

# QUALITY OSP FIBER OPTIC CABLE INSTALL

Key Requirements

March 2019


PCCA Conference

Gerry Harvey

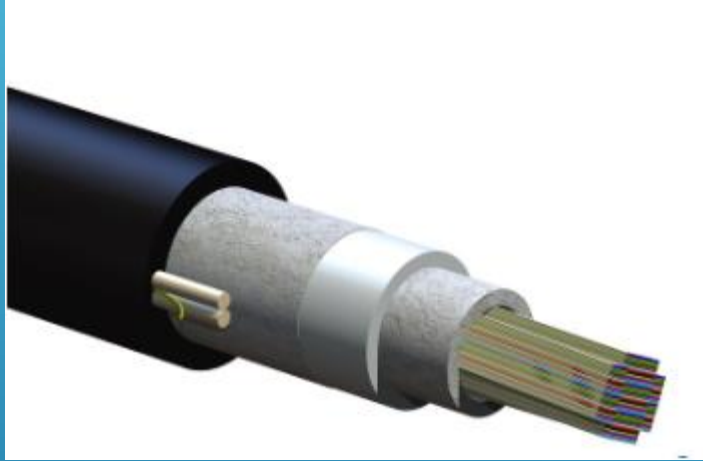
# FIBER OPTIC CABLE INSTALL: TODAY AND TOMORROW

- ▶ What's Driving the Change
  - ▶ Proposal for Step Change in Improvement
    - ▶ Standardize Terminology from MBR to MBD
    - ▶ Garner Support from Manufacturers
  - ▶ Contractor Opportunities
  - ▶ Next Steps/ Action Plans
- 

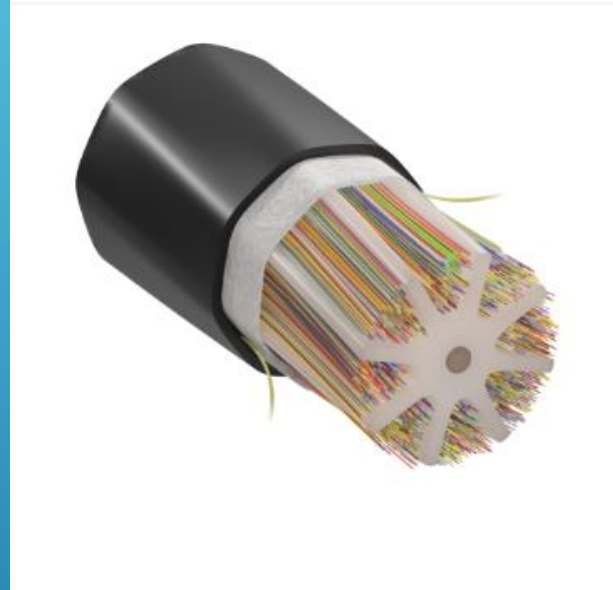
# WHAT'S DRIVING THE INDUSTRY CHANGE

- ▶ Fiber Optic Cable Packing Density Increasing (50x)
  - ▶ Market Demand for Dry Cables
  - ▶ Bend Insensitive Fibers May Mask Cable Damage
  - ▶ Cost per Reel Higher
  - ▶ Old Thumb Rules of 10x and 15x Cable OD for MBR not Valid
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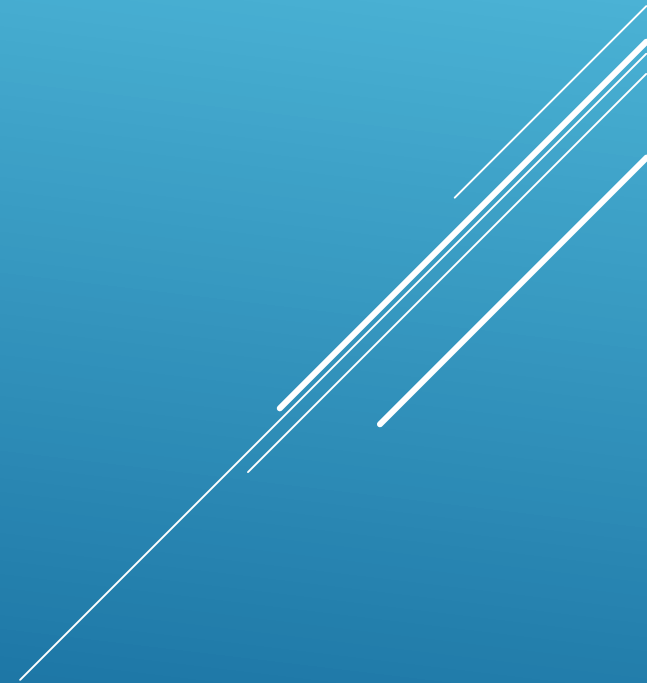
# FIBER OPTIC CABLE TODAY



