



OSP HANDBOOK

CONSTRUCTION & CONTRACTOR BEST PRACTICES

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OSP Handbook 2019





QUALITY

We're getting hit. All contractors are getting hit because work is not being done according to specifications!

Our customers EXPECT that the work we do is
DONE RIGHT THE FIRST TIME.

BUT, If you don't know, or forgot, or are deliberately not following the rules, you're putting VerTek and your job at risk.

This handbook of SPECIFICATIONS needs YOU to pay attention to details. Your continued work with VerTek depends on it.

WORK MANAGEMENT

Be prepared EVERY SHIFT and you'll be better able to handle the surprises.

SCOPE OF WORK

- Do you have a well-defined work plan with locations, deliverables, schedules, etc.?
- Are all contractors qualified to work in the state/jurisdiction and OK'd by client?
- Do you have all contracts, contractor's licenses, and insurance certifications?
- Have you had a preconstruction meeting with all crews and contractors?
- Is material in the warehouse, ready for work?
- Are your invoice control systems in place and are the contractors ready to use them?

DAILY PLAN

- Do your daily work-assignment tools and applications work properly?
- Are you able to properly manage inventory?
- Have you communicated your work plan with Public Safety and other local/county agencies?
- Does your customer know your work plan for today?
- Are your crews properly staffed?

CONSTRUCTION ISSUES

- Have the routes been walked out before work starts?
- Do the as-builts conform to what you find during walk-out?
- Are all joint use and pole attachment agreements in place and ready?
- Are permits ready and copies in the hands of work crew supervisors and foremen?
- Are you able to track Make-Ready status?
- Do As-Builts identify the locations of Grounding Electrodes?
 - And are they confirmed as per walk out?

DOCUMENTATION

- Permits
- Licenses
- Insurance
- Agreements

TRAINING

- Are techs "cable savvy?"
- Hold regular connectorization training sessions in the field
- Hold regular Fiber Splicing training sessions in the field
- All new techs should receive:
 - Ladder Safety
 - Defensive Driving
 - PPE
 - Use of Penguin Data App

VEHICLE, TOOLS & EQUIPMENT INSPECTION

Perform the following safety checks monthly:

VEHICLE

- Steering
- Flashers (Hazard)
- Headlights
- Brakes/Taillights
- Turn signals
- Back-up lights
- Dash
- Interior lights
- Brakes
- Tire Pressure
- Back-up sensor/alarm
- Seat belts
- Wipers
- Windows and windshields
- Mirrors
- Horn
- Body condition
- Clean cab
- Clean floor in cargo
- Organized test equipment
- Storage in cargo department
- Spare tire
- Jack/lug wrench
- Inverter

UNDER THE HOOD

- Fluids: o Brake o Trans o Power steering o Coolant o Washer
- Oil (change date)
- Hoses
- Belts

BUCKET SYSTEM

- Lift condition
- Hydraulic fluid (reservoir)
- Date of last safety inspection
- Wheel chocks
- Outriggers (if installed)
- Safety lanyard & harness
- General condition
- Safety decals

SAFETY EQUIPMENT

- Fire extinguisher
- First Aid kit
- Hard hat
- Eye Safety o glasses o goggles
- Safety vest
- Cones: o 6 for service vehicle o 13 for bucket truck
- Voltage detector
- High voltage gloves
- Flashlight
- Strobe
- Ice scraper
- Accident Forms
- HazCom Manual
- Battery handling kit

DOCUMENTATION

- Drivers License up to date
- Employee ID
- Insurance card
- Vehicle Registration
- Fuel log

SAFETY INSPECTION CHECKLIST

Perform the following safety checks on-site, on a regular basis:

VEHICLE

- Parking - Off property if possible, follows parking policy
- Beacon and Flashers - Activated
- Security / Inspection - Pre-trip complete, emergency brake engaged, vehicle locked
- Documentation - Licenses, daily inspection form, insurance card, accident kit
- Tools / Equipment - Properly secured
- Items Secured - vehicle had no loose or unsecured objects

TRAFFIC MANAGEMENT

- Cones - Used, proper # in channel with taper and separation
- Glow Vest / Signs / Barricades - Used where needed - both directions
- Flaggers - lane blockage, street crossings, proper procedure

PPE

- Hard Hat
- Eye Protection
- Hand Protection - material handling, ladder usage, pulling cable, digging, etc.
- Footwear - proper boots for the job
- Hearing Protection – as required when working with loud power tools

POLE CLIMBING

- Clothing - Long pants, long sleeves.
- Gauntlet Gloves - Used / in good condition.
- Climbing Gear Condition - Gaff shape, strap wear, etc.
- Pole Condition - prod and sounding test performed & performed correctly
- Cut-out Test - performed correctly
- Gaffs - demonstrated proper technique

BUCKET TRUCK

- Set Up - Within angle limits, uses chocks properly
- Harness and Lanyard - In use
- Boom Operation - Smooth and confident, works below conductors

LADDER USE

- Survey Path - Plans route, clears hazards
- Removal / Carry - Proper technique off truck, proper carry & control
- Set Up - Solid, flat surface, proper angle (1:4 rule), safe - tie on poles
- Up / Down / Working - Hands on rails, 3-point contact, working position, safety on/off

VOLTAGE DETECTOR

- Testing - Inspection up to date, correctly demonstrates self-check
- Properly used

TRAFFIC MANAGEMENT

- Cones - Used, proper # in channel with taper and separation
- Glow Vest / Signs / Barricades - Used where needed - both directions
- Flaggers - lane blockage, street crossings, proper procedure

GENERAL

- Tool Selection and Use - used proper tool for the job & used properly
- Worksite Housekeeping - good (low risk)
- Safety - current work operation was being done safely
- Lifting and Carrying - associate used proper carrying and lifting techniques

