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SSIT-302 Wire & Cable Resistance

Purpose

Wires and cables shall be tested for proper insulation and isolation.

Test Intervals

Tests shall be performed when installed as required, and at least once every ten (10) years. Wet or freezing weather may negatively affect the results of the rest. Whenever possible, tests shall be scheduled for clear, warm days. Refer to *SSIT-7 Signal System Inspection and Test Intervals* for all test intervals.

Rail Safety

Employee shall ensure the site is safe for employees, the public, vehicular traffic and train operations as defined in *SSIT-8 Protecting Train Operations* prior to performing tests and inspections.

Personal Safety

Leakage through arrestors or transformers connected to AC power supply may cause the voltage on the disconnected grounding network to reach dangerous levels. Proper precautions must be taken whenever connecting or disconnecting a made ground or any part of the grounding network.

Equipment Manuals

A copy of relevant insulation resistance testing equipment manufacturer's manual should be on hand for reference when performing tests. For circuits and equipment under 250V, an instrument with a minimum of 250V may be used, but 600V is preferred. For cables over 250V, instrument must have a minimum voltage potential of twice the operating voltage.

Procedure

The following tests are to be performed at location:

Step	Procedure
1. Inspect Ground Network	• A visual inspection of the ground network is required prior to insulation resistance testing. Refer to *SSIT-301 Ground Resistance* for procedures.
2. Test Insulation Resistance Testing Equipment	• Connect leads together, and observe the insulation resistance reading says zero. • Take the leads apart, and observe the insulation resistance reading is infinite resistance. **If readings not zero and infinity**: Meter cannot be used for testing. Obtain other insulation resistance testing device.
3. Disconnect Wire(s)	• Use mechanical disconnects to isolate wires individually for testing. **If no disconnects available:** Remove wire(s) from termination point(s) individually. Install disconnects, if possible. **If more than one wire is disconnected at a time:** Operational tests must be performed after reconnecting the wires, prior to returning to service.

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Step	Procedure
4. Test Wire-to-Ground Isolation	• Connect one test lead of megger to a ground terminal. • Connect other test lead to each individual conductor one at a time. **If insulation resistance is less than 500Kohms:** remove arrestor to determine if leakage is from arrestor circuit. **If insulation resistance is still less than 500Kohms:** Contact the ONR S&C Supervisor to arrange wire replacement. Insulation resistance checks to be performed annually until replaced. **If insulation resistance is less than 200Kohms:** Wire must be replaced immediately. Contact the ONR S&C Supervisor to formulate plan to remove cause of fault.
5. Reconnect All Wiring	• Return all disconnects prior to proceeding to wire-to-wire isolation testing.
6. Disconnect Wire(s)	• Use mechanical disconnects to isolate all wires of multiconductor cable for testing. **If no disconnects available:** Remove one wire to test at a time. Install disconnects, if possible. **If more than one wire is disconnected at a time:** Operational tests must be performed after reconnecting the wires, prior to returning to service.
7. Test Wire-to-Wire Isolation	• Connect one test lead of megger to one wire. • Connect other test lead to each individual conductor one at a time. • Where disconnects not available, repeat process for all wires in multiconductor disconnected individually. **If insulation resistance is less than 500Kohms:** remove arrestor to determine if leakage is from arrestor circuit. **If insulation resistance is still less than 500Kohms:** Contact the ONR S&C Supervisor to arrange wire replacement. Insulation resistance checks to be performed annually until replaced. **If insulation resistance is less than 200Kohms:** Wire must be replaced immediately. Contact the ONR S&C Supervisor to formulate plan to remove cause of fault.
8. Update Log Book	• Add any notes of issues observed, or adjustments made.
9. Complete Test Form	• Record the test as completed on SSIT test form.