

E. Drislane



**Research
Laboratories**

Bendix Center
Southfield, Michigan 48076
The Bendix Corporation

Dr. Joseph Breen
Project Officer
Office of Toxic Substances
U.S. Environmental Protection Agency
401 M Street S.W.
Washington, D.C.

May 11, 1978

RE: Report titled "Chemical Market Input/Output Analysis of Asbestos to Assess Sources of Environmental Contamination" prepared by W. M. Meylan, P. H. Howard, and S. S. Lande of Syracuse Research Corporation under EPA Contract No. 68-01-3224-Task III, for the Office of Toxic Substances, U.S. Environmental Protection Agency, Washington, D.C. 20460.

Dear Joe:

In my letter of April 7, 1978 to you I enclosed a "red-pencil-marked-up-copy" of pages 73 through 104 of the March 1977 version of the subject report. Noting that there are almost no changes in the March 1978 version for basically the same text on pages 73 through 92, my original comments, corrections, and additions stand. I suggest that the original which I sent to you be passed on to the authors of the report.

In addition, the following comments are offered:

- On page 87, the second sentence at the top of the page should be corrected to read: In brake wear debris, the problem is compounded because the reaction products of asbestos - forsterite, olivine, and dehydroxylated serpentine have similar elemental ratios, and several non-fibrous minerals have similar x-ray diffraction patterns to asbestos.
- Since the authors have abandoned the claims that x-ray diffraction is suitable to measure asbestos in brake debris (page 87, middle of page, March 1977 version), shouldn't they also abandon the Rohl et al (1976) figures for asbestos (page 89, bottom March 1978 version) and the subsequent calculations given in Table 6.7?
- Why do they say "the annual asbestos emissions reported in Table 6.7 (4.5% median) is nearly 22 times higher than the total reported in Table 6.6" when they can get more than 22 times if they used the Murchio et al (1973) and Anderson et al (1973) figures which were lower than the data of Jacko and DuCharme. Better yet, why are they

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disregarding two other studies with even lower asbestos emission findings and instead are honoring data produced by an analytical technique which even Rohl et al state are inaccurate?

- On page 101, middle of page, March 1978 version, the authors state "Virtually all of the asbestos collected in baghouses is in a free-fiber state." The authors should provide proof for such a statement. In the past, I have looked at grinding dust and have found that much of the asbestos is still bound by the resin and there is little or no concentration of asbestos. That is, the small amount of asbestos fiber collected in plants is diluted with a large amount of grinding dust which are friction material compositions (~50 wt% asbestos). Moreover, much of the grinding dust is from the skin produced in the molding process, and this skin contains more resin and less asbestos than the middle of the brake or clutch friction material. Finally, a portion of the Bendix and Delco grinding dusts contain semimetallic materials which are asbestos-free.
- The authors have been ignorant of the trends in the automotive friction material market. I suggest that the bottom of page 294, March 1978 version be improved as follows: "In present-day drum brake lining and clutch facing use, the presence of asbestos is almost essential; no other fiber or material performs the job requirements as well as asbestos. In disc brake pad area, steel fiber reinforced semimetallic friction materials, as described by Klein (1969), Aldrich (1971), and Kwolék (1975), have enjoyed increased usage; in model year 1978 the projected usage is for ~17% of the U.S. production of passenger cars and ~13% of light trucks. Semimetallic disc pads are specified for certain after-market replacements and semimetallic brake blocks are also installed on heavy trucks as aftermarket replacements to the original equipment materials which are asbestos-based. Alternate materials have been tested and are considered inferior. In practical terms, it will probably be a number of years before asbestos can be totally eliminated from automobile brake linings, disc pads, and clutches. Replacement of asbestos will be accompanied by cost penalties due to increased material and processing costs.
- The following references must be included to accompany the above statements:



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- Klein, B.W. (1969), "Semimetallic Outer Pads for Disc Brakes," Bendix Technical Journal, 2 (No. 3), 109-113 (1969).
- Aldrich, F. W. (1971), "Semimetallics: A New Type of Friction Material", SAE Paper 710591 presented at SAE Mid-Year Meeting, at Montreal, P.Q. Canada, June 1971.
- Kwolek, J. P. (1975), "Friction Material for Small Car Solid Rotor Applications," SAE Paper No. 750874 presented at SAE Automotive Engineering Meeting, Detroit, Michigan, October 1975.
- I reviewed only the sections dealing with friction materials and prefer not to offer comments on the other sections.

As a final comment, I was and still am surprised that the March 1977 version was not corrected in the year interval to the March 1978 version. I certainly hope the March 1978 version receives correction and improvement.

Except for having to find additional time to review the reports, it has been a pleasure to cooperate with The Office of Toxic Substances in an area which I feel is very important to peoples of the United States and eventually to peoples around the world. I hope I can be of additional service in reviewing the revised draft of the March 1978 version of the report.

Yours sincerely,

Michael G. Jacko

MGJ:nlm

cc: C. M. Brunhofer, Bendix Friction
Materials Division
W. M. Meylan, Syracuse Research Corp.
R. Mereness, Asbestos Information Assoc.
I. Weaver, Raybestos-Manhattan
S. K. Rhee
G. T. Burton
R. M. Rusnak
R. T. Ducharme
J. H. Somers
V. DeCarlo
E. Drislane

EPA, Ann Arbor
EPA, Washington
FMSI

FMSI 03323