Customer Success Story

HITACHI
Inspire the Next

Grid Automation Systems

San Bernardino road tunnel 50 kV and 16 kV installations, secondary engineering

Hitachi Energy

In 1967 the 6.6 kilometer long San Bernardino tunnel was opened in the canton of Grisons (Graubünden) between the villages of Hinterrhein and San Bernardino. For the first time this tunnel provided a year-round connection between the southern Grisons valleys of Misox and Calanca with Chur. As part of the national road N 13 - A 13 today - it also connects Eastern Switzerland to the southern side of the Alps and Ticino and is also used, among other things, as the alternative route for the Gotthard tunnel.

Project

Due to the age of the San Bernardino tunnel and the sharp increase in traffic volume, the renovation of the tunnel was inevitable. Among other things, the renovation of the electromechanical equipment and the power supply was also planned, wherein the secondary technology was also considered. For the maintenance of the tunnel operation, the following indoor installations of the substations listed below have been replaced:

- Hinterrhein substation
- Aria power station
- Sasso power station
- San Bernardino substation

The power for the San Bernardino tunnel and all associated crossways, escape tunnels and ancillary structures is supplied by the feeds from the 50 kV network of the KHR (Kraftwerke Hinterrhein AG) as well as from the 50kV network of the OIM (Officine Idroelettriche di Mesolcina SA).

Hitachi Energy solution

The feeds from the networks of the power stations involved are designed in such a way that two independent connections lead to the two independent substations. These connections enable the supply of the transformer substations for the tunnel supply from both sides of the tunnel.

The network control centers of the network operators KHR and OIM are connected to the respective systems via gateways. Thus, all systems can be remotely controlled and monitored. Additional „remote workstations“ at KHR and OIM enable the operating personnel to remotely access system data, SOE recorder data files and configuration data of all devices.
The part of Hitachi Energy includes two station control and instrumentation systems based on MicroSCADA Pro (respectively for the KHR northern network and the OIM southern network), as well as control and protection devices from the Relion family. REx670 devices were installed at the gas-insulated 50kV switchgear. The medium-voltage part is controlled and at the same time protected mainly by REF630 devices and partly by REx670 devices.

The independent station control and instrumentation systems exchange information that have been precisely defined by the owners and plant operators during the project phase. Safe operation can be ensured through the exchange of data between the systems of Hinterrhein substation and San Bernardino substation. As requested, the Aria and Sasso systems and the 16kV system part are recorded and presented from the San Bernardino substation on the station control and instrumentation system of Hinterrhein.

Hinterrhein substation

Transformer stations of the Southern ramp

San Bernardino substation

On the control and instrumentation system of the southern network, transformer stations of the south ramp were implemented, so that a picture of the overall situation is available for the network operator at any time.

The instrumentation and control as well as protection systems of the station were designed on the basis of IEC 61850. The great benefit lies in the consistency of the data for the entire system, re-usability of the configuration settings in IED- and system upgrades, maintainability, extensibility, and in the long-term stability. The IEC 61850-compliant communication comprises on one side the vertical communication between field device and station control and instrumentation system, and on the other the horizontal communication from field device to the field device. This additionally supports the entire integration of IEC 61850-compliant products from different manufacturers. The delivery of the cabinets and subsequent commissioning for the northern network began in February 2011. For the south network, these started in April 2011.

Hitachi Energy scope of supply

Supply of protection and control cabinets with Relion devices

Customer feedback

The final handover to our customers, the Civil Engineering Office of Grisons, took place at the end of August 2012 to the complete satisfaction of the customer.

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