Workplace Health and Safety

Bulletin

Safe Operating Procedures for Seismic Drilling

Introduction

The purpose of this Safety Bulletin is to make all personnel involved with the seismic drilling industry aware of safe operating procedures.

This Safety Bulletin is the combined effort of various companies within the seismic drilling and explosive industries and Alberta Employment and Immigration.

These guidelines are intended to establish minimum standards of practice for seismic drilling done in the province of Alberta.

Each seismic drilling rig must meet the first aid requirements of the *Occupational Health and Safety (OHS) Code*.

Requirements

Each seismic drilling rig must meet the first aid requirements of the *Occupational Health and Safety (OHS) Code*, for example, the number and qualifications of first aiders and first aid equipment.

On each seismic drilling rig, at least one worker must be in possession of a valid blaster's permit for the jurisdiction where they are working.

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Government of Alberta
Employment and Immigration

Definitions

A *seismic driller* shall be:

- a competent person in charge of, and responsible for the safe working operations of a drilling rig, and
- a person knowledgeable of the applicable regulations and codes for the seismic industry and the safe operating procedures for seismic drilling, and
- a person responsible for ensuring that the helper is capable of operating and driving the drill unit, and
- a person physically capable of operating the seismic drilling rig without threat to the health and safety of others.

A *seismic drill helper* shall be:

- a person who is an assistant to the driller, under the supervision of the driller at all times, and
- a person physically capable of operating the seismic drilling rig without threat to the health and safety of others , and
- a person familiar with all functions of the equipment and its controls.

A *seismic drilling rig* is:

- a rotary drive drill or earth boring machine used to drill seismic shot holes in preparation for a dynamite seismic survey, and
- the rig shall be of a design and standard capable of performing the function for which it is intended.

Drilling operations

Workers' clothing

Both the driller and helper will wear their protective clothing at all times throughout the working day.

(a) Workers must not wear loose clothing, nor leave long hair, boot laces or jacket ties uncontrolled while operating moving equipment.
(b) Hard hats and safety footwear must be worn at all times.
(c) During hunting season, proper reflective safety vest or equivalent must be worn.

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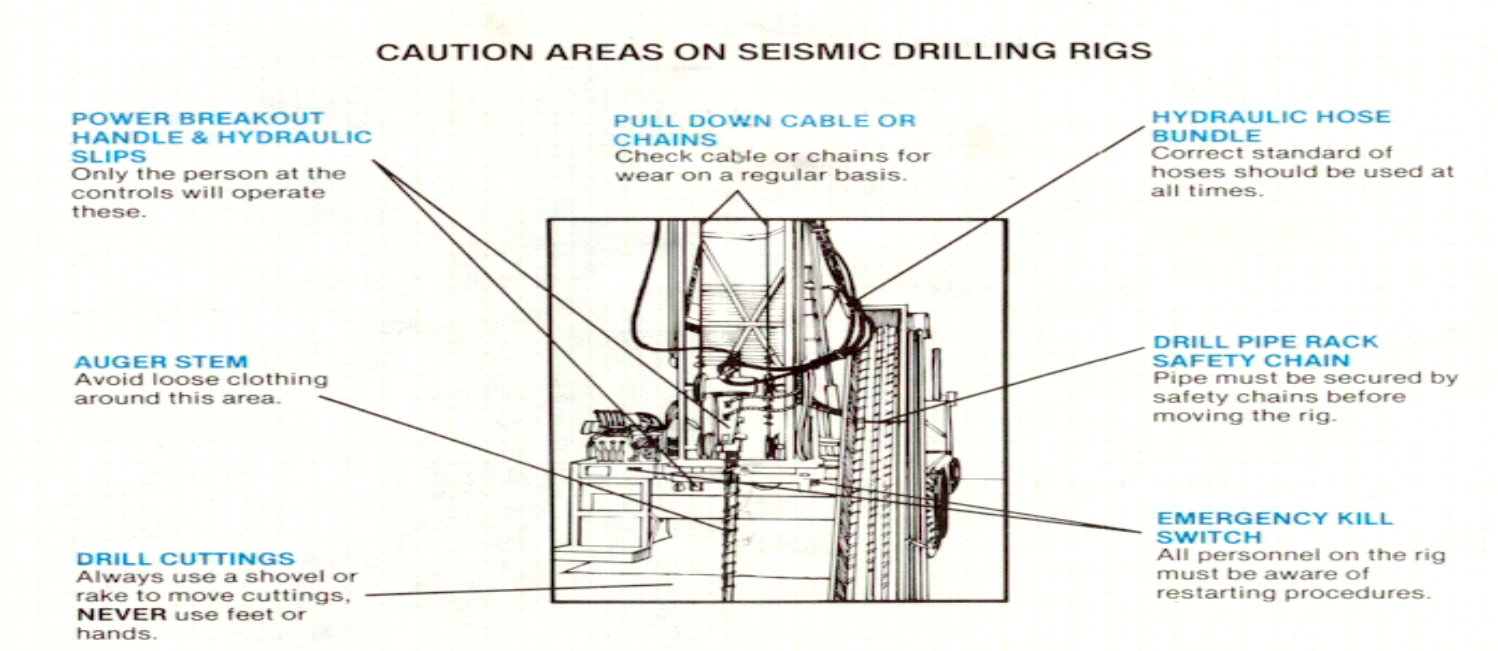
(d) When drilling with air, adequate hearing and eye protection must be used at all times.



