Air Blown Fiber at SUNY Oneonta

Curt Underwood
Background

• 2009 the demand for gigabit transport between edge switches grew tremendously.
  • Existing plant consisted of high strand counts of OM1 combined with limited strand counts of OS1.
  • Existing duct banks had limited capacity for growth, conduit sheering.
  • Core alignment gel was causing connectors to fail at a high rate.
  • Poor original installation of original fiber optic plant made MAC’s a nightmare.

• Mission: Obtain capital funding to upgrade our outside plant infrastructure that will support immediate and future campus initiatives.
Background

• 2010 I was at BICSI conference and was introduced to the technology of Air Blown Fiber (ABF).
  • Marketed under the concept of “build as you grow” and offers:
    • Long Term Flexibility
    • Long Term Expandability
    • Lower upfront capital needed, defer cost over the long term
What is ABF?

• ABF systems are comprised of a series of micro duct pathways that allows small light weight cables to be installed within using compressed air or nitrogen carry the fiber along the pathway to it’s destination at a rate of 150 feet per minute.

• ABF is similar to the concept of Air Blown Cables but miniaturized which allows further blowing distances.

  • ABF Eliminates:

    • Large loud noisy compressors
    • Air coolers and dryers
Testing your craftsmanship

• Step 1
  • Pressure Test – tube pathway must hold specified pressure for specified amount of time.
    • Typically 150-200 psi for 10 seconds

• Step 2
  • Obstruction Test – send BB through tube pathway to ensure there are no blockages.

• Performing these tests take less than 5 minutes for a 7 tube cable.
• To further reduce friction blow a lubricated sponge through tube pathway.
  • Follow manufacturer specifications.
Termination and Testing

• Just like traditional loose tube fiber optical cables you need to furcate the 250um strands.

• For our application we choose splice on fusion connectors.

• Tier 1 and 2 testing was specified.
Phase 1 work

Tube cable being transitioned from OSP to Riser rated.

Tube cable organizers in vertical cable manager.
Why Oneonta choose this method?

• Scalability and flexibility.
  • 7 tubes were deployed to each building = 672 fiber strand capacity
  • Ribbon cable is also offered by manufactures

• Deferred cost of installing the technology you need when you need it fits our campus.

• Gives us the opportunity to install our OSP backbone in house for future MAC’s.

• Blowing equipment can be rented if we decide not to invest in our own.
SUCF #09386 Upgrade Networking and Telecom Infrastructure at SUNY Oneonta.

• With a little research of ABF vs. traditional fiber optic practices and a demonstration to SUNY Oneonta Facilities and SUCF approved funding for design.

• Began design in 2010, finally bid in 2014.

• 2 year phased installation based on campus priorities.

• Design includes Approximately:
  • 12,000 LF of new duct bank.
  • 759,175 LF of tubes.
  • 2,822,742 strand feet of OM1, OM4, and OS2.
    • 6, 12, 24, 48 counts based on application.
  • 50 splice cases

• Cost for tube cable and fiber installation estimated at $1,175,000.
  • About $2.40/strand ft.
250 Acres
Where do we start?
Design Conclusion

• The design phase was a little bit bumpy.
  • Due to campus priorities for capital funding the design phase was halted several times between 2010 and 2014.
  • 3 different design coordinators were assigned throughout the process.
  • Job was rushed to bid before design was completed due to campus initiatives to build two new buildings.
  • Both of which our existing plant could not support.

• Since the design was not complete a series of addendums and bulletins were issued in order to complete design.
  • This made administration of the job difficult.
DIG WE MUST, but first: VERIFY Utility Layout!

GPR

Vacuum extraction.
The surprise of the unknown!

Things that make you go HMMM.....

Blue Stone?! That wasn’t on our profiles drawings!
Progress!

Installation

Restoration
7 way Tube Cable
Installs just like standard smooth wall inner duct.
What we learned in phase 1

• Teach your electrical contractors to pay careful consideration to bends and elevation changes in your duct system.

• 19 way tube cables don’t bend easily!
  • A 7 tube configuration would have been better for our existing environment.

• Once the tube pathways are in, installing fiber is a breeze, literally.

• Communication to the campus community is harder than you think.
  • We didn’t make many friends in Phase 1.
  • People don’t read their emails.

• Drivers and pedestrians don’t pay attention to road closures or detour signs.

• People don’t watch where they are walking.
Pros vs. Cons of ABF

• Pros:
  • Pay as you grow.
  • ROI as soon as you install fiber in the future.
    • 3,000 ft. of ABF can be installed in 20-30 minutes by 2-3 installers.
    • 3,000 ft. of conventional fiber takes a crew of 4 to 6 installers 8 hours.
  • No need to guess on dark fiber capacity.
  • No splices with in your cabling plant.
  • Once tube cable is in there is little to no disruption to camps when adding fiber.
  • Shorter mean time to repair and less costly when damage occurs.
Pros vs. Cons

• Cons:
  • Majority of initial ABF installations are slightly higher in costs vs. traditional installations.
  • Not the normal practice for fiber optic installation in the US.
  • Specialized training required.
Some Myths about ABF

• Not standard complaint.
  • Most ABF systems exceed TIA/EIA 568 and GR-409.

• Cables do not consist of water blocking jackets.
  • Most manufacturers are using water blocking jackets.

• Harder to design ABF systems.
  • Just as easy as a traditional system, instead of planning fiber optic splice locations you are planning tube cable splice locations.
Is ABF technology for your Campus?

• Depends on multiple factors:
  • Need
  • Budget
    • ABF makes sense for interbuilding backbone.
  • Existing conditions
  • Size of campus:
    • If the majority of your fiber runs are less than 3,000 ft. ABF is very cost effective.
    • If you have runs between above 3,000 ft. ABF can still be cost effective.
      • To accomplish runs above 3,000 ft. tandem jetting methods can be used.
References


