Bringing FTTH to Low-Rise MDUs:
Thinking Outside the Box Means Thinking Outside the Building

Kevin White, Market Development Manager, Corning Cable Systems

Multidwelling units (MDUs) continue to be a logistical challenge for bringing fiber to the home (FTTH). This is especially true for the three- to six-story "brownstones" and low-rise multitenant structures that were built in the larger cities of the U.S. in the late 1800s and early 1900s. These ubiquitous structures, offering both history and character, offer little in the way of facilitating fiber optic installation into the living unit. Why should the inhabitants of these structures be deprived of the enormous broadband pipe that fiber offers? It doesn't have to be this way. For this application, we were not only thinking outside the box, we were thinking outside the building.

The greatest challenge with deploying fiber to the living unit in these structures is the lack of available pathways such as elevator shafts or conduits of any sort. Hence, installing fiber, even extremely small, bend-insensitive fiber cables such as Corning's ClearCurve® rugged drop, is nearly impossible to do in an efficient and aesthetically pleasing way. Fortunately, innovation, determination and thinking outside the building have resulted in products that now make installing FTTH into low-rise and mid-rise MDUs not only possible, but very cost effective.

Passing Living Units

The key to solving this logistical challenge is to leverage state-of-the-art fiber and cabling technology. The enabling solution, all-dielectric preconnectorized outdoor bundled drops with ClearCurve fiber, available in three, five- and six-fiber versions, offers a product that allows installers to pass up to six living units in as little as 15 minutes with only two people. This novel product allows the installers to pass living units on the *outside* of the building as shown in Figure 1.

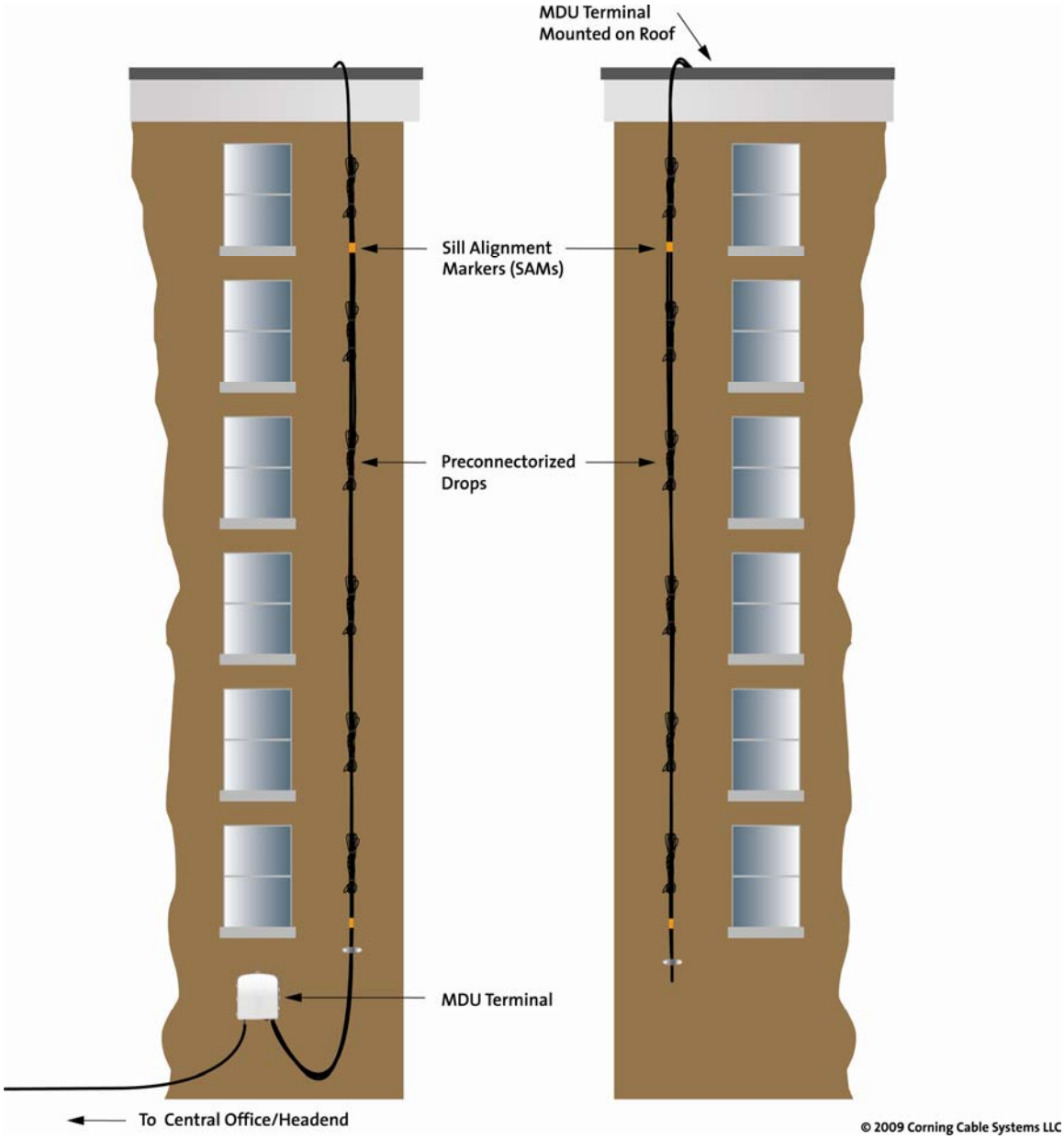

Figure 1: Two deployment methods of bundled drop cable (feed-up and feed-down). (The cabling system is larger than scale for effect.)

