

# STANDARD OPERATING PROCEDURE

## TRACK FRAME REMOVAL & INSTALLATION

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## TRACK FRAME REMOVAL & INSTALLATION

*Tammy Siver*

6	APP	JUN 11, 2025	Approved	Andre Brule	Lisa Norris	Tammy Siver
5	APP	MAY 19, 2022	Approved	Andre Brule	Rob Rondeau	Tammy Siver
4	APP	AUG 26, 2019	Approved	Andre Brule	Tammy Siver	Stan Miller
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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 track frame removal and installation.

## 2.0 SCOPE AND APPLICATION

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

## 3.0 HAZARDS AND CONTROLS

- Equipment failure/malfunctioning or rigging failure resulting in personal injury and/or property damage.
  - The operator will complete a visual inspection of the equipment used to remove the track frame (i.e., forklift, loader, skid steer, crane, etc.).
  - Know the weight of the track frames being lifted and remember that mud and material buildup will affect the overall weight of the track frames.
  - Approximate weights of different model track frames are listed below. Always reference the manufacturer or OEM procedures to identify specific weights for each model and manufacturer of equipment.
    - CAT D8T - 10,360lbs
    - CAT D9T - 9,600lbs
    - CAT D9R - 12,520lbs
    - CAT D10T - 16,020lbs
    - CAT D11T - 25,000lbs
  - Ensure that all rigging components, including shackles, hooks, and slings, are rated for, and capable of handling, the maximum anticipated load.
  - Inspect all rigging equipment prior to use to identify and eliminate any damaged or defective components. This includes lifting lugs on the track frames, as well as shackles, slings, and cables (see Appendix C for examples of lifting lugs).
  - Rigging and signaling activities must only be performed by trained, certified, and competent personnel.

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- All personnel must maintain a minimum safe distance of 1.8 meters (6 feet) from any suspended load. Under no circumstances shall anyone stand or walk beneath a raised load.
- Taglines will be used on suspended loads to maintain control and prevent uncontrolled movement during lifting operations.
- Pinching, crushing, and line-of-fire hazards.
  - Do not position yourself between the front idler and the blade, as well as between the track frame and push arm, during track frame removal and installation.
  - Keep hands and fingers clear of pinch points when tensioning slings or using come-alongs.
  - Ensure all personnel involved in the task are aware of potential pinching, crushing, and line-of-fire hazards.
- Heavy manual lifting resulting in musculoskeletal injuries (sprains/strains).
  - Perform stretching exercises before starting the task and periodically during the task. Take microbreaks when working in awkward or sustained positions. Use proper body mechanics when lifting (i.e., keep your shoulders and feet square to the load, lift with your legs from a squat position, keep your back straight, and maintain proper footing).
  - Assess the load before lifting. Ensure it is within your capacity to lift safely without overexertion. If unsure, do not attempt the lift.
  - Do not lift any object exceeding 50 lbs (22.7 kg) without assistance from a second person or the use of a mechanical lifting aid. Refer to 962C-SOP-009 Manual Lifting and Carrying Heavy Objects.
  - Inspect the travel route prior to the task; remove tools, dunnage, cords/cables, and other potential tripping hazards from the lift and travel areas.
- Bogie assembly separating from the track frame.
  - Use an engineered or manufacturer-approved bogie strap/suspension strap to secure the suspension to the track frame (see Appendix A for examples of bogie straps).
- Unintentional movement of the equipment causing personal injury and/or property damage.
  - Isolate hazardous energy and lock out/tag out equipment when removing the track frames (refer to 950C-C-028 Hazardous Energy Isolation Code).
  - Flag and tag the work area to warn others of potential hazards. Maintain effective communication with all personnel in the vicinity throughout the operation (see 960C-SOP-004: Flagging, Tagging, and Barricading Hazardous Areas).
  - Use jacks and stands certified for the weight to be lifted and supported.

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### 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 General Safety

- 1) Complete hazard assessment (i.e., FLRA) for task. Notify your supervisor if you are unsure of the task and if there are any hazards outside of your control.
- 2) Inspect all rigging components prior to lifting, including but not limited to lifting lugs located on the track frames, shackles, rigging, and the equipment used to hoist track frames (see Appendix C for an example of lifting lugs).

#### 6.2 Track Frame Removal in a Shop

- 1) Using a spotter, position the machine in the designated location in the shop. Lower the blade.
- 2) Install the bogie strap or suspension strap to secure the suspension to the track frame.
- 3) Use a support stand to hold the ripper off the ground, remove the ripper tooth, and raise the ripper.
- 4) Remove the stand, install a square plate under the ripper shank, and lower the ripper to the steel plate.
- 5) Place the machine on stands, following the SOP 960C-SOP-401 – Raising, Blocking, and Lowering Dozers Using Hydraulic Attachments in a Shop or the Field.
- 6) Drain the track frames and release the slack adjusters.

