

KEARNEY ASBESTOS REPORT SYNOPSIS: AUTOMOTIVE SEGMENT

Recently much emphasis has been placed upon the handling of toxic and hazardous materials. Asbestos, one such material, has been a major point of concern.

In an effort to provide the Consumer Product Safety Commission with fundamental information concerning asbestos, Kearney Management Consultants have released a 300 page report. This report, "Review of Asbestos Use in Consumer Products," attempts to identify and describe products, resolve amounts and methods of asbestos usage, determine if and how asbestos might be released, and estimate the consumer presence during conditions or activities which might release asbestos.

This report deals with a broad range of products which include asbestos usage. A brief summary of products, basic market information, and related viewpoints which specifically apply to the automotive industry is shown on the following pages.

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Market Size

Over the past decade the U.S. has consumed between 608,000 and 876,000 short tons of asbestos annually. Each year, approximately 15% of the asbestos usage is produced in the U.S. with the remaining amount being imported primarily from Canada.

The asbestos industry divides sales data into several categories. Of these categories, only four; packing and gaskets, friction products, coatings and sealants, and reinforced plastics, actually pertain to the automotive industry.

Packing and gasket use of asbestos fiber is cited by the Bureau of Mines to average about 25,000 short tons per year. This volume, however, probably understates the actual usage since asbestos paper is frequently converted to gasket material. The total value of the various grades of fiber used is estimated, by an industry contact, to be approximately \$10,000,000 yearly. Weston^{1/} and CONSAD estimate the annual value of shipments to be near \$140,000,000.

Friction products containing asbestos, such as; clutches, brake shoes and pads, are not under the jurisdiction of the CPSC.

The annual fiber use for coatings and sealants, at \$110 per ton, is estimated to range between \$4,500,000 and \$8,600,000. However the value of shipments, estimated by CONSAD and Weston, range from 250 million to 275 million dollars.

Asbestos usage in reinforced plastics is reported by the Bureau of Mines to be 20,000 short tons valued at \$2,500,000 per year.

Market Structure

In 1976, according to the Bureau of Mines, there were five U.S. asbestos mining and milling operations yielding a total U.S. employment of under 400. All but one of these operations was controlled by small businesses specializing in asbestos mining and milling. U.S. producers typically sell their production to other manufacturers while Canadian operations are controlled by major international corporations, five of which are U.S. based, who further process much of their own production.

The asbestos fiber producers or miners and mill operators sell fibers through wholesale distribution channels or direct to primary manufacturers. Although these outlets typically do not sell to consumers, it is possible for consumers to obtain loose fibers.

Packing and gasket manufacturers are medium-sized companies who impregnate or laminate the primary asbestos product which is purchased from larger manufacturers. The packings and gaskets are then sold through various distribution channels as finished products. Both finished and unfinished packing and gasketing material is sold through channels which sell to consumers.

^{1/} "Technological Feasibility and Economic Impact of OSHA Proposed Revision to the Asbestos Standard"; Weston Environmental Consultants - Designers, West Chester, PA., 1976

Market Structure (continued)

Manufacturers of friction products fabricate loose fibers or buy these products from the primary manufacturer. The friction product is then fabricated and generally sold directly to an automotive manufacturer or through automotive channels, however, consumers can easily purchase friction products.

The majority of coating and sealant manufacturers are composed of several small firms who either sell through the wholesale/retail channels or sell in large quantities to major firms with a wide distribution area.

The plastic molding material is typically compounded from loose fibers by relatively large firms. The molding material is either used internally or sold to various small specialty molding firms. The finished molded plastic products are widely used by the consumer and are sold to original equipment manufacturers.

Trends

The U.S. asbestos usage is apparently increasing at a rate equalling economic growth. An annual growth rate of 1 to 3.8% is predicted by the Bureau of Mines for the remainder of the century. Significant fluctuations in asbestos use, related to construction activity, are expected to continue in the future.

