RISK-UTILITY ANALYSIS AND THE LEARNED HAND FORMULA: A HAND THAT HELPS OR A HAND THAT HIDES?

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> Through the results of the crash tests[,] Ford knew that the Pinto's fuel tank and rear structure would expose consumers to [the risk of] serious injury or death in a 20 to 30 mile-per-hour collision. There was evidence that Ford could have corrected the hazardous design defects at minimal cost but decided to defer correction of the shortcomings by engaging in a cost-benefit analysis balancing human lives and limbs against corporate profits. Ford's institutional mentality was shown to be one of callous indifference to public safety. There was substantial evidence that Ford's conduct constituted 'conscious disregard' of the probability of injury to members of the consuming public.

Grimshaw v. Ford Motor Company (the *Pinto* case).[1]

> [T]he negligence formula proposed in *Johnson v. A/S Ivarans Rederi*[2] . . . requires 'balancing the usefulness to the ship of the dangerous condition and the burden involved in curing it against the probability and severity of the harm it poses.' This formula echoes that of Judge Learned Hand in *United States v. Carroll Towing Co.*[3]. . . [T]he formula is a valuable aid to clear thinking about the factors that are relevant to a judgment of negligence and about the relationship among those factors.

United States Fidelity & Guaranty Company v. Jadranska Slobodna Plovidba.[4]

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1. 119 Cal. App. 3d 757, 174 Cal. Rptr. 348 (1981). See *infra* text accompanying notes 269-84. See in particular *infra* note 279.
2. 613 F.2d 334, 348 (1st Cir. 1980).
3. 159 F.2d 169, 173 (2d Cir. 1947).
4. 683 F.2d 1022, 1026 (7th Cir. 1982).

What precepts in negligence jurisprudence could spawn such diametrically opposed views as to the proper measure of negligent behavior? While the *Plovidba* court applauds weighing the risk of human injury against the cost of its circumvention as the arbiter of negligence standards, the *Grimshaw* court is appalled by Ford Motor Company's use of the same criteria in its production decisions. Though the balancing of costs against benefits in legal determinations has been widespread and growing in recent years, judicial inconsistencies indicate that the implications of such a trend are not fully understood. The recent incorporation of economic cost-benefit analysis by some courts to further develop the balancing approach has only served to increase the confusion and wariness about fostering such guidelines for social behavior.[5]

This article's purpose is threefold. One is to demonstrate how the use of cost-benefit analysis necessarily imparts the moral and/or political values of the user into his or her decisions. While the cost-benefit technique is itself value-neutral, its application, as will be shown, requires that some moral choice be made for the cost-benefit implementation. Though the very existence of an underlying value-choice is often obscured by scholars' and judges' presentations of "objective" cost-benefit conclusions (whether deliberately or naively so), the choices are in fact there and should be elucidated and discussed. The second goal of this article, therefore, is to shed sufficient light on the dimensions of using cost-benefit reasoning so that the reader, whether or not in support of a particular application, can venture knowledgeably into a debate of the value choices attending any cost-benefit argument that might arise.

The third purpose of this article is to demonstrate that, in fact, cost-benefit reasoning as an adjudicatory process is one that grows naturally out of *legal* jurisprudence and is not merely an intrusion by another social discipline.[6] Because of the furor created by a particular brand of cost-benefit reasoning (primarily by the adherents of the Chicago School), cost-benefit analysis is often viewed as a callous derivative of economic theory insensitive to our notions of fairness and equity, rather than the tool it can be for facilitating existing legal doctrine and values. To assist in demonstrating that cost-benefit analysis can extend rather than supplant traditional legal standards, the second and third parts of this Article trace the evolution of negligence standards from the nineteenth-century "avoidable accident" approach to the modern method of balancing risks against benefits. As will be seen, the shift towards a balancing standard was a judicial response to inconsistencies created by the older "avoidable accident" approach. The courts have never, however, completely abandoned the "avoidable accident" standard and its powerful appeal to a sense of fairness. As a result, the "avoidable accident" standard intermittently reemerges to create conflict and confusion both in the court room and in the establishment of social guidelines for appropriate private sector behavior.

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5. *See, e.g.*, Dobson v. Camden, 705 F.2d 759, 772 (5th Cir. 1983) (Higgenbotham, J., dissenting).

6. Black's Law Dictionary's definition of "jurisprudence" echoes the very essence of cost-benefit reasoning. The definition reads in part as follows:

> [W]hen a new and doubtful case arises to which two different rules seem, when taken literally, to be equally applicable, it may be, and often is, the function of jurisprudence to consider the ultimate effect which would be produced if each rule were applied to an indefinite number of similar cases, and to choose that rule which when so applied, will produce the greatest advantage to the community.

The Article also includes an examination of two vehicles of cost-benefit analysis that have risen to the legal forefront in recent years: risk-utility analysis for product-design liability[7] and Judge Learned Hand's *Carroll Towing* formula for determining negligence liability in general.[8] The courts clearly view them as simplifying the legal reasoning process while bringing into sharp relief the issues the courts wish to address.[9]

Although Judge Hand developed the *Carroll Towing* formula in 1947, courts virtually ignored it for two decades and only sporadically turned to it in the third.[10] Recently, however, the Carroll Towing formula has experienced a renaissance with the appointment of Professor Richard A. Posner to the Seventh Circuit Court of Appeals.[11] Its application has reached beyond the boundaries of negligence liability to such novel areas as the degree of recklessness in governmental action for purposes of the eighth amendment, the sufficiency of probable cause for a warrantless search under the fourth amendment, and the sufficiency of evidence for granting preliminary injunctions by the federal district courts.[12] One might suspect that such innovative applications of cost-benefit analysis are prescient. It would be surprising if the catalogue of legal issues

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BLACK'S LAW DICTIONARY 767 (5th ed. 1979).

7. *See, e.g.*, Barker v. Lull Engineering Co., 20 Cal. 3d 413, 435, 573 P.2d 443, 457-58, 143 Cal. Rptr. 225, 239-40 (1978).

8. *Carroll Towing*, 159 F.2d at 173.

9. In a case in which it is not altogether clear whether or not the risk of injury exceeds the expectations of the ordinary consumer . . . the plaintiff will almost certainly seek to make out his case for imposing liability on the manufacturer on the basis of a risk-utility balancing approach. Practically, it thus seems quite unnecessary to confuse juries with disjunctive instructions posing the vague standard of reasonable consumer expectations on the one hand against the more concrete elucidation of risk-utility factors on the other.

Birnbaum, *Unmasking the Test for Design Defect: From Negligence [to Warranty] to Strict Liability to Negligence*, 33 VAND. L. REV. 593, 646-47 (1980).

10. Although *Carroll Towing* was cited for other reasons in several cases, the Learned Hand formula was explicitly mentioned in only two cases: Rosenquist v. Isthmian S.S. Co., 205 F.2d 486, 489 (2d Cir. 1953); and Andros Shipping Co. v. Panama Canal Co., 298 F.2d 720, 725-26 (5th Cir. 1962). One U.S. appellate court case, however, used the formula during this decade: Burgess v. M/V Tamano, 564 F.2d 964, 981 (1st Cir. 1977), *cert. denied sub nom.*, Tamano v. United States, 435 U.S. 941 (1978).

11. For examples of U.S. appellate court opinions, see Wright v. United States, 809 F.2d 425, 427 (7th Cir. 1987); Davis v. Consolidated Rail Corp., 788 F.2d 1260, 1263-64 (7th Cir. 1986); Lawson Prods., Inc. v. Avnet, Inc., 782 F.2d 1429, 1433-34 (7th Cir. 1986); American Hosp. Supply Corp. v. Hosp. Prods. Ltd., 780 F.2d 589, 593 (7th Cir. 1985); Duckworth v. Franzen, 780 F.2d 645, 652 (7th Cir. 1985), *cert. denied*, 479 U.S. 816 (1986); General Foods Corp. v. Valley Lea Dairies, Inc., 771 F.2d 1093, 1103 (7th Cir. 1985); Llaguno v. Mingey, 763 F.2d 1560, 1564 (7th Cir. 1985); United States v. Paducah Towing Co., 692 F.2d 412, 422 n.18 (6th Cir. 1982); *Jadranska Slobodna Plovidba*, 683 F.2d at 1026; Washington Post Co. v. United States Dept. of Health & Human Serv., 690 F.2d 252, 285 n.32. (D.C. Cir. 1982); Evra Corp. v. Swiss Bank Corp., 673 F.2d 951, 958 (7th Cir. 1982), *cert. denied*, 459 U.S. 1017 (1982); Lange v. Schultz, 627 F.2d 122, 129 (8th Cir. 1980); Maine Yankee Atomic Power Co. v. N.L.R.B., 624 F.2d 347, 349 (1st Cir. 1980); and Massachusetts v. Andrus, 594 F.2d 872, 892 (1st Cir. 1979).

12. *See Lawson Prods.*, 782 F.2d at 1433-34 (injunctive relief); *American Hosp. Supply Co.*, 780 F.2d at 593 (injunctive relief, *see infra* text accompanying notes 235-41); *Duckworth*, 780 F.2d at 652 (definition of cruel and unusual punishment, *see infra* text accompanying notes 210-19); *Llaguno*, 763 F.2d at 1564 (unreasonableness of warrantless search, *see infra* text accompanying notes 220-34); *Washington Post Co.*, 690 F.2d at 285 n.32 (freedom of information act application); *Evra Corp.*, 673 F.2d at 958 (consequential damages); *Maine Yankee Atomic Power Co.*, 624 F.2d at 349 (classification of employees); and *Andrus*, 594 F.2d at 892 (balancing of mineral and fishing interests).

touched by cost-benefit reasoning did not continue to expand in the future.[13] The need to understand the ramifications of these legal approaches seems clear.

As a result of the multi-faceted analysis, this Article contains several parts. Part I gives a brief overview of the development of negligence through the incorporation of economic analysis. It also highlights the current issues arising from the use of economic reasoning that form the basis of discussion in the major parts of the Article, that is, parts V, VI and VII. Parts II and III give a more detailed history of negligence standards showing the evolution from the avoidable accident approach to one of weighing and balancing. The purpose of these two sections is to show that cost-benefit reasoning is, in fact, organic legal doctrine and not the foreign construct of another discipline. These sections can easily by skipped by the reader without loss of continuity, if he or she is not interested in a historical perspective or wishes to leave it to another time. Part IV examines the two most prominent uses of legal cost-benefit analysis: the Learned Hand formula and risk-utility analysis. Part V discusses the philosophical underpinnings of cost-benefit reasoning and delineates the demarcations between a balancing test and value choices. Parts VI and VII investigate the use of cost-benefit reasoning in the court room, scrutinizing each application to discover the underlying value-choices made in each case. These two sections discuss extensively the conflicts regarding the legal use of cost-benefit reasoning in an effort to unmuddy the waters of value-choices and balancing tests. The Article closes in part VIII with the conclusions.

I. FROM NEGLIGENCE TO ECONOMIC REASONING: AN OVERVIEW

The early nineteenth century saw the development of negligence theory that expanded the doctrine of liability for harm to include those harms arising out of the failure of a party to take due care for others.[14] This development encompassed a

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13. For examples of cost-benefit analysis in other non-traditional areas, see National Treasury Employees Union v. Von Raab, 816 F.2d 170 (5th Cir. 1987), *remanded*, 109 S. Ct. 1384 (1989) (in deciding reasonableness of warrantless searches, courts must weigh need for search against risk that search will undermine the social order by unduly invading personal rights); Pruitt v. Allied Chem. Corp., 523 F. Supp. 975, 978 (E.D. Va. 1981) (tort law should maximize social utility; non-existance of individual rights to wildlife should not preclude a polluter's liability for polluting them); and Magayanes v. Terrance, 542 F. Supp. 28, 29 (N.D. Ill. 1982) (having all-metal interior in police van is not violation of 42 U.S.C. § 1983 civil rights law §1983 because utility outweighed risk).

14. The conventional view of nineteenth century negligence law is that it displaced older rules of strict liability to accommodate the interests of emerging industries. This view is summarized by Schwartz, *Tort Law and the Economy in Nineteenth-Century America: A Reinterpretation*, 90 YALE L.J. 1717, 1717-18 (1981):

> [T]he prevailing view of American tort history regards nineteenth-century tort doctrine as deliberately structured to accommodate the economic interests of emerging industry. According to this view, the courts jettisoned a potent pre-nineteenth-century rule of strict liability in favor of a lax negligence standard, leniently applied that standard to enterprise defendants, administered a severe defense of contributory negligence, and placed strong controls on negligence law under the name of 'duty.'

The central thesis of Schwartz's article throughout, however, is to disprove the most extreme scholarly assertions of judicial economic subsidization of industrial growth and to sharply criticize the remaining positions in that vein.

For an early contribution to this composite view, see Wigmore, *Responsibility for Tortious Acts: Its History* (pts. 1-3), 7 HARV. L. REV. 315, 383, 441 (1894). Wigmore sees the law of responsibility for harmful results as a continuous development in Germanic law, without a break, for two thousand years. *Id.* at 315. He finds that the earlier rule was strict li-

broader range of liability than existed previously. Historically, liability arose only from intentional harms or from a limited category of harms to which the courts assigned absolute liability without regard to any notions of fault.[15] The new theories of negligence now added liability for accidental harms to the traditional ones, though not comprehensively. Adopting the philosophy that certain risks were inherent to living in society, the courts limited their application of negligence liability by utilizing the argument that some accidents were the result of unanticipated acts of nature or an unfortunate sequence of events. The standard for determining liability was whether the court found the accident to be "truly unavoidable." If the court made such a determination, then no liability would arise and the consequential harms lay where they fell.[16]

Complicating the growth of negligence liability, however, were industrial advances involving increasingly complex scenarios of harm. As a result, the prevailing negligence analyses were unable, given the technological complexities underlying any particular injury, to support determinations of liability-free accidents. The presence of human design inherent in any mechanical event rendered it no longer logically possible to find (or perhaps, more accurately, unreasonable to describe) any accident as truly unavoidable.[17]

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ability: "[t]he doer of a deed was responsible whether he acted innocently or inadvertently, because he was the doer." *Id.* at 317. He concludes that by the nineteenth century, three classes of cases had emerged: (1) acts done wilfully with reference to the harm; (2) acts done at peril with reference to the harm [strict liability]; (3) acts done negligently with reference to the harm. *Id.* at 455-56. For an argument that the law alternates between periods of emphasis on liability without fault and fault doctrines, rather than Wigmore's continuous movement toward fault, see Isaacs, *Fault and Liability, Two Views of Legal Development*, 31 HARV. L. REV. 954 (1918). Isaacs finds "that the history of tort law records lapses from the moral fault basis and returns to it, rather than a single movement in any one direction." *Id.* at 966.

For examples of modern scholars contributions to the conventional view of tort history, see L. FRIEDMAN, A HISTORY OF AMERICAN LAW 409-27 (1973) ("Absolute liability might have strangled the economy altogether . . . [s]o ordinary caution became the standard."); M. HOROWITZ, THE TRANSFORMATION OF AMERICAN LAW, 1780-1860, at 85 (1977) (before 1800, almost all injuries were classified as nuisances and came under strict liability standards; by the 1860's many injuries were considered under negligence analysis and this substantially reduced entrepreneurial liability); and Gregory, *Trespass to Negligence to Absolute Liability*, 37 VA. L. REV. 359, 365 (1951) (judges believed that the development of the American economy would be hindered by liability for consequences of pure accident and began to require fault). *But see generally* Schwartz, *supra*, for an argument that fault liability had been the general rule well before 1800.

In addition to Schwartz, Posner, in *A Theory of Negligence*, 1 J. LEGAL STUD. 29 (1972) also rejects the subsidization view, arguing in its stead that courts were choosing the economically efficient results. Though ideologically at the opposite end of the spectrum from Horowitz and Friedman, Posner's conclusion is in effect not that distinguishable from the positions he writes against. If the courts chose to "subsidize" industry by developing negligent theories that liberated defendants from accident liability, and if the purpose was to promote (or at least not retard) economic growth, then the courts applied a cost-benefit analysis. Clearly, the courts valued the benefits of technological advance over the harms it created and chose an economic direction. This, by definition, is a decision based on economic efficiency and therefore is consistent with Posner's view. It is imperative for the reader to note, however, that if this was the courts' choice, it was not the *only* economic efficient choice available, and certainly in the minds of many—including this author—not the most fair or just one to make. Certainly, the courts' direction in the second half of the nineteenth century reflects such sentiments in contrast to the direction in the first half. *See infra* text accompany notes 61-95.

15. There was, in fact, prior to the nineteenth century, some limited development of liability for unintentional torts. *See infra* text accompanying notes 43-48.

16. *See infra* text accompanying notes 49-72.

17. "[A] perfect locomotive engine, properly equipped and properly run, will not ordinarily throw out sufficient sparks to destroy adjoining property." Judson v. Giant Powder

Nevertheless, the courts were unwilling to shift exclusively to theories of absolute liability, a course that would seem, at least intellectually, the inevitable outcome when the concept of unavoidable accidents ceased to be functional.[18] As findings of "unavoidable accidents" became increasingly rare, the courts struggled to fashion another method to assign liability short of absolute liability. With growing frequency they turned to methods of weighing and balancing to serve this purpose. Beginning in the early twentieth century, judicial considerations implicitly compared the benefit of an activity with the risk to which it exposed society, or the degree of risk against the cost of forestalling the harm.[19] Under this approach, when the benefit was perceived to outweigh the risk of harm or the risk was considered less than the cost to avoid it, the courts typically found that the costs of the risk should be borne by society and not by the risk initiator. In those instances no liability would be assigned.[20] This balancing approach became more prevalent

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Co., 107 Cal. 549, 560, 40 P. 1021, 1023 (1895). Of course, using the ideal engine as the benchmark for determining negligence was not universally held. *See, e.g.*, Flinn v. N.Y. Cent. & H.R.R. Co., 142 N.Y. 11, 36 N.E. 1046 (1894), in which the court of appeals reversed a judgment for plaintiff whose house was burned down by engine sparks. In this case, the court's position was at the other extreme:

> The defendant was operating its road under lawful authority, past the plaintiff's lot, upon its own land, and therefore it could not be made liable for the destruction of the house upon the adjoining lot except upon proof of negligence in the management or condition of its engines .... The law is well stated in an extract found in the brief of the plaintiff's counsel from Pierce on Railroads (page 433), as follows: 'The duty of the company to use reasonable care in order to avoid injury resulting to others from the exercise of its powers requires it to avail itself to the best mechanical contrivances and inventions in known practical use which are effective in preventing the burning of private property by the escape of sparks and coals from its engines, and it is liable for injuries caused by its omission to use them. Its duty in this respect is limited to such contrivances as have been already tested and put in use, and it is not required to use every possible contrivance, although already patented and recommended in scientific discussions.'
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> This house was a small wooden structure, and it is quite apparent that its destruction by fire communicated by engines was inevitable at some time.
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> ....
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> ... The defendant is not bound absolutely to keep the spark arresters upon its engines in perfect condition. It is in proof that they would sometimes break and get out of repair, and if the defendant, having a regular system of inspection, repaired them at the first opportunity, it cannot be said to have been negligent.

Id. at 11-14, 36 N.E. at 1046-49.

18. *See infra* text accompanying notes 73-97.

19. *See infra* text accompanying notes 123-43.

20. The business of life is better carried forward by the use of dangerous machinery; hence the public good demands its use, although occasionally such use results in the loss of life or limb. It does so because the danger is insignificant, when weighed against the benefits resulting from the use of such machinery and for the same reason demands its reasonable, most effective, and unrestricted use, up to the point where the benefits resulting from such use no longer outweigh the danger to be anticipated from it. At that point the public good demands restrictions.

Chicago, B & Q Ry. Co. v. Krayenbull, 65 Neb. 889, 903, 91 N.W. 880, 882 (1902).

> Roads must be built and traveled, and to hold that the public cannot open their highways until they are prepared to fence their roads with barriers strong enough to hold a team and wagon when coming in violent contact with them, the condition being the ordinary condition of the country, would be to put a burden upon the public that it could not bear. It would prohibit the building of new roads, and tend to the financial ruin of the counties undertaking to maintain the old ones.

Leber v. King County, 69 Wash. 134, 137, 124 P. 397, 399 (1912).

as industrialization and scientific progress advanced and the courts felt a need to circumscribe the extent of negligence liability.[21]

Over the last two decades the courts have turned more specifically to the discipline of economics to guide them in their determinations of negligence.[22] In part, this can be explained by the similarities between the courts' own balancing deliberations and "cost-benefit" analysis — a decision-making tool economists derived from the principles of economic efficiency.[23] The courts' adaptation of the more formalistic approach of economics to decision-making is also in part due to the encouragement by a number of scholars, who observe that efficiency analysis is designed to maximize society's welfare.[24] Some scholars suggest, and the courts often appear to believe, that economic analysis can go even further and actually dictate policy choices.[25] In the field of negligence theory, this perception has been translated into the belief that negligence liability can and should be assigned so as to maximize economic efficiency — the implication being that to do so will maximize society's well-being.[26]

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21. *See infra* text accompanying notes 144-60.

22. *See infra* notes 242-58, 259-68, 287-307 and accompanying text for examples where the economic technique of cost-benefit analysis has specifically been applied to negligence law. Cost-benefit analysis is particularly prevalent in products liability cases; *see* Birnbaum, *supra* note 9, at 605, 617-18 (risk-utility used in design defect cases even before explicitly enunciated). Furthermore, cost-benefit analysis has spread to areas of the law where its application is not immediately obvious. See Tribe's disapproving comments on its frequent use by the Supreme Court in settling Constitutional questions. Tribe, *Seven Deadly Sins of Straining the Constitution through a Pseudo-Scientific Sieve*, 36 HASTINGS L. J. 155, 160-61 (1984). As noted by Caplan, *Does good economics make good law?* [sic], CALIF. LAW., May 1985 at 29:

> [T]he major tool of 'law and economics' is cost-benefit analysis, and it is applied in seemingly unlikely cases .... [Advocates] also apply economic analysis to areas of law where, until recently, economic theory has been considered irrelevant: constitutional law, family law and election law, for example.

23. For a definition of cost-benefit analysis and its relationship to efficiency, see, D. PEARCE, COST-BENEFIT ANALYSIS 2 (2d ed. 1983).

> [Cost-benefit analysis] is a procedure for: 1) measuring the gains and losses to individuals, using money as the measuring rod of those social gains and losses; 2) aggregating the money valuations of the gains and losses of individuals and expressing them as net social gains and losses. Given the definitions of 'rationality' and 'society' we can therefore say that a rational social decision is one in which the benefits to society exceed the costs.

See also R. COOTER & T. ULEN, LAW AND ECONOMICS 50-51 (1988):

> A *potential* Pareto improvement allows changes in which there are both gainers *and* losers, but requires that the gainers gain more than the losers lose. If this condition is satisfied the gainers can, in principle, compensate the losers and still have a surplus left for themselves. Compensation does not actually have to be made, but it must be possible in principle for the change to be a potential Pareto improvement. In essence, this is the technique of cost-benefit analysis.

For discussions on the similarities of cost-benefit analysis and legal balancing, see Demsetz, *When Does the Rule of Liability Matter?* 1 J. LEGAL STUD. 13, 28 (1972):

> [T]he law based its decisions on acceptable and appropriate precedents, but the acceptability of those precedents should not be confused with the morality of the interacting parties. A deeper analysis of these precedents may reveal that they generally make sense from the economic viewpoint of placing the liability on the party who can, at least cost, reduce the probability of a costly interaction happening .... If the courts are to ignore wealth, religion, family in decid ing ... conflicts, if persons before the court are to be treated with regard only to the cause of action and available proof, then, as a normative proposition, it is difficult to suggest any criterion for deciding liability other than placing it on the party able to avoid the costly interaction most easily.

See also R. POSNER, ECONOMIC ANALYSIS OF LAW 22 (3d ed. 1986):

> Since any ruling of law will constitute a precedent, the judge must consider the probable impact of alternative rulings on the future behavior of people engaged in activities that give rise to the kind of accident involved in the case before him .... The issue becomes what is a fair and just result for a *class* of activities, and it cannot be sensibly resolved without consideration of the impact of alternative rulings on the frequency of accidents and the cost of accident precautions. The legal and economic approaches are not so divergent after all.

The Supreme Court's *de facto* use of cost-benefit analysis without explicit reference to the term can be seen in Miller v. Schoene, 276 U.S. 272, 279 (1928):

> [T]he state was under the necessity of making a choice between the preservation of one class of property and that of the other, wherever both existed in dangerous proximity .... When forced to such a choice the state does not exceed its constitutional powers by deciding on the destruction of one class of property in order to save another which, in the judgment of the legislature, is of greater value to the public.

See also Cooley v. Public Service Co., 90 N.H. 460, 10 A.2d 673 (1940) (plaintiff suffered injuries while using home phone when an ungrounded power line broke, hit the telephone cable, and made a "terrifically" loud noise through the telephone. The court found that the suggested precaution devices would cause greater risk of electrocution to people passing on the street than to people using a telephone.).

