Implenia

Waldeck I pumped storage plant

SHORT DESCRIPTION

Construction of a new shaft power plant, reinforcement of machine sets in the old plant, and renovation of the upper reservoir

THE PROJECT

The Waldeck I pumped storage plant has four machine sets and a total output of 140 megawatts. It was constructed between 1928 and 1932. After being operational for more than 70 years, it was renovated and modernised.

Two of the four machine sets from the old plant were kept and were provided with reinforcements. The other two were taken out of operation and replaced by a new shaft power plant with an output of 70 megawatts. The associated upper reservoir, with a holding capacity of more than 600,000 cubic metres, was also renovated.

The new shaft power plant was constructed right next to the existing powerhouse. The heart of the system is a horseshoe-shaped, 40-metre-deep shaft measuring 22 by 17 metres. The top part of this shaft was constructed using an overlapping bored pile wall. Beneath this, the excavated shaft was secured with rock nails and shotcrete.

The project also included excavating a sloping tunnel, building a cofferdam for the construction of the new extraction and inflow structure under the surface of the Eder River, and carrying out renovation work on the upper reservoir and on the existing powerhouse, which is a listed building.

SERVICES IN DETAIL

Sinking of a 40-metre-deep shaft construction pit and construction of the shaft structure as a single-faced, water-resistant concrete structure with climbing formwork.

- Securing of the excavation pit over an area of 800 square metres using overlapping bored pile wall
- 12,000 square metres of excavation pit securing using shotcrete
- Partial conversion of the existing power plant (a listed monument)
- Renovation of the upper reservoir with 14,000 square metres of plastic waterproofing membrane and 18,500 square metres of sealing asphalt in the base
- Construction of a 70-metre sloping tunnel with a gradient of up to 26 degrees for the pressure line under the existing building

CHALLENGES

Construction of the 40-metre-deep shaft in the immediate vicinity of the Eder River was especially challenging from a technical perspective. The shaft runs approximately 35 metres into the groundwater and was built as a class A waterproof construction.

Work was made even more difficult by the fact that it had to be carried out while the existing power plant was still in operation, with further restrictions arising from the site's location in a nature conservation area.

FACTS

Location	Kraftwerkstraße 10, Edertal , Germany
Status	completed
Construction volume (value of our services)	41 M EUR
Start of construction	December 2005
Completion	December 2008
Contracting entity	e.on Wasserkraft GmbH
Project management	Implenia Construction GmbH, Niederlassung Mitte, Geschäftsstelle Mannheim
Planning	Bilfinger und Voith Siemens
Concrete volume	13000 m^3
Reinforcement	1200 to
Blasting method	✓
Other tunnelling	✓
Tunnel length	75 m

SERVICES

- Concrete construction
- Industrial construction
- Structural engineering
- Power plant expansion
- Water and sewage plant construction

https://implenia.com/en/references/detail/ref/waldeck-i-pumped-storage-plant/

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