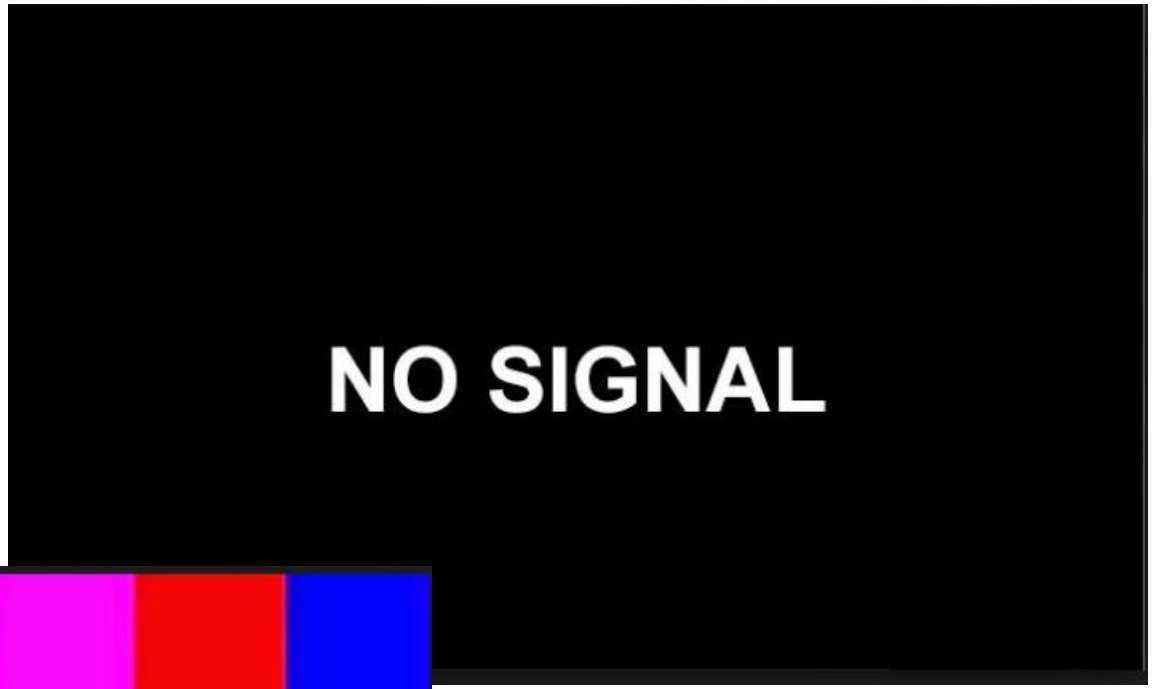
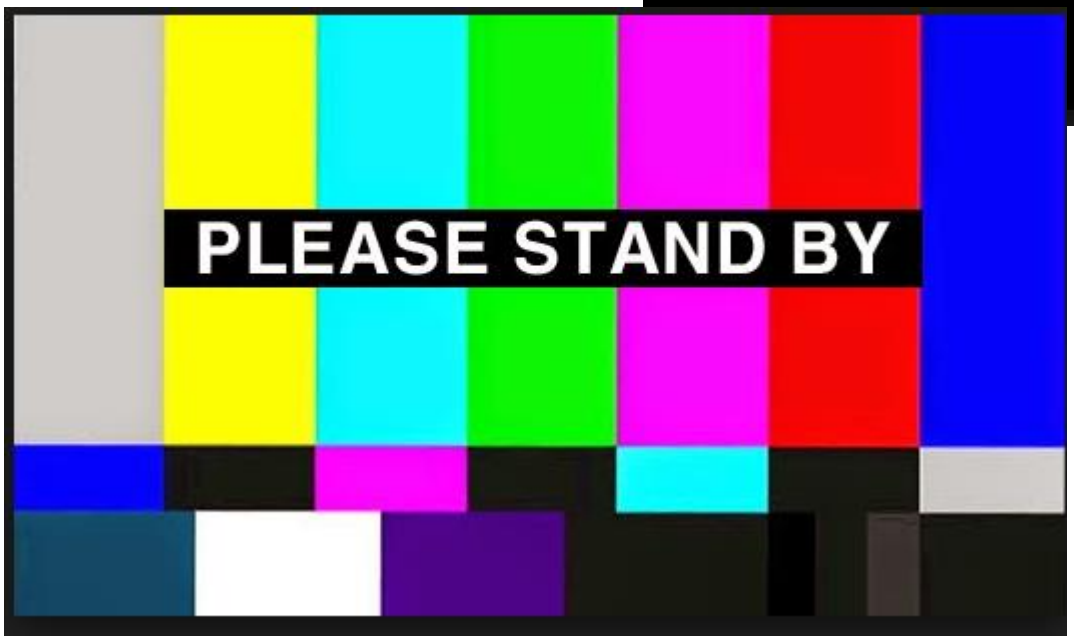
Capex vs. Opex
The Cost of Poor Quality

