Notes

The Causation Problem in Asbestos Litigation: Is There an Alternative Theory of Liability?

I. Introduction

"Asbestos" is the name given to a family of hydrated silicate minerals which occur naturally as masses of fibers with the unique properties of relative indestructibility and high resistance to fire.[1] These properties combine to make asbestos an invaluable ingredient in a variety of products used to protect human life.[2]

Ironically, asbestos has recently been labeled one of the most dangerous and life-threatening natural materials used by man.[3] Masses of asbestos fibers, when disturbed in any manner, have a tendency to break easily into tiny dust particles which become suspended in the air.[4] Extended periods of ingestion and inhalation of these particles have recently been linked to such debilitating diseases as asbestosis,[5] bronchogenic carcinoma,[6] and mesothe-

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[1]Mansfield, *Asbestos: The Cases and the Insurance Problem*, 15 Forum 860 (1980); Mehaffy, *Asbestos-Related Lung Disease*, 16 Forum 341, 341-42 (1980).

[2]The heat-resistant properties and fibrous structure of asbestos make it extremely desirable as a fireproofing, insulating, and friction-resistant material. These unique properties make it a valuable ingredient in such products as brake shoes on automobiles, fireproof clothing, fire-resistant wallboard and cement, and coverings for pipes and electrical wiring. *See* U.S. Dep't of Health, Educ., and Welfare, Pub. L. No. 78-1594, Asbestos Exposure (1978) [hereinafter cited as DHEW Asbestos Exposure].

[3]Mehaffy, *supra* note 1, at 341.

[4]DHEW Asbestos Exposure, *supra* note 2, at 1.

[5]Asbestosis is classified as a pneumoconiosis (lung disease caused by extended inhalation of a mineral or metallic dust). It is a nonmalignant response of the body to the inhalation of asbestos fibers which sets up an inflammatory process that replaces functioning lung tissue with scarred tissue. This process destroys the air sacs in the lung tissue, preventing the lung from diffusing oxygenated blood to the arteries and preventing carbon dioxide from being released. There are two types of asbestosis; parenchymal asbestosis and pleural asbestosis. These two types of asbestosis may occur simultaneously or independently. Each can be severely disabling and neither type is necessarily fatal. Currently, there is no cure for asbestosis. Also, asbestosis is generally accompanied by an enlargement of the right side of the heart (cor pulmonale) resulting from the encroachment of the scar tissue on the lung. Essentially, the heart must work harder to deliver oxygenated blood to the body, causing the right side enlargement. Deposition of Harriet Louise Hardy, M.D. at 18-23, Roderman v. Combustion Eng'r, Inc., No. C72-390 (N.D. Ohio, deposition taken on Feb. 21, 1977) [hereinafter cited as Deposition of Dr. Hardy].

[6]Bronchogenic carcinoma of the lung, as characteristic of most cancers, involves

lioma.[7] Each of these diseases has a documented latency period of twenty to forty years after the initial exposure to asbestos.[8]

The recent proliferation of product liability lawsuits for asbestos-related diseases had its genesis in the 1973 case of *Borel v. Fibreboard Paper Products Corp.*[9] Between 1973 and 1980, an estimated ten thousand asbestos suits were filed.[10] As of February 1, 1981, twenty-five thousand individual plaintiffs had filed asbestos suits with an additional five hundred suits being filed each month.[11] This, however, is only the beginning. An estimated eleven million American workers have been exposed to significant concentrations of asbestos since the beginning of World War II,[12] and this does not begin to include the millions of consumer exposures.[13] Appropriately,

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the completely disordered multiplication of cells in the lung and bronchial tubes resulting in the unrestrained growth of abnormal cells. These abnormal cells tend to break into bits and be distributed to other parts of the body via the blood stream or lymphatic system where the unrestrained growth and multiplication continues. For instance, if one of these abnormal cells is carried to the brain, an individual may experience what appears to be a stroke. Bronchogenic carcinoma is ultimately fatal. *Id.* at 23-28.

[7]Mesothelioma is a diffuse malignancy of the mesothelial cells which are found in various linings of the body, such as the pleura (thoracic cavity lining) and the peritoneum (abdominal cavity lining). These linings react to the inhalation or ingestion of asbestos fibers resulting in the very rapid multiplication of cells. This multiplication of cells, referred to as a tumor, eventually presses against the lungs, impairing breathing. There is no known cure for mesothelioma and it is fatal in all cases. *Id.* at 28-31.

[8]In some cases, these diseases may become manifested to the point of diagnosis within two months after the initial exposure. Generally, however, the latency period is over twenty years after first exposure. *Id.* at 26-27; Henderson, *Product Liability Disease Litigation: Blueprint for Occupational Safety and Health*, TRIAL, April 1980, at 26; *see also* note 12 *infra*. This latency period is explained by the fact that asbestos fibers, once inhaled, remain in place in the lung, causing a tissue reaction that is slowly progressive and apparently irreversible. Even if no additional fibers are inhaled, tissue damage may continue undetected for decades. Furthermore, the effect of the disease is cumulative because each exposure to asbestos dust can result in additional tissue damage. *See generally* Comment, *Asbestos Ligitation: The Dust Has Yet To Settle*, 7 FORDHAM URB. L.J. 55, 63 (1978) [hereinafter cited as *Asbestos* Comment].

[9]493 F.2d 1076 (5th Cir. 1973), *cert. denied*, 419 U.S. 869 (1974). The first asbestos case, Potter v. Fibreboard Paper Prod. Corp., No. C.A.6329 (E.D. Tex. 1968), was filed in 1968 and settled for a relatively small amount prior to verdict. *Borel* was the first asbestos case which was tried to a verdict.

[10]Mehaffy, *supra* note 1, at 345.

[11]Levit, *Levit Outlines Catastrophic Product Liability Development*, Nat'l Underwriter, June 19, 1981, at 20, col. 1.

[12]DHEW ASBESTOS EXPOSURE, *supra* note 2, at 2; Mansfield, *supra* note 1, at 865-66.

[13]The carcinogenic effects of consumer products are speculative because little research of this type has been done. The sale of certain items containing asbestos, however, has been banned. 42 Fed. Reg. 63,354-64 (1977). For instance, in 1978, the Consumer Product Safety Commission issued a two-page fact sheet encouraging homeowners to remove asbestos-containing patching plaster, and to remove and

the effects associated with asbestos exposure have been labeled "toxic time bombs."[14]

Asbestos litigation presents unique legal problems.[15] A major problem is the inherent difficulty in identifying the manufacturer of the particular products which caused the plaintiff's injuries. Due to the latency period of asbestos diseases, the plaintiff and his co-workers' memories concerning the particular products they used are often faulty. In many cases, documents which identify the products used have been lost or destroyed.[16] Furthermore, because workers may have moved from one job to another, and because the employers using asbestos products generally obtain them from more than one manufacturer, the asbestos plaintiff has frequently been exposed to thousands of products containing asbestos. Where the asbestos plaintiff was a bystander,[17] consumer, or demolition worker,[18] the difficulties associated with the identification of the product and the manufacturer of that product become even more pronounced.

Traditionally, identification of the manufacturer has been a recognized requirement in product liability actions.[19] For example, under the Indiana Product Liability Statute which codifies the common law action of strict liability, the defendant must be linked in some way to the defective and unreasonably dangerous product which caused the injury before that defendant may be held liable.[20] This requirement may prevent recovery for many plaintiffs in asbestos lawsuits, where manufacturer identification is not always

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dispose of any asbestos-containing artifical fireplace logs which were being used in conjunction with gas burners in fireplaces. U.S. DEP'T OF HEALTH, EDUC., AND WELFARE, PUB. L. NO. 78-1842, ASBESTOS AND HEALTH: AN ANNOTATED BIBLIOGRAPHY OF PUBLIC AND PROFESSIONAL EDUCATION MATERIALS 4 (1978).

[14]Podgers, *Toxic Time Bombs*, 67 A.B.A. J. 139 (Feb. 1981).

[15]One problem for individuals injured as a result of asbestos exposure is the application of a statute of limitations. *See, e.g.*, Bassham v. Owens-Corning Fiber Glass Corp., 327 F.Supp. 1007 (D.N.M. 1971). *But see, e.g.*, White v. Johns-Manville Corp., 662 F.2d 234 (4th Cir. 1981); Bunker v. National Gypsum Co., 426 N.E.2d 422 (Ind. Ct. App. 1981). Another unique problem in this litigation involves insurance coverage. *See, e.g.*, Keene Corp. v. Insurance Co. of N. Am., No. 81-1180 (D.C. Cir. 1981); Insurance Co. of N. Am. v. Forty-Eight Insulations Inc., 633 F.2d 1212 (6th Cir. 1980).

[16]Henderson, *supra* note 8, at 26.

[17]For the purposes of this Note, a bystander is a worker who did not work directly with asbestos products, but was working in close proximity with workers using asbestos products so as to be exposed to similar concentrations of asbestos dust.

[18]A demolition worker may be exposed to high concentrations of asbestos dust during the demolition of a building which contains asbestos products. Selikoff, *E.P.A. Wins Suit on Demolition of Insulation*, INSULATION HYGIENE PROGRESS REP., Summer 1976, at 3.

[19]Annot., 51 A.L.R.3d 1344 (1973); 2 L. FRUMER & M. FRIEDMAN, PRODUCTS LIABILITY § 16A[4][e][i], at 3B-88-88.1 (1980); 1 R. HURSH & H. BAILEY, AMERICAN LAW OF PRODUCTS LIABILITY § 1:41, at 125 (2d ed. 1974); W. PROSSER, HANDBOOK OF THE LAW OF TORTS § 103 at 671-72 (4th ed. 1971).

[20]IND. CODE § 33-1-1.5-3 (Supp. 1981). For an application of the identification re-

possible.[21] Consequently, many asbestos plaintiffs must reshape existing theories of liability to deal with the peculiar factual background of asbestos litigation, or seek new theories of liability in which the burden of identifying the source of the injury-causing product is eliminated or shifted to the defendants.

The courts are just beginning to decide who shall bear the financial burden of these debilitating asbestos-related diseases when the plaintiff is unable to identify the source of the injury-causing products. This Note will analyze the propriety of using the traditional theories of alternative liability and concert of action in asbestos litigation. It will also discuss the new theory of market share liability which was recently developed to solve similar identification problems in DES cases, and will determine whether such a theory could apply to asbestos cases. Finally, this Note will discuss other possible solutions to the identification problem facing asbestos litigants.

