

Cosmos Nickel Mine

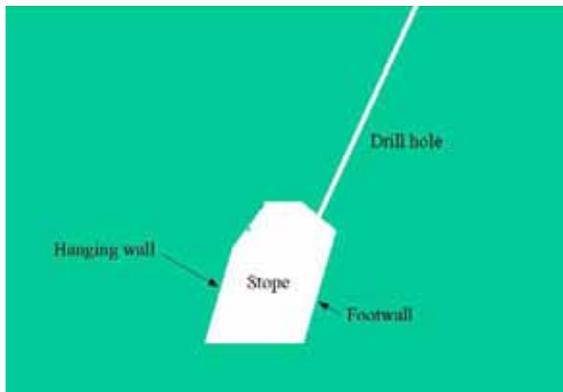
Project Report - Western Australia

Cosmos is a nickel mine situated about 500km north of Kalgoorlie where temperatures through summer are often over 45°.

Key design criteria

The nickel ore is mined using a technique involving downward long hole drilling methods. The resulting by-product of this method is a large hole (a stope) of dimensions approximately 50m x 50m x 50m. The drill hole is steel lined for the first 45m and has an approximate diameter of 300mm.

The stope is 500m below the surface and is inclined at about 60°. However, the rock characteristics limit the width of the hanging wall to about 50m and thus ore is left on either side of the stope to prevent the cavity from collapsing. By filling the stope with a 3MPa fill material the ore on either side of the stope can be mined.

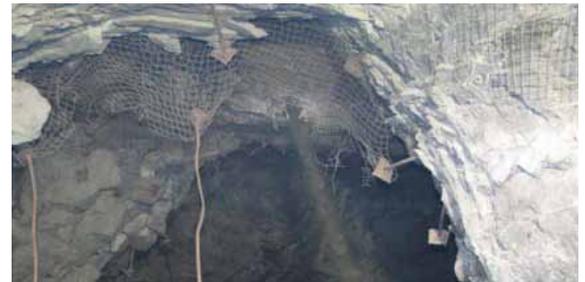


Specification requirements

The specification required that the underground fill would flow, set and achieve a 3MPa strength criterion. The mix design and trials were conducted at Gosnell's laboratory and onsite. The trials were conducted to ensure that the mix would set, as fine soluble nickel, lead and zinc has a tendency to reduce the effectiveness of the hydration reaction of cement.

Concrete used

Cement aggregate fill (CAF) was used to fill the stope taking about 20 seconds to fall the 500m into the stope. The cement aggregate fill could not be shifted by a bogger (underground FEL) the day after placement.



Solutions developed

The stope was filled by Holcim by providing two 12 hour shifts with a front end loader feeding the two agitators on skids. The agitators were loaded alternately to allow one agitator to be discharged while the other was being loaded and mixed, the plant discharging about 1,000m³ per day. Closed circuit TV showed the underground fill discharging.



Location	Cosmos nickel mine, 420km north of Kalgoorlie, WA
Client	Sir Samuel Mines
Contractor	Holcim
Engineer	Kasandra Braddon
Products supplied	46,525m ³ of cement aggregate fill (CAF) to date including 40mm aggregate with 6% cement
Commencement	February 2005
Completion	October 2005