MOUNT - DISMOUNT DOUBLE GUTTER WHEEL ASSEMBLIES

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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 mounting and dismounting double gutter wheel assemblies.

2.0 SCOPE AND APPLICATION

- This document applies to all company Heavy Construction 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.
    - Isolate all forms of hazardous energy and use wheel chocks.
    - Inspect equipment prior to use.
    - When using tire manipulators to install/remove tires and wheel components:
        - (a) Do not stand in the line of fire.
        - (b) Do not stand under manipulator arms.
        - (c) Ensure park brake has been set before exiting tire manipulator.
- Tire rupture during installation and removal of tires and wheel components.
    - Ensure tire-wheel assemblies are fully deflated prior to mount-dismount. Run a wire down the valve stem to remove obstructions that would prevent full deflation.
    - Do not stand in the line of fire or trajectory zone when inflating tire.
    - Do not clamp the hands of the tire manipulator on the tire during inflation.
- Noise exposure when deflating tires.
    - Wear hearing protection when deflating tires. Double hearing protection may be required for tires with super large bore or larger valve stems; alternatively tire deflaters with mufflers may be used to reduce the noise.
- Contact with foreign objects when deflating tires.
    - Do not stand in the line of fire, always stand to one side to avoid contact with dirt and debris.

- Pinch points during installation and removal of wheel components.
    - Use tooling to keep hands and fingers away from pinch points.
    - Do not use fingers to remove O-rings.
    - Use lock ring catcher to support lock ring during removal and installation. Do not use hands to hold lock ring in place.
    - Do not use fingers to pry lock ring out of groove. Lock rings are under tension and can spring from grooves resulting in injury.
    - Do not place hands or fingers near the lock ring split.
    - Ensure tire manipulator, tire handler or truck mounted crane does not move when applying inward pressure to bead seat band/flange. Tire manipulators must have park brake engaged. Truck mounted cranes must use load holding valves.
    - Never use hands or fingers to insert or remove spacers.
- Line of fire when removing lock ring.
    - Do not allow lock ring to fall to ground, use controlled movement to lower to the ground.
    - Use lock ring catcher to support lock ring during removal.
    - This is a two (2) person task. Use more than one person to move the lock ring.
    - Place lock ring away from work area and stack correctly to minimize the potential of falling.
    - Do not attempt to stop or catch a lock ring if it is falling to the ground.
    - Do not place hands or fingers near the lock ring split.
- Tool failure.
    - Inspect all tools prior to task and ensure they have been calibrated as required.
- Injuries caused by using bead breaker.
    - Do not stand in front of bead breaker when using.
    - Do not hold onto pressurized bead breaker hoses; ruptured hoses can cause oil injection injuries.
    - Wear hearing protection.
- Uncontrolled work area.
    - Communicate with co-workers involved in the removal-installation process.
    - Keep work area clear of unnecessary personnel, erect barriers as required.
- Equipment falling off jacks and stands.
    - Use jacks rated for the weight of the equipment and install under manufacturer designated lifting points.
    - Isolate all forms of hazardous energy, use wheel chocks on the opposite side of the equipment being jacked.
    - Never support an axle end with a jack by itself. Use stands with sufficient safe working load or cribbing to support the equipment. Jack stands with load holding rings or u-rings may be used to support the load providing personnel are not under the equipment.

- Avoid excessive inward pressure from tire manipulator when pushing on bead seat band/flange to expose O-ring and lock ring. Excessive pressure can cause the equipment to displace position on the stands. Do not over push!
- Do not push or pull too aggressively when removing tire from vehicle.

4.0 CHECKLIST

- ☐ Attend all preparatory meetings (IE: daily PSI; job scope; review of JSA's and SOP's 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.

5.4 Double Gutter Series Wheel

Double Gutter Series is a wheel/rim assembly consisting of two bead bands and side rings, a unique 2-piece (split and both together) lock ring and one standard lock ring. The double gutter was developed as a position sensitive outer dual so the inside tire could be mounted and dismounted without removing the outer wheel or rim base.

