



SIKA AT WORK

ANDEAN RICHNESS

YAURICOCHA MINE, PERU

BUILDING TRUST



ANDEAN RICHNESS

PROJECT DESCRIPTION

The Yauricocha Mine is located in the Alis district, Yauyo province, department of Lima in the high zone of the eastern Andean with an average altitude of around 4.600m above sea level. Sierra Metals retains a controlling ownership status in the Yauricocha Mine, through their subsidiary Sociedad Minera Corona S.A. (SMCSA).

The Yauricocha Mine consists of a number of mineralized bodies, which have been emplaced along major structural trends mainly as limestone replacements by hydrothermal fluids. The mineralisation varies widely in morphology, from large, relatively wide, tabular manto-style deposits to narrow, sub-vertical chimneys. The mineralization features economic grades of Ag, Cu, Pb and Zn, with local Au to a lesser degree. The primary mining method at Yauricocha is sublevel caving and is used in Mina Central, Esperanza, Mascota and Cachi Cachi. Cut and fill mining, typically overhand cut and fill, is performed selectively.

Sierra Metals is currently undertaking a large expansion project to bring daily ore throughput from 3.150 tons to 5.500 tons. This expansion project includes a significant increase of underground drifting and general development work. The current reserve base of Yauricocha is in the order of 9 million tons providing a life of mine of at least 8 years.

EFFICIENT MINE DEVELOPMENT

Sika Peru is a long standing partner of Sierra Metals at Yauricocha, providing extensive mine site support and is supplying key components for efficient underground development at

the different ore bodies. The substantial depth of the operation, that reaches well below 1.200m below surface requires a good yielding of the shotcrete liner to deal with dynamic loading and destressing events. Sika Peru was key in introducing modern SikaFiber® macrosynthetic fibre technology to the Yauricocha operation and supported the team during the transition from steel to macro pp fibers. 20 Kg of steel fibres per m³ of shotcrete could be replaced by less than 4Kg Sika Fiber® Force-60. A mobile fibre testing unit is frequently used at the site to assist with the quality control of the shotcrete and to develop new mix designs. High performance shotcrete accelerator technology is used to provide the required early strength in order to keep mine cycle times as rapid as possible allowing fast re-entry into freshly secured development headings. In the case of Yauricocha, 4 MPa after 4 hours can be reached. Macrosynthetic, fiber reinforced shotcrete reduced also the amount of screen installation and is very effectively countering corrosion of the primary support.

PROJECT REQUIREMENTS

- Rapid early strength development of shotcrete
- High final strength
- A minimum dosage of accelerator for the shotcrete
- Excellent yielding properties of the shotcrete liner
- Long slump keeping of concrete and shotcrete and cope with long underground haulage distances

SIKA SOLUTION

Sika's world leading Sigunit® and Viscocrete® technology is



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among the key elements for the shotcrete and concrete works at Yauricocha. For the shotcrete, the mine relies on the proven Sika Fiber® technology with excellent load bearing capacity at a low fiber dosage. Many other construction products are supplied to the mine site. As the ore bodies are located along major structures at the contact of an intruded granodiorite into to a very permeable marble coupled with the subvertical nature of the ore bodies, water infiltration into the underground workings is frequent. Sika Peru introduced powerful, two component, chemical injections to the underground mining crew at yauricocha in order to effectively counter water ingresses

