Y-shaped joint for EHV submarine cable

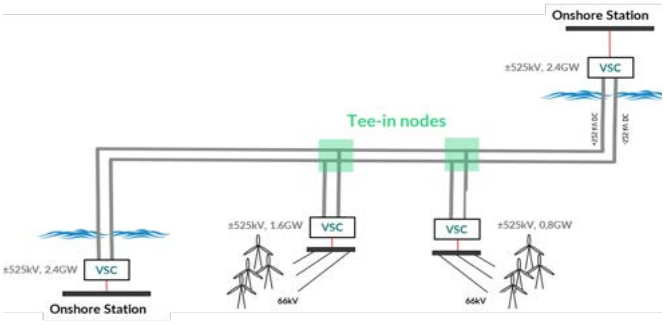
Enabling a connection between three XLPE submarine cables

CONTEXT

Meshed HVDC networks, and in particular the integration of large offshore renewable sources into the grid, requires companies to mutualise assets in order to reduce the Levelised Cost of Energy (LCOE) and the Total Cost of Ownership (TCO).

When a large power corridor (eg. interconnection) is too far from the offshore wind farm substation, a dedicated tee-in node is required to join the cables.

In deep seas, such a node can be very expensive if implemented on a platform. When disconnection capabilities are not required, a passive Tee-in joint can be implemented. The following invention describes a possible solution for extruded cables rated between 320 and 600kV DC.



APPLICATION DOMAIN

Mutiterminal HVDC grids
Submarine cable
Extruded insulation

ADVANTAGES

- Fast jointing procedure
- Longterm and reliable dielectric jointing

TRL SCALE

1 2 **3** 4 5 6 7 8 9

Concept validated in multiphysic analysis

DELIVERABLES

First level design CAD
Numerical electrothermal model (COMSOL)
Concept proposal report (.docx)
Patent FR-16 59962

TECHNOLOGY DESCRIPTION

In the present solution the dielectric design leverages the Premolded Joint (PMJ) principle that already exists in extruded cables. The insulation system is composed of a branch insulated electrode and three PMJs.

The electrical contact between the cable conductors and the branch electrode is ensured via soldering or a compression ferrule. Spare place up to PMJ's inner diameter is filled with conductive material, typically an electrode, assembled from two halves. A PMJ which was inserted and momentary parked is positioned on each electrode to ensure the continuity of the insulation systems.

In order to keep the cable completely watertight, a lead sleeve covers each core joint. The sleeve comes as a lead sheet, which is draped around the core joints, and soldered longitudinally. The sleeves are plumbed to the lead sheaths of the cable cores and branch electrode. The branch electrode water barrier is assembled by soldering two lead shells longitudinally.

The whole assembly is housed in a rigid outer casing for mechanical and corrosion protection. The armour is classically terminated to the outer casing using armouring clamping blocks. The outer casing is then filled with bitumen for corrosion protection.