6.0 PROCEDURE

6.1 Dismount Double Gutter Assembly

1. Complete a hazard assessment (i.e. FLRA) for the task. Notify supervisor of all hazards outside of the worker's control.

2. Inspect all tooling and equipment prior to task. Remove from service, tagout and notify supervisor of any defective or damaged tooling and equipment.

3. Isolate hazardous energy on unit and install wheel chocks.

4. Lift the axle using an approved hydraulic jack with sufficient lifting capacity. Ensure jack is positioned under manufacturer approved lifting points, refer to manufacturer service manuals. Follow NACG

960C-SOP-801 Jacking Large OTR and Haulage Vehicles. Use stands and/or cribbing to support load, never support an axle end with the jack by itself. Jack stands with load holding rings or u-rings may be used to support the load providing personnel are not under the equipment.

5. Install tire deflators with mufflers on both valve stems of both tires on the rear axle. Remove the valve cores to deflate both tires of the dual assembly. Do not stand in front of the valve stem.

6. After the tires have been completely deflated, remove the deflators and check both valve stems with a wire to ensure that there are no obstructions.

7. Install and secure the appropriate lock ring catcher to the wheel assembly. ***A JSA must be completed if a lock ring catcher is not available.*** NOTE: For the inside rear wheels where the lock ring catcher cannot be installed, utilize the rear driver assembly to act as the ring catcher.

8. Unseat bead band to expose O-ring and lock ring by using a wheeled manipulator or tire handler to apply inward pressure on the bead seat band / flange with the manipulator pads. Ensure the O-ring and lock ring are easily accessible. Do not over push.

9. Ensure the tire manipulator is secure and will not release inward pressure on the assembly. Apply park brake.

10. Use lock ring bars to dislodge lock ring from lock ring groove. Start at the split in the lock ring.

11. This step involves two (2) people. Lower the lock ring to the ground and place in a safe, suitable location away from the working area. Do not allow the lock ring to fall to the ground. Keep hands and fingers away from split in lock ring and between ground and lock ring. Remove the lock ring catcher.

12. Insert an O-ring pick, screwdriver or tire iron under the O-ring and pull it free from the O-ring groove. ***Cut O-ring to make sure it cannot be used again.***

13. To prevent the bead seat band and side ring flange from separating and falling to the ground during the dismount process, special clamps should be installed at the four (4) designated points on the side ring flange.

14. With the clamps in place, use the tire handler / tire manipulator to gradually remove the outside tire. Set it aside away from the work area with the bead seat band and side ring flange facing up.

15. Remove the inner O-ring with an O-ring pick, tire iron or screwdriver, proceeding to sever the O-ring such that it cannot be re-used.

16. Completely remove and discard the set of torx bolts closest to the bottom of the rim.

17. Loosen the other set of torx bolts, but do **NOT** remove from the two-piece lock ring.

18. This step involves two (2) people. Carefully remove the two-piece lock ring, ensuring that it does not fall to the ground. Place in a safe, suitable location away from the working area. Do not allow the lock

ring to fall to the ground. Keep hands and fingers away from split in lock ring and between ground and lock ring.

19. Wash away as much dirt as possible from the inner tire, preventing the inner tire from hanging up on the outer rim. Install clamps at the previously mentioned four (4) points on the side ring flange to prevent it from being separated from the bead seat band during the dismounting process. Using the tire hand / tire manipulator, unseat the bead seat band of the inner tire, making sure that the O-ring is exposed. Do not over push.

20. This step involves two (2) people. Completely remove one (1) set of torx bolts while just loosening the other set so the two-piece lock ring can be carefully removed. Ensure that the two-piece lock ring is not allowed to fall onto the ground during the removal process. ***Next, remove the O-ring from the inner rim and sever it to ensure it cannot be re-used.***

21. Place the hands of the tire hand / tire manipulator on both sides of the inner tire and gradually slide the inner tire over the outer rim. NOTE: a bead breaker or ram may be required to de-energize the inner flange prior to dismounting the inner tire (this is particularly important on the TSR 930's).

