# Change Is the Splice of Life

## Fusion Splicing Equipment Adapts to FTTP Strategies

By Mark Turner and Bryan Roark

**Optical fiber access networks have evolved** in order to continue reducing the costs of deployment and customer turn-up. For example, pre-connectorized terminal distribution system and fiber drop cable technology clearly enable the fastest deployment and customer turn-up in the industry. However, in scenarios where long-length customer drops or conduit restrictions play a factor, splicing the network interface device (NID) end of the drop could be the next best way to quickly turn-up the customer. In another scenario, perhaps both ends of the drop may need to be spliced if fiber distribution terminals were installed before the "pre-con age." Furthermore, pre-stubbed LCP splitter cabinets must be spliced to gel-free OSP fiber cables, both ribbon and loose tube, well before customer turn-up can occur. Additionally, splice equipment convenience matters a lot when restoration time rolls around, especially when splicing 12 pairs together at a time where large-count fiber cable continuity has been interrupted. Thus, innovative splice equipment should be considered in today's next-generation OSP.

Figure 1. Conventional fusion splicing.

If you have fusion-spliced optical fibers together in the OSP, you are well aware that the splice tray had to be well-secured to the splice equipment within a few feet of the electrode arc area. This method kept the length of 250-µm fiber or ribbon fiber stored inside the tray to no more than a few feet in order

Figure 2. Residential NID.

Figure 3. Hands-free splicer secured to tripod.

Figure 4. Splicer secured to tripod.

to protect the fiber and for proper fiber placement back inside the tray. Consequently, the splice equipment needed to be supported on a steady work surface because a technician could not hold the heavier splice equipment and prepare and manipulate the fibers at the same time (See Figure 1). No news there, right? That's because conventional point-to-point networks such as hybrid fiber-coax (HFC) and transport links (DLC) in telephony were spliced in one fell swoop, as there were no optical distribution/drop cables to access - only copper and coax.

Compare that to today's dynamic fiber-to-the-end user (FTTx) networks, where splice equipment portability matters a lot. It needs to be compact so the splice equipment can be easily and quickly taken right where the splice tray has been permanently mounted. Consider that today's next-generation residential NID doesn't even have a splice tray, just simply a modular splice organizer, as shown in Figure 2.

## How Things Have Changed

It is no secret that FTTx networks typically require just-in-time network elements in order to align the capital expenditure to the revenue generated by operating the asset. In most cases, although fiber distribution cables are typically deployed up-front, installing the fiber drop cable and NID occurs only when a home requests subscription services. This customer turn-up process involves mounting the NID and terminating the drop with a 900-µm pigtail assembly, as previously discussed. On the other end, if the drop does not contain a hardened, pre-connectorized end at the fiber distribution terminal, then it must also be spliced to the distribution fiber at the network access point terminal.

Obviously, this quick turnaround and splicing on the fly relies on the technician. Therefore, FTTx splice equipment technology has evolved to include a modular, platform-free feature. No longer requiring a separate work space, the field technician can support the equipment comfortably by adjustable straps around his or her shoulders. Only ergonomic, lightweight, and hands-free splice equipment will get the job done in a timely and cost-effective manner (See Figure 3). Additionally, today's handheld FTTx fusion splice equipment can also be secured to a camera tripod for placement in front of a NID, as seen in Figure 4.

So what else can portable, ergonomic, handheld splice equipment do for you? In short, not only can this just-in-time, just-not-long-enough, just-too-high-to-reach splice equipment reduce operational complexity and cost and increase technician productivity. It can also serve as your workhorse splice

equipment at consolidation splice points. For instance, a typical FTTH network deployment requires all distribution cables within the neighborhood to be spliced to the pre-stubbed cables originating at the LCP splitter cabinet. As such, ribbon cable technology has certainly been widely accepted in order to speed up the deployment.

Not only can this compact splice equipment fuse individual fiber pairs together at the access terminal and home, it can likewise splice up to 12 fiber pairs at once. This mass-fusion splice approach is four to five times faster than splicing one pair at a time. But how does that save you money upfront? Material and splicing cost together constitute a capital expenditure, because the distribution portion of the OSP has to be completely joined together initially to pass each home with fiber. So by significantly reducing your up-front splice time with mass fusion splicing, you significantly curb your initial labor expenses to pass homes.

But there's more to it than just that. In the past, commercial splice equipment could either splice one fiber pair or mass fusion splice up to 12 pairs. However, today's FTTx handheld splice equipment, by design, integrates single-fiber and mass-fusion technology, further curbing the cost of deploying FTTH.

In conclusion, today's next-generation OSP requires smaller, lightweight fusion splice equipment that can conveniently operate within close proximity to fiber NIDs, pedestals, and terminals in situations where pre-connectorized optical fiber cable assemblies have not been installed. At the same time, mass fusion splicing is becoming ever more popular in FTTx networks, curbing both deployment time and associated cost. Recent splice equipment innovation now enables a single pair of fibers all the way up to 12-fiber ribbons and combinations in between (2-, 4-, 6- and 8-fiber ribbons) to all be performed in sleek, portable, high-performance, cost-effective, handheld fusion splice equipment. That's really using your head to make and save you more money in your OSP.

Mark Turner, Manager of Consultant Engineers, Corning Cable Systems, has 12 years experience in Marketing, Engineering Services, and Product Development. Bryan Roark, Splice Equipment Product Specialist, Corning Cable Systems, has 14 years experience in Splice Equipment Product Management and Engineering Services. For more information, visit www.corning.com/cablesystems.

CORNING

Corning Cable Systems
PO Box 489
Hickory, NC 28603-0489
Tel: 800.743.2671
Fax: 828.901.5973
www.corning.com/cablesystems