

AMERICAN BRAKE SHOE COMPANY
AMERICAN BRAKEBLOK DIVISION
WINCHESTER, VIRGINIA



SURVEY OF LEAD AND DUST EXPOSURES

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LIBERTY MUTUAL INSURANCE COMPANY

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SURVEY OF LEAD AND DUST EXPOSURES

On November 1 and 2, 1962, a survey was conducted to re-evaluate some of the health hazards associated with the manufacturer of brake linings.

Specific attention was given to the airborne lead and airborne asbestos exposures in the wet and dry compounding areas, the pre-forming areas using dry compound and the block finishing area.

The survey could be characterized as a "spot" or check survey rather than an attempt to cover all operations completely. Lead-in-air samples were obtained only at operations processing lead bearing materials.

General Conclusions:

1. On the basis of the air samples obtained, there was a "borderline" lead exposure in the book press pre-forming department while handling materials containing lead. The operation was visibly dusty and a single dust sample showed a concentration in excess of the hygienic standard of 5 million particles per cubic foot of air. Contemplated controls in the form of exhaust ventilation should be completed.
2. Airborne dust exists at the wet mix compounding area and exceed the hygienic guide of 5 million particles per cubic foot of air during weighing and dumping, but not on a continuous basis.
3. Airborne lead is present in concentrations sufficient to merit additional controls at both the wet compounding and dry compounding line during weigh hopper loading operations.
4. The operator engaged in transferring lead to the storage hoppers is exposed to a serious health hazard from airborne lead.
5. The exhaust from the vacuum transferring apparatus produces a serious health hazard in the compounding area when lead is being transferred and adds generally to dustiness in the area when other compounds are being transferred.



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Wet Compounding:

Airborne samples were obtained for the evaluation of the airborne lead and airborne dust (asbestos) exposures associated with the wet compounding operations.

Conclusions:

1. Airborne dust constitutes a marginal health hazard during the weighing and dumping of asbestos.
2. Airborne dust constitutes a health hazard to the operator during the dumping of the asbestos from the first level hoppers to the second level mixers.
3. A serious health hazard is produced by airborne lead during the weighing operation on the compound lines because of insufficient capture of dust and nearby drafts from open windows.
4. The operator loading the storage bins with the vacuum apparatus is exposed to a serious health hazard when lead compounds are loaded.
5. A serious health hazard is produced in the compounding area due to the discharge from the vacuum loading arrangement when it is loading lead into the storage bin.

Recommendations:

1. Repair the weigh hopper used to transfer asbestos on the wet compounding line. Currently, there are some leaks in the hopper itself, which allow dust to escape during dumping.
2. Review the loading techniques used by the operator weighing asbestos on the wet compounding line and be certain that he is producing no more dust than necessary.
3. Clean and repair the air collection system and ducts on the Lancaster mixers on the wet line.
4. Improve the method of opening and closing the exhaust ducts on the wet mix compounding line. This is now done by hand and some of the exhaust valves are from time to time not properly operated.
5. Provide a Bureau of Mines approved respirator to be worn by the operator of the vacuum apparatus loading the lead into the bin.
6. Provide a means whereby the discharge from the vacuum loading apparatus is exhausted from the building or into an exhaust system duct until the contemplated changes in the hopper loading operations are completed.
7. The windows near the weigh hopper unloading should be kept closed to prevent violent drafts from defeating the purpose of the exhaust hoods.

Discussion:

The values found from the samples taken and evaluated for airborne dust (dust samples 1 and 2) indicated the dust hazard is only marginal; however, with poor operating techniques, the situation could be changed drastically. It is important that close supervision be given to this area at all times.

It was noted that when the asbestos weigh hopper was discharged, moderate amounts of dust (not necessarily asbestos) did escape from the openings in the weigh hopper. The holes were apparently the results of damage or mechanical modification.

