

STANDARD OPERATING PROCEDURE

Operating TowHaul Trucks for Recovery of Disabled Mechanical Haul Trucks

Document Number: 960C-SOP-119

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OPERATING TOWHAUL TRUCKS FOR RECOVERY OF DISABLED MECHANICAL HAUL TRUCKS



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| 5 | APP | Apr 06, 2022 | Approved | | | Tammy Siver |
| 4 | APP | Apr 03, 2019 | Approved | T. Siver | R. Sample | G. Schreyer |
| 3 | APP | Oct 10, 2017 | Approved | T. Siver | G. Schreyer | G. Schreyer |
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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 do not replace the requirements contained in the NACG 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 operating TowHaul trucks for recovery of mechanical haul trucks.

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

- Unfamiliar with driving in a mine environment.
 - Follow site specific mine driving rules. Obtain permits as required.
 - Review 962C-SOP-016 Driving Haul Trucks – General
 - Use an escort where required, as per site specific mine driving rules.
 - Use a pilot vehicle.
 - Plan and drive route before towing a disabled truck.
 - Do not tow trucks on grades greater than 8%
 - Do not tow with operator in cab of disabled truck.
 - Do not tow disabled truck with box raised or material in box.
 - Assess area for overhead hazards and power lines; plan the tow away from power lines and trailing cables.
- TowHaul unit jackknifing due to turning too sharp and operating on uneven roads.
 - Always ensure there is adequate room to turn the unit; be aware of the unit's turning radius. Wait for traffic to clear the intersections.
 - When turning the TowHaul unit on a tight radius, take care that the leading edge of the disabled unit does not interfere with the TowHaul truck.
 - Drive to road conditions and slow down when travelling on uneven roads. Maximum speeds shall not exceed:
 - 35 km/hr (22 mph) when empty
 - 8 km/hr (5 mph) at the top of first gear when towing
- Improper communication; interaction with other equipment and personnel.
 - Follow site specific mine driving rules.

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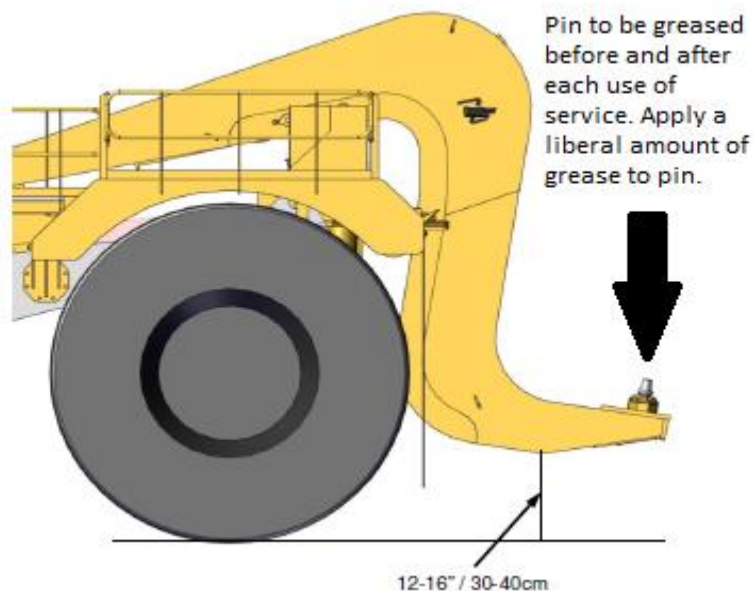
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- Use a pilot vehicle to control traffic where necessary.
- Notify area supervisor of tow.
- Establish hand signals and/or radio communication with ground personnel.
- Establish radio communication with pilot vehicles.
- Determine requirement to use client radio in addition to Company radio; use client radio if applicable.
- Use pylons and/or barricades to identify work area when connecting and disconnecting TowHaul and disabled truck. Do not permit unnecessary personnel in work area.
- TowHaul truck contacting disabling truck causing equipment damage.
 - Use cameras and spotters for spotting equipment. On their own, cameras are not adequate because they cannot estimate depth accurately therefore spotters are required as well.
 - If more than one spotter is used, designate primary spotter. Two spotters are recommended, one to guide left to right alignment of trunnion pin and tow hook; one to relay signals to TowHaul truck operator.
 - Review spotter signals with all personnel prior to the task.
- Uncontrolled movement of equipment or energy sources while inspecting disabled truck, hooking up hoses and lines, securing disabled truck to TowHaul, or dumping material from disabled truck.
 - Ensure hazardous energy is isolated (lockouts and wheel chocks) on TowHaul and disabled truck while park brake hoses, service brake hoses and hydraulic lines are being hooked up to disabled truck.
 - Ensure disabled truck is locked out when inspecting.
 - TowHaul truck transmission is locked out when dumping load on disabled truck. No one in cab of disabled truck while material is being dumped using the auxiliary dump procedure.
 - Ensure front service brakes on disabled truck have been engaged via service brake tooling before using TowHaul to release park brakes on disabled truck.
 - Do not park equipment or vehicles behind disabled truck. Do not work behind disabled truck if hazardous energy (haul truck movement) has not been controlled.
- Pinch point between trunnion pin cup and disabled truck.
 - Grease pin when required to prevent it from becoming stuck.
 - Do not place body parts in the line of fire.
 - Before raising a disabled truck, ensure personnel are far enough away from the TowHaul unit as the disabled truck may jerk in any direction when lifted.

