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Manufacturers of Inherently Dangerous Products: Should They Have a Continuing Duty to Make Their Previously Sold Products Conform to State of the Art Safety Features

Tamara J. DeFazio
West Virginia University College of Law

MANUFACTURERS OF INHERENTLY DANGEROUS PRODUCTS: SHOULD THEY HAVE A CONTINUING DUTY TO MAKE THEIR PREVIOUSLY SOLD PRODUCTS CONFORM TO STATE OF THE ART SAFETY FEATURES?

I. INTRODUCTION

In a day and age when the rate of technological advancement is exceeded only by human inability to comprehend it,[1] there is little wonder why the area of product development is a dynamic one. However, as products found in the marketplace increase both in kind and number so does the volume of litigation concerning them.[2] Consequently, traditional legal concepts must be developed by the courts in such a manner so as to accommodate the novel legal problems which arise in the ever-changing realm of products liability litigation.[3]

Although one could premise a products liability action upon theories other than negligence in tort,[4] such theories are beyond the scope of this article, as it will deal exclusively with the issue of whether, in the context of a products liability action premised upon negligence in tort, courts should recognize a continuing duty on behalf of manufacturers of inherently dangerous products[5] to make their previously sold products conform to state of the art safety features. The issue as presented in this article, presumes that the inherently dangerous product in question is faultlessly designed and

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1. *See* A. TOFFLER, FUTURE SHOCK (1970), *cited in* Cady, *Law of Products Liability in West Virginia*, 74 W. VA. L. REV. 283, 283 (1972).

2. Allee, *Post-Sale Obligations of Product Manufacturers*, 12 FORDHAM URB. L.J. 625, 625 (1984).

3. *Cf.* W. KEETON, D. DOBBS, R. KEETON & D. OWEN, PROSSER AND KEETON ON THE LAW OF TORTS 10 (5th ed. 1984 & 1988 Supp.) [hereinafter W. KEETON].

4. As an alternative to the negligence in tort theory of recovery, a products liability action could also be premised upon 1) strict liability in contract for breach of warranty, express or implied, 2) negligence liability in contract for breach of an express or implied warranty that the product was designed and constructed in a workmanlike manner, or 3) strict liability in tort largely for physical harm to persons and tangible things. W. KEETON, *supra* note 3, at 678.

5. For the purposes of this article the term "inherently dangerous product" means a product which is unavoidably unsafe even though it has been manufactured and designed as safely as modern technology permits. In addition, the utility of such a product is presumed to outweigh the risk it poses to society.

manufactured and, as such, conforms to state of the art safety features as they existed at the time of sale. Moreover, it is presumed that the manufacturer has, at the time of sale, adequately warned the consumer and/or user of the dangers which inhere in the product. Thus, at the point of sale, the manufacturer has incurred no liability. Therefore, the crux of the issue to be explored in this article is whether a manufacturer who, because of technological advancements, develops a new design for an already existing inherently dangerous product should have a duty to develop a retrofitting safety device for previously sold products of that type.

It is essential to note at the outset that it is not the purpose of this article to provide dispositive answers to the foregoing questions; rather, this article has as its purpose 1) to provide a survey of case law which is relevant to the disposition of these issues; 2) to formulate a list of factors based upon relevant case law and principles of equity and fairness which are likely to be weighed by a court when determining whether to impose such a duty upon a manufacturer; and 3) to provide an analysis of combinations of factors which are most likely to lead a court to determine that such a duty does exist.

II. THE MANUFACTURER'S POST-SALE DUTY TO WARN

Traditionally, American courts have applied the rule that, at the time of sale, manufacturers have a duty to warn of the latent and foreseeable dangers which arise from the proper and intended use of their products.[6] However, both courts[7] and commentators[8] alike have recognized that under certain circumstances the duty to warn

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6. Goldberg, *Manufacturers' Post-Sale Duties in Texas—Do They or Should They Exist?*, 17 ST. MARY'S L.J. 965, 978 (1986). *See* Gillham v. Admiral Corp., 523 F.2d 102 (6th Cir. 1975) (holding manufacturer had duty to warn of dangers inherent in television sets which were known to pose fire hazard) *cert. denied*, 424 U.S. 913 (1976); doCanto v. Ametek, Inc., 367 Mass. 776, 328 N.E.2d 873 (1975) (manufacturer has duty to warn of dangers in commercial ironer known at time of sale). *See also* W. KEETON, *supra* note 3, at 685.

7. *See* Comstock v. General Motors Corp., 358 Mich. 163, 99 N.W.2d 627 (1959) (to be discussed at length in Part II.A *infra*); Cover v. Cohen, 61 N.Y.2d 261, 461 N.E.2d 864, 473 N.Y.S.2d 378 (1984) (discussing post-sale duty to warn with regard to automobile throttle return spring).

