PERFORMANCE ANALYSIS OF OPTICAL FIBER COMPOSITE LOW-VOLTAGE CABLE

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ABSTRACT

Optical fiber composite low-voltage cables (OPLC), as a new type of optoelectric composite cables, are used in access network for electric power telecommunication and installed with low-voltage line, with functions of power cable and communication cable. Access net is an important port to communications users, and the synchronization features of electricity is innovation of OPLC, which promoting the integration of electrical energy and information sharing, avoiding resources costs, meeting the development concept of saving social.

By investigation， it's found the former optoelectric composite cables were used usually in submarine cable and it's blank space in access network. Accordingly, there is no criterion and testing data.

To OPLC can meet the require of engineering, firstly, we did a lot of research about key technology and test on developing products, summarized a series of universal laws and requirements, established a comprehensive testing programmers and the inspection standard system.

In this course of work, firstly, we considered the special of the operation and using, research of OPLC design and manufacturing, experience of many kinds of power cables and communication cables, access net optic cables and optical fiber composite cables. Secondly, we did a lot of testing research to manufactured and improved products in mechanical, optical, electrical and environmental performance. Finally, we found there is very serious impact effects among the cores unit and optical unit as a result of intertwist, which lead to its mechanical, optical and environmental properties have difference from power cable and access optical cable. These test data provided reliable reference for performance index and test method of OPLC standard.

In this paper, it drew conclusion about configuration design, technical index and method, package and carriage of OPLC by testing and analysis on OPLC with different type, different material, different structure, which are research base to optimization, application and performance characteristics analysis of OPLC.

KEYWORDS

Optical fiber composite low-voltage cable; OPLC; optical unit; technical index; test method; mechanical property; optical property; electrical property; environmental property.

INTRODUCTION

State Grid Corporation of China announced a developing plan to establish consolidating smart grid at middle conference 2009. PFTTH (power fiber to the home) is one of the most outstanding content in smart grid.

Firstly, PFTTH can save about 10 thousands million yuan in the direct cost of the basic project of information and telecommunication.

Secondly, PFTTH can meet the needs of intelligence and information itself to select the electronic information and establish the power service system.

Thirdly, PFTTH is good to establish the public telecommunication service plat and fair competition environment.

Finally, FFTTH can supply not only electronics, but also a G-bit WB resource for every user.

For the technology of PFTTH, it's important not only web technology, but also the optical fibre cable as the transmission path. In China, the electric power system communication web is constructed In the core-network upper 35kV, the ADSS and OPGW are used widely, the technology is almost mature.

In the middle-voltage network, the ADSS and optical fibre cable for communication are used widely, the technology is almost mature too. Meanwhile, OPPC is expected to use widely.

In the low-voltage access network, 380V and 220V, the OPLC will be used widely.

The use of the OPLC provides the possibility to the combine between electric power and telecommunication.

2 OPTICAL FIBER COMPOSITED LOW-VOLTAGE CABLE

Optical fiber composited low-voltage cable is a kind of cable composited by optical fiber unit and insulation core, with ability of transmission electronic energy and optical communication, used in electric project under 1kV. It is lay in the distribution of electricity, resolving these problems about construction period longer and cost expensively, providing the service of WB access and electricity and signal transmission. As all known , the access is the important port to telecommunication and user. It accelerates the process of synchronous access about electricity power and information.