

# SAFETY ALERT

## Winder balance rope failure

### INCIDENT

A friction winder was being used to hoist 21 people to the surface at the end of shift. The winder stopped on a safety device trip. The conveyance, a skip over cage, was 5m below the surface plat.

The mine's rescue team was used to evacuate all people. No-one was injured.

### CIRCUMSTANCES

The friction winder consisted of a solo skip in balance with the skip over cage.

An inspection revealed one of two 46mm non-rotating balance ropes had broken 25m below the cage. The broken rope, which weighed several tonnes, fell to the bottom of the shaft some 1000m resulting in significant damage.

If the failure had occurred on the solo skip side with the cage conveying the people at the bottom of the shaft, the failed rope could have fallen onto the cage with disastrous consequences.

### INVESTIGATION

The 25m portion of the broken balance rope that remained suspended below the cage after the incident was recovered (see photographs). The rope was severely corroded immediately adjacent to the break. It appears the reduction in cross sectional area due to corrosion combined with the self weight of the rope caused the failure. This corroded section of the rope formed the tail loop at the shaft bottom when the skip over cage was at the loading stage. This section of rope was most exposed to spillage during loading, and hence to the corrosion and wear that would result from the entry of fine particles of sulphide ore into the rope structure.

What could be observed of the remainder of the rope appeared to be relatively free of corrosion although poorly lubricated.

Non destructive testing was routinely carried out six monthly. The last test was one month before the incident. No significant loss of area was identified. However only those parts of the balance ropes that could be safely accessed from an existing inspection platform were subject to testing.

The testing did not include the point at which the failure occurred. This was the section that was most prone to corrosion and was the most highly stressed part of the balance rope.



*Photo 1 - Broken end of balance rope.*



*Photo 2 – Close-up of corroded rope.*

## RECOMMENDATIONS

Mines that operate winders should review their winder management plans with consideration to -

1. Safe systems of work for the inspection and testing of all winder ropes.
2. Periodic non destructive testing and visual inspections covering the full length of the rope.
3. Particular attention being given to inspection and testing of high risk areas, such as the tail loop area on balance ropes.
4. The provision of fit-for-purpose infrastructure in shafts to provide safe access to winder ropes for inspection and testing,
5. All winder ropes being inspected, tested and discarded in accordance with –
  - o AS4812:2003 *Non-destructive examination and discard criteria for wire ropes in mine winding systems*, and
  - o [MDG 26 Guideline for examination, testing and discard of mine winder ropes for use in coal mines.](#)
6. The winder management plan not being altered, and safety critical inspections not being delayed, unless a thorough risk assessment has establish that the deviation from the plan will not compromise safety and the variation has been approved at a senior level.

**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 notice board.

**Signed**



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