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AIR FLOW SURVEY AT COLONIAL MINE  
AUSTRALIAN BLUE ASBESTOS LTD., WITTENOOM

on 17-19th November, 1964.

During the 17, 18 and 19th November 1964, an air flow survey of the underground workings of the Colonial Mine, Wittenoom was carried out by members of this Department.

The results of this survey, together with my observations are recorded below.

The effective intake into the underground workings consists of 36,000 cunins being drawn into the main adit under the influence of 2 x 60" Richardson axial flow fans, working in parallel.

The object of this is to draw the air down the main adit to the Nos. 5, 6, 7, 8 and 9 service rises where it is upcast to the main levels and thence up into the Nos. 6, 7 and 8 level stops before being exhausted thru' either of the two exhaust fans, one of which is installed in 548 and the other at 615B.

Ventilation doors are installed in all the turnouts off the main adit, to the No. 5 level turnout, to prevent air being drawn off at these points. However, due to ineffective sealing of the doors, there is some leakage at these points.

No. 5 level

Intake to the No. 5 level off the Main Adit consists of 4,800 cunins. This flow is upcast to the upper seam workings thru' the Nos. 50, 518 and 528 Manways. There is also a volume of approximately 3,000 cunins enters the No. 5 level thru' the door in the No. 3 adit below the No. 4 level. This is drawn in thru' the No. 4 level adit and is upcast to the upper seam workings at thru' No. 528 M/way.

No. 6 level

The intake into this level consists of 14,500 cunins upcast from the main adit, plus 3,000 cunins downcast from the upper seam workings thru' the 618 - 618 M/ways. Both of these volumes are induced under the influence of a 16" E.P. situated at the top of the No. 6 level Service Rise. All of this air is upcast to the upper seam workings thru' the North and North West Manways.

There is also 3,000 cunins of air downcasting thru' the No. 658 manway to No. 6 level which flows south under the influence of the Main Exhaust Fans. This is increased to approximately 10,000 cunins by further downcasting thru' the Nos. 688, 698 and 6108 manways and is drawn thru' the two ventilation doors, in the 6118 area to the main exhaust fans.

No. 7 level

The amount of air entering the No. 7 level consists of 10,000 cunins upcast thru the service rise from the main adit, plus 1,000 cunins downcast thru the 718 manway and 2000 cunins downcast thru the No. 70 Manway from the upper seam workings. This flow again passes North and is dispersed upwards thru the North and North West Manways into the upper seam workings.

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There is also a downcast flow of 9,000 cunins from the 73S and 74S manways which goes west down the No. 3 adit and joins the flow to the main exhaust fans from No. 8 level.

#### No. 8 level

A volume of 4,000 cunins is upcasted from the main adit thru' the service rise, this is joined by a flow of 2,000 cunins coming up the No. 6 adit from No. 9 level and the combined volume of 6,000 cunins flows south to the No. 3 adit being added to by a strong downcast flow of 3,000 cunins from the 81S manway and 2,000 cunins from the 82S manway making a total of 11-12,000 cunins at the junction of the No. 3 adit where it joins a flow of 3,500 cunins coming up the No. 3 adit from 9 level.

At this juncture there is approximately 30,35,000 cunins flow south along 8 level towards No. 5 adit, and this total is made up from the following :-

Entering No. 8 level via No. 3 adit from 7 level  
 = 10,000 cunins.  
 " No. 8 " " No. 3 " from 9 level  
 = 4,000 cunins.  
 South along 8 level from north of No. 3 adit  
 = 12,000 cunins.  
 Downcast to 8 level from 83S manway = 6,000 cunins.

Approx. = 32,000 cunins.

The flow along No. 8 level is also boosted up by the time it reaches No. 5 adit by further downcasting from the upper seam workings thru' No. 81S manway (approx. 13,000 cunins) and No. 82S manway (7,000 cunins). This flow is then exhausted up the No. 5 adit to No. 7 level where it is joined by a further flow of approximately 8,000 cunins, which is leaking thru' the ventilation doors on 7 level. There is also a very strong leakage downcast to the No. 7 level thru' the Nos. 76S and 78S manways and the airflow entering the adit at 79S on 7 level has been built up from approximately 60,000 cunins to approximately 90,000 cunins. At the junction with No. 6 level, the main flow is joined by a strong leakage thru' the ventilation doors on No. 6 level and then the flow is split under the influence of the two main exhaust fans.

60,000 cunins are exhausted to the surface thru' the 60" Richardson axial flow fan situated at 94S on 5 level, whilst the remaining 35,000 cunins is exhausted south along No. 6 level thru' the 60" Richardson axial flow fan situated in the south drive. The flow along 6 level builds up to approximately 42,000 cunins by the time it reaches the fan due to further downcasting thru' the brattices on the manways in the 6 level south drive. There is also a recirculation of some 11,000 cunins thru' the exhaust fan due to the leakage thru' the brattice in the drive alongside the fan, making a total fan output of approximately 53,000 cunins.

#### Results and Conclusions:

The results of this airflow show that there is a considerable amount of short-circuiting of air through the two exhaust fans. The measured volume of air entering the mine, and hence ventilating the workings, is 36,000 cunins.

Whereas the total volume of air measured as passing thru' the two exhaust fans is 101,000 cunins, made up from -

- (a) -  
 1st thru' fan at 94S = 60,000 cunins.  
 2nd thru' fan at  
 1st South Drive = 53,000 cunins.

This short-circuited air enters the upper seam workings from the openings to the cliff face at the Nos. 1, 2 and 3 levels, where it can be seen that the brattices, which were previously in position in those sections, have since been blown out. There is also a possible entry point near section 12K.

The air entering from the cliff face moves down through the old upper seam workings to the Nos. 5 and 7 levels and flows directly to the two exhaust fans, ventilating very few of the current working places enroute. On an effective basis therefore, it can easily be seen that if the measured volume of the two exhaust fans is 103,000 cums, whilst the measured intake thru' the main edit is only 36,000 cums, the exhaust fans are theoretically working with an efficiency of only 35% effective airflow, based on the fact that the only effective airflow is that which is ventilating the workings via the main edit.

To overcome this and to increase the intake thru' the main edit it will first be necessary to effectively seal off all openings around the cliff face caused by the recent cave in. To date a programme of bratticing in the old workings and installation of ventilation doors on the levels has been carried out, but the pressures exerted on these brattices and doors by the airflows entering the old workings has nullified this programme to a great extent. During the course of our airflow survey, we measured volumes of up to 10,000 cums passing thru' these ventilation doors, and also volumes of up to 3-4,000 cums, leaking thru' some of the brattices. If the cliff face could be bratticed off then the brattices and doors already installed should be capable of doing the job they were intended for.

It was also apparent, from our survey, that the primary airflow must be altered to improve the flow thru' the northern sections of the mine.

#### Recommendations:

- (1) Openings to cliff faces to be effectively sealed. This might require timber or concrete bulks.
- (2) Ventilation door in the No. 3 edit, just above No. 5 level, should be re-hinged so that the door opens upwards on the top side of the doorway.
- (3) Compressed air-cylinder control jacks to be installed on ventilation doors on No. 6 level to facilitate correct opening and closing of doors by truckers.
- (4) All ventilation doors and brattices already in position to be reconditioned and rescaled.
- (5) Large fan to be installed on north side of mine workings, preferably on No. 8, or when more stoges are connected between the No. 8 level and No. 9 level, on No. 9 level, to increase the volume of air being distributed throughout this section of the workings.
- (6) Consideration be given to the construction of a ventilation shaft to coast between the No. 8 - No. 9 levels and just outside the northern ore limits. This shaft is going to be essential in the future when the mine is deepened down towards Nos. 10 and 11 levels. Ventilation connections can be made to this shaft from the stop seams with small drives at necessary intervals, and also from the levels themselves.

It can be expected that the section of the mine above 7 level will be worked out within a few years and there is also the possibility of further collapses to be considered in the area of No. 6 level, therefore it would be advisable to start planning such a ventilation shaft immediately.

Under the present primary airflow system, there is an insufficient volume of air ventilating the northern section of the workings and with both exhaust fans so closely positioned to each other in the south section of the mine, the primary airflow is tending to be unbalanced. Therefore, that is why I consider that the immediate installation of a 3rd primary air fan in the northern section, followed at a later stage by the construction of a new ventilation shaft, is necessary.

This would provide a very simple layout for two possible primary airflows. The main intake down the main edit, being drawn off from the lower sections of the workings and two exhaust airways one in the south and one in the north.

A fan, similar in size to the type already installed at 54S and 6 level south drive, would be sufficient for the new installation.

SPECIAL INSPECTOR OF MINES.

(Ventilation)

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Forwarded for your information.

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