

LINEMAN Training

THE POWER of Steel

The steel distribution pole is an **engineered product**. Each steel pole is designed to meet specific strength and load requirements. They are tested to American Society of Civil Engineers (ASCE) tolerances and National Electric Safety Code (NESC) load requirements, and fabricated to American Society for Testing and Materials (ASTM) tolerances. The result is an extremely strong and reliable product with uniform dimensions and strength, but without twists, knots, splits or bows.

Through design, a steel pole is a **lighter product** – at least 30 percent lighter than wood. Lighter weight can **reduce the cost** of transportation, handling and construction. It also simplifies remote location installations.

A steel pole distribution system requires little maintenance. There's minimal need for tightening hardware to compensate for pole shrinkage. Steel has proven to retain its strength and shape over many years.

Inspections for damage caused by rot, insects or woodpeckers are eliminated. Steel poles are impermeable to these forces of nature.

Plus, steel poles can be factory pre-drilled, which minimizes the time spent by construction crews preparing poles for installation.

Steel poles **offer flexibility**. Steel installations offer an economical alternative for guying and strength problems at angles and deadends.

There's **safety in steel**. With minimal maintenance and inspection, steel poles can reduce workers' risk of accidents. Also, steel poles are conductive so there is no need to install the full-length copper ground wire typically required for wood. Steel distribution poles are safe to install or maintain under hot line or energized working conditions. No matter if the pole is wood or steel, proper procedure is essential when working with live lines.

Also, steel poles provide safety when impacted by a vehicle. While wood poles tend to shear, steel poles will typically bend when impacted, keeping the energized lines upright and away from the vehicle.

And because steel will not burn, ground and pole-top fires are not an issue.

Increasingly, steel is becoming a material of choice for distribution poles, as management and linemen at utility companies realize its important cost, installation and maintenance benefits.

AISI launched the Steel Distribution Pole Lineman Training Workshops to educate utility linemen, students and instructors on the use of steel distribution poles and, more importantly, to reinforce safety requirements for working with steel. The workshops include a classroom session and hands-on demonstrations, teaching linemen how to climb, drill, install and maintain steel distribution poles.

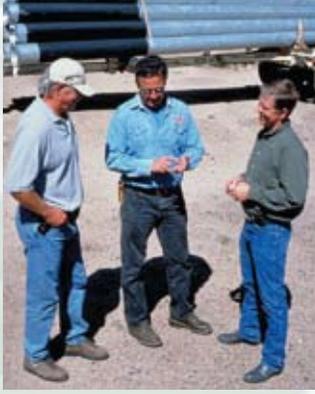
The AISI Lineman Training Kit was developed specifically for use by utilities and lineman program instructors as a supplement to the workshops. It contains a student/teacher manual, instructional DVD, case studies, and other information essential for lineman training. It is available to download on the AISI Web site or can be ordered. Interested in scheduling a training workshop at your school or utility, or ordering a kit? **Email ti@steel.org or call 202.752.7100.** To learn more, go to lineman.steel.org.

STEEL IS THE CHOICE for Today

A steel distribution pole is a value-added product. It is reliable. Cost-competitive. Strong by design. Steel reduces labor costs. And it is 100% recyclable, with no toxic chemicals.

Distribution poles made of steel are a sound investment in a utility's future. Find out more about how steel can strengthen your utility's distribution system at www.steel.org/utilitypoles.





**American
Iron and Steel
Institute**

For more information on steel distribution poles, contact the American Iron and Steel Institute, 202.452.7100 or www.steel.org/utilitypoles.



ARIZONA PUBLIC SERVICE Puts Steel to the Test

In 1997, Arizona Public Service Company (APS) implemented a pilot program to test the overall performance of steel distribution poles in the area it serves. The steel poles came through with high marks for ease of installation, durability, safety and cost.

The utility's search for alternative materials got serious after an extremely damaging summer season when strong winds wreaked havoc on the company's distribution pole system. The necessary repairs were costly, and APS turned to steel poles as a possible labor and expense-saving solution.

"We began to look for ways to increase the longevity and reliability of our distribution structures," remembers Duane Oliver, who was then the construction supervisor for the Northwest Division. "More than that, we had to stop the damage caused to the system when we lost one structure. Often, one pole would go down, and it would cause a domino effect with other poles. We saw this in all seasons, with high winds in the summer, or with snow and ice in the winter. This was not acceptable."