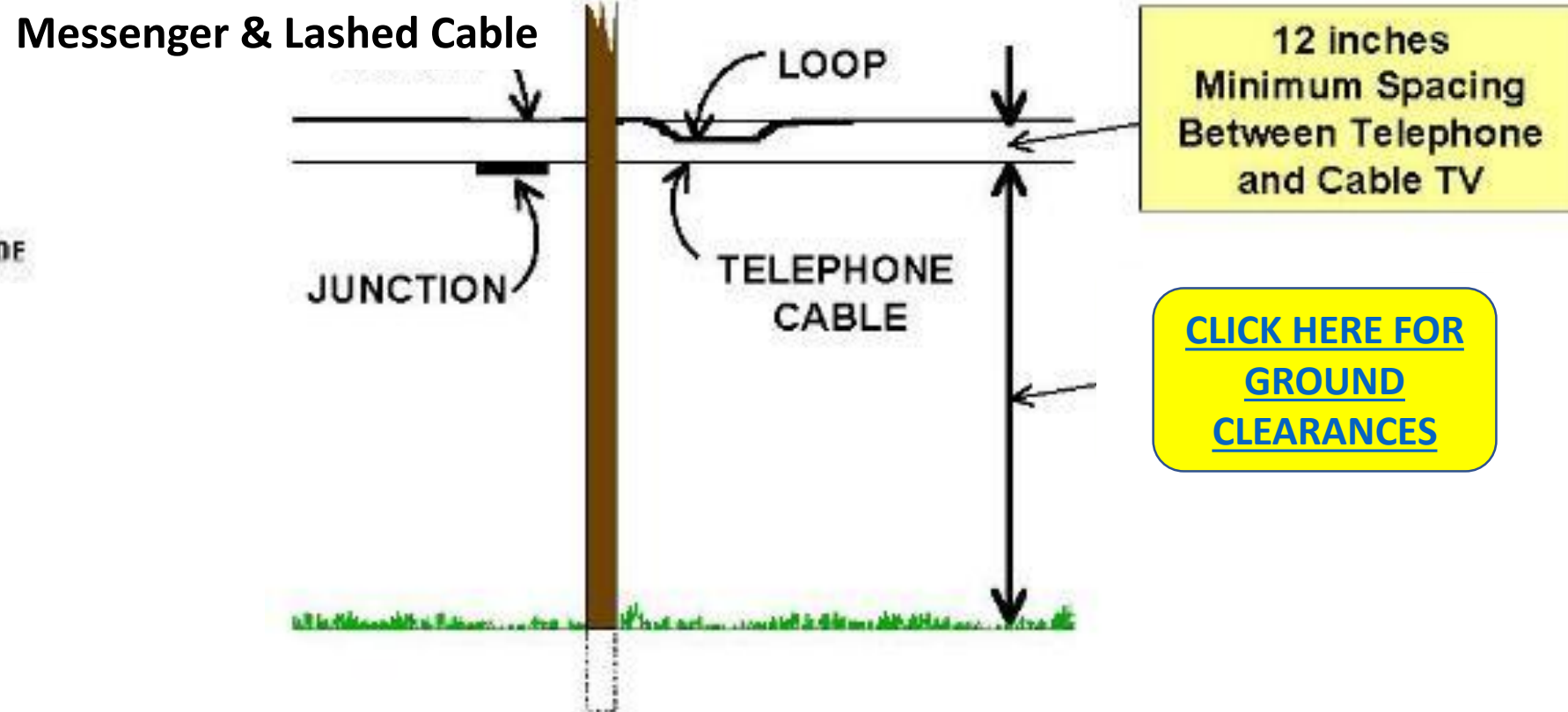
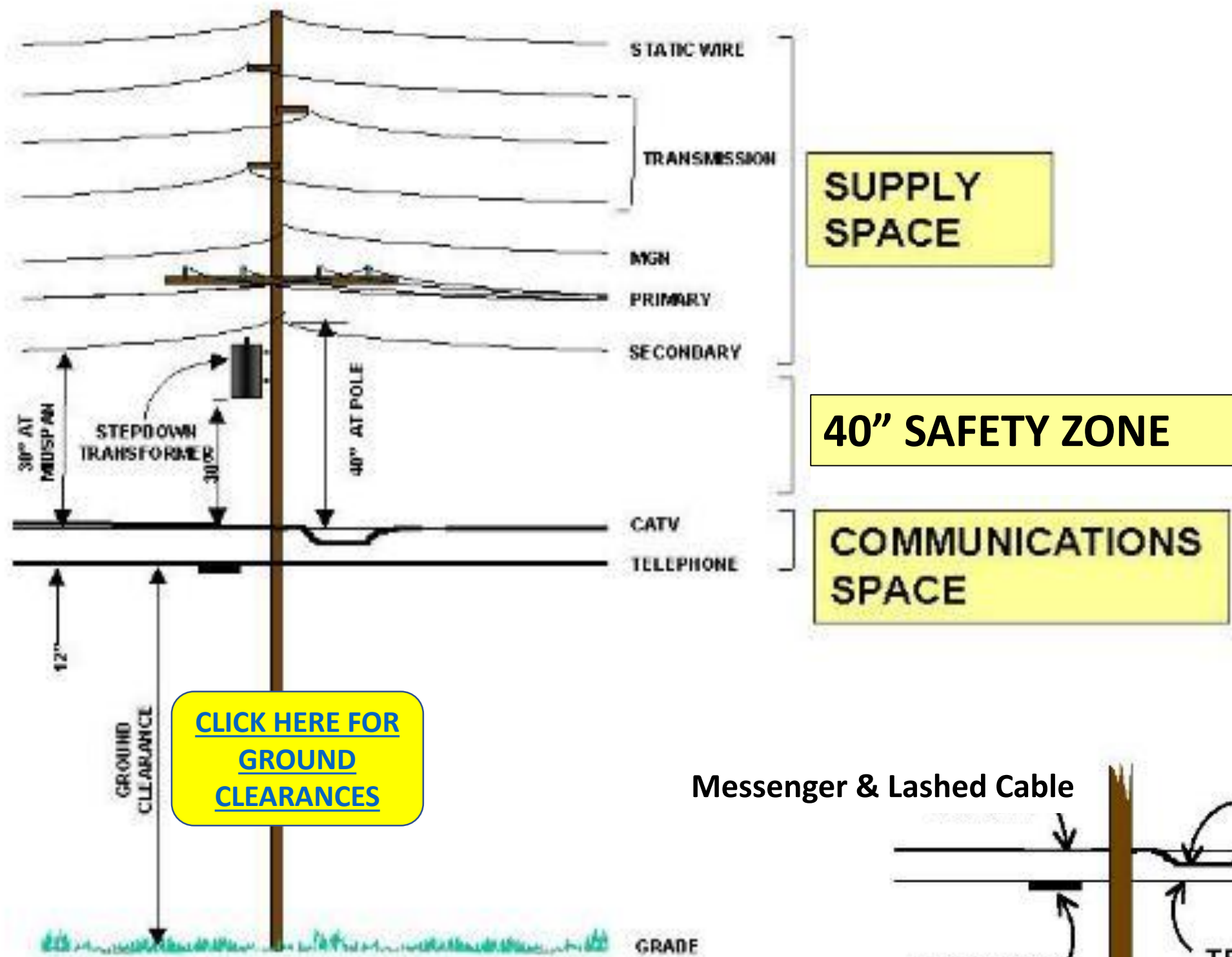
AERIAL CLEARANCES

