Southwire ACSS/HS28® Cable

Project Profile
CenterPoint Energy

High-Capacity Tie Line Uses Low-Sag Technology

When Houston-based CenterPoint Energy needed to upgrade a tie line between two major generating stations, their choice was a new product from Southwire that delivers high-temperature, low-sag capacity rivaling exotic composite-core designs — without the exotic cost. The wire CenterPoint chose puts an ultra-high strength steel core inside an ACSS/TW conductor architecture.

CenterPoint's challenge was to bring more power to the greater Houston area. They needed increased transmission capacity between a nuclear plant near Bay City, Texas, and a generating facility in Rosenberg, Texas. The solution was an $80 million, 60- mile, two-circuit 345kV transmission line. The question was how to implement the circuits.

High-Temperature, Low-Sag ACSS/HS285® CABLE Won Over Many Options

CenterPoint analyzed 60 different design combinations, factoring in distance between structures, land-use impacts, construction issues and total installed costs. Circuit options included: two conductors using ACSR (aluminum conductor, steel reinforced); three conductors using standard ACSS/TW (aluminum conductor, steel-supported, trapezoidal wires); and two conductors using

Project Title: Hillje Project

Location: Houston, Texas

Project Owner: CenterPoint Energy

Electrical Contractor: InfoSource

Product Used: Southwire ACSS/TW HS285® Cable

In Service Date: July 2007

Southwire ACSS/TW HS285® ultra-high strength, high-temperature, low-sag cable design.

CenterPoint found that the new ACSS/TW HS285® conductors would give 55 percent more capacity than the ACSR conductors with a project cost premium of only about four percent. That made the decision clear. Forty miles of the line will use new structures to carry two 1433.6 kcmil ACSS/TW HS285 conductors. That installation was energized in July 2007.

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Chuck Bennett, Manager of Transmission Engineering for CenterPoint, says, "We would have used ACSS/HS285® cable for the entire project, but testing time and early product availability didn't quite meet schedule requirements for the first phases. For the same scheduling reasons, we originally designed our new structures for the reduced sag of standard ACSS/TW. Reduced tower height saved several hundreds of thousands of dollars over the ACSR option, but even then we didn't make full use of ACSS/HS285 conductor economies. ACSS/HS285 conductors will reduce maximum sag by yet another three to four feet."

ACSS/HS285® CABLE Rivals Composite-Core Designs

ACSS/TW HS285 conductor is an enhanced version of Southwire's ACSS/TW. Like standard ACSS/TW, ACSS/TW HS285 cable is rated for continuous operation at 250°C. An ultra-high strength steel core puts ACSS/TW HS285 cable sag performance on a par with recently developed composite cores "…at a reasonable cost, not 10 to 30 times the price," according to Bennett. The ultra-high-strength steel core material borrows heavily from existing steel technology to develop high tensile strength without loss of elongation, ductility or stress corrosion properties. The ACSS/TW HS285 cable core is protected by a Galfan coating that contains 95 percent zinc and about five percent aluminum, with a small addition of rare earth elements, primarily cerium and lanthanum. The Galfan coating protects the steel core at operating temperatures that would shorten the life of traditional galvanizing. "The advanced steel core in ACSS/TW HS285 cable lets us get more strength with tested and known technology," says Mark Lancaster, former manager of overhead transmission engineering. "The higher strength of ACSS/TW HS285 cable lets us pull the cable tighter at installation. That helps sag performance and allows shorter, less expensive support structures." In addition to cost advantages, another advantage of ACSS/HS285 conductor over exotic composite conductors is that it uses the same installation techniques as standard ACSS. ACSS/HS285 cable is commercially available with lead times in line with conventional ACSR conductors.

CenterPoint Sees Future Uses

Bennett says, "We have a long history with the ACSS/TW cable architecture. We have been using ACSS/TW since 2000, and have installed over 3,000 miles of it." CenterPoint sees Southwire ACSS/HS285 conductors as an economical solution for increasing capacity needs. The additional mechanical strength will also meet new needs. The 2007 National Electrical Safety Code will require higher mechanical loading design criteria, and the Texas PUC may be considering higher hurricane storm-loading criteria. "This is a good option to have in our toolbox," says Bennett.

High Temperatures with Low Sag

In ACSS conductors, the weight of the wire is taken almost entirely by the steel core. Sag is determined by the low expansion rate of steel, rather than the high expansion rate of aluminum. That allows higher operating temperatures – and more capacity. ACSS can operate continuously at temperatures up to 250°C without loss of strength. For the same conductor size and weight, an ACSS solution can give substantial increases over ACSR without significant changes in structure or line design, sometimes exceeding 100 percent more power than ACSR with the same sag.

Strength Comparison of Steel Cores

- A typical steel core in a standard ACSR cable has a tensile strength of about 210 ksi.
- A traditional "high-strength" core delivers a tensile strength of about 235 ksi.
- ACSS/HS285 cable's steel core can stand up to 285 ksi before failure, 21 percent stronger than the usual "high-strength" core, and 36 percent stronger than a standard core.

If you need increased capacity in a new line, Southwire ACSS/HS285® conductor is the multi-purpose tool you need.

Call your Southwire representative or visit www.southwire.com today to learn more.

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