What Does Your Customer Think When They See This?





Or This…

CLEARFIELD

You Are Not Connected To The Internet

cannot connect to http://www.youcutyourownfiber.com because your computer isn't connected to the internet

Click Here For Network Diagnostics

Soft Costs…Hard Facts

Let's face it, driving for "Bare Bones" FTTH application minimum costs per home passed or connected (CPHP/CPHC) are really making these statements:

- Construction costs are what's important to me
- I'm not concerned about repairing and maintaining what I designed and built (or maybe I don't understand)
- 1 Gbps is all our customers will need from now until…
- I'm willing to build at the lowest possible cost and gamble with the service interruption risks
- I'm willing to build at the lowest possible cost and risk the restoration time of my customer's service
- I cannot compete with my competitors who follow the philosophies and statements above

Your Customer's Satisfaction…

- Is in your hands
- Might result in less churn
- Might develop a reputation of superior service
- Reduces calls to *YOU* - the provider
- Is often forgotten during the planning and engineering phases of FTTH or FTTP

Customers Have a Poor Tolerance of Low Quality Service or No-Service

There is a balance between inexpensive upfront costs and operational costs by reducing risk where it has been historically high, between the FDH, serving terminal and the customer premise. The risk reduction business case can be calculated considering future operational costs and may reveal surprising results.

Variables for Calculation Consideration, including but not limited to:

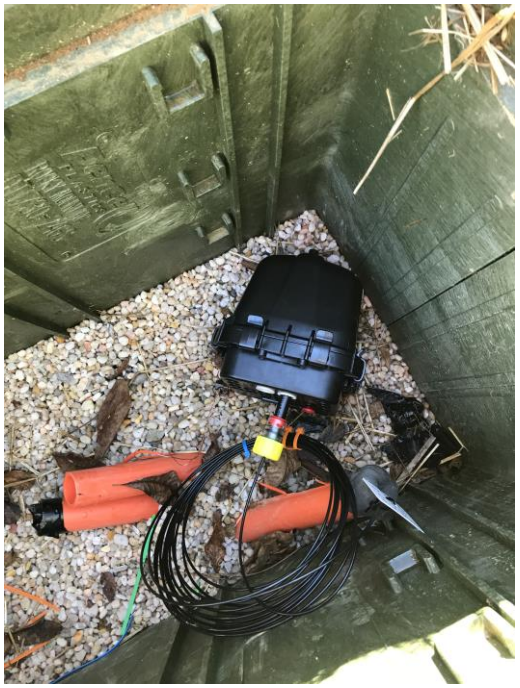
- Soil type
- Average length of a fiber drop run (ft.)
- Initial fiber cost per ft.
- Premise density
- Initial installation labor cost
- Risk factor % (see RVA LLC) http://www.rvallc.com/ftthreports/
- Customer churn average
- Customer retention costs
- Average revenue per subscriber
- Number of truck rolls required to replace ducted vs. non-ducted drop
- Number of labor hours to restore drop
- Truck roll costs
- Loaded labor rate per hour
- Maintenance materials inventory costs (include cubic ft. storage costs)

Some Considerations:

