



Mine Truck Underpass Tunnels Cerro Verde Mine, Peru

OWNER	Sociedad Minera Cerro Verde (Freeport-McMoRan)
DESIGNER	Fluor Canada Ltd.
CONTRACTOR	Maccaferri de Peru S.A.C
LOCATION	Cerro Verde Mine, Peru

Cerro Verde Mine is an open-pit copper and molybdenum complex near Arequipa in southern Peru. In operation since 1916, it is one of Peru's oldest copper mines. With demands for copper growing worldwide, processing facilities were expanded as part of the Cerro Verde Production Unit Expansion project. Copper production was tripled to 600 metric tons of copper per year. Included in the infrastructure upgrades was the requirement for approximately 350 metres of conveyor and mine truck tunnels, varying in size from 3,990 to 7,695mm in diameter and buried up to 23 metres below course ore stockpile.

Application:

New conveyor and mine truck underpass tunnels were required for the mine site as part of the Cerro Verde Mine facilities upgrade.



TECHNICAL DETAILS

- Bridge-Plate and Multi-Plate
- Round Structures
- Diameter: 3,990mm to 7,695mm
- Length: 12.2m to 39.0m

The Challenge:

Structural plate tunnel products used in the mining industry are typically subjected to higher loads than any other application. Ranging in size from approximately 3m to 8m each new tunnel for the Cerro Verde Mine had to be custom designed to meet these demanding site requirements. The largest tunnel situated beneath 23m of course ore stockpile would be subjected to the highest dead load.

The Cerro Verde Mine operators required construction to proceed as quickly as possible in order to minimize downtime and production losses. A single day's delay could cost hundreds of thousands of dollars. It was important that plate assembly was completed quickly and on schedule.

The Cerro Verde Mine is located high in the mountain regions of Peru. This remote location required a product that could be easily transported and assembled on-site.

The Solution:

Approximately 250m of Multi-Plate and 100m of Bridge-Plate structural plate were installed for a variety of high traffic, haul road underpass tunnels. Four Bridge-Plate structures and six Multi-Plate structures were constructed in total. The largest, two 35m long full periphery double plate ribbed round Bridge-Plate structures, were specially designed to accommodate the additional loading from 23m of course ore stockpile.

During fabrication precise curving of over 2,000 corrugated plates was performed in Armtec's production facilities. Quality checks were performed in the ISO certified plant to simulate assembly in the field. Test rings were erected to ensure the assembled structure would fit within allowable tolerances. Over 600 tonnes of structural plate product was successfully delivered to the site on schedule. Strict quality control measures taken during fabrication ensured the structures were assembled with minimal disruption to operations.

The Cerro Verde Mine is located high in the mountain regions of Peru. This remote location required a product that could be easily transported and assembled on-site. Installation was successfully completed in 2013 with ten tunnels constructed in total. The two 7.7m double plate ribbed round Bridge-Plate structures were Armtec's deepest reclaim tunnels.



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