Steel Distribution Poles

What Every Lineman Should Know
Steel Distribution Pole Disclaimer

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Course Outline

• What is a **steel pole**?
• How can they be **used**?
• What are the **differences** between steel poles and wood poles?
• What is needed for **inspection and maintenance** of steel poles?
Why Steel Poles?

- Dimensional consistency
- Light weight
- Dependable strength
- Improvements in manufacturing technology
- Ease of disposal
- Range of sizes, strength
- Lineman safety: no concern for climbing a decayed or woodpecker-infested pole
Manufacturing

- Consistency
- Controlled environment
- Uniform weight
- Recycled materials
Single Pole Tangents
Single Pole Tangents
Single Pole Deadends
Guyed Poles
Tapered and Tube
Shipping

- Shipped via truck or rail to service yard
- # of poles per load is generally governed by volume, not weight
- Cribbing is used to protect finish
Hauling

Haul to pole site in similar manner as for wood poles
Handling

- At least 30 percent lighter than wood poles
- Handle using nylon straps or rope
- Typically lifted using a single point pick up
Handling

- And ... when necessary:
Storage

• Place on cribbing, keep off the ground
• Space so poles have no contact with each other
• No need to rotate when stored long-term
• Poles with below grade coating should NOT be stored long term unless rotated or covered. UV can have a negative effect on coating exposed to prolonged horizontal exposure.
Coatings: Above Ground Protection

- Hot-dipped galvanizing
- Metalizing
- Zinc silicate
- Painting
- Self-weathering steel
Galvanized vs. Weathering Steel

- Different chemistries
- Same pole strengths, dimensions
- Galvanizing is sacrificial coating
- Weathering steel provides own barrier coating
Galvanized vs. Weathering Steel

- Color difference:
  - Galvanizing is grey and dulls with age
  - Weathering steel turns to an even dark brown

- Galvanized poles are vented
- Weathering steel may be sealed
Coatings: Below-Ground Protection

- Urethane
- Epoxy
- Bituminous coating (Bitumastic)
- Wraps
Corrosion Protection

- Sacrificial Zinc Coating
- Polyurethane Coating
- Corrosion Zone
- Steel Pole
- Ground Line
- Soil
Hot Dip Galvanizing

- With a cathodically protective coating, such as galvanized steel, damaged areas will be protected by the surrounding zinc.
Strength

• Vehicle Impact
Sustainable

• Steel is the most recycled material in the world—More steel is recycled annually than all other materials, including aluminum, glass, and paper combined.
• The US steel industry has reduced its energy intensity/ton of steel shipped by 29% since 1990.
• Greenhouse Gas Emissions: GHG/ton of steel shipped have been reduced by nearly 45% since 1975.
• Every steel pole is made from between 25% and 100% recycled steel – and is 100% recyclable and the end of its long service life.
Line Construction
Framing: Steel Pole Characteristics

- Hollow steel members
- Consistent dimensions from pole to pole
- Dimensions will not vary with temperature or moisture
Framing: Hardware

- Steel poles can generally be framed the same as wood

- EXCEPT:
  - Use gains without cleats
  - Use manufacturer’s recommended bolt torques
Framing: Bolt Holes

- Pre-drilled at factory
- Field drill using:
  - hole saw
  - stepped bits
  - titanium bit
Pole Joints

• Longer poles have option of being multi-furnished as multi-section poles
• Field assembly is accomplished using:
  ▪ Slip joints
  ▪ Flange joints
Foundations

Direct Embed
Cross Arms and Hardware

- Same as wood
- Through bolts with curved (or flat) washers
- Banding can also be used for making attachments
- Option of welded attachments for unique applications
Line Operations
BIL

- Achieving 300 kV BIL
- Single Phase - use 13-14 inch FRP pole top pins
- Three Phase - use 8-foot wood or FRP arm w/13” - 14” pin or 10-foot arm:
Grounding

- Steel is an excellent conductor
- No need to run copper ground wire
- Little chance of break in ground
- In most installations, every pole is a ground
- Grounding preferences vary by utility
- Various techniques help ensure proper grounding
Working Around Energized Lines

- Steel pole good conductor
- Minimizes voltage gradients along pole
- Safer place to work
- Good work practices:
  - Use cover ups or guards
  - Use a dedicated observer
  - Set reclosures to non-reclosure positions
  - Consider using ground gradient matting
Live-line installation
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Climbing

Several options available:

- Removal steps
- Removable ladders
- Permanent steps
Safety

• Dielectric Shoes
Climbing

Removable Step

Bucket Truck
Work Platforms
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Gary McDonald
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Thank You!

To learn more…

• Visit linemen.steel.org,
• Call (202) 452.7100, or
• Email ti@steel.org