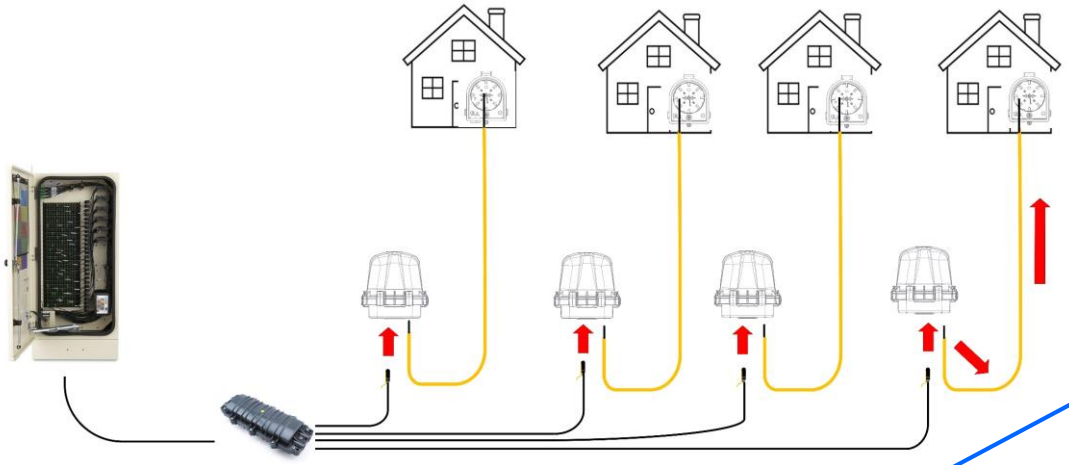
- Fiber Accessibility / Consolidation
- Distribution
- Protection
- Recovery / MTTR
- Training / Documentation
- Connector Cleaning

Accessibility and Consolidation

- Connector Accessibility
  - From the FDH to the Premise
- Testing Efficiencies
- Trouble Isolation
- Consolidated Terminations

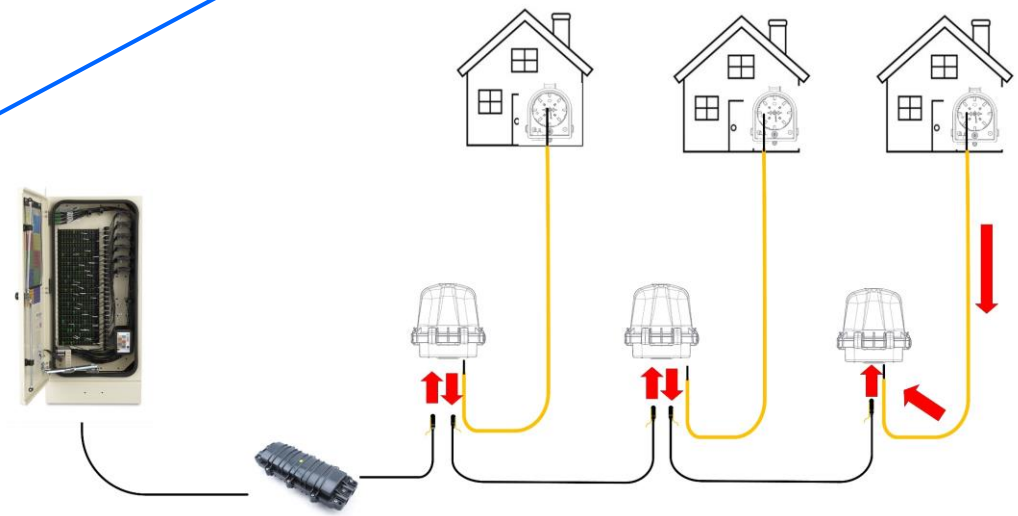


Distribution



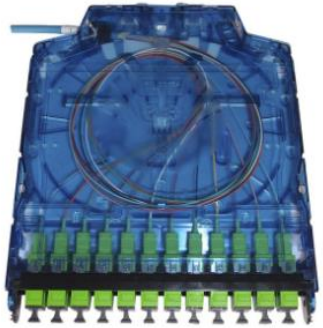
Straightforward sensible network design options with common products and fiber accessibility.

Makes record keeping, provisioning processes, maintenance and repair simpler and efficient.

