10 Steps to Building a Better Distribution & Sub-Transmission System With Steel
Steel poles help harden an electric utility line, providing increased reliability at a lower installed cost.

Industry research and user experience show that steel poles require less maintenance and offer more protection against extreme weather, pests and rot.

This guide is a resource to help utility companies and their linemen implement a steel distribution and sub-transmission utility pole program.

For an interactive version of this document, with added links to the online resources, please visit lineman.steel.org

**STEP 1:** Evaluate Your Existing Power Delivery System.

All power delivery systems are not created equal. Before deciding on what type of utility pole to purchase, evaluate your system’s unique requirements. Consider the additional heights and longer spans needed for highway crossings, the installation and maintenance required for remote installations, right-of-way issues, developer or city-mandated aesthetic considerations, special technical situations and budgetary restraints. It is likely that steel poles can provide an economical solution to your distribution and sub-transmission needs.

*Online Resource:
- Steel Utility Pole Manufacturers and Related Companies Listing

**STEP 2:** Compare the Alternatives.

Today, utility companies have several options to consider when constructing a new distribution or sub-transmission line, or upgrading or replacing an existing system. These include steel, wood, fiberglass and concrete. With the myriad of benefits steel can introduce into a power delivery system, it is not surprising that an estimated one million steel distribution poles have been installed in the last 10 years. There are an estimated 185 million electric distribution poles that crisscross North America (not including sub-transmission poles), and more than 600 utility companies now use steel distribution poles.

*Online Resources:
- “The Science of Pole Selection”
  * Transmission and Distribution World - August 2003
- “Environment: Steel Utility Poles vs. Wood (Study - Environmental Life Cycle Assessment of Southern Yellow Pine Wood and North American Galvanized Steel Utility Distribution Poles)”
  * Steel Times International – April 2014

**STEP 3:** Get the Facts on Steel Straight.

A steel utility pole is a value-added product. It is reliable, cost-competitive, engineered for strength, and sustainable. Non-toxic and 100 percent recyclable, steel poles offer a long-term solution for regulatory pressures to buy recycled and recyclable materials. Steel is North America’s most recycled material. Each year, more steel is recycled than aluminum, paper, glass and plastic combined!

*Online Resources:
- Get Current
- “Lighting Up the Future”
  * Steel Orbis – May-June 2011
- Steel Utility Poles - Frequently Asked Questions
**STEP 4:** Calculate the Savings.

Steel poles can reduce costs, especially labor costs associated with installation, handling and maintenance. The longer life span, strength and flexibility of steel poles can also trim workforce and equipment outlays.

*Online Resources:*
- Steel Utility Pole Pro Forma (on request)
- “Utilities Make Tradeoffs When Selecting Pole Types”
  *Transmission and Distribution World* - June 2003
- Predicting Hot-Dip Galvanized Steel's Service Life

**STEP 5:** Review the Research.

Steel utility poles offer solid performance and present significant advantages.

*Online Resources:*
- “Raptors: Test to Protect”
  *Transmission and Distribution World* - March 2002
- BIL Testing on Steel Poles
- Grounding Equivalency of Steel Poles
- Conductivity Research

**STEP 6:** Evaluate Various Coatings.

Steel poles resist corrosion through the use of hot-dip galvanizing, or an uncoated weathering grade steel. In the hot-dip galvanizing process, steel poles are dipped into a bath of molten zinc, forming a permanent metallurgical bond between the zinc and the steel substrate. In the case of uncoated weathering steel, a dense and tightly adherent oxide barrier forms when the material is exposed to the environment, sealing out the atmosphere and retarding further corrosion. Advanced coatings, including polyurethane for below-ground protection of direct-embedded poles, further extend the life of steel poles.

*Online Resources:*
- RUS Guidelines for Approval for Use of Steel Distribution Poles
- FHWA Technical Advisory on the Use of Weathering Steel in Structures
- Life Cycle Cost Calculator (American Galvanizers Association)
- Polyurethane Coatings Overview

**STEP 7:** See What Works for Other Users.

**Tucson Electric Power,** Tucson, Arizona

TEP started using steel poles as stopper poles but soon realized that steel poles minimize the potential cascading effects of sudden failure during a storm or a microburst. In addition, a TEP life cycle analysis of steel versus wood pegged the life expectancy of a steel pole at 60 years - twice that of a wood pole, which is typically 30 years.

**Bluebonnet Electric Cooperative,** Bastrop, Texas

Bluebonnet performed an extensive steel-versus-wood trade study to evaluate overall life cycle costs from longevity to installation costs to resistance to damage. They found that the benefits of a steel pole are longevity, maneuverability, and low maintenance and durability, particularly in difficult-to-access areas. The economic study found that the steel poles saved the utility 10-20% in life cycle costs when compared with wood poles.

**Carbon Power and Light,** Saratoga, Wyoming

Steel poles have helped crews at Carbon Power and Light harden the utility’s distribution line against storm and woodpecker damage, increased line reliability, provided a uniform pole that is light and easy to handle, and given the community a more environmentally responsible and aesthetic alternative to wood poles.
**STEP 8:** Get Your Linemen Involved.

Your linemen are the strongest link in your power delivery system. These training tools can help them master the art of steel pole installation.

Online Resources:
- Lineman Training Overview (VIDEO)
- Hotline Training with the Nebraska Rural Electric Association (VIDEO)
- Storm Restoration (VIDEO)
- Setting a Steel Pole in a Live Circuit
- Free Student/Instructor Online Training - “Essential Lineman Training: Working With Steel Utility Poles”

**STEP 9:** Ask for a Demonstration.

Looking for more interactive information? Request a hands-on training session, attend a steel pole workshop, or talk to a steel pole manufacturer’s representative to learn more about how steel can fit into your power delivery system.

Online Resources:
- Lineman Training Workshop Information
- List of Manufacturing Representatives
- Lineman Training Workshop (Schedule one today. Email dsnyder@steel.org.)

**STEP 10:** Start Using Steel Distribution and Sub-Transmission Poles.

Steel is becoming a standard material for distribution and sub-transmission poles, as management and linemen at utility companies realize its benefits. Lineman training with steel is essential to helping new and experienced linemen gain valuable skills they will use right away on the job.

The Steel Market Development Institute (SMDI) connected with respected industry leaders in utility safety and linework training, including the Institute for Safety in Powerline Construction (ISPC) and the Metropolitan Community College (MCC), to develop two distinct training modules:
- Essential Lineman Training: Working With Steel Utility Poles (recommended for students and instructors)

Topics such as climbing, framing, joining, field deployment, and energized linework (apprentice/journeyman only) are covered through videos, photos, and written material within the training. The training materials are available online and in notebook format - complimentary for qualified training schools and electric utilities. (learn more at lineman.steel.org).