Computer Malfunctions - What Damages May Be Recovered in a Tort Product Liability Action

Stephen R. Brenneman
COMPUTER MALFUNCTIONS—WHAT DAMAGES MAY BE RECOVERED IN A TORT PRODUCT LIABILITY ACTION

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During the short-lived Falkland Islands conflict, the computerized radar warning system on the British ship H.M.S. Sheffield failed to detect an Argentine-launched Exocet missile which sank the ship. According to one report, the system had been programmed to recognize the Exocet missile as “friendly,” since the British had these missiles in their arsenal. Because the radar system failed to react to homing signals that the missile sent out, the missile was able to hit its mark.¹

Less dramatically, a failure of the computer system at the Bank of New York, which could not be corrected for several days, reportedly resulted in a four million dollar loss to the bank.² The system had been used for buying and selling government securities. As securities came into the bank for its customers, the bank was required to pay for them. However, because the computer was down, these securities could not be transferred to the bank’s customers. Because it could not in turn collect from those customers, the bank had to

¹. Lin, *The Development of Software for Ballistic-Missile Defense*, 253 *Sci. Am.* 46 (1985). The inclusion of this example herein should not be mistaken as a suggestion that this type of loss, occurring during an armed conflict, would be the proper subject of a products liability action. It is only included here as an illustration of the magnitude of loss which could be traced to a computer defect.

². DP Nightmare Hits N.Y. Bank, 19 *COMPUTERWORLD* 1 (Dec. 2, 1985); Bank Blames Nightmare on Software Flop, 19 *COMPUTERWORLD* 1 (Dec. 16, 1985).
borrow heavily to pay for the securities that came in. The computer problem was eventually traced to the software's inability to handle an unexpectedly heavy load of business.  

We have been relatively fortunate in the use of computers and computerized equipment. Although the world is firmly in the grips of an information and technology age, where computers permeate nearly every aspect of our lives, there have been very few reported injuries caused by what could be considered computer malfunctions. Such injuries have occurred, however, and, judging by the number of near misses which have been reported, many more such losses are inevitable.

This article is an attempt to survey and analyze the law of tort product liability as it applies to defects in computers and computerized equipment. Starting with an assumption that contractual relief is unavailable to the injured party, the discussion will survey the state of the law on what damages may nevertheless be recovered in tort from the manufacturer or retailer of the computer. The main purpose for this is to alert the unwary practitioner to the issues and pitfalls involved in prosecuting or defending such an action. The article is also intended to alert the potential purchaser of a computer or computerized equipment of the need to obtain adequate protection from certain losses either through a carefully drafted contract or insurance. In conclusion, the article will suggest a cohesive approach to cases involving tort recovery for injury or loss caused by computer defects.

I. BACKGROUND

Recovery for damages caused by a defective product is provided for under the law of product liability. This body of law provides recovery under general tort theories of negligence and strict

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3. See supra note 2.
4. Besides the Falkland Islands incident described previously, another reported incident involved the death of a factory worker in Kobe, Japan who was crushed by an industrial robot. However, it is not certain in this instance that the computer had actually malfunctioned. See Comment, Computer Software and Strict Products Liability, 20 SAN DIEGO L. REV. 439 (1983). See also Crash Spur Fixes to F-18, AVIATION W., Dec. 15, 1980, at 24 (where computer error was suspected as cause of crash).
5. Computer malfunctions have caused near misses in the air, CPU Fails, Two Jets Nearly Collide, COMPUTERWORLD, Nov. 12, 1979, at 1; forced the shut down of five nuclear reactors, Lin, supra note 1, at 49; caused the wasting of fuel on Skylab which may have been needed to avert a disaster, NASA Jumbles Skylab Flight Data, COMPUTERWORLD, Nov. 19, 1979, at 1; and caused the false alert of a world war, Norad System Goofs, Calls Missile Alert, COMPUTERWORLD, Nov. 19, 1979, at 1. See Gemignani, Product Liability and Software, 8 Rutgers J. of Computers, Tech. and the Law 173 (1982).
liability and under the contract theory of breach of warranty. Under negligence, recovery may be permitted if a defect was caused by failure to use due care in the design or manufacture of a product. Under strict liability, in most states, recovery is permitted if the defect caused the product to be unreasonably dangerous to person or property, regardless of fault on the part of the manufacturer. Under both tort theories the plaintiff may be able to recover all damages proximately caused by the defect.

Recovery may also be available for breach of warranty. As part of the sale of a computer system, the manufacturer or supplier may have made certain express warranties about the product's performance. Other warranties may have been implied by law. Where a product is defective, it probably will not be as warranted. In a breach of warranty action, recovery may be obtained for all foreseeable damages caused by the breach.

In many cases recovery may be obtained under all three legal theories, while in others, recovery may be precluded under one or more of them. Warranty recovery may be precluded because of lack of privity. Warranty law also may not provide full relief. As previously noted, contract recovery is generally limited to those damages which were reasonably foreseeable at the time of contracting. In addition, the contract between the parties may not

6. See generally Prosser & Keeton, The Law of Torts § 99 (5th ed. 1984). Negligent products liability does not normally include cases where the basis of the plaintiff's claim is professional malpractice. For a discussion of malpractice as it applies to computer professionals, see Triangle Underwriters, Inc. v. Honeywell, Inc., 604 F.2d 737, 744 (2d Cir. 1979); Chatlos Systems, Inc. v. N.C.R. Corp., 479 F. Supp. 738 (D. N.J. 1979), aff'd, reh'g denied 635 F.2d 1081 (3d Cir. 1980). This article assumes that the basis of any negligence claim is a failure to use due care in some phase of the production of the computer or computerized product. For this, it is also assumed that the manufacturer owes a duty of care to the injured party in producing the product.

7. See infra pp. Part II.B. for discussion regarding the various theories of strict liability.


For purposes of this article it is assumed that the Uniform Commercial Code is applicable to the sale of a computer. However, at least in the case of custom-built software, this may not in fact be true. Such software may not qualify as "goods" under the Code. See infra note 28.

9. See infra pp. Part II.A for discussion regarding the interrelationship between the term "defect" and warranty law.

contain express warranties about the product or its performance and may exclude implied warranties.\(^\text{11}\) Finally, the contract may contain a limitation of liability clause precluding any recovery in a breach of contract action beyond return of the purchase price.\(^\text{12}\)

Because of these limitations on recovery under warranty law, it is often necessary to rely on tort product liability theories. Under tort law, considerations of privity, foreseeability and contractual limitations would not normally exist.\(^\text{13}\)

Typically, a computer defect causes only economic losses.\(^\text{14}\) The purchaser will have paid for a computer which proves to be worth less than expected. Claims may also exist for delays in getting the computer up and running, for malfunctions during the early stages of operation, and for damages associated with down time. These disruptions may have resulted in lost profits, diverted personnel time and costs incurred in attempting to fix the problems. There may also have been a loss of goodwill due to billing errors, and, in the extreme case, loss of the business altogether.\(^\text{15}\)

Damages from computer defects, however, are not limited to economic losses. Malfunctions can also cause the loss of valuable data, the destruction of raw materials and the destruction of other property because of a computer controlled machine run amok.

\(^{11}\) U.C.C. § 2-316 provides for the exclusion of implied warranties.

