Research & Engineering Center
February 7, 1966

J. A. Vermeulen

cc: A. C. Smith - (2)
J. Goldfield - (15)

REPORT OF TRIP TO TURNER BROS.
ASBESTOS CO., LTD.
REPORT NO. 1 OF 2
GENERAL AND HEALTH PROBLEMS

General

Turner Bros. is a company employing 5,000 people in several plants, the largest being in Rochdale and the Hendley-Green plant about twenty miles away. They manufacture asbestos textiles, sheeter materials, asbestos fabrics for brake lining and clutch facings, rubber rings, conveyor belting, V-belts, and fibre glass rovings which they weave into a cloth. The size of their operation may be appreciated from the fact that at Rochdale I saw a textile operation with 103 cards producing 70-90 lbs. per hour of yarn each. They had four fibre preparation systems each with a capacity of 3,000 lbs. per hour.

At Hendley-Green, the building, in which rubber rings and conveyor belts are made, has a floor area of 500,000 sq. ft.

The Turner Bros. company is a part of the Turner-Newall group, which employs 40,000 people, has yearly sales of about $300,000,000 and profits of about $22,000,000.

I spent a full week visiting at Rochdale and Hendley-Green. A program was prepared for my visit and faithfully followed. It is appended to the report as Enclosure 1. Enclosure 2 shows a list of some of the people whom I met and with whom I discussed numerous subjects of common interest.

In the interest of clarity, I have divided my report into two parts, this one on health problems and a second on production facilities.

Background of English Health Activities

Health activities in English asbestos factories date from 1931 when the Asbestos Industry Regulations were formulated. These regulations were spurred by a report issued in 1930 by Dr. Merewether, which showed that 80.9% of workers with 20 years or more service in the asbestos industries

showed evidence of fibrosis. These figures are publicized by men in the industry together with figures that show a reduction to an incidence of 3% for employees starting after 1933.

The measures for controlling dust have been effective but not wholly so.

Health Committee

The health problems at Turner Bros. are supervised and monitored by a rather high level committee composed of the following personnel:

Mr. Hill, Managing Director of Turner Bros. reporting to Mr. Waddell; Mr. Hill is Chairman of the Health Committee.

Mr. Pierce, Director of Turner Bros., Production Manager in charge of the two plants.

Dr. Knox, Medical

Dr. Kearns, Medical

Mr. Rhodes, Rochdale Works Manager

Mr. Jackson, Hendley-Green Works Manager

Mr. Arnold, Central Personnel

Mr. Bamblin, Manager, Engineering Design

This committee meets about once every two months and focuses attention on the most important health problems. A meeting may be carried to the floor of the plant to investigate particular health problems.

Asbestosis Research Council

The asbestos manufacturers in England, especially Turner Bros., Cape Asbestos, and British Belting have established a joint council that permits exchange of health information and conducts joint research activities on health problems.

Role of the Doctor

Dr. Knox takes an aggressive role in the health program. His primary function is to give examinations and examine chest X-rays. He has the advantage that every asbestos worker who dies is autopsied. Fairly complete records are therefore being compiled on medical evidence found during autopsies and their relation to dust exposure.

He is convinced that there is a correlation between exposure to asbestos fibre - especially crocidolite and lung cancer.

He also goes into the plant and insists that bad conditions be corrected.

Dust Counting

The dust counting activities of Turner Bros. are outlined in two reports that I brought back - "Developments in Dust Sampling and Counting Techniques in the Asbestos Industry" by S. Holmes and "Asbestos Dust and Its Measurements" by C. G. Addingley.

The dust counting activities of Turner Bros. are on a much higher technical level than ours. Dr. S. Holmes, in charge of their Physics Research section, supervises these activities. They had used the Thermal Precipitator method for many years. In recent years they have developed a new method using membrane filters to catch samples. They count under a microscope, counting only fibres. A complete description of this method of dust counting is available in the reports mentioned above.

For very rapid, almost instantaneous monitoring, they are using a Royco instrument which is a sophisticated, electronic machine using scattered light to detect dust particles. This instrument can be used for day-to-day monitoring to insure that conditions do not deteriorate and to quickly check the efficiency of dust control changes. The instrument is worth $7-$10,000.

The dust counting done by Research insures that a constant check is made on the method used and constant attempts to improve and correlate with physiological data carried on.

They take a dim view of our use of the Greenburg-Smith impinger method of sampling, although I believe that the relative results obtained can be almost as useful as those obtained with their more accurate method. There is an advantage to carrying on one type of technique over long periods of time. We don't have the problem of getting correlations among various test methods.

There is an important difference in philosophy between the use made by Turner Bros. and Johns-Manville of the results of dust counts.

We use the results of the Greenburg-Smith impinger counts to determine whether we are above or below an arbitrary limit of 5,000,000 particles per cubic foot or 1,000,000 fibres per cubic foot. The English make the point that we have no basis for these limits. No one knows the lower limit of concentrations that will cause lung damage. They use their counts to determine that controls are remaining effective and to pick out the areas of worst exposure which they then concentrate on trying to improve even though the counts are well below the limits as might be set by us.

Methods Used to Control Dust

Housekeeping

The housekeeping in the textile plants is very good. Fibre is handled in closed containers only. There are no accumulations of fibre anywhere in the plant. There is very little evidence of air-borne asbestos dust.

Fibre Warehousing

Much of the fibre they use comes from Southern Rhodesia - non-pressure packed and in jute bags. They have recently determined that some of their worst counts are in the warehouse area and they don't know what to do about it.

Fibre Preparation

At Rochdale, there are four fibre preparation systems - each of 3,000 lbs. per hour capacity. A man places a bag on a turntable which is in a ventilated enclosure. He slits the bag on three sides and empties the bag onto an enclosed belt. When a batch of 1900 lbs. is made up, the contents of the belt are dropped into a completely enclosed mixer. Four (4) percent of a 50-50 solution of oil and water are added to the fibre through sprays in the shaft of the mixer. The spray must be added very uniformly.

Mixing is complete in about 30 minutes. The contents of the mixer are dropped into a live bottom bin of a different type than that with which we are familiar. From the bin a Redler conveyor carries the fibre to a Canadian type fibre willow and from there to a cyclone feeding four rotary screens. The prepared fibre is bagged in nylon-reinforced polyethylene bags with zippers.

It must be stressed that from the time the bag of fibre is slit to the time it is bagged, in an enclosed, well-designed bagging machine, the fibre does not see the light of day.

Cards

The asbestos fibre is brought to the cards in the enclosed, zippered bags. At the Hamilay-Green factory they have installed a Redler conveyor system which will be described in a second report. This system can supply one blend to any of the 40 cards in that plant. The system was not as automatic as had been hoped and causes many maintenance problems. In addition, it can only carry one blend whereas a textile plant may use five, six or even more blends. Work is still continuing on developing this method.

The bags are emptied into feeders at the cards. There is only a 3 inch diameter dust pipe connected to the feed hopper. The volume is inadequate to control dust when the feed hopper is opened for charging.

The enclosures on the breaker and finisher cards look similar to those in our plants. Both cards are in a line instead of side-by-side as in our plants.

In addition to the dust pipe on the feed hopper, there is a 3 inch pipe above the feed lattice, a second at the entrance to the feed roller, a 4 inch over the breaker cylinder and a 4 inch at the exit from the breaker cylinders. The finisher card has a 5 inch pipe above the finisher cylinder, a 3 inch at the finisher doffer and a 4 inch below the finisher cylinder.

The dust ducts look similar to those on our cards.

Cleaning under the cards is done by a higher than normal velocity dust system. However, this method is not considered satisfactory and they were very interested in our experience with high pressure vacuum cleaning systems. They are also investigating a scraper conveyor developed by Whitin, a U.S. textile machinery manufacturer, to continually remove fly from under the cards.

At Hindley-Green, they definitely do not reuse the fly and the bag collector products in the blends for the textile operations. I got mixed replies to this question at Rochdale. I am inclined to believe that they do not reuse waste products.

Spinning and Doubling (Twisting)

The machines used for twisting and spinning are flyer frames. They are older types of machines than our ring frames. They have not been replaced because Turner Bros. cannot prove a financial pay-off. At Rochdale, I saw a few ring frame machines which were used for the finer cut yarns.

The flyer frames used for spinning had no methods of dust control on them. At this stage the yarn cannot be wetted. The oil added to the fibre in the mixers was the only dust suppressant used. All flyer frames used for twisting were equipped with means of wetting the yarn with water. The mechanism was simply a roll moving at a speed slower than the yarn. The roll dipped into a shallow trough in which a water level was maintained by means of a "chicken feeder".

There were a few ring frames used for finer cut yarns. These machines had enclosures on the spindles and some ventilation. They also had "Yarnmiser" systems for catching loose yarns on the ring frame machines.

Each home-made bag collector has about 3,000 sq. ft. of cloth and handles 13,000 to 15,000 CFM. With the fan, the collector costs $12,000. The bags are about 10 inches in diameter and about 10-12 feet long. They are arranged in two rows, each row having a group of three. Each group of three is connected together with a yoke on top. The yoke has a cable running over a pair of pulleys and a weight at the end. Shaking is accomplished by lifting and dropping the weights.

The collectors are about 8 ft. wide by 36 ft. long. There are two hoppers underneath with a series of polyethylene bags connected to the hoppers for catching the collected dust. To remove dust, the collector must be shut down and about 20 bags removed and replaced.

Hundreds of thousands of CFM of dust control air is handled by systems of the type described.

Air Make-Up

The government authorities will not permit recirculation of air from the bag collectors, the bag collector galleries are extremely clean. Dust counts show lower values than outdoors.

They have extensive heated air make-up systems to make-up the exhaust air and keep the plant under positive pressure.

They were very interested in my explanation of successful attempts at Manville and Toronto to recirculate air from bag collectors over the objections and finally with the approval of state and provincial authorities.

J. Goldfield

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<u>Enclosure 1</u>

KHD/EOe
GEN 330
Copies: JW/KMP/RAM/HVP/RAJ/HR/DS/MS/RS/AF/TB/HH/TF/JFK/WK

14th January, 1966.

<u>Programme for Mr. Goldfield from JM Inc.</u>

<u>Monday, 17th January, 1966.</u>

		<u>Lunch</u>
9.00 a.m. to 9.30 a.m.	Directors. (Mr. R. H. Pearce)	
9.30 a.m. to 12.30 a.m.	Discussion with Mr. N. V. Fostereff Mr. W. F. Hamblin and other members of R.D.D. Staff	
		Dr. S.H. WPB
2.00 p.m. to 3.30 p.m.	Discussion with Dr. S. Holmes	
3.30 p.m. to 4.30 p.m.	Tour of Physics Research Dept.	

<u>Tuesday, 18th January, 1966.</u>

9.00 a.m. to 9.15 a.m.	Introduction to Mr. N. Rhodes	
9.15 a.m. to 11.00 a.m.	Tour of Weaving and Plaiting areas including sleeve filter galleries.	
11.00 a.m. to 12.00 a.m.	Discussion with Mr. A. Foster	
2.00 p.m. to 3.45 p.m.	Tour of Carding and Spinning Dept. including opening plant but <u>NOT</u> C.M. Units	R.S. A.F.
3.45 p.m. to 4.45 p.m.	Discussion with Mr. R. Spencer	

<u>Wednesday, 19th January, 1966.</u>

9.00 a.m. to 10.00 a.m.	Discussion with Mr. G. Chadwick	
10.00 a.m. to 12.00 a.m.	Discussion with Dr. Knox and Dr. Kearns, including tour of Medical Centre	Dr. Knox T.B.
2.00 p.m. to 3.00 p.m.	Tour of Fibre Receiving areas	
3.00 p.m. to 3.45 p.m.	Discussion with Mr. T. Berry	
3.45 p.m. to 4.30 p.m.	Discussion with Mr. N. Rhodes	

Thursday, 20th January, 1966.

10.00 a.m. to 10.15 a.m.	Introduction to Mr. R. A. Jackson	
10.15 a.m. to 11.30 a.m.	Tour of Asbestos Textile areas but excluding opening plant and C.M. units	
11.30 a.m. to 12.30 a.m.	Discussion with Mr. Howell	RAJ [illegible] CEC
2.00 p.m. to 3.00 p.m.	Discussion with Mr. Jackson	
3.00 p.m. to 3.45 p.m.	Return to Rochdale	
3.45 p.m.	Writing up notes	

Friday, 21st January, 1966.

9.00 a.m. to 12.30 p.m.	Discussion with Mr. Rushlin and other members of R.B.D. Staff and return to specific areas is required.	[illegible] Mr. [illegible]
2.00 p.m. to 3.00 p.m.	Discussion with Dr. Holmes	
3.00 p.m.	Chairman and Directors	

NOTE: Lunches have been booked for 17th, 18th, 19th and 21st January at Rochdale in the Small Dining Room for visitors. During Monday and Tuesday, Mr. Rushlin will be responsible for conducting Mr. Goldfield to the various departments for tours and discussions. During Wednesday and Thursday Mr. T. Forth of R.B.D. will perform this function.

Enclosure 2

Some of the people whom I met and with whom I held discussions:

Mr. John Waddell, Chairman of the Board of Directors of Turner Bros.

Mr. R. H. Pearce, member Board of Directors. In charge of both Rochdale and Hundley-Green plants.

Mr. W. P. Hamblin, Manager of Engineering Design. My host for the week.

Mr. N. V. Pasteroff, Chief Engineer.

Dr. S. Holmes, Chief of Physics Research Dept.

Mr. S. Chadwick, in charge of personnel.

Dr. Knox, retired medical man, consultant, many years handling medical problems for Turner Bros.

Mr. H. Rhodes, Rochdale works manager.

Mr. R. A. Jackson, Hundley-Green works manager.

Mr. A. Foster, Rochdale Weaving and Plaiting.

Mr. B. Spencer, Carding and Spinning.

Mr. T. Barry, Fibre Warehousing.

Mr. Tom Forth, Engineering.