8. *See* Allee, *supra* note 2, at 628; Goldberg, *supra* note 6, at 977; Patterson, *Products Liability: The Manufacturer's Continuing Duty to Improve His Product or Warn of Defects After Sale*, 62 ILL. B.J. 92 (1973).

owed by such manufacturers may extend well beyond the point of sale.

A. The Origin of the Post-Sale Duty to Warn

The manufacturers' post-sale duty to warn is widely recognized as originating in *Comstock v. General Motors Corp.*[9] *Comstock* arose out of an action filed by a garage mechanic against an automobile manufacturer for personal injuries suffered by him when he was struck by an automobile which had a defective brake system.[10] Comstock contended that Defendant General Motors was negligent in failing to warn the owners of 1953 Buicks, the model involved in the case, of the defective power brake systems found to be present in the cars.[11] Comstock premised his contention on the fact that General Motors was well aware of the power brake failures and the cause of such failures immediately after the 1953 Buicks were placed on the market and had instructed Buick agencies to replace the defective brake systems whenever 1953 Buicks were brought in for repair.[12] However, the record revealed that General Motors had not warned the individual owners of the failures associated with the power brake system.[13]

In view of the foregoing facts, the Michigan Supreme Court held,

> [i]f such duty to warn of a known danger exists at point of sale, we believe a like duty to give prompt warning exists when a latent defect which makes the product hazardous to life becomes known to the manufacturer shortly after the product has been put on the market.[14]

As is evident from the holding itself, the court reasoned that a post-sale duty to warn should be imposed because 1) the manufacturer became aware of the brake system failures shortly after the car had been placed on the market, and 2) the existence of such failures posed a threat to human life. Finally, the fact that a prompt

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9. *Comstock*, 358 Mich. 163, 99 N.W.2d 627 (1959). *See* Goldberg, *supra* note 6, at 977.
10. *Comstock*, 358 Mich. at 166-67, 99 N.W.2d at 629.
11. *Id.* at 168, 99 N.W.2d at 630-31.
12. *Id.* at 171, 99 N.W.2d at 630-31.
13. *Id.* at 171, 99 N.W.2d at 631.
14. *Id.* at 177-78, 99 N.W.2d at 634.

warning might well have prevented the accident was integral to the court's decision.[15]

Three factors can be extrapolated from *Comstock* which are likely to be of concern to a court which is trying to determine whether to impose the above duty upon a manufacturer. Those factors are: 1) the severity of the harm caused by the condition of the product at the time of sale; 2) the length of time the product has been on the market when retrofitting becomes feasible; and 3) the effectiveness of the retrofitting device.

B. The Post-Sale Duty to Warn After Comstock

Since the *Comstock* decision was handed down in 1959, courts have considered the post-sale duty to warn in a variety of different contexts. One context in which the post-sale duty to warn has been discussed involves a situation where the product has been modified and/or misused after sale. The issue arising out of such a situation is whether, after being notified of the modification/misuse, "a manufacturer has a duty to warn of hazards created by a third party modification[/misuse] of its product."[16] This precise issue was addressed by the Arizona Court of Appeals in *Rodriguez v. Besser Co.*,[17] which involved a cement block cubing machine manufactured and sold by Besser.[18] As designed and delivered by Besser, a person "would not have been able to place his hand into the top of the [machine] while he was standing on the [attendant's] platform."[19] However, after the machine had left Besser's control, the buyer, "without prior notification or consultation with Besser,"[20] modified the machine and "destroyed the guarding . . . [effect] provided by the original platform and placed the attendant in close proximity to the paddles of the [machine]."[21] After the modification, the plaintiff

15. *Id.* at 178, 99 N.W.2d at 635.
16. 115 Ariz. 454, 456, 565 P.2d 1315, 1317 (1977). *See also* Haley v. Allied Chem. Corp., 353 Mass. 325, 231 N.E.2d 549 (1967).
17. *Id.* at 454, 565 P.2d at 1315.
18. *Id.* at 456-58, 565 P.2d at 1317-18.
19. *Id.* at 458, 565 P.2d at 1319.
20. *Id.*
21. *Id.*

was severely injured.[22] However, despite the fact that Besser had notice of the modification after it was completed and before the accident occurred,[23] the court held that the manufacturer had no duty to warn of hazards created by a third party modification of its product.[24] In so holding, the court reasoned that:

> [t]he duty to warn rests on foreseeability. If a chattel is sold that is free from defects in manufacture and design and is not dangerous if used as intended, the manufacturer is not liable for results caused by improper use of the chattel or changes made in its construction without the manufacturer's knowledge which makes it dangerous.[25]

Moreover, the court indicated that:

> [A contrary holding] *would place an intolerable burden on the manufacturer.* Such a rule would in effect make a manufacturer with notice of post-sale modification of its products an insurer of the success and safety of the modified products. It would be obliged not only to discover and warn of the foreseeable dangers inherent in the products it manufacturers *but also those not of its creation*—the altered product of which it has notice.[26]

Discernable from the court's analysis in *Rodriquez* is one factor which a court is likely to consider in determining whether to impose the post-sale duty at issue upon a manufacturer. That factor is the burden which such a duty would place upon the manufacturer. Although the court in *Rodriguez* was inclined to believe that the imposition of such a duty would unduly burden the manufacturer, there are indications that other courts may posit a different view.

