HYDRAULIC HOSE MANUFACTURING – SKIVING

Tammy Siver

Rev	Status	Rev. Date	Status Description	Prepared by	Reviewed by	Approved by
4	APP	Sep 11, 2025	Approved	Andre Brule	John Owens	Tammy Siver
3	APP	May 10, 2022	Approved	Andre Brule	J. Owens	T. Siver
2	APP	Nov 25, 2019	Approved	Andre Brule	Tammy Siver	Stan Miller

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 the skiving process for hydraulic hose manufacturing.

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

- Rotating and moving parts causing personal injury and/or property damage.
    - Always use appropriate PPE when operating the skiving machine, including hose clamps, safety guards, eye protection, gloves, and coveralls.
    - Keep your body out of the line of fire and maintain a safe distance from all moving or rotating parts. Ensure the lid is securely closed before operating the machine.
    - Do not wear loose or baggy clothing, dangling accessories, jewelry, or any other items that could become entangled in the equipment.

NOTE: Immediately remove your foot from the actuation foot pedal if the hose begins to rotate in the clamp. Always ensure the hose is properly clamped before operating the skiving machine. Failure to do so could result in severe injury.

- Not qualified and/or trained to operate the skiving machine and/or the manual skiver.
    - Only trained and competent personnel are permitted to operate the skiving machine and/or manual skiver.
    - Always follow the manufacturer's procedures for proper setup and operation of the skivers.
    - Supervisors are responsible for ensuring all operators are adequately trained and deemed competent before using the skiving equipment.

- Exposed frayed wires causing punctures, cuts, and lacerations.
    - Inspect the hose prior to lifting. Ensure you handle the hose in areas that do not have any exposed wires.

- Ensure that exposed wires do not come into contact with any part of your body during the skiving process.
- Always wear appropriate gloves and PPE when handling hoses.

NOTE: If hoses cannot be safely handled during the skiving process, wrap the end of the hose with tape or plastic wrap, ensuring that all frayed wires are covered over.

- Overuse and repetitive motion causing personal injury.
  - Support and move heavy hoses by using proper body mechanics and positioning. Utilize the overhead crane to maneuver heavy hoses into position safely.
  - When operating the manual skiver, maintain an upright posture with good ergonomics. Take microbreaks as needed. If multiple hose technicians are involved, share the workload throughout the shift to reduce the risk of injury.

4.0 CHECKLIST

- ☐ Attend all preparatory meetings (i.e.: 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.

6.0 PROCEDURE

6.1 Skive Machine – General Procedure

1) The Supervisor and workers will discuss the task and plan the safest way to approach the work. Workers will complete a hazard assessment (e.g., FLRA) for the task to identify potential risks and determine the appropriate equipment required.

2) Prior to skiving the hose, visually inspect the end of the hose to ensure it has been cut squarely, the wires are not corroded, and the rubber has not deteriorated. If this is the case or if in doubt, discard that section of hose.

6.1.1 External Skiving – Machine

1) Skive externally first if the hose requires internal and external skiving. (The reason for this is that the mandrel that is inserted internally during the external skiving operation will not properly support the hose if the internal rubber is removed first).
2) Select the appropriate outside skiving mandrel tool, according to hose size, and install the tool in the machine.
3) Use digital calipers to mark outside skive length on hose as per Production Instruction (PI) tag.
4) Lubrication can be applied to the mandrel at the operator's discretion. For example, large diameter hoses can be more difficult to push onto the rotating mandrel and more difficult to keep from rotating with the rotating mandrel; in these cases, lubrication is appropriate.
5) Set the machine to "EX" external skive, start the rotation of the skiving machine.
    a. **NOTE:** For spiral reinforced hose, ensure that the rotation of the machine is in the same direction as the wires on the hose.
6) Push the hose onto the mandrel up to the skiving knife. Adjust the knife depth by turning the depth adjustment knob so that only some of the rubber will be removed on the first cut. Ensure that the knife will not dig into the reinforcement.
7) Adjust the distance of the clamp from the machine so that when you clamp the hose, you will be able to insert the hose onto the mandrel, the rest of the distance required to fully skive the outside of the hose.
8) Adjust the torque pressure of the clamp using the lobe nut. Close the clamp onto the hose by pulling the clamp closing handle. When satisfied that the hose is properly clamped, begin the rotation of the blade by depressing the foot pedal switch.
9) Ensure that the skiving knife is not digging into the wire reinforcement and that the hose is not turning in the clamp. If it stops by removing your foot from the pedal switch. Adjust the knife depth, clamping force, and, if required, add lubrication of the mandrel. When the knife and clamp are properly adjusted, make your first cut of rubber by pushing the clamped hose onto the mandrel up to the skive depth marked on the outside of the hose. You can push on the clamp or the hose itself to exert the pushing force required to push the hose onto the mandrel.
10) After the first cut of rubber from the outside of the hose has been removed, adjust the knife deeper and take another cut. Continue this process until the wire reinforcement is revealed. The object is to remove as much rubber as possible without damaging the wire reinforcement.
11) Measure skive length with digital calipers and verify that skive length is correct according to the PI Tag.
12) You can now skive the other end of the hose. As the clamping force, knife depth, and the requirement for lubrication have been established on the first end, you should be able to skive the hose without making further adjustments to the machine.

