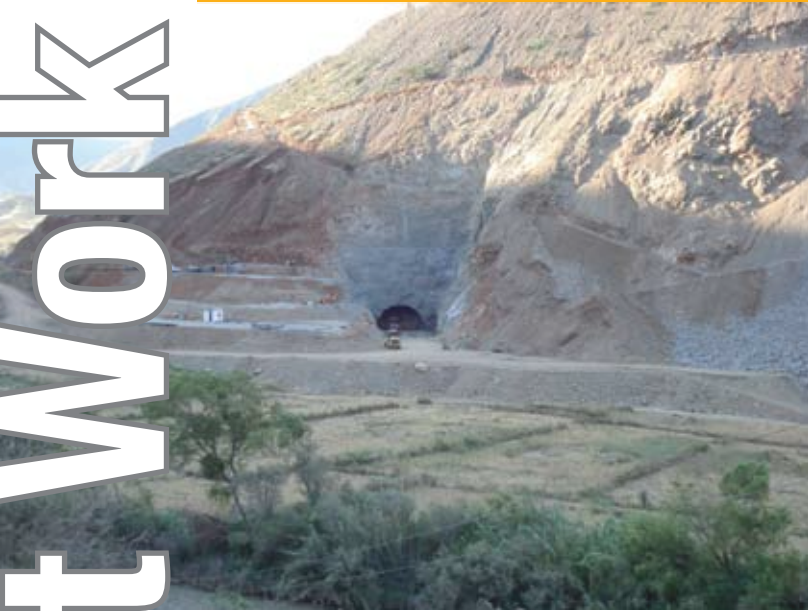


Sika at Work



Tunnels

International Case Studies



Tunnels

Road Bypass Flüelen, Switzerland

Project

The Flüelen bypass road was opened to traffic in 2005. According to the latest EU safety instructions every new road tunnel must in future be equipped with an escape gallery. This is the reason why construction work for the safety gallery was started in October 2005, after the official inauguration of the bypass.

Requirements

The gallery has a diameter of 4.75 m and a length of 2'500 m. The approximately 90 m long starting gallery was advanced by explosives. Support of the gallery had to be assured by steel arches HEB 150, erected at intervals of 1 m and covered with sprayed concrete. Afterwards, the TBM was brought to the site and installed. The gallery will be cut through by about the middle of this year. In total about 20'000m³ of sprayed concrete will be applied for immediate support upon excavation. The gallery will be finished by March 2007.

Sika Solution

Because the gallery diameter is only about 4.75 meters, the compact and very manoeuvrable concrete spraying system **Sika®-PM407P** from Sika Tunneling & Mining is the optimal solution for successfully carrying out this work.

Concrete production with **Sigunit®-L53 AF**, **Sika® ViscoCrete® SC-305**. Further products: **SikaPump-Start® 1**, **Sika® Mixer Protection** and **Separol®-4G**.



Islisbergtunnel (Westumfahrung Zürich / N4 Knonaueramt), Schweiz

Project

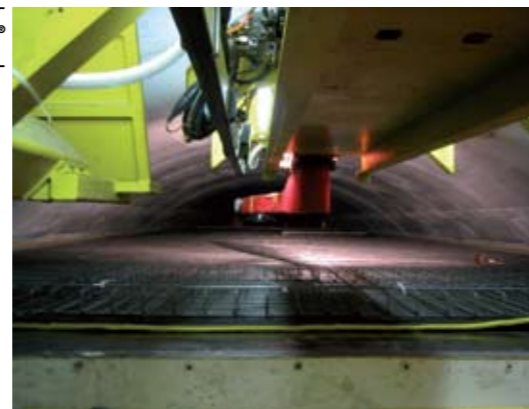
Der Islisbergtunnel ist Bestandteil der N4 durch das Knonaueramt. Der Tunnel ist 4.95 km lang und besteht aus zwei Röhren. Zusammen mit der Westumfahrung Zürich, der A1 (Zürich-Bern) und der A3 (Zürich-Chur) entlastet die N4 Knonaueramt (Zürich-Zentralschweiz) mehrere Agglomerationsgemeinden vom Pendlerverkehr und die Stadt Zürich vom Transitverkehr.

