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# Truck Tire Safety Issues

*Service Specialists Association*

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# OSHA 29 CFR 1910.177

- Federal regulation that covers all employees who service tires and wheels.
- Definition of “service” encompasses mounting, demounting, inflating, deflating, installing, removing and handling.
- Requires training for all employees who service truck tires and wheels.

# Parked car, truck speed 55 mph



# Torque

- Torque is used to measure the amount of twisting force that is applied to a fastener.
- In its most simple form, it can be calculated by multiplying weight times the length of a lever.
- A 200-pound man with a one-foot breaker bar can generate 200 ft lbs of torque while a two-foot breaker bar will enable the same man to generate 400 ft lbs of torque.

# Clamping Force

- When torque is applied to a nut, it creates tension on the stud between the nut and the head as the components are compressed.
- Bolt tension is often referred to as clamping force and it is the single property that keeps the wheel attached to the end of the axle.
- Clamping force cannot be measured in the field so technicians must control the torque in order to approximate the correct clamping force.

In a bolted joint, the thing that interconnects the parts is the bolt. Their sole function is to clamp and/or pin the joint members together. The life and performance of that joint depends on the “correctness” of the clamping force holding the parts together.



# Torque and Clamping Force

- Clamping force is the key and it cannot be measured in the field.
- Clamping force is dependent on a number of different properties, including torque.
- Even though proper torque is a critical component, it does not guarantee that the clamping force will be correct.

# RIST Procedure

- R** - Remove debris and foreign material from all mating surfaces.
- I** - Inspect components for damage or signs of severe wear.
- S** - Snug the lug nuts in a star pattern to seat the wheel on the hub.
- T** - Torque the lug nuts to specification using a calibrated torque control tool.

# Remove



# Remove



# Inspect





# Inspect Components

- Look for any cracks around the bolt holes or the center bore of the wheel.
- Inspect the studs for damaged or stripped threads.
- Inspect the lug nuts for thread or hex damage.
- Make sure the hub, rotor, and/or drum are properly cleaned and not damaged or cracked.

# Snug





# Snug in a Star Pattern

- The goal of the “snug” step is to evenly seat the wheel(s) and the drum on the hub.
- Always start at the 12 o’clock position.
- Target torque range for the snug procedure is approximately 50 - 100 ft lbs.
- If the impact wrench has variable settings, use the lowest to snug the fasteners.

# Torque



# Torque Control Tools

- The most economical and effective torque control tool is the standard clicker torque wrench.
- Torque wrenches should be calibrated on a regular basis with certificates on file.
- Torque limiting extensions are not recognized as torque control devices by industry experts or manufacturers.

# Torque Wrench Care

- Torque wrenches are precision instruments and they should be treated accordingly.
- Store the wrench at the lowest setting when not in use.
- Technically, if a torque wrench falls on the floor, it should be recalibrated.
- If a wheel installer cannot produce a calibration certificate for every torque wrench in the event of a wheel-off accident, the plaintiff has the edge.

# Torque Wrench Operation

- Always load the end of the wrench and do not bounce or apply pressure after the click.
- Use only one extension (no limit to length) and keep it 90 degrees to the face of the wheel.
- The torque process should be slow and deliberate with the emphasis on precision and accuracy.
- It is acceptable to check the torque in a circular pattern to ensure none have been missed.



# Hub-Pilot Fastener Test

Used Stud/Used Nut (no oil)	480 ft lbs = 27,000 lbs
Oiled Stud/Dry Nut	470 ft lbs = 30,000 lbs
Dry Stud/Oiled Nut	482 ft lbs = 40,000 lbs
Oiled Stud/Oiled Nut	476 ft lbs = 47,000 lbs
New Stud/New Nut	487 ft lbs = 56,000 lbs
Anti-Seize Stud/Dry Nut	488 ft lbs = 25,000 lbs
Clean Anti-Seize then Oil	490 ft lbs = 40,000 lbs

# Torque is ...

- The only way that technicians can approximate the proper clamping force to keep the wheels on the vehicle without damaging the components.
- A measure of twisting force and is no different than the temperature of an oven or a setting on a grill.
- Not a magic wand that mysteriously makes all of your wheel problems go away.

# Clamping force is ...

- Completely dependent on the RIST procedure so failure to perform one step can result in a loose wheel or damaged components.
- Impossible to measure or prove in the field.
- The result of a good wheel installation program that includes proper torque.
- Is difficult to say in the same sentence with words like "torque stick" and "impact wrench."



# Wheel Retention Program

- There are a number of steps to a wheel retention program and each one of them are equally important.
- Torque is simply one step of the process so it does not guarantee that the clamping force is correct.
- Excessive clamping force is just as dangerous as insufficient clamping force, so technicians must follow all of the steps for installing wheels.

- More technicians are aware of the relationship between torque and clamping force.
- Although proper torque is important, it does not guarantee that the wheels will stay on the vehicle.
- Clamping force is the key factor and it cannot be measured in the field.
- Torque checks should be encouraged to identify fatigued and yielded studs.



Thank You!

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