Resources Regulator
Department of Regional NSW

Safety Alert

Date: October 2023

Conveyor tail pulley fire

This safety alert provides safety advice for the NSW mining industry.

Issue

Underground mine workers investigating a burning smell discovered a fire on a longwall conveyor tail pulley. Workers tried unsuccessfully to extinguish 300 mm high flames with water hoses and fire extinguishers while the conveyor was running. The fire reignited when the cool water was removed. The conveyor was stopped, and the fire was extinguished. The conveyor was isolated, water applied to the tail pulley shaft area, and a fire watch was posted pending investigation.

Figure 1: Failed tail pulley bearing

Circumstances

The mine determined the fire was caused by a failed tail pulley bearing. The 2 tail pulley bearings were monitored by resistance temperature detectors (RTDs). Tail pulley bearing temperature trending was available through the mine's monitoring system.

The recorded temperature of the bearing involved in the incident rose to about 41°C compared with the recorded temperature of the opposite pulley bearing that remained relatively steady about 25°C. The monitoring system was set to alarm when bearing temperature reached 65°C.

The grease used in the bearing had a melting point of 180°C and a flash point of 230°C.

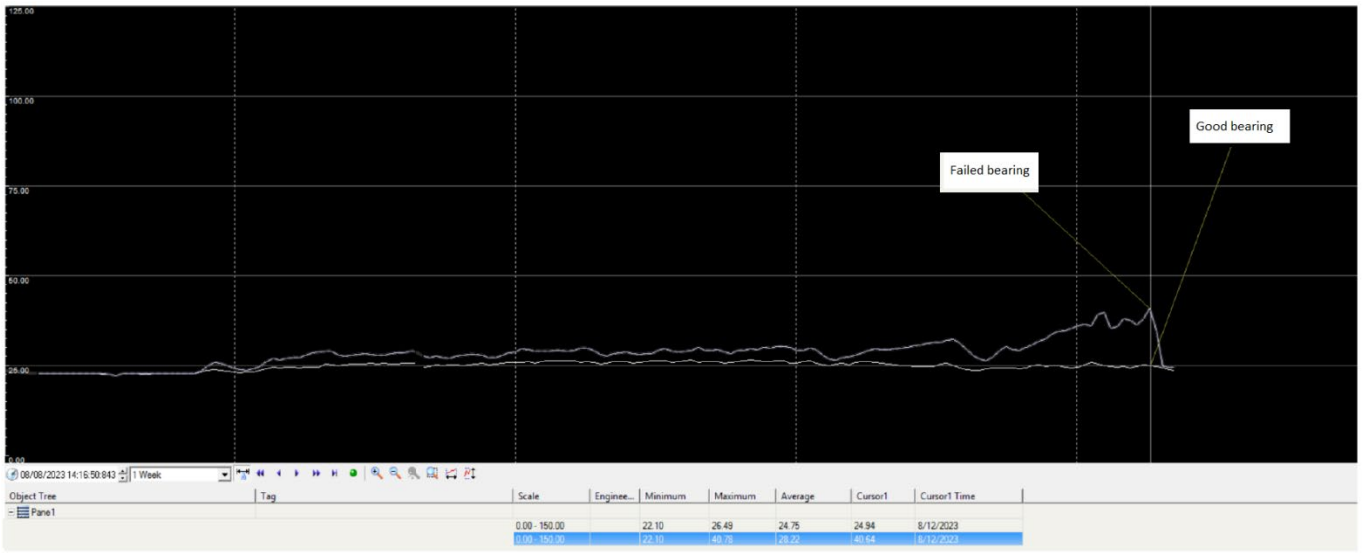
Investigation

The mine is investigating the circumstances surrounding the fire. An investigation discovered 2 key factors that contributed to failing to detect the deteriorating tail pulley bearing.

1. The design length of the RTDs monitoring the tail pulley bearing temperatures was 450 mm. The RTDs installed in the tail pulley assembly were only 290 mm, meaning that the measured temperature may not have reflected the actual bearing temperature.
2. The tail pulley bearing temperatures were monitored independently. Differential temperature monitoring of pulley bearings was the established standard at the mine but was not in place for the longwall tail pulley.

Monitoring records for the tail pulley involved in the incident revealed bearing temperature divergence began several days before the incident. An alarm setting of 10°C differential temperature (for example), would have provided several hours warning of the failure.

Figure 2: Bearing temperature monitoring for the week prior to the incident



Recommendations

Equipment manufacturers should:

- ensure temperature monitoring systems are fitted in accordance with the equipment designs to achieve highest level of accuracy and sensitivity
- provide guidance on establishing and implementing setpoints for over-temperature alarms and tripping functions.

Mine operators should:

- establish systems to verify that devices provided to manage fire risks detect, alarm and trip in accordance with equipment specifications.
- ensure that monitoring systems are installed and operated to manage fire risk as described in the mine's safety management system.
- ensure monitoring data is readily available to enable the identification of emerging hazards.

Safety Alert SA23-03

Note: Please ensure all relevant people in your organisation receive a copy of this safety alert and are informed of its content and recommendations. This safety alert should be processed in a systematic manner through the mine's information and communication process. It should also be placed on the mine's common area, such as your notice board where appropriate.

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