

## ***RULES RESPECTING TRACK SAFETY***

**December 15, 2021**

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## PART I – GENERAL

### 1. SHORT TITLE

These Rules may be cited as the *Track Safety Rules* (TSR).

### 2. INTERPRETATION

In these Rules:

“continuous welded rail” (CWR) is rail welded into lengths of 400 ft (121.920 m) or more; (*long rail soudé*),

“crossover” means a track joining adjacent main tracks, or a main track and another track; (*liaison*)

“deviation requiring a one class speed reduction” means any measured deviation that exceeds the limits of the current class of track but does not exceed the limits of the class of track that is one class below the current class of track; (*écart nécessitant une limitation de vitesse correspondant à une catégorie de voie inférieure*)

“deviation requiring a two class speed reduction” means any measured deviation that exceeds both the limits of the current class of track and the limits of the class of track that is one class below the current class of track; (*écart nécessitant une limitation de vitesse correspondant à deux catégories de voies inférieures*)

“inactive track” means a track used less than once per month and secured in a manner that will prevent use by train or movements; (*voie inactive*)

“key route” is as defined in the *Rules Respecting Key Trains and Key Routes*; (*itinéraire clé*)

“line of track” or “track” means a railway of any length including yard tracks, sidings, spurs and other tracks auxiliary thereto, and including the right-of-way and the structures supporting or protecting the track or facilitating drainage from the track; (*voie*)”

“movement(s)” the term used in these Rules to indicate that the rule is applicable to trains, equipment, transfers or engines in yard service; (*mouvement(s)*)

“quality assurance (QA)” means a systemic set of activities carried out by a QA personnel to verify that the work is done in accordance with the railway company’s standards and procedures, and in compliance with the TSR; (*assurance de la qualité*).

“QA personnel” is a track inspector, track supervisor or a professional engineer, who is not directly involved in performing the maintenance and repair work; (*member du personnel responsable de l’AQ*);

“railway company” means a railway company that is under the jurisdiction of the *Railway Safety Act*; (*compagnie de chemin de fer*)

"railway crossing" means the crossing of two tracks; (*traversée*)

“siding,” means a track adjacent and connected to the main track, which is so designated in the timetable, GBO or operating bulletin; (*voie d’évitement*)

“track inspector” means a person certified in this capacity in accordance with Part I, subsections 7.1 to 7.5; (*inspecteur de la voie*)

“track supervisor” means a person certified in this capacity in accordance with Part I, subsections 7.1 to 7.5; (*superviseur de la voie*)

“yard” means a system of non-main tracks, utilized to switch equipment and for other purposes over which movements may operate subject to prescribed signals, rules and special instructions; (*triage*)

“yard track” means a track unclassified or classified as category 1, 2, 3 or 4 for inspection purposes (*voie de triage*).

### **3. SCOPE**

- 3.1 These Rules prescribe minimum safety requirements for federally regulated standard gauge railway track.
- 3.2 The Rules specify the limits of certain track conditions existing in isolation. A combination of track conditions, none of which individually amounts to a deviation from the requirements in these Rules may require remedial action to provide for safe operations over the track.
- 3.3 A railway may adopt additional or more stringent requirements than those contained in these Rules.

### **4. APPLICATION**

- 4.1 These Rules apply to all federally regulated railway companies operating on standard gauge track.
- 4.2 The purpose of these Rules is to ensure the safe operation of movements on standard gauge track owned by, operated on or used by a railway company.

- 4.3 Railway wishing to operate movements at speeds greater than Class 5 track must have a plan approved by the minister.

## **5. EXCEPTED TRACK**

- 5.1 A railway company may designate a segment of track as Excepted Track provided that:
- (a) The segment is identified in the timetable, special instructions, general order, or other appropriate records that are available for inspection during regular business hours;
  - (b) The identified segment is not located within 30 feet (9.144 m) of an adjacent track which can be subjected to simultaneous use at speeds in excess of 10 miles per hour;
  - (c) The identified segment is inspected in accordance with the frequency specified for Class 1 track;
  - (d) The identified segment of track is not located on a bridge including the track approaching the bridge for 100 feet (30.480 m) on either side, or located on a public street or highway;
  - (e) The railway conducts operations on the identified segment under the following conditions:
    - (i) no movements shall be operated at speeds in excess of 10 miles per hour, and
    - (ii) no occupied passenger train nor movements carrying dangerous goods shall be operated, and
    - (iii) the railway company shall advise Transport Canada within 10 days of designating a segment of track as “excepted track”.
    - (iv) The gauge on excepted track shall not be more than 58 1/4”.
    - (v) When a railway company designates a segment of track as “excepted track”, operations may continue over that segment of track without complying with the provisions of Subparts B, C, and D of Part II of the TSR.
    - (vi) The railway company shall advise Transport Canada prior to removing the status of “excepted track.”
    - (vii) On annual basis, track designated as “excepted track” must be re-evaluated by the railway company and a risk assessment report indicating that the track is safe for operations shall be provided to Transport Canada. The status of the track must also be confirmed in the report.

## **6. RESPONSIBILITY OF THE RAILWAY COMPANY**

- 6.1 The railway company shall ensure that track inspections are undertaken at such frequency and by such a method as to ensure the line of track is compliant with the TSR and is safe for all movements at the authorized speed.
- 6.2 Where a line of track is not in compliance with the requirements of these Rules, the railway company shall immediately:
- (a) Bring the line of track into compliance; or
  - (b) Halt operations over that line of track.
- 6.3 Notwithstanding subsection 6.2, in the case of Class 1 track that is not in compliance with these Rules, the railway company may operate on that line of track under the authority of a track supervisor for not more than 30 days. Subsection 6.3 does not apply where defective rails are involved. Part II, Subpart D section III (Defective Rails) of the TSR exclusively governs further operations over defective rails.
- 6.4 When any person, including a contractor for a railway company, performs any function required by these Rules, that person is required to perform that function in accordance with these Rules.