Continued asbestos utilization is affected by three major factors. First, asbestos has unique properties and any efforts to substitute other materials for asbestos have generally resulted in a cost penalty. Second, the cost of asbestos has increased over the past several years with no break expected in the future. Finally, stringent pressure to limit the hazards associated with asbestos use has been placed upon the industry. These pressures have brought about an increase in the cost of asbestos causing firms to eliminate asbestos usage in their products.

Alternative materials to asbestos in friction products were found to be impractical from both a cost and performance point of view.

Many of the asbestos related coating and sealant products intended for the consumer market are being reformulated. However, products intended for use by professionals have not been reformulated due to the more severe performance demands placed on these products.

Asbestos usage as a reinforcement in molded plastics has diminished considerably over the past two years. This reduction is attributed to the availability of asbestos, increased cost, demanding OSHA controls, and deletion of asbestos from industrial work areas and products.

The selective removal of asbestos as a product constituent appears to be the future trend in products where asbestos is not critical to product acceptance and where asbestos is considered to be hazardous. However, products, in which there is difficulty in duplicating the attributes of asbestos and for which there are no economically feasible alternatives, continue to be produced.

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ASBESTOS FACT SHEET

<u>Product</u>	<u>Discussion</u>	<u>Asbestos Concentration</u>	<u>Method of Incorporation</u>	<u>Scenario for Fiber Release</u>	<u>Consumer Contact</u>
Automotive Mufflers	Asbestos sheet is used between the inner and outer shell of standard mufflers because of its heat resistance and sound deadening properties. The sheet varies between .030 and .090 inches thick. Suitable asbestos substitutes have not been identified. However, through design changes asbestos can be eliminated from the product. An industry respondent indicated that the two largest domestic auto makers will purchase no asbestos containing mufflers after 1978. ✓	To 90%	Paper	Puncture or deterioration of inner or outer shell.	In presence of damaged muffler during engine use or muffler repair.
Automotive Undercoating	Undercoating on automobiles, trucks, and other vehicles are applied to retard rust and to help prevent stone damage to the body. These undercoatings are asphalt or wax based and designed to remain semi-viscous. The coatings are applied by the manufacturer or by specialty undercoating garages.	5 to 80%	Fibers thoroughly mixed in semi-viscous matrix.	Industry sources report that fiber release is highly unlikely.	Product widely used in consumer environment.
Custom Auto Body Filler	Published sources report that it is not uncommon for these body fillers to contain asbestos. Of those contacted only one indicated any current use of asbestos fibers.	5%	Thoroughly mixed in viscous matrix which becomes hard after application.	Sanding of hardened filler material.	Product available for purchase by consumers.
Friction Materials	Clutch plates and brake linings contain asbestos bound in resins. Respondents indicated that fibers are mechanically and thermally altered to a non-fibrous form during product use. However, some sources indicate that unaltered fibers can be emitted during use of the product.	30-70%	Fibers generally in felt or cloth form impregnated with resin.	During use fibers may be emitted to the atmosphere or emitted and retained by related mechanical parts and released to atmosphere during repair or replacement operations.	Consumers occasionally repair product incorporating asbestos friction materials; consumers may be present during commercial repair activity.

✓ Ford is currently using mufflers where the asbestos has been replaced with fiberglass.

