



# SIKA AT WORK

## SILVER LINING

EFFICIENT UNDERGROUND MINING IN THE MEXICAN HEARTLAND

**BUILDING TRUST**



# UNDERGROUND MINING IN THE MEXICAN HEARTLAND

## PROJECT DESCRIPTION

The Mexican state Zacatecas is home to some of the richest silver deposit on the globe. Mined since hundreds of years, this region has been among the major producers of Silver globally. Sika is involved in a number of projects around Zacatecas and Fresnillo supplying underground construction materials to mining projects such as the Fresnillo, Juanicipio and Saucito operations from Fresnillo plc, the Goldcorp Peñasquito mine or the Frisco Tayahua operation. Fresnillo plc is the world's largest silver producer and also Mexico's largest gold producer, operating a number of mines in Mexico. The Fresnillo and Saucito operations are the flagship operations of the company, providing more than 60% of the silver output of the company. The joint Fresnillo-MAG Silver development of Juanicipio in close proximity to the existing mines will cement the importance of this mining cluster for many years to come. Sika is a long standing partner of Fresnillo and it's underground main contractors such as DICOM and strongly involved to help increasing efficiencies, providing close technical support for concrete production, shotcrete application and quality control of the applied primary support

## RAPID MINE DEVELOPMENT

The mines around Fresnillo are type localities for epithermal silver deposits. Hot, thermal springs, originating from volcanic activity, were responsible in depositing high grade silver, zinc and lead and to a smaller amount gold in narrow, well defined vein systems that are mined today with highly selective min-

ing methods that enable fairly high ore throughput at the same time. Due to the narrow type of mineralisation, multiple development drives need to be installed to enable enough ore output to feed the mill on surface. Nominal output capacity of the Fresnillo mine is around 8.000 tons of ore per day, Saucito around 7.000 tons and the new Juanicipio project will have a planned output of 4.000 tons per day. Alone for the Juanicipio mine development more than 140km lateral underground development will be installed and around 8'000 meters of vertical ore-passes, winze and ventilation raises constructed

## PROJECT REQUIREMENTS

- Rapid early strength development
- High final strength
- Dense matrix to counter acid mine drainage
- A minimum dosage of accelerator
- Excellent yielding properties of the shotcrete liner
- Extended open time to allow long haulage distance of concrete to the point of use.
- High Energy absorption of the shotcrete liner
- Trouble free application of the shotcrete

## SIKA SOLUTION

Sika's market leading Sigunit® and Viscoflow® technology are key for the shotcrete and concrete works at the Fresnillo operations. Highly effective and versatile dry shotcrete mixes and powder accelerators are used at different mine sites. At the Fresnillo operations, wet shotcrete is applied mainly by



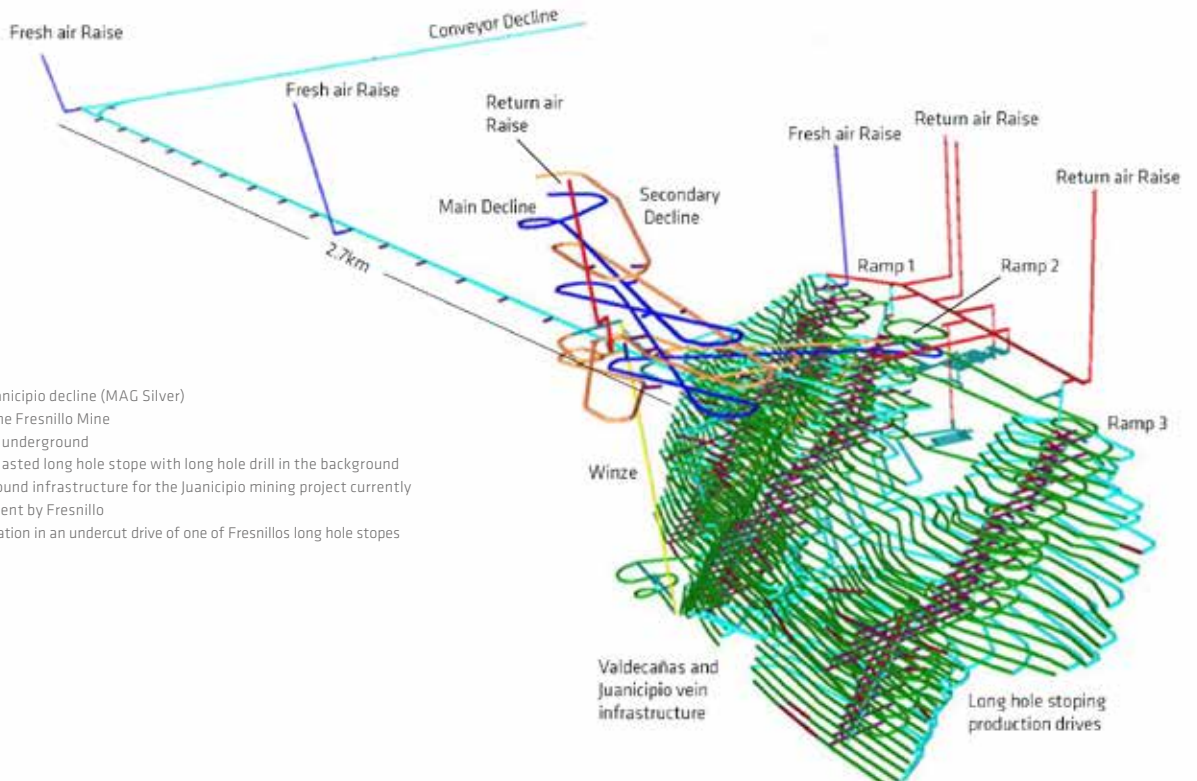
SPM 4210 wet spray rigs. The dry mixes are sprayed using Sika Aliva rotary machines. For the shotcrete, the mine relies on the proven Sika Fiber® technology with excellent load bearing capacity at a low fiber dosage. Sika is involved with a number of special projects such as lightweight concrete for void filling and HPC concrete for special reinforcement and ground slab designs. As the concrete is supplied by a batch plant outside the mine perimeter, the long transport and haulage distances to the point of use require an effective retardation of the concrete and hence well adjusted mix design using powerful Sika admixtures. Sika is at the forefront when implementing best demonstrated mining practices from case studies around the world with its customers and is sharing this knowledge frequently with Fresnillo and DICOM.

**SELECTION OF SIKA PRODUCTS**

- Sika Viscoflow® Superplasticizer/Slump retainer
- Plastiment liquid Consistency stabilizer
- Sigunit® L50 AFX Alkali-free, high performance shotcrete accelerator
- Sika Fiber® Polypropylene Macro-fiber
- Sika PM 4210 Wet shotcrete spray units
- Sika Aliva Dry spray shotcrete equipment
- Many other Sika construction products



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- 1 Portal to the Juanicipio decline (MAG Silver)
- 2 Headframe of the Fresnillo Mine
- 3 DICOM and Sika underground
- 4 Upper cut and blasted long hole stope with long hole drill in the background
- 5 Planned underground infrastructure for the Juanicipio mining project currently under development by Fresnillo
- 6 Shotcrete application in an undercut drive of one of Fresnillos long hole stopes

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# SILVER LINING



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## PROJECT PARTICIPANTS

Owner: Fresnillo PLC  
Main Contractor DICOM  
Sika Organization Sika Mexico

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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