

## Production, installation and commissioning of two 380kV underground lines for the Pump-Storage Plant project of Linth Limmern (Swiss Alps)

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Axpo (a Swiss DSO) is currently completing a 1GW Pump Storage Plant project in the central Swiss Alps, in the region of the Limmern lake. This plant will work between the 50 year old Limmern dam at 1850 meter of altitude (480MW installed) and a natural lake (Muttsee) at 2470 meter. The underground power plant will be connected to the grid via two 380kV underground feeders and our team is in charge of the fabrication, the installation in the tunnels and the commissioning of these two lines.

The different challenges of the project lie in the fact that the 380kV-1600mm<sup>2</sup> copper cables are installed in a cable-car tunnel, exhibiting a stiff incline (25%), with very little room (1.2 meter wide) for the 420kV joint installation.

This paper will describe the techniques developed for the cable laying, including the design of a specific laying system, the jointer training for the 420kV junction preparation in such a confined environment, and the required work organization able to keep the project timing on track while the cable car was running at full capacity for the material transportation.

Another difficulty was to guarantee the clamping of the cables in such an incline; a specific solution which had to be developed, tested in thermal cycles and validated in our labs will also be described in this paper.



Fig.1a Loading of the laying bench on the cable car lorry



Fig.1b 380kV cable installation in the tunnel