II. Traditional Theories of Liability

A. Alternative Liability

Under existing tort law in most jurisdictions, there are two traditional theories which may ease the identification burden placed upon the asbestos plaintiff. One theory, that of alternative liability, originated in the California Supreme Court case of *Summers v. Tice*.[22] Alternative liability is applied in cases where all defendants behaved tortiously but only one unidentifiable defendant actually caused the plaintiff's injury.[23] There must be uncertainty as to which defendant actually injured the plaintiff and relative certainty

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quirement, see American Optical Co. v. Weidenhamer, 404 N.E.2d 606 (Ind. Ct. App. 1980).

[21]*See, e.g.*, Gray v. United States, 445 F.Supp. 337 (S.D. Tex. 1978) (recovery denied for DES daughter unable to identify manufacturer of the injury-causing drug); Davis v. Yearwood, 612 S.W.2d 917 (Tenn. App. 1980) (plaintiffs, unable to identify the particular product which caused a fire in the padded cell of a jail, not allowed recovery). *But see* Hall v. E. I. Du Pont De Nemours & Co., 345 F. Supp. 353 (E.D.N.Y. 1972) (plaintiff injured by a blasting cap could not identify specific manufacturer, allowed recovery on an enterprise liability theory); Sindell v. Abbott Laboratories, 26 Cal. 3d 588, 607 P.2d 924, 163 Cal. Rptr. 132, *cert. denied*, 449 U.S. 912 (1980) (DES daughter unable to identify specific manufacturer of injury-causing drug allowed recovery on a market share theory).

[22]33 Cal. 2d 80, 199 P.2d 1 (1948). In *Summers*, the plaintiff and the two defendants had gone quail hunting. When the plaintiff flushed the quail out of their nests, the defendants fired their guns simultaneously and negligently in the plaintiff's direction, striking the plaintiff in the eye. Faced with two negligent defendants and a plaintiff, who, through no fault of his own, could not identify the responsible party, the court shifted the causation burden to the defendants holding both liable. *Id.* at 86-87, 199 P.2d at 4-5.

[23]1 F. Harper & F. James, The Law of Torts § 10.1, at 702-04 (1956); W. Pros-

that one of the defendants did injure the plaintiff.[24] The burden of proof on the causation issue may then be shifted to the defendants to show that they were not responsible for the harm.[25] Joint and several liability is then imposed on all defendants who fail to meet this burden.[26] Although it has been argued that the defendants should have superior access to evidence of causation as a prerequisite to the court's shifting of the burden, it appears that the theory of alternative liability imposes no such requirement.[27]

The traditional application of an alternative liability theory as presented by *Summers* poses many theoretical difficulties when applied to industry-wide litigation, such as asbestos litigation. In *Summers*, the total possible number of wrong-doers was two, both of whom were joined as defendants. Therefore, one of them must have been the cause in fact of the plaintiff's injury. By shifting the burden of proof and imposing joint and several liability, the court in *Summers* created the presumption that each defendant was the cause in fact of the plaintiff's injury. This shift in the burden of proof was justified *only* by the one hundred percent collective probability of causation.

In asbestos cases, it would be difficult, if not impossible, for the plaintiff to join all possible tortfeasors.[28] Joinder of less than all of

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SER, *supra* note 19, at 243. This doctrine has also been incorporated into the RESTATEMENT (SECOND) OF TORTS § 433:

> Where the conduct of two or more actors is tortious, and it is proved that harm has been caused to the plaintiff by only one of them, but there is uncertainty as to which one has caused it, the burden is upon each such actor to prove that he has not caused the harm.

RESTATEMENT (SECOND) OF TORTS § 433B(3) (1965) (illustration 9 is based on *Summers*).

[24]RESTATEMENT (SECOND) OF TORTS § 433B(3) (1965).

[25]33 Cal. 2d at 86-87, 199 P.2d at 4-5.

[26]*Id.* at 84, 199 P.2d at 5.

[27]The logic and policy justification behind the alternative liability theory in *Summers* was drawn from the case of Ybarra v. Spangard, 25 Cal. 2d 486, 154 P.2d 687 (1944), in which the doctrine of *res ipsa loquitur* was used to infer negligence. *See* Sindell v. Abbott Laboratories, 26 Cal. 3d 588, 599, 607 P.2d 924, 928-29, 163 Cal. Rptr. 132, 137-38 (1980). In *Ybarra*, the plaintiff allegedly suffered an injury during the course of surgery while he was unconscious. The court held that the burden of proof as to which defendant injured the plaintiff shifted to the defendants because the defendants had a superior ability to identify the specific instrumentality which injured the plaintiff. 25 Cal. 2d at 488, 154 P.2d at 690-91. However, in *Sindell*, the California Supreme Court specifically denied that superior knowledge or ability of the defendant to identify the specific instrumentality which injured the plaintiff was a prerequisite to the shifting of the burden of proof under the *Summers* doctrine. 26 Cal. 3d at 602, 607 P.2d at 930, 163 Cal. Rptr. at 138. *But see* Namm v. Charles E. Frost & Co., 178 N.J. Super. 19, 427 A.2d 1121 (App. Div. 1981) (rejecting application of alternative liability on the basis of no superior knowledge).

[28]The need to join numerous defendants poses problems in maintaining complete diversity of citizenship when the action is in federal court and problems in obtaining

the possible tortfeasors would undermine the theoretical justification for the alternative liability theory. Moreover, the equity of this theory diminishes as the disparity between the number of total possible tortfeasors and the number of tortfeasors joined becomes greater.[29] Because alternative liability calls for the imposition of joint and several liability upon all tortfeasors, it does not ensure equitable apportioning of liability among manufacturers.[30] Therefore, the alternative liability theory, in its traditional form, would not be appropriate in large industry-wide litigation,[31] particularly in asbestos litigation in which not all causes of the plaintiff's injury can be isolated and identified.[32]

B. Concert of Action

Concert of action is the second of the two theories under which a plaintiff may be able to obtain joint and several liability in

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personal jurisdiction in both federal and state courts. Additionally, due to the latent effect of asbestos-related diseases, the asbestos plaintiff is often faced with the impossibility of joining a manufacturer which has gone out of business after the plaintiff's exposure.

[29]*See* Comment, *DES and a Proposed Theory of Enterprise Liability*, 46 FORDHAM L. REV. 963, 991 (1978) [hereinafter cited as FORDHAM Comment].

[30]The apportionment of damages under an alternative liability theory does not consider the length of exposure to various asbestos products and the relative propensity of each of these products to create asbestos dust when disturbed. The length of exposure to each asbestos product would be a necessary requirement in asbestos litigation. *See* notes 62-70 *infra* and accompanying text.

[31]Although alternative liability would not be applicable in its traditional form, a modified application is intimated by the RESTATEMENT (SECOND) OF TORTS. According to the RESTATEMENT, the burden of proof shifts to the defendants only if the plaintiff can demonstrate that all defendants acted tortiously and that the harm resulted from the conduct of one of them. RESTATEMENT (SECOND) OF TORTS § 433B, comment g (1977). The RESTATEMENT further notes that the rule thus far has been applied only where all the actors involved are joined as defendants and where the conduct of all is simultaneous, but cases may arise in which some modification of the rule would be necessary. *Id.*, comment h. This proposed modification has been accepted only in a few cases where joinder of all possible tortfeasors was impossible. *See, e.g.*, Haft v. Lone Palm Hotel, 3 Cal. 3d 756, 478 P.2d 465, 91 Cal. Rptr. 745 (1970) (despite the fact that other persons not before the court could have caused the drownings, the court applied an alternative liability theory, shifting the burden of proof to the defendants); Abel v. Eli Lilly & Co., 94 Mich. App. 59, 289 N.W.2d 20 (1979) (plaintiffs asserted that 16 defendants were the entire Michigan market for DES; however, the court did not condition liability on this factor, intimating that joinder of less than all possible defendants may be permissible). Other courts deciding DES cases have refused to expand the theory of altenative liability beyond its traditional application. *See, e.g.*, Sindell v. Abbott Laboratories, 26 Cal. 3d 588, 607 P.2d 924, 163 Cal. Rptr. 132 (1980) (rejecting application of alternative liability because a major portion of the total number of possible tortfeasors were not joined).

[32]*See* notes 73-77 *infra* and accompanying text.

asbestos suits. This theory was developed and traditionally applied in illegal drag racing cases in which a bystander was injured by one of the participants.[33] Under the concert of action theory, the injured bystander could proceed against any one or all of the participants in the drag race by alleging that each of the defendants helped plan or facilitate the illegal drag race, that such participation in the drag race was tortious, and that the bystander's injury resulted from the illegal drag race.[34] The bystander must also allege that an agreement existed between the participants. Such agreement may, however, be inferred from the participants' conduct.[35]

To satisfy the cause in fact problems presented when more than two participants are involved,[36] the concert of action approach theorizes that the causative agent of the plaintiff's injury was the illegal car race itself, rather than using the traditional "but for" determination of cause in fact which would necessarily include only two participants. In this manner, each participant could be held liable as a "material element and substantial factor" in causing the plaintiff's injury, regardless of the fact that the absence of one participant would not have prevented the injury from occurring.[37]

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[33]*See, e.g.*, Bierczynski v. Rogers, 239 A.2d 218 (Del. 1968); Skroh v. Newby, 237 So. 2d 548 (Fla. Dist. Ct. App. 1970); Lemons v. Kelly, 239 Or. 354, 397 P.2d 784 (1964). *See also* W. PROSSER *supra* note 19, § 46, at 292. The RESTATEMENT (SECOND) OF TORTS sets forth the following elements for an action based upon concert of action:

> For harm resulting to a third person from the tortious conduct of another, one is subject to liability if he
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> (a) does a tortious act in concert with the other or pursuant to a common design with him, or
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> (b) knows that the other's conduct constitutes a breach of duty and gives substantial assistance or encouragement to the other so to conduct himself, or
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> (c) gives substantial assistance to the other in accomplishing a tortious result and his own conduct, separately considered, constitutes a breach of duty to the third person.

RESTATEMENT (SECOND) OF TORTS § 876 (1979).

[34]W. PROSSER, *supra* note 19, § 46, at 291-92.

[35]*E.g.*, Bierczynski v. Rogers, 239 A.2d 218, 221 (Del. 1968) (agreement inferred from defendants' cars racing side by side at twice the legal speed limit); Skroh v. Newby, 237 So. 2d 548 (Fla. Dist. Ct. App. 1970) (agreement inferred from close proximity of cars, both of which were traveling at 90 miles per hour).

[36]The "but for" definition of cause in fact establishes the outer limits of who may be held liable for the plaintiff's injury. If more than two people are involved in the illegal drag race, it could not realistically be said that "but for" the actions of the third person, the plaintiff would not have been injured. The race still could have taken place and injured the plaintiff without the third person. W. PROSSER, *supra* note 19, § 41, at 238-39.

[37]Prosser suggests that being a "material element and substantial factor" in the plaintiff's injury would be a more preferable definition of cause in fact than the traditional "but for" definition. *Id.* at 240.