NESC Table 232-1/Vertical Clearance of Wires

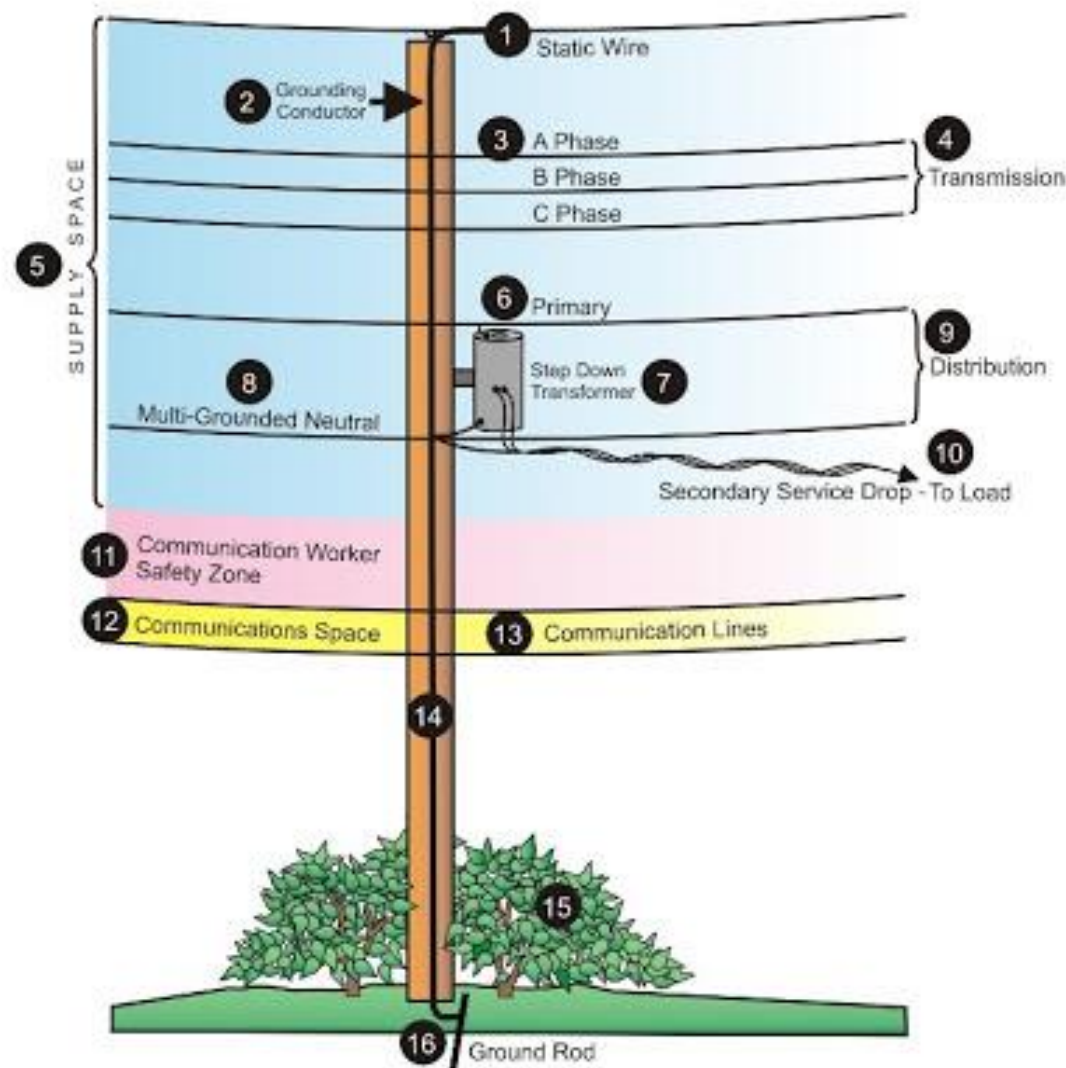
This chart shows the clearances required for a coaxial cable, isolated communication conductors and cable, messengers and surge-protected wire meeting NESC Rule 230C1, depending on the type of surface it is above. For a complete listing, please contact the NESC at the address on previous page.

Surface	Minimum Distance feet (meters)
Railroad tracks (except electrified railroads using overhead trolley conductors)	23.5 (7.2)
Roads, streets, and other areas subject to truck traffic	15.5 (4.7)
Driveways, parking lots and alleys	15.5 (4.7)
Other land traversed by vehicles, such as cultivated, grazing, forest, orchard, etc.	15.5 (4.7)
Spaces and ways subject to pedestrians or restricted traffic only	9.5 (2.9)
Water areas not suitable for sailboating or where sailboating is prohibited	14.0 (4.0)
Water areas suitable for sailboating with an unobstructed surface area of:	
Less than 20 acres	17.5 (5.3)
Over 20 to 200 acres	25.5 (7.8)
Over 200 to 2000 acres	31.5 (9.6)
Over 2000 acres	37.5 (11.4)
Land adjoining water areas posted for rigging or launching sailboats with an unobstructed surface area of:	
Less than 20 acres	22.5 (6.8)
Over 20 to 200 acres	30.5 (9.3)
Over 200 to 2000 acres	36.5 (11.1)
Over 2000 acres	42.5 (12.9)

AERIAL CLEARANCES



AERIAL CLEARANCES



The 40" space between the lowest power line and the CATV system is the SAFETY ZONE, designed to protect broadband technicians from shock and electrocution.

DO NOT RAISE your bucket above this space and do not use push poles that might contact power lines..



OSHA ALERT

Working Safely Near Overhead Power Lines

Working with or near power lines can expose workers to electrical hazards, but these dangers can be avoided through safe work practices. These practical steps can prevent injuries from contact with power lines.

- Conduct a hazard assessment to identify and address potential safety hazards before work begins.
- Ask the electric company to de-energize and ground overhead power lines.
- Educate workers on safety procedures and requirements.
- Know the safe working distance for workers and equipment.
- Use non-conductive wood or fiberglass ladders.
- Wear personal protective equipment, such as rubber insulating gloves and insulating sleeves, and industrial protective helmets.

For more information on recognizing hazards from energized power lines, visit OSHA's [Electrical Safety and Health Topics](#) page. OSHA videos on electrocutions in construction show how to work safely with [cranes](#) and [ladders](#) near power lines.

OSHA's [On-Site Consultation Program](#) provides no-cost and confidential occupational safety and health compliance assistance to small- and medium-sized businesses. Consultation services are separate from enforcement and do not result in penalties or citations. The [OSHA Training Institute Education Centers](#) offer courses for workers, employers, and managers on hazard recognition and abatement at convenient locations nationwide.

OSHA alerts are issued on occasion to draw attention to worker safety and health issues and solutions.



• osha.gov/powerlines • 800-321-OSHA (6742) • @OSHA_DOL

AERIAL SAG

Unique Aspects of the Messenger Strand (Suspension Strand)

The aerial messenger strand is designed to support the actives, passives, cables, clamps, and lashing wire of a cable system.