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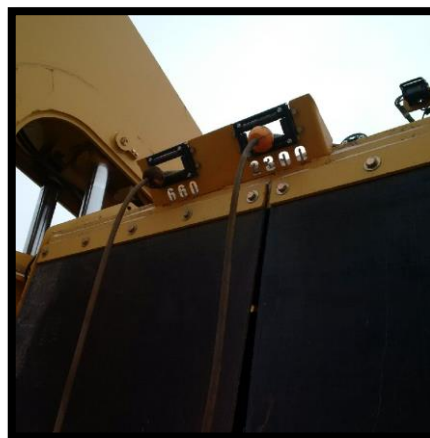
- Debris on trunnion pin and in receiver bracket causing inadequate attachment of disabled unit. Damaged receiver bracket.
 - Inspect and clean pin and receiver bracket regularly.
 - Prior to the unit's first tow, ensure the receiver bracket is non-destructively inspected (NDT). NDT inspection shall be completed annually thereafter and may occur more frequently if visual inspection observes wear or cracks in the receiver.
- Trunnion pin popping out releasing towed disabled unit.
 - Ensure the TowHaul is in the proper position and the goose neck is all the way up with the manual lock in place.
 - Ensure the proper washer is on the trunnion pin with the flat side up.
 - Inspect trunnion pin receiver/tow hook for damage after connection. Do not tow disabled unit if hook is cracked.
- Load exceeding tow capacity of TowHaul causing damage or breakage to tow hook or receiver.
 - Do not exceed maximum combined gross vehicle weight of 983,618 lbs (equivalent weight of towing a Caterpillar 797 haul truck) while towing disabled unit.
 - Disabled unit must be empty prior to towing.
 - Conduct visual inspections of tow hook and receiver prior to towing followed by annual NDT testing of receiver.

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- Park Brake System malfunction on disabled unit when connected to TowHaul.
 - Ensure the TowHaul system is set up as per procedure such that park brakes on disabled unit are controlled by the TowHaul truck and activate upon release.
 - **DO NOT** operate TowHaul unit until park brake system is fully operational.
 - NOTE: CAT 777D Haul Trucks do not have spring applied front wheel park brakes. Follow procedures 6.4.1 & 6.4.2 to apply the front service brakes as a safety precaution during towing.
- Oil injection from hydraulic hoses when disconnecting disabled unit.
 - Release pressure from TowHaul to disabled truck before disconnecting hydraulic hoses.
- Incorrect park brake release hoses between TowHaul truck and disabled truck.
 - Park brake release hoses are manufacturer specific; ensure the hoses match the type of equipment being towed:
 - 660psi circuit - Caterpillar 797B, 797F, 793C, 793D, 793F, 789C, 785, 777.
 - 2300psi circuit – Komatsu 830E, 930E, and Hitachi EH5000.



