COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF HEALTH
BUREAU OF INDUSTRIAL HYGIENE

Report of Engineering Survey

U. S. Asbestos Division
Manheim, Pennsylvania

Following arrangements with Mr. B. W. Luttenberger, Factory Manager, and Mr. Sweigart, Personnel Manager, an engineering survey was made of the above named plant June 9th to 27th, 1947. This plant has had a number of similar dust surveys in the past by its insurance carrier, The Industrial Hygiene Foundation of America, Inc., and this Bureau, consequently this survey becomes a follow-up study of prevailing dust concentrations under present conditions of equipment and manufacturing procedure. The company manufactured asbestos cloth, tape, and related products from crude asbestos.

RECOMMENDATIONS

In view of the result of the study the following recommendations are made:

Preparing
1. Reduce the drop level of the asbestos at the fiberizer as far as practical.

Carding
1. No recommendations.

Twisting
1. Provide additional exhaust ventilation for the twisters.

Winding and Speeding
1. No recommendations.

Weaving
1. No recommendations.

Dry Process Brake Lining Department
1. Continue to exhaust ventilate the mixer and the briquetting operation.
2. Continue to provide employees with U. S. Bureau of Mines approved respirators for lead dust, (litharge).
3. Instruct workmen about the lead hazard incident to the use of litharge.
4. Insist on personal cleanliness among employees.
5. Allow no food, and lunches in this area.
6. Recheck lead concentrations at the brake lining grinder during cold weather.

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Rubber Compounding

1. Continue to provide employees with U. S. Bureau of Mines approved respirators for lead dust (litharge).
2. Do not allow employees to work at the rubber mills unless employees wear approved type respirators.
3. Instruct workmen about the lead hazard incident to the use of litharge.
4. Insist on personal cleanliness among employees.
5. Allow no food, and lunches in this area.

Emulsion Making

1. Continue to provide U. S. Bureau of Mines approved type respirator for lead dust, (litharge).
2. Instruct employee concerning lead hazard.
3. Insist upon personal cleanliness of employee.
4. Allow no food or lunches in this area.

Department F22

1. No recommendations.

DETAILED FINDINGS

Preparing. Workmen were exposed to low concentrations of asbestos dust produced while handling asbestos. The various machines used to prepare the crude asbestos for carding were equipped with exhaust ventilation and the natural ventilation of the room was increased by the opening of most windows and doors, common operating conditions for the warm season. The dust concentrations are reported in Table 1. Dust concentrations were found high at only one location, the fiberizer take-off side. Since the asbestos dropped from a chute of the machine to a lower level, the production of some dust must be expected in spite of exhaust ventilation. It is recommended that this change of level of the fine material be reduced as far as practical in order to increase further the efficiency of the exhaust ventilation.

Carding. Workmen were exposed to low concentrations of asbestos dust while operating the carding machines, condensers, lap machines, and "L" spinners. See Tables 2 and 3. The carding process was in two rooms, known as the "Old Breaker Room", and the Main Card Room. The dust concentrations in both rooms were essentially the same. No

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recommendations are made.

Twisting. Workmen were exposed to fairly high concentrations of asbestos dust while operating the twisters. These machines were provided with local exhaust ventilation installed within the framework of the machines. However the exhaust ventilation failed to be entirely satisfactory and plans were under way for changes in the system. See table 4 for dust concentrations.

In order to test the dust control efficiency of the exhaust ventilation system at the twisters it was decided to take samples while the ventilation was on, followed by samples with ventilation turned off, and finally another set of samples with the ventilation turned on again. The twisters were operated as usual and approximately five minutes were allowed with the ventilation turned off before the samples were collected with "ventilation off". Similarily another 5 minute interim was allowed when the system was turned on before the final set of samples were collected. From Table 5 it will be noted that the existing ventilation reduced the dust count by a little over a million particles per cubic foot of air. This should not be considered as entirely satisfactory. It is recommended that additional exhaust ventilation be provided for the twisters. This may mean provision for a new and redesigned system.

Winders and Speeders. Workmen were exposed to low concentrations of asbestos dust while operating the winders and speeders. The dust concentrations are listed in Table 6. No recommendations are made.

Weaving. Workmen were exposed to low concentrations of asbestos dust at the various weaving machines. See Tables 7 and 8. The dust concentrations were low mainly because the looms were equipped with nozzles which sprayed a fine mist of water upon the asbestos thread before it was woven.

Dry Process Brake Lining Department. Workmen were exposed to lead mainly in the form of litharge while manufacturing dry process brake linings. The degree of exposure to lead varied from potential to hazardous, considering that the maximum allowable concentration for lead is 0.15 milligram per cubic meter of air. The exposure to lead compounds should be expected to vary since the amount used in different batch mixes varied. From Table 9 it will be noted that the exposure for the same sampling locations

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at the mixer varied from none when the low lead mix #4010 was compounded to a hazardous exposure when the lead containing mix #9209 was made. The exposure to lead was controlled partly by a canopy hood over the mixer and by the use of respirators by the employees while loading and unloading the mixer. A potential exposure to lead occurred at the briquetting press and in the case of one sample of general air taken on the main floor near the lockers a considerable amount of lead was detected while a duplicate sample showed none. Allowance should be made for intermittent generation of lead-bearing air depending on the mixtures used and such factors as loading, and unloading of the mixtures, and sweeping of the area.