The exhausts on the Lancaster mixer were checked and found, in some instances, to be dirty (large collections of material around opening) and damaged. The dust count obtained in the breathing zone of the operator when transferring the asbestos from the asbestos hoppers to the mixers (Sample #4) was possibly caused by the dust generated by the #2 Lancaster. A mix was dumped at #2 Lancaster during the sampling.

The exhaust system for the weigh hopper loading operations on the wet compounding lines consisted of hand operated dampers or valves which sometimes were left closed when material was being weighed out and others not in use left open. Some were not properly operated due to damaged linkages.

The situation, perhaps, can be corrected by some form of automatically opening and closing devices, similar to that used on the dry compounding lines.

The individual operating the vacuum transferring apparatus and transferring lead was exposed to excessively high concentrations of lead during the period of transfer.

It was also found that the discharge from the vacuum transferring apparatus contained an extremely high concentration of airborne lead and added to the overall contamination within the compounding department.

Until an improved method can be arranged for the transfer to this material, the operator should be equipped with an approved respirator for lead and the exhaust from the vacuum cleaner should be delivered to an exhaust system duct which will transfer it out of the building.

Dry Compounding - Conclusions:

1. The airborne lead from one sample, taken during the loading of the weigh hopper, in the dry compounding operation was found to be quite high. This was surprising since little or no lead was used for this batch; however, a high result from one sample is not too significant.
2. The airborne asbestos dust produced in the weighing operation of the dry compounding line is being adequately controlled.
3. The dust concentration at the dumping position of the dry line at the No.3 mixer on the first floor is just at the hygienic guide figure. However, the worker is not present for long periods of time so that this exposure is not particularly significant.

Recommendations:

1. As a matter of good practice, it would be desirable to improve the storage and handling procedure for the Litharge used at the dry compounding line. Currently, this Litharge is stored in an open container and some dust is disseminated in the air when the material is handled.
2. The actual positioning of the weigh hopper is important as regards dust control. This is particularly true at the final weigh position where bagged material is added. This operation should be reviewed and the best possible work practice used.
3. Improve the enclosure around the No.1 dry line unloading station on the 1st floor so the dust generated at the final dumping position will be more adequately controlled.

Discussion:

The operator weighing the asbestos into the weigh hoppers appeared to be performing his job quite adequately and the air exhaust system provided at the weighing station appeared to control the dust adequately. This was confirmed by asbestos dust sample No.#5.

The breathing zone sample for lead of the operator compounding on the dry line was obtained on the morning of November 2, 1962, and was taken during one complete cycle of the compounding weigh procedures. It was noted that the Litharge used in the compound being made up was stored in a fibre drum and dust was produced when the material was removed from the drum. This may have accounted for the high lead concentrations, but it does not seem likely.

The weigh hopper appeared to have adequate control, except in one or two instances when considerable dust was produced. In discussing this matter with the plant engineer, it was thought that this dust was being controlled as adequately as possible; however, the dust was simply of such a fine nature as to be almost uncontrollable. Perhaps with some re-design of the exhaust hood system at these locations, this dust control could also be improved.

At the first floor dumping area, it was found that the No.1 dry line loading station was not as well enclosed as it could have been. It appeared that sides could be added to the enclosure and the overhead opening reduced by a foot or more. This would allow the present exhaust system to better control the dust.

Book Press Pre-Form:Conclusions:

1. There is a marginal exposure to airborne lead at the book press pre-forming machines in the book press pre-form department.
2. The airborne dust at this operation is visible and the plans for the exhaust ventilation of these operations should be completed.

Recommendations:

1. Provide, as is already being planned, local exhaust ventilation at the book press pre-form machines which will provide sufficient exhaust velocities to collect any lead or asbestos dust which becomes airborne.

Discussion:

This survey was made in the book press pre-form department on the morning of November 2, 1962. The operations observed were those at which lead was used in the compound being formed. One dust sample obtained as a check at the No.1 machine in book press pre-forming exceeded the hygienic guide of 5 million particles per cubic foot.

In discussing this problem with the plant engineers, it was found that current plans do call for the installation of local exhaust ventilation on the operations.

