



# SIKA AT WORK

## SCC DEVELOPMENT FOR HYDRO- POWER PLANT NANT DE DRANCE, SWITZERLAND

CONCRETE SOLUTIONS

BUILDING TRUST





## PROJECT DESCRIPTION

Ad midst the Swiss mountains in the Canton of Wallis in the western part of Switzerland close to France a hydropower plant was built in the underground. It is one of the most powerful pumped-storage hydro-power plant in Europe with a yearly power of 900 MW which produce around 2.5 billion kWh electricity. The whole power station was built in the underground in order to protect the mountain scenery. 17 km tunnels were built and therefore around 1.7 million m<sup>3</sup> rock were excavated, which partly were used as aggregates for the in-situ and sprayed concrete. The concrete required for shotcrete applications, inner linings, caverns as well as backfilling of steel tubes was produced at two concrete plants which were installed in caverns in the underground. Most of the in-situ concrete was produced as self-compacting concrete (SCC).

## CONCRETE MIX-DESIGN DEVELOPMENT

The mix-design for the self-compacting concrete was developed during a phase of lab trials as well as 1:1 trials on site. The owner wanted fair-faced concrete quality. Further requirements on the concrete resulted from the concrete pumps, pipelines and filling of moulds. There were two different mix designs for the concrete. One mix design OB24-SCC was used for fair-faced concrete parts and the second mix design OB27-SCC was used for backfilling of steel tubes.

### Concrete Mix Designs SCC:

Concrete	OB24-SCC	OB27-SCC
Strength Class	C30/37	C25/30
Strength development	medium	Slow
Type of cement	CEM II/B-M (S-T) 42.5 R	
Amount of cement	kg/m <sup>3</sup> 320	225
Fly Ash	kg/m <sup>3</sup> 160	255
Aggregates (all)	kg/m <sup>3</sup> 1630	1586
Sand 0-4mm	kg/m <sup>3</sup> 929	904
Crushed 4-8mm	kg/m <sup>3</sup> 244	206
Crushed 8-16mm	kg/m <sup>3</sup> 456	476
Sika® ViscoCrete®	kg/m <sup>3</sup> 4.8 (1.5%)	3.8 (1.7%)

## SIKA SOLUTION

After preliminary trials, Sika was able to offer tailor-made products for the concrete systems. The requirements on both, fresh and hardened concrete, have been quite demanding. The use of excavation material as aggregates for the self-compacting concrete was an added challenge for the fulfilment of this task.

Sika impressed the contractor with different products, which enabled the manufacturing of self-compacting and conventional cast-in-place concrete as well as project-specific special concrete. The construction site was visited regularly by our technical personnel and Sika concrete service technicians carried out quality checks.

### SIKA PRODUCTS FOR SCC AND IN-SITU CONCRETE

Sika® ViscoCrete® GTC 1: Superplasticizer for concrete  
 Sika® ViscoCrete® GTC 2: Superplasticizer for concrete  
 Sika® FroV 5 A: Air void entrainer  
 SikaRetarder®: Retarder

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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