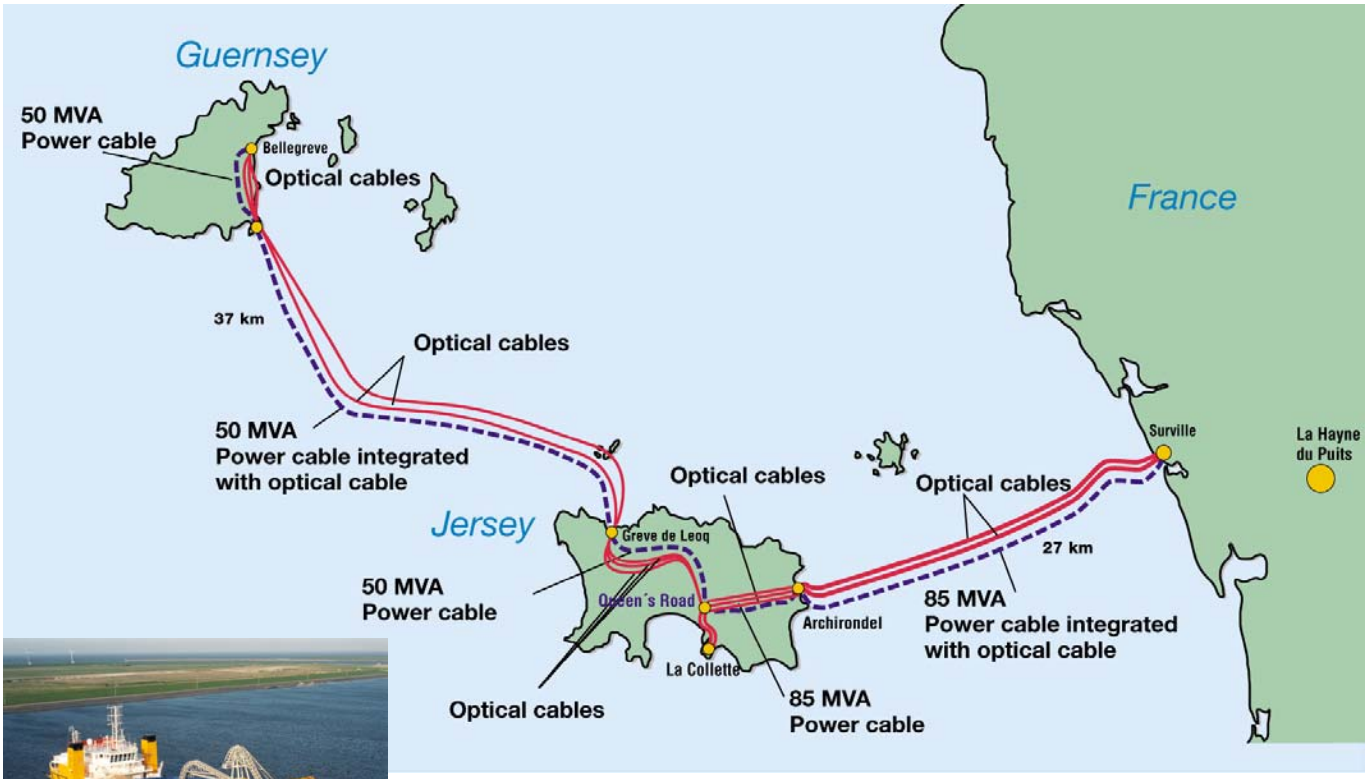
Submarine Cable Link

Channel Islands Electricity Grid Project



Cable data power cables

Voltage	90 kV AC	
Power	85 MVA and 50 MVA	
Insulation	XLPE	
Length	Submarine cable	Land cable
	64 km	24 km
Conductor	3 x 300 mm^2 Cu	1 x 500 mm^2 Cu
	3 x 240 mm^2 Cu	1 x 240 mm^2 Cu
Weight	81 kg/m	8,7 kg/m
	77 kg/m	12 kg/m
Customer	Channel Islands Electricity Grid (CIEG)	
Year	1998 - 2000	

Project content

XLPE cable and accessories
Fibre optic cables
System study
Cable system design
Project management
Installation (on land and at sea)
Network control

History

The British island of Jersey in the English Channel has since the mid 1980's been electrically connected to France by a submarine cable. This cable is a paper insulated oil impregnated cable made by a European competitor. During the past few years however, the cable has had serious problems with oil leakages. A cable leaking oil is neither reliable from a service point of view nor is it environmentally friendly. This was one of the main reasons for the Channel Islands Electricity Grid (CIEG) to decide to invest in a new cable interconnection. An increased power demand on the island, environmental aspects in general (e.g. back up generation on the island is by diesel generators) and the possibility to select the most cost effective power resource were factors also supporting the decision.

