§ 213.113  

Restored under static loading conditions.

(n) The track owner shall maintain a record of the two most recent GRMS inspections at locations which meet the requirements specified in §213.241(b). At a minimum, records shall indicate the following—

(1) Location and nature of each First Level exception; and

(2) Nature and date of remedial action, if any, for each exception identified in paragraph (n)(1) of this section.

(o) The inspection interval for designated GRMS line segments shall be such that—

(1) On line segments where the annual tonnage exceeds two million gross tons, or where the maximum operating speeds for passenger trains exceeds 30 mph, GRMS inspections must be performed annually at an interval not to exceed 14 months; or

(2) On line segments where the annual tonnage is two million gross tons or less and the maximum operating speed for passenger trains does not exceed 30 mph, the interval between GRMS inspections must not exceed 24 months.

(p) As used in this section—

(1) Gage Restraint Measurement System (GRMS) means a track loading vehicle meeting the minimum design requirements specified in this section.

(2) Gage Widening Projection (GWP) means the measured gage widening, which is the difference between loaded and unloaded gage, at the applied loads, projected to reference loads of 16 kips of lateral force and 33 kips of vertical force.

(3) L/V ratio means the numerical ratio of lateral load applied at a point on the rail to the vertical load applied at that same point. GRMS design requirements specify an L/V ratio of between 0.5 and 1.25.

(4) Load severity means the amount of lateral load applied to the fastener system after friction between rail and tie is overcome by any applied gage-widening lateral load.

(5) Loaded Track Gage (LTG) means the gage measured by the GRMS vehicle at a point no more than 12 inches from the lateral load application point.

(6) Portable Track Loading Fixture (PTLF) means a portable track loading device capable of applying an increasing lateral force from 0 to 4,000 pounds on the web/base fillet of each rail simultaneously.

(7) Projected Loaded Gage (PLG) means an extrapolated value for loaded gage calculated from actual measured loads and deflections. PLG 24 means the extrapolated value for loaded gage under a 24,000 pound lateral load and a 33,000 pound vertical load.

(8) Unloaded Track Gage (UTG) means the gage measured by the GRMS vehicle at a point no less than 10 feet from any lateral or vertical load.

§ 213.113  

Defective rails.

(a) When an owner of track to which this part applies learns, through inspection or otherwise, that a rail in that track contains any of the defects listed in the following table, a person designated under §213.7 shall determine whether or not the track may continue in use. If he determines that the track may continue in use, operation over the defective rail is not permitted until—

(1) The rail is replaced; or

(2) The remedial action prescribed in the table is initiated.
## REMEDIAL ACTION

<table>
<thead>
<tr>
<th>Defect</th>
<th>Length of defect (inch)</th>
<th>Percent of rail head cross-sectional area weakened by defect</th>
<th>If defective rail is not replaced, take the remedial action prescribed in note</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>More than</td>
<td>But not more than</td>
<td></td>
</tr>
<tr>
<td>Transverse fissure</td>
<td>70          100</td>
<td>5          100</td>
<td>B. A2. A.</td>
</tr>
<tr>
<td>Compound fissure</td>
<td>70          100</td>
<td>5          100</td>
<td>B. A2. A.</td>
</tr>
<tr>
<td>Horizontal split head</td>
<td>1           10</td>
<td>2          10</td>
<td>H and F. I and G. B. A.</td>
</tr>
<tr>
<td>Vertical split head</td>
<td>2           10</td>
<td>4          10</td>
<td>H and F. I and G. B. A.</td>
</tr>
<tr>
<td>Piped rail</td>
<td>1           10</td>
<td>4          10</td>
<td>H and F. I and G. B. A.</td>
</tr>
<tr>
<td>Head web separation</td>
<td>1           10</td>
<td>4          10</td>
<td>H and F. I and G. B. A.</td>
</tr>
<tr>
<td>Bolt hole crack</td>
<td>1/4         1/10</td>
<td>1/5        1/10</td>
<td>H and F. I and G. B. A.</td>
</tr>
<tr>
<td>Broken base</td>
<td>1/4         1/10</td>
<td>1/5        1/10</td>
<td>H and F. I and G. B. A.</td>
</tr>
<tr>
<td>Ordinary break</td>
<td>1/4         1/10</td>
<td>1/5        1/10</td>
<td>H and F. I and G. B. A.</td>
</tr>
<tr>
<td>Damaged rail</td>
<td>1/4         1/10</td>
<td>1/5        1/10</td>
<td>H and F. I and G. B. A.</td>
</tr>
<tr>
<td>Flattened rail</td>
<td>Depth &gt; 1/4 and Length &gt; 8</td>
<td>1/4        1/10</td>
<td>H.</td>
</tr>
</tbody>
</table>