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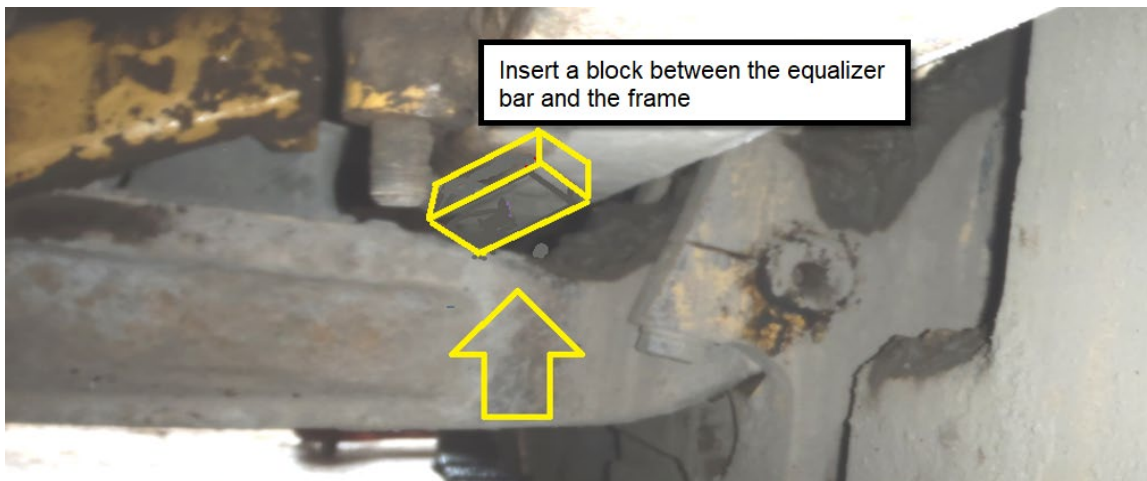
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- 7) Remove the blade push arms. Remove trunnion ball caps and spacers. Support the push arm with the crane. Move the push arm away from the machine as far as it will go and lower it to a stand or block. Do the same to the other side.
- 8) Remove the trunnion ball, lock, and sealed cover.
- 9) Removed the seal retainer bolts from the inner side of the frame.
- 10) Remove the pivot shaft retainer bolts and cover.
- 11) Install certified track frame lifting tool 5P8619 bracket.
- 12) Insert a block between the equalizer bar and the frame to ensure that the equalizer bar is secure against movement when the hard bar pin is removed.



- 13) Position a hydraulic press to press out the hard bar pin. Support the press from falling during the pin removal.
- 14) Install the pivot shaft retainer bar.
- 15) Remove the opposite track frame by repeating steps 7 through 10.

### 6.3 Track Frame Removal in the Field

- 1) Prepare a flat, level ground surface. Lay out steel plates to support the stands and ripper.
- 2) The crane must be rated for twice the weight of the track frame (i.e., a D11 frame is 22,000 lbs.).
- 3) Follow the above steps for Track Frame Removal in a Shop.

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## 6.4 Track Frame Installation – Shop

- 1) Clean the pivot shaft, threaded holes, and the mounting pivot shaft seal surface, and lubricate all components.
- 2) Inspect hard bar seals and bearings, clean up, and lubricate.
- 3) Inspect the mounting “O” ring on the track frame mounting plate. Clean the track frame hard-bar mounting pin bores and bolt holes. Lubricate the “O” ring.
- 4) Do a lift study and match the lifting components to the track frame. Attach a certified and sized lifting bracket to the track frame. Watch for materials on the fender and ensure the cab door is closed so they will not be damaged by the bracket as it moves inward.
- 5) Install the bogie strap or suspension strap to secure the suspension to the track frame.
- 6) Restrain the pivot shaft so it will not push through.
- 7) Install the track frame and bolt the pivot shaft seal holder to the body.
- 8) Install the pivot shaft spacer, end retainer plate, and bolts—torque to the specified torque.
- 9) Install the sealed end plate and lock.
- 10) Install the hard-bar pin.
- 11) Install the bolts, washers, and nuts for the hard-bar pin lock.
- 12) Install a spacer between the hard bar and the body on the other side of the machine to keep the hard bar level.
- 13) Remove the lifting bracket.
- 14) Remove the pivot shaft retainer bar.
- 15) Install the next track frame following steps 1 through 12.
- 16) Remember to remove the hard-bar spacers.
- 17) Remove all vent plugs from the pivot shaft and fill the shaft with the recommended oil from the reservoir. Top up the reservoir as needed. Replace each vent plug once the oil is oozing out. The last vents should be those on the ends of the shaft. Top up the reservoir.
- 18) Attach a sling to one push arm and move it to the trunnion ball.
- 19) Install the trunnion ball and torque it to the specified torque.
- 20) Install spacers and the trunnion cap; remove spacers if needed to obtain proper spacing. Repeat this installation for the other side.

