



VUL-SWP-072a-010-Removal and Installation of Rim Assembly

STANDARD WORK PROCEDURE (SWP)	
Description	Removal and Installation of Rim Assembly
Site	Vulcan Mine
Department	Maintenance – Tyres
PPE Required	Job Step Analysis Reference
    	CTMS-WI-GNC-004 Complete Tyre Management Services - Removal and Installation of Rim Assembly – Work Instruction. This integrated SWP forms part of VUL-SOP-072a-Tyres, Wheels & Rims Mgmt.
	Other Relevant Information ☐ Relevant OEM instructions & specification available
Task Specific PPE	
  	ERT resources available on-site during operations. Personnel performing tyre fitting and maintenance tasks shall be assessed as competent in the specific units of competency according to the state OR national regulations • AURKTJ011 Remove, inspect, and fit earthmoving and off-the-road tyres. • AURKTJ012 Remove, inspect, and fit earthmoving and off-the-road wheel / rim assemblies. • RIIVEH307D Operate heavy rigid vehicle. • RIIHAN307D Operate a vehicle loading crane.
The purpose of this SWP is to provide a documented way of working to achieve an acceptable level of risk. The steps outlined pertain to the titled task only. All other SHMS requirements such as SOPs must be followed e.g., VUL-SOP-065-PPE, VUL-SOP-089-Dust etc.	Work Instruction is based on working in a controlled environment (Tyre Bay) on OEM standard Machine. If the environment, tools, equipment changes and or a deviation from this Work Instruction, a new JHA must be created and approved by all workers conducting the task.
Critical (Hazard) Risks	
Ensure controls are in place for critical risks associated with this task. These include:	    



1. Planning and preparation
- Attend daily pre-start Meeting - Confirm tasks with supervisor - Complete personal hazard id tool (take five). - Establish Work Zone – Refer to VUL-SWP-072a-004- Tyre Bay - Establishment of Work Zones; and VUL-SOP-094-Check, Examine and Restrict Work Areas
2. Jacking and Supporting of Machine
Follow instructions outlined in VUL-SWP-072a-005-Jacking and Supporting of Machine – Rear Dump Trucks VUL-SWP-072a-006- Jacking and Supporting of Machine – Grader VUL-SWP-072a-007- Jacking and Supporting of Machine – Loader
3. Tyre Deflation & Inflation
- Follow instructions outlined in VUL-SWP-072a-008-Tyre Deflation & Inflation
4. PROHIBITED PRACTICES
The application of heat to fasteners [nuts, studs etc] is PROHIBITED as it may weaken the component, leading to a future failure. The application of any kind of heat to a rim with a tyre mounted on it is PROHIBITED, regardless of it being inflated or not. NO WELDING, NO GRINDING, NO HEATING - Pyrolysis may occur, resulting in a violent and possibly fatal explosion. The use of lift and lock jacks and timber cribbing (as loadbearing members) is not permitted.
5. Remove Rim Assembly (Front positions)
5.1 Loosening and removal of primary cleat fasteners - Use a pneumatic impact gun and or pneumatic torque wrench to LOOSEN all rim cleat nuts to remove tension form the cleat EXCEPT cleat nuts in these positions: - At 12 o'clock x2, - At 3 o'clock x2, - At 6 o'clock x2, - At 9 o'clock x2. NOTE: Cleat nuts MUST remain on stud when loosening cleats to prevent the release of stored energy ejecting the cleat. - Using a soft face hammer (copper face), strike the cleats to dislodge. - Remove cleat nuts and washers by hand. - Place all cleat nuts and washers into a clean container. 5.2 Clamping of Rim Assembly with Tyre Handler. - Using the tyre handler, ensure fall back arrestors in place in the fall-back position. - Grab the Rim assembly on the tread area with the tyre handler attachment. - Apply the park brake. - Switch off the tyre handler and exit the cab. - Ensure that wheel chocks have been placed under the tyre handler wheels prior entering the RWZ.



2. Before entering the RWZ ensure that your name, signature, time, and date are written on the “sign on point” on the door of the tyre handler.