Under its traditional application, it is clear that the chief purpose of imposing joint liability under a concert of action theory was deterrence,[38] rather than an easing of the causal burden placed upon the plaintiff who was unable to identify the injury-producing party. Application of a concert of action theory has recently been used to establish industry-wide vicarious liability on the grounds that all members of that industry acted in concert by establishing a common design and safety standard for an allegedly defective product or by marketing such an allegedly defective product.[39] Such an application of the concert of action theory makes identification of the specific source of an injury-causing product unnecessary.

The usefulness of a concert of action theory by the asbestos plaintiff as a device to avoid the requirement of identifying the actual source of the injury-causing product is limited, for two essential reasons. First, most product liability actions involving asbestos are omission cases arising from the failure to test, warn, or otherwise anticipate and provide for the risk of injury.[40] The principle evidence of explicit agreement in asbestos cases involves the written correspondence of three representatives of two asbestos manufacturers between the years 1934 and 1939.[41] This correspondence may indicate an interest of these manufacturers in suppressing information about the *possible* hazards of asbestos.[42] Such correspondence is insufficient, however, to conclude that an express agreement existed between *all* asbestos manufacturers to suppress information concerning the hazards of asbestos. With respect to manufacturers other than these two, evidence consists of parallel activity[43] and the cooperation

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[38]*Id.* § 46, at 292.

[39]Hall v. E. I. Du Pont De Nemours & Co., 345 F. Supp. 353 (E.D.N.Y. 1972) (manufacturers of blasting caps and trade association not entitled to dismissal for plaintiffs' pleading of concert of action based upon defendants' agreement not to place warnings on blasting caps); *In re* Beverly Hills Fire Litigation, No. 77-79 (E.D. Ky. Nov. 14, 1979) (denied motion for summary judgment by manufacturers of aluminum wire and devices because evidence revealed genuine issue as to whether the defendants acted in concert in promoting and selling a defective product without adequate warning); Bichler v. Eli Lilly & Co., No. 15600-1974 (N.Y. App. Div. July 16, 1979) (verdict in DES case for plaintiffs on the basis of defendants' conscious parallelism and tacit agreement in failing to conduct second-generation animal tests).

[40]Mansfield, *supra* note 1, at 866.

[41]The representatives were Sumner Simpson, president of Raybestos-Manhattan, Vandiver Brown, secretary of Johns-Manville, and Mr. Hobart, Johns-Manville's New Jersey attorney. For excepts of these letters, see Motley, *The Lid Comes Off*, TRIAL, April 1980, at 21-22. *See* note 107 *infra*.

[42]Motley, *supra* note 41, at 21-23.

[43]This parallel activity primarily consists of a universal failure by all manufacturers of asbestos products to place warning labels on their products. *See* note 112 *infra* and accompanying text.

of manufacturers within the industry.[44] Although the concert of action theory does not require an express agreement, it does, at a minimum, require a "tacit understanding."[45] An entire industry's failure to perform adequate testing or provide adequate warnings is generally insufficient to establish concert of action, and does not amount to a tacit understanding.[46] Based upon existing evidence, an application of concert of action in asbestos litigation would expand the doctrine far beyond its intended scope.

Second, in cases in which the plaintiff is unable to identify the source of the injury-causing products, concert of action fails to supply the theoretical basis for joining numerous defendants. Allowing the joinder of multiple defendants by the asbestos plaintiff who cannot identify the source of the injury-causing product would necessitate an expansion of the already liberal definition of cause in fact.[47] Because it cannot be proven that *all* defendants participated in injuring the plaintiff, this liberal definition would have to be expanded to include any material element and substantial factor which *may have* caused the plaintiff's injury. Such an expansion of the causation concept would undermine the notion of fault inherent in the traditional concert of action theory. Each defendant would be jointly and severally liable for the total damages on the basis of a theory without theoretical justification.

III. The Theory of Market Share Liability

Although the theories of alternative liability and concert of action, in their traditional form, do not appear to be of great value to the asbestos plaintiff who is unable to identify the source of the injury-causing product, the plaintiff may be aided by a new theory called market share liability. This approach was proposed and adopted by the California Supreme Court in *Sindell v. Abbott Laboratories*[48] to

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[44]The cooperation between asbestos manufacturers could be inferred from the various industry associations to which these manufacturers belonged, such as the Asbestos Textile Institute (ATI). The ATI's decision not to conduct a study on animals to determine the carcinogenic effects of asbestos is cited as evidence of the cooperative relationship between asbestos textile manufacturers. Motley, *supra* note 41, at 23.

[45]W. Prosser, *supra* note 19, § 46, at 292.

[46]Sindell v. Abbott Laboratories, 26 Cal. 3d 588, 605, 607 P.2d 924, 932, 163 Cal. Rptr. 132, 140, *cert. denied*, 449 U.S. 912 (1980). From the asbestos plaintiff's viewpoint, the most serious problem with relying on a concert of action theory would be the risk of a directed verdict where the court determines that there is insufficient evidence of agreement or tacit understanding among the defendants.

[47]*See* notes 36-37 *supra* and accompanying text.

[48]26 Cal. 3d 588, 607 P.2d 924, 163 Cal. Rptr. 132, *cert. denied*, 449 U.S. 912 (1980). The market share liability theory adopted in *Sindell* is derived from a theory proposed in a 1978 Comment in the Fordham Law Review. *See* Fordham Comment, *supra* note

ease the causal burden placed upon plaintiffs who experienced inherent difficulties in identifying the manufacturer of the injury-causing drug diethylstilbestrol (DES) that they were exposed to *in utero*.[49]

To understand the implications of the market share theory, it is necessary to appreciate the causation problem presented by the DES cases. Generally, the plaintiffs in these cases are not able to identify the specific drug company which manufactured the pills which their mothers ingested. DES was never patented, and all manufacturers of DES followed a standard formula set forth in the United States Pharmacopeia.[50] DES was a prescription drug often sold through pharmacies under its generic name rather than a brand name.[51] Furthermore, in the twenty to thirty years since the DES was prescribed, memories have faded and prescription records have often been lost or destroyed. Consequently, the particular manufacturer is unknown or unknowable to most DES plaintiffs.[52]

Faced with the unique factual background of DES cases, the court in *Sindell* adopted a revolutionary theory of liability which obviates the DES plaintiff's difficulties in manufacturer identification while observing traditional notions of justice in only holding a manufacturer liable when there is actual proof that the manufacturer produced the DES which injured the plaintiff.[53] In adopting the

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29. The court in *Sindell* made numerous references to this Comment and developed a theory which is nearly identical to the theory proposed by this Comment, even though the court in *Sindell* specifically distinguished its theory. 26 Cal. 3d at 608-09, 607 P.2d at 935, 136 Cal. Rptr. at 143.

[49]Diethylstilbestrol is a synthetic estrogen which was first approved by the Food and Drug Administration (FDA) in 1947 to prevent miscarriages. 26 Cal. 3d at 593, 607 P.2d at 925, 163 Cal. Rptr. at 133. This drug was manufactured by hundreds of drug companies until 1971 when the FDA banned further marketing and promoting of DES as a miscarriage preventative. *Id.* at 594, 607 P.2d at 925, 163 Cal. Rptr. at 133. After being prescribed to several million pregnant women, research linked DES to cancerous and precancerous vaginal tract abnormalities in prenatally exposed daughters of women who took DES during their pregnancy. FORDHAM Comment, *supra* note 29, at 963-67. The form of cancer linked to DES use is adenocarcinoma which has a latency period of 10 to 12 years. Herbst, Ulfelder & Poskanzer, *Adenocarcinoma of the Vagina*, 284 NEW ENG. J. MED. 878 (1971).

[50]21 U.S.C. § 351(b) (1976).

[51]FORDHAM Comment, *supra* note 29, at 976.

[52]*Id.* at 974. In recent years, numerous law review articles have been published on the topic of DES and the difficulties with manufacturer identification. *See, e.g.*, FORDHAM Comment, *supra* note 29; Note, *Beyond Enterprise Liability in DES Cases—Sindell*, 14 IND. L. REV. 695 (1981); Note, *Market Share Liability: An Answer to the DES Causation Problem*, 94 HARV. L. REV. 668 (1981) [hereinafter cited as HARVARD Note]; Note, *Proof of Causation in Multi Party Drug Litigation*, 56 TEX. L. REV. 125 (1977).

[53]26 Cal. 3d 588, 611-12, 607 P.2d 924, 937, 163 Cal. Rptr. 132, 145, *cert. denied*, 449 U.S. 912 (1980).

market share theory, the court in *Sindell* rejected the traditional theories of liability on which the plaintiffs were relying to ease the causal burden.[54] The market share theory is a hybrid theory, however, derived primarily from the *Summers* doctrine of alternative liability and, to a lesser extent, from the concert of action theory. The court held that because all defendants produced a drug from an identical formula, it is

> reasonable in the present context to measure the likelihood that any of the defendants supplied the product which allegedly injured the plaintiff by the percentage which the DES sold by each of them for the purpose of preventing miscarriage bears to the entire production of the drug sold by all for that purpose.[55]

Although it has been suggested that seventy-five to eighty percent of the market must be represented in a case before such liability is applied,[56] the *Sindell* court required only a "substantial per-

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[54]The *Sindell* court rejected an application of the *Summers* doctrine of alternative liability, recognizing that with only five of the two hundred DES manufacturers being defendants to this action, there was a significant possibility, perhaps a high probability, that the company which actually manufactured the particular DES causing the plaintiff's injury would escape liability. *Id.* at 611, 607 P.2d at 936-37, 163 Cal. Rptr. at 144-45. The *Sindell* court rejected the application of a concert of action theory because there was inadequate evidence in the record of an agreement or tacit understanding among the defendants to engage in tortious conduct. *Id.* at 605, 607 P.2d at 932-33, 163 Cal. Rptr. at 140-41. The court also considered the enterprise liability theory suggested in Hall v. E. I. Du Pont De Nemours & Co., 345 F. Supp. 353 (E.D.N.Y. 1972), but rejected this theory because a large number of DES manufacturers were not joined in this action. 26 Cal. 3d at 607-11, 607 P.2d at 933-35, 163 Cal. Rptr. at 141-43. In *Hall*, there were only six manufacturers of blasting caps, all of which were joined in the action. Furthermore, the conclusion in *Hall* that the defendants jointly controlled the risk to the plaintiffs based on allegations that functions related to safety had been delegated to a trade association, was absent from the *Sindell* case. *Id.* The major drawback of the *Hall* theory is the application of vicarious liability, rather than a shifting of the burden of proof. Also, the theory is inherently contradictory: parties who are acting independently *a fortiori* do not have joint control of risk. As a consequence, few jurisdictions have been willing to adopt the *Hall* theory of enterprise liability.

