

Installation of 3M ACCR in Siberia Boosts Electric Power To City of Irkutsk without Need for Larger Towers

Utility Upgrades Key Overhead Line with Breakthrough Conductor, Nearly Doubling Capacity to Accommodate Growing Demand

Already in use on four continents in a broad range of harsh climates, 3M ACCR (Aluminum Conductor Composite Reinforced) has now been installed in Siberia, serving one of the region's largest cities, Irkutsk.

Irkutsk Electronetwork Co. (IESK) chose the breakthrough overhead conductor as a way to avoid tower construction or right-of-way expansion while nearly doubling power transmission to the city's central district, where growing demand was putting a severe strain on capacity, according to the utility.

3M ACCR is a lightweight, low-sag, high-capacity conductor that can carry twice the current or more of conventional steel-core conductors of the same diameter, on existing towers, thereby helping utilities circumvent problems in crowded urban settings and environmentally sensitive areas. Its low-sag characteristic also provides a solution for clearance issues.

In Irkutsk, the 110 kV line raises capacity to 1600 amperes on the link between a local hydropower plant and the Tzimlyanskaya substation, and to 1240 amps on the Tzimlyanskaya-Kirovskaya substation link. The 3M ACCR line replaced conventional steel-aluminum conductors.

The utility considered the option of increasing capacity by building a parallel line, but determined that acquiring the land and constructing the towers would be prohibitively expensive and difficult because of the crowded urban area. Installing larger aluminum-steel conductors would have required rebuilding the existing towers to bear the heavier weight.

"3M ACCR was the most cost-effective, fastest and least disruptive solution, with proven reliability in all kinds of extreme climates," says Tim Koenig, director of the 3M High Capacity Conductor Program. "3M ACCR applications are often for line upgrades in densely packed urban settings, as is the case in Irkutsk, or in environmentally sensitive areas, such as wetlands and river crossings, where construction poses the threat of long permitting delays, disruptions to the communities and potential environmental damage."

Koenig adds that interest in 3M ACCR also is growing as a tool for helping to bring power from renewable energy sources onto the grid.

Irkutsk is a city of about 600,000 residents, in the Irkutsk Oblast (administrative district), approximately 2,600 miles east of Moscow. Its midwinter average daily mean temperature is about 0 degrees Fahrenheit (minus 18 Centigrade). The city plays an important role in aircraft manufacturing and metals smelting.

3M ACCR also is operating in installations by utilities in Moscow and several other Russian locations, as well as in China, India, Brazil, Canada, Western Europe and throughout the United States.

3M ACCR was developed with the support of the U.S. Department of Energy and with early contributions by the Defense Advanced Research Projects Agency. 3M's innovation is the ACCR core, which is composed of aluminum oxide (alumina) fibers embedded in high-purity aluminum utilizing a highly specialized and proprietary process. The result is a lightweight, low-sag, high-capacity conductor that can carry up to twice the current of conventional steel-core conductors of the same diameter on existing towers, thereby helping utilities upgrade transmission lines while avoiding a wide range of problems in a variety of applications. It has the

durability and longevity of traditional steel core conductors, even after decades of continuous operation at temperatures as high as 210 degrees Celsius (410° F) and in emergency conditions at 240 degrees Celsius (464° F). The conductor's performance has been demonstrated during testing at the U.S. Department of Energy's Oak Ridge National Laboratory in Tennessee and in more than a decade of successful U.S. and international installations.

3M holds several patents on its [ACCR](#) technology, which has been recognized by *R&D Magazine* with an R&D 100 Award as one of the most technologically significant products introduced into the marketplace, and by the Minnesota High Tech Association with a Tekne Award for innovative development.

The [3M Electrical Markets Division](#), based in Austin, Texas, designs, manufactures and markets products for electrical construction, industrial maintenance, utility and industrial power, and electrical and electronic components. EMD has more than 60 years of experience serving customers with highly reliable products, including electrical and electronic insulating tapes and papers; electromagnetic compatible products; power cable splices and terminations; high-temperature, low-sag transmission conductors; heat shrinkable tubing and molded shapes; electrical wire connectors, terminals, tools and lugs; wire marking products; cable ties; portable labeling devices and electrical diagnostic and detection products.

More information is available at www.3M.com.

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