

Resilient 12 to 36 kV touch-safe aerial network solution with a competitive Total Cost of Ownership

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ABSTRACT

A system has been developed in response to demands for a touch-safe aerial line. At the same time this has resulted in a line that can withstand extreme weather without power interruption. The unique design can handle e.g. ice loads, storms and snow-laden trees. The self-supporting conductors take up the bulk of the tensile stress. The forces of a falling tree are transferred through the cable sheath and insulation to the supporting conductor, without damaging the cable. Clearing and maintenance can be done with the lines live. This avoids down-time for repair in comparison with other systems – resulting in fewer repair call-outs and smooth maintenance. In general the danger due to exposure to live lines is removed.

Outages in the power supply can quickly have severe consequences and can be expensive for the entire community. In 2012, outage costs were estimated at almost 100 million Euros – in Sweden alone.

Keywords

AXCES™; AXCES-O; Medium voltage cable; Duct; Aerial cable; Three-core cable, Fully insulated medium voltage aerial cable, Fully insulated high voltage aerial cable. Total cost of ownership, TCO,

1. THE AERIAL CABLE CONCEPT



Fig.1. Cable from coming up from ground and going further as aerial cable

The robust construction of the fully insulated cable system offers several significant savings due to greater freedom and flexibility of line routing. There is no risk of power

outages caused by falling trees or by bird-induced short circuits on bare lines. Risks of direct lightning strikes are also greatly reduced compared with bare lines, since the fully insulated cable does not attract lightning strikes, and indirect strikes cause no damage to cables. Lightning problems at OHL/underground cable transitions are also reduced.

Other benefits of the fully insulated cable system are the rarity of power cuts caused by broken line wires, and of environmental hazards such as sand, salt and conducting dust causing fires. Conventional bare line systems are prone to short circuits due to clashing conductors, whereas the fully insulated system comprises one fully insulated cable, and therefore completely eliminates this problem. Tests on installations on the Shetland Islands and in Norway have proven that galloping and vibration are no problem.

As a result of the above, fewer repair call-outs are required for the fully insulated cable system, and the number of difficult repair and line-clearing jobs is reduced. Emergency call-outs are not needed.

If required by the terrain, the cable also works well as a sea cable due to its high tensile strength and density in water.



Fig.2. Joint installation between 24 kV, 1 kV, electric light and telecom cables

The first fully insulated cables have been in operation for over fifteen years. Installed in over 20 countries, they have shown exceptionally high operational reliability compared to other systems. During a large storm in Sweden 2005, "Gudrun," when thousands of fallen trees on aerial transmission systems caused several long electrical power interruptions, the AXCES™ Cable System was the only aerial transmission system without any power outages.