Tire, Wheel, & Rim Servicing Safety & Compliance Game Plan

While it may seem like a safe and simple job, inflating the tire of a truck, forklift, or other piece of powered mobile equipment is akin to handling explosives. Tires are like bombs waiting to go off with a 20-inch tire inflated to 100 psi containing up to 40,000 pounds of explosive force. So it's not surprising that dozens of Canadian workers suffer serious and even fatal injuries while servicing tires every year. The risk is especially great when tire explosions involve multi-component wheel assemblies resulting in the sudden and violent release of tire lock rings, rims, flanges, and other flying parts.

OHS regulations require employers to take specific measures to protect workers who engage in tire servicing operations. Failure to comply with these requirements can lead to significant penalties. **Example:** A 16-inch tire being mounted on a 16.5-inch rim exploded while a worker was inflating it, resulting in serious head injuries and a fine of over $102,000 against the victim's employer [*Kavanaugh Investments Ltd.*, Alberta Govt. News Release, July 4, 2016].

Here's an 8 step Game Plan to help you keep your company compliant with the OHS tire servicing requirements of your jurisdiction.

Defining Our Terms: Tire vs. Wheel

While “tire” and “wheel” are often used interchangeably in everyday life, in the OHS regulatory context, “tire” refers to the rubber material that runs along a road to propel a vehicle while “wheel” refers to the entire assembly of parts, including not just the tire but also the rim base, flanges, bead seat bands, lock rings, and O-ring that bolts the tire to the vehicle. “Rim” is a key part of that assembly that supports the tire, either as a single or multi-component piece.

Source: https://www.ontario.ca/page/working-wheel-rims-and-tire-assemblies

Step 1. Create Safe Work Procedures for Tire Servicing Operations

While engineering controls can help minimize hazards, the focal point of preventing tire explosions and other mishaps is to create and implement written safe work procedures for servicing the wheels, tires, and rims of vehicles and powered mobile equipment, including procedures for:

- Inspecting tire, rim, and wheel components;
- Mounting a tire to the rim and wheel;
- Inflating the tire;
- Installing and removing tire assemblies; and
- Dismounting tires from the rim and wheel assemblies.

Ensure the procedures are clearly written, consistent with manufacturer's specifications and readily available to workers who perform tire servicing operations at the work site where the work is done.

Step 2. Ensure Workers Are Competent & Properly Trained to Perform Tire Servicing

Employers are responsible for ensuring that only competent, qualified, and experienced workers are required or allowed to service, inspect, disassemble, and reassemble a tire or conduct tire and wheel assembly. That means providing workers the training and information they need to carry out servicing operations in accordance with the safe work procedures and manufacturer's specifications or instructions. According to Ontario government guidelines, training should focus on the

worker’s need to:

- Relieve explosive energy inside tires before working on any damaged or overheated wheel assembly or tire;
- Stand in a safe location and, if possible, place a tire inside an enclosure to contain any flying pieces or secure tire pieces with a safety chain or other suitable device;
- Deflate and remove any tire that’s at 80% or less of the manufacturer’s recommended pressure;
- Have a trained person regularly inspect tires and wheel assemblies that are subject to heavy loads and abuse during service and safely remove any defective items from service;
- Recognize hazards and dangerous work practices to prevent injuries from explosions caused by chemical reactions in tires; and
- Understand how to use a manufacturer’s information and tire charts to ensure correct repair parts are installed.

Step 3. Implement Measures to Ensure Safe Deflation & Dismounting of Tires

Let’s get into the different phases of tire servicing. The starting point is to ensure that a tire is deflated before it’s dismounted and that deflation is done in an area where sources of ignition have been removed or controlled to avoid the risk of sparking an explosion. Other precautions:

- Ban workers from performing welding or heating on an assembled rim or wheel parts to facilitate removal of a wheel from a hub unless the tire has been completely deflated by removing the valve core;
- Don’t dismount a tire on a multi-piece rim wheel unless

and until it’s deflated to atmospheric pressure by removal of the valve core or other effective means; and
- In the case of a dual wheel arrangement, deflate both tires to atmospheric pressure before loosening any wheel nuts; and
- Verify deflation before dismounting by having a competent worker inspect the tire, remove the valve core from the tire stem, and insert a wire into the tire assembly.

Step 4. Inspect for & Replace Worn Parts

Before mounting the tire, the worker should clean and inspect the rim, and the wheel part must be cleaned for damage such as cracked, broken, or bent parts. Any damaged parts identified must be replaced before the tire is mounted on the wheel or rim. Best practices:

- Cleaning dirt and rust from rim bases and parts;
- Disassembling and carefully inspecting wheel assemblies whenever they’re removed or remounted;
- Checking carefully for metal fatigue, dents, pitting, or corrosion; and
- Using new or undamaged parts of the same size and type, in accordance with manufacturer specifications.

Step 5. Avoid Over Inflation of Tires

Mishaps are especially likely to occur during the inflation process. As a general rule, workers shouldn’t inflate tires to a pressure higher than 40 psi to seat beads or side rings, unless higher pressures are recommended by the manufacturer.

Caution workers to check and stay within the maximum pressure for the particular tire indicated on the tire wall when inflating. Provide workers tables listing the maximum inflation pressures for various sizes and types of tires normally encountered in case the maximum pressure isn’t clearly listed on the tire wall. Require the worker inflating the tire to actively monitor its inflation pressure and try to stay out of the potential explosion trajectory.

Step 6. Use Restraining Devices When Inflating Tires Mounted on Rims

Require workers not to inflate tires that are mounted on a split rim or locking ring wheel unless the wheel assembly is secured in a safety cage or other restraining device, other than a chain, which is capable of containing any potential flying parts in case the tire, split rim, or ring wheel rupture and explode.

Source:

https://martinsindustries.com/us_en/4-bar-tire-inflation-cage-mic-4

Step 7. Take Other Precautions to Prevent Explosions During Inflation & Mounting

Take other precautions to prevent explosions during the inflation and mounting process, including ensuring that:

- Workers who use a bead expander to seat the beads of a tire remove it before inflating the tire to more than 5 psi;
- Workers using a clamp-on type of connector to inflate a tire use an in-line pressure gauge and positive pressure control and inflate the tire while standing a distance away in a safe position that’s not within the potential trajectory of an explosion;
- Workers don’t reinflate and reinstall a tire that was mounted on a multi-piece rim if the tire was flat or ran while under-inflated at less than 80% of its recommended pressure unless and until the tire is deflated, disassembled, and inspected;
- Workers don’t interchange multi-piece rim and wheel components, except as permitted by rim/wheel charts from the appropriate rim/wheel manufacturer; and
- Workers don’t use flammable gases to seat a tire onto a rim.

Step 8. Take Precautions to Prevent Tire Explosions Due to Overheating

Extreme heat can produce a chemical reaction that causes flammable gases to rapidly build up inside a tire increasing the risk of explosion. The so-called pyrolysis may occur when

heat is applied to a tire. Safe practices:

- Banning workers from performing welding or hot work on or near the tire;
- Banning workers from using a blow torch to heat lug nuts to make them easier to remove;
- Keeping all personnel away from the tires of a vehicle that has made contact with a power line until the tires have had enough time to safely cool; and
- Re-inflating an overheated tire after it has sufficiently cooled and been carefully deflated and inspected for damage by qualified personnel or the manufacturer.