


STANDARD OPERATING PROCEDURE

Safe Use of Grinders		Document Number: 960C-SOP-502
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SAFE USE OF GRINDERS

						
2	APP	Apr 04, 2022	Approved	Faheem Mohamed	Tammy Siver	Tammy Siver
1	APP	Mar 11, 2010	Approved	Ken Morran	Stan Miller	Stan Miller
Rev	Status	Rev. Date	Status Description	Prepared by	Reviewed by	Approved by

STANDARD OPERATING PROCEDURE

Safe Use of Grinders		Document Number: 960C-SOP-502
Original Approval Date: Mar 11, 2010	Revision Number: 2	Page 2 of 10
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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 using grinders.

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

- Damage or injury caused by faulty, damaged or improperly used grinders.
 - Inspect all grinders before use. Damaged, defective, deteriorated, or poorly maintained tools are not to be used. Remove and tag out damaged/defective grinders from service for repair, or discard and replace them. Notify supervision.
 - Only use grinders for their intended purpose. Do not modify the tool.
 - Guards must be used and adjusted properly as per the manufacturer's requirements.
 - Handheld grinders must have a guard that covers the grinder accessory contained within an arc of at least 120 degrees of the accessory's circumference.
 - Before use, check the manufacturer's stated running speeds, or markings on the grinder, and grinder wheel for the maximum speed that it can be used at. The maximum safe operating speed of the grinder accessory in revolutions per minute must be equal to or greater than the maximum speed of the grinder shaft in revolutions per minute.
 - Ensure that tool rests on a fixed or bench grinder is installed as per manufacturer's specifications and:
 - installed in a manner compatible with the work process,
 - securely attached to the grinder,
 - set at or within 3 millimetres of the face of the wheel and
 - set at or above the centre line of the wheel.
 - Only competent workers will operate grinders. Review manufacturer's operating manual before first use and as required thereafter. Follow up with supervision if unsure on how to use the tool.

STANDARD OPERATING PROCEDURE

Safe Use of Grinders		Document Number: 960C-SOP-502
Original Approval Date: Mar 11, 2010	Revision Number: 2	Page 3 of 10
Latest Revision Date: Apr 04, 2022	Next Revision Date: Apr 04, 2025	Document Approval Level: 4

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- o Dress wheels regularly. Do frequent, light dressings rather than one heavy dressings. Replace worn wheels if you cannot dress it. Support dressing tools so you can apply leverage without undue effort.
- o Check wheel integrity by performing a “ring test” (refer to Appendix A). Ring tests do not apply to small wheels that are 10 cm (4 in.) in diameter or smaller.
- o Grinders must be de-energized while inspecting and maintaining them as well as while changing out discs and wheels.
- Contact with grinding disc or wheel.
 - o Use both hands when holding portable handheld grinders. Ensure the side handle is equipped and secure.
 - o Stand away from the wheel when starting fixed bench grinders. Warn co-workers to do the same.
 - o Ensure that the grinder will not operate when unattended by checking the dead-man (constant pressure switch). Trigger locks are not permitted.
 - o Cut away from yourself.
 - o Do not apply excessive force when using a handheld grinder. Be prepared for kickback.
 - o Wear gloves that are appropriate for the task. If changing wheels or discs, wear gloves that have a cut or abrasion resistance (i.e. leather or cut resistant gloves).
- Entanglement hazard.
 - o Long hair and loose clothing must be secured before using grinders.
 - o Jewelry must be removed before using grinders (necklaces, rings etc.).
 - o Ensure gloves cannot become caught in the grinder. Only wear tight fitting gloves, in good condition, that are appropriate for the task.
 - o Keep the power cord away from the grinding wheel and the material being ground.
 - o Make sure the grinder stops spinning before setting it down.
- Flying debris, shrapnel, and/or ejected disc or wheels.
 - o Before use, check the manufacturer's stated running speeds, or markings on the grinder, and grinder wheel for the maximum speed that it can be used. The maximum safe operating speed of the grinder accessory in revolutions per minute must be equal to or greater than the maximum speed of the grinder shaft in revolutions per minute.
 - o Guards must be used and adjusted properly as per the manufacturer's requirements.
 - o Follow the manufacturer's manual for the safe use of grinder wheel guards. Position the guard to protect you from flying debris.
 - o Do not use wheels that are cracked or excessively vibrate.
 - o Wear appropriate eye, ear, and face protection. Face shields in addition to safety glasses or goggles must be worn.
 - o When using a handheld grinder, ensure the object being ground cannot move.
 - o Utilize screen or curtain to prevent sparks and flying debris from contacting other workers.

