



The crane systems in the machine cavern of hydropower station Linth-Limmern are being put into operation.

photo credits: Gersag Krantechnik AG

AIMING HIGH INSIDE THE MOUNTAIN: 'CONSTRUCTION SITE OF THE CENTURY' AT LINTH-LIMMERN

The Linth-Limmern power plant complex comprises the three power plants of Muttsch, Tierfehd and Linthal. With construction work to boost the output of the Linth-Limmern facilities from 480 MW to 1,480 MW, the Swiss energy sector's largest construction project was brought to a successful completion. The plant's output is now equivalent to that of nuclear power plant Leibstadt or the Cleuson-Dixence hydropower facility.

Overall, planning and construction took around ten years to complete. The new underground pumped-storage plant is designed to pump the water from the Limmernsee back into the Muttsch some 630 above it. Pumped-storage power stations like this one not only generate energy; during off-peak times,

they also convert surplus electricity into valuable peak energy. The plant's construction was a logistic feat of genius. Far more than 3,000 workers from numerous engineering and construction firms, suppliers and specialists were kept busy in high mountain regions, as well as underground and in the valley area at Tierfehd.

BRIDGE CRANES SUPPORTING CONSTRUCTION LOGISTICS UNDERGROUND

Among other things, bridge cranes and ceiling travelling cranes were required during the construction phase to support on-site logistics. Lucerne-based crane manufacturer Gersag provided seven crane systems to five sites. Four double-girder ceiling travelling cranes were installed at the central control cavern; three further cranes were fitted to serve the smoke extraction shaft, the concrete preparation site and the workshop. The project involved various challenges in terms of logistics, installation and engineering.

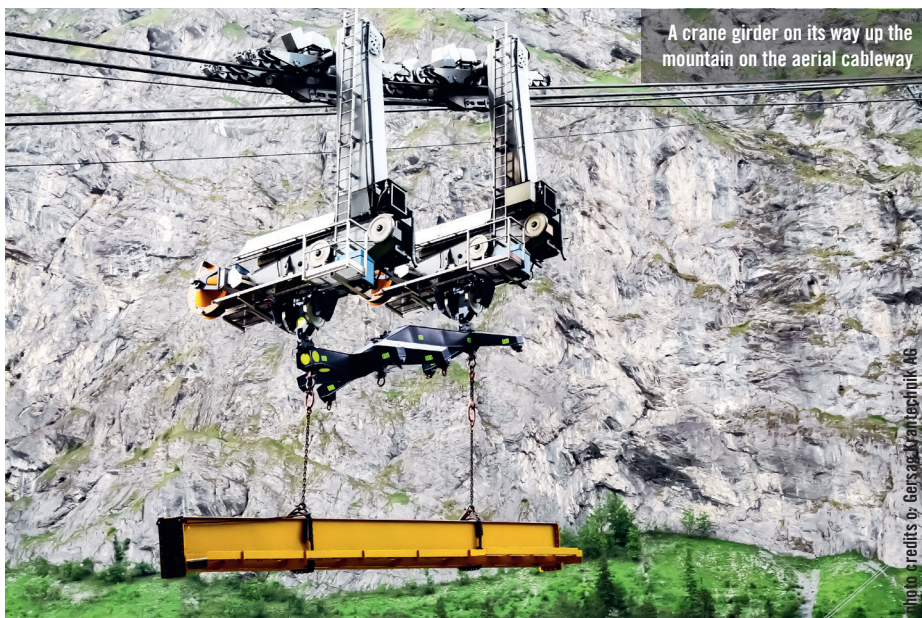
CONSTRUCTION SITE TRANSPORTATION VIA AERIAL CABLEWAY

The central control cavern was fitted with four double-girder ceiling travelling cranes. Located 1,700 m above sea level, the cavern forms the central part of the new power station.



Installing the crane bridge

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on. All crane components were delivered from Tierfehd (800 m above sea level) to Kalktrittli (1,850 m above sea level) via an aerial cableway. From Kalktrittli the equipment was then hauled to the installation site with special vehicles. Transporting the components this way posed a series of challenges to Gersag. The cableway is designed only for actual loads of up to 25 tonnes and lengths of up to 15 metres. To ensure that the components could be transported safely, the crane manufacturer had to construct various multi-part crane bridges. As a result, four crane bridges (with spans of 22 m) for the two double-girder ceiling travelling cranes were built from three parts, while the bridges for the double-girder gantry crane (with a 16.24 m span) for concrete preparation site were constructed from two parts. Two wheeled loaders then hauled the long parts through the uneven tunnel to the installation site, with the parts being secured to the frontshovel of a bi-directional wheeled loader by means of lashing straps.

INSTALLATION INTERRUPTIONS DUE TO PIT BLASTING WORK

Despite careful planning and preparatory work, installing the cranes turned out to be quite a challenge. 72 support plates were cemented in already during the excavation phase in preparation for the later installation of the crane runway. However, subsequent work to secure the crane runway to the cavern vault and for the installation of the crane bridge was interrupted repeatedly by blasting work. This meant that the installation of sensitive parts such as travel motors, switch control boxes or power supply lines had to be delayed accordingly. This way, possible damage by falling rocks could be avoided.

COMPLEXITY IN ENGINEERING

It was already clear during the planning stage that the cavern ceiling would give way by up to 6 cm due to the extensive height (up to 50 m). To counterbalance this uncertainty, Gersag had constructed a 'floating' trolley, which allows the span to be adjusted by 10 cm either way.

NO CHALLENGE TOO GREAT

Gersag crane technology is able to prevail in challenging situations, thanks to the firm's meticulous approach and unique ideas: qualities that allow the crane manufacturer to serve an extensive customer base in the energy and hydropower sectors. Projects are implemented in-house all the way, from planning to production, installation and transport. This allows the crane manufacturer to guarantee smooth project processes and a high level of quality to

boot. Especially hydropower plants are often constructed in mountainous areas, where delivery routes for special transports are particularly challenging. In some cases, narrow adits or the need to transport parts by aerial cableway add to the challenges. As a result, smooth collaboration between the project leader and experienced operators is key. If nothing else, the sensitive environment inside the power station is a frequent issue to be dealt with. Cranes often have to be mounted and unmounted above running machines or expensive turbines while ensuring the uninterrupted operation of at least one crane. Working conditions like these require diligent qualified engineers with lots of experience, as a Gersag representative explains.

"SWISS MADE" INTO THE FUTURE

Gersag prefers to keep its manufacturing base in Switzerland. Doing so gives the firm great leverage in meeting individual requirements and staying close to its customers. Thanks to this high level of customer proximity, requirements can be met more quickly, and project implementation is less complicated. Switzerland as a production location is publicly funded, which allows Gersag to build a new production hall at its facilities in Reiden, thereby expanding its production space by around 3,300 square metres. With this enlarged production capacity, the course is set for more efficient workflows and digitalised manufacturing. As a result, Gersag is supporting Switzerland as a production location while promoting job security. All of this is made possible by the winning formula of combined quality, innovation and automation.

For further details visit www.gersag-kran.ch