\(^{12}\) Limitations of liability are authorized under the U.C.C. §§ 2-718 and 2-719 (1983). Absent a basis for excluding a limitation clause such as duress, or unconscionability such a clause will likely be upheld by the courts. See generally Note, Causes of Action in Computer Litigation: Special Problems for the Small or First Time User, 14 LOYOLA U. CHI. L.J. 327 (1983); Elligett, Enforcing Contract Limitation Clauses in Negligence Actions, 8 FLA. ST. BAR J. 457 (1984). See also Earman Oil Co., Inc. v. Burroughs Corp., 625 F.2d 1291, 1298-1300 (5th Cir. 1980); Aplications, Inc. v. Hewlett-Packard Co., 501 F. Supp. 129 (S.D.N.Y. 1980); Badger Bearing Co. v. Burroughs Corp., 444 F. Supp. 919 (E.D. Wis. 1977), aff'd without opinion, 588 F.2d 838 (7th Cir. 1978).


\(^{15}\) "According to some estimates, a typical company would lose over 40% of its operational effectiveness by the fourth day of a major computer outage. Less than 25% of the company's operations would continue to function after the first week and less than 10% after the second week." Tarkington & Ulrich, Disaster Recovery Planning - Insuring Against the Unthinkable, 17 COMPUTERWORLD BUYER'S GUIDE, COMPUTER SYSTEMS, 47 (1983).
They can also cause personal injury. As previously stated, this article will examine the different types of damage which may be caused by a computer defect and how such damages may be recovered in a tort product liability action. Because it is the type of injury most readily suffered, and because it is the area of most controversy, this analysis will primarily deal with the question of whether and when economic losses may be recovered. Although this question will be dealt with chiefly from the standpoint of a computer defect, the analysis is equally applicable to other products.

II. Definitions

A. Defect

Before embarking on a discussion of the state of the law on the recovery of damages in tort products liability, it is first necessary to define certain key terms. The term “defect” as used in this context refers to that aspect of a computer or other product which makes it unfit for the ordinary purposes for which it is sold and used. It is a flaw in the design or manufacture of the computer. This definition is similar to that for a product which is not merchantable under the Uniform Commercial Code. It does not require that the flaw make the product unreasonably dangerous, or dangerous at all. For example, a computer system would contain a defect if it contains an error in the software logic which generates improper spreadsheet calculations.

B. Strict Liability

It is generally accepted that “strict liability” as a separate cause of action in tort was first recognized in Greenman v. Yuba Power Products, Inc. As stated by the Greenman court, “[a] manufacturer is strictly liable in tort when an article he places on the market, knowing that it is to be used without inspection for defects, proves to have a defect that causes injury to a human being.”

As it has evolved, strict liability theory is applied differently depending upon the jurisdiction involved. There are three generally

19. Id. at 62, 377 P.2d at 900, 27 Cal. Rptr. at 700.
recognized theories. In *Cova v. Harley Davidson Motor Co.*, a theory similar to implied warranty was introduced. Under it, the plaintiff must prove a specific defect in the product which caused the damage alleged. The most generally recognized theory of strict liability is that adopting the language of section 402A of the Restatement (Second) of Torts. Under this theory, the plaintiff must prove that the product was in an unreasonably dangerous condition when it left the defendant's control and that such condition caused the plaintiff's injuries. The third theory, announced by the California Supreme Court in *Cronin v. J.B.E. Olson Corp.*, requires only that the plaintiff prove the product contained a defect which caused the injury. It is not necessary that the product was either unmerchantable or unreasonably dangerous. Unless otherwise indicated, it will be assumed for purposes of this discussion that the more narrow Restatement approach applies.

22. Id. at 611, 182 N.W.2d at 806.
24. The Restatement (Second) of Torts § 402A (1965) states:

SPECIAL LIABILITY OF SELLER OF PRODUCT FOR PHYSICAL HARM TO USER OR CONSUMER

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

(a) the seller is engaged in the business of selling such a product, and
(b) it is expected to and does reach the user or consumer without substantial change in the condition in which it is sold.

(2) The rule stated in Subsection (1) applied although

(a) The seller has exercised all possible care in the preparation and sale of his product, and
(b) the user or consumer has not bought the product from or entered into any contractual relation with the seller.

25. Id.
27. Id.
28. One issue which has not yet been resolved is whether computer software is a product, subject to strict liability analysis. This issue is currently being determined on an ad hoc basis. If the software is custom made, it will probably be viewed as a service provided to the purchaser (computer programming service) and not a product. *Cf.* *K-Mart Corp. v. Mideo Realty Group of Connecticut, Ltd.*, 489 F. Supp. 813, 816-820 (D. Conn. 1980) (architectural drawings); *Halstead v. United States*, 535 F. Supp. 782, 789-91 (D. Conn. 1982) (navigational charts). If mass produced, however, it would more readily be viewed as a product and subject to strict liability. For a thorough analysis of this question, see *Comment, Computer Software and Strict Products Liability*, 20 SAN DIEGO L. REV. 439 (1983); Note, *Strict Products Liabili-
C. Economic Loss

Because every loss or injury must eventually be reduced to monetary terms in order to be compensable in a civil action for damages, it is not enough simply to define "economic loss" as including those damages having a financial impact on the plaintiff. Economic loss has been characterized as that loss which results from "failure of the product to perform to the level expected by the buyer." It is commonly measured by "the cost of repairing or replacing the product and the consequent loss of profits, or by the diminution in value of the product because it does not work for the general purposes for which it was manufactured and sold."

Economic loss does not refer to the type of damage which has been sustained, such as diminution in value, repair or lost profits. It refers to the way in which the damage was done. If damage arose from the fact that the product did not work as expected, it would normally be considered economic loss. If, however, the damage arose as a result of some accident or incident, such as a fire, explosion or other similar event, the damage would normally not be considered an economic loss.

Economic loss is generally contrasted with personal injury and property damage. Personal injury refers to those damages associated with a physical injury to a person's body. Even though such physical injury could result from failure of a product to function as expected, as in the case of a computerized life support system, this is nevertheless viewed as outside of the realm of economic loss. Property damage generally refers to an injury to property other than the defective product itself.

As to damage to the defective product, the line between economic loss and property damage is often blurred. The determina-

ity and Computer Software: Caveat Vendor, 4 COMPUTER L.J. 373 (1983). For purposes of this article, it is assumed that strict liability does apply.

29. Although personal injury damages are universally viewed as not being economic losses, they are generally compensable in terms of medical expenses and lost earnings. These monetary amounts are as much economic losses to the injured individual as lost profits would be to a business. Both are based on the intentions and expectations of the parties.


33. See infra Part VI for discussion.
tion of whether such damage will be considered "property damage" will often depend on the manner in which the damage is incurred. If from a sudden or calamitous event, it is generally considered property damage. If, on the other hand, from deterioration, internal breakage or depreciation, it will more readily be considered economic loss.

III. WHAT ARE COMPUTER DEFECTS?

Computer malfunctions can occur in the hardware or the software. Hardware errors can occur because of a deficient design in the circuitry or because of incompatibility of the various components of the computer. For example, in the case of a computer system designed to control a medical life support system, a design error might be a failure to include some type of fault-tolerant circuitry in the system. Such deficiency could result in an electronic signal error going undetected and uncorrected, thereby resulting in a failure to signal medical personnel when a critical condition arises.

Hardware malfunctions may also result from manufacturing...
errors, wherein the producer of the computer simply fails to build it as designed.

It is more typical for computer malfunctions to occur in the software. Roughly half of these errors are the result of defects in design. In the example of the H.M.S. Sheffield described earlier, the failure of the computer programmer to take into consideration the possibility that an opponent might be using an Exocet missile would be considered a design defect.