The messenger cable must be tensioned so that it will sag (typically 1%-1.5% of Length) and remain within the 12" of space between it and the telco cables. Example: If a span is 100 feet between poles, then the allowable sag should be 1 foot BUT this is for the span alone with .5" of Ice and about 4 PSI of wind in the zones of OK, and TX. Mounting the cables, lash, and electronics adds to the load on the messenger and adds to the sag.

To achieve this, the messenger strand's installation tension must be adjusted sufficiently to offset the effects of span length, temperature, mechanical loading, and wind and ice.

YOU MUST CONFORM TO THE DESIGN SPECIFICATIONS PROVIDED TO YOU. FAILURE TO TENSION MESSENGER CORRECTLY WILL RESULT IN REWORK, DELAY, AND JEOPARDIZE YOUR CONTINUED WORKING WITH VERTEK, LLC.



Distance from horizontal to bottom of center is called "Sag."

AERIAL SAG

Who is responsible for this? The sag of the CATV messenger, loaded with fiber appears to be sagging correctly.

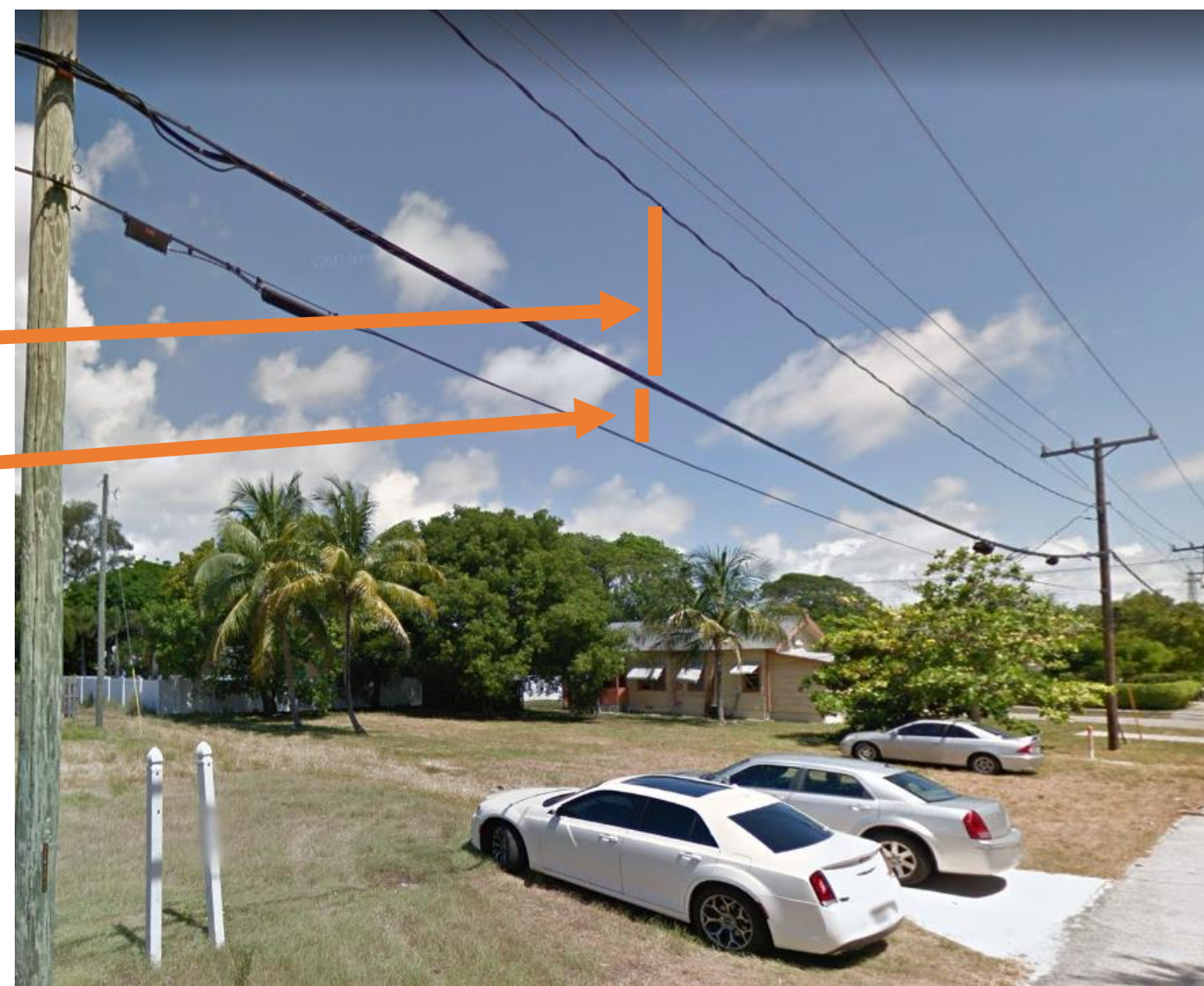
The telco messenger below CATV appears to be tensioned too tight. It does not have enough sag.



These spans appear to be correctly tensioned.

Note the 40" Safety Zone

Note the 12" min space between CATV and Telco.



BONDING TO GROUND

Bonding is the permanent joining of metallic parts to form an electrically conductive path to ensure electrical continuity. Bonding metallic system parts together safely conducts current likely to be imposed on the grounding electrode.

Messenger is bonded to ground to prevent flashover (Shorts/Lightning) between the messenger and the cable shield, and the possibility of damage to active and passive devices.

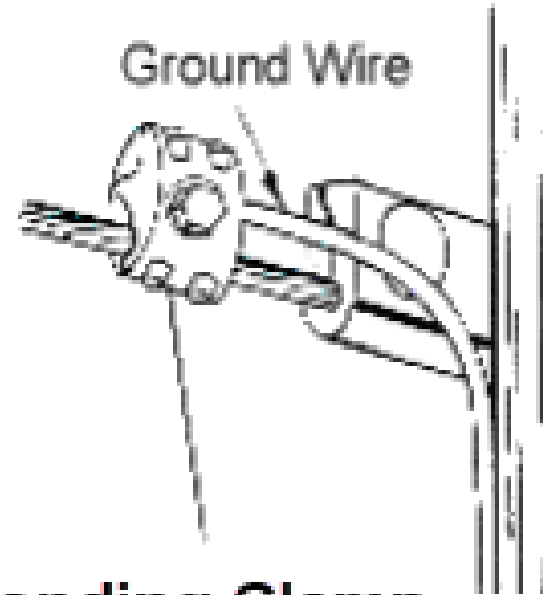
Messenger **MUST BE** bonded to the pole's grounding electrode located at the base of the pole.