III. Beyond The Duty To Warn: The Expansion Of The Post-Sale Duties Of Manufacturers

Interestingly, it is in the context of cases involving aviation that courts have chosen to greatly expand manufacturers' post-sale duties.

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22. *Id.*

23. *Id.*

24. *Id.* at 460, 565 P.2d at 1321. *But see* Haley v. Allied Chemical Corp., 353 Mass. 325, 231 N.E.2d 549 (1967) (suggesting that even though a manufacturer fulfills his duty to warn at the time of sale, an additional duty to warn arises when he learns that his product is being misused by a consumer).

25. *Rodriguez*, 115 Ariz. at 460, 565 P.2d at 1321 (quoting Westerberg v. School District No. 792, 276 Minn. 1, 9-10, 148 N.W.2d 312, 317 (1967)).

26. *Id.* at 460, 565 P.2d at 1321 (emphasis added).

A. *The Aviation Cases*

Noel v. United Aircraft Corp.[27] first signaled that such an expansion of manufacturers' post-sale duties was about to take place. In *Noel*, the survivors of a passenger killed in a plane crash sued the manufacturer of the plane's propeller system, alleging that the accident resulted from propeller overspeed[28] in combination with the pilot's inability to get the propeller feathered.[29] The crux of the plaintiff's complaint was that because 1) propeller overspeeds were known to be very dangerous unless the propeller could be feathered and 2) because United, the manufacturer of the propeller system, was aware of the "long history of overspeeds together with [the] inability to feather its propellers, it was United's duty to have developed earlier some form of overspeed control or separate feathering device."[30] After conducting a thorough analysis of the evidence presented, the district court noted that "the amount of care [United] must take increases with the foreseeable risk involved to others."[31] The court concluded that United had a "continuing duty to improve its propeller system in view of the factor of human safety involved."[32]

The district court revealed a number of factors which it considered to be central to its holding. First, the court emphasized that six years prior to the date of the crash, United knew of the inability of its propellers to feather.[33] Further, the court cited nine instances where "overspeeds accompanied by inability to feather"[34] resulted in a fire[35] within an airplane's engine. The court added that the mere

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27. 219 F. Supp. 556 (D. Del. 1963), *aff'd in part*, 342 F.2d 232 (3d Cir. 1964), *reh'g denied*, 342 F.2d 232 (3d Cir. 1965). *See also* Braniff Airways, Inc. v. Curtiss-Wright Corp., 411 F.2d 451 (2d Cir.), *cert. denied*, 396 U.S. 959 (1969).

28. *Noel*, 219 F. Supp. at 557-58.

29. *Id.* at 558. "To feather means to cause the propeller blades to be turned to a position parallel to the airstream so that they will cease to rotate due to pressure of air across the blades. Inability to feather permits the overspeeding propeller to rotate at an uncontrolled speed." *Id.* at 558 n.5.

30. *Id.* at 558 n.4.

31. *Id.* at 568.

32. *Id.* at 574.

33. *Id.* at 568.

34. *Id.*

35. *Id.* at 568 n.21.

fact that no lives were lost during those nine instances was "sheer luck."[36] The court also emphasized that a safety device limiting overspeeds was in use at the time of the crash in question on other airplane models, but that United had not taken steps to adapt the device for use on the model at issue.[37] Thus, it appears that the fact that United possessed the resources to adapt the safety device to the model at issue, but simply chose not to allocate those resources to that project weighed heavily in the court's decision.[38] Finally, the district court noted that "United was negligent in that it should and could have produced [a safety device] for use on [such] planes . . . and had it done so, the ability . . . to control the overspeed would have been materially increased."[39] Therefore, the district court's belief that, had the safety device been developed, it would have been at the very least marginally effective also figured prominently into the court's decision to hold United liable for the breach of its continuing duty.

Thus, two additional factors, which courts are likely to consider in determining whether to impose the duty at issue in this article, can be extracted from *Noel*. One of those factors is the number of injuries caused by the product's condition at the time of sale. Although in *Noel* only the plane crash in question had produced fatal injuries, the court considered the fact that the overspeeding propeller system had the potential to cause a large number of injuries and/or deaths sufficient to justify weighing the factor in favor of the plaintiff. The second factor is the availability of resources needed to develop and market a retrofitting safety device. In *Noel*, the court posited that United had such resources, but chose to allocate them to another project which the court deemed to be less worthy.