22. If necessary, slightly adjust the pads and rotate the hands during the dismount process.

23. **NOTE:** Take as much time as needed when sliding the inner tire over the outer rim.

6.2 Mount Double Gutter Assembly

1. This step involves two (2) people. Prior to attempting to mount the inner tire, ensure that the mating surface at the back of the rim is thoroughly cleaned and inspected. Clean the area where the rear side ring flange mates.

2. Complete a hazard assessment (i.e. FLRA) for the task. Notify supervisor of all hazards outside of the worker's control

3. Inspect all tooling and equipment prior to task. Remove from service, tagout and notify supervisor of any defective or damaged tooling and equipment.

4. Isolate hazardous energy on unit and install wheel chocks.

5. Using the tire handler / tire manipulator, position the rear side ring flange against the back of the rim.

6. Using a wire brush, thoroughly clean the front O-ring and lock ring grooves on the inner rim, ensuring that the entire surface has been cleaned and inspected.

7. Lubricate the bead seat band with an approved rubber lubricant. If a tire stand is available, place the inner tire on the stand such that it can be inspected prior to mounting.

8. After the tire has passed inspection, the entire bead surface must be lubricated all the way around the tire.

9. Using the tire handler / tire manipulator, remove the tire from the tire stand.

10. Carefully slide the tire over the outer rim until it is completely seated against the rear side ring flange.

11. Using the tire handler / tire manipulator, carefully slide the bead seat band and flange ring onto the wheel.

12. Ensure that the outer O-ring groove on the inner rim is clearly visible.

13. Position a new O-ring on the inner rim and lubricate it with an approved rubber lubricant.

14. Prior to installing the two-piece lock ring on the inner rim, clean and thoroughly inspect both portions; paying close attention to any cracks, damage or signs of fatigue.

15. This step involves two (2) people. Place half of the two-piece lock ring in the lock ring groove on top of the rim, using **ONLY new bolts and attaching hardware**. Keep hands and fingers away from split in lock ring.

16. Hand-thread the bolts on one side of the lock ring, and then partially tighten the bolts prior to moving onto the other side. Repeat this on the other side such that both halves can be properly positioned.

17. This step involves two (2) people. Lift and position the lock ring such that it is securely in the lock ring groove and that the gap between the two halves of the lock ring is almost the same. Do not place fingers in pinch points.

18. Once the gaps are close to identical, tighten the bolts such that they are snug and that all of the components are held in place.

19. Use a torque wrench and set the final tightening to the manufacturer's specification.

20. Remove the tire hand / tire manipulator after all of the components have been properly installed. In order to seat the beads onto the inner tire, place an inflator on the inner valve stem and begin inflating the tire. The tire hand / tire manipulator should be positioned around the tire with a small amount of pressure during the bead seating process. Use a brass mallet, dead-blow hammer, or soft-faced hammer to lightly tap on the lock ring until all of the components are seated.

21. Some rims include a hole in the side ring flange. If this is the case, use a gauge to determine if the tire is properly seated on the rim.

22. Prior to fully inflating the inner tire or attempting to mount the outer tire, remove the clamps that held the bead seat band and side ring flange together.

23. Thoroughly clean and inspect both O-ring and lock ring grooves all the way around the outer rim, once again using **new Torx bolts and hardware.**

24. Attach the halves of the two-piece lock ring by hand-threading and then partially tightening the bolts.

25. This step involves two (2) people. Place the two-piece lock ring into the rear lock ring groove and then hand-thread the remaining two bolts. Do not place fingers in pinch points.

26. One the gaps are equal on both sides of the lock ring, tighten the Torx bolts and torque to the manufacturer's specifications.

27. After the two-piece lock ring has been properly installed, a new O-ring must be placed into the correct groove at the back of the outer rim and lubricated with an approved rubber lubricant.

28. If a tire stand is available, place the outer tire on the stand so that it can be cleaned and inspected. Ensure that the points where the bead seat bands contact the O-rings on both sides of the rim are cleaned.