Use the proper conductor gauge, and bond to pole ground when riser is adjacent to pole using industry-accepted components designed for such use.

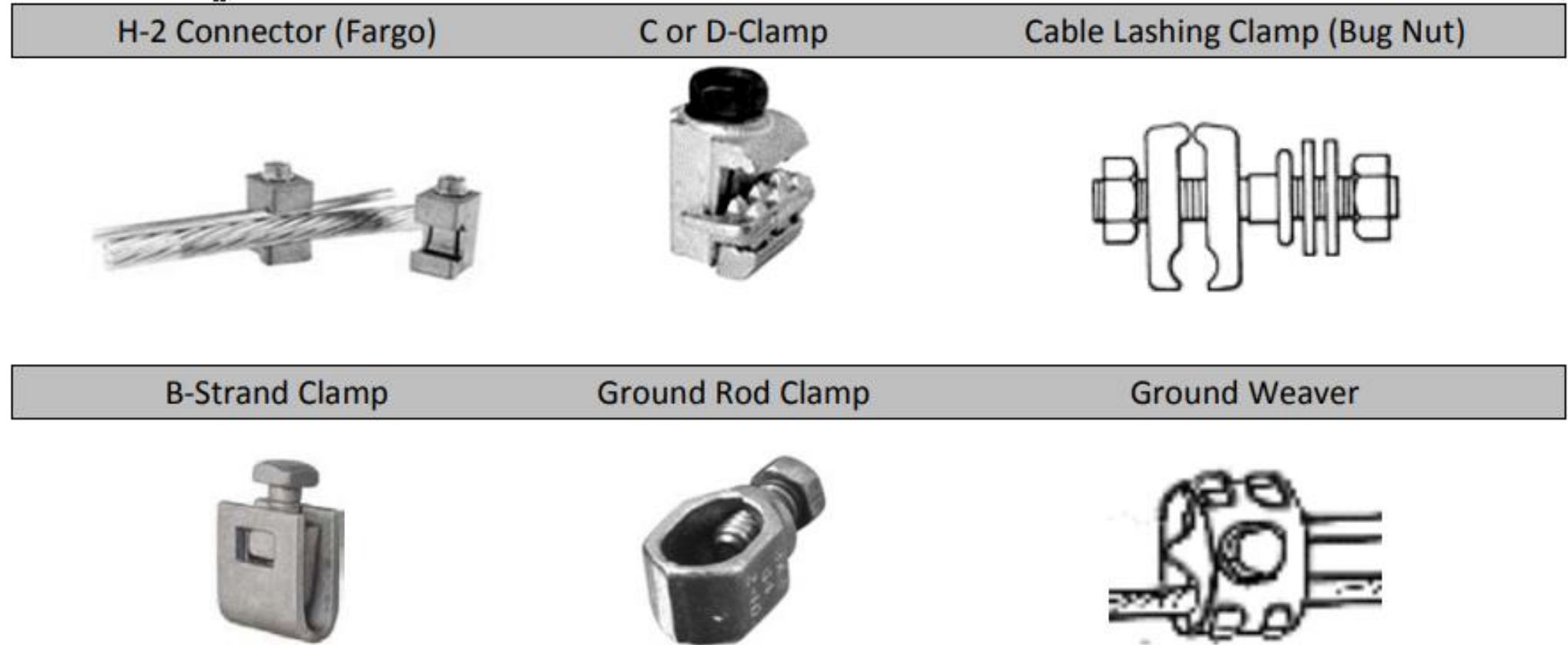
PROTECT THE bond wire riser using U-Guard as suggested by the manufacturer.

BEST RESOURCE: [OREGON JOINT USE ASSOCIATION STANDARDS COMMITTEE \(2017\)](#)

BONDING TO GROUND



Bonding Clamp
Ground wire must not extend past the end of the clamp.



GUYS & ANCHORING

The National Electrical Safety Code (NESC) addresses anchors in Sections 253, 261, and 264.

Placement Considerations The distance between the anchor and the pole is generally based on the load the anchor is required to hold and the anchor type.

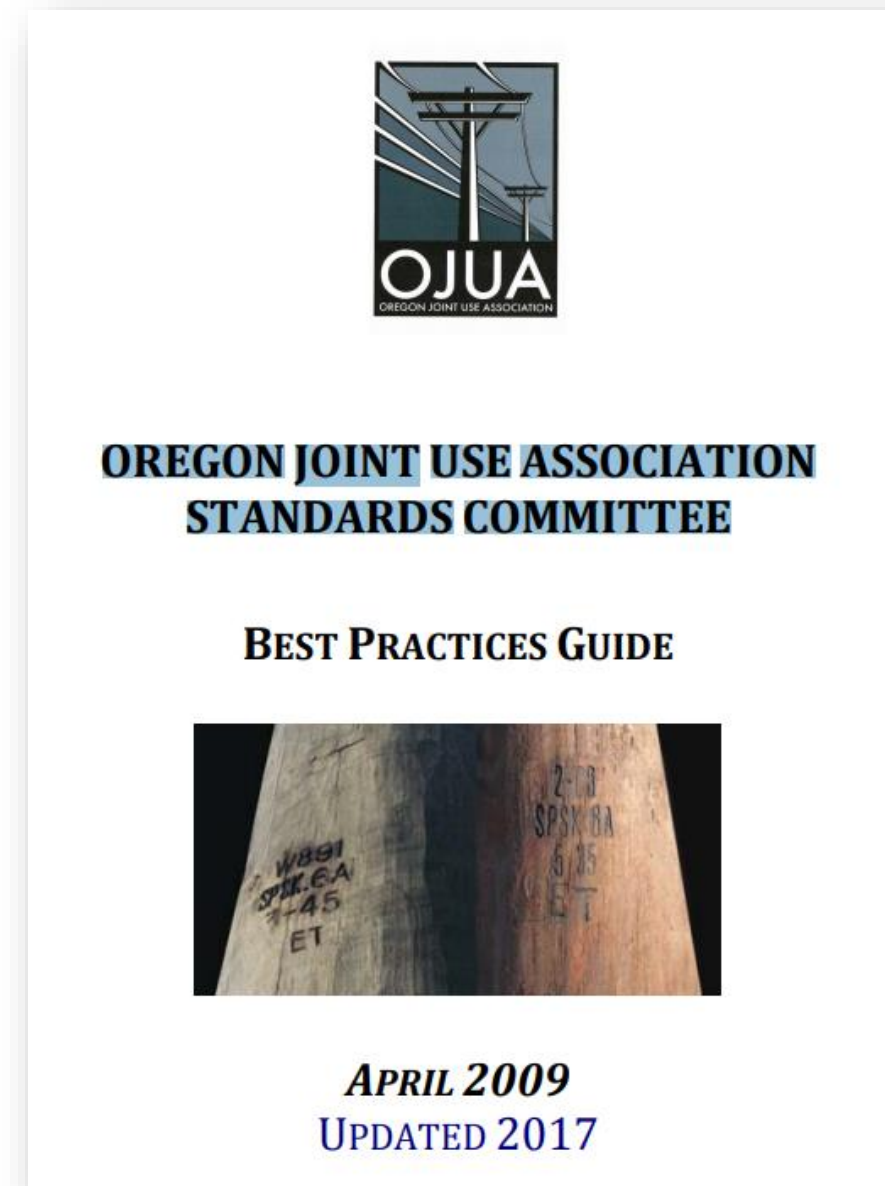


Anchors are generally placed no less than five (5) feet from an existing anchor. This is done to ensure the soil surrounding the existing anchor is not loosened while installing the new anchor.