The decision of whether to utilize the "feed-up" or "feed-down" (terminal placement) method is determined by the physical characteristics of the building. If there is a convenient terminal location on the street level, one would want to place the terminal there. If there is a cluster of adjoining buildings to be connected, or if the service provider wants to place the terminal out of sight, it may make more sense to place the terminal at the top of the building.

In either case, a bright orange marker, referred to as a SAM (**S**ill **A**lignment **M**arker) is attached to the top and bottom 20 ft bundles that are to be pulled into the living unit when service is ordered. The SAMs serve as an easy visual indicator for the installers. When

they see that the SAM is next to the windowsill of the top and bottom living units, they know that all of the SC APC preterminated drop cables are properly aligned and can begin the clamping process. This feature can be seen in Figure 1.

The cable is secured and strain-relieved by simply clamping the easy-to-access dielectric strength member via a two-pair wedge clamp (P clamp) and rams' head hardware. The recommended tension on the strength member is approximately 50 lbs. This allows the cable bundle to remain taut enough to keep it immobile with clamping devices only at the top and bottom of the building.

This method of deployment offers multiple advantages. First, the service provider no longer has to go through the long, arduous process of getting the building owner's permission to perform destructive and reconstructive work on the inside of the building. This alone is a great burden lifted from the service provider. Instead, by performing work only on the outside of the building, the building owner is more apt to quickly approve the project, knowing there will be little to no disruption to the tenants or damage to what could be historically significant architecture.

The second and most important reason is cost. Reduced costs are realized by the aforementioned methods of avoiding expensive and time-consuming interior construction costs. Additional cost reductions are achieved by completing the installation in just a fraction of the time it takes to perform an in-building installation.

Connecting Living Units

Once the preconnectorized outside plant bundled drop has been secured to the outside of the building, connecting the subscriber becomes a quick and easy task. After a subscriber orders service, the technician simply enters the living unit, drills a 0.75 in hole, removes the environmental seal from the factory-installed connector and pulls in the 20 ft connectorized bundle that is waiting outside of the living unit. The drop cable is then plugged into the optical network terminal (ONT). The whole process takes significantly less time than connecting a greenfield single-family unit (SFU).

Cable Assembly Construction

The all-dielectric, indoor/outdoor 4.8 mm rugged drop cable design that constitutes the bundled drop solution is well-established inside the MDU, having been installed in over 200,000 living units to date. The incorporation of Corning® ClearCurve® single-mode fiber enables it to be installed safely, even under the most stringent, bend-inducing conditions. This is particularly useful when the drop cable is pulled into the living unit where, for this application, installation takes place from the building façade into the apartment/condo. This will often induce a bend of up to 90º. Fortunately, this is not a concern with this cable design for several reasons. ClearCurve fiber is tested and specified at just 0.1 dB of attenuation at a 5 mm bend radius. Additionally, the design of the 4.8 mm cable has a self-bend-limiting sheath that will not violate the 5 mm bend radius of the fiber. Lastly, the 4.8 mm drop cables are individually marked with easy-to-read print and unique buffer tube colors indicating which living unit will receive the drop. This leaves no question as to which drop cable connects to the appropriate terminal port.

The 4.8 mm drop cables are stranded and secured around a dielectric strength member/messenger that is designed to withstand a max pulling force of 300 lbs and has a long-term tensile load rating of 150 lbs. Most importantly, the all-dielectric design eliminates the need to bond and ground that a conventional metal messenger requires. The cabling solution is shown in Figure 2.

All of these features provide technicians with a simplified installation and a robust cabling solution.

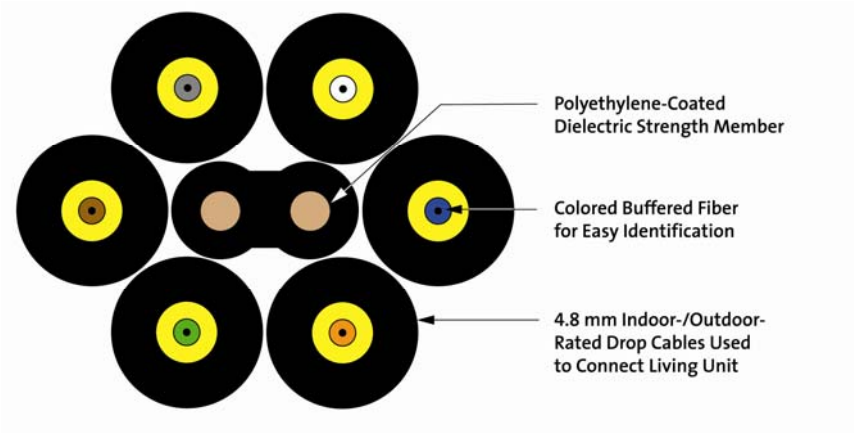

Figure 2: Bundled drop cross-section

Conclusion

Older MDUs, once considered a complicated and expensive proposition for installing FTTH, are now as easy to pass and connect living units as any other building architecture thanks to Corning Cable System's Outdoor Bundled Drop Cable Solution. This innovative solution, enabled by ClearCurve fiber and robust indoor-/outdoor-rated cable, facilitates installation on the outside of the building structure quickly and safely with only two technicians, thus minimizing the cost and complexity of tackling the low and mid-rise MDU challenge.