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.**

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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 Disabled Truck

Disabled equipment that is being towed with the TowHaul truck.

5.5 TowHaul Truck

Tow truck with trunnion pin.

5.6 TowHaul Unit

TowHaul truck and disabled truck.

6.0 PROCEDURE

6.1 General

- Operate the TowHaul unit in compliance with site specific mine driving rules. Complete a site specific hazard assessment (JSA/FLRA) to follow site specific rules and identify and control site hazards.
- Maintenance personnel completing hookups must refer to OEM manuals for disabled vehicles.
- Area supervisor must be notified prior to working on a disabled vehicle. Area will be identified with pylons or barricades.
- Routes, horn signals and radio channels must be understood. Routes must be planned and driven ahead of task.

6.2 TowHaul Truck Operating Procedure

- Operate truck brake systems prior to operating and moving the unit. These systems include but are not limited to individual activation of the service brake, park brake, secondary brake, and retarder brake from the operator's cab. Activate each brake system individually with the engine running and the air system fully charged. If any application or release of any brake system does not appear to operate properly or if sluggishness is apparent on application or release shut the unit down and notify maintenance personnel.
- Raise the main boom cylinders to lift tow hook approximately 12-16" / 30-40 cm above ground level.

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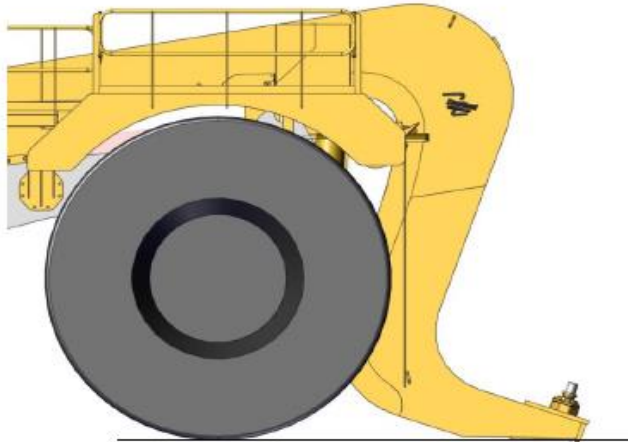
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- Release truck brakes and transport at slow speed. Maximum speeds will not exceed:
 - 35 km/hr (22 mph) when empty.
 - 8 km/hr (5 mph) at the top of first gear when towing.

6.3 TowHaul Truck Parking Procedure

- Set parking brakes on TowHaul truck.
- Lower main boom cylinders to rest tow hook on the ground.



6.4 Connecting TowHaul to Disabled Haul Truck

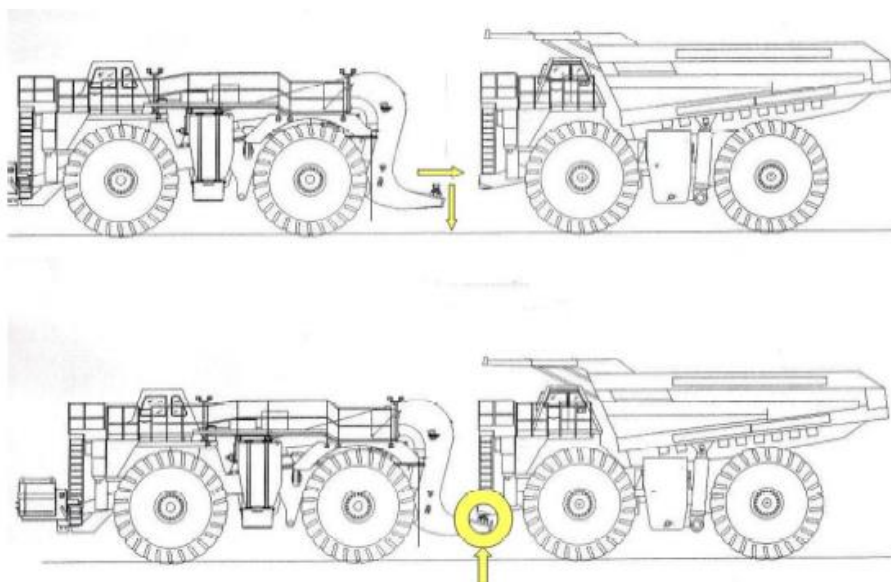
- Lockout (including wheel chocks) and inspect **disabled truck** in preparation for towing. Ensure disabled truck is empty and box is lowered prior to being towed. If material is in truck box and assistance is required, refer to Section 6.7 TowHaul Unit Auxiliary Functions – Auxiliary Dump Procedure. NOTE: do not use procedure if material is frozen in box; contact operations for removal.
- Ensure there is no material in front of the disabled truck so that the trunnion pin can go under the bumper.
- Lockout (including wheel chocks) and inspect the trunnion pin on **TowHaul** for any damage. Ensure it is clean and the proper washer is on the pin (flat side up).
- Inspect the **TowHaul** hydraulic system, including but not limited to valves, hoses and cylinders, for leaks. Ensure dirt has not entered the system.
- Inspect the tow hook for cracks or any irregular wear.

