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On-site AC testing and PD measurement of 345 kV/2500 mm² XLPE cable systems for bulk power transmission

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Beginning of 2001 ABB Energiekabel, Germany has taken over a new challenge more than 10.000 km away from home:

Taiwan's first EHV underground cables turnkey project consists of eight 345 kV XLPE cable systems. The cable system shows prefabricated joints leading to very short installation period. According to the contract the total delivery was divided in two equal stages to provide the bulk power transmission for the extra-high-voltage power grid.

The total scope describes 62 km of 345 kV/2500 mm² XLPE cables, 122 pieces prefabricated joints and 48 pieces of terminations and includes cable laying and assembly of accessories.

Due to the turnkey contract, the cable supplier was also requested to provide and install all necessary steel works, a differential protection system (DPS), and a temperature monitoring system (DTS) for the cable system.

To ensure the quality of the installation of the XLPE cable systems an on-site AC test including a partial discharge (PD) measurement was performed. The on-site AC test was carried out by means of a mobile resonant testing set-up which was able for both, to generate the testing voltage of 250 kV and to deliver the needed power. All accessories showed integrated PD sensors which made an easy PD measurement possible.

A new PD measuring and analysing technique was able to reduce the external noise level to 1 - 2 pC for the joints during PD testing even under on-site testing conditions. This was possible by selection of the frequency range with a low noise level which was used for PD-measurement.

During the on-site after installation test one of 60 joints (at stage 1) showed partial discharges. Within 24 hours this joint was reinstalled and successfully AC - tested without partial discharges detected from the joint.

The first stage was handed over in time after a total accessory installation time of 90 days in April 2002. The second stage is being installed at the moment. Commissioning is planned for March 2003.