29. Lubricate the outer bead seat band and side ring flange. Use the tire handler / tire manipulator to install the outer tire on the outer rim. Reposition the tire handler / tire manipulator such that the outer side ring flange can be pressed against the tire until the O-ring is exposed. Lubricate and install the inner bead seat band and flange ring.

30. Using the tire hand / tire manipulator, carefully install the outer tire on the outer rim. Ensure that the outer bead seat band and side ring flange are completely on the rim. Then reposition the tire hand / tire manipulator such that the outer side ring flange can be pressed against the tire and seated on the back of the outer rim until the O-ring groove is exposed.

31. Install a new O-ring, lubricating it with an approved rubber lubricant. Ensure that the O-ring is in the correct groove and never use your hands to position an O-ring.

32. If applicable, use a special stand to support and prevent the lock ring from falling. Position the lock ring into the lock ring groove on the rim. Using appropriate equipment, seat the outer lock ring onto the outside tire.

33. Remove the lock ring stand (if applicable) prior to attempting to inflate the tire. Install an inflator on the outer rim, connect it to the air supply and begin inflating the tire to seat the beads onto the outer tire.

34. Remove the tire hand / tire manipulator. Begin lightly tapping on the lock ring with an appropriate hammer (brass mallet, dead-blow hammer, or soft-faced hammer) to ensure that the components are fully seated.

35. Use a gauge to determine if the outer beads have completely seated. Remove the clamps prior to inflating both tires to the operating pressure. Reposition the tire hand / tire manipulator around the outer tire prior to inflating both tires. Once the correct operating pressure has been reached, shut off the air support and remove the airline prior to installing the valve core housing. Do not stand in the line of fire or trajectory zone while inflating the tires. Remove tire manipulator.

36. Slightly release the air in the inflator and tighten the valve core. Remove the inflator and install the metal valve cap after the pressure has been checked.

37. Repeat this process on the other tire, ensuring that the valve core is tightened, and that the metal valve cap has been installed.

38. Lower the vehicle and remove the jack.

39. Technicians can remove personal lock and tags when job is complete

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 Code – Part 12, Section 193 (1-6) Tire Servicing
- Alberta Occupational Health and Safety Code – Part 14, Section 208 (1-4), Section 209 Lifting and Handling Loads
- Equipment Manufacturers' Service Manuals – Disassembly and Assembly of Wheels (i.e., CAT; Euclid; Kenworth)
- TIA (Tire Industry Association) Earth Mover Tire Service.
- US Department of Labour: Occupational Safety and Health Administration, 1910 Subpart N - Materials Handling and Storage, Standard Number 1910.177 Servicing Multipiece and Single Piece Rim Wheels
- 960C-SOP-500 Safe Use of Pneumatic Tools
- 960C-SOP-501 Rad Gun Operation
- 960C-SOP-503 Hytorc Wrench Operation
- 960C-SOP-504 Safe Use of Hand Tools
- 960C-SOP-800 Hydraulic Bead breakers and Rams, Use of
- 960C-SOP-801 Jacking large OTR and Haulage Vehicles
- 960C-SOP-803 Lifting and Securing Haulage Trucks Using Box Hydraulics
- 960C-SOP-804 Lifting and Securing an OTR Machine Using Hydraulic Implements
- 960C-SOP-805 Manipulator Loading Unloading and Handling of Tires
- 960C-SOP-806 Manipulator Use to Remove and Install Tire-Wheel Implements
- 960C-SOP-809 Mount-Dismount Multipiece OTR Wheel Assemblies – Loose
- 960C-SOP-822 Securing Raised Haulage Truck Boxes Using Box Pins-Cable
- 960C-SOP-823 Vertical Mount-Dismount of Multipiece OTRA Wheels While on Vehicle
- 960C-SOP-824 Torquing of Tire-Wheel Assemblies
- 960C-SOP-825 Jacking Up Axle Housings on Haul Trucks
- 960C-SOP-829 Working on or around OTR Equipment with Damaged Tires

9.0 APPENDICES

There are no appendices applicable to this document.