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- Inspect receiver brackets for debris and apply antiseize/grease on the trunnion pin at all times to ensure proper engagement and removal of the trunnion pin from the receiver on the disabled vehicle.
- Ensure all brakes except the park brake have been released from the **disabled truck** and the gear select is in neutral. Any hydraulic applied brakes must not be applied due to residual accumulator pressure.
- Remove lockout and wheel chocks from TowHaul. Lower tow hook to tow bracket level.
- Reverse TowHaul until the trunnion pin aligns with the opening in the tow bracket. Spotters must be used. One spotter will guide alignment of the trunnion pin to tow hook, a second spotter will communicate with TowHaul operator. Spotters will stay out of the line of fire. TowHaul operator will immediately stop if they lose sight of primary spotter.
- Raise the main boom cylinders until the trunnion pin is fully seated in the receiver.



- Put TowHaul truck in neutral and set park brake. Lockout TowHaul truck transmission and ensure no one is in cab of TowHaul. Use wheel chocks.
- Inspect tow hook for damage; do not attempt to tow disabled truck if tow hook is cracked from connecting the two units.

REFER TO THE FOLLOWING SECTIONS FOR MODEL SPECIFIC CONNECTIONS & PARK BRAKE RELEASE INSTRUCTIONS:

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NOTE: CAT 777D Haul Trucks do not have spring applied front wheel park brakes therefore the front service brakes are required to be applied as a safety precaution during towing (sections 6.4.1 & 6.4.2).

- 6.4.1 Connecting to Disabled CAT 777D with Caliper Front Service Brakes
- 6.4.2 Connecting to Disabled CAT 777D with Oil Cooled Front Service Brakes
- 6.4.3 Connecting to Disabled CAT Haul Trucks (777D/785/789C/793C/D/F & 797B/F) and Releasing Rear Park Brakes

6.4.1 Connecting to Disabled CAT 777D with Caliper Front Service Brakes

- Install Front Wheel Service Brake Tooling to the front service brakes of disabled 777D truck to apply both service brakes.



777D Service Brake Tooling for Caliper Front Brakes

- 1) Disconnect service brake lines on disabled truck from 'T' fitting located behind left front wheel on bottom of the frame rail.
- 2) Install a whip line from the service brake tooling to each front wheel.
- 3) Ensure service brake lines from the disabled unit are plugged using #6 ORFS (O-Ring Face Seal) plugs.

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777D with Caliper Front Service Brakes
Remove lines and cap 'T' fitting with #6
ORFS. Install the "Front Service Brake
Tooling".

- 4) Connect **Komatsu brake release supply line** from TowHaul to service brake tooling.
- 5) Open valves and pressurize service brakes (2185psi – 2875psi). **On the plus one system in TowHaul use control function #6 Park Brake Release. RELEASE Park Brake BUTTON, this applies pressure to service line.**
- 6) Once application pressure has stabilized, close valves on tooling and release pressure that is in the supply line from the TowHaul. **On the plus one system in TowHaul use control function #6 Park Brake Release. APPLY Park Brake BUTTON; this releases pressure from supply line for service brake use.**
- 7) Disconnect Komatsu brake release supply line from front wheel service brake tooling.
- 8) Install Do Not Operate tag on front bumper stating "front service brake lines are disconnected, front service brakes are pressurized up with installed tooling".
- 9) Refer to Section 6.4.3 for Releasing Rear Park Brakes.

