

Nip and tuck

Mike Fuller, Manager, Private Networks Market Development, Corning Cable Systems, on why pre-connected solutions are best when it comes to communications network deployment



As the demands on and number of ITS deployments have increased, there is a risk that quality can suffer

Efforts to increase the efficiency and safety of existing and newly-planned infrastructure are underway around the world and are heavily funded at the governmental level. In 2008, global ITS spending is expected to reach approximately US\$10 billion (€6.4bn), growing to over \$12 billion (€7.7bn) by 2010. Approximately 50 per cent of deployments will be in arterial (traffic control) and freeway management.

While the technologies for monitoring and managing traffic flows have evolved dramatically over the last 20 years, by and large the methods used for the installation and deployment of the communications backbone have barely changed. Traditional optic-fibre cables, hardware, fusion-splicing and connection in the field have remained the same and have been, by default, the products and methods of choice. As both the demands on and number of ITS deployments have increased, there is a risk that quality can suffer. As a result, the final deployment can be costlier, slower and differ markedly from the initial design. Whether due to installation delays, the costs associated with the reworking of improperly installed components or the unanticipated and attendant maintenance, ITS deployments are becoming far more complex and costly than is necessary.

In an effort to provide greater control of the deployment process and to offer those most directly responsible for the success of the ITS system design and deployment a greater likelihood of success, pre-connected optic-fiber

solutions have been introduced (Figure 1). These increase deployment speed, quality and reliability. They offer a path to better future-proofing and, in most cases, lower overall system costs.

Traditional ITS deployments involve single-mode or occasionally multimode, loose-tube outside plant (OSP) cables ranging from two to 144 fibres. Whether configured in a star, ring or daisy chain, cables are fusion-spliced in the field, using a variety of personnel and specialised equipment, into splice closures and termination hardware. These can be in the open or in ducts, hand-holes or manholes. Additionally, at traffic control cabinets, lower fibre-count drop cables (two to 12 fibres) are terminated by fusion-splicing single-fibre pigtailed or field-connecting and hand-polishing a variety of connectors. This type of installation is complex and increases the risk of complication.

Inefficiencies

Clearly, one of the greatest frustrations of these undertakings is time; that is, time to deploy and, potentially, the time required for repair in the case of errors. The traditional route to deployment involves a contract bidding process, review and awarding, set-up, planning and staffing for potential traffic disruption and, finally, execution. Additional staffing - facilities personnel, law enforcement - and additional traffic control may also be required. By the time fibre cabling installation is actually carried out, deployments are often delayed to the

point of liquidated damages, and time is of the essence. If the budget for a project is tied to a specific funding cycle or influenced by some other external pressure, there is the greater possibility of errors, shortcuts or cost run-ons. And ultimately, when preparing and splicing 12, 24 or 144 fibres, hours quickly turn into days and days quickly turn into weeks. This added time creates frustration for all involved. A further consideration is that precision work is often expected to be performed in environmentally unfriendly and unsafe conditions. Whether high heat or extreme cold, dust, wind, rain or high traffic, the conditions often found at the roadside are not conducive to technically precise labour-intensive techniques such as fusion-splicing.

While many advances have been made in optic-fiber technologies, the truth is that the termination and splicing task remains a specialised one which can be performed by many but which is in fact performed well by few. Minor oversights in choosing the proper equipment, procedures and personnel can lead to major failures from day one which will have a knock-on effect throughout the project lifecycle and greatly increase total system cost. Year-in, year-out temperature cycling and daily use require the highest levels of both installer competency and product capability in order for a system to ever have a hope of performing as designed. ITS deployments require the highest reliability as they control, monitor and record the flow of traffic twenty-four hours-a-day, seven days-a-week, every day

of the year. Failure is not an option. Due to this complexity and potential for error, labour rates have increased and in many cases are now far greater than material costs.

Innovations in pre-connected solutions have now removed many of these costly, time-dependent and unsafe variables from the communication network deployment process, leading to timely, reliable and cost-effective solutions. Pre-connected solutions have evolved and grown from traditional local area network solutions via data centre solutions to today's most advanced fiber-to-the-home (FTTH) solutions. Pre-connected solutions, factory-engineered solutions that are modular and built to exact, customer-specified requirements, have been deployed globally for years.