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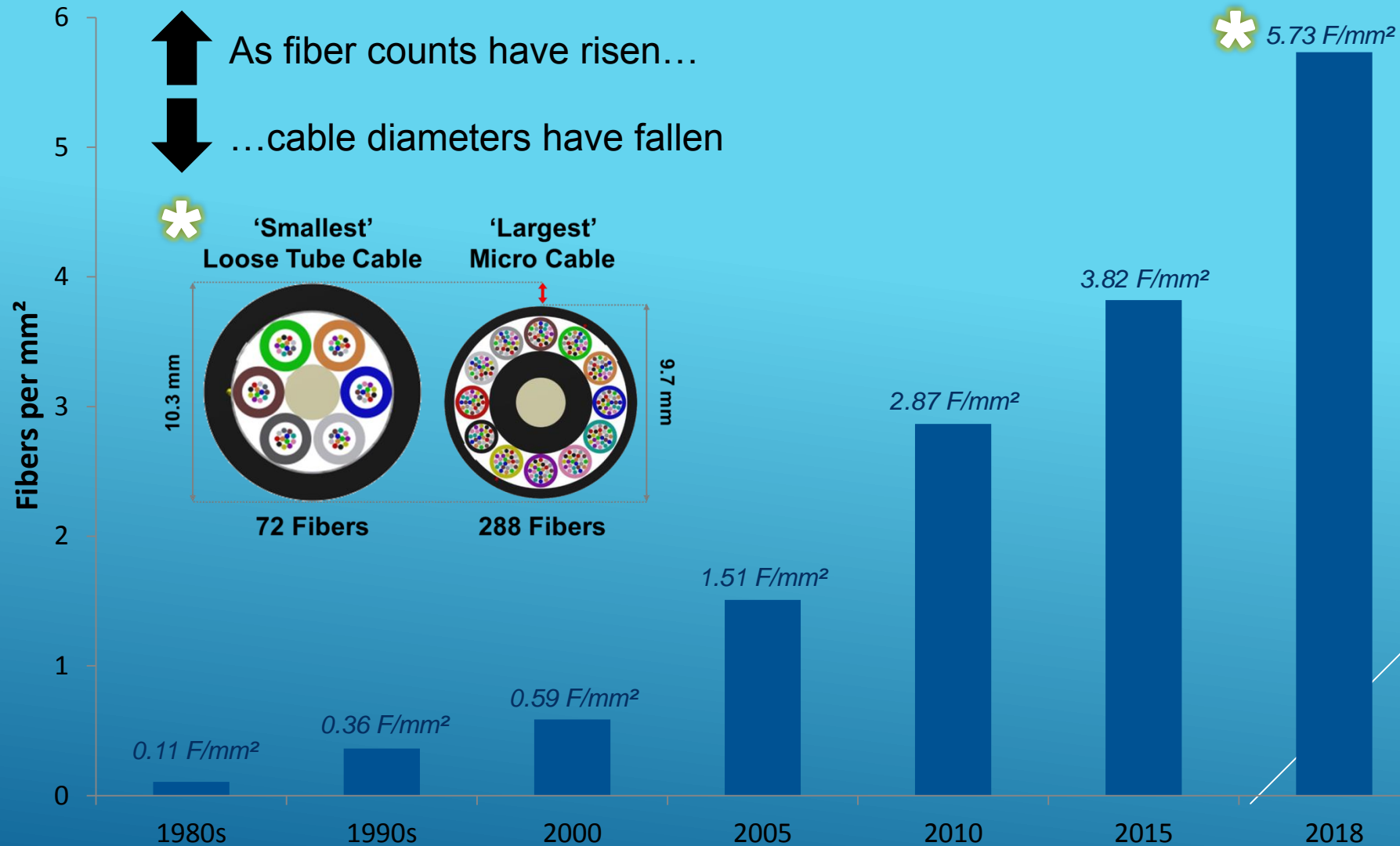


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# CABLE MINIATURIZATION HAS OCCURRED THROUGH CONCERTED INDUSTRY EFFORT


## TRACKING FIBER DENSITY OVER TIME (FIBERS PER MM<sup>2</sup>)



# DRY OR GEL-FREE CABLE

- ▶ New Water Blocking Materials of Tapes and Powders
    - ▶ Reduce Time to Prepare Cable
    - ▶ Reduce Potential Ribbon Damage Due to Solvent Cleaning
    - ▶ Provide Cleaner Splice Cases and Equipment Racks/Floors
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# BEND INSENSITIVE FIBERS CAN HIDE CABLE DAMAGE