Noel undoubtedly establishes the continuing duty of a manufacturer to improve his product after the point of sale when he is aware of danger posed to the general public by the product's condition at the time of sale. However, the *Noel* holding must be viewed

36. *Id.*
37. *Id.* at 571.
38. *Id.* at 572.
39. *Id.*

with some caution given that 1) the manufacturer knew of the many instances in which fires developed in aircraft engines because the propellers could not be feathered; 2) a safety device had already been developed, yet the manufacturer refused to adapt the device to the model in question; and 3) there was evidence indicating that the manufacturer had destroyed relevant records for reasons which the court deemed unsatisfactory.[40] Thus, when viewing the holding of *Noel*, one must remain mindful of the fact that the case arose in a context in which the facts were particularly favorable to the plaintiff.

Like *Noel*, the Texas Court of Civil Appeals in *Bell Helicopter Co. v. Bradshaw*[41] also outlines a number of additional factors which a court faced with the issue addressed in this article would be likely to consider. That case involved a product liability action brought by helicopter passengers against the manufacturer-seller of the helicopter to recover for injuries they sustained as the result of a helicopter crash[42] which occurred when one of the tail rotor blades broke off the helicopter.[43] "When Bell originally sold the helicopter . . . the . . . blade represented the most advanced state of the art in tail rotor blade technology."[44] However, several years later Bell became aware of the fact that the owners of helicopters equipped with the existing systems were not properly maintaining them.[45] Mindful of this fact, Bell voluntarily improved its rotor system design.[46] When the new system became commercially available, Bell notified the owners of its older helicopter models of the availability of the new system.[47] Included among those notified was the owner of the helicopter in question who chose not to have the new system installed on his helicopter.[48]

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40. *Id.* at 568-69.
41. 594 S.W.2d 519 (Tex. Civ. App. 1979).
42. *Id.* at 524.
43. *Id.* at 526.
44. *Id.*
45. *Id.* at 527.
46. *Id.*
47. *Id.*
48. *Id.*

Despite Bell's efforts to facilitate the replacement of the existing systems, the Texas Court of Civil Appeals nonetheless affirmed the lower court's findings that Bell was both strictly liable under § 402A of the Restatement (Second) of Torts and negligent under the theory that Bell had assumed the duty to improve the safety of the helicopter.[49] Once assumed, Bell's duty developed into an obligation to use all reasonable means available to it to cause replacement of the defective system with the new design.[50] The court stated the following:

> Bell was not obliged to design the safest possible product, or one as safe as others make, or a safer product than the one it has designed. We merely hold that, once Bell produced a design which was known to be safer, the manufacturer owed a duty to person[s] using its helicopters to refrain from allowing [existing] systems to be used.[51]

The facts which served as a basis for the court's conclusion in *Bell* are just as important, if not more so, than the conclusion itself. First, the court emphasized that after the helicopter in question was originally sold, Bell regained control over it before reselling the helicopter to the individual who owned it at the time of the crash.[52] Thus, Bell should have replaced the rotor system while the helicopter was within its control.[53] Additionally, the cost of the new system was, in the eyes of the court, quite reasonable.[54] Finally, the court emphasized the existence of a continuing relationship between Bell and those who had purchased helicopters in the past. According to the court, "when a person purchases a Bell helicopter, he acquires a right to receive all relevant literature from Bell, including service bulletins, safety notices, and revisions of maintenance and flight manuals."[55] Although Bell did provide the owners and operators of its previously sold helicopters with notice of the availability of the new system and its cost,[56] the court apparently felt that Bell should have provided such owners and operators with literature explaining

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49. *Id.* at 540.
50. *Id.* at 532.
51. *Id.* at 530.
52. *Id.* at 530-31.
53. *Id.* at 531.
54. *Id.* at 527 n.2.
55. *Id.* at 527.
56. *Id.*

that "increased safety and decreased costs . . . [were] advantages to updating their tail rotor configurations. . . ."[57] Thus, three factors emerge from *Bell*: 1) the extent to which the manufacturer assumes control over the product after the point of sale; 2) the cost of the retrofitting safety device; and 3) the extent to which a continuing relationship exists between the manufacturer of the product and those who have purchased his previously sold products.

