

STANDARD OPERATING PROCEDURE

WORKING NEAR WATER & SOFT GROUND CONDITIONS

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WORKING NEAR WATER & SOFT GROUND CONDITIONS



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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 working near water and in soft ground conditions.

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

- Unstable ground conditions when working near deep bodies of water. Deep bodies of water can include but are not limited to lakes, streams, rivers, tailings ponds and sumps and is defined as any body of water that is greater than one (1) metre in depth; or above the height of the tracks or tires of the equipment; or a depth unable to determine visually. Unknown transition points from hard to soft ground and unknown soil conditions at the water edge.
 - **Deep bodies of water will be adequately marked with signage.** Permission to work in area must be obtained from the area owner. Additional hazard assessment and or permit specific to the type of work may be required. Control zones may be required to identify safe work areas as identified in the hazard assessment.
 - Supervisor will inspect soil conditions above waterline to determine ground stability at start of shift and as conditions change. Instruct operators to test ground underwater using excavator bucket for depth and stability throughout the task.
 - Work area must have a defined access route for emergency and light vehicles. If an access route cannot be maintained for light vehicles, alternative equipment (i.e. amphibious all-terrain vehicle) must be designated and readily available for rescue.
 - Excavator operators will conduct a tri-directional bucket test periodically during work and in the direction of any travel as well as to both sides. This will be the control to maintain equipment stability when working near bodies of water as visual inspection through clouded water may be difficult or impossible.
 - If carrying a load (i.e. access mats), the excavator operator must travel the work area first without the load so that a tri-directional bucket test can be completed to confirm ground stability.

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- Use access mats (i.e. rig mats, swamp mats) in soft ground conditions to increase machine stability and to allow for site access. Ensure access mats are removed from the area after use. Only use mats that are in good condition and appropriate for the task.
- Mobile equipment will work perpendicular to shoreline for maximum stability. Final drives must be directed away or uphill.
- Operator must wear seatbelt and have a rescue tool (seatbelt cutter with a hammer) to break glass.
- PFDs may be provided to operators as per the local legislation depending on the risk assessment by the supervisor. Hydrostatic PFDs are not to be worn in equipment cabs.
- Life ring and throw bags are required within 25 m of any person working near deep water and when equipment is working within one equipment length of water.
- Warming blankets must be immediately available on site.
- No bush guards or plexiglass windows permitted on equipment working near deep water where there exists a potential of operator entrapment / drowning due to equipment compromise.
- When equipment is within a minimum of one (1) equipment length or five (5) metres from the water's edge a spotter must be present and be able to communicate immediately with all nearby operators and be able to contact emergency services.
- Two large slings and shackles must be available immediately in the work area for heavy rescue operations in case the operator is trapped and unable to self-rescue. Ensure rescue equipment is stationed properly (within 100 m of the work) and of the appropriate size for rescue.
- Work in deep bodies of water is not permitted. Should a temporary task involve work in deep bodies of water, an additional hazard assessment approved by site management is required.
- Hidden water and soft ground conditions due to area being undisturbed and or covered in snow, ice, grass, bush, etc. causing equipment to become compromised.
 - Supervisor to identify deep water boundaries and wetland areas during daily hazard assessment. Use berms to protect equipment from danger areas. **Use pylons/delineators to mark water boundary where berm is not in place.**
 - All equipment will have a rescue tool (seatbelt cutter with window hammer) if there is a potential to be working near water.
 - Visually inspect all areas before entering. Vegetation such as bulrushes, cattails and reedy grasses are indications that the ground below is swampy and soft. Water being forced to the surface is also an indication of pre-existing wetland or soft conditions. Notify supervision before going into area.

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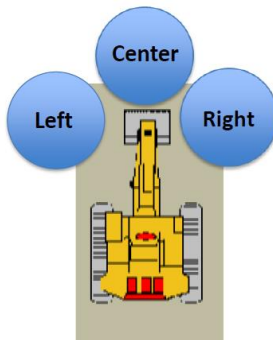
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- Excavator operators must test ground conditions in advance of movement into new or covered areas to ensure the ground will support the machine. Test the ground using a tri-directional testing method. Use bucket down pressure to test left, right and center of the travel path.



- Equipment sinking in soft ground conditions.
 - Use access mats (i.e. rig mats, swamp mats) in soft ground conditions to increase machine stability. Ensure access mats are removed from the area after use. Only use mats that are in good condition and appropriate for the task.
 - If equipment begins to sink in soft ground conditions, the operator will immediately attempt to reverse out of the area. If they are unable to reverse, they will stabilize the low side of the machine by swinging to the direction the machine is sinking and applying downward pressure with the bucket to keep the cab above water and prevent it from taking on water. Contact supervision immediately.
 - Follow 962C-SOP-032 Recovery of Stuck or Immobile Equipment procedure should equipment become compromised.
- Equipment breaking through ice covered areas.
 - Working on ice with equipment is not permitted.
 - Ice covered areas must be broken up and the ground under the ice tested for load bearing strength. Permission to work in an ice covered area must be authorized by a supervisor before proceeding.
- Light vehicles travelling through water or on ice covered areas.
 - Light vehicles will not travel over frozen bodies of water unless an 'Ice Safety Plan' and Emergency Response Plan has been developed as well as authorization from the area owner has been obtained. The ice safety plan will include at a minimum, description of task and duration, GVW of all vehicles, tools, materials, fuel and people, type of water body, ice inspection and monitoring requirements, minimum allowable ice thickness, method to test ice thickness and maximum time allowed on ice. Minimum allowable ice thicknesses for parked or slow moving

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loads (GVW less than 5,000 kg) less than 2 hours on the ice is 38 cm or 15 inches. Anyone working on ice must be trained in ice safety and self-rescue techniques. The Ice Safety Plan must be approved by site management.