Daily checks:

- The driller and helper shall be aware of the location of the nearest medical centre and should be capable of communicating with that centre. All drill rigs must have radio communications.
- Prior to the start of the daily drilling operations, the driller should check his drill rig carefully to make sure its suitable for the day's work.
- The driller will ensure that the vehicle is properly equipped with a first aid kit and appropriately charged fire extinguishers.
- The installation and use of seat belts is mandatory.
- Defensive driving training is recommended.
- A work travel plan and expected time of return should be filed or communicated to the drill push before leaving base camp.
- The driller will ensure that adequate lighting is on the rig to enable the job to be performed safely.
- All drills must be equipped with an operable kill switch and personnel must be aware of restarting procedures.
- All fittings, connections and hydraulic hoses must be of a standard to operate in a safe manner.

- The mud pump must have a proper pressure gauge and relief valve. The relief valve must be operated as designed and must be guarded, and the blow pipe directed towards the ground. The mud lines must be secured to the mast and to the drill.
- All shafts, sprockets and gears must be guarded. If guards must be removed for maintenance work, they must be replaced before the machinery is put back into operation.

Daily drilling procedures

- At no time will the driller operate the drill controls and add stem while alone, unless the drill rig is mechanically designed to operate as a single person operation. The drill helper must always be present whenever the drill is in the operating mode.
- At no time will the driller try to operate the drill beyond the capabilities of the drilling rig.
- A driller shall always remember that power lines can appear in both remote and populated areas. Therefore, a careful visual check must be taken at all times when the mast is raised or, when the rig is moved with the mast up.
- Repairs or service must not be attempted while rotary machinery is running.
- Before drilling, check for buried cable or buried pipeline signs.
- Pressure must be completely released before breaking any line or connection. Check the gauges.
- When drilling on an auger type drill or a heli-portable drill, only the person drilling shall handle the slip.
- For safety consideration, drill units with rotary controls that will automatically return to the neutral position are preferable to “constant-on” controls.
- Hands and feet must be kept clear of the rotating drill stem.
- When using a pipe wrench, extreme caution must be exercised at all times.
- The wrench handle must be secured before moving the drill.
- Extreme caution must be used when drilling in summer operations to ensure that the exhaust system is protected from underlying grasses which could become a fire hazard.

Preparation and use of explosives

Preparation of charge

- After drilling the shot-hole, remove only the number of explosive cartridges for that shot. Couple charges if necessary. Do not make up more charges than required to be loaded and fired in one shot.
- Handle charges carefully. Do not drop or throw cartridges on the ground.
- Use only an approved brass priming punch to make a cavity for the detonator.
- Do not use screwdrivers or any other steel implements for punching.
- Do not use undue force in punching. Do not hammer punches. Do not swing axes or other steel implements at cartridges. Do not swing cartridges at sharp objects. Do not spear cartridges with the loading pole.
- If required to cut powder, do this only with an approved brass knife. Cut only on a soft surface, such as the ground or on wood, (not on a metal surface). Clean up any fragment of powder, and drop them down the borehole. Never cut cartridges in magazines or day-boxes.

