

India's TATA Power Company to Install 3M ACCR to Boost Electricity Transmission near Mumbai

High-Capacity 3M Aluminum Conductor Composite Reinforced Will Double Capacity Without Disrupting Densely Populated Urban Communities

The TATA Power Company, Ltd., India's oldest and largest private-sector electric utility, has chosen 3M Aluminum Conductor Composite Reinforced (3M ACCR) to substantially increase electricity transmission capacity on their 110kV Borivali-Malad and Salsette-Saki transmission lines near Mumbai.

The 3M conductor is being installed in place of existing ACSR conductors, without the need to construct new transmission towers, as the right of way available was inadequate. The innovative lightweight, sag-resistant overhead conductor can carry twice the amount of electricity compared with conventional steel conductors of the same diameter.

This deployment adds India to the growing list of countries in which 3M ACCR is being used to boost transmission capacity in either densely developed or environmentally sensitive areas. The conductor allows major capacity increases while avoiding the costs and disruptive effects of tower construction or acquiring additional rights of way. Some of the other countries in which 3M ACCR is in use are the U.S., Canada, Brazil and the People's Republic of China.

TATA Power Company, part of the India-based worldwide TATA industrial conglomerate, is headquartered in Mumbai, the capital of Maharashtra state. The utility has installed generation capacity of 2,323 megawatts.

Formerly known as Bombay, the city of Mumbai occupies a peninsula on India's west coast. The city and its environs make up one of the world's most densely developed metropolitan areas, with a population of nearly 12 million. The above two transmission lines serve growing areas to the north of Mumbai.

"The lines linking these substations were upgraded a few years ago, going from a single to a bundled ACSR, but that upgrade has not kept pace with the growth in demand," explains Tim Koenig, director of the 3M High Capacity Conductor Program. "The installation of two double-circuit 110kV lines using lightweight 3M ACCR will provide a cost-effective long-term solution with minimal disruptive impact on the communities."

The Borivali-Malad and Salsette-Saki line upgrades will require a total of 200 kilometers (125 miles) of conductor to cover circuits of eight kMs of each line, making this the largest single application of 3M ACCR to date. Installation of the Borivali-Malad circuits is complete. Installation on Salsette-Saki is planned in the near future.

Located on the Arabian Sea, between the Tropic of Cancer and the Equator, Mumbai is subject to both extreme heat and heavy monsoons. Koenig notes that 3M ACCR has been in use in continuous field tests and commercial operation for nearly a decade, under a wide range of harsh climate conditions, meeting all performance and reliability expectations with no failures in the field, in either installation or operation.

"It's a proven, high-performance conductor that can match the sag and tension of the existing conductor with less weight while doubling capacity on the line," he says. "And because it's installed on existing towers, utilities can reduce the costs and risks associated with transmission construction projects, without adding any risk to the existing system."

3M ACCR's low sag, strength and durability result from its core, which is composed of aluminum oxide (alumina)

fibers embedded in high-purity aluminum. The constituent materials are chemically compatible with each other and can withstand high temperatures without adverse chemical reactions or any appreciable loss in strength. The conductor also is highly resistant to corrosion and has the durability typically associated with all-aluminum conductors.

3M ACCR was developed with the support of the U.S. Department of Energy, which tested the conductor at Oak Ridge National Laboratory (ORNL) in Tennessee, and with early contributions by the Defense Advanced Research Projects Agency. The ORNL tests demonstrated the conductor's integrity after exposure to temperatures even higher than the rated continuous operating temperature of 210 degrees Celsius. 3M holds at least 18 patents on this new technology. 3M ACCR 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

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