Although the court in *Bell* found it unnecessary "to hold . . . that a manufacturer has a duty to remedy dangerous defects in a product which are not discovered until after manufacture and sale,"[58] the Fifth Circuit indicated in *Syrie v. Knoll Int'l*,[59] that, absent the element of regained control present in *Bell*, "[a] manufacturer did not have a duty to warn of hazards discovered years after the product had been manufactured and sold and had no duty to recall the product to correct its deficiencies."[60] The plaintiff in *Syrie*, sued the manufacturer of a chair after the back of a chair in which she was sitting fell off, causing the chair to roll out from underneath her.[61] The plaintiff alleged that Knoll, the manufacturer, was negligent in "failing to warn of the hazard presented by the chair after it had been sold and failing to recall and correct the defect in the chair."[62] In upholding the district court's refusal to allow a jury instruction on negligence, the court acknowledged that ten thousand chairs of the type in question were produced by Knoll and that Knoll had only received two complaints regarding such chairs.[63] Undoubtedly, the court weighed heavily the fact that a chair, unlike a helicopter, does not pose a serious threat to human safety. Thus, *Bell* and *Syrie* viewed in conjunction with each other, provide another factor which a court will likely consider in addressing the issue presented herein. That factor is the nature of the product in question.

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57. *Id.*
58. *Id.* at 531-32.
59. 748 F.2d 304 (5th Cir. 1984).
60. *Id.* at 304, 311-12.
61. *Id.* at 305.
62. *Id.* at 305-06.
63. *Id.* at 310.

B. The Duty to Notify Purchasers of Previously Sold Products of the Availability of Safety Devices Developed After the Point of Sale

Another area of case law that is relevant to the issue addressed in this article is that area dealing with the issue of whether manufacturers have a post-sale duty to notify purchases of the availability of safety devices that were developed after the point of sale. This issue was addressed in *Kozlowski v. John E. Smith's Sons Co.*,[64] a case in which the widow of a man killed while cleaning a sausage stuffing machine sued the manufacturer of the machine alleging that it failed to warn the decedent's employer of the availability of a safety device developed after the sale of the machine.[65] In *Kozlowski*, the Wisconsin Supreme Court held that the manufacturer of the machine did indeed have a duty to warn the decedent's employer of the availability of such safety devices.[66] However, the court in *Kozlowski* was careful to restrict the scope of its holding by stating that:

> We do not in this decision hold that there is an absolute continuing duty, year after year, for all manufacturers to warn of a new safety device which eliminates potential hazards. A sausage stuffer and the *nature of that industry bears no similarity to the realities of manufacturing and marketing household goods such as fans, snowblowers or lawn mowers* which have become increasingly hazard proof with each succeeding model. *It is beyond reason and good judgment to hold a manufacturer responsible for a duty of annually warning of safety hazards on household items, mass produced and used in every American home, when the product is 6 to 35 years old* and outdated by some 20 newer models equipped with every imaginable safety innovation known in the state of the art. *It would place an unreasonable duty upon these manufacturers if they were required to trace the ownership of each unit sold and warn annually of new safety improvements over a 35 year period.*[67]

From the court's analysis in *Kozlowski*, one additional factor may be extracted: the nature of the industry[68] in which the product in question is manufactured. Essentially, this requires a court to

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64. Kozlowski v. John E. Smith's Sons Co., 87 Wis. 2d 882, 275 N.W.2d 915 (1979). *See also* Jackson v. New Jersey Mfr.'s Ins. Co., 166 N.J. Super. 448, 400 A.2d 81 (1979).

65. *Kozlowski*, 87 Wis. 2d at 884-89, 275 N.W.2d at 915-18.

66. *Id.* at 900-01, 275 N.W.2d at 923.

67. *Id.* at 901, 275 N.W.2d at 923-24 (emphasis added).

68. *Id.*

determine whether the industry that manufactures the product in question is one which sells the product to a relatively small number of customers or, alternatively, whether the industry caters to a large and diverse consumer group. *Kozlowski* further refines the nature of the product factor which emerged out of *Bell* and *Syrie* indicating that one of the key inquiries with respect to the nature of the product in question would be whether the product was an item of commercial machinery, which would be expected to have a long useful life, as opposed to a household item, the projected useful life of which would be relatively short.[69] Given that the *Kozlowski* court expressly excepted mass produced goods from its holding,[70] it appears that manufacturers of goods which are custom made for a given consumer are more likely to be held to a higher standard of care than those manufacturers whose goods are mass produced.

IV. Should Manufacturers Of Inherently Dangerous Products Have A Continuing Duty To Make Their Previously Sold Products Conform To State Of The Art Safety Features?

