Key technical research on submarine optic fiber and power composite cable with long length, three cores & high voltage

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There are many differences between high voltage (with long length & three cores) and low/middle voltage of submarine optic fiber and power composite cable on the production technology and testing aspects. This article focuses on the key technical research of long length, high voltage submarine composite cable. E.g. extrusion technology, power cores and optic fiber cores assembly, optic fiber cable protection, main performance tests, etc.

1 Summary

1.1 Application scope of product: The product is mainly used high capacity supply network between the main land and island; near offshore oil exploration, platforms group supply network; offshore wind power generation transmitting to the mainland.

1.2 Advantage of three cores comparing to the single core cable: Save the submarine route resources, very low electromagnetic consume, low cost for the fabrication and maintenance.

1.3 Manufacturing background: The first offshore wind power of China south power grid—Zhuhai Guishan offshore wind power demonstration project started in March of 2013. Electric energy generated by offshore wind turbine, was transmitted to the mainland through two runs (20 km for each run), three cores, 110kV submarine composite cable. At the same time, the optic fiber cable was used to complete the communication, control equipment and monitor the running status of submarine composite cable.

2 Key technical research

2.1 Conductor water blocking technology research for high voltage submarine power cable: The conductor water blocking (semi-conductive water blocking compound is filled inside and wrapping the water blocking tape over the conductor) performance has been verified by the production experience, lots of test researches to make sure the shorter repair length after the submarine cable damaged.

2.2 Insulation production technology for the long length submarine cable: The insulation continuous length of high voltage cable has been extended, Quantity of factory joint has been reduced, the stability of the cable has been improved through improving the production die, adjust the insulation extrusion temperature and filter net arrangement.

2.3 Research on the assembly, armoring technology: The structure after assembly has been stabilized and the optic fiber cable has also been protected well through the research on rotating tank vertical assembly line, assembly pitch, filling type, etc.

3 Tests for long length and completed submarine cable

In order to complete the AC high voltage test, the capacity of test equipment will be very big especially for the long length and high voltage submarine cable. This paragraph will mainly introduce the frequency conversion series resonance test equipment is used to do the routine test and factory acceptance test and also the configuration of the test equipment and calculation method will be introduced.

4 Conclusion

Construction design, equipment chose, production technology and reasonability of test method of long length submarine composite cable have been verified by the fabrication and tests of 40 km (two runs) submarine cable.The proposal for the long length submarine fabrication has also been recommended.