## **7. KNOWLEDGE, QUALIFICATIONS AND CERTIFICATION**

### **A. Track Inspectors and Track Supervisors**

- 7.1 Each railway company shall ensure that track inspectors and track supervisors are qualified and certified to inspect track for defects or supervise restoration or renewal of track under traffic conditions; and must develop and adhere to a documented certification process that demonstrates such qualification and certification. This certification process shall be made available upon request to Transport Canada.
- 7.2 Each railway company shall ensure that the certification process for track inspectors and track supervisors contains:
- (a) minimum training requirements;
  - (b) requirements for minimum experience in railway track inspection and maintenance; and
  - (c) a process for demonstrating competency.
- 7.3 Each railway company shall ensure that track inspectors and track supervisors:

- (a) know and understand the requirements of the TSR;
- (b) know and understand the railway company's requirements, including procedures, and standards for track inspection and maintenance;
- (c) can detect deviations from those requirements; and
- (d) can prescribe appropriate remedial action to correct or safely compensate for those deviations.

- 7.4 Recertification of track inspectors and track supervisors must be completed at intervals not exceeding three years.
- 7.5 For each certified track inspector and each certified track supervisor, the railway company shall issue a certificate demonstrating that it is satisfied that each track inspector and track supervisor is qualified and certified.
- 7.6 A railway company shall maintain a record of each certificate issued and of each person who has been certified as track inspector or track supervisor. Records shall be made available, upon request, to Transport Canada.
- 7.7 If during a period of restoration or renewal, track is under traffic conditions and does not meet all of the requirements prescribed in these Rules, the work on the track shall be under the continuous supervision of a person certified as a Track Supervisor and subject to any limiting conditions specified by such a person.
- (a) The term "continuous supervision" as used in this section means the physical presence of that person at a job site. However, since the work may be performed over a large area and it may not be possible for that person to visually supervise each segment of the work, in this case the person must be present at the job site, in direct control of the work and have direct knowledge of the condition of the track over which they permit movements to pass.
  - (b) When the designated person leaves the work site and before movements are authorized to operate over the affected segment, the track must be in compliance with the TSR.

## **B. Track Maintenance and Repair Work**

- 7.8 Each railway company shall ensure that persons performing maintenance and repair work have :
- a) knowledge of the relevant company standards and procedures for the work they are performing; and
  - b) skills and abilities to perform the work.



### **C. A Person Authorizing Movements to Pass Over a Broken Rail**

7.9 Each railway company shall ensure that a person authorizing movements to pass over a broken rail is qualified and certified:

- (a) to identify rail end mismatch, rail defects, condition of track ties, track surface, gauge and alignment defects; and
- (b) on the requirements of Part II, Subpart D section III (a) (2) of the TSR.

7.10 Each railway company must develop and adhere to a documented certification process that demonstrates such qualification and certification that contains:

- (a) minimum training requirements;
- (b) requirements for minimum experience in railway track maintenance, signal or train operations experience; and
- (c) a process for demonstrating competency.

This certification process shall be made available, upon request, to Transport Canada.

7.11 Recertification must be completed at intervals not exceeding three years.

7.12 For each person certified to authorize movements to pass over a broken rail, the railway company shall:

- (a) issue a certificate demonstrating that it is satisfied that each person is qualified and certified; and
- (b) maintain a record of each certificate issued and of each person who has been certified. Records shall be made available, upon request, to Transport Canada.

## **8. MEASURING TRACK NOT UNDER LOAD**

8.1 When unloaded track is measured to determine compliance with requirements of these Rules, the amount of rail movement which occurs while the track is loaded must be added to the measurements of the unloaded track.

## **9. TRACK MAINTENANCE AND REPAIR WORK**

- (a) Track maintenance and repair work must be performed in accordance with the railway company's standards and procedures. Track must be compliant with the TSR after the work is

- performed.
- (b) Each railway company must identify and maintain a list of safety critical maintenance and repair activities. Railway companies must consider, as a minimum, the following in determining what constitutes a safety critical maintenance and repair activity:
    - i. derailment risk, if the work is not performed in accordance with railway company standards and procedures, and
    - ii. track related derailment occurrences.Such list shall be made available to Transport Canada upon request.
  - (c) For railway companies with a key route or track over which trains operate at Class 3 speed or higher the list of safety critical maintenance and repair activities under item 9 b) and any subsequent revision to the list must be approved by a professional engineer.
  - (d) QA must be conducted by QA personnel for safety critical maintenance and repair activities.
  - (e) Railway companies must establish and adhere to time limits for performing and documenting the QA. Such time limits shall be made available to Transport Canada upon request. For railway companies with a key route or track over which trains operate at Class 3 speed or higher, such time limits must be approved by a professional engineer.
  - (f) Railway companies must maintain records, for a minimum of 1 year, to demonstrate that the requirements of items 9 d) and 9 e) above are being adhered to.

## PART II - TRACK SAFETY RULES

### A. CLASSES OF TRACK: Operating Speed Limits

The following maximum allowable operating speeds apply:  
(in miles per hour)

Maximum allowable operating speeds

Over track that meets all of the requirements prescribed in this part for-	The maximum allowable operating speed for freight trains is -	The maximum allowable operating speed for passenger trains is -
Class 1 track	10	15
Class 2 track	25	30
Class 3 track	40	60
Class 4 track	60	80
Class 5 track	80	95*

\* For LRC Trains, 100 mph

### B. ROADBED

#### I. Drainage

Each drainage or other water carrying facility under or immediately adjacent to the roadbed must be maintained and kept free of obstruction, to accommodate expected water flow for the area concerned.

#### II. Vegetation

Vegetation on railway property which is on or immediately adjacent to roadbed must be controlled so that it does not:

- (a) become a fire hazard to track-carrying structures;
- (b) obstruct visibility of railway signs and signals;
- (c) interfere with railway employees performing normal track side duties;
- (d) prevent proper functioning of signal and communication lines; or
- (e) prevent railway employees from visually inspecting moving equipment from their normal duty stations.

## C. TRACK GEOMETRY

### 1. Scope

This subpart prescribes minimum requirements for the gauge, alignment, and surface of track and the elevation of the outer rails and speed limitations for curved track.