Heights to lead ratio means that for every foot of pole height that place your attachment, you place the anchor one foot away from the pole.

- 1:1 ratio is optimum
- 2:1 ratio is good
- 3:1 ratio is the minimum

When identifying the need to have your plant guyed at a specific location, you may observe another utility's anchor(s). This anchor may have an available open eye. You must first get permission from the anchor owner prior to occupying that open eye with your guy. These are "eye" bolts that are attached to an anchor rod above grade.



For detailed specs and standards for Guys and Anchors, refer to this document.

CONE PLACEMENT



CONE PLACEMENT

Cones. Yeah, Cones!

There's an OSHA [Rulebook](#) for it. Each state Department of Transportation (DOT) has a standard based off the OSHA Rulebook. [TEXAS](#), [OKLAHOMA](#), [KANSAS](#), [NEW YORK](#), [ARIZONA \(Phoenix\)](#)

If you're parked, PUT OUT YOUR CONES!

- Driveway?
 - CONES in front and behind your truck
- Parked on street but working in easement?
 - FIVE CONES MINIMUM: one front, three side, one or more behind depending on speed limit
- Ladder on sidewalk?
 - TWO CONES, three feet from ladder, side to side

Crossing a street? PUT OUT CONES, SIGNS, FLASHERS, AND BARRICADES!

- FLAGGER stopping and directing traffic.
- CONSTRUCTION AHEAD WITH FLASHER sign placed seven car lengths behind worker on ladder, in street, or in bucket.
- Create a safe zone (See [OSHA GUIDE](#)) behind crossing on BOTH SIDES OF STREET.
- REMOVE CONES AND SIGNS ASAP after lash off.
- DO NOT HANG splice case or snowshoes above road crossing

Slack

DO NOT coil slack and hang with tie wraps unless coming back next day to properly install slack

DO NOT EVER leave fiber or splice case hanging or on the ground where it can be vandalized.

SIGN PLACEMENT



SIGN PLACEMENT

Did we forget the signs – HECK NO!

Before any new detour or temporary route is opened to traffic, all necessary signs shall be in place. All Traffic Control Plan (TCP) devices shall be removed as soon as practical when they are no longer needed. When work is suspended for short periods of time, TCP devices that are no longer appropriate shall be removed or covered.

Common sense dictates that if a vehicle or bicycle cannot see the work area up ahead, like on a curve, PLACE A SIGN!

Signs are especially critical when working aerial plant over a road.

**LACK OF PROPER SIGNAGE AND TCP MAY
RESULT IN A STOP WORK ORDER AND FINES!**

PERSONAL PROTECTIVE EQUIPMENT [PPE]



Since 1857

Impact Resistant Polycarbonate Lenses

Temple-End Holes for lanyard attachment



Uvextreme® Coating
Anti-fog, anti-scratch, anti-static and UV protection

ANSI Z87.1+ 2010 OSHA 1910.133 SP Z94.3-07 (R2014)

MADE IN USA GLOBAL COMPONENTS



PPE

Techs are forgetting to use PPE

You're working outdoors, or in a warehouse. Stuff can fall, you can fall. It's not a matter of IF, it's a matter of WHEN. YOU HAVE TO BE PREPARED!

- Safety vests are required AT ALL TIMES
- Lineman's Belt with D-Rings
- The standard hard hat has the brim and vents
- Safety glasses AT ALL TIMES
- GLOVES, they make ones you can use with a phone
- Gaffing? You NEED A BUCKSQUEEZE fall arrestor
- Ladders? Bucket Truck?
 - Harness and Lanyards are a MUST. Don't be lazy or a show-off

Working on a Power Supply?

- Neoprene gloves and a face shield - batteries are filled with acid
- Have Eyewash station available. The manufacturer often specs what First Aid Kits to have.

PPE

DON'T TAKE CHANCES – PROTECT YOURSELF

BORING TECHS

- Read material data sheets on the lubricants you use
- Have eyewash and handwash stations available
- Use the proper gloves

**Hard Hats, Eye Wear,
Gloves, and Boots are the
most overlooked PPE
items.**

**DO NOT SKIMP ON
PROTECTING YOURSELF
FROM INJURY.**

PERMITS

A jobsite without a posted permit, or one that's easily accessible is a STOP WORK ORDER waiting to happen.

- 1. Make sure a readable image of the permit is sent to all foremen on the job. Take photos with your phone and text the permit to your team.**
- 2. Have a copy of the actual permit in the hands of someone on the jobsite AT ALL TIMES.**
- 3. DO NOT STRAY from the work you are allowed to do and where you are allowed to do it. If you “get creative” it might mean you have to wreck it out, restore the property, and DELAY THE PROJECT. Stay within the confines of the permit.**

AS-BUILTS

While system maps should all be universal, some companies use symbols that don't always match what we typically consider "THE STANDARD."

Spend some time getting familiar with the system maps you are given. If you have any questions, ASK!!!!

Your JOB is to provide accurate details about what you built and how it changes the previous AS BUILT. You MUST use the client's symbols to identify pole attachments, bonds, power supplies, power insertion, actives, passives, aerial and underground runs, vaults and handholes and locations of slack managers and splice cases.

Failure to provide this TRUE AND ACCURATE updated information will result in chargebacks, delays, and a loss of trust between VerTek and the Client.

LOCATING

Source: CGA Best Practices

Available Records

Facility locators use available records at all times. Facility records indicate approximate location, number of facilities, and access points for buried facilities within a requested area. The use of facility owner/operator-supplied records is an effective method of identifying facilities as part of the locating process.

Corrections and Updates

If a facility locator becomes aware of an error or omission, then the facility locator provides information for updating records that are in error or for adding new facilities.

During the course of a locating activity, a locator may become aware of errors or omissions. The corrections are submitted to the appropriate person or department in a timely manner. The method of notification is determined by the facility owner/operator.

