputation is said to create strict manufacturer liability because the manufacturer may be liable without fault, i.e., without actually knowing of the risk the product poses to consumers. *Id.* For a detailed discussion concerning the imputation of knowledge in various jurisdictions, see Wertheimer, *supra* note 3, at 1213-71 (arguing that knowledge of product risks must be imputed back to time of manufacture for strict product liability doctrine to remain truly strict).

307. *See, e.g.*, *Phillips v. Kimwood Mach. Co.*, 525 P.2d 1033, 1036 (Or. 1974). The *Phillips* court stated that:

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.

*Id.* (footnotes omitted). The traditional authority for imputing knowledge of the risk to the manufacturer is the scholarship of Deans Wade and Keeton, cited in the footnotes omitted from the above quote. *Id.* In light of the commentaries espoused by Deans Wade and Keeton, courts have continued to impute knowledge of design risks to manufacturers. *See, e.g.*, *Robertson v. General Tire and Rubber Co.*, 462 N.E.2d 706, 710 (Ill. App. Ct. 1984) (holding that trial court's instruction that defendant had to know of product's danger in strict liability design case was erroneous); *Nichols v. Union Underwear Co.*, 602 S.W.2d 429, 433 (Ky. 1980) ("[S]trict liability makes unnecessary proof by the plaintiff of what a prudent manufacturer exercising ordinary care actually should have discovered and foreseen as in a negligence action."); *Weber v. Fidelity & Casualty Ins. Co.*, 250 S.2d 754, 756 (La. 1971) (stating that when product is hazardous in



mentators, on the other hand, are opposed to the imputation of knowledge.<sup>308</sup> Even Dean Wade, to whom, along with Dean Kee-

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normal use, and therefore defective, "the plaintiff need not prove any particular negligence by the maker in its manufacture or processing; for the manufacturer is presumed to know of the vices in the things he makes, whether or not he has actual knowledge of them"); *Voss v. Black & Decker Mfg. Co.*, 450 N.E.2d 204, 207-08 (N.Y. 1983) ("[A] manufacturer is held liable regardless of his lack of actual knowledge of the condition of the product . . ."); *Peterson v. Safeway Steel Scaffolds Co.*, 400 N.W.2d 909, 912 (S.D. 1987) ("For purposes of the strict tort claims, but not for purposes of the negligence claim, knowledge of the potential risk is imputed to the manufacturer."). According to one court:

[I]n a strict liability analysis, the defendant is assumed to know of the dangerous propensity of the product . . . The question in strict liability design-defect and warning cases is whether, assuming that the manufacturer knew of the defect in the product, he acted in a reasonably prudent manner in marketing the product . . . [O]nce the defendant's knowledge of the defect is imputed, strict liability analysis becomes almost identical to negligence analysis . . .

*Feldman v. Lederle Lab.*, 479 A.2d 374, 385-86 (N.J. 1984). Similarly, another court stated:

[I]t is assumed that this hypothetical prudent supplier knows all the risks of the use of the product revealed at the trial . . . [T]his liability is not rested upon what he knew or should have known when the manufactured or sold the product; it rests on his placing into the stream of commerce a product which is demonstrated at trial to have been dangerous. The damaging event may not have been reasonably foreseeable at the time of manufacture or sale because the dangerous factor of the product might not then have been even reasonably knowable.

*General Motors Corp. v. Hopkins*, 548 S.W.2d 344, 347, 351 (Tex. 1977); *see also* *Kearl v. Lederle Labs.*, 218 Cal. Rptr. 453, 473 (Cal. Ct. App. 1985) (stating that "in strict liability actions . . . we focus not on the reasonableness of the defendant's conduct but on the product, and we . . . in effect impute to the manufacturer defendant current scientific knowledge of the risk caused by his product (as in a risk/benefit design defect balancing case)"); *Johnson v. Raybestos-Manhattan, Inc.*, 740 P.2d 548, 549-50 (Haw. 1987) (deciding issue of whether manufacturer knew of dangers inherent in allegedly defective product is irrelevant to issue of liability, and concluding that it is not necessary to adopt fiction that defendant is presumed to know of dangers); *Cryts v. Ford Motor Co.*, 571 S.W.2d 683, 688-90 (Mo. 1978) (holding that neither negligence, knowledge or fault of manufacturer are relevant when recovery is sought under strict liability); *Wilson v. Piper Aircraft Corp.*, 577 P.2d 1322, 1327 n.3 (Or. 1978) ("The jury [in a strict design defect case] is to be instructed in terms of what a reasonably prudent manufacturer would have done had he known of the harmful characteristics of the product."); *Wertheimer, supra* note 3, at 1249 (arguing that *Barker v. Lull Eng'g Co.*, decided by California Supreme Court in 1978, implicitly made manufacturer knowledge of product risks irrelevant in both design and warning cases). For a discussion of how some states have eliminated the imputation of knowledge, *see* *Wertheimer, supra* note 3, at 1206.

308. *See* *Henderson & Twerski, Proposed Revision, supra* note 3, at 1517. *Henderson* and *Twerski* admit that imposing liability for unforeseeable risks might foster greater safety investment. *Id.* They refuse to impute such knowledge, however, because of the difficulty—or impossibility—of insuring against unforeseeable and/or indeterminate risks and because of the manufacturer's right to be held to a liability standard it is "capable of meeting". *Id.* *See generally* *Henderson, Coping with the Time Dimension, supra* note 306, *passim* (arguing that courts should not impute knowledge of risk to manufacturer); *Wertheimer, supra*

ton, the idea of imputing the knowledge of product risk to manufacturers is credited, has apparently retreated from this position.<sup>309</sup>

In the design context, imputing knowledge of product risks to manufacturers comports with reality. Manufacturers almost always know, or easily could know, of design risks.<sup>310</sup> By taking advantage of general consumer unawareness of these product hazards,<sup>311</sup> manufacturers are able to, and unfortunately do, “impose value choices on passive, unconsenting users, consumers, and bystanders.”<sup>312</sup> If in design cases manufacturers do, or easily could, have knowledge of product risks, it might seem redundant for courts to impute such knowledge. Regardless of manufacturer knowledge, however, there are basic and fundamental deterrence reasons for imputing knowledge to manufacturers.<sup>313</sup>

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note 3, at 1206 n.76 (stating that “the vast majority of commentators now oppose imputing knowledge of unknowable dangers”).

309. John W. Wade, *On the Effect in Product Liability of Knowledge Unavailable Prior to Marketing*, 58 N.Y.U. L. REV. 734, 764 (1983) (“Indeed, I would now be inclined to think that there is no longer any particular value in using the assumed-knowledge language.”). For a further discussion concerning the Wade-Keeton views on the relevance of a manufacturer’s knowledge of product hazards, see Wertheimer, *supra* note 3, at 1196-97 n.46.

310. For a discussion concerning manufacturers’ access to information about product risks, see *supra* notes 256-60 and accompanying text.

311. For further discussion concerning how manufacturers take advantage of consumer ignorance of product design hazards, see *supra* notes 256-60 and accompanying text.

312. Henderson, *Coping with the Time Dimension*, *supra* note 306, at 965. Professor Henderson states that if product manufacturers are dominant and powerful, and consumers are passive and uninformed, then various forms of strict products liability, including imputation of knowledge of risk to manufacturers, are appropriate—at least on fairness grounds. *Id.* Henderson concedes that consumers are “frequently misinformed as to the risks and benefits.” *Id.* at 953 n.138. He insists, however, that consumers are the only ones who know what they want, and that when they are well-informed they make efficient decisions about their consumption. *Id.* Henderson apparently believes that the knowledge/power discrepancy between manufacturers and consumers is not significant, and that manufacturers are merely the “conduits through which the value choices of users and consumers find expression.” *Id.* at 965. For a discussion concerning the nature of corporate decision-making and its affect on product safety, see *supra* notes 167-252 and accompanying text.

313. See Wertheimer, *supra* note 3, at 1193 (arguing that imputing knowledge may serve goals of simplifying litigation process, encouraging product safety and increasing cost-spreading and fairness). This author contends that the *deterrence goal* is the most important strict liability policy served by imputing knowledge. Of course, imputing knowledge serves additional products liability goals as well. Specifically, imputing knowledge eases the plaintiff’s burden and simplifies the overall litigation process. See Wertheimer, *supra* note 3, at 1193 (noting that imputing knowledge relieves plaintiff of burden of proving that manufacturer was negligent in failing to discover danger and that danger was knowable or discoverable).

In the typical case, where a manufacturer knows, or easily could know, of the design risks in its product, imputing knowledge of such risks eases a plaintiff's burden of proof.<sup>314</sup> In such cases, imputing knowledge creates certainty and predictability that the manufacturer will not be able to avoid responsibility merely because, for example, the plaintiff may have difficulty proving the manufacturer's knowledge. Moreover, in such cases, the manufacturer will have greater incentive to, and less excuse not to, make safety calculations.<sup>315</sup>

In the unusual case, where the manufacturer does not know of a product's design risks,<sup>316</sup> imputing knowledge of the risk to the manufacturer creates an incentive to seek out such risks.<sup>317</sup> The failure to impute knowledge of product risks in design cases can create disincentives for product safety that increase product risks and user injuries. In *Heritage v. Pioneer Brokerage & Sales, Inc.*,<sup>318</sup> the defendant admitted that it knew of the presence of formaldehyde in its mobile homes.<sup>319</sup> The defendant also knew of the general risks associated with formaldehyde.<sup>320</sup> Nonetheless, the Alaska Supreme Court refused to impute knowledge of the risk of the particular kind of lung disease that the plaintiff's wife had contracted.<sup>321</sup>

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314. For a detailed discussion concerning manufacturer knowledge of design risks, see *supra* notes 41-58 and accompanying text.

315. See *Phillips v. Kimwood Mach. Co.*, 525 P.2d 1033, 1040-41 (Or. 1974) (stating that imposing liability in design defect case will cause manufacturer to at least make safety calculations and take greater care in designing safer products).

316. See, e.g., *Heritage v. Pioneer Brokerage & Sales, Inc.*, 604 P.2d 1059, 1063 (Alaska 1979). In *Heritage*, the manufacturer admitted that it was aware that its mobile homes contained dangerous formaldehyde fumes. *Id.* at 1061 n.4. There was evidence, however, that the manufacturer could not have known of the particular risk of lung damage created by the insulating material. *Id.* An expert witness testified for the defense that "exposure to the concentrations of formaldehyde which were measured in [plaintiffs'] mobile home for the length of time that [plaintiffs] resided there are not known scientifically to cause permanent deep lung damage of the type suffered by [wife/plaintiff]." *Id.*

317. Courts ought to create incentives for manufacturers to conduct extensive research on, for example, the materials they incorporate into their products. Where there is any question of the toxicity of a material, such as insulating material, manufacturers ought to have incentives to calculate the costs of utilizing a less risky substitute. This is true even where available scientific information does not indicate that a particular risk is extreme, as was apparently the case in *Heritage*. *Id.* at 1063.

318. 604 P.2d 1059, 1063 (Alaska 1979).

319. *Id.*

320. *Id.*

321. *Id.* Over plaintiffs' objection, an expert testified that the specific concentration of formaldehyde in plaintiffs' mobile home was "not known scientifi-

The court's failure to impute knowledge in a design case may cause manufacturers to ignore rather than to act on general risk information similar to that possessed by the manufacturer in *Heritage*.<sup>322</sup> In *Heritage*, the court's decision failed to create any incentive for the manufacturer to discontinue use of the materials that emitted the formaldehyde that damaged the lungs of the plaintiff's wife; it also failed to create any general incentive for manufacturers to become knowledgeable about the toxicity of materials and to consider substituting alternative, safer materials.<sup>323</sup>

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cally to cause permanent deep lung damage of the type suffered by [plaintiff wife]." *Id.*

322. The manufacturer's awareness of risk in *Heritage* is perhaps similar to that of asbestos manufacturers during the period from 1930 to the early 1960s. See *Borel v. Fibreboard Paper Prods. Corp.*, 493 F.2d 1076, 1092 (5th Cir. 1973) (noting that defendant claimed it did not fail to warn plaintiff of possible danger involved in asbestos inhalation because this danger was not foreseeable until around 1968, and plaintiff had been exposed in late 1930s); *Beshada v. Johns-Manville Prod. Corp.*, 447 A.2d 539, 542-543 (N.J. 1982) (explaining that defendants claimed that until 1960s they believed danger from asbestos was limited to workers in asbestos textile mills). The asbestos manufacturers claimed that they could not have known of the risks to workers who used asbestos products, in contrast to the risks to workers in the asbestos industry who were constantly exposed to pure asbestos while on the job. The asbestos manufacturers took the position that the state of scientific and medical knowledge precluded knowing about the risks to the former, although they knew about risks to asbestos industry workers as early as the 1930s and 1940s. *Borel*, 493 F.2d at 1092 ("[T]here is ample evidence in the record that the danger of inhaling asbestos . . . was widely recognized at least as early as the 1930's."). The New Jersey Supreme Court refused to accept the manufacturers' argument, and refused to allow evidence of scientific unknowability for any reason; thus, the court seemingly imputed knowledge of an unknowable risk to defendants. See *Beshada*, 447 A.2d at 542 ("There is substantial factual dispute about what defendants knew and when they knew it. A trial judge in the Eastern District of Texas, the forum for numerous asbestos-related cases, has concluded that '[k]nowledge of the danger can be attributed to the industry as early as the mid-1930's . . . .'); *Feldman v. Lederle Labs.*, 479 A.2d 374, 388 (N.J. 1984). The *Feldman* court stated that:

We note, in passing, that, although not argued and determined in *Beshada*, there were or may have been data and other information generally available, aside from scientific knowledge, that arguably could have alerted the manufacturer at an early state in the distribution of its product to the dangers associated with its use.

