

LUDA YANA DAM

Non-Filtration Curtain



New drinking water reservoir to provide water for 45,000 people.

Location

Panagyurishte, Bulgaria

Client

Ministry of Regional Development and Public Works

Contractor

Strabag/Staniolov JV

Subcontractor

Geoservice Engineering AD

Field of application

Permeability grouting

Products used

IC 650/712 + DPV-H
MCI 650/712 726

Throughput

5m³ per plant

Delivery of plant

May 2017

Sales contact

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Background

Luda Yana dam is located in the central part of Southern Bulgaria, about 2 km north of the town of Panagyurishte on the Luda Yana river. The dam is set to provide drinking water for 45,000 people living in the region. The Luda Yana water supply system includes: a dam wall, water intake tower, diverting tunnel, main water outlet, spillway, and a Potable Water Purification Plant (PWPP).

The Luda Yana dam is an embankment dam with a central clay core, founded on a grouting gallery in its central part and on a concrete plinth in the banks. There are ballast shells on both core sides, conjugated with the clay core by transition zones.

The challenge

Work began on the construction of the dam in 1986 and ceased in 2000. The main challenges during the study stage were evaluating the work already done over the years and determining the action that needed to be taken to complete this work. To this end, a number of core drilling samples were taken and water permeability tests were carried out in specific areas, before implementing the permeation grouting method on the shores and in the service tunnel inside the dam wall.

- ▶ The main drill hole length is 40 m for the purpose of building a non-filtration curtain under the dam wall.
- ▶ The project consists of 5 steps of grout viscosity in 3 rows, depending on the permeation parameters.
- ▶ The grouting is to be done in stages of 5 m each, located by the double, inflatable packer with integrated pressure sensor for accurate pressure measurement on the injection spot.



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Our solution

Given these conditions, the company (responsible for injection works) needed specific equipment to combine the test measurement and recording system (3-level water permeability tests) for evaluation of the existing ground conditions, as well as mixing and grouting equipment with automatic reports for the main parameters (flow, pressure, volume and Lugeon number).

After several discussions and visits to similar projects together with the customer, Häny provided a proposal for a custom-made fully automated plant with two separate independent mixing and injection lines, placed in a common 20" container, with fully autonomous management of the process for each plant via touch screen displays, enabling visualization and set-up/control of the main grouting parameters: working pressure, safety pressure, volume injected, flow control, recipe adjustment, as well as the automatic feed and mixing process of the components. The system is also able to visualize in real time and record the current injection parameters which can then be extracted from the memory via USB for further analysis. This was also a mandatory requirement set by the investor.

Reliable systems and services from Häny

The system enables the mixing of water, one (1) dry component (cement) and one (1) liquid admixture per mixer – a pre-mixed bentonite (10%) in this case. Precise dosing of the individual components is guaranteed by a sophisticated weighing system in the mixer. The whole plant is controlled on the basis of consumption. All the functions are indicated on the screen. The plant can be operated manually as well as fully automatically.

The pressure and volume are measured by the integrated pressure sensor and flowmeter in the grout line. Full automation allows both plants to be operated by one person, minimizing the human factor and allowing savings on labor cost for the company. These cost savings equated to 50% of the grout plant cost when calculated for one year in two shifts. Last but not least, Häny was chosen by the customer due to the special attention given to the specifics of the plant and the further services provided by the company engineers, both on site or via the Teleservice module. This module makes it possible to connect to the main control program remotely to carry out checks or to make program modifications.

The clearest evidence of a job well done by the Häny Mixing and Injection Technology team was the recent purchase by the same customer of a HCM600 high-shear colloidal mixer for bentonite premixing, as well as an upgrade of the old IC650/712 Häny manual grout plant to the fully automated plant with a recording system for grout parameters to enable complete control of the injection pump via a proportional valve and pressure transducer.

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