

### **234.229 Shunting sensitivity.**

This section requires that each highway-rail grade crossing train detection circuit shall detect the application of a 0.06 ohm resistance shunt when the shunt is connected across any part of the track rails of the train detection circuit.

#### **Application:**

Detection may or may not include activation of the warning system with a 0.06 ohm resistance shunt applied to the approach circuit(s). Detection shall include continuous activation of the warning system with a 0.06 ohm resistance shunt applied to any part of the island circuit(s). This section applies to all train detection circuits that utilize the track rails as part of the detection circuit.

For purposes of this section a train detection circuit is a dc, ac, or audio frequency track circuit, or track circuit associated with a motion sensing device or constant warning time device that is used to detect the presence and/or motion of a train, engine, or car. For dc, ac, or audio frequency track circuits, the active portion of the train detection circuit includes all the track between the ends of the track circuit. For motion sensing device or constant warning time device, the active portion of the train detection circuit includes all the trackage between the crossing and the point where the device is designed to activate the warning system.

### CLASSIFICATION OF DEFECTS

234.229.01 Train detection circuit does not detect the application of a shunt of 0.06 ohms resistance when the shunt is connected across the track rails of the circuit.

### **§ 234.231 Fouling wires.**

This section requires that when a switch turnout located within a highway-rail grade crossing train detection circuit is equipped with fouling wires, those wires shall consist of two discrete conductors, and each conductor shall be of sufficient conductivity and maintained in such condition to ensure proper operation of the train detection circuit as required in Section 234.227.

#### **Application:**

This section applies only to installations where parallel fouling circuits are utilized as part of the highway-rail grade crossing warning system.

August 1, 2002

The installation of a single duplex wire with single plug as fouling wires is prohibited. The single plug constitutes a single conductor. Existing installations having single duplex wires with single plug for fouling wires may be continued in use until such time as they require repair or replacement.

Fouling circuits shall be maintained with the requirement of two fouling wires at the heel of the reverse switch point, toe and heel of the switch frog, and between the outer rails of the main track and turnout.

#### CLASSIFICATION OF DEFECTS

- 234.231.01 Fouling wires do not consist of at least two discrete conductors.
- 234.231.02 Fouling wires not of sufficient conductivity to detect occupancy when train detection circuit is shunted.
- 234.231.03 Fouling wires not maintained in such condition to detect occupancy when train detection circuit is shunted.

#### **§ 234.233 Rail joints.**

This section requires that each non-insulated rail joint located within the limits of a highway-rail grade crossing train detection circuit be bonded by means other than joint bars and that the bonds be maintained in such condition to ensure electrical conductivity.

#### CLASSIFICATION OF DEFECTS

- 234.233.01 Non-insulated rail joint located within the limits of highway-rail grade crossing train detection circuit not bonded to ensure electrical conductivity.

#### **§ 234.235 Insulated rail joints.**

This section requires that each insulated rail joint used in train detection circuits of a highway-rail grade crossing be maintained to prevent current from flowing between the rails separated by the insulation, in an amount sufficient to cause a failure of any train detection circuit.

#### CLASSIFICATION OF DEFECTS

- 234.235.01 Insulated rail joint not maintained in condition to prevent current from flowing between rails separated by the insulation, in an amount sufficient to cause a failure of any train detection circuit.

August 1, 2002

234.235.02 Insulation in insulated rail joint in bad condition.

**§ 234.237 Reverse switch cut-out circuit.**

This section requires that when a switch is equipped with a switch circuit controller connected to the point and interconnected with highway-rail grade crossing warning system circuitry, such switch circuit controller shall be maintained so the warning system can be cut out only when the switch point is within one-half inch of the full reverse position.

**Application:**

Tests shall be made by placing appropriate gauge between the reverse switch point and rail, 6 inches from the end of the point and applying pressure against the gauge until it cannot be removed.

Normally open contacts shall be open at least one sixteenth inch. The one sixteenth inch requirement applies to reverse contacts when the switch is in full normal position, or the normal contacts when the switch is in full reverse position.

This section applies specifically to highway-rail grade crossing reverse switch position cut-out circuits using switch circuit controllers. The switch circuit controller shall be securely fastened in place with its connections also securely fastened.

CLASSIFICATION OF DEFECTS

- 234.237.01 Switch circuit controller contacts on hand-operated switch adjusted to cut out warning system when reverse switch point is open more than one-half inch.
- 234.237.02 Contact opening of switch circuit controller contact less than one-sixteenth inch.
- 234.237.03 Switch circuit controller not securely fastened in place.
- 234.237.04 Switch circuit controller connections not securely fastened.

**§ 234.239 Tagging of wires and interference of wires or tags with signal apparatus.**

This section requires that each wire be tagged or otherwise so marked that it can be identified at each terminal. Tags and other marks of identification shall be made of insulating material and so arranged that tags and wires do not interfere with moving parts of apparatus.

