



# SIKA AT WORK

## GRASBERG COPPER-GOLD MINE, WEST PAPUA, INDONESIA

CONCRETE: Sika® ViscoCrete®, Sika ViscoFlow®, Sigunit®,  
SikaTard®, Sikacrete®, Sikafloor®

BUILDING TRUST



# FRONTIER COPPER

## PROJECT DESCRIPTION

The Grasberg mine operated by Freeport McMoRan and jointly owned by Freeport and Rio Tinto is one of the largest mining clusters on the globe. The mine is located in the very remote highlands of the Sudirman mountain range in the province of Papua, Indonesia. Re-discovered in 1960, production by Freeport began in 1973 from the Ertsberg open pit. Rapid expansion followed and the production from several different ore bodies ramped up to 240'000 tons per day. The Grasberg ore bodies contain very high combined copper-gold grades, especially when considering the size of production. As ore extraction from the open pit will be soon uneconomic due to the increased strip, production will continue to move underground with block caved ore from the Grasberg Block Cave (GBC), and Deep Ore Zone (DOZ) as well as ore from the Big Gossan ore body that will be mined using open stoping methods. Freeport plans to maintain the current mill throughput even after the ore from the open pit has been depleted. The current output should be achieved by the underground caving operations by 2021 when the support infrastructure will be installed.

## PROJECT REQUIREMENTS

The ore bodies within and around the Grasberg main intrusion have been created due to the distinct structural and lithological contact of the intrusion with the surrounding limestone. The extensive development for the existing and planned underground operations will pass through areas of challenging geotechnical ground conditions especially at contact zones from the igneous complexes to the sediments. Challenging underground conditions demand high requirements for the underground support. For the Grasberg block cave alone, 30'000 meters of development for ventilation and conveyor declines are constructed, which represents a challenge from both, a logistics and a planning point of view. Long transport distances require long open time of the concrete when leaving the batch plant to the point of use. Also material transportation to the remote mine site warrants detailed planning. As the mine is located in an area with large amounts of annual rainfall, the underground development faces areas which high pressure and high volume water inflows. Furthermore, the risk of elevated rock stresses and rock bursts is increasing when reaching deeper levels of the underground infrastructure and hence, good yielding properties of the shotcrete liner is necessary to take up the increased dynamic loads.



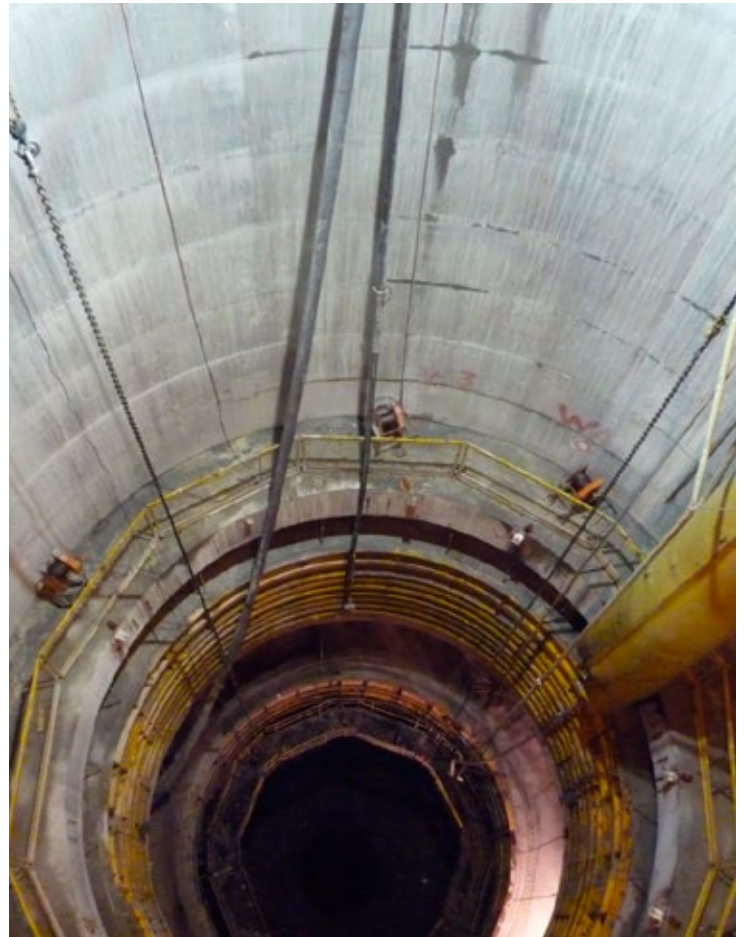
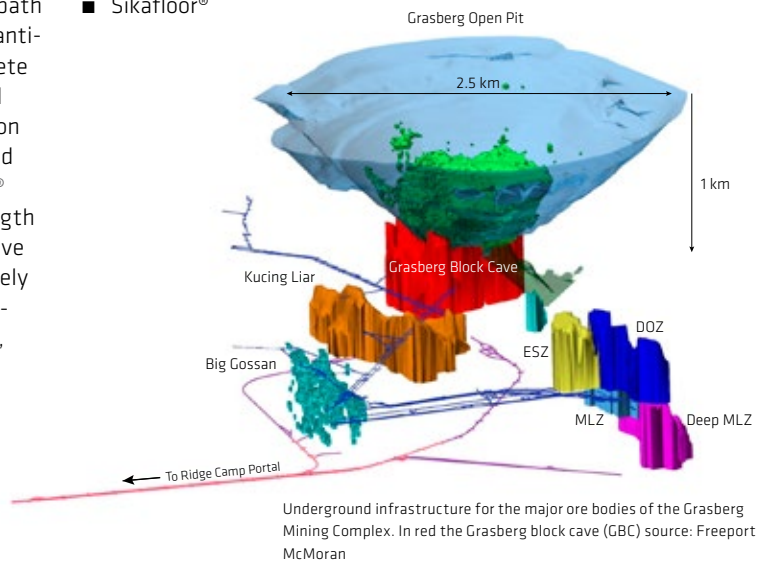
The mill infrastructure has been constantly expanded since the 70ies and a whole range of refurbishment works are undertaken on a constant basis to maintain the productivity of the ore milling and concentrator facilities.

**SIKA SOLUTION**

Freeport McMoRan and its main contractors such as Redpath are long standing partners of Sika. Sika supplies large quantities of supplies to the Grasberg operation including concrete admixtures for self- compacting shaft lining concrete and shotcrete, shotcrete accelerators, two component injection resins and refurbishment products. Especially for the rapid underground development, high performing Sika Sigunit® shotcrete accelerators are in use to reach high early strength of the shotcrete that allow short cycle times. The extensive development of the Main Grasberg block cave (GBC) is solely supported by Sika admixtures. Sika trains shotcrete applicators at the mine site and fulfills highest environmental, health and safety standards for the materials supplied.

**SIKA PRODUCTS**

- Sika® ViscoCrete®
- Sika ViscoFlow®
- Sigunit®
- SikaTard®
- Sikacrete®
- Sikafloor®



# GRASBERG MINE, INDONESIA



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



**SIKA SERVICES AG**  
Tueffenwies 16  
CH-8048 Zurich  
Switzerland

**Contact**  
Phone +41 58 436 40 40  
Fax +41 58 436 41 50  
[www.sika.com](http://www.sika.com)

**BUILDING TRUST**

