S & C
DISTRIBUTION COMPANY

USING THE 360 GROUND FINDER AT LOCATIONS WITH WIND TURBINES

Subject: **Wind Turbine System & Ground Testing**
Date: March 23, 2017

There has been a growing application of wind turbines to keep signal batteries charged at locations where commercial power is not available. Ground testing of these locations will benefit from the discussion that follows.

Variables in the designs and installation recommendations of different brand wind turbines can present unique problems. It is suggested that the two main components: (1) the co-located railroad signal bungalow and (2) the wind turbine, turbine mast, and connecting cable assembly, be tested for grounds, separately.

The easiest way to temporarily separate the two main components is to open test nut "switches" common to most railroad signal installations. At the signal bungalow, install the test nuts in series with both wires of the output circuit of the wind turbine, to allow separation of the two main components. Some wind turbine manufacturers recommend shorting the turbine leads once they have been separated from the bungalow. This allows a single connection point to check the entire turbine network. Otherwise, ground test each wire from the turbine separately. Test the signal bungalow for grounds in the standard manner.

If a "ground" is detected, it is important to determine if the "ground" is an actual ground, or if it is AC voltage above 10 to16VAC (depending on wave shape), that will present on the 360 Ground Finder as a "ground". Wind turbines may generate spurious AC signals. The most expeditious method of confirming that the "ground" is real or not is to use the 355 Signalman's Meter (or other AC volt meter) to determine if AC is flowing to ground, enabled by the test connection. If AC voltage is detected, confirm that it is not a ground by observing the simultaneous DC voltage display on the Signalman's Meter to verify that no DC voltage is flowing between the two connection points.

To help guard against a test nut switch being left open following the ground tests, for those so equipped, we recommend taking a jumper from the Jumper Keeper Rack Unit and attaching it near the test switch. If the person conducting the test forgets to reclaim the jumper (and restore the test switches) at the completion of the tests, the Jumper Keeper will remind him to do so, by "screaming" at him as soon as the truck is started.

Some have asked whether or not the Ground Finder test will affect the typical wind turbine. The measuring circuit of the Model 360 Ground Finder is similar to a 1000 Ohm per volt meter in series with a 22.5V battery. The approximate impedance of 25,000 ohms is limiting the current of the 360 test to about .0009A or about .9mA. The likelihood is that this circumstance is not apt to affect any wind turbine operation. Given the wide variety of wind turbines on the market this is supposition on our part. We have not surveyed all models of all brands.

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