



MOUNT SINAI SCHOOL OF MEDICINE
of The City University of New York
FIFTH AVENUE AND 100TH STREET • NEW YORK, N.Y. 10029



Department of Community Medicine

April 8, 1974

Dr. Roy Gealer
Ford Motor Company
The American Road
Dearborn, Michigan 48121

Dear Roy:

Enclosed you will find a brief summary concerning our research over the past year on brake decomposition products.

I trust that this is the information you requested. If you have any further questions, please don't hesitate to call me.

Sincerely,

Arthur M. Langer, Ph.D.
Associate Professor of Mineralogy

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Enc.

Roy - Note that this is a very broad treatment of what we're doing and what will be done.

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Brake-Drum Decomposition Products-Current Research Areas

March, 1973 - March, 1974

The Environmental Sciences Laboratory is currently studying asbestos exposure in workmen who repair and service brake-linings. Although the area of investigation focuses on passenger vehicles, we are also incorporating studies involving large-passenger and commercial-type vehicles as well. It is the purpose of this research to obtain information regarding asbestos exposure in the automotive maintenance and repair, specifically among men repairing brakes.

We will simultaneously conduct retrospective and prospective health studies on such individuals. We are now gathering data concerning past morbidity and mortality experience. Workmen currently employed in these trades will be examined clinically and followed to determine prevalence and incidence of specific diseases. A cohort of these workmen is currently being developed by our research group.

In addition to the human disease experience, we will also include quantitative characterization of their work environment. Work in this area is currently being done. We have obtained data concerning light microscopic-electron microscopic characterization of dust aerosols liberated from such repair work. We have determined already that, in some instances, a light microscopic observation indicating no asbestos present in the atmosphere may actually conceal several micrograms of asbestos fiber. These particles are visible only by electron microscopy. We are presently characterizing the environments created during the removal of old brake-drums, i.e., "blowing-off" of decomposed brake-shoe dust and the refitting of brake-shoes onto drums by means of grinding techniques. We have dust counts of the ambient environment, in such localities before, during and after brake maintenance and repair. Some of these levels approach and compare with occupational exposures to asbestos.

In addition to the characterization of the atmosphere in this environ-

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ment, we are characterizing the recovered dust as well. The mineralogical characterization of such materials has been underway for the past year and some interesting information has been already gathered. Some of these are: some asbestos fiber does survive the braking cycle; in some fibers, although the morphology of the asbestos is retained, it appears to be physically degraded; selected area electron diffraction patterns indicate a great amount of "disorder" in surviving fibers suggesting an interfibril rotation of individual units; a host of other materials are present in the brake-drum dust which include a range of silicate phases, only some of which are apparently "crystalline"; other materials are present in the dust which are presently uncharacterized. We are currently, and will in the future, characteriz^{ing} these materials by means of electron beam instrumentation.

On the basis of a careful literature search we are convinced that the focus of disease risk, which may be present in individuals exposed to disintegrated brake-drums, should not be centered primarily on the asbestos as an agent. It is apparent that the brake-drum dust consists of a number of silicate phases in addition to a number of inorganic materials incorporated as "modifiers". Some of these e.g. lead compounds, may have profound biological effects. Exposure to brake-drum dust may include possible hazards from asbestos, other silicate forms, modifying compounds, as well as the organic binders. Therefore, clinical work-ups of individuals exposed to brake-drum dust will have to take into consideration a number of interacting agents.

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