[55]26 Cal. 3d at 611-12, 607 P.2d at 937, 163 Cal. Rptr. at 145.

[56]FORDHAM Comment, *supra* note 29, at 995. This Comment suggested requiring the following elements in an enterprise liability theory:

(1) Plaintiff is not at fault for his inability to identify the causative agent and such liability is due to the nature of the defendants' conduct.
(2) A generically similar defective product was manufactured by all the defendants.
(3) Plaintiff's injury was caused by this product defect.
(4) The defendants owed a duty to the class of which plaintiff was a member.
(5) There is clear and convincing evidence that plaintiff's injury was caused by the product of one of the defendants. For example, the joined defend-

centage" of the total market.[57] Once the plaintiff has joined the manufacturers of a substantial share of the relevant market in the action, the burden of proof shifts to each defendant to demonstrate that it could not have made the particular substance which injured the plaintiff.[58] If the defendant can not so demonstrate, then "[e]ach defendant will be held liable for the proportion of the judgment represented by its share of that market unless it demonstrates that it could not have made the product which caused the plaintiff's injuries."[59]

The policy underlying *Sindell* is that "as between an innocent plaintiff and negligent defendants, the latter should bear the cost of the injury."[60] This policy was, in the court's view, applicable in the DES litigation because the plaintiffs were totally innocent in failing to provide evidence of causation. In addition, the court found, "[f]rom a broader policy standpoint, [the] defendants are better able to bear the cost of injury resulting from the manufacture of a defective product."[61]

Essentially, the DES plaintiff need only prove the following under market share liability: that the defendants were negligent either by their knowledge that DES was carcinogenic or by their failure to properly test the drug prior to marketing; that the defendants produced a generically similar defective product with inadequate warnings of the dangers associated with taking DES; and that the plaintiff was injured by DES. In proving these elements, the plaintiff has a cause of action against DES manufacturers so long as a substantial share of the relevant market can be joined. The

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ants accounted for a high percentage of such defective products on the market at the time of plaintiff's injury.

(6) There existed an insufficient, industry-wide standard of safety as to the manufacture of this product.

(7) All defendants were tortfeasors satisfying the requirements of whichever cause of action is proposed: negligence, warranty, or strict liability.

Id. at 955. Most of these elements appear in the market share theory adopted by the *Sindell* court. For an excellent analysis of the differences between these two theories of industry-wide liability, see Note, *Industry-Wide Liability and Market Share Allocation of Damages*, 15 GA. L. REV. 423 (1981).

[57]26 Cal. 3d at 612, 607 P.2d at 937, 163 Cal. Rptr. at 145.

[58]The shift in burden of proof for manufacturer identification represents a substantive shift in burden and not merely a procedural shift. The effect is to eliminate the identification requirement of traditional tort law. Berns & Lykos, *Sindell v. Abbott Labs—The Heir of the Citadel*, 15 FORUM 1031, 1035 (1980).

[59]26 Cal. 3d at 612, 607 P.2d at 937, 163 Cal. Rptr. at 145. Although the court did not specify whether the appropriate market shares would be determined as of the time of ingestion or the time of judgment, it is reasonable to assume that the court intended that market shares be determined as of the time of ingestion.

[60]*Id.* at 610-11, 607 P.2d at 936, 163 Cal. Rptr. at 144.

[61]*Id.*

obvious question in asbestos litigation is whether such a theory would be available to the asbestos plaintiff who is unable to identify the source of the injury-causing product.

IV. Applicability of Market Share Liability to Asbestos Litigation

To properly analyze the applicability of a market share liability theory to asbestos litigation, it is necessary to review the underlying justifications for such a theory and apply the required elements of the market share theory to the asbestos situation.

A. Requirement of Fungible Products

Of critical importance to the market share theory is the requirement of generically similar defective products. Because all defendants in the DES cases produced a drug from an identical formula,[62] the pills were equally harmful regardless of who manufactured them. Therefore, the total volume of DES marketed in the year of injury directly corresponded to the amount of risk created and relative harm caused by each manufacturer.[63] Where the products are not uniformly harmful, the logical correlation between the volume sold and the harm caused by each manufacturer would be lost, unless the market share approach also considered the relative harmfulness of each manufacturer's product.[64]

Asbestos plaintiffs generally have been exposed to a wide variety of not generically similar products containing asbestos.[65] The

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[62]*See* note 50 *supra* and accompanying text.

[63]The Fordham Comment explains the relationship between the percentage of market share and liability as follows:

> [I]f *X* Manufacturer sold one-fifth of all the DES prescribed for pregnancy and identification could be made in all cases, *X* would be the sole defendant in approximately one-fifth of all cases and liable for all the damages in those cases. Under alternative liability, *X* would be joined in all cases in which identification could not be made, but liable for only one-fifth of the total damages in these cases. *X* would pay the same amount either way. Although the correlation is not, in practice, perfect, it is close enough so that defendant's objections on the ground of fairness lose their value.

Fordham Comment, *supra* note 29, at 994 (footnote omitted). The court in *Sindell* adopted this explanation theorizing that, "[u]nder this approach, each manufacturer's liability would approximate its responsibility for the injuries caused by its own products." 26 Cal. 3d at 612, 607 P.2d at 937, 163 Cal. Rptr. at 145.

[64]Harvard Note, *supra* note 52, at 679.

[65]*E.g.*, Memorandum of Johns-Manville Products Corporation in Opposition to the Plaintiffs' Motion to Amend Complaint at 19, Neary v. Johns-Manville Prod. Corp., No. H78-790 (D. Md., filed May 5, 1978) (plaintiff alleged exposure over decades to molded pipe and block insulation, asbestos cloth, insulating and finishing asbestos cement, asbestos paper, and other asbestos products).

probability that these plaintiffs were actually harmed by any particular asbestos product is a function of the amount and percentage of asbestos in each product and the tendency of the asbestos to free itself from that product.[66] Therefore, in order for the determination of market share to have any logical relationship to the amount of risk created by each manufacturer and the probability that its products caused the plaintiff's injury, the market share determination would have to incorporate these factors.

Although the amount and percentage of asbestos in each manufacturer's products generally can be ascertained, the determination of the relative propensity of each product to release asbestos is much more difficult and speculative. For instance, asbestos bonded in a finished product, such as linoleum, does not present significant health risks, unless the product is damaged or disturbed in such a way as to free fibers into the air.[67] On the other hand, spray asbestos insulation, which has a very high propensity to release asbestos dust, is extremely dangerous to health.[68] Between these two extremes are asbestos cement, molded pipe covering, asbestos clothing, asbestos ceiling tiles, and a host of other asbestos products, each of which has a different propensity to release asbestos fibers into the air. The determination is further complicated by the varying tendencies of each particular product to release asbestos fibers depending upon when the exposure occurred and the method of application or use of the product. Although bonded asbestos products may present little health risk in their finished form, the health risk is significantly greater during the manufacturing process. Furthermore, the method in which a product is used or applied plays an important role in determining the propensity of that product to release asbestos fibers.[69] The failure to consider these factors might result in one manufacturer, who produced a bonded product containing only two percent asbestos, sharing *equal* liability with another manufacturer who produced a product containing eighty percent asbestos which required spray application. These two products could not reasonably share an equal probability of causing the plaintiff's injuries.

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[66]*Id.*

[67]Bruck, *The Armies of Asbestos*, AM. LAW., Nov. 1979, at 20; DHEW ASBESTOS EXPOSURE, *supra* note 2, at 4.

[68]Selikoff, *A Gloomy Picture*, INSULATION HYGIENE PROGRESS REP., Winter 1972, at 1.

[69]Selikoff, *Insulation Industry Hygiene Research Program*, INSULATION HYGIENE PROGRESS REP., Winter 1972, at 15-16 (dumping dry asbestos cement into trough prior to adding water creates more dust than adding asbestos cement to water; wetting pipe covering prior to cutting creates less dust than without wetting; cutting asbestos products with saber saw creates more dust than cutting with band saw which has dust collector).

As an additional consideration, medical studies on asbestos exposure indicate that the diseases linked with asbestos inhalation increase in severity in a direct relationship to the length of exposure to asbestos dust.[70] Therefore, the length of exposure to each product should be factored into the market share equation.

From the above analysis, it is readily apparent why the court in *Sindell* placed so much emphasis on the fungibility of DES. The lack of generically similar defective products injects serious practical and theoretical difficulties into the application of the market share theory. A rote application of this theory to asbestos litigation without considering the relative harm which each product causes, would destroy the underlying justifications of the market share theory and impose liability on one manufacturer for another manufacturer's dissimilar defective products.

B. Relevant Market Requirement

Implicit in the *Sindell* formulation of the market share theory is the requirement of a definite, determinable market for the DES to which the plaintiff was exposed. Because it can be assumed that most mothers during their pregnancy remain in the same geographical area, a local market is both logical and readily ascertainable. By determining the relevant local market, all defendants who did not distribute their product within that geographic area during the period in which the mother was exposed to DES can be excused from the action.[71] The probability that one of the limited number of named defendants actually caused the plaintiff's injury is thereby increased.

Because many asbestos plaintiffs have been exposed to a wide variety of products over decades, the determination of a relevant local market in an asbestos suit would be highly complex. In each geographic area where the plaintiff was exposed to asbestos dust, a determination would have to be made concerning each defendant's share of the local market. Presumably, after all local markets are determined, an average market share for each defendant could be computed. This average market share, however, would also need to be weighted by the plaintiff's length of exposure in each local market.[72] Alternatively, if there was no attempt made to identify local markets and a national market was assumed, the results could

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[70]Selikoff, Hammond & Seidman, *Cancer Risk of Insulation Workers in the United States*, INSULATION HYGIENE PROGRESS REP., Fall 1974, at 6; *See also* Mansfield, *supra* note 1 at 861.

[71]Sindell v. Abbott Laboratories, 26 Cal. 3d at 611-12, 607 P.2d at 937, 163 Cal. Rptr. at 147.

[72]*See* note 70 *supra* and accompanying text.

prove extremely harsh and inequitable. A manufacturer who controlled an extremely high percentage of the national market, but only a small percentage of the local market where the plaintiff was actually exposed, would be subject to a very large percentage of the judgment even though it controlled only a very small proportionate share of the relevant local market. Therefore, if the determination of market share is to have any logical relationship to the degree of each defendant's culpability, an effort must be made to define the relevant local markets and consider the relative lengths of plaintiff's exposure in each market.