6.4.2 Connecting to Disabled CAT 777D with Oil Cooled Front Service Brakes

- Install Front Wheel Service Brake Tooling to the front service brakes of disabled 777D truck to apply both service brakes.

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777D Service Brake
Tooling for Oil Cooled
Front Brakes

- 1) Disconnect service brake lines on disabled truck at each front wheel.
- 2) Install a whip line from service brake tooling to each front wheel.
- 3) Ensure service brake lines from the disabled unit are plugged using #8 ORFS plugs.



777D with Oil
Cooled Front
Brakes
Remove hose &
cap with #8 ORFS
Install "Front
Service Brake
Tooling"



- 4) Connect the **CAT brake release supply line** from TowHaul to service brake tooling.
- 5) Open valves and pressurize service brakes (520-660psi). **On the plus one system in TowHaul use control function #6 Park Brake Release. RELEASE Park Brake BUTTON, this applies pressure to service line.**
- 6) Once application pressure has stabilized, close valves on tooling and release pressure that is in the supply line from the TowHaul. **On the plus one system in TowHaul use control function #6 Park Brake Release. APPLY Park Brake BUTTON; this releases pressure from supply line for service brake use.**
- 7) Disconnect CAT brake release supply line from front wheel service brake tooling.

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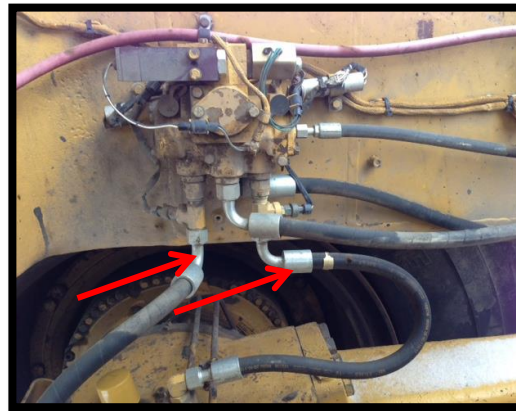
- 8) Install Do Not Operate tag on front bumper stating "front service brake lines are disconnected, front service brakes are pressured up with installed tooling".
- 9) Refer to Section 6.4.3 for Releasing Rear Park Brakes.

6.4.3 Connecting to Disabled CAT Trucks (777D/785/789C/793C/D/F & 797B/F) & Releasing Rear Park Brakes

- Clean the Traction Control Valve (TCS) before removing park brake release lines. The valve is located on the left hand frame rail above the transmission at the rear of the CAT 777/785/789/793/797.
- Remove both park brake lines from the TCS valve and cap off the valve side to prevent any contamination and oil spills.
- Attach park brake release whip line. Use appropriate fittings (#12 o-ring face seal) with (dash 8) JIC coupler to make the connections.
- Connect whip line in such a way that it will not catch or rub on anything and it does not restrict flow. Do not connect to any pressure test ports.



"Park Brake Release Whip Line"



777D

Remove lines and install the "Park Brake Release Whip Line". Cap off outlets at the valve with #12 ORFS

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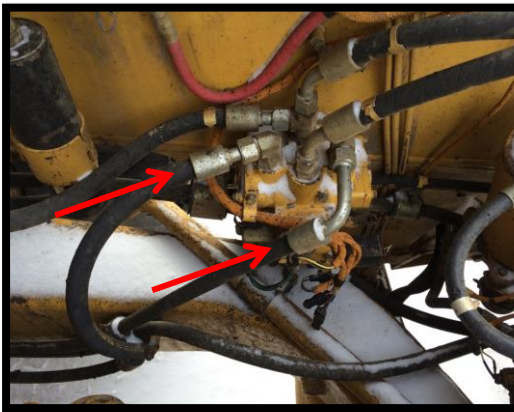
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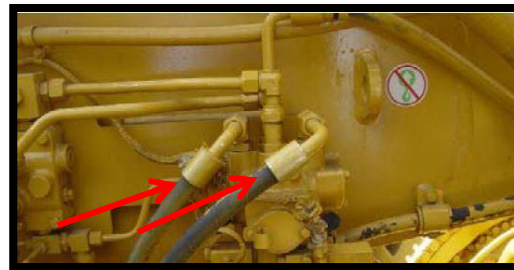
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CAT 785
Remove lines and install the "Park Brake Release Whip Line". Cap off outlets at the valve with #12 ORFS



