Windampers help keep gallop-prone lines in service

John Marks, Science Writer

Damping devices for eliminating galloping on transmission lines have found increasing supporters in the sleet belt of the midwest. The sleet belt is bounded in the west by a line from El Paso, Texas, to Duluth, Minn.,and extends east to Toledo, Ohio, with some incidences in New York and Pennsylvania. But galloping can occur anywhere under the right conditions.

In these areas, winter storms result in ice buildup on transmission lines, and in high winds the layer of ice acts like an airfoil, creating a lift force on conductors. If the force goes undamped, it may be amplified until galloping occurs, causing the lines to touch and trip out. Surveys show that galloping occurs in winds of about 25 mph, usually across flat terrain.

Jim Hayward, electrical engineer in the Engineering and Operations Support Dept. of Northern Indiana Public Service Co. (NIPSCO) reports his company damped a 12-mile, 345-kV line, plus an additional seven miles of 138-kV line in 1992. "We plan to add dampers to another eight miles of 345-kV line during 1994," said Hayward, "and we've budgeted dampers on 18 spans of 138-kV for 1995.

The steel companies served by NIPSCO also demonstrated an enlightened self interest by installing dampers of their own. U.S. Steel in Gary, Ind., put 230 dampers on a 1.5-mile section of 69-kV lines that were on its property along Lake Michigan. "The lines most susceptible to galloping are those running east-west close to the lake," said Steve Potter of U.S.Steel. "We prefer the Windamper® System by Research Consulting Associates (RCA) because we only need 12 per double-circuit span, as opposed to 50 or 60 of the spoiler types."

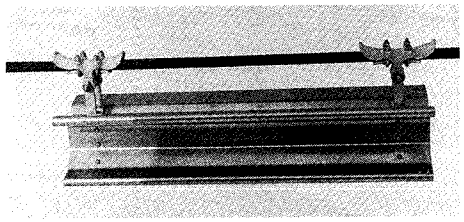
Robert Trajkovski, an electrical foreman at Bethlemen Steel in Burns Harbor, Ind. gives a different reason for favoring the Windampers. "We looked at spoilers, pendulums and dampers, but we liked the dampers because the spoilers were made of plastic instead of metal. It just didn't seem as though the plastic would hold up over the long term," said Trajkovski. "We need to maintain high reliability for these lines, because loss of power for even a short interval when molten steel is between rollers means that we may end up chipping steel out of the rollers."

Like U.S. Steel, Bethlehem's lines that run east-west along the lake cause the most trouble. It installed the Windamper System on a 1.5-mile stretch of both its 13.8-kV and 138-kV lines, and has not had a problem since.

George Damianick, staff engineer at Inland Steel in East Chicago, Ind. reports that they have six 138-kV lines feeding Inland from NIPSCO, and as long as they have enough lines energized, they're al right. "But the voltage dip resulting from trip-outs due to galloping cause us to lose electric arc furnaces, continuous casters, annealing lines, rolling mills, and galvanizing lines, all of which are computer-controlled. It may take us as much as an hour to come back on line after an interruption because the steel has to be removed and in some cases re-threaded into the lines," said Damianick.

"John Stocks, our senior staff engineer got us started on the windampers, says Damianick. "Al Richardson of Research Consulting Associates also served as a good reference for advice and counsel," he said.

"Stocks did some investigation of dampers and he talked to NIPSCO, which favored the Windamper System. The work rules at NIPSCO did not favor spoilers because they were so labor intensive. So we chose the Windamper System because of its ease of installation."



The AR Windamper System is said to provide an effective control of galloping for transmission lines with spans of 1,000 feet or more using single or bundled conductors.

Inland then installed 84 dampers on its 69- and 138-kV lines with bucket trucks, some over buildings so they didn't have to lower the lines down to where they could reach them.

"Further, NIPSCO has offered us their computer program to identify other lines that might touch during galloping. Wear and tear on cables sometimes occurs at night, and we wouldn't know it," said Damianick. As mentioned before, galloping is not limited to the midwest sleet belt.

Nearly 1,200 Twister dampers and more than 400 Windampers were recently installed over a 45-mile section of 230-kV line serving the new Denver International Airport. Tom Malone, Transmission Engineer at Public Service Co. of Colorado (PSCO) reports that the utility had tried a number of other dampers before, but none of them worked satisfactorily. "Some of the lines were built in the 1960s, and we had a lot of trouble with them, even though they were supposed to be self-damping," he said.

Since the airport has two redundant lines, one from the north and one from the south, PSCO wanted to ensure that galloping would not trip out both lines. "We protected the east-west line sections only, however, since most storms come from the north," said Malone. ■

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