Department of Mineral Resources
New South Wales

Coal Mining Inspectorate and Engineering Branch

INSPECTION SURVEY OF CONVEYOR SYSTEMS IN UNDERGROUND COAL MINES

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CONTENTS

1. INTRODUCTION

At the meeting of the Coal Mines Safety Advisory Committee held on 31 January, 1991 the Chief Inspector of Coal Mines requested that through my direction, a detailed inspection of all conveyor systems in underground coal mines be carried out. The inspection's were to be conducted by the District Inspectors of Mechanical Engineering.

The purpose of the detailed inspection survey was to measure the safety performance of each individual mine coal conveying system compared to an ideal industry standard developed by the Mechanical Engineering Inspectorate.

2. BACKGROUND

The Coal Mines Inspectorate has always viewed the occurrence of any fire in an underground coal mines as serious for its potential to develop into a major conflagration. This is especially important in relation to conveyor systems as basically they are unattended. Considerable effort has been made to reduce the potential for a major fire to occur by the imposition of stringent requirements for conveyor belting to be manufactured from fire resistant and anti-static material.

Inspectors of Mechanical Engineering in particular have endeavoured over the past 10 years to pursue the elimination of fires related to mechanical apparatus through the implementation of engineering solutions. A specific example of this is the virtual elimination of fires caused by electric shuttle car open disc traction brakes through the installation of oil immersed wet disc brakes. Industry safety has been enhanced with the elimination of shuttle car brake fires with up to 50 such fires occurring annually in the early 1980's.

As a continuum of this concern circular letters were issued in November, 1989 and January, 1991 to advise industry of the statistics pertaining to fires reportable under the Coal Mines Regulation Act which had occurred on conveyors. These circulars included the number and location of fires and are attached as Appendices I and II. This information was considered to be crucial in assisting mine management to improve the safety performance of their conveyor systems. For example the statistical review concluded that almost 50% of the conveyor fires were attributed to idler failure and that the majority of these failures were with return idlers.

During 1991 the rate at which fires were occurring as compared to previous years continued to escalate. It was concluded that the circular letters had not been as effective as anticipated in increasing the awareness of conveyor safety at all mines. The introduction of the seven(7) day working week had occurred during this period and it was considered that the operational changes resulting from the various roster systems could be contributing to a deteriorating safety performance.

3. CONVEYOR SURVEY METHODOLOGY

Prior to commencing the physical inspection of the underground coal mine conveyor systems it was considered necessary to develop an appropriate methodology to ensure that the project was conducted in an efficacious manner.

All underground mines were to be included in the inspection program with the exception of Huntley and Coal Cliff Mines in the Southern District which were in the process of being closed and Vickery in the North-Western District which was being converted to an open cut operation. The inspection program was to be conducted basically by the local Inspector of Mechanical Engineering for the mine. However due to the number of mines in the Northern District assistance was to be provided by the Inspector of Mechanical Engineering from Sydney Office and the Senior Inspector of Mechanical Engineering was to undertake the survey of some mines in the Western District in order to maintain an overview of the program.

A total of 53 mines to be inspected for the four (4) Districts as follows:

Southern	16
Western	11
Northern	18
North-Western	8
Total	53

3.1 REVIEW OF CONVEYOR SAFETY STATISTICS

A detailed review of recent history of incidents associated with conveyors that have occurred was conducted in order to provide relevant background data of the operation of mine conveyor systems.

This information was obtained from two (2) sources, viz

(a) The Joint Coal Board lost time injury statistics for the 12 month period from 1 July 1989 to 30 June 1990.

The injury statistics were accessed from the JCB data utilising the Inspectorate's "Reflex" Software Package.

This review concluded that a total of 127 injury reports had been made for the 12 month period. 44% of the injuries were categorised as sprains/strains. It is to be noted that the injury review only included those reports allocated with the JCB "Conveyor" equipment code and that there may well be additional injuries related to the operation of conveyor equipment which had occurred for which the equipment code had "not been specified" at the time of entry into the JCB databank.

(b) The Inspectorate's records of the Dangerous Occurrences reported under the CMRA for the category of "Fires in Underground Coal Mines" that had occurred on conveyors for the 6 1/2 year period from 1 July, 1984 to 31 December, 1990.
These statistics were obtained from a database of reportable occurrences which have been investigated

under the Coal Mines Regulation (Notification and Investigation of Accidents and Dangerous Occurrences) Regulation, 1984. This database has been compiled by the Inspectorate as a means of improving access to the records for previous occurrences.

For the period reviewed a total of 53 underground fires on conveyors had been investigated which is an average of 8 fires per annum. However during 1990 a total of 14 fires were reported.

The results of the above searches were combined and formatted for each of the four (4) districts to provide each Inspector of Mechanical Engineering with an overview of the performance of each mine as compared to the overall district performance in relation to lost time injuries and fires associated with conveyors.

No attempt was made to adjust these statistics to allow the mines to be compared on a uniform basis e.g. No. of fires/km of conveyor.

The District Conveyor Statistical Review Reports are attached as Appendices 3(a) to (d).

3.2 CONVEYOR SYSTEM DATA

To assist with the inspections a questionnaire was compiled and distributed to each underground coal mine and all open cut coal mines operating conveyors in reclaim tunnels in excess of 60 m in length. The purpose was to provide each Inspector of Mechanical Engineering with:

(a) Details of each conveyor within the mine;
(b) A schematic layout of the mine conveyor system;
(c) Information pertaining to the inspection, maintenance and reporting procedures utilised at the mine.

The questionnaire was distributed to the mines concerned under a covering letter signed by the Chief Inspector.

This questionnaire is attached as Appendix 4.

3.3 CONVEYOR INSPECTION PROFORMA

An inspection check list proforma was developed to assist the Inspectors with the systematic recording of the status of each conveyor at the mine. As it was agreed that the format for conducting the inspection was to enter the mine at the outbye end of the conveyor system i.e. at the portal and proceed towards the boot/tail end of the conveyor the check list was developed to correspond with this procedure.

The check list was formated to enable the data for each conveyor to be collected under the following main categories:

(a) Transfer Point
(b) Drive Head
(c) Loop Takeup
(d) Along Conveyor
(e) Boot End
(f) Controls
(g) Walkways
(h) Reports
(i) Miscellaneous.

Data entry was arranged to simplify the method of reporting by the provision of either a Y/N or a 1 to 5 response to each question.

The proforma of the Conveyor Inspection Check List is attached as Appendix 5.

4. CONVEYOR SURVEY RESULTS

Prior to commencing the inspection program it was intended to utilise the information requested by the questionnaire sent to each mine. Unfortunately in general the responses were not provided in time to enable comparison and further analysis with the Inspection Survey results. In fact some mines did not respond at all.

4.1 INSPECTION SURVEY

During the course of the inspection program it was decided that two (2) mines should be reviewed slightly differently to the other 51 in that these mines operated two (2) large relatively independent conveyor systems. Thus the results have been entered separately for South Bulli Mine's "No. 4 Shaft" and "Bellambi" and Myuna Mine's "Wallarah" and "Other" conveyor systems. The separation of the conveyor systems at South Bulli and Myuna enables each independent system to be assessed without the potential "masking" effect which could eventuate with combining the results.

In order to negate the effects of any disparity of results which could eventuate from the use of reports from the various sources in endeavouring to summarise the status of each mine in relation to the remainder the following method was utilised.

The completed checklist for each individual conveyor inspected was assessed for each of the main categories incorporated on the check list with the exception that the category of "Along Conveyor" was divided into three (3) separate sections viz. Idlers, Spillage and Conveyor Belting. Each of the ten (10) categories were then given a rating from between 1 to 5 based on the following inspection gradings:

Rating	Standard Grading
1	Poor
2	Below Average
3	Average
4	Good
5	Excellent

The results of these gradings for the mines grouped into districts are shown in Table 1. Subset tables have been produced from Table 1 to group all mines rated =<2 for each of the ten(10) categories for ease of reference.

It is to be noted that for the South, West and North Districts that the surveys were mainly conducted by two (2) Inspectors of Mechanical Engineering and some variation in the results of the assessment were evident during the compilation of the Table. In order to achieve uniformity of results for ease of comparison all assessments rated to one (1) decimal point have been rounded off to the nearest whole number.

The results of the survey for the North-West District have been presented in a different manner to those for the other districts i.e. the rating for each category is given as a percentage (%) and individual assessments for "Controls" and "Reports" categories have not been included.

4.2 RISK SURVEY

In addition to the above an assessment of risk for the mine conveyor systems in the South and West Districts has also been carried out. Risk was categorised into two (2) areas viz. fire and injury. This assessment included consideration of the history of fires and injuries which had been provided.

Each risk category was given a rating from between 1 to 5 which is similar with the Inspection Survey rating system. The gradings allocated were as listed below:

Rating	Standard Grading
1	Very High
2	High
3	Moderate
4	Low
5	Very Low

The results of this risk assessment are shown in Table 2.

4.3 SUMMARY OF DISTRICT REPORTS

Following completion of each individual conveyor system inspection survey, the Inspector of Mechanical Engineering, for the mine has advised the mine managament of their findings. Whilst noting these findings in their "District" reports comments relating to the overall findings were incorporated in some reports.

It is considered important that these general comments be included in this report. Whilst they have been included as individual comments, there is sufficient evidence provided which indicate that there are a number of problems that are common to the industry.

4.3.1 EXTRACT FROM MR. J. BOUT'S "DISTRICT REPORT"

Primary areas of concern were identified as:-

1. Standards of the belt inspection reports by Deputies and the failure to follow up problems with proper professional maintenance programmes for conveyors.

2. The lack of planned down time for conveyors.

3. The non allocation of regular belt attendants or the lack of priority given to the need for some attendants to remain on belts rather than replace absenteeism.

4. Abnormal wear rates on Vee return rollers.

5. The inability of scraper systems to handle slurry build up caused by excessive application of dust suppression water to the belts.

6. Seven day week production.

7. Poor transfer point design concepts.

It was noticeable that the mines which rated best have the following things in common.

1. Good transfer point designs utilising all the necessary height required, even if it means excavating the roof.

2. Attention to detail on scraper selection fitment and servicing and constant review of effectiveness.

3. Good informative feedback from Deputies reports and reliable maintenance response.

4. An attitude which does not condone the continued operation of defective rollers, worn scrapers or poor quality belting.

It is also worth noting that the best mines were not necessarily those who appear to have the most resources. Rather it was found to be those who made better use of their available resources.

The problem with collapsing return rollers appears to be increasing. One of the major concerns here is that historically a "failing" roller was identified by the noisy bearing as it deteriorated. Generally, replacing the roller over the next few days or even a week sufficed. In addition to the historical bearing failures rollers are failing due to shell wear usually with no warning noise apparent.

Deputies, upon noticing the roller that has failed supposedly report it or simply just mark it and consider that the problem is now someone else's. Remedial action is often delayed due to labour and production demands so that the collapsed roller remains in service sometimes long enough to wear away all of the shell and often through into the main roller shaft. This process is continually creating frictional heating and if dry coal fines are in close proximity a fire is very likely.

The short term solution to this is to carry out pre-emptive inspections of all rollers to identify wear areas and to change out or rotate these rollers end for end. However the cost to productivity this would cause is unacceptavle to the producers.

Engineers need to select roller designs whereby the roller body outlasts the bearings. This would once again allow the old practice of "listening" for rollers to be effective providing reasonable prompt remedial action is undertaken.

4.3.2 EXTRACT FROM MR. R.HOERNDLEIN'S "DISTRICT REPORT"

1. In the majority of the mines surveyed, it was found that a standard of reporting has crept into the industry whereby the deputy or person inspecting the belts is making his own decision when to report a noisy roller. A noisy roller is not reported when first detected. It is only reported when it becomes "noiser". Their experience tells them that some noisy rollers will run 2 to 3 weeks before collapsing so they are not reported for the first week or so. The hot roller and potential fire occurs when their judgement was wrong or they are moved to another district and the replacement allows another week.

2. The information provided by the belt inspection reports is quite often limited to "Rollers as marked". At mines where management has insisted on reports stating location and identification, the results are obvious. The reporting of location and extent of spillages is similarly inadequate.

3. Due to 24-hour 6 days per week production at some mines, maintenance and roller replacement is limited to weekend overtime work. Reduced weekend supervision produces a lower work standard. Unreliable availability of labour and importance placed on other work may cause the belt maintenance to be deferred to the following weekend.

4. Most mines cut out roof if required to achieve adequate height for sound transfer point design. Some managers are however, still not convinced, resulting in poor designs for scraping, transfer of scrapings to the next belt and smooth change of direction. The evidence of poor scraping can then be found in the form of fines under return rollers along the belt, a ready fuel for a hot roller.

5. Modern roller design, as a cost cutting measure, welds the end plate to the outer shell at the corner where they meet. Older design had the shell extend beyound the end plate by about 8mm allowing an internal weld to be used to connect the two. On the new design, the corner weld is soon worn through allowing the shell to break free and leaving the end plate exposed as a sharp cutting blade. This causes belt damage, premature bearing failure and reduced roller life, long before reaching normal bearing life. Some mines have specified the older design when re-ordering but some are still receiving the other type.

RECOMMENDATIONS
For an acceptable standard to be achieved, the following must be in place:

1. Rollers must be reported at first sign of bearing noise.

2. Belt inspection reports must contain location and roller identification not just "rollers as marked".

3. Belt maintenance must be raised up the priority list. It tends to fall into the "if there is time" category.

4. Belt transfers must be designed for the purpose, not be allowed to "happen". Scrapers' effectiveness must be monitored after installation. They are often scrapers in name only.

4.3.3 EXTRACT FROM MR. R. SMITH'S "DISTRICT REPORT

GENERAL OBSERVATION / OVERVIEW

1. Replacement conveyor idler quality needs to be assessed by each mine due to the tendency to buy on price rather than quality.

2. A general lack of roller failure severity guidelines i.e. urgent, can wait three shifts, wait three days, etc, (i.e. training).

3. Fixed structure showed less belt tracking problems than variable through structure.

4. When roof mounting structure with chains, angle of chains to the vertical too small, causing tracking problems.

5. Inspections were generally carried out on the same walkway route regularly and therefore "off side" problems not recorded.

6. Persons inspecting seem reluctant to "bend down" and look under drive units, take ups, and boot ends and the like.

7. Panel belt structure should be designed and built for more side clearance between return belt edge and vertical structure legs (a minimum of 150mm is recommended). This would assist with belt extensions, with clip joints and hence tracking.

8. Vee returns improve return belt tracking however appear to fail prematurely (refer 1).

9. Some so trained "competent persons" do not know the principles of "tracking" conveyor belts.

10. Vee return design problems exist due to the Vee return "Vee" being below the stand cross number causing the return belt to "cut" the stand cross members.

4.3.4 MR. W.J. KOPPE AND MR. G. JERVIS - NEWCASTLE DISTRICT REPORT

1. The Management Systems for conveyors should be substantially improved at most collieries. Mining, mechanical engineering, purchasing and cost control generally need improvement.

2. Costs control at many collieries doesn't specify individual categories for components such as idlers, clean up labour, inspection labour and delays thus individual problem areas are not identified.

3. More labour appears to be spent on inspecting conveyors rather than fixing problems identified.

4. Personnel inspecting conveyors do not list all the faults. They should be more accountable and use a more comprehensive check list.

5. Spillage is not being managed effectively. The mechanical engineer doesn't regard it as his job and the undermanager doesn't want to know as long as the conveyor runs. Spillage is often due to poor transfers, belt runoff and ineffective scrapers.

6. Purchase of conveyor components such as transfers, belting, scrapers, structure, idlers, tensioning units and brakes are not always based on good engineering practice.

7. Brakes are not effectively managed although they are historically a frequent cause of fires.

(a) Maintenance adjustment and inspection of brakes is generally done poorly.

(b) Brakes are often installed but not required and temporarily spragged out of service rather than removed.

(c) Limits switches are often poorly adjusted in that they don't prevent start up when the brake is still partly on.

8. Water barriers often contain some empty tubes.

9. A more detailed inspection sheet should be used by collieries to ensure all points are covered e.g. the list used for this inspection.

10. Some conveyor drifts that are inspected from dolly cars are not being inspected properly on the opposite to travel side.

11. Housekeeping on many walkways was so poor that inspectors had to constantly watch their feet and as a result hit their head on intermittent low roof.

12. Many collieries still use the Departments minimal clearance under the return belt yet a greater clearance would make cleaning much easier and simultaneously reduce the fire risk.

13. Numerous collieries had spillage built up around brakes, fluid couplings and drive motors. This could often have been prevented by a simple deflector guard between the top belt and the item concerned.

14. Some collieries had guards not fitted or poorly fitted.

15. Tracking of conveyors is generally poor in that belting rubs on structure.

16. Idlers are not managed effectively at many collieries although their failure is the most frequent cause of conveyor fires.

(a) The date that an idler becomes noisy is not recorded so it is not possible to ensure that idlers are replaced within a certain period.

(b) Frequency of idler failures are not being monitored so it is not possible to determine the cost effectiveness of any changes in idler design.

17. Longwall collieries suffer from excessive water on the belt system which results in spillage all the way to the surface.

5. CONCLUSIONS

The comprehrensive inspection survey conducted on all the conveyor systems in underground coal mines provided the Inspectorate with a unique opportunity to compare the quality of each individual mine's inspection and maintenance system against a set of standards derived by the Inspectorate as being goals for which optimum safety performance could be achieved.

No attempt was made to rate performance against the criteria of total conveyor system belt length, number of conveyors in the system or coal production tonnages as it was considered that the resources made available to manage each mine conveyor system would take the above factors into account.

Any mine which has a rating of 1 or 2 in any of the ten(10) Inspection Survey Categories should consider it to be unsatisfactory and that immediate action is necessary to bring those categories identified to a rating level of 3 which has been determined to be a minimum standard of performance. Some mines have already undertaken remedial action to reduce or eliminate those areas identified as contributory factors in the unsatisfactory rating recorded. In some cases it is known that this has been very expensive. It is to be noted that for the North-West District a rating of <60% for any of the eight(8) categories should be considered unsatisfactory.

Irrespective of the ratings attained in any of the Inspection Survey Categories any mine which the overall result was <50% should be subjected to an intense regime of further inspections until their performance reaches at least an overall rating of 70%

Any mine in either the South or West Districts which has a rating of 1 or 2 in the Risk Categories for Injury and Fire should also consider their safety performance to be extremely unsatisfactory.

It is interesting to note that the two(2) mines which attained the equal highest overall rating also currently have the lowest Lost Time Injury Frequency Rates of all underground coal mines viz. Northcliff and Kandos.

Conveyors are critical components in the coal production process and when combined form a system which is virtually fully automated with minimum involvement being required from mining personnel for its operation. Consequently to achieve optimum system performance an effective management system must be in place. This system must be formally documented and include specific details for inspection and maintenance. In this regard the system needs to incorporate the following matters :-

(A) Responsibilities of personnel whose duties are related to the operation of the underground conveyors must be clearly defined.

(B) A program for the inspection of the conveyor system determined from the coal production schedule. The requirements of the Coal Mines Regulation Act must be incorporated in the inspection program.

(C) Effective means to rectify any deficiencies identified by the inspection program must be provided. Typical problems such as spillage, noisy or failed idler rollers, incorrectly adjusted belt scrapers, etc. have to be directed to either production or maintenance officals as appropriate. The offical to which any such matter is referred should then be responsible for any subsequent action deemed necessary to rectify the problem and to ensure that inspection personnel are informed of what action is to be taken.

(D) Provide a mechanism to enable the standards of engineering for the existing conveyor systems to be upgraded in order to eliminate or reduce the incidence of equipment failures or any other identified deficiencies.

(E) Monitor the performance of the management system to ensure that action required to resolve problems can be initiated as soon as practically possible after they are identified.

The Inspectorate should actively encourage existing practices for the inspection and maintenance of conveyor systems to be upgraded as appropriate in accordance with the above and monitor the performance of the conveyor systems against the results obtained from this survey.

The Inspectorate should aim to have all mines achieve at least an Inspection and Risk rating of 3 for all categories.

TABLE 1

CONVEYOR INSPECTION SURVEY - UNDERGROUND COAL MINES
SURVEY PERIOD - FEBRUARY 1991 TO APRIL 1991

DISTRICT	MINE	TRANSFER POINTS	DRIVE HEAD	LOOP TAKE UP	IDLERS	SPILLAGE	BELTING	BOOT END/TAIL ROLLERS	CONTROLS	WALKWAYS	REPORTS	TOTAL	%
SOUTH													
	APPIN	4	4	4	3	3	4	4	4	4	4	36	72%
	AVON	2	3	3	2	2	3	3	3	3	3	27	54%
	BERRIMA	2	3	3	1	2	2	3	3	2	3	24	48%
	BRIMSTONE	2	3	3	1	2	2	2	3	1	2	21	42%
	CORDEAUX	4	4	4	5	4	4	4	4	4	4	41	81%
	KEMIRA	4	4	4	4	3	4	3	4	3	4	37	74%
	METROPOLITAN	3	2	3	3	3	3	3	2	3	3	30	59%
	NATTAI	2	2	2	1	3	2	3	3	2	2	23	46%
	NEBO	3	3	3	4	4	4	3	4	4	4	36	72%
	NORTHCLIFF	5	5	4	5	4	5	3	4	5	4	42	84%
	OAKDALE	2	2	2	1	2	3	2	3	2	3	22	44%
	SOUTH BULLI												
	a)NO 4 SHAFT	3	3	3	4	4	3	3	4	3	3	33	66%
	b)BELLAMBI	3	2	3	2	2	2	3	3	1	3	24	48%
	TAHMOOR	2	3	3	2	2	3	3	3	3	3	27	54%
	TOWER	4	4	4	4	4	4	4	4	4	4	38	75%
	WESTCLIFF	4	4	4	4	4	4	3	4	3	4	38	76%
	WONGAWILLI	4	4	4	3	4	3	4	4	4	4	37	74%
WEST													
	ANGUS PLACE	3	3	3	3	3	3	3	3	1	3	28	55%
	BAAL BONE	3	4	3	2	1	3	3	4	2	3	28	56%
	BLUE MOUNTAIN	2	2	3	1	2	2	3	3	2	3	25	49%
	CANYON	3	3	3	4	3	3	3	3	4	3	32	64%
	CHARBON	2	3	3	2	1	1	2	3	2	2	21	42%
	CLARENCE	2	3	3	1	1	3	3	2	1	2	21	42%
	INVINCIBLE	2	2	3	1	1	1	3	3	2	2	20	40%
	IVANHOE	3	3	3	4	3	3	3	3	3	3	31	62%
	KANDOS	4	4	4	5	4	4	4	4	5	4	42	84%
	ULAN NO 2	4	3	4	3	4	4	4	4	3	4	37	74%
	WESTERN MAIN	2	2	2	3	3	2	2	3	2	2	25	49%
NORTH													
	AWABA	4	4	3	3	3	2	3	4	3	3	32	64%
	BLOOMFIELD	3	4	3	3	3	3	3	4	3	3	32	64%
	CHAIN VALLEY	4	4	3	3	2	2	3	4	2	2	29	58%
	COORANBONG	4	4	3	4	4	4	4	4	3	3	37	74%
	ELLALONG	2	3	3	2	1	1	2	2	2	3	21	42%
	GRETLEY	4	2	2	2	3	4	3	3	2	2	27	54%
	LAMBTON	3	3	3	2	3	3	3	4	3	2	29	58%
	MOONEE	3	2	2	3	2	4	3	3	2	2	26	52%
	MUNMORAH	4	3	3	3	4	4	3	4	4	3	35	70%

	MYUNA												
	a)WALLARAH	4	2	3	3	2	4	3	3	4	3	31	62%
	b)OTHER	4	2	3	3	2	4	3	3	1	3	28	56%
	NEWSTAN	4	4	3	3	4	3	3	4	4	3	35	70%
	NEWVALE	3	1	1	3	1	4	2	3	2	2	22	**44%**
	NEWVALE 2	4	4	3	3	3	3	3	4	4	3	34	68%
	PELTON	3	3	3	3	3	2	3	4	3	2	29	58%
	TERALBA	3	4	3	2	1	1	3	4	1	2	24	48%
	WALLARAH	3	3	3	3	2	2	3	4	2	2	27	54%
	WEST WALLSEND	3	2	3	2	2	4	3	3	3	3	28	56%
	WYEE	3	4	3	4	4	3	3	4	3	3	34	68%
NORTH WEST													
	GREAT GRETA	75	82	85	95	85	58	78	-	73	-	-	72%
	GUNNEDAH	70	77	74	60	79	66	69	-	60	-	-	73%
	LEMINGTON	76	68	84	90	81	73	75	-	30	-	-	72%
	LIDDELL	61	68	71	71	72	68	57	-	58	-	-	**65%**
	LIDDELL STATE	72	71	77	53	63	77	57	-	66	-	-	67%
	MUSWELLBROOK	64	61	60	46	73	46	47	-	46	-	-	**56%**
	PRESTON	71	70	70	74	80	58	64	-	73	-	-	71%
	WAMBO	66	72	90	65	57	60	73	-	50	-	-	66%

CONVEYOR INSPECTION SURVEY - NSW UNDERGROUND COAL MINES
SURVEY PERIOD - FEBRRUARY 1991 TO APRIL 1991
LIST OF MINES REPORTED AS BELOW THE MINIMUM ACCEPTABLE STANDARD IN THE CATEGORY OF TRANSFER POINTS

Rating	Standard Grading
1	Poor
2	Below Average
3	Average
4	Good
5	Excellent

DISTRICT	MINE	GRADING
SOUTH	AVON	2
SOUTH	BERRIMA	2
SOUTH	BRIMSTONE	2
SOUTH	OAKDALE	2
SOUTH	TAHMOOR	2
WEST	CHARBON	2
WEST	CLARENCE	2
WEST	INVINCIBLE	2
NORTH	ELLALONG	2

CONVEYOR INSPECTION SURVEY - NSW UNDERGROUND COAL MINES
SURVEY PERIOD - FEBRRUARY 1991 TO APRIL 1991
LIST OF MINES REPORTED AS BELOW THE MINIMUM ACCEPTABLE STANDARD IN THE CATEGORY OF DRIVE HEADS

Rating	Standard Grading
1	Poor
2	Below Average
3	Average
4	Good
5	Excellent

DISTRICT		MINE	GRADING
SOUTH	SOUTH BULLI	b)BELLAMBI	2
SOUTH		OAKDALE	2
WEST		INVINCIBLE	2
NORTH		GRETLEY	2
NORTH		MOONEE	2
NORTH	MYUNA	a)WALLARAH	2
NORTH	MYUNA	b)OTHER	2
NORTH		NEWVALE	1
NORTH		WEST WALLSEND	2

CONVEYOR INSPECTION SURVEY - NSW UNDERGROUND COAL MINES
SURVEY PERIOD - FEBRRUARY 1991 TO APRIL 1991
LIST OF MINES REPORTED AS BELOW THE MINIMUM ACCEPTABLE STANDARD IN THE CATEGORY OF LOOP TAKE UP

DISTRICT	MINE	GRADING
SOUTH	OAKDALE	2
NORTH	GRETLEY	2
NORTH	MOONEE	2
NORTH	NEWVALE	1

CONVEYOR INSPECTION SURVEY - NSW UNDERGROUND COAL MINES
SURVEY PERIOD - FEBRRUARY 1991 TO APRIL 1991
LIST OF MINES REPORTED AS BELOW THE MINIMUM ACCEPTABLE STANDARD IN THE CATEGORY OF SPILLAGE

Rating	Standard Grading
1	Poor
2	Below Average
3	Average
4	Good
5	Excellent

DISTRICT	MINE	GRADING
SOUTH	AVON	2
SOUTH	BERRIMA	2
SOUTH	BRIMSTONE	2
SOUTH	SOUTH BULLI(b)BELLAMBI	2
SOUTH	TAHMOOR	2
WEST	BAAL BONE	1
WEST	CHARBON	1
WEST	CLARENCE	1
WEST	INVINCIBLE	1
NORTH	ELLALONG	1
NORTH	MOONEE	2
NORTH	MYUNA a)WALLARAH	2
NORTH	MYUNA b)OTHER	2
NORTH	CHAIN VALLEY	2
NORTH	NEWVALE	1
NORTH	TERALBA	1
NORTH	WALLARAH	2
NORTH	WEST WALLSEND	2

CONVEYOR INSPECTION SURVEY - NSW UNDERGROUND COAL MINES
SURVEY PERIOD - FEBRRUARY 1991 TO APRIL 1991
LIST OF MINES REPORTED AS BELOW THE MINIMUM ACCEPTABLE STANDARD IN THE CATEGORY OF IDLERS

Rating	Standard Grading
1	Poor
2	Below Average
3	Average
4	Good
5	Excellent

DISTRICT	MINE	GRADING
SOUTH	AVON	2
SOUTH	BERRIMA	1
SOUTH	BRIMSTONE	1
SOUTH	NATTAI	1
SOUTH	OAKDALE	1
SOUTH	SOUTH BULLI(b)BELLAMBI	2
SOUTH	TAHMOOR	2
WEST	BAAL BONE	2
WEST	BLUE MOUNTAINS	1
WEST	CHARBON	2
WEST	CLARENCE	1
WEST	INVINCIBLE	1
NORTH	ELLALONG	2
NORTH	GRETLEY	2
NORTH	LAMBTON	2
NORTH	TERALBA	2
NORTH	WEST WALLSEND	2
NORTH WEST	MUSWELLBROOK	2

CONVEYOR INSPECTION SURVEY - NSW UNDERGROUND COAL MINES
SURVEY PERIOD - FEBRRUARY 1991 TO APRIL 1991
LIST OF MINES REPORTED AS BELOW THE MINIMUM ACCEPTABLE STANDARD IN THE CATEGORY OF BELTS

Rating	Standard Grading
1	Poor
2	Below Average
3	Average
4	Good
5	Excellent

DISTRICT	MINE	GRADING
SOUTH	BERRIMA	2
SOUTH	BRIMSTONE	2
SOUTH	NATTAI	2
SOUTH	SOUTH BULLI(b)BELLAMBI	2
WEST	BLUE MOUNTAINS	2
WEST	CHARBON	1
WEST	INVINCIBLE	1
WEST	WESTERN MAIN	2
NORTH	AWABA	2
NORTH	CHAIN VALLEY	2
NORTH	ELLALONG	1
NORTH	PELTON	2
NORTH	TERALBA	1
NORTH	WALLARAH	2
NORTH WEST	MUSWELLBROOK	2

CONVEYOR INSPECTION SURVEY - NSW UNDERGROUND COAL MINES
SURVEY PERIOD - FEBRRUARY 1991 TO APRIL 1991
LIST OF MINES REPORTED AS BELOW THE MINIMUM ACCEPTABLE STANDARD IN THE CATEGORY OF BOOT END/TAIL ROLLERS

Rating	Standard Grading
1	Poor
2	Below Average
3	Average
4	Good
5	Excellent

DISTRICT	MINE	GRADING
SOUTH	BRIMSTONE	2
SOUTH	OAKDALE	2
WEST	CHARBON	2
NORTH	ELLALONG	2
NORTH	NEWVALE	2
NORTH WEST	MUSWELLBROOK	2

CONVEYOR INSPECTION SURVEY - NSW UNDERGROUND COAL MINES
SURVEY PERIOD - FEBRRUARY 1991 TO APRIL 1991
LIST OF MINES REPORTED AS BELOW THE MINIMUM ACCEPTABLE STANDARD IN THE CATEGORY OF CONTROLS

DISTRICT	MINE	GRADING
SOUTH	METROPOLITAN	2
WEST	CLARENCE	2
NORTH	ELLALONG	2

NOTE: NORTH WEST DISTRICT MINES WERE NOT RATED FOR THIS CATEGORY.

CONVEYOR INSPECTION SURVEY - NSW UNDERGROUND COAL MINES
SURVEY PERIOD - FEBRRUARY 1991 TO APRIL 1991
LIST OF MINES REPORTED AS BELOW THE MINIMUM ACCEPTABLE STANDARD IN THE CATEGORY OF WALK WAYS

Rating	Standard Grading
1	Poor
2	Below Average
3	Average
4	Good
5	Excellent

DISTRICT	MINE	GRADING
SOUTH	BERRIMA	2
SOUTH	BRIMSTONE	1
SOUTH	SOUTH BULLI(b)BELLAMBI	1
WEST	ANGUS PLACE	1
WEST	BAAL BONE	2
WEST	CHARBON	2
WEST	CLARENCE	1
WEST	INVINCIBLE	2
WEST	WESTERN MAIN	2
NORTH	CHAIN VALLEY	2
NORTH	ELLALONG	2
NORTH	GRETLEY	2
NORTH	MOONEE	2
NORTH	MYUNA (b)OTHER	1
NORTH	NEWVALE	2
NORTH	TERALBA	1
NORTH	WALLARAH	2
NORTH WEST	LEMINGTON	2
NORTH WEST	MUSWELLBROOK	2

CONVEYOR INSPECTION SURVEY - NSW UNDERGROUND COAL MINES
SURVEY PERIOD - FEBRRUARY 1991 TO APRIL 1991
LIST OF MINES REPORTED AS BELOW THE MINIMUM ACCEPTABLE STANDARD IN THE CATEGORY OF REPORTS

Rating	Standard Grading
1	Poor
2	Below Average
3	Average
4	Good
5	Excellent

DISTRICT	MINE	GRADING
SOUTH	BRIMSTONE	2
WEST	CHARBON	2
WEST	CLARENCE	2
WEST	INVINCIBLE	2
NORTH	CHAIN VALLEY	2
NORTH	GRETLEY	2
NORTH	LAMBTON	2
NORTH	MOONEE	2
NORTH	NEWVALE	2
NORTH	PELTON	2
NORTH	TERALBA	2
NORTH	WALLARAH	2

NOTE: NORTH WEST DISTRICT MINES WERE NOT RATED FOR THIS CATEGORY.

TABLE 2

CONVEYOR INSPECTION SURVEY - NSW UNDERGROUND COAL MINES
SURVEY PERIOD - FEBRUARY 1991 TO APRIL 1991

RISK - RATING

DISTRICT	MINE	FIRE	INJURY
SOUTH			
	APPIN	3	3
	AVON	2	3
	BERRIMA	2	3
	BRIMSTONE	2	2
	CORDEAUX	4	3
	KEMIRA	5	4
	METROPOLITAN	1	3
	NATTAI	2	3
	NEBO	5	5
	NORTHCLIFF	5	5
	OAKDALE	1	4
	SOUTH BULLI	2	2
	TAHMOOR	2	3
	TOWER	4	3
	WESTCLIFF	5	4
	WONGAWILLI	4	4
WEST			
	ANGUS PLACE	3	1
	BAAL BONE	3	2
	BLUE MOUNTAINS	2	4
	CANYON	5	5
	CHARBON	3	2
	CLARENCE	2	2
	INVINCILBLE	1	2
	IVANHOE	4	4
	KANDOS	5	5
	ULAN NO 2	4	4
	WESTERN MAIN	3	4

Rating	Standard Grading
1	Very High
2	High
3	Moderate
4	Low
5	Very Low

Note: Only mines in the South and West Districts were assessed for risk of fire and injury.

New South Wales Government

Department of Minerals and Energy

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Telex AA74875
Facsimile (02) 233 7017

Our reference: C89/1052

Your reference:

For further information ring: W.J. Koppe

Telephone 231 0922
Extension 240 4686

6th November, 1989

Dear Sir,

RE: FIRES ASSOCIATED WITH UNDERGROUND CONVEYORS

The Coal Mines Inspectorate has carried out a review of fires involving underground coal mine conveyor systems as reported under the Coal Mines Regulation Act. The review covered a 15 year period from 1973 to 1988 and established that a total of 105 fires had been investigated.

The major cause of the fires, as identified by the investigation, have been categorised in the table below.

Category	Cause	% of Total
1	1. Collapsed idler bearing	46
2	2. Friction due to drive brake	21
3	3. Excessive temperature of drive system	15
4	4. Friction due to conveyor belt	8
5	5. Slip at drive pulley	4
6	6. Collapsed pulley bearing	5
7	7. Belt carcass breaking down and building up on ilders	1
8	8. Cause not ascertained	1

Whilst there are many ways to reduce or eliminate these fires the following comments are offered which are considered to cover some of the more important aspects:-

1. Ensure that idlers are rated for the duty they are exposed to, particularly with regards to belt speed, peak load, shaft deflection, bearing rating and dust and water sealing of bearings.

2. Ensure that changes in grade are gradual to reduce localised loading.

3. Vee return idlers improve belt tracking and also improve access for cleaning.

4. The use of fire and water resistant grease for the lubrication of idler bearings should be considered when purchasing idlers.

5. As far as possible maximise the clearance between the return belt and the floor to facilitate cleaning and reduce the potential for build up of combustible material around return idlers.

6. Provide a cover over the motor, coupling, brake and gearbox sloped so that any coal dust or spillage is deflected away from the drive area.

7. When purchasing new conveyor structure check that there is sufficient allowance for belt drift as there are many cumulative items that adversily effect belt tracking in numerous underground installations.

8. When purchasing new drive heads consideration should be given to specify fully enclosed oil immersed brakes.

9. When purchasing new conveyor belting include in the specifications:-

   (a) The belt when installed and running should not move more than 50 m.m. either side of centre.

   (b) An appropriate tear test which should establish that the belt carcass will not easily breakdown.

It is to be noted that there have been major conveyor belt fires at coal mines and at shiploading terminals in N.S.W. In all such cases known to the Inspectorate the conveyor belt material was not F.R.A.S. (Fire Resistant and Anti-Static.) However it is suggested that procedures for purchase of approved conveyor belt be reviewed in order to establish if adequate provisions exist to verify that the material supplied complies with the F.R.A.S requirements.

The purpose of this circular is to provide the coal mining industry with statistical data and advice which may lead to a reduction in the incidence of reportable fires on conveyors being achieved. Should further advice in relation to any aspect of this circular be required please contact Mr. W. Koppe, Inspector of Mechanical Engineering on (02) 240 4248.

Yours faithfully,

R. W. Scott.

R W Scott
Acting Chief Inspector of Coal Mines

DEPARTMENT OF MINERAL RESOURCES

NEW SOUTH WALES GOVERNMENT

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DX 3324 ST LEONARDS
TELEPHONE (02) 901 8888
FACSIMILE (02) 901 8777

Our Ref: C89/1052

For further information
ring: L. Roberts

Telephone: 02-901 8550

Dear Sir,

Re: **FIRES ASSOCIATED WITH UNDERGROUND CONVEYORS**

In November 1989 a circular letter was issued which summarised the causes of conveyor fires for the 15 year period from 1973 to 1988. These fires were classified as reportable and were investigated under the requirements of the Coal Mines Regulation Act. The summary indicated that 105 fires had been reported for the period which averages to 7 fires/annum. The 1989 letter also incorporated a range of measures for consideration by mine management to effectively reduce or eliminate the incidence of conveyor fires.

The purpose of this letter is to advise that for the past 18 month period the incidence of fires has increased to an average rate of 12 fires/annum. This rate of increase is considered to be unacceptable and your attention is drawn to the employers responsibilities under the Occupational Health and Safety Act, 1983:- Part 3 - General Provisions Relating to Health, Safety and Welfare at work particulary in relation to this matter.

The major cause of conveyor fires continues to be due to collapsed conveyor idler bearings with the subsequent increase in temperature to a level where a build up of fine coal which is adjacent to the roller is ignited. It would appear that the incidence rates with this type of occurrence will further increase in the future if the current trend continues.

The effectiveness of existing means adopted by management at the mine to control the hazards associated with the operation of conveyors need to be reviewed as it is evident from the statistics that improvement is warranted. In particular the quality of the existing inspections conducted in accordance with Clause 27 of the Coal Mines Regulation (Belt Conveyor) Regulation, 1984 should be critically assessed. It is to be noted that Subclause (6) states that any person making an examination pursant to this clause finding a situation of danger, the person shall immediately inform the senior mining official on the shift.

For the purpose of this subclause it is considered that where either the conveyor belt, pulleys or idlers are in contact with a build of fines or spillage then this should constitute a situation of danger.

It is also considered that a condition of danger exists if idlers or pulleys with defective bearings are left in service for extended periods of time. The practice at some mines of changing idlers at weekly intervals is not considered satisfactory as the longer a defective bearing is in service the higher the probability that a fire could result.

The installation of conveyor drive motors, couplings and brakes below overhead conveyor belting without an effective means of preventing spillage collecting around the drive components is considered unsatisfactory and potentially dangerous particularly where open brakes or other drive components can quickly generate surface temperatures to a level at which a build up of coal will ignite. Generally surface temperatures should not be allowed to exceed 150 degrees Centigrade.

The summary of conveyor fires has been updated and is listed below.

SUMMARY OF CONVEYOR FIRES FROM 1973 TO 12/90.

Cause	No. of Fires
Collapsed/seized idler bearing	46
Friction due to drive brake	24
Excessive temperature of drive system	18
Friction due to jammed idlers	9
Friction due to conveyor belt	8
Collapsed pulley bearing	6
Slip at drive pulley	4
Belt carcass breaking down and building up on idlers	2
Miscellaneous	4
Total	121

It is requested that the safety aspects associated with the operation, inspection and maintenance of the underground system of conveyors at the mine be reviewed so that the potential for a fire to occur is eliminated.

Yours faithfully

R. W. Scott 15/1/91

R W Scott
Acting Chief Inspector of Coal Mines

APPENDIX 3

MINUTE

FILE NO:

SUBJECT: ASSESSMENT OF UNDERGROUND CONVEYORS.

At the meeting of the Coal Mines Safety Advisory Committee held on 31 January 1991 the Chief Inspector of Coal Mines reiterated his concern over the number of fires associated with conveyors in underground coal mines which had been formally advised to industry via circular letter issued earlier in January.

To add further emphasis to this concern the C.I.C.M. requested that the Inspectors of Mechanical Engineering conduct an assessment of all underground coal mine conveyors in order to ascertain the extent that the management at each mine have been effective in eliminating the hazards identified as contributory factors in conveyor fires.

In order to assist in the assessment of the overall performance of the conveyor systems the following statistical data has been extracted from the Inspectorate's and J.C.B.'s records and is attached for each District.

1. Summary of the Reportable Occurrences categorised as an underground conveyor fire for the period from 1-7-84 to 31-12-90.

2. Summary of injuries reported to the J.C.B. from 1-7-89 to 30-6-90 where 'conveyor' has been reported to be the agency of the accident.

These statistics will be utilised to provide guidance for the Mechanical Inspectors as a review of the recent history for each mine's safety performance associated with the operation of underground conveyors.

So that the assessment is carried out in a uniform manner a proforma questionnaire is being developed for use during each conveyor inspection. The results from these assessments will be used in conjunction with the above statistics combined with the total length of installed conveyors as a means of rating the mine's performance.

To enable the final report to be made avilable to the next meeting of the Committee it will be necessary for the inspection phase to ~~be~~ completed by 21 March 1991.

L.J.Roberts
S.I.M.E. 11/2/91

All I.M.E.'s

Copy: C.I.C.M.
S.I.C's

Attach.

DISTRICT CONVEYOR INCIDENTS.

DISTRICT: SOUTH.

TYPE: DANGEROUS OCCURRENCES.
CLASSIFICATION: CONVEYOR FIRES (OFU)
PERIOD: 1-7-84 TO 31-12-90

DATE	MINE	SUBSYSTEM
6-8-84	Darkes Forest	BTR
9-10-84	Corrimal	LTU
5-12-84	Clarence	BTR
17-3-85	Bulli	DVH
29-3-85	Coalcliff	BLT
21-8-86	Wongawilli	BTR
12-9-86	Coalcliff	BTR
11-1-87	Westcliff	DVH
16-1-87	Coalcliff	BTR
18-5-87	Westcliff	BTR
9-3-88	Coalcliff	DVH
10-3-88	Oakdale	DVH
3-11-88	Oakdale	DVH
7-12-88	South Bulli	DVH
21-9-89	Metropolitan	BTR
8-10-89	Metropolitan	BLT
15-2-90	Tahmoor	DVH
15-5-90	Metropolitan	BTR
1-6-90	Westcliff	BTR
13-6-90	Oakdale	BTR
17-10-90	Brimstone	BTR
25-10-90	Tower	BTR
13-7-90	Coalcliff	DVH
6-8-90	South Bulli	DVH

TOTAL: 24

SUMMARY OF INJURIES.
SOURCE : J.C.B. Statistics
Agency of accident: Conveyors
Severity: All categories.
Period: 1-7-89 to 30-6-90

MINE	NATURE OF INJURY								
	0100	0208	0250	0408	0501	0509	0550	0900	ALL
Appin	1	1	2				2		6
Avon			1						1
Berrima							1		1
Coalcliff			1				1		2
Cordeaux			2	2		1	3		8
Kemira						1			1
Metropolitan			2	1			1		4
Nattai-South				2					2
Oakdale	1			1					2
South Bulli			4	1	1	1	1		8
Tahmoor								1	1
Tower			1	1					2
Westcliff			2				1		3
ALL	2	1	15	8	1	3	10	1	41

DISTRICT CONVEYOR INCIDENTS

DISTRICT: WEST.

TYPE: DANGEROUS OCCURRENCES.
CLASSIFICATION: CONVEYOR FIRES (OFU)
PERIOD: 1-7-84 TO 31-12-90

DATE	MINE	SUBSYSTEM
6-2-85	FERNBROOK	DVH
29-9-87	INVINCIBLE	BLT
5-11-88	BAAL BONE	BTE
7-3-90	ULAN	BTR
13-7-90	ULAN	BTR
13-2-87	ANGUS PLACE	DVH
	TOTAL:	6

SUMMARY OF INJURIES.
SOURCE : J.C.B. Statistics
Agency of accident: Conveyors
Severity: All categories.
Period: 1-7-89 to 30-6-90

MINE	NATURE OF INJURY						
	0250	0408	0509	0550	0900	0990	ALL
Angus Place	2	1		3		1	7
Clarence	3			1	1		5
Invincible			1				1
Ivanhoe				1			1
Ulan No. 2	1						1
ALL	6	1	1	5	1	1	15

DISTRICT CONVEYOR INCIDENTS

6-2-91

DISTRICT: NORTH.

TYPE: DANGEROUS OCCURRENCES.
CLASSIFICATION: CONVEYOR FIRES (OFU)
PERIOD: 1-7-84 TO 31-12-90

DATE	MINE	SUBSYSTEM
23-5-86	NEWVALE NO. 2	DVH
10-7-86	ELLALONG	DVH
25-8-86	ELLALONG	BLT
12-3-87	MOONEE	BTR
8-4-87	WALLSEND BOREHOLE	BTR
8-8-88	ELLALONG	BTR
12-8-88	WALLARAH	BTR
21-10-88	WALLARAH	LTU
25-10-88	WALLARAH	LTU
3-11-88	MYUNA	BTE
1-2-89	GRETLEY	OTH
19-9-89	MYUNA	DVH
	TOTAL:	12

PLUS DANGEROUS OCCURRENCES KNOWN 1-1-91 TO DATE.

7-12-90	TERALBA	DVH
13-12-90	AWABA	?

SUMMARY OF INJURIES.
SOURCE : J.C.B. Statistics
Agency of accident: Conveyors
Severity: All categories.
Period: 1-7-89 to 30-6-90

MINE	NATURE OF INJURY								
	0100	0250	0408	0501	0509	0550	0608	0900	ALL
Awaba		4							4
Chain Valley		1	1						2
Cooranbong		3	2		1	1			7
Gretley	1		1				1	1	4
Moonee	1	1							2
Munmorah		1							1
Myuna		2	1						3
Newstan		2				1			3
Newvale No. 1					1	1			2
Pelton/Ellalong		4	2						6
Teralba		2	3	1		2		1	9
Wallarah		2							2
West Wallsend		1	2			1			4
Wyee		2			1				3
ALL	2	25	12	1	3	6	1	2	52

DISTRICT CONVEYOR INCIDENTS

6-2-91

DISTRICT: NORTH-WEST.

TYPE: DANGEROUS OCCURRENCES.
CLASSIFICATION: CONVEYOR FIRES (OFU)
PERIOD: 1-7-84 TO 31-12-90

DATE	MINE	SUBSYSTEM
21-9-84	LIDDELL	DVH
11-8-85	LIDDELL STATE	BTR
20-5-86	FOYBROOK NO.1	DVH
21-5-86	WAMBO	DVH
3-8-87	WAMBO	OTH
19-2-88	WAMBO	BTR
14-4-88	LIDDELL	BTR
25-6-90	WAMBO	DVH

TOTAL: 8

PLUS DANGEROUS OCCURRENCES KNOWN 1-1-91 TO DATE.

2-9-90	LIDDELL	LTU
17-1-91	LIDDELL	BTE

SUMMARY OF INJURIES.
SOURCE : J.C.B. Statistics
Agency of accident: Conveyors
Severity: All categories.
Period: 1-7-89 to 30-6-90

MINE	NATURE OF INJURY						
	0100	0250	0408	0501	0550	0900	ALL
Great Greta			1				1
Gunnedah		2	1		1		4
Lemington	1	1			1		3
Liddell State		4					4
Preston Extended						1	1
Wambo		3		1	2		6
ALL	1	10	2	1	4	1	19

APPENDIX 4

Department of Minerals and Energy

NEW SOUTH WALES GOVERNMENT

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TELEPHONE (02) 901 8888
FACSIMILE (02) 901 8777

Ref.: C89/1052
Contact: L Roberts
Phone: 901 8550

18 February 1991

Dear Sir

RE: UNDERGROUND COAL MINE CONVEYORS

Further to the circular letter dated 15 January 1991, relating to the number and nature of reportable conveyor fires, a review of conveyor installations in underground coal mines has been initiated. The aim of the review is to assess the effectiveness of the protection systems utilised to prevent the occurrence of fires and measures adopted to reduce the incidence of injury.

The review will be conducted by an Inspector of Mechanical Engineering and will cover the following conveyor systems at the mine as applicable:

(a) All conveyors in service at underground coal mines including surface sections for these conveyors but excluding other surface conveyors.

(b) All conveyors in service in reclaim tunnel type installations which are in excess of 60m in length.

In order to assist with this review, it is requested that the attached questionnaire be completed which will provide pertinent data for the conveyor system at the mine. This data should be forwarded to the District Inspector of Mechanical Engineering. The Mine Mechanical Engineer is requested to contact the Inspector as to when the data is required to be provided.

Your co-operation in providing this information and in assisting the Inspector of Mechanical Engineering with this review would be appreciated.

Yours faithfully

Bruce McKensey

B R McKensey
CHIEF INSPECTOR OF COAL MINES

QUESTIONNAIRE
CONVEYORS - UNDERGROUND INSTALLATIONS

Please provide the following information for the conveyor systems installed underground at the colliery including any reclaim tunnel conveyor installations > 60m long.

CONVEYOR SYSTEM.

A separate conveyor belt schematic is to be provided for each seam.

Details of the procedures utilised at the colliery for the inspection, reporting and maintenance of the underground conveyor system including the following:

QUESTION		TICK ANSWER
1. Who does 103 inspections	- deputy	____
	- fitter	____
	- other (specify)	____
2. At what frequency are idlers changed	- daily	____
	- each 2 to 3 days	____
	- weekly	____
	- other (specify)	____
3. On average how many idlers are changed/month.		No: _____
4. Who inspects water barriers	- deputy	____
	- fire officer	____
	- other (specify)	____
5. Who inspects fire fighting equipment	- deputy	____
	- fire officer	____
	- other (specify)	____
6. Who tests conveyor stop/sequence/control systems	deputy	____
	- electrician	____
	- other	____
7. Who checks hydrant pressure and flow	- fire officer	____
	- fitter	____
	- deputy	____
	- other (specify)	____

CONVEYOR NO: _____ (one form/conveyor)

(Conveyor designation: eg 1, 3A, etc)

Conveyor type:
- Drift _____
- Trunk _____
- Panel _____

1 **Conveyor belt:**

1.1 Type:
- Solid woven _____
- Ply _____
- Steel Cord _____

1.2 Length of conveyor (m): _____

1.3 Conveyor Belt Width (mm): _____

1.4 Date of original belt installation
- Pre 1984 _____
- Post 1984 _____

1.5 Conveyor mounting
- Floor: _____
- Roof: _____
- Combined: _____

1.6 Access:
- 1 side only _____
- Both sides _____

1.7 Difference in elevation between load and delivery points (m):
- Up _____
- Down _____
- Level _____

2 **Conveyor Idlers.**

2.1 Manufacturer _____

2.2 Diameter _____

2.3 Type - suspended
- fixed

3 **Conveyor Drive**

3.1 Potential tonnes per hour: _____

3.2 Speed of conveyor (m/s): _____

3.3 Brake type:
- Disc _____
- Drum _____
- Oil immersed disc _____
- Not fitted _____

3.4 Anti-run back:
- Fitted _____
- Not fitted _____

3.5 Fluid coupling used:
Aluminium _____
Steel _____
Not used _____

4 Belt tension.
4.1 Type Automatic _____
Manual _____

4.2 Does take-up comply with intent of Department guidelines:

4.3 Guarding of take up assembly is installed on:
Side _____
Tension end _____
Other end _____

4.4 Guarding of drivehead assembly:
Individual components guarded _____
Area fully fenced _____

5 Tail end loading arrangement:
Feeder
Bin
Transfer
Other (specify)

Manufacturer:
Capacity:

6 Belt scrapers- types, location and spillage removal system:

Location	No.	Type		Spillage removal			
	Fitted	Fixed	Self-adjusting	Auto	Manual	Water	M/C
Headpulley							
Drivehead							
Loop take-up							
Change in gradient.							
Transfer points							
Boot end							

7 Transfer points:
7.1 Designate number of transfer points on conveyor.

7.2 For each one complete the following:-

Transfer Point	1	2	3	4	5
Bin					
In line					
90 degree					
Other					
If other specify					
Dust emission control (yes/no)					
Blocked chute device (yes/no)					

8 Type of joints used:
Clipped _____
Spliced _____

9 Conveyor roadway

9.1 Velocity of air
< 1 m/s _____
> 1 m/s _____

9.2 If velocity > 1m/s what means are available to reduce to 0.25 m/s.
Doors _____
Regulator _____
Other _____
If other describe _____

Conveyor Inspection Check List (Progressing inbye)

Colliery: ..... Conveyor Designation: .....

Trunk/Panel: ..... Mounting(Floor/Roof/Combination): .....

1. Transfer Point(Discharge End):(Discharge End)

a) Direction of coal onto receiving belt

Inline ☐

Up to 90° to conveyor ☐

<90° in opposite direction ☐

b) Scrapers

Head Scraper(s):

Number Fitted ____

Installation quality ____ (1 to 5)

Effectiveness ____ (1 to 5)

Return belt scraper(s):

Number fitted ____

Installation quality ____ (1 to 5)

Effectiveness ____ (1 to 5)

Are water spray(s) used ____ (Y/N)

Slinger roller fitted ____ (Y/N)

Slinger roller effectiveness ____(1 to 5)

Are all scrapings & water transferred to receiving belt effectively ____ (Y/N)

c) Return belt carryback (<u>with belt stationary</u>):

Place a flat steel 150mm rule on belt carry surface and check for carryback past scrapers.

zero ..... = 5

water only ..... = 3

fines ..... = 1

_____(1 to 5)

d) Dust emission

Extent of emission:

Visible in air ____ (Y/N)

Visible on structure ____ (Y/N)

e) Dust emission control:

Installed ____ (Y/N)

In use ____ (Y/N)

Effectiveness ____ (Y/N)

f) Guarding of transfer point:

Is guarding satisfactory ____ (Y/N)

If not why not .....

.....

.....

2. Drive Head

a) Guarding of exposed rotating components between motor and drive pulley(s):

Guard type:

Individual component guards = 5

Area fenced & interlocked to drive at access gate = 3

Area fenced only = 2

Not fitted = 1

____ (1-5)

Quality of installation

Properly fitted = 5

Loose mesh = 2

Not fitted(any component) = 1

____ (1-5)

b) Drivepulley guarding

Adequate. ____ (Y/N)

c) Braking arrangement:

Fitted ____ (Y/N)

Type: (Wet.=5, Dry=2) ____ (1 to 5)

Adjustment Correct. ____ (Y/N)

Conditions Satisfactory ____ (Y/N)

Shoes touching rotating drum____(Y/N)

Limit switches installed ____ (Y/N)

Limit switches operating satisfactory ____ (Y/N)

d) Spillage

Drive installed under belt ____ (Y/N)

Motor:

Evident on cooling fins ____ (Y/N)

Brake:

Evident around brake ____ (Y/N)

Beneath drive pulley(s):

None = 5

Clearance >150mm = 3

Clearance <150mm = 2

Touching belt = 1

____ (1 to 5)

Spillage deflector plate fitted between belt and drive ____ (Y/N)

Effectiveness ____ (1 to 5)

Lubricant Spillage:

None = 5

Some evident = 3

Excessive = 1

____ (1 to 5)

Fluid coupling:

Installed ____ (Y/N)

Fire resistant fluid used ____ (Y/N)

Fire resistant sign fitted ____ (Y/N)

Comments:

Conveyor Inspection Check List (Progressing inbye)

Colliery: ..... Conveyor Designation: .....

Trunk/Panel: ..... Mounting: (Floor/Roof/Combination).

3) Loop Takeup

Guarding - quality of installation:

Nip points of moving parts

Protected	= 5
Loose mesh	= 2
Not fitted	= 1

_____ (1 to 5)

Take up trolley rails guarded:

_____ (Y/N)

Take up winchs:

Power operated _____ (Y/N)

Manually operated _____ (Y/N)

Spillage:

Zero ☐

< 0.5 m^3 ☐

> 0.5 m^3 ☐

4. Along Conveyor

a) Troughing idlers:

Collapsed, seized or in danger of damaging belt:

Number marked ☐

Number unmarked ☐

Noisy idlers (not included above):

Number marked ☐

Number unmarked ☐

b) Return idlers

Collapsed, seized or in danger of damaging belt:

Number marked ☐

Number unmarked ☐

Noisy idlers (not included above):

Number marked ☐

Number unmarked ☐

c) Time interval since defective roller identified by Colliery inspection:

Quantity at < 3 days ☐

Qty>3 days & <7 days ☐

Quantity at > 7 days ☐

Not known ☐

d) General idler installation:

Evidence of overloading ____ Y/N

Can 300mm floor clearance be achieved ____ Y/N

e) Overpass:

Gradual grading _____ (1 to 5)

Heavy duty idlers at grade change _____ (Y/N)

Is guarding satisfactory _____ (1 to 5)

f) Vertical alignment of idlers:

Extent that return belt is supported by return idlers _____ 1-5

Extent that unloaded belt is supported by trough idlers set _____ 1-5

g) Spillage:

Under return rollers:

Nil	= 5
Contact <10 idlers	= 4
Contact >10 & <20	= 3
Contact >20 idlers	= 2
Contact with belt	= 1

_____ (1 to 5)

General extent of spillage:

Nil	= 5
Upto 1 m^3	= 3
> 5 m^3	= 1

_____ (1 to 5)

h) Structure:

Cleanliness _____ (1 to 5)

Alignment _____ (1 to 5)

General condition _____ (1 to 5)

i) Conveyor belt

Tracking /alignment:

Good	= 5
Over edge rollers	= 2
Contact with stationary components	= 1

- Carry side _____ (1 to5)

- Return side _____ (1 to 5)

Belting:

Cover condition _____ (1 to5)

Edge damaged/loose fibre _____ (Y/N)

Fibre buildup on rollers _____ (Y/N)

5) 1st Intermediate Transfer Point Designation.....

a) Scrapers(on receiving belt):

Installation quality _____ (1 to 5)

Effectiveness _____ (1 to 5)

b) Spillage:

Receiving belt return side beneath transfer point:

Is 300mm clearance from floor available _____ (Y/N)

Extent ofspillage

Zero	= 5
< 100mm	= 4
> 100mm	= 3
touching idlers	= 2
touching belt	= 1

_____ (1 to 5)

General extent of spillage at transfer point:

Zero	= 5
< 0.5 m^3	= 3
> 0.5 m^3	= 1

_____ (1 to 5)

Conveyor Inspection Check List (Progressing inbye)

Colliery: ..... Conveyor Designation: .....

Trunk/Panel: ..... Mounting(Floor/Roof/Combination): .....

5) 2nd Intermediate Transfer Point Designation.....

a) Scrapers(on receiving belt):

Installation quality _____ (1 to 5)

Effectiveness _____ (1 to 5)

b) Spillage:

Receiving belt return side beneath transfer point:

Is 300mm clearance from floor available _____ (Y/N)

Extent ofspillage

Zero	= 5
< 100mm	= 4
> 100mm	= 3
touching idlers	= 2
touching belt	= 1

_____ (1 to 5)

General extent of spillage at transfer point:

Zero	= 5
< 0.5 m^3	= 3
> 0.5 m^3	= 1

_____ (1 to 5)

5) 3rd Intermediate Transfer Point Designation.....

a) Scrapers(on receiving belt):

Installation quality _____ (1 to 5)

Effectiveness _____ (1 to 5)

b) Spillage:

Receiving belt return side beneath transfer point:

Is 300mm clearance from floor available _____ (Y/N)

Extent ofspillage

Zero	= 5
< 100mm	= 4
> 100mm	= 3
touching idlers	= 2
touching belt	= 1

_____ (1 to 5)

General extent of spillage at transfer point:

Zero	= 5
< 0.5 m^3	= 3
> 0.5 m^3	= 1

_____ (1 to 5)

6) Controls

Conveyor sequencing:

Checked _____ (Y/N)

Effectiveness _____ (1 to 5)

Conveyor interlock & emergency stop switches:

Number tested _____

Number failed _____

Chute full limits:

Number tested _____

Number failed _____

7. Walkways

Width adequate ____ (Y/N)

Headroom adequate ____ (Y/N)

Walkway extremely muddy ____ (Y/N)

Pipes/cable obstructing way ____ (Y/N)

Housekeeping of walkway ____ (1 to 5)

Access across belt required ____ (Y/N)

Access across belt adequate ____ (1 to 5)

Waterholes present too deep for gumboots ____ (Y/N)

Pumplines installed to waterholes ____ (Y/N)

8) Boot End or Receiving End Transfer point

a) Scrapers(on receiving belt):

Installation quality _____ (1 to 5)

Effectiveness _____ (1 to 5)

b) Spillage:

Receiving belt return side beneath transfer point or boot end:

Is 300mm clearance from floor available _____ (Y/N)

Extent ofspillage

Zero	= 5
< 100mm	= 4
> 100mm	= 3
touching idlers	= 2
touching belt	= 1

_____ (1 to 5)

General extent of spillage at transfer point: Zero = 5

< 0.5 m^3	= 3
> 0.5 m^3	= 1

_____ (1 to 5)

c) Guarding of tail roller:

Satisfactory ____ (Y/N)

Comments:

Conveyor Inspection Check List (Progressing inbye)

Colliery: ..... Conveyor Designation: .....

Trunk/Panel: ..... Mounting: (Floor/Roof/Combination).

9. Heatings:

Was any evidence of heating found during the inspection. ____ (Y/N)

If YES please elaborate below:

.....

.....

.....

10. Reports

a) Colliery belt inspection reports:

Reviewed ____ (Y/N)

Defective items recorded ____ (Y/N)

Defect and repair / replace dates recorded ____ (Y/N)

Defective items specified for number and location ____ (Y/N)

Spillage identified ____ (Y/N)

Tag system used for defective rollers ____ (Y/N)

b) Section 103 Mechanical Report:

Reviewed ____ (Y/N)

Satisfactory ____ (Y/N)
OR
Included in 10(a) ____ (Y/N)

c) Fire Officers Report:

Reviewed ____ (Y/N)

Satisfactory ____ (Y/N)

11. Miscellaneous:

Report by exception on any matters considered to be relevent and not covered within report above.