5.3 Loosening of remaining cleats.

1. Use a pneumatic impact gun and or pneumatic torque wrench to **LOOSEN** all rim cleat nuts to remove tension from the remaining cleat positions.
 - At 12 o'clock x2,
 - At 3 o'clock x2,
 - At 6 o'clock x2,
 - At 9 o'clock x2.

NOTE: Cleat nuts MUST remain on stud when loosening cleats to prevent the release of stored energy ejecting the cleat

3. Using a soft face hammer, strike the cleats to dislodge or use a jacking bolt.
4. Remove cleat nuts and washers by hand.
5. Remove ALL loosened cleats from the rim assembly.
6. Once all fasteners have been removed from the rim, place all cleats, nuts, and washers into a container / trolley for cleaning and inspection.
7. Remove and clear all items within the RWZ and exit the Restricted Work Zone (RWZ). Ensure hard barriers are in place to establish RWZ before commencing next steps.

5.5 Removing Rim assembly from hub

1. Remove wheel chocks and remove your name from the “sign on point” on the door.
2. Operate tyre handler to creep handler in the REVERSE position to allow outward force of the rim to hub (minimal applied pressure).
3. The rim may dislodge from the hub mating face with outward forces applied by the tyre handler.

DO NOT APPLY EXCESSIVE FORCE WITH THE TYRE HANDLER WHICH COULD DISLODGE JACK AND/OR STANDS.

5. Remove the rim assembly from the hub.
 - a) Reverse the tyre handler slowly to ensure no twisting force is applied with the tyre handler to prevent damage to the rim / hub.
 - b) Ensure valve assembly within the rim does not fowl on hub during removal process.

CAUTION: Spotter may be required to guide the tyre handler movement if the rim assembly fowls during removal.

CAUTION: Be aware of the surroundings while reversing to avoid any collision.

- c) Ensure rim assembly is clear of machine.
- d) Rotate the tyre handler arm so that the tyre and wheel assembly changes from a vertical position to a horizontal position.
- e) Place the tyre and rim assemblies in a designated area.
- f) Park the tyre handler and return the fallback arms to the “Stowed” position.

5.6 Rim and Tyre Marking

1. Mark the removed rim and tyre with the following information.
 - Date of removal
 - Asset ID & its designated area e.g., scrap, repair, inspection, crack test.
 - Reason for removal
 - Tread depth
2. If assembly needs to be stripped refer to horizontal method;
 - **VUL-SWP-072a-009- Demounting and Mounting Tyres**



6. Remove Rim Assembly (Rear positions)

6.1 Loosening and removal of primary cleat fasteners

NOTE: BEFORE COMMENCING REMOVAL OF REAR POSITIONS RIM ASSEMBLIES, ENSURE BOTH INNER AND OUTER TYRE HAVE BEEN DEFLATED TO 10Psi (refer to **VUL-SWP-072a-008-Tyre Deflation & Inflation**)

1. Use a pneumatic impact gun and or pneumatic torque wrench to **LOOSEN** all rim cleat nuts to remove tension from the cleat EXCEPT cleat nuts in these positions:
 - At 12 o'clock x1,
 - At 3 o'clock x1,
 - At 6 o'clock x1,
 - At 9 o'clock x1.
2. Using jacking bolt and impact wrench, torque the jacking bolt to release the cleats.
3. Remove retainers and cleats, leaving only cleat positions as per step 1 in place.
4. Place all cleat nuts and washers into a clean container for cleaning and inspection.

6.2 Clamping of Rim Assembly with Tyre Handler

1. Using the tyre handler, ensure fall back arrestors are engaged
3. Grab the Rim assembly on the tread area with the tyre handler attachment.
4. Apply the park brake.
5. Switch off the tyre handler and exit the cab.
6. Ensure that wheel chocks have been placed under the tyre handler wheels prior entering the RWZ.
7. Before entering the RWZ ensure that your name, signature, time, and date are written on the "sign on point" on the door of the tyre handler.

6.3 Ensure loose objects on the drill deck or walkways are secured.

1. Use a pneumatic impact gun and or pneumatic torque wrench to **LOOSEN** all rim cleat nuts to remove tension from the remaining cleat positions (Nuts to remain on stud thread during cleat tension release process).
 - At 12 o'clock x1,
 - At 3 o'clock x1,
 - At 6 o'clock x1,
 - At 9 o'clock x1.
2. Using jacking bolt and impact wrench, torque the jacking bolt to release tension from the cleats.