In view of the exposure to lead it is recommended that the exhaust ventilation already provided for the mixer and the briquetting operations be continued and adequately applied, and that the employees at these operations be provided and wear U. S. Bureau of Mines approved type respirators for lead dust. It is also recommended that this area be rechecked for lead concentrations in the air particularly during the cold season when the general natural ventilation of this building may be less. Workmen should be thoroughly instructed about the lead hazard, personal cleanliness, and no food or lunches should be allowed in this area.

Workmen were exposed to fairly low concentrations of asbestos dust while grinding dry process brake band linings. See Table 10. This was due largely to the exhaust ventilation on the machine. However somewhat high concentrations of lead were found. See Table 11. While these concentrations were below the maximum allowable concentration of 0.15 milligrams per cubic meter of air, the concentrations may be high enough to indicate further study particularly during the winter season.

Rubber Compounding. Workmen were exposed to hazardous amounts of lead in the breathing zone near the movable scales where litharge was weighed and at the rubber mills when black rubber was made. Exposure to lead was partially controlled by exhaust-ventilated hoods over the rubber mills and by the use of respirators by the workmen at the rubber mills and while weighing litharge. The litharge weighing is to be replaced by a new arrangement and is to be ventilated. One of the men at the rubber mill however was not wearing his respirator while directly engaged in mixing black rubber. See Table

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12. In view of the amount of lead found in the operators breathing zone at the hood of the rubber mill, it is recommended that no one be allowed to operate a rubber mill without the protection of a U. S. Bureau of Mines approved for lead dust respirator. While each mill was equipped with exhaust ventilation it should be considered that an employee will be exposed to lead while working near or within the face of the hood. No exposure to lead was found in the general area about the coolers and in the center of the room. Workmen should be instructed about the lead hazard, personal cleanliness, and no food or lunches should be allowed in this area.

Emulsion Making. Exposure to lead was found to be potential in degree for a workman while engaged in weighing and mixing litharge at the emulsifiers, the hopper of emulsifier was exhaust ventilated. See Table 13. This workman was provided with a respirator and it should be worn whenever litharge is handled in its dry dusty form. This workman should be instructed about the lead hazard, personal cleanliness and no food or lunches should be allowed in this area.

Department F22. No exposure to lead was found when brake linings were ground and drilled. Exhaust ventilation was installed at the grinders and drills. See Table 14.

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Table 1

Dust Concentrations – Preparing

U. S. Asbestos Division
Manheim, Pennsylvania

Location and Operation	Dust Concentration Millions of particles per cubic foot of air	Remarks
Vertical opener #1	0.8	
	2.2	Right side of hopper
	2.6	
	2.0	Left side of hopper
Vertical opener #2	3.2	
	0.6	Right side of hopper
	2.2	Left side of hopper
Johnson grader #10, chute	2.8	
	1.6	
Fiberizer feeder	1.6	Left side
	1.8	Right side
	5.0	Take-off
Cutter #960	1.6	Feeder
	1.5	Take-off

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Table 2

Dust Concentrations – Carding

U. S. Asbestos Division
Manheim, Pennsylvania

Location and Operation	Dust Concentration Millions of particles per cubic foot of air	Remarks
	OLD BREAKER ROOM	
Wick card, #136, 137	2.0	
	2.0	Take-off
	2.3	Saddle
Lap machine #2	4.0	
	2.4	Operators side
	3.2	
	2.2	Opposite operator
Condenser #2	2.4	
	1.2	Breathing zone
Condenser #1	0.8	
	1.6	Breathing zone
Finisher #2	1.6	Saddle
	1.0	
	0.6	Take-off
Breaker #2, saddle	1.4	

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Table 3

Dust Concentrations - Carding

U. S. Asbestos Division
Manheim, Pennsylvania

Location and operation	Dust Concentration Millions of particles per cubic foot of air	Remarks
	MAIN CARD ROOM	
Card #13	1.8	
	1.6	Saddle
	1.4	
	1.4	Take-off
Card #16	6.0	Saddle
	1.8	Take-off
Card #22	1.6	
	1.6	Saddle
	1.2	
	2.6	Take-off
Card #2	3.4	
	2.2	Saddle
	3.2	
	4.4	Take-off
Card #3	2.8	
	3.2	Saddle
	1.6	
	1.8	Take-off
Card #16	2.4	Saddle
	2.6	Take-off
Lap machine #154	0.8	
	0.8	Operator's side
	1.0	
	1.6	Opposite operator
L spinner, #17, 18	1.2	
	1.0	Followed operator
L spinner, #9, 10	0.3	
	0.4	Followed operator
L spinner #1,2,3,4	0.8	Followed operator

