

VERTICAL CRATER RETREAT MINING. AT THE LUOSSAVAARA RESEARCH MINE

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ABSTRACT

A test stope at the Luossavaara Research Mine in Kiruna, Sweden, was divided into four different modules in which various hole patterns and explosives were tested in order to evaluate:

1. The optimum combination of explosive and hole pattern
2. The resulting fragmentation
3. The damage to the surrounding rock
4. The application techniques of the VCR mining method

Each module consisted of approximately 5000-7000 tons of magnetite ore. The bore hole diameter was held constant at 165 mm and three different explosives; ANFO, an emulsion and a TNT-slurry, were tested in various hole patterns.

Fragmentation was measured by boulder counting and by digitizing video photos taken regularly at the draw points.

Damage assessment to the remaining rock was measured by a sliding micrometer and a rod extensometer. In addition vibration monitoring, seismic cross hole scanning and counting the number of cracks in cores drilled before and after blasting was also employed.

During the program various charging techniques were developed and a follow up of blasting performance was made.

The favourable structural conditions was in all probability the main reason for the good results in terms of fragmentation and specific charge.