Omissions and errors may occur as a result of misdrawn records, changes during construction at the job site, repair or abandonment of facilities, and delays in posting new records. Failure to note errors or omissions when found could result in damages to the facility at a later date.

Color Code

A uniform color code and set of marking symbols is adopted nationwide.

Color Code Identifiers

White	Proposed Excavation
Pink	Temporary Survey Markings
Red	Electric Power Lines, Cables, Conduit, and Lighting Cables
Yellow	Gas, Oil, Steam, Petroleum, or Gaseous Materials
Orange	Communication, Alarm or Signal Lines, Cables, or Conduit
Blue	Potable Water
Purple	Reclaimed Water, Irrigation, and Slurry Lines
Green	Sewers and Drain Lines

LOCATING

Typical Q&A – What to do if...

I do not think the locate marks for underground utilities at my dig site are correct. What should I do?

First, check the Positive Response System to make sure any utility hasn't left instructions for you. Then, contact the utility owner directly. Contact numbers are on your ticket or in Internet Ticket Entry.

I've confirmed utility responses, and all indicate the site is located, but when I got to the site there were no locate marks. What do I do?

Excavation or demolition is not safe without first checking into why the marks are not there. There are several reasons why the marks are missing. Contact the utility directly responsible for those marks and get clarification. Contact numbers are on your ticket or in Internet Ticket Entry.

If I'm a subcontractor on a job, do I have to get a separate locate ticket or will the general contractor's locate ticket protect me?

Each jurisdiction recommends that all excavators request tickets and subcontractors can be listed in the Remarks section on the ticket.

I requested to meet with the utility companies at my dig site, but no one showed up at the designated time. Why?

Requests are just that, requests. If you want confirmation that a utility company will meet you, please contact the utility directly to arrange a date and time.

The locate marks at my excavation site have been destroyed. What do I do?

Stop digging where the marks are destroyed and request another ticket. Remember to reference the current ticket number for easy retrieval. You can dig in another part of the job site covered on the ticket where the marks are still visible.

How can I protect the marks?

Do not drive machinery over the marks.

Do not place spoil piles or building materials over marks.

Sweep paved areas often so painted marks remain visible.

EXCAVATING

Source: CGA Best Practices

One Call Facility Locate Request

The excavator requests the location of underground facilities at each site by notifying the facility owner/operator through the one call center.

Unless otherwise specified in state/provincial law, the excavator calls the one call center at least two working days and no more than ten working days prior to beginning excavation.

Currently 50 states and 5 Canadian provinces have one call legislation and/or established one call centers recognizing that excavation performed without prior notification poses a risk to public safety, excavators, and the environment, and can disrupt vital services provided by facility operators. Increased participation in this one call system provides for improved communication between excavators and facility operators necessary to reduce damage.

White Lining

When the excavation site cannot be clearly and adequately identified on the locate ticket, the excavator designates the route and/or area to be excavated using white pre-marking, either onsite or electronically (when available through the one call center), prior to or during the request for the locate ticket.

The route of the excavation is marked with white paint, flags, stakes, lines, polygons, or a combination of these to outline the dig site prior to or during notification to the one call center and before the locator arrives on the job. Electronic white lining when available provides an alternative method where excavators may indicate their defined dig area visually by electronic data entry (lines or polygons) without the need for a physical site visit. The technology allows the excavator to identify for the locate technician a clear delineation of their proposed excavation area. Pre-marking allows the excavators to accurately communicate to the one call center, facility owners/operators, or their locator where excavation is to occur. The 1997 safety study "Protecting Public Safety through Excavation Damage Prevention" by the NTSB reached the conclusion that pre-marking is a practice that helps prevent excavation damage. Maine was one of the first states to have mandatory pre-marking for non-emergency excavations. Connecticut also adopted a pre-marking requirement; however, the law provides for face-to-face meetings between operators and excavators on projects that are too large for or not conducive to pre-marking. Facility owners/operators can avoid unnecessary work created when locating facilities that are not associated with planned excavation. (See Appendix B for additional practice information)

EXCAVATING

Locate Reference Number

All calls from excavators processed by the one call center receive a unique message reference number, which is contained on all locate request messages.

The excavator records this number; it is proof of notification to the members. The computer-generated request identifies the date, time, and sequence number of the locate request. Each locate request ticket (notification) is assigned a unique number with that one call center, the requestor, and the facility owner/operator.

This number distinguishes this ticket from all other tickets so that it can be archived and retrieved upon request to provide the details of that request only.

Pre-Excavation Meeting

When practical, the excavator requests a meeting with the facility locator at the job site prior to marking the facility locations. Such pre-job meetings are important for major, or unusual, excavations.

The meeting facilitates communications, coordinates the marking with actual excavation, and ensures identification of high-priority facilities. An on-site pre-excavation meeting between the excavator, facility owners/operators, and locators (where applicable) is recommended on major or large projects. This includes projects such as road, sewer, water, or other projects that cover a large area, that progress from one area to the next, or that are located near critical or high-priority facilities. Such facilities include, but are not limited to, high-pressure gas, high-voltage electric, fiber-optic communication, and major pipe or water lines.

Trenchless Excavation

The excavator requests the location of underground facilities at the entrance pit, trenchless excavation path, and the exit pit by notifying the facility owner/operator through the one call center.

The trenchless equipment operator performs a site inspection, walking the trenchless excavation path prior to commencing work, and has a good understanding of the job.

The trenchless excavation operator confirms and maintains the path and minimum clearances established by the project owner and design engineer by tracking and recording the path of the trenchless excavation until complete. Means of tracking trenchless excavations include electronic locating/guidance devices, pipe lasers, water levels, visual inspection, etc.

When existing facilities are known to be present but cannot be potholed as a result of local conditions, the facility owner and the excavator meet to discuss how to safely proceed with the excavation.

The excavator stops the trenchless excavation operations if an abnormal condition, unknown substructure, or other hidden hazard is encountered. The excavator proceeds safely only after making positive identification.

EXCAVATING

Potholing

Potholing shall be utilized, as required and described herein, to prevent excavation damage to underground utilities.

Potholing is the practice of digging a test hole to expose underground utilities to ascertain the horizontal and vertical location of the facility. The horizontal and vertical position of the exposed facility must be tied to a survey benchmark or permanent above grade feature.

The position may be identified by GPS or traditional survey coordinates or by measuring the distance, with a tape measure, to permanent features in three horizontal directions. In addition, the vertical distance below grade should be obtained. Some municipalities and utility companies do not consider potholing to be an option. Rather, it is viewed as an essential phase of underground construction for all types of excavation including horizontal directional drilling (HDD) operations.

This practice applies to all potholing activities for both construction and design applications.

