Innovative new Hydropower Plant with Microtunneling as key

The project owner decided to renew its existing Hydropower Plant which was fully integrated in an existing industrial complex. The situation and use of existing buildings did not allow any open dig construction method for the penstock bet-ween water inlet and power house. Considering the geological and hydraulic boundary conditions microtunneling technique turned out as the most suitable construction method for the penstock.

Most challenging aspects for the microtunneling planning and execution process were the existing buildings, which had to be avoided by curves, and the small overburden of the pipes regarding these existing buildings, which provoked an intense survey for settlement and adequate control of face pressure. Furthermore the composition of the ground containing significant amount of Quartz required provisions to exchange cutting tools which also had to be applied during the execution. The watertight connection of the jacking pipes with the Hydraulic Components/Turbine required diligent planning and could have been done successfully.

The application of Microtunneling technique for a penstock in a Hydropower plant with Kaplan turbine axis showed to be an efficient and fast construction method.

AT A GLANCE	
Project name	Spinnerei Linthal Hydropower Plant
Project location	Linthal, Canton of Glarus, Switzerland
Purpose	Hydropower Penstock
Time of completion	2012–2013
Specialties	– Crossing of industrial complex – Curved alignment – Abrasive ground
Total length	451 m / 1480 ft (all in soft and saturated soil)
Pipe ID	3000 mm / 118,1 in
Pipe OD	3600 mm / 141,7 in
Alignment	3-D curve
Min. curve radius	400 m / 1312 ft
Pipe material	reinforced concrete
Pipe length	3 m / 9,8 ft
Geology & groundwater	Saturated debris; highly permeable, lose sandy / silty gravel with more than 20 % Quartz. Above Groundwater level.
Hydraulic Joint	JC232 / double loop. Admissible jacking force 16 000 kN / 1630 t
Guidance system	VMT SLS Microtunneling LT
TBM	Herrenknecht AVND2400
Owner	Spinnerei Linthal AG, Bahnhofstrasse 1, 8783 Linthal, Switzerland
Consultant / Designer	Jackcontrol AG, Glarus / Switzerland
Contractor	Implenia AG, Switzerland

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monitoring microtunneling