A careful review of case law reveals that only one court has addressed the issue presented in this article. Specifically, in *Stephan v. Marlin Firearms Co.*[71] the Second Circuit Court of Appeals affirmed an unpublished opinion in which a federal district court chose not to impose upon a manufacturer the duty at issue in this article.[72] In *Marlin*, the guardian of the estate of a hunting accident victim brought a personal injury action against a rifle manufacturer.[73] The plaintiff alleged that the manufacturer negligently failed to install a safety device, developed subsequent to the sale of the rifle, while performing unrelated repairs on the rifle.[74] The plaintiff "argued that the existence of the [safety device] would demonstrate that Marlin had a continuing duty requiring it to install this improvement

69. *Id.*
70. *Id.*
71. Stephan v. Marlin Firearms Co., 353 F.2d 819 (2d Cir. 1965), *cert. denied*, 384 U.S. 959 (1966).
72. *Id.* at 823.
73. *Id.* at 819.
74. *Id.* at 823.

when [the rifle] was returned for repairs."[75] However, the trial judge held, and the Second Circuit affirmed, "that . . . unless the original design was inherently unsafe, Marlin was under no duty to install an improvement in design when the gun was submitted for specific, unrelated repairs."[76] More importantly, the trial court emphasized that the plaintiff presented no evidence that the safety device could be used on rifles of the type in question.[77] This fact provides those who litigate the issue presented in this article with a substantial basis upon which they can distinguish *Marlin* from a case where there is evidence indicating that a given safety device could in fact be used on the product in question. Thus, although the court in *Marlin* did address the issue presented in this article, given the brevity of the court's analysis, the case itself provides very limited guidance to those courts which will be faced with the very same issue in the future. In view of this fact, it becomes necessary to elaborate upon the factors extrapolated from the other cases previously discussed in this article.

A. The Determining Factors

Throughout this article, various cases which deal with the post-sale duties of manufacturers have been discussed and analyzed in an effort to compile a list of factors which would be relevant to a court faced with the issue of whether to impose upon a manufacturer of an inherently dangerous product the continuing duty to make his previously sold products conform to state of the art safety features. At this point, it is appropriate to set forth those factors and discuss each of them separately.

1. Severity of Harm

The first factor is the severity of the harm caused by the condition of the product at the time of sale. Where a product's condition causes death or severe injury, a court would be more likely

75. *Id.*
76. *Id.*
77. *Id.*

to impose the post-sale duty upon a manufacturer than it would be where the product's condition causes only slight injury. In light of the analysis present in the cases previously discussed, it appears that this factor is one which would weigh heavily in a court's determination of whether or not to impose such a duty.

2. Length of Time Product Has Been On the Market

The second factor is the length of time a product has been on the market when retrofitting becomes feasible. A court will more likely impose the aforementioned post-sale duty where the product in question has been on the market for a relatively short time. Economically, this would seem to make sense in that if a product has been on the market for a relatively short period of time, it is likely that the product in question is still subject to wide use. Thus, it would appear that a greater number of persons would stand to benefit from the imposition of such a post-sale duty when a product is widely used as opposed to when a product has been on the market for a long period of time and is being used by a limited number of persons. However, where a product has been on the market for a long period of time when retrofitting becomes feasible and where that product has an extended useful life, a court may, likewise, choose to impose such a post-sale duty based upon the same economic reasoning. Thus, this factor is one which is closely tied to the factor that involves the nature of the product in question.

3. Effectiveness of the Safety Device

The third factor is the effectiveness of the retrofitting safety device. A court would be more likely to impose the foregoing post-sale duty where the retrofitting safety device has the potential to prevent a large percentage of the injuries and/or deaths caused by the product as opposed to where the safety device could at best only prevent a few accidents or deaths. Nonetheless, it is likely that there are some courts which would impose such a post-sale duty even where the given safety device has the potential to be only marginally effective.

4. Burden Placed Upon Manufacturer

Another factor, which is closely connected to the effectiveness of the retrofitting safety device, is the burden which the imposition of such a post-sale duty is likely to place upon a given manufacturer. In evaluating such a burden, a given court is likely to focus on at least three different areas: a) the cost to the manufacturer of notifying the owners of its previously sold products of the availability of the retrofitting safety device (which would include the direct costs of notification as well as the cost of "trac[ing] the ownership of each [product] sold . . ."); [78] b) the value of the resources which must be expended by the manufacturer in developing the safety device and making it available to the owners of the previously sold products; and c) the equity aspect of the burden (i.e., whether it would be fair to impose such a duty upon a manufacturer whose product is deficient in terms of safety features only because of technological advancements and not because of the manufacturer's acts or omissions. It is likely that a court will carefully balance these three aspects of the burden when faced with the issue presented in this article. However, this factor may become less significant where a highly effective safety device is available at a reasonable cost and the product in question, having a long useful life, is causing a large number of deaths or severe injuries.

5. Number of Deaths/Injuries Caused By Product

The fifth factor is the number of deaths and injuries caused by the condition of the product at the time of sale. As the number of such incidents increases, the more likely a court will be to impose upon a manufacturer the foregoing post-sale duty. However, as in *Noel*, a given court may choose to weigh this factor in favor of the plaintiff where, although the number of actual deaths and injuries is relatively low, the product in question has the potential to cause a large number of deaths or severe injuries.[79] Thus, where a product has the potential to cause a significant degree of harm, that po-

78. *See supra* note 67 and accompanying text.
79. *See supra* notes 31-39 and accompanying text.

tential, accompanied by only a few actual deaths or injuries, may prove to be just as weighty in the eyes of a court as would be a situation where a large number of deaths or injuries actually occur.

