



Vehicles and Equipment - Wheel Care - Lug Torque

Standard
Operating
Procedure

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1.0 Purpose

This SOP provides:

- Awareness for all employees to understand the importance of follow-up maintenance and visual checks required after wheels have been removed on all vehicles

2.0 Roles and Prerequisites

Role(s)	Quantity Required	Prerequisites
Employee	1 or more	1. Understand the contents of this Standard Operating Procedure

3.0 Tools and Equipment

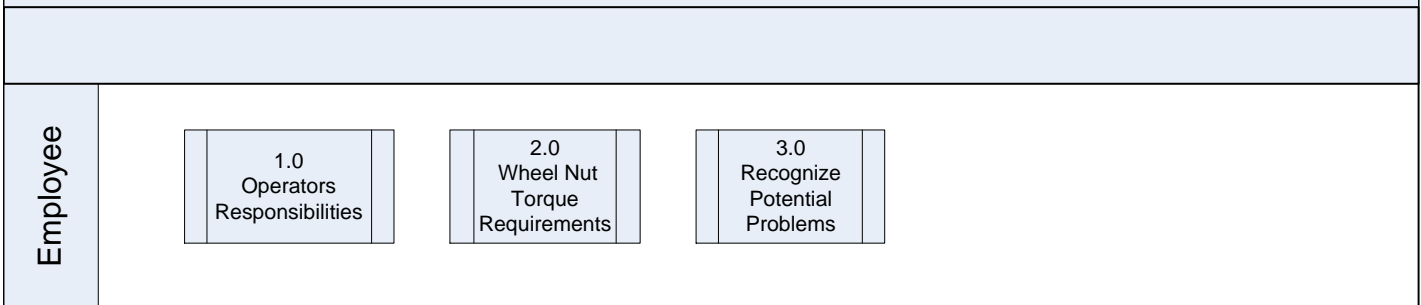
Minimum Tools and Equipment Required:

- Vehicle Maintenance Log Book (If applicable)
- Torque Wrench (If checking for appropriate torque personally)

4.0 Procedure

High Level Flowchart

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The Procedure

NOTE: The following requirements shall be met prior to the start of the procedure:

- Complete Hazard, Aspect and Risk Assessment
- Applicable Personal Protective Equipment (PPE) is available and in good condition



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Most cases of vehicle wheel loss while driving are directly related to improper wheel nut torque. Over-torquing a wheel nut will overstress the wheel stud causing a brittle failure of the wheel stud and/or wheel nut. However, under-torquing a wheel nut can lead to a loosening or loss of wheel nuts causing a fatigue failure of the wheel studs

1.0 Operator's Responsibilities for Wheel Care - Lug Torque

NOTE: Always follow the manufacturer's recommendations outlined in the vehicle's operator manual

1.1 Documentation of Wheel Repair

- *When wheels have been removed it is the responsibility of the operator to note this in the vehicle log book (if applicable) and follow up with re-torques as required*
- *If a log book is not supplied with the vehicle, notify the person responsible for the vehicle (Admin or Supervisor) of the work that was done*

1.2 Vehicles with Multiple Operators

- *It is mandatory to carry out a circle check prior to driving to ensure that the lugs/nuts are in good condition*
- *If there is a recognized major defect (Examples in Section 3.0), it is to be noted and repaired as soon as possible and notify the person responsible for the vehicle (Admin or Supervisor) of the defect and the steps taken to rectify it*
- *It is the responsibility of the employee getting the maintenance done to notify the person responsible for the vehicle (Admin or Supervisor) for the vehicle follow up re-torquing requirements (See section 2.2)*
- *For vehicles equipped with log books, the first driver/inspector of the day is to check the log book to verify that no wheel or other maintenance is required*
- **NOTE:** *Most qualified vehicle repair/tire shops provide an indicator such as a sticker or a tag that indicates the wheels need to be re-torqued, however, that is not always the case. Operators must be familiar with the work performed and know if the tires have been removed and follow the re-torquing intervals (See section 2.0)*

1.3 Regular Vehicle Maintenance

- *It is the operator's responsibility to request the wheel re-torquing during regular maintenance at a qualified repair shop*

2.0 Wheel Nut Torque Requirements

2.1 Requirements After Wheel Removal

- *After performing any wheel removal on a vehicle, the wheel nuts must be torqued to the manufacturer's specifications*

2.2 Wheel Nut Re-Torquing Requirements

- *Wheel nuts need to be kept torqued to the manufacturer's specified wheel nut torque at all times. In order to ensure this, the following wheel nut re-torquing intervals must be followed:*
 - *Always follow the manufacturer's recommendations for re-torquing requirements in the vehicle operator's manual*
 - *If the manufacturer's recommendations are not available or does not specify torque requirements, the following shall be adhered to (Contact SaskPower Fleet Services if unsure):*
 - *Whenever a wheel has been removed, the wheel nuts must be re-torqued to the OEM specified value within the first 160 km of driving;*
 - *The wheel nuts must be re-torqued to the OEM specified value a second time, within 800 km of driving;*
 - *If one or more wheel nut(s) is loose during the second re-torque interval (at 800 km or as per operators manual), the operator must ensure that all of the wheel nuts and studs are replaced on the hub assembly immediately. **Ensure that Fleet Services is notified with the details of the wheel nut/stud failure***

