Abstract

In 1997, ABB and GEAB agreed to install the world's first HVDC Light cable system. The transmission, rated 50 MW at 80 kV dc, includes a bipolar 72 km extruded HVDC cable link. The successful introduction of the extruded HVDC cables system is the outcome of a comprehensive development program. Space charge accumulation, resistivity and electrical breakdown strength were identified as the most important material properties when selecting the insulation system of the cable. The selected peroxide crosslinkable material gives cables with high mechanical strength, high flexibility and low weight. Extruded HVDC cable systems in bipolar configuration have both technical and environmental advantages. The cables are small yet robust and can be installed by ploughing, giving only minor impact and making the installation fast and economical.

New types of dc accessories have also been developed. This research has mainly focused on understanding the high stress interface phenomena between the materials. Tape moulded joints as well as prefabricated EPDM joints have been developed, together with prefabricated polymeric terminations with resistive control of the dc electrical field.

The extruded cable system has been introduced on the market together with new transistor based converters in the HVDC Light concept. The first commercial installation was made on the Swedish island of Gotland during 1998 and 1999.

With the HVDC Light concept, dc links can now also be employed for smaller transmission demands such as the 50 MW Gotland link. The extruded cables can however be used for higher power demands. Today 150 kV cables are available, and the present target is set at 600 kV.