

Workplace Health and Safety Queensland

Information guide – Rural industry

7. Single-piece and multi-piece rim wheels

General information

- A number of hazards can occur when servicing tyres on single-piece and multi-piece rim wheels involving handling pressurised systems.
- Look at the side wall of a tyre. Estimate how many square inches and multiply by the tyre pressure to determine the force which can be released. Typically, the side wall area of a truck tyre is nearly two-thirds of a square metre in area (approximately 1000 square inches), making available a force of 35 tonnes at 517 kPa (75 psi). When servicing tyres on single-piece and multi-piece rim wheels, this explosive force must be controlled.
- Plan beforehand on how to control this explosive force with equipment on your property. People are most frequently injured when you remove, dismantle or reinflate tyres, particularly with high pressure tyres on multi-piece (split) rims.

Ask yourself:

- When this release of force is most likely to occur?
- What equipment will be needed to control this force and who will operate this equipment?
- Who needs to know the safety procedure for controlling this force?
- How often should I check that the necessary equipment, knowledge and willingness are there?

Single-piece rim wheels are used on virtually all types of motor vehicles. The effective tyre and rim seal allow the use of tubeless tyres, which offer less rolling resistance, and hence increased mileage. Tubeless tyres have physical limitations when operated under more severe environmental conditions. Generally, they offer a much lower level of injury risk when servicing.

Multi-piece rim wheels - heavy vehicles, off-road vehicles and rubber tyred plant continue to rely on tube-type tyres. The wheel assembly has one or more side rings supporting the tyre's bead and serving as a flange and locking system to keep the inflated tyre on the rim. The rim base, side or lock rings and inflated tyre assembly make up the wheel. It is an inherently unsafe design.

Factors which result in misfit of the side or lock rings to the wheel base and result in explosion include:

- mismatched, distorted, worn or corroded components, resulting in physical misalignment on the rim
- external factors resulting in sudden deflation or operation with under-inflated or flat tyres causing rim assembly failure.

Dangers

- If all air pressure is not released in the tyre before servicing, the valve core may be ejected during its removal.
- Any tyre under pressure presents a potential hazard. The volume of air that can be released suddenly can cause a worker in close proximity to be thrown against walls, ceilings or other hard unyielding objects.
- If the air blast is directed against a floor or wall, the unrestrained wheel rim may be thrown across the workplace.
- Multi-piece rim wheels pose the added risk of components separating in the air blast and becoming missiles.

Precautions

- Always deflate and inflate tyres in a safety cage or other portable restraint device. Belting restraints are available.
- Never reach into the cage during inflation or deflation and always position the body to one side of it.
- Never position the head or body in front of the rim during deflation or inflation.
- Use recommended tyre mounting tools and equipment to avoid rim damage.
- Wear protective goggles or face shields when working on wheels or tyres.
- Have a regular tyre maintenance schedule which checks tyres for condition, matching, pressure, tread depth and wear patterns, as well as rims for corrosion or cracking.
- Always follow the recommended tyre servicing procedures and ensure all workers undertaking these procedures are trained and follow them (e.g. the side or lock ring split should be installed directly opposite (180 degrees) the valve stem slot).

“Hoisted by his own petard” was a popular saying. Petard derives from a French word meaning “to break wind”. Petard is now also a small bomb used to break down doors. When changing, repairing and inflating tyres, particularly on multi-piece rims, do not be “hoisted by your own petard”.

More information

Further information is available from www.worksafe.qld.gov.au or by calling the WHS Infoline on 1300 369 915.

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