

Technical Issue:

Cable Lifetime Estimation

When customer selects Optical Fiber Cable, maybe they will take the price into consideration firstly, but for further analysis, they will not only compare price, but also consider the function of the Optical Fiber Cable, so another new economic parameter "Annual Cost" arisen, It is the total of the cost of annual running, service and consuming of the Optical Fiber Cable during it's lifetime. This is a universal economic target used by all kinds of economic departments and ITU-T. The longer lifetime, the lower annual cost is.

The lifetime depends on raw material, process technique and operation environment. To guarantee over 20 years operation of our Optical Fiber Cable, we utmost following efforts:

1. Using High Quality Optical Fiber

We select top quality optical fiber in our cable, and have strictly selection of fiber's transmission ability, geometrical precision, tensile strength and so on. All Optical Fibers shall be recoiled by full length for tensile test. The formula of calculations for the cable's lifetime is as following:

$$t_s = t_p \cdot \left(\frac{\sigma_p}{\sigma_s} \right)^{n_s} \cdot \left\{ 1 - \frac{\ln(1-F)}{N_p \cdot L} \right]^{\frac{n_s-2}{m}} - 1 \right\}$$

Note: t_s : Optical Fiber's lifetime

σ_p : Selection Stress

t_p : Operation Time

σ_s : Survived Stress

F: Total Broken Probability of Optical Fiber

L: Total Length of Optical Fiber

N_p : Broken Times of Per Unit of Optical Fiber While Selecting

M: Distribution Parameter of Weibull Strength

N: Static Weary Parameter of Optical Fiber

We can ensure to self-broken probability with less than 1×10^{-2} for 100km fiber length during the operation time of 20 years.

2. Compacted Structure Designing

With high strength element-kevlar® from Dupont USA, and precise fiber excess length controlling, when the cable is under maximum tensile strength load, fibers inside will not get strengthen and extended.

Physical and chemical characteristic of fiber is very important to its stability. ZTT cable is applicable to be storage, transport and operation under the temperature of $-40^{\circ}\text{C}\sim+70^{\circ}\text{C}$, temperature during installation can be -10°C for minimum.

To be applied in various circumstances, such as chemical pollution, UV radiation, sharpstone conglomerate, water wave, termite, mice, lightning strike, and electrical interference etc, ZTT can provide every kind of sheath for cable protection which was proved effective and stable by practice.