An Experiment That Worked

A company team was assembled to look for ways to build a better system. It included members of the APS standards department, engineering, environmental, procurement, construction crews and management. They reviewed the alternatives of concrete, fiberglass, wood and steel; analyzed each material's costs and safety factors; and concluded that steel stood out as a high-quality and cost-effective alternative to wood.

With this information, the Northwest Division asked APS if it could implement the pilot program to put steel distribution poles to a real-life test.

Linemen Adapting To Change

One of the most critical tests was how well linemen would adjust to using a different material. According to Oliver, the transition in Prescott went smoothly.

"The crews helped make decisions and set the standards," Oliver explains. "We owe much of the success of the pilot program, and the quality system we have in place, to them. They made the transition happen."

He adds that the pilot program was a success in large part because the crews saw the advantages of using steel. "We resolved issues as they arose, and haven't regretted our decision to give steel a real try."

Following the pilot program, APS put together a committee to resolve many significant issues relating to materials, safety, transportation, tools and design.

A common misconception is that steel poles cost more than wood. Oliver refutes this myth. "The longevity of steel poles is greater than wood, which makes them cheaper in the long run. Some people say that wood poles last as long, but typically they don't," he says. "The exception is a cedar pole. But cedar is almost impossible to come by now, and if available, can cost more than steel. If you evaluate the life-cycle costs of both wood and steel, APS believes steel is the best choice."

Another misconception is that linemen will only work with wood. Oliver believes that the way steel was introduced to the APS crews paid off. "Now that the guys are experienced with steel, they prefer to use it," Oliver says. "Even when told to use wood, they've been caught sneaking out a steel pole."

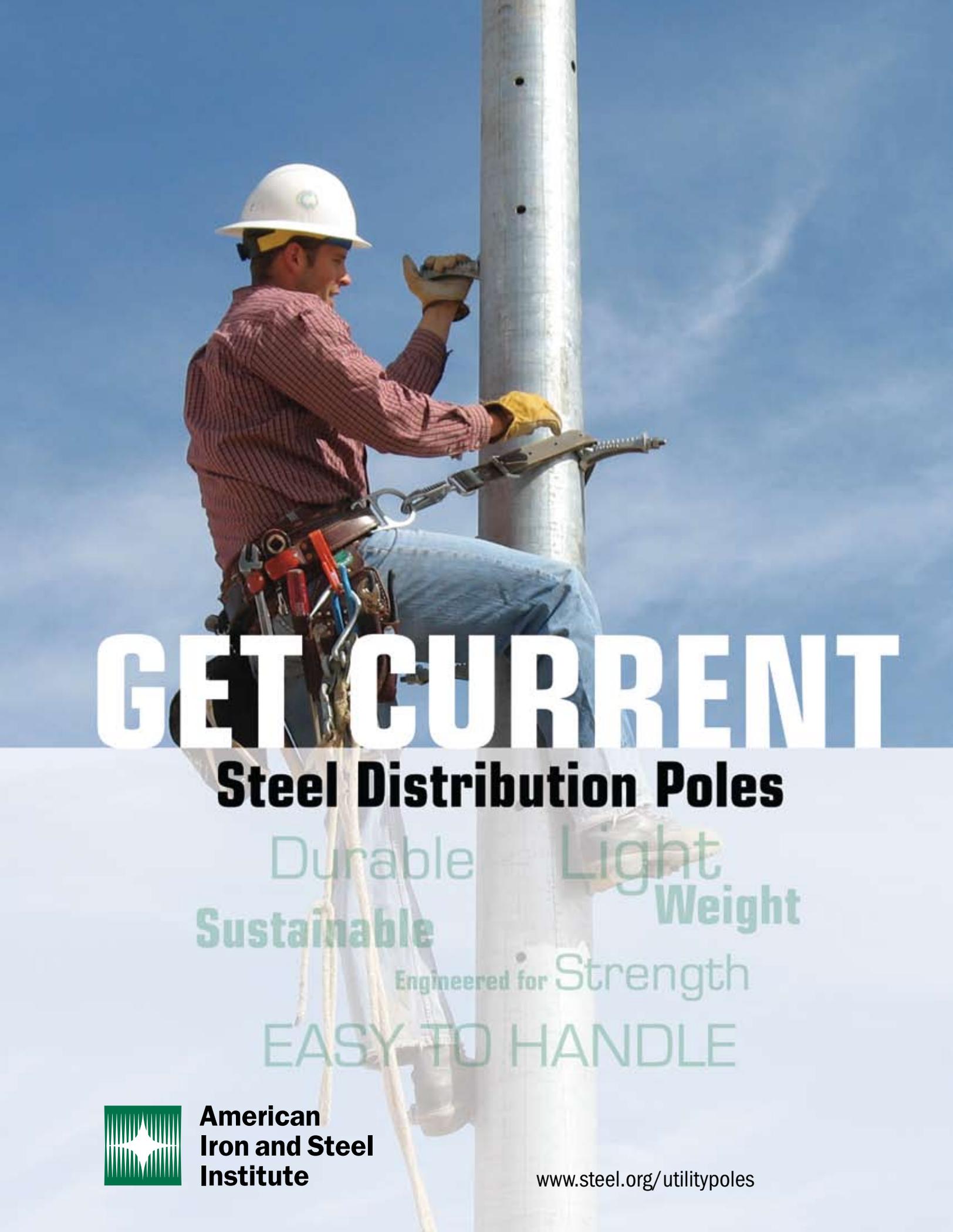
In the years since the pilot program, steel has become the distribution pole of choice for the Northwest Division of APS. And, totally sold on the ease of installation and its durable nature, steel is the pole of choice throughout the entire company.

