Aerial Ultra High Density Optical Fiber Cable

1. INTRODUCTION

Recently, with the increase of telecommunication traffic demand in light of the expansion of FTTH, further construction of the optical fiber cable network is underway. In order to build the optical fiber cable network economically, it is necessary to accommodate efficiently an optical fiber cable in the current space. Therefore, a lighter and smaller optical fiber cable is required. Now we have been developing and commercializing a new product that has a lighter weight and a smaller diameter in comparison to our conventional products.

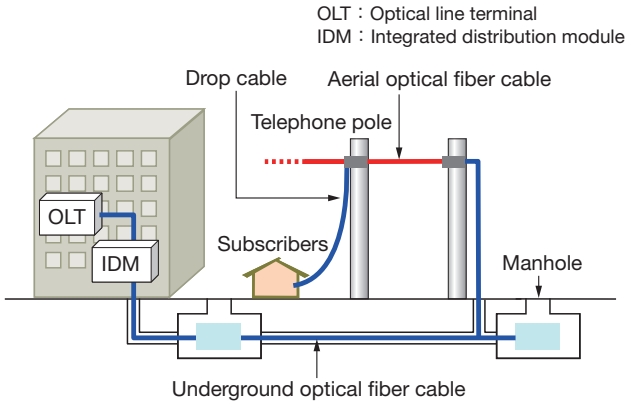

Figure 1 Example of aerial optical fiber cable installation.

2. ROLLABLE OPTICAL FIBER RIBBON

2.1 Structure

The structure of the ribbon that has been developed this time is shown in Figure 2. 4 single mode fibers that have a minimum bending radius of 15 mm are put into parallel and 2 adjacent fibers are intermittently bonded longitudinally.

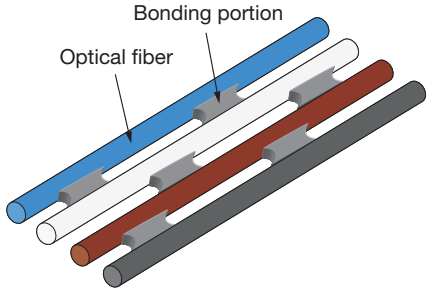

Figure 2 The structure of rollable optical fiber ribbon.

2.2 FEATURES

The optical fiber ribbon which has been developed can accommodate optical fibers into the cable effectively by changing the shape of the ribbon as shown in Figure 3. The original ribbon shape can be recovered when the ribbon is pulled out from cable core. Thus multi-fusion splice can be done. Also the ribbon can become a single fiber by splitting the bonded portion.

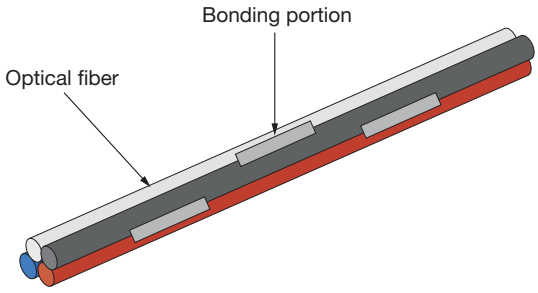

Figure 3 "Rolled" rollable optical fiber ribbon.

3. AERIAL ULTRA HIGH DENSITY OPTCAL FIBER CABLE

3.1 Structure

Figure 4 shows the cable construction of 200-fiber self-support type cable. 5 ribbons are bound by colored plastic tape as shown in Figure 5 and the optical fiber units are stranded. Then the stranded core is jacketed together with a suspension member. The cable component and the suspension member component are bonded intermittently to have a cable excess length.

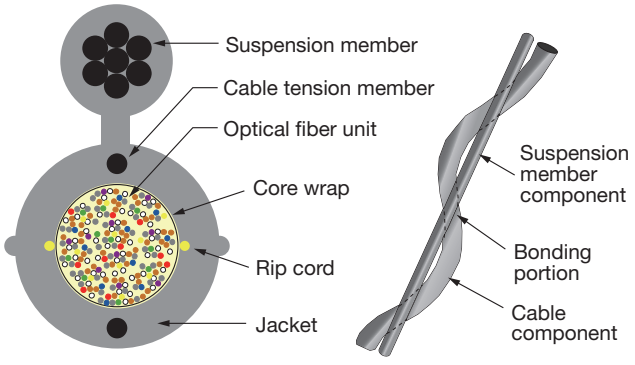

Figure 4 200- fiber optical cable.

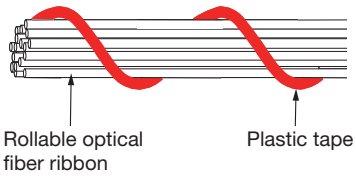

Figure 5 Optical fiber unit.

3.2 Features

After disconnecting the suspension member component and the cable component, this newly developed cable allows the removal of the jacket and the pull out of the fibers from the cable core in the middle of cable by splitting the jacket using the rip cord. The fiber can be identified by the color of plastic tape and fiber.

The ratio of the cable diameter and the weight to those of our conventional products is shown in Figure 6. In case of the 200-fiber optical cable that has been developed, the cable diameter is reduced by 30% and the cable weight is reduced by 50%.

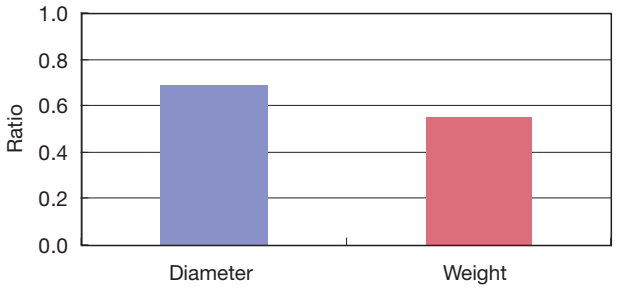

Figure 6 The ratio of cable diameter and weight in comparison to those of the conventional products.

4. PROPERTIES

Table 1 shows the properties of the aerial optical fiber cable with the small diameter. Transmission properties, mechanical properties and temperature cycling properties have excellent performances.

Table 1 Characteristics of the optical fiber cable.

Items	Test condition	Result
Attenuation	@1310 nm	less than 0.35 dB/km
	@1550 nm	less than 0.25 dB/km
Bending	R=160 mm ± 180 degree	less than 0.1 dB
Crash	1960 N/10 mm for 1 min	less than 0.1 dB
Torsion	± 90 degree	less than 0.1 dB
Impact	Weight 1 kg Height 1 m	less than 0.1 dB
Temperature cycling	-30 – +70℃ 3 cycles	less than 0.1 dB/km

Note) The numbers in the table above are typical values.

5. PRODUCT LINE-UP

Table 2 shows the product line-up of the optical fiber cable with the small diameter. Not only the self-support type, but also the round cable is available.

Table 2 Self-support type optical fiber cable.

No. of fiber	Suspension member No. of strands/mm	Diameter mm	Weight kg/km
24	7/1.4	9.0 × 17.5	165
40		9.0 × 17.5	165
60		9.5 × 18.0	170
100		10.5 × 18.5	180
200		12.0 × 20.5	200

6. CONCLUSION

The newly developed aerial optical fiber cable with the small diameter is now commercialized.

The cable diameter is reduced by 30% and the weight is reduced by 50% in comparison to those of our conventional products.

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