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Getting Started Installing Fiber

Speakers

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Getting Started Installing Fiber

Welcome! This presentation covers the fundamentals of fiber optic installation, equipping you with the knowledge and best practices to successfully install, splice, and test fiber optic cables.

Key Topics:

- Fiber Optic Cable Basics: Types, connectors, and essential components.
- Installation Best Practices: Handling, routing, and securing fiber optic cables.
- Splicing Techniques: Mastering fusion splicing and mechanical splicing for reliable connections.
- Testing and Troubleshooting: Essential tools and techniques for ensuring optimal performance.
- Using contractors VS in-house construction

Let's Get Started!

Ask questions!

Please feel free to ask questions and make this interactive.

We’re here to help you get started installing fiber!

Who here is already installing fiber ISP? OSP?

Are you looking for high level and budgetary? Or the nuts and bolts of popping getting customers?

Quick Bio

Josh
*Started wireless in 2006
*Started fiber in 2019
*RDOF winner, ARPA projects, about 150 miles of OSP in parts of three rural counties

Bayan
*Started wireless in 2002
*Started Fiber in 2019
*Joined WAV to promote Fiber in the WISP industry in 2023

Attenuation:

- **Absorption :** Absorption occurs in several specific wavelengths called water bands due to the absorption by miniscule amounts of water vapor in the glass.

- **Scattering** : Scattering is caused by light bouncing off atoms or molecules in the glass. It i s strongly a function of wavelength, with longer wavelengths having much lower scattering. 95% Average attenuation for single-mode fiber is approximately .3 db/km depending on wavelength

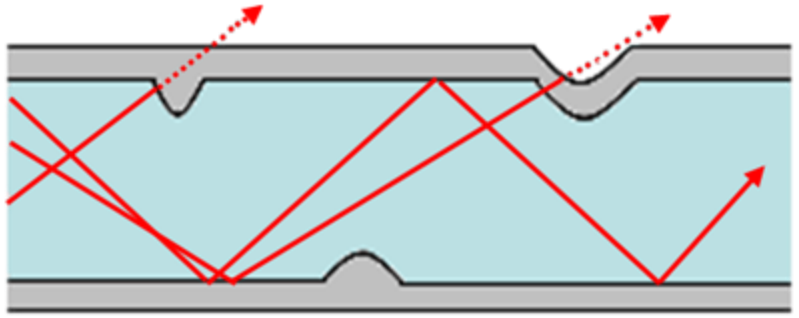
- **Bends and microbend**

- **Splicing:** Fiber optic splicing is a common cause of extrinsic fiber attenuation. Splicing loss can be reduced by using high quality fiber optic connectors and a fusion splicing machine.

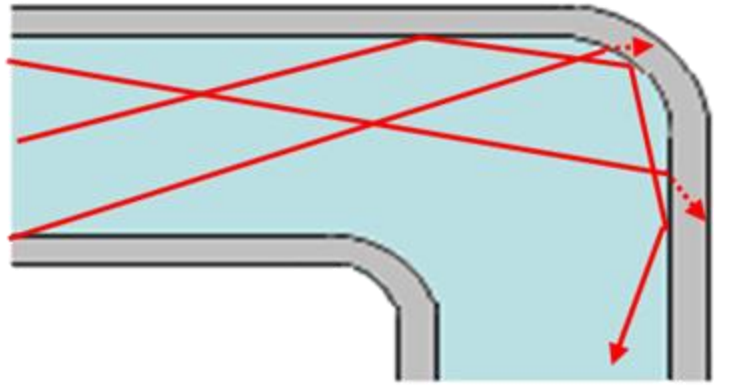
- **Contamination:** Dirty end-faces (fiber connections) can cause many problems, including intermittent operation or a complete breakdown.

Bending

- **Micro Bending:** Micro-bend losses are caused by microscopic fiber deformations in the core-cladding interface caused by induced pressure on the glass.