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Table 4

Dust Concentrations – Twisting

U. S. Asbestos Division
Manheim, Pennsylvania

Location and operation	Dust Concentration Millions of particles per cubic foot of air	Remarks
Machine side, #16, 17	4.0	
	3.4	
Machine side, #21, 22	2.6	
	3.6	
Machine side, #3, 9	6.0	
	7.4	
Machine side, #4, 5	6.7	
	6.8	

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Table 5

Dust Concentrations - Twisting

U. S. Asbestos Division
Manheim, Pennsylvania

Location and operation	Dust Concentration Millions of particles per cubic foot of air	Remarks
	2.9	
	4.0	Ventilation system turned on
	4.6	
	4.2	Ventilation off during sampling and for preceding 5 minutes
Machine side #4, 5		
	2.9	
	2.8	Ventilation on during sampling and for preceding 5 minutes

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Table 6

Dust Concentrations – Winders and Speeders

U. S. Asbestos Division
Manheim, Pennsylvania

Location and operation	Dust Concentration Millions of particles per cubic foot of air	Remarks
Foster winder	2.2	
	2.0	
Sales winder, #50	1.0	Left end
	1.6	Rear of operator
Sales winder, fifth machine	2.0	
	2.0	Rear of operator
Roving yarn machine	2.0	
	1.2	Behind operator
Roper and twister, #1	0.4	
Roper and twister, #2	0.6	
Speeders, #7, 8	1.2	
Speeders, #5, 6	2.0	
Speeders, #1, 2	2.6	
Speeders, #3, 4	1.6	

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Table 7

Dust Concentrations – Broadcloth Weaving

U. S. Asbestos Division
Manheim, Pennsylvania

Location and operation	Dust Concentration Millions of particles per cubic foot of air	Remarks
Loom 20	1.0	
Loom 21, 22	0.8	
Loom 17, 18	0.6	
Loom 16, 12	0.6	
Loom 4	0.6	
Loom 3, 7	1.4	
Loom 8, 5	2.6	
Loom 6, 7	2.4	

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Table 8

Dust Concentrations – Tape Weaving

U. S. Asbestos Division
Manheim, Pennsylvania

Location and operation	Dust Concentration Millions of particles per cubic foot of air	Remarks
Loom #11 & 20	0.4	
	0.1	West wing of tape shop
Loom #18 & 19	0.3	
	0.3	Center of tape shop
Loom #7 & 12	0.1	
	0.4	East end of tape shop

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Table 9

Lead Concentrations - Dry Process Brake Lining

U. S. Asbestos Division
Manheim, Pennsylvania

Location and operation	Lead Concentration Milligrams per cubic meter of air	Remarks
Blending #4010 mix	0	Left side, 6 feet away
	0	Right side, 2 feet away
Unloading #4010 mix	0	Left side, 6 feet away
	0	Right side, 2 feet away
Blending #9209 mix	1.02	Left side, 6 feet away
	0.11	Right side, 2 feet away
Briquetting #9209 mix	0	5 feet from roll conveyor
	0.07	3 feet from roll conveyor
	0	10 feet opposite belt conveyor
	0	3 feet from take-off end of belt conveyor
General air	0	
	0.13	3 feet from locker area

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Table 10

Dust Concentrations — Brake Band Grinding

U. S. Asbestos Division
Manheim, Pennsylvania

Location and operation	Dust Concentration Millions of particles per cubic foot of air	Remarks
Grinder #1208A	2.0	Feeder
	2.4	Take-off

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Table II

Lead Concentrations - Brake Lining Grinding

U. S. Asbestos Division
Manheim, Pennsylvania

Location and operation	Lead: Milligrams per cubic meter of air	Remarks
Grinding brake lining mix #9209	0.11	Feeder side
	0.11	Take-off side

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Table 12

Lead Concentrations – Rubber Compounding

U. S. Asbestos Division
Manheim, Pennsylvania

Location and operation	Lead Concentration Milligrams per cubic meter of air	Remarks
Weighing litharge on movable scales	2.7	Near scales
	1.4	At rubber cutter
Mill #1, compounding and mixing black rubber	0.17	Left side of operator
	0.35	Right side of operator
Mill #2, compounding and mixing black rubber	0.28	Left side of operator
	0	Right side of operator
Mill #1, mixing white rubber	0	General air between coolers
Mill #1, mixing black rubber	0	General air between coolers
	0	Center of room

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Table 13

Lead Concentrations – Emulsion Making

U. S. Asbestos Division
Manheim, Pennsylvania

Location and operation	Lead Concentration Milligrams per cubic meter of air	Remarks
Making emulsion #314, 2073 (scales near exhaust ventilated hopper)	0.07	6 feet to left of platform scales
	0	6 feet to right of platform scales
	0	2 feet back of platform scales

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Table 14

Lead Concentrations — Dept. F22

U. S. Asbestos Division
Manheim, Pennsylvania

Location and operation	Lead Concentration Milligrams per cubic meter of air	Remarks
Grinder 30D	2.00	
Between Drill #3 and 4	0.00	
Between Drill #4 and 5	0.00	

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