C. Medical Causation

In addition to defining a relevant geographic market, the determination of a relevant market would need to include all possible sources of the plaintiff's injury. Asbestosis, pulmonary and bronchogenic carcinoma, and mesothelioma are not uniquely caused by and specifically traceable to asbestos exposure. A recent study by the National Cancer Institute concluded that the carcinogenic effect of asbestos is primarily related to its structural shape rather than its physiochemical properties.[73] Medical evidence indicates that pulmonary fibrosis, with symptoms identical to asbestosis symptoms, may be caused by the inhalation of numerous other types of fibrous dusts and chemicals.[74] Secondly, pulmonary and bronchogenic carcinoma are common diseases which generally result from a combination of carcinogens.[75] Consequently, it is nearly impossible to isolate the particular causative agents in carcinoma cases.[76] Thirdly, although it was once thought that mesothelioma was uniquely associated with asbestos exposure, medical evidence suggests that the inhalation of any inorganic fibrous material may cause mesothelioma.[77]

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[73]Stanton & Wrench, *Mechanism of Mesothelioma Induction with Asbestos and Fibrous Glass*, 48 J. NAT'L CANCER INST. 797 (1972).

[74]Deposition of Dr. Hardy, *supra* note 5, at 20; Mansfield, *supra* note 1, at 862-63. For a detailed description of asbestosis, see note 5 *supra*.

[75]Deposition of Dr. Hardy, *supra* note 5, at 27. Henderson, *Environment*, TRIAL, Feb. 1978, at 6. Examples of other carcinogens which cause pulmonary cancer are: chromates, nickel, coke oven emissions, cigarette smoke, uranium, and arsenic. Speech by Peter Shea, Home Office Supervising Examiner for Liberty Mutual Insurance Co., Boston, Mass., to the Association of Insurance Attorneys, March 21, 1980. For a description of these diseases, see note 6 *supra*.

[76] Mansfield, *supra* note 1, at 863.

[77]Medical science has linked mesothelioma to such other inorganic sources as fibrous glass and polyurethane foam. Selikoff, *Caution Essential in Use of All Insulation Material*, INSULATION HYGIENE PROGRESS REP., Summer 1972, at 3 (five varieties of fibrous glass were applied to pleura of rats, and all developed mesothelioma) (citing Stanton & Wrench, *Mechanism of Mesothelioma Induction with Asbestos and*

The market share calculation logically requires the consideration of all possible sources of the asbestos plaintiff's disease.[78] For example, cigarette smoking, like asbestos exposure, increases the incidence of pulmonary fibrosis and bronchogenic carcinoma, but cannot be isolated from other factors also causing these diseases.[79] Furthermore, the combined effects of cigarette smoking and asbestos exposure geometrically increase an individual's risk of fatal lung cancer over individuals who either smoke or are exposed to asbestos but not both. Specifically, the asbestos worker who smokes faces a risk of fatal lung cancer ten times greater than the asbestos worker who does not smoke.[80]

If a plaintiff has a history of cigarette smoking and asbestos exposure, the market share calculation would have to make a preliminary determination of the percentage contribution to the plaintiff's disease which each of these factors played.[81] It can be hypothesized that there was an eighty percent chance that the plaintiff's disease was caused by asbestos exposure and a twenty percent chance that the disease was caused by cigarette smoking.[82] If a manufacturer of asbestos products controlled thirty percent of the relevant asbestos market, its share of responsiblity for asbestos-related injuries would be twenty-four percent.[83] Such computations would have to be made for all possible sources of the plaintiff's

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Fiberous Glass, 48 J. NAT'L CANCER INST. 797 (1972)). Later studies by the National Cancer Institute confirmed these results. Selikoff, *Dust Control Important in Alaskan Pipeline Work*, INSULATION HYGIENE PROGRESS REP., Summer 1974, at 2. This conclusion suggests that any inorganic fibrous material which may be inhaled has the potential of causing mesothelioma. Selikoff, *Caution Essential in Use of All Insulation Material*, INSULATION HYGIENE PROGRESS REP., Summer 1972, at 3. For a description of the disease mesothelioma, see note 7 *supra*.

[78]HARVARD Note, *supra* note 52, at 678.

[79]*See* U.S. DEP'T OF HEALTH, EDUC., AND WELFARE, SMOKING AND HEALTH, 4-63 to -66, 5-25 to -29 (1978). However, there is no evidence that smoking increases the risk of mesothelioma among asbestos workers. Mehaffy, *supra* note 1, at 345.

[80]The results of a recent study on death rates from lung cancer (per 100,000 man-years, standardized for age) were as follows:

> 11.3 for men who neither worked with asbestos nor smoked cigarettes, 58.4 for men who worked with asbestos but did not smoke, 122.6 for cigarette smokers who had not worked with asbestos, 601.6 for those unfortunate enough to have had both exposures—cigarettes and asbestos.

Selikoff & Hammond, *Asbestos and Smoking*, 242 J. A.M.A. 458 (1979).

[81]Such a determination may prove to be medically impossible. *See* note 79 *supra*. However, from a statistical standpoint such a determination might be made. *See* notes 126-28 *infra* and accompanying text.

[82]If cigarette manufacturers could not be held liable due to appropriate warnings on each package consistent with the "state of the art," then plaintiffs may be held 20% contributorily negligent.

[83]30% x 80% = 24%.

disease. Failure to consider all of the possible sources of injury would result in one group of manufacturers, whose products contained the particular carcinogen considered in the market share computation, bearing a greater proportion of the judgment than that for which they are logically responsible.[84]

D. Requirement of Joining a Substantial Share

In accordance with the market share theory as set forth in *Sindell*, the asbestos plaintiff would need to join a "substantial share" of the relevant market.[85] The court in *Sindell* reasoned that joinder of the manufacturers of a substantial share of the DES which the plaintiff's mother may have taken, would significantly diminish the injustice of shifting the burden of proof to the defendants to demonstrate that they could not have made the particular DES which injured the plaintiff.[86] This reasoning is logically sound when applied to DES cases because the DES plaintiff's cancer is uniquely caused by and traceable to DES.[87] In DES cases, the court can determine with reasonable accuracy whether the defendants joined in the action collectively distributed a substantical share of the product which caused the plaintiff's injury.

Implicit in the requirement of joining a substantial share of the relevant market is the knowledge of all possible sources of the plaintiff's injuries. In asbestos litigation, the plaintiff's injuries generally can not be traced solely to asbestos exposure.[88] Asbestos-related diseases may result from the combined effects of asbestos exposure and numerous other carcinogens to which the plaintiff was exposed. The plaintiff who has been exposed to asbestos and who also has a history of exposure to other carcinogens, not only would have to join a substantial share of the relevant asbestos market, but also would have to join a substantial share of the markets for all other carcinogens to which he was exposed.

With reference to the example above, where there exists an eighty percent chance that the plaintiff's injuries were caused by asbestos exposure and a twenty pecent chance that the injuries were caused by cigarette smoking, joining one hundred percent of

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[84]In the example above, considering a plaintiff who was exposed to cigarette smoke and asbestos dust, the asbestos manufacturer would only be responsible for 24% of the damages. A failure to consider the cigarette smoke would render this manufacturer liable for 30% of the plaintiff's injuries.

[85]*See* note 57 *supra* and accompanying text.

[86]26 Cal. 3d at 612, 607 P.2d at 937, 163 Cal. Rptr. at 145.

[87]FORDHAM Comment, *supra* note 29, at 965 n.8 (citing Ulfelder, *The Stilbestrol-Adenosis Carcinoma Syndrome*, 38 CANCER 426, 428 (1976).

[88]*See* notes 74-77 *supra* and accompanying text.

the possible asbestos sources would only constitute eighty percent of the possible sources of the plaintiff's injuries. A failure to join a substantial share of all relevant markets may prove to be inadequate to overcome the injustice of shifting the burden of proof to the defendants in asbestos litigation under a market share liability approach. All possible sources of the plaintiff's injuries should be considered if the market share theory is to maintain any rational relationship between the injuries sustained and the defendants' relative culpability. It should be noted, however, that the joinder of non-asbestos defendants may be frustrated by the procedural requirement which allows permissive joinder of parties only where there exist questions of law or fact common to all parties.[89]

E. Requirement That All Defendants Be Shown to Have Sold a Defective Product

Under both the alternative liability and concert of action theories, it is incumbent upon the plaintiff to prove that all defendants were negligent.[90] Under a strict liability theory, the plaintiff must prove that all of the defendants sold an unreasonably dangerous and defective product which caused the plaintiff's injuries.[91] Consistent with these theories, the court in *Sindell* formulated the market share theory on the supposition that all defendants can be shown to have sold a defective product and that injury resulted from the conduct common to all defendants.[92] In distinguishing earlier cases in which the California Supreme Court refused to expand the *Summers* alternative liability theory to include situations in which the plaintiff could not establish that all defendants were negligent, the court in *Sindell* stated that, "[h]ere, by contrast, the DES manufactured by *all* defendants is alleged to be defective . . . ."[93] It is clear from this distinction, that by holding the defendants liable only where it could be established that all defendants either were negligent or sold a defective product, the court in *Sindell* wanted to maintain the justice of earlier case law. The presumption that all DES manufacturers were tortfeasors was

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[89]FED. R. CIV. P. 20.

[90]*See* notes 23 & 33 *supra*.

[91]RESTATEMENT (SECOND) OF TORTS § 402A (1965) (codified at IND. CODE § 33-1-1.5-3 (Supp. 1981)).

[92]The question presented to the court in *Sindell* was whether to sustain the defendants' demurrers; therefore, the court assumed as true the plaintiff's allegations that the defendants sold defective products. 26 Cal. 3d at 595-96, 607 P.2d at 926-27, 163 Cal. Rptr. at 134-35.

[93]26 Cal. 3d at 603 n.18, 607 P.2d at 931 n.18, 163 Cal. Rptr. at 139 n.18 (emphasis added) (distinguishing Wetzel v. Eaton Corp., 62 F.R.D. 22 (D. Minn. 1973) and Garcia v. Joseph Vince Co., 84 Cal. App. 3d 868, 148 Cal. Rptr. 843 (1978)).

based on the production of a generically identical defective product by all defendants.[94]

In contrast, the asbestos manufacturers did not produce generically identical defective products; instead, they manufactured and sold thousands of different types of asbestos products, each of which had a different propensity to release asbestos dust.[95] Unlike DES, there are some asbestos products which present little or no health risk;[96] moreover, it is believed there are safe levels of exposure to asbestos dust.[97] Therefore, it can not be presumed that all asbestos manufacturers were negligent nor can it be presumed that all asbestos manufacturers sold unreasonably dangerous defective products. In order to demonstrate that all asbestos defendants are tortfeasors, the plaintiff must establish that all defendants acted in concert by failing to test, warn, or otherwise anticipate and provide for the risk of injury. Although there is some evidence that certain asbestos manufacturers either knew or should have known of the dangers of asbestos inhalation, this cannot be assumed for all asbestos manufacturers.