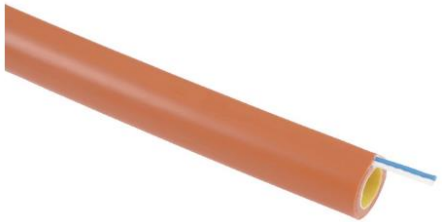


Protection

- Terminating fiber protection using Clearview® Cassettes



- Toneable cable and/or duct



- Telco depth at 24” or greater for cables, spec. drops at 12” and hope for depth beyond shovels

Recovery/MTTR/Protection

- Available inventory for maintenance and repair
- Ducted drops reduce risk
- Temporary drops on top of the ground:
  - Increase service recovery time/the Mean Time To Repair (MTTR)
  - Are often cut before permanent restoration
  - Are a liability, unsafe
  - Create customer anxiety
  - Create customer loss confidence in the provider
  - Waste material
  - Require subsequent visit (perhaps multiple subsequent visits)
  - Would not be necessary with a ducted solution

Many Ducted Drop Solution Choices

www.seeclearfield.com/products/category/pushable-fiber.html

Supporting Information

So, to duct or not to duct?

I have completed 40+ years in telecom and have a definite opinion based on experience.

But everyone needs to make the business case for themselves. Below is a link to an independent study and resulting document for consideration.

- https://www.seeclearfield.com/assets/documents/white-papers/clearfieldtcoreview140916final.pdf

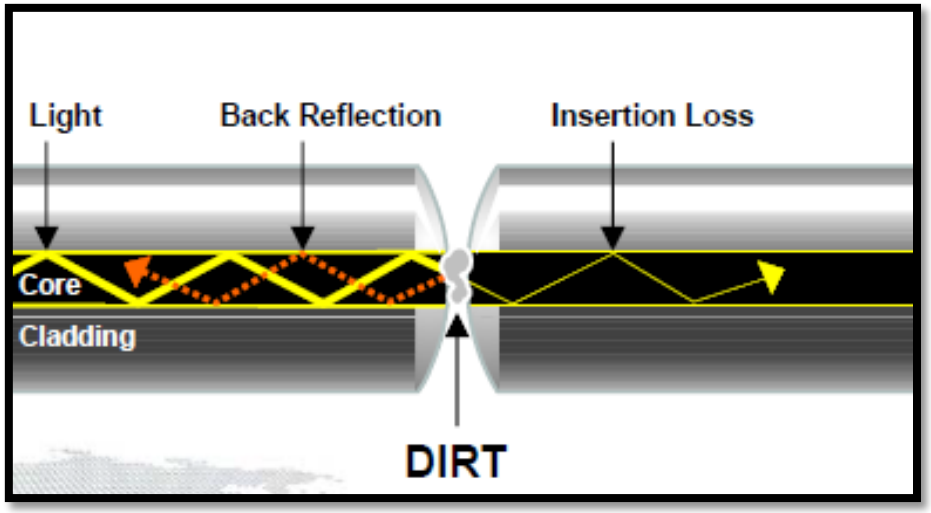
Training/Documentation

- Develop in-house training regarding local standard processes and practices
- Single page laminated job aids for field use
- Clearfield® Technician Certification Program - offered at no charge. We teach your Technicians the proper installation techniques for Clearfield products.
- Record keeping is key, including but not limited to:
  - Baseline Light Source to Power Meter to A to Z and Z to A loss readings between fiber network terminations (Not OTDR Traces/Readings)
  - Network equipment and terminating element labeling and stenciling from network beginning to the premise
  - Initial install loss readings recorded on premise termination tags
  - Fiber assignment /cable count records for all fiber network terminations
  - Cable route cable count records for all cables, splices and drops
  - Cable route engineering / plat drawings with element description/designations, cable and drop footages, terminal, splice, vault, manhole, pedestal, pole locations
- Methods and procedures in place to update and modify training and network documentation, everything listed above
- Making everything listed above easily accessible to technicians and supporting personnel for provisioning, maintenance, service, repair, recovery

