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December 15, 1953

ASBESTOS TEXTILE INSTITUTE

Minutes of Meeting of Air Hygiene Committee - 12/9/53

This meeting was attended by the following:

Thos. Schmidt of K & M
Geo. Luttenberger of R & M
John Weber of American Asbestos Co.
G. Novack representing Union, Charlotte Plant
Benj. Stanton of J-M
Ralph Smith of R-M, Charleston Plant
John McCormack & D. R. Holmes of Asten-Hill Mfg. Co.

This meeting was comprised to two sessions. The morning session was devoted to the stody of a survey of asbestosis incidence case histories complete with years of exposure submitted by member Companies. This survey showed the percentage of incidence of asbestosis cases in relation to the number of employees exposed in each plant. This study shows percentage figures varying from five to eleven percent of those employees working in exposed areas affected. A copy of this survey is enclosed and is to be part of the minutes.

In our discussion it was brought out that perhaps the survey did not delve far enough into the subject of exposure. Also, the following factors should have been considered in order to make this survey more accurate. A study of the employees' work record, the exposure of the departments in which he had worked or works, his period of employment and the total time of exposure and dust counts recorded in these areas during periods of exposure.

This information may be necessary in order to determine just where the disease was contacted and why.

This survey showed one Company with a Stage 1 case with only three years of exposure and one other Company showed one Stage 1 case with only two years of exposure. We believe that if these cases were reported accurately they could have been avoided by the use of proper pre-hire physical and x-ray examinations.

Discussion of forced breathing therapy and its value took place. It was agreed that this equipment is of some value in giving relief to Asbestotics in Stages 1, 2 & 3. In many cases these people have shown remarkable improvement in their condition and it aids them in that they learn to breathe deeper all through their daily lives, both on and off the job. This tends to give people a lift in their daily living in that they breathe easier, walk easier, have a better appetite and sleep more normally. There were three member Companies present using this apparatus and all three reported good results.

The next matter under discussion was the particle size and diameter study to be made by the Traveler's Engineering Laboratory in Hartford. Each member Company is to forward samples, according to instructions received, to this Laboratory within the next few weeks. As Travelers' have accepted this project it was agreed that we should all cooperate in this survey and, it may be that we will have the results of this study possibly for the Spring meeting. It is hoped that this study will answer some of our questions concerning the particle sizes and diameters of fibres and their relation to the contacting of asbestosis.

The Committee was pleased to note that the U.S.P.H.S has agreed to include dust sampling equipment in their current dust survey. The Committee feels that this operation is a major step toward the solving of some of the problems involved in standardizing dust count studies throughout the Industry.

AFTERNOON SESSION

The afternoon session was devoted to the study of dust collection equipment.

Five member Companies reported their experiences. Three member Companies made written reports of their dust collecting experiences which are enclosed and are part of these minutes. There are two reports from Raybestos-Manhattan; one from their U. S. Asbestos Div. and the other from the General Asbestos Div. Mr. Benj. Stanton of Johns-Manville, Industrial Hygienist, read a complete report of their dust collection equipment experiences. It is their opinion that the American Wheelobraiter is the best type of dust collector on the market. It is Johns-Manville's experience that this type of unit shows the lowest maintenance cost, less cleaning necessary and the finest operating performance.

Mr. Ralph Smith in his report for General Asbestos agreed that the American Wheelobraiter was also the best type of collector according to their experience.

John McCormack of Asten-Hill Mfg. Co. reported on a Pangborne collector and its problems. All members of the Committee seemed to be of the opinion that Pangborne collectors to date are unsatisfactory.

Mr. Luttenberger reported for Raybestos-Manhattan. Asbestos on their experiences throughout the entire plant. Mr. Novack of Union Asbestos, Charlotte, N. C. reported a recent installation of an American Wheelobraiter which, so far, is giving them excellent performance. After a long discussion on dust collecters it was agreed by all that, according to the experiences of three of the member Companies, there was no doubt by the Committee that the

Minutes - Air Hygiene Committee - 12/9/53

American Wheelobraiter was by far the best type of collecter on the market for the handling of asbestos dust.

We then discussed many types of dust collection equipment and dust eliminating processes being used throughout plants in the entire industry. This discussion covered spray systems, water-wetting systems, oil systems for mixes, dust systems for Cards, Pickers, Weave Room, Winders, etc. All member Companies are making some progress in the elimination of dust. After some discussion the problem of dry weaving came up and after a full discourse on this subject it was decided by the Committee that we make recommendations to members at the General Meeting, December 10th, to this effect:

RECOMMENDATION

Due to the fact that it is our job to eliminate dust in an effort to protect our plant personnel from this hazard, we recommend that a study be made by the Technical Committee of the possibility of eliminating dry weaving in member Company plants. We ask that this recommendation be given consideration by the full committee.

At the General Meeting, this recommendation was accepted.

AGENDA FOR SPRING MEETING - 1954

SUBJECTS:

1. Twister Enclosure and Spinner Survey
2. Travelers' Report of Dust Particle Survey
3. Report on U.S.P.H.S. Sampling Equipment Survey if available by this time.
4. The Study of the Possibility of Eliminating Dry Weaving.

December 8, 1953

ASBESTOSIS INCIDENCE STUDY

Five member Companies reported their experiences:

COMPANY A

This Company reports 22 cases in three stages;

7	Stage #1
13	Stage #2
2	Stage #3

There are also six borderline cases as yet to be determined. This Company employes 295 people. The percentage of incidence of asbestosis is 7.46% for classes #1,2 and 3 or 9.66% including the six questionable or borderline cases.

This survey was completed on October 1, 1953. This study was made from a history of x-rays covering the period of 1946 until the present.

It is presumed, at present, that no one should contract asbestosis with less than five years exposure. However, this Company's experience at present is that one person in Stage #1 has been employed only six years and another in Stage #1 has been employed only eight years. Also, in Stage #2 there is one employee with nine years and one employee with 10 years.

COMPANY B

This Company does not report any questionable or borderline cases. There are 363 employees here engaged. The percentage rate in this case is that 5.23% of the average number of employees are affected. Also, the earliest a person contracted asbestosis in Stage #1 was after twelve years of exposure. The year periods run from twelve years to 28 years of exposure.

COMPANY C

This Company reports a total of 125 employees under exposure. Of this number, there are fourteen cases of asbestosis at this plant. These are:

8	Stage #1
4	Stage #2
2	Stage #3

This report shows that 11.2% of the total number of employees exposed were affected. This Company reports one male in Stage #1 with only five years exposure. There is one in Stage #1 with nine years, one in Stage #1 with ten years, one in Stage #2 with five years and one in Stage #2 with nine years of exposure.

Asbestosis Incidence Study

The earliest exposure recorded in Class 3 is eleven years.

COMPANY D

This Company reports a total of 142 employees exposed, showing a total of 11 cases as follows:

5	Stage #1
4	Stage #2
2	Stage #3

A breakdown of these figures show one person classified as Stage #1 with 8½ years of exposure, one person classified as Stage #2 with 8 years of exposure and another person classified as Stage #2 with 4½ years of exposure. Here, we find that the five year minimum was not effective in one case.

The percentage of cases with a total number exposed in this case is 7.75%.

COMPANY E

This Company reports asbestosis incidence for two plants. In plant #1 there are 79 persons exposed. All of these employees are classed as negative. Four of these employees were employed for 23 years.

In plant #2 there are 300 persons under exposure. This plant reports a total of 12 persons in Stage #1, 2 and 3 and 30 cases classified as #A-1, 2 and 3 which are questionable or borderline cases. 4% of the employees exposed are classified as Stage #1, 2 and 3. 10% of the 300 persons exposed are classified as Stage A-1, 2 and 3.

This report shows one person in Stage #1 with six years of service, 2 in Stage #1 with eight years of service, one in Stage #1 with ten years of service and one in Stage #2 with only 2 years of service. Again, we find that the five year minimum was not effective in one case.

A report has been received from M. Jacques Texniere of S.A. Francaise du Ferodo from Paris which forwarded to Dr. Shaw. This report is from a factory physician covering a French asbestos plant which does not run at the present time.

In this report, the physician explains that according to years of exposure involving this plant with 88 employees

Asbestos Incidence Study

0 to 5 yrs.	No percentage of asbestosis
5 to 10 yrs.	4.7%
10 to 15 yrs.	15%
15 to 20 yrs.	23%
20 to 30 yrs.	43.7%
30 & over	50%

In this report are also some statistics published in a paper entitled, "Asbestos" by two French doctors. These statistics, however, were published in the year 1930. These figures show the following:

0 to 4 yrs.	No percentage of asbestosis
5 to 9 yrs.	23%
10 to 14 yrs.	32%
15 to 19 yrs.	53%
20 & over	80%

These figures cover 350 employees exposed. Both sets of these figures have very little significance in our study as the plant is no longer operating and we do not know when they went out of existence. These are the first figures that have been given here. Also, their percentage of cases is much higher than any in the U.S. that we have seen. As far as the second part of this report involving the exposure of 350 workers, the percentage was extremely high and all out of proportion in comparison with our experiences here.

SUMMARY

We find that most of the Companies reporting asbestosis case history studies of their plants in this survey have shown that the five year minimum exposure is correct except in two instances; one in Company D and one in Company E. However, we should agree that with proper pre-hire physicals and x-ray examinations these few cases with less than five years exposure could have been avoided and it is quite possible that in a short time we may be able to say that this disease should not be contracted with less than ten years exposure.

Great!

D. R. Holmes
Asten-Hill Mfg. Co.
Acting Chairman of
AIR HYGIENE COMMITTEE
ASBESTOS TEXTILE INSTITUTE

SURVEY OF DUST COLLECTION EQUIPMENT - ASTEN-HILL MFG. CO. CARD ROOM

The dust collection system can be divided into three phases for discussion:

1. We can consider air supply
2. Air removal from the machines
3. The dust collector

The Card Room includes the blenders, pickers, cards, spinning frames and twisters.

The entire system was engineered in 1949 at which time we built an entirely new plant.

SUPPLY:

We supply to the Card Room a total of 25,000 cfm of conditioned air. This air is cooled in the summer and heated in the winter and held to a maximum relative humidity of 50%. This air has been filtered by a Westinghouse electrostatic precipitron and an American blower spray type air washer. The Card Room is divided into three separate zones, each of which can be controlled by a thermostat. We supply to the Pickers a total of 2800 cfm of air through two 1400 cfm defusers. The Cards are supplied with 8700 cfm through 16 defusers and the Twisters are supplied with 13,500 cfm through 10 defusers. The defuser installation has been successful with the exception that the ceiling lights are surface mounted and sometimes we have difficulty with the blast of air striking the projecting lighting fixtures and blowing down on the operators.

DUST REMOVAL FROM THE MACHINES:

We remove from the Picker section approximately 6900 cfm which is taken through two Picker condensers. We remove from each of six Cards approximately 1800 cfm each. All of this air is removed from the top of the Card through a wood and sheet metal hood system. The hoods over the main cylinders are fairly successful. However, we are now experimenting with changing the shape of the hoods over the aprons, etc. to get better efficiency.

We now remove from 10 of our 11 Twisters about 1000 cfm each through an 8" pipe under each machine. We are, at present, installing the system originated by John Weber. We are making a few modifications to this system and we are pleased with the results as shown on one spinning frame.

We try to exhause more air than we supply to this room so that we have a flow into the room from other areas.

DUST COLLECTER:

Our dust collecter consists of three Pagborne #913 CB-1 cyclones arranged in parallel and are fed by a 42" diameter pipe which collects the dust from all of the aforementioned machines. These cyclones

discharge into a four section CJ-1 Pangborne bag collecter. The bag collecter discharges into a 30" x 30" square manifold which is exhausted by a #397 American blower. This is a backward curved, bladed fan used for clean air. It is driven by a 75 hp motor and operates at 1530 rpm.

We have had to replace the bearings in this blower every year since its installation. We have tried all kinds of bearings including roller, ball, etc. without any improvement. We have had the rotor balanced and have installed a new shaft.

It is my opinion that the bearing trouble is caused by the fan operating at a static pressure beyond its rating which causes hunting. This is further shown by the fact that we hear an occasional rumble in the fan and a decrease in the amperage load. The 30" square duct has collapsed on several occasions due to high static pressures.

The CJ-1 bag collecter operates well from the standpoint of removing the dust from the air but the resistance across the bags is excessively high as can be noted from the table below. These bags are cleaned by periodic shaking at which time the section being rapped is closed off and reverse air is introduced which is supposed to blow the dust from the bags. This was originally supposed to be done by the operators every four hours and was a complete failure because we could never get the operators to conscientiously perform this duty. We have now installed an automatic screen rapping system which operates each section for five minutes on an hour and a half cycle. This bag collecter is cleaned every other week but we have had trouble with the cleaning personnel tearing the bags while attempting to blow off the dust with a compressed air hose and pipe.

We are now awaiting the Pangborne Company's recommendation as to how the high resistance across these bags can be reduced. We fully expect that they will recommend replacing the bags at an expense of approximately $3,000 plus labor.

The CB-1 cyclones operate rather well except when the bag collecter's excessive resistance has reduced the velocity through the inlet pipe at which time we have settling of the heavier dust in the inlet pipe. We have made it a policy to clean these pipes once a week.

SUMMARY OF STATIC HEADINGS IN INCHES OF WATER

	Min. Design Conditions	Present Cond. With Clean Bags	Present Aver. Condition	Cond. where dust will be objectionable
At 397 Blower	10.5	12	12	12
Clean Air Side of Bag Collecter	10	11	11	11
Dirty Air Side of Bag Collecter	7½	4.5	4	3.5
At Cyclone	6	2.4	2.2	2
Manometer	5.8	2.4	2.1	1-3/4

The reading referred to as the manometer reading in this table is a reading where one of the main ducts goes through the floor and gives some idea of the efficiency of the entire system. This manometer, because it is conveniently placed, can be read often and will give an indication of any difficulty before it becomes serious enough to affect the efficiency of the system seriously.

John McCormack
Plant Engineer

Review of Johns-Manville's Experience in the Use of Dust Collection Equipment in the Asbestos Textile Industry.

Johns-Manville Corp. in its earlier experience, like many other manufacturers, of asbestos products, resorted to various types of exhausts that would reduce harmful asbestos dust exposures. Early installations consisted of exhaust hoods, located where the dust appeared to originate, thereafter drawing the dust through suction fans that exhausted either to the atmosphere or to varying types of dust arrestors and dust houses.

The design of dust houses no doubt represented the best thinking of earlier times and were usually the push through type of exhuase; that is, the type where asbestos dust was blown into a dust house against cloth baffles of a loose woven burlap type of material. Apparently earlier designers worked on the theory that the expanded air would drop out the asbestos dust and the supposed uncontaminated air would pass over the top of the baffles and be forced back to the process area through filter cloth where the air returned to the work rooms.

Later research developed facts limiting the maximum allowable concentration in the working area and the pull through system of exhaust was developed which located the fan beyond the filter medium rather than between the exhausted area and the filter medium. More study indicated that direct attached hoods would control the dust more nearly at its point of origin and we learned to limit the volume of air that could be pulled through a known square foot area of filter cloth in order that such air may be free of contaminating dust when it was returned to the working area.

Several years ago Johns-Manville realized that careful engineering was necessary to develop better dust control and organized a section of its Engineering Dept. to design or procure more efficient dust control equipment. Engineering study has given us improvement in dust hood design, graduation of duct diameters, fans more suited to the exhaust of dust and fibre, dust house and screens and bag type collectors that have sufficient filter cloth area to clean the volume of air exhausted.

Exhausting additional volumes of contaminated air from working areas required the installation of equipment to return tempered air in the volume required to keep a proper atmospheric pressure balance. We have installed tempered air make-up equipment and it is our intention to continue this procedure.

Carding Dept. Dust House

The air from our card rooms is exhausted to a large well insulated dust house above the process area where it is filtered through a succession of passages covered on the sides and ceilings with filter cloth. The filtered air passing through clean air chambers is returned through insulated ducts to overhead sections of the card rooms. Dust counts at these return air entrances are below

the maximum allowable concentrations. Cleaning crews vacuum clean the filter cloth each week and all reclaimed fibre is returned to process. Aisle floors in filter chambers are metal plate covered to facilitate the recovery of collected fibre.

A special industrial type vacuum cleaning system was installed to properly clean and maintain the filter cloth areas of the dust house. The aisles in this dust house are well lighted to aid in proper cleaning.

Production changes and improvement now require that the dust house be redesigned and we have divided the total dust house area into four sections depending upon the capacity of 3/4 of the filter area to handle the exhausted air while 1/4 is shut down for cleaning. Where we formerly used a ten man crew for the week's cleaning of the total dust house area we expect one man working continuously on each successive shut down quarter will be able to keep the filter areas clean.

At present the filter cloth area covers 45,000 square feet handling 90,000 cubic feet per minute. The cleaning and maintenance costs total $16,000. We expect the improvement will reduce this cost between 65 and 70%, yearly.

Through experience we have found that dust house filter cloth must be removed at ten year intervals. The material and labor costs of renewal at the last installation in 1949 was $14,000.

The card room dust exhaust is divided into seven independent systems each having its independent fan exhausting into the dust house at floor level. Manometer readings from the dust house indicate the filters function best when 1 to 1½" of water is recorded as the resistance acress the cloth.

Woven Asbestos Products

The department in our Manville plant where we manufacture articles from woven asbestos is exhausted into an envelope bag collector furnished with an automatic timer which shakes the filters for three minute periods after each shut down. This is an American Wheelabrator Company dust collector handling 7,200 CFM and the cost of installation in 1951 was $10,000.

This is a late installation and its yearly maintenance is not in excess of $200. We feel this type of installation does a very satisfactory job and would recommend such installation for similar operations.

Blending and Distribution

In our Fibre Department we have installed a Proctor & Swartz ceiling condensor for bagging fibre and loading trucks for distribution to the Carding Department. This condensor is exhausted to a

DUST COLLECTING EXPERIENCE OF

GENERAL ASBESTOS & RUBBER DIVISION OF RAYBESTOS-MANHATTAN, INC.

BY- RALPH B. SMITH

Fans- From practically the beginning it was proven, to us, that the Type "E" Standard Industrial Fan was best suited to handle our dust. These fans are equipped with the "Long Shaving" Standard Paddle Type Wheels in preference to the "Multi-Vane" Type. This conclusion was drawn from the fact that the "Long Shaving" Wheel is self-cleaning whereas the "Multi-Vane" Wheel had a tendency to clog up, since the fans handle the dust laden air directly.

We use several size fans, but the average has an inlet and outlet diameter of 23". The wheel diameter being 40" and running approximately 850 R.P.M. with static pressures of 3.0" Inlet and 1.5" Outlet. The speed of our dust laden air in our main pipes is from 3,000 ft. per min. for the Card Room to 4,000 ft. per min. for the Preparation Department.

All of our fans are located in the departments in which they are serving. Therefore we consider our systems as "Push Type", since we are actually pushing our dust laden air into the collecting equipment.

DUST COLLECTORS- Our experience with dust collecting dates back some 35 years and a lot of this time it has been sad. The first half of this time was spent trying to make Cyclone Type Collectors work. This type was effective in collecting the dust, but the top outlet would discharge very fine particles of dust to the atmosphere. This would create a problem to the Plant Property and adjoining community. With this problem, much time was spent in the following sequence:

1- A fine water spray was placed on top of the collectors (there were 8 large ones involved approximately 14 ft. in diameter) trying to wet the discharged air and make the dust settle out. This did not prove too practical because of the mess and expense involved.

2- The collectors were discontinued. All of the fan discharge pipes were connected into one large duct. This duct was run into a room and the dust laden air discharged through an atmosphere of steam and water. This also involved a mess and was discontinued.

3- The discharge was left piped into one large duct, but was inserted in to tunnels that were constructed of burlap. This worked very well, however was not the final answer yet, as the amount of air was too great for the amount of burlap.

4- It was next decided to expand on the idea of the burlap covered tunnels. To do this, a Sheet Metal Building was constructed 60 ft. wide x 160 ft. long x 22 ft. high. Into this building nine burlap tunnels were built. These tunnels were 150 ft. long and backed up to an axisting brick building having 1900 sq. ft. floor area and ceiling height of 26ft. This brick building was used as a Settling Chamber with the dust laden air entering directly into it. This air then passed through holes in the brick wall into the 9 burlap tunnels and filtered out through the pores in the burlap. This arrangement would leave the longer heavier fibers in the Settling Chamber, with the rest dropping out through the entire length of the nine tunnels and collecting on the inside of the burlap. This system would require a crew of 7 men from midnight to six o'clock in the morning every day "Beating Down" the burlap and entering each tunnel to shovel up the dust and fibers from the floor. This system was costly to clean and also subjected the cleaners to dusty working conditions.

5- In January 1953 we discontinued the above described dust tunnels and began operating our two new collecting units purchased from American Wheelabrator & Equipment Corporation. This installation was accomplished by removing 4 of our burlap tunnels from the above Sheet Metal Building. These 4 tunnels occupied a space of approximately 20 ft. x 160 ft. long. In this area we erected our two Wheelabrator Units. One unit was purchased to handle our Preparation Department Air and the other to handle the Card Room Air. Both of these units are on the discharge end of the fans, the same as the burlap covered tunnels were. These two units are as follows:

PREPARATION DEPARTMENT: Handles all dust laden air from this department. It is 15 feet wide x 36 feet long x 22 feet high. Has 736 Cotton Sateen Dustubes 8" diameter x 138" long. Handles 56,200 c.f.m. of air with a ratio of 3.21 per sq. ft. of cloth. Has a total cloth area of 16,928 sq. ft., with an average static pressure at the unit of 1.60" W.G. before shaking and 1.10" W.G. after shaking.

CARD ROOM: Handles all dust laden air from the cards in this department. This unit is 15 feet wide x 56 feet long x 22 feet high. Has 1152 Cotton Sateen Dustubes 8" diameter x 138" long. Handles 93,053 c.f.m. of air with a ratio of 3.50 c.f.m. per sq. ft. of cloth. Has a total cloth area of 26,496 sq. ft., with an average static pressure at the unit of 2.00" W.G. before shaking and 1.00" W.G. after shaking.

These dustubes are supported from the top by automatic shakers and on the bottom are inserted in cell plates. Directly under these cell plates are two hoppers with a Screw Conveyor mounted in the bottom of each hopper. The dust laden air enters into the side of the hoppers, where the longer fibers fall directly out of the air stream into the Screw Conveyor and are conveyed

out. The dust remains in the air stream and is carried up into the dustubes. As the air escapes through the cloth tubes, the dust is deposited on the inside. At the end of 8 hours for the Preparation Unit and 16 hours for the Card Room Unit the fans are stopped and the shaker motors turned on. This shaking of the tubes causes the accumulated dust and dirt to break loose and drop into the Screw Conveyors. This residue is then conveyed out for disposal. This system produces two separate grades of dust. One that is falling all day long and the other that is conveyed out during the 15 minute shaking cycle. The entire operation is conducted in a dust free atmosphere now and with only 4 men.

NOTE: The above described involves only the Preparation Department and Card Room. We have a Kleissler bag type collector for our Brake Bank Department, a large burlap screen house for the Weave Room, a Cyclone type collector for our Winding Department, a Wet Roto-Clone and Pangborn collector for our Rubber Department. From this, it can be realized that we have a large investment in dust collecting equipment.

R E P O R T

Conclusion of a factory physician from X-Ray Reports of workers in an asbestos manufacturing plant which is not working at the present time.

The x-ray exam of 88 employees, male and female, of the plant shows interesting facts on the frequency of asbestosis and the x-ray clinical findings of this workmens' disease.

For the purpose of utmost accuracy, I have excluded from these 88 employees 8 who have not worked permanently in the manufacturing depts.; boilermem, masons, carpenters, etc.

Among the 80 workers, 15 have asbestosis to a more or less marked degree, i.e., 18.7% that are subdivided as follows:

1. <u>According to Age</u>

15 to 20 yrs	2 workers	0 asbestosis
20 to 25 yrs	3 "	0 "
25 to 30 yrs	7 "	0 "
30 to 35 yrs	11 "	1 "
35 to 40 yrs	13 "	3 "
40 to 45 yrs	12 "	1 "
45 to 50 yrs.	14 "	5 "
50 to 60 yrs.	14 "	4 "
60 to 70 yrs	3 "	1 "
70 & over	1 "	0 "

2. <u>According to Seniority</u>

0 to 5 yrs	8 workers	0 asbestosis	
5 to 10 yrs	21 "	1 "	4.7%
10 to 15 yrs	20 "	3 "	15 %
15 to 20 yrs	13 "	3 "	23 %
20 to 30 yrs	16 "	7 "	43.7%
30 & over	2 "	1 "	50 %

3. <u>According to Departments</u>

6 Weavers
2 Braiders
1 Caneteuse (?)
5 Spinners
1 Carder

There were five men & 10 women out of a total of 34 men and 46 women.

The most interesting statistics refer to the seniority of the worker. The number of asbestosis cases increases with seniority.

The figures that I have found are comparable with the statistics published in the paper "Asbestos" of the l'Encyclopedie Medico-Chirurgicale fascicule No 6018 C.10 paper of Prof. Luton and Dr. Chamieix of the Medical School in Clermont-Ferrand and published in 1951. The statistics in this paper and due to two Englishmen published in 1930:

0 to 4 yrs.	of presence	0% asbestosis
5 to 9 "	" "	23% "
10 to 14 "	" "	32% "
15 to 19 "	" "	53% "
20 & over	" "	80% "

These figures refer to 350 workers.

In addition to these 15 cases of asbestosis, I have found with some workers unusual shadows of the lung which are subdivided as follows:

Lung TB in an early stage with a worker 49 yrs. old and employed for 32 yrs. There is a little cavity on the top of the left lung. The lungs of this man do not show any shadows that would indicate asbestosis. With 13 others, a minimum effect of cancer (d'inoculation) incurred during childhood or from pleurisy had no adverse affects on the general physical condition. I have not found among these workers x-rays which would indicate an association of asbestosis and TB.

Asbestosis is a frequent workmens' disease hitting 18.7% of a group of 80 workers. It is an unusual disease. The x-rays are quite unusual and different from other diseases which are caused by dust (coal & silicoses) or by infection of diversified microbes. It seems to me that the disease hits exclusively the lower inner section of the pulmonary bases mainly at the right side (the right inner bronchi is the direct prolongment of the trachea). At this time an enlargement of the normal broncho vascular shadow is characteristic. They are light, small, very fine (criss-cross) and at times look like masses of star-like formations. The most inner part of the diaphragmatic dome at the right side becomes soft. Then, one perceives on the cliches showing the lungs more seriously affected, these shadows gain more in space and in tensity and occupy the inner middle half of the lungs as well as the upper half and the tops. These shadows have, at this moment, an unusual shape like splintered glass whose fragments are increasingly lying closer together. At this stage, one notes an immobilization of the diaphragm and an increase in the shape of the heart. At this time, I want to stress one particular angle in the x-ray technique. The x-rays should be preferably taken when the patient breathes in. It is necessary that the photographic paper be 60" x 72" for the purpose of greater clarity.

Fluoroscopes do not catch the very supply shadows and it is of utmost importance to diagnose this disease at an early stage.

Systematic x-ray examination is the only way to determine the beginning of asbestosis; asbestosis being a very insidious disease which for years does not cause any functional troubles and does not respond to stethoscopic examination.

EXAMPLE:

Worker A. 45 yrs. old, employed 22 yrs., has never had a disease of the lungs

Worker B. 52 yrs. old, employed 23 yrs., has never had a disease of the lungs.

Worker C. 34 yrs. old, employed 19 yrs., has never had a disease of the lung.

Worker D. 40 yrs. old, employed 11 yrs., has never had a disease of the lung.

The first symptoms of this disease is the dyspnea showing up under strain and increasing slowly. As soon as the worker has difficulty breathing, it is normal that the aggravation advances faster. Nasal respiration becomes insufficient at certain times. The worker has to breathe through the nose and mouth at times; the air is not filtered by the nasal passages. The dust particles penetrate in greater numbers to the base of the small bronchi and to the avelia of the lungs and furthermore, these patients become more susceptible to infections of the larynx, the trachea and the bronchi.

The disease takes an insidious beginning, requiring 10 to 15 yrs. to become evident. It can only be diagnosed by means of systematically x-raying workers who have worked 10 yrs in the asbestos plant.

The use of a dust mask or a respirator should reduce the feequency of asbestosis to a considerable extent.

Another point that needs stressing; physical condition at the hiring date and close examination of the breathing through the nose.

February 13, 1952

J. Tesniere
S.A. Francaise du Ferodo
64 Avenue de la Grande Armee
Paris, France

settling chamber over our fibre bins but we propose to improve this method of exhaust with the intention of eliminating fibre escape to atmosphere due to excessive pressure. A cylindrical bag type dust collector would best solve this problem. Installation cost in 1946 was $2,400. Our overall maintenance costs on this ceiling condensor do not exceed $200. yearly.

Spinning Department

The dust control in our Spinning Department is by way of overhead hoods exhausting through an American Air Filter Company's cycle operated paper filter. This is a new installation and should be called a part of our research and development work in dust collection. Estimates originally indicated that the maintenance costs of this equipment would total $1,000 yearly but its few months of operation has indicated this estimate will be doubled if we are unable to improve its operation.

The installation cost of the American Air Filter collector, including weather proof housing will, when completed, amount to $10,500. Perhaps in the future we will be able to give a more satisfactory account of the operation of this equipment but at this time we are not ready to recommend this type of installation to others.

Weaving Department.

In our Weaving Department we are using one old type CC Pangborn collector handling 20,000 cubic feet of air per minute and an envelope Sly collector handling 20,000 cubic feet of air per minute. The Pangborn collector has filter cloth envelopes mounted on wood frames and is hand cleaned into a dust house enclosure below the collector. The Sly collector has the filter cloth envelopes mounted on wire frames and has an automatic timing device shaking the filters through three minute intervals after each shut down. Fibre is bagged off below the hopper valves in each cleaning period. Both the Pangborn and the Sly collector are cleaned on an average of six times yearly depending upon production. These collectors have not required more than seven cleanings yearly. The yearly cost of maintaining both these collectors totals $200. We have applied exhausts at our cloth inspection tables in the Weave Room and this installation has helped greatly in controlling what would be a very dusty operation. If any members of the Institute are interested in drawings of this installation I would be glad to comply with a written request. Installation costs would be of no value at this time since these systems were installed over ten years ago.

From our experience we believe that cylindrical bag collectors of the Parsons type are more satisfactory than the envelope type for collecting asbestos fibres. This experience is based on the following:

1. Fibrous materials arch easily between envelope bag type collectors and the type of shaking mechanism does not dislodge all the fibre making it necessary to poke out fibres and run the risk of puncturing the filters.

2. The cylindrical bag type of collector with a classifying chamber below the filter bags permits the heavy particles to fall into the hoppers and the light dust to rise into the filter bags.

3. The shaking mechanism of most cylindrical bag collectors successfully shake out any fibres collected and permit the operation of this filter medium over a period four times that of the envelope bag collector.

We prefer the round bag to the oval bag due to the fact that a ball of fibre may form in the upper section of a filter bag and not readily drop through an oval metal opening in the bottom where the bag is attached.

I have given you our earlier experiences with dust collection equipment in our Textile Department and have brought you up to date on our recent installations including capacities, types, installation costs, maintenance costs and operating practices.

Efficiency

In evaluating the efficiency of any dust collecting systems, the cleaning and maintenance costs would be one of the selling factors but it is necessary to make regular dust counts in all operating areas and prepare analysis of dust and fibre contents. Increased production, lack of proper maintenance or broken filters can change the efficient operation of any dust control system that may, under proper operating conditions, keep the working atmosphere below the maximum allowable concentration.

It is important too to have employee periodical Medical Examination and also that reports of x-ray findings be made available. In the last analysis the efficiency of any dust control system is best indicated by the fact that s-ray indicate no progress in any indicated case of pneumonoconiosis.

Because I believe it is the intention of the Asbestos Textile Institute to convey to its members any information which will preserve the health of employees I am willing, if I have the answer, to comply with requests for information beyond that which I have given you.

Bdnj. F. Stanton
Sup'r. of Safety
Johns-Manville Corp.
Manville, N. J.