CAT 789/793
Remove lines and install the "Park Brake Release Whip Line". Cap off outlets at the valve with #12 ORFS

Remove these lines, and install the "Park Brake Release" whip line, cap off outlets at the valve side.



TCS Valve

CAT 797

- Install the **Caterpillar 660psi park brake release line** from TowHaul to the park brake release whip line on the disabled truck. Secure the line against dragging on the ground, and away from hot or moving parts.
- Use the TowHaul one plus system (control panel) to release the disabled trucks park brakes (525psi min to 680psi max).
- Allow the park brake system release pressure to build up and stabilize before attempting to raise the front wheels, otherwise severe front bumper and possible brake damage may occur.

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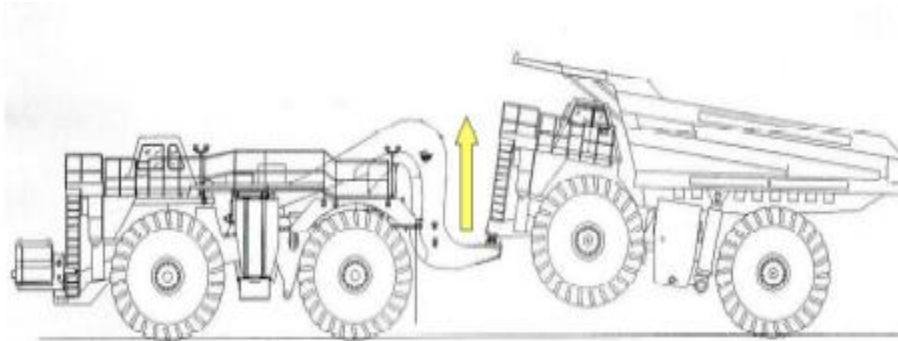
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6.5 Towing Disabled Truck

- Remove wheel chocks and lockouts on both units.
- Raise tow boom slightly, taking weight off disabled truck's front tires. Ensure personnel are clear from area and not in pinch point between trucks or behind disabled truck.
- Ground personnel will ensure there are no leaks occurring when park brakes are released. Ground personnel will inspect front bumper area to ensure there is no damage, slippage or cracking and that the front end is structurally sound.
- TowHaul operator will raise tow hook until the main boom cylinders are fully extended.



- Lock the mechanical lock.
- TowHaul operator will lower the main boom cylinders so the mechanical lock rests on the pedestal.
- Using a competent operator, commence towing through mine or work area. Following site specific rules and site specific hazard assessment (JSA/FLRA). Use a pilot vehicle. Do not exceed speeds greater than 8 km/h.

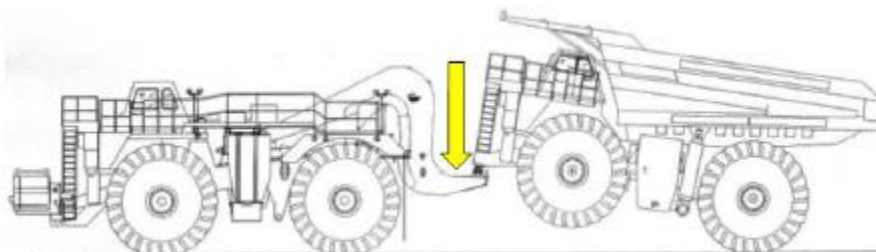
6.6 Disconnecting Disabled Unit from TowHaul

- Stop on a flat and level surface.
- Set the park brake on the TowHaul truck only.
- Fully raise main boom then unlock the mechanical lock.
- Lower the front wheels of the disabled unit to the ground until the weight of the disabled unit is resting on the suspensions. Ensure the tow pin stays fully engaged in the receiver.

