

Surface (Hardrock) Ground Control

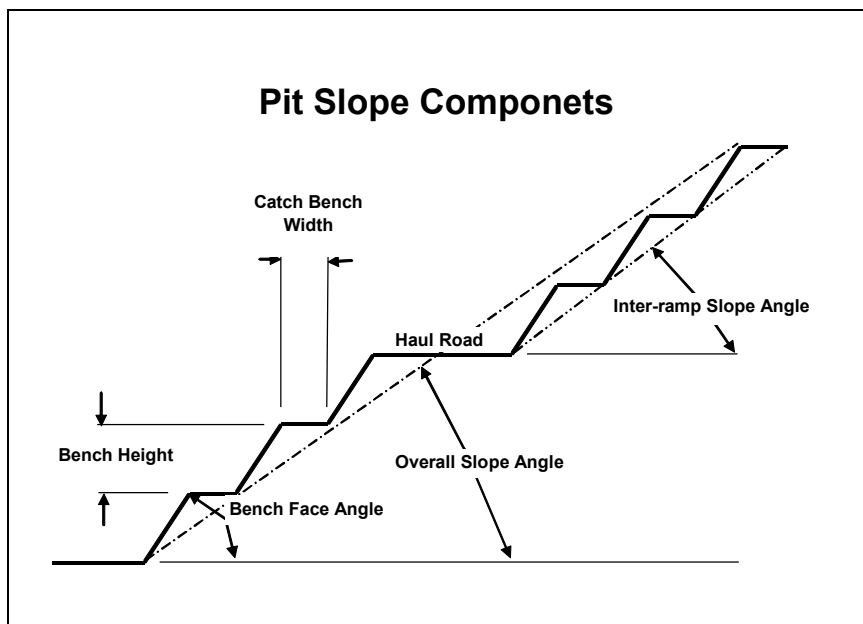
1 PURPOSE

To ensure slope stability, mine design, excavation design, ore dump construction, leach pad design, etc. in order to prevent losses or minimize personal injuries as well as damage to the environment or the property.

2 SCOPE

This procedure applies to all operating areas, as well as for all employees and contractors, functions and local procedures.

3 DEFINITIONS



Bench The mine is excavated by cutting horizontal slices to move waste and recover ore. Each slice is called a “bench” and is described by the elevation at which the excavation takes place. The bench face is the rock exposure remaining after excavation is finished.

Catch Bench A bench designed to provide sufficient width to catch loose, fallen rock from the bench or benches above.

Rock fall Any gravity-driven collapse of a small volume of rock.

Slope Failure: Any gravity-driven collapse of a significant volume of soil or rock (or both).

4 RESPONSIBILITY

Employees

Persons potentially exposed to the risk of rock slides will be trained annually on surface ground control methods appropriate for their jobs.

Shall examine the conditions of the highwall prior to any work in the area and routinely throughout their shift.

Inform their supervisor immediately of any adverse conditions regarding ground control.

General Foreman

Shall ensure execution of the pit, dump, or leach pad design/mine plan.

Directs blasting operations with regard to blast design.

Ensures ground control information is communicated to employees potentially impacted.

HSLP

Review procedures and perform inspections to ensure compliance with this standard.

Perform annual audits to the "Surface Ground Control" procedure.

Manager

Develop a management plan for surface ground control.

Ensure ongoing monitoring for execution of the management plan for surface ground control against the life-of-mine plan.

Ensure that a continuous training program is provided which ensures that employee competency is maintained.

Ensure that risk assessments are performed relating to surface ground control elements and include but are not limited to the following:

- Geotechnical evaluations and monitoring of slope stability according to the site program, giving priority to the operative areas.
- Selection criteria for mine design, material and equipment.
- Identification of standard operation procedures required (based on consequences).
- Training and competence level of employees.
- Operation planning.
- Significant changes in operation plans or ground changes.
- Ground conditions monitoring methods.
- Emergency Response Plan.

Mine Engineering

Pit slope management is the responsibility of the Geotechnical Group within the Mine Engineering Department. Support is required from the Geology Department, Survey Group, Planning Sections, and Mine Operations, each of whom is responsible for their areas. The Geotechnical Group is responsible for the provision of slope design criteria, noting the onset of instabilities, monitoring the development, interpreting the causes and consequences, and communicating the information to all concerned parties. Options are discussed with planning and operations personnel to develop mitigating strategies and maintain a safe work environment.

Supervisors

Line managers within the mine are responsible to apply the requirements presented in this document to manage slopes in such a manner as to minimize the risk of serious harm as a result of slope failures.

5 PROCEDURES & GUIDELINES

General Aspects

Surface Ground Control Procedure and SOPs will be written in accordance with all regulatory requirements.

Pit Design/Mine Plans

Each pit shall have a pit design/mine plan developed and maintained by Mine Engineering and the Surface Operation Department.

Surface Ground Control Plans

Each site shall develop and maintain a surface ground control plan. The plan will address the following key components:

- Geotechnical design approach
- Geotechnical data collection
- Slope monitoring
- Risk assessment
- Third party review
- On-going design and engineering analysis
- Standard Operating Procedures

Failure Management

The Geotechnical group working with the operations department shall develop strategies for working areas of the pit when movement in the slopes warrant. The strategies should consider the following:

- Placing berms to prevent entry into the area when not being worked.
- Provide design and engineering analysis for remediation measures.
- Coning areas to mark the area of concern.

- Use of spotters to monitor ground conditions and warn personnel in the area of any changes.
- Implementing emergency pull out and area shut down procedures.
- Increased frequency of survey monitoring.
- Limiting personnel in an area.
- Limiting work in specific areas to day light hours or providing additional illumination during night operations.

A communication plan for these strategies shall be developed and delivered to the appropriate personnel.