The first reported case of an asbestos-related disease was disclosed in an unpublished report presented by Dr. H. Montagu-Murry in England in 1906.[98] In 1924, W. E. Cooke reported the first published instance of a death presumed related to asbestos exposure.[99] Cooke's report marked the turning point in asbestos research, capturing the interest of numerous British physicians.[100]

Concerned by these British reports, two American manufacturers of asbestos products, Johns-Manville and Raybestos-Manhattan, along with their insurance carrier, Metropolitan Life Insurance Company, in 1929 funded a research program headed by Dr. Anthony Lanza.[101] The results of the study were published in 1935 indicating that fifty-five percent of these workers had positive lung

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[94]26 Cal. 3d at 610-11, 607 P.2d at 936, 163 Cal. Rptr. at 144.

[95]*See* notes 65-69 *supra* and accompanying text.

[96]*See* Cooke, *Asbestos Dust and the Curious Bodies Found in Pulmonary Asbestosis*, 2 BRIT. MED. J. 578 (1929).

[97]*See* notes 67-69 *supra* and accompanying text.

[98]Felton, *The Prevention of Asbestos-Related Diseases*, in ASBESTOS: PROPERTIES, APPLICATIONS, AND HAZARDS 496 (Michaels & Chissick ed. 1979).

[99]Cooke, *Fibrosis of the Lungs Due to the Inhalation of Asbestos Dust*, 2 BRIT. MED. J. 147 (1924).

[100]*See, e.g.*, Haddow, *Clinical Aspects of Pulmonary Asbestosis*, 1929 BRIT. MED. J. 580; Merewether, *A Memorandum on Asbestosis*, (pts. 1-3) 1933-34 TUBERCLE 69, 109, 152; Merewether, *The Occurrence of Pulmonary Fibrosis and Other Pulmonary Affections in Asbestos Workers*, (pts. 1-2) 1930 J. INDUS. HYGIENE 198, 239; Seiler, *A Case of Pneumoconiosis*, 1928 BRIT. MED. J. 982; Wood, *Pulmonary Asbestosis*, 1929 TUBERCLE 353; Wood & Gloyne, *Pulmonary Asbestosis*, 1930 LANCET 445.

[101]Motley, *supra* note 41, at 22.

damage while only seventeen percent were asymptomatic.[102] One of the few American doctors who devoted time and research to the asbestos problem before the mid-1930's was Dr. K. A. Lynch. Dr. Lynch's articles, however, received little attention in the medical field.[103] Like the early British medical literature, the Lynch studies, the Lanza studies, and the other American studies dealt almost exclusively with the effect of asbestos inhalation on asbestos textile workers and mine workers.[104] None of these studies examined the effects of asbestos exposure on shipyard workers, insulation workers, bystanders, or consumers.[105]

In 1937, Dr. LeRoy V. Gardner at the Saranac Laboratory, Saranac Lake, New York, began asbestos dust research at the request of, and with the financial backing of ten American manufacturers of asbestos products.[106] The Saranac study continued into the 1960's, but no articles or papers of any kind were released on asbestos-related diseases.[107] In 1946, the Fleischer-Drinker Re-

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[102]Lanza, McConnell, & Fehnel, *Effects of the Inhalation of Asbestos Dust on the Lungs of Asbestos Workers*, 50 PUB. HEALTH REP. 1, 7-8 (1935). Although the Lanza Study concludes that prolonged exposure to asbestos dust causes a pulmonary fibrosis of a type milder than silicosis, correspondence from Vandiver Brown, secretary of Johns-Manville, to Dr. Lanza on December 10, 1934, indicates that such a conclusion was made at the request of Johns-Manville. *See* Motley, *supra* note 41, at 22.

[103]Deposition of Dr. Hardy, *supra* note 5, at 38-40. During the middle to late 1930s infrequent studies and reports were being added to American medical literature on the subjects of asbestosis and bronchogenic carcinoma. *See, e.g.*, Donnelly, *Pulmonary Asbestosis*, 23 AM. J. PUB. HEALTH 1275 (1934); Lanza, *Asbestosis*, 1936 J. A.M.A. 368; McPheeters, *A Survey of a Group of Employees Exposed to Asbestos Dust*, 18 J. INDUS. HYGIENE 229 (1936); Stone, *Clinical Studies in Asbestosis*, 41 AM. REV. TUBERCULOSIS 12 (1940); Egbert & Geiger, *Pulmonary Asbestosis and Carcinoma*, 34 AM. REV. TUBERCULOSIS 143 (1936).

[104]*See* medical literature in notes 98-103 *supra*.

[105]*Id.*

[106]These manufacturers were:

1. Johns-Manville
2. Thermoid Rubber and Southern Asbestos
3. Keasbey & Mattison (predecessor of Nicolet Industries, Inc.)
4. Asbestos Manufacturing
5. Russell Manufacturing
6. Raybestos-Manhattan, Inc.
7. American Brake Block Corp.
8. Gatke Corp.
9. United Asbestos & Rubber Co. (UNARCO)
10. United States Gypsum Co.

Plaintiff's Contentions at 7, Hartnagle v. Johns-Manville Sales Corp., No. IP80-66C (S.D. Ind., filed Jan. 30, 1980).

[107]Deposition of Dr. Hardy, *supra* note 5, at 47-48. Dr. Hardy was involved with the Saranac research from 1945-46. *Id.* at 45. Correspondence in 1936 among Sumner Simpson, president of Raybestos-Manhattan, Vandiver Brown, secretary of Johns-Manville, and Dr. LeRoy V. Gardner, Chief Investigator at Saranac Laboratories, sug-

port[108] was published. This report, the first to specifically study the effects of asbestos on insulation workers, concluded that pipe covering operations on naval vessels were relatively safe.[109] This conclusion was not contradicted by any major asbestos study until 1964.[110]

The present awareness of the debilitating effect of the diseases linked to asbestos and of the number of those affected by asbestos exposure is the result of massive epidemiological studies conducted during the mid-1960's and 1970's. In 1964 and 1965, Dr. Irving Selikoff and the Mount Sinai School of Medicine published comprehensive and well-documented studies warning insulation workers of the extreme hazards of asbestos insulation.[111] In these same two years, warning labels began appearing on products containing asbestos; by 1967, warning labels could be found on virtually all products containing asbestos.[112] At this same time, most work areas

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gests that as a condition to the funding of the Saranac Study, all results obtained were to be considered the property of those who advanced the funds. Furthermore, all decisions on whether such results were to be published were to be made by the sponsors. Motley, *supra* note 41, at 22-23. (excerpts of this correspondence).

[108]Fleischer & Drinker, *A Health Survey of Pipe Covering Operations in Constructing Naval Vessels*, 28 J. INDUS. HYGIENE TOXICOLOGY 9 (1946).

[109]*Id.* at 13. It has been suggested that this misleading conclusion was due to the authors' failure to recognize the long latency period of asbestos-related diseases. Deposition of Dr. Hardy, *supra* note 5, at 87.

[110]Deposition of Dr. Hardy, *supra* note 5, at 86-87. Although numerous research programs on the relationship of asbestos fiber inhalation to bronchogenic carcinoma and asbestosis were undertaken during the late 1940's and 1950's, these studies were minor and were not widely relied upon by the medical community. *Id. See, e.g.*, Cureton, *Squamous Cell Carcinoma Occurring in Asbestosis of the Lung*, 2 BRIT. J. CANCER 249 (1948); Doll, *Mortality for Lung Cancer in Asbestos Workers*, 12 BRIT. J. INDUS. MED. 81 (1955); Isselbacher, Klaus, Hanna, Hardy & Harriet, *Asbestosis and Bronchogenic Carcinoma*, 15 AM. J. MED. 721 (1953); Lynch & Cannon, *Asbestosis: Analysis of Forty Necropsied Cases*, 14 DISEASES OF THE CHEST 874 (1948); Smith, *Survey of Some Current British and European Studies of Occupational Tumor Problems*, 5 A.M.A. ARCH. INDUS. HYGIENE, OCCUPATIONAL MED. 242 (1951); Stoll, Bass & Angrist, *Asbestosis Associated with Bronchogenic Carcinoma*, 88 ARCH. INTERNAL MED. 831 (1951); Wagner, *Diffuse Pleural Mesothelioma and Asbestos Exposure in the North Western Cape Province*, 17 BRIT. J. INDUS. MED. 260 (1960) (first study to link asbestos exposure with mesothelioma).

[111]Selikoff, Churg & Hammond, *Asbestos Exposure and Neoplasia*, 188 J. A.M.A. 22 (1964); Selikoff, Churg & Hammond, *The Occurrence of Asbestosis Among Insulation Workers in the United States*, 132 ANNALS N.Y. ACAD. SCI. 139 (1965).

[112]Mehaffy, *supra* note 1, at 345. The first warning labels were similar to the following:

> CAUTION
> THIS PRODUCT CONTAINS ASBESTOS FIBER. INHALATION OF ASBESTOS IN EXCESSIVE QUANTITIES OVER LONG PERIODS OF TIME MAY BE HARMFUL.
> IF DUST IS CREATED WHEN THIS PRODUCT IS HANDLED, AVOID BREATHING THE DUST. IF ADEQUATE VENTILATION CONTROL IS

were in compliance with governmental standards for permissible levels of asbestos dust.[113] It was not until 1974 that this standard was determined to be ineffective by a federal court of appeals.[114]

As indicated by the above history, it cannot be said that asbestos manufacturers, on a collective basis, knew or should have known that their type of product was dangerous, nor can it be presumed that *all* manufacturers of asbestos products were negligent. The mere fact that numerous manufacturers included asbestos as a component part of their dissimilar products may not, in itself, justify the imposition of market share liability.

V. A Possible Solution

Although the market share liability theory, as formulated in *Sindell*, can not be strictly applied to asbestos litigation, the market share theory does provide a sound policy foundation supporting the imposition of liability in asbestos cases. By holding each defendant liable for approximately the same amount of losses as were actually caused by its production of DES,[115] the court in *Sindell* relied on traditional concepts of fault and on the broader policy that the manufacturer is better able to bear the loss through insurance and distribute this loss among the public as a cost of doing business.[116] The latter rationale is a resource allocation and risk distribution concept which utilizes the marketplace not only for the original allocation of resources but also for the distribution of losses. The resource allocation and risk distribution concept requires that the cost of injury be borne by the industry which creates the risk because the injury, regardless of fault, is a cost of such industry activity.[117] Furthermore, this concept requires that the loss be borne

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NOT POSSIBLE, WEAR RESPIRATORS APPROVED BY THE U.S. BUREAU OF MINES FOR PNEUMOCONIOSIS PRODUCING DUSTS.