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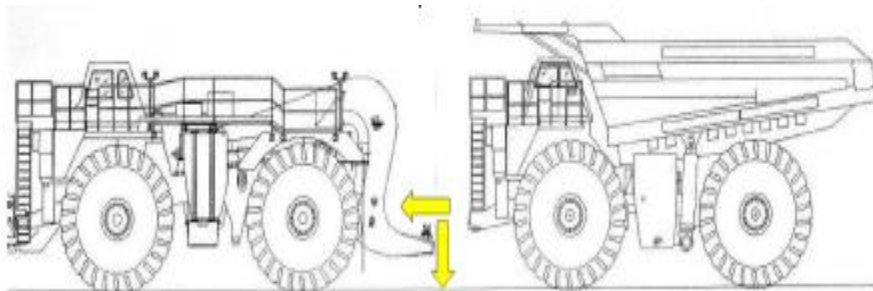


- Using the TowHaul control panel set the park brake on the disabled unit (use the down arrow to apply the park brakes on the disabled truck). Confirm the park brakes are fully engaged. Properly chock wheels. Leave sufficient distance between wheels and chocks to avoid the chocks becoming pinched under the wheels during disconnection.
- Completely lower the front of the disabled unit to fully disengage the tow pin from the front bumper receiver. It will be necessary to release the TowHaul park brakes in order to relieve pressure on the tow pin while unhooking. Be aware that the TowHaul will move slightly and will be able to roll once the tow pin is free of the receiver. The TowHaul operator must be ready to apply the service brakes and hold position of the TowHaul during this step.
- Once the tow pin is clear of the disabled unit's receiver apply the TowHaul park brakes and install wheel chocks. Apply transmission lock to TowHaul.
- Lockout disabled haul truck.
- Release park brake pressure and disconnect park brake release system. Remove park brake whip lines and install all park brake lines to their original locations.
- For 777D haul trucks with oil cooled brakes or caliper front brakes, purge the Service Brake Tooling by slowly opening the valves and draining into a suitable container. Confirm zero pressure prior to removing service tooling. Re-install left hand (LH) and right hand (RH) front service brake hoses to original locations.
- Remove transmission lock and wheel chocks from TowHaul and ensure the trunnion pin is fully disengaged and clear of the bumper. Drive the TowHaul truck forward until it is clear of the disabled unit.

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- Install “Do Not Operate” tags on disabled unit stating the service and park brakes are to be purged prior to moving unit. Prepare truck for repairs by applying personal locks and/or crossover locks.

6.7 Parking Operations for TowHaul Connected to Disabled Truck (TowHaul Unit)

- Park on a level surface.
- Engage the truck parking brake.
- Shift the transmission control lever into NEUTRAL.
- Fully raise main boom then unlock the mechanical lock.
- Lower the disabled vehicle to the ground and disengage the park brake release.
- Stop engine.
- Turn the start switch and/or key to the off position.
- Disengage the isolation switch.

6.8 TowHaul Unit Auxiliary Functions – Auxiliary Dump Procedure

- Do not dump if load is frozen, contact operations.
- Shut down TowHaul truck while connecting lines to avoid residual pressure.
- Lockout TowHaul truck transmission while connecting lines and when load is being dumped.
- Connect the auxiliary dump lines to the disabled truck.
- Bypass hoist control valve so the TowHaul has full hoist control.
- Select the auxiliary dump option in the main screen of the Plus One system.
- Use the up and down arrows to raise/lower the bed of the disabled truck.

