

ENGINEERING AND MANUFACTURING STAFF

March 3, 1986

to: Mr. R. J. Donnellan
cc: Mr. R. S. Krause

Subject: COMMENTS ON TWO EPA MEMORANDA FROM MR. R. S. KRAUSE

1. Amy Moll memo from Weil and Delpire, dated October 17, 1985

I am in agreement with the data and commentary of this document. The authors also feel that the value from Rohl (of 29.8 f/cc, 1976) was not representative of typical brake service. As I recall, but not with much clarity, this was discussed with (I believe) Sinai's Arthur Langer. My opinion then, more firm today, is that such high values result from measurements on a drum brake that was:

- a. of inferior initial quality (e.g. using a drying oil or similar low grade binder resin; and was
- b. exposed to long periods of high temperature (e.g. hard braking and/or parking brake left dragging for some time); and then
- c. worn, with attendant very high brake lining wear rates and resultant friable fiber release.

The only other mechanism that could lead to such high fiber emissions during service would appear to be from high lining wear rates, with prolonged low rubbing speeds, after severe rusting of the cast iron and/or from rust bonding of the cast iron to lining. This is a statistically improbable, though possible, usage situation.

The TWA value of 0.04 f/cc that was suggested does appear to be reasonable and correct for most service mechanics, based on the information at my disposal.

2. Amy Moll memo from ICF Corporation, dated March 13, 1985

There is an air of superficiality to this document. It is fraught with numerous errors of both technical data and of apparent fundamental understanding. For example:

p5/P1 Nuturn's comments were not interpreted correctly here. Flexibility during forming is not a major problem in finding asbestos substitutes for drum brakes.

p5/P2 Disc brakes are not new (Lancaster's patent on disc brakes was before 1910). Disc technology did not develop due to pressure from car downsizing.

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p6/P1 "Most heavy vehicles use drum brakes which are called brake blocks" Tch! Tch!

p6/P2 Brake tooling is not done according to wheel size, as suggested. However, retooling may be needed for the different disc brake designs used in foreign cars. Asbestos substitution efforts at Bendix concentrated on the larger markets, not the larger brakes.

p7/P2 Non-asbestos linings, in some cases, are being refitted to brakes that originally were asbestos-based. That does not make them equal or equivalent. In general, aftermarket linings are cheaper, poorer wearing (esp. at elevated temperatures), and less stable frictionally than OEM. Sears dropped an advertizing blitz on their non-asbestos brake linings when they became aware of their attendant performance shortcomings.

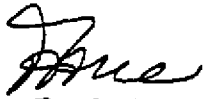
p10/P1 The aftermarket for drum brakes is larger than that for disc brakes because many older vehicles were all-drum, where now they are typically disc/drum combinations.

p10/P2 For heavy trucks there are eight blocks per axle, not per vehicle. The heavy truck brake is assumed to have two, not four, blocks per brake. Trailer brakes were not addressed at all.

p11/P3 There are many more lining manufacturers than 21 in the USA. Bendix and Raymark (now ESI) do not supply a majority of the market. The reference for this was listed in the appendix as the owner of a brake reline shop! The aftermarket estimate also appears to be in error, where Brazil, Mexico, and Korea apparently were not included.

The above comments cover less than half of the 'ticks' I made to the memo. I called several of the persons interviewed and referenced. One, Francis Hudson of Abex, did not even recall having the telephone interview and was displeased that he had been referenced without having been told of, or shown, the text.

The 'interviews' were exclusively by telephone, from January 16 to March 7, 1985. Published references were poorly selected, such as Loken's infamous SAE paper that contained much misinformation about Kevlar and non-asbestos friction materials. Since the memo was dated March 13, 1985, the author(s) apparently wasted little time in completing this draft. The header stamp showed it to be an Asbestos Ban Support Reference. It is disheartening to think that important EPA decisions may be based on memos of such dubious quality.


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