*Id.* From a deterrence perspective, the New Jersey court was effectively saying that the manufacturers had enough information—even if not definitive information about the particular risk in question—to be required to pursue more studies and testing, and to share their own data. *Id.* Through these processes, the manufacturer almost certainly would have obtained particular risk information, beyond the general risk information they already had, enabling them to provide a product warning. *Id.* For a spirited and persuasive defense of *Beshada* based on the premise that the defendant manufacturers could not have known of the risks, and were therefore required to do the impossible, i.e., warn about risks they could not know, see Wertheimer, *supra* note 3, at 1213-27.

323. *Heritage*, 604 P.2d at 1063.

The unusual cases, in which the manufacturer does not know of a particular product risk, tend to involve chemical or toxic substances, or pharmaceutical drug products.<sup>324</sup> A majority of such cases are raised as failure to warn claims.<sup>325</sup> Several courts in these failure to warn cases have refused to impute knowledge of the product's risk to the manufacturer, and have instead admitted evidence of scientific and technological unknowability of the risk at issue.<sup>326</sup> In *Heritage*, the Alaska Supreme Court effectively treated the plaintiff's claim the same as those courts who have eliminated the imputation of knowledge in failure to warn cases.<sup>327</sup>

While courts do impute knowledge of risk to manufacturers in design defect cases,<sup>328</sup> several courts have suggested that such

324. See, e.g., *id.*; see also Owen, *Moral Foundations*, *supra* note 17, at 462-68 (discussing how moral quality of manufacturers' choices depends on knowledge of danger held by manufacturer and consumer); Wertheimer, *supra* note 3, at 1195 n.41 (discussing hindsight and rarity of unknowable product dangers at time of manufacture).

325. Because a majority of cases involving a manufacturer that does not know of particular product risks are brought as failure to warn claims, it was somewhat unusual for a case like *Heritage* to be based on a claim of manufacturing or design defect. For a discussion of *Heritage*, see *supra* notes 318-23 and *infra* notes 327, 334-39.

326. See *Anderson v. Owens-Corning Fiberglass Corp.*, 810 P.2d 549, 550 (Cal. 1991) (concluding that state-of-the-art evidence is admissible in failure to warn context because exclusion of such evidence would make manufacturer "virtual insurer of product's safe use," which is not consonant with strict liability policies); *Feldman v. Lederle Labs.*, 479 A.2d 374, 386 (N.J. 1984) (noting that in failure to warn context manufacturer's conduct should be measured by "scientific, technological and other information available when the product was distributed"). For a more detailed discussion concerning the imputation of knowledge in the failure to warn context, see Wertheimer, *supra* note 3, at 1212-71 (arguing that refusal to impute knowledge in failure to warn context abolishes strict products liability and improperly imposes loss on consumer rather than manufacturer thereby violating basic tenet of strict products liability).

327. *Heritage*, 604 P.2d at 1062. In *Heritage*, the plaintiffs' complaint failed to clearly distinguish between manufacturing defect and design defect, but in any event never implied that the claim was based on failure to warn. *Id.* The plaintiffs' claim, set forth in their appellate brief, was based on a manufacturing defect only, although, as the supreme court noted, the jury instructions required the jury to decide whether there was either a design or a manufacturing defect. *Id.* The court thus viewed the claim as one based on both design and manufacturing defect. For further discussion concerning manufacturer awareness of product risks, see *supra* notes 322, 324 and accompanying text.

328. Courts impute knowledge of risks in design defect cases because manufacturers actually know of these risks. This prevents a non-issue from becoming an issue in the heat of litigation. For a detailed discussion concerning manufacturer knowledge of design risk, see *supra* notes 41-58 and accompanying text. In addition, imputing knowledge of design risks promotes other goals of strict liability, especially that of deterrence. For further discussion concerning the goals of strict product liability, see *supra* notes 292-305 and accompanying text.

imputation may not be appropriate in failure to warn claims.<sup>329</sup> Although design defects and manufacturing defects may be evaluated by reference to the product itself, warning defects can be evaluated only by reference to an alleged defect extraneous to the risk inherent in the product itself.<sup>330</sup> Thus, there is some basis for regarding warning claims as the equivalent of negligence cases.<sup>331</sup> Another way of making the distinction between design defect and warning claims is to view the so-called state-of-the-art in design cases as the scientific or technological knowledge that manufacturers usually have, or could have, and by which they could create a safer alternative design;<sup>332</sup> in warning cases, because there is usually no possibility to design the product more safely, the only state-of-the-art evidence is the manufacturer's

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329. See *Feldman*, 479 A.2d at 386. In *Feldman*, the court upheld the New Jersey rule that assumes that manufacturers, in both design and warning cases, know of the product risk. *Id.* Thereafter, however, the court stated that it would allow evidence of scientific and technological feasibility, apparently without reference to the manufacturer's knowledge of product risks. *Id.* The court then created an exception for warning cases: a manufacturer is only liable if it knew, or should have known, of the risk at the time of distribution based on scientific and technological information then available. *Id.*; see also *Anderson*, 810 P.2d at 550, 553. The issue presented in *Anderson* was whether a manufacturer in a failure to warn case may present evidence that a particular risk was unknown and unknowable, based on scientific knowledge available at the time of manufacture/distribution. *Id.* at 550. The court ultimately stated that excluding such evidence, "when the basis of liability is failure to warn, would make a manufacturer the virtual insurer of its product's safe use, a result that is not consonant with established principles underlying strict liability." *Id.* The *Anderson* court expressly refused to decide whether such evidence is admissible in design defect cases pursued under the California rule announced in *Barker v. Lull Eng'g Co.*, 573 P.2d 243 (Cal. 1973), and applied either a consumer expectations test or the risk/benefit analysis. *Id.* at 551 n.2.

330. *Anderson*, 810 P.2d at 558 (noting that "while manufacturing or design defect[s] can be evaluated without reference to the conduct of the manufacturer, the giving of a warning cannot") (citations omitted); *Feldman*, 479 A.2d at 386 (limiting manufacturer duty in warning cases by comment j, *Restatement (Second) of Torts*, which requires warnings only if manufacturer knew, or should have known, of product risks).

331. *Feldman*, 479 A.2d at 386 ("Under this standard negligence and strict liability in warning cases may be deemed to be functional equivalents."); *Carter v. Johns-Manville Sales Corp.*, 557 F. Supp 1317, 1319 (E.D. Tex. 1983) (stating that to require that danger be reasonably foreseeable so that prudent manufacturer would not have marketed product with knowledge of such danger "is to render the test for whether a product is defective and unreasonably dangerous due to lack of adequate warning indistinguishable from a negligence test").

332. In design cases, courts can impute knowledge of a product's risk and then, without reference to the manufacturer's knowledge, allow evidence of state-of-the-art, i.e., whether scientific and technological knowledge would allow a safer redesign of the product, relative to the risk-benefit factors. For discussion concerning how the risk-benefit analysis is used to determine the optimum level of safety for products, see *supra* note 275.

knowledge of the product's risk.<sup>333</sup>

*Heritage* not only undermined the important deterrent effects of strict products liability in design defect cases, but also effectively eliminated strict liability altogether.<sup>334</sup> The court apparently confused what the manufacturer did not know about the particular risk, on the one hand, with the manufacturer's scientific and technological ability to eliminate the known risk by creating a safer design, i.e., the ability to use an insulating product that does not contain formaldehyde, on the other.<sup>335</sup>

Therefore, the *Heritage* court's conclusion that failure to allow evidence of the manufacturer's lack of knowledge concerning the *specific* risk "would effectively mean absolute liability" is erroneous for two reasons.<sup>336</sup> First, the manufacturer admitted that it knew of the general risk associated with formaldehyde products, and had the wherewithal to substitute a non-formaldehyde insulating product.<sup>337</sup> Second, under the risk-benefit balancing test for design defect, the liability is strict because liability is imposed if a product's risks—whether known or not at the time of manufacturer—outweigh the product's benefits.<sup>338</sup> Thus, the liability is not absolute even if the manufacturer does not know of the risks because liability attaches only after the product is determined, on balance, to be defective.<sup>339</sup>

333. *Johnson v. Raybestos-Manhattan, Inc.*, 740 P.2d 548, 549 n.1 (Haw. 1987) (stating that "state-of-the-art" refers to ability to discover products' dangers when it is marketed due to scientific or technological knowledge available at that time); *Feldman*, 479 A.2d at 386 ("[T]he state of the art refers not only to the common practice and standards in the industry but also to the other design alternatives within practical and technological limits at the time of distribution.") (citing *Suter v. San Angelo Foundry & Machine Co.*, 405 A.2d 140 (N.J. 1981)). In *Heritage*, although the court analyzed the design defect claim as if it were a warning claim, the circumstances were more like those of the typical design claim. *Heritage v. Pioneer Brokerage & Sales, Inc.*, 604 P.2d 1059, 1063 (Alaska 1979). In fact, the manufacturer could have redesigned the mobile home using materials that did not emit any formaldehyde. *Id.*

334. For a discussion of the *Heritage* decision, see *supra* notes 318-23 and accompanying text.

335. *Heritage*, 604 P.2d at 1063-64 ("Thus, we think that 'scientific knowability' of the injurious nature of the product should be considered because, otherwise, imposition of liability for a design defect would effectively mean absolute liability, even though there is no alternative way for the manufacturer to discover the risk and remedy it.").

336. *Id.* at 1063.

337. *Id.* at 1061 n.4.

338. For a brief discussion of the imputation of knowledge, see *supra* note 326 and accompanying text.

339. In effect, *Heritage* ignores the negligence-like balancing that occurs when courts subject design defects to the risk-benefit analysis. Risk-benefit balancing under *Barker v. Lull Eng'g Co.*, the test adopted by the Alaska court, occurs

## b. Limiting State-of-the-Art

Courts can create additional safety incentives in design cases, without unfairly burdening manufacturers, by limiting use of so-called state-of-the-art evidence in two ways.<sup>340</sup> First, courts can disallow evidence of mere industry custom. Second, courts can limit the application of evidence respecting a practicable, safer, alternative design to the relevant risk-benefit factors such that this evidence would be neither a defense per se for the manufacturer nor an element per se of plaintiff's prima facie case.<sup>341</sup>

With respect to whether there is a practicable, safer, alternative design, courts can create significant deterrence by distinguishing mere industry custom evidence from evidence of

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in hindsight. *Heritage*, 604 P.2d at 1063. The factors to be balanced include, among others, the magnitude of the risk, the likely incidence of the risk, mechanical and financial feasibility of a safer alternative, and the alternative design's impact on the product and on users. See *Barker v. Lull Eng'g Co.*, 573 P.2d 443, 455-57 (Cal. 1978). Although liability may be imposed without fault—e.g., when a manufacturer knowingly places a dangerous product into the stream of commerce—the liability is not absolute because it is created only when the product is found to be more dangerous than is reasonable under the circumstances, given its inherent risks and benefits. This standard is certainly closer to a reasonableness standard, on the liability spectrum, than to absolute liability. Many courts, including the *Heritage* court, have voiced concern over absolute liability, but this author is aware of no decision that actually imposes an absolute liability standard. Nor is it clear that the jury in *Heritage* would have found the product defective even had knowledge of the risk been imputed to the manufacturer. Given the dispute over whether the particular risk to plaintiff was foreseeable, the jury could have attributed substantial weight to the testimony that suggested a small likelihood of injury and found the mobile home to be, on balance, safe. See *Heritage*, 604 P.2d at 1063.

340. Henderson & Twerski, *Proposed Revision*, *supra* note 3, at 1517. The assertion that a "manufacturer's right to be held to a liability standard which it is capable of meeting," implies that there are significant product risks that manufacturers cannot know and eliminate. *Id.* At least in the design context, this assertion is not valid. For a discussion concerning why this assertion is not valid, see *supra* notes 237-42 and accompanying text. Furthermore, because consumers have rights as extensive and important as those of manufacturers, should not those of consumers sometimes take precedence? For example, where consumer and manufacturer rights conflict and, in the exceptional case, where the manufacturer has no knowledge of the risks, who should prevail? Arguably, the consumer should prevail. After all, even in the exceptional case in which manufacturers are unaware of a product's risk, consumers are also completely unaware. Considering that most products are fungible so that consumers could choose a safer one if they were aware of risks inherent in a particular brand, only the manufacturer benefits from sales that injure some consumers. Thus, in this context, fairness seems to point in the direction of protecting consumers, not manufacturers.

