Department of Natural Resources and Mines

Queensland Government

Earthmover tyre and rims

Mines safety alert no. 334 | 06 December 2016 | Version 1

What happened?

Recent incidents reported to the Mines Inspectorate highlight the need for continual vigilance when working around tyres and rims. This alert aims to refresh your awareness of some of the hazards associated with tyres, rims and wheel assemblies and the need to manage these safety critical items to minimise risks to the safety of workers. The following incidents have been reported to the Inspectorate during the last quarter.

Lock-ring failure

A CAT 992 front end loader left the tyre bay after a new O-ring had been fitted to the position one wheel. After travelling for about 100 metres, the assembly failed catastrophically, resulting in parts being propelled from the loader. No injuries occurred.

The lock-ring cracked circumferentially through the thinnest section (refer Fig. 1), resulting in two rings that were no longer able to keep the assembly together. Investigations including wear limits (refer Fig. 2) of mating components and metallurgical assessments are ongoing.

Tyre and rim assembly failure

A maintenance section was assembling four 36.00 trailer tyres (refer Fig. 3). Two tyres had been assembled and inflated to 10-15 PSI as per site procedures. During this process the tyre had been manipulated by the tyre handler. Approximately 20 minutes after inflating the first tyre (and while personnel were working on the third tyre) the lock-ring of the first tyre let go. The rim was projected vertically so that the bottom of the rim was roughly one metre above the top of the tyre at its highest point. At the time the tyre let go, two workers were at the third tyre, which was eight metres away. Procedures in place at the time of the incident required the tyres to be inflated from a remote location, however, once inflated workers are required to reach over the tyre and rim assembly to disconnect the airline.

Fall of double gutter components

A rear dump truck went to the workshop to have a position 6 flat tyre replaced. The dual rear wheel assemblies were fitted with double gutter rim components. The flat tyre and rim assembly was removed from the truck and placed in a vertical tyre inspection stand (refer Fig. 4). Personnel working on the assembly left the area and on their return a bead seat band, with a mass of 230 kg, had fallen off the rim assembly into an area where personnel stand to inspect and assemble the tyre and rim.

Fall of rim components following in service tyre burst

A loaded CAT 789 rear dump truck had a position 6 tyre burst while travelling from the digger to the dump. The supervisor advised the operator to dump the load and then take the truck to the tyre bay. The truck travelled approximately 4 kilometres before stopping at a park-up area where the position 6 tyre fell off the rim. The lock-ring was found 225 m away and the bead seat band was found 150 m back along the route the vehicle had taken.

Fall of spacer ring during maintenance

Tyre fitters were positioning a spacer-ring upright on the ground ready for lifting into position, when the unsecured spacer-ring fell onto its side catching a coal mine worker on the lower right leg causing a serious laceration.

Workshop hand injury

A workshop fitter was using a Radgun to tension bolts. The Radgun jammed and spun in reverse jamming the fitter's ring finger left hand against the rim. The fitter suffered a compound fracture of the finger and multiple stitches.

Comments

1. Tyres, rims and wheel assemblies are safety-critical items that must be maintained and used correctly.
2. Further information on earthmover tyre and rim safety is available in the safety bulletins previously published by the Mines Inspectorate (refer References 1 & 2) and from equipment suppliers.
3. These incidents had the potential to result in serious injury and highlight the need for continued vigilance in managing tyres.
4. There is a need to understand component wear limits and provide usability guidelines for tyre fitters.
5. Critical steps and hazards in managing tyres and rims need to be understood and managed. This includes the potential for manual handling risks, falls due to gravity and pressure.
6. Hazards associated with continuing to operate defective equipment need to be understood and controlled.

Recommendations

Mines should:

1. Review standard operating procedures for fitting, removing, testing, maintaining and repairing tyres and rims on fixed and mobile plan.
2. Review and assess risks associated with each step of the assembly and disassembly process. This should include the potential for falls of components due to gravity, fitment and dislodgement of components, access to pressurised assemblies.
3. Component inspection standards, reusability criteria and wear limits of components should be established and made available to tyre fitters. Tyre fitters must be trained in how to measure these limits. This may include the use of profile gauges and go-no go gauges.
4. Review site procedures to be followed in the event of tyre burst or deflation.
5. Review use of hand tools, in particular their suitability for particular applications.

References and further information

1. Earthmover tyre and rim safety: Mines safety bulletin no77; 25 June 2008.
2. Earthmover tyre and rim safety: Safety alert from the Office of the Commissioner for Mine Safety and Health, No. 1, 28 March 2011.

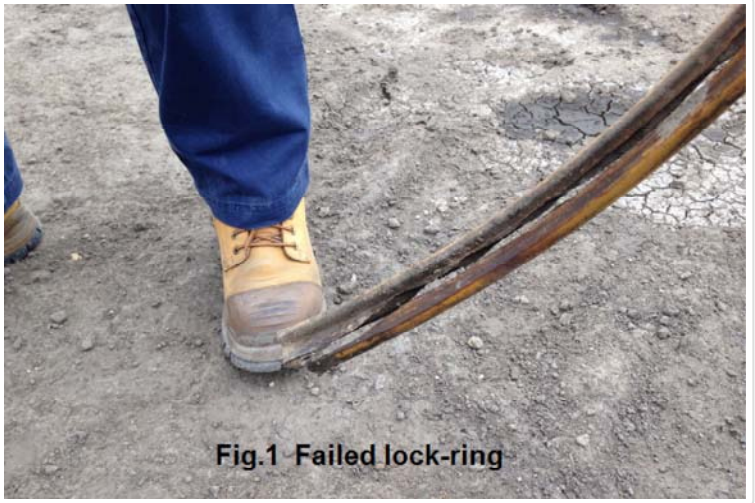

Fig.1 Failed lock-ring

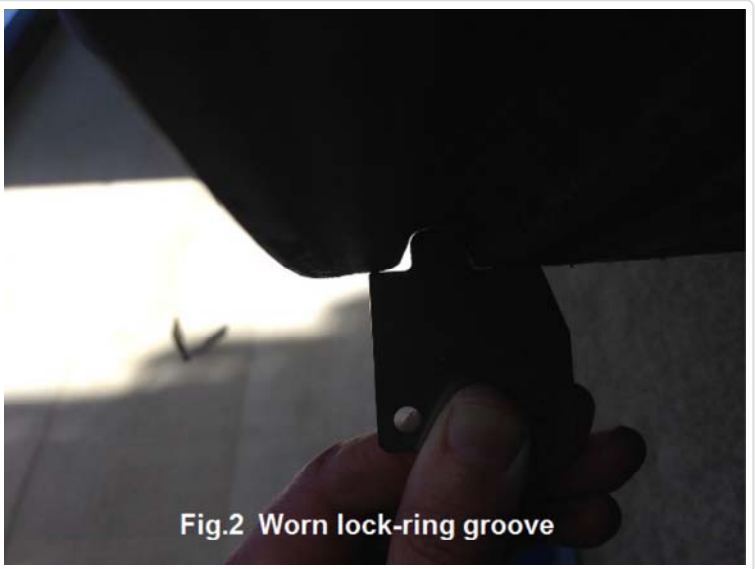

Fig.2 Worn lock-ring groove

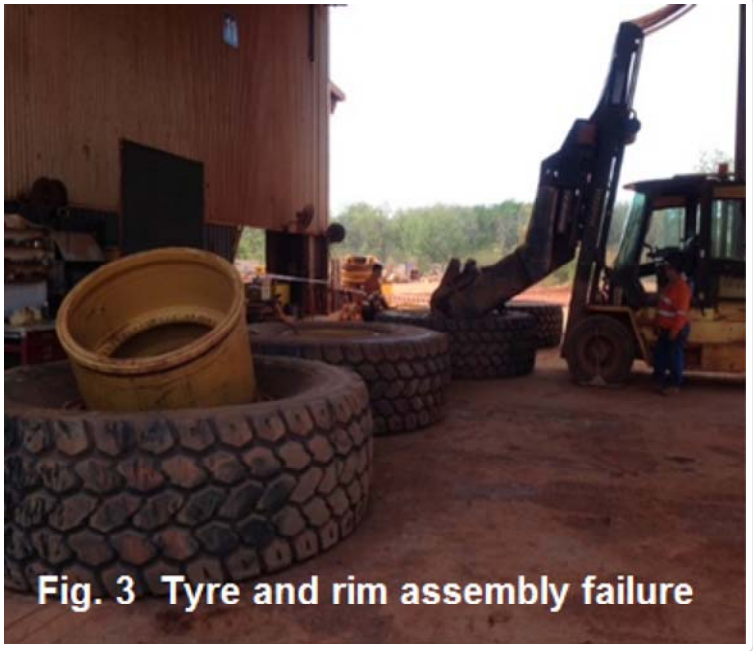

Fig. 3 Tyre and rim assembly failure

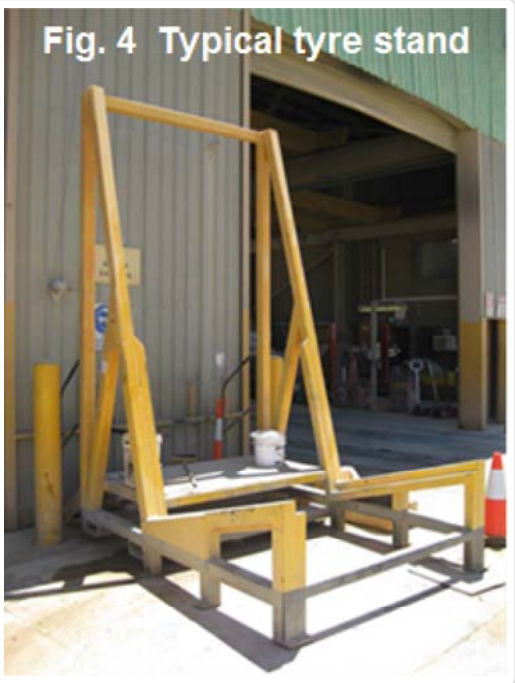

Fig. 4 Typical tyre stand

Authorised by Russell Albury - Chief Inspector of Coal Mines
Contact: Anthony Logan, Inspector of Mines, +61 7 3199 8013 anthony.logan@dnrm.qld.gov.au
Issued by the Queensland Department of Natural Resources and Mines

Placement: Place this announcement on noticeboards and ensure all relevant people in your organisation receive a copy.

Find more safety alerts and bulletins

Search the hazards database