

Windamper System to Reduce Mechanical Vibration

Impacts

AR Windamper and AR Twister Overcome Galloping on High-Voltage Electric Power Lines

Ice and snow build-up on high-voltage electric power lines in moderate to high winds causes high-amplitude, low-frequency mechanical vibration called galloping. When power lines react aeroelastically to these conditions, undamped vibration tears apart transmission towers and fittings or propels lines into each other, shorting out large circuits. Besides causing costly electric system outages and structural damage, this dramatic phenomenon steals power through higher electricity line losses that occur when other conductors have to carry more power to compensate for a tripped or damaged line. In a 1981 survey, 17 of 38 utilities reported that galloping was a moderate to severe problem, and 11 reported that they had a galloping event at least once a year. Fifty-seven percent of the incidents included flashover (power outage occurring when lines propel into each other), and 60% included structural damage.

Damage to transmission equipment can be reduced by employing technologies developed by Research Consulting Associates (RCA) in collaboration with DOE's Inventions and Innovation Program. The AR Windamper developed by RCA is an aerodynamic device that clamps to high-voltage overhead transmission lines to overcome galloping. The system introduces damping force by twisting the conductor to cancel the aerodynamic lift caused by clinging ice and snow. Another RCA product, the AR Twister, accomplishes the same result using an inertial device that can also be used to dampen the vibration of guy wires on tall broadcast towers.

Benefits

Reliability

Ensures reliable power distribution during severe weather.

Safety

Protects transmission equipment from catastrophic failure and surrounding facilities from collateral damage.

Overview

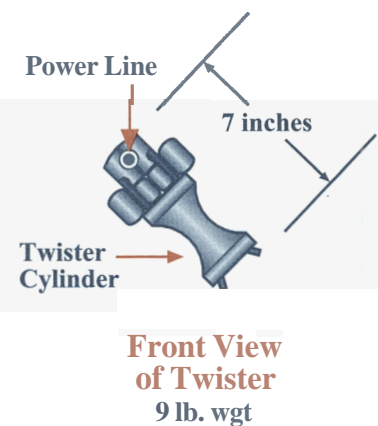
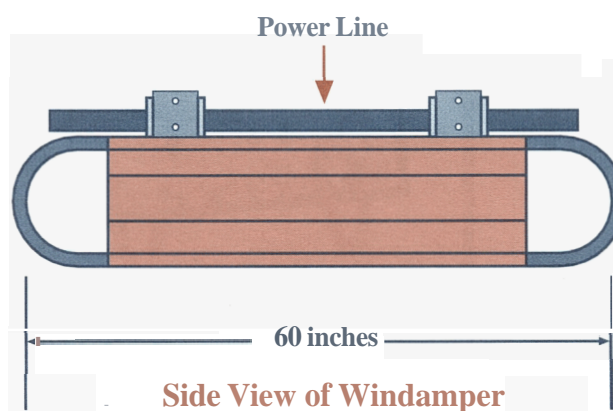
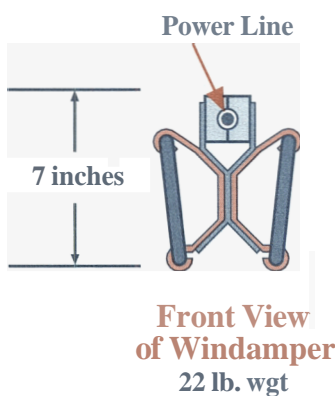
- ◆ Developed by Research Consulting Associates
- ◆ AR Twister introduced commercially for utility applications in 1988
- ◆ AR Windamper installed on Western Area Power Administration and 10 utility company transmission lines as well as in 3 steel plants
- ◆ More than 25 utilities and companies have installed AR Windamper and AR Twister during the last decade

Applications

General protection of power, communications, and transmission lines, especially in the sleet belt extending through the central United States and the Eastern Canadian provinces

Capabilities

- ◆ Protects power transmission lines by eliminating the "galloping" phenomenon in spans of 1000 feet or longer for single or bundled conductors.
- ◆ Applicable to tower guy wires.



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