TORQUEING OF TIRE-WHEEL ASSMEBLIES

						
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Rev	**Status**	**Rev. Date**	**Status Description**	**Prepared by**	**Reviewed by**	**Approved by**

The following is a step-by-step procedure on how to complete a specific task or meet a facility specific requirement. Standard Operating Procedures (SOPs) are written for all identified critical tasks. By virtue of the hazard or complexity associated with critical tasks it is paramount that the SOP be followed as written. SOPs contain a listing of high-level hazards associated with the task, for detailed hazard analysis reference the applicable Task Hazard Assessments. SOPs do not replace the requirements contained in the company Standards, Codes, and Processes nor does it replace the need to comply with required legislation. Section 8.0 references documentation that the worker shall understand before work commences.

1.0 PURPOSE

- To establish a company standard to safely and effectively carry out work as it applies to torqueing of tire-wheel assemblies.

2.0 SCOPE AND APPLICATION

- This document applies to all Company Heavy Construction and Mining operations. Ensure all site-specific requirements are being met or exceeded before performing the task.

3.0 HAZARDS AND CONTROLS

- Uncontrolled movement of equipment.
    - Follow 950C-C-028 Hazardous Energy Isolation Code and ensure equipment and / or vehicles are locked out (isolated) and wheel chocked prior to working on them.
    - If equipment cannot be isolated, follow 960C-SOP-111 Live Testing: Working on Equipment while it is Running to ensure adequate controls are in place.
- Noise levels exceeding 85 dBA when operating impact tools or torque wrench/rad gun.
    - Always wear hearing protection when operating impact tools.
- Pinch points when operating impact tools or torque wrench/rad gun.
    - Use two hands to support impact tool or torque wrench.
    - Do not place hand in line of fire, for example do not hold impact tool with one hand and place second hand on work surface immediately beside nut.
    - Do not place hand or fingers between rad gun reaction arm and wheel rim.
- Flying debris or parts when using impact tools or torque wrench/rad gun.
    - Always wear proper eye protection.
    - Use the proper size impact socket for the application.
    - Only use impact sockets and extensions with impact drivers.
    - Do not use sockets or extensions that are worn enough to create slack and possible slippage on wheel nuts during torque procedure.
    - Follow and apply proper torque pressure as per manufacturer's recommendations.
    - Inspect all air hoses and tools prior to commencing task.

- Improper torqueing of wheel nut resulting in loose wheels.

    - Inspect impact gun and torque wrench prior to use.
    - Inspect rad gun prior to use; confirm it has been serviced and calibrated (follow 960C-SOP-501 Rad Gun Operation).
    - Operate rad gun as per 960C-SOP-501 Rad Gun Operation.
    - Torque wheel nuts to manufacturer's specifications for the size and style of wheel. Indicate the following on service reports for OTR wheel assemblies:
        - Serial number of rad guns being used
        - Rad gun air pressure setting (for pneumatic rad guns)
        - Actual torque measurement
        - Ambient temperature
    - Use a paint marker to mark an 'x' on bolts that have been torqued.
    - Use proper tooling for torqueing. Rad guns must be used when torqueing off-the-road (OTR) wheel assemblies.
    - Do not over torque OTR wheel nuts by using a large impact tool. Impact tools may be used to secure the nut, rad guns must be used to torque the nut.
    - Ensure mounting surfaces are clean, dry and free of debris. Be aware that if using an air compressor in cold temperatures to blow out debris from mounting surfaces, a small layer of condensation may result on the mounting surface. This may affect the mating of the surfaces and provide an inaccurate torque reading. All surfaces must be DRY.
    - Ensure mounting hardware is clean and in good condition. Watch for recessed holes, missing washers, stripped wheel nuts and bolts.
    - When torqueing OTR wheel assemblies in ambient temperatures below -20 degrees Celsius, the wheel nut torque must be verified with a manual torque wrench and torque multiplier prior to releasing to the field.
    - Tire-wheel assemblies must be retorqued within 24 hours or 150 km for on highway vehicles, light duty vehicles, busses, and transport trucks/trailers. Document using the wheel retorque tag (Appendix A). Follow a star pattern when torqueing wheel nuts.