NOTE: sudden burst of energy will occur.

3. Remove retainers and cleats.
 4. Place all cleat nuts and washers into a clean container.
 5. Once all fasteners have been removed from the rim, place all cleats, nuts, and washers into a container / trolley for cleaning and inspection.
 6. Remove clamps / zip ties from valve assemblies.
 7. Remove and clear all items within the RWZ and exit the RWZ.
- Ensure hard barriers are in place to establish RWZ before commencing next steps.

6.4 Removing Rim assembly (Outer positions) from hub

1. Remove wheel chocks and remove your name from the "sign on point" on the door.
2. Operate tyre handler to clamp and remove outer position rim assembly.
3. Remove the rim from the hub.



- a) Reverse the tyre handler slowly to ensure no twisting force is applied with the tyre handler to prevent damage to the rim / hub.
- b) Ensure valve assembly within the rim does not fowl on hub during removal process.

CAUTION: Spotter may be required to guide the tyre handler movement if the rim assembly fowls during removal.

CAUTION: Be aware of the surroundings while reversing to avoid any collision.

- c) Ensure rim assembly is clear of machine.
- d) Rotate the tyre handler arm so that the tyre and wheel assembly changes from a vertical position to a horizontal position.
- e) Place the tyre and rim assemblies in a designated area.
- f) Park the tyre handler and return the fallback arms to the "Stowed" position. Remove clamps / zip ties from valve assemblies.

6.5 Rim and Tyre Marking

1. Mark the removed rim and tyre with the following information.
 - a) Date of removal
 - b) Asset ID & its designated area e.g., scrap, repair, inspection, crack test.
 - c) Reason for removal
 - d) Tread depth
2. If assembly needs to be stripped refer to horizontal method;
 - **VUL-SWP-072a-009- Demounting and Mounting Tyres**

7. Remove Spacer Band (Rear positions) Removing spacer band from wheel hub))

1. Using an approved and certified lifting sling, wrap the sling around the spacer band in a choke position on top of spacer band.
- NOTE:** Must be a licensed dogger / rigger to perform task.
2. Affix 2T rated shackle to sling.
3. Lifting options.
 - a) Forklift with approved and certified lifting jib
 - b) Tyre handler with approved lifting point
4. Using the nominated lifting forklift / tyre handler above, position machine within RWZ above the sling for connection.
 - a) Apply the park brake.
 - b) Switch off the machine and exit the cab.
 - c) Ensure that wheel chocks have been placed under the machine wheels prior entering the RWZ. Before entering the RWZ ensure that your name, signature, time, and date are written on the "sign on point" on the door of the machine.
5. Attach shackle to lifting device.
6. Remove wheel chocks from forklift / tyre handler and remove your name from the "sign on point" on the door.
7. Operate forklift / tyre handler to lift and take the weight of the spacer band.

NOTE: Use caution not to damage hub during removal.

8. Remove the spacer from the hub.
 - a) Reverse the forklift / tyre handler slowly to ensure no twisting force is applied to prevent damage to the spacer / hub.
- CAUTION:** Be aware of the surroundings while reversing to avoid any collision.
- b) Ensure spacer is clear of machine.
- c) Lower spacer outside RWZ in designated storage area.
- d) Chock spacer to prevent un-controlled movement.



- e) Disconnect sling from forklift / tyre handler. Move and park the forklift / tyre handler to the designated parking bay.

8. Remove Rim Assembly (Rear inner positions)

8.1 Clamping of Rim Assembly with Tyre Handler

1. Using the tyre handler, ensure fall back arrestors in place in the fall-back position.
 - a) Grab the Rim assembly on the tread area with the tyre handler attachment.
 - b) Apply the park brake.
 - c) Switch off the tyre handler and exit the cab.
2. Ensure that wheel chocks have been placed under the tyre handler wheels prior entering the RWZ.
3. Before entering the RWZ ensure that your name, signature, time, and date are written on the "sign on point" on the door of the tyre handler.