Handling of detonators

- Keep detonators away from open flame, sparks or heat sources. NO SMOKING.
- Avoid impact on detonators. Do not attempt to pry detonators open to investigate the contents. Do not attempt to pull the legwires out of detonators.
- Wear only natural fibre outer clothing. Synthetics, such as nylon, generate static energy.
- Ground yourself whenever possible to bleed away static charges prior to handling detonators. Many simple actions such as sliding of a vehicle seat can generate static.
- Avoid excessive friction with plastics. Do not let legwires slide through your hands.
- Minimize handling of detonators. Leave in containers until required. Do not carry detonators in your pockets.
- Do not throw legwires through the air.
- Do not handle detonators during severe dust, snow or electric storms.

- Do not transmit on any radio when handling detonators. Radio Frequency energy can initiate detonators under certain circumstances.
- Keep legwires close to the ground to minimize any antenna effect for Radio Frequency pick-up.
- Avoid any contact between detonators or legwires and any sources of power such as electric cables, etc. Avoid unnecessary contact with any conductor of electricity such as fences, etc.
- MOST IMPORTANT – Never remove the shunt or separate the duplex wires until the charge is safely in the hole, or until absolutely necessary.

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Priming of charge

- Remove only the number of detonators required for the shot-point at hand.
- Check that the detonator is securely shunted. If you have any doubt, twist wire-ends together.
- Do not start priming until the hole is ready to load.
- Prime the charge by inserting the detonator firmly into the detonator-cavity. Never force the detonator into the charge. Enlarge the cavity if necessary.
- Secure the detonator by making at least two half-hitches with the legwires around the cartridge.
- Never prime charges in advance of your immediate requirements.
- Never transport a primed-charge on a vehicle.
- Never drag primed-charges by the detonator wires.

Loading of charge

- Use drive-points to anchor the charge and to prevent upward movement.
- Re-check that the shunt is secure before starting to load.
- Lower the charge slowly into the hole. If force is required to lower the charge, apply even pressure on the loading pole. Do not hammer charges with loading poles.
- Use only approved wooden loading poles.
- Never drop-load a primed cartridge.
- Never drop-load cartridges on top of a primed cartridge.
- Check circuit continuity with an approved galvanometer or circuit tester, but only after the charge is loaded to depth.
- Close day-boxes before proceeding to the next shot-point.

- When the day's work is complete, return any unused explosives and detonators to the magazine in their original cases.
- Make sure magazines are locked.

Shooting

- Do not remove protective legwire shunts until ready to make final connections.
- Make sure all wire-ends are bright and clean before making connections.
- Do not transmit on any radio until ready to fire.
- Keep the firing circuit insulated from the ground or other conductors such as bare wires, rails, pipes, etc.
- Keep all electric wires or cables away from the blasting area until ready to prepare and fire the shot.
- Ensure that the blasting-machine is incapable of dispensing an electrical charge before making connections. Touch firing-cable ends together to equalize any potential difference.
- Test circuits of all detonators using only an approved blasting galvanometer.
- Withdraw all personnel to a safe distance and/or take cover before shooting. Charges might be shallower than intended which could cause cratering and dangerous flyrock.
- In the unlikely event that a charge is thrown from the hole, do not approach the charge until you are sure it is not burning.
- Approach a hole with caution even after the charge has detonated. Always be prepared for delay blow-out.

Summary

- This Safety Bulletin is for the benefit of all seismic drilling personnel.
- We ask that you re-read it from time-to-time to remain familiar with the contents.
- If any of the contents of this Safety Bulletin are not understood, please discuss them with your supervisor or employer.
- We would also caution you that the guidelines set down in this Safety Bulletin are minimum standards.
- If you have any comments, please contact Alberta Employment and Immigration.

NOTE: A driller and helper, as well as an employer, can be cited for an offence for failing to comply with the Occupational Health and Safety Act, Regulation or Code

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Contact us:

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Throughout Alberta
1-866-415-8690
(Toll Free)

Deaf or hearing impaired
- Edmonton 780-427-9999
- Other locations 1-800-232-7215
(Toll Free)

Web Site

www.worksafe.alberta.ca

Getting copies of OHS Act, Regulation & Code:

Queen's Printer

www.qp.gov.ab.ca

Edmonton 780-427-4952

Workplace Health and Safety

http://employment.alberta.ca/whs-ohs

Call any Government of Alberta office toll-free
Dial 310-0000, then the area code and telephone number you want to reach