4.0 CHECKLIST

- ☐ Attend all preparatory meetings (IE: daily PSI; job scope; review of JSA's and SOPs for the job)
- ☐ Complete FLRA cards before starting the work.
- ☐ Ensure all personnel involved in the task are aware of the hazards and the controls to be used, as identified in the SOP's; JSA's; and FLRA's
- ☐ Conduct a pre-job inspection of all equipment to be worked on and tools to be used.
- ☐ **Standard of Training required for working on this job: On-the job training.**

5.0 DEFINITIONS

5.1 Company

Means North American Construction Group Ltd. (NACG) and all directly or indirectly owned subsidiary companies, including joint ventures.

5.2 Company Personnel

Includes the Company's employees, officers, directors, agents, associates, consultants/contractors, temporary employees and third-party processors.

5.3 HSE

Refers to the Health, Safety & Environment department

6.0 PROCEDURE

6.1 Off the Road (OTR) Wheel Torque

(a) Inspect and clean all mounting surfaces; ensure they are clean, dry and free from debris.

(b) Mount wheel on equipment, follow 960C-SOP-823 Vertical Mount Dismount of Multi piece Wheels.

(c) Inspect all mounting hardware and ensure it is clean and in good condition.

(d) Use a ½" or ¾" impact to secure nut onto bolt, ensure a washer is used. Do not over torque. Use proper size impact and sockets, avoid using adapters or extensions.

(e) Use appropriate size rad gun for torque required on wheel. Inspect rad gun prior to use and confirm its service and calibration is current. For pneumatic rad guns, ensure air pressure setting matches chart specific for tool. Record rad gun serial number and air pressure setting on the equipment service report.

(f) Torque wheel nut to manufacturer specification. Record torque measurement on equipment service report.

(g) Mark an 'X' on the bolt that has been torqued and move to the next wheel nut.

(h) Record ambient temperature on equipment service report. For ambient temperatures lower than -20 degrees Celsius, use a manual torque wrench and torque multiplier to verify torque.

6.2 On Highway / Light Vehicle – Disc Type Wheel Torque

1) Determine proper torque to be applied by consulting equipment manufacturer's specifications.

2) Choose appropriate torque wrench and set to recommended torque.

3) Choose proper impact socket, extension and/or reaction arm.

4) Place socket on first wheel nut. Be sure that extensions and/or reaction arms have minimal slack and apply recommended torque.

5) Begin torqueing at the twelve o'clock position.

6) Use a "star" pattern and repeat step 5 until all wheel nuts are properly torqued.

7) Complete Wheel Retorque Tag (Appendix A) and install tag in rear view mirror.

8) Perform re-torques at required intervals.

6.3 On Highway / Light Vehicle – Rim Wheel Torque

1) Follow steps 1-5 of the disc type wheel torque.

2) For double spoke clamps, torque both nuts as a set. Continue in a “star” pattern until all lugs are properly torqued.

3) Complete Wheel Retorque Tag (Appendix A) and install tag in rear view mirror.

4) Perform re-torque at required intervals.

7.0 NOTES

If this task is to be done by a method different than described in this SOP, the work must **STOP,** and the alternate method must be **DOCUMENTED** with an adequate hazard assessment tool such as a JSA. The document must be **APPROVED** by a supervisor before such procedures are implemented.

8.0 REFERENCES

- Alberta Occupational Health and Safety Act, Regulation and Code – Part 12, Section 193, Tire Servicing
- Alberta Occupational Health and Safety Act, Regulation and Code – Part 14, Sections 208 & 209, Lifting and Handling Loads
- Tire Industry Association Earthmover Tire Service Training Program
- Vehicle/Equipment Manufacturer Service Manuals
- Equipment Manufacturers’ Service Manuals – Disassembly and Assembly of Wheels (i.e., CAT; Euclid; Kenworth)
- 960C-SOP-501 Rad Gun Use
- 960C-SOP-504 Hand Tools; Use of
- 950C-C-028 Hazardous Energy Isolation Code
- 960C-SOP-823 Vertical Mount Dismount of Multi piece Wheels

9.0 APPENDICES

- Appendix A – Wheel Retorque Tag & Procedure

Appendix A Wheel Retorque Tag & Procedure

WHEEL RETORQUE TAG PROCEDURE

1) Technician will complete the relevant sections on both upper and lower portions of tag when wheel(s) are removed and installed. Indicate which wheels have been removed by marking a single line or checkmark on the tire diagram.