Miscellaneous Departments:

Samples of airborne lead were obtained in the block press pre-forming department, the block finishing and drilling department and the block grinding department.

The samples obtained at the location of the block press pre-forming indicated the airborne lead was being adequately controlled as it was at the grinding machines and the drilling machines.

Data:

Results of: Airborne Asbestos

Method of Collection: Vacuum pump with midget impingers collected at the rate of 5 liters per minute in distilled water.

Method of Analysis: Samples were counted microscopically by the Light Field Technique on a Spencer Bright-Line Haemocytometer Counting Cell.

Sample No.	Time	Location	Result*	H.G.*
<u>Wet Mix Line:</u>				
1.	4 Min.	Breathing zone of asbestos weigher on wet line.	5.2	5
2.	4 Min.	General room approximately 4 feet from the asbestos dump station on the wet line.	5.5	5
3.	5 Min.	General room sample taken on the mixer level during the dumping operation from the asbestos hopper to the mixer on the wet line.	3.9	5
4.	5 Min.	Operator's breathing zone of mixer operator during dumping operation on the wet line from the asbestos hopper to the mixer.	17.0	5
<u>Dry Mix Line:</u>				
5.	6 Min.	Breathing zone of the asbestos weigher on the dry line.	3.9	5
6.	8 Min.	Breathing zone of operator dumping from the No.3 mixer on the ground floor on the dry line.	5	5
7.	10 Min.	Taken on 11/2/62 - dust sample at book press pre-form machine No.1. Operator's breathing zone.	14.8	5

*Result and Hygienic Guide given in million particles per cubic foot.

Data:

Results of: Airborne Lead

Method of Collection: Vacuum pumps with filter paper cones.

Method of Analysis: Dithizone method. Read on Beckman Spectrophotometer.

Date	Sample No.	Location	Results*	H.G.*
<u>Wet Mix Line:</u>				
11/1/62	1. 5 Min.	Breathing zone of operator, wet mix line during weighing operation.	53.1	2
	2. 5 Min.	Breathing zone of operator, wet mix line during weighing operation.	01.5	2
	3. 15 Min.	Operator's breathing zone while the operator was removing lead from a tote pan to hopper using an industrial vacuum cleaner.	03.8	2
	4. 2 Min.	Taken at the discharge end of the vacuum cleaner used in loading lead into the hopper on the wet mix weigh line.	262.4	2
<u>Book Press Pre-Forming:</u>				
11/2/62	5. 10 Min.	Taken in breathing zone of the operator of the book press pre-forming machine No.2.	01.1	2
	6. 10 Min.	Taken in the breathing zone of the operator of machine No.1 in the book press pre-forming.	02.4	2
	7. 10 Min.	Taken at the same place as No.6 sample.	01.3	2
	8. 10 Min.	Taken in the breathing zone of the operator of the book press pre-forming machine No.9	01.9	2
<u>Block Press Pre-Forming:</u>				
	9. 12 Min.	Taken in the breathing zone of the operator of the block press pre-forming machine No.3.	00.8	2

*Results and Hygienic Guide given in milligrams of Lead per 10 cubic meters.

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10.	Taken in the breathing zone of the operator of the block press pre-forming machine No.2.	00.5	2
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Block Finishing - Drilling:

11. 12 Min.	Taken in the breathing zone of the operator of machine No.5, vertical surface grinder, block finishing area.	00.2	2
12. 12 Min.	Taken in the breathing zone of the operator of the Avey drill No.41 - finishing drilling, block finishing area.	00.2	2
13. 10 Min.	Taken in the breathing zone of operator of Avey drilling machine No.3.	00.5	2
14. 10 Min.	Taken in the breathing zone of operator of the Fox drill No.4.	00.3	2

Dry Mix Line:

15. 15 Min.	Taken at the dry mix weigh line - breathing zone of operator.	06.2	2
16. 15 Min.	Taken near the dry mix weigh line as a background sample.	00.3	2