STANDARD OPERATING PROCEDURE

Safe Use of Grinders		Document Number: 960C-SOP-502
Original Approval Date: Mar 11, 2010	Revision Number: 2	Page 4 of 10
Latest Revision Date: Apr 04, 2022	Next Revision Date: Apr 04, 2025	Document Approval Level: 4

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- Fire, explosion, and electrical hazards.
 - o Where required, obtain a hot work permit.
 - o Ensure work area is clear of flammable materials and that combustible dust is not allowed to accumulate.
 - o Identify and control ignition sources.
 - o Ensure fire extinguisher is readily available.
 - o Do not use grinder in wet conditions.
 - o Inspect grinder before use. Frayed or damaged cords are not permitted.
 - o Do not carry grinder by cord.
 - o Wear body coverings appropriate to task (i.e., FR coveralls, leather apron) to protect against sparks.
 - o Do not touch the area on an object that has recently been ground as the surface will be hot.
- Dust inhalation.
 - o Ensure there is adequate air flow so as not to create a hazardous atmosphere.
 - o Wear an air-purifying respirator where appropriate. Consult with supervision if unsure.
- Noise hazards.
 - o Wear hearing protection if noise levels exceed legislated occupational exposure limits. Follow up with supervision if unsure.

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.

STANDARD OPERATING PROCEDURE

Safe Use of Grinders

Document Number: 960C-SOP-502

Original Approval Date: Mar 11, 2010

Revision Number: 2

Page 5 of 10

Latest Revision Date: Apr 04, 2022

Next Revision Date: Apr 04, 2025

Document Approval Level: 4

This document is not controlled if printed.

6.0 PROCEDURE

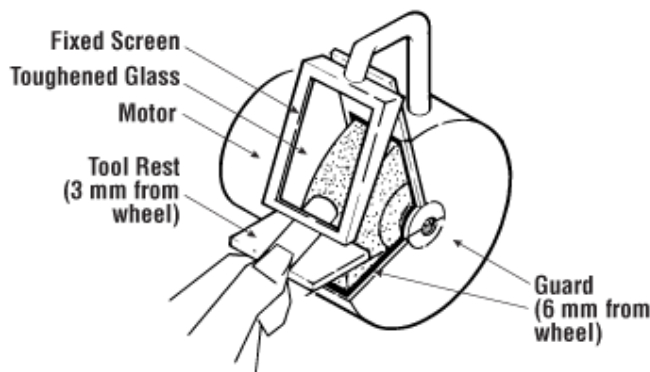
6.1 General Procedure for using Grinders

- 1) Complete a hazard assessment (i.e. FLRA) for the task and follow up with supervision if unsure of the task or how to use the grinder.
- 2) Inspect grinder before use. Remove and tagout damaged/defective grinders from service for repair, or discard and replace them. Notify supervision
- 3) Confirm guards and tool rests are in place and adjusted correctly.
- 4) Confirm the manufacturer's stated running speeds for the maximum safe operating speed it can be used. Ensure the maximum safe operating speed of the grinder accessory is equal to or greater than the maximum speed of the grinder shaft.
- 5) Obtain a hot work permit where required.
- 6) Identify and control all ignition sources.
- 7) Wear appropriate PPE; ensure clothing, jewelry and PPE do not cause an entanglement hazard. Face shields, in addition to safety glasses or goggles, must be worn when using grinders.
- 8) Secure items to be ground if using a handheld grinder.
- 9) Follow manufacturer's inspections if unsure of how to use the specific type of grinder. Refer to sections 6.2 & 6.3 for additional instructions on using fixed and handheld grinders.

