

## EMESRT CATEGORY:

## Risk of assembly failure from mismatched components on multiple component rim assemblies

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TYREgate Reference:3

A new multi piece rim and tyre were assembled but the locking ring was installed the wrong way around

Root & Contributing Causes:

- **LTA matching of assembly components.**

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

All components were new and free from defect. The lock ring had no markings of identification, size or fitting instruction. The tyre fitter had recently received instruction in tyre assembly from an international tyre company. Most lock rings fail safely as they cannot be retained in the lock ring groove 'the wrong way around' or they 'peel out' at very low pressures. A new type of lock ring bearing the warning 'Do not inflate wrong way around' has been located. Safety Alert Number 78 was issued in May 1995 and recounted a very similar story. If we do not learn from mistakes we are doomed to repeat them.

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Site Answers &amp; Comments:

TYREgate Reference:28

Cumulative effect of deficiencies: Rim components (flange) not properly matched - incorrect flange was installed, insufficient training of tyre servicing personnel

Root & Contributing Causes:

- **LTA matching of assembly components.**
- **LTA material testing/fatigue NDT**
- **LTA procedure**
- **LTA training /competency**
- **Fitted assemblies received but not checked for integrity.**

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

Use of solid fill (foam filled tyres) to eliminate the pressure hazard. Check all rim components for compatibility prior to assembly. Do not interchange rim components unless safe to do so as per applicable rim manuals. Inspect rim components for dirt, surface rust, corrosion and pitting before mounting. The tyre side of the lock ring should be marked by some distinctive means so that immediate identification of proper location of the lock ring is achieved. Clean all rust and dirt from mating surfaces before assembly. Do not mix components from different manufacturers or models. Never beat on a

Site Answers &amp; Comments:

pressurized multi piece wheel/tyre assembly. Provide comprehensive tyre and rim safety training to maintenance personnel who service tyres and rims. Never attempt to use broken, work or unserviceable parts.

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TYREgate Reference:41

## Tyre was not compatible for the rim

Root & Contributing Causes:

- **LTA matching of assembly components.**

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

Employees undertaking tyre fitting work must be given adequate instruction and training as per relevant mining acts and regulations. Persons engaged in tyre fitting work must ensure the tyre being fitted is the correct size and compatible with the rim. All light vehicle or industrial tyres that have just been mounted onto a rim must be inflated inside a tyre cage. Personnel should stand to one side of the wheel during inflation. During inflation process, the tyre pressure should be regularly monitored using a suitable pressure gauge. Tyres must never be inflated beyond manufacturers` recommendations. Damaged tyres that are no longer serviceable should be discarded and not reused.

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Site Answers & Comments:

TYREgate Reference:42

## Failure of lip on bead seat band

Root & Contributing Causes:

- **LTA material testing/fatigue NDT**
- **LTA rim integrity**

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

It is unsure what exact root causes caused the failure of the bead seat band, however as a precaution the following steps are recommended:

1. Closely inspect all rim components prior to assembly for suitability, cracks, damage, deformation and corrosion. If in doubt consult with a supervisor or the original equipment manufacturer to check safety and serviceability of the componentry.
2. Always ensure that all rim components are fitted correctly and rim assembly integrity is assured.
3. Never stand in the trajectory zone (i.e. in front of a tyre and rim assembly) while it is being inflated. Either use a certified inflation cage, or use a 3 m long inflation line as per SWP and stand well away from the tyre.
4. While the assembly is being inflated check seating of all componentry for proper seating, and stop/dump all the air if a problem is identified.
5. Ensure all your rim bases and components are tracked and nondestructively tested as per industry Standards.

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Site Answers & Comments:

TYREgate Reference:51

## The split ring tyre was not assembled correctly

Root & Contributing Causes:

- **LTA matching of assembly components.**

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

### COMMENTS AND PREVENTATIVE ACTION

Care must be exercised when assembling rims and tyres provided with a split lock ring. Particular attention must be given to:

- The removal of rust and other foreign matter from the rim and the split lock ring before assembly.
- The application of recommended lubricant on the rim or tyre bead to reduce friction between tyre and rim.
- Partial inflation of tyre and inspection of the degree of fit between tyre and locking ring.
- Full inflation of tyre to manufacturer`s specification, in a tyre cage, and further inspection of degree of fit between tyre and split locking ring before removal from cage.