8.2 Removing Rim assembly (Inner positions) from hub

1. Remove wheel chocks and remove your name from the "sign on point" on the door.
2. Operate tyre handler to clamp and remove inner position rim assembly.
3. The rim may dislodge from the hub mating face with outward forces applied by the tyre handler. DO NOT APPLY EXCESSIVE FORCE WITH THE TYRE HANDLER WHICH COULD DISLODGE JACK AND/OR STANDS.
4. IF THE RIM DOES NOT DISLODGE, contact your supervisor.
5. Remove the rim from the hub.
 - a) Reverse the tyre handler slowly to ensure no twisting force is applied with the tyre handler to prevent damage to the rim / hub.
 - b) Ensure valve assembly within the rim does not fowl on hub during removal process.

CAUTION: Spotter may be required to guide the tyre handler movement if the rim assembly fowls during removal.

CAUTION: Be aware of the surroundings while reversing to avoid any collision.

- c) Ensure rim assembly is clear of machine.
- d) Rotate the tyre handler arm so that the tyre and wheel assembly changes from a vertical position to a horizontal position.
- e) Place the tyre and rim assemblies in a designated area.
- f) Park the tyre handler and return the fallback arms to the "Stowed" position.

8.3 Rim and Tyre Marking

1. Mark the removed rim and tyre with the following information.
 - a) Date of removal
 - b) Asset ID & its designated area e.g., scrap, repair, inspection, crack test.
 - c) Reason for removal
 - d) Tread depth
2. If assembly needs to be stripped refer to horizontal method;
 - **VUL-SWP-072a-009- Demounting and Mounting Tyres**

9. Install Rim Assembly (Front positions)

9.1 Rim Assembly Preparation

1. Check that the rim components are correctly seated in the assembly.
 - a) If there are any form of damages, deflate the tyre and resolve the issue. If unsure, consult with a supervisor.
 - a) Rim assembly is the correct machine and position required.
 - b) Valve is in the correct for the position intended.



- c) Check Assembly is at handling pressure of 10PSI (70 kPa) using handheld pressure gauge.
 - d) Rim mating surface is free of foreign material (including paint and lubricants)
 - e) Ensure all fasteners (cleats, nuts, and washers) are in serviceable condition.
 - f) If new studs are used for assembly, ensure new washers and nuts are used.
 - g) Ensure that the rim identification (ID) number is distinctly visible on the gutter (check near the valve hole) and back section of the rim.
 - h) If there is no rim ID, then consult the supervisor for the wheel ID and stamp the wheel accordingly before fitting the tyre (record on job docket).
2. Check hub condition and studs/ bolt holes are serviceable and free of obstructions etc.
 3. Mating face of hub must be free of foreign materials including oil, grease, and paint.

NOTE: if bolts or studs are damaged or missing refer to OEM recommendations for minimum bolting requirements.

CAUTION: Damaged bolts and nuts poses cut hazards and will lead to a loose wheel incident or tyre explosion if not handled in time.

9.2 Installation of primary cleats and fasteners

1. Ensure that there are no personnel in the RWZ prior to carrying out any activities & Engage fall arrestors prior to grabbing wheel assembly.
2. Using the tyre handler, grab the rim / tyre assembly on the tread area.
 - a) Transport the rim / tyre assembly to the RWZ in horizontal position.
 - b) Once in the RWZ rotate wheel assembly until vertical.
 - c) Gently rotate the rim to align to the hub, ensuring the valve location lug is in line with the hub-valve recess.
 - d) Slowly approach wheel hub, fit the rim over the hub. (Spotter may be required)
 - e) Ensure rim mating surface is firmly against the hub mating face.
 - f) Apply some forward and upward pressure to the rim.
 - g) Engage park brake.
 - h) Switch off the tyre handler and exit the cab.
 - i) Place wheel chocks between the wheels of the tyre handler.
 - j) Before entering the RWZ ensure that your name, signature, time, and date is written on the "sign on point" on the door of the tyre handler.
3. Enter the RWZ.
 - a) Place work platform in position to install mounting hardware.
 - b) Manually fit by hand or tooling aid 2 cleats and nuts in the below sequence;
 - Position 12 o'clock (2 cleats/nuts)
 - Position 3 o'clock (2 cleats/nuts)
 - Position 6 o'clock (2 cleats/nuts)
 - Position 9 o'clock (2 cleats/nuts)
 - a) Ensure rim base is aligned with the front face of the hub by checking with a tread depth gauge around the mating surfaces circumferential of the hub / rim in the 12, 3, 6 & 9 o'clock position.
 - b) If the rim base / hub faces are greater than 3mm variance, the rim must be re-aligned on the hub.
4. Use an impact gun to secure cleating nuts and washers firmly against the mating face taking care to ensure no over-torquing.
 - a) Inspect all valve components & ensure they are not damaged from the fitment process.
 - b) Replace any damaged items.
5. Exit the RWZ.
 - a) Remove wheel chocks from tyre handler.
 - b) Release the grabbing arms from wheels.



