

Determination of 850 nm and 1 dB/km at 1300 nm, 9/125 single mode losses 0.4/0.25 dB/km at 1310/1550 nm. for insulating submarine cables for understanding variation IN high dielectric constant

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Abstract

Optical fibers are very strong, but the strength is drastically reduced by unavoidable microscopic surface flaws inherent in the manufacturing process. The initial fiber strength, as well as its change with time, must be considered relative to the stress imposed on the fiber during handling, cabling, and installation for a given set of environmental conditions. There are three basic scenarios that can lead to strength degradation and failure by inducing flaw growth: dynamic fatigue, static fatigues, and zero-stress aging.

Keywords: Fiber strength, Dynamic fatigue.

1. Introduction

Critical concern in outdoor cabling is to protect the fiber from contamination by water. This is accomplished by use of solid barriers such as copper tubes, and water-repellent jelly or water-absorbing powder surrounding the fiber.

Finally, the cable may be armored to protect it from environmental hazards, such as construction work or gnawing animals. Undersea cables are more heavily armored in their near-shore portions to protect them from boat anchors, fishing gear, and even sharks, which may be attracted to the electrical power that is carried to power amplifiers or repeaters in the cable

Typical modern multimode graded-index fibers have 3 dB/km of attenuation loss (50% loss per km) at 850 nm and 1 dB/km at 1300 nm. 9/125 single mode losses 0.4/0.25 dB/km at 1310/1550 nm. POF (plastic optical fiber) loses much more: 1 dB/m at 650 nm. Plastic optical fiber is large core (about 1mm) fiber suitable only for short, low speed networks such as within cars.

Each connection made adds about 0.6 dB of average loss and each joint (splice) adds about 0.1 dB. Depending on the transmitter power and the sensitivity of the receiver, if the total loss is too large the link will not function reliably.

Invisible IR light is used in commercial glass fiber communications because it has lower attenuation in such materials than visible light. However, the glass

fibers will transmit visible light somewhat, which is convenient for simple testing of the fibers without requiring expensive equipment. Splices can be inspected visually, and adjusted for minimal light leakage at the joint, which maximizes light transmission between the ends of the fibers being joined.

2. Power-Over-Fiber

It is a technology in which a fiber optic cable carries optical power, which is used as an energy source rather than, or as well as, carrying data. This allows a device to be remotely powered, while providing electrical isolation between the device and the power supply. Such systems can be used to protect the power supply from dangerous voltages such as from lightning, or to prevent voltage from the supply from igniting explosives.

2.1 Submarine cables across the pacific

The first trans-pacific cables were completed in 1902–03, linking the US mainland to Hawaii in 1902 and Guam to the Philippines in 1903. Canada, Australia, New Zealand and Fiji were also linked in 1902 with the trans-Pacific segment of the All Red Line. Eighty-eight years later, the North Pacific Cable system was the first regenerative (repeated) system to completely cross the Pacific from the US mainland to Japan. The US portion of NPC was manufactured in Portland, Oregon, from 1989 to 1991 at STC

Submarine Systems, and later Alcatel Submarine Networks. The system was laid by Cable & Wireless Marine on the CS Cable Venture in 1991.

Transatlantic cables of the 19th century consisted of an outer layer of iron and later steel wire, wrapping India rubber, wrapping gutta-percha, which surrounded a multi-stranded copper wire at the core. The portions closest to each shore landing had additional protective armor wires. Gutta-percha, a natural polymer similar to rubber, had nearly ideal properties for insulating submarine cables, with the exception of a rather high dielectric constant which made cable capacitance high. Gutta-percha was not replaced as cable insulation until polyethylene was introduced in the 1930s. In the 1920s, the American military experimented with rubber-insulated cables as an alternative to gutta-percha, since American interests controlled significant supplies of rubber but no gutta-percha manufacturers.

2.2 Optical Illusion

An optical illusion (also called a visual illusion) is characterized by visually perceived images that differ from objective reality. The information gathered by the eye is processed in the brain to give a perception that does not tally with a physical measurement of the stimulus source. There are three main types: literal optical illusions that create images that are different from the objects that make them, physiological illusions that are the effects of excessive stimulation of a specific type (brightness, color, size, position, tilt, movement), and cognitive illusions, the result of unconscious inferences. Pathological visual illusions arise from a pathological exaggeration in physiological visual perception mechanisms causing the aforementioned types of illusions.



Figure1: Optical color illusions

The first stage in the operations that transfer information from a visual target in front of an observer into its neural representation in the brain and then allow a percept to emerge is the imaging by the eye and the processing by the neural circuits in the retina. Some components of geometrical-optical illusions can be ascribed to aberrations at that level. Even if this does not fully account for an illusion, the step is helpful because it puts elaborate mental theories in a more secure place. The moon illusion is a good example. Before invoking concepts of apparent distance and size constancy, it helps to be sure that the retinal image hasn't changed much when the moon looks larger as it descends to the horizon.

3. Conclusions

The main point of interaction of cables with marine life is in the benthic zone of the oceans where the majority of cable lies. Recent studies (in 2003 and 2006) have indicated that cables pose minimal impacts on life in these environments. In sampling sediment cores around cables and in areas removed from cables, there were few statistically significant differences in organism diversity or abundance. The main difference was that the cables provided an attachment point for anemones that typically could not grow in soft sediment areas.

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