



Testing of Conveyor Belts . . . Not Your Usual Barbeque!

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You wouldn't cook a steak this way but then again the barbecuing process required in the Australian Standard for testing of the flame integrity of a rubber and steel belted conveyor belt is a far cry from the subtle cooking of a T-bone steak.

Conveyors using rubberised conveyor belts are in common usage in port installations, mines, and grain handling. Over the last 6 years there has been a spate of fires on conveyors in NSW underground coal mines. They have occurred on both surface conveyors, in Drifts and main trunks and at boot ends. The cause of these fires is thought to derive from high temperatures (above 150 degrees) generated on the surface of the conveyor belts.¹



Laurie Gerisch checking the temperature & humidity of the air flow through the gallery

As a risk management procedure both mines and mines inspectors are now routinely insisting that conveyor belts be tested prior to installation in accordance with the provisions of AS1334 Part 12. This pertains to determining the integrity and fire resistance of the conveyor belt under severe exposure to flame.



Michael Kovacs igniting the gas flame prior to testing the conveyor belt

But back to the barbeque. The actual testing of conveyor belts requires that a barbeque-type process be done in TestSafe's fire gallery on a sample of a conveyor belt placed 100mm directly above a burner containing 1.3kg of LPGas. The burning process is specified for 10 minutes, and an airflow within the fire gallery needs to be achieved at 1.5 metres per second to replicate the airflow in an underground coal mine. The sample is tested to destruction and upon cooling an expert analysis is undertaken of the charred features of the surface of the belt.

A viewing room is provided for those enthusiastic clients wishing to observe the process at close hand.

TestSafe's Fire Gallery is one of the few places in the southern hemisphere that this test can be safely undertaken in an environmentally sensitive manner. The test is required to be conducted in an internal space, with large exhaust fans capable of lifting the residual smoke to atmosphere more than 30 metres above the fans. Testing within TestSafe's 100 acre site is only done on warm days with a Ringelman analysis of smoke emissions being conducted by the staff.

Samples of conveyor belts are now being tested from Chinese, Indian and Australian manufacturers, and many coal mines are interested in a further more advanced analysis of the after glow effect of the belt once the fire has concluded.

This essential testing process will undoubtedly lead to safer convey of bulk products and a removal of one of the major risk factors for underground fires.



Conveyor belt under test conditions



Gallery exhaust fans which controls the rate of air flow

(Footnotes)

¹ W.Koppe Inspector of Mines
Department of Primary Industries,
NSW, "Overview of Fires on
Conveyors in NSW Underground Coal
Mines ... Period 1999 - 2005 and
1989 - 1995"

Presentation to the 15th
Mechanical Engineering Safety
Seminar 2-3 August 2005

*(see pages 4, 5 & 6 for more
details)*

Department of Primary Industries New South Wales



Overview of Fires on Conveyors In NSW Underground Coal Mines

Period 1999 to 2005
and
1989 to 1995

DISCLAIMER

Statistics may be inaccurate due to:-

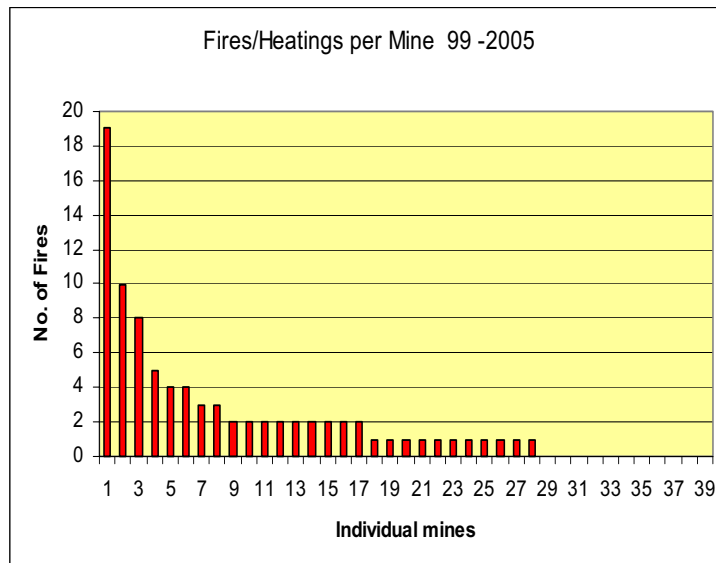
1. Reporting not consistent
2. Definition of fire has changed
3. Definition interpreted differently
4. Heatings treated as fires

Years	89/95	99/05
Number of years	6	6
Total fires	43	85
North	15	37
South East	29	48

Obtained from 15th Mechanical Engineering Safety Seminar 2-3 August 2005

Issues

Years	89/95	99/05
Hazardous zone	2	16
Tracking	7	38
Bearing failure	26	26
Spillage	17	22
Design/Standards	23	71
Engineering Practice		
Drive shaft/coupling	12	4
Maintenance	26	54
Electrical	6	6



Compliance Issues

- Coal Mines (Underground) Regulation 1999
- AS 1755-is called up in Regulations
- Good Practice

Non Compliance Areas

1. Managers
2. Undermanagers
3. Deputies
4. Risks

5. Conveyor Management Plans
6. Standards of Mechanical Engineering Practice
7. Defect Management Systems
8. Inspections don't cover requirements
9. Use in dusty places

Non Compliance - Fires

•Contacting stationary objects	37
•Spillage	10
•Belt fabric	2
•Bearing temperature monitoring	10
•Tracking limits	38
•Surface temperature above 150°C	85

Significant Fires

- Appin Drift
- Wambo Main Trunk
- Wyee Drift
- South Bulli - Steel Cord
- South Bulli - Boot End
- Ulan surface conveyor
- Huntley surface conveyor

Recommendations

1. Compliance Improvements
2. S.E. Practice Improvements
3. Conveyor Management Plan Improvements
4. Change traditional conveyor inspections to cover compliance issues
5. Improve belt tracking
6. Install more tracking limits, improve their effectiveness
7. Improve bearing seals, for pulleys
8. Reduce pulley bearing load/rating
9. Fit temperature/vibration controls
10. Stop running conveyors in spillage
11. Stop running conveyors with a build up of belt carcass
12. Stop running conveyors in contact with stationary objects