

Notice of Safety Advisory 2000-2 - Addressing recommended replacement of certain components in Harmon Industries' ``Electro Code 4'' and ``Electro Code 4 Plus'' intermediate signal units.

On March 25, 1998, a Norfolk Southern Corporation (NS) freight train collided with a Consolidated Rail Corporation freight train in Butler, Indiana. The post-accident investigation of the accident revealed that an intermediate signal in the vicinity of the accident would randomly go dark. While it has been determined that the signal malfunction did not contribute to the accident, the malfunction was further investigated by the FRA, the National Transportation **Safety** Board (NTSB), NS and Harmon Industries (Harmon), manufacturer of the signal control equipment.

The investigation revealed that certain modules in Electro Code 4 and Electro Code 4 Plus intermediate signal units can contribute to intermittent dark signal occurrences.

On May 15, 1998, Harmon, through its Electro Pneumatic Corporation subsidiary, issued PIA [Product Improvement Announcement] 98-101 in which it recommended an upgrade to the ``211S, 211SRP, and 212A'' modules that are used in Electro Code 4 and Electro Code 4 Plus Intermediate signal units. Harmon offered to supply upgrades to the listed modules at no charge through December 31, 1999.

In its Product Improvement Announcement, Harmon discussed the 211S, 211SRP and 212A modules:

211S and 211SRP

The 211S and 211SRP modules are DC to DC converters that are used in Electro Code 4 and Electro Code 4 Plus Intermediate signal units. These modules provide isolated battery for signal lighting circuits and are located in the top of the chassis housing behind the front panel. A resistor in the module's mid stage driver circuit may be subject to excessive heating due to heavy lamp load and/or continuous duty cycle of the lamp-lighting circuits. Eventually this resistor can fail open. In the event this circumstance occurs, excessive noise can be passed through the converters to the balance of the lamp lighting circuits. Random noise on a lamp output can be interpreted by the dual microprocessors as false energy. In response, the processors will reset, resulting in a dark signal for a period lasting approximately 40 seconds. Ultimately, the processors will attempt to reinitialize the converters and restore the signal lighting. The frequency of the dark signal occurrence depends on many variables and may be recognized many times during a single day, or sporadically during the course of one or several months.

212A

The 212A module is also part of the signal lighting circuits within Electro Code 4 and Electro Code 4 Plus equipment. AC signals from the processor modules are combined on the 212A to provide the excitation voltages to the 211 converter modules. It has been recognized that several of the electrolytic capacitors on the 212A modules have failed, resulting in symmetry distortion of the AC signal passed to the 211 modules. This distortion may exaggerate the noise condition as described with the 211S and 211SRP above.

Harmon further stated that ``[on the 211S and 211SRP modules, several components in addition to the resistor described above, will be replaced and added to the base design. This upgrade offer applies only to 211S and 211SRP converter modules * * * manufactured between March 1994 and March 1998 * * *

Recommendation

In recognition of the need to assure safe reliable **railroad** signal operations, FRA strongly recommends that:

1. Each **railroad** having a signal system which uses any ``Electro Code 4'' or ``Electro Code 4 Plus'' Intermediate signal unit immediately identify each 211S, 211SRP, and 212A module within their signal system.
2. Each **railroad** replace or upgrade every 211S, 211SRP, or 212A module within their signal system as soon as possible.
3. Each **railroad** having 211S, 211SRP, or 212A modules contact Harmon Industries Riverside Operations, Attention Repair and Return, 7337 Central Avenue, Riverside, California 92504, phone no.: 800-854-4752 for further information pertaining to upgrades.

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George Gavalla,
Associate Administrator for Safety.