6. Resources Available to the Manufacturer

The sixth factor is whether the manufacturer possesses the resources necessary to develop and market the retrofitting safety device. If such resources are not readily available to the manufacturer and can only be acquired by him at great cost, it is likely that this factor would weigh in favor of the manufacturer. If, however, as in *Noel*, the manufacturer possesses the necessary resources, but refuses to allocate them to the development of a retrofitting safety device,[80] this factor is likely to weigh heavily in favor of the plaintiff. In addition, it is important to note that this factor is closely related to the aspect of factor four which deals with the value of the resources which must be expended by the manufacturer in developing and marketing a retrofitting safety device.

7. Manufacturer's Post-Sale Control Over the Product

The seventh factor which a court is likely to consider is the extent to which a manufacturer assumes control over the product after the point of sale. *Bell* and *Marlin*, viewed in conjunction with one another, indicate that the longer the period of time the manufacturer has control over the product after the point of sale, the more likely it is that a court will weigh this factor in favor of the plaintiff. Where, as in *Bell*, the manufacturer retained control over the product over a period of years,[81] it is more likely that a higher standard of care will be imposed. In contrast, in a situation similar to the one in *Marlin*, where the manufacturer regains control over the product for the period of time required to make a minor repair,[82] a court is likely to hold the manufacturer to a reduced standard of care. Although this factor is an important one, it is unlikely that

80. *See supra* notes 37-38 and accompanying text.
81. *See supra* note 52 and accompanying text.
82. *See supra* notes 74-76 and accompanying text.

the presence of such an assumption of control would alone provide a sufficient basis upon which a court would seek to impose the duty at issue in this article.

8. Cost of the Safety Device

The eighth factor is the cost of the retrofitting safety device.[83] If such a device can be made available to consumers at a reasonable cost, a court will more likely impose upon a manufacturer the above post-sale duty. However, even if the cost of such a device is relatively high, a court might nonetheless choose to impose such a duty especially where the product in question is causing a large number of deaths or severe injuries. Thus, the severity and number of the injuries being caused by the product in question are factors which can potentially outweigh the relatively high cost of a retrofitting safety device.

9. Continuing Relationship Between the Manufacturers and Owners

The ninth factor is whether a continuing relationship exists between the manufacturer and the owners of these products.[84] If such a relationship does exist, this fact is likely to weigh in favor of the plaintiff because the existence of such a relationship is likely to minimize the cost of the notification aspect of the burden which the duty to retrofit would place upon the manufacturer. In contrast, if no such relationship exists, the cost of tracing the ownership of each product[85] will increase the burden placed upon the manufacturer and will therefore weigh in its favor. Thus, factor nine is closely related to factor four which encompasses the burden placed upon the manufacturer if the duty at issue is imposed.

10. Nature of Product

The tenth factor is the nature of the product in question, a factor implicit in *Syrie* and refined by the court in *Kozlowski*. If the prod-

83. *See supra* note 54 and accompanying text.
84. *See supra* note 55 and accompanying text.
85. *See supra* note 67 and accompanying text.

uct in question is one with a projected long useful life (i.e., a piece of commercial machinery) and is not mass produced, a court is more likely to impose the duty at issue because the product is difficult and costly to replace. As a result, many persons will be exposed to the danger posed by its condition over a long period of time. Thus, the economics of the situation dictate that the benefits accruing from the imposition of the duty will outweigh the manufacturer's costs. If, however, the product in question is one with a projected short useful life (i.e., a household knife sharpener) and is mass produced, a court is less likely to impose the duty at issue because the product can be easily replaced with a safer model at a relatively low cost. Thus, it is likely that very few persons will be exposed to the dangers of the product's condition over an extended period of time. Accordingly, the costs of retrofitting outweigh its benefits.

It is important to note that factor ten, nature of product, is closely related to factor two, length of time the product has been on the market. Consequently, one could envision a situation where a product has a long useful life, is not mass produced, and has been on the market for fifty years when retrofitting becomes feasible, but because so few of these products are in use a court would choose not to impose the post-sale duty. In contrast, one could likewise envision a court imposing such a duty in the foregoing situation because the burden on the manufacturer would be minimal if only a few of the products were in use. Regardless of the outcome, factors two and ten must be considered in conjunction with one another.

11. Nature of the Industry

The eleventh factor is the nature of the industry which produces the product in question. In other words, is it an industry which sells only a few products to a limited number of customers? If the answer to this question is affirmative, then a given court may impose the post-sale duty because the manufacturer's cost of tracing ownership would be relatively low. If, however, the industry is one in which goods are mass produced and sold to a large and diverse consumer group, it is more likely that a court will not impose the above duty because the costs of retrofitting may outweigh the benefits to be

derived from it. Thus, this factor is closely related to factors four, nine and ten.