See Borel v. Fibreboard Paper Prod. Corp., 493 F.2d 1076, 1104 (5th Cir. 1973), *cert. denied*, 419 U.S. 869 (1974). In 1973, the court in *Borel* found that a warning label similar to the example above, was inadequate to communicate the dangers of asbestos exposure to workers. *Id.* at 1106.

[113]Selikoff, *Proposed Standard for Workers Questioned*, Insulation Hygiene Progress Rep., Summer 1971, at 3. The American Conference of Governmental Industrial Hygienists adopted the standard of five million particles per cubic foot in 1968. In 1971, the standard was revised to five fibers per cubic centimeter. *Asbestos* Comment, *supra* note 8, at 65-66. This standard became legally enforceable under the Walsh-Healy Act. 41 U.S.C. § 35-45 (1976).

[114]Selikoff, *Court of Appeals Orders Review of Asbestos Standard*, Insulation Hygiene Progress Rep., Summer 1974, at 1, 4.

[115]*See* note 63 *supra*.

[116]Sindell v. Abbott Laboratories, 26 Cal. 3d 588, 611, 607 P.2d 924, 936, 163 Cal. Rptr. 132, 144, *cert. denied*, 449 U.S. 912 (1980).

[117]Calabresi, *Some Thoughts on Risk Distribution and the Law of Torts*, 70 Yale

by the group which is most likely to cause the burden to be reflected in the price of the product.[118]

This combination of relative fault and risk distribution renders the market share theory a logically sound and a legally justifiable means of solving the DES causation problem. A theory to allow recovery in asbestos litigation could be justified by this same rationale, if the theory were formulated to take into account the unique aspects of asbestos cases. The theory which this Note proposes combines the underlying rationale of relative fault and risk distribution as set forth in *Sindell* with a means to evaluate the risk created by each asbestos defendant.

A. The Theory of Product Line Liability

Product line liability would be available to asbestos plaintiffs who are unable to identify the particular products to which they were exposed. The elements of product line liability, similar to those in *Sindell*'s theory of market share liability, consist of the following:

1) The plaintiff is not at fault in his inability to identify the particular manufacturers which caused his injury.
2) The plaintiff's injury was caused, at least in part, by asbestos exposure which resulted from the risk created by the asbestos industry.
3) The joined defendants represent a high percentage of the market for each product line to which the plaintiff was exposed within the relevant geographic markets and during the relevant period of exposure.
4) Except for manufacturer identification, the plaintiff has satisfied all of the other elements of the proposed cause of action: negligence, warranty, or strict liability.

Once the plaintiff proves these elements, the burden of proof for causation shifts to the defendants. Each of the defendants can exonerate itself only by a showing that its product line or lines could not have been the ones to which the plaintiff was exposed.

The apportionment of damages among those defendants found liable is determined by a four-step process which takes into account the unique aspects of asbestos litigation. The initial step requires the identification of all the types of asbestos-containing products to

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L.J. 499, 505 (1961). For further discussion on loss spreading and risk distribution, see Klemme, *The Enterprise Liability Theory of Torts*, 47 U. COLO. L. REV. 153 (1976) and Calabresi & Hirschoff, *Toward a Test for Strict Liability in Tort*, 81 YALE L.J. 1055 (1972).

[118]Calabresi, *supra* note 117, at 505.

which the plaintiff was exposed.[119] For instance, the plaintiff may have been exposed to the following types of asbestos products: cloth, board, sectional pipe covering, cement, spray insulation, spray sealant and paint, tile, and friction products. Each of these product lines can be assigned a fiber concentration and emission value which represents the average amount of asbestos fibers released by each product during either the process of fabrication, application, or demolition. These concentrations and emission values are based upon a time-weighted average exposure[120] and have been measured and quantified by several research groups.[121]

By assigning a fiber concentration and emission value to each of the product lines and processes to which the plaintiff was exposed and multiplying by the number of years of exposure, a determination can be made as to the relative risk created by each of the product lines. For example, assume that the plaintiff was exposed to the application of spray insulation for ten years, to cement mixing and application for five years, and to the cutting and installation of sectional pipe covering for two years. The following would represent the relative risk of each of the product line exposures:

Exposures	Emission Value (f/ml)		No. of Years		Extended Value	%Responsibility Assigned to Product Line	
Spray insulation	1.5	x	10	=	15	(15/50)	30%
Asbestos cement	5.0	x	5	=	25	(25/50)	50%
Sectional pipe covering	5.0	x	2	=	10	(10/50)	20%
					50		100%

This first step determines the relative propensity of each type of product to create asbestos dust during a particular process. By multiplying the fiber concentration and emission value of each product

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[119]Although a plaintiff may not be able to identify the products to which he was exposed by brand name, the plaintiff generally can remember the types of products to which he was exposed. *E.g.*, Memorandum of Johns-Manville Products Corporation in Opposition to the Plaintiff's Motion to Amend Complaint, at 19, Neary v. Johns-Manville Prod. Corp., No. H78-790 (D. Md., filed May 5, 1978) (plaintiff alleged exposure over decades to molded pipe and block insulation, asbestos cloth, insulating and finishing asbestos cement, asbestos paper, and other asbestos products).

[120]For instance, mixing asbestos cement, which has a very high dust emission value of 50-100 f/ml., is generally only performed for a few minutes once every hour, creating an average concentration factor of 5 f/ml. Selikoff, *The Asbestos Exposure of Insulation Workmen*, INSULATION HYGIENE PROGRESS REP., Spring 1975, 3.

[121]*Id.* at 1-4, citing five different studies on asbestos dust concentrations conducted from 1965 through 1971. During the periods of measurement in the 1960's, the work practices were virtually identical to those of prior years and few controls of significance were in use. *Id.* at 3.

and process by the period of exposure, a percentage of responsibility can be assigned to each product line. In the above situation where the plaintiff was exposed to three product lines and processes, the responsibility for the injury caused by asbestos exposure would be allocated as follows: the defendants which manufactured spray insulation would be responsible for thirty percent of the injury caused by asbestos exposure, the defendants which manufactured asbestos cement would be responsible for fifty percent of the injury caused by asbestos exposure, and the defendants which manufactured sectional pipe covering would be responsible for twenty percent.

The second step involves the calculation of responsibility which should be borne by each defendant within each product line. This calculation considers the average market share which each defendant held during the relevant period of exposure and the percentage of asbestos in each defendant's product. Assume that defendants A, B, and C manufactured spray insulation and represent a substantial portion of the spray insulation market during the relevant period of exposure.[122] Using the example above, assume further that during the ten year period of exposure, manufacturer A controlled an average of sixty percent of the market for spray insulation, and manufacturers B and C controlled an average of thirty percent and ten percent of the spray insulation market, respectively. Using the same rationale as the market share liability theory,[123] these market shares would represent the relative responsibility which each of these manufacturers should bear for the damages caused by spray insulation. These market shares, however, must first be adjusted to reflect the percentage of asbestos in each of the different spray insulation products. The calculation would be as follows:

Manufacturer	Average Market Share		% Asbestos in Spray Insulation		Extended Value	% Responsibility in Spray Application
A	60%	x	20%	=	.12	(.12/.16) 75.00%
B	30%	x	10%	=	.03	(.03/.16) 18.75%
C	10%	x	10%	=	.01	(.01/.16) 6.25%
					.16	100.00%

Therefore, manufacturer A would be responsible for seventy-five

[122]It has been suggested that a substantial percentage of the market should be 75% to 80%. FORDHAM Comment, *supra* note 29, at 996. The higher the percentage of the market that is required to constitute a substantial share, the greater the correlation will be between each defendant's share of the judgment assigned to that product line.

[123]*See* note 63 *supra*.

percent of the damages caused by spray insulation and manufacturers B and C would be responsible for eighteen and seventy-five one-hundredths percent and six and twenty-five one-hundredths percent, respectively.[124]

This step-two calculation would need to be made for all product lines to which the plaintiff was exposed. If a manufacturer produced numerous asbestos product lines during the relevant periods of exposure, this manufacturer's responsiblity for the risk it created in each of these product lines would be considered in each of the product line calculations.

Step three involves the claculation for the total responsibility attributed to each defendant when a judgment is rendered in favor of the plaintiff. Assume that manufacturer A manufactured and distributed all three product lines to which the plaintiff was exposed. Manufacturer A's share of the total responsiblity would be calculated as follows:

Product Line	% Responsibility Assigned to Product Line (From Step One)		% Responsibility Assigned to Manufacturer A (From Step Two)		Percent Contribution Toward Judgment
Spray Insulation	30%	x	75%	=	22.5%
Cement	50%	x	20%	=	10.0%
Sectional Pipe Covering	20%	x	14%	=	2.8%
	100%				35.3%

Therefore, manufacturer A would be held responsible for thirty-five and three-tenths percent of the judgment rendered in favor of the plaintiff.

The fourth step adjusts the total judgment to reflect only that portion which relates to the plaintiff's injury which is due to asbestos exposure. For instance, if the plaintiff has a history of cigarette smoking and asbestos exposure, a calculation must be made to determine the extent of the plaintiff's injury which is attributable to asbestos exposure and the extent of the plaintiff's injury which is

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[124]If additional facts indicate that manufacturer A only produced spray insulation for seven of the ten years during which the plaintiff was exposed to spray insulation, the following adjustment would be made:

Manufacturer	Average Market Share		Fraction of Time Spray was in Use		% Asbestos in Spray Insulation		Extended Value	Percent Responsibility
A	60%	×	7/10	×	20%	=	.084	67.7%
B	30%	×	10/10	×	10%	=	.03	24.2%
C	10%	×	10/10	×	10%	=	.01	8.1%
							.124	100.0%

attributable to cigarette smoking.[125] A failure to consider non-asbestos sources of the plaintiff's injury would result in asbestos manufacturers bearing a greater proportion of the judgment than that for which they are logically responsible.

This latter adjustment may be calculated using statistical data. A recent study indicates that cigarette smoking increases an individual's risk of fatal lung cancer approximately eleven times over that of an individual who does not smoke and has no history of asbestos exposure.[126] This study also indicates that an individual who both smokes cigarettes and has a history of asbestos exposure increases the risk of fatal lung cancer approximately fifty-three and one fourth times over that of an individual who neither smokes nor has a history of asbestos exposure.[127] Therefore, it can be determined statistically that approximately twenty percent of the bronchogenic carcinoma and pulmonary fibrosis injuries in smoking asbestos workers should be attributed to cigarette smoking.[128] The total judgment rendered in favor of a plaintiff then can be adjusted to reflect only those injuries which resulted from asbestos exposure.

