» New Products

Ultra-high Fiber Count (UHFC) 6912-Fiber Cable With 200 µm 16-Fiber Rollable Ribbon, Ribbon Fiber Mass Fusion Splicer S124M16 and Related Tools

1. INTRODUCTION

Recently, the data traffic in the world is experiencing a swift increase due to the spread of internet services and cloud applications and further capacity increase of the optical fiber network is required. For example, by replacing the conventional 864-fiber cable with the latest 6912-fiber cable, communication capability can be expanded to 8 times, however there has been issues in the workability, that is the burden of a replacing cost and a working period being large, due to the larger working time for splicing and the requirement of significant work such as replacing the whole duct system depending on the outer diameter limitation of the duct where the cable is to be installed.

This time, we developed an optical cable of less than 30 mm outer diameter, which assembles 6912 optical fibers by using rollable ribbons (RR), 16-small diameter fibers of 200 µm-outer diameter bonded at intervals (200 µm 16-fiber RR), and we confirmed it can be installed in an existing 1.5-inch-duct. We also developed both the mass fusion splicer S124M16 and the related tools which are necessary for splicing the cables. Using the tools which are optimized for 200 µm 16-fiber RR, it is possible to reduce 25% of splicing working hours per each cable, and therefore contributing to the expansion of the optical network.

2. 6912-FIBER CABLE

2.1 Cable Structure

2.1.1 Rollable ribbon

The structure of the 200 µm 16-fiber RR used for the cable is shown in Figure 1. The RR is constructed by bonding, at intervals, 16 optical fibers which have a small outer diameter of 200 µm. Conventionally 12-fiber RR has been used, however 16-fiber RR can make the working time of splicing shorter on mass fusion splicing with a fusion splicer. We also colored the fibers in 16 colors which conform to the standards of TIA (Telecommunications Industry Association) in the US to make each fiber easily identified. Similar to a 12-fiber RR, the high-density assembly of the optical fibers in the cable becomes possible with a rolling form and a size reduction and a weight saving of the cable are all achieved.

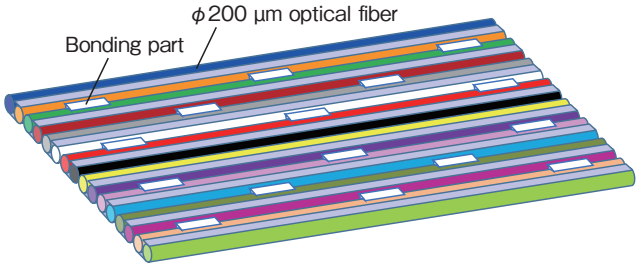

Figure 1 Structure of a 200 µm 16-fiber RR.

2.1.2 Cable structure

The structure of the developed 6912-fiber cable is shown in Figure 2. The 48 units of 144-fiber unit are intertwined to construct a cable core. The cable core is wrapped around by a water-absorbent non-woven fabric for waterproof and also covered collectively together with 2 non-metallic strength members and 2 rip cords in black polyethylene. The locations of the rip cords are identified by the projections on the surface of the outer sheath.

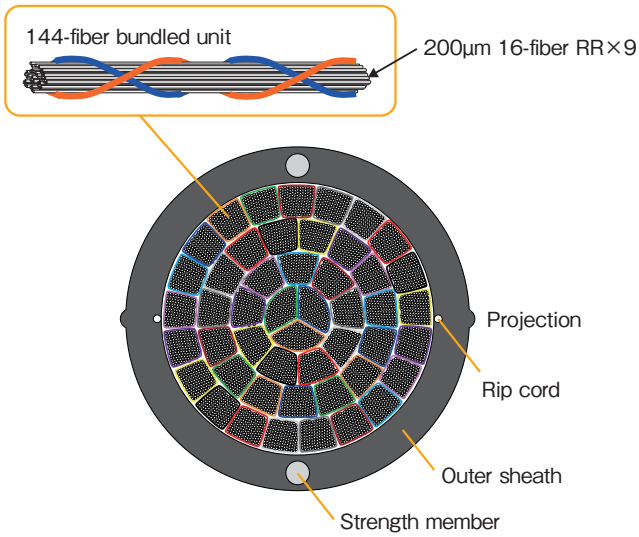

Figure 2 Structure of a 6912F cable.

2.2 Characteristics of the Cable

The characteristics of the developed 6912-fiber cable are shown in Table 1. Good results are obtained on optical, mechanical and environmental characteristics.