As with hardware, software errors can also result from manufacturing defects. For example, a failure to properly copy software onto a floppy disk for transmittal to a customer would be considered a manufacturing error.

Defects in computers, like many other products, can cause injury to persons or property directly or indirectly. A direct injury occurs when a defective industrial robot goes out of control and destroys raw materials with which it is working. In contrast, an indirect injury can result from a defect in a computer aided design program. If that program is used by an architect for the design of a building, and if, in the process, the computer provides information to the architect which indicates the vertical strength of the design as being stronger than it really is (for example, a misplaced decimal point which gives a figure ten times higher than the actual number), this may lead to collapse of the building and significant injuries.

IV. Recovery of Economic Losses Generally

It is generally accepted that personal injury and property damage may be recovered in a tort product liability action. However, there has traditionally been a split of authority as to whether economic losses, when the only damages suffered, are recoverable.
The minority view, announced by the New Jersey Supreme Court in *Santor v. A&M Karaghensian, Inc.*[^45^] allows recovery of such damages in all instances. In *Santor* the plaintiff purchased carpet which developed unsightly lines after only a few months of use.[^46^] Although the carpet had been purchased from a third party, the plaintiff sued the manufacturer for damages associated with diminution in value of the carpet. Despite lack of privity, the court concluded that the plaintiff could maintain an action for breach of implied warranty.[^47^] In dicta, the court noted that the plaintiff could have maintained an action in strict liability as well.[^48^]

In support of this latter conclusion the court pointed out that the manufacturer is in a better position to insure against such losses and to spread their risk. Placing such burden on the manufacturer is justified because the manufacturer places its goods on the market with "a representation that they are suitable and safe for the intended use . . ."[^49^] Liability in such instances should not depend upon "the intricacies of the law of sales."[^50^]

In further support of the *Santor* approach, it has been argued that a consumer is not always provided adequate protection by the law of sales.[^51^] Protection may be denied because the consumer failed to give timely notice of a breach, because warranties were effectively disclaimed, or because the plaintiff was not in privity with the defendant.[^52^] Recovery in negligence has also been supported by the idea that the manufacturer owes a separate duty to

[^46^]: Id. at 54, 207 A.2d at 307.
[^47^]: Id. at 57, 207 A.2d at 310.
[^48^]: Id. at 58-59, 207 A.2d at 311-13.
[^49^]: Id. at 58, 207 A.2d at 311.
[^50^]: Id. at 59, 207 A.2d at 312. The diminution in value damages allowed in *Santor* are considered direct economic losses. This is the difference in value of the product if it had been as expected and its actual value. In subsequent cases, New Jersey has also permitted the recovery in tort products liability of indirect economic losses - those associated with repair costs and loss of profits. *See Spring Motors Distributors v. Ford Motor Co.*, 191 N.J. Super. 22, 465 A.2d 530 (1983). In *Spring Motors*, it was also noted that *Santor* is not applicable to a dispute between merchants.
[^51^]: See Thompson v. Nebraska Mobile Homes, 647 P.2d 334 (Mont. 1982).
[^52^]: See generally 63 AM. JUR. 2d Products Liability § 164 (1972).
the user or consumer to exercise due care to avoid foreseeable harm, regardless of the type of harm suffered. As stated by the Washington Supreme Court in Berg v. General Motors Corp.,

[a] manufacturer intending and foreseeing that its product would eventually be purchased by persons operating commercial ventures, owes such persons the duty not to impair that purchaser's commercial operations by a faulty product. The negligent manufacture of such an article sold, poses the foreseeable risk that the output of the entire enterprise would be diminished or even temporarily halted. The specie of harm generated by such work stoppage (lost profits) is well within the zone of danger created and foreseen by the negligent act.

Several months after Santor, the California Supreme Court announced in Seely v. White Motor Co. what has become the majority rule in this area. In Seely, the plaintiff sought recovery of damages associated with a defect in his truck which allegedly caused it to overturn. The plaintiff sought two types of damages: (1) repair costs for the accident damage, and (2) return of the purchase price and lost profits unrelated to the accident. The California Supreme Court concluded that the plaintiff could recover the second category of damages on the basis of breach of express warranty. In dicta, the court also concluded that the plaintiff could not recover such losses in an action for strict liability in the absence of personal injury or property damage. The court reasoned that such economic losses, resulting solely from failure of the truck to live up to the expectations of the plaintiff, are not properly the subject of a tort action. To permit such recovery would interfere with the parties' right to freely contract.


55. 63 Cal. 2d 9, 403 P.2d 145, 45 Cal. Rptr. 17 (1965).

56. Id. at 17, 403 P.2d at 152, 45 Cal. Rptr. at 24.

57. Id., at 16, 403 P.2d at 151, 45 Cal. Rptr. at 23.

58. Chief Justice Traynor, writing for the majority, stated:

The distinction that the law has drawn between tort recovery for physical injuries and warranty recovery for economic loss is not arbitrary and does not rest on the "luck" of one plaintiff in having an accident causing physical injury. The distinction rests, rather, on an understanding of the nature of the responsi-
Criticizing Santor, the court stated that recovery in strict liability should be limited to those situations where there has been personal injury or property damage caused by the product being unsafe.99 Here, unlike Santor, there was a claim for property damage. However, the trial court concluded that the plaintiff had failed to prove "that the defect caused the physical damage to the truck."60 Finding that this conclusion was supported by the evidence, the supreme court affirmed.

Following the reasoning of Seely and subsequent cases, the federal district court in Wisconsin, applying California law, denied recovery for negligent development of a computer system in Office Supply Co. v. Basic/Four Corp.61 In that case the plaintiff sought damages for lost customers, income and goodwill, lost executive time dealing with the problems, additional hardware and software expenses, and miscellaneous expenses for office forms, personnel and maintenance. All of these damages were considered by the court to be associated with an economic loss only—failure of the purchaser to obtain the benefit of its bargain. Quoting the recent Ninth Circuit decision of S. W. Wilson & Co. v. Smith International62 the court stated:

Where the suit is between a nonperforming seller and an aggrieved buyer and the injury consists of damage to the goods themselves and the costs of repair of such damages or a loss of profits that the deal had been expected to yield to the buyer, it would be sensible to limit the buyer's rights to those provided by the Uniform Commercial Code. [Citations omitted.] To treat such a breach as an accident is to confuse disappointment with disaster. Whether the complaint is cast in terms of strict liability

99. 63 Cal. 2d at 19, 403 P.2d at 152, 45 Cal. Rptr. at 24.
60. 538 F. Supp. 776 (E.D. Wis. 1982).
61. 587 F.2d 1363 (9th Cir. 1978).
in tort or negligence should make no difference.\textsuperscript{63} According to the court, damages of this type should only be recoverable in an action for breach of contract.\textsuperscript{64}

Although California itself no longer appears to follow Seely, at least in negligence actions,\textsuperscript{65} the majority of American jurisdictions do so for both negligence and strict liability and will not permit recovery of economic losses absent personal injury or property damage.\textsuperscript{66}

There are several policy reasons for exclusion of economic losses in a tort products liability action. The most often repeated justification is that such recovery would undermine legislative intent in enacting the Uniform Commercial Code (U.C.C.).\textsuperscript{67} Article 2 of

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\item Id. at 1376.
\item In light of the California Supreme Court's decision in J'Aire Corp. v. Gregory, 24 Cal. 3d 799, 598 P.2d 60, 157 Cal. Rptr. 407 (1979), Seely probably no longer represents the law in California as to actions sounding in negligence. In J'Aire, it was alleged that the defendant negligently completed construction work on premises leased by the plaintiff and that such negligence delayed completion of the work, thereby damaging the plaintiff. Economic loss recovery was permitted under a theory of negligent interference with prospective economic advantage.
the U.C.C. is designed to regulate the conduct of parties in a sale of goods context. It provides a parol evidence rule, express and implied warranty provisions, a notice requirement, rules regarding disclaimer of warranties, limitations of liability, and a statute of limitations. Although the U.C.C. would permit a manufacturer to disclaim warranties or limit its liability for economic losses, precluding full recovery in contract, the manufacturer might still find itself liable for such recovery in strict liability or negligence. Tort liability generally cannot be disclaimed or limited. To permit such recovery in tort would therefore frustrate legislative and, presumably, the parties’ intent.