### 2. Gauge

2.1 Gauge is measured between the heads of the rails at right angles to the rails in a plane 5/8 inch below the top of the rail head.

2.2 Standard gauge is 56 1/2 inches.

2.3 Gauge must be within the limits prescribed in the following table:

<b>Class of track</b>	<b>The gauge must be at least</b>	<b>But not more than</b>
Excepted track	N/A	58 1/4"
1	55 3/4"	58"
2	55 3/4"	57 3/4"
3	56"	57 3/4"
4 and 5	56"	57 1/2"
Yard Track Category 1 & Category 2	55 3/4"	57 3/4"
Yard Track Category 3 & Category 4	55 3/4"	58"

### 2.4 Variation in Gauge

When the gauge is less than 56 inches and the change in gauge over a distance of 20 feet (6.096 m) or less on either side of the defective location exceeds 1 1/2 inches, train speed must be reduced according to Class 1 track speed.

### 3. Track Alignment

Alignment may not deviate from uniformity more than the amount prescribed in the following table:

Class of Track	Tangent Track	Curved Track	
	The deviation of the mid-offset from a 62-foot line <sup>[1]</sup> may not be more than-	The deviation of the mid-ordinate from a 31-foot chord <sup>[2]</sup> may not be more than-	The deviation of the mid-ordinate from a 62-foot chord <sup>[2]</sup> may not be more than-
1	5"	N/A <sup>[3]</sup>	5"
2	3"	N/A <sup>[3]</sup>	3"
3	1 3/4"	1 1/4"	1 3/4"
4	1 1/2"	1"	1 1/2"
5	3/4"	1/2"	5/8"

[1] The ends of the line must be at points on the gauge side of the line rail, 5/8 inch below the top of the railhead. Either rail may be used as the line rail; however, the same rail must be used for the full length of that tangential segment of track.

[2] The ends of the chord must be at points on the gauge side of the outer rail, 5/8 inch below the top of the railhead.

[3] N/A – Not Applicable

### 4. Curves: Elevation and Speed Limitations

- 4.1 The maximum cross level on the outside rail of a curve may not be more than 7 inches on any track. Curves exceeding 6 inches cross level must be monitored and have a remedial action plan to bring it back to 6 inches or less cross level. The outside rail of a curve may not be lower than the inside rail, except as per table in Part II, Subpart C section 6 Track Surface.

- 4.2 The maximum allowable operating speed for each curve is determined by the following formula:

$$V_{max} = \sqrt{(Ea + 3)/0.0007d}$$

where:

Vmax = Maximum allowable operating speed (miles per hour)

Ea = Actual elevation of the outside rail (inches)<sup>1</sup>

d = Degree of curvature (degrees)<sup>2</sup>

- a) For the purpose of calculating Vmax only, actual elevation for each 155 foot track segment in the body of the curve is determined by averaging the elevation for 10 points through the segment at 15.5-foot spacing. If the curve length is less than 155 ft, average the points through the full length of the body of the curve.
- b) Degree of curvature is determined by averaging the degree of curvature over the same track segment as the elevation.

Below is a table of maximum allowable operating speed computed in accordance with this formula for various elevations and degrees of curvature.

Degree of Curvature	Three-Inch Unbalance												
	Elevation in Inches												
	0	1/2	1	1½	2	2½	3	3½	4	4½	5	5½	6
Maximum allowable operating speed (m.p.h.)													
0° 30'	93	100	107	113	120	125	131	136	141	146	151	156	160
1° 00'	66	71	76	80	85	89	93	96	100	104	107	110	113
1° 15'	59	63	68	72	76	79	83	86	89	93	96	99	101
1° 30'	54	58	62	66	69	72	76	79	82	85	87	90	93
1° 45'	50	54	57	61	64	67	70	73	76	78	81	83	86
2° 00'	46	50	54	57	60	63	66	68	71	73	76	78	80
2° 15'	44	47	50	54	56	59	62	64	67	69	71	74	76
2° 30'	41	45	48	51	54	56	59	61	63	66	68	70	72
2° 45'	40	43	46	48	51	54	56	58	60	62	65	66	68
3° 00'	38	41	44	46	49	51	54	56	58	60	62	64	66
3° 15'	36	39	42	45	47	49	51	54	56	57	59	61	63
3° 30'	35	38	40	43	45	47	50	52	54	55	57	59	61
3° 45'	34	37	39	41	44	46	48	50	52	54	55	57	59
4° 00'	33	35	38	40	42	44	46	48	50	52	54	55	57
4° 30'	31	33	36	38	40	42	44	45	47	49	50	52	54
5° 00'	29	32	34	36	38	40	41	43	45	46	48	49	51
5° 30'	28	30	32	34	36	38	40	41	43	44	46	47	48
6° 00'	27	29	31	33	35	36	38	39	41	42	44	45	46
6° 30'	26	28	30	31	33	35	36	38	39	41	42	43	45
7° 00'	25	27	29	30	32	34	35	36	38	39	40	42	43
8° 00'	23	25	27	28	30	31	33	34	35	37	38	39	40
9° 00'	22	24	25	27	28	30	31	32	33	35	36	37	38
10° 00'	21	22	24	25	27	28	29	31	32	33	34	35	36
11° 00'	20	21	23	24	26	27	28	29	30	31	32	33	34
12° 00'	19	20	22	23	24	26	27	28	29	30	31	32	33

4.3 A track owner or a railway company may request approval from Transport Canada to operate specified railway equipment at a level of cant deficiency greater than 3 inches.

## 5. Elevation of Curved Track: Runoff

5.1 If a curve is elevated, the full elevation must be provided throughout the curve, unless physical conditions do not permit. If elevation runoff occurs in a curve, the actual minimum elevation must be used in computing the maximum allowable operating speed for that curve under 4.2.

5.2 Elevation runoff must be at a uniform rate, within the limits of track surface deviation prescribed in Part II, Subpart C section 6 and it must 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.