Requirements

Festigkeitsklasse B35/25
Frosttausalzbeständiger Beton
SCC
Geringe Arbeitshöhe

Sika Solution

Für die Zwischendecken der zwei Tunnelröhren wird SCC eingesetzt. Das Betonvolumen der Zwischendecken beträgt 20'000m³. **Sika® ViscoCrete® SCC** war die wirtschaftlich optimale Lösung für die Betonarbeiten unter engen Platzverhältnissen bei gleichzeitiger Erzielung einer hohen Betonqualität.



Connection Arica-Blanco, Chile

Project

The road connection Blanco-Arica is part of the works for Transantiago that will have a longitude of 1,73 kilometers with 388 tunnel meters, green areas. The purpose of the project, is to build a new corridor that will connect the areas east and west of Santiago, connection that it implies to enable two unidirectional tunnels of three highways for sense, below the railroad lines of the Estacion Central's commune.

Requirements

The works consider to intervene 1'700 street meters to enlarge it, 388 tunnel meters (between the streets Exhibition and San Borja) and two green areas of almost 1'900 meters. The works also demand new signaling, demarcation and traffic lights as well as the installation of ducts for the gathering of waters rains.

Sika Solution

It stands out that this project has been one of those that present bigger complications, due to the technical specification elaborated by the planner, however **Sika® ViscoCrete®-5000 CI** associated to a new accelerator variety free of alkalis **Sigunit® STM AF**, completes the given demands.



La Polvora Road, Chile

Project

It is summed up the south access to Valparaiso, union of both fronts of excavation of the Tunnel T1, a super structures that connects directly the Road La Polvora with the port of Valparaiso. This is a very excellent landmark from the point of view of the engineering, being a work of great complexity.

Requirements

The tunnel T-1 was executed using the new Austrian method of tunnels NATM that allows the construction of tunnels in a more economic, quick and sure way. This technology consists in an excavation followed by the immediate installation of a temporarily primary lining. The same technique is applying with success in an itinerary of the new line 4 of the subway.

This tunnel of 2'150 meters of longitude passes under the hills and it will allows to enter to the sector of the port through a viaduct on the Av. A. Varas, also allowing the conector with the rest of the city through a series of connections.

Sika Solution

The Road La Polvora whose global investment overcomes those \$50'000 millions, it will allow that the flow of trucks of great tonnage that traffic for the Route 68 or for the Route 60 CH, toward or from the port of Valparaiso, make it in direct form for this new road without having to enter to the downtown of the city, making possible the use of the coastal border for tourist and real state ends. The Road La Polvora or South Access to Valparaiso are one of the most important works considered in the mark of the Bicentennial one of the Republic, forming a bridge of conector for the regional capital with the corridor Central Bioceánico Chile - MERCOSUR. Products used: **Sikaplan®-14.6**, **Sikaguard®-550 CL W**



Tunnels

Loureiro Alvito, Portugal

Project

A water irrigation system, connected with the largest artificial lake in Europe (Alquiva dam, Guadiana River).

This tunnel system with a total length of 9.8 km and a cross section of 16m² will be connecting the two dams Loureiro and Alvito.

Requirements

Due to the changing rock conditions (soft to medium soft) a fast shotcreting system is required for minimizing the open time of the excavation face, without protection. Even though, the biggest possible output into a very narrow section has to optimize the economical result for the contractor.

Sika Solution

5 units of concrete spraying system, **Sika®-PM407P**, have been chosen for serving the five parallel excavation faces with a high quality, steel fiber inforced, wet shotcrete at any time when needed. The output, up to 20m³ / h, is helping to achieve 1'000 m of secured excavation per month.



Project Trasbase Olmos, Cajamarca, Perú

Project

Irrigation project Olmos Tinajones. Dringing the water from the Huancabamba river located in the west slope of the andean hills to the east slope through a 21 kilometers tunnel.

Total Project Volume : Shotcrete 130'000 m³, Concrete 50'000 m³
Project Start / End: April 2006 / April 2010

Requirements

Sika Solution

To fulfil the requirements of a waterproof construction (Contractor Norberto Odebrecht) Sika Shotcrete additives, Steel fiber (Sika fiber LHO) and Concrete additives were used.



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