The U.C.C. also limits recovery of economic losses to those which were reasonably foreseeable. Tort recovery, on the other hand, extends to all damages proximately caused by the defect, regardless of foreseeability. To allow such expanded recovery in a sale of goods context would again frustrate legislative intent and would place too onerous a burden upon the manufacturer. This would in turn result in higher prices charged to all purchasers of the product, a result which may be contrary to everyone’s wishes.

As further justification for excluding recovery of economic losses, courts have looked at the basic distinction between tort and contract law. The question of recovery of economic losses is viewed as part of the larger question of what distinguishes tort law from contract law. The fundamental difference is in the type of interests protected. Tort law is concerned with the protection of freedom from various types of harm and is based on social policy. Contract law, on the other hand, is concerned with the protection of


70. U.C.C. § 2-607 (1986).
73. U.C.C. § 2-725 (1986).
75. See supra note 10.
interests and rights created by contract.\textsuperscript{78}

The line between tort and contract must be drawn by analyzing interrelated factors such as the nature of the defect, the type of risk, and the manner in which the injury arose. These factors bear directly on whether the safety-insurance policy of tort law or the expectation-bargain protection policy of warranty law is most applicable to a particular claim.\textsuperscript{79}

Claims of economic losses are generally associated with failure of some standard of \textit{quality} of the product. This standard should be defined by reference to the agreement between the parties and should be governed by contract law.\textsuperscript{80}

This distinction between tort and contract law was the specific basis for the federal district court's denial of recovery on a claim of negligence in \textit{Investors Premium Corp. v. Burroughs Corp.}\textsuperscript{81} There, the plaintiff attempted to assert four causes of action in connection with the sale of an inadequate computer system. The second cause of action alleged that the defendant's conduct was "careless, negligent, willful and wanton, through faulty design, manufacture, etc."\textsuperscript{82} According to the court, this was nothing more than a re-statement of the first cause of action alleging breach of warranty, and this second claim was disallowed.\textsuperscript{83}

A final justification for excluding recovery of economic losses in tort actions is to permit the parties to allocate, as they please, costs associated with the risk of loss.\textsuperscript{84} To impose tort liability for economic losses would make the manufacturer the insurer of the quality of the goods. The cost of providing this insurance will certainly be passed on to purchasers. Instead, purchasers should be free to avoid such additional cost if they desire and to rely instead on the safeguards provided by the U.C.C.\textsuperscript{85}

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\item \textsuperscript{78} Prosser & Keeton, \textit{The Law of Torts} § 92 (5th ed. 1984).
\item \textsuperscript{79} Pennsylvania Glass Sand Corp. v. Caterpillar Tractor Co., 652 F.2d 1165, 1173 (3d Cir. 1981).
\item \textsuperscript{80} Crowder v. Vandendeale, 564 S.W.2d 879, 882 (Mo. 1978).
\item \textsuperscript{81} 389 F. Supp. 39 (D. S.C. 1974).
\item \textsuperscript{82} \textit{Id.} at 42.
\item \textsuperscript{83} \textit{Id.} at 45-46.
\item \textsuperscript{84} Moorman Mfg. Co. v. Nat'l Tank Co., 91 Ill. 2d 69, 435 N.E.2d 443.
\item \textsuperscript{85} \textit{Id.} It has been suggested that the rule against recovery of economic losses in a tort products liability action should only apply to the purchaser, and then only in favor of those from whom the purchaser could have obtained contractual relief (but for the existence of a disclaimer of warranties or limitation of liability). See Ferentchak v. Village of Frankfort, 121 Ill. App. 3d 599, 459 N.E.2d 1085 (1984), \textit{aff'd in part, rev'd in part}, 105 Ill.2d 474, 475 N.E.2d 822 (1985). However, in this type of case, it is the purchaser who is most likely to suffer economic loss. Jones & Laughlin Steel Corp. v. Johns-Manville Sales Corp., 626 F.2d at 288-89. It is the purchaser alone who would have failed to receive the benefit of his bar-
\end{itemize}
This rationale was used by the Illinois Court of Appeals in Black, Jackson & Simmons Insurance Brokerage v. IBM Corp.\(^6\) to deny recovery for negligent misrepresentation in the sale of a computer system. In Black, the plaintiff had approached IBM to discuss the possibility of computerizing its operations, and IBM recommended one of its computers with software from another vendor. The computer system proved to be inadequate, and the plaintiff sued to collect lost profits, salaries, office supplies and accounting and leasing expenses. The trial court granted summary judgment to the defendants because Illinois law did not permit recovery of economic losses in a negligence action. The appellate court affirmed, concluding that the damages suffered were in no way unexpected but were simply associated with failure of the product to function appropriately. According to the court, such loss is ill-suited for tort law.

If the courts allow parties to circumvent their contractual remedies by suing in tort, the ability of contracting parties to allocate and bargain for risk of loss will be effectively destroyed and certainty in commercial transactions will be radically undermined.\(^7\)

V. RECOVERY FOR PERSONAL INJURY AND PROPERTY DAMAGE

The majority rule, as represented by Seely, denies recovery of economic losses in a tort product liability action but permits recovery of personal injury or property damage. Personal injury encompasses any losses directly associated with physical injury to a person's body, including medical expenses, pain and suffering, lost wages, diminished earning capacity, and mental anguish. Property damage normally refers to damage to property other than the defective product. For example, if an industrial robot went out of control because of a software defect and ran into a wall, thereby damaging the wall and the robot, only damage to the wall would be considered property damage. Damage to the defective robot would be considered a form of economic loss.\(^8\)

Personal injury and property damage were present in Arizona gain. Furthermore, damages for such loss would usually be sought from the seller or manufacturer, from whom the purchaser could normally obtain relief in contract, unless effectively disclaimed. Therefore, the viability of this suggestion shall not be dealt with in this article.

87. Id. at 134, 440 N.E.2d at 283.
88. See supra note 4.
State Highway Department v. Becktold.  There, an automobile accident ensued when a faulty turn signal caused two cars to collide. Eighteen months prior to the accident, the then existing intersection controls had been replaced by a complicated electronic computer-type control which sensed traffic load and optimized flow. An integral part of this system was a relay which had gone bad, causing the malfunction. Just prior to the accident the defendant had attempted to replace the relay, but allegedly had been negligent in doing so. The plaintiff in this action, one of the drivers involved in the accident, was permitted to recover in negligence for damage to his car and minor personal injuries. Although this action was not against the developer of the computerized traffic control system, it is likely that the Department would have been entitled to indemnity from such developer had the system been faulty when installed.