- ▶ Cables Shifting from Standard G652D Fibers 2.0" Bend Diameter to G657A  $\frac{3}{4}$ " Bend Diameter
  - ▶ Leads to Potential Masking Cable Internal Damage
    - ▶ Delamination of Ribbon Matrix
    - ▶ Core Tube/ Buffer Tubes Crushed
    - ▶ GRP Strength Elements Fractured and Compromised
- 

# LACK OF CONSISTENT FIBER OPTIC CABLE INSTALLATION INSTRUCTIONS

- ▶ Manufacturers Have Different Cable Installation Diameters Under Load (15X OD, 20X OD, etc.)
- ▶ No Standardized OSP Installation Methods
  - ▶ Most Procedures Have not Been Updated in Over 15 Years
  - ▶ International Standards are not USA Pertinent
  - ▶ US Standards are not Specific Enough
- ▶ Some Recommend Improper Equipment - Cable Wrapping Machines

\* This is for Standard OSP Fiber Optic Cable – OPGW and ADSS Higher Installation Loads



# CRITICAL INSTALLATION STEPS

1

Maintain Forces Less Than Manufacturer's Cable Installation Load

2

Utilize Tools that Provide **Minimum Cable Installation Diameter** Under Load

3

Figure 8 Cable Slack During Install to Minimize Cable Twist


4

Prevent Impact to Cable to Prevent Crush

# MAINTAIN PULL FORCES UNDER RATED LOAD

- ▶ Continuously Monitor Tension
  - ▶ Use a Swivel
  - ▶ If Cannot Monitor Tension, use a Breakaway Swivel
- 
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# MAINTAIN BEND CONTROL – MINIMUM CABLE INSTALLATION DIAMETER UNDER LOAD

- ▶ Rollers and Sheaves
  - ▶ Duct and Split Duct
  - ▶ Capstans
  - ▶ Cable Jetting Equipment
- 
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# STEP CHANGE IN INDUSTRY METHODS AND PROCESSES FOR IMPROVED OSP FIBER OPTIC CABLE INSTALL

- ▶ Four major steps:
  - ▶ Garner industry support from suppliers to address the fiber optic cable changes (optical fiber packing density and dry) and standardize on easier terminology (“minimum bend diameter”, tooling markings and access via a singular web portal to ensure the fiber optic cable can be placed as close as possible to the cable manufactured quality - mechanical and optical properties. Complete (1 October 2018)
  - ▶ Find an independent agency (PCCA) that can be the focal group to facilitate the implementation and administration of the vendors, suppliers and contractors to provide the necessary data for this optimized cable placement. Complete (26 October 2018)
  - ▶ HD Fiber Task Force formed: Ed Campbell, Chair, Sam Stephens, Dan Levac - I will facilitate. Complete (16 November 2018)
  - ▶ Present to the contractor community and garner feedback. Open - PCCA Conference (March 2019)

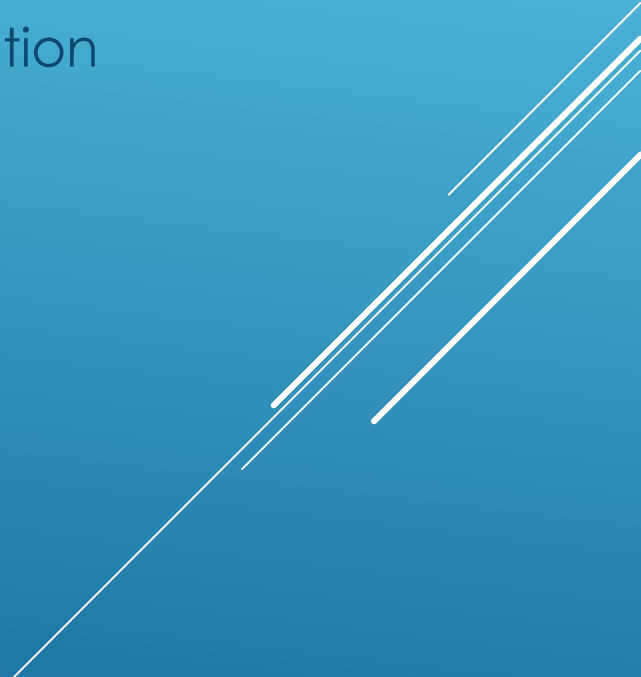
# FIBER OPTIC CABLE MANUFACTURERS

- ▶ In addition to existing specifications - cable ODs, weights, MBR, tensile load - an added specification will include a value for:
  - ▶ “Minimum Cable Installation Diameter Under Load” or
    - ▶ “MUD” – Minimum Underload Diameter
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# TOOLING MANUFACTURERS

