

## **A Study of Galloping Conductors on a 230 kV Transmission Line**

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This study was motivated by galloping of 20 miles of transmission line running south of Kokomo, Indiana. The actual galloping occurred on February 14, 1990, where field observations confirmed a solid hard glaze surface had formed on the windward side of the conductor. The thickness was estimated at 1/8in. to 1/4in., where temperature was just below freezing, and wind gusts had increased to 18-27mph (8-12 m/s).

The scope of this study includes the theoretical basis for galloping caused by light ice. Each span length was examined to determine the likelihood of galloping, and anti-galloping devices were studied with field observations of two different types of devices made in the U.S and Canada. A ranking of the various remedies was provided according to installed cost, performance, including other factors.

A performance index was identified which compares the anti-galloping concepts based on field observations for each device. This index is a ratio of PASS/FAIL of the device to the PASS/FAIL of the placebo/no device, where the placebo index is simply the number of untreated spans that do not gallop divided by the number of spans that do gallop. In the case of the two devices studied, the actual field data shows a performance index equal to 109 for the first device and a performance index of 1.18 for the second device, indicating the first device is 92 times more effective than the second device in terms of actual field observations. This means the first device is 109 times more effective than its untreated span reference, whereas the second device is only 18% more effective than its untreated span reference.

Subsequent to this study, the 230kV transmission line was treated with AR WINDAMPER® anti-galloping devices on one phase, with AR TWISTER™ anti-galloping devices on a second phase, while the remaining phase was left untreated. In an ice storm that occurred the following year, the treated spans were observed to have galloping amplitudes of only 2-3ft. while the untreated span were observed to gallop 10-12ft. (Video of field observations available upon request).

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