**6. Track Surface**

6.1 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:

Track Surface	Class of Track				
	1	2	3	4	5
The runoff in any 31 ft of rail at the end of the raise may not be more than	3 ½"	3"	2"	1 ½"	1"
The deviation from uniform profile on either rail at the mid-ordinate of a 62 foot chord may not be more than	3"	2 ¾"	2 ¼"	2"	1 ¼"
The difference in cross level between any two points less than 31 ft apart on spirals may not be more than	2"	1 ¾"	1 ¼"	1"	¾"
The deviation from zero cross level at any point on tangent track or reverse cross level elevation on non tangent track may not be more than	3"	2"	1 ¾"	1 ¼"	1"
The difference in cross level between any two points less than 62 ft apart may not be more than	3"	2 ¼"	2"	1 ¾"	1 ½"



- 6.2 To control harmonics on Class 2 through 5 jointed track with staggered joints, the cross level differences shall not exceed 1 ¼ inches in all of six consecutive pairs of joints, as created by 7 low joints. Track with joints staggered less than 10 feet (3.048 m) 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 subsection. For 79 or 80 foot long rails, this subsection is not applicable.

## **7. Remedial Action for Measurements by Electronic Geometry Inspection Vehicle**

- 7.1 When a track geometry-related defect is detected during an electronic geometry inspection and communicated to the track supervisor prior to the next train movement:
- a) For any deviation requiring a two class speed reduction, the railway company must immediately, upon notification to the track supervisor, comply with Part I, Subsection 6.2.
  - b) For any deviation requiring a one class speed reduction, the railway company may, for a period of seventy-two (72) hours after the inspection, use linear interpolation to determine the speed of the temporary slow order initiated to protect the defect. Records of slow orders imposed or reason for not imposing one must be maintained. Upon the expiration of the seventy-two (72) hours period, if the track defect has not been repaired, the slow order speed(s) must be revised to those of the next lower track Class.
- 7.2 When a track geometry-related defect is detected during an electronic geometry inspection and not communicated to the track supervisor prior to the next train movement:
- a) Notwithstanding Part I Subsection 6.2, the railway company must ensure that the track supervisor is notified of track geometry-related defect, within 48 hours of the electronic geometry inspection vehicle inspecting the track.
  - b) For any deviation requiring a two class speed reduction, the railway company must immediately, upon notification to the track supervisor, comply with Part I, Subsection 6.2.
  - c) Notwithstanding Part I Subsection 6.2, for any deviation requiring a one class speed reduction, the railway company must within twenty-four (24) hours of notification to the track supervisor, bring the line of track into compliance.

## **8. Track Geometry Management Plan**

- 8.1 Each railway company must develop and adhere to a Track Geometry Management Plan that:
- a) defines a combination of track geometry conditions including:

- (i) Maximum spacing;
  - (ii) Combinations of track geometry conditions, which should include as a minimum:
    - 1) For railway companies transporting covered hopper cars: Lateral alignment and deviation from uniform profile
    - 2) For railway companies transporting tank cars: Lateral alignment and rate of change for cross level
  - (iii) Thresholds for the combinations of track geometry conditions, which must be lower than single defect thresholds as defined in Subpart C – Track Geometry; and
  - (iv) Requirements for remedial action(s) to be taken if the combination(s) of track geometry conditions exceeds thresholds as defined in the Track Geometry Management Plan.
- b) Includes instructions for monitoring and taking appropriate measures for track geometry conditions approaching the limits prescribed under Part II Subpart C Sections 2, 3, and 6, at a minimum for key routes or tracks over which trains operate at Class 3 speed or higher.
- 8.2 Each railway company with a key route or track over which trains operate at Class 3 speed or higher must have the Track Geometry Management Plan approved by a professional engineer.
- 8.3 Each railway company must file a copy of their Track Geometry Management Plan with Transport Canada within 3 months after the date on which these Rules come into force. Any subsequent revisions to the plan must be filed with Transport Canada before the revisions become effective.
- 8.4 Each railway company must maintain records, for a minimum of 1 year, to demonstrate that the requirements of the Track Geometry Management Plan are being adhered to.

## **D. TRACK STRUCTURE**

**Scope:** This subpart prescribes minimum requirements for ballast, crosstie, track assembly fittings, and the physical condition of rails.

### **I. Ballast: General**

Unless it is otherwise structurally supported, all track must be supported by material which will:

- (a) transmit and distribute the load of the track and railroad rolling equipment to the subgrade;
- (b) restrain the track laterally, longitudinally, and vertically under dynamic loads imposed by railway rolling equipment and thermal stress exerted by the rails;
- (c) provide adequate drainage for the track; and
- (d) maintain proper track cross-level, surface, and alignment.

### **II. Crossties**

- (a) Crossties shall be made of a material to which rail can be securely fastened.
- (b) Each 39 foot segment of track shall have:
  - (1) a sufficient number of crossties which in combination provide effective support that will:
    - (i) hold gauge within the limits prescribed in C. 2.3;
    - (ii) maintain surface within the limits prescribed in C. 6;
    - and
    - (iii) maintain alignment within the limits prescribed in C. 3.
  - (2) the minimum number and type of crossties specified in paragraph(c) of this section effectively distributed to support the entire segment; and
  - (3) At least one crosstie of the type specified in paragraph (c) of this section that is located at a joint location as specified in paragraph(d) of this section.

(c) Each 39 foot segment of:

Class 1 track shall have five crossties;

Class 2 track shall have eight crossties;

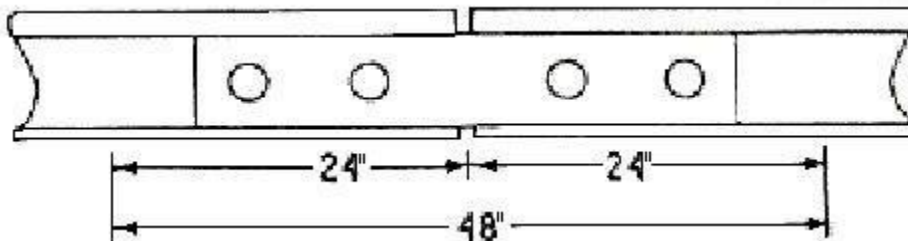
Class 3 track shall have 10 crossties; and

Classes 4 and 5 track shall have 12 crossties, which are not:

- (1) broken through;
- (2) split or otherwise impaired to the extent the crossties will allow the ballast to work through, or will not hold spikes or rail fasteners;
- (3) so deteriorated that the tie plate or base of rail can move laterally more than 1/2 inch relative to the crossties; or
- (4) cut by the tie plate through more than 40 percent of a tie's thickness.