APS is proud of the fact that this diverse group took on a problem that needed real solutions, and by working in tandem, found success. Oliver concludes, "The success of the pilot program at APS is due to the support and hard work of many people — from executive management to the front-line crews."



*Duane Oliver,
Arizona Public Service*





GET CURRENT

Steel Distribution Poles

Durable

Light

Weight

Sustainable

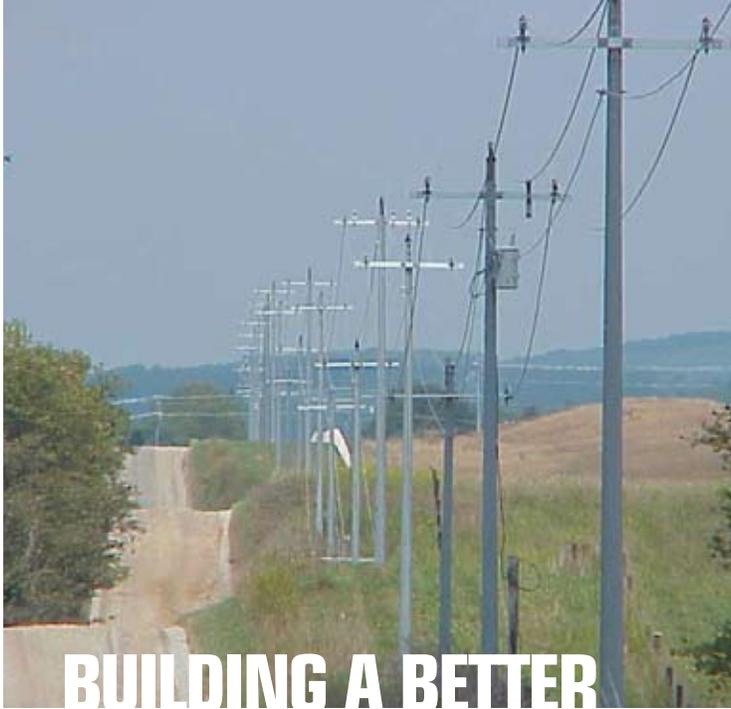
Engineered for Strength

EASY TO HANDLE



**American
Iron and Steel
Institute**

www.steel.org/utilitypoles



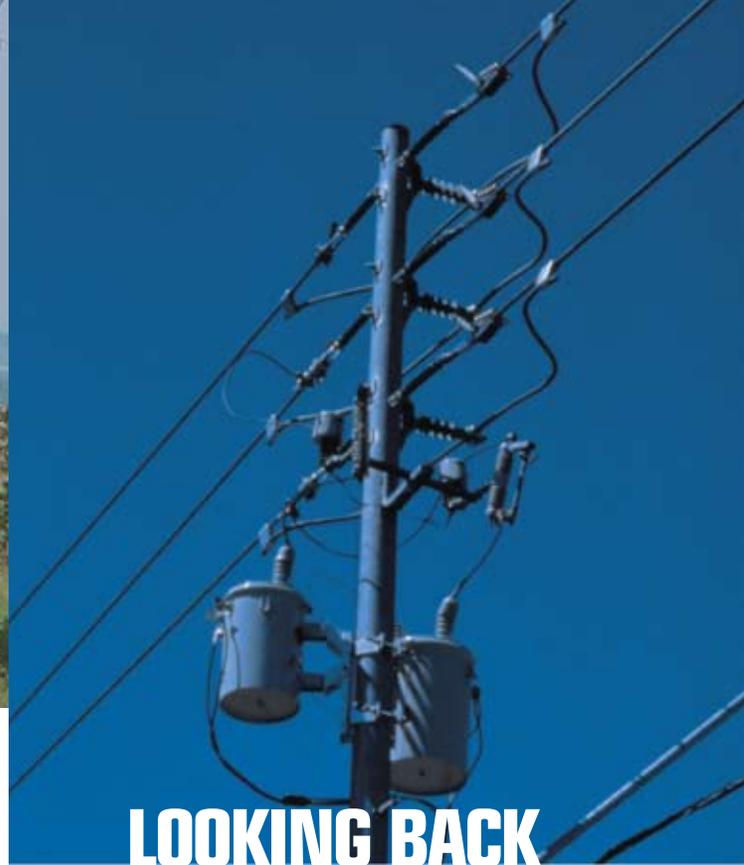
BUILDING A BETTER Distribution System

A utility company relies on a strong and resilient overhead distribution system to deliver electricity to its customers through wind, snow, sleet, fire and rain. Today, over 185 million electric distribution poles line the streets and open terrain of North America.

Steel distribution poles carry electric, telephone and cable-television services to keep customers safe, productive and in touch – and our economy strong. Keeping these services ‘on-line’ is essential to daily living. Steel distribution poles help build a reliable and cost-effective distribution system – a system that will deliver electric power and access to communication when and where they are needed.

“Because of extensive storm and ice damage to our wood distribution poles, we switched to steel poles for their strength and durability.”