- c) Move tyre handler away from the area.
- 6. Manually fit remaining cleats and nuts by hand.
- 7. Use an impact wrench to run-up nuts, and washers firmly against the mating face taking care to ensure no over-torquing.
- 8. Torque mounting hardware to "Initial cleat torque"

CAUTION: Damaged bolts and nuts from overtightening will lead to a loose wheel & equipment damage

9.3 Torquing of Mounting Hardware.

- 1. Refer to torque chart for the OEM torque value.
- 2. Conduct pre-start for the torque wrench
- 3. Set up torque:
 - a) Ensure the torque wrench is set to "Forward."
 - b) Establish the pneumatic air pressure setting required to achieve the desired torque (refer to the tool calibration chart to determine the air pressure required)
 - c) Adjust the air regulator using pressure gauge to ensure the correct pressure setting.
- 4. Position the wrench on the wheel fastener securely, operate the torque wrench. When the correct torque has been applied, the wrench will stall.

NOTE: The reaction arm will respond upon touching a solid object, beware of fingers, hands, and other body parts.

NOTE: If the wrench is not able to move the fastener, loosen the fastener and re-tighten it to the correct torque value.

- 5. Mark each fastener with permanent pen as each fastener has been torqued.
- 6. Complete torquing of each fastener as per the torque sequence.
- 7. Record the torque values on the change sheet.
- 8. Attach the torque calibration tool printout (If available) to the change sheet and sign off.
- 9. Attach the retorquer completion tag on the ignition key of machine.

10. Install Rim Assembly (Rear inner positions)

10.1 Rim Assembly Preparation

(REFER TO STEP 8.1: Rim Assembly Preparation).

10.2 Installation of rim (rear inner positions)

- 1. Ensure that there are no personnel in the RWZ prior to carrying out any activities & Engage fall arrestors prior to grabbing wheel assembly.
- 2. Using the tyre handler, grab the rim / tyre assembly on the tread area.
 - a) Transport the rim / tyre assembly to the RWZ in horizontal position.
 - b) Once in the RWZ rotate rim assembly until vertical.
 - c) Gently rotate the rim to align to the hub, ensuring the valve location lug is in line with the hub-valve recess.
 - d) Slowly approach wheel hub, fit the rim over the hub. (Spotter may be required)
 - e) Ensure rim mating surface is firmly against the hub mating face.
- 3. Release tyre handler from rim assembly (leaving the inner rim assembly suspended on hub).
- 4. Ensure inner valve stem is secured out of the travel path of spacer and outer assembly.
- 5. Continue to step below.



10.3 Installation of spacer band (rear positions)

1. Using an approved and certified lifting sling, wrap the sling around the spacer band in a choke position on top of spacer band.

NOTE: Must be a licensed dogger / rigger to perform task.

2. Affix 2T rated shackle to sling.
3. Lifting options.
 - a) Forklift with approved and certified lifting jib
 - b) Tyre handler with approved lifting point
4. Using the nominated lifting forklift / tyre handler above attach shackle to lifting device.
5. Operate forklift / tyre handler to lift and take the weight of the spacer band.
6. Install the spacer to the hub.
 - a) Use the forklift / tyre handler slowly position the spacer band over hub, ensure no twisting force is applied to prevent damage to the spacer / hub.
 - b) Lower jib / attachment when spacer in position

NOTE: Use caution not to damage hub during installation.