- **Macro Bending:** Macro-bending losses are due to physical bends in the fiber that are large in relation to fiber diameter

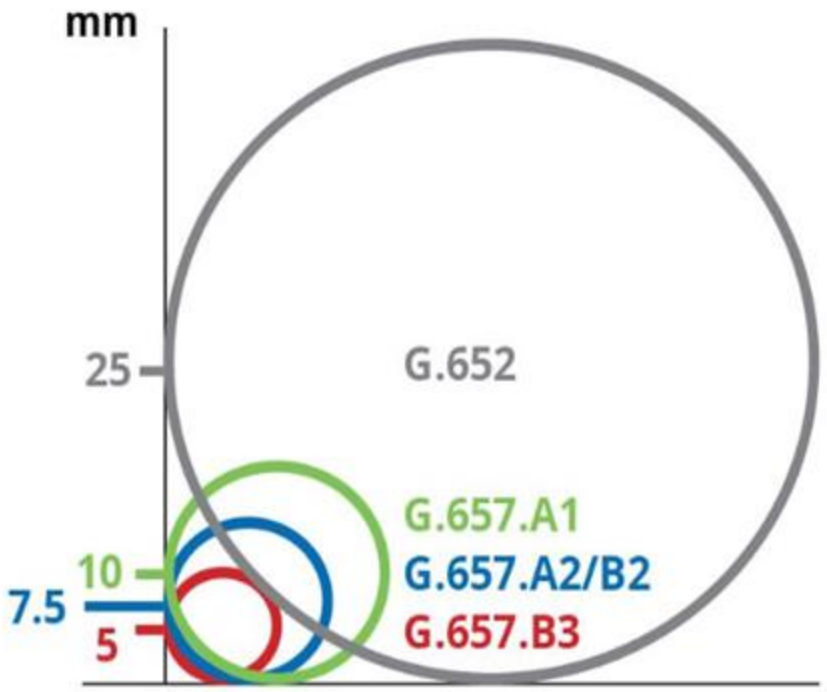


Types of SM Glass

ITU-T standards: International Telecommunication Union- Telecommunication

G.652D fiber is widely recognized as the most commonly used single-mode fiber.

G.657 can be categorized into three subtypes: G.657.A1, G.657.A2/B2, G.657.B3 and is more common in Micro Fiber, Drop cables, patch cables.