- ▶ Minimum Cable Installation Diameter Under Load will be listed on the tooling manufactures' specification sheet
- 

# EQUIPMENT MANUFACTURERS

- ▶ Cable Puller Capstans – Capable Diameters
  - ▶ Cable Plow Blades – MBR to include “Minimum Cable Installation Diameter”
  - ▶ Cable Reel Trailers – Cable Tension and Bend Controls
- 
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# DUCT MANUFACTURERS

- ▶ Proper Duct Placing Guidelines
    - ▶ Placing Integrity
    - ▶ Maintain Routing Diameters
- 
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# SPLICE CLOSURE/ FRAME MANUFACTURERS

- ▶ Proper Buffer Tube/ Optical Fiber Routing
  - ▶ Placing Integrity
  - ▶ Maintain Routing Diameters




# CURRENT VENDORS THAT HAVE PLEDGED SUPPORT

- ▶ Fiber Optic Cable Manufacturers
    - ▶ AFL – Kevin Clayton
    - ▶ CommScope – Rob Wessels
    - ▶ Corning- Darin Howe
    - ▶ OFS - Howard Kemp
    - ▶ Prysmian – Jim Ryan
    - ▶ Sumitomo- Kurt Templeman
    - ▶ Superior Essex- Keith Hoover
- 

# TOOLING MANUFACTURERS

- ▶ Condux – Clay Harris
  - ▶ DCD Design – Chris Pudlak
  - ▶ GMP – Ted Clemens
  - ▶ Jameson – Brad Kekoski
- 

# EQUIPMENT MANUFACTURERS

- ▶ Condux – Clay Harris
  - ▶ Ditchwitch – Tucker Dotson
  - ▶ GMP – Ted Clemens
  - ▶ Jameson – Brad Kekoski
  - ▶ Plumettaz America Corp – Robert Orr
  - ▶ Vermeer – Ed Savage
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# Duct Manufacturers

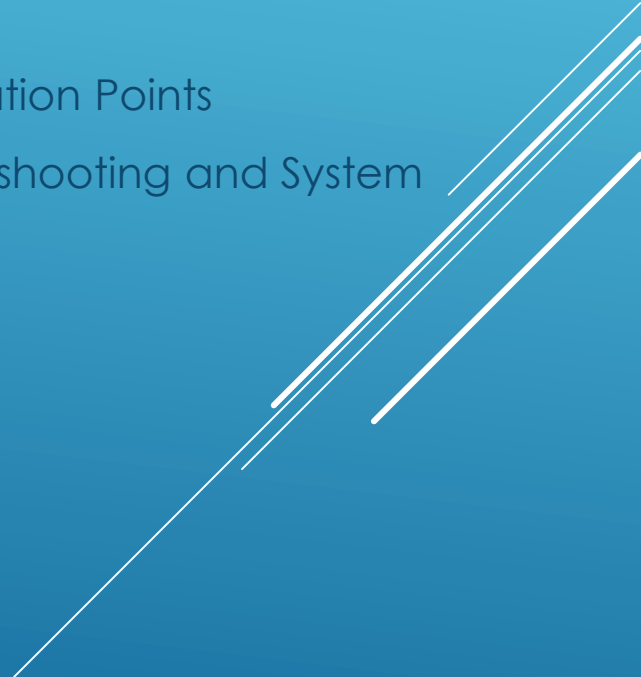
- ▶ Blue Diamond – Bo Vogt
- ▶ Duraline – Tim Grimsley




# Splice Closure/ Frame Manufacturers

- ▶ AFL – Kevin Clayton
  - ▶ CommScope – Rob Wessels
  - ▶ Corning – Derek Corpening
  - ▶ PLP – Dan Levac
- 

# PCCA EXPANDED INITIATIVE TO SYSTEM IMPROVEMENTS

- ▶ First Focus is implement steps for Quality Cable Install
  - ▶ Expand to Include Buffer Tube/ Optical Fiber Routing in Splice/ Termination Points
  - ▶ Next Phase for Connector Handling/ Cleaning, Optical Testing/Troubleshooting and System Documentation
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# CONTRACTOR OPPORTUNITIES

- ▶ Use Required FO Tools, not “Whatever is on the “Truck”
  - ▶ Do not Force Install
  - ▶ Establish a Training Reference and Disseminate
  - ▶ Follow Critical Installation Steps
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# WORK ETHIC - IMHO

- ▶ Safety
  - ▶ Quality
  - ▶ Productivity
- 



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*These four states...*

- Rushing
- Frustration
- Fatigue
- Complacency

*can cause or contribute to these critical errors...*

- Eyes not on Task
- Mind not on Task
- Line-of-Fire
- Balance/Traction/Grip

*...which increase the risk of injury.*

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