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<u>Product</u>	<u>Discussion</u>	<u>Asbestos Concentration</u>	<u>Method of Incorporation</u>	<u>Scenario for Fiber Release</u>	<u>Consumer Contact</u>
Metal Deadener	Closely related in composition to automobile undercoating. Metal deadener is known as "Dum-Dum" in the trade. As used on the inside of fenders, doors, hoods, etc., it serves to muffle road, vibration, and engine noises. The product is designed to remain semi-viscous.	10%	Thoroughly mixed in asphalt.	Abrasion if material hardened.	Applied to automobiles during manufacture.
Molded Plastics	Asbestos fibers are used in molded plastics to impart impact and tensile strength, heat and chemical resistance. Industry contacts indicate a dramatic reduction in the use for this purpose. Substitutes include talc which may contain asbestos contaminants.	5 to 50%	Fibers are thoroughly mixed in hard to brittle matrix.	Sanding or abrading; no product identified which would be sanded or abraded in foreseeable use.	Products widely used in consumer environment.
Phenolic Laminates	This category includes a large group of industrial sheeting materials. Asbestos cloth as well as paper, cotton fabric, etc. serve as a structural element for phenolic resins. The sheeting is cut or stamped into a multitude of items such as washers, bearings, spacers, and motor vanes. Industry respondents reported that the trend is away from the use of asbestos in laminates.	Up to 85%	Thoroughly encapsulated in plastic matrix.	Abrasion destruction.	Asbestos phenolics are generally for industrial use; however they may be used as components of consumer products such as lawn care and home shop equipment.
Radiator Sealant	Asbestos is included in the formulations of some automotive radiator sealants. The fibers serve to form a minute network at the area of the leak, thus sealing it. 2/	3%	Mixed with liquid chemicals.	None identified.	Product directed to consumer market

2/ Ford radiator sealants do not contain asbestos

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ASBESTOS EMISSIONS

PROJECT	AUTHORS	SUMMARY	CONCLUSIONS
Brake & Clutch Emissions Generated During Vehicle Operation. SAE May 14-18, 1973	M.G. Jacko-Bendix R.T. Du Charme-Bendix J.H. Sprys-EPA	This report outlines the study conducted on disc & drum brakes & clutches utilising dynamometer testing & actual driving cycles in the Detroit area. On the average greater than 99.7% of the asbestos is converted to forsterite, olivine, polymeric & carbonaceous materials. The contribution to the atmosphere is 3.2% of the total asbestos emissions.	The combined total to brake and clutch friction material worn away annually is 117 million lbs. for brakes & 6.56 million lbs. for clutches. The total debris is 123.6 million lbs. Assuming the asbestos content is a maximum of 6% by wt. the amount of asbestos worn away as friction material debris is approximately 7 1/4 million lbs. Observations relating to emission trends were the following: • Asbestos emissions were higher for new friction surfaces and decreased with use. • Drum brakes produced more asbestos emission than the disc brake with the difference decreasing as the friction materials continued in use. • Heavy duty did not necessarily give a higher percent of asbestos; the large amount of debris produced, however, gave a significant rise in asbestos emissions. • For the disc pads there was an increase in asbestos emissions with increased asbestos content. No such trend existed for the drum materials.
Asbestos Emissions from Brake Dynamometer Tests. SAE May 14-18, 1973	A.E. Anderson, R.L. Gealer, R.C. McCune and J.W. Sprys- Ford Motor Co.	This report concludes that most of the lining asbestos was found to be converted to a non fibrous material by the high flash temp. of the braking surface. Less than .02% of the lining wear was released as asbestos fibers. The concentration of asbestos fibers in the urban atm. due to brake usage, was estimated at less than $.07 \times 10^{-9} \text{ g/m}^3$.	Observations: • Interfacial temperatures during braking could be high enough to decompose the chrysotile asbestos into non fibrous thermal degradation products. • Asbestos crudes (large bundles) were calculated to reach their rapid decomposition temperature during normal braking speeds between 18-56 mph. and above. • Local flash temperature and severe mechanical action are major factors in the breakdown of asbestos fibers for brake usage. Examination of lining surfaces revealed the presence of non fibrous magnesium silicate in both crystalline (forsterite) and amorphous phases.
Asbestos Exposure During Brake Lining Maintenance and Repair. Dec. 10, 1975 Project Re-Funded	A.N. Rohl, A.M. Langer, M.S. Wolf, & J. Weisman- Mt. Sinai School of Medicine	The project demonstrated the presence of unaltered fiber & fibrils of chrysotile ranging from 2-15% in brake drum dusts (av. 3-6%).	Shear causes structural strain & substructural fragmentation producing material fatigue which, with binder pyrolysis, can cause lining disintegration at temp. far below those required for chrysotile dehydroxylation (650-680°C). At lower temperature forsterite has been noted to form during prolonged static heating

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