There have been exceptions to the general rule permitting recovery in tort for damage to other property. It has been held that, where the property damage is only minor in comparison to the economic losses suffered, recovery will not be permitted. For example, in Minneapolis Society of Fine Arts v. Parker-Klein Associates Architects, Inc. the court denied recovery where defective bricks manufactured by the defendant had to be removed from a building and replaced. Although the plaintiff argued that this resulted in damage to the mortar used to install the bricks, which was admittedly other property, the court concluded that this damage was minor in comparison to the cost of replacing the bricks. This minor loss would not justify recovery.

Recovery in tort for damage to other property has also been denied in a number of cases because such loss was associated with the main function of the product and was readily foreseeable by the contracting parties. It is presumed that the parties have in mind at the time of contracting that the product may be defective and may not be able to perform its intended tasks.

All products carry the risk that they will serve their intended function poorly. In this sense, the risk of "ordinary" malfunctions is well within the contemplation of the average purchaser.

91. 354 N.W.2d 816 (Minn. 1984).
92. Id. at 820.
This view comports with common sense as well as with the underlying purpose of strict products liability, which is to protect consumers from products which are unreasonably unsafe, not from those which are merely ineffective. [citations omitted]

All losses foreseeable from such failure should be recoverable, if at all, in an action for breach of contract. As with economic losses, they are not the kind of losses that tort law was designed to protect against.

An example of this type of loss was claimed in Fireman’s Fund American Insurance Co. v. Burns Electronic Security Services, Inc. There, the insurer of the purchaser of an alarm service was denied relief in strict liability from the supplier of the services for losses incurred when the system failed to work and a theft occurred. The system was designed to send an electronic signal to the police and the service headquarters whenever an unauthorized entry occurred. For some undisclosed reason, the system failed to respond in this instance.

The complaint alleged breach of warranty, negligence and strict liability. The lower court limited recovery on the first two counts to the terms of an exculpatory clause in the contract between the insured and the security service. The third count was stricken. Strict liability recovery was unavailable, according to the court, because the theft loss was considered to be the normal risk associated with a defective alarm system. Even assuming that the theft loss could be construed as property damage, the court concluded:

We see no reason to make the presence or absence of physical harm the determining factor; the distinguishing central feature of economic loss is not its purely physical characteristic, but its relation to what the product was supposed to accomplish. For example, if a fire alarm fails to work and a building burns down, that is 'economic loss' even though the building was physically harmed; but if the fire is caused by a short circuit in the fire alarm itself, that is not economic loss.

The court went on to state that other harms “peripheral” to the normal function of the product would be recoverable in tort. For example, if the alarm put off a stench which drove customers away, causing loss of profits, this would be recoverable in tort. In addition, personal injury damages, even though associated with the nor-

95. 93 Ill. App. 3d 298, 417 N.E.2d 131 (1980).
96. Id. at 300, 417 N.E.2d at 133.
mal function of the product, would be recoverable.97

The loss here, regardless of its form, was economic. The "fundamental character" of the insured's complaint was that "it was sold a poor burglar alarm."98 The loss suffered was not merely a side effect of the system's operation. "The soundness of the system was the core of the commercial bargain."99 According to the court, the insured should have known that the system might fail and should have protected against it.100 If it did not do so, it must suffer the loss.101

Notwithstanding the logic of this analysis, most of the reported cases where foreseeable property damage has been sustained have permitted recovery.102 For example, in Oldham's Farm Sausage Co. v. Salco, Inc.,103 the plaintiff was permitted to recover in both warranty and strict liability because of a defect in a sausage chilling machine. The machine was designed as a fully automated conveyor system for chilling and packaging sausage. After installation, the system malfunctioned at various places along the conveyor, causing destruction of sausage and propylene glycol used in the chilling process. This property damage was deemed sufficient to justify recovery in strict liability.104 In like fashion, the plaintiffs in Hamilton Fixture Co. v. Anderson105 were permitted to recover in strict liability for damage to their home as a result of a defective humidifier. The humidifier had put out overly humid air which damaged various items in the home. In each case the damage suffered could easily have been anticipated from a defect directly associated with the function of the product. In Oldham's Farm Sausage, the chilling machine failed to chill and package correctly. In Hamilton Fixture, the humidifier put out overly humid air. Nevertheless, the damage done was held recoverable.106

Of course, it may be a fallacy to presume in the computer con-

97. Id. at 301, 417 N.E.2d at 134.
98. Id.
99. Id.
100. Id.
103. 633 S.W.2d 177 (Mo. App. 1982).
104. Id. at 180.
105. 285 So. 2d 744 (Miss. 1973).
text that any type of property damage is foreseeable. Because of the
complexity and mystery of computerized products, it is hard for the
average consumer to recognize how such a product might malfunc-
tion. Nevertheless, such consumer can recognize what the particu-
lar product is expected to do. A computerized burglar alarm
system, for example, is supposed to detect intrusions. A computer-
ized traffic control system is supposed to permit traffic to flow along
only one axis at a time. When the system causes damage because of
its failure to do that which it is supposed to do, this is a failure
associated with the benefit of the bargain and may be viewed as
recoverable only in contract.

VI. DAMAGE TO THE DEFECTIVE PRODUCT

Damage to the defective product itself can be characterized by
the hypothetical situation of a defective power supply in a computer
which causes a fire, thereby damaging the computer. The com-
puter, though defective already, sustains further damage in the fire.
Although its value was diminished before the accident because of
the existence of the defect, its value is further reduced as a result of
the accident.

When a defect causes damage to the product itself, there are
conflicting views as to whether this should be recoverable in tort. It
is felt that a defect which causes only internal deterioration is not
the proper subject of a tort action.107 Such loss is considered a form
of failure of the purchaser to receive the benefit of his bargain. For
example, in Moorman Manufacturing Co. v. National Tank Co.,108
the owner of a grain storage tank sued the manufacturer in strict
liability and negligence when a crack developed in the tank. The
plaintiff sought to recover for the cost of repair and loss of use of
the tank. Such recovery was denied by the Illinois Supreme Court
which concluded:

where only the defective product is damaged, economic losses
cолused by qualitative defects falling under the ambit of a pur-
chaser's disappointed expectations cannot be recovered under a
strict liability theory. Here, count I of the complaint alleged that
during the last few months of 1976 and the first few months of

(1982); N. Power & Eng’g Corp. v. Caterpillar Tractor Co., 623 P.2d 324 (Alaska 1981);
Pennsylvania Glass Sand Corp. v. Caterpillar Tractor Co., 652 F.2d 1165 (3d Cir. 1981);
Sanco, Inc. v. Ford Motor Co., 579 F. Supp. 893 (S.D. Ind. 1984); Minnesota Society of Fine

108. 91 Ill. 2d 69, 435 N.E.2d 443 (1982).
1977, 'a crack developed in one of the steel plates on the second ring of [the] tank; such crack was not discovered by plaintiff... until such tank was being emptied on or about August 24, 1977.' This was not the type of sudden and dangerous occurrence best served by the policy of tort law that the manufacturer should bear the risk of hazardous products.\textsuperscript{109}

The court applied this reasoning to the plaintiff's negligence claim as well.\textsuperscript{110}

While some courts simply refuse to recognize damage to the defective product itself as property damage, compensable in tort,\textsuperscript{111} most others have found special circumstances to justify recovery. One such special circumstance permits tort recovery if the damage resulted from a sudden or calamitous event.\textsuperscript{112} For example, in Bi-Petro Refining Co. v. Hartness Painting, Inc.,\textsuperscript{113} the Illinois Appellate Court permitted recovery for damage to a storage tank, notwithstanding the prior decision of the Illinois Supreme Court in Moorman. In Bi-Petro, unlike Moorman, the damage resulted from a sudden rupture of the tank which was considered a calamitous event.\textsuperscript{114}

