

3. June 2009**"85t inspection crane in Grimsel I hydroelectric power plant"**

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Oberhasli power plants, Switzerland _
85t inspection crane in Grimsel I hydroelectric power plant

Generating energy with water power has always been a popular choice. Mills, sawmills and hammer mills used to be powered by running water. Nowadays, electricity is generated with hydropower: without emitting CO₂ or consuming fossil fuels. Thus hydropower still plays a major role today in developing the generation of renewable energy. The Grimsel, the "reservoir of the Alps" is the ideal region for generating electricity from hydropower. A high level of precipitation, steep gradients over short distances and hard rock forming an ideal foundation for construction make the region the best hydroelectric power location in Switzerland. The Oberhasli power plants (KWO) have been generating clean, environmentally friendly energy here since 1925 – today, 9 hydroelectric power stations on 8 lakes generate electricity for 1 million people. Production can be boosted considerably in the medium term at comparatively low outlay by successively extending and modernising the existing plants. KWO has drawn up a corresponding capital expenditure plan, initial projects of which have already been completed.

Starting situation

Expansion stage 2 of the "KWO plus" capital expenditure plan is the modernisation of the Grimsel I power plant, commissioned in 1953. Up to now, two turbines were operated in a cavern below the Grimsel Lake 2000 m above sea level. The plan envisaged completely removing one of the generators with its turbine and replacing it with a new supply turbine with higher output. Lowering

the turbine 30 m below the existing machine room floor was intended to further increase the yield. Ever since the power station had been built, an old 140 t crane had been used for maintenance work on the turbines in the cavern. However the maximum height of lift of the crane was insufficient to be able to use it for subsequent inspection work on the new lowered machine. On this account, KWO invited tenders for modifying the hoist, built in 1950, to a lifting height of 40 m – while complying with the particular requirements specific to power plants.

Realisation

The Swiss company Amacher Technik is a specialist for crane systems in power plants and in this field has been a close partner of STAHL CraneSystems' Swiss subsidiary for 10 years. The company has made a name for itself with Swiss power plant operators with controls specially adapted to the requirements in power plants. When analysing the existing crane system, Amacher reached the conclusion that it was not practicable to modify the old hoist within the narrow window of one week and at acceptable cost, and thus quoted the installation of an additional crane bridge with new, state-of-the-art hoisting technology. KWO welcomed this suggestion and placed the order with Amacher Technik. The new crane bridge was manufactured by STAHL CraneSystems in its Ettlingen crane factory and equipped with an 85 t SHW8 rope winch. In addition, KWO requested an auxiliary hoist for installation work and transporting lighter loads, and which was also to be used for work on the backflow valve in the gallery to the Räterichboden Lake 40 m lower down. For this work, STAHL CraneSystems installed a wire rope hoist with 10 t S.W.L. which was designed with a relatively high auxiliary hoisting speed to accommodate the great heights of lift. Both hoists have a maximum lifting height of 40 m. A team from Amacher Technik went to Ettlingen where the off-standard control was installed and tested. Thanks to this technology, the power plant operators can control the crane with extreme accuracy, hoisting and travelling speeds are in the region of a few millimetres per second. A specialised Swiss company took on the difficult transport of the 13 m long crane bridge over the Grimsel Pass which is extremely steep and winding in places. The narrow approach gallery down to the cavern presented a particular challenge. In spite of accurate calculations manoeuvring the crane bridge through the 2.5 m wide and 2 m high cavern approach was precision work. It was even necessary to dismantle several parts of the mobile crane required for erection before it could be moved into the gallery. But it was a tight fit in the underground machine room too: the mobile crane was wedged in

between the outside walls and the 40 m deep construction pit. The old crane and an erection crane which was also installed further restricted mobility.

Result

And yet everything went to plan. After only a week, the modification was completed, the supply cables laid and the customer's acceptance test passed without any problems. Now the old and the new crane work in tandem on the existing crane runway. The "newcomer" has stood the test to the full: in the following months it was used to erect the new hydroelectric plant and to transport building materials to and from the construction pit. Since construction was completed in 2007 the crane has been used for inspection work on the new turbine, an application demanding maximum precision and availability. During the short period in which the plant is taken offline and the heavy turbine lifted, dismantled, tested and finally reassembled, everything is extremely hectic: specialists work under intense pressure and all the while the clock is ticking, as every minute of downtime costs hard cash. In a situation such as this the hoisting technology must function perfectly and a replacement be on the spot immediately in an emergency. Hoists from STAHL CraneSystems have always stood the test in this type of application and the new system too has worked well since its installation. The STAHL CraneSystems and Amacher Technik teams can congratulate themselves on another successful off-standard project in a Swiss power station – it will surely not be the last.