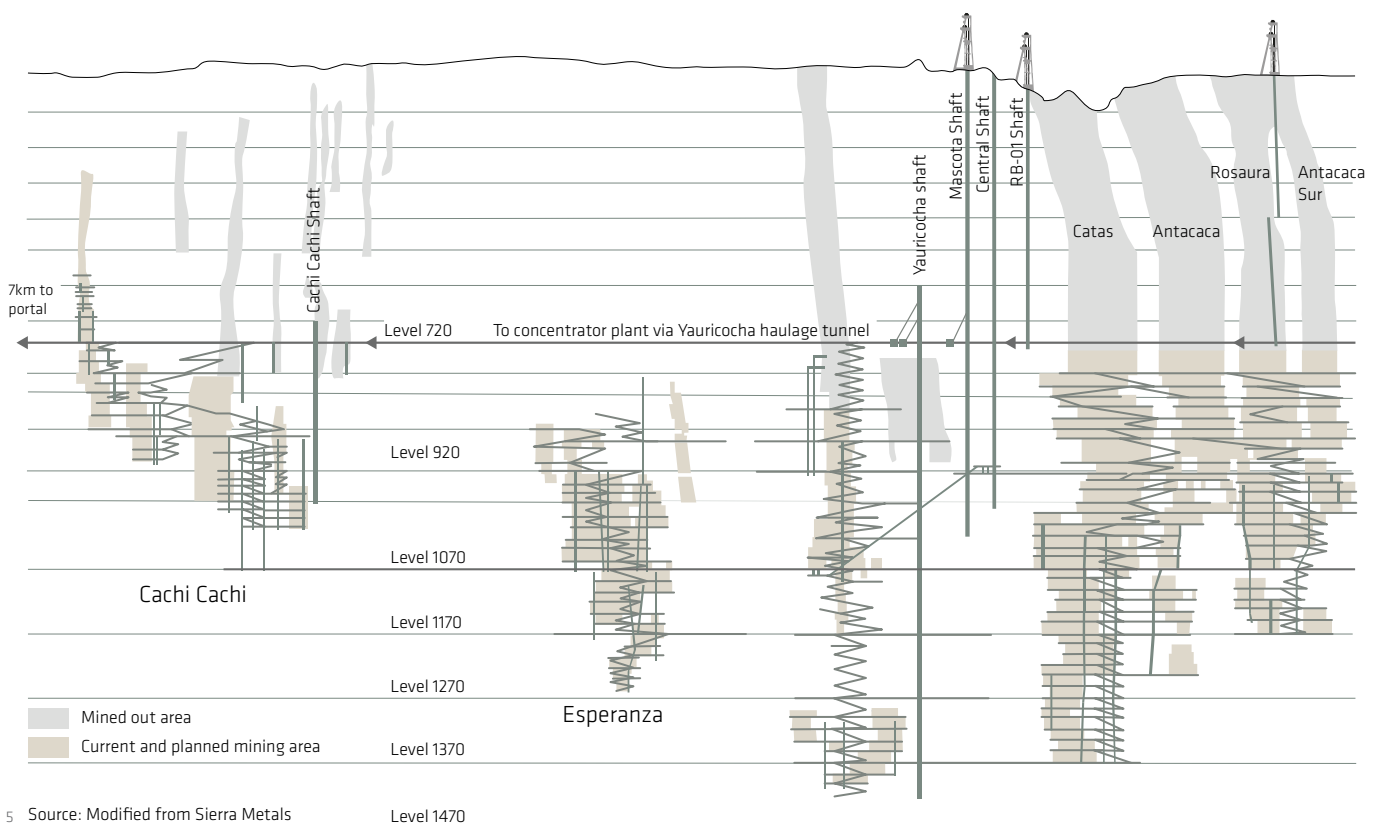
SELECTION OF SIKA PRODUCTS

- Sika Viscocrete® High range water reducer
- SikaTard®-930 Consistency stabilizer
- Sika Rapid®-1 Concrete accelerator
- Sigunit® L500 AF Alkali-free, high performance shotcrete accelerator
- SikaFiber® Force-60 Polypropylene macro fiber
- SikaFix®-210 Two component, PU injection resin
- Many other Sika construction products and products for asset maintenance and repair



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- 1 Front: Underground spraying at Yauricocha
- 2 Mobile, Sika energy absorption testing unit of fibre reinforced shotcrete
- 3 Spraying a narrow stop
- 4 Early strength testing and quality control of the shotcrete
- 5 Long section Yauricocha mine
- 6 The Yauricocha mine site



5 Source: Modified from Sierra Metals

Level 1470

YAURICOCHA MINE, PERU



Our most current General Sales Conditions shall apply. Please consult the most current local Product Data Sheet prior to any use.



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