ICPC Recommendation

Recommendation No. 16

Considerations for Marking Submarine Cables

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1. INTRODUCTION

In this document, the ICPC provides its Recommendation for the marking of submarine cables. Higher level considerations are provided here rather than a set of detailed specifications. This Recommendation should form the basis of any method for marking cables and record keeping. Each cable manufacturer will likely have equipment and constraints unique to their facilities, so the detailed implementation is best left to each manufacturer. Although specific implementation methods may vary, they should still fulfil the basic requirements of this Recommendation.

Commercial issues notwithstanding, the ICPC strongly encourages submarine cable manufacturers to develop and adopt a common scheme for cable marking for the benefit of the entire industry. Similarly, submarine cable system purchasers are strongly encouraged to include cable marking as a requirement for all new cables.

2. HISTORY

SubOptic 2001 Paper T5.2.2 discussed processes and tools, including the need for cable markings, for optimizing Chromatic Dispersion during the repair. A summary of the issues was presented during the ICPC June 2002 meeting in Naples, Florida as part of the Presentation on Submarine Cable Improvement Group (SCIG) Activities. Those original works form the basis for this recommendation for which the ICPC gratefully thanks their authors.

3. RATIONALE

The requirement for cable marking is driven by the need to efficiently manage repair operations. The markings can also assist in determining that the correct cable has been recovered where cables are closely spaced.

Depending on the type of optical system, the markings should also provide a confirmation of fibre types in the recovered cable during a repair.

Note: This Recommendation is not designed to address RPL marking.

3.1. Factory Markings

New cables should be marked at the cable factory during the cable manufacturing process in an automated process with marking applied to the polyethylene core at regular intervals.

3.1.1.1. Cable ID Code

An alphanumeric cable ID code should be imprinted onto the polyethylene core to identify the cable. The alphanumeric code is referenced to a documented code key that provides the full details of number of fibres, fibre type and fibre specifications.

Manufacturers will have their own unique codes, however the ICPC strongly recommends that a common code be adopted that would allow easy identification of any cable, anywhere in the world, without reference to system specific documentation.

3.1.1.2. Reference Scale

A numeric length scale imprinted onto the polyethylene jacket should also be applied to assist in locating underlying fibre splices in lieu of hand applied tape marks. The reference length scale is also applied continuously during cable manufacture. If the cable is subsequently cut when integrated, it is expected that there will be discontinuities of the length scale at cable bodies. This will be recorded in the SLD; therefore any arbitrary starting number for applying the scale is acceptable.

3.1.1.3. Size of Lettering/Visibility

The marking should be visible with the naked eye for viewing from a distance of approx. 0.5m. The ICPC recommends a minimum size lettering of 5mm in height.

3.1.1.4. Spacing

Markings should repeat at intervals of between 1 to 5 meters.

3.1.1.5. Tolerance of Placement

The length scale should be applied with a tolerance consistent with the contract requirements. A tolerance of +/- 0.1% or better of length is desirable.

3.1.1.6. Allowable Gaps in Marking

All gaps should be recorded in the manufacturing log and identified on the cable acceptance documentation. Gaps greater than 100 m should be recorded in the system documentation.

3.1.1.7. Lifetime

Marking should last for the lifetime of the system (excluding tape markings). The markings should be insoluble in solvents used for the removal of bitumen. Tapemarkings, required for cable installation should remain during the installation time.

3.1.1.8. Abrasion Resistance

Markings should remain intact through all normal cable handling equipment used during cable loading, unloading, deployment, recovery and repair.

4. RECORD KEEPING

4.1. Traceability

Records should be kept by the manufacturer and owners that cross reference the cable ID to the optical fibre specifications including the following:

- Number of fibres in the cable
- Fibre type
- Manufacturer
- Test data.

4.2. Fibre Type Transition Location

Records should be kept by the manufacturer, owner and maintainer that cross reference the cable length reference to the locations of fibre splices between different fibre types. Particularly important is the recording of the beginning and end of bridge splice sections used in newer cable systems.

5. REFERENCES

Document Number	Title
SubOptic 2001 Paper T5.2.2 (Lonnie Hagadorn FLAG Telecom)	The Necessary Evolution of Marine Repair Processes in the DWDM Cable World
ICPC Plenary Session Naples FL, 4-6 June, 2002 (R. Rapp on behalf of SCIG)	An Update on Submarine Cable Improvement Group Activities

6. DEFINITIONS

The following words, acronyms and abbreviations are referred to in this document.

Term	Definition
DWDM	Dense Wavelength Division Multiplexing
ID	Identity
LW	Lightweight
ROV	Remotely Operated Vehicle
RPL	Route Position List
SCIG	Submarine Cable Improvement Group
SLD	Straight Line Diagram
SPA	Special Application