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

- 962C-SOP-008 Signaling Equipment
- 962C-SOP-016 Driving Haul Trucks – General

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Operating TowHaul Trucks for Recovery of Disabled Mechanical Haul Trucks

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- 962C-SOP-032 Recovery of Stuck or Immobilized Equipment
- 950C-C-028 Hazardous Energy Isolation Code
- 960C-SOP-111 Live Work Working on Equipment While it is Running
- TowHaul Operation Manual – TH-360 TowHook
- Syncrude P28284-04 Recover Disabled Haul Truck with CAT 793B Tow Truck
- Suncor MEP4076A Towing of a Disabled Komatsu 930E Haul Truck with 797 Tow Truck
- Suncor MEP4058A Recovery of Disabled Cat 797 Haul Truck with the 797 Tow Truck

9.0 APPENDICES

- Appendix A – General Diagram of TowHaul Truck Assemblies

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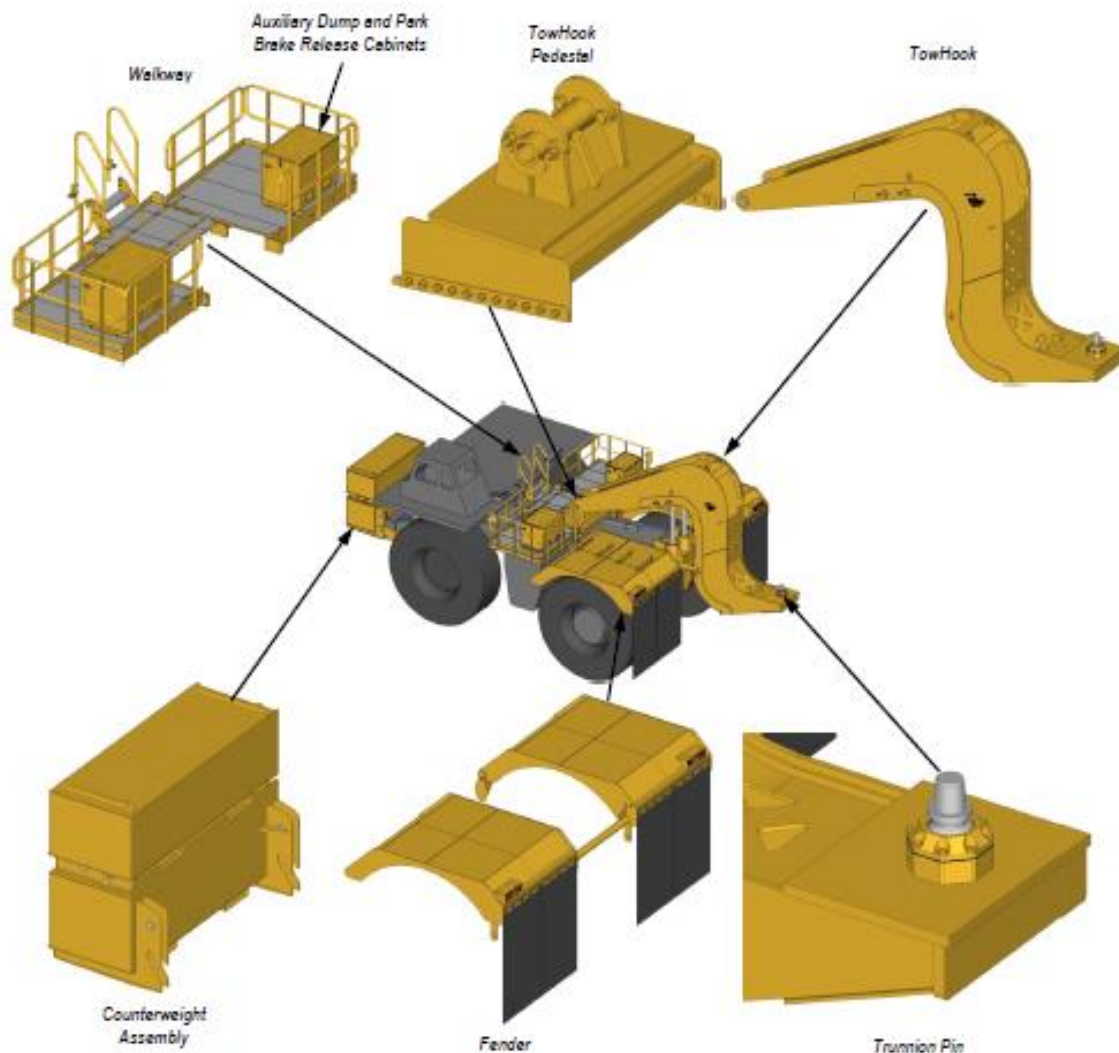
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