Table 1 Characteristics of the 6912F cable.

Test item	Condition	Result
Attenuation	Cut-back technique	<0.30 dB/km
Tensile	Tension: 2700 N	<0.10 dB
Crush	2200 N / 100 mm, 1 min retaining	<0.10 dB
Impact	10 N × 1 m	<0.10 dB
Repeated bending	20 D, 10 cycles	<0.10 dB
Torsion	±90 deg. / m, 3 cycles	<0.10 dB
Temperature cycling	−30°C - +70°C, 6 hours, 3 cycles	<0.15 dB
Water penetration	Tap water, water head height 1m, 10 days	<40 m

*Measurement wavelength: 1550 nm

2.3 Cable Installation Test

We confirmed that the developed 6912-fiber cable can be installed, into an existing 1.5-inch (approx. 38 mm)-inner diameter duct, which is widely used at data centers. It can be possible to increase further the capacity of the optical fiber network expeditiously while the cost and time of the new cable installation are reduced to the minimum.

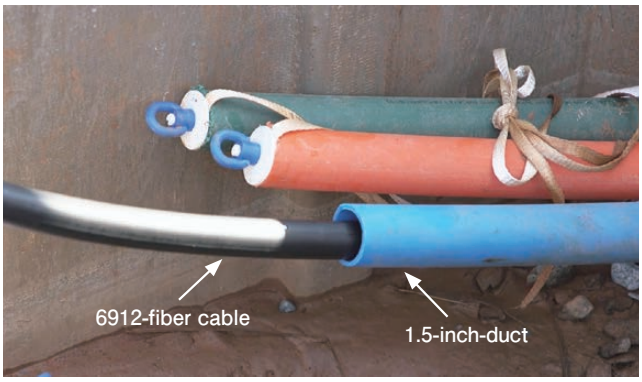

Figure 3 Installation demonstration.

3. FUSION SPLICER AND RELATED TOOLS

3.1 Fusion Splicer

The picture of the mass fusion splicer S124M16 is shown in Figure 4. We added a V-groove for 200µm 16-fiber RR which can be exchanged by the customer, being the greatest feature of the S124 series. It can manage various fiber types at the site of the construction. The main specifications of the S124 series are shown in Table 2.

Figure 4 S124M16 picture.

Table 2 Specifications of the S124 Series.

Item	Specification
Applicable fiber type	SMF, MMF, DSF, NZDSF
Corresponding cladding diameter	125 µm
Corresponding coating diameter	200 µm - 900 µm
Optical fiber cut length	10 mm
Splice loss	SMF: 0.05 dB
Battery	Built-in lithium ion battery
Data communication port	USB 2.0 × 2 ports (Mini B: 1 port, Standard: 1 port)
Main body dimension	179W × 246D × 131H mm
Main body weight	1.8kg (including the battery)

3.2 Related Tools

The 200 µm-RR is thinner than the conventional ribbon fiber and the related tools adequate to this RR require a peeling mechanism with an accuracy higher than before. Using the heating type coating removal device (thermal stripper) S218R-200 and the fiber cleaver S326R, shown in Figure 5, which are adequate to this RR, it is possible to achieve a workability equal to the conventional ribbon.

Figure 5 S218R-200 (top), S326R (bottom) picture.

Moreover, the splicing working hours for the 200 µm 16-fiber RR which uses such tools is same as those for the conventional 250 µm 12-fiber ribbon and 200 µm 12-fiber RR. That is, when the 6912-fiber cable is spliced, the number of splicing is 576 times for a usage of 12-fiber RR, however it becomes 432 times for a usage of 16-fiber RR. Therefore it is possible to reduce 25% of the splicing working hours per one cable.

4. CONCLUSION

The 6912-fiber cable which we developed this time has achieved the highest world's level in core density and its cable outer diameter is less than 30 mm, therefore it can be easily installed into a 1.5-inch duct. The fibers can be identified in 16 colors.

In order to reduce the splicing working time of the RR cable which has an increase demand, we developed the mass fusion splicer S124M16 and the related tools, which are adequate to the 200 µm 16-fiber RR. Achieving same splicing working time as the conventional 12-fiber ribbon, it becomes possible to reduce 25% of the splicing working hours per one cable. We will continue to further provide the necessary firmware updates and to offer adequate accessories for those splicing.

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