Notes:
- A person designated under §213.7 to visually supervise each operation over defective rail.
- A2. Assign person designated under §213.7 to make visual inspection, after a visual inspection, that person may authorize operation to continue without continuous visual inspection.

(1) Break out in rail head.
supervision at a maximum of 10 m.p.h. for up to 24 hours prior to another such visual inspection or replacement or repair of the rail.

B. Limit operating speed over defective rail to that as authorized by a person designated under §213.7(a), who has at least one year of supervisory experience in railroad track maintenance. The operating speed cannot be over 30 m.p.h. or the maximum allowable speed under §213.9 for the class of track concerned, whichever is lower.

C. Apply joint bars bolted only through the outermost holes to defect within 20 days after it is determined to continue the track in use. In the case of Classes 3 through 5 track, limit operating speed over defective rail to 30 m.p.h. until joint bars are applied; thereafter, limit speed to 50 m.p.h. or the maximum allowable speed under §213.9 for the class of track concerned, whichever is lower. When a search for internal rail defects is conducted under §213.237, and defects are discovered in Classes 3 through 5 which require remedial action C, the operating speed shall be limited to 50 m.p.h., or the maximum allowable speed under §213.9 for the class of track concerned, whichever is lower.

D. Apply joint bars bolted only through the outermost holes to defect within 10 days after it is determined to continue the track in use. In the case of Classes 3 through 5 track, limit operating speed over the defective rail to 30 m.p.h. or less as authorized by a person designated under §213.7(a), who has at least one year of supervisory experience in railroad track maintenance, until joint bars are applied; thereafter, limit speed to 50 m.p.h. or the maximum allowable speed under §213.9 for the class of track concerned, whichever is lower.

E. Apply joint bars to defect and bolt in accordance with §213.121(d) and (e).

F. Inspect rail 90 days after it is determined to continue the track in use.

G. Inspect rail 30 days after it is determined to continue the track in use.

H. Limit operating speed over defective rail to 50 m.p.h. or the maximum allowable speed under §213.9 for the class of track concerned, whichever is lower.

I. Limit operating speed over defective rail to 30 m.p.h. or the maximum allowable speed under §213.9 for the class of track concerned, whichever is lower.

(b) As used in this section—

(1) Transverse fissure means a progressive crosswise fracture starting from a crystalline center or nucleus inside the head from which it spreads outward as a smooth, bright, or dark, round or oval surface substantially at a right angle to the length of the rail. The distinguishing features of a transverse fissure from other types of fractures or defects are the crystalline center or nucleus and the nearly smooth surface of the development which surrounds it.

(2) Compound fissure means a progressive fracture originating in a horizontal split head which turns up or down in the head of the rail as a smooth, bright, or dark surface progressing until substantially at a right angle to the length of the rail. Compound fissures require examination of both faces of the fracture to locate the horizontal split head from which they originate.

(3) Horizontal split head means a horizontal progressive defect originating inside of the rail head, usually one-quarter inch or more below the running surface and progressing horizontally in all directions, and generally accompanied by a flat spot on the running surface. The defect appears as a crack lengthwise of the rail when it reaches the side of the rail head.

(4) Vertical split head means a vertical split through or near the middle of the head, and extending into or through it. A crack or rust streak may show under the head close to the web or pieces may be split off the side of the head.

(5) Split web means a lengthwise crack along the side of the web and extending into or through it.

(6) Piped rail means a vertical split in a rail, usually in the web, due to failure of the shrinkage cavity in the ingot to unite in rolling.

(7) Broken base means any break in the base of the rail.