341. For a discussion proposing that courts shift the burden to manufacturers to prove, by evidence relevant to the risk-benefit factors, that the product is on balance safe, see *infra* notes 392-467.



scientific and technological feasibility.<sup>342</sup> The failure to do so can create major disincentives for manufacturers to seek out safer designs. *Boatland of Houston, Inc. v. Bailey*<sup>343</sup> is a prime example of this error.<sup>344</sup> In *Boatland*, the plaintiffs' decedent was thrown out of his fishing boat when the boat collided with a submerged object.<sup>345</sup> Thereafter, the plaintiffs' decedent was killed by the propeller when the boat circled back toward him.<sup>346</sup> The plaintiffs alleged, inter alia, that the boat was defective because it failed to automatically turn off when the plaintiffs' decedent was thrown from the boat.<sup>347</sup> A central issue at trial, in the intermediate appellate court and in the supreme court, was whether evidence of commercial unavailability of an automatic shut-off switch was admissible in a strict liability design case.<sup>348</sup> The trial court allowed the evidence, and the jury found that the boat was not defectively designed.<sup>349</sup> The appellate court reversed based on this issue and the supreme court reversed the appellate court based on the same issue.<sup>350</sup>

In a narrow evidentiary sense, the *Boatland* court was correct in asserting that the evidence of commercial unavailability was relevant to determining the feasibility of installing a safety switch on the boat.<sup>351</sup> If, at the time the boat in question was constructed, all manufacturers failed to incorporate such a safety switch into their boats, that industry-wide custom would have some, however slight, probative value of the infeasibility of doing so.<sup>352</sup> The weak relevance of this evidence is underscored, how-

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342. A majority of jurisdictions have allowed evidence of industry custom relevant to determinations of defect under a risk-benefit analysis. David A. Urban, *Custom's Proper Role in Strict Products Liability Actions Based on Design Defect*, 38 UCLA L. REV. 439, 442 (1990). These jurisdictions, however, have not made such decisions with adequate regard for the role of deterrence in strict products liability.

343. 609 S.W.2d 743 (Tex. 1980).

344. *Id.* at 748 (discussing distinction between industry "custom" and "state of the art").

345. *Id.* at 745.

346. *Id.* at 745. The facts of the case were unclear as to whether the propeller struck the plaintiff's decedent when he was first thrown out of the boat or after the boat circled back towards him. *Id.*

347. *Id.* The plaintiffs also alleged that the seating arrangement was inadequate and that the steering and throttle designs were unsafe. *Id.*

348. *Id.* at 745-48.

349. *Id.* at 745.

350. *Id.*

351. *Id.* at 748-49.

352. The automobile industry epitomizes industry-wide practices of withholding safety equipment from products without a valid financial or technological reason. *See, e.g., Horn v. General Motors Corp.*, 551 P.2d 398, 401-02 (Cal.

ever, by the undisputed evidence that racing boats had such devices for over thirty years,<sup>353</sup> and by the lack of evidence that the device would have been expensive or technologically difficult.<sup>354</sup>

Even given its relevance, however, the prejudicial effect created by evidence of industry custom subverts any serious incentives for manufacturers to apply existing technology for optimum design safety. Although the defendant in *Boatland* was actually the retailer of the boat, the manufacturer testified on its behalf.<sup>355</sup> The manufacturer's testimony echoed that of several other witnesses: no safety switch was commercially available at the time this boat was manufactured, and it first became aware of such devices a year or two after the date of manufacture.<sup>356</sup>

Despite the fact that technology for the safety switch was available,<sup>357</sup> that need for such devices was well-known in the boating world,<sup>358</sup> and that the defendant offered no evidence of infeasibility—such as inadequate time for application and implementation or inordinate cost or impairment of the boat's usefulness—<sup>359</sup>the court effectively allowed the defendant manufacturer to argue that it had no duty to incorporate a feasible safety device into its product merely because such a device was not available "off the shelf" in the commercial market.<sup>360</sup> Evidence was presented that an independent inventor, rather than a boat manufacturer, obtained the first patent for a safety switch that he began

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1976) (raising defense of industry practice when cheap screw would have corrected defect in horn ring); *Bexiga v. Havir Mfg. Corp.*, 290 A.2d 281, 285-86 (N.J. 1972) (holding that evidence showing entire power press industry sold products without safety guards was no defense, and jury could find that manufacturer failed to incorporate adequate safety into its own presses).

353. *Boatland of Houston, Inc.*, 609 S.W.2d at 747.

354. *Id.* at 746-48. In addition, homemade crash throttles, serving the same purpose as safety switches, had been in use for a long time prior to the death of plaintiff's decedent. *Id.* at 747.

355. *Id.* at 746-47.

356. *Id.* at 747.

357. The safety switches on racing boats and homemade crash throttles on other boats had both been around for many years before the boat in question was built. *Id.*

358. *Id.*

359. *Id.* at 748-49.

360. The plaintiff in *Boatland* failed to offer any evidence that similar boats actually utilized the safety switch, and therefore implied that the industry custom was to manufacture similar boats without such safety devices. Allowing the evidence of industry custom, of course, is not equivalent to allowing a per se defense based on industry custom. For a discussion of why allowing evidence of industry custom is not equivalent to allowing a per se defense based on industry custom, see *infra* notes 369-91 and accompanying text discussing limitations of state-of-the-art evidence.

to manufacture for commercial availability approximately one year after the boat in question was built.<sup>361</sup> Given the background of available technology and general awareness of the risk,<sup>362</sup> any manufacturer with minimal incentive to eliminate the risk could have engineered a safety switch that most likely would have prevented the death of plaintiffs' decedent.

*Appel v. Standex International Corp.*<sup>363</sup> provides another illustration of how courts have undermined deterrence by applying a mechanical state-of-the-art defense. In *Appel*, the plaintiff—a nurse—injured her back while turning a patient in a hospital bed containing wheel brakes that failed to hold in the locked position.<sup>364</sup> The plaintiff's evidence consisted, in part, of two videotaped reenactments of the incident: one depicting the type of wheel brakes utilized on the bed when she was injured, and one depicting differently designed brakes.<sup>365</sup> Because the plaintiff could not produce evidence that the substitute brakes were commercially available when the bed was manufactured, the evidence was ruled inadmissible.<sup>366</sup> Despite evidence that the alternative brake design was technically feasible at all relevant times,<sup>367</sup> the court held that a jury could not find that the alternative brakes were practicable without evidence of commercial availability.<sup>368</sup>

The *Appel* court, like the *Boatland* court, gave substantial weight to the fact that the manufacturer chose to rely on a compo-

361. *Boatland of Houston, Inc.*, 609 S.W.2d at 746-47. The inventor of the safety switch, who began developing the idea two years earlier, kept it to himself until he obtained the patent. *Id.*

362. For a discussion of the background of available technology and general manufacturer awareness of the risk in *Boatland*, see *supra* notes 343-60 and accompanying text.

363. 660 P.2d 686 (Or. Ct. App. 1982).

364. *Id.* at 687.

365. *Id.*

366. *Id.* at 687-88.

367. *Id.* at 688. Plaintiff's expert testified that the scientific principles involved in the alternative brake design were known when the bed was manufactured. *Id.* This evidence apparently was not contradicted by defendant.

368. *Id.* According to the *Appel* court:

There was no evidence that the alternative design was practicable in the sense that wheel brakes of that design were commercially available when the bed was manufactured.

....

... Use of the alternative safer design cannot be said to be 'practicable' if the defendant is not in the business of manufacturing the component part, and if a part incorporating the allegedly safer design is not available for purchase.

*Id.*

nent part manufacturer for the allegedly defective part.<sup>369</sup> This implies that manufacturers can consciously limit their liability by manufacturing fewer components themselves, and instead buying more component parts from independent third parties.<sup>370</sup> It is hard to believe that courts allow such a delegation of responsibility when manufacturers of a finished/final product are generally liable for defects in parts supplied by component parts manufacturers.<sup>371</sup>

When courts fail to create reasonable safety incentives by not reasonably limiting evidence of common industry practice, manufacturers will probably avoid seeking out, engineering and incorporating important safety devices into their products.<sup>372</sup> Allowing evidence of industry custom in these circumstances encourages juries to find that an industry's actions were reasonable despite clear evidence that the industry as a whole, or any given manufacturer, reasonably could have provided greater safety that would have prevented the plaintiff's injury.<sup>373</sup> This situation

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369. *Id.* ("Use of the alternative design cannot be said to be 'practicable' if the defendant is not in the business of manufacturing the component part . . ."). In *Boatland*, the court emphasized the evidence of commercial unavailability in the market of a switch that would have prevented the death of plaintiffs' decedent. *Boatland of Houston, Inc.*, 609 S.W.2d at 747-49. This seems to assume that the failure of a component parts supplier to make that product is an excuse for defendant's failure to correct the defect, a correction the evidence demonstrated could have been done with relative ease. *Id.* Not surprisingly, this approach allows a jury to render exactly the same erroneous conclusion at trial.

370. In *Boatland*, rather than incorporating a defective safety device as in *Appel*, neither the defendant retailer nor the non-defendant manufacturer had purchased a component part safety device from another manufacturer because such devices were commercially unavailable. *Boatland of Houston, Inc.*, 609 S.W.2d at 746-48. Thus, the *Boatland* decision implies that a seller may rely on market failures, including those of component part manufacturers, to not seek out, develop or employ existing technology.

371. *See, e.g.*, *Lee v. Butcher Boy*, 215 Cal. Rptr. 195, 199 (Cal. Ct. App. 1985) ("We have found no case in which a component part manufacturer who had no role in designing the finished product and who supplied a non-defective component part, was held liable for the defective design of the finished product.").

372. *See Urban, supra* note 342, at 480. In an article on custom evidence in design defect cases, David Urban argues that evidence of industry custom serves several important purposes, while conceding that such evidence tends to undercut the deterrence goal of strict liability. *Id.* Urban also criticizes courts that do not allow evidence of industry custom in design cases for basing those rulings on the assumption that consumers know little or nothing about product safety features. *Id.* at 486. The reality is, however, that in the context of design defects, this assumption is valid. For a discussion of why this assumption is valid in the context of design defect, see *supra* notes 59-78 and accompanying text.

373. For a discussion of why allowing evidence of industry custom encourages juries to find that the actions of a manufacturer are reasonable, see *supra* notes 341-91.

comes perilously close to allowing an industry to set its own standards of liability.<sup>374</sup>

Courts can also create incentives for manufacturers to design safety into products by limiting the significance of state-of-the-art evidence in the risk-benefit balancing test.<sup>375</sup> State-of-the-art evidence is the basis upon which a jury effectively determines whether there is a safer alternative design that the defendant manufacturer ought to have incorporated into its product.<sup>376</sup> A few courts make state-of-the-art evidence, in the form of a safer, feasible, alternative design, a specific prerequisite to a determination of product defect.<sup>377</sup> In fact, one suggested revision of section 402A of the *Restatement (Second) of Torts* makes exactly the same proposal.<sup>378</sup> The better approach, however, is to regard ev-

374. See *Barker v. Lull Eng'g Co.*, 573 P.2d 443, 449 n.4 (Cal. 1978) (stating that trial court had instructed jury that "an industry cannot set its own standards").

375. State-of-the-art generally refers to the scientific and technological knowledge that is available to make a product safer. The technological "environment" surrounding a particular product includes not only scientific and technological knowledge, but also the economic feasibility and the practicalities of implementing a safer design. See, e.g., *Boatland of Houston, Inc.*, 609 S.W.2d at 748. This technological "environment" is incorporated into the risk-benefit analysis, under *Barker*, in the factors regarding "the mechanical feasibility of a safer alternative design, [and] the financial cost of an improved design." *Barker*, 573 P.2d at 455. Under Dean Wade's risk-benefit analysis, the technological "environment" is incorporated in the factors regarding "[t]he availability of a substitute product which would meet the same need and not be as unsafe . . . [and] [t]he manufacturer's ability to eliminate the unsafe character of the product without impairing its usefulness or making it too expensive to maintain its utility." Wade, *Strict Tort Liability*, *supra* note 284, at 837.

376. For a discussion concerning why manufacturers must eliminate product risks by incorporating safer design alternatives, see *supra* notes 253-91 and accompanying text.

377. See, e.g., *Wilson v. Piper Aircraft Corp.*, 579 P.2d 1287, 1287 (Or. 1978) ("In our original opinion in this products liability case we held that a prima facie case of design defect must include evidence which would permit a finding that a safer design would have been practicable."). Compare this statement with an earlier statement made by the *Wilson* court:

There might be cases in which the jury would be permitted to hold the defendant liable on account of a dangerous design feature even though no safer design was feasible (or there was no evidence of a safer practicable alternative). If, for example, the danger was relatively severe and the product had only limited utility, the court might properly conclude that the jury could find that a reasonable manufacturer would not have introduced such a product into the stream of commerce.

*Wilson v. Piper Aircraft Corp.*, 577 P.2d 1322, 1328 n.5 (Or. 1978).

378. Henderson & Twerski, *Proposed Revision*, *supra* note 3, at 1514 (proposing as black letter rule of § 402A that liability for design defects may be found "only if the foreseeable risks of harm presented by the product, when and as marketed, could have been reduced at reasonable cost by the seller's adoption of a safer design").

idence of safer, feasible, alternative design as information that a jury may consider—but to which a jury need not necessarily attribute much weight—in determining whether a product is defective.<sup>379</sup>

An obvious reason for not requiring evidence of a safer design as a prerequisite to liability is to create a kind of macro deterrence. When a product contains exceptional design dangers, courts have recognized that manufacturers ought to keep the product off the market if the product has limited utility and there is no safer alternative design that will minimize or eliminate such risks.<sup>380</sup> Manufacturers need not concern themselves unduly with this “sanction,” however, because it will occur infrequently at best. Two reasons support this assertion.<sup>381</sup> First, as has been demonstrated, manufacturers can make most defective designs safer with reasonable effort and cost—i.e., safer designs are usu-

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379. See, e.g., *Mitchell v. Fruehauf Corp.*, 568 F.2d 1139, 1143-44 (5th Cir. 1978) (rejecting defendant's argument that under Texas law proof of feasible alternative design is essential part of concept of unreasonably dangerous product); *Bernal v. Richard Wolf Medical Instruments Corp.*, 272 Cal. Rptr. 41, 44 (Cal. Ct. App. 1990) (noting that in California where burden of proving that design is risk-beneficially safe shifts to defendant, plaintiff has no burden to prove that reasonable alternative design was feasible); *Seward v. Griffin*, 452 N.E.2d 558, 571 (Ill. App. Ct. 1983). In *Seward*, the court stated that:

[T]he rule of law in Illinois is that evidence of alternative design feasibility is relevant and admissible in a design defect case, but it is not an essential element of such a case if the finder of fact can be persuaded in the absence of such evidence that the defect in design rendered the product unreasonably dangerous.

*Id.*; see also *Rahmig v. Mosley Mach. Co.*, 412 N.W.2d 56, 80-82 (Neb. 1987) (relying in part on *O'Brien v. Muskin Corp.*, 463 A.2d 298, 306 (N.J. 1983) for holding that plaintiff need not prove feasibility or reasonable alternative design); *O'Brien v. Muskin Corp.*, 463 A.2d 298, 306 (N.J. 1983) (“To establish sufficient proof to compel submission of the issue to the jury for appropriate fact-finding under risk-utility analysis it [is] not necessary for [a] plaintiff to prove the existence of alternative, safer designs.”).

380. *Wilson*, 577 P.2d at 1322 n.5; *Rahmig*, 412 N.W.2d at 80 (“[W]here danger from a product is relatively severe and the product has limited utility, a jury may find the manufacturer liable, although no safer design was feasible.”); *O'Brien*, 463 A.2d at 306. In *O'Brien*, the court stated that:

[O]ther products, including some for which no alternative exists, are so dangerous and of such little use that under the risk-utility analysis, a manufacturer would bear the cost of liability of harm to others. That cost might dissuade a manufacturer from placing the product on the market, even if the product has been made as safely as possible.

*Id.* But see N.J. STAT. ANN. § 2A:58C-3(a)(1) (West 1990) (conditioning liability on finding of “practical and technically feasible alternative design that would have prevented the harm without substantially impairing the reasonably anticipated or intended function of the product”).

381. N.J. STAT. ANN. § 2A:58C-3(b) (West 1990). For further discussion of this statute, see *supra* note 380.

ally quite feasible.<sup>382</sup> Second, some of the relatively few dangerous designs that cannot be made safe are not unreasonably dangerous.<sup>383</sup>

Even with respect to products that are not exceptionally dangerous, however, limiting state-of-the-art evidence serves important safety goals. Making state-of-the-art an “absolute” defense rather than mere evidence tending to prove the impossibility of creating a practicable, safer, alternative design effectively undercuts the imputation of knowledge and its inherent safety incentives.<sup>384</sup> Furthermore, establishing state-of-the-art as a defense undercuts incentives for safety even more than admitting evidence of mere industry custom evidence.<sup>385</sup> Admitting evidence of industry custom in the form of “commercial availability”<sup>386</sup> sometimes distorts the risk-benefit balancing by causing juries to attribute undue weight to how much safety was actually in the marketplace, rather than how much could have been available.<sup>387</sup> Merely admitting such evidence, however, does not preclude a

382. For a discussion concerning the ability of manufacturers to make most product designs safer, see *supra* notes 253-67 and accompanying text.

383. See *Bernal*, 272 Cal. Rptr. at 41. In *Bernal*, the jury found the surgical instrument not defective in design, but the appellate court reversed because of error in the jury instructions. *Id.* The court stated that the instrument was made of the best steel available but “had inherent dangers no human skill or knowledge has yet been able to eliminate.” *Id.* at 46. Thus, despite evidence of risk inherent in the design, the product was reasonably safe for its use and, but for the error in instructions, the court would have approved the verdict. *Id.*

384. For a discussion concerning why allowing state-of-the-art as an absolute defense undercuts the imputation of knowledge, see *supra* notes 322-39 and accompanying text.

385. For a discussion of why state-of-the-art evidence undercuts safety incentives more than evidence of industry custom, see *supra* notes 340-68 and accompanying text. Even the *Boatland* court—which, under the circumstances of that case, erroneously approved the admission of industry custom evidence in the form of “commercial availability”—recognized the importance of limiting state-of-the-art as mere evidence, and not allowing it to be raised as a defense. *Boatland of Houston, Inc. v. Bailey*, 609 S.W.2d 743, 749 n.3 (Tex. 1980) (“This opinion, insofar as it holds that certain evidence of the state of the art is admissible on the issue of defectiveness in product design cases, is not intended to suggest that such evidence constitutes a defense, such as do misuse and assumption of the risk . . .”). The most extreme view of state-of-the-art as a defense is taken by the American Insurance Association. It would make a defense of “any substantial body of actual practice, no matter what the dominant or preferred opinion.” Johnson, *supra* note 296, at 680 (quoting AMERICAN INSURANCE ASSOCIATION, PRODUCT LIABILITY LEGISLATIVE PACKAGE: STATUTES DESIGNED TO IMPROVE THE FAIRNESS AND ADMINISTRATION OF PRODUCT LIABILITY LAW 24 (Revised Draft, Mar. 1977)).

386. *Boatland of Houston, Inc.*, 609 S.W.2d at 748 (discussing availability of kill switch at time of manufacture of boat to establish feasibility of more safely designed boat).

387. For a discussion of how admission of industry custom in the form of

jury from attributing more weight to the product's risks and thereby finding the manufacturer liable. On the other hand, when state-of-the-art is a defense, a finding of "commercial availability" or some other distorted notion of state-of-the-art precludes risk-benefit balancing, thereby protecting both excessively dangerous products for which there is no alternative design and other dangerous products for which an alternative design was available upon reasonable effort.<sup>388</sup>

Additionally, where state-of-the-art is a defense and its application is heavily influenced by existing standards, whether industry, professional or governmental, such standards tend to be minimum standards only.<sup>389</sup> These standards frequently reflect industry influence and bias, and upon close scrutiny demonstrate that safety is commonly a secondary consideration.<sup>390</sup> Attributing such weight to suspect standards as the basis for a state-of-the-art defense encourages manufacturers to avoid seeking and utilizing safer design alternatives.<sup>391</sup>

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"commercial availability" distorts risk-benefit balancing, see *supra* notes 351-62, 372-74 and accompanying text.

388. For a discussion of why state-of-the-art as a defense protects manufacturers of dangerous products, see *infra* notes 384-85.

389. *Wilson v. Piper Aircraft Corp.*, 577 P.2d 1322, 1324-25, 1328 (Or. 1978) (noting that FAA standards are minimum standards). Although the *Wilson* court said that FAA approval of airplane design is not a defense to a design defect claim, it effectively said the opposite by making practicable, safer, alternative design a prerequisite to the plaintiff's claim. *Id.* at 1328. The court relied heavily on FAA approval of the design in determining that plaintiff's claim was insufficient: "it is proper to take into consideration, in determining whether plaintiffs have produced sufficient evidence of defect to go to the jury, the fact that the regulatory agency has approved the very design of which they complain after considering the dangers involved." *Id.* The court also was impressed that, at that time, 80-90% of all small planes used carburetor engines. *Id.* at 1327. But plaintiffs had introduced evidence that a fuel injected engine, unlike the approved carburetor engine in question, was far less subject to icing—the condition that caused the crash and resulting deaths. *Id.* The availability and additional safety of the alternative engine apparently were not disputed by defendant manufacturer. Despite this evidence, however, the court said that the plaintiffs' claim failed for lack of sufficient evidence of practicability, i.e., reasonable cost, reasonable maintenance and no detrimental impact on product performance and safety characteristics. *Id.* at 1328. The court could have preserved safety incentives without distorting the realities of knowledge and control of product safety, by shifting to the manufacturer the burden to prove that, on balance, the reasonable safety of the carburetor engine as compared to the fuel injected engine. For a detailed discussion concerning shifting the risk-benefit burden to manufacturers, see *infra* notes 392-467 and accompanying text.

390. For a discussion of the influence of industry standards, see Johnson, *supra* note 296, at 681-82 n.28.

391. In *Wilson v. Piper Aircraft Corp.*, undisputed evidence suggested that had manufacturers of small aircraft asked the FAA to approve the safer fuel injected



### c. Shifting the Risk-Benefit Burden

A final procedural device courts ought to utilize in encouraging greater product design safety is that of shifting the risk-benefit burden to defendants.<sup>392</sup> While it appears that there are several variations of the burden shift,<sup>393</sup> the most persuasive rationale for the shift is to place the burden on the party with the greatest information about product risks.<sup>394</sup> Although some courts have ar-

engine, it would have. *Wilson*, 577 P.2d at 1327. No evidence was offered to explain why the manufacturers had not requested FAA approval for the fuel injected engine. *Id.* at 1327-28. A logical inference is that courts had not given the industry incentives for this kind of airplane safety. As *Appel* and *Boatland* both demonstrate, distorted notions of "feasibility" allow manufacturers to avoid responsibility even in situations where the alternative was readily available to a manufacturer willing to actively seek design safety. *Appel v. Standex Int'l Corp.*, 660 P.2d 686, 688 (Or. Ct. App. 1983) (stating that alternative wheel brake could allegedly have been engineered); *Boatland of Houston, Inc. v. Bailey*, 609 S.W.2d 743, 747 (Tex. 1980) (stating that safety shut-off switch could have been easily engineered). The liability standards created by these distorted applications of state-of-the-art are equal to, or perhaps even weaker than, ordinary negligence. These cases demonstrate, in the guise of attempts at fairness to manufacturers, a new doctrine of strict products non-liability.

392. See, e.g., *Barker v. Lull Eng'g Co.*, 573 P.2d 443, 452 (Cal. 1978). In *Barker*, the court stated that:

[I]n design defect cases, a court may properly instruct a jury that a product is defective in design if . . . the plaintiff proves that the product's design proximately caused 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 the product.

*Id.*

393. In *Barker*, the shift is greater than in any of the other variations because the plaintiff's prima facie case consists merely of showing that some aspect of the product's design proximately caused plaintiff's injury. *Id.* at 453-56. The important omission from plaintiff's burden is the element of defect. *Accord Caterpillar Tractor Co. v. Beck*, 593 P.2d 871, 886 (Alaska 1979) (applying same jury instructions as *Barker*). Under the *O'Brien v. Muskin Corp.* approach, the plaintiff bears the burden of going forward with risk-benefit evidence from which the product may be found to be defective on balance, even without evidence of a feasible, safer, alternative design. 463 A.2d 298, 306 (N.J. 1983). The burden then shifts to the defendant to prove that the product is not defective by offering state-of-the-art evidence, not as a defense, but as a means of persuading the jury to give compliance with state-of-the-art such weight so as to re-shift the risk-benefit balance, i.e., by finding that the product is, on balance, safe. *Id.* at 305. In *Ontai v. Straub Clinic and Hospital, Inc.*, the court purported to follow *Barker* but then indicated that the plaintiff would have to prove that the product was "dangerously defective" as an element of its prima facie case before the burden would shift. 659 P.2d 734, 740 (Haw. 1983).

394. E.g., *Beck*, 593 P.2d at 886 (stating that "this allocation puts the burden of producing the relevant complex and technical evidence on the party who has the most access to and is the most familiar with such evidence"); *Barker*, 573 P.2d at 455 (stating that most evidence relevant to risk-benefit analysis is similar to "technical matters peculiarly within the knowledge of the manufacturer"). For further discussion concerning manufacturer knowledge of design risks, see *supra* notes 41-58 and accompanying text. Courts have made the argument, against the presumption of corporate control of information, that plaintiffs can

gued that modern discovery rules undercut this rationale for the shift,<sup>395</sup> such an argument appears weak when compared to even a sampling of scenarios in which corporations manipulated information against plaintiffs' interests.<sup>396</sup>

An ultimate goal of deterrence is to encourage corporations to seek out and employ safe designs, within reasonable limits, particularly when safety designs and devices are readily accessible.<sup>397</sup> If corporations had the burden of justifying their failures to pursue and apply readily accessible safety precautions, they would have greater incentives to make reasonable increases in product safety. Several cases discussed previously illustrate this point. In *Wilson*, where the plaintiff alleged that an airplane's car-

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obtain all the necessary risk-benefit facts "through liberalized modern discovery." *Prentis v. Yale Mfg. Co.*, 365 N.W.2d 176, 185 (Mich. 1984); *see also* *Foley v. Clark Equip. Co.*, 523 P.2d 379, 391 (Pa. Super. Ct. 1987) (stating that modern liberalized discovery is reason not to apply strict liability to design defect cases because plaintiff can obtain necessary facts about defendant's fault in design process).

395. *Foley*, 523 P.2d at 391 (stating that liberalized discovery undercuts rationale behind shifting burden).

396. That manufacturers are willing to manipulate their control of product defect information is evident from even a small sample of corporate activities designed to keep necessary information from plaintiffs.

For cases involving corporations that have withheld evidence from discovery, *see* *Rozier v. Ford*, 573 F.2d 1332, 1339-40 (5th Cir. 1978) (stating that defendant kept important cost-benefit documents from plaintiff); *West v. Johnson & Johnson Prods., Inc.*, 220 Cal. Rptr. 437, 462-64 (Cal. Ct. App. 1985) (involving manufacturer that allegedly withheld research books), *cert. denied*, 479 U.S. 824 (1986); *NADER & TAYLOR*, *supra* note 91, at 72 (stating that Chevrolet kept Corvair documents from discovery); *Westin*, *supra* note 230, at 119-21 (stating that Ford representatives lied under oath).

For cases involving corporations that have sanitized their files, *see* *Westin*, *supra* note 230, at 2, 3, 10, 83-84, 139, 151.

For cases involving corporations that have destroyed records, *see* *Palmer v. A.H. Robins Co.*, 684 P.2d 187 (Colo. 1984) (involving destruction of information concerning Dalkon Shield); *Tetuan v. A.H. Robins Co.*, 738 P.2d 1210 (Kan. 1987) (involving destruction of information concerning intrauterine device); *Johnson*, *supra* note 296, at 683 n.33 (stating that General Motors threw out customer complaints concerning Corvair); *NADER AND TAYLOR*, *supra* note 91, at 73-74 (stating that General Motors destroyed important air bag and motor mount information); *Stevenson*, *supra* note 226, at 717 (stating that General Motors destroyed incriminating records).

For cases involving corporations that have suppressed scientific studies, *see* *Alix M. Freedman & Laurie P. Cohen*, *Smoke and Mirrors: How Cigarette Makers Keep Question 'Open' Year after Year*, *WALL ST. J.*, Feb. 11, 1993, at A1, A6.

For cases involving corporations that have generally controlled information against future discovery, *see* *Pierce*, *supra* note 305, at 1295-96 (stating that plaintiffs could not obtain information to prove defectiveness of MERJ/29, but later obtained clear evidence of criminal activity that resulted in criminal charges to which defendant's agents pled *nolo contendere*).

397. For a discussion of two rare cases in which design risks could not have been eliminated by safety devices, *see* *supra* note 243.

buretor engine was defectively designed because it was susceptible to icing, there was undisputed evidence that a fuel injected engine was available that did not have the same dangerous susceptibility.<sup>398</sup> The *Wilson* court held that the plaintiff had failed to make a prima facie case of design defect because the plaintiff had offered no evidence of the alternative engine's impact on cost, economy of operation, maintenance, overall performance or general safety aspects.<sup>399</sup> This missing evidence, however, consisted of facts that would have been in the manufacturer's possession had it given reasonable consideration to using the safer engine. Imposing the burden of producing such information on the manufacturer would create greater incentives to obtain the information and, thus, there would be a greater incentive to "take some steps (or at least make calculations) to improve [its] product."<sup>400</sup>

Shifting the risk-benefit burden to manufacturers, however, is no guarantee that they will act reasonably to eliminate design risks. Even assuming that corporate managers have adequate and necessary information about inherent design risks, there are still factors in corporate structure and function that create incentives to minimize safety.<sup>401</sup> Managers that feel pressure to increase

398. *Wilson v. Piper Aircraft Corp.*, 577 P.2d 1322, 1327 (Or. 1978). For further discussion of the *Wilson* case, see *supra* notes 389 & 391 and accompanying text.

399. *Wilson*, 577 P.2d at 1327.

400. *Phillips v. Kimwood Mach. Co.*, 525 P.2d 1033, 1041 (Or. 1974). The burden shift includes not only the burden of producing evidence of risk-beneficial safety, but also ultimately of persuading the jury on that issue. See *Barker v. Lull Eng'g Co.*, 573 P.2d 443, 455 (Cal. 1978) (stating that "the defendant's burden is one affecting the burden of proof, rather than simply the burden of producing evidence"). *Boatland* and *Appel* illustrate equally well the unfortunate effects of judicial failure to create deterrence by shifting the burden. *Boatland of Houston, Inc. v. Bailey*, 609 S.W.2d 743 (Tex. 1980); *Appel v. Standex Int'l Corp.*, 660 P.2d 686 (Or. Ct. App. 1982). In *Boatland*, the court allowed the jury to focus on, and apparently give inappropriate weight to, the fact that although a safety device was available by minimal application of mechanical skill, no such device was actually "commercially available." *Boatland*, 609 S.W.2d at 746-48. If the manufacturer had the burden on the design defect issue, then it would have had to explain why it did not adapt either the racing boat device, available for more than 30 years, or the homemade "crash throttle" that had also been in use for a long time. *Id.* Having full awareness of its burden of production and persuasion, and given the accessibility of a safety device, the manufacturer probably would have recognized that it could not justify its failure to make the adaptation and to incorporate the device into its boats. In *Appel*, had the bed manufacturer known that it had the burden of proof, it easily could have seen the ready accessibility, despite a lack commercial availability, of an effective locking mechanism on the hospital bed's wheels. *Appel*, 660 P.2d at 688.

401. For a discussion of the lack of information available to managers due to the vertical organizational structure of corporations, see *supra* notes 232-42 and accompanying text.

short-term profits will have little incentive to increase current costs in order to achieve long-term liability cost savings.<sup>402</sup> In addition, future liability is discounted by managers who are aware of the likelihood of moving on to other employment, or who appreciate the time barriers to liability claims.<sup>403</sup> Moreover, managers who are aware that corporate law allows them to ignore the personal threat of tort liability claims sometimes believe that avoiding safety costs increases the corporation's competitiveness in relevant markets.<sup>404</sup>

Nonetheless, burden-shifting does create pressure to focus on design risks and their ensuing costs. If plaintiffs experience difficulty proving that a product is defectively designed,<sup>405</sup> it is at least as difficult to rebut the presumption of design defect created by the burden shift.<sup>406</sup> Offering evidence of risk-beneficial safety that persuades a jury is certainly more difficult than merely having to defend against a claim by chipping away at the plaintiff's proofs.<sup>407</sup> One would expect that if manufacturers were charged

402. Gillette & Krier, *supra* note 241, at 1040 ("Even managers who extend the time horizon by plotting the value of their remaining careers can be expected to discount, perhaps even disregard, risks with long latency periods."). Compare the observations made by Gillette and Krier with manufacturer ability to factor in safety early in the design process with reasonably small or no cost increases, as discussed in *supra* notes 167-206 and accompanying text.

403. Gillette & Krier, *supra* note 241, at 1040 ("The lag between cause and effect shelters managers from the consequences of their decisions: evidence disappears, or the managers do.").

404. Siliciano, *supra* note 73, at 1840-53 (discussing how producers who reduce accident costs to socially efficient level will prevail over rivals who spend too much or too little on product safety).

405. See James A. Henderson & Aaron D. Twerski, *Closing the American Products Liability Frontier: The Rejection of Liability without Defect*, 66 N.Y.U. L. REV. 1263, 1313 (1991) [hereinafter Henderson & Twerski, *Closing the Frontier*] ("Proving that a product is defectively designed . . . is not an easy task.").

406. Some commentators have suggested that corporate defense counsel believe that juries will not accept an arguably optimum cost-utility analysis as a defense to a design defect claim. Schwartz, *Pinto Case*, *supra* note 65, at 1038. In cases where that is true, of course, the manufacturer's burden is even more difficult. *Id.*

407. Manufacturers can defend against a claim in which a plaintiff has the risk-benefit burden without presenting any defect rebuttal evidence—i.e., evidence of risk-beneficial safety—at least theoretically, by defeating the plaintiff's proximate cause element or affirmatively proving the plaintiff's own causal responsibility. See *Barker v. Lull Eng'g Co.*, 573 P.2d 443, 448-49 (Cal. 1978). A defendant may also offer limited risk-benefit evidence, e.g., that an alternative design would have "adverse consequences to the product and to the consumer." *Id.* at 455. In *Barker*, the manufacturer's expert witness testified, inter alia, that seat belts on a high lift loader—the lack of which allegedly made the loader defective—"would have increased the danger of the loader by impairing the operator's ability to leave the vehicle quickly in case of an emergency." *Id.* at 448; see also *Lewis v. Coffing Hoist Div., Duff-Norton Co.*, 528 A.2d 590, 592 (Pa. 1987).

with the affirmative risk-benefit burden, they would make their cost-benefit analyses with more emphasis on risk elimination to preserve a more viable risk-benefit case. There are several aspects of the design process a manufacturer may utilize in order to satisfy itself that its safety trade-offs are reasonable.<sup>408</sup>

The shifted burden may well give manufacturers an enhanced incentive to conduct pre- and post-marketing tests and studies. While producers generally know—either from their expertise or from the choices they make during the design development process—that particular design configurations are risky, they may not know precisely, without tests or studies, either the magnitude of particular risks or the incidence with which those risks are likely to occur.<sup>409</sup> Knowing that they have the affirmative burden to prove risk-beneficial design, manufacturers have a greater incentive to become especially knowledgeable about the incidence and magnitude of design risks.<sup>410</sup>

Producers who fail to perform adequate pre-design or pre-marketing tests may become aware of the incidence and magni-

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In *Lewis*, the manufacturer's evidence in defense of an allegedly defective control box used to operate an overhead crane was limited to testimony by defendant's expert-employee that the alternative design suggested by plaintiff's expert "presented a greater risk of accidental activation than the defendant's." *Id.* The *Lewis* court barred defendant's only other risk-benefit evidence—evidence that the manufacturer of an alternatively designed control box also made a model identical to the defendant's design. *Id.*

Where the burden shifts to the manufacturer, with an effective presumption that the product is defective, and the plaintiff offers "defect" evidence in his or her case, the manufacturer begins its case in a one-down position. That is, the manufacturer has an affirmative burden and is forced to present its case by defending against plaintiff's affirmative evidence. The manufacturer's case is thus not only more difficult than the traditional case in which one chips away at the plaintiff's case, but is also more difficult than the plaintiff's case in which the burden has not shifted and the plaintiff's evidence is the first on the record.

408. See *Barker*, 573 P.2d at 456 (stating that manufacturer's burden is to "establish that because of the complexity of, and trade-offs implicit in, the design process, an injury-producing product should nevertheless not be found defective").

409. For discussion concerning a manufacturer's knowledge and choices regarding design risks, see *supra* notes 41-58 and accompanying text.

410. The incidence and magnitude of a particular risk are two of the specifically enumerated risk-benefit factors. *Barker*, 573 P.2d at 455 (listing several of such factors including "the gravity of the danger posed by the challenged design, [and] the likelihood that such danger would occur"). Although juries may be skeptical of risk-benefit trade-offs where the risks have a high magnitude, one would expect them to be more accepting of a lower incidence of injury, especially where the costs of eliminating the risk are relatively great. For a discussion of jury skepticism concerning risk-benefit trade-offs, see Schwartz, *Pinto Case*, *supra* note 65.

tude of design risks from product accidents.<sup>411</sup> Given their affirmative burden to prove risk-beneficial safety, manufacturers can be expected to have the same enhanced incentive to acquire the same particularized and complete incidence and magnitude of risk information that they would have had from pre-marketing tests. One way to acquire this information is to conduct post-accident tests, which may either support their affirmative case for risk-beneficial design or at least tell them definitively how to redesign the allegedly defective product.

Shifting the risk-utility burden may also create incentives for better corporate communication.<sup>412</sup> If shifting the burden creates an incentive for corporate managers to give more consideration to eliminating design risks, a likely by-product of this incentive is a need for better internal corporate communication. High-level managers will presumably have more reason to hear the safety "bad news," and they will understand that preserving those records and sharing their information will serve the corporate interest better than destroying such records.<sup>413</sup> Moreover, by documenting the risk-utility trade-offs in the design process, they will presumably make it easier for manufacturers to meet their affirmative risk-utility burdens.<sup>414</sup>

#### Opposition to shifting the risk-utility burden to manufactur-

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411. See, e.g., *United States v. General Motors Corp.*, 565 F.2d 754, 756 (D.C. Cir. 1977). The court stated that General Motors' pre-marketing tests greatly underestimated the incidence of risk involving carburetor fires. *Id.* n.4. General Motors first learned of the much higher incidence from risks materializing during product use. *Id.* at 758-59. Nonetheless, they continued to downplay the incidence of such risk in defense of an action to force recall of its defective carburetors. *Id.*

412. As discussed previously, channels of communication within corporations are often quite limited, especially where safety information is concerned. For a discussion of why this lack of communication often results in a "shoot the messenger" mentality, or the sending of a message that undesirable safety information must not be sent up the chain of responsibility, see *supra* notes 232-42 and accompanying text. Perhaps the more typical corporate response is to ignore the safety warnings from technical personnel, and to introduce a product into the market without eliminating or modifying the design risks. For a more detailed discussion of corporate managerial responses, see *supra* notes 181, 191-93 and accompanying text.

413. For a discussion concerning manufacturer manipulation of defect information, see *supra* note 396 and accompanying text.

414. Better communication and record-keeping, however, will probably cause the design process to result in more risk-beneficial—i.e., safer—products. In turn, these safer products will result in fewer injuries and fewer claims than would have occurred if corporate decision-makers knew they could defend unreasonably unsafe designs merely by chipping away at plaintiffs' proofs. For a discussion of how manufacturers defend unreasonably unsafe designs by chipping away at a plaintiff's proofs, see *supra* note 407 and accompanying text.

ers has taken two forms. First, opponents of shifting the burden assert that courts would have no basis to screen cases as a matter of law and could therefore rarely, if ever, grant directed verdicts.<sup>415</sup> Second, opponents assert that shifting the burden inappropriately forces the manufacturer to prove a negative.<sup>416</sup> Neither of these criticisms, however, deserves to be given much weight.

Regarding judicial screening under the burden shift, Dean Wade indicated in an early article that the policy issues in strict liability design defect cases dictate that courts screen those cases more severely than they would ordinary negligence cases.<sup>417</sup> There is no reason to believe that the policy reasons in these cases are less important merely because the burden shifts to the defendant.<sup>418</sup>

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415. *Wilson v. Piper Aircraft Corp.*, 579 P.2d 1287, 1287 (Or. 1978) (noting that under *Barker* "a design defect case will always go to the jury if only the plaintiff can show that the product caused the injury"); Richard A. Epstein, *Products Liability: The Search for the Middle Ground*, 56 N.C. L. REV. 643, 651 (1978) [hereinafter Epstein, *Middle Ground*] ("With this distribution of burden, the plaintiff can always show some way in which the product might have been changed in order to avert the accident, as it is always possible to generate some improvement at some price."); James A. Henderson, *Renewed Judicial Controversy Over Defective Product Design: Toward the Preservation of an Emerging Consensus*, 63 MINN. L. REV. 773, 784-85, 787 (1979) [hereinafter Henderson, *Controversy*] (noting that *Barker's* lower prima facie burden for plaintiffs means that "plaintiffs should succeed in establishing a prima facie case in virtually every instance"); Gary T. Schwartz, *Foreword: Understanding Products Liability*, 67 CAL. L. REV. 435, 470 (1979) ("Under *Barker*, however, once the burden of proof has been shifted by the plaintiff's limited showing, only in a few cases will the manufacturer be able to offer the kind of unmistakable evidence that overcomes the defect presumption as a matter of law.").

416. Henderson & Twerski, *Closing the Frontier*, *supra* note 405, at 1293 (noting that parties should not be required to prove negatives); Schwartz, *Foreword*, *supra* note 415, at 468, 471 (same). Variations of this criticism suggest that the burden is inordinately expensive and difficult. See Epstein, *Middle Ground*, *supra* note 415, at 651 (noting that under *Barker* test manufacturer must, at great expense, routinely justify each feature of its product as best it can); Henderson, *Controversy*, *supra* note 415, at 792 (same); Henderson & Twerski, *Closing the Frontier*, *supra* note 405, at 1293 (same). *But see* Birnbaum, *supra* note 297, at 607 (calling attention to "fact that shifting the burden of proof not only does not necessarily increase defendant's burden, but its impact on plaintiff's burden might also be de minimis"). Another criticism of burden-shifting is that it imposes absolute liability on manufacturers. See Henderson & Twerski, *Closing the Frontier*, *supra* note 405, at 1292; *see also* Pietrone v. American Honda Motor Co., 235 Cal. Rptr. 137, 144 (Cal. Ct. App. 1987) (Roth, J., dissenting) ("Absent [plaintiff's having to prove an alternative, safer design], the defendant becomes an absolute insurer of the product.").

417. See Wade, *Strict Tort Liability*, *supra* note 284, at 838-39 ("Court control of jury action is more extensive [in the product liability arena] than in the ordinary negligence action.").

418. Courts may even be too ready to grant directed verdicts where the

As a threshold matter, courts can grant directed verdicts when a product is not used in a reasonably foreseeable manner.<sup>419</sup> This screening mechanism supports the policy of not extending manufacturers' liability beyond all reasonably expected applications of their products. *Garcia v. Joseph Vince Co.*<sup>420</sup> is directly on point. In *Garcia*, the plaintiff claimed that some defective aspect of the design allowed a sword blade to pierce his fencing mask, a mask that was designed and manufactured by the defendant.<sup>421</sup> The plaintiff's own expert testified that this was an extremely rare occurrence.<sup>422</sup> The plaintiff's expert also testified that: (1) the mask's mesh was penetrated by a sharp-edged or tipped sabre; (2) a sabre with sharp corners could penetrate any fencing mask; (3) the mask was designed to have a standard "round tipped and ended object" slide off it; and (4) when used with button or round-tipped sabres, the mask in question was comparable to other masks in perforation resistance.<sup>423</sup> Another expert testified that it was "inconceivable how a legal, standard weapon could have penetrated the mask."<sup>424</sup> In addition, the court noted that neither party presented testimony to suggest that

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risk-utility burden has shifted to the defendant. *See, e.g., Campbell v. General Motors Corp.*, 649 P.2d 224, 227-33 (Cal. 1982). In *Campbell*, the Supreme Court of California reversed the trial court's grant of a directed verdict in favor of the defendant bus manufacturer. *Id.* at 233. The court held that the plaintiff had produced prima facie evidence that a design feature, the absence of a restraining bar or pole on the bus, was the proximate cause of the plaintiff's injury. *Id.* at 228-30; *see also* *Meyering v. General Motors Corp.*, 275 Cal. Rptr. 346, 347, 352 (Cal. Ct. App. 1990) (reversing trial court decision upholding defendant's demurrer where plaintiff had claimed that design features of Chevrolet Corvette roof had caused injuries sustained by plaintiff when juveniles threw chunk of concrete from overpass); *Garcia v. Joseph Vince Co.*, 148 Cal. Rptr. 843, 845 (Cal. Ct. App. 1978) (affirming directed verdict for fencing mask manufacturer where plaintiff had presented claim that design of mask caused plaintiff's injuries when sabre pierced mask during fencing competition).

419. *See, e.g., Barker v. Lull Eng'g Co.*, 573 P.2d 443, 457 (Cal. 1978) ("We hold that a trial judge may properly instruct a jury that a product is defective in design . . . 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 . . ." (emphasis added)).

420. 148 Cal. Rptr. 843 (Cal. Ct. App. 1978).

421. *Id.* at 845. The fencing mask had been purchased approximately one month before the accident. *Id.*

422. *Id.* at 848. The plaintiff's expert testified that the occurrence was a one in a million happening, although the trial court did not take the assertion as a literal expression of probabilities. *Id.*

423. *Id.* at 849. After the accident, one of the plaintiff's coaches determined that the tip of the blade was thinner than normal, but another coach determined that it complied with regulations. *Id.* at 845. The blade, however, was placed in a team bag and its identity was thereby lost. *Id.*

424. *Id.* at 847.



the mask's vertical reinforcing bar would have any negative effect on performance when proper sabre blades—i.e., those with button- or round-tipped ends as required by fencing competition rules—were used.<sup>425</sup> Moreover, the undisputed testimony suggested that a competition participant would never deliberately use an illegally sharpened sabre like the one that penetrated plaintiff's mask.<sup>426</sup> Thus, the manufacturer could not reasonably have foreseen that the mask would be used in conjunction with illegal blades.<sup>427</sup> The California Court of Appeals relied on this finding and affirmed the lower court's grant of a directed verdict for the defendant.<sup>428</sup> In essence, the court found that it was not reasonably foreseeable that an individual wearing the mask in competition would encounter a sabre with a point sharp enough to penetrate mesh that was, indisputably, sufficient to prevent penetration by legal sabres. Consistent with Dean Wade's admonition, the court screened the claim so that the design defect liability, even where the risk-benefit burden shifted, "stop[ped] somewhere short of the freakish and the fantastic."<sup>429</sup>

When the Supreme Court of California adopted burden-shifting in design defect cases, it expressly included in the plaintiff's burden in the consumer expectations prong—but not in the risk-benefit, burden-shifting prong—proof that the product was used "in an intended or reasonably foreseeable manner."<sup>430</sup> The *Garcia* court concluded, however, that *Barker* implicitly intended that the use limitation should apply to the risk-utility, burden-shifting prong as well.<sup>431</sup> *Garcia* correctly pointed out that *Greenman v. Yuba Power Products, Inc.*<sup>432</sup> had explicitly included an intended use element in the plaintiff's strict liability claim of either manufacturing or design defect.<sup>433</sup> The California Supreme Court recognized soon after *Greenman* that intended use must include reasonably foreseeable uses, and continued to apply the foreseeability of use limitation to both manufacturing and design

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425. *Id.* at 849-50.

426. *Id.* at 848-50.

427. *Id.*

428. *Id.* at 850.

429. William L. Prosser, *Palsgraf Revisited*, 52 MICH. L. REV. 1, 27 (1953).

430. *Barker v. Lull Eng'g Co.*, 573 P.2d 443, 457 (Cal. 1978).

431. *Garcia*, 148 Cal. Rptr. at 848.

432. 377 P.2d 897 (Cal. 1963).

433. *Garcia*, 148 Cal. Rptr. at 848. *Garcia* cited the *Greenman* test, which stated that to present a prima facie case plaintiff must prove "that he was injured while using the Shopsmith in a way it was intended to be used as a result of a defect in design and manufacture." *Greenman*, 377 P.2d at 901.

defects.<sup>434</sup> As *Garcia* noted, however, the *Barker* court did not purport to overrule previous California strict liability decisions.<sup>435</sup> Rather, it sought to approve the two tests—the consumer expectations test and the risk-benefit test—that the lower courts had theretofore applied to strict manufacturer liability.<sup>436</sup> *Garcia* persuasively argued that the *Barker* decision did not change a plaintiff's prima facie burden other than to shift the burden of the risk-benefit proof of defect to the defendant.<sup>437</sup>

There are additional reasons why the *Garcia* construction of *Barker* is persuasive. *Barker* expressly reaffirmed the *Cronin* requirement that “the adequacy of a product must be determined in light of its reasonably foreseeable use.”<sup>438</sup> In addition, the court expressly stated that the consumer expectations prong represented only the minimum standard of liability.<sup>439</sup> Thus, “even if [a product] satisfies ordinary consumer expectations,” it may still be found defective under the risk-benefit, burden-shifting prong.<sup>440</sup> Because *Barker* clearly intended that both the consumer expectation and the risk-benefit tests could apply to design defects,<sup>441</sup> it is difficult to imagine that the court would require that a product be used in a reasonably foreseeable manner as a condition of manufacturer liability under one test, but not under the other.<sup>442</sup>

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434. See *Cronin v. J.B.E. Olson Corp.*, 501 P.2d 1153, 1157 (Cal. 1972) (stating that “strict liability should not be imposed upon a manufacturer when injury results from a use of its product that is not reasonably foreseeable”).

435. *Garcia*, 148 Cal. Rptr. at 849 n.3.

436. *Id.* at 848 (“*Barker* reiterated the elements established in [other decisions] necessary in a products liability case.”); see also *Barker*, 573 P.2d at 454 (noting that previous cases established consumer expectations and risk-benefit tests).

437. *Garcia*, 148 Cal. Rptr. at 848 (stating that “*Barker* . . . shifted to the defendant the burden of proof with respect to the ‘risk-benefit’ standard”).

438. *Barker*, 573 P.2d at 452 n.9 (citing *Cronin*, 501 P.2d at 1157).

439. *Id.* at 451 n.7.

440. *Id.* at 454.

441. *Id.* at 457. The *Barker* court stated that:

We hold that 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 discussed above, that on balance the benefits of the challenged design outweigh the risk of danger inherent in such design.

*Id.* (emphasis added).

442. See *Campbell v. General Motors Corp.*, 649 P.2d 224, 232 (Cal. 1982) (“Where the plaintiff in a strict liability action introduces evidence that she was injured while using the product in an intended or reasonably foreseeable man-

Even where the threshold reasonable use limitation does not apply to screen particular cases, courts in burden-shifting jurisdictions can nonetheless screen cases and grant directed verdicts. Assume a plaintiff claims that a particular kitchen knife, sharper than any the plaintiff had used previously, proximately caused the plaintiff's severe injuries. Theoretically, the burden should shift to defendant to prove the knife's risk-beneficial safety, and the plaintiff's claim should get to the jury.<sup>443</sup> The defendant might offer evidence that the knife is very sharp, which is why it was such a popular brand. The defendant might also offer evidence that the design of the blade and handle, and its balance of weight between handle and blade, are all standard when compared to kitchen knives of that type. If the plaintiff could not rebut defendant's proofs with evidence of faulty design, the court would have to grant a directed verdict because the knife's design would not have proximately caused the plaintiff's injury as a matter of law. The court could properly grant the directed verdict by imposing a policy limit on manufacturer liability. While there is clearly some causal connection between the sharpness of the knife and plaintiff's injury, traditional use of the proximate cause concept to limit defendant's liability would have logical application in this instance.<sup>444</sup> In addition, there is no reason to believe that burden-shifting courts would not apply the proximate cause concept in a strict liability case in the same manner in which they have applied

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ner and an attempt to avoid injury was frustrated by the absence of a particular safety device . . . .").

443. Because the plaintiff was using the knife in the kitchen to cut food, one cannot argue that the knife was being used in a manner not reasonably foreseeable.

444. *Whitner v. Lojeski*, 263 A.2d 889, 893 (Pa. 1970). According to the *Whitner* court:

One could wish that the pronouncements of this Court on [proximate cause] over the years had been more lucid, forthright; had distinguished between cause in a factual or 'philosophic' sense and proximate or legal cause; had acknowledged that the concept, like that of negligence itself, was designed not only to permit recovery for a wrong, but to place limits upon liability as are deemed socially or economically desirable from time to time.

*Id.*; see also KEETON ET AL., *supra* note 31, at 492 (stating that "the proximate cause concept has been used by the courts to extend or restrict liability"); Linda Lipput, *Pennsylvania Strict Products Liability Law and Comparative Causation: Answer to a Doctrinal Dilemma*, 13 (1992) (citing *E.J. Stewart v. Aitken Prods., Inc.*, 607 F. Supp. 883, 889 (E.D. Pa. 1985)) (stating that proximate cause requires determination that nexus between defect and injury sustained is of such nature that it is socially and economically desirable to hold defendant liable) (student paper on file with author).

it in traditional negligence cases.<sup>445</sup>

While the directed verdict in the knife hypothetical is obviously appropriate, it does not provide the avoidance of trial expense and inconvenience that is warranted in such a case. In order to create this efficiency, the court must be able to screen the frivolous or even insufficient case at an earlier stage of the proceedings, i.e., by means of summary judgment. Would such a judgment be appropriate in the knife hypothetical? Arguably, it would. The manufacturer's motion for summary judgement would be supported by an expert affidavit to the effect that the sole purpose of knives is to cut, that in order to do so they must be sharp, and that all knife users know or should know this fact.

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445. There is no indication that burden-shifting courts intended lower court judges to abandon their common sense, or intended proximate cause in the risk-benefit prong to have any meaning other than the traditional one. An early criticism of *Barker* was that the two-pronged test would require more of the proximate cause concept than it could provide, and gave the following hypothetical in support thereof: a driver traveling 75 miles per hour is injured when she is unable to stop her car upon encountering an obstacle 275 feet ahead on the highway (for example, a stalled semi-trailer truck). To rephrase the hypothetical, the car's design allows speeds of 75 miles per hour, but its brakes do not enable it to stop within 275 feet when it attains such speeds. Schwartz, *Foreword*, *supra* note 415, at 466-67. In this hypothetical, the plaintiff has prima facie demonstrated that the design of the car caused her injuries, at least in part. *Id.* Under *Barker*, the burden would shift to the defendant. *Id.* After the defendant presents evidence to prove that the car's design was risk-beneficial, the court ought to submit this case to the jury, who will undoubtedly give special attention to: (1) the feasibility of designing brakes that will stop a car within 275 feet from a speed of 75 miles per hour; and (2) the plaintiff's comparative fault. Professor Schwartz accurately suggests that *Barker* has effectively created a presumption of defect because courts will almost always find that the design proximately caused plaintiff's injury. *Id.* However, one has difficulty finding a proximate cause dilemma in this instance. Defendants consciously choose risky designs knowing that safer ones are available in almost every case. *See, e.g.*, *Grimshaw v. Ford Motor Co.*, 174 Cal. Rptr. 348, 361 (Cal. Ct. App. 1981) (discussing how Ford knew of defects in Pinto, but deferred corrective measures to save costs and enhance profits). A rebuttable presumption of design defect is warranted except in cases where the product has not been used in a reasonably foreseeable manner, or where, for policy reasons, manufacturer liability ought to be limited. Thus, in the unusual but appropriate case, a defendant may effectively shift the burden back to the plaintiff. In the previous hypothetical, assume that defendant offered the following un rebutted evidence: (1) that no passenger vehicle can stop within 275 feet from 75 miles per hour because existing technology did not allow that design without adding \$5,000 of additional costs to the vehicle, and without adding required maintenance every 1,000 miles; (2) that every jurisdiction requires drivers to know auto stopping distances, including the fact that the average vehicle requires 500 feet to stop from 75 miles per hour; and (3) that the legal speed limit at the time and place of the accident was 55 miles per hour. Based on these facts, a *Barker* court following *Garcia* could well grant a directed verdict for the defendant. *See Garst v. General Motors Corp.*, 484 P.2d 47 (Kan. 1971) (holding that there was no substantial evidence upon which jury could find design of braking and steering system to be negligent).

The argument in support of the manufacturer's motion is that an injury from the knife resulted either from a use that, as a legal matter, cannot be reasonably foreseeable—unless courts are going to hold the manufacturer responsible for all injuries resulting from a product performing exactly as planned—or, the injury was proximately caused, as a matter of law, not by the product's design, but by the plaintiff's misapplication of the product.

The plaintiff's responsive affidavit probably could not offer facts sufficient to meet its summary judgment burden. The plaintiff's most likely successful responses would have to be based on facts going beyond the sharpness of knives or the particular designs and configurations of their blades and handles.<sup>446</sup> Courts should not, nor is it likely that they would, abandon the proximate cause policy limitations of manufacturer liability in the summary judgment context by allowing a claim involving a simple knife to proceed beyond the summary judgment stage.<sup>447</sup>

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446. The plaintiff's responses would have to focus on facts beyond the sharpness and design of the knives, such as: (1) that the handle was defective and broke during use, and thereby caused plaintiff's hand to slip and misapply the blade; or (2) that the handle was made of a new, space-age, synthetic material unknown to consumers and that was 10 times more slippery than any plastic or other material of which knife handles were then made, and that the unusual slipperiness caused plaintiff's hand to slip, with a causal chain similar to that of the previous example.

447. For a discussion of why courts would not abandon the proximate cause limitations, see *supra* notes 444-45 and accompanying text. Some commentators argue that judges, for policy reasons, would ordinarily be expected to keep the hypothetical knife case from the jury by means of a directed verdict. Wade, *Strict Tort Liability*, *supra* note 284, at 838-39. Even in a burden-shifting jurisdiction, however, there is no reason why the same case could not be decided by summary judgment. Because the standard for granting summary judgment "mirrors the standard for a directed verdict," courts should have no procedural difficulty granting summary judgment in the knife case after the defendant presents the factual affidavit of the knife's ordinary blade and handle. See *Celotex Corp. v. Catrett*, 477 U.S. 317, 323 (1986). Unless the plaintiff responds with facts about extraordinary design, e.g., a defective handle that breaks or is made of material ten times more slippery than any consumer could possibly know, the court will find that there is no genuine issue as to whether the design of the knife proximately caused the plaintiff's injury. This result is consistent, on the one hand, with the inherent nature of knives and the risk knowledge of users and, on the other, with the traditional proximate cause principle of limiting tort and strict products liability short of the absurd. See Prosser, *supra* note 429, at 27 (stating that "liability must stop somewhere short of the freakish and the fantastic"); see also *Kahn v. Chrysler Motors Corp.*, 221 F. Supp. 677 (S.D. Tex. 1963) (granting summary judgment for automobile manufacturer because there was no genuine issue as to its duty to design cars that are safe for small children who ride their bicycles into them while they are legally parked). If courts should grant summary judgment because of policy limitations on a manufacturer's duty in designing cars by not affording protection to children who accidentally ride their bicycles into parked cars, then courts should also grant summary judgment because of similar proximate cause policy limitations in cases where consumers

Pursuing the hypothetical case further, assume a child brings a claim against an automobile manufacturer for a head injury incurred when the child stumbled on a sidewalk and fell against the side of a parked vehicle.<sup>448</sup> The threshold question is whether the child's "use" of the vehicle is reasonably foreseeable. The court would likely rule that the accident lay outside the expectancy obligations of the manufacturer. This result is consistent with limitations that courts have generally placed on motor vehicle manufacturer liability in similar circumstances.<sup>449</sup> Absent highly unusual circumstances, a product use totally unrelated to the central, essential and only reasonable purposes for which the product is intended should not be reasonably foreseeable as a matter of law and policy.<sup>450</sup> Thus, pedestrians who come into contact with

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cut themselves on ordinary kitchen knives, irrespective of whether there is a burden shift *after*, and *if*, plaintiff presents a genuine issue of material fact on a challenged element of her claim.

448. See Henderson, *Controversy*, *supra* note 415, at 793-97. Professor Henderson argues that a court applying the *Barker* burden-shifting analysis would inappropriately send the following hypothetical case to the jury: a child trips on the sidewalk, falls and lacerates her face on a sharp panel of a car—parked legally adjacent to the sidewalk—when a more rounded panel would have prevented much, or all, of the child's injury. *Id.*

449. See, e.g., *Schneider v. Chrysler Motors Corp.*, 401 F.2d 549 (8th Cir. 1968) (stating that car was not being used for its intended purpose because "it is overstraining a manufacturer's duty to foresee that individuals would allow their eye to come in contact with the glass edge of a wing vent window on a parked automobile"); *Kahn*, 221 F. Supp. at 679. According to the *Kahn* court:

The duty of the automobile manufacturer extends to the ordinary use of the vehicle, and may even be such as to cover certain situations when the automobile is being negligently used. But the manufacturer has no obligation to so design his automobile that it will be safe for a child to ride his bicycle into it while it is parked.

*Id.*; see also *Hatch v. Ford Motor Co.*, 329 P.2d 605, 606-07 (Cal. Ct. App. 1958) (stating that manufacturer has no duty as matter of law to six year old who walked into radiator ornament of parked car, ultimately losing eye as result). *But see Green v. Volkswagen of Am., Inc.*, 485 F.2d 430, 431, 435 (6th Cir. 1973) (vacating summary judgment in favor of defendant where 11 year old severed finger in side vents of parked vehicle). Courts have distinguished parked vehicle cases from moving or "run-away" vehicles because moving vehicles are generally being used in a reasonably foreseeable manner. See, e.g., *Preissman v. Ford Motor Co.*, 82 Cal. Rptr. 108, 114 (Cal. Ct. App. 1969) (allowing jury to determine whether parked car that subsequently rolled down incline, due to defect in transmission's "park" gear, and injured parking lot attendant was "being used in a manner which was reasonably foreseeable by the manufacturer"); *Mitchell v. Miller*, 214 A.2d 694, 699 (Conn. Super. Ct. 1965) (overruling demurrer of car manufacturer where plaintiff's decedent was killed when defect in transmission's "park" gear allowed parked car to roll onto fairway where plaintiff's decedent was playing golf).

450. See *Cronin v. J.B.E. Olson Corp.*, 501 P.2d 1153, 1157 (Cal. 1972) ("Strict liability should not be imposed upon a manufacturer when injury results from a use of its product that is not reasonably foreseeable.").

parked vehicles usually should be considered as having “used” the vehicle in an unforeseeable manner. Alternatively, courts ought to find that the injury was not proximately caused by the design of the vehicle. Failing to place limits on manufacturer liability in either of the two ways suggested means that manufacturers will be strictly liable for virtually all injuries suffered by any person who comes into contact with a motor vehicle at any time and in any manner. There is no indication in any reasonable construction of the language in *Barker*, or of other burden-shifting cases, that the courts intended for manufacturer liability to extend so far. No California decision since *Barker* has construed *Barker* in such an extreme fashion.<sup>451</sup>

The directed verdict result—as well as the avoidance of trial costs and inconvenience—of the last hypothetical can be achieved by means of summary judgment as well.<sup>452</sup> There is no significant difference between a court limiting a manufacturer’s duty by not extending it, as a matter of law and policy, to protect particular categories of persons injured by a product (e.g., children who ride their bicycles into parked cars), and a court limiting proxi-

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451. A California appellate decision indicates how straight-forward the risk-benefit prong of *Barker* is, although defense counsel appears to have misread it. See *Pietrone v. American Honda Motor Co.*, 235 Cal. Rptr. 137 (Cal. Ct. App. 1987). In *Pietrone*, the plaintiff, whose foot became lodged in a motorcycle wheel, presented a bare prima facie case of design defect by offering evidence that the unprotected spokes of the wheel allowed her foot to become entangled in it, eventually requiring amputation of her lower leg. *Id.* at 138. When the plaintiff rested, having offered no specific evidence of design defect or any other evidence pursuant to *Barker’s* risk-benefit factors, the defendant rested and moved for a directed verdict. *Id.* at 138-39. The court denied the motion, and allowed the jury to decide ultimately in the plaintiff’s favor. *Id.* at 139-40. The verdict was affirmed on appeal. *Id.* at 140-41. There is little doubt that the plaintiff’s manner of use of the vehicle was reasonably foreseeable because manufacturers are generally held to foresee accidents and mishaps with motor vehicles. See *Larsen v. General Motors Corp.*, 391 F.2d 495, 502 (8th Cir. 1968) (noting that automobile mishaps are foreseeable by manufacturer and are statistically inevitable). In *Pietrone*, the plaintiff obviously offered evidence adequate to shift to defendant the burden of proving that the wheel design was risk-beneficial. 235 Cal. Rptr. at 139. Had the defendant offered such evidence, it is doubtful whether the court would have granted a directed verdict. *Barker* does not directly delineate the circumstances under which a court may direct a verdict under the risk-benefit, burden-shifting prong. In pre-*Barker* products liability cases, however, courts did grant directed verdicts in design defect cases. See *Garst*, 484 P.2d at 54-56, 62-63 (involving expert’s opinion that earth-mover’s design was defective in several respects, but he could neither specify how to correct defects nor how to correct proposed alternative designs that severely interfered with scraper’s functioning). There is no basis to assume that risk-benefit burden-shifting requires a different result.

452. For a discussion of why summary judgment is a viable judicial alternative, see *supra* note 447 and accompanying text.

mate cause in cases where as a matter of law and policy a victim's own behavior rather than a design feature of the challenged product was the cause of her injury (e.g., where a child's careless riding of her bicycle into a car, and not the car's design, was the proximate cause of her injury). The court in the latter instance is not stretching the proximate cause concept any more than the court in the former is arbitrarily and artificially limiting the duty concept.<sup>453</sup>

Commentators have also faulted burden-shifting for requiring manufacturers to prove a negative.<sup>454</sup> Some commentators argue that this burden is inordinately expensive and difficult.<sup>455</sup> Others have suggested that burden-shifting imposes absolute liability on manufacturers.<sup>456</sup> Conceding that the burden-shift comes close to creating a rebuttable presumption of defective de-

453. If *Barker*-type burden-shifting demands more of the proximate cause concept than it can provide, then courts appear routinely—in negligence and also in non-burden-shifting strict product liability cases—to be demanding more of the duty concept than it can provide. See Schwartz, *Foreword*, *supra* note 415. For a more detailed discussion of Professor Schwartz's views, see *supra* note 445 and accompanying text. In either case, courts appear to be arbitrarily imposing limitations on manufacturer liability without a clear or easily identifiable standard. But courts have been successfully applying these limitations to the reach of defendants' liability at least since *Palsgraff*. See Prosser, *supra* note 429, at 8-12 (noting that *Restatement* and various cases cite to *Palsgraff* to limit liability). If a plaintiff cannot meet his or her production burden at an early stage of the proceedings, there is no reason why fundamental liability-limiting tort principles should not apply equally to cases sounding in negligence or strict products liability, or to cases applying a burden-shifting analysis.

