

Submarine Cable Link

Grand Cayman Islands



Cable data power cables

Voltage	69 kV AC	
Power	75 MVA	
Insulation	XLPE	
Armour	Galvanised steel	
Length	Submarine cables	Land cable
	23 km	12,2 km
Conductor	3 x 500 mm ² Cu	1 x 630 mm ² Cu
Weight	48 kg/m	13 kg/m
Customer	Caribbean Utilities Company Ltd	
Year	1999 - 2001	

Project content

XLPE cables
Cable accessories
Integrated Fibre optic cable
Cable design
Installation
Installation management

History

Grand Cayman Islands is an old British colony, with an attractive climate and a flourishing tourism business. The electricity demand has rapidly increased during the last years due to the increase in the tourism industry, with new hotels and vacation resorts being the prime users.

ABB Power T&D was awarded a 7 year Alliance Agreement with the Caribbean Utilities Company (CUC) in 1999, for the upgrading of the electric grid. ABB received the contract to supply submarine cables over North Sound as part of the grid upgrade. The purpose of installing this submarine link is to form a loop of existing and new 69 kV cables and over head lines.

CUC decided to invest in the cable connection in order to achieve a loop feeding on the island. From an environmental point of view cables are also an attractive solution, as they do not disturb the view of the scenery. Furthermore, they will not be damaged by hurricanes, frequent as they are in this part of the World, nor will they be affected by salt and pollution.

The cable type chosen is XLPE insulated, and is laid directly on the seabed of North Sound, which is an environmentally sensitive area with coral reefs. Subsequently, oil-filled cables could never be considered due to the environmental risks should the cables be damaged. This is a cable type with "dry" insulation. It does not contain any oil and thus fulfils the highest environmental standards.

ABB has a long experience and a successful history of producing XLPE insulated power cables, and installing complete XLPE cable systems, both on land and at sea. Already in 1972 ABB installed an 84 kV XLPE submarine cable between Sweden and the Finnish island of Åland. This cable has served its purpose very well and during its lifetime no electrical failure has occurred.

The project is a complete turn-key project for ABB. Subcontractors are involved: for survey and environmental reports, PBS&J, for local civil works Hadsphaltic, and for the marine activities Van der Stoel, Netherlands.

The scope also included system studies, surveying, manufacturing, supply of cables and accessories and installation.

The cable system

The 3x 500 sqmm, 69 kV three core cable is quite heavy, 48 kg/m and will rest well on the sea bed where it is laid directly on the hard bottom. It will sink into the mud at soft locations along the route by its own weight.

Each core in the power cable has its own lead sheath to form a radial water barrier. The longitudinal water sealing is achieved by swelling tape under the lead sheath and compound in the conductor. The cable has a strong mechanical protection. One layer of 5mm galvanised steel wires and a "slip" armour consisting of two layers of galvanised steel tape. Top serving is made of two layers of bitumen bonded polypropylene yarn, which gives a "slippery" cable to prevent sharp edges from penetrating between armour wires.

The submarine power cable, supplied in two continuous lengths, has a powerful integrated fibre optic cable link consisting of 48 single mode fibres.

So as not to reduce the transmission capacity of the cable system, the submarine cables are jointed to bigger land cables right at the shore. Connection between submarine and land cables is done by pre-moulded transition joints. The power cables are terminated at both ends by open type terminations.

The cable system is connected to the generating station at George Town and is connected by about two 12 km long branches to the overhead lines at Morgans Harbour and Rum Point. Thereby forming a loop feeding to the island.

Underground cables

The underground power cable is single core type with copper screen and a PE outer sheath, with a cross section of 630 sqmm to suit the transmission capacity of the submarine cables. They are laid in a trefoil formation in ducts. The fibre optic cables are land-adopted types pulled into PE ducts.

Installation

The North Sound is a rather shallow water, 2 to 6 m deep along the cable routes. This means that no cable-laying vessel can enter into North Sound. The cable is brought to Cayman by an ocean going vessel. Then it is coiled on to a locally assembled pontoon, which is pulled into the North Sound by a shallow draft tug. Then the cable is laid from the pontoon, which is moored along the cable route in a controlled way.

The land approaches will be prepared in advance. Pipes laid into shallow trenches and covered by grout bags, which are linked to each other by steel rods to strengthen the mechanical protection. Special attention will be paid to the environmental aspects. In selection of the cable routes all areas with sensitive corals were avoided.

Commissioning

After installation the cables have successfully been tested by high voltage DC. Commissioning is planned for early 2002, when remaining parts of the circuit elements are completed. Once the cable is in service Cayman Island has taken one step further in its process to safeguard the increased demand of electricity on the island.

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