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EXCAVATING

Dos and Don'ts

DO

- **Dig a pothole for utilities every 100'**
- Receive and maintain a reference number from the one call center that verifies that the locate was requested
 - All calls from excavators processed by the one call center receive a unique message reference number, which is contained on all locate request messages.
 - The excavator records this number; it is proof of notification to the members. The computer-generated request identifies the date, time, and sequence number of the locate request. Each locate request ticket (notification) is assigned a unique number with that one call center, the requestor, and the facility owner/operator.
 - This number distinguishes this ticket from all other tickets so that it can be archived and retrieved upon request to provide the details of that request only.

DON'T

- Dig a pothole prior to verifying marks
- Fail to maintain clearance after verifying marks
- Use improper backfilling practices
- Let marks faded or not maintained



Vac-Tron Vacuum Soil Extraction for Potholing.

STITCH BORING



Use a tarp to make it easy to put the dirt back



Place handholes where specified or as desired by the property owner. Restore with sod or seed & straw.



STITCH BORING

TX/KS/OK Frost depth in your zone is 30”.

Conduit **MUST BE AT LEAST 30”** below the surface.

If you encounter an obstacle like fill, stump, rock, or boulder, you may have to excavate. At no time are we allowed to bore above 30”.

UG fiber installations need a way for us to trace and locate. Make sure that each pull has the necessary tracer wire included.

TESTING FIBER ON THE REEL

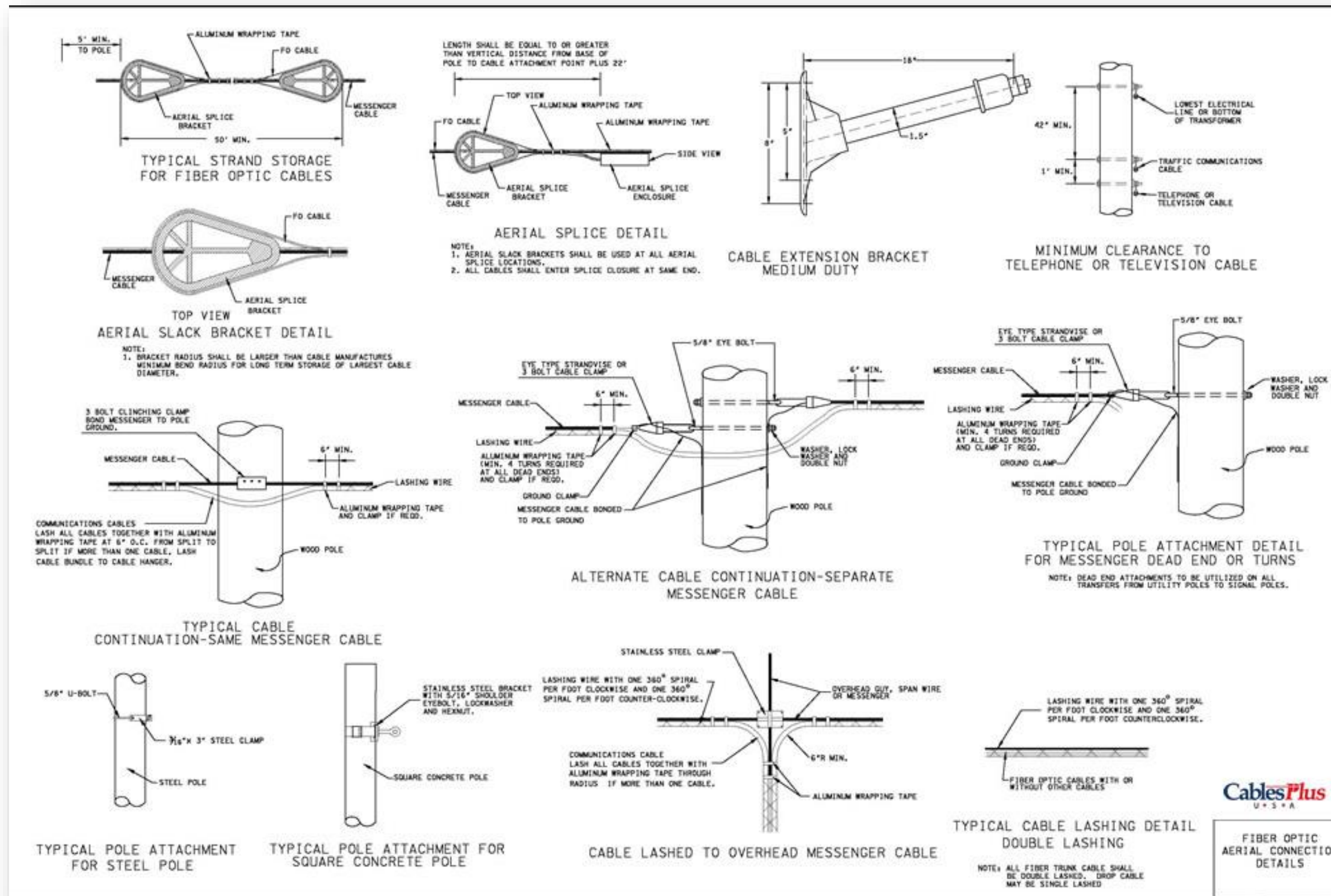
- All optical fiber cables must be tested while on the reel, prior to deployment.
- Pre-test the cable with a Visual Fault Locator (VFL) and/or an Optical Time-Domain Reflectometer (OTDR).
- The VFL will show if the fiber is continuous; the OTDR will confirm that the fiber still meets specifications and has no damage.
- Use a pigtail with a mechanical splice or a bare fiber adapter.
- Test in one direction at 1550nm, using a pulse width of 30ns. There should be no unexpected attenuation and the readings should match the specifications.
- Generate the report and submit it to management.

FIBER INSTALLATION 101

Check out [101 Tips for Fiber Installation](#)

REVIEW THIS RESOURCE

Fiber Optic Aerial Connection Details & Illustrations



FIBER RISERS AND GUARDS



Typical u-guard used in cable systems.

Place footers at base of pole.



Riser Guards (U-Guards) provide high impact, non-conductive protection to communication cables that are installed vertically on utility poles.

Install Riser Guards for all vertical installations on poles.

VIDEOS TO REVIEW

1. [UG Cable Pulling](#)
2. [Multilink Surelight H IP field installable SC/APC connectors](#)
3. [Ladder Safety](#)
4. [Using the Foreign Voltage Detector](#)
5. [Aerial Cable Installation](#)
6. [Proper Property Restoration](#)
7. [Attaching Hardline to equipment \(actives and passives\)](#)
8. [Hubbell - Installing Aerial Fiber Slack Management](#)
9. [Vac-Tron Air Excavation for Potholes](#)