



When to Choose Air-blown Fiber Installations

Greater flexibility, less impact on fiber, and less disruption for existing business operations make this technology attractive

BY TERRI L. DIXON

AIR-BLOWN FIBER CAN DELIVER unprecedented flexibility in accommodating growth and change in the enterprise-wide local area network (LAN). The more complex the corporate network, the more potential air-blown fiber offers for initial and long-term savings.

Few components of a LAN are less glamorous than the plumbing that carries the optical fiber infrastructure connecting the enterprise's network. Nevertheless, most administrators will agree that few components are more subject to adds, moves, and changes required to handle advances in technology and evolution within the organization.

In past years, designing LANs with more optical fiber than required at the outset, then hoping forecasts proved correct, accommodated anticipated future changes. In most instances, LAN planners' crystal balls proved faulty.

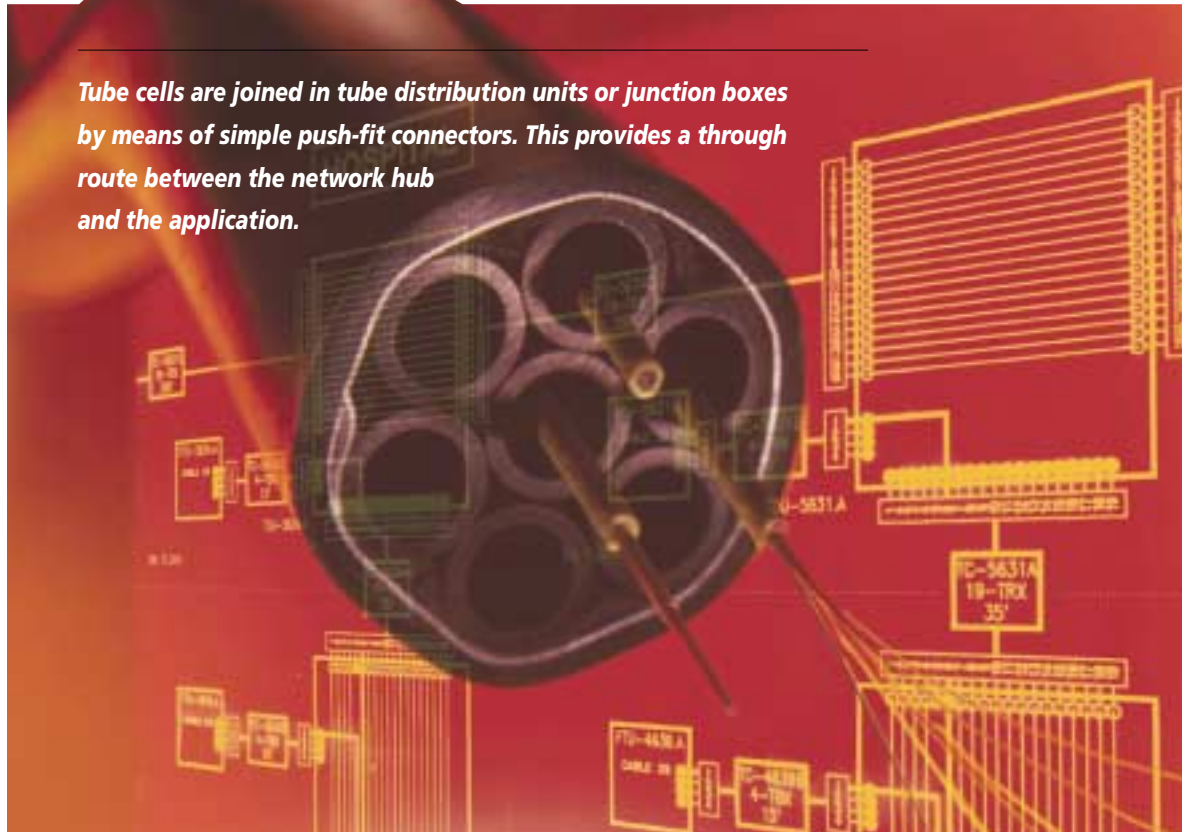
The more dynamic the organization, the more difficult and costly it becomes to keep LAN capabilities current with needs. These difficulties and their costs also contribute to workplace disruptions as crews pull cable through conventional conduit and innerduct, then perform myriad splicing operations at junction boxes. Pulling and splicing can also degrade fiber performance.