2.3 Dual Wheel Vehicles/Equipment

- *All vehicles equipped with dual rear wheels shall have wheel nut torque indicators installed on all wheels (including the non-dual front axle wheels). If the vehicle does not have indicators currently, they shall be installed during the next wheel maintenance*

2.4 Personnel Changing Tires Manually

- *Ensure you follow all safety rules and specific changing procedures as outlined in the vehicle's owner's manual. Manufacturer's recommendations supersede any instructions listed in this section*
- *Ensure the wheel nuts go on easily by starting them by hand to prevent stripping the threads of the stud*
- *Using the vehicle supplied tire wrench or socket of proper size/depth, tightening is to be done using a "crisscross" torquing sequence, as outlined in the vehicle operator's manual*
- *Never use an impact wrench to tighten a wheel nut*
- *When an operator changes a flat tire using the tire wrench that is supplied with the vehicle, the operator must take the vehicle to a qualified repair shop as soon as possible afterward. The shop will ensure the wheel nuts are torqued correctly, using a calibrated torque wrench.*

Note: It is impossible to accurately torque a wheel nut using a tire iron. Therefore a qualified vehicle repair/tire shop should be the first stop after a field flat repair

3.0 Recognize Potential Problems

3.1 Indication of Potential Problems During Pre-Trip Circle Checks

- *Inspect wheel nuts for signs of loosening during a vehicle pre-trip circle check. This may include, but not limited to, visual inspection, movement of wheel nut torque indicators (if equipped), or rust streaks starting at the wheel nuts and radiating toward the outside of the rim*

3.1.1 Wheel Nut Indicators



Loose wheel nut indicators (left Picture) show the nuts have not changed since they were installed. The right picture shows that the nuts have loosened and is unsafe (Requires re-torque). If this happens again after re-torque the wheel(s) shall be inspected at a qualified vehicle repair/tire shop

3.1.2 Over Torqueing Wheel Nuts

- *When the nuts are overtightened it will add additional stress by stretching the lug, potentially causing it to shear off or break while moving (Figure below)*
- *This may also strip the threads of the lug stud or the wheel nut*



Results of Over Tightening the wheel nuts

3.1.3 Loose or Under Torqued Wheel Nuts

- *Under-torquing a wheel nut can lead to a loosening or loss of wheel nuts*
- *This can be determined by manually attempting to move a wheel nut or there may be visible rust streaks starting at the wheel nut(s) and radiating toward the outside of the rim*
- *This will eventually cause a fatigue failure of the wheel studs and may enlarge the lug hole(s) due to the movement (Figures below)*



Wear due to lug nut being loose while in motion

3.1.4 Wheel Nuts

- *This is not common, however wheel nuts may have a visible defect. As seen below. Replace as soon as possible if this is detected*



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Wheel nut cracked

5.0 Components

The following is a list of components for this SOP which can be accessed through the SOP System:

Component Name	Component Type	Component Description	Location of Component
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6.0 Acronyms, Definitions and Symbols

Acronyms and Abbreviations

OEM - Original Equipment Manufacturer

PPE - Personal Protective Equipment

Definitions

N/A

Symbols

N/A

7.0 Policies and Regulatory Requirements

This SOP is a result of the following regulations, policies, industry standards, and corporate directives and standards:

Regulatory Requirement(s)

- The Vehicle Equipment Regulations, 1987 Section 196,197
- National Safety Code Standard 13: Trip Inspections



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- The Security of Loads and Trip Inspection Regulations "Chapter H-3.01 Reg. 4 (effective April 6, 2005)
- The Highways and Transportation Act, 1997

Policies

- Motor Vehicle Safety Policy

Standards

- Operation and Maintenance of Registered Commercial Vehicles over 5000 kg Standard
- Corporate Safety Motor Vehicle and Traffic Safety Directive

Other

- Safety and Environment Rule Book - Section 604
- Pre- Trip Chassis and Trailer Inspection Checklist SOP
- Mobile Equipment - Perform Pre-Trip Inspections SOP
- SaskPower Transport Compliance Code of Practice
- SaskPower Safety Bulletin - March 18, 2005. Wheel Nut Torque Inspection Intervals For all Operators of SaskPower Light Trucks & Sport Utility Vehicles
- Safety Briefing # 2: Transportation Compliance - October 27, 2015
- Safety Alert - Lug Nut Re-torque Requirement - March 13, 2017

8.0 References

References

Manufacturer's Specifications