HV Cable Transmission Systems

High voltage cable transmission systems are chosen increasingly often for transmission of electrical energy, both for onshore and offshore transmission applications. The drivers behind this development differs in the different sectors. In the oil and gas industry the primary driver is reduction of carbon emissions by energising oil and gas installations from the onshore electrical power system. Onshore the typical driver is environmental aspects and public resistance towards overhead lines. Further, the offshore wind industry use high voltage power cable systems to a large scale for transmitting the generated electrical power to shore. In addition to the above, high voltage cable systems are typically used for bulk power transfer between countries.

Common to all these different applications is the need to do in-depth electrical power systems studies to assess the impact of introducing power cables in the network. The different aspects to consider in AC networks is well described in Cigré technical brochure no 556 *Power system technical performance issues related to the application of long HVAC cable.* Unitech Power Systems have extensive in-house expertise and calculations tools to consider all relevant aspects.

To engineer and design power cable systems it is necessary to take into account electrical, mechanical and environmental factors. In case of single core AC cable systems, there is a well established set of international standards and recommendations governing the design and testing. It is, however, important to be aware that the majority of these standards have primarily been written for land cable systems, and can therefore in some cases have limited application or validity for submarine cable systems. For example, in case of large 3-core submarine power cables, using the international standards to compute the electrical characteristics of the cable will for some parameters produce inaccurate values. Such an inaccuracy can have a significant effect on the ability to predict system characteristics and unexpected situations can results.

The resulting power cable design is also influenced by limitations of the different manufacturing processes, and therefore in-depth knowledge is required to finalise the design.

Assuring acceptable quality of the manufactured power cables is of crucial importance. The quality is controlled by performing different tests during the manufacture of the cable as well as a set of tests after the manufacture is completed. In most cases a minimum level of testing is defined in international standards and recommendations. Again these standards are primarily written for land cable applications and may not be equally applicable to submarine cable systems.

Installation of power cable systems is a complicated operation both on land and offshore. Particularly for installation of submarine power cables there is a high number of different campaigns required. Typically an installation sequence will involve pre-lay survey, route clearance, pre-lay rock placement, cable laying, post-lay burial and protection. The installation operation has inherent high risk. Combined with being capital intensive, the operation must be carefully engineered, planned and executed.

Within the competence area of high voltage cable transmission systems Unitech Power Systems can offer extensive experience in engineering, design, manufacture, testing, installation and commissioning of high voltage AC and DC cable systems, as well as in-depth analysis of the electrical power system characteristics. Additionally, Unitech can offer wide contractual and managerial expertise within the competence area.

Contact us for more information and to discuss how we can serve your needs.

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UNITECH POWER SYSTEMS

HV Cable Transmission Systems

Services

HV Cable Transmssion Systems				
Engineering and design of HV AC power cables	Engineering and design of HV DC power cables	Technology assessments	Transmission solutions	Management consulting

Selected project references

Year: 2014 - 2015
Customer: Statnett

North Sea Link HVDC Interconnector (Norway – UK)

Participation in the technical and commercial bid clarification and evaluation for the world's longest 525 kV HVDC cable system.

Year: 2015 -
Customer: Statnett

North Sea Link HVDC Interconnector (Norway – UK)

Senior project manager with overall technical and commercial responsibility for cable contracts. The cable contracts includes EPCI delivery of approximately 1440 km of 525 kV mass impregnated DC cable.

Year: 2013-2014
Customer: Statnett

420 kV AC cable connection, system studies and design of cable system

Technical considerations of replacing a section of 420 kV overhead line by 420 kV cable. Considerations involved dimensioning of 420 kV HVAC cable and assessment of over-voltages, including effect of lightning strikes (PSCAD analysis).

Year: 2013-2014
Customer: Total

Martin Linge, Assessment and review of documents

Support Total in the assessment and review of the documents from the cable contractor.

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