

Brazil's Companhia de Transmissão de Energia Elétrica Paulista Energizes 3M ACCR in Line Upgrade at Paraná River Crossing

Six-Day Installation More than Doubles Capacity; Avoids Permit Delays, Environmental Issues and High Cost of Building Larger Towers in River Bed

Companhia de Transmissão de Energia Elétrica Paulista (CTEEP), has completed the installation of 3M's Aluminum Conductor Composite Reinforced (ACCR) across the Paraná River as part of a key line upgrade designed to bring more power to rapidly growing southeastern portions of Brazil.

The lightweight, sag-resistant breakthrough 3M ACCR provides more than twice the capacity of conventional conductors of similar size without requiring construction of new or enlarged towers. Installed in only six days, CTEEP's 1.1-mile, 138kV ACCR line, crossing the nearly mile-wide Paraná River, is boosting power transmission for the Jupiá Electrical System. Ampacity on the line was increased by 121 percent, with a 36 percent reduction in weight, using only the existing structures.

CTEEP, which is principally owned by Grupo Empresarial ISA (ISA Group), one of South America's largest electricity and telecommunications providers, supplies most of the electricity consumed in São Paulo State and about 30 percent of the electrical power used nationwide.

"The installation process went smoothly, and the line was energized on February 15th," says CTEEP engineering manager Caetano Cezario Neto. "Had we upgraded with a heavier conductor, we would have had to not only build larger towers but also change the concrete foundations that rise out of the river to support the new towers, probably requiring the use of dynamite in an environmentally sensitive area. Instead of six days, it would have taken much longer and been more costly."

Tim Koenig, director of the 3M High Capacity Conductor Program, notes that the 3M ACCR is scheduled for installation this spring by a second Brazilian utility, CPFL Piratininga, a power distribution unit of CPFL Energia, in a very densely populated area where tower enlargement would have been difficult because of nearby homes. He adds that line upgrades with 3M's ACCR have been made by utilities in Canada, China and India, as well as by many in the United States. "The number is growing steadily, as utilities become aware that this special conductor is a proven, cost-effective solution to the problem of bottlenecks, especially where permitting and construction of new towers or obtaining additional rights of way would create major problems and delays."

Says Koenig: "The performance and reliability of this conductor have been persuasively established over years of field tests and commercial use, under all kinds of harsh environmental and operating conditions."

3M ACCR's strength, durability and light weight result from its core, composed of aluminum oxide (alumina) fibers embedded in high-purity aluminum, using a highly specialized and patented process. The constituent materials can withstand high temperatures without appreciable loss in strength, even over long periods of time.

3M ACCR was developed with the support of the U.S. Department of Energy, which tested the conductor at its Oak Ridge National Laboratory (ORNL) in Tennessee, and with early contributions by the Defense Advanced Research Projects Agency. The ORNL tests demonstrated the conductor retains its integrity after exposure to temperatures even higher than the rated continuous operating temperature of 210 degrees Celsius and the emergency operating temperature of 240 degrees Celsius. It has the durability and longevity of traditional steel core conductors, even when operated continuously at high temperatures.

Also, since 3M's ACCR is based on aluminum, it is not susceptible to environmental conditions such as moisture or UV exposure, like other traditional conductors, and it has the corrosion resistance typically associated with all-aluminum-based conductors.

3M holds 18 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.

3M ACCR is offered by 3M's Electrical Markets Division (EMD), which designs, manufactures and markets products for electrical utilities, electrical construction and maintenance, and electrical/electronic device manufacturers. EMD has more than 60 years of experience serving utility customers with highly reliable products, including high-capacity transmission conductors; power cable splices and terminations; electrical wire connectors, terminals and tools; wire marking products; cable ties; electrical insulating tapes; electromagnetic shielding and absorbing materials; heat shrinkable tubing and molded shapes for electrical insulation; and cold shrink sealing and insulating tubes.

More information about the 3M high-capacity conductor is available at www.3M.com/accr.

About 3M

A recognized leader in research and development, 3M produces thousands of innovative products for dozens of diverse markets. 3M's core strength is applying its more than 40 distinct technology platforms – often in combination – to a wide array of customer needs. With \$25 billion in sales, 3M employs 79,000 people worldwide and has operations in more than 60 countries. For more information, visit www.3M.com.

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3M Public Relations Colleen Horn Harris, 651-733-1566 cahornharris1@mmm.com or LVM Group Inc. Bob Ruman, 212-499-6567 boruman@lvmgroup.com or Alan Metrick, 212-499-6571 alan@lvmgroup.com

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