13) If you are unable to properly clamp the hose in the skive machine when externally skiving, you must use a manual hand skiving method to skive the hose (see 6.2).
    a. **NOTE:** If the hose begins to turn, remove your foot from the pedal to stop the machine.
14) The external skive-only hose should then be cleaned with Styrofoam projectiles as per PI Tag.

6.1.2 Internal Skiving – Machine

1) Internal skiving change mandrel to the internal skive tool, which is already preset for the internal skive depth and skive length, turn the machine directional dial to the right “IN” internal skive.
2) Lubricate the mandrel and push the hose onto the mandrel up to the internal skive knife.
3) Adjust the distance of the clamp from the machine so that when you clamp the hose, you will be able to insert the hose onto the mandrel, the rest of the distance required to fully skive the inside of the hose.
4) Adjust the torque pressure of the clamp using the lobe nut. Close the clamp onto the hose by pulling the clamp closing handle. When satisfied that the hose is properly clamped, begin the rotation of the blade by depressing the foot pedal switch.
5) Measure skive length with digital calipers and verify that skive length is correct according to the PI Tag.
6) Push the hose into the knife slowly, ensuring the skiving knife is not digging into the wire reinforcement. Continue feeding the hose into the skiving knife until it bottoms out on the mandrel.
7) Remove the hose and visually inspect if all the rubber is removed. If rubber remains, repeat steps 5 and 6. If, after repeating steps 5 and 6, the rubber remains, an adjustment to the skiving knife depth position will be required. You may also use the manual tool to remove any small amount of rubber remaining. The objective is to remove as much rubber as possible without damaging the wire reinforcement.
    a. **NOTE:** Ensure that the skiving knife is not digging into the wire reinforcement and that the hose is not turning in the clamp. If it stops by removing your foot from the pedal switch.
8) If you are unable to keep the clamped hose from turning in the skive machine when internally skiving, you must use a manual hand skiving method to skive the hose (see section 6.2).
9) Measure internal skive length with digital calipers and verify that skive length is correct according to the PI Tag.
10) The internal skive hose should then be cleaned with Styrofoam projectiles.

6.2 Manual Skiving – General Procedure

Hand skiving should be used for removing any small amount of rubber that remains after the hose has been skived by the machine. If you are unable to skive the hose in the machine, then a supervisor must be consulted before proceeding with a manual skiving process.

1) Complete a hazard assessment (i.e. FLRA) for the task. Notify supervision if unsure of task or if hazards are outside of the worker’s control.

2) Inspect tooling and work area prior to task. Remove from service and notify supervision of any damaged or defective tooling. Do not use unsafe tooling.

6.2.1 External Skiving – Manual

1) External skiving, use digital calipers to mark outside skive length on hose as per Production Instruction (PI) tag.
2) Lubricate the inside of the hose and the mandrel to be inserted inside the hose, and insert the mandrel.
3) Clamp the external skive tool to the outside of the hose.
4) Ensure Proper body ergonomics before using the manual skiving tool and take micro breaks when needed.
5) Turn the skiving tool in the same direction as the wire reinforcement. If rubber remains, adjust the clamping force on the tool and repeat steps 4 and 5.
6) Remove the mandrel from inside the hose once you are satisfied that all the rubber is removed.

6.2.2 Internal Skiving – Manual

1) Lubricate the inside of the hose and the mandrel on the skive tool.
2) Insert the mandrel into the hose until the skiving knife meets the rubber hose.
3) Rotate the tool in the same direction as the wire reinforcement.
4) When using the manual skiver, ensure the body is in an upright position with good ergonomics. Take micro breaks as needed. If there is more than one hose technician during the task, share the workload throughout the shift to prevent injuries from occurring.
5) Once you have finished skiving, remove the tool from the hose.
6) The internal skive hose should then be cleaned with Styrofoam projectiles.

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

- Refer to the Manufacturer's Operation Manual or OEM Parts Manual for operation and setup details.
- Alberta Occupational Health and Safety Act, Regulation and Code
- 950C-C-025 Hand Tools Code
- 950C-C-050 PPE General Code
- 960C-SOP-504 Hand Tools; Use of
- 960C-SOP-505 Hand Tools Powered Use

- 960C-SOP-112 Air Line Control and Dangers

9.0 APPENDICES

- No appendices.