B. Further Considerations

There are two considerations worthy of mention with respect to the practical application of the product line liability theory. The first consideration is how to deal with asbestos substitutes in the product line analysis. As mentioned earlier, recent studies indicate that substances such as fibrous glass have the same carcinogenic effect as asbestos fibers.[129] This evidence suggests that products containing asbestos substitutes should be treated as products containing asbestos under the product line liability analysis.

A second consideration is the effect on product line liability of not being able to join one hundred percent of the market for a particular product line.[130] Essentially, the question is whether joint and several liability should be imposed on the defendants within

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[125]*See* notes 78-81 *supra* and accompanying text.

[126]*See* note 80 *supra* for the results of this study. This result was acquired by taking the incidence of fatal lung cancer for cigarette smokers who have no history of asbestos exposure and dividing by the incidence of fatal lung cancer for individuals who do not smoke nor have any history of asbestos exposure. (122.6 ÷ 11.3 = 10.8).

[127]*Id.* This result was acquired by taking the incidence of fatal lung cancer for individuals who have a history of both cigarette smoking and asbestos exposure and dividing by the incidence of fatal lung cancer for individuals who neither smoke nor have any history of asbestos exposure. (601.6 ÷ 11.3 = 53.24).

[128]10.8 ÷ 53.2 = .2 or 20%.

[129]*See* notes 73-77 *supra* and accompanying text.

[130]The plaintiff may be unable to assert jurisdiction over the potential defendant, or the defendant may be judgment-proof.

each product line under the product line liability theory. The practical effect of this question is best illustrated by the following hypothetical situation. Assume the five defendants joined by the plaintiff represent only eighty percent of the spray insulation market and that the other twenty percent of the spray insulation market cannot be joined. If joint and several liability is imposed on these five defendants the initial allocation of responsibility within the spray insulation product line would be as follows:

Defendant	Average Market Share	Market Share Percentage ÷ Total Percentage of the Market Represented	Percentage Responsibility
A	40%	40/80	50%
B	20%	20/80	25%
C	10%	10/80	12.5%
D	5%	5/80	6.25%
E	5%	5/80	6.25%
	80%		100%

By imposing joint and several liability where less than one hundred percent of the market is represented, the percentage of responsibility which each defendant bears will be greater than each defendant's market share.[131] Consequently, each defendant would bear a greater share of the liability than that for which it is responsible.

If joint and several liability is not imposed and the market share is used as the basis for calculating each defendant's responsibility, twenty percent of the responsibility for the harm from spray insulation products will remain unsatisfied. Although this approach results in a more equitable allocation of responsibility based upon the relative probability of causation, leaving the plaintiff partially uncompensated with respect to asbestos-related injuries may not be an acceptable result from a policy standpoint. The policy advanced by *Sindell* favors the innocent plaintiff over the defendant manufacturers which created the risk that caused the plaintiff's injury.[132] Furthermore, *Sindell* stated that the defendants are better able to bear the cost of injury.[133] It is unclear, however, whether the market share liability theory in *Sindell* imposes joint and several liability on

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[131]For an excellent discussion of how this inequitable distribution could be partially readjusted through the use of comparative contribution, see Note, *Industry-Wide Liability and Market Share Allocation of Damages*, 15 GA. L. REV. 423, 440-43 (1981) [hereinafter cited as GEORGIA Note].

[132]*See* note 60 *supra* and accompanying text.

[133]*See* note 61 *supra* and accompanying text.

the defendants when less than one hundred percent of the market has been joined.[134]

Not allowing joint and several liability under the product line liability theory would create a strong financial incentive for the plaintiff to make every attempt to join as many defendants as possible.[135] However, the requirement that the plaintiff join a substantial share of the market for each product line identified as a source of the plaintiff's injury provides a similar incentive without placing the burden of not being able to join an insolvent or unamenable defendant on the plaintiff. Under this requirement, the higher the percentage of the market required to constitute a substantial share, the greater the correlation between each defendant's share of the market and its share of the responsibility for the portion of the judgment assigned to the particular product line. With this reasoning and the policies underlying market share liability, joint and several liability should be imposed and a very high percentage of the market for each product line should be required.[136]

C. Justification for the Imposition of Liability

When there is no proof that an asbestos manufacturer's product actually caused or contributed to the plaintiff's injury, the imposition of liability on an asbestos manufacturer under a product line liability theory will result in the most equitable solution to the asbestos causation problem. Although such liability would extend the present scope of products liability law, such an extension would not lack historical justification. Product line liablity not only finds support under the market share liability theory, but also finds support in the older doctrine of respondeat superior.[137] The modern justification for the imposition of vicarious liability under the doctrine of respondeat superior is that it "is a rule of policy, a

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[134]For conflicting interpretations of this aspect of *Sindell*, see Note, *Beyond Enterprise Liability in DES Cases—Sindell*, 14 IND. L. REV. 695, 721 (1981) and GEORGIA Note, *supra* note 131, at 443-44.

[135]Because a solvent and amenable defendant cannot be held liable for more than his proportionate share, the plaintiff would bear the risk of being unable to collect from insolvent or unamenable defendants. This risk is generally present in most civil suits for damages.

[136]If joint and several liability is imposed under the product line liability theory, the market shares in step two of the apportionment calculation would need to be adjusted to reflect the "adjusted" market share percentages in this phase of the apportionment calculation.

[137]The doctrine of respondeat superior holds a master liable for the torts committed by his servant even though the master is not in privity with the injured party and is innocent of any tortious behavior himself. W. PROSSER, *supra* note 19, § 69 at 458.

deliberate allocation of risk. The losses caused by the torts of the employees, which as a practical matter are sure to occur in the conduct of the employer's enterprise, are placed upon that enterprise itself, as a required cost of doing business."[138] Likewise, the losses caused by the use of a dangerous ingredient in the products manufactured by an industry should also be placed upon that industry as a cost of doing business where particular manufacturers can not be singled out.[139] To deny liability in asbestos cases where the plaintiff is unable to identify the actual manufacturers which caused his injury would place the entire risk of loss squarely on the injured plaintiff who can not be faulted for his inability to identify these manufacturers.

From an economic standpoint, asbestos manufacturers did attempt to internalize the potential cost of asbestos-related injuries by purchasing liability insurance and including these insurance premiums in the total cost of the asbestos products. Because asbestos manufacturers and their insurance companies are in the best position to distribute risks as a cost of doing business, policy should favor such distribution regardless of fault, so long as the allocation of losses is accomplished by a logically justifiable means of apportionment. A similar rationale recently formed the basis for the holding in *Keene Corp. v. Insurance Co. of North America*[140] where the court ruled that insurance coverage was triggered at the time of the plaintiff's exposure to the asbestos product and continued through the time when the injury finally manifested itself.[141] This decision emphasizes the risk distribution purposes of product liability insurance by holding all prior insurers of Keene Corporation liable regardless of when the plaintiff's injury was detected.

One important aspect of asbestos litigation which differentiates asbestos cases from DES cases and makes them more conducive to a theory that imposes liability on an industry-wide basis is the high probability that the asbestos plaintiff's injury was the result of exposure to a variety of asbestos products which were produced by numerous manufacturers.[142] By imposing liability on the manufacturers of each injury-causing product line, there is a greater possibility that more than one of the asbestos defendants' manufac-

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[138]*Id.* at 459.

[139]The purpose of strict liability in tort is to make the industry responsible for harm caused by defective products, allowing the costs to be distributed to the public in the form of higher costs. *See* RESTATEMENT (SECOND) OF TORTS § 402A, comment c (1965).

[140]No. 81-1179 (D.C. Cir. Oct. 1, 1981).

[141]*Id.*

[142]*See* note 119 *supra*; *Asbestos* Comment, *supra* note 8, at 83.

tured products which were the actual cause of the plaintiff's injury. In contrast, the DES plaintiff's mother was generally exposed to only one manufacturer's product; therefore, market share liability, in any one single DES case, imposes liability on numerous defendants that could not have manufactured the particular product which actually caused the plaintiff's injury.

A major concern to both future plaintiffs and defendant manufacturers in asbestos litigation will be whether the asbestos manufacturers and their insurers will be financially capable of fully compensating all of the potential plaintiffs who eventally develop asbestos-related diseases. Eleven million individuals are estimated to have had exposure to significant concentrations of asbestos since 1940.[143] Last year, the average amount paid to plaintiffs in 395 cases settled out of court was $76,000.[144] In forty-five asbestos trials which were tried to a verdict, the plaintiffs won twenty-five verdicts ranging from $16,000 to $1,857,600.[145] The cost of litigation just on existing cases is estimated to be in excess of $300,000,000.[146] These figures become even more staggering considering that many asbestos substitutes may cause the same diseases which until recently have been linked only to asbestos. Furthermore, some major asbestos manufacturers are already reaching the limits of their primary insurance.[147]

The principle policy underlying the product line liability theory is that the industry is better able to bear the cost of injuries resulting from the use of asbestos products and to distribute such costs to the public as a cost of doing business.[148] The fulfillment of such a policy is critically dependent upon the financial health of the asbestos industry. Therefore, each case should be carefully evaluated to determine the extent of injuries which are related to asbestos exposure and the extent of injuries which are derived from non-asbestos sources. Placing the risk of injuries caused by non-asbestos sources on the asbestos industry may well lead to the industry's inability to bear the cost.

VI. Conclusion

Millions of human beings have been or will be affected by what

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[143]*See* note 119 *supra* and accompanying text.

[144]Granelli, *The Asbestos Case Explosion*, Nat'l L.J., Oct. 19, 1981, at 24, col. 4.

[145]*Id.*

[146]*Id.*

[147]Levit, *Levit Outlines Catastrophic Product Liability Development*, Nat'l Underwriter, June 19, 1981, at 20, col. 1. Johns-Manville and Raybestos-Manhattan qualified their financial statements for the years 1979 and 1980 due to the ultimate costs of asbestos litigation. *Id.*

[148]*See* notes 137-39 *supra* and accompanying text.

may have become the largest single occupational health problem of our time. Traditional legal theories offer little hope of recovery for the plaintiff who is unable to identify the source of the injury-causing products. Although the market share liability theory, which was designed to overcome the identification problems of DES plaintiffs, is incapable of providing an equitable solution to the asbestos problem, it does provide a sound policy foundation for the imposition of liability in asbestos cases. This Note suggests a theory based upon the rationale of the market share liability theory which is designed to provide an equitable means of apportioning liability among the asbestos manufacturers.

Society faces a choice in asbestos cases in which the plaintiff is unable to identify the particular source of his injury. It can either leave the injury where it falls as the price of modern technology and provide only sporadic compensation through the application of current tort theories, or it can adopt a new legal theory which provides a realistic means of compensating all plaintiffs who suffer from injuries resulting from asbestos exposure. The product line liability theory suggests that the legal system is capable of adjusting to the equities and the economic realities presented by asbestos litigation.

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