**Note:** If the distance between the trunnion ball and the push arm is too large, raise the blade slightly and slowly push the arm until it butts up against the trunnion ball.

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## 6.5 Track Frame Installation – Field

- 1) This installation procedure may be performed in the field using the same steps. However, if a lifting bracket is not available, a forklift may be used to lift the frame assembly. Ensure the frame is properly secured and stable on the forks to prevent it from rolling or falling off during lifting.

## 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 21 Rigging
- Alberta Occupational Health and Safety Act, Regulation and Code – Part 6 Cranes, Hoists and Lifting Devices
- Manufacturer's / OEM Procedures (EG, CAT Service Manual)
- 950C-C-022 General Housekeeping Code
- 950C-C 025 Hand Tools Code
- 950C-C-028 Hazardous Energy Isolation Code
- 950C-C-008 Cranes, Hoists and Rigging Code
- 960C-SOP-004 Flagging, Tagging, and Barricading Hazardous Areas
- 960C-SOP-019 Slip Trip and Fall Hazard Prevention
- 960C-SOP-110 Track Frame Rebuild
- 960C-SOP-112 Compressed Air and Air Hoses
- 960C-SOP-401 Raising, Blocking and Lowering Dozers Using Hydraulic Attachments
- 960C-SOP-403 Crane Operation - Shop Bridge & Jib Cranes
- 960C-SOP-506 Press Tooling Use Of
- 962C-SOP-008 Signaling Equipment
- 962C-SOP-009 Manual Lifting and Carrying Heavy Objects

## 9.0 APPENDICES

- Appendix A - Example of Bogie Straps
- Appendix B - Examples of Cables Used to Tie Back the Front Frame Assembly
- Appendix C - Lifting Lug Inspection



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## Appendix A Example of Bogie Straps



Bogie straps installed on a D8 track frame



Bogie straps installed on a D9 track frame.



Bogie straps installed on a D10 track frame.



Bogie straps installed on a D11 track frame.



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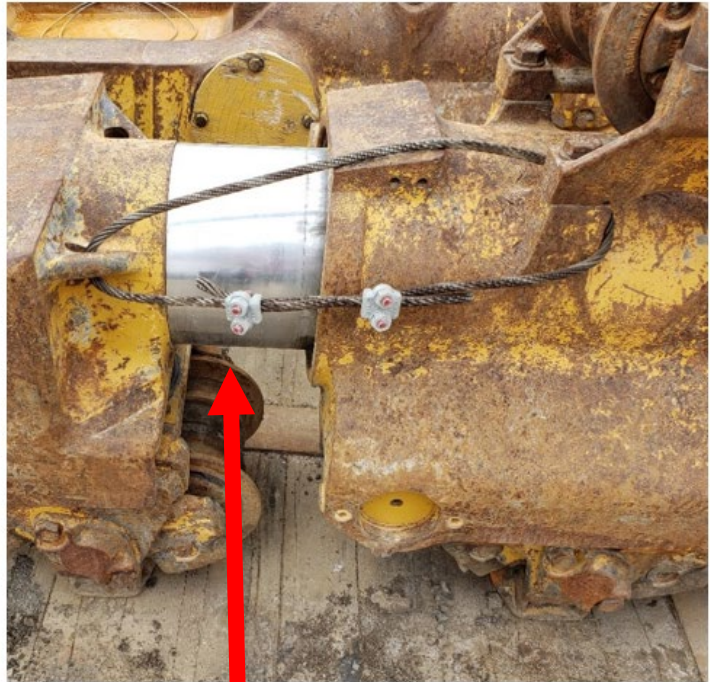
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## Appendix B Cables Used to Tie Back the Front Frame Assembly



## Cables Used to Tie Back the Front Frame Assembly

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## Appendix C Lifting Lug Inspection

Inspect the lifting lug located on the center of the track frame. Ensure to clean up any built-up material. Look for cracks, broken welds, bent lugs, discoloration, and any other structural defects that may cause the lifting lug to fail.



Example of a good lifting lug.



Example of a lifting lug failing during lifting operations.