Another such calamitous event might be recognized in the hypothetical situation of a microcomputer with a defective hard disk controller. If the controller malfunctions causing the read-write head to crash, thus damaging the heads, the disk and data on the disk, this crash may be viewed as a calamitous event. This would then give rise to recovery for the damage done.

\begin{itemize}
\item \textsuperscript{109} Id. at 85, 435 N.E.2d at 450.
\item \textsuperscript{110} Id.
\item \textsuperscript{113} 120 Ill. App. 3d 556, 458 N.E.2d 209 (1983).
\item \textsuperscript{114} Id. at 559, 458 N.E.2d at 212.
\end{itemize}
Another special circumstance has been recognized where the defect made the product unreasonably dangerous to the user or to his property.\textsuperscript{115} Such an exception might have been used in the previously noted case of the faulty burglar alarm system.\textsuperscript{116} Clearly, a defect in such a system would pose danger to the user or his property. Unfortunately, the court did not consider this in its discussion except insofar as it noted that, if personal injury were threatened, the result might be different.\textsuperscript{117}

Of course, this exception may be nothing more than a recognition that strict liability recovery requires that the product be unreasonably dangerous.\textsuperscript{118} Therefore, at least in the case of strict liability, this is an exception that practically does away with the distinction between damage to the defective product and damage to other property.

Recovery of damages for injury to the defective product itself in situations involving unreasonable danger or a calamitous event is consistent with the general purposes of tort and contract law. Contract law is intended to protect the expectations of the parties to a contractual relationship. While the purchaser is expected to protect his expectations through the mechanism of the contract, he is not expected to anticipate that the product may contain a defect which would make it unreasonably dangerous or cause a calamitous event. The user is not expected to have to bargain for a safe product.\textsuperscript{119}

While most courts which recognize the exception for unreasonably dangerous defects permit recovery whether or not a calamitous event occurs,\textsuperscript{120} a minority require both an unreasonably dangerous
In situations where damage to the defective product itself is not recoverable, either because no calamitous event has occurred or otherwise, some plaintiffs have sought recovery by defining the defective product as a component of the whole and defining the remainder as "other property." For example, in the computer context, defective software might be viewed as a separate product which operates to cause the hardware to somehow be damaged. In most instances this type of argument has failed. To accept this reasoning, according to most courts, would be to effectively do away with the rule prohibiting recovery for damage to the defective product. Virtually any defect can eventually be localized to a particular component of the product. In the software context, this argument might be taken one step further to define the defective product as a subroutine or even a single line of code. A computer program which then malfunctions by causing garbage to be written over other parts of the software, a common occurrence, would give rise to damage to other property. Notwithstanding this criticism, a few courts have accepted this argument and have allowed recovery.

has been argued that to hold otherwise would be to draw an arbitrary line. There is no logical basis for disallowing recovery simply because a defect is discovered before an accident occurs. As stated by Justice Peters in Seely:

I cannot rationally hold that the plaintiff whose vehicle is destroyed in an accident caused by a defective part may recover his property damage under a given theory while another plaintiff who is astute or lucky enough to discover the defect and thereby avoid such an accident cannot recover for other damages proximately caused by an identical defective part. The strict liability rule should apply to both plaintiffs or to neither. They cannot be validly distinguished.

Seely v. White Motor Co., 63 Cal.2d at 22 n.2, 403 P.2d at 154 n.2, 45 Cal. Rptr. at 26 n.2 (1965) (Peters, J., concurring and dissenting).

It has similarly been argued that there is no logical reason to allow or disallow recovery simply on the basis of how the loss occurs. See Zizzo, supra note 119 at 525.

123. See supra note 122.
125. Id.
126. See, e.g., Air Products and Chemical, Inc. v. Fairbanks Morse, Inc., 58 Wis.2d 193, 206 N.W.2d 414 (1973)(applying Pennsylvania law); Gherna v. Ford Motor Co., 246 Cal.App.2d 639, 55 Cal. Rptr. 94 (1966). It has been suggested that the success of this
VII. WHEN PERSONAL INJURY OR PROPERTY DAMAGE IS PRESENT, WHAT DAMAGES ARE RECOVERABLE?

Under the minority view, all damages proximately caused by a defect, whether economic or otherwise, are recoverable if a cause of action in tort product liability can be stated. Under the majority view, however, recovery in tort is only permitted if there has been personal injury, property damage or damage to the defective product from a calamitous event or unreasonably dangerous defect. Under this view, a determination that recovery will be permitted is only the first step. Next it must be determined which elements of the plaintiff's damages may be recovered. It is in this second step that most of the reported decisions have provided little guidance. Most such decisions simply conclude that economic losses are recoverable, and do not pursue the analysis any further. Logically, it may be assumed from this silence that these courts have concluded that all damages are recoverable. This would arguably eliminate the need for further analysis.

In those few cases where the question has been addressed, however, results have varied. Some courts have permitted recovery of all damages on the basis that recovery should turn on whether or not a compensable loss has been suffered. If so, recovery of all losses sustained is justified.

In contrast, some courts have permitted recovery of that portion of the plaintiff's damages associated with a compensable loss, such as personal injury or property damage, but have excluded recovery of all other damages sustained. For example, in Mercer v. Long Mfg., N.C., Inc., the Fifth Circuit, applying Texas law, permitted recovery on the theory of strict liability for damage to the plaintiff's peanut crop caused by a defective combine. The plaintiff component part approach should depend upon who is the defendant. See Note, Oregon Adopts the Degree of Danger Test for Strict Tort Liability—The Implied Warranty Alternative, 58 OR. L. REV. 545 (1980). If the defendant is the seller of the entire computer system, then the system should be viewed as the product. If, on the other hand, the defendant is only the developer of the software, then the software should be viewed as the product, and the rest of the computer system as other property. While this approach has some appeal, it would appear to threaten circumvention of legislative intent and that of the parties by providing tort recovery in instances where it should only be available in contract.

130. 665 F.2d 61 (5th Cir. 1982).
had sought damages for 1) diminution in value of the combine because of the existence of a defect, 2) cost of interim repairs, 3) losses due to deterioration of crops while the combine was unusable, 4) loss of marketable hay which is normally produced during combine operation, and 5) loss of marketable peanut crop which was dropped during faulty operation of the combine. Of these claims, only the last was considered property damage and recoverable. The rest were purely economic losses unassociated with the damaged crop.\(^{131}\)

Recovery of the economic loss portion of damages was likewise excluded in *John R. Dudley Construction, Inc. v. Drott Manufacturing Co.*\(^{132}\). In that case, a crane was seriously damaged as a result of defective bolts which permitted it to collapse. The plaintiff was permitted to recover for damage to the crane, caused as it was by a calamitous event, but no such recovery was permitted for diminution in value of the crane because of the presence of defective bolts.\(^{133}\)

The logic of this approach seems clear. Losses associated with failure of the product to meet the purchaser's expectations are not recoverable under the majority rule. Why should such losses thereafter become recoverable simply because of the fortuity of a calamitous event which causes recoverable damage to other property or the defective product? To permit this would lead to the anomaly of denying recovery of diminished value to the party who discovers a defect before the product causes damage but permitting such recovery where the product is allowed to cause other damage. The question of recovery should not be left to turn on such fortuitous circumstances.

For example, a party with a defective hard disk controller in his microcomputer should not be able to recover the cost of repairing that controller simply because a head crash occurs which further diminishes the value of the microcomputer. If a microcomputer owner could not recover such damages in a tort action before a calamitous event occurs, he should equally not be able to do so thereafter.