2) Display the upper portion of the tag in the rearview mirror inside the cab of the vehicle.

3) Return bottom portion of the tag to the supervisor/lead hand's office.

4) Vehicle operator will return unit to maintenance department for the retorque to be completed within the time and distance indicated on the retorque tag in the unit's rearview mirror.

5) Qualified technician will complete the retorque to manufacturer's specifications and complete upper portion of tag. Indicate which wheels have been retorqued by marking a second line on the tire diagram in an "X" pattern.

6) Technician will return upper portion of the tag to supervisor/lead hand's office where it will be attached to the bottom portion of the tag and the supervisor/lead hand will initial that the retorque has been completed.

7) Supervisor/lead hand will attach both portions of the tag to the hard copy of the work order and file in the appropriate location.

Where practical, work order will remain open until the retorque is completed and both portions of the tag have been attached to the work order.


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Wheel Retorque Tag

Work Order #

Unit #

Date wheels removed

Odometer at wheel removal km

Torque specification (ft/lbs)

Technician name

UNIT MUST BE RETORQUED AT km

Date of retorque

Odometer at retorque km

Retorque specification (ft/lbs)

Technician name

NACG requires that all wheels be retorqued after any wheel work has been performed.

The operator MUST ensure wheel lug nuts are retorqued by a qualified tire or heavy equipment technician within 150 km or 24 hours whichever occurs first.

Indicate which wheels were removed:

steer axle

drive axle

trailer axle

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Wheel Retorque Tag

Work Order #

Unit #

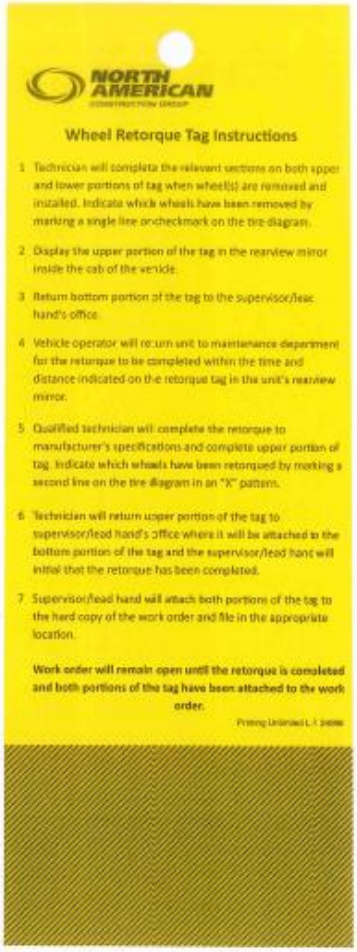
Date wheels removed

Odometer at wheel removal km

Torque specification (ft/lbs)

Technician name

Supervisor initials that retorque has been completed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Wheel Retorque Tag Instructions

1 Technician will complete the relevant sections on both upper and lower portions of tag when wheel(s) are removed and installed. Indicate which wheels have been removed by marking a single line or checkmark on the tire diagram.

2 Display the upper portion of the tag in the rearview mirror inside the cab of the vehicle.

3 Return bottom portion of the tag to the supervisor/lead hand's office.

4 Vehicle operator will return unit to maintenance department for the retorque to be completed within the time and distance indicated on the retorque tag in the unit's rearview mirror.

5 Qualified technician will complete the retorque to manufacturer's specifications and complete upper portion of tag. Indicate which wheels have been retorqued by marking a second line on the tire diagram in an "X" pattern.

6 Technician will return upper portion of the tag to supervisor/lead hand's office where it will be attached to the bottom portion of the tag and the supervisor/lead hand will initial that the retorque has been completed.

7 Supervisor/lead hand will attach both portions of the tag to the hard copy of the work order and file in the appropriate location.

Work order will remain open until the retorque is completed and both portions of the tag have been attached to the work order.