6.2 Using Bench & Pedestal Grinders (Fixed Grinder)

- 1) Fasten pedestal and bench grinders on a solid surface securely.
- 2) Ensure all the guards are in place and secure before using a grinder.
- 3) Adjust tool rests to within 3 mm (1/8 in.) of wheels. Never adjust rests while wheels are moving. Work rest height should be on the horizontal centre line of the machine spindle.
- 4) Maintain 6 mm (1/4 in.) wheel exposure with a tongue guard or a movable guard.
- 5) Check that wheels have blotters on each side.
- 6) Check that the wheel fits properly to the spindle when mounting. If it is loose, get another wheel.
- 7) Tighten the nuts before you turn the grinder on.
- 8) Before you plug in the grinder, manually spin the wheel to make sure it is spinning freely.

Figure 1-0



STANDARD OPERATING PROCEDURE

Safe Use of Grinders

Document Number: 960C-SOP-502

Original Approval Date: Mar 11, 2010

Revision Number: 2

Page 6 of 10

Latest Revision Date: Apr 04, 2022

Next Revision Date: Apr 04, 2025

Document Approval Level: 4

This document is not controlled if printed.

- 9) Make sure the cables are not damaged and in good condition. Keep the cables out of the work area.
- 10) Stand to one side of the grinder until the wheel reaches operating speed.
- 11) Bring work into contact with the grinding wheel slowly and smoothly, without bumping.
- 12) Apply gradual pressure to allow the wheel to warm up evenly. Use only the pressure required to complete a job.
- 13) Move the work back and forth across the face of the wheel. This movement prevents grooves from forming. Wheels are made only for grinding certain items. Do not grind rough forgings on a small precision grinding wheel.

6.3 Using Portable Grinders (Handheld Grinder)

- 1) Secure and support the work piece (item being ground) using clamps, bench vices, etc.
- 2) Hold the grinder with a firm grip using two hands. Ensure the side handle is used.
- 3) Allow grind to reach operating speed before applying to the work piece. Increase load gradually.
- 4) Position grinder so that sparks deflect away from you.
- 5) If using the grinder for cutting, keep the disc straight and do not over-apply pressure. Do not bend the cutting disc. Allow objects to fall away from you. Cut away from you.
- 6) If using the grinder for surface grinding use the flat part of the wheel, maintaining a 20°-30° angle between the tool and the work surface. Use a smooth back and forth motion to guide the disc over the material.
- 7) If using the grinder for sanding applications, hold the tool at a 5°-10° angle to the work surface and apply minimal pressure.
- 8) When changing or cleaning discs, de-energize the grinder and use the correct tool (i.e. Grinder Wrench).

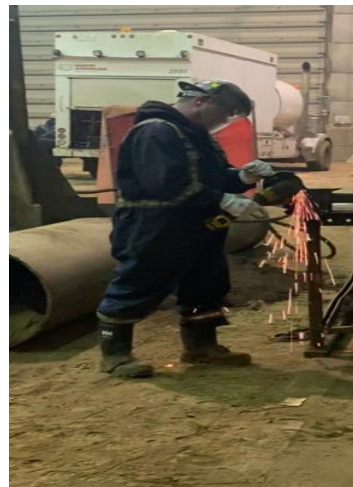
Figure 2-0 Incorrect Cutting Technique

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Figure 2-1 Correct Cutting Technique

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STANDARD OPERATING PROCEDURE

Safe Use of Grinders

Document Number: 960C-SOP-502

Original Approval Date: Mar 11, 2010

Revision Number: 2

Page 7 of 10

Latest Revision Date: Apr 04, 2022

Next Revision Date: Apr 04, 2025

Document Approval Level: 4

This document is not controlled if printed.

