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**Code for engineering design of optical fiber submarine cable
systems**

海底光缆工程设计规范

(English Translation)

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1 General

1.0.1

In order to unify and standardize the construction of submarine optical cable projects, so that submarine optical cable projects comply with relevant national policies, advanced technology, safe and reliable, economical and reasonable, energy-saving and environmentally friendly, this specification is formulated.

1.0.2

This specification is applicable to the engineering design of submarine optical cable lines and digital signal transmission systems of submarine optical cables and related auxiliary systems.

1.0.3

Submarine optical cable engineering design should be compared with multiple schemes, and efforts should be made to improve economic benefits and reduce project costs.

1.0.4

Submarine optical cable projects should be planned, jointly constructed, and resource shared to meet the requirements of building a resource-saving and environment-friendly society.

1.0.5

The equipment of submarine optical cable projects constructed in areas with seismic fortification intensity 7 and above in my country shall meet the seismic performance requirements of communication networks.

1.0.6

In addition to complying with these regulations, the engineering design of submarine optical cables shall also comply with the relevant current national standards.

2.1.1 Submarine repeater

Submarine optical signal amplification equipment composed of one or several regenerators or optical amplifiers and other related devices.

2.1.2 Repeated submarine cable system with relay submarine cable system

Submarine optical cable system using submarine optical repeater in the submarine line.

2.1.3 Repeaterless submarine cable system

Submarine optical cable transmission system without submarine optical repeater in the submarine line.

2.1.4 Beach manhole

The man well installed on the landing beach of the submarine optical cable is used to terminate the submarine optical cable and connect the land optical and cable.

2.1.5 Submarine cable landing point cable landing point

The location of the joint point between the submarine optical cable and the land optical cable is generally located on the beach manhole.

2.1.6 Submarine cable landing station cable landing station

Terminal station for submarine fiber optic cable systems. Submarine optical cable terminal equipment, monitoring equipment and remote power supply equipment can be installed in the submarine optical cable landing station.

2.1.7 Sea wall

A dyke on the coast to keep out the sea.

2.1.8 Submarine cable segment

The collection of all submarine cable system components between two adjacent submarine cable terminal equipment connected on the same pair of optical fibers.

2.1.9 Anchorage area

A special area at sea where designated ships can drop anchor.

2.1.10 Deep sea section

Submarine optical cables laid in sections with a water depth greater than 1000m.

2.1.11 Shallow sea section

Submarine optical cables laid in water depths ranging from 20m to 1000m.

2.1.12 Inshore section

The submarine optical cable laid in the section from the shore beach man's well to 20m.

2.1.13 Landing section landing section

The submarine optical cable laid in the section from the beach man's well to the water depth of 5m.

2.1.14 Remote power supply system power feeding system

A power supply system that provides power to submarine equipment using the loop formed by the conductor in the submarine optical cable and the earth.

2.1.15 Remote optical pumped EDF amplifier

A remote optical amplification system consisting of the pump source in the terminal equipment and the erbium-doped optical fiber embedded in the optical cable line at a certain distance (usually 80km to 120km) from the terminal equipment.

2.1.16 Cable route desktop study

According to the design of the topology structure of the submarine optical cable system, through the collection and analysis of existing geophysical data, marine environmental elements and marine development activities, one or more technically and economically feasible submarine optical cable routing schemes are proposed.

2.1.17 Ocean route survey route survey

Using geological sampling, geophysical surveying, on-site observation and other professional technical methods, conduct on-the-spot investigations on the routing scheme proposed by the routing pre-selection tabletop research, and determine the best routing scheme after comprehensive evaluation and comparison of the obtained data, and provide for the optical cable project. Design and construction provide scientific and technological basis.

2.1.18 Static penetration test cone penetration test

The process of pressing the conical probe into the soil at a constant speed and measuring its penetration resistance (cone head resistance, side wall friction resistance), etc.

2.1.19 Optical coherent reception optical coherent detection

In the receiving device, the local optical carrier and the same-frequency optical carrier signal are used for coherent mixing, and the phase information of the carrier signal is detected and received.

2.2 Symbols

English abbreviation English name Chinese name ASE Amplified Spontaneous Emission Amplified spontaneous emission BBER Background Block Error Ratio background error block ratio BER Bit Error Ratio bit error rate BJ Beach Joint Shore Beach Joint Box BOL Begin Of Life BU Branch Unit subsea branch unit C-OTDR Coherent Optical Time-Domain Reflectometer Coherent Optical Time Domain Reflectometer CTB Cable Terminating Box optical cable terminal box DA cable Double Armored cable double armored cable (D) BPSK (Differential) Binary Phase (differential) binary phase shift Shift Keying Keying DCC Data Communication Channel data communication channel DCN Data Communication Network Data Communication Network DGD Differential Group Delay Differential group delay DPSK Differential Phase Shift Keying Differential Phase Shift Keying (D)QPSK (Differential) Quadrature (differential) quadrature phase shift Phase Shift Keying Keying DSP Digital Signal Processing Digital Signal Processing EOL End Of Life FEC Forward Error Correction forward error correction LME Line Monitoring Equipment Line Monitoring Equipment LW cable Light Weight cable light weight cable LWP cable Light Weight Protected cable OADM