(8) Detail fracture means a progressive fracture originating at or near the surface of the rail head. These fractures should not be confused with transverse fissures, compound fissures, or other defects which have internal origins. Detail fractures may arise from shelly spots, head checks, or flaking.

(9) Engine burn fracture means a progressive fracture originating in spots where driving wheels have slipped on top of the rail head. In developing downward they frequently resemble the
compound or even transverse fissures with which they should not be confused or classified.

(10) Ordinary break means a partial or complete break in which there is no sign of a fissure, and in which none of the other defects described in this paragraph (b) are found.

(11) Damaged rail means any rail broken or injured by wrecks, broken, flat, or unbalanced wheels, slipping, or similar causes.

(12) Flattened rail means a short length of rail, not at a joint, which has flattened out across the width of the rail head to a depth of \( \frac{3}{8} \) inch or more below the rest of the rail. Flattened rail occurrences have no repetitive regularity and thus do not include corrugations, and have no apparent localized cause such as a weld or engine burn. Their individual length is relatively short, as compared to a condition such as head flow on the low rail of curves.

(13) Bolt hole crack means a crack across the web, originating from a bolt hole, and progressing on a path either inclined upward toward the rail head or inclined downward toward the base. Fully developed bolt hole cracks may continue horizontally along the head/web or base/web fillet, or they may progress into and through the head or base to separate a piece of the rail end from the rail. Multiple cracks occurring in one rail end are considered to be a single defect. However, bolt hole cracks occurring in adjacent rail ends within the same joint must be reported as separate defects.

(14) Defective weld means a field or plant weld containing any discontinuities or pockets, exceeding 5 percent of the rail head area individually or 10 percent in the aggregate, oriented in or near the transverse plane, due to incomplete penetration of the weld metal between the rail ends, lack of fusion between weld and rail end metal, entrainment of slag or sand, under-head or other shrinkage cracking, or fatigue cracking. Weld defects may originate in the rail head, web, or base, and in some cases, cracks may progress from the defect into either or both adjoining rail ends.

(15) Head and web separation means a progressive fracture, longitudinally separating the head from the web of the rail at the head fillet area.

§ 213.115 Rail end mismatch.

Any mismatch of rails at joints may not be more than that prescribed by the following table—

<table>
<thead>
<tr>
<th>Class of track</th>
<th>On the tread of the rail ends (inch)</th>
<th>On the gage side of the rail ends (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1 track</td>
<td>( \frac{1}{8} )</td>
<td>( \frac{1}{8} )</td>
</tr>
<tr>
<td>Class 2 track</td>
<td>( \frac{1}{8} )</td>
<td>( \frac{1}{8} )</td>
</tr>
<tr>
<td>Class 3 track</td>
<td>( \frac{3}{16} )</td>
<td>( \frac{3}{16} )</td>
</tr>
<tr>
<td>Class 4 and 5 track</td>
<td>( \frac{1}{8} )</td>
<td>( \frac{1}{8} )</td>
</tr>
</tbody>
</table>

§ 213.118 Continuous welded rail (CWR); plan review and approval.

(a) Each track owner with track constructed of CWR shall have in effect and comply with a plan that contains written procedures which address: the installation, adjustment, maintenance, and inspection of CWR; inspection of CWR joints; and a training program for the application of those procedures.

(b) The track owner shall file its CWR plan with the FRA Associate Administrator for Railroad Safety/Chief Safety Officer (Associate Administrator). Within 30 days of receipt of the submission, FRA will review the plan for compliance with this subpart. FRA will approve, disapprove or conditionally approve the submitted plan, and will provide written notice of its determination.

(c) The track owner’s existing plan shall remain in effect until the track owner’s new plan is approved or conditionally approved and is effective pursuant to paragraph (d) of this section.

(d) The track owner shall, upon receipt of FRA’s approval or conditional approval, establish the plan’s effective date. The track owner shall advise in writing FRA and all affected employees of the effective date.

(e) FRA, for cause stated, may, subsequent to plan approval or conditional approval, require revisions to the plan to bring the plan into conformity with this subpart. Notice of a revision requirement shall be made in writing and specify the basis of FRA’s requirement. The track owner may, within 30 days of