- Light vehicles will not travel through water or large puddles if the depth of the water is unknown and is likely to cause damage to the vehicle or cause it to become stuck.
- Working alone causing a delay in emergency response.
 - When equipment is within a minimum of one equipment length or 5 metres from the water's edge a spotter must be present and be able to communicate immediately with all nearby operators and be able to contact emergency services.
 - Spotter must be able to communicate clearly and not be engaged in any other task.
- Soft, uneven surfaces causing workers to slip, trip, or fall.
 - Inspect ground conditions to determine ground stability before walking in area. Pay attention to foot placement so as to avoid ruts and slippery areas.
- Sloping banks towards open water.
 - Set up equipment on even ground, use blocks or access mats (i.e. rig mats, swamp mats) to stabilize equipment.
 - Excavators will not undercut material when digging near the water edge.
- Personnel falling into water when exiting equipment, working near the shoreline or working on ice.
 - Ensure life rings and throw bags are within 25m.
 - Workers on ground must wear PFD (inflatable style acceptable) when within 5m of shoreline where the hazard of drowning exists.
 - Select employees that know how to swim/tread water.
 - Demonstrate use of life ring and throw bag during start up meeting with crew.
 - Walking on ice covered bodies of water is not permitted unless an 'Ice Safety Plan' and Emergency Response Plan has been developed as well as authorization from the area owner has been obtained. The ice safety plan will include at a minimum, description of task and duration, GVW of all vehicles, tools, materials, fuel and people, type of water body, ice inspection and monitoring requirements, minimum allowable ice thickness, method to test ice thickness and maximum time allowed on ice. Minimum allowable ice thicknesses to walk on ice is 10 cm or 4 inches. Anyone working on ice must be trained in ice safety and self-rescue techniques. The Ice Safety Plan must be approved by site management.

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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.
- Develop a rescue plan when working near bodies of water. Rescue plan must be reviewed with all workers and in place prior to the start of work.**
- Standard of Training required for working on this job: On-the job training.**

5.0 DEFINITIONS

5.1 Deep Water

- Any body of water that is:
 - greater than 1 metre deep; or
 - over the height of the tracks or tires of equipment; or
 - a depth unable to determine visually.

5.2 Company

- North American Construction Group (NACG) divisions, departments, or subsidiaries.

6.0 PROCEDURE

- 1) Supervisor will inspect all work areas prior to assigning any task working near deep water or potential wetlands. Supervisor will ensure adequate controls such as but not limited to signage, berms, access mats and soil stability testing has been completed or installed as needed.
- 2) Supervisor will review task with equipment operator and ensure the operator understands the hazards, controls and scope of work.
- 3) Supervisor will ensure a spotter is present if equipment is working within a minimum of one (1) equipment length or five (5) metres of shoreline. Supervisor will ensure adequate PPE and rescue equipment is available. Rescue equipment and spotters may be required at distances greater than one (1) equipment length from shoreline. This will be determined by the supervisor through a hazard assessment.
- 4) Operator will complete a hazard assessment (i.e. FLRA) for the task and confirm communication devices (i.e. two-way radio) are working.
- 5) Operator will complete a pre-operation inspection of equipment and confirm that equipment has a rescue tool (seatbelt cutter with window hammer). Operator will notify supervision of deficiencies.
- 6) Operator will test ground conditions before entering any area and before moving equipment in soft ground conditions or near areas of water.
- 7) Operator will work perpendicular to shoreline.

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- 8) Operator will continually monitor for soft ground conditions and unexposed wetland areas.
- 9) Operator will break up any ice-covered areas and test ground stability before entering the area. Operator will not work on ice.

6.1 RESCUE PROCEDURE

Note: this is a general rescue procedure and must be adapted to meet the job specific requirements.

- 1) **Ensure your own safety** and that of nearby workers when responding to any emergency.
- 2) Standby person will activate emergency response by calling Emergency Services by phone or radio as applicable by site.
- 3) Contact your supervisor and activate emergency response.
- 4) Designate an employee to meet emergency response at the designated Emergency Meeting Point.
- 5) Evaluate situation and plan the response to help the operator without placing the standby person or employees at risk.
- 6) Standby person can use the life ring and throw bag to help a victim. Do not go into the water. Under no circumstance is a worker permitted to dive under a rolled machine to extricate a trapped worker. Rolled equipment can shift in soft soil conditions. This is a high risk rescue situation that requires emergency services with the proper equipment and training.
- 7) Two lifting slings and shackles will be available on site at all times to use with the rescue equipment to manipulate the compromised/rolled equipment to free a worker in the cab. The supervisor shall review, with the standby person and rescue equipment operator at the start of work, possible lifting points on dozers, haulers and excavators in case of heavy rescue operations. Heavy rescue procedures shall be formulated on site by assessing the hazards and control measures with the supervisors, experienced operators and emergency response before action is taken to rescue a trapped operator.

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 18, Section 240-241 Personal Protective Equipment}
- NACG 950C-C-039 Mobile Equipment Code
- NACG 950C-C-046 Powered Equipment Code

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9.0 APPENDICES

No appendices.