

## TYRE SAFETY

### Exploding tyres and zippers

#### THE HAZARDS

**Exploding tyres:** Divided wheels, split rims, and locking rings are likely to be thrown with force when a tyre explodes. Most likely, wheels will come from heavy or light trucks, construction vehicles, off-road vehicles, and buses. Small wheels of pressed steel construction, in good condition, will not throw parts around the adjacent area, but if rusted badly enough to weaken the welds, even a wheel from a wheelbarrow can explode.

Anyone in the way will be injured, and in the worst case, injuries will be fatal.

**Zippers:** Steel cables reinforcing sidewalls flex at normal operating pressures but the amount of

flex increases when tyres are run at low pressure or flat. With prolonged heating and flexing in the steel cables, some will weaken and break. Tyres in this condition are likely to experience zippers.

When a zipper forms during inflation, the weakened sidewall will start to tear at the point of weakness, and burst with a long, narrow opening. Wire and rubber shrapnel will leave the tear driven by escaping compressed air. When the zipper occurs at higher pressures, whole tyre and wheel assemblies can be thrown upwards as the side wall explodes.

Potential injuries include penetration by wire shrapnel, deep into the arm of one victim, and impact of moving wheel assemblies.

#### THE SAFETY MEASURES

Use of tyre cage and wheel guard or T-bar safety devices are illustrated in the OSH booklet *Tyre Safety*. There are variations on these devices, developed since the booklet was written. Those seen by OSH are for field servicing: a folding tyre cage weighing from three to five tonnes mounted on a truck; and a folding wheel guard easily carried on a utility.

When tyres are serviced in a workshop, especially if the owner is a tyre seller or truck fleet operator, there should be a tyre cage available for use during inflation, secured against movement.

When tyres are serviced in the field and a cage is not available, safe completion of tyre repair will require management of the hazards. The most obvious hazard to manage is containing wheel assemblies when tyres explode.

Options are:

1. Use of wheel guards within a clear space.
2. Sliding the wheel assembly under some convenient part of the truck. If it is the tailgate, the tyre service person should be aware that the tailgate may lift rapidly during an explosion.

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3. Inflation to say 35 kPa before mounting the wheel on the truck to continue inflation to working pressure.

All of the above should occur with a clip-on air chuck and an air hose long enough to enable staff to remain clear of the area.

Dealing with the likelihood of zippers requires precautions, performed by trained staff. A safe work procedure should include:

1. Protective clothing including acrylic face masks and thick jackets;
2. Examination of side walls for bulges, soft spots, darkened liners, and other signs of damage;
3. Careful beading of the tyre;

4. Inflation without a valve core (allows quick, remote air release) to examine the tyre at low pressure, about 140 kPa;
5. Inflation to 120% of working pressure while listening for the popping sound of a zipper ripping cords. This also occurs without a valve core. Use of a cheap microphone and wireless transmitter taped to the tyre would avoid the need for close approach during inflation.
6. Inflation to low pressure only, say 35 kPa, while the tyre is being moved until it is secured to the truck.
7. Scrapping of any tyre which appears to have the potential for failure.

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