

 <p><b>DUTCH BROTHERS</b> <b>HEALTH, SAFETY &amp;</b> <b>ENVIRONMENTAL PROGRAM</b></p>	<b>Section: Stockpile and Pit Face Safety</b>		
	PREPARED BY: HEALTH AND SAFETY TEAM	DATE OF ORIGIN: 02/02/2023	REVISION # 1
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## STOCKPILE AND PIT FACE SAFETY

### PURPOSE

All workers must understand the hazards and risks of working around stockpiles and pit faces and the procedures used to control those hazards.

### SCOPE

**All work must meet the requirements of the Occupational Health and Safety Act and Regulation 854 Mines and Mining Plants.**

#### General Rules

- Stockpiles shall be inspected for hazardous conditions regularly by a competent person.
- Stockpiles shall be made safe before an operator/machine is allowed to work close to or on top of the stockpile.
- The top of a stockpile shall be graded to promote surface runoff and no ponding of water shall be allowed on top of the pile.
- When removing earth, clay, sand or gravel by means of powered equipment:
  - The working face shall be sloped at the angle of repose; or
  - The vertical height of the working face shall not be more than 1.5 metres above the maximum reach of the equipment.
- Stockpiles in safe zones must not be higher than 3 metres.
- Persons on foot must maintain a distance no less than the height of a working or vertical pit face. A minimum of a 1:1 relationship between height of face to distance to the base must be maintained.
- Persons on foot at the top of a pit face must maintain a distance greater than 3 metres from the edge. If cracks on the surface are seen; then stay 3 metres from the crack.
- There shall be no access of heavy equipment within 2 metres of the crest of a slope unless the loose material has been pushed and compacted with a bucket. On a slope that has an overall profile steeper than the angle of repose, the crest of the pile shall be excavated in benches using an excavator or equivalent.
- Material must be dumped back from the edge of a pile or face. Material should be pushed by a machine using a “bumper” of material in front of the machine at the edge.
- Berms of appropriate height should be used to protect the edges of piles or pit faces in traveled areas. The height of the berm must be a minimum of the radius of the largest wheel in the pit.
- Trees and other vegetation or materials within 2 metres of the rim of a surface mine and likely to endanger a person, must be removed.
- Overhangs, undercutting or tunneling of material both in a stockpile or pit face is not permitted.

#### Stockpile Characteristics

- Processed granular material is usually placed in a stockpile by conveyors or by carrying the material by bucket or truck. Stockpiles created by these methods from materials found in our pits will typically have a slope at its edges (“Angle of Repose”) of about 30 to 37 degrees. This angle of repose is the natural state at which the material falls and conforms to. When loading out of a stockpile the angle of repose and the natural state of the granular material no longer exists.



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- In dry warm conditions granular material found in our pits will generally act more free-flowing and the material will continually fall towards its angle of repose. This falling of material is not instantaneous though and can happen at any moment.
- In the winter and in wet conditions materials found in our pits will freeze or stick and not naturally fall to their angle of repose. Overhangs may occur in these situations which are unsafe.
- Regardless of weather conditions some materials will not free flow to their angle of repose. These materials possess an inherent stickiness property and will form overhangs even in the summer. Examples are recycled asphalt and concrete.
- When external forces are placed upon a stockpile its contents may shift because of them. A good example of this is when weight from a piece of machinery is placed on top of the pile near the tipping edge. The weight placed on the stockpile can cause the material to fall to a new angle of repose. The effects of this can cause the piece of equipment to fall with the material supporting its weight. This can be unsafe.

### Stockpile Mining Safety Rules

- Stockpiles shall be excavated in such a manner so as not to result in a concave working face on a horizontal plane.
- Loaders must excavate a stockpile at right angles. Loading shall be uniform along the entire working face.
- Trucks must not dump at the top of the pile where the toe (bottom) has been removed.
- Samples must not be taken from a stockpile by hand unless it is in complete repose and no other activity is being performed on the pile. (i.e. Machines traveling on top of the pile). The preferred method of sampling is to use a loader and create a sampling platform less than 1 metre high and in a safe location away from the working face of the stockpile.

### PROCEDURE

- Overhangs and vertical cut faces in stockpiles are potential hazards. Their stability can be reduced by wet conditions caused by precipitation and snow melt.
- If an overhang develops an unsafe condition occurs. The overhang must be dealt with before any further loading or excavating can occur. If the loader can reach the overhang, then the operator must knock down the overhang before continuing.
- If the overhang cannot be removed safely by the mining equipment, then it must be protected from access using berms and/or safety barrels and signage. The operator must also notify their supervisor of the unsafe condition.
- Removing an overhang that cannot be managed by a loader can be performed by a hydraulic excavator. The operator of the excavator must be trained in managing overhangs. When knocking down the overhang the excavator must never be positioned in the falling path of the overhanging material. The preferred method of knocking down an overhang is to excavate behind the overhang from on top of the pile.
- The stockpile may be excavated in benches each not exceeding the allowable height of the vertical face.
- The loader operator can load from another safe area of the stockpile if an overhang exists on one side. Try to load from the side of the stockpile which has the greatest exposure to the south.
- If because of the material type or season, the stockpile is becoming prone to overhangs, it must be stockpiled no higher than the maximum reach height of the machine mining out of it. i.e. A 980H Cat loader will reach



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6.36m in height. A 980H loader cannot mine a pile greater than 6.36m that is prone to overhangs. The reason for this is that the loader operator can manage the overhang themselves if it occurs.

- In the event that the stockpile height exceeds the vertical reach of the equipment and there is a likelihood that overhangs will occur, the excavation shall proceed in benches beginning from the upper part of the pile.
- Since in the winter all materials in our pits are susceptible to overhangs, stockpiles will be constructed with a “winter loading face” which consists of material piled no higher than the reach of the machines loading out of it. A part of or the entire stockpile can be constructed with a winter loading face. Construction of winter stockpiles should be attempted in the fall season before frost sets in.
- If space is limited more than one lift/bench can be constructed when creating the winter stockpile. Ramps double the width of the loader and at a slope of 1:10 should be constructed to reach the upper bench levels. Large enough loading and turn around areas must also be constructed with safety berms at their edges. Bench heights are determined by the maximum reach of the machine used to load material out of the stockpile.

#### REQUIREMENTS

- Mining Regs. 854, Sections 61, 88