B. Determining Whether To Impose the Duty—A Two-Tiered Scheme for Analysis

Given that the foregoing factors provide a framework to which a court is likely to resort in determining whether to impose the above duty upon a manufacturer, it becomes necessary to develop a scheme under which a court may conduct its analysis. Such a scheme should be comprised of two tiers.

In the first tier of analysis, the court should employ a rebuttable presumption in favor of imposing the duty to retrofit. However, this presumption should arise only if all five of the following factors are met:

1. The nature of the product is such that it has a projected long useful life (factor ten); and
2. A highly effective safety device is available (factor three); and
3. The safety device is available at a reasonable cost (factor eight); and
4. The condition of the product at the time of sale is causing harm which results either in death or severe injury (factor one); and
5. The condition of the product at the time of sale is causing a large number of deaths or severe injuries (factor five).

Thus, if the above combination of factors is satisfied, a rebuttable presumption should arise in favor of imposing the duty to retrofit. However, the manufacturer-defendant should be able to rebut this presumption if it can sufficiently demonstrate that:

The manufacturer would be unduly burdened by the imposition of the duty to retrofit because:

a) the costs of notifying those who own the previously sold product of the availability of the retrofitting safety device would be so high as to endanger the existence of the manufacturer's business; and

b) it would be inequitable to impose such a duty on the manufacturer.

It is important to note that the burden placed upon the manufacturer's resources in developing and producing the safety device is to be analyzed under Step two of the five steps giving rise to the presumption. Thus, under this scheme, the availability of a highly effective safety device presupposes that the manufacturer has the

resources to develop and market the safety device (factor six) and is able to expend such resources without endangering its own existence (factor four). Therefore, the manufacturer may not rebut the presumption by demonstrating either its lack of resources to develop and market the safety device or its inability to expend such resources without endangering the existence of its business. These two arguments must be made, when the manufacturer is attempting to convince the court of the unavailability of a highly effective safety device within the meaning of step two of the scheme. If the manufacturer successfully argues either of these two points, the presumption will not arise in the first instance. However, the complaint against the manufacturer would not fail at this point, rather the plaintiff would merely proceed to the second tier of analysis without the aid of a presumption. The rationale underlying this aspect of the scheme is that if a manufacturer lacks the resources to develop and market the safety device or if it is unable to expend such resources without endangering the existence of its business then it would be unfair for the court to apply a rebuttable presumption against that manufacturer. Likewise, with respect to the rebuttable presumption, if a manufacturer successfully rebuts the presumption, the complaint against the manufacturer would not be dismissed. Instead the complaint would be adjudicated on its merits under the second tier of analysis.

Under the second tier of the scheme, a court would take into account all eleven factors. The second tier of analysis would only be utilized by courts when 1) the five factor combination giving rise to the presumption is not satisfied or 2) when the manufacturer successfully rebuts the presumption. Even though a court would take into account all eleven factors, under the second tier of the scheme, it is likely that the existence or nonexistence of one or more of the five factors which potentially can give rise to the presumption will weigh more heavily in a given court's analysis than would the remaining six factors. This is so because these five factors along with the presuppositions incorporated into Step two go to the heart of the balance which must be struck by a court that is trying to determine whether it should impose the duty to retrofit upon a given manufacturer. For, in so doing, a court must not only strive to protect society from the dangers which inhere in the product in

question, but must also seek to engender a legal environment that does not burden manufacturers to the extent that it is no longer profitable for them to design new products and develop retrofitting safety devices for existing ones.

V. Conclusion

The intent in formulating the above analytical scheme was to incorporate the policy considerations expressed in the preceding paragraphs into the two-tiered scheme for analysis. Such an intent was effectuated under the proposed scheme in that a court will be able to impose upon a manufacturer of inherently dangerous products the continuing duty to make its previously sold products conform to state of the art safety features in most cases where public safety is being seriously compromised by the existence of products, the dangerous propensities of which may be remedied by modern technology. This desire is actualized in that under the scheme, public safety is being seriously compromised if the five factors of the first tier are satisfied, in which case a rebuttable presumption arises in favor of imposing the duty. However, the manufacturer is given the opportunity to display the magnitude of the burden which the imposition of such a duty would place upon him in that he may 1) prevent the presumption from arising or 2) rebut the presumption once it has arisen. Therefore, this proposed two-tiered scheme accommodates both the needs of society and the interests of manufacturers of inherently dangerous products. Thus, as technology advances at an ever-increasing rate, the proposed scheme for analysis set forth in this article may prove to be beneficial not only to courts faced with the issue addressed by it, but to all members of society as well.

Tamara J. DeFazio