§ 213.57 Curves; elevation and speed limitations.

(a) The maximum crosslevel on the outside rail of a curve may not be more than 8 inches on track Classes 1 and 2 and 7 inches on Classes 3 through 5. Except as provided in §213.63, the outside rail of a curve may not be lower than the inside rail. (The first sentence of paragraph (a) is applicable September 21, 1999.)

(b)(1) The maximum allowable operating speed for each curve is determined by the following formula—

$$V_{\text{max}} = \sqrt{\frac{E_a + 3}{0.0007D}}$$

Where—

- $V_{\text{max}} = \text{Maximum allowable operating speed (miles per hour)}$
- $E_a = \text{Actual elevation of the outside rail (inches)\,}^1$
- $D = \text{Degree of curvature (degrees)\,}^2$

(2) Table 1 of appendix A is a table of maximum allowable operating speed computed in accordance with this formula for various elevations and degrees of curvature.

(c)(1) For rolling stock meeting the requirements specified in paragraph (d) of this section, the maximum operating speed for each curve may be determined by the following formula—

$$V_{\text{max}} = \sqrt{\frac{E_a + 4}{0.0007D}}$$

Where—

- $V_{\text{max}} = \text{Maximum allowable operating speed (miles per hour)}$
- $E_a = \text{Actual elevation of the outside rail (inches)\,}^1$
- $D = \text{Degree of curvature (degrees)\,}^2$

(2) Table 2 of appendix A is a table of maximum allowable operating speed
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computed in accordance with this formula for various elevations and degrees of curvature.

(d) Qualified equipment may be operated at curving speeds determined by the formula in paragraph (c) of this section, provided each specific class of equipment is approved for operation by the Federal Railroad Administration and the railroad demonstrates that:

(1) When positioned on a track with a uniform 4-inch superelevation, the roll angle between the floor of the equipment and the horizontal does not exceed 5.7 degrees; and

(2) When positioned on a track with a uniform 6 inch superelevation, no wheel of the equipment unloads to a value of 60 percent of its static value on perfectly level track, and the roll angle between the floor of the equipment and the horizontal does not exceed 8.6 degrees.

(e) A track owner, or an operator of a passenger or commuter service, who provides passenger or commuter service over trackage of more than one track owner with the same class of equipment may provide written notification to the Federal Railroad Administrator with the written consent of the other affected track owners.

(f) Equipment presently operating at curving speeds allowed under the formula in paragraph (c) of this section, by reason of conditional waivers granted by the Federal Railroad Administration, shall be considered to have successfully complied with the requirements of paragraph (d) of this section.

(g) A track owner or a railroad operating above Class 5 speeds, may request approval from the Federal Railroad Administrator to operate specified equipment at a level of cant deficiency greater than four inches in accordance with §213.329(c) and (d) on curves in Class 1 through 5 track which are contiguous to the high speed track provided that—

(1) The track owner or railroad submits a test plan to the Federal Railroad Administrator for approval no less than thirty calendar days prior to any proposed implementation of the higher curving speeds. The test plan shall include an analysis and determination of carbody acceleration safety limits for each vehicle type which indicate wheel unloading of 60 percent in a steady state condition and 80 percent in a transient (point by point) condition. Accelerometers shall be laterally-oriented and floor-mounted near the end of a representative vehicle of each type;

(2) Upon FRA approval of a test plan, the track owner or railroad conducts incrementally increasing train speed test runs over the curves in the identified track segment(s) to demonstrate that wheel unloading is within the limits prescribed in paragraph (g)(1) of this section;

(3) Upon FRA approval of a cant deficiency level, the track owner or railroad inspects the curves in the identified track segment with a Track Geometry Measurement System (TGMS) qualified in accordance with §213.333 (b) through (g) at an inspection frequency of at least twice annually with not less
than 120 days interval between inspections; and

(4) The track owner or railroad operates an instrumented car having dynamic response characteristics that are representative of other equipment assigned to service or a portable device that monitors on-board instrumentation on trains over the curves in the identified track segment at the revenue speed profile at a frequency of at least once every 90-day period with not less than 30 days interval between inspections. The instrumented car or the portable device shall monitor a laterally-oriented accelerometer placed near the end of the vehicle at the floor level. If the carbody lateral acceleration measurement exceeds the safety limits prescribed in paragraph (g)(1), the railroad shall operate trains at curving speeds in accordance with paragraph (b) or (c) of this section; and

(5) The track owner or railroad shall maintain a copy of the most recent exception printouts for the inspections required under paragraphs (g)(3) and (4) of this section.

[63 FR 34029, June 22, 1998; 63 FR 54078, Oct. 8, 1998]

§ 213.59 Elevation of curved track; runoff.

(a) If a curve is elevated, the full elevation shall be provided throughout the curve, unless physical conditions do not permit. If elevation runoff occurs in a curve, the actual minimum elevation shall be used in computing the maximum allowable operating speed for that curve under §213.57(b).

(b) Elevation runoff shall be at a uniform rate, within the limits of track surface deviation prescribed in §213.63, and it shall extend at least the full length of the spirals. If physical conditions do not permit a spiral long enough to accommodate the minimum length of runoff, part of the runoff may be on tangent track.

§ 213.63 Track surface.

Each owner of the track to which this part applies shall maintain the surface of its track within the limits prescribed in the following table:

<table>
<thead>
<tr>
<th>Track surface</th>
<th>1 (inches)</th>
<th>2 (inches)</th>
<th>3 (inches)</th>
<th>4 (inches)</th>
<th>5 (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The runoff in any 31 feet of rail at the end of a raise may not be more than</td>
<td>3 ½</td>
<td>3</td>
<td>2</td>
<td>1 ½</td>
<td>1</td>
</tr>
<tr>
<td>The deviation from uniform profile on either rail at the mid-ordinate of a 62-foot chord may not be more than</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The deviation from zero crosslevel at any point on tangent or reverse crosslevel elevation on curves may not be more than</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The variation of crosslevel in crosslevel on spirals per 31 feet may not be more than</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Where determined by engineering decision prior to the promulgation of this rule, due to physical restrictions on spiral length and operating practices and experience, the variation in crosslevel on spirals per 31 feet may not be more than</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Except as limited by §213.57(a), where the elevation at any point in a curve equals or exceeds 6 inches, the difference in crosslevel within 62 feet between that point and a point with greater elevation may not be more than ½ inches. (Footnote 1 is applicable September 21, 1999.)

2 However, to control harmonics on Class 2 through 5 jointed track with staggered joints, the crosslevel differences shall not exceed ½ inches in all of six consecutive pairs of joints, as created by 7 low joints. Track with joints staggered less than 10 feet shall not be considered as having staggered joints. Joints within the 7 low joints outside of the regular joint spacing shall not be considered as joints for purposes of this footnote. (Footnote 2 is applicable September 21, 1999.)

[83 FR 34029, June 22, 1998; 63 FR 45959, Aug. 28, 1998]

Subpart D—Track Structure

§ 213.101 Scope.

This subpart prescribes minimum requirements for ballast, crossties, track assembly fittings, and the physical conditions of rails.

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