Discussion Items

Loose tube versus Ribbon

Multi mode versus Single mode

VFL tool, light meter tool

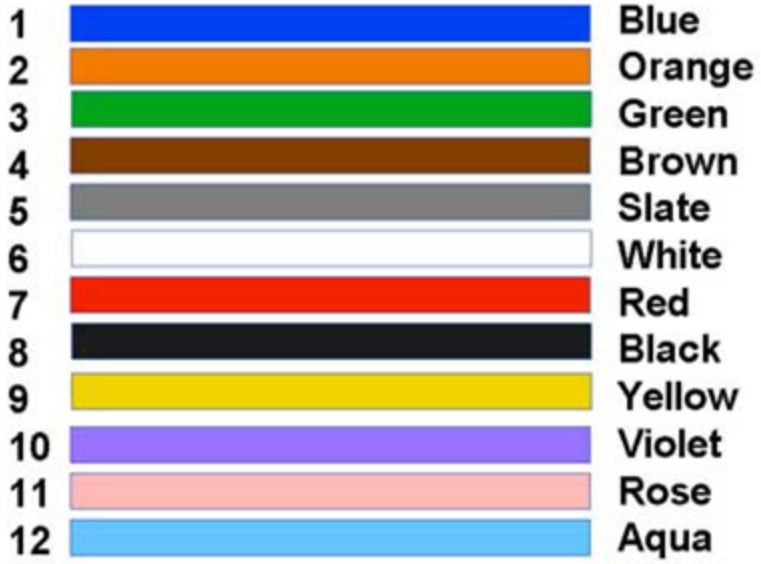
Mechanical connectors versus splicing

Connectors - LC, SC, APC, UPC

Urban and rural installs

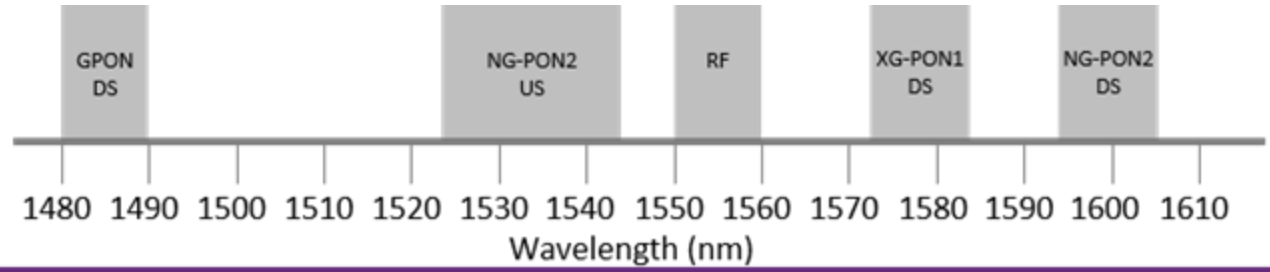
Handy notes

FIBER	TUBE	1 Blue	2 Orange	3 Green	4 Brown	5 Slate	6 White	7 Red	8 Black	9 Yellow	10 Violet	11 Rose	12 Aqua
1	Blue	1	13	25	37	49	61	73	85	97	109	121	133
2	Orange	2	14	26	38	50	62	74	86	98	110	122	134
3	Green	3	15	27	39	51	63	75	87	99	111	123	135
4	Brown	4	16	28	40	52	64	76	88	100	112	124	136
5	Slate	5	17	29	41	53	65	77	89	101	113	125	137
6	White	6	18	30	42	54	66	78	90	102	114	126	138
7	Red	7	19	31	43	55	67	79	91	103	115	127	139
8	Black	8	20	32	44	56	68	80	92	104	116	128	140
9	Yellow	9	21	33	45	57	69	81	93	105	117	129	141
10	Violet	10	22	34	46	58	70	82	94	106	118	130	142
11	Rose	11	23	35	47	59	71	83	95	107	119	131	143
12	Aqua	12	24	36	48	60	72	84	96	108	120	132	144



Cord jacket (or buffer) color

Color	Meaning
Orange	Multimode (50/125) (OM2)
Aqua	Multimode (50/125) (850 nm Laser-optimized) OM3 or OM4 10 G laser-optimized 50/125 µm multi-mode optical fiber
Violet	OM4 multi-mode optical fiber (some vendors)
Lime green	Multimode (50/125) (850 nm Laser-optimized) OM5 10 G wideband
Grey	outdated color code for multi-mode optical fiber
Yellow	single-mode optical fiber
Blue	Sometimes used to designate polarization-maintaining optical fiber



ISP/OSP

Design first, build second

Building a fiber plant is expensive. Doing it over is even more expensive!

Due to inability to manufacturer a crystal ball, a lot of the design comes from experience and knowledge of your market.

Want help? Visit ‘Fiber Design and Engineering’ on Wednesday 10AM in Versailles 1 - Paris

Buried vs Aerial

Buried is generally more reliable. Aerial is largely considered to be faster. Neither of these statements are entirely consistent as some operators can build buried fiber faster than utility pole owners can make ready and some buried plants get hit by poorly run crews every day.

In some environments, like rocky or mountainous areas, buried plants would cost monstrous dollars making aerial the only choice.

Never do peds.

-Every fiber company ever

Seriously, do not do peds

Contractor versus employees

Contractor needs a profit, but a good one should be able to build faster than you especially when you pay for AsBuilts.

Employees have their share of issues but the managers/owners of your company have full control over them and what they do. But of course, their mistakes are your mistakes.

Active Ethernet (AE) versus PON

Active Ethernet gives you far more capacity and can be much more economical for electronics. A single fiber strand from CO to customer can do 10Gbps FDX with $100 in parts (RB260GS + optic). Active Ethernet is simply the fiber version of what you're used to with cat5e/rj45 with mega-ultra-range (up to 75 miles).

Think 100 port switch for 100 customers.

PON shares one head end optic to many (16, 32, 128) customers. GPON shares 2.5Gbps, XSGPON shares 10Gbps, NGPON2 shares 40Gbps, etc. Range is 16+ miles (assuming 1x32 split).

Think 16 port OLT for 512 customers.

Guided tours

Imagine Networks does ~66% direct plow and ~33% drill. We splice, install customers, and bury the drop in house. We have 0 aerial at this point.

Tours available. Our plant is outside of Casstown, OH 45312. Tours cost a CBR & Baja Blast from Taco Bell.

THANK YOU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