7. Shut-down forklift / tyre handler within RWZ above for sling disconnection.
 - a) Apply the park brake.
 - b) Switch off the machine and exit the cab.
 - c) Ensure that wheel chocks have been placed under the machine wheels prior entering the RWZ.
 - d) Before entering the RWZ ensure that your name, signature, time, and date are written on the "sign on point" on the door of the machine.
8. Disconnect from forklift / tyre handler and remove sling from spacer band.
9. Ensure that there are no personnel in the RWZ prior to carrying out any activities & Engage fall arrestors prior to grabbing wheel assembly.
10. Using the tyre handler, grab the rim / tyre assembly on the tread area.
 - a) Transport the rim / tyre assembly to the RWZ in horizontal position.
 - b) Once in the RWZ rotate wheel assembly until vertical.
 - c) Gently rotate the rim to align to the hub, ensuring the valve location lug is in line with the hub-valve recess.
 - d) Slowly approach wheel hub, fit the rim over the hub. (Spotter may be required)
 - e) Ensure rim mating surface is firmly against the hub mating face.
 - f) Apply some forward and upward pressure to the rim.
 - g) Engage park brake.
 - h) Switch off the tyre handler and exit the cab.
 - i) Place wheel chocks between the wheels of the tyre handler.
 - j) Before entering the RWZ ensure that your name, signature, time, and date are written on the "sign on point" on the door of the tyre handler.
11. Enter the RWZ.
 - a) Place work platform in position to install mounting hardware.
 - b) Manually fit by hand or tooling aid 2 cleats and nuts in the below sequence.
 - Position 12 o'clock (1 cleats/nuts)
 - Position 3 o'clock (1 cleats/nuts)
 - Position 6 o'clock (1 cleats/nuts)
 - Position 9 o'clock (1 cleats/nuts)
 - c) Ensure rim base is aligned with the front face of the hub by checking with a tread depth gauge around the mating surfaces circumferential of the hub / rim in the 12, 3, 6 & 9 o'clock position.
 - d) If the rim base / hub faces are greater than 3mm variance, the rim must be re-aligned on the hub.



12. Use an impact gun to secure cleating nuts and washers firmly against the mating face taking care to ensure no over-torquing.
 - a) Inspect all valve components & ensure they are not damaged from the fitment process.
 - b) Replace any damaged items.
13. Exit the RWZ.
 - a) Remove wheel chocks from tyre handler.
 - b) Release the grabbing arms from wheels.
 - c) Move tyre handler away from the area.
14. Manually fit remaining cleats and nuts by hand.
15. Use an impact wrench to run-up nuts, and washers firmly against the mating face taking care to ensure no over-torquing.

CAUTION: Damaged bolts and nuts from overtightening will lead to a loose wheel & equipment damage.

10.4 Torquing of Mounting Hardware

Refer to torque chart for the OEM torque value.

1. Refer to torque chart for the OEM torque value.
2. Conduct pre-start for the torque wrench
3. Set up torque:
 - d) Ensure the torque wrench is set to "Forward."
 - e) Establish the pneumatic air pressure setting required to achieve the desired torque (refer to the tool calibration chart to determine the air pressure required)
 - f) Adjust the air regulator using pressure gauge to ensure the correct pressure setting.
4. Position the wrench on the wheel fastener securely, operate the torque wrench. When the correct torque has been applied, the wrench will stall.

NOTE: The reaction arm will respond upon touching a solid object, beware of fingers, hands, and other body parts.

NOTE: If the wrench is not able to move the fastener, loosen the fastener and re-tighten it to the correct torque value.

5. Mark each fastener with permanent pen as each fastener has been torqued.
6. Complete torquing of each fastener as per the torque sequence.
7. Record the torque values on the change sheet.
8. Attach the torque calibration tool printout (If available) to the change sheet and sign off.
Attach the retorquer completion tag on the ignition key of machine.

11. Tyre Deflation & Inflation

Refer to **VUL-SWP-072a-008-Tyre Deflation & Inflation**

12. Jack and Stand Removal

Refer to

- **VUL-SWP-072a-005-Jacking and Supporting of Machine – Rear Dump Trucks**
- **VUL-SWP-072a-006- Jacking and Supporting of Machine – Grader**
VUL-SWP-072a-007- Jacking and Supporting of Machine – Loader