In other cases where recovery has been permitted in tort for personal injury or property damage, recovery has nevertheless been

\(^{131}\) Id. at 67, 68.
\(^{133}\) Actually the plaintiff had not sought recovery in tort for such diminished value. These damages were insignificant compared to damage done to the crane. However, the fact that the court made a point of mentioning the failure of the plaintiff to seek such damages indicates that the court probably would not have allowed such recovery if it had been sought.
excluded for any indirect economic losses. For example, in *Star Furniture Co. v. Pulaski Furniture Co.*,\(^{134}\) the West Virginia Supreme Court, answering questions certified by the federal district court, concluded that damage to the defective product itself could be recovered if it resulted from a calamitous event. As in *Mercer*, however, no recovery was permitted for diminution in value of the defective product because of the presence of a defect. Recovery was also precluded for indirect economic losses, such as lost profits, associated with the accident damage.\(^{135}\)

VIII. A SUGGESTED APPROACH

As the foregoing indicates, the courts have struggled to avoid inequitable results while patterning a consistent approach to tort product defect cases. On the one hand, these courts have been mindful not to allow tort law to encroach on that which traditionally and appropriately has been reserved for the law of contracts. On the other hand, these courts have attempted to provide consumers with protection against dangerous situations and calamitous, unforeseeable destruction of property. Although these attempts have been generally successful, they have the potential for causing many inequitable results.

A more sensible approach to these cases would be one similar to that applied by the Fifth Circuit Court of Appeals in *Mercer v. Long Manufacturing, N.C., Inc.*,\(^{136}\) denying recovery of the economic loss portion of damages in all tort product liability actions. Even where a compensable loss has occurred, such as personal injury or property damage, recovery should still be denied for any separable economic losses which have been suffered because of the defect.

For example, in the hypothetical case of a computer with a defective hard disk drive controller, suppose the cost of repairing the controller is $300. Suppose further that this defect made the computer unusable for three days of the time the purchaser had it and that repair would require another two days of down time. If the purchaser must rent a replacement computer for his business during those days, at $100 per day, further losses are $500. These are all costs directly associated with failure of the purchaser to receive the benefit of his bargain.

If the defect is discovered before further problems occur, and if

\(^{134}\) 297 S.E.2d 854 (W. Va. 1982).

\(^{135}\) *Id.* at 859.

\(^{136}\) 665 F.2d 61 (5th Cir. 1982).
the purchaser cannot recover from the seller or manufacturer for breach of warranty or contract, these losses must be borne by the purchaser, as the parties presumably intended. But, if the hard disk drive causes a head crash which damages the read/write heads and the hard disk, and such accident does $1000 in damage to the computer, the purchaser should be able to recover this $1000. This would be viewed as simply further damage to the defective product from a calamitous event. He should also be able to recover for loss of use of the computer if extra time is required to repair it beyond the two days already needed. No recovery should be permitted, however, for the $800 economic losses directly associated with the presence of a defect.

Unlike the conclusion of the West Virginia Supreme Court in *Star Furniture*, however, recovery in tort should be permitted for indirect damages suffered as a result of a compensable loss. Where property damage or personal injury exist, all damages associated with such loss should be recoverable.\(^\text{137}\) In the example previously noted, if the plaintiff is unable to obtain a replacement computer during the period its computer is down, and extra down time because of the head crash causes $1,000 in lost profits, this loss should be equally recoverable in tort. There is no logical distinction between costs associated with renting a replacement computer during down time and lost profits because a replacement computer could not be obtained. Both are a result of the tortious damage to the computer, and both should be equally compensable.

Recovery in tort should also be excluded for property damage caused by the defective product which is associated with the normal function of the product and presumably within the contemplation of the parties at the time of contracting.\(^\text{138}\) For example, the theft losses in *Fireman’s Fund American Insurance Co. v. Burns Electronic Security Services, Inc.*,\(^\text{139}\) and the building damages in *Arizona v. Cook Paint and Varnish Co.*,\(^\text{140}\) would not be recoverable. Similarly, damage to the peanut crop in *Mercer*,\(^\text{141}\) should not have been recovered. Clearly, it should have been anticipated that a defective combine would damage the plaintiff’s crop. Such damage

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138. Of course, it is a legal fiction to assume that the parties had any losses in mind at the time of contracting. Parties seldom contemplate that a product they are buying will contain a defect. Nevertheless, except for unreasonably dangerous defects, courts consistently hold parties responsible for anticipating such losses in their contract.
139. 93 Ill. App. 3d 298, 417 N.E.2d 131 (1980).
140. 391 F. Supp. 962 (D. Ariz. 1975), aff’d, 541 F.2d 226 (9th Cir. 1976).
141. 665 F.2d 61 (5th Cir. 1982).
must be distinguished, however, from that which would result if, for example, a defective combine caught fire and burned much of the plaintiff’s fields. This is a loss peripheral to the product’s normal function. Of course, it cannot be overlooked that damages from a defective computer product may be difficult to foresee. The sheer complexity of such products may preclude reliance on this principle. Note, however, that damages associated with the primary function of the computerized product would normally be foreseeable.

For policy reasons, though, an exception should be made for property damage occasioned by a calamitous event or an unreasonably dangerous defect in the product. Even if anticipated, a purchaser should not be required to bargain for a safe product. For example, losses resulting from a hypothetical air disaster caused by a defective air traffic control system, though clearly foreseeable, should be recoverable. These are the type of losses that tort law was meant to protect against.142 The same would be true of a computerized braking system in an automobile which failed to function correctly and caused a crash.143

From a practical standpoint, if the existence of a defect makes the product less valuable, this loss of value is the risk contemplated by the parties when they enter into their contract of sale. If the defect also causes the buyer damage in his inability to use the product, including cost of repair and lost profits, these too are losses associated with the contract. Lastly, if such defect would normally lead to other property damages, this also must be considered as having been within the contemplation of the parties. If the purchaser wishes to place the risk of such losses on the manufacturer, he bargains for a warranty. If no warranty exists, it is presumed that the parties intended the risk to be placed on the buyer. The buyer should not then be able to recover such losses if the product also causes recoverable injury to person or property.

This approach is also consistent with the policy considerations cited by the courts. It is clearly consistent with the legislative purpose in enacting the U.C.C. Those damages which would normally be recoverable under the U.C.C. where no personal injury or property damages occur are the very ones which would not be recoverable in a tort product liability action under this approach. A party

143. See Vaughn v. General Motors Corp., 102 Ill. 2d 431, 80 Ill. Dec. 743, 466 N.E.2d 195 (1984), where recovery was permitted when a faulty braking system malfunctioned and caused an accident which damaged the vehicle. Although not a computerized braking system, the same principal should apply.
DAMAGES FOR COMPUTER MALFUNCTIONS

precluded from recovery by contract law would not be able to mask its breach of contract claim as a tort, and thereby obtain recovery.

