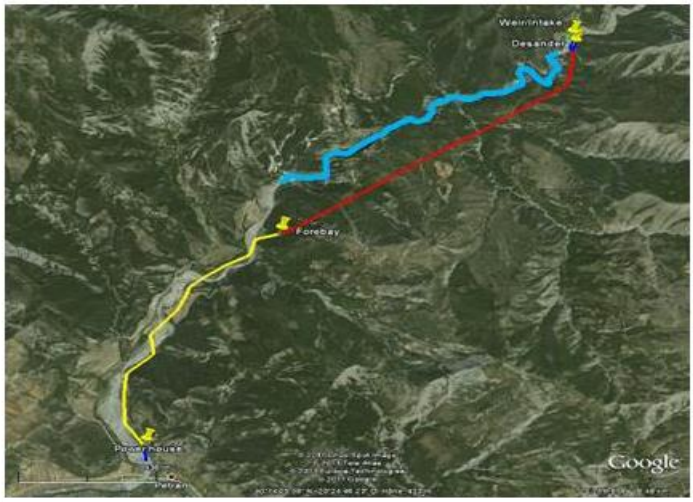
SIKA AT WORK
Hydroelectric Power Plant Lengarica 2, Përmet, Albania

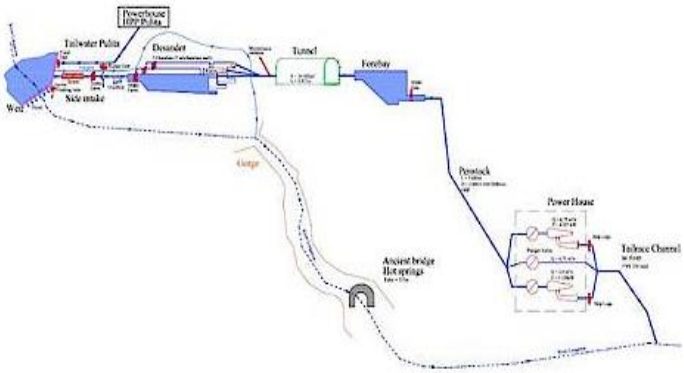
CONCETE PRODUCTION: Sika® ViscoCrete®, Sika® Sigunit®, Sika® Stabilizer Sika® Antifreeze, SikaTard®

WATERPROOFING: Sika®-Waterbars

BUILDING TRUST



HYDRAULIC SCHEME LENGARICA



PROJECT DESCRIPTION

The HPP location is in the south-east region of Albania. The power plant produces approximately 35 GWh per year, with the installed power capacity of 9.3 MW (two Francis turbines with capacity 6.2 MW and 3.1 MW). The project contains a gravity reinforced concrete dam with a length of 64 m and a height of 7.1 m. Two gates of dimensions (2.5x3.0) m have been used at the intake area.

The desander has a total length of 200 m, containing along its route 6 control gates and 3 smaller flushing gates. A tunnel of length 3965 m and inner surface of 12.5 m^2 follows. At the exit of the tunnel, immediately after the forebay, a GRP pressure pipe with a length of 3715 m starts (composed by pipes of diameters DN 2400, DN 2200, DN 2000). The power house is situated near the Petrani bridge and contains three Francis turbines. A tail race with a length of 300 m discharges the waters into the river. The project was unique in different aspects mainly due to the historical and environmental parameters that had to be considered during its design phase.

PROJECT DEMANDS

The project had demands for both design and construction phases, involving concrete production, waterproofing, sealing and bonding, injections, flooring, concrete repair, main gates installation, tunnelling works, turbine and electrical installation, substation erection etc.

CONCRETE & SHOTCRETE PRODUCTION

For all concrete types, natural (river) aggregates were used. Since natural aggregates featured a hard-to-work-with granulometry, it was a major issue achieving pumpable, easy to work and cast mixes while maintaining their plasticity and workability over time.

Following the high importance of the structures which were to be built, different demands had to be met:

- Early & late strength development (7 and 28 days strength)
- Pumpable and flowable concrete
- Rapid strength development concrete for special structures

The total quantity of concrete produced was approximately 18.000,00 m^3.

SIKA SOLUTION

For all concrete & shotcrete casting works was used **Sika® ViscoCrete®-400,** a 3rd generation superplasticizer with high range water reducing properties that also offers prolonged slump maintenance. **Sika® ViscoCrete®-400** was used for concrete types C20/25, C25/30.

During concrete production was requested high concrete flowability, so at the mixture was added **Sika® Stabilizer-4R,** a liquid admixture that increases the stability and cohesiveness of the concrete mixes and protects the pumps and the other mechanical equipment from tear and wear.

Also, the use of the admixture **Sika® Antifreeze,** helped for mixing, casting, placing and curing where low temperatures (below 0°C) were expected.

All the shotcrete works in the tunnel were performed using the alkali accelerator **Sika® Sigunit® L-22 E**. This accelerator offers a lot of benefits, exceptional early strength development, it improves the adhesion to the substrate, reduces rebound and allows for high output.

Also, for the shotcrete production was used **SikaTard®-930,** an admixture developed for the control of cement hydration. It stabilises the concrete mixes without setting for extended periods and without negatively influencing their quality.

JOINT WATERPROOFING

The concreting works of the project buildings, were foreseen to be done in a certain depth below the natural level, making it thus necessary the injection application for all the crack fillings and PVC waterstops for the different casting levels of the same structure.

The main structures of the project requiring waterproofing works were the power house and the desander area.

Construction joints, holes left from the formworks, the anchoring of the rebars and the reinforcement steel bolts required materials for filling and waterproofing.

SIKA SOLUTION

Many needed waterproofing products were required given the specific kind of work processes mentioned in the works area. The main products used for these necessities were **Sika®-Waterbars Yellow SH** for waterproof constructions and expansion joints in concrete structures such as those in water retaining structures. In our case this included the different casting phases of the spillway walls, intake area walls, desander walls and slab and finally all the underground part of the power house area.

SIKA PRODUCTS IN VOLUMES:

- *Concrete & shotcrete production:*

Admixtures:
Sika® Antifreeze
Sika® Stabilizer-4R
SikaTard®-930
Superplasticizers:
Sika® ViscoCrete®-400
Liquid shotcrete accelerator:
Sika® Sigunit® L-22 E

- *Joint waterproofing:*

Joint waterproofing system:
Sika®- Waterbars V-24 SH
Sika®- Waterbars V-32 SH

PROJECT PARTICIPANTS:

Owner: Lengarica & Energy SHPK
Contractor: Trema Engineering 2 SHPK
Consultants: ILF Consulting Engineers
Start & completion date: July 2013 up to November 2015

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