Figure 2-3 Correct Grinding



Figure 2-4 Correct Grinding



Figure 2-5 Use of Welding Screen



Figure 2-6 Use of Grinder Wrench



STANDARD OPERATING PROCEDURE

Safe Use of Grinders		Document Number: 960C-SOP-502
Original Approval Date: Mar 11, 2010	Revision Number: 2	Page 8 of 10
Latest Revision Date: Apr 04, 2022	Next Revision Date: Apr 04, 2025	Document Approval Level: 4

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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 3 Specifications and Certifications}
- Alberta Occupational Health and Safety Act, Regulation and Code – {Part 25 Tools, Equipment and Machinery}
- Alberta Occupational Health and Safety Act, Regulation and Code – {Section 12 General Safety Precautions}
- WorkSafeBC OH&S Regulation Part 3
- Manitoba OH&S Regulations Part 16
- Saskatchewan OH&S Regulation Part III
- Ontario OH&S Reg. 851, Part 1
- Ontario OH&S Reg. Reg. 213/91, Section 93, 94, 187, 192, 195, 275, 298
- 950C-C-028 Hazardous Energy Isolation Code
- 950C-C-025 Hand Tools Code
- 950C-C-045 Power Tools Code
- Accident Prevention Manual: Engineering and Technology, 12th Edition
- Canadian Center for Occupational Health & Safety: Abrasive Wheels
- Manufacturers' use and maintenance instructions

9.0 APPENDICES

- Appendix A – Check Wheel Integrity (Ring Test)
- Appendix B – Handling and Storing of Abrasive Wheels

STANDARD OPERATING PROCEDURE

Safe Use of Grinders

Document Number: 960C-SOP-502

Original Approval Date: Mar 11, 2010

Revision Number: 2

Page 9 of 10

Latest Revision Date: Apr 04, 2022

Next Revision Date: Apr 04, 2025

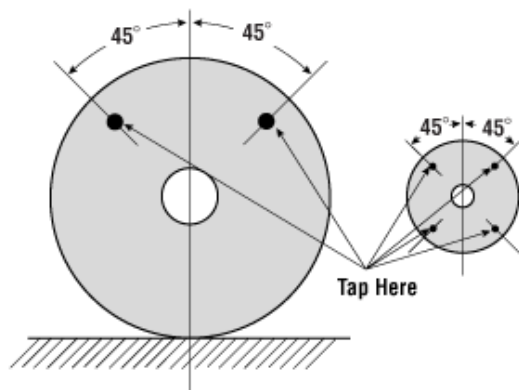
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Appendix A Check Wheel Integrity (Ring Test)

- 1) The ring test is one way to check whether the wheel is cracked or damaged. Ensure the wheel is clean and dry. Tap wheels gently with a nonmetallic tool such as a plastic screwdriver handle for light wheels and a wooden mallet for heavy wheels.
- 2) Tap wheels about 45 degrees each side of the vertical center line and about 3 to 5 cm (1 or 2 in) from the periphery. Repeat the test by rotating the wheel 45 degrees
- 3) An undamaged wheel will emit a metallic ring. Reject any wheel that sounds dead or cracked and does not have a clear ring.

Figure 3-0



STANDARD OPERATING PROCEDURE

Safe Use of Grinders

Document Number: 960C-SOP-502

Original Approval Date: Mar 11, 2010

Revision Number: 2

Page 10 of 10

Latest Revision Date: Apr 04, 2022

Next Revision Date: Apr 04, 2025

Document Approval Level: 4

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Appendix B Handling and Storing Abrasive Wheels

- 1) All abrasive wheels are fragile, and as such, handle wheels carefully- avoid dropping or bumping.
- 2) Do not roll a wheel on its edge.
- 3) Transport wheels in containers designed to provide support for the wheels if they are too heavy to carry by hand.
- 4) Do not pile other items such as tools on top of wheels.
- 5) Store wheels in racks or bins with dividers for different types of wheels and ensure easy access and less handling.
- 6) Place straight or tapered wheels on end in a cradle or chocked position to prevent rolling.
- 7) Never store wheels near excessive heat or cold, in contact with water, oil or moisture, nor in drawers with loose tools.
- 8) Store wheels in a dry area. When selecting the racks, bins, boxes, or drawers for storage consider the size and type of wheels to be stored: for example, lay flat thin bonded wheels, and support larger wheels in racks. Always follow the manufacturer's instructions.
- 9) Sort and store wheels in such a way that older wheels can be selected first.
- 10) Follow the manufacturer's instructions for length of time a wheel should be stored.