One of the most widely used justifications for permitting recovery of damage to the defective product itself as a result of a calamitous event or an unreasonably dangerous defect is to give the manufacturer incentive for producing safe products. Such incentive is not lost under the proposed approach. If the manufacturer is liable for personal injury or property damage caused by a product which is unreasonably dangerous or which causes an accident, this is enough incentive. A manufacturer is induced to provide safe products by the threat of high damage claims if he does not do so. Under the proposed approach, the manufacturer is threatened that if he manufactures an unsafe product which in fact causes recoverable damage, he will be punished by paying for such damage, which could be substantial. It is unlikely that the manufacturer will overlook the fact that an unreasonably dangerous product is more likely to cause the more substantial personal injury and property damage. Little if any additional incentive is supplied by the threat that, even if no additional damage occurs, the manufacturer will have to pay for the plaintiff's economic losses.144

Another cited reason for permitting recovery of economic losses is to spread the risk of loss among all purchasers and to facilitate insuring against such loss. It is felt that the manufacturer is better able to obtain insurance against losses than individual purchasers. The cost of such insurance, as well as the cost of self-insurance, can be spread to all purchasers through higher prices. While this is all quite true, it ignores the purposes of contract and tort law and forces contractual terms on the parties that they might not otherwise desire. Certainly it is a laudable purpose of tort law to protect consumers. However, in its extreme this concern would totally supplant contract law and make the manufacturer the insurer of the quality of its products forever. As stated by Justice Thompson in Kaiser Steel Corp. v. Westinghouse Electric Corp.:145

The rule of strict liability for defective products is an example of necessary paternalism judicially shifting risk of loss by application of tort doctrine because California's statutory scheme fails to adequately cover the situation. Judicial paternalism is to loss shifting what garlic is to stew—sometimes necessary to give full flavor to statutory law, always distinctly noticeable in its result,

144. In most cases the purely economic loss portion of damages will be much smaller than those associated with personal injury or property damage.
overwhelmingly counterproductive if excessive, and never an end in itself.\textsuperscript{146}

Strict liability has been universally recognized as a necessary act of judicial paternalism to provide protection to purchasers and users through risk spreading. This risk spreading should not, however, be taken to the extreme sought by those who would permit recovery of purely economic loss outside of the breach of contract context.\textsuperscript{147}

One criticism of the proposed approach may be that it will prove difficult to administer. In the typical situation where a defect causes an accident which damages the defective product, it may be difficult to allocate costs of repair between the defect and the damage caused by the accident. This is especially true for repair costs and costs associated with inability to use the product during such repair. What period of time and cost of repair should be allocated to repairing the defect, and what should be allocated to repairing the accident damage?

While this criticism may be justified, it should not stand in the way of application of a sound principle of law. This is merely an evidentiary problem. The same criticism is equally applicable to situations involving allocation of fault in comparative negligence jurisdictions and contribution among joint tortfeasors. Nevertheless, those principles have been applied by the courts and have become standard tort law. Any evidentiary problems encountered by the approach proposed here must simply be resolved as they are encountered.

The benefits of this approach are many. Besides those already discussed regarding avoidance of inequitable results simply because of the fortuity of a calamitous event or a defect which is considered unreasonably dangerous, this approach places the burden squarely on the contracting parties to allocate risk of contract losses as appropriate. Without the unnecessary protections of tort product liability recovery for economic losses, the parties will have greater incentive

\textsuperscript{146} Id. at 747, 127 Cal. Rptr. at 845.

\textsuperscript{147} It might be argued that judicial paternalism is necessary because of the typical bargaining process in consumer goods sales. That process involves a product sold with an agreement that contains a disclaimer of warranties and/or limitation of liabilities. Typically the user has no opportunity to bargain over such terms of the agreement. Under the approach proposed here such user would be left with no redress for economic losses. That user should, therefore, be protected. However, this again is a matter of contract law. If it is deemed unfair to hold the user to such a clause, contract law should provide protection. Sanco, Inc. v. Ford Motor Co., 579 F. Supp. 893 (S.D. Ind. 1984). This could be done through the recognition of contracts of adhesion and unconscionable agreements. These legal mechanisms should be sufficient to provide the consumer adequate protection without resorting to tort law.
to do so. The contracting parties will be free to allocate as they
desire and are able. To the extent this might result in an unfair
advantage to the savvy seller, contract law must be counted on to
provide protection.

In the context of damage to the defective product itself, an-
other benefit provided by this approach is that it permits recovery
for such damage whenever it is outside of the normal contemplation
of the parties. This does away with the strict necessity of an unreas-
sonably dangerous defect or a calamitous event. It also avoids the
problem of damage to other property which is only slight in compa-
ration to all damages and the strained attempts at providing recov-
ery by viewing the defective product as only a component and
allowing recovery for damage to the rest of the product. Whenever
damage is done to the defective product itself, this damage alone
will be recoverable in tort, regardless of its magnitude or where in
the product it occurs.

Also in the context of damage to the defective product itself,
this approach is consistent with basic logic. A product with a defect
normally has a diminished value to the owner. This value relates to
the cost of repair and downtime during repair. In addition, up until
the time of an accident or other damaging event, the product may
have failed to operate as expected or at all, thereby causing lost
profits and costs associated with attempts to fix the problem. All
such costs have already been incurred by the user prior to the time
the product is damaged. Because such costs are associated with the
normal function of the product, they should be recoverable only in
an action for breach of contract. They reflect a failure of the pur-
chaser to receive the benefit of his bargain.

After an unforeseeable accident or other event which damages
the product, its value will presumably have been diminished further.
The loss incurred by the user because of this accident or event, then,
is only the further amount by which the product's value has been
diminished and costs associated with any further downtime that re-
sults. It is this loss, alone, which should be recoverable in tort.

For example, if a $5,000 computer has a defect in its power
supply which would require $500 in repair costs and downtime ex-
penses to fix, the computer is presumably only worth $4,500 to the
owner. He must put $500 into the computer to bring it's value back
to $5,000. If that computer is then totally destroyed by a fire before
repairs are undertaken, what has the owner lost? Since the com-
puter was only worth $4,500 to him at the time, this is all that has
been lost. This is all that should be recovered in tort. Any other
recovery would be a windfall simply because of the fortuity of an accident. Such fortuity should not be the basis for recovery.

IX. CONCLUSION

Where a product, such as a computer or a computerized machine, malfunctions and causes personal injury or property damage to the purchaser or user, such damage is universally recoverable in a tort product liability action. Where the defect causes injury to the defective product alone, recovery is also normally permitted if the injury resulted from an unreasonably dangerous defect in the product or a calamitous event. When recovery is permitted in a given situation, there is uncertainty as to whether all damages should then be recoverable or simply those which are not purely economic.

Economic losses are those associated with failure of the purchaser to receive the benefit of his bargain—diminished value of the product because of the existence of a defect, cost of repairs and costs associated with malfunction of the product or inability to use it. Such losses are the normal result of a computer defect. Economic losses alone should not be recoverable in a tort product liability action. They should be recoverable, if at all, under the law of contracts. This conclusion should not then change simply because the product also causes personal injury or property damage. To permit such recovery would result in a windfall.

Tort law should also not be available to provide relief in a situation where the only losses incurred are those naturally within the contemplation of the parties. This would not, however, include damages resulting from a calamitous event or an unreasonably dangerous defect, even though otherwise foreseeable. As a matter of public policy parties should not be held to contemplate that a product might not be safe. Manufacturers are obligated to produce safe products regardless of what the parties might anticipate.

Where recoverable personal injury or property damage does exist, recovery should be permitted for all losses flowing from such injury or damage, including lost profits. As long as the requirement to mitigate damages does not require that the injured party find some means to avoid lost profits, such as obtaining replacement equipment, there is no rational basis for excluding such recovery.

The trend in law in recent history has been to blur the distinction between tort and contract law and to provide injured parties with all means possible for obtaining recovery. While this is a desirable end, the damage it does to general contract principles is a cause
of some concern. The approach proposed here is an attempt to bring the basic principles of law back on track and to restore to the parties their right to freely contract.