August 1, 2002

**Application:**

Applies to each wire at each terminal in all housings including switch circuit controllers and terminal or junction boxes. This requirement does not apply to flashing light units, gate arm light units and other auxiliary light units.

Wiring shall be tagged or otherwise marked at a terminal. A terminal is any point where the wire terminates from its point of origin to and including the point of final termination. The wire may be tagged or marked in any manner so that it can be identified. All tag and wire identification shall correspond with the circuit plan. If it is necessary to pull the wire to identify it, the railroad is in non-compliance.

The local wiring on a solid state crossing controller rack will not require tags, as long as the wiring is an integral part of the solid state equipment.

CLASSIFICATION OF DEFECTS

- 234.239.01 Wire not tagged or otherwise marked so that it can be identified at terminal.
- 234.239.02 Nomenclature of tag or wire identification does not correspond to that of the circuit plan.
- 234.239.03 Tag interferes with moving parts of apparatus.
- 234.239.04 Wire interferes with moving parts of apparatus.
- 234.239.05 Tag or other mark of identification in instrument case or apparatus housing not made of insulating material.

**§ 234.241 Protection of insulated wire; splice in underground wire.**

This section requires that insulated wire be protected from mechanical injury. The insulation shall not be punctured for test purposes. A splice in underground wire shall have insulation resistance at least equal to that of the wire spliced.

**Application:**

Insulated wire shall be placed in wire runs, strung on pole line or messenger, buried or otherwise

August 1, 2002

protected in a manner that it cannot be damaged by the operation of apparatus, vehicles, tools, workers, or by the opening or closing of doors. No insulated wire or conductor, whether in housing or outside, shall be punctured for test purposes. Temporary installation of cable or wires on top of the ground must be made permanent as soon as practical.

#### CLASSIFICATION OF DEFECTS

- 234.241.01 Insulated wire not protected from mechanical injury.
- 234.241.02 Insulation of insulated wire punctured for test purposes.
- 234.241.03 Splice in underground wire does not have insulation resistance value at least equal to that of the wire spliced.

#### **§ 234.243 Wire on pole line and aerial cable.**

This section requires that all wires be securely tied in on insulators that are properly fastened to a crossarm or bracket attached to a pole or fixture. Wires are required to be maintained clear of all other wires.

Open-wire transmission lines of 750 volts or more must be placed at least 4 feet above the nearest crossarm carrying highway-rail grade crossing control circuits.

#### **Application:**

Applies to all wires that affect the proper operation of highway-rail grade crossing warning systems, including AC power supply carried on pole line.

Particular attention should be given to vertical runs of cable. These are frequently found tied off at the top of the run, at which point the entire weight of the cable is self-supported. The cable is required to be supported throughout by messenger.

#### CLASSIFICATION OF DEFECTS

- 234.243.01 Wire carried on pole line not securely tied in on insulator.
- 234.243.02 Wire not secured because of broken, missing, or burnt pole.

August 1, 2002

- 234.243.03 Wire not secured because of broken, missing, or burnt crossarm.
- 234.243.04 Wire interferes with or is interfered with by another wire.
- 234.243.05 Cable used aerially not supported on insulators or by messenger.
- 234.243.06 Open wire transmission lines operating at 750 volts or more, less than 4 feet above nearest crossarm carrying highway-rail grade crossing control circuits.

**§ 234.245 Signs.**

This section requires that each sign mounted on a highway-rail grade crossing signal post or mast be maintained in good condition and be visible to the highway user.

August 1, 2002

**Application:**

This section applies to signs located at highway-rail grade crossings equipped with any type of active warning system.

CLASSIFICATION OF DEFECTS

- 234.245.01 Sign not clearly visible to highway user.
- 234.245.02 Sign not in good condition.
- 234.245.03 Sign missing or not secure.

August 1, 2002



U.S. Department  
of Transportation  
Federal Railroad  
Administration

# Memorandum

Date: November 21, 1996

Reply to Attn of: S-96-09

Subject: Interpretation and Application of 49 CFR Sections 234.245

*(Original Signed by E. R. English)*

From: E. R. English  
Director, Office of Safety Assurance and Compliance

To: All Regional Administrators, Deputy Regional Administrators, S&TC Specialists and S&TC Inspectors

The S&TC Technical Resolution Committee meeting held in Portland, Oregon the week of July 22, 1996, acted on a request for the application, interpretation, and enforcement of the requirement of Section 234.245, Signs.

The consensus of the committee was that Section 234.245 applies to any sign that is attached to the signal pole and is associated with warning highway motorists.

The following defect code will be added to clarify the intent of this section:

234.245.03 Sign missing or not secure.

#

August 1, 2002



August 1, 2002