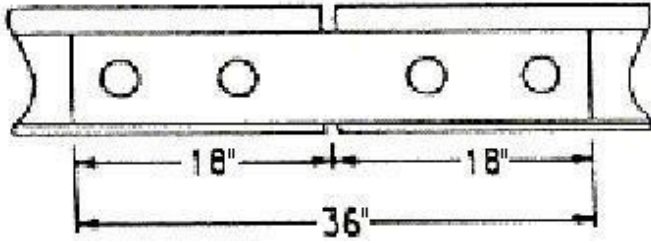
(d) Class 1 and Class 2 track shall have one crosstie whose centerline is within 24 inches of the rail joint location, and Classes 3 through 5 track shall have one crosstie whose centerline is within 18 inches of the rail joint location. The relative position of these ties is described in the following diagram:

**Classes 1 through 2**



Each rail joint in Classes 1 and 2 track shall be supported by at least one crosstie in paragraph (c) of this section whose centerline is within the 48 inches shown above.

## Classes 3 through 5



Each rail joint in Class 3 through 5 track shall be supported by at least one crosstie specified in paragraph (c) of this section whose centerline is within 36 inches shown above.

### III. Defective Rails

- (a) When a rail in track contains any of the defects listed in the following table, 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**

Defect	Length of Defect (inch)		Percent of Rail Head Cross-Sectional Area Weakened by Defect		If Defective Rail is not Replaced, Take this Remedial Action Prescribed in Note
	More than	But not more than	Less than	But not less than	
Transverse fissure			20 100	20 100	B B A
Compound fissure			20 100	20 100	B B A
Detail fracture Engine burn fracture Defective weld			20 100	20 100	C D A or E and H
Horizontal split head	0 2	2 4			H and F I and G
Vertical split head	4 (1)	(1)			B A
Split web Piped rail Head web separation	0 ½ 3 (1)	½ 3 (1)			H and F I and G B A
Bolt hole crack	0 ½ 1½ (1)	½ 1½ (1)			H and F G B A
Broken base	0 6	6			E A or E and I
Ordinary break					A or E
Damaged rail					C

(1) Break out in rail head.

**Notes:**

- A.\*** Assigned person to visually supervise each operation over defective rail.
- B.** Limit operating speed over defective rail to that as authorized by the Track Supervisor or other supervisory personnel.
- 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 the defective rail to 30 mph until angle bars are applied; thereafter limit speed to 60 mph or the maximum allowable speed under Subpart A Classes of Track: Operating Speed Limits 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 mph or less as authorized by a Track Supervisor or other supervisory personnel until angle bars are applied; thereafter limit speed to 60 mph or the maximum allowable speed under Subpart A Classes of Track: Operating Speed Limits for the class of track concerned, whichever is lower.
- E.** Apply joint bars to defect and bolt in accordance with V (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 60 mph or the maximum allowable speed under Subpart A, Classes of Track: Operating Speed Limits for the class of track concerned, whichever is lower.
- I.** Limit operating speed over defective rail to 30 mph or the maximum allowable speed under Subpart A, Class of Track: Operating Speed Limits, for the class of track concerned, whichever is lower.
- \*** Where there is an ordinary break; or a complete break in which there is a sign of a transverse fissure or compound fissure or defective weld, movements over these rail breaks may take place under the following conditions:

- (1) All persons performing these duties have been properly trained.

- (2) Unsupervised movement over a rail break can only be performed where the rail break is at a significant distance from a location where a person's vehicle can be stored, for example, where there is no other track, grade crossings or other road nearby, or access on foot is impeded by adverse weather conditions such as snow, ice or cold temperatures. In addition, unsupervised movement over rail break must also comply with the requirements of following items: (1) and (3) to (9).
- (3) Movements must not be permitted to operate over the rail break when any of the following conditions exist:
  - (a) the rail break is in a tunnel or on an open deck bridge;
  - (b) the rail break is within 150 m of an unanchored open deck bridge;
  - (c) the ties on either side of the break are defective, crushed, or split in the tie plate area;
  - (d) cracks are observed radiating from the broken rail ends;
  - (e) the rail break occurs in an area of unstable grade;
  - (f) the offset (overhang) is greater than 2 inches (50 mm);
  - (g) the gap is greater than 3½ inches (89) mm;
  - (h) in the case of a joint area, the break extends beyond the limits of the joint bar; or
  - (i) the rail break occurs in an area in which the engineer in charge has specified that movements over rail breaks are not permitted.
- (4) Where joint bars are installed with at least one bolt through the centre of the rail break, movements may operate over the rail break at a speed not exceeding 10 miles per hour.
- (5) Where the rail break is not on a ballast deck bridge and the gap size is too small to allow for the installation of joint bars with one bolt through the centre of the rail break (i.e. less than 1 1/8 inches), movements may operate over the rail break at a speed not exceeding 5 miles per hour.
- (6) The condition of the rail break, splice bars, and supporting ties, must be inspected prior to each movement over the break.
- (7) Speed restrictions must be applied in accordance with the applicable operating rules.
- (8) Records of these rail breaks must be kept for a period of at least 1 year including:



- (a) the mileage and subdivision where each rail break occurred;
  - (b) the measured gap and offset at the rail break; and
  - (c) the type of rail defect.
- (9) Repairs must be completed within 24 hours from the time that the defect is first inspected.

### **III. Defective Rails Continued**

- (b) As used in this section:
  - (1) "Transverse Fissure" means a progressive crosswise fracture starting from a crystalline centre 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 centre 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 a 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 are found.
- (11) "Damaged Rail" means any rail broken or injured by wrecks, broken, flat, or unbalanced wheels, slipping, or similar causes.