*Bryan Zapf,
Former Electrical Engineering Supervisor,
Sheffield Utilities,
Alabama*



LOOKING BACK Moving Forward

Utilities have traditionally used wood poles to carry electric wires and cables from point to point. This dates back to the early days of electricity, when wood was readily available for pole production.

But the market is changing.

There’s a growing acceptance of steel distribution poles as a viable alternative to wood and other materials.

What’s behind this market shift?

“Steel poles allow us to design with confidence, especially when it comes to preparing for severe weather – wind, ice and snow.

By incorporating steel into our system, we saved money and now have a stronger power line.”

*Riley George,
Former Engineering Manager,
Dawson Public Power District,
Lexington, Nebraska*



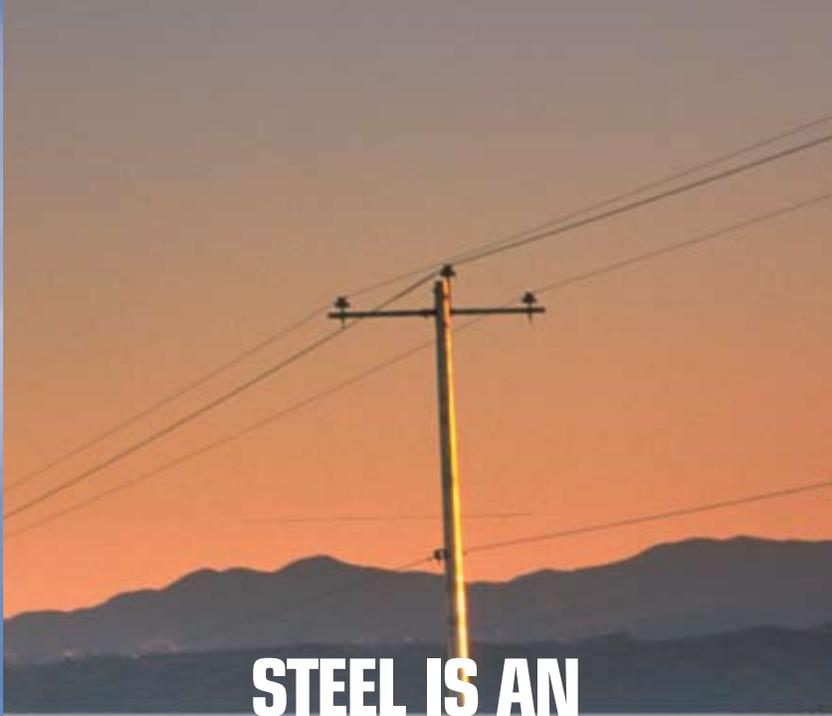
VALUE IS The Bottom Line

The competitive utility marketplace demands exceptional customer service while containing costs. Industry research and user experience show that steel distribution poles cost less – and deliver more – over the long haul. For example, Jeff Hohn, manager of engineering for Farmers Electric Cooperative in Clovis, New Mexico, found that using steel for a 225-pole installation saved his company \$50,062. How? The poles took less time to install and the pole materials cost less than other materials.