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Site Answers &amp; Comments:

TYREgate Reference:55

The exact cause of the split ring coming loose is not known, however it is alleged that: the split ring assembly had not been seated correctly; the tyre was an incorrect size for the rim; the training of the deceased was inadequate, and therefore the supervision was also inadequate; the procedure for fitting the tyre was poor; and the equipment provided for the fitting of the tyre did not allow a safe system of work to be used

Root & Contributing Causes:

- **LTA matching of assembly components.**
- **LTA procedure**
- **LTA training /competency**

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

Recommendations Two areas of concern identified were the fitting of the tyre and installation of the wheel onto the axle. Attention must be given to:

- The provision of suitable equipment and a safe system of work to remove and fit the tyre to the rim. Suitable equipment should include a tyre cage, tyre pressure gauge in the airline, soft headed hammer (not steel), suitable rim cleaning equipment and a chart that provides details of tyre-rim compatibility.
- Whenever a tyre is replaced, rims must be inspected for defects such as rust, distortions, cracks and imperfections before a new tyre is fitted.
- Wheels must be placed into a restraining device (safety cage) before inflation.

Site Answers &amp; Comments:

4. The person inflating the tyre must stand to the side of the wheel in a safe position, and not in the trajectory line of the split ring. Note the diagrams below.
5. The airline should incorporate a hand piece with gauge and be a sufficient distance from the valve stem attachment so the fitter is in a safe position while inflating the tyre, should the split ring part with the wheel.
6. Inflation should be undertaken in stages, not more than 70kpa (10psi) at a time. (While AS 4457-1997 does not apply to these rims it is recommended initial inflation should be nominally 35kpa.) The ring should then be checked for correct seating.
7. When fitting the wheel to the axle hub, the fitter should not sit or crouch in the unprotected trajectory line of the split ring.
8. Always consider the trajectory line of the split ring components and rim during any stage of dismantling, re-assembling and fitting of wheels to a vehicle. DON'T be unprotected and in the path at any stage. NEVER allow an untrained unsupervised person to undertake the fitting of tyres to a split ring rim.

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TYREgate Reference:59

## Inflation caused failure of the lip of bead seat band and disintegration of rim

Root & Contributing Causes:

- **LTA rim integrity**

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

As a precaution the following steps are recommended:

- Closely inspect all rim components prior to assembly for suitability, cracks, damage, deformation and corrosion. If in doubt consult with a supervisor or the original equipment manufacturer to check safety and serviceability of the componentry.
- Always ensure that all rim components are fitted correctly and rim assembly integrity is assured.
- Never stand in the trajectory zone (i.e. in front of a tyre and rim assembly) while it is being inflated. Either use a certified inflation cage, or use a 3 m long inflation line as per SWP and stand well away from the tyre.
- While the assembly is being inflated check seating of all componentry for proper seating, and stop/dump all the air if a problem is identified.
- Ensure all your rim bases and components are tracked and nondestructively tested as per industry Standards.

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Site Answers & Comments:

TYREgate Reference:62

## Incorrect bead seating angle can cause the tyre to blow off the rim which like any uncontrolled deflation can have fatal consequences

Root & Contributing Causes:

- **LTA matching of assembly components.**

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

- Do NOT install a light truck tire on an industrial wheel - if in doubt, stop and consult with the tyre manufacturer.
- Always check vehicle OEM specifications on correct tyre size and type recommended

Site Answers & Comments:

- for mounting to a vehicle rim/wheel.
- Ensure bead angle of the tyre will be compatible with the bead angle of the rim/wheel.

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TYREgate Reference:82

## Inflation of an assembly fitted with corroded and pitted lockring

Root & Contributing Causes:

- **LTA matching of assembly components.**
- **LTA rim integrity**

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

If the tyre assembly is to be used for Underground Service, then replace the Lock Ring at each Tyre Change to ensure safety. For Surface Service, replace Lock Rings in accordance with Site Specific Safe Operating Procedures (SOP) or when wear, rust, pitting and or damage is evident. All Rim Bases must be NDT tested (non destructive testing) in accordance with site specific SOP. Clean rim parts of all foreign matter taking special care around bead seating areas and inspect for wear, rust, cracks or damage. Apply rust inhibiting primer to the rim, in accordance with site SOP's as necessary. Check that all rim parts to be assembled are of the same manufacturer, are of the same size and specification and are properly matched. If unsure do not proceed! If doubt exists as to the suitability for continued service, identify (by marking clearly) the areas of concern, tag the item 'out of service' and notify your supervisor. The mismatching of rim components and the use of unserviceable components can lead to extremely hazardous incidents, causing severe damage, injury or death. Unserviceable rim components must be destroyed i.e. cut with HOT TORCH.

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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.

Site Answers & Comments:

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TYREgate Reference:95

## Fatality and Serious Injury - Earthmover Wheel - Lockring Detachment Open Cut Coal Mine

Root & Contributing Causes:

- **LTA rim integrity**

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

No recommended actions given.

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