

EMESRT CATEGORY

Risk of tire or rim failure due to loss of control of the previous duty or repair history of these components

TYREgate Information Phone: +61 7 3346 4081 Fax: +61 7 3346 4067

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TYREgate Reference:5

Metal fatigue causing fire - it appears the hubs failed under tensile load, initiated from a fatigue crack

Root & Contributing Causes:

Material fatigue

Preventative / Recommended / Accepted Steps of Risk Mitigation, Points of Interest:

Hastings Deering will be issuing an information bulletin for the use and maintenance of hubs in questions, the following may be included:

- Replace rear hubs before reaching 60,000 hours
- Visually inspect hubs each time a wheel is replaced
- · Periodically inspect the early series hubs for signs of cracking, possibly 12 monthly or more frequently if the vehicle is used in arduous conditions.
- Continue with good management practices.
- · Review the mine fire management procedure for rubber-tyred vehicles, specifically isolation of burning tyres and removal of all persons from a possible blast zone.

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TYREgate Reference:36

Reuse of damaged rim components

Root & Contributing Causes:

- LTA matching of assembly components.
- LTA material testing/fatigue NDT
- LTA rim integrity
- Abnormal operating conditions.
- Tyre low pressures (under inflation) causing the rim integrity to be compromised.

Preventative / Recommended / Accepted Steps of Risk Mitigation, Points of Interest:

- Manufacturers of multi-piece rims list a number of important procedures.
- Do not use a hammer or any other object to force rim components in place.
- Do not attempt to take rim components apart on inflated tyres.
- Always use a clip on chuck that permits a person to stand clear of the potential path of rim components when inflating tyres on these rims.
- Always deflate the tyre before removing a wheel from an axle and before removing the tyre from the rim, by removing the valve core.
- Do not rework or reuse damaged rim components.
- A rubber type lubricant must be applied to the tyre bead and the contact surfaces of

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Site Answers & Comments:

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the rim during assembly of wheel and inflation of the tyre.

- Wherever possible tyres must be inside a cage during inflation. If this is not possible all personnel must stand well clear of the tyre and rim components during the inflation.
- Do not rest or lean any part of your body or any equipment against the cage during the inflation process.
- Do not inflate a tyre above 35 kpa whilst it is outside of a cage, unless the area can be isolated.
- Always inspect the tyre after it has been inflated whilst it is still in the cage to ensure all components are correctly fitted.
- In addition to these recommended procedures it was recognized that "Sur-Loc" bands which are welded to bead seat bands on some of the multi-piece rim assemblies can cause obstruction to proper visual inspection of the fitment of lock-rings. If the "Sur-Loc" bands have been hammered, the resultant burring and/or deformation can interfere with the fitting of the lock-ring and can move the lock-ring out of the correct position during tyre inflation.
- Recommendations are also made about the use of special tools to check the profile of lock-ring grooves and lock rings to avoid incidents of this type.

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 TYREgate Reference:43
 Site Answers & Comments:

 Substandard workmanship of tube repair.
 Site Answers & Comments:

 Root & Contributing Causes:
 Failure of tyre or tube repair.

 Preventative / Recommended / Accepted Steps of Risk Mitigation, Points of Interest:
 File Answers & Comments:

 Tube should not be older than tyres fitted to vehicle.
 Site Answers & Comments:

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TYREgate Reference:45

Initial indications are that a previous repair of a sidewall tear (approximately 125 mm x 100 mm) by a tyre repairing company had failed during service

Root & Contributing Causes:

• Failure of tyre or tube repair.

Preventative / Recommended / Accepted Steps of Risk Mitigation, Points of Interest:

Energy released by tyre explosion or rupture is enormous. The consequences therefore, are often massive equipment damage and fatal injuries. Explosions usually occur due to impact or chemical pyrolysis (chemical heating causing build up of flammable gas and pressure within the tyre). Pyrolysis related explosions have been known to occur up to 24 hours after the initiation of pyrolysis. Whilst this incident appears to be related to defective repair rather than an explosion due chemical effects, it is an opportunity to reiterate possible initiators of pyrolysis such as contact with high voltage power lines, application of heat to wheel rims and lightning strikes. There are also high safety risks associated with multi-piece rims. Many serious and fatal accidents over the years have been attributed to poor maintenance, inadequate inspection, poor fitting practice and use of incompatible components in multi-piece rims. The risk of damaging pressure energy release associated with tyres warrants a risk management exercise encompassing the whole life cycle from selection to discard.

Site Answers & Comments:

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RECOMMENDATIONS:

- Develop standards for tyre management through a risk management exercise. Guidance could be sought from tyre manufacturers and Australian Standard AS 4457-1997: Earth-moving machinery off-highway rims and wheels, maintenance and repair.
- Ensure that training and competency requirements for persons involved in tyre repairs are adequately addressed.
- Ensure that designers, manufacturers, importers, suppliers, tyre repairers and other service providers are aware of and understand their obligations under the Mining and Quarrying Safety and Health Act 1999 and the Coal Mining Safety and Health Act 1999.

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TYREgate Reference:52	Site Answers & Comments:
Split ring fractured striking employee Root & Contributing Causes:	
 LTA material testing/fatigue NDT No NDT schedule 	
Preventative / Recommended / Accepted Steps of Risk Mitigation, Points of Interest:	
Before tyres are repaired, written procedures for the type of tyre in question should be checked instead of guessing what may be required. Care must be exercised when assembling multi-piece rims with special attention to the following points:	
(i) The rim components should be carefully inspected prior to assembly, with particular attention given to wear in the rim.	
(ii) The rim assembly nuts should be tightened to the correct torque specifications using a 'T' bar and socket or tension wrench.	
(iii) Prior to inflating the tyre, an appropriate restraining device should be fitted.	
(iv) The person inflating the tyre should not stand in front of the tyre, but in a safe position.	
(v) The inflation device should incorporate a hand piece with a pressure gauge, flow control mechanism and sufficient hose to distance the operator from the inflation chuck.	
(vi) Assembly and dismantling of multi-piece rim components should be carried out with care and 'shock loading' of vulnerable parts of the assembly (e.g due to striking with heavy hammers) should be avoided.	
(vii) Periodically, components should be checked for cracks. Training in tyre repair procedures must be provided to all maintenance personnel required to carry out repairs, to ensure that they are competent to do so. This competence must be verifiable by the production of a certificate of competency or ticket provided by recognized tyre repair trainer.	
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TYREgate Reference:78

Equipment carried in LV tray not secured Root & Contributing Causes:

Root & Contributing Causes.

• Equipment in transport not secured

Preventative / Recommended / Accepted Steps of Risk Mitigation, Points of Interest:

To avoid incidents like this from recurring, ensure you always adhere to the following points:

- All loads must be placed into the tray of the vehicle and properly secured using the supplied tie-down straps check the straps each time you use them and ensure they stay with the vehicle. Only use proper tray tie-down points to secure the load.
- Ensure that the load can safely be carried by the vehicle never overload the vehicle!
- Tools incl. stands, jacks, tyres, rims etc must not be carried inside the passenger compartment.
- Loose items in the passenger compartment must be restrained or placed on to the floor of the vehicle.
- Loads must not protrude from the side of the vehicle and must not interfere with the forward or rearward vision of the driver.
- f a load protrudes from the front or back of the vehicle, you must abide by site/relevant government traffic rules and attach a suitable warning flag to the item.
- When loaded, drive at reduced speed, particularly in corners, and allow for increased braking distance.

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Site Answers & Comments:

Site Answers & Comments:

TYREgate Reference:93 The specialised rim retaining bolts as supplied by the OEM were not used to assemble the split rim Root & Contributing Causes:

- LTA procedure
- LTA dismantling of 2 piece industrial rim.
- Incorrect fasteners used nuts and studs

Preventative / Recommended / Accepted Steps of Risk Mitigation, Points of Interest:

Short term Controls:

- Attach information tags to rims adjacent to wheel struts "Tyres must be deflated and valve stems removed before removing wheels" on forklifts fitted with split rims.
- Only use contractors who hold the competency MNCG1031A "Remove, fit and adjust Wheels" to repair and refit tyre/wheel assemblies for all equipment used on site.
- Reinstate all forklift wheels to OEM specifications.

Long Term Controls

- Identify alternate rims/tyre types for forklifts to eliminate the exposure associated with slit rims (solid tyres are available for all forklift sizes)
- Audit all mobile plant and equipment on site to identify other equipment that may be fitted with split rims.

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