While these latest advances in pre-connected solutions are new to the ITS market, they are not new to telecommunications networks. FTTH providers have deployed this technology since 2004 and have begun to deliver cutting-edge voice, data and video services. Hundreds of millions of dollars have been invested, and millions of homes have been passed by these providers in North America in an effort to deliver the most reliable, cost-effective and innovative telecommunications networks. As the products have matured, additional markets have been identified that have needs that pre-connected solutions could solve. Therefore, many of the early-adopter pains felt by those adopting new technologies can be put aside as the product technology and manufacturing has matured significantly since its initial launch.

In addition to using standard optic-fiber cables, connectors are pre-installed, completely eliminating the need for any field termination. These connections can be standard single-fiber connectors or new environmentally hardened MT (12-fibre) connectors. These environmentally

hardened solutions can be connected in under a minute, are able to withstand both high and low temperatures, are waterproof and have optical loss levels that rival fusion splicing. Additionally, their small footprint allows them to be installed in a 2in (5cm) duct or in the open.

Faster, simpler

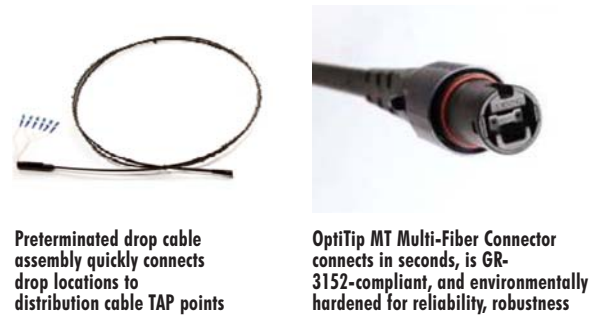
Space-saving and cost-effective pre-terminated solutions at the traffic control cabinet also eliminate the need for field terminations. These traffic control cabinet solutions can be integrated into cabinets, speeding up initial deployments as well as dramatically reducing the time required to repair damaged or destroyed cabinets. Specifically, it is this labour saving that not only saves time but also saves significant money and makes pre-connected solutions a cost-effective alternative. Deployments are accomplished in a fraction of the time, without the need for specialised labour, training or concern. Many of the municipalities that have already purchased and installed pre-connected solutions for ITS have done so using their own crews and personnel.

Consider the value of connecting 12 fibres in under a minute in an environmentally hardened connector, versus spending eight to 10 hours with multiple personnel preparing cables, a splice closure and then splicing 12 fibres. Figure 2 shows the typical savings possible.

Forward planning

These solutions involve spending slightly more time in the design phase determining appropriate lengths, spacing and technical requirements. However, future growth and expansion can be easily designed in during this phase as well - all in all, time spent early on in the design phase results in dramatically reduced time spent in the deployment phase.

Figure 1: Pre-connected optic-fiber solution



Preterminated drop cable assembly quickly connects drop locations to distribution cable TAP points

OptiTip MT Multi-Fiber Connector connects in seconds, is GR-3152-compliant, and environmentally hardened for reliability, robustness

These design requirements are sent to the factory to be built to customer specifications. Factory-installed solutions involve highly trained staff performing these splices and/or terminations in environmentally controlled factories where cleanliness and consistent processes lead to the highest reliability and quality. It is these conditions that lead some manufacturers to provide guaranteed results upon delivery and extended warranties - up to 10 years - upon deployment. While these types of solutions may at first seem rigid and inflexible in the event of unforeseen circumstances, slack and future network growth are easily built in at minimal cost. The small footprint of the solution is both user-friendly and environmentally robust. Whether a design includes rings, daisy chains, star topologies or some combination of any or all, pre-connected solutions can meet the many needs of a diverse range of installations.

Time is money, and both are often in short supply. Solutions that allow quick, reliable deployments decrease the overall cost of variable labour and easily offset increased material costs. Connections of locations, cabinets and equipment can be made three to four times more quickly and complete network installations can be carried out in half the time needed with traditional cable-and-splicing methods. Reliability and risk avoidance are both high, as the products are manufactured and tested by experts in environments conducive to reliability.

Systems are now capable of being deployed that are independent of installer skill level, without the risk of unforeseen downtime and are now capable of carrying extended warranties. Labour costs can be dramatically reduced by speeding installation and eliminating the need to field-terminate and splice. Additionally, this labour cost and time can be appropriately planned and accounted for due to the reduced variability that exists today. And, ultimately, future growth is easily built into the design so that the same deployment speed and reliability can be taken advantage of when the network grows. ■

Figure 2: Typical time saving with a pre-connected solution