#### **IV. Rail Surface Management**

- a) Rail Surface Management
  - i) Each railway company must develop and adhere to a Rail Surface Management Plan that:
    - 1) Defines, as a minimum, the following rail surface conditions: crushed heads, flattened rail, corrugation, and rail end batter for which companies must inspect; and
    - 2) Establishes acceptable limits for these conditions; methods to measure conditions and corrective action(s) to be taken when conditions approach and exceed the acceptable limits.
  - ii) Each railway company with a key route or track over which trains operate at Class 3 speed or higher must have the Rail Surface Management Plan approved by a professional engineer.
  - iii) Each railway company must file a copy of their Rail Surface Management Plan with Transport Canada within 3 months after the date on which these Rules come into force. Any subsequent revisions to the plan must be filed with Transport Canada before the revisions become effective.
  - iv) Each railway company must maintain records, for a minimum of 1 year, to demonstrate that the requirements of the Rail Surface Management Plan are being adhered to.

b) Rail End Mismatch

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

<b>Class of Track</b>	<b>On the top of the rail ends (inch)</b>	<b>On the gauge side of the rail ends (inch)</b>
1	1/4	1/4
2	1/4	3/16
3	3/16	3/16
4,5	1/8	1/8

**V. Rail Joints**

- (a) Each rail joint, insulated joint, and compromise joint must be of the proper design and dimensions for the rail on which it is applied.
- (b) If a joint bar on Classes 3 through 5 track is cracked, broken, or because of wear allows vertical movement of either rail when all bolts are tight, it must be replaced.
- (c) If a joint bar is cracked or broken between the middle two bolt holes it must be replaced.
- (d) In the case of conventional jointed track, each rail must be bolted with at least two bolts at each joint in Classes 2 through 5 track, and with at least one bolt in Class 1 track.
- (e) In the case of continuous welded rail track, each rail must be bolted with at least two bolts at each joint.
- (f) Each joint bar must be held in position by track bolts tightened to allow the joint bar to firmly support the abutting rail ends and to allow longitudinal movement of the rail in the joint to accommodate expansion and contraction due to temperature variations. When out-of-face, no-slip, joint-to-rail contact exists by design, the requirements of this paragraph do not apply. Those locations are considered to be continuous welded rail track and must meet all the requirements for C continuous welded rail track prescribed in this part.
- (g) No rail or angle bar having a torch cut or burned bolt hole may be used.

## **VI. Tie Plates**

In Classes 3 through 5 track where timber cross ties are in use there must be tie plates under the running rails on at least eight of any 10 consecutive ties.

## **VII. Rail Anchoring**

A sufficient number of anchoring devices will be applied to provide adequate longitudinal restraint.

## **VIII. Rail Fastenings**

Each 39 foot segment of rail shall have a sufficient number of fastenings to effectively maintain gauge within the limits prescribed in C. 2.

## **IX. Continuous Welded Rail (CWR)**

- a) Each railway company must develop and adhere to a CWR Management Plan that includes comprehensive installation, inspection and maintenance requirements;
- b) Each railway company with CWR track on a key route or over which trains operate at Class 3 speed or higher must have the CWR Management Plan approved by a professional engineer.
- c) Each railway company must file a copy of their CWR Management Plan with Transport Canada within 3 months after the date on which these Rules come into force. Any subsequent revisions to the plan must be filed with Transport Canada before the revisions become effective.
- d) Each railway company must maintain records, for a minimum of 1 year, to demonstrate that the requirements of the CWR Management Plan are being adhered to.

## **X. Rail Wear**

- a) Railway companies must develop and adhere to a Rail Wear Management Plan that includes rail wear limits for each section (weight) of rail in service and prescribes the action(s) to be taken when rail approaches or exceeds limits; and
- b) Railway companies with a key route or track over which trains operate at Class 3 speed or higher must have the Rail Wear Management Plan approved by a professional engineer.
- c) Railway companies must file a copy of the Rail Wear Management Plan with Transport Canada within 3 months after the date on which these Rules come into force. Any subsequent revisions to the plan must be filed with Transport Canada before the revisions become effective.
- d) Railway companies must maintain records, for a minimum of 1 year, to demonstrate that the requirements of the Rail Wear Management Plan are being adhered to.

## **XI. Turnouts and Track Crossings Generally**

- (a) In turnouts and track crossings, the fastenings must be intact and maintained so as to keep the components securely in place. Also, each switch, frog, and guard rail must be kept free of obstructions that may interfere with the passage of wheels.
- (b) Classes 4 through 5 track must be equipped with rail anchors through and on each side of track crossings and turnouts, to restrain rail movements affecting the position of switch points and frogs.
- (c) Each flange way at turnouts and track crossings must be at least 1 ½ inches wide.

## **XII. Switches**

- (a) Each stock rail must be securely seated in switch plates, but care must be used to avoid canting the rail by over tightening the rail braces.
- (b) Each switch point must fit its stock rail properly, with the switch stand in either of its closed positions to allow wheels to pass the switch point. Lateral and vertical movement of a stock rail in the switch plates or of a switch plate on a tie must not adversely affect the fit of the switch point to the stock rail.
- (c) Each switch point be maintained so that the outer edge of the wheel tread cannot contact the gauge side of the stock rail.
- (d) The heel of each switch rail must be secure and the bolts in each heel must be kept tight.
- (e) Each switch stand and connecting rod must be securely fastened and operable without excessive lost motion.
- (f) Each throw lever must be maintained so that it cannot be operated with the lock or keeper in place.
- (g) Each switch position indicator must be clearly visible at all times.
- (h) Unusually chipped or worn switch points must be repaired or replaced. Metal flow must be removed to insure proper closure.

### **XIII. Frogs**

- (a) The flange way depth measured from a plane across the wheel-bearing area of a frog on Class 1 track may not be less than 1 3/8 inches, or less than 1½ inches on Classes 2 through 5 track.
- (b) If a frog point is chipped, broken, or worn more than five-eighths inch down and 6 inches back, operating speed over the frog may not be more than 10 miles per hour.
- (c) If the tread portion of a frog casting is worn down more than three-eighths inch below the original contour, operating speed over that frog may not be more than 10 miles per hour.
- (d) Where frogs are designed as flange-bearing, flange way depth may be less than that shown for Class 1 if operated at Class 1 speed.