24. *See, e.g.*, Bator, *The Simple Analytics of Welfare Maximization*, 47 AMER. ECON. REV. 22 (1957); Lachman, *Knowing and Showing Economics and Law* Book Review), 93 YALE L.J. 1587 (1984) (reviewing M. POLINSKY, AN INTRODUCTION TO LAW AND ECONOMICS (1986)). Judge Posner has made one of the most explicit statements of the role for efficiency analysis in the courts:

> 'Wealth maximization' as a guide to governmental including judicial action means that the goal of such action is to bring about the allocation of resources that makes the economic pie as large as possible, irrespective of the relative size of the slices. It means in other words using cost-benefit analysis as the criterion of social choice, where the costs and benefits are measured by the prices that the economic market places on them, or would place on them if the market could be made to work.

Posner, *Wealth Maximization and Judicial Decision-Making*, 4 INT'L REV. L. & ECON. 131, 132 (1984).

25. *See* Kennedy, *Cost-Benefit Analysis Of Entitlement Problems: A Critique*, 33 STAN. L. REV. 387, 388 (1980) (emphasis added):

> What makes the efficiency or cost-benefit analysis attractive and interesting is that it appears to involve only one rather uncontroversial (or at least apolitical) value judgment: If a change in the legal regime helps those who gain by it more than it hurts those who lose, it is a good idea to put it into effect .... Insomuch as the goal of efficiency has been a factor in past choices to set rules one way or another, it will also be helpful in understanding the *rationale of the rules in force.*

One form that this argument takes is to maintain that common law, whether knowingly or not, has tended to pursue the goal of economic efficiency. *See, e.g.*, R. POSNER, *supra* note 22, at 21 (emphasis added):

> Although few judicial opinions contain explicit references to economic concepts, often the true grounds of legal decision are concealed rather than illuminated by the characteristic rhetoric of opinions .... It would not be surprising to find that legal doctrines rest on inarticulate gropings toward efficiency ....
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> The efficiency theory of the common law is not that *every* common law doctrine and decision is efficient .... The theory is that the common law is best (not perfectly) explained as a system for maximizing the wealth of society.

See also Posner, *The Economic Approach to Law*, 53 TEX. L. REV. 757, 763-64 (1975) (logic of law is economics); Priest, *The Common Law Process and the Selection of Efficient Rules*, 6 J. LEGAL STUD. 65 (1977) (the tendency of the set of all legal rules to become dominated by rules achieving efficient rules is widespread); and Rubin, *Predictability and the Economic Approach to Law: A Comment on Rizzo*, 9 J. LEGAL STUD. 319, 334 (1980) (inefficient laws are more likely to be litigated and overturned).

26. A number of commentators have used efficiency analysis to arrive at liability rules for assigning fault in tort cases. For example, G. CALABRESI, THE COSTS OF ACCIDENTS: A LEGAL AND ECONOMIC ANALYSIS 70 (1970), argues that assigning liability to the person who can best avoid it maximizes efficiency:

Contrary to these apparent beliefs, the use of economic efficiency analysis for determining negligence is not and cannot be dispositive of the fundamental policy question of who should bear the cost of an unintentional harm. Although economic efficiency analysis can give considerable assistance in ascertaining the behavior incentives the courts can foster by various liability rulings, the analysis does not provide ultimate policy choices.[27] In the case of an accident, who should bear its cost is a policy decision that is *analytically* about equity and is severable from, without precluding, the separate issue of inducing efficient behavior.[28]

Economic analysis is a reasoning process that explores how to bring stated priorities to a maximum while minimizing certain losses society wishes to avoid. To do so is, by the economist's definition, to be efficient. Though the process itself is value-neutral, it cannot be applied without some prior decision as to which values are to be maximized and which losses are to be minimized. Thus, though economic analysis does not inherently embody any particular ideological approach or social mores, its application necessarily requires that the user elect some value choice as the guiding principle. Furthermore, though economic reasoning can help discern often conflicting social values (for example, by determining possible candidates for bearing the risk of accidental harm), it cannot, by itself, choose from amongst them. Yet the fervor with which the legal community has grasped at economic theory to make "objective" decisions has helped to create the illusion that economics gives answers rather than merely guidance.[29]

The tenacity with which the legal community has clung to the erroneous perception that economics dictates value choices spans the full spectrum of political philosophy from the conservative to the liberal, including the critical legal studies

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> [I]f all activities reflect the accident costs they 'cause,' each individual will be able to choose for himself whether an activity is worth the accident costs it 'causes.' The sum of these choices is, *ex hypothesis*, the best combination available and will determine the degree to which accident-prone activities are engaged in . . . .

Shavell, *Strict Liability Versus Negligence*, 9 J. LEGAL STUD. 1, 2-3 (1980), argues that strict liability yields more efficiency than fault doctrine because negligence looks only at the level of care required, not at the level of activity.

> Because an injurer must pay for losses whenever he is involved in an accident, he will be induced to consider the effect on accident losses of both his level of care *and* his level of activity. His decisions will therefore be efficient. Because drivers will be liable for losses sustained by pedestrians, they will decide not only to exercise due care in driving but also to drive only when the utility gained from it outweighs expected liability payments to pedestrians.

(emphasis in original).

27. *See* Peller, *The Metaphysics of American Law*, 73 CALIF. L. REV. 1151, 1272-73 (1985) (although cost-benefit analysis purports to be neutral, it depends on social context for definition of costs and benefits); Vandall, *Judge Posner's Negligence-Efficiency Theory: A Critique*, 35 EMORY L.J. 383, 384-86 (1986) (value judgments are inherent in cost-benefit analysis); Dworkin, *Hard Cases*, 88 HARV. L. REV. 1057, 1075-77 (1975) (despite economic dress, cost-benefit analysis is a choice between conflicting rights based on assumptions about duty); White, *Coase and the Courts: Economics for the Common Man*, 72 IOWA L. REV. 577 (1987) (the decision to use economic reasoning involves certain policy choices).

28. *See infra* text accompanying notes 259-68.

29. The search for a basis upon which to assign the cost of injury is reflected in nineteenth century cases such as Brown v. Collins, 53 N.H. 442 (1873) where the court, criticizing English decisions that focused solely on the harm to plaintiff, stated that the English view "disregards the question whether, by transferring the hardship to the other party, anything more will be done than substitute one suffering party for another; and does not consider what legal reason can be given for relieving the party who has suffered, by making another suffer the expense of his relief." *Id.* at 446.

perspective. The typical view is that economic efficiency is a moral choice competing with more traditional manifestations of equity and fairness. This belief is evident not only among conservative advocates of economic determinism, such as Richard Posner,[30] and "liberal" law and economics philosophers,[31] such as Guido Calabresi,[32] who urge that efficiency be weighed against other considerations, but the misperception also underlies criticisms of the law and economics approach offered by scholars from the left such as Mark Kelman[33] and Duncan Kennedy,[34] as well as scholars from the right, such as Richard Epstein.[35]

There are several dangers in failing to recognize the inherent necessity of making value choices in applying economic reasoning. Since economic analysis usually involves consideration of several complex factors, the implicit value judgments contained in the analysis may not be apparent. If the court believes that economic reasoning is value-free and its application must lead to objective results, the court may inadvertently promote certain policies it does not intend. In the areas of the law where the courts have embraced economic reasoning to assist in their

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30. "[M]y argument is not that wealth maximization is the only social value that government ought to pay attention to, but that it is the only such value (at least, if all other social values can be grouped under the distributional rubric) that *courts* can do much to promote." Posner, *Wealth Maximization and Judicial Decision-Making*, 4 INT'L REV. L. & ECON. 131, 133 (1984) (emphasis in original).

31. So named by Duncan Kennedy, see Kennedy, *supra* note 25, at 387 n.1.

32. [W]e would not presume collectively and objectively to value the cost of a rape to the victim against the benefit to the rapist even if economic efficiency is our sole motive. Indeed when we approach bodily integrity we are getting close to areas where we do not let the entitlement be sold at all and where economic efficiency enters in, if at all, in a more complex way.

Calabresi & Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089, 1125-26 (1972).

Our reaction to accidents is not a strict dollars-and-cents one. If it were, I doubt that we would accept railroad crossing accidents because it costs too much to eliminate grade crossings[,] and yet spend 'whatever it takes' to save a known individual trapped in a coal mine. An economically optimal system of reducing accident costs . . . might be totally or partially unacceptable because it strikes us as unfair, and no amount of discussion of the efficiency of the system would do much to save it. Justice must ultimately have its due.

G. CALABRESI, *supra* note 26, at 25-26.

33. Neo-classical economists feign an apolitical value neutrality: they purport simply to explain how people can best attain *any* set of values. But the discipline's basic building block method . . . is anything but apolitical. It is a method that could only be invented and adhered to by apologists, those whose interest was in reassuring us all of the beneficence of whatever order happens to emerge from the interplay of market forces, regardless of the nature of the society in which that market functions.

Kelman, *Choice and Utility*, 1979 WIS. L. REV. 769, 796-97 (1979) (emphasis in original).

34. If we wish to use economic analysis to generate a determinate ideal of private law regime, we have to make a series of value judgments that are more controversial, because more overtly political, than that involved in saying we should make changes whose benefits to the gainers exceed the costs to the losers.

Kennedy, *supra* note 25, at 388.

35. Even if they cannot provide satisfactory answers to fairness questions, the advocates of economic analysis in the law still insist that their work is of primary importance because it reduces the area in which fairness arguments must be judged in order to reach a decision in a particular case. But once it is admitted that there are questions of fairness as between the parties that are not answerable in economic terms, the exact role of economic argument in the solution of legal question becomes impossible to determine.

Epstein, *A Theory of Strict Liability*, 2 J. LEGAL STUD. 151, 152 (1973).

determinations, failing to acknowledge the true values underlying the analysis can lead to inconsistent rulings when the court is faced with similar circumstances in slightly different form.[36] Furthermore, without a clear statement of the values underlying the analysis, a court facile in applying economic reasoning may change precedent or subvert legislative intent while appearing to be merely applying an "objective science" to reach an "objective" conclusion.[37] Finally, by not recognizing the separation between the value choices and the reasoning process, individuals disaffected by results dictated by particular value choices underlying a given economic analysis may choose to reject economic analysis as a whole rather than the value choice with which they disagree.[38]

II. THE EMERGENCE OF NEGLIGENCE THEORY

During the course of the nineteenth century, courts grappled with a myriad of harms that arose out of the increased complexity of commercial and social interaction.[39] Developing sophistication in transportation and communications brought a greater number of people together in an unprecedented fashion.[40] Along with the growing bustle of social and economic activity, a vast array of new and novel unintentional injuries occurred forcing the courts to address the two-pronged question of what levels of risk society should tolerate and who should bear their costs when harms actually occurred.[41] The negligence theories that emerged were an outgrowth of the courts' struggle with those issues.[42]

The nineteenth century negligence doctrines served to both expand and contract liability for unintentional harms over what existed previously.

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36. *See, e.g.*, the contradictory results in manufacturer's design defects analysis in the *Grimshaw* case, *infra* notes 269-86 and accompanying text.

37. *See, for example, Llaguno* , 763 F.2d at 1560 (for further discussion see *infra* text accompanying notes 220-34), and *Jadranska Slobodna Plovidba*, 683 F.2d at 1022 (for further discussion see, *infra* text accompanying notes 259-68, 287-307).

38. In effect, that is the conclusion that both Duncan Kennedy and Richard Epstein reach. Disaffected by the value choices implicit in the traditional legal applications of law and economics that they examine, they each seize on the "inherent indeterminacy" of economics for making moral choices for the purposes of attack. Instead of recognizing that the indeterminacy of economic reasoning is what liberates it as a tool for all political perspectives, Kennedy and Epstein choose instead to reject the reasoning process rather than value choices they do not share. *See, e.g.*, Kennedy, *The Role of Law in Economic Thought: Essays on the Fetishism of Commodities*, 34 AM. U.L. REV. 939, 962-63 (1985); Kennedy, *supra* note 25, at 419-21; Epstein, *The Risks of Risk /Utility*, 48 OHIO ST. L.J. 469 (1987).

39. C. DEGLER, THE AGE OF THE ECONOMIC REVOLUTION, 1876-1900 (2d ed. 1977); R. HIGGS, THE TRANFORMATION OF THE AMERICAN ECONOMY, 1865-1914 (1977); E. KIRKLAND, INDUSTRY COMES OF AGE (1961).

40. M. HOROWITZ, *supra* note 14, at 88-89 (courts were forced to develop negligence theory because of an increase in collision accidents between strangers).

41. Every legal system tries to redress harm done by one person to another. The industrial revolution added an appalling increase in dimension. Its machines produced injuries as well as profits and products .... The dilemma was first posed in railroad cases, and continued to be posed most often and most strikingly in this industry. Almost every leading case in tort law was connected, mediately or immediately, with this new and dreadful presence.

L. FRIEDMAN, *supra* note 14, at 410.

42. "Changing times and the amazing growth of our industries, together with a gradual shift in the basis of political power, are factors which affect the direction of judicial thinking." Gregory, *supra* note 14, at 382. "[Negligence] provided a workable standard for the numerous inadvertent injuries involving strangers, which had come to be characteristic of late nineteenth-century tort action." G. WHITE, TORT LAW IN AMERICA 18 (1980).

Traditionally, unintentional harms that were considered actionable[43] were dealt with either by actions on trespass or by actions "on the case." The former (and older) action was one of absolute liability.[44] Defendant was held fully accountable for injuries resulting from a trespass, which required a direct act by defendant to plaintiff. For example, if, while working in a hay loft, defendant dropped his pitchfork and hit plaintiff below, defendant would be held absolutely liable for all resulting injuries in an action on trespass.[45]

On the other hand, if plaintiff stumbled onto the pitchfork after it came to rest on the ground, any injuries ensuing were viewed as an indirect result of the defendant's activities and were therefore considered "consequential" harms.[46] In that instance, plaintiff could seek recovery only in an action on the case and only if he could show some fault on defendant's part.[47] Thus, whether or not the plaintiff was required to demonstrate fault on defendant's part in order to collect compensation depended on whether the courts viewed the harm as consequential or the result of a direct action.[48]

This dichotomy in treatment of unintentional harms was repudiated in what is now viewed as a landmark decision, *Brown v. Kendall*.[49] Writing on behalf of

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43. Even the old strict liability rules did not afford relief for all unintentional wrongs. For example, by the sixteenth century, a master was not liable for the wrongs of his servants unless he had commanded the *particular* deed or he had consented to the deed either before or after the servant's actions. Wigmore, *supra* note 14, at 383-92. As commercial activity required that contractors and agents assume more responsibility, the rule of the particular authority yielded to a rule of liability for a broader range of actions by this special class of servants, under the rule of implied command. *Id.* at 392-99. Similarly, one did not have liability for the acts of one's animals unless one had knowledge of the animal's dangerous nature. *Id.* at 327-28. Finally, while trespass to land was traditionally a strict liability offense, it did not cover cases where the damage was from percussive effects of blasting. *See* Exner v. Sherman Power Const. Co., 54 F.2d 510, 514 (2d Cir. 1931) (discussion of old rule of trespass).

44. Gregory, *supra* note 14, at 361-64.

45. Now, the law is well established, on the one hand, that, whenever the injury done results from the immediate force of the defendant himself, whether intentionally or not, the plaintiff may bring an action of trespass; on the other, that if the act be that of the servant, and be negligent, not wilful, case is the only remedy against the master .... Trespass will not lie against him; case will, in effect, for employing a careless servant ....

Sharrod v. London & North Western Ry. Co., 4 Ex. 581, 585 (1849), *reprinted in* THE EXCHEQUER REPORTS 580, 584 (J. Hare & H. Wallace eds. 1851).

46. *See* Cole v. Fisher, 11 Mass. 136, 137 (1814) (question of whether correct action is trespass or case depends on whether injury is direct or accidental).

47. Gregory, *supra* note 14, at 361-64. *But see* Wigmore, *supra* note 14, at 442-43. The evidence seems certain that the rationalization towards the line of present standards [fault required for trespass] began at a much earlier period than has been supposed. In other words, there has never been a time, in English law, since (say) the early 1500s, when the defendant in an action for [personal] Trespass was not allowed to appeal to some standard of blame or fault in addition to and beyond the mere question of his act having been voluntary .... (citations omitted).

48. Gregory, *supra* note 14, at 364.

49. 60 Mass. (6 Cush.) 292 (1850). According to Gregory, Chief Justice Shaw should receive most of the credit for the establishment of a consistent theory of liability for unintentionally caused harm by his decision in this case; Gregory asserts that the case quickly became a landmark decision. Gregory, *supra* note 14, at 365-67. Commentators who agree with Gregory include Roberts, *Negligence: Blackstone to Shaw to ? An Intellectual Escapade in a Tory Vein*, 50 CORNELL L.Q. 191, 192 (1965); and G. WHITE, *supra* note 42, at 14-17. Federal cases citing *Kendall* for the proposition that negligence is necessary to tort action include *Exner*, 54 F.2d at 514, and McGettigan v. Nat'l Bank of Washington, 320 F.2d 703, 705 n.3

the court, Chief Justice Shaw acknowledged the precedent to treat injuries resulting from direct action as actions of trespass, as distinct from consequential injuries which were considered in actions on the case.[50] However, he dismissed as *dicta* the conclusion that just because the harm is the result of a direct action, that liability for the harm automatically arises without consideration of whether it was "willful, intentional, or *careless*."[51] By so delimiting the necessary *mens rea* for liability and by including carelessness as one of the alternatives, Justice Shaw eliminated the absolute liability effect that had made the distinction between actions on trespass and actions on the case meaningful. He also established, in the opinion, what the standard should be for determining "ordinary care":

> In using this term, ordinary care, it may be proper to state, that what constitutes ordinary care will vary with the circumstances of cases. In general, it means that kind and degree of care, which prudent and cautious men would use, such as is required by the exigency of the case, and such as is necessary to guard against probable danger.[52]

To give an example of how the standard of care adjusts to the circumstances, Judge Shaw noted the difference in care a man must take in discharging a gun if he were in open fields as compared with being in an urban setting.[53] Thus Judge Shaw established that the cautiousness of one's conduct in the context of his surroundings—and not the harm alone—will determine liability for the effects of his actions.[54]

Justice Shaw's decision highlights the nineteenth century courts' efforts to create a more uniform standard for recovery for unintentional harms: for both trespass and actions on the case, the plaintiff was required to show that the defendant was at fault before plaintiff could collect damages.[55] His opinion also reflects the courts' desire not to expand absolute liability doctrines to accommodate the burgeoning array of accidents stemming from increased social and commercial mobility.[56] Though several types of unintentional harms were still recoverable

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(D.C. Cir. 1963). *But see* M. HOROWITZ, *supra* note 14, at 89-90 (an exaggerated significance is placed on *Kendall* because trespass already required negligence).

50. *Kendall*, 60 Mass. (6 Cush.) at 295.

51. *Id.* at 294-95 (emphasis added).

52. *Id.* at 296.

53. *Id.*

54. The old writs in trespass did not allege, nor was it necessary to show, anything savoring of culpability. It was enough that a certain event had happened, and it was not even necessary that the act should be done intentionally, though innocently. An accidental blow was as good a cause of action as an intentional one.

Collins, 53 N.H. at 445 (Doe, J., quoting Justice Holmes).

55. *See, e.g.*, Center v. Finney, 17 Barb. 94, 98 (N.Y. App. Div. 1852) (no liability when, through no fault of defendant's, horse became unmanageable and struck another's wagon); Morris v. Platt, 32 Conn. 75, 84-89 (1864) (foundation of liability same in trespass and case); and Bullock v. Babcock, 3 Wend. 391, 392-93 (N.Y. Sup. Ct. 1829) (only if injury is not result of unavoidable accident will defendant be liable for striking another with an arrow).

56. For example, the Iowa Supreme Court said:

> The mere fact they [railroads] so run [in close proximity to roads], although it may render the use of the highway less safe, does not of itself constitute negligence upon the part of the railway company. Such increase of danger is necessarily incident to, and attendant upon, this improved mode of transportation, (*sic*) All persons must accept the advantages of this mode of intercommunication with

under absolute liability,[57] the move was towards a negligence theory limiting the recovery for many instances of harm which were of the type previously compensable by the absolute liability of trespass.[58]

The legal approach to unintentional harm, however, consisted of more than just a decision to limit liability short of absolute liability. The courts also developed a philosophical basis for determining what constituted fault. Throughout the theory's development, the courts established other dimensions of negligence beyond taking due care. One was whether the accident was foreseeable: "It [is] a question . . . whether [the] danger . . . was not to be apprehended, and whether . . . the defendant [was] not bound to inquire into the nature . . . of the risk."[59] A second was whether the defendant's actions were sufficiently causally related to the harm.[60] Another was whether the defendant exercised the full extent of his expertise and skill.[61] Courts also considered whether the defendant could have taken preventative measures before undertaking the particular course of action that led to the harm.[62]

Underlying all the different inquiries for determining negligence was the fundamental question of whether *in fact* the accident was truly unavoidable. The inquiry into defendant's knowledge and actions was framed in a way to determine if the harm was really the result of a convolution of events rather than defendant's conscious deeds. So, for example, the court in *Vincent v. Stinehour* [63] states:

> [I]f a horse, upon a sudden surprise, run (*sic*) away with his rider, and runs against a man and hurts him, this is no battery. Where a person, in doing an act which it is his duty to perform, hurts another, he is not guilty of battery. . . . A soldier, in exercise, hurts his companion—no recovery can be had against him. . . . If the act which occasioned the injury to the plaintiff was wholly unavoidable, and no

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the dangers and inconveniences which necessarily attend it. The price of progress cannot be withheld.

Beatty v. The Central Iowa Ry. Co., 58 Iowa 242, 247-48, 12 N.W. 332, 334 (1882).

57. For example, blasting that carried rocks or debris onto another's land (*see* Hay v. Cohoes Co., 2 N.Y. 159, 161-62 (1849)); or interfering with the flow of water to another riparian owner's injury (*see* Pixley v. Clark, 35 N.Y. 520, 523 (1866)).

58. For an example in which former strict liability regarding the master servant relationship and the spread of fire yields to the requirement for negligence, see the discussion of Snee v. Trice, 1 S.C.L. (2 Bay) 345, 3 S.C.L. (1 Brev.) 178 (1802) in M. HOROWITZ, *supra* note 14, at 92-93.

59. Lehigh Bridge Co. v. Lehigh Coal & Navigation Co., 4 Rawle 8, 25 (Pa. 1833). *Accord Collins*, 53 N.H. at 450.

60. Crain v. Petrie, 6 Hill 522, 524 (N.Y. Sup. Ct. 1844) (damages must appear to be the legal and natural consequences arising from the tort); Finch v. Brown & Bartholomew, 13 Wend. 601, 603 (N.Y. Sup. Ct. 1835) (in negligent collision, boat owner is able to recover only for damage to boat and not for loss of earnings); and Guille v. Swan, 19 Johns. 381, 382 (N.Y. Sup. Ct. 1822) (because man landing balloon in field naturally produced crowd of spectators, liable for damage).

61. "[P]laintiffs charge the defendant with so negligently, unskillfully and carelessly managing his boat, that she run foul of the vessel. . . ." Foot v. Wiswall, 14 Johns. 304, 306 (N.Y. Sup. Ct. 1817). *See also* Gerke v. California Steam Navigation Co., 9 Cal. 251 (1858); Presby v. Grand Truck Ry., 66 N.H. 615, 22 A. 554 (1891), for examples where the courts found defendants negligent for not adopting particular safety measures.

62. "It will be worthy of inquiry . . . whether the construction of the body of the dam ought not to have immediately preceded the permanent provision . . . for the accommodation of those who should prefer to use the bed of the river." *Lehigh*, 4 Rawle at 25.

63. 7 Vt. 62 (1835).

> degree of blame can be imputed to the defendant, the conduct of the defendant was not unlawful.[64]

Similarly, the court in *Lehigh Bridge v. Lehigh Coal & Navig. Co*[65]. declared:

> The defendant had the . . . right to erect the dam at the particular place . . . and if chargeable with no want of attention to its probable effect, is not answerable for consequences which it was impossible to foresee and prevent. Where a loss happens exclusively from an act of Providence, it will not be pretended that it ought to be borne by him whose superstructure was made the immediate instrument of it.[66]

And even in *Brown v. Kendall*,[67] Justice Shaw writes:

> If, then, in doing this act, using due care and all proper precautions necessary to the exigency of the case, to avoid the hurt to others, in raising his stick . . . , [the defendant] accidentally hit the plaintiff in his eye, and wounded him, this was the result of pure accident, or was involuntary and unavoidable, and therefore the action would not lie.[68]

The dividing line between the unavoidable or inevitable accident and the negligent deed was drawn in each case based on the court's perception as to whether or not the situation causing harm was within defendant's control in some fashion. Consider, for example, the judicial treatment of harms to the property of others caused by a fire spreading from a defendant's property. If the fire's origins were from a lamp lit by a human being, the presumption was that the ultimate blaze was negligently caused; whereas if the initial spark came from lightning, it was treated as an act of nature with no liability attached.[69] The courts viewed the spontaneous acts of animals,[70] the natural consequences of acts of duty (such as military exercises),[71] and situations of surprise (e.g., injuring another while jumping from a burning building or while carrying a third to safety)[72] as being beyond defendant's control when no evidence existed that ordinary precautions or foresight or due care could have avoided the injury. These accidents were treated as inevitable and unavoidable, part and parcel of modern day society, and hence no action for recovery would lie.

As nineteenth century technology progressed a contradiction developed between the desire to avoid absolute liability effects and the unavoidable accident analysis. An increasing number of accidents were the result of human interaction with more complicated and sophisticated human-designed mechanisms and

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64. *Id.* at 64-65 (the last sentence actually appears on page 64, but is quoted in this fashion for expositional purposes).
65. 4 Rawle 8 (Pa. 1833).
66. *Id.* at 24.
67. 60 Mass. (6 Cush.) 292 (1850).
68. *Id.* at 297.
69. "The ground work of the common law principle seems to be, that some degree of negligence is imputable in every case of accidental fire produced by human means; and it is universally just that a loss shall be borne by him whose act contributed to it . . . It would be otherwise, however if the fire were kindled by lightening . . . ." *Lehigh*, 4 Rawle at 25, 24 (sentence order reversed for expositional purposes).
70. *Vincent*, 7 Vt. at 65-66; *Collins*, 53 N.H. at 446-48.
71. *Collins*, 53 N.H. at 444.
72. *Vincent*, 7 Vt. at 65.

machinery.[73] It became easier, with the advantage of hindsight, to perceive accidents as foreseeable since the accidents were less frequently the result of some surprise event of nature, such as a horse bolting loose. *Ex post facto*, the accidents increasingly seemed to be a logical extension of the design of the mechanism under question. As a result, the frequency of finding against the defendant in cases involving technological advances rose dramatically.[74] Though the courts applied the prevailing negligence analysis, the effect approached absolute liability, since the findings were much more likely to favor the plaintiff.[75]

For example, *Huntress v. Boston & Main R.R.*,[76] concerned plaintiff's decedent who died crossing the railroad track in front of an oncoming train. The evidence showed that there was a long unobstructed view of the tracks and that the train rang a warning bell upon approaching. Furthermore the court itself held that there was no negligence in the manner in which the engineer conducted the train in this circumstance.[77] Nevertheless, the court upheld a verdict for the plaintiff on a negligence basis.[78] The court reasoned that absent "evidence of insanity, intoxication, or suicidal purpose," the decedent must not have appreciated the risks he was taking. Therefore, even though the court found no negligence in the way that the engineer operated the train, the court felt that whether the railroad company was negligent in failing to foresee the plaintiff's poor appreciation of the risk and to take preventative measures was a question of fact for the jury.[79]

The degree to which the courts' tolerance of risk declined when confronting harm arising out of technological advances can be seen by comparing *Huntress* with earlier cases. The analysis and conclusion in *Huntress* contrasts significantly with that in *Vincent v. Stinehour*, which five decades earlier stated, "where a horse takes a sudden fright, and there is no imprudence in the rider, either in managing the horse or in driving an unsafe horse, and the horse runs against another, and injures him, the trespass is wholly involuntary and unavoidable, for which no action can be maintained."[80] The similarity of circumstances is striking save for the substitution of surprising behavior by a human being for that by a horse, yet the two cases yield quite different results. The *Huntress* analysis is also considerably less forgiving than that in *Brown v. Collins*, which claimed no liability would lie if "defendant had said that the plaintiff ran cross his piece [gun] when it was discharging . . . ."[81] Certainly the risk of one's horse bolting or of a bystander crossing one's line of fire is no less foreseeable, and probably a great deal more so, than an individual purposely crossing railroad tracks with an unobstructed view of an oncoming train ringing a warning bell. What elements of control must the courts have felt the railroad industry to have, in order to reach the

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73. The number of accidents involving railways and streetcars alone was a tremendous strain on the courts. In some cities, these claims occupied a third to a half of the time spent in jury trials. Ballantine, *A Compensation Plan for Railway Accident Claims*, 29 HARV. L. REV. 705 (1916).

74. *See infra* note 96.

75. "The Courts expanded on the negligence standard in ways that rendered it ambitious and demanding, narrowing the gap between negligence and strict liability." Schwartz, *supra* note 14, at 1773, commenting on his findings from a detailed study of the application of negligence theory in the nineteenth century by the courts of California and New Hampshire.

76. 66 N.H. 185, 34 A. 154 (1890).

77. *Huntress*, 66 N.H. at 186, 34 A. at 155.

78. *Id.* at 191-92, 34 A. at 157.

79. *Id.*

80. *Vincent*, 7 Vt. at 66.

81. *Collins*, 53 N.H. at 444.

conclusion under the traditional negligence standard, that the accident in *Huntress* was avoidable?

As the power of design improved, so did the courts' perception of the power to prevent accidents. In *Butcher v. Vaca Valley & Clear Lake R.R.*,[82] the California Supreme Court decided that a presumption of negligence was raised by evidence that, *theoretically*, a railroad engine could be made that would not produce fire-causing sparks. Therefore, the court found that the railroad engine's production of sparks was, in fact, *prima facie* proof of defendant's negligence.[83]

The standard of due care also increased with the complexity of modern invention. In *Giraudi v. Electric Imp. Co.*,[84] a restaurant employee went on the roof to repair a sign during a heavy thunderstorm. He inadvertently came in contact with a power line that he knew (but forgot) was there.[85] The court upheld a jury verdict against the power company, stating that electricity was dangerous and that defendant had to take the utmost care to avoid injury,[86] a higher standard than "ordinary care."[87] In terms of acknowledging and accepting risks, the turn-of-the-century courts' positions represented a shift from earlier courts such as the *Collins* court, which stated (with regard to the developments of modern society):

> Traffic on the highways, whether by land or sea, cannot be conducted without exposing those whose persons or property are near it to some inevitable risk; and that being so, those who go on the highway, or have their property adjacent to it, may well be held to do so subject to their taking upon themselves the risk of injury from that inevitable danger; and persons who, by license of the owner, pass near warehouses where goods are being raised or lowered, certainly do so subject to the inevitable risk of accident.[88]

The *Collins* court's analysis, which found "inevitable" the risk of harm from highways and the loading and unloading of warehouse cargo (both considered quite dangerous in those days) suggests that the courts should reach a similar

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82. 67 Cal. 518; 8 P. 174 (1885).

83. *Id.* at 524, 8 P. at 178. *But see* Stringham v. Hilton, 111 N.Y. 188, 195-96, 18 N.E. 870, 872 (1888) (employer entitled to use any machinery which is reasonably safe; not required to use safest alternative).

84. 107 Cal. 120, 40 P. 108 (1895).

85. The defendant claimed that the plaintiff was contributorily negligent. The plaintiff was employed by the hotel and restaurant which occupied the building when the defendant initially installed the wires passing over the roof. *Id.* at 123, 40 P. at 109. He had been on the roof of the hotel only once before the accident and only for a short time. This was during the daytime and on that occasion, the wires were dead. *Id.* The court noted that there had been no reason for the plaintiff to take notice of them and no evidence to show that he did so. *Id.*

86. The defendant's attorney argued that the trial court erred in allowing an expert witness to testify as to whether the defendant's placement of the wires was negligent and in instructing the jury that a lesser degree of care is demanded from one who is ignorant of the danger. *Id.* at 126-27, 129, 40 P. at 110-11. The court found that, because there was sufficient additional evidence to show defendant's negligence, the testimony of the expert witness caused no harm. *Id.* at 127, 40 P. at 110. It also upheld the judge's instruction. *Id.* at 129, 40 P. at 111.

87. *Id.* at 124, 40 P. at 109. The court also felt the electric power company could have avoided the accident by hanging their power lines sufficiently high above the rooves so that people walking there would not come in contact with the wires. The court argued that this could have been done relatively inexpensively, an argument that foreshadows the cost-benefit approach to risky activities that was to be adopted later. *Id.* *See infra* text accompanying notes 119-40.

88. *Collins*, 53 N.H. at 449.

conclusion for the facts in *Huntress*[89] and *Butcher*.[90] Analytically, one might expect the later courts also to conclude that people traversing near rail transportation and electric power transmission do so subject to the risk. Presumably the earlier courts' decision to limit liability arose out of a desire to make available to society the benefits of the challenged activities.[91] It would seem to follow then that the railroads and the power lines would receive similar treatment.[92] But as *Hunter* and *Butcher* indicate, they did not.

The language of the courts' opinions demonstrates, moreover, that the disparity of treatment was not due primarily to a perceived difference in the level of risk. Instead, it appears that courts assigned liability because they felt that it was within the enterprises' power to avoid the harm; that this power arose out of the fact that the implements or environments of harm were initially of human design.

This approach was a logical extension of the unavoidable accident analysis. Since the fundamental criterion for determining negligence at that time was whether the accident could have been avoided,[93] it only made sense for the courts to examine the defendant's knowledge and expertise to determine whether preventative measures were possible. The fact that the harming agent was initially designed by the defendant made conception of preventative measures after the fact easy for the courts to perceive. For some reason, however, consideration of preventative measures was not adopted in the older cases to the same degree. For example, in *Brown v. Kendall* [94] the defendant, knowing that the plaintiff was close by, could have turned around to see if the plaintiff was behind him before raising the stick to separate their fighting dogs. But Justice Shaw presumably decided that in the excitement of the moment, the defendant's failure to do so was not unexpected, or was at least human and therefore not negligent. One can

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89. *See supra* notes 76-81 and accompanying text.

90. *See supra* notes 82-83 and accompanying text.

91. In Losee v. Buchanan, 51 N.Y. 476 (1873), the court considered the question of whether trespass to land, in this case from fragments of an exploding boiler, should be a absolute liability offense. The court noted that some previous cases laid down the principle that any individual is entitled to undisturbed possession and enjoyment of his property. It retreated from this absolute liability position, saying "this principle . . . has many exceptions and limitations, made necessary by the exigencies of business and society." *Id.* at 480. The *Losee* court based its decision on a need to enhance the general welfare:

> I hold my property subject to the risk that it may be unavoidably or accidentally injured by those who live near me; and as I move about upon the public highways and in all places where other persons may lawfully be, I take the risk of being accidentally injured in my person by them without fault on their part. Most of the rights of property, as well as of person, in the social state, are not absolute but relative, and they must be so arranged and modified, not unnecessarily infringing upon natural rights, as upon the whole to promote the general welfare.

Id. at 485. For a further discussion of *Losee*, *see infra* text accompanying notes 104-22.

92. The court in *Butcher*, similar to *Losee*, declined to find absolute liability the rule. *Butcher*, 67 Cal. at 523-24, 8 P. at 177-78. "In the absence of statute, the rule is that inasmuch as railroad companies, authorized by charter to use steam-power, have necessarily the right to use fire as a means of generating steam, and are therefore not liable for fires *unavoidably* produced by keeping fire for such a purpose . . . ." *Id.* at 523, 8 P. at 177 (emphasis in original).

93. "Unavoidable accident" means an unintended occurrence which could not have been foreseen or prevented by the exercise of reasonable precautions. W. PROSSER & W. KEETON, THE LAW OF TORTS 162 (5th ed. 1984). The addition of the reasonability standard makes the basis for liability less clearcut and absolute. "What was expected [under the nineteenth century liability standard] was not perfection, but the vague, subtle standard of the 'reasonable man' . . . . The morals were those of the ordinary man, in an industrial world." L. FRIEDMAN, *supra* note 14, at 410.

94. *See supra* note 68 and accompanying text.

conclude that in the cases of the railroads, electric power and other more complex innovations, the courts were impressed by the power of human inventiveness, and as a result, reached further into the designs to find the power to avoid harm.

The effort to discern possible preventative measures was at cross-purposes, however, with the other goal of the avoidable accident analysis, which was to avoid absolute liability.[95] Even though the courts used the traditional negligence analysis to make their determinations, in the areas involving technological advance the consistency of finding for the plaintiff created an atmosphere of absolute liability.[96] This was a result the courts probably did not want to reach,[97] but was one to which they must have felt inexorably led by the methods of determining negligence available at that time.

Faced with an intellectual conundrum, the courts gradually resolved the problem technology created by evolving a new theory of negligence, one which considered as a major factor the weighing of risks against benefits, costs against harms.[98] By determining negligence decisions with a balancing test, the courts found a means to avoid absolute liability. Now the courts were no longer confined to assign liability on the basis of risk alone but could choose instead to assign liability on the basis of whether the risk of harm outweighed the benefits of the activity or product under scrutiny. Such balancing tests permitted the courts to limit the instances in which defendants would be held liable for harm. These balancing tests contained in essence the principles of cost-benefit reasoning.[99]

III. THE UNFOLDING OF LEGAL COST-BENEFIT REASONING

Most principles of tort liability appear to reflect widely divergent policies; and they become modified before our eyes as the exi-

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95. *See supra* note 91.

96. Schwartz found that in nineteenth century cases heard by California appellate courts, there were two hundred forty-eight jury verdicts for plaintiffs and only twenty-six for defendants. In suits against railroads in the same state, the breakdown is one hundred eleven to twelve. Similarly for New Hampshire, among appellate cases after 1850, there were one hundred forty-seven jury verdicts for the plaintiff and twenty-two for the defendant. For the entire nineteenth century, there were seventy-one verdicts for the plaintiffs in railroad cases and nine for the defendants. The ratio for highway accident cases against towns was a similarly overwhelming ratio of forty-one to nine. Schwartz, *supra* note 14, at 1764. Richard Posner's survey of nineteenth century appellate opinions across the country indicates a ratio of ten to one jury verdicts for plaintiff against verdict for defendant. Posner, *A Theory of Negligence*, 1 J. LEGAL STUD. 29, 51 (1972). To test whether cases appealed may be a biased sample, Schwartz read all tort cases filed against railroad defendants in Los Angeles County between 1889 and 1895. The ratio of decisions for plaintiffs against those for defendants was approximately two to one. Schwartz, *supra* note 14, at 1764.

97. For example, the *Losee* court disavows absolute liability expressly: "It is sufficient, however, to say, that the law, as laid in those [absolute liability] cases, is in direct conflict with the law as settled in this country." *Losee*, 51 N.Y. at 486-87.

98. The necessity of balancing the risk against harm is apparent in a number of early cases. *See, e.g.*, Card v. New York & Harlem R.R. Co., 50 Barb. 40 (N.Y. App. Div. 1864) (railroads "should exercise a degree of care and precaution proportioned to the impending danger and probabilities of a collision"); and Caldwell v. New Jersey Steamboat Co., 47 N.Y. 282, 288 (1872) (where common carriers transport passengers and the result of an accident is almost certain to be fatal, they are bound to use every precaution human skill can provide); Schwartz has noted that "[t]he more substantial the New Hampshire and California Courts perceived the risks in the defendant's activity to be, the higher the level of care they required the defendant to exercise." Schwartz, *supra* note 14, at 1757.

gencies of changing times demand that they should serve new policies.[100]

Two cases illustrate the courts' movement away from the limitations of actions in trespass to the burgeoning mode of weighing and balancing decision-making. *Losee v. Buchanan*,[101] an 1873 New York intermediate appellate decision, is exemplary in that it displays the court's sweep from the absolute liability of direct trespass analysis to the nineteenth century negligence standard of the unavoidable accident approach. Yet embodied in the court's language justifying that transformation is the substance of cost-benefit reasoning, a harbinger of legal postures to come. Exemplifying the full flower of the balancing approach, five decades later, is *Adams v. Bullock*,[102] a New York Court of Appeals decision by Judge Cardozo. The opinion, while echoing the language of the older unavoidable accident framework, depicts the court determining liability by weighing risks of harm against costs of avoiding injury stemming from the impact of technological fall-out.[103]

A. Losee v. Buchanan

In *Losee*, an exploding boiler from the defendant's paper mill catapulted projectiles onto plaintiff's land, causing damage to his buildings and personal property.[104] The plaintiff claimed that the defendant was liable for the damages even though there was no allegation or evidence of lack of due care. The plaintiff's argument rested on the principles of trespass, which automatically invoked absolute liability.[105] The court's analysis in rejecting the plaintiff's position clearly demonstrates the desire to curtail the absolute liability standard. While acknowledging that trespass case law seemed in accord with the plaintiff's argument for absolute liability, the court distinguished the various cases and analogous principles by finding that in fact those results were not inconsistent with a negligence standard.

The court observed in each type of case the plaintiff offered to support his position, that the damages were not only a direct result of the action taken (a

99. *See infra* text accompanying notes 123-42.
100. Gregory, *supra* note 14, at 360.
101. 51 N.Y. 476 (1873).
102. 227 N.Y. 208, 125 N.E. 93 (1919).
103. *See infra* text accompanying notes 123-42.
104. *Losee*, 51 N.Y. at 476. In the original trial, the plaintiff sued both the company and Buchanan and Bullock, major stockholders of the company, as agents. Losee v. Saratoga Paper Co., 42 How. Pr. 385, 385 (1866). The judge held that the question of negligence was not a factor in such a trespass case. *Id.* at 396. Defendants appealed, and the appeals court ordered a new trial on the question of negligence. *Id.* at 386, 396. At the second trial, a verdict was rendered against the company but in favor of Buchanan and Bullock. The plaintiffs moved for a new trial as to defendants Buchanan and Bullock; the motion was denied. *Losee*, 51 N.Y. at 477. The General Term of the Supreme Court agreed with the previous appellate court that negligence was necessary for liability. Nonetheless, it vacated the judgment for the defendants and ordered a new trial because of certain errors. Losee v. Buchanan, 61 Barb. 85, 121 (N.Y. App. Div. 1871). The defendants then appealed; the New York Commission of Appeals found no error, reversed the intermediate appellate court, and affirmed the lower court judgment upon the verdict. *Losee*, 51 N.Y. at 493.
105. The claim on the part of the plaintiff is, that the casting of the boiler upon his premises by the explosion was a *direct trespass* upon his right to the undisturbed possession and occupation of his premises, and that the defendants are liable just as they would have been for any other wrongful entry and trespass upon his premises.

requirement for an action on trespass), but the ensuing harms were inevitable outcomes of the activity, completely foreseeable and thereby implicating defendant's fault.[106] The court contrasted the facts in these cases with those in Losee's complaint, in which the boiler explosion was purely accidental, unintended, and lead to unexpected results. Unless the plaintiff could demonstrate that the accident itself was the result of some negligence on defendant's part, the court asserted, no liability would lie.

One English case in support of the plaintiff, *Fletcher v. Rylands*,[107] being squarely on point, was not distinguishable by the court's analysis. *Fletcher* upheld a broad basis for applying absolute liability, declaring that "the person who, for his own purposes, brings on his land and collects and keeps there anything likely to do mischief if it escapes, must keep it at his peril."[108] Though acknowledging the English standard, the *Losee* court rejected this view outright, stating that the law in the United States was "that no one can be made liable for injuries to the person or property of another without some fault or negligence on his part."[109] The court justified the requirement of negligence with a cost-benefit styled reasoning, expressing concern for technological progress:

> By becoming a member of civilized society, I am compelled to give up many of my natural rights, but I receive more than a compensation from the surrender by every other man of the same rights, and the security, advantage and protection which the laws give me.... We must have factories, machinery, dams, canals and railroads. They are demanded by the manifold wants of mankind, and lay at the basis of all our civilization. If I have any of these upon my lands, and they are not a nuisance and are not so managed as to become such, I am not responsible for any damage they accidentally and unavoidably do my neighbor. [My neighbor] receives his compensation for such damage by the general good, in which he shares, and the right which he has to place the same things upon his lands.[110]

This paean to modern invention and the need for reciprocal tolerance of technological externalities foreshadows future courts' use of cost-benefit analysis for determining negligence. The *Losee* court weighed and balanced the results of holding persons liable against the need for societal progress to justify restrictions on liability assignments. The analysis, however, serves only to explain the refusal to adopt an absolute liability approach; it does not determine (as does the analysis

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Losee, 51 N.Y. at 479 (emphasis added).

106. The plaintiff cited several previous cases to support an argument that the falling of the boiler on the plaintiff's land was a trespass upon his right of undisturbed possession and that defendants were liable even without negligence. The court distinguished these because, unlike blasting cases, the damage from the boiler was not a necessary consequence of the precise activity the defendant engaged in. *Id.* at 479-80. Similarly, the facts in *Losee* were distinguishable from cases involving continuing nuisances, in which owners of land on which certain machines were placed were liable to building owners on adjacent land who suffered damage from continuing vibration. *Id.* at 482. Likewise, the cases imposing strict liability for animals known to stray from the owners' premises or for wild animals did not control the result in cases involving inanimate objects. *Id.* at 482-83.

107. L.R. 1 Ex. 265 (1866), *aff'd*, 3 L.R. - E&I 330 (1868).

108. *Id.* at 279 (Blackburn, J.).

109. *Losee*, 51 N.Y. at 491:

110. *Id.* at 484-85.

by Judge Cardozo in *Adams*, below,[111]) the actual standard of negligence to be applied.

In reviewing the lower court's instructions to the jury, the *Losee* court turned to the traditional unavoidable accident framework for guidelines in determining negligence. The jury's charge was to find no liability if the defendant acted with ordinary prudence and if the boiler's defects causing the explosion were imperceptible or undiscoverable upon examination.[112] Since the instructions reflected the avoidable accident's requirement of foreseeability and lack of due care for liability, the *Losee* court found the jury charge to be consistent with the prevailing negligence principles.[113]

Since the court concurred with the jury's finding of an unavoidable accident, the case appears not to contain the contradictions inherent in applying avoidable accident analysis to mishaps stemming from advanced technology. However, this is not true. If the court had conformed to the negligence reasoning used in the later railroad cases,[114] it would have found the defendant liable because the accident was indeed — by the railroad analyses — avoidable.[115] Even though the defendant presumably exercised due care in operating the boiler,[116] negligence could have been found by the defendant's failure to consider precautionary measures in the event of an explosion, such as erecting barriers to prevent shards from escaping his property.[117] Under the railroad analysis the accident was not truly unavoidable and the defendant would have been liable.

As already noted,[118] however, such a conclusion would imply that nearly all accidents involving modern invention would be found avoidable, since the very knowledge creating the new design appeared to contain the capacity to prevent the resulting harm. Acceptance of this view would have meant the adoption of a rule that had virtually the same effect as absolute liability. Because of its concern for modern technology the *Losee* court did not want an absolute liability environment.[119] Thus, to avoid holding defendant liable the court was limited, at

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111. *Adams*, 227 N.Y. at 210, 125 N.E. at 93. *See infra* notes 123-42 and accompanying text.

112. *Losee*, 51 N.Y. at 492.

113. *Id.* at 492-93.

114. *See supra* text accompanying notes 76-83 and note 92.

115. No accident, of course, is entirely inevitable, so long as it results from a voluntary human act. If the defendant rides a horse, which runs away with him and injures the plaintiff, the accident is not strictly inevitable, since the defendant intentionally rode the horse, and might have prevented all harm by keeping him in the barn.

W. PROSSER & W. KEETON, *supra* note 93, at 162.

116. *Losee*, 51 N.Y. at 492-93.

117. At the trial, there was evidence that the boiler had been leaking a week or more before the explosion. The plant engineer reduced the steam pressure from 120 pounds to 110 pounds. The leakage continued and the engineer of the paper company informed Bullard of the leakage. The engineer also told Bullard that he had reduced the pressure. There was no evidence that the engineer said it was prudent to run the boiler at 110 pounds. Nonetheless, the trial court judge instructed the jury that if Goddard told Bullard that it would be prudent to run the boiler at 110, and Bullard believed him, Bullard was not liable. *Losee*, 61 Barb. at 97-98. The Commission of Appeals found that, although certain charges should have been better explained, the entire charge to the jury must be considered as a whole and the judges charge did not constitute error. *Losee*, 51 N.Y. at 491-92.

118. *See supra* notes 76-97 and accompanying text.

119. Although this view represented a trend begun earlier in the century, *see, e.g.*, Harvey v. Dunlop, __ Hill & Den. 193 (N.Y. Sup. Ct. 1843), and the more celebrated *Kendall*, 60 Mass. (6 Cush.) 292 (1850), occasionally a court would balk at the prospect of the defendant

least at this stage of legal development, to using the language of traditional negligence theory and declaring the accident unavoidable.

Losee demonstrates how the court shifted from absolute liability to negligence. Though the court focused on the unforeseeability of the technological accidents as the distinguishing factor separating them from the absolute liability of traditional trespass case law, later courts[120] became more impressed with the power of modern design and perceived in it an inherent ability to forestall the incidence of injury. In the pre-technological world, unforeseeability and unavoidability were consistently intertwined. With the advent of technological advance, however, the two characteristics were no longer simultaneous dimensions of any given accident. Often, technological accidents that were not to be foreseen became preventable, with the benefit of hindsight, after they occurred. Consistent with their efforts to avoid absolute liability,[121] the courts initially seized on the unforeseeability element to distinguish technological accidents to be deemed unavoidable.[122] Eventually, however, the impressiveness of the power of design overwhelmed the persuasiveness of the unforeseeability of the accident, leaving the courts to find for the plaintiff with rapidly growing frequency.

B. Adams v. Bullock

Since most accidents stemming from human designed structures are in some sense preventable, legal consistency would require that the continued use of the avoidability criteria alone would lead either to all such accidents being declared avoidable or to all such accidents being declared unavoidable. If the courts chose not to go to such extremes in an effort to avoid holding all defendants liable or leaving all victims uncompensated, their decisions as to which accidents were avoidable would then necessarily become arbitrary. The avoidability criteria no longer served to make meaningful distinctions in the face of complex technological advances.

This dilemma gave rise to the need for a new standard for determining negligence, perhaps one that could expand the avoidability principle. Once it became evident that the burgeoning number of accidents were avoidable in some fashion, the issue then arose: at what cost? Since the courts had already determined that to avoid the accident by not having the technology at all was too high a price,[123] the stage had been set to consider the costs of avoiding an accident as one factor in determining a duty to undertake them. In addition, some accidents appeared to be freakish occurrences (or at the very least exceedingly rare), while others appeared to be more of a minor inconvenience insufficient to warrant the efforts to avoid them. Weighing the costs of preventative measures, which were often large sums certain, against highly improbable or relatively harmless accidents seemed an appropriate basis for determining legal obligations to circumvent them. The effort to create such a new measure is evident in *Adams v. Bullock.*[124] The

escaping liability for unintentional harm on the grounds of no legal fault and the court would revert to a more strict liability approach; *see* Hay v. Cohoes, 2 N.Y. 159, 161 (1849) ("If he cannot construct the work [on his land] without the adoption of such means [involving trespass], he must abandon that mode of using his property, or be held responsible for all damages resulting therefrom.").

120. *See supra* text accompanying notes 76-87.
121. *See supra* text accompanying notes 49-72.
122. *See supra* text accompanying notes 73-87.
123. *See supra* text at note 110.
124. 227 N.Y. 208, 125 N.E. 93 (1919).

Adams court, although still grounded in the language of traditional negligence, endeavored to articulate an expanded test for determining negligence, one that augured the modern cost-benefit approach.

In *Adams*, a twelve year-old boy was injured when a wire, attached to a rod he was playfully swinging, accidentally touched defendant's electric trolley wires which had been strung several feet below the railroad bridge over which the boy was walking.[125] The court reversed a judgment for the plaintiff holding that the trolley company did not violate its duty to take all "reasonable precautions" to minimize the risk of accidents.[126] The court's discussion suggested ways the accident could have been avoided. One intimation was to post guards with sufficient intermittency to prevent passers-by from injuring themselves and another was to put the wires underground.[127] The first was not addressed and the second was dismissed on the ground that no evidence was offered to indicate either an ability or a duty on the part of the defendant to do so.[128] The court concluded that "[t]o hold [the defendant] liable upon the facts exhibited in this record would be to charge it as an insurer."[129]

On the surface, Judge Cardozo appears to analyze the problem presented in *Adams* with the traditional tools of the unavoidable accident approach of negligence. When he states "we think that ordinary caution did not involve forethought of this extraordinary peril" he seems to be using the foreseeability element of the conventional unavoidable accident standard of negligence. Nonetheless, the language he uses is sufficiently flexible that it encompasses the implicit cost-benefit analysis with which he reinforces his conclusion of non-liability. So, for example, when Judge Cardozo discusses "the duty to adopt all reasonable precautions,"[130] or notes the "extraordinary casualty, not fairly within the area of ordinary prevision,"[131] his terminology invokes the traditional notion of foreseeability in terms of an ordinary person's ability to foresee danger. The language and its juxtaposition, however, also signifies that whether a precaution is reasonable to undertake depends on its expense when weighed against the low ("extraordinary")

125. *Id.* at 209, 125 N.E. at 93. The defendant owned a trolley line that employed overhead wires. At one point, a railroad bridge crossed the road on which the trolley cars ran; the defendant's wire was strung beneath the bridge. Pedestrians often used the bridge as a short-cut across the road and children frequently played on it. The side of the bridge was protected by a parapet about eighteen inches wide and the defendant's wire hung over four and one-half feet below the top of the parapet. Normally, no one standing on the bridge or even leaning over the parapet could touch the wire strung beneath it. *Id.* at 209-10, 125 N.E. at 93. The plaintiff, a boy twelve years old, came across the bridge swinging a wire about eight feet long. This wire came into contact with the trolley company's wire, and the boy was shocked and burned when the two wires came together. *Id.* at 209, 125 N.E. at 93. The boy's guardian sued and the trial court entered a verdict for the plaintiff. On appeal, the Appellate Division affirmed the trial court. The defendant appealed to the Court of Appeals. *Id.* at 208-09, 125 N.E. at 93.

126. *Id.* at 210, 125 N.E. at 93.

127. *Id.* at 211, 125 N.E. at 94. Cardozo also discussed the possibility of insulating the wires, which he noted was impossible, presumably for technological reasons. *Id.*

128. *Adams*, 227 N.Y. at 211, 125 N.E. at 94. Compare this finding with that in *Butcher*, 67 Cal. at 518, 8 P. at 174, (*see supra* text accompanying notes 82-83) where the court found *prima facia* proof of negligence on the basis of the theoretical possibility of a spark-proof railway engine.

129. *Adams*, 227 N.Y. at 211, 125 N.E. at 94.

130. *Id.* at 210, 125 N.E. at 93.

131. *Id.*

probability of an unexpected harm.[132] This latter dimension is a precursor of the more modern day cost- benefit analysis[133] and it becomes more explicit as the opinion proceeds.

Even though Judge Cardozo concludes that the accident was not foreseeable, which under traditional negligence theories should have brought the liability question to a close,[134] he nonetheless undertakes to bolster his conclusion of nonliability by engaging in a balancing analysis. "Chance of harm, though remote, may be token negligence, if needless. Facility of protection may impose a duty to protect."[135] In effect, Judge Cardozo says that even if the harm has an extremely low probability of occurring, if the cost of avoiding it is equally small, there is a duty to avoid the harm anyway. This precisely foreshadows the *Carroll Towing* formula[136] and is a cost-benefit standard.

In applying this test, Judge Cardozo notes that absent a "gift of prophecy" the company "could [not] have predicted the point upon the route where such an accident would occur."[137] He concludes that "[g]uards here and there are of little value."[138] Implicit in his analysis is a consideration of the costs of placing guards because, clearly, with a sufficient number of guards, the accident could have been avoided. But obviously, that expense would have exceeded his notion of "facility of protection."[139]

Though Judge Cardozo must have felt it self-evident that placing a sufficient number of guards on duty to preclude the possibility of such harms would be too costly, he does not feel equally comfortable in making that blanket assumption with regard to the issue of placing the wires underground, perhaps because there is some question as to its expense and feasibility.[140] With respect to the guards, Cardozo is willing to dismiss the possibility without discussion but with regard to placing the wires underground he requires an evidentiary base.[141] Thus we observe Judge Cardozo making a determination of negligence not on the sole basis of whether the accident could have been avoided, but on the basis of weighing the risk of harm against the alternative costs of avoiding it.[142]

Judge Cardozo's approach helps relieve the dilemma created by the courts' use of the avoidability criteria alone in the face of technological progress. The avoidability criteria is an absolute standard that does not permit the consideration

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132. Even the foreseeability element, as Justice Cardozo applies it, presages the current approach to weighing benefits against harms. Foreseeability can be interpreted to mean something other than whether an accident is possible at all. Foreseeability can also mean whether the probability of a particular accident occurring is sufficiently high that it is "worth" (when weighed against the alternatives) guarding against. Thus, Justice Cardozo's terms of "ordinary caution" and "extraordinary peril" tend to suggest this latter interpretation as well.

133. *See infra* text accompanying notes 144-60.

134. *See supra* text accompanying notes 59 and 69.

135. *Adams*, 227 N.Y. at 211, 125 N.E. at 94.

136. *See infra* notes 154-56 and accompanying text.

137. *Adams*, 227 N.Y. at 210, 125 N.E. at 93.

138. *Id.* at 211, 125 N.E. at 94.

139. *Id.*

140. Cardozo notes, "Neither its [the trolley company's] power nor its duty to make the change [putting the wires underground] is shown. To hold it liable upon the facts exhibited in this record would be to charge it as an insurer." *Id.*

141. Because the feasibility and expense of putting the wires underground was not established, Cardozo remanded the case for new trial. *Id.*

142. For other analysis recognizing the implicit cost-benefit reasoning in Adams, see W. LANDES & R. POSNER, THE ECONOMIC STRUCTURE OF TORT LAW 97-98 (1987).

of trade-offs between harms and the cost of avoiding them.[143] Allowing for such weighing and balancing permits the court to determine which defendants should pay for accidental harms in a consistent manner. What is missing, however, is a scale to measure the pros and cons of a particular activity. Judge Cardozo does this implicitly by indicating that certain measures of precaution cost too much. His test does not, however, articulate a methodology to weigh and balance the variables of degree of harm, its probability of occurrence, and the cost of its avoidance. That refining process was left to the more modern courts.

IV. MODERN COST-BENEFIT ANALYSIS IN THE COURTS

Among the recent developments applying economic principles to legal issues, two well-springs of legal theory have adopted the formality of cost-benefit reasoning for determining negligence. One is Learned Hand's *Carroll Towing*[144] formula for determining defendant's duty to forbear risk, and the other is risk-utility analysis for determining which risks inherent in manufacturers' designs should be deemed legally defective. Each body of law has developed in the context of the court's recognition that risk inevitably inures to the complications of modern commercial and scientific evolutions. In applying these frameworks, the question the courts seek to answer is whether a particular risk exceeds some social norm. As a result of the manner in which the courts apply both the *Carroll Towing* formula and risk-utility analysis, however, the answer in each case also becomes the answer to the subsidiary and sometimes obscured question of who is to bear the risks' costs when the harms do occur. Though these separate questions concerning the definition of acceptable risks and the allocation of the costs of the inevitable harms do not have to be so intertwined, the manner in which the *Carroll Towing* formula and the risk-utility analysis incorporate cost-benefit reasoning into their liability determinations forces their cost-benefit analyses to serve both purposes. As will be seen later,[145] this is not only an unnecessary outcome of utilizing cost-benefit reasoning, but it also may be counter-productive for the goals our society wishes to promote.

Historically, the *Carroll Towing* formula and risk-utility analysis were each developed to define a standard of negligence or liability in areas for which traditional analyses were either ambiguous or inadequate. In each instance, the courts sought to find a middle ground that neither left all victims uncompensated nor rendered all defendants insurers for every conceivable harm stemming from

143. The imposition of the reasonable man standard does tend to soften the absolute nature of the unavoidable accident criterion. *See supra* text accompanying notes 55-58. Courts earlier than *Adams* attempted explicitly to do so. *See Collins*, 53 N.H. at 444: "There may be some ground to argue that 'utterly without his fault,' 'inevitable,' and 'no negligence,' in the sense intended in that case, mean no more than the modern phrase 'ordinary and reasonable care and prudence . . . .'" The reasonable man standard, however, is vague and intuitive. Compare, for example, the different results courts have reached on the question of an industrialist's duty to use the safest technologically possible machinery. *See supra* text accompanying notes 82-87. Furthermore, it is unclear how the *cost* of avoidance should be weighed. *See* Sewall's Falls Bridge v. Fisk & Norcross, 23 N.H. 171, 178-79 (1851) (court ruled inadmissible defendant's evidence that timber could not be taken to market, without costing more than its market value, in any manner other than the one they used).

144. *Carroll Towing Co.*, 159 F.2d at 173.

145. *See infra* text accompanying 259-68.

their product or service.[146] In particular, risk-utility analysis — the more recent legal phenomenon — serves to resolve problems in negligence decisions caused by the difficulties of both manufacturers and consumers to accurately assess *ex ante* the risks in the products and services with which they deal. Each legal approach incorporates the weighing and balancing of harms against benefits and risks against costs of avoidance to make their liability determinations. Each approach also contains, however, an implicit value choice concerning who should bear the cost of risky harms and who should not.

A. The Carroll Towing *Formula*

In 1947 Judge Learned Hand in his now famous decision *United States v. Carroll Towing Co.*,[147] explicitly posited a cost-benefit formula to deal with the problem of determining negligence in situations when traditional standards were of little use.[148] In *Carroll Towing*, an unattended barge broke loose from its moorings and caused damage.[149] One question facing the court was whether the lack of supervision was, by itself, determinative of liability. While there was substantial case law assigning liability because of the failure of a bargee to be present, there were a significant number of cases which held that the attendant's absence also was insufficient grounds to support a judgment for the plaintiff.[150]

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146. A good description of the extremes of liability if defendant were made, in effect, an insurer is found in Wade, *On The Nature Of Strict Tort Liability For Products*, 44 MISS. L. J. 825, 828 (1973) [hereinafter *Strict Tort Liability*]:

> Thus, the manufacturer of a match would be liable for anything burned by a fire started by a match produced by him, an automobile manufacturer would be liable for all damages produced by the car, a gun maker would be liable to anyone shot by the gun, anyone cut by a knife could sue the maker, and a purchaser of food with high calories would have an action for his overweight condition and for an ensuing heart attack.

147. 159 F.2d 169 (2d Cir. 1947).

148. *Id.* at 173.

149. *Id.* at 170-71. The owner of the "Anna C" had chartered the barge to the Pennsylvania Railroad Company. The charter was at a stated charge per diem and included the services of a bargee between the hours of eight A.M. and four P.M. The "Anna C" was moored as the innermost vessel of a tier of six barges at a particular pier, Pier 52. A tug boat, the "Carroll" began operations to "drill out" a barge at an adjacent pier about two o'clock in the afternoon. To do this, it had to release a line from the outermost barge in the tier at the next pier to a vessel in the tier at Pier 52. Before releasing this line, the captain of the "Carroll" asked the harbor master and a deckhand to make sure that the barges at Pier 52 were safely moored. The harbor master and the deckhand readjusted the lines to their satisfaction. Nonetheless, the tier of barges at Pier 52 went adrift because the fasts from the "Anna C" to the pier were insufficient. As the six vessels, still tied together, drifted, the "Anna C" struck a tanker and the tanker's propeller broke a hole at or near the bottom on the vessel. The "Carroll" and another tug, the "Grace," came to the aid of the flotilla. Had the crew on the tugs known the barge was leaking, they could have saved her. However, since no bargee was on board to notice the leak, the "Anna C" sank. *Id.* at 170-71. The bargee who should have been on duty was absent. *Id.* at 173.

The court addressed the question of whether the "Anna C" owner's failure to maintain a bargee on duty should prevent his full recovery. *Id.* at 172-74. The court held that, under the circumstances, it was a fair requirement that the owner should have a bargee aboard during daylight working hours. *Id.* at 174.

150. *Id.* at 172-73. Prior case law was divided on the question of whether leaving the barge without a bargee on board was negligence. The factual circumstances of the previous cases were important in determining the results. For example, in one case leaving a barge made fast outside another barge with no one on board was negligence, in part because there was a storm warning at the time. In contrast, in another instance it was not negligence for the bargee to have left before a storm arose, because there was no reason to expect danger. In cases where a vessel was moored to another ship, negligence was generally found because the bargee could not

As Judge Hand noted, "there is no general rule to determine when the absence of a bargee or other attendant will make the owner of the barge liable for injuries to other vessels if she breaks away from her moorings."[151]

In an effort to derive a basis upon which liability could be assigned, Judge Hand indicated that there are some circumstances of runaway barges in which the owner will not be found negligent.[152] Since the liability arising from an absent bargee was equivocal, Judge Hand sought to establish criteria for determining when an unattended barge was negligence and when it was not. Abstracting from the case law before him, Judge Hand concluded that liability depended on a variety of factors, as well as their varying degrees, and a determination should depend on the weighing and balancing of those variables.[153]

Categorizing the range of factors into three basic types, Judge Learned Hand explicitly addressed the issue of weighing the costs of accident avoidance against the expected harm to determine the defendant's obligation:

> [t]he owner's duty . . . to provide against resulting injuries is a function of three variables: (1) The probability that she will break away; (2) the gravity of the resulting injury, if she does; (3) the burden of adequate precautions.[154]

He then presented the appropriate relationship between the variables in the framework of a formula:

> Possibly it serves to bring this notion into relief to state it in algebraic terms: if the probability be called P; the injury, L; and the burden, B; liability depends upon whether B is less than L multiplied by P: i.e., whether $B < PL$.[155]

Thus, by a distillation of the previous case law, Judge Hand presented, in a formal fashion, the factors that should be considered in determining negligence and how to weigh and balance them in order to reach a decision. On one side of the scale is the risk of harm, calculated by the harm's severity adjusted for its probability of occurring, PL. Borrowing from the language of mathematicians, this calculation is often referred to as the "expected harm."[156] Balanced against the

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anticipate when the stevedores might have to cast off the barge, and should have stayed aboard against that eventuality.

151. *Id.* at 173.

152. "[T]here are occasions when every vessel will break from her moorings . . . ." *Id.*

153. *Id.* Among the factors Hand weighed in concluding that it was negligence for the bargee to be gone during the working daylight hours were: the length of time the bargee was gone (from five o'clock one afternoon until after two the next afternoon); the high level of activity (particularly during wartime); the foreseeability of lack of care given the "inevitable haste and bustle;" and the short January days. *Id.* at 173-74.

154. *Id.* at 173.

155. *Id.*

156. Though "expected harm" also has a common parlance meaning, i.e., the harm one expects to happen, its mathematical meaning, though not inconsistent with every day use, has a more rigorous definition. Expected harm in a mathematical sense literally means the severity of the harm adjusted by its probability of occurring. Of course, since the definition is mathematical, the concepts must be quantified. This quantification is reflected in Judge Hand's formula. The severity of the harm, as measured by L, adjusted by its probability of occurring, as measured by P, appears in Hand's discussion as L multiplied by P, or algebraically, L x P, which abbreviates to PL. PL, then, is the "expected harm."

For example, if the damage caused by an escaping barge is $10,000 (i.e., L =$10,000) and the probability that it escapes is 50% (i.e., P =.50), then the "expected harm" of leaving the

"expected harm" on the other side of the scale, is the cost to avoid the harm, B. If the scale tilts towards the expected harm, then the cost to avoid the harm, B, is less than the expected harm, PL. According to Judge Hand's analysis, in such a case the defendant is obligated to undertake those precautions, and in failing to do so, should be held liable for any consequential harms. Under the circumstances in *Carroll Towing*, the court felt the probability of the barge causing damage was too great to justify the day and a half absence of the bargee.

Carroll Towing is the analogue of the situation presented in *Adams*.[157] The accident in *Adams* was preventable if a sufficient number of guards were posted along the trolley line.[158] In *Carroll*, the barge's escape would not have occurred if there had been a twenty-four hour bargee on duty.[159] As in *Adams*, the accident with the barge, evaluated by nineteenth century negligence principles, was avoidable. In *Adams*, the court did not articulate its obvious conclusion that the requisite number of guards to avoid such accidents was too expensive given the probability of the harm. It simply dismissed that possibility by only considering the ineffectiveness of a few guards, thereby concluding summarily — without any evidence or explicit balancing — that the defendant was under no duty to do more.[160] In *Carroll Towing*, however, the court is quite explicit that the defendant's duty to do more is affected by its cost, in particular, the cost relative to the degree of risk. The court clearly indicates that a twenty-four hour bargee by

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barge unattended is PL, or in this case, .50 x $10,000 which equals $5000. If instead, the probability of escape was only 25%, then the "expected harm" would only be .25 x $10,000 = $2500. Thus, even though the actual damage — if the accident occurs — remains the same, a lower probability of its occurrence lowers the "expected harm." Obviously, in a similar fashion, differences in actual harms will also lead to differences in "expected harm."

The purpose of the formula is to determine liability for damages, but not the damages themselves. If a defendant is found liable via the formula, then the defendant pays for the damages in full. The reason for adjusting the damages by the probability of occurrance is to avoid an absolute liability result. If the legal decision is to avoid absolute liability, then one way of making liability distinctions is to base it on the likelihood of occurrence as well as the severity of the calamity. The "expected harm" captures that approach by allowing a trade-off between the strength of the likelihood and the degree of severity for determining liability. For example, a harm costing $1000 in damages with a 25% chance (i.e., one out of four times) of occurring will yield the same "expected harm" for determining liability as a harm costing $25,000 with only a 1% chance (1 time in a 100) of occurring. Thus, the Learned Hand formula will place the same legal duty on a defendant to avoid a harm whether it is of limited degree but likely to happen quite frequently (as in a nuisance), or if it is an extensive harm but extremely rare to occur. In this respect, the Learned Hand formula does seem to capture the essence of "foreseeable harm."

This framework can be expanded to incorporate more complicated and sophisticated scenarios. Suppose, for example, that the barge is left unattended so that the probability of escape and the level of damage depends on the possibility of a storm, and assume that storms are rare. Suppose there is a 10% probability of an escaping barge in non-stormy conditions and a 15% probability of an escaping barge in stormy conditions. If the damage is $2000 in non-stormy weather and $10,000 in stormy weather, then the expected harm of leaving the barge unattended is:

P	x	L		P	x	L		
.10	x	$2000	+	.15	x	$10,000	=	$1700

Thus, the expected harm of leaving the barge unattended is the aggregate of the expected harm for each type of accident. Theoretically, when the court applies this formula, it can take into account all the possibilities of harm a particular activity might generate along with their respective probabilities. However, some scholars view such theoretical applications to real world court room situations with skepticism; they believe that decisions based on such analyses creates more confusion than enlightenment. *See, e.g.*, Epstein, *supra* note 38, at 469.

157. *See supra* text accompanying notes 123-42.
158. *Id.*
159. *Carroll Towing*, 159 F.2d at 173.
160. *Adams*, 227 N.Y. at 211, 125 N.E. at 94.

itself was not a cost the owners were expected to incur. But the owners were expected to ensure that adequate supervision was available when the probability of harm was sufficiently large.

While deciding that the owners were not expected to incur the cost of a twenty-four hour bargee, the court simultaneously decided that as long as the supervision reached a legally sufficient level, the owner would not be liable for any damages that resulted from an unsupervised escaping barge. In other words, the court did more than use cost-benefit reasoning to determine what the social standards of due care ought to be and whether defendant's conduct comported satisfactorily with them. It also decided that the defendant would not bear the costs for any harms that would eventually and inevitably ensue from its activities as long as, at any particular moment of time, the risk of occurrence was sufficiently small. Both the standard of appropriate risky conduct and the decision as to how to allocate harm's costs are crystallized in Learned Hand's formula. The question of judicial redress when defendant takes inappropriate social risks, however, should be a separate issue from whether and by whom victims of accidents should be compensated for their harms.

B. Risk-Utility Analysis in Product Design

Risk-utility analysis, though not presented with the same grandeur of a formula, nevertheless employs the same factors that *Carroll Towing* does, in a similar balancing fashion, to determine liability in the area of product design. Risk-utility analysis was developed to cope with the nature of harms arising out of the mass production and circulation of manufactured goods of sophisticated design.[161] Typically, there were two kinds of harms stemming from manufactured goods that seemed to thwart the purposes of more traditional negligence analysis: harms resulting from goods that were imperfectly manufactured and harms caused by the very nature of the product design.

Harms resulting from imperfectly manufactured goods arose because something happened during production or distribution that prevented the product from taking the shape the manufacturer intended. An example is a loose bolt or a leaky valve or an exploding soda bottle.[162] Harms resulting from the nature of the product involved products that were as the manufacturer intended but that induced harms as a result of the design. Examples are knives that cut, airplane carburetors which are at some risk of icing and causing engine failure,[163] and automobiles that can accidently kill people.

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161. For articles reviewing the issues with respect to risk-utility analysis, see Birnbaum, *supra* note 9; Epstein, *supra* note 38; Note, *Adding a Risk/Utility Analysis to the Consumer Expectation Test in Design Defect Cases*, 28 ARIZ. L. REV. 459 (1986); Twerski, *From Risk-Utility to Consumer Expectations: Enhancing the Role of the Judicial Screening in Product Liability Litigation*, 11 HOFSTRA L. REV. 861 (1983); *Strict Tort Liability*, *supra* note 146; and Wade, *On Product "Design Defects" and Their Actionability*, 33 VAND. L. REV. 551 (1980). The seminal opinion adopting the risk-utility approach is Barker v. Lull Engineering Co., 20 Cal. 3d 413, 573 P.2d 443, 143 Cal. Rptr. 225 (1978) (*see infra* text accompanying notes 242-58). Other interesting cases are Halphen v. Johns-Manville Sales Corp., 484 So. 2d 110 (La. 1985), *certified from*, 755 F.2d 393 (5th Cir. 1985), *aff'd*, 788 F.2d 274 (5th Cir. 1986), and Dart v. Wiebe Manufacturing, Inc., 147 Ariz. 242, 709 P.2d 876 (1985).

162. *See, e.g.*, Escola v. Coca Cola Bottling Co., 24 Cal. 2d 453, 150 P.2d 436 (1944).

163. Wilson v. Piper Aircraft Corp., 282 Or. 61, 577 P.2d 1322 (1977), *rehearing denied with opinion*, 282 Or. 411, 579 P.2d 1287 (1978).

The question facing the courts in both types of situations was whether the manufacturer should be held liable for the ensuing harms. The problem with the traditional approaches for assigning liability was that they required a demonstration of some negligent act on defendant's part. In those cases when individual items did not conform to production standards, this would entail showing that the accident of a loose screw in a particular unit was the result of a negligent action somewhere in defendant's production line at the time the unit was made. This burden seemed, to the courts, hopelessly impossible for the plaintiff to bear.[164] When some subtlety in the design itself caused the harm, both plaintiff and defendant would frequently be unaware of the potential for injury until it actually occurred.[165] When the defendant could not foresee the injury, a conclusion that he behaved negligently in the traditional sense was difficult to reach.

The courts were reluctant to let manufacturers escape liability altogether merely because the traditional negligence analysis failed to enable plaintiffs to gain verdicts in their favor. Furthermore, there was a growing sentiment that even in instances when the defendants did not behave negligently by traditional standards, they should nevertheless pay for a substantial amount of the injuries that their product innovations introduced to the commercial mainstream. These views were fostered by several beliefs. One was that the manufacturers were in the best position to control and eliminate risks their products introduced into society. Requiring the manufacturers to pay for the consequences of those risks seemed to be the most effective way to create incentives for them to minimize those risks. Another reason was that manufacturers seemed better able than consumers to bear the costs of those risks. If forced to absorb the full consequences of randomly inflicted harm, the consumer may face financial peril. The product manufacturer can raise prices and spread the costs of those random injuries among all the consumers who benefit from the product. Thus, courts and scholars generally propose that enterprises should pay for the full costs of doing business.[166]

The courts, however, did not want to achieve the goal of broader liability by returning to the early nineteenth century era of absolute liability. Though they wanted the manufacturers to bear responsibility for harms they brought about, the courts did not want liability to be applied for every conceivable harm. Once again, they were faced with creating a new standard that fell somewhere between existing standards. In this instance they sought a standard between negligence liability and absolute liability. Ultimately, it was called strict liability.[167]

The first efforts in this direction were to strip away the legal protections that barred plaintiffs' ability to hold manufacturers liable. In the famous case of *MacPherson v. Buick Motor Company*,[168] Judge Cardozo removed the requirement of privity of contract that prevented the ultimate purchaser from suing the manufacturer in tort for harms arising out of the use of his product. Prior to this decision, the manufacturer was liable only to the immediate purchaser who was

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164. *Id.*

165. *E.g.*, Greenman v. Yuba Power Products, Inc., 59 Cal. 2d 57, 377 P.2d 897, 27 Cal. Rptr. 697 (1963).

166. *Id.* at 63, 377 P.2d at 901, 27 Cal. Rptr. at 701; Birnbaum, *supra* note 9, at 596.

167. *See Greenman*, 59 Cal. 2d 57, 377 P.2d 897, 27 Cal. Rptr. 697.

168. 217 N.Y. 382, 111 N.E. 1050 (1916).

usually a middle man and not the ultimate user.[169] The demise of the requirement of privity, however, did not alleviate the plaintiff's evidentiary problems of proving defendant's negligent behavior. A shift to suits in warranty was of some assistance,[170] particularly after its privity requirement was dropped,[171] since the focus of liability was on the merchantability of the product rather than the behavior of the manufacturer. Other requirements of warranty, such as proper notice, seriously impeded the unknowing consumer. Until the landmark decision *Greenman v. Yuba Power Products, Inc.*,[172] substantial legal loopholes enabled manufacturers to avoid liability for harms the courts clearly wanted to impose.

Greenman removed the obstacles stemming from traditional negligence and warranty law by asserting that manufacturers' liability was "not one governed by the law of contract warranties but by the law of strict liability in tort."[173] Establishing a new standard for manufactured goods, the court said "[a] manufacturer is strictly liable in tort when an article he places on the market . . . proves to have a defect that causes injury to a human being."[174] What was not defined was the meaning of defective product, and the judicial struggle over what that standard should be is what ultimately led to the development of risk-utility analysis.[175]

Initial efforts to define defective products also attempted to assure that strict liability did not extend as far as absolute liability, that is, that the manufacturer would not be liable for every conceivable harm that might stem from his product. Endeavoring to create a standard that transcended traditional notions of negligence, section 402A of the *Restatement (Second) of Torts* provided that strict liability applied to products in a "defective condition," that is, "a condition not contemplated by the ultimate consumer, which will be unreasonably dangerous to him."[176] It went on to note that "[m]any products cannot possibly be made entirely safe for all consumption, and any food or drug necessarily involves some risk of harm, if only from overconsumption."[177] Though it is clear the *Restatement* writers intended to draw some limits on manufacturers' liability, the qualifier of "unreasonably dangerous" seemed to beg the question of what constituted a legally defective product.

Some interpretations compare the *Restatement*'s definition to a common law attempt at defining defective products based on a "consumer expectations" test.[178] One definition of the consumer expectations test is that "a product is defective in design . . . if the product has failed to perform as safely as an ordinary consumer would expect when used in an intended or reasonably foreseeable manner . . . ."[179] Some of the difficulties with this standard arise because consumers often do not

169. *See, e.g.*, Huset v. J.I. Case Threshing Machine Co., 120 F. 865, 867-71 (8th Cir. 1903).
170. Birnbaum, *supra* note 9, at 594-96.
171. *E.g.*, Henningsen v. Bloomfield Motors, Inc., 32 N.J. 358, 161 A.2d 69 (1960).
172. 59 Cal. 2d 57, 377 P.2d 897, 27 Cal. Rptr. 697 (1963).
173. *Id.* at 63, 377 P.2d at 901, 27 Cal. Rptr. at 701.
174. *Id.* at 62, 377 P.2d at 900, 27 Cal. Rptr. at 700.
175. A number of recountings of that struggle, each with their own interpretations, can be found in the references cited in note 161, *supra*.
176. RESTATEMENT (SECOND) OF TORTS § 402A, comment g (1965).
177. *Id.* comment i.
178. *E.g.*, Birnbaum, *supra* note 9, at 611.

know what to expect from a new and different product and thus consumer expectations would set a standard far lower than the courts intend.[180] Another objection is whether the consumer expectations test implicitly entails assumptions of risk and is therefore inconsistent with the spirit of strict liability, which seeks to be independent of either the consumer or the manufacturer's behavior.[181]

Considerable frustration with attempts to establish a standard that holds defendants liable for a broader range of harm than traditional negligence principles and yet avoids an absolute liability effect, has caused some courts to turn to the risk-utility approach for solace. Recommended by Dean Wade in his classic article, *On The Nature of Strict Tort Liability for Products*,[182] the risk-utility test classifies a design as legally defective when "the magnitude of the risk created by the dangerous condition of the product [is] outweighed by the social utility attained by putting it out in this fashion."[183] The factors Dean Wade suggests considering in making this determination are: the usefulness and the desirability of the product, the availability of safer alternatives, the probability of injury and its seriousness, the obviousness of the danger, public expectation of the danger, and the ability to eliminate the danger without seriously impairing the usefulness of the product.[184] This test defines a product as "defective" by a combination of weighing benefits against risks and risks against the cost of risk avoidance. Whether or not the defendant produces a "defective" product through negligent acts is not at issue; what is at issue is whether the product, with its strengths and weaknesses, is one society finds, at the very least, tolerable.

Though this test appears to avoid satisfactorily all the pitfalls the courts envisioned, it has not put the debate to rest; scholars and courts now argue whether the risk-utility definition is truly a strict liability standard or is in fact a variant of a negligence test.[185] Some courts and many scholars view the standard as "making a judgment about the manufacturer's judgment"[186] and is therefore really a negligence test. "[I]f liability is to be imposed on the grounds that the manufacturer could have feasibly made the product safer (we use the term 'feasibly' here to denote a risk/benefit analysis), then the inquiry must be based upon whether the conduct of the manufacturer was reasonable, that is, standard

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179. Barker v. Lull Engineering Co., 20 Cal. 3d 413, 418, 573 P.2d 443, 446, 143 Cal. Rptr. 225, 237 (1978).

180. Birnbaum, *supra* note 9, at 611; *Strict Tort Liability*, *supra* note 146, at 829.

181. Birnbaum, *supra* 9, at 611; *Dart*, 147 Ariz. at 244, 709 P. 2d at 878.

182. *Strict Tort Liability*, *supra* note 146, at 829.

183. *Id.* at 835. *See, e.g., Barker*, 20 Cal. 3d at 430, 573 P.2d at 454, 143 Cal. Rptr. at 236 ("[P]roduct may be found defective in design . . . if the jury finds that the risk of danger inherent in the challenged design outweighs the benefits of such design."); Caterpillar Tractor Co. v. Beck, 593 P.2d 871, 886 (Alaska 1979) (following *Barker*, trial court may instruct jury that a product is defectively designed 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 such design."); and Turner v. General Motors Corp., 584 S.W.2d 844, 847 n.1 (Tex. 1979) (a defectively designed product is one that is unreasonably dangerous as designed, taking into consideration the utility of the product and the risk involved in its use). *See also Dart*, 147 Ariz. at 245, 709 P.2d at 879.

184. Byrns v. Riddell, 113 Ariz. 264, 267, 550 P.2d 1065, 1068 (1976), summarizing Dean Wade's criteria.

185. *See* Birnbaum, *supra* note 9, at 609; Epstein, *supra* note 38, at 474; Note, *supra* note 161, at 462; *Barker*, 20 Cal. 3d 413, 573 P.2d 443, 143 Cal. Rptr. 225; *Dart*, 147 Ariz. 242, 709 P.2d 876.

186. Birnbaum, *supra* note 9, at 609-10.

principles of negligence."[187] Other courts and scholars argue to the contrary, that in fact the risk-utility test can be applied in a strict liability framework. These proponents argue that when the test is applied to the state of the product, rather than the manufacturer's conduct, it comports with the purpose of the strict liability approach.[188]

It seems, however, that these disputes originate in interpretations driven by semantics rather than substance. What has been created with the risk-utility analysis is a new standard of culpability, one based on whether the risk introduced by the product is "reasonable," given its benefits, for society to tolerate. The fact that the term "reasonable" is used does not necessarily invoke the negligence standard of reasonable as in, for example, the "reasonable man." The reasonable man standard of the late nineteenth and early twentieth century impliedly held out that it was a uniform standard known to all and merely needed to be revealed in any particular instance by the pronouncements of a jury. The underlying presumption was that everyone should and could operate as the "reasonable man" would in a given situation, and their failure to do so (which was deemed negligence) gave rise to their liability for any ensuing harms. Implicit in such pronouncements was that "reasonable risk" was a well worked-out concept and understood by the community at large.

Modern product design, while so miraculous, is also so complex that whether society considers, in any instance, the product's utility as outweighing the risks is not clear cut. In effect, it must be decided *de novo* with every modern invention. These are policy choices, value choices that society, not some manufacturer, makes. Risk-utility analysis presumes that the trier of fact, whether it be a trial judge or a jury, is society's representative to make that decision and the risk-utility test provides guidelines for making a determination. In other words, the risk-utility approach asks the jury to decide in each instance whether the risks are reasonable for society to absorb given the benefits. In making this determination, the jury is not passing judgment on whether the manufacturer's conduct is reasonable. The jury's decision is a judgment, after the full ramifications are revealed, on whether the product is reasonable. "Reasonable" is a general broad-based word and can easily accommodate the two separate notions of reasonableness that exist here.

The primary focus of the debate should be whether risk-utility will, in fact, impose greater liability than negligence and yet still be more circumscribed than absolute liability. When critics argue that they see negligence lurking in the corners of the cost-benefit calculations, they trigger an alarm set by the original intentions for developing a strict liability standard. Strict liability served to ensure that a significantly broader liability was to be imposed on the manufacturer than the negligence standard. When the critics argue that risk-utility acts as a judgment on

187. Brady v. Melody Homes, 121 Ariz. 253, 259, 589 P.2d 896, 902 (Ct. App. 1978). *See also* Cronin v. J.B.E. Olsen Corp., 8 Cal. 3d 121, 501 P.2d 1153, 104 Cal. Rptr. 433 (1972) (determination of whether product is unreasonably dangerous, which requires weighing of benefits and risks, rings of negligence).

188. *Dart*, 147 Ariz. at 246-47, 709 P.2d at 880-81; *Barker*, 20 Cal. 3d at 426-34, 573 P.2d at 453-57, 143 Cal. Rptr. at 235-39. *See* Phillips v. Kimwood Mach. Co., 269 Or. 485, 497-98, 525 P.2d 1033, 1039 (1974) (same process of weighing the utility of the product against the risks it imposes is present in both strict liability and negligence, but strict liability looks at the product, not the reasonableness of the manufacturer's actions). *See also, generally, Strict Tort Liability, supra* note 146.

the manufacturer's judgment, the question is whether risk-utility's ability to assess the capabilities of the manufacturer is really at issue here. Clearly the answer is no. What is at issue is whether risk-utility analysis is capable of determining for society whether the product's combination of risks and benefits should be viewed as acceptable. The fact that the jury's determination can also act as a scorecard for the fortuitousness of the manufacturer's decisions is merely an incidental side-effect of the primary purpose of the process. That risk-utility analysis also provides standards of social acceptability for which the manufacturers can strive is an additional benefit of the process, not a detraction. One must not lose sight of risk-utility's primary duty which is to establish a threshold of acceptable risk that every good must equal or exceed, a threshold that can rise with changing social and commercial experience.

V. COST-BENEFIT ANALYSIS AS A POLICY TOOL

A. The Cost-Benefit Framework

Functionally, cost-benefit analysis plays the same role that the avoidable accident approach played prior to the complications created by technological advances. Given the time and its milieu, the unavoidable accident test provided a reasonable standard for determining liability. It provided a clear demarcation for allocating the costs of risks between plaintiffs and defendants. The cost-benefit analysis does the same thing. In examining an unintentional harm, the court has an opportunity to weigh the value of the defendant's actions against the risk of harm or the possible benefit. The difference between the two tests is one of complexity. The unavoidable accident standard focuses solely on the behavior of the defendant in the context of his surrounding circumstances.[189] The cost-benefit analysis is a more sophisticated test, requiring the balancing of several variables.[190] Just as the unavoidable accident approach produced varying results in different situations before technological advance, so does cost-benefit analysis in the face of modern invention. Thus both tests satisfy the need for making distinctions among different situations. The fact that the cost-benefit approach is a more complex standard for assessing who should bear the cost of accidents in given situations is not surprising given the more complex nature of our society. The development of legal tests often mirrors the development of the community.[191]

Given the nature of the inquiry, the choice of variables that are being weighed in the cost-benefit standard is entirely reasonable. One basic criticism that has been directed at the test, however, is the use of cold-blooded calculations in the realm of personal injury.[192] How can a test that permits the acceptance of a

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189. *See supra* text accompanying notes 49-62.

190. *See supra* text accompanying notes 147-88.

191. See, for example, the discussion of legal tests for product liability in *Barker*:

> 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 agricultural, 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.

Barker, 20 Cal. 3d. at 434-35, 573 P.2d at 457, 143 Cal. Rptr. at 239.

192. It is unfortunate that cost-benefit analysis, a tool of some economic validity perhaps, was ever perverted to be applied to the comparison of risks to health versus a wide range of supposed benefits . . . .

certain number of deaths or injuries be an appropriate social mechanism for determining risks?

It must be acknowledged that there is validity to the criticism. The test, unlike the more humanistic unavoidable accident approach, which focuses solely on the possibility of preventing harm, does in fact permit callous assessments of acceptable risks of personal injury to others. It may well be, however, that cost-benefit tests reflects a human reality, recognizing that people do in fact make these kinds of assessments in all areas of life on a daily basis. What is perhaps startling to see is the test articulated formally and elevated to an institutionalized legal setting. It makes us uncomfortable.

Yet, in a thousand ways, we willingly put strangers, our loved ones, and ourselves in danger every day. We drive our cars while slightly or not so slightly inebriated;[193] we keep matches, knives and guns in our homes where our children may and sometimes do get to them;[194] we smoke cigarettes;[195] we overeat.[196] These activities reflect that we have, on some level, made internal cost-benefit calculations. In each of these instances, we have made a decision that even though the consequences may be disastrous, the perceived probability of such occurrences is so small that we are willing to undertake the risk of the activity in order to derive its benefits.

B. Economic Efficiency v. Policy Choices

Clearly, weighing and balancing harms against benefits is a socially acceptable and useful approach for assessing liability. There are, however, other dimensions of this test that must also be considered in this context. The test, on its

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> It is impossible to develop a valid equation of human values to be balanced each time . . . the population [is] exposed to another toxic substance. It is thus critical to keep this catch-phrase out of public laws and agency policies.

Zimmerman, *Risk-Benefit Analysis: The Cop-Out of Governmental Regulation*, TRIAL, Feb. 1978, at 47.

This concern has often led to a common misunderstanding as to the role of prices in efficiency. For example, *see*, Vandall, *Judge Posner's Negligence Efficiency Theory: A Critique*, 35 EMORY L.J. 383, 384 (1986):

> Because our most important values lack a market, and cannot be assigned a price, it is not possible to engage in efficiency analysis in regard to personal injuries. That is, since it is not possible to discover a price for love, pain, depression, loss of a child, the burden of raising an unwanted child, supporting the handicapped, or encouraging children to explore, efficiency analysis rests upon speculation.

193. According to Mothers Against Drunk Driving (MADD), 23,900 people were killed in 1986 in drunk driving accidents. NAT'L HIGHWAY TRAFFIC SAFETY ASS'N, 1986 REPORT (1986).

194. According to the National Electronics Institute of Safety Surveillance (NEISS), approximately 800 children were injured by matches in 1986, and 10,000 by knives. NAT'L ELEC. INST. OF SAFETY SURVEILLANCE, U.S. CONSUMER PRODUCT SAFETY COMM'N, SUMMARY REPORT, NAT'L INJURY INFO. CLEARING HOUSE (1986). More than 27,000 12-15 year-olds were handgun victims in 1985 (most recent figures). Thirty-eight percent of California households have guns. *Kids: Deadly Force*, NEWSWEEK, Jan. 11, 1988, at 18-19.

195. The American Heart Association estimates that 350,000 Americans die each year from heart disease and cancer caused by smoking. AMERICAN HEART ASSOCIATION, PAMPHLET No. 51-033B (CP) 2-87-200M, SMOKING AND HEART DISEASE (1987).

196. According to the National Center for Health Statistics, approximately 34 million U.S. adults (25.7%) are overweight, and approximately 13 million adults (9.4%) are severely overweight. NAJJAR & ROWLAND, DIVISION OF HEALTH EXAMINATION STATISTICS, NATIONAL CENTER FOR HEALTH STATISTICS, No. 238 LC87-600186.S/N 017-022-01023-2, ANTHROPOMETRIC REFERENCE DATA AND PREVALENCE OF OVERWEIGHT (Oct., 1987).

face, appears neutral and indeed, it is often touted as exemplifying and promoting economic efficiency.

Although economic efficiency is, in and of itself, a neutral method that seeks to maximize social benefits at minimum social costs, its application must inherently embody some prior judgment to assess the value of the benefits and the value of the costs. That judgment defines what constitutes society's well-being and transcends the decision to maximize social welfare.[197] Just as the achievement of economic efficiency requires that a choice be made as to which social values are to be maximized, so must the application of cost-benefit analysis to any particular issue or dispute meet the same prerequisite to reach a policy decision. It is the failure to articulate the need for making some prior value judgments (as well as the failure to acknowledge the ability to accommodate a variety of value preferences) that has led to the confusion and controversy surrounding applications of the cost-benefit test.[198]

After the value judgment determining the nature of costs and benefits has been made, the cost-benefit formula promotes economic efficiency in the following way. By weighing and balancing harms against benefits, the cost-benefit formula provides incentives to induce situations in which the benefits outweigh the harms, and disincentives to discourage situations where the harms outweighs the benefits.[199] When we aggregate these results we find that benefits are maximized while costs are minimized. Achieving this end is moving towards the goal of economic efficiency.[200]

The difficulty is that while economic efficiency analysis itself is value-neutral, the determination of what constitutes harms or benefits and their magnitude is not. That evaluation should reflect social decision-making that must be engaged in before economic efficiency analysis can be applied. So, for example, we must choose whether sex education in the schools should be fostered[201] or prohibited,[202] whether prisons should be punitive[203] or rehabilita-

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197. Treating a . . . court's task as merely one of toting up marginal costs and benefits . . . ignores the crucial questions of what *counts* as a cost or a benefit—and who gets to decide that issue . . . . [C]onstitutional choices affect, and hence require consideration of, the way in which a polity wishes to *constitute* itself. In making such choices, we reaffirm and create, select and shape, the values and truths we hold sacred.

Tribe, *Constitutional Calculus: Equal Justice or Economic Efficiency?*, 98 HARV. L. REV. 592, 595 (1985).

"[C]ritics [of economic analysis] have suggested that because of the difficulty of quantifying certain costs or benefits, the economic analyst will tend to substitute his own subjective values for these items, and therefore the analysis may simply 'confirm' his prior beliefs." A. POLINSKY, AN INTRODUCTION TO LAW AND ECONOMICS 126 (1983).

198. Punishing defendants for using a cost-benefit approach actually promotes economic inefficiency. For an example, see Grimshaw v. Ford Motor Co., 119 Cal. App. 3d 757, 174 Cal. Rptr. 348 (1981), discussed *infra* text accompanying notes 269-86.

199. *See generally*, Posner, *supra* note 14, at 32-33 (use of balancing formula maximizes society's welfare by preventing over investment in accident prevention).

200. *See* A. POLINSKY, *supra* note 197, at 115-17.

In disputes in which the parties are, in actuality or in effect, strangers—as in the nuisance law, automobile accident, and pollution control examples—it is possible to promote the equitable distribution of income through the legal system, but this can usually be done better through the government's tax and transfer system. Thus, efficiency generally should be the primary criterion for evaluating legal rules.

201. Leo, *Sex and Schools, AIDS and the Surgeon General add a New Urgency to an Old Debate*, TIME, Nov. 24, 1986, at 54 ("There is no doubt that we need sex education in

tive,[204] or whether the Contras should be supported[205] or abandoned.[206] Even after deciding whether something is a harm or benefit, we must also decide how their measurements should be quantified. For example, we must evaluate the safety of human lives when we use pesticides in agriculture[207] against the need for sufficient

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schools and that it must include information on heterosexual and homosexual relationships. . . . [W]e have to be as explicit as necessary to get the message across. You can't talk of the dangers of snake poisoning and not mention snakes." (quoting Surgeon General C. Everett Koop's October 1986 report on AIDS)).

202. *See id.* at 54-55 ("The way sex education is taught in the schools encourages experimentation. It's the cause of promiscuity and destroys the natural modesty of girls." (quoting Phyllis Schlafly)).

> Our schools have enough of a job teaching reading and writing without teaching values about sex . . . . The [sex-education] texts I read . . . totally neglect the traditional values that may be important to a student's family and church and impose a psuedomorality: 'If you can't be good, be careful' . . . . Since adequate information . . . is available through clinics and hospitals, it isn't necessary or appropriate for public schools to provide it, too.

Your Opinion, SEVENTEEN MAGAZINE, Sept., 1984, at 56.

203. Punishment is the way in which society expresses its denunciation of wrong-doing: and, in order to maintain respect for law, it is essential that the punishment inflicted for grave crimes should adequately reflect the revulsion felt by the great majority of citizens for them . . . . The truth is that some crimes are so outrageous that society insists on adequate punishment, because the wrong-doer deserves it, irrespective of whether it is a deterrent or not.

ROYAL COMM'N ON CAPITAL PUNISHMENT (1949), *reprinted in* S. KADISH, S. SCHULHOFER, & M. PAULSEN, CRIMINAL LAW AND ITS PROCESSES: CASES AND MATERIALS 190-91 (4th ed., 1983).

> [What the criminal fears is] unrelenting punishment. That is what he understands, and nothing else, and that fear is the only thing which will force him into the ranks of the law abiding . . . . If we wait upon the medical quacks, the parole panderers, and the misguided sympathizers with habitual criminals to protect our lives and property from the criminal horde, then we must also resign ourselves to increasing violence, robbery, and sudden death.

Address by J. Edgar Hoover, Daughters of the American Revolution Annual Convention (Apr. 23, 1963) *reprinted in* Morris & Hawkins, *Attica Revisited: The Prospect for Prison Reform*, 14 ARIZ. L. REV. 747, 753-54 (1972).

204. [W]e must somehow escape from the crippling idleness, lack of training, inhumanity and futility of the mega-prison system which still characterizes most state systems. We know that the prisoner must be given work and an opportunity to develop himself, and that if we wish to reduce his later depredations on society, it is incumbent on us to give him some opportunity of a tolerable life of conformity when he is released from our control . . . . We know all these things and some of them we have known for over a century. The riots and strikes have merely underlined the need for renovation of our correctional system.

Morris & Hawkins, *supra* note 203, at 747.

205. [P]reventing the establishment of a Leninist dictatorship in Nicaragua is a goal worthy of American support, and that those willing to fight for this cause are deserving of American assistance. A decision to support one side in a civil war is not one to be taken lightly. We come to it in the full realization that, whatever tragedy it brings, the liquidation of the democratic side of Nicaraguan civil war will bring infinitely more tragedy to Nicaragua, to Central America, and ultimately to the rest of the western hemisphere.

The Case for the Contras, THE NEW REPUBLIC, Mar. 24, 1986, at 9.

206. "Military aid to the Contras would simply up the ante in the Nicaraguan Civil War . . . . It would again put this nation in the dubious position of seeking to overthrow a government that most of the world, including our own allies, regards as legitimate." Herald-Leader of Lexington editorial, *reprinted in* THE NEW REPUBLIC, Mar. 17, 1986, at 71.

207. No one is quite sure how many people in the United States are poisoned by pesticides each year . . . or even how many are at risk of falling ill from pesticide exposure . . . . Farm worker's organizations in various states paint a . . . disturbing picture: in some instances, fully two-thirds of the work force has been

food production to feed the world population.[208] Applying cost-benefit tests does not avoid the necessity of making those value choices, and facing up to those responsibilities should shift concerns away from the use of cost-benefit reasoning to the heart of social debate where they belong.

VI. COST-BENEFIT ANALYSIS AS A POLICY CHOICE AMONG POLICY CHOICES: ECONOMIC REASONING IN THE COURTS

It is important to understand all the dimensions in which value judgments occur when one uses a cost-benefit approach. Not only do the evaluations of the factors entering into a cost-benefit determination reflect value choices, but the very decision to apply cost-benefit analysis is itself also a policy decision. As noted above, abandonment of the unavoidable accident approach and the use of the cost-benefit test was a social policy choice.[209] It reflects a decision to use a criterion of weighing and balancing instead of a standard that measures liability in the more absolute terms of accident avoidance. That this is a value choice becomes even more apparent when we examine how modern day courts decide whether to apply a cost-benefit analysis or another standard for determining liability.

Ironically, our first case, in which the court rejects the results of a cost-benefit analysis in favor of a more stringent test, is an opinion by Judge Posner, a strong advocate of the *Carroll Towing* formula. In *Duckworth v. Franzen*,[210] prisoners brought suit under 42 U.S.C. § 1983 for injuries sustained when the bus in which they were chained caught fire. The prisoners claimed that prison officials violated the eighth amendment prohibition against cruel and unusual punishment.[211] Judge Posner had to decide on what basis liability could be as-

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> sprayed directly or covered with drifting insecticides, while an even greater number may be contaminated by 'dislodgeable residues,' which shake loose from standing crops.

Wiles, *Pesticide Risk to Farm Workers*, 241 NATION 10, 306 (1985).

208. "Pesticides are remarkably beneficial, for they increase the volume and quality of agricultural produce and save millions of human lives that would otherwise be sacrificed to insect-transmitted diseases." Edwards, *Pesticide Safety: A Response*, CONSUMER RESEARCH MAGAZINE, Feb. 1988, at 34, 35.

209. *See supra* text accompanying notes 157-60.

210. 780 F.2d 645 (7th Cir. 1985), *cert. denied*, 479 U.S. 816 (1986).

211. A bus containing 35 prisoners caught fire. The prisoners were in handcuffs and all prisoners on each side of the aisle were joined by a chain running through the handcuffs. All exits to the bus but the front door had been sealed and a metal screen separated the passengers from the front door. The bus filled with dense smoke and neither group of prisoners was able to leave the bus; the one prisoner who succeeded in getting away by slipping off his handcuffs was pushed back onto the bus by a guard. Eventually guards equipped with gas masks cut through the chains and brought the prisoners out. One prisoner died; others suffered serious lung damage. *Id.* at 648.

Twenty-one prisoners brought suit against three prison officials and three guards under section 1 of the Civil Rights Act of 1871, charging cruel and unusual punishment. The complaint included a pendent claim against the six defendants for negligence and a diversity claim against the manufacturer of the bus for product liability. The district judge severed the pendent claim and the suit against the bus company. In the jury trial in district court, judgment was for the plaintiffs and a jury award of $561,000 against three of the defendants, exonerating the prison guards. *Id.* at 648. The three defendants found liable—the then head of the Illinois prison system at the time of the fire; the then prison warden of the prison from which the bus was leaving; and the director of security at the prison—appealed. They claimed that the prisoners were suing them in their official capacities and such suits were barred by the eleventh amendment. *Id.* at 648-49.

signed under the eighth amendment.[212] Feeling that "[t]he reigning formula of . . . 'deliberate indifference' . . . evades rather than expresses precise meaning,"[213] Judge Posner choose instead to assign liability on the basis of whether the government officials' actions constituted recklessness. He then addressed two possible choices for defining recklessness, one from tort law and the other from criminal law.

Upon considering a tort law standard, Judge Posner decided that recklessness can be equated with the tort notion of gross negligence.[214] He modified the Learned Hand formula for simple negligence so that it could characterize a gross negligence standard for recklessness. Judge Posner then defined "recklessness" as occurring when "the disparity between the cost of prevention and the expected accident cost is great."[215] Under that definition, it would be easy for the court to find, given the facts, that the prison officials had acted recklessly.[216]

The court first considered the eleventh amendment question. Judge Posner concluded that the defendants were being sued in their individual capacities and, therefore, the suit was not barred. *Id.* at 649-50. By the same token, the defendants could be liable only for their individual wrong doing. Hence, the suit against the head of the prison system was dismissed, since there is no doctrine of respondent superior under section 1 of the Civil Rights Act of 1871 and no evidence of his individual wrong-doing had been offered. *Id.* at 650. The other two prison officials, however, were considered to be personally involved in security and safety and therefore subject to closer scrutiny.

212. *Id.* at 651-56

213. *Id.* at 652. The Supreme Court decided, in Estelle v. Gamble, 429 U.S. 97 (1976), that the standard for eighth amendment violations in this context was "deliberate indifference." *Id.* at 104. The court, however, left the content of that test ambiguous. *See id.* at 109 (Stevens, J., dissenting).

214. Gross negligence is a tort standard considerably stricter than its milder cousin, ordinary negligence. The Supreme Court found in Estelle v. Gamble that mere negligence was not enough to constitute an eighth amendment violation. Estelle v. Gamble, 429 U.S. 97, 106 (1976). The Court left open the question, as the dissent in *Gamble* (*Gamble*, 429 U.S. at 117 n.13 (Stevens, J., dissenting)) and Judge Posner (*Duckworth*, 780 F.2d at 652) pointed out, whether "reckless or 'gross negligence . . .' is enough to trigger . . . protection . . . ." Daniels v. Williams, 474 U.S. 327, 334 n.3 (1986) (Though *Daniels'* focus is on violations of the due process clause, Whitley v. Albers ruled that in the context of prison security if the harm violates the fourteenth amendment it also violates the eighth amendment. Whitley v. Albers, 475 U.S. 312, 327 (1986)).

215. *Duckworth*, 780 F.2d at 652. Posner's assertion derives from his modification of the *Carroll Towing* formula. Ordinarily the *Carroll Towing* formula draws the demarcation line between ordinary negligent and non-negligent behavior when the expected harm *equals* the cost of avoiding it. That is, if the particular facts and circumstances are such that the expected harm is less than the cost of avoiding it, failure to avoid it is deemed not to be negligent. If the expected harm is greater than the cost of avoiding it then to fail to avoid the harm is found to be negligent. Algebraically, this translates as follows, where P is the probability of harm, L is the value of the actual harm if it occurs (L stands for liability), and B is the cost of avoiding the harm (B stands for the burden of avoiding the harm):

> If P x L < B (where "<" means "less than") then if defendant does not incur the burdens to avoid the accident, he is *not* negligent. On the other hand if P x L > B (where ">" means "greater than") then if the defendant fails to undertake to avoid the accident, he *is* negligent.

See supra notes 154-56 and accompanying text.

Borrowing from the ordinary negligence formula, Judge Posner defines "gross negligence" as those instances where the expected harm (P x L) *greatly* exceeds (">>") the cost of avoiding it (B). Hence, his statement to which this footnote is appended in the text above. Such a definition is fully consistent with the Supreme Court's holdings.

216. Clearly, keeping the prisoners chained to a bus left them vulnerable and without the ability to protect themselves from a whole myriad of accidents that might befall a vehicle. Thus the expected harm is not particularly low and might, given the possibility of loss of life, be considered fairly high. What would be at issue is the cost of avoiding the accident. The answer

After using cost-benefit analysis to define recklessness, however, Judge Posner then rejected it in favor of an alternative higher standard, one which is more familiar to criminal law. This definition of recklessness imposes liability only on those who commit "an act so dangerous that the defendant's knowledge of the risk can be inferred."[217] The reason he offered for choosing this higher standard is that he felt it comported with the language of the eighth amendment which prohibits cruel and unusual punishment in that, as Judge Posner noted, "infliction of punishment is a deliberate act intended to chastise or deter."[218] Judge Posner found that the tort standard of gross negligence for recklessness derived from the Learned Hand formula "does not import danger so great that knowledge of the danger can be inferred."[219] While that may well be true, Posner's choice of standards means that prison officials will be liable under the eighth amendment only when the act is extremely dangerous, so dangerous that knowledge can be inferred. The use of a criminal intent standard in the context of a suit for damages under the federal civil rights law clearly constitutes a policy choice.

The converse situation in which a traditional standard gives way to a cost-benefit result also reveals a policy choice. In *Llaguno v. Mingey*,[220] plaintiffs also brought suit under 42 U.S.C. § 1983 charging members of the Chicago police department with having entered and searched the home of one of the plaintiff's seizing him without probable cause or a warrant.[221] On appeal, Judge Posner held

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would probably hinge upon the cost of alternative means of safeguarding prisoners other than chaining them to the bus and forcing them back in the bus after the bus caught fire.

217. *Duckworth*, 780 F.2d at 652.

218. *Id.* The Supreme Court in *Gamble* did not make it clear whether deliberate indifference required a criminal intent standard. "If [the majority's opinion] is meant to indicate that intent is a necessary part of an Eighth Amendment violation, I disagree." *Gamble*, at 116 n.13 (Stevens, J., dissenting). "[W]hether the constitutional standard has been violated should turn on the character of the punishment rather than the motivation of the individual who inflicted it." *Id.* at 116 (Stevens, J., dissenting). Clearly, Judge Posner felt that this ambiguity left him free to choose from different definitions of recklessness.

219. *Duckworth*, 780 F.2d at 653. It is not clear whether Posner's concern is for knowledge or degree of harm. His test is set up so that even if the conduct is reckless in the criminal sense it may not be reckless in the tort sense. In other words, it is conceivable that the cost of avoiding the accident (e.g., the cost of the alternative for guarding the prisoners) may be so great that even if the expected harm is extremely great, the disparity between the two may not be sufficiently great to constitute Judge Posner's definition of gross negligence.

220. 763 F.2d 1560 (7th Cir. 1985) (en banc).

221. Two young Hispanic men in Chicago committed two robberies, killed four people, wounded three others, and abducted a young girl. The getaway car crashed and the police shot and captured one of the men. The other escaped on foot. The license plate number of the car showed it as registered to one Vilma Llaguno at an address two miles from the crash site and the owner had not reported it as stolen. The police went to the Llaguno home and ordered the woman who answered the door to open it. When she did so, the police rushed in with drawn guns, searched the house, and herded the occupants into the living room. In response to questions from the police, one of the Llaguno children, David, said that he owned the car and had loaned it to a friend. There was conflicting testimony about whether David revealed the name of the friend upon questioning and whether the police threatened to shoot the occupants of the house. The police later came back to the house; it was disputed whether they entered the second time without consent. The police spoke to David again, then arrested him and held him in custody for 42 hours without charging him. While the police were in the house, officers shot and killed the fleeing man, another son of the Llagunos who did not live in the house. *Id.* at 1563.

The Llagunos brought suit charging that their fourth amendment rights had been violated. The district court judge refused to direct a verdict for the plaintiffs and the jury found for the defendants. A panel of the Seventh Circuit Court of Appeals held that the district court should have directed a verdict for the plaintiffs. On rehearing *en banc*, the court concluded that the trial court was correct not to give a directed verdict, but that errors entitled plaintiffs to a new trial. *Id.* at 1563-64.

that even though "the present case is close to the line that separates arguably reasonable from unarguably unreasonable police behavior, it does not cross it."[222] As Judge Posner himself acknowledged, "this case is more difficult . . . because the police had less reason to be confident that they really were in hot pursuit of the killer when they entered the Llagunos' house."[223]

Traditional fourth amendment jurisprudence requires both probable cause and warrant for the police to search a home. The warrant can be dispensed with, but only upon a showing of exigent circumstances.[224] The requirement for probable cause in this context cannot be waived and indeed where exigent circumstances do permit search without a warrant, the courts tend to scrutinize the probable cause very carefully.[225]

The difficulty with the *Llaguno* case is that although there was arguably an emergency situation[226] it is highly questionable that there was probable cause shown.[227] Judge Posner nonetheless upheld the intrusion by making the test for obtaining the warrant "reasonableness" in which probable cause was merely one contributing factor that need not necessarily be met.[228] He employed Judge

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The court acknowledged that police may not enter a person's home without either a warrant or consent, even where there is probable cause, except in an emergency. If the police had probable cause to believe that a killer was in the house, "[t]he situation was an emergency in about as vivid a sense as can be imagined." *Id.* at 1564. In deciding whether police could enter a home, the court had said in United States v. Acevedo, 627 F.2d 68, 70 (7th Cir. 1976), that the question was simply "whether the exceedingly strong privacy interest in one's residence is outweighed by the risk that delay will engender injury, destruction of evidence, or escape." *Llaguno*, 763 F.2d at 1564 (quoting *Acevedo*, 627 F.2d at 70).

222. *Llaguno*, 763 F.2d at 1565.

223. *Id.* at 1567.

224. *See, e.g.*, Chambers v. Maroney, 399 U.S. 42, 51 (1970) ("Only in exigent circumstances will the judgment of the police as to probable cause serve as a sufficient authorization for a search."); Vale v. Louisiana, 399 U.S. 30, 35 (1970) (court declines to hold that an arrest on street near house "can provide its own 'exigent circumstance' so as to justify a warrantless search of the arrestee's house"); and Chimel v. California, 395 U.S. 752, 763 (1969) (search incident to an arrest cannot extend beyond area within which suspect might gain a weapon or destructible evidence without a warrant).

225. Posner states, "[t]rue, other cases where an emergency has been held to justify a search without a warrant have involved a clearer showing of probable cause for the search than this case." *Llaguno*, 763 F.2d at 1564. *See, e.g.*,Warden v. Hayden, 387 U.S. 294, 297-99, (1967); Dorman v. United States, 435 F.2d 385, 392-93 (D.C. Cir. 1970) (en banc) ("[T]here [must] exist[ ] not merely the minimum of probable cause, that is requisite even when a warrant has been issued, [ ] but beyond that a clear showing of probable cause . . . .); Payton v. New York, 445 U.S. 573 (1980) (probable cause absent exigent circumstances did not justify warrantless search).

226. Judge Wood, in an opinion dissenting in part and concurring in part, disputes whether, in fact, an emergency existed. He notes that not only was there a magistrate available but the police drove back to headquarters to obtain a shotgun and sledgehammer providing an opportunity to get a warrant as well. Furthermore, there were numerous policemen already on the scene who could have put the house under surveillance while a warrant was obtained. *Laguna*, 763 F.2d at 1579 (Wood, J., dissenting).

227. *Id.* at 1578-79 (Wood, J., dissenting) ("It seems to me that you have to concede that probable cause in the traditional sense is lacking in this case, and that a magistrate would not have authorized the search warrant.").

228. Judge Posner justified his position by citing the opinions of *Dorman*, 435 F.2d at 393, and United States v. Robinson, 533 F.2d 578, 583-84 (D.C. Cir. 1975), both of which had the same author, Judge Leventhal. *Dorman* listed six factors necessary for a warrantless search, one in particular being a "clear showing of probable cause." *Dorman*, 435 F.2d at 392 (*see supra* note 225). In *Robinson*, the police entered a vehicle from which a suspect just left, which they believed was the getaway vehicle from a bank robbery. The *Robinson* court noted that the police had five of the six factors listed in *Dorman*:

Hand's *Carroll Towing* balancing test to show the potential harm from waiting for a warrant.[229] He then, as Judge Wood observed in dissent, "ma[d]e up that shortage [of probable cause] by adding exigent circumstances."[230] Thus, Judge Posner chose to abandon the traditional fourth amendment jurisprudence analysis, which requires a showing of probable cause independent of any question of exigent circumstances.[231] He substituted instead a balancing test that allowed the

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> [W]e have a grave offense; a clear showing of probable cause; reasonable belief that the suspects are armed; a liklihood that the suspects will escape if not speedily aprehended, and peaceable entry. This case lacks the element of 'strong reason to believe that the suspect is in the premises being entered,' [ ] which was stressed in *Dorman* as justifying a warrentless entry into the suspect's home to make an arrest. [ ] But in the case of a car on the street there is both lessor expectation of privacy then in a home . . . and the entry into a car believed strong probable cause to be the gettaway car is justified, even though the suspect is plainly not now inside, in order to get clues that will aid location and apprehension of the suspect.

Robinson, 533 F.2d at 583-84 (footnotes omitted).

Even though the Robinson court excused the absence of one of the six *Dorman* factors on the basis that the search was of an empty vehicle which has a lessor expectation of privacy, Judge Posner concluded that *Robinson* supports the absence of any of the factors in the case of searching a private home, including inferentially, probable cause. *Llaguno*, 763 F.2d at 1564. One might reasonably argue, however, that in fact Judge Posner is merely substituting his own value choices for legal precedence.

229. The use of balancing formulas to decide fourth amendment cases has drawn some criticism from members of the Supreme Court itself. For example, in New Jersey v. T.L.O., Justice Brennan says:

> In the past several terms, this Court has produced a succession of Fourth Amendment opinions in which 'balancing tests' have been applied to resolve various questions concerning the proper scope of official searches . . . . In my view, the presence of the word 'unreasonable' in the text of the Fourth Amendment does not grant a shifting majority of this Court the authority to answer *all* Fourth Amendment questions by consulting its momentary vision of the social good.

New Jersey v. T.L.O., 469 U.S. 325, 369-70 (1985) (Brennan, J., concurring in part and dissenting in part.)

230. *Llaguno*, 763 F.2d at 1578 (Wood, J., dissenting) ("Insufficient probable cause is why the majority needs to invent this new blended warrantless search concept.").

231. The staunchness of the judiciary's position that probable cause is a requirement that must be met *independently* of any consideration of exigent circumstances to justify warrantless searches can be seen by the following:

> In enforcing the Fourth Amendment's prohibition against unreasonable searches and seizures, the Court has insisted upon probable cause as a *minimum requirement* for a reasonable search permitted by the Constitution. As a general rule, it has also required the judgment of a magistrate on the probable-cause issue and the issuance of a warrant before a search is made. Only in exigent circumstances will the judgment of the police *as to probable cause* serve as a sufficient authorization for a search.

Chambers v. Maroney, 399 U.S. 42, 51 (1975) (emphasis added).

> '[T]he warrantless intrusion into the home is one that cannot be sanctioned under the Fourth Amendment . . . absent exigent circumstances.' (quoting United States v. Houle, 603 F.2d 1297 (8th Cir. 1979)) . . . . [However, e]ven assuming for the purpose of discussion the existence of exigent circumstances, the warrantless entry in the present case is unlawful because there is no probable cause.

United States v. Williams, 604 F.2d 1102, 1121-22 (8th Cir. 1979).

> The State cites the Supreme Court opinion of Warden v. Hayden, 387 U.S. 294, 87 S.Ct. 1642, 18 L. Ed. 2d 782 (1967), and urges that police entry into a dwelling in search of a suspect, without probable cause to believe that he is within, may be constitutionally reasonable if certain exigent circumstances exist. But in *Hayden* the police in fact had probable cause . . . and the *Hayden* opinion does not suggest that exigent circumstances may eliminate the need for police to have probable cause to believe the suspect is inside the premises to be searched.

weight of one factor to offset the lack of weight of the other. Such a decision changes the role that the probable cause standard plays in permitting warrantless searches. Instead of probable cause being the constitutional absolute that must be met, under Judge Posner's rule, some lesser standard will be sufficient to authorize the police to invade the privacy of one's home without a warrant.[232] In

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Rice v. Wolff, 513 F.2d 1280, 1293 (8th Cir. 1975), *rev'd on other grounds*, 428 U.S. 465 (1976). *See also* Edwards v. United States, 364 A.2d. 1209, 1214 (D.C. 1976) ("[P]olice who enter a private dwelling to make an arrest or affect a seizure of contraband without a warrant must have clear-cut probable cause . . . ."); Note, *Warrantless Entry Without Probable Cause: A Diluting of the Fourth Amendment?* State v. Penas, 200 Neb. 387, 263 N.W.2d 835 (1978), 12 CREIGHTON L. REV. 187, 191 (1978) ("[P]robable cause forms the core of the fourth amendment. While a warrant may be dispensed within certain circumstances . . . the fourth amendment demands that each search or seizure be based *at least* upon probable cause.") (emphasis added).

232. Though Judge Posner does not spell out how to apply the Learned Hand formula in this instance, a comparison between the traditional standard and Posner's standard would be as follows.

Since probable cause addresses the issue as to the likelihood that the evidence will be found in the home the police wish to search, probable cause, in reality, represents a probability. In other words, in order to satisfy the requirement of probable cause, the probability that the evidence is where the police hope to find it must pass some threshold value. Let P represent the probability that the evidence is where the police wish to look.

Similar to probable cause, exigent circumstances also raises questions of probability. The question of exigent circumstances asks whether the probability is sufficiently high that the evidence, if it is in the home to be searched, will be destroyed in the course of a delay to get a warrant. In order to justify not delaying a search to get a warrant, the probability of destruction must pass some threshold. Clearly there is no probability of destruction if the evidence is not where the police think it is. Let D be the probability of destruction.

Traditionally, the test for determining when a warrantless search is permitted is multifaceted. One requirement is that the probability that the evidence is where the police think it is, P, must pass the probable cause threshold. In other words, P must be at least as high as the probable cause standard:

$$P \geq \text{probable cause standard.}$$

This is the standard that must be met if there is a search, with or without a warrant.

A second requirement raises the question as to whether there are sufficient exigent circumstances to justify a warrantless search. In other words, D, the probability of destruction must equal or exceed the threshold for exigent circumstances:

$$D \geq \text{exigent circumstances standard.}$$

In some instances, when the issue is whether a guilty party will flee, the court will also consider the degree of crime in justifying exigent circumstances. *See, e.g.*, Welsh v. Wisconsin, 466 U.S. 740 (1984). If that is the case, then an additional standard would require that the value of the harm equal or exceed some value. In other words, let V be the value of the harm if a fleeing suspect escaped (or a piece of evidence were destroyed) then:

$$V \geq \text{sufficient seriousness of harm.}$$

Thus, the traditional evaluation of whether a warrantless search is justified can be summarized mathematically as follows:

If and only if

(a) the probable cause standard is met, i.e.,

$$P \geq \text{probable cause standard,}$$

and if and only if

(b) the exigent circumstances standard is also met, i.e.,

$$D \geq \text{exigent circumstances standard,}$$

and (in some situations) if and only if

(c) the sufficient harm standard is met, i.e.,

$$V \geq \text{sufficient seriousness of harm}$$

then and only then is a warrantless search justified.

Judge Posner applies a different standard. Judge Posner also considers the gravity of harm arising from the potential flight of a suspect in his assessment of a warrantless search. Contrary to other courts, however, which require that the probability of destruction satisfy the exigent circumstances standard, Judge Posner allows the gravity of harm to off-set the short-fall in probability of destruction. "The greater that harm would be, the less need be the probability

Llaguno, Judge Posner allowed a combination of harm and probability to offset the short-falls in probable cause. "The potential harm from waiting for a search warrant in this case was very great even though it was far from certain that an immediate search would be productive."[233]

Presumably, Judge Posner has his own threshold standard of seriousness that the combination of the three variables — probable cause, exigent circumstances, and gravity of harm — must meet in order to satisfy his requirement of warrantless searches.[234] Thus, instead of the traditional requirement of three independent absolutes that must be met, Judge Posner's standard merely requires that the three variables satisfy one inequality jointly. This formulation permits a warrantless search even when there is an extremely small probability that the police have reliable information about a fleeing suspect being in a particular home. Even if probable cause is extremely ambiguous, if the gravity of harm (a sought-for killer) or its probability of occurrence (who might escape) are sufficiently large, the combination can satisfy Judge Posner's standard. In other words, probable cause can be far from satisfied and now a warrantless search would be permitted after *Llaguno*, as long as the potential harm and the probability of escape or destruction is sufficiently high. This permits the police to engage in warrantless searches in circumstances under which they would not be able to obtain a warrant, thereby encouraging a preference for warrantless searches.

Similar results can occur even when exigent circumstances do not exist. According to Judge Posner's standard, if the probability of escape or destruction do not satisfy the requirement of exigent circumstances, as long as the gravity of the harm is sufficiently large in the small chance it did occur, such requirements can be dispensed with. Such results only serves to further encourage warrantless searches. Judge Posner's rule expresses a preference for a trade-off analysis to an absolute standard and reflects a value choice.

A policy determination is being made even when courts substitute one balancing test for another. In *American Hospital Supply Co. v. Hospital Products Ltd.*,[235] Judge Posner substituted the *Carroll Towing* formula[236] for the multi-

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that it would have actually occurred to justify the police invading the interest . . . in the privacy of the home." (*Llaguno*, 763 F.2d at 1564). Mathematically, this can be represented as:

DV ≥ Posner's standard for exigent circumstances

where if D, the probability of destruction, is not sufficiently high to meet his standard, then if V, the value of the evidence if lost, is great enough then the combination may satisfy Judge Posner's requirement.

233. *Llaguno*, 763 F.2d at 1564.

234. Mathematically, his standard looks as follows:

DVP > Posner's standard for warrantless search.

235. 780 F.2d 589 (7th Cir. 1985). American Hospital Supply Corporation was the exclusive distributor for Hospital Products. The original contract between the two corporations was for three years initially, but provided that it would be renewed for successive one year periods (to a limit of ten years) unless American Hospital Supply notified Hospital Products at least 90 days before the expiration date of its current contract. American Hospital Supply failed to terminate its contract and in response to a direct query from Hospital Products announced that it considered the contract renewed. Nonetheless, Hospital Products informed American Hospital Supply the next day that American was no longer an authorized distributor of its products. *Id.* at 592.

American Hospital Supply brought suit for breach of contract and moved for preliminary injunction to prevent Hospital Products from acting in derogation of its contract rights. The injunction was granted by the district court. *Id.* at 592-93. Two months after the entry of the injunction, Hospital Products filed for bankruptcy under Chapter 11. Hospital Products moved for the bankruptcy court to cancel the renewed contract, on grounds that it was still executory at

factor test traditionally used by the lower federal courts in determining whether to grant preliminary injunctions, claiming it is merely a "distillation" of the prior test.[237] He disavowed any intent to change the law, stating "[t]he formula is new; the analysis it capsulizes is standard."[238] Judge Swygert's dissenting opinion, however, makes it clear that the application of the traditional test would have yielded a different result. Indeed, as Judge Swygert noted, "if nothing is added to the substantive law, why bother?"[239]

If the formula is to be taken seriously, at the very least it modifies the ways in which the factors enter into the balancing test. The Learned Hand formula prescribes that each factor be considered with a predesignated importance relative to the other factors, and any adjustment in that weight is based solely on the factor's magnitude. In the traditional test the district court judge has the discretion to decide, beyond each factor's magnitude, which set of factors he wishes to emphasize. So, for example, in a particular case it may be that the harm to the defendant is greater than the harm to the plaintiff, but the probability of winning is greater for the plaintiff than for the defendant. Under certain circumstances the judge may feel that it is more equitable to emphasize the probability of success whereas in other situations the court might view the degree of harm as more important. On its face, the Learned Hand formula does not permit this kind of equitable discretion. The formula dictates the result solely according to the magnitudes of the numbers and the way they interact with each other in the formula; the result cannot be tempered by notions of fairness arising from any particular fact situations before the court. In other words, if the numbers in the two different hypotheticals noted above were exactly the same, the Learned Hand

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the time of the declaration of bankruptcy and subject to disaffirmance. The bankruptcy courts decision was still pending at the time of the appeal from the preliminary injunction by Hospital Products. *Id.* at 593.

236. The formula Judge Posner uses, although equivalent to Judge Hand's formula, actually takes a somewhat different form. Judge Posner weighs the probability of the plaintiff's success (P_p), multiplied by the harm (H_p) failure to grant him an injunction would yield (i.e., when considered altogether the plaintiff's "expected harm," $P_p \times H_p$ — *see supra* note 154-56) against the harm (H_d) that would be done to the defendant by granting an injunction multiplied by the probability the defendant will prevail, P_d (i.e., the defendant's "expected harm," $P_d \times H_d$ — *supra* note 154-56). This measure balances expected harm to the plaintiff against expected harm to the defendant. *American Hosp. Supply*, 780 F.2d at 593. Since either the plaintiff or the defendant must win, that means that the sum of the plaintiff's probability of victory and the defendant's probability must add up to 100 percent (when using percentages) or, equivalently, 1 (when using fractions). Judge Posner redefines (correctly) the defendant's probability of winning as 1 minus the plaintiff's probability of winning. In other words, since $P_p + P_d = 1$, subtracting P_p from both sides of the equation yields $P_d = 1 - P_p$. Thus Judge Posner's balancing equation looks as follows:

grant a preliminary injunction if
plaintiff's expected harm exceeds defendant's expected harm

$$P_p \times H_p > (1 - P_p) \times H_d.$$

(Since there is only one probability variable in the ultimate expression of the equation, Judge Posner substitutes the symbol P for P_p in his formulation.)

237. *American Hosp. Supply*, 780 F.2d at 593. The usual test considered several factors: whether the plaintiff will be irreparably harmed if the preliminary injunction is denied; whether the plaintiff's harm upon denial will exceed the defendant's; whether the plaintiff is reasonably likely to prevail at trial; and whether the public interest will be affected by granting or denying the injunction. *Id.* at 594.

238. *Id.* at 593-94.

239. *Id.* at 609 (Swygert, J., dissenting).

formula would yield the same result in both cases, whereas with the traditional balancing test, the judge could reach different conclusions in each case.[240]

The substitution of the Learned Hand formula can also affect the way the Court of Appeals reviews the district courts' granting or denial of preliminary injunctions. Although the standard of review, "abuse of discretion," presumably would remain unchanged, the formula expands the circumstances under which an abuse of discretion may be found. The use of a mathematical formula narrows the circumstances in which discretion can be viewed as reasonable, thereby facilitating the appellate court's finding that the district court's decision was an abuse.[241] Thus, *American Hospital* demonstrates that the use of a balancing test as opposed to an absolute, or some other standard for legal determinations does not, in and of itself, define the full scope of the value choice. How the balancing test is actually structured embodies value choices as well.

A different policy decision may involve combining cost-benefit analysis and some other operative standard. In *Barker v. Lull Engineering*,[242] the plaintiff-worker was injured while operating a forklift manufactured by defendant. Plaintiff sued defendant on the basis that there was a design defect in defendant's machine that caused plaintiff's injury.[243] The jury verdict for defendant was reversed by the California Supreme Court.[244]

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240. As Judge Swygert noted in his dissent, the four-pronged test may lack precision, but "such 'precision' is antithetical to the underlying principles of injunctive relief." Equity consideration cannot be quantified, and decisions depend on the "feel" of the case. *Id.*

241. "The traditional element of discretion residing in the decision of a trial court to grant a preliminary injunction has been all but eliminated by today's decision." *Id.*

242. 20 Cal. 3d 413, 573 P.2d 443, 143 Cal. Rptr. 225 (1978).

243. Plaintiff, who had received only limited instruction in the use of the fork lift, was injured when he was attempting to lift a load of lumber to a height of approximately 18 to 20 feet and to place the load on the second story of a building under construction. The terrain on which the fork lift operated sloped sharply in several directions, a fact which complicated the operation of the lift. Other workers shouted to the plaintiff that the load was beginning to tip and plaintiff jumped off the fork lift; while scrambling away a piece of lumber struck him on the head and caused serious injury. *Id.* at 419, 573 P.2d at 447, 143 Cal. Rptr. at 229.

At trial, plaintiff's expert witness testified that the fork lift was unstable because of its narrow base, that it should have been equipped with outriggers (mechanical arms that could be extended independently and placed on the ground to lend stability); that the loader should have had a roll bar and seat belt; and finally that the placement of the leveling lever and absence of an automatic lock on the lever made it likely the operator would bump and accidentally move the lever. *Id.* at 420-21, 573 P.2d at 447-48, 143 Cal. Rptr. at 229-30. The defense testified that the loader was stable when used on the terrain for which it was designed and any instability was caused by operating it on steep terrain for which it was not intended. Similarly, outriggers were unnecessary when the loader was operated on the terrain for which it was intended. Furthermore, the bulk of the loader meant it would not roll completely over, so that a roll bar was unnecessary. Defense also testified that the manual lock on the leveling device provided adequate protection and the positioning of the lever was the safest and most convenient for the operator. Finally, seat belts would not add to the safety because they prevented the operator from exiting quickly. *Id.* at 421-22, 573 P.2d at 448-49, 143 Cal. Rptr. at 230-31.

After a jury trial verdict for the defendants, the plaintiff appealed on the basis that the judge's jury instructions were in error. The trial court had instructed the jurors that strict liability for a defect in design is based on finding the product "unreasonably dangerous" for its intended use. California had explicitly rejected the "unreasonably dangerous" test in Cronin v. J.B.E. Olson Corp. 8 Cal. 3d 121, 501 P.2d 1153, 104 Cal. Rptr. 433 (1972). *Barker*, 20 Cal. 3d at 417, 573 P.2d at 446, 143 Cal. Rptr. at 228.

244. *Barker*, 20 Cal. 3d at 417, 573 P.2d at 446, 143 Cal. Rptr. at 228.

There are several tests that might be applicable in a design defect case, including the *Restatement of Torts*' "unreasonably dangerous" standard.[245] The "unreasonably dangerous" test holds manufacturers liable if the product is more dangerous than the average consumer contemplates.[246] The *Barker* court rejected this standard, "refusing to permit the low esteem in which the public might hold a dangerous product to diminish the manufacturer's responsibility for injuries caused by that product."[247] It adopted instead a two-prong test incorporating warranty standards in the form of consumer expectations and cost-benefit standards in the form of risk-utility.[248] The court treated the first prong as a strict liability standard that is prospective in nature.[249] It viewed that test, however, as insufficient by itself for determining when a defect exists because consumers might not know how safe the product might be.[250] The court concluded, therefore, that even if the product satisfies ordinary consumer expectations, the jury in hindsight can apply the risk-utility test and find that the risk of danger outweighs the benefits of design and subject the manufacturer to liability.[251] Thus, the court chose a policy containing both an absolute standard and a balancing standard for determining liability. This too is a value choice.

Every time the court chooses to use a cost-benefit analysis and rejects another standard, it is, in effect, rejecting the policy choice implicit in the alternative standard and adopting the policy choice embodied in the particular cost-benefit analysis it decides to apply. The converse of this is also true. So, for example, Judge Posner's policy choice in *Duckworth* is to make it more difficult for prisoners to maintain a cause of action against prison officials whose actions injure them and thus tends to immunize such officials from suit.[252] Judge Posner's decision in *Llaguno* encourages police officers, who fear there is not sufficient probable cause, to claim exigent circumstances and thereby by-pass magistrates

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245. *See supra* text accompanying notes 161-88.

246. Many products cannot possibly be made entirely safe for all consumption, and any food or drug necessarily involves some risk of harm, if only from over-consumption .... That is not what is meant by 'unreasonably dangerous' in this Section. The article sold must be dangerous to an extent beyond that which would be contemplated by the ordinary consumer who purchases it, with the ordinary knowledge common to the community as to its characteristics.

RESTATEMENT (SECOND) OF TORTS § 402A comment i. For a further discussion of the problems addressed by the *Restatement*, see *supra* text accompanying notes 176-88.

247. *Barker*, 20 Cal. 3d at 425, 573 P.2d at 451, 143 Cal. Rptr. at 233.

248. [The court stated 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. at 435, 573 P.2d at 457-58, Cal. Rptr. at 239-40.

The *Barker* court refers to the first prong of the test as reflecting the "warranty heritage upon which California product liability doctrine in part rests." *Id.* at 429-30, 573 P.2d at 454, 143 Cal. Rptr. at 236. The court identified the second test as a risk benefit standard. *Id.* at 418, 573 P.2d at 446, 20 Cal. Rptr. at 228. Factors to be considered include "the gravity of the danger posed by the challenged design, the likelihood that such danger would occur, the mechanical feasibility of a safer alternative design, the financial cost of an improved design, and the adverse consequences to the product and to the consumer that would result from an alternative design." *Id.* at 431, 573 P.2d at 455, 143 Cal. Rptr. at 237.

249. *Id.* at 430, 573 P.2d at 454, 143 Cal. Rptr. at 236.

250. *Id.*

251. *Id.*

252. *See supra* text accompanying notes 210-19.

who, in our system of law, determine whether police intrusion is warranted.[253] Judge Posner's opinion in *American Hospitals* narrows the discretionary powers of the federal district court judges with regard to preliminary injunctions and enlarges the power of the court of appeals to supervise their decision in that context.[254] The *Barker* court's policy choice in rejecting the *Restatement of Torts*' unreasonably dangerous standard is to reject consumer awareness as the sole determinant of what are permissible levels of risk in products on the market.[255] That same court, in adopting the two-prong test of consumer expectations and risk-utility, incorporates two separate policies: one that makes consumer awareness a floor but not a ceiling,[256] and the other that avoids making manufacturers insurers of all harm proximately stemming from their design.[257] With respect to the latter policy, however, the court is also establishing a floor. The court is saying that the benefit of the design must be sufficiently great so as to off-set the risk to which it exposes society's members.[258]

In the cases analyzed above, the courts are choosing between a policy that incorporates a cost-benefit analysis in its application and some other policy. In order to highlight that the application of cost-benefit analysis must involve some policy choice beyond the decision to reach a conclusion through cost-benefit reasoning, we now examine a case in which the results of a specific cost-benefit analysis can support two different policy choices. Depending on which policy is adopted, the same cost-benefit reasoning yields opposite legal conclusions. While both policies seek to promote the specific efficiency consideration, each policy differs in how the damages for harm are allocated.

In *United States Fidelity & Guaranty Company v. Jadranska Slobodna Plovidba*,[259] a longshoreman fell to his death when he wandered into a darkened hold whose hatches were left open. The question facing the court was whether the shipowner should be held liable for the longshoreman's death given that it failed to take precautions to prevent the accident.[260] To resolve the issue of the ship's duty, Judge Posner applied the *Carroll Towing* formula to weigh the costs to the ship of avoiding the accident against the risk of harm. Finding that the "expected harm" (i.e., the loss of life times the probability of it occurring[261]) was less than the burden to the ship of accident prevention, Judge Posner found the ship not liable.

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253. *See supra* text accompany notes 220-34.
254. *See supra* text accompanying notes 235-41.
255. *See supra* text accompanying notes 242-58.
256. *Barker*, 20 Cal. 3d at 425 n.7, 573 P.2d at 451 n.7, 143 Cal. Rptr. at 233 n.7.
257. *Id.* at 432, 573 P.2d at 456, 143 Cal. Rptr. at 238.
258. *See supra* text accompanying note 247.
259. 683 F.2d 1022 (7th Cir. 1982).
260. *Plovidba* was a suit involving a longshoreman who had fallen to his death through an open hatch in a darkened hold. The ship on which one Patrick Huck was working as a longshoreman had five holds. Each hold had three decks with hatches that can be opened to the deck above or below; when all three hatches are open, cargo can be loaded into (or from) the lowest cargo area. After the longshoremen had completed work in the forward-most hold (hold 1) and broken for lunch, the ship's crew came in, closed the top hatch and opened the lower two. This plunged the hold into darkness and created an opening with a drop of about twenty-five feet. The ship's decision to do so was to facilitate loading at the next port of call. That afternoon, the longshoremen's crew worked in the adjacent hold. Sometime late afternoon, Huck returned to hold 1, now in darkness and fell to his death through the open hatch. The jury found that the shipowner had not been negligent but Huck and his employer, the stevedore company, had. The plaintiffs appealed. *Plovidba*, 683 F.2d at 1023-24.
261. *See supra* note 156.

Assuming that Judge Posner's calculations regarding the value of human life and his assessment of an extremely low probability of such an accident occurring comport with generally acceptable standards,[262] then his cost-benefit analysis clearly indicates that the probability of an accident was just too low to warrant the cost of the preventative measures. Under this value assessment, the ship's course of action was the efficient choice to make. However, this does not preclude the shipowner from paying for the accident.

Society clearly accepts that some accident prevention measures are so costly to undertake, given the low probability of harm, that it would not be in society's interest to force enterprises to undertake such precautions. Obvious extreme examples include forcing companies not to release miracle drugs because of low level risks of harm, not to fly airplanes because of the risk of crashes, and not to build homes out of wood because of the risk of fire. Preventative measures are insisted upon when situations are viewed as "just too dangerous" relative to the costs of the alternatives.[263] Cost-benefit analysis merely provides guidelines for society to use in making its determinations as to when that line of danger has been crossed.

The implication Judge Posner draws from assigning liability according to the *Carroll Towing* formula is that efficiency requires that the shipowner pay only for harms generated by inefficient activity. This is not correct. Not requiring corporations to undertake every conceivable costly prevention is not synonymous with leaving the victims to absorb the full costs of such accidents when they do occur. Though it is in society's interest that corporations only undertake levels of prevention that society deems efficient, allowing the corporation to be liability-free if it behaves efficiently is not the only means to accomplish that goal. An example of an alternative policy that also promotes economically efficient levels of precaution, is one that assigns liability to the party who could have avoided the accident at the least cost.[264]

In *Plovidba*, for example, the ship could have avoided the accident if it had closed the intermediate hatches or posted warning signs and locked the doors to the darkened hold.[265] Even though the cost to the ship of these actions are minimal,[266] Judge Posner concludes that the expected harm from not undertaking the precautions was even less. It was appropriate, then, on that basis, for the ship not to undertake them. The question is whether the *Carroll Towing* rule of holding the ship not liable in this case is necessary to encourage the ship to take this course of (in)action. In other words, would the ship have made the same efficient decision if, instead, it were held liable as it would be under the least-cost accident avoider approach, or would it have felt compelled, due to the liability assignment, to undertake an inefficient, excessive level of precaution? The answer is, in fact, that *the ship would have made the same efficient decision whether or not it was assigned the liability for the longshoreman's accident.*

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262. For a criticism of his analysis *see infra* notes 287-307 and accompanying text.

263. *See supra* text accompanying notes 161-88.

264. For descriptions of the least-cost accident avoider approach, see G. CALABRESI, *supra* note 26, at 35-129; Latin, *Problem-Solving Behavior and Theories of Tort Liability*, 73 CALIF. L. REV. 677, 688-93 (1985); Shavell, *supra* note 26, at 1, 2-3, 6-8.

265. *Plovidba*, 683 F. 2d at 1027.

266. "[W]e judge [these costs] in this case to have been, at most, moderate, and possibly small." *Id.*

This can be seen by recognizing that the ship makes its own calculations to ascertain the optimal course for it to take. When it is liable for the harm, its expected cost from inaction equals the value of the expected harm.[267] On the other hand, it can avoid that cost by undertaking another cost, the cost of preventative measures. It makes the decision whether or not to undertake accident prevention activities by weighing the cost of prevention against the expected cost of harm.[268]

If the *Carroll Towing* formula holds, then the ship is liable for the harm only when the burden of avoiding an accident *is less* than the expected harm and the ship takes no precautions. Thus, in those situations in which the burden is less than the expected harm, the ship will choose to undertake accident avoidance because it is cheaper for the ship to do so than pay for the expected harm. From society's point of view, this is the efficient course of action. If the burden *exceeds* the expected harm, then under *Carroll Towing* the ship will not be liable for any accident regardless of its actions. Since zero liability is less than the cost of accident prevention, the ship will choose to take no action. In this instance, since the burden exceeds the expected cost, the ship has taken the efficient course. Thus, we can see that under the *Carroll Towing* liability assignment, the ship is encouraged to make efficient decisions with regard to accident prevention activity.

Does the ship's course of action change under the least-cost accident avoider approach? Assuming that the shipowner *is* the least-cost accident avoider, then under that rule, the shipowner is liable no matter what course of action it takes. Will it make the same efficient choices as under the *Carroll Towing* liability rule? Since, under the least-cost accident liability assignment, the ship must pay for the expected harm under every circumstance, it is really facing only one decision: should it undertake the burden of avoiding the accident or should it decide to pay the cost of the expected harm. Clearly, its decision depends upon which is cheaper. If the burden is less than the expected cost, it will choose to undertake the burden. If the burden is greater than the expected cost, it will choose to pay the expected cost of the harm and not undertake the burden. This proves to be exactly the same (efficient) course of action as the ship chose under the *Carroll Towing* formula: the ship undertakes accident prevention only when its costs are less than the expected harm. The only difference lies in who pays for the accident when the efficient course dictates not to undertake the burden of prevention. Under the least-cost accident-avoider approach, it is the ship who pays for the accident. Under the *Carroll Towing* formulation, the victim pays.

Thus, it is apparent that even the decision to encourage efficient behavior according to a cost-benefit analysis does not alleviate the need for making value choices. As has been demonstrated, the same efficient behavior dictated by a cost-benefit analysis can be a dimension of different policy choices. In the example of *Plovidba*, the choice to be made is who will pay for accidental harms, even when everyone behaves efficiently. The decision represents a value choice and the *Carroll Towing* formula embodies only one of them.

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267. If L is the liability if the accident occurs and P is the probability it will occur, then the expected harm is PL (*see supra* note 156). Though when an accident occurs, the firm will have to pay L, an accident will not occur every trip. Accidents will occur P percent of the time. Thus, when averaged out, the firm's expected cost each trip is PL.

268. Whereas the firm's expected cost to pay for harm is PL (*see supra* note 266), the firm's costs to prevent such accidents, B, is incurred every trip. It is this cost that the firm must weigh against the expected cost of harm to determine whether it should undertake preventative efforts.

VII. SUBSTITUTION OF VALUE CHOICES

A. The Ford Pinto Case and Judicial Angst

When courts adopt cost-benefit analysis for certain kinds of issues like product design, they are implicitly recognizing the need to accept the notion that society must be exposed to some level of risk of harm if it is to enjoy the benefits of modern technology. Sometimes, however, the courts are repelled by the actual results in particular cases. There are instances in which the courts punish those who adopt the very criteria by which the courts decree the litigants' behavior will be judged.

The judicial angst created by such conflicting views is observable in *Grimshaw v. Ford Motor Co.* (the *Pinto* case).[269] In that case, the plaintiff sued Ford Motor Company for injuries he sustained when the Ford Pinto in which he was a guest exploded. The explosion occured when another car rearended the Pinto and ruptured the Pinto's gas tank.[270] Plaintiff claimed that the defendant's car was defectively designed with respect to the placement of the gas tank, and was awarded punitive damages.[271] The court held that the defendant's decision to engage in a prospective cost-benefit analysis for determining whether or not to

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269. 119 Cal. App. 3d 757, 174 Cal. Rptr. 348 (1981).

270. The owner of the car, Lilly Gray, and her guest Richard Grimshaw, were in her 1972 Ford Pinto on a California freeway. The car suddenly stalled and came to a halt in the middle lane. The driver of a 1962 Ford Galaxie was unable to stop and hit the rear of Mrs. Gray's car. The Ford Galaxie was traveling at between 28 and 37 miles per hour when it hit the Pinto. The Pinto caught fire upon impact. The Galaxie had pushed the Pinto gas tank forward and caused it to be punctured by the flange or one of the bolts on the differential housing. Fuel sprayed from the punctured tank and entered the passenger compartment. By the time the car came to a rest, both Gray and Grimshaw had been seriously burned. Gray died a few days later; Grimshaw survived but suffered permanent serious and disfiguring injuries. *Id.* at 773-74, 174 Cal. Rptr. at 359.

271. Testimony presented at trial included the results of crash tests Ford itself had conducted. These showed that the Pinto did not meet the proposed federal regulation requiring all automobiles manufactured in 1972 to be able to withstand a 20-mile per hour fixed barrier without significant fuel spillage. *Id.* at 774-75, 174 Cal. Rptr. at 360. Mechanical prototypes, when struck from the rear with a barrier moving at twenty-one miles an hour suffered damage very much like that incurred by the Gray's car. The gas tank was moved forward and punctured, causing fuel leakage in excess of federal standards. *Id.*

The plaintiffs at trial also introduced evidence that technological changes to the Pinto design were possible which would have significantly altered the car's ability to survive a crash without fuel leakage. A Pinto with two longitudinal "hat sections" (reinforcing longitudinal side members) passed a 20 mile-per-hour rear impact fixed barrier test without fuel leakage. Vehicles with fuel tanks installed above rather than behind the differential passed rear crash tests into fixed barriers at 31 miles-per-hour, while the Pinto as built could not pass such a test at 21 miles-per-hour. *Id.* A former Ford engineer and executive in charge of crash testing testified that Ford's management knew of the fuel system's vulnerability and of the possible changes which might increase its safety. Documentary evidence corroborated the engineer's testimony. *Id.* at 775-78, 174 Cal. Rptr. at 361-62.

The jury awarded Grimshaw $2,516,000 compensatory damages and $125 million punitive damages; Gray's heirs, who sued for wrongful death, received $559,680 in compensatory damages. On Ford's motion for a new trial, Grimshaw was required to remit all but $3.5 million of the punitive award as the court's condition for denying Ford's motion. *Id.* at 771-72, 174 Cal. Rptr. at 358.