In 1990, a technology called air-blown fiber (ABF) was pioneered in the United States at the University of Utah. The university selected a system manufactured by Sumitomo Electric Lightwave, of Research Triangle Park, N.C. The university decided to use the FutureFlex ABF system instead of a conventional infrastructure to completely remake its campus-wide network.

Air-blown Fiber Explained

The system uses either compressed air or nitrogen to literally blow lightweight single-mode or multimode optical fiber bundles through previously installed tube cables. Bundles can contain up to 18 strands of fiber, are color coded to identify fiber type, and must be Un-

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derwriters Laboratory-approved for use in plenum and riser tube cable. Bundles are typically one-sixth the size of conventional fiber bundles because they do not require strength members to protect the fiber from stresses during conventional pulling operations.

Tube cables contain up to 19 individual tube cells, each with an inner diameter of 6 mm. Flexible and tough, the tube cables replace conventional conduit and meet industry specifications for indoor and outdoor application. Typically, tube cable is installed with more cells than required at the outset, allowing room for expansion.

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(TDUs) or junction boxes by means of simple push-fit connectors. This provides a through route between the network hub and the application. Unused cells are capped until needed. As network topology or applications change, additional tube cable can be installed between the nearest TDU and the application. Then the required tube cells are joined.

Fiber termination units provide a juncture between the air-blown fiber infrastructure and fiber jumpers connected to servers, computers, or other network equipment.

Once the infrastructure is in place, the blowing operation begins, and usually requires only two people. Reels of fiber are placed on a payoff stand. The fiber is fed into a blowing head used to direct fiber bundles into the tube cells at a rate controlled by the installer. Fiber bundles float through tube cells at rates up to 150 feet per minute. A special textured surface provides aerodynamic features, minimizing contact between the fiber bundles and cable walls. While the length of splice-free runs varies depending on the complexity of the route, lengths of 6,000 feet have been reached.

When requirements change, such as from multimode to single-mode fiber, the multimode fiber can be blown out of a cell and used elsewhere. The same tube cell can then be used for single-mode fiber.

Reconciling Topologies

Comparing ABF with conventional installations may not be easy because network topologies based on one or the other do not always support an apples-to-apples tableau. That is, the two designs are seldom the

same schematically. For example, because ABF runs are point-to-point and do not require splice points or access areas, tube cable paths may differ from conduit or innerduct paths.

ABF also allows each fiber system to get its own bundle. Ethernet topology, for instance, does not have to take into account Token Ring path preference or the need to share a common sheath. Redundant path back-up through path diversity is a natural pattern with ABF, and network designs consider this.

When to Use Air-blown Fiber

Before committing to ABF, nearly all major installations to date have been subjected to an extensive cost/benefit analysis comparing ABF with conventional systems, taking into account the differentials cited above. In general, experience has shown that while initial costs for ABF are comparable to a conventional system, a long-term cost perspective favors ABF.

The ability of ABF to win a competitive analysis is enhanced as the complexity of the network increases; as adds, moves, and changes figure more and more prominently into the network's characteristics; when labor costs for pulling and splicing are high; if the cost of disruptions to the workplace when making changes is high (such as stopping an assembly line); and when decibel loss traceable to fiber stress and splices could cause unacceptable degradation of the network, now or in the future.

Managers contemplating building or rebuilding their LANs should investigate ABF and conventional technology by asking their installers to bid the job both ways, and factor in anticipated adds, moves, and changes.

Today, ABF is being employed by a wide range of businesses and institutions to offer future flexibility for their networks. Air-blown fiber has been installed at military complexes, health care facilities, power generating plants, high-rise office buildings, educational institutions, water treatment plants, casinos, insurance companies, manufacturing plants, and museums. In addition to voice/data/video, ABF supports security and HVAC systems.

Air-blown fiber is a LAN construction option that accommodates network growth and change found in today's enterprise networks. Guesswork goes down because fiber can be quickly and easily installed or removed by a crew of two in a matter of hours. Users experience reduced cost, ease of installation, and greater flexibility in managing a network that leaves room for installing more air-blown fiber later. **EC**

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