The other of the two Channel islands, Guernsey, had previously never been connected to another grid. They have all along been dependent on its own diesel generators and gas turbines.

Based on the previous problems with the oil filled cable, the client was looking for a new cable technology That was why ABB came into the picture. We have a long experience and a successful history of XLPE insulated power cables. This is a cable type with a "dry" insulation. It does not contain any oil and is thus very environmental friendly. ABB did already 1972 install an 84 kV XLPE submarine cable between Sweden and the Finnish island of Åland. This cable has served it purpose very well and during all years no electrical failure has occurred. Based on this background and in combination with the composed ABB knowledge in the electric field and bounded to an attractive tender ABB won the CIEG project.
The project was a complete turn-key project with several ABB companies involved. The scope included system studies, surveying as well as the manufacturing and supply of cables, substations and network control systems.

Location

Jersey and Guernsey are the two main islands in channel between England and France. They belong to the UK, but both have a certain degree of independence. They are especially known for their banking business. Due to their global contacts the banks have extreme severe requirements regarding the access and reliability of the fibre optic links. In addition of a great number of high-capacity DWM fibres the requirement was triple redundancy in cables.

Installation of cables in this area is rather difficult. There is a risk for cable damage from extensive fishing, ship traffic, heavy water current in rocky area and extensive tide (up to 14 meters).

The cable system

The cable system connects the two islands to the French Grid by 90 kV cables. The system also includes a powerful fibre optic link. The submarine cables were supplied in continuous lengths. Before laying–up of the cable the production lengths were jointed by moulded joints, with features identical to the cable itself. The underground cables were jointed by pre-moulded joints at site. The power cables were terminated both in GIS stations and by open type terminations.

Jersey-France

This cable route is 28 km. The power cable has 3 x 300 sqmm copper conductor with 15,5 mm thick XLPE insulation. In addition to a lead sheath, protected by a PE jacket, both the conductor and the core are water-sealed. A fibre optic cable is integrated in the power cable containing 24 high-capacity fibres. Due to the tough surrounding conditions the power submarine cable is provided with a double 7 mm galvanised steel wire armour. The outer layer is a so called "rock armour". Two fibre optic cables are laid in parallel to the power cable, each provided with 48 high-capacity DWM fibres and galvanised triple steel wire armour. The outer serving of the submarine cables consist of bitumen-bonded polypropylene yarn.

Jersey – Guernsey

The cable route here is 37 km. The power cable has 3 x 240 sqmm copper conductor with 17 mm thick XLPE insulation. In addition to a lead sheath, protected by a PE jacket, both the conductor and the core are water-sealed. A fibre optic cable is integrated in the power cable containing 24 high-capacity DWM fibres. Due to the tough surrounding conditions the power submarine cable is provided with a double 7 mm galvanised steel wire armour. The outer layer is a so called "rock armour". Two fibre optic cables are laid in parallel to the power cable, each provided with 48 high-capacity DWM fibres and galvanised triple steel wire armour. The outer serving of the submarine cables consist of bitumen-bonded polypropylene yarn.

Underground cables

The underground power cables on the islands are single core cables and laid in a trefoil formation. The cross section is 240 and 500 sqmm to fit the transmission requirements. The fibre optic cables are land-adopted types pulled into PE ducts.

Installation

The submarine cables were laid by the purpose built cable laying-vessel CLV Sea Spider. The transport and laying was divided into two campaigns. The cables were loaded directly onto the laying vessel in the deep-sea harbour of our Karlskrona cable plant. The power cable was stored on the turntable in the laying vessel, the fibre optic cables were stored in two separate coils onboard the vessel.
The power cable and the fibre optic cables were laid in separate runs. The two fibre optic cables were bunched together and laid along the same route as the power cables but at a 30 meters pacing.

Land cables were transported on drums and laid into open-cut trenches. Due to traffic problems we had to build joint pits about every 400 m. Ducts for the fibre optic cable were laid together with the power cables. After back filling the fibre optic cables were blown into the pipes and jointed every 2 to 3 km. The power cables were jointed by pre-moulded joints.

Commissioning

By September 2000 all cables had successfully been laid and installed. Commissioning tests have been successfully performed together with the other ABB companies involved. The entire cable system was timely handed over to the client for commercial operation in November 2000. With the CIEG project ABB has once more proven its capability to upgrade complex cable systems and to achieve environmentally sound solutions for our clients.

BU Cables

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