- As noted by utility executive George Manning, **the life span of a steel pole is 60 to 80 years**. That's two times that of the average wood pole.
- Steel poles offer **reduced risk of catastrophic system failure**, or the 'domino effect' from a single downed pole.
- Steel poles can be taller and carry heavier loads, permitting **longer span lengths** and requiring fewer poles. The costs of framing, insulators, line hardware and stringing are reduced, and steel poles require **less labor** for installation and maintenance.

"We replaced a three-pole wood structure with a one-pole steel structure, which reduced our installation time and saved over 50% in labor costs."

*Jeff Padavick,
Former Superintendent of Trans. & Distribution,
Austin Energy, Texas*



STEEL IS AN Environmental Winner

Non-toxic and 100 percent recyclable, steel poles offer a long-term solution for regulatory pressures to buy recycled and recyclable materials. Today's spiraling costs for disposal of chemically treated wood poles is another selling point for steel. Even untreated wood pole disposal is now a serious issue, as landfills are no longer an option in many areas.

While it takes an entire tree to produce a wood pole, one scrapped automobile may produce more than four steel distribution poles.

Steel poles can be customized. They can be directly embedded or anchor-based for specific applications. On the aesthetic side, a variety of finishes are available with steel. These include galvanized, paint over galvanized (powder coat over liquid), dulled and darkened galvanizing and weathering steel.

"Steel distribution poles require less maintenance and are much more reliable than other materials."

*Duane Oliver,
Construction Supervisor,
Arizona Public Service*



LEARN MORE Steel Distribution Poles

In conjunction with colleges, vocational schools and utilities, the American Iron and Steel Institute offers steel pole training at locations throughout North America. This training addresses steel pole economics, design, installation and safety. The program is designed to offer useful information to utility managers and linemen alike.

Online courses offering continuing education units for a range of steel distribution-related topics are also available through the American Iron and Steel Institute's Web site.

For information about these educational opportunities, or about steel distribution poles in general, visit www.steel.org/utilitypoles, or lineman.steel.org, or call (202) 452-7100.

"The steel pole lineman training was comprehensive. It is the kind of information our students need to succeed on the job."

*Keith Landing,
Assistant Professor,
Bismarck State College Lineworker Program,
Bismarck, North Dakota*

This brochure is produced by the Steel Market Development Institute (SMDI), a business unit of AISI.

STEEL POLES STAND UP TO THE TEST

In 1998, Hurricane Georges struck Puerto Rico, devastating a major portion of the country's utility system. The Puerto Rico Electric Power Authority, a government-owned utility that provides electricity to over 1.3 million customers, reported that over 8,400 wood distribution poles were damaged or failed during the storm. Conversely, no failures were reported among the 1,000 steel distribution poles within the system.

In July 1997, a storm with sustained winds of up to 120 mph collided with Monticello and Big Lake, Minnesota. Anoka Electric, a municipality located in Minnesota, was using both steel and wood distribution poles in its system. Once again, wood distribution poles sustained severe damage, with no failures reported among the steel distribution poles.

THE POWER OF ZINC AND WEATHERING STEEL EXTEND STEEL'S SERVICE LIFE

The quality and inherent value of steel distribution poles is often enhanced by the process of hot-dip galvanizing, or the use of weathering grade steel. Each of these methods provide unmatched corrosion resistance and service life for steel distribution poles.

The Power Of Galvanized Steel

In the hot-dip galvanizing process, steel poles are dipped in a bath of molten zinc, forming a permanent metallurgical bond between the zinc and the steel substrate. This ensures a tough, uniform barrier coating both inside and out. Also, if the steel becomes exposed, zinc will corrode first, maintaining the strength and integrity of the steel pole. Zinc flows across the coating break, in much the same natural way that the human body heals a skin cut.

The Protection of Weathering Steel

Uncoated weathering steel is also proven as a cost-effective solution to atmospheric corrosion control. When exposed to the environment, it forms a dense and tightly adherent oxide barrier, sealing out the atmosphere and retarding further corrosion. The embedded section of a weathering steel pole is usually coated for below-grade protection.

Below-Ground Protection

A range of advanced coatings, including some for below-grade protection for direct-embedded poles, further extends the life of steel poles. These coatings, which can be applied over top of both galvanizing and weathering steel, provide a non-leaching, environmentally friendly corrosion barrier that will last as long as the poles - even in harsh soil conditions.