454. For a discussion concerning arguments that burden-shifting requires proof of a negative, see *supra* note 416 and accompanying text; Henderson & Twerski, *Closing the Frontier*, *supra* note 405, at 1293; Schwartz, *Foreword*, *supra* note 415, at 468, 471.

455. For a discussion of arguments that the burden is too difficult and expensive, see *supra* note 408 and accompanying text. See Henderson, *Controversy*, *supra* note 415, at 792 (noting that traditionally plaintiff bears burden of producing sufficient evidence to put design defect issue in reasonable doubt, but that under *Barker* test, defendant is forced "to rely on speculative, hypothetical testimony to support the reasonableness of its design choices"); Henderson & Twerski, *Reflections*, *supra* note 2, at 1293 ("[S]hifting the burden of proof to the defendant makes it difficult, if not impossible, for a defendant to defend itself from liability."). *But see* Birnbaum, *supra* note 297, at 607 ("MacPherson calls attention to the fact that shifting the burden of proof not only does not necessarily increase the defendant's burden, but its impact on the plaintiff's burden might also be de minimis.").

456. Henderson & Twerski, *Closing the Frontier*, *supra* note 405, at 1292 (claiming that burden-shifting "smacks of defect-free liability"); see also Pietrone v. American Honda Motor Co., 235 Cal. Rptr. 1137, 1144 (Cal. Ct. App. 1987) (Roth, J., dissenting) ("Absent [plaintiff's having to prove an alternative, safer design], the defendant becomes an absolute insurer of the product."). For a discussion providing at least a partial answer to charges of absolute liability, see *supra* notes 336, 339 and accompanying text.



sign, how can defendants rebut the presumption and how difficult is it?

Once a plaintiff has proved that a manner of use is reasonably foreseeable, the plaintiff may cause the burden to shift by simply offering evidence that some aspect of the product's design proximately caused the plaintiff's injury.<sup>457</sup> In proving that the challenged design is risk-beneficially safe, defendants will want to offer risk-benefit evidence concerning the safety of the actual design, as well as evidence of the lack of risk-beneficial safety of design alternatives that the defendants considered and rejected. In this regard, the defendant's evidence will be both affirmative and negative in nature. The manufacturer will offer testing evidence demonstrating, for example, that the incidence and magnitude of the risk are extremely small.<sup>458</sup> The defendant may also have to prove the unavailability or infeasibility of alternative designs, or that severe impairment to the product will result if the defendant utilized alternative designs.<sup>459</sup> To the extent that some of these proofs are "negative," they are little different from the proofs manufacturers are required to offer in negligent design cases, in which they defend the reasonableness of their design choices and of their rejection of, or failure to consider, alternative choices.<sup>460</sup>

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457. *Barker v. Lull Eng'g Co.*, 573 P.2d 443, 455 (Cal. 1978) (noting that once plaintiff shows proximate cause burden shifts to defendant).

458. In cases where manufacturers have actually considered safety in developing a product's design, they may be able to show affirmatively that the challenged design is reasonably safe. *See Bernal v. Richard Wolf Medical Instruments Corp.*, 272 Cal. Rptr. 41, 46 (Cal. Ct. App. 1990). In *Bernal*, a strict liability design case, the defendant manufacturer presented "evidence [that] the surgical instrument was made with the best steel available and was reasonably safe for its intended use, but had inherent dangers no human skill or knowledge has yet been able to eliminate." *Id.* Apparently persuaded by defendant's risk-benefit evidence, the jury awarded a verdict to the defendant. *Id.* The appellate court would have affirmed on the risk-benefit evidence, but reversed due to erroneous jury instructions. *Id.* at 46-49.

459. *Id.* (stating that "the defense may show any alternate design would entail unreasonable costs, be uneconomic or impractical, interfere with the product's performance, or create other increased risks").

460. For another example of how defendants can present such a defense, see *Garst v. General Motors Corp.*, 484 P.2d 47 (Kan. 1971). The *Garst* court reversed the plaintiff's verdict as a matter of law because the plaintiff could not demonstrate that the challenged design could have been replaced by one that was risk-beneficial. *Id.* at 62-63. The defendant was able to show that the alternatives suggested by plaintiff's expert were either not technologically feasible or not practicable, i.e., that the alternatives would severely impair the usefulness or add prohibitive cost to the machine. *Id.* at 55-62. Although *Garst* involved a negligent design claim, the defendant's proofs were essentially identical to those it would have offered in a strict liability design action. *See, e.g., Bernal*, 272 Cal. Rptr. at 46 (suggesting proofs that alternative design is not feasible or practicable).

In a case similar to *Grimshaw*,<sup>461</sup> the manufacturer would need to present evidence that the actual design—and design alternatives that it had considered and rejected or that the plaintiff had offered in its case-in-chief—<sup>462</sup>of the Pinto's gas tank location and protective features relating to rear-end collision were risk-beneficial.<sup>463</sup> The risk-benefit proofs required of defendants with the affirmative burden are not significantly different from, or more difficult or expensive than, those required of plaintiffs in nonburden-shifting jurisdictions. In fact, if the defendants have factored safety into the design process, they will have access to the design trade-offs and related data, which makes it cheaper and easier for defendants to present the necessary risk-benefit evidence.<sup>464</sup> Even where the defendants have not done their homework, they still often have the easier task of gathering data because of their established facilities, available personnel and product design experience.

Where the burden does not shift, plaintiffs have to prove that

461. *Grimshaw v. Ford Motor Co.*, 174 Cal. Rptr. 348 (Cal. Ct. App. 1981). For a detailed discussion of the *Grimshaw* case, see *supra* notes 169-81 and accompanying text.

462. Plaintiffs will likely offer evidence of design defect and of safer alternative designs at some point in the trial, either in their cases-in-chief or in a rebuttal case. See *Pietrone v. American Honda Motor Co.*, 235 Cal. Rptr. 137, 138-39 (Cal. Ct. App. 1987) (stating that plaintiff presented prima facie case that "open, exposed, rotating wheel" on motorcycle proximately caused plaintiff's injury, and further advised court that plaintiff was prepared to offer additional evidence to rebut any evidence presented by defendant in meeting its risk-benefit burden).

463. The manufacturer would ideally want to offer the following evidence: (1) that the magnitude of the risk is low, i.e., minor rather than life-threatening; (2) that in any event the probability of the risk materializing was low; (3) that a safer design was not technologically feasible; (4) that if a safer design was technologically feasible its cost was prohibitively expensive relative to the cost of the vehicle; and (5) that the alternative design, if feasible, would severely impair the utility of the vehicle. See *Barker v. Lull Eng'g Co.*, 573 P.2d 443, 455 (Cal. 1978) (noting that above factors may be considered by jury). In *Grimshaw*, Ford had no effective risk-benefit defense. *Grimshaw*, 174 Cal. Rptr. at 358-62. After it had stood the design process on its head by arbitrarily setting the price and weight of the vehicle before design began, and by failing to factor in engineering and safety considerations until after the over-all design had been configured, it then rejected "fixes" that would have mitigated the risks created by the original design. *Id.* Ford could hardly argue that its reasons for rejecting post-marketing design modifications were reasonable. It rejected a package of gas tank modifications costing only four to eight dollars per vehicle. *Id.* at 359-61. It did so for two reasons. *Id.* First, Ford rejected the modifications because it did not want to increase the sales price beyond the arbitrary \$2,000 established even before the design process had begun. *Id.* Second, Ford rejected the modifications because it was not willing to absorb the cost and resulting loss of profits. *Id.* at 370.

464. For a discussion of the information to which manufacturers have access, see *supra* notes 48-58 and accompanying text.

the challenged design is not risk-beneficially safe, either by offering evidence of safer, alternative designs, or by proving that the challenged design was so unsafe as to be defective. These proofs are little different from those the defendant would offer to prove that the design is risk-beneficially safe.

To argue that the overall risk-benefit burden is a negative one, no matter to whom the burden is assigned, is a mere semantic posture.<sup>465</sup> More importantly, however, plaintiffs in burden-shifting jurisdictions often must assume a burden only slightly less onerous than that of a defendant manufacturer.<sup>466</sup> In most cases, a plaintiff's best trial strategy is to offer evidence challenging the actual design as well as evidence of safer, alternative designs, even when the defendant bears the risk-benefit burden. In order to make these proofs, a plaintiff will offer the same kind of evidence, including expert testimony, required of the defendant to meet its risk-benefit burden.<sup>467</sup> The plaintiff will likely incur more expense than the defendant in making the same or similar proofs. The plaintiff will also experience at least as much difficulty as the defendant in making these proofs—including the difficulties inherent in meeting negative burdens—even when the risk-benefit burden has shifted.

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465. One may characterize defendant's burden either affirmatively or negatively. See *Barker*, 573 P.2d at 455, 456 (characterizing defendant's burden as having to prove that product is "not defective" and that "benefits of the challenged design outweigh the risk of danger inherent in [the] design"). Note that *Barker* expressly directs lower courts to instruct juries in a manner that states a defendant's burden more affirmatively than negatively. *Id.* Trial judges may instruct juries that a product may be defective "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 outweigh the risk of danger inherent in the design." *Id.* at 457-58. No matter how the burden is characterized, however, the defendant's evidence and burden in proving that the product is on balance risk-beneficially safe are the same.

466. Often times, plaintiffs must incur the expense of hiring experts to investigate risk factors and even perform product or materials testing. *E.g.*, *Schleining v. Questor Corp.*, 200 Cal. Rptr. 634, 637 (Cal. Ct. App. 1984) (noting that plaintiff retained several experts in preparation for trial, including one who performed crash tests on allegedly defective infant car seat).

467. If manufacturers have factored safety into their designs, their burden will be significantly easier and less costly. Presumably, manufacturers test their designs, and take other steps to factor safety into the design process, before production and/or marketing. If this assumption is correct, those costs are factored into the price of the product. If manufacturers have not done their homework, however, they may be forced to incur significant expense—substantially more than if they had factored safety into the process appropriately. Holding manufacturers accountable in this fashion is hardly the same as imposing an inordinate expense upon them.

## V. CONCLUSION

It may be unrealistic to believe that common-law courts will be able to work out the difficult issues surrounding product design liability. Political pressures are quite strong and continue to grow.<sup>468</sup> Large financial interests have increasingly attempted to shape the debate, and in the process have attempted to influence courts and legislatures.<sup>469</sup> Suggestions for reform may not reflect either the direction in which courts are moving the law or realistic considerations of marketplace dynamics. To the extent that these forces exert greater influence over the development process of strict products liability, courts will have less chance to shape the doctrine in order to create necessary product safety in the marketplace.

Massive interference with common-law development, however well-intentioned, may do more harm than good if product safety is not given adequate consideration in the process.<sup>470</sup> If the redrafting of section 402A is but a clarification for manufacturers in order to protect them from a supposed confusion about the definition of product defect,<sup>471</sup> it is hard to justify some of the suggested "clarifications."<sup>472</sup> It is surely time to recognize both the reality of the marketplace and the special expertise of common-law courts. Common-law courts have demonstrated a great deal of wisdom over the ages. Moreover, their common-law rule-making has been eminently sound.<sup>473</sup> There is no reason to believe, despite the clamor of the "reformers,"<sup>474</sup> that the common-

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468. See *Civil Justice Reform*, *supra* note 1, at 1245-49 nn.2, 8, 19, 28 (discussing political pressures to expand scope of tort reform).

469. *Id.* at 1246 n.5. For a more detailed discussion of industry attempts to create the impression that products liability law is economically counter-productive, see *supra* notes 298-300; John W. Wade, *Strict Products Liability*, 19 THE BRIEF 8, 56 (1989) [hereinafter Wade, *Strict Products Liability*] (stating that legislative tort reform "should be classed as special-interest legislation").

470. For a discussion concerning one proposal to revise the law of strict liability, see *supra* note 378 and accompanying text.

471. See generally Henderson & Twerski, *Reflections*, *supra* note 3, at 1261-67 (discussing several issues in products liability in which new Restatement could provide desperately needed clarification).

472. For a discussion of the suggested clarifications to § 402A, see Henderson & Twerski, *Reflections*, *supra* note 3, at 1261-67. For a discussion of how the "clarification" of making a safer alternative design a prerequisite to manufacturer design liability may be nothing more than a not-so-subtle shift of the risk from the manufacturer to the unknowing consumer, all at the expense of accident prevention, see *supra* notes 355-74 and accompanying text.

473. See Henderson & Twerski, *Reflections*, *supra* note 2, at 1261 ("The actual holdings of the courts have by and large been eminently sensible.").

474. See generally *Civil Justice Reform*, *supra* note 1.

law courts cannot continue to resolve the outstanding strict liability issues and create a consensus.<sup>475</sup> In the process, those who have not factored the grossly unequal relationship between producers and consumers into design defect doctrine must begin to do so in order to give appropriate consideration to deterrence.

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475. See Wade, *Strict Products Liability*, *supra* note 469, at 56 (“[I]t appears that the judicially created law of the various states has been gradually coming closer to a consensus. The problems are capable of being resolved, and it may be that the best way to handle them is to leave them in the hands of the state appellate courts.”).