Ford appealed from the judgment and from an order denying its motion for a judgment notwithstanding the verdict as to punitive damages. Grimshaw appealed from the order granting a conditional new trial and from the order amending his award of punitive damages. Gray's heirs cross-appealed from the judgment and from an order denying leave to amend their complaint to seek punitive damages. *Id.* at 772, 174 Cal. Rptr. at 358-59.

install a safety feature constituted malice sufficient to uphold an award of punitive damages.[272] The court's decision in this regard is problematic and raises fundamental questions about the consistency with which courts wish to adopt a risk-utility analysis for determining manufacturers' liability.

The court was obviously perturbed, if not repelled, by the specter of corporate executives deciding to take calculated risks of harm on the basis of the cost of avoiding harm relative to the benefits.[273] The court's view of Ford's behavior is reminiscent of the older standard of negligence requiring parties to avoid accidents at all costs. It is almost as if the court at some level refused to accept the full implications of its abandonment of unavoidable accident judgments and its adoption of risk-utility analysis in this area.

This schizophrenic view cannot be justified (as the *Grimshaw* court may have thought) by the fact that risk-utility analysis used in the courts usually involves retrospective determinations of unintended risk of harm, whereas in the *Pinto* case, Ford Motor engaged in prospective intentional and knowing acceptance of an actual risk of harm. Courts use risk-utility analysis to determine what constitutes a socially acceptable level of risk; a distinction in the use of such a standard between retrospective and prospective application is meaningless. The crucial factor is not at what point the decision about harm occurs but what level of harm society is going to tolerate.[274]

Furthermore, the danger of, on the one hand, accepting risk-utility analysis as the standard for retrospective determination of liability but on the other hand penalizing those who use it prospectively, is to encourage purposeful corporate ignorance.[275] While it is true that courts may attempt to deal with such a response

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272. *Id.* at 819-21, 174 Cal. Rptr. at 388-89. In its appeal from the award of punitive damages, Ford argued that such awards were impermissible in product design cases. California law provided for an award of damages in civil cases only when the defendant had been guilty of "oppression, fraud, or malice, express or implied." *Id.* at 807, 174 Cal. Rptr. at 380-81. The court noted, however, that California case law interpreted malice to include conduct evincing "a conscious disregard of the probability that the actor's conduct will result in injury to others." *Id.* at 808, 174 Cal. Rptr. at 381 (quoting Dawes v. Superior Court, 111 Cal. App. 3d 82, 88, 168 Cal. Rptr. 319, 322 (1980)). Furthermore, the court found that there was sufficient evidence of such malice to justify the punitive damages. *Id.* at 812-14, 174 Cal. Rptr. at 384-85.

273. The court termed Ford's behavior "reprehensible in the extreme." *Id.* at 819, 174 Cal. Rptr. at 388.

274. When the courts use risk-utility in strict liability design fault cases, the emphasis is on the product rather than the manufacturer's conduct. Thus, the knowledge that he had, or should have had, when the design was first put in the market is theoretically immaterial. The product is judged in hindsight. *Barker*, 20 Cal. 3d at 434, 573 P.2d at 457, 143 Cal. Rptr. at 239; Cepeda v. Cumberland Eng'g Co., 76 N.J. 152, 386 A.2d 816 (1978). Conversely, under a true strict liability theory, as opposed to negligence, a manufacturer who knew of the defect before putting a design on the market should not be judged more harshly than one whose knowledge is only after-the-fact. *See supra* text accompanying notes 161-88.

275. While a legal incentive to improve product safety is present in a state of the art defense based upon feasibility, . . . the incentive is not as strong as it could be. There is, to be sure, an impetus to incorporate safety devices which are feasible. There is not, however, an incentive to develop safety technology to a point at which it becomes feasible. Professor X . . . may not be inclined to devote additional time and money, once the airbag is developed, for the purpose of making it economically feasible. Since further refinement by manufacturer Y could deprive the firm of the benefit of the [state of the art] defense, it is not in the firm's best interest to refine the airbag system. If neither the inventor nor the industry is inclined to do so, their inaction collectively sets the standards.

Note, *Product Liability Reform Proposals: The State of the Art Defense*, 43 ALB. L. REV. 941, 953 (1979).

by imputing malice to studied indifference,[276] that remedy is likely to be unsuccessful. Because finding the risk of harm will usually entail innovative development for its discovery, there will be no bench mark of established procedure against which the courts can judge any particular corporation's failure to conduct investigations.[277] Indeed such an approach might well have the effect of lowering the safety research goals of entire industries.

> If the decision on actionability is made on the basis of knowledge available at the time of trial, it obviously is made on the basis of hindsight....
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> ....
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> The hindsight standard ... provides a disincentive for the manufacturer to discover safety improvements for a product that has already been marketed. And, even if improvements are discovered, it discourages their utilization or disclosure and encourages their concealment in order to prevent liability for products already distributed.

Wade, *On the Effect in Product Liability of Knowledge Unavailable Prior to Marketing*, 58 N.Y.U. L. REV. 734, 755 (1983).

> Hindsight analysis removes any element of culpability. Liability may be imposed even where no risk of harm was foreseeable at the time of manufacture. Indeed, hindsight analysis eliminates some incentive to discover such risks. Once discovered, the knowledge of the risk may be used against the manufacturer to show the product is defective.

Diamond, *Eliminating the "Defect" in Design Strict Products Liability Theory*, 34 HASTINGS L. J. 529, 543 (1982-83).

276. *See* United States v. Jewell, 532 F.2d 697, 700 (9th Cir. 1976) ("The substantive justification for the rule [equating knowledge with conscious disregard of facts] is that deliberate ignorance and positive knowledge are equally culpable.").

> 277. Putting aside the issue of what it would take to rebut the 'state of the art' presumption, there is yet another question which must be confronted. Why is there a presumption of any kind in favor of the defendant [manufacturer]? The self-evident answer is that once the state of the art has been met the defendant should be entitled to a presumption in his favor—he has, after all, conformed to existing technology. But, we forget in what posture the issue is raised. Invariably, the plaintiff has raised a design alternative which is both technologically and economically feasible at the time of trial. There are at least grounds for suspicion that the state of technology was not as limited as we might have thought.... The assumption is that scientific knowledge can be frozen and easily determined at any given point in time. That is sheer nonsense. The state of technical knowledge and technological feasibility is in a constant ebb and flow .... To require a plaintiff who stands from the outside to cut through the maze of industry knowledge and identify technological feasibility at a particular point in time seems drastically unfair.... [T]he manufacturer who is best able to marshall the evidence to support the proposition that it was not feasible should be made to carry the burden on this issue. It makes no sense whatsoever to throw on to the [plaintiff] the burden to prove... that a presently feasible design could have been accomplished by industry if they had properly advanced the state of their knowledge. If the advance was not made, industry can best tell us of the false positives and blind alleys of their research (if in fact they performed the research properly) which led them away from making the desired advance.

Twerski & Weinstein, *A Critique of the Uniform Product Liability Law—A Rush to Judgment*, 28 DRAKE L. REV. 221, 239-40 (1979). *See also* White, *Economizing on the Sins of Our Past: Cleaning Up Our Hazardous Wastes*, 25 HOUS. L. REV. 899, 932-33 (1988), discussing advantages of proposal for liability framework which creates incentives for firms to police themselves by tax assessments to compensate victims:

> In cases of advanced technological innovations, the technical expertise necessary to grasp the implications of any particular safety measure is very high. Often the accused corporation is the only source for this assessment, and naturally its expressed opinion will be biased. By creating incentives for the industry to police itself, the question of the appropriateness of the degree of safety undertaken can be debated [in the court room] by experts on both sides of the issue. If the industry as a whole feels that a particular firm is negligent, they will be able to present

Part of the court's repulsion in *Grimshaw* may have been caused by the small cost per car that would have to be expended to substantially reduce the risk of explosion — two dollars.[278] Although this is an understandable emotional reaction, it tends to color the analysis of these issues. Although the cost of avoiding this particular harm was only two dollars per car, in the aggregate it represented over one hundred million dollars of certain expense to forestall the potential of exploding rear-ended gas tanks risking an estimated one hundred and eighty lives.[279]

Though it might seem easy to argue that two dollars is an insignificant sum to ask consumers to pay for safety,[280] it is important to remember that there are potentially hundreds of inexpensive equally significant safety measures that can be taken with each automobile prototype.[281] The aggregate of these can easily add hundreds if not thousands of dollars to the cost of each car while avoiding risks that have little more than one in a million chance of occurring. Though it may seem callous to make such calculations on human lives, imposing the incorporation of such costs can put the price of an automobile beyond the reach of many people, thereby creating another loss to society that may be at least the same if not greater than the one that has been avoided. Certainly, social acceptance of the "inherently dangerous" automobile is quite evident. Limitations on maximum speeds could be lowered for significant gains in highway safety and reduced fatalities.[282] Better traction, steering and braking power enhances the driver's control over the vehicle

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evidence and arguments for the purposes of persuasion. The industry will have an incentive to do so since they most certainly would not want to pay higher tax rates [for victim compensation] in order to protect a negligent firm.

278. The longitudinal reinforced members necessary for the car to pass the twenty mile-per-hour rear impact fixed barrier test cost $2.40; additional cross members to further strengthen the back end cost $1.80. Changes necessary to make the Pinto's gas tank safe in a 34 to 38 mile-per-hour rear end collision by a vehicle the size of a Ford Galaxie would have cost $15.30 per car. *Grimshaw*, 119 Cal. App. 3d at 775-76, 174 Cal. Rptr. at 360-61.

279. In making its cost-benefit analysis, Ford used the figures calculated by the National Highway Traffic and Safety Association to be the value of human life ($200,000) and serious burn injury ($67,000). Using an estimation of 180 burn deaths and 180 serious burn injuries per year, Ford calculated that the benefits that would be realized by adding safety devices to the Pinto's fuel tank, in terms of lives saved and injuries prevented, would equal approximately $50 million dollars, whereas the associated costs would be $137 million dollars. *See* S. Kinghorn, Corporate Harm—A Structural Analysis of the Criminogenic Elements of the Corporation 218 (1984) (unpublished dissertation).

280. Though the court views the two dollar expense as coming out of Ford's corporate profits, in fact, as economics tells us, and as has been repeatedly verified empirically, any increases in costs are ultimately passed on to the consumer. Even the legal circles understand and accept that fact, as is reflected in the courts' decision to impose strict liability on the grounds that manufacturers are better able to absorb the risks of harm by passing them on to consumers through higher prices.

281. The evidence in *Grimshaw* indicates at least ten changes that could have been made to improve the fuel tank integrity. *Grimshaw*, 119 Cal. App. 3d at 776, 174 Cal. Rptr. at 361.

282. In April [1987], when Congress permitted all states to raise the speed limit on rural interstate highways to 65 m.p.h., 38 states chose to do so.

'People are voting with their gas pedals,' says Gene Berthelsen of the California Department of Transportation .... 'We feel it's wiser to post speeds that people are already going.'

The results thus far have been ominous. The National Highway Traffic Safety Association reports that in 22 of those states, highway deaths jumped 46% between May and July over the same three months in 1986 ....

Wilentz, *Putting the Pedal to the Metal*, TIME, Jan. 11, 1988, at 29 (reported by Ted Gup).

but such features add substantially to the price of the car.[283] Finally, studies have indicated that consumers themselves when faced with options in both safety and fashion details almost invariably choose conspicuous consumption over safety devices, reflecting their own internal cost-benefit analysis of putting their life and the lives of others at risk.[284]

As the discussion above indicates, the *Grimshaw* case highlights the courts' need to come to grips with the full implications of cost-benefit analysis in judicial determinations. At the very least, consistent application of the standard is warranted. Consistency in the application of risk-utility analysis does not mean, however, that notions of fairness and minimal standards of safety cannot also be imposed. To accommodate these apparently conflicting needs, the courts should, in addition to risk-utility or any other cost-benefit analysis, use a separate standard that would operate as a threshold test to protect societal interests. In effect, the two-prong test of *Lull v. Barker* in the context of compensatory damages presages this movement by establishing consumer expectations as a floor of safety.[285] If consumer expectations or other court-created standards are viewed as insufficient or inappropriate, the various federal regulatory guidelines for product and environmental safety can serve as the threshold standard.[286] What is necessary is to avoid the court's inconsistent posture regarding risk-utility.

B. The Longshoreman Case and Judicial Legerdemain

The type of reasoning in *Grimshaw* tends to make the use of risk-utility analysis suspect. Since the court is assessing punitive damages for the application of a standard that it has itself adopted, it appears as if the court is rejecting cost-benefit analysis as being inherently evil.[287] For different reasons, the results in *Plovidba*,[288] also gives cost-benefit analysis a bad name. In *Grimshaw*, the

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283. Compare the ability of a Porsche to a mid-priced American automobile to avoid an accident. (Of course, this ignores the temptation the Porsche offers the driver to undertake greater risks — which in itself reflects another cost-benefit analysis calculating the value of human life.).

284. *See, e.g.*, Malcolm, *On the Road Again With a Passion*, NEW YORK TIMES, Oct. 10, 1988, at A10, col. 1. "Customers are looking for a lot of special things in new cars, but safety and gas mileage are not two of them." Interview with Chris Cedergen, an analyst with J.D. Powers & Associates.

285. *See supra* notes 242-58 and accompanying text.

286. In the two product catagories most frequently encountered in recent manufacturers' design choice cases, Congress has . . . establish[ed] specialized administrative agencies and procedures for handling problems, including the establishment and enforcement of standards relating to product design . . . .

> Moreover, . . . enactment of the Federal Consumer Product Safety Act, creating a[n] . . . administrative agency empowered to establish safety standards for a wide range of consumer products, strongly suggests that the trend toward legislative and administrative standard-setting will continue.

Henderson, *Judicial Review of Manufacturers' Conscious Design Choices: The Limits of Adjudication*, 73 COLUM. L. REV. 1531, 1574-75 (1973).

> Who . . . *should* decide how much public risk we will accept and in what areas? The answer is painfully obvious . . . outside the legal community: expert administrative agencies, not lawyers. To make life safer, faster, we need not more scientists in the legal process but fewer lawyers in the scientific one . . . . Expert administrative agencies . . . [are] best able to regulate public risks in a manner calculated to advance the public health and welfare.

Huber, *Safety and the Second Best: The Hazards of Public Risk Management in the Courts*, 85 COLUM. L. REV. 277, 329 (1985).

287. *See supra* text accompanying notes 269-85.

288. 683 F.2d 1022 (7th Cir. 1982).

court does not like the implications of corporate risk-utility decision-making and therefore adopted its own policy judgment to assuage its sense of outrage.[289] In *Plovidba*, on the other hand, Judge Posner apparently did not like the policy judgment of Congress and by using the *Carroll Towing* formula he was able to substitute his own policy judgment in place of theirs.[290] It is not, however, the cost-benefit analysis itself that accomplishes this replacement, it is Judge Posner's particular handling of the mathematical variables in the formula that obfuscates the substantive issues, thereby facilitating the substitution of policy choices.

The significance of hidden value choices is made even more acute when we examine the implications of Judge Posner's choice of the Learned Hand formula in light of the express legislative intent behind the changes in the applicable law in *Plovidba*. The law with regard to the shipowner's liability for injuries sustained by longshoremen is regulated by the Longshoremen's and Harbor Workers' Compensation Act.[291] In 1972, Congress amended the statute thereby changing the shipowner's third party liability to the longshoreman from one of strict liability to one based on negligence.[292] While doing so Congress also made clear (as the House and Senate Reports[293] expressly state, the Supreme Court confirms[294] and Judge Posner did indeed acknowledge,) that the now applicable standard of negligence is not to be construed to permit arguments of assumption of risk or contributory negligence to bar a longshoreman's recovery.[295] In spite of the Congressional mandate, Judge Posner's application of the *Carroll Towing* formula to the facts in *Plovidba* incorporates those very elements with which contributory negligence and assumption of risk are concerned in order to reach a judgment that does, in fact, relieve the shipowner of liability.

The shipowner was being sued for failing to take measures that would have prevented the longshoreman's death. Articulating a new basis for evaluating negligence findings, Judge Posner applied the *Carroll Towing* formula to assess the rationality of a jury's finding that the ship's inaction did not constituted negligence.[296] This required weighing the cost to the ship of taking preventative measures against the value of the harm multiplied by the probability of the harm occurring (i.e., the expected harm).[297] As noted earlier, the burden to the ship of avoiding the accident was very small; it entailed either closing the darkened hold's

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289. *See supra* text accompanying notes 269-85.

290. *See infra* text accompanying notes 290-306.

291. 33 U.S.C. § 905 (1982).

292. Act of Oct. 27, 1972, Pub. L. No. 92-576 §§ 1 *et. seq.*, 86 Stat. 1263, amending 33 U.S.C. §§ 901 *et. seq.* (1970) (codified as modified at 33 U.S.C. §§ 901 *et. seq.* (1982)).

293. The Report of the Senate Labor and Public Welfare Committee said that the admiralty concept of comparative negligence, not the common law rule of contributory negligence would apply. Furthermore, the defense of assumption of risk was precluded. S. Rep. No. 1125, 92d Cong., 2d Sess. 12 (1972). *See also* H. Rep. No. 1441, 92d Cong., 2d Sess. 12 (1972), *reprinted in* 1972 U.S. Code Cong. & Admin. News 4698, 4705.

294. We agree with the Court of Appeals that the shipowner may not defend on the ground that Santos should have refused to continue working in face of an obviously dangerous winch which his employer, Seattle, was continuing to use. The District Court erred in ruling otherwise, since the defense of assumption of risk is unavailable in 905(b) litigation.

Scindia Steam Nav. Co. v. De Los Santos, 451 U.S. 156, 176 n.22 (1981).

295. *Plovidba*, 683 F.2d at 1028.

296. *Id.* at 1028-29.

297. *See supra* notes 154-56 and accompanying text.

intermediate hatches or locking its doorways and putting up warning signs.[298] The decision not to take the precautionary actions created the risk of serious injury and loss of life, thereby placing a very high value on the harm. Since the cost to the ship of avoiding the harm was very small and the cost of the harm was extremely high, the shipowner's liability for the longshoreman's death hinged on the court's assessment of the probability of the accident occurring.

The reason Judge Posner gave for upholding the jury verdict relieving the shipowner of liability was his finding, under the facts before him, that the probability of accidental loss of life was extremely small.[299] The probability was so small, Judge Posner argued, that it offset the high value of the harm to such an extent that when the two were multiplied together, the combination was less than the costs to the shipowner of putting in the safeguards, even though the value of the lost life alone greatly exceeded those costs.[300]

When we examine how Judge Posner reached his conclusion we see that he, in effect, used those very elements that Congress expressly forbade in determining third party negligence in this area. Judge Posner's primary argument was that the probability that a longshoreman would go into an adjacent darkened hold and fall through an open hatch was very small.[301] To support that conclusion, Judge Posner posited that the deceased longshoreman was probably stealing,[302] that he was forewarned of danger by the darkness itself, and that he probably knew of the open hatch since he must have skirted around it to be found on the hatch's far side.[303] By attaching a low probability to the longshoreman deciding to be dishonest and reckless, as well as a low probability to his failing to successfully skirt the open hatchway, Judge Posner felt able to conclude that it was a low probability event that the longshoreman would fall into the hatch itself.[304]

Each of the factors Judge Posner used included elements of assumption of risk and contributory negligence. The whole purpose of prohibiting assumption of risk and contributory negligence as a bar to recovery is to prevent the shipowner from using the longshoreman's decisions and behavior in these matters to relieve the shipowner from liability for its own (in)action. It is true that Judge Posner was not using contributory negligence and assumption of risk directly to bar recovery — but by incorporating those actions of the longshoreman that constituted contributory negligence into the probability formula, he achieved the same ends indirectly. While using the Learned Hand formula would not necessarily yield this same result in every case, it does — as the court applies it — in *Plovidba*. In *Plovidba*, the burden of avoiding the harm was so small and the harm itself was so great that the decisive variable was the probability of harm. Judge Posner's focus

298. *See supra* note 264 and accompanying text.

299. *Providba*, 683 F.2d at 1028.

300. *Id.* at 1027-28. For a discussion on how the probability interacts with the loss of life in the Learned Hand formula, see the discussion in note 215, *supra*, on probability and multiplication.

301. *Providba*, 683 F.2d at 1028.

302. *Id.* Crates of liquor were stored in hold 1 and it was conjectured that Huck was planning to steal some on his way off the ship. *Id.* at 1024.

303. *Id.* at 1028. Huck's body was found about forty feet from the hatchway from which he entered. The open hatch in the deck began six to ten feet from the hatchway and was roughly thirty feet across. Thus, one could conclude that Huck had successfully skirted the hatch and fallen in from the far side. *Id.* at 1024.

304. *Id.* at 1028.

on the plaintiff's behavior alone to evaluate that probability was determinative in barring recovery.[305]

Nonetheless, even in *Plovidba*, a proper evaluation of the probability of harm for the *Carroll Towing* formula would have reached a different result. Judge Posner looked only to the probability of the *particular* acts of the *particular* longshoreman. Proper use of the *Carroll Towing* formula requires an assessment of a risk of fall into a darkened open hatchway based on the probability of what *any* longshoreman might do (or indeed what anyone else on the ship might do) for *any* reason. The formula measures the risk (i.e., the probability) that if a darkened hold's hatch floors are left open that someone, anyone, might wander in and fall to their injury or death. It does not measure the probability of a specific reason being the cause of that wandering. In other words, the greater the number of individuals on board, the greater the likelihood that someone will wander into the darkened hold and fall in. Under that more appropriate evaluation, the probability surely would have been large enough so that the expected harm would outweigh the burden of avoiding harm. This is particularly likely to be the case in *Plovidba*, since avoiding the harm was nearly costless. Thus, based on the Carroll Towing criterion that Judge Posner elected to judge the jury findings by, Judge Posner should have found no rational basis for the jury verdict.[306]

Finally, the settled case law appears to be that it is "negligence for the vessel to leave cargo hatches unguarded on a working deck if the particular hatch was not to be worked."[307] Indeed one may well ask why in the face of such case law making shipowners who leave hatches open and unguarded liable for the consequences, Judge Posner reopened the question by employing the weighing and balancing of the *Carroll Towing* formula.

Is the attraction of the Learned Hand formula in *Plovidba* because mathematical variables tend to obscure the value choices that are being incorporated indirectly? It seems clear Judge Posner thinks that contributory negligence and assumption of risk are proper defenses in § 905(b) cases. The difficulty, of course, is that Congress thinks otherwise. An overt ruling contrary to congressional intent is out of the question. What is apparently not out of the question is a ruling that has the same effect Congress specifically prohibited. Judge Posner's application of the Learned Hand formula neatly facilitates this result. It is, however, unfair to blame the formula.

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305. Posner's conclusions that a low P offsets the liability arising from a low B are at variance with those of other courts. For example, the court in Helling v. Carey, 83 Wash. 2d 514, 519 P.2d 981 (1974) reached the opposite conclusion when both a low cost accident avoidance technique and a low probability of the accident occurring were present in the case:

> Although the incidence of glaucoma in the age range of the plaintiff is approximately one in 25,000, this alone should not be enough to deny her a claim. Where its presence can be detected by a simple, well-known harmless test, where the results of the test are definitive, where the disease can be successfully arrested by early detection and where its effects are irreversible if undetected over a substantial period of time, liability should be imposed upon the defendants ....

Id. at 522, 519 P.2d at 985.

306. One of the issues Judge Posner addressed was "the plaintiff's challenge to the jury instructions and its contention that negligence was shown as a matter of law." *Plovidba*, 683 F.2d at 1026. Ironically, if Judge Posner had included all the correct variables in assessing the probability of harm in his application of the Learned Hand formula, he could have easily found the shipowner negligent as a matter of law.

307. Johnson v. AS Ivarans Rederi, 613 F.2d 334, 342 (1st Cir. 1980).

VIII. CONCLUSION

As we have seen, the growing and widespread use of cost-benefit reasoning in the courts is an outgrowth of the origins of negligence law. Desiring to find ways to circumscribe the scope of liability that the courts themselves were expanding, judges have turned to a weighing and balancing approach to find the appropriate delimiters. Coupled with the analysis of economic and legal scholars, the more generalized weighing and balancing has given way, in modern times, to a more formal and somewhat restrictive framework of cost-benefit reasoning. Some jurists have become enamored with its power; others are disgusted with its results, which are purported to be "objective." In some areas of liability law, the courts are increasingly depending on cost-benefit analysis as the ultimate arbiter of their standards. New areas of law are being introduced to cost-benefit analysis as it is being applied in entirely novel contexts. With this advent comes the necessity of greater comprehension and refinement of the cost-benefit technique. The first order of business in that direction is to draw the distinction between cost-benefit reasoning and social value decision-making. This Article demonstrates a variety of ways that social decisions arise in the context of applying cost-benefit analysis to legal frameworks. Understanding the full scope and ramifications of this approach, however, is really just beginning. As the use of the cost-benefit test expands, the necessity of inquiry into its nature will expand as well.