Connector Cleaning

A single particle mated into the core can cause significant

- Back Reflection
- Insertion Loss
- Equipment Damage



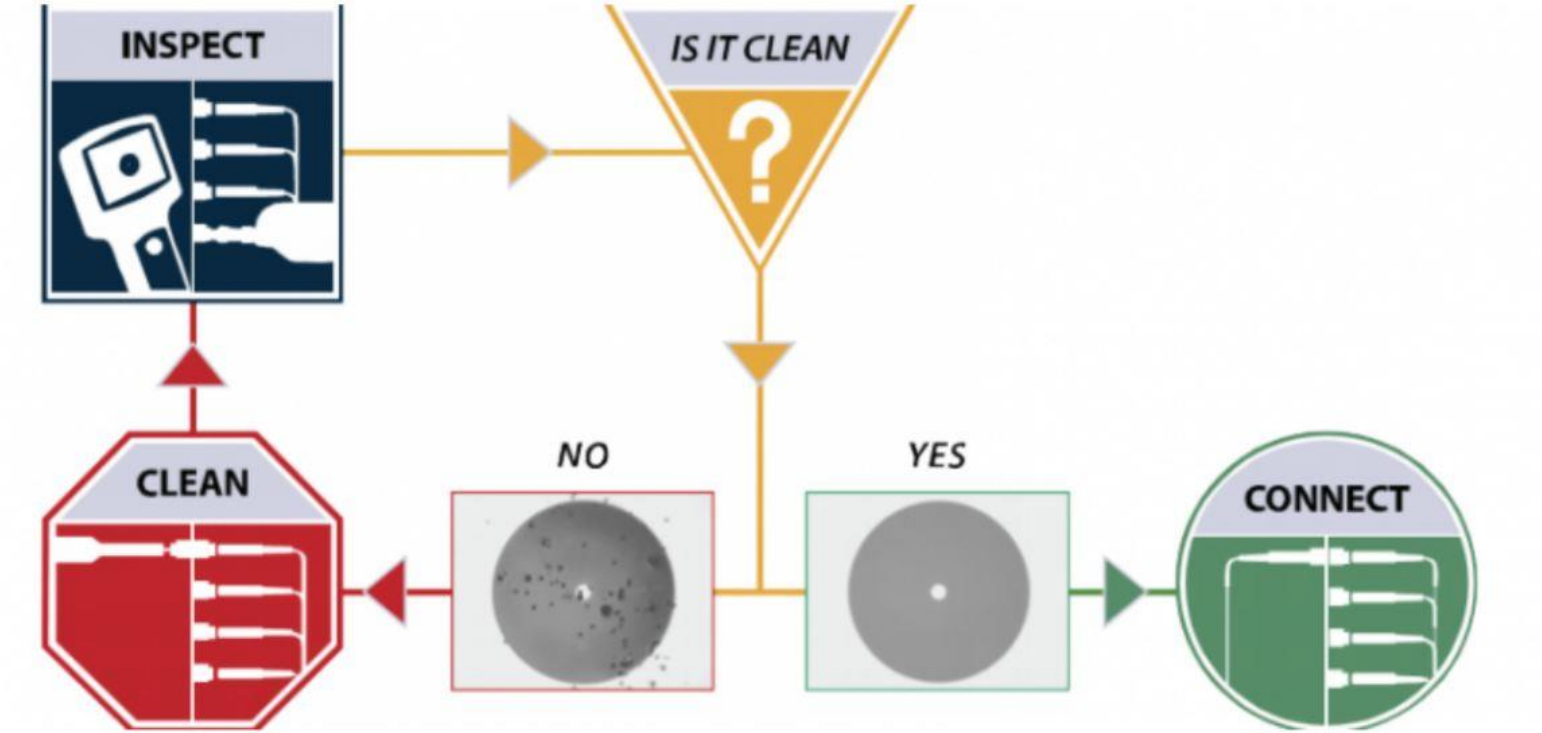
End face pressure when mated is up to 50kpsi (similar to water jet cutters)

Recent study by NTT-**A**dvanced Technology, reported that 98% of Installers/technicians reported that issues with connector contamination was the greatest cause of network failure.

Connector Cleaning

CLEARFIELD

Hands On!



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