### **XIV. Spring Rail Frogs**

- (a) The outer edge of a wheel tread may not contact the gauge side of a spring wing rail.
- (b) The toe of each wing rail must be solidly tamped and fully and tightly bolted.
- (c) Each frog with a bolt hole defect or head-web separation must be replaced.
- (d) Each spring must have a tension sufficient to hold the wing rail against the point rail.
- (e) The clearance between the hold-down housing and the horn may not be more than one-fourth of an inch.

### **XV. Self-Guarded Frogs**

- (a) The raised guard on a self-guarded frog may not be worn more than three-eighths of an inch.
- (b) If repairs are made to a self-guarded frog without removing it from service, the guarding face must be restored before rebuilding the point.

## XVI. Frog Guard Rails

The guard check in frogs must be within the limits prescribed in the following table:

Class of Track	Guard check gauge - The distance between the gauge line of a frog to the guard line <sup>1</sup> of its guard rail or guarding face, measured across the track at right angles to the gauge line, <sup>2</sup> may not be less than -
1	4 feet 6 1/8 inches
2	4 feet 6 1/4 inches
3, 4	4 feet 6 3/8 inches
5	4 feet 6 1/2 inches <sup>3</sup>
<p><b>Note:</b></p> <p><sup>1</sup> Line along that side of the flange way which is nearer to the centre of the track and at the same elevation as the gauge line.</p> <p><sup>2</sup> Line 5/8 inch below the top of the centerline of the head of the running rail, or corresponding location of the tread portion of the track structure.</p> <p><sup>3</sup> At points of heavy point frogs equipped with through gauge plates, 4' 6 3/8".</p>	

## **E. TRACK APPLIANCES AND TRACK-RELATED DEVICES**

### **I. Scope**

This Subpart prescribes minimum requirements for certain track appliances and track-related devices.

### **II. Derails**

Each derail must be clearly visible. When in a locked position a derail must be free of any lost motion which would allow it to be operated without removing the lock.

Derails must be installed when there is any possibility of equipment that has been left standing on tracks other than main tracks or sidings being moved by gravity so as to obstruct a main track or siding.

## **F. INSPECTION**

### **1. Scope**

This subpart prescribes minimum requirements for the frequency and manner of inspecting track to detect deviations from the TSR.

- 1.1 All tracks Classes 1 through 5 must be inspected in accordance with the requirements as prescribed herein.
- 1.2 The minimum requirements for the frequency and manner of inspecting track over which movements are operated at speeds in excess of those permitted over Class 5 track must be filed with and approved by the Minister.
- 1.3 If the person making the inspection finds a deviation from the requirements of the TSR, that individual must immediately initiate remedial action.
- 1.4 Unless otherwise specified, the interpretation of designated minimum inspection frequency intervals are as follows:



<b>Designated Inspection Frequency</b>	<b>Designated Inspection Frequency means</b>
<b>Twice weekly</b>	<p>A minimum of two inspections each week (Sunday to Saturday) and:</p> <ul style="list-style-type: none"> <li>• with no more than 3 days between days of inspection in a week, and</li> <li>• with no more than 3 days between the day of inspection in one week and the next day of inspection in the following week.</li> </ul>
<b>Weekly</b>	<p>A minimum of one inspection each week (Sunday to Saturday) and:</p> <ul style="list-style-type: none"> <li>• with no more than 10 days between days of inspection.</li> </ul>
<b>Twice monthly</b>	<p>A minimum of two inspections each month (between the 1<sup>st</sup> and last day of each month) and:</p> <ul style="list-style-type: none"> <li>• with no more than 20 days between days of inspection in a month, and</li> <li>• with no more than 20 days between the day of inspection in one month and the next day of inspection in the following month.</li> </ul>
<b>Monthly</b>	<p>A minimum of one inspection each month (between the 1<sup>st</sup> and the last day of each month) and:</p> <ul style="list-style-type: none"> <li>• with no more than 40 days between days of inspection.</li> </ul>
<b>Quarterly</b>	<p>A minimum of one inspection each quarter (January 1<sup>st</sup> to March 31<sup>st</sup>, April 1<sup>st</sup> to June 30<sup>th</sup>, July 1<sup>st</sup> to September 30<sup>th</sup>, October 1<sup>st</sup> to December 31<sup>st</sup>) and:</p> <ul style="list-style-type: none"> <li>• with no more than 100 days between days of inspection.</li> </ul>
<b>Three times annually</b>	<p>A minimum of one inspection each 4 months (January 1<sup>st</sup> to April 30<sup>th</sup>, May 1<sup>st</sup> to August 31<sup>st</sup>, September 1<sup>st</sup> to December 31<sup>st</sup>) and:</p> <ul style="list-style-type: none"> <li>• with no more than 180 days between days of inspection .</li> </ul>
<b>Twice annually</b>	<p>A minimum of one inspection each 6 months (January 1<sup>st</sup> to June 30<sup>th</sup>, July 1<sup>st</sup> to December 31<sup>st</sup>) and:</p> <ul style="list-style-type: none"> <li>• with no more than 225 days between days of inspection.</li> </ul>
<b>Annually</b>	<p>One inspection each year (January 1<sup>st</sup> to December 31<sup>st</sup>) and:</p> <ul style="list-style-type: none"> <li>• with no more than 400 days between days of inspections.</li> </ul>

## 2. Track – Inspections

### 2.1 General

A Track Inspector or Track Supervisor must undertake track inspections at such frequency and by such a method as to ensure the track is compliant with the TSR and is safe for all movements at the authorized speed.

### 2.2 Special Track Inspections

In the event of a fire, flood, severe storm or any other occurrence that may have damaged the track structure, a Special Track Inspection must be made of the track involved as soon as possible after the occurrence and, if possible, before the operation of any train and equipment movements.

### 2.3 Inactive track Inspections

Inactive tracks must be secured in a manner that must prevent use by movements and must be inspected before being used to ensure the track is compliant and safe for all movements at the authorized speed.

### 2.4 Visual Track Inspections

- (a) Unless otherwise specified, each Visual Track Inspection must be made on foot or by riding over the track in a vehicle at a speed that allows the person making the inspection to visually inspect and evaluate the track for compliance to the TSR.
- (b) The speed of the vehicle must not be more than 5 mph when traversing railway crossings, turnouts or special trackwork.
- (c) Mechanical, electrical and other track inspection devices may be used to supplement Visual track inspections.
- (d) When inspecting track, an inspector may inspect up to two tracks at one time provided that:
  - (i) The inspector's visibility remains unobstructed by any cause and that the second track is not centered more than 30 ft (9.144m) from the track upon which the inspector is traversing.

- (ii) Each track that requires weekly or more frequent inspection must be traversed by the vehicle or inspected on foot at least once every two weeks, and each siding and crossover must be traversed by the vehicle or inspected on foot at least once every month.
- (e) All track except yard track and inactive track must be visually inspected at the minimum frequency specified in the following table:

**Track**

**Designated Minimum Visual Track Inspection Frequency Table**

Class of Track	Annual Tonnage (MGT)		
	< 5	5 – 15	> 15
<b>Class 1</b>	Monthly	Twice Monthly	Weekly
<b>Class 2</b>	Weekly	Twice Weekly	Twice Weekly
<b>Class 3</b>	Weekly	Twice Weekly	Twice Weekly
<b>Class 4 &amp; 5</b>	Twice Weekly	Twice Weekly	Twice Weekly

And,

- (i) In the case of Class 1 track where passenger trains are operated, track must be inspected weekly or before use of passenger traffic if the track is used less than once per week.
- (ii) In the case of Class 2 and 3 track, where passenger trains are operated, track must be inspected at least twice weekly or before use of the passenger traffic.

**2.5 Walking Inspection – General**

- (a) A Walking Track Inspection must allow the inspector a clear view of all track components including rail, ties, fasteners and ballast.
- (b) Within 3 months after the date on which these Rules come into force, each railway company must develop and adhere to a process to:
  - (i) Assess and identify lines of track that require walking track inspection, and
  - (ii) Establish and adhere to the walking track inspection requirement for the identified lines of track.
- (c) The railway company must provide the process referenced in paragraph (b) to Transport Canada upon request.

2.6 Walking Track Inspection – Jointed Tracks

- (a) A Walking Track Inspection must be completed on all jointed tracks and must be capable of identifying the following defects:
  - (i) Cracked or broken joint bars; and
  - (ii) Loose, broken and missing bolts.
- (b) If joint bars are inspected electronically, a Walking Track Inspection in jointed track territory is not required. The technology must be capable of identifying the defects listed in (a) above.
- (c) A Walking Track Inspection for jointed track must be completed at the minimum frequency specified in the following table:

**Track  
Designated Minimum Walking Track Inspection Frequency for Jointed  
Tracks Table**

Class of Track	Annual Tonnage (MGT)				
	< 5	5 – 15	15 – 35	>35 – 80	> 80
<b>Class 1</b>	N/A	N/A	N/A	N/A	N/A
<b>Class 2</b>	Every 2 <sup>nd</sup> year	Every 2 <sup>nd</sup> year	Annually	Annually	Twice Annually
<b>Class 3</b>	Annually	Annually	Annually	Twice Annually	Three times annually
<b>Class 4 &amp; 5</b>	Annually	Twice Annually	Twice Annually	Twice Annually	Three times annually

**3. Track - Turnouts and Special Trackwork Inspections**

3.1 General

A Special Trackwork includes railway crossings at grade, sliding joints, moveable point frogs, lift rail assemblies and other transition devices on moveable span bridges. Types of Turnout and Special Trackwork Inspections are as described below:

3.2 Routine Turnout and Special Trackwork Inspection

A Routine Turnout and Special Trackwork Inspection is an inspection to

assess general condition and identify defects on a Turnout or Special Trackwork each time they are traversed during a Visual Track Inspection.

### 3.3 Walking Turnout and Special Trackwork Inspection

A Walking Turnout and Special Trackwork Inspection is an inspection performed on foot to assess the general condition of a Turnout or Special Trackwork and must meet the minimum frequency shown in the following table except that a monthly Walking Turnout and Special Trackwork Inspection is not required in any month that a Detailed Turnout and Special Trackwork Inspection is completed.

**Track  
Designated Minimum Walking Turnout and Special Trackwork Inspection  
Frequency Table**

Class of Track	Annual Tonnage (MGT)			
	< 5	5 – 15	> 15 – 35	> 35
<b>Class 1</b>	Quarterly	Monthly	Monthly	Monthly
<b>Class 2</b>	Monthly	Monthly	Monthly	Monthly
<b>Class 3</b>	Monthly	Monthly	Monthly	Monthly
<b>Class 4 &amp; 5</b>	Monthly	Monthly	Monthly	Twice Monthly

### 3.4 Detailed Turnout and Special Trackwork Inspections

(a) A Detailed Turnout and Special Trackwork Inspection is an inspection performed on foot to assess the condition of turnout or special trackwork. Hand operated turnouts must be operated to all positions during this inspection. A Detailed Turnout and Special Trackwork Inspection must include the measuring and recording of the following specified items:

- (i) Track gauge measurements 5 to 10 feet ahead of switch points, at the heel block, at the mid point of curved closure rail and at intervals throughout the diverging route behind the frog. \*
- (ii) Guard check gauge measurement.
- (iii) Guard face gauge measurement.
- (iv) Switch Point Rise where contact is evident (Vertical clearance between the Switch Point and Stock Rail).
- (v) Heel Block assembly for surface and check bolts to confirm they are tight.

(vi) Cross level measurements at locations 15.5 feet apart on both routes throughout the turnout. \*

\* Measurements obtained at required locations with Track Geometry vehicles meet the requirement i.) and vi.).

(b) Each Turnout and Special Trackwork must receive a Detailed Turnout and Special Trackwork Inspection annually.

## 4. Track - Electronic Geometry Inspections

### 4.1 General

An Electronic Geometry Inspection Vehