

A novel design for Military Communications Cable

Authors

P. Arya, A. Tanwani, M.S. Chavan, N.R. Patil, B.V.H. Rao

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Abstract

Customer applications drive the very need for newer cable designs. The development needs is influenced by application and usage of these products. This paper highlights the development of a novel design of Optical Fiber Cable specifically developed for military communications applications and foolproof protection for data hacking.



Keywords

Dual layer fiber optic cable, military cable, intruder proof cable, ribbon cable

1. Introduction

Stringent applications have always influenced the development of newer cable designs. The usage of the cables in areas as military communications makes it still more important to develop not only a foolproof solution against intruder protection but also have very high reliability and correct selection and usage of raw materials in the cables.

This study shares our developments and design of a military application dual layer ribbon optical fiber cables.

In order to design the cable the exact applications were understood with customer.

- ✓ Main considerations were
- ✓ Reduce splicing time
- ✓ Rodent resistance
- ✓ Withstand high corrosive environments (Deployment near to seashores)
- ✓ Same network can also detect Intrusion / Data hacking at various sensitive points
- ✓ Anti buckling requirements to support Riser Applications (Military Guard Points)
- ✓ Different fiber count cables for 56 F, 68 F, 86 F should have the same diameter for all hardware and other accessories uniformity

2. Cable Designs

For military communications usage the most suitable design that we found looking to the splicing time needs was that of ribbon. We decided to go with central tube designs with up to 68 F in the same dimensions tube.

We choose 12 F per ribbon due to uniformity of designs and reduced splice time during installations.

For the intrusion proofing on the same network we provided a dual layer stranding of loose tubes around the central tube comprising of ribbon fibers. We proposed 2 fibers per tubes for easy and convenient mid span access.

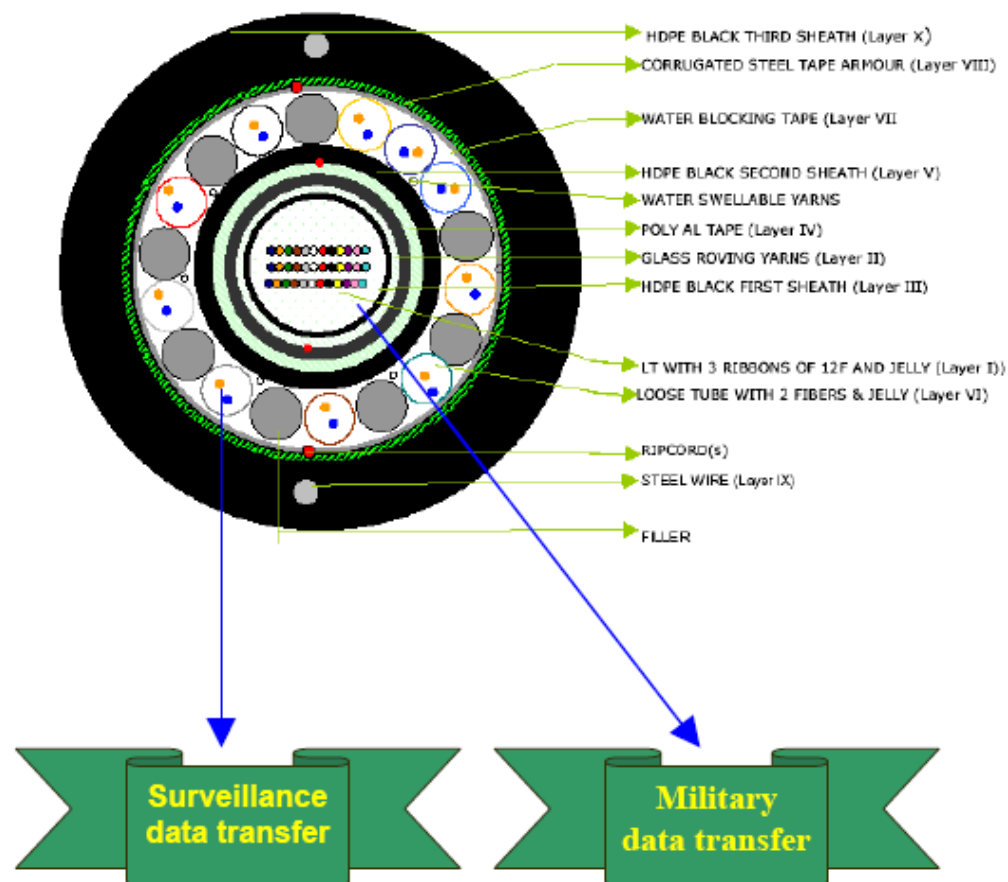
The central core was covered with SAP coated glass roving. A PE sheath was provided for making this as an inner core and weather proof. This portion was waterproofed and in case application requires only inner core to be used at places, the same could be easily possible.

The excess fiber lengths between the Inner Layer and the Outer Layer was carefully designed to 1.005% to meet the Bending and Tensile applications that the cables could be subjected to without any Macro Bending problems for the outer layers during installations.

Longitudinally formed Polyaluminium covering was selected in addition to water blocking tape to provide the high corrosion resistance requirements due to deployment near the seashores. This provides reliability to the cable designs at splice points.

The cable is rodent resistance after the application of ECCS tape. The anti buckling strength members are provided in form of 2 steel wires diagonally opposite with embedded inside the outer sheath.

2.1 Cable Construction Diagram



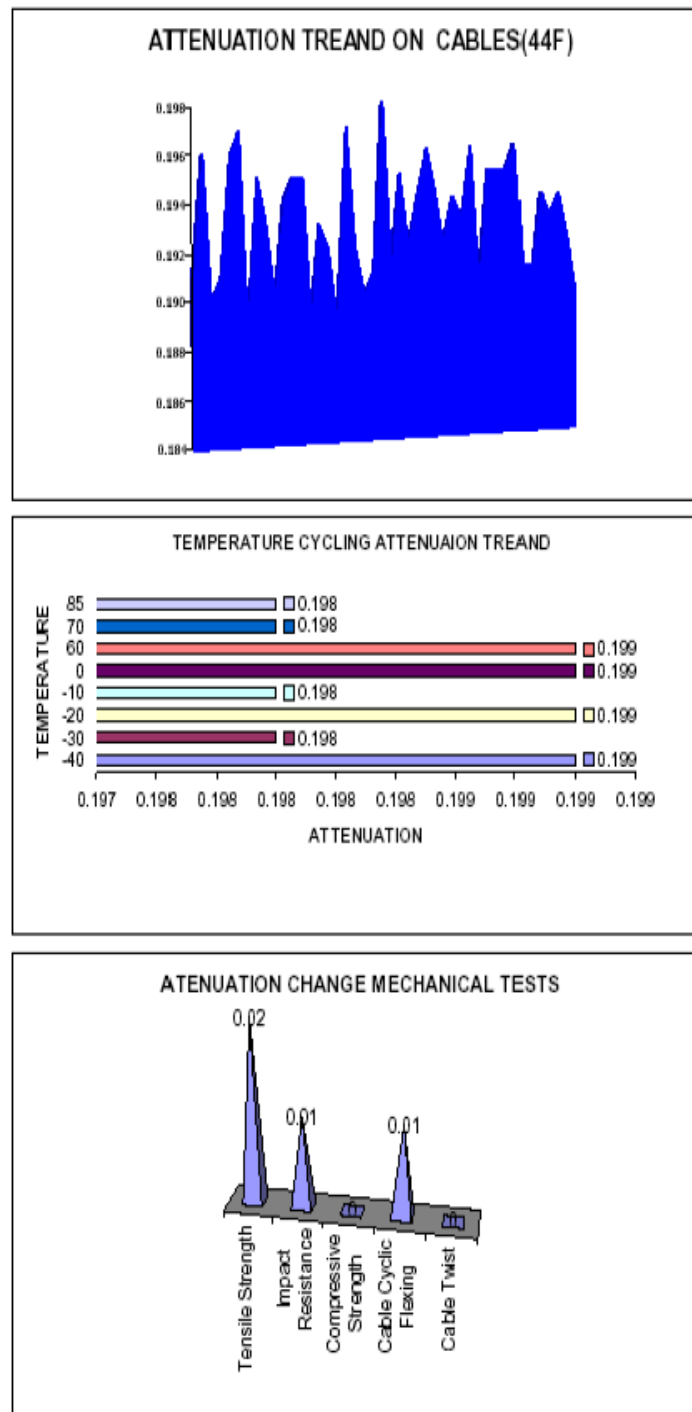
3. Test Results

Tests were done on the Pilot cable complying to Bell Core GR-20 and a summary of major tests were evaluated.

- Tensile Strength test
- Environmental Chamber test
- WPT

- Optical results summary
- Loose winding and laying tests: (Actual Field Simulation) be acknowledged within text, not referenced (e.g., “[Coyle, personal communication]”).

3.1 Attenuation Trends





4 Conclusions

After carefully studying all the test results it was confirmed that the specialized cable designed for military communications and intrusion protection was very rugged to handle extreme field conditions requirements.

5 References

Sterlite Product Design Department References
Simulation Test Department Application Engineering Manuals

Whitepaper

Fiber Optic Cable



Sterlite Technologies Limited

**Aurangabad
Bangkok
Beijing
Boston
Haridwar
Johannesburg
Dadra
London
Moscow
Mumbai
New Delhi
Piparia
Pune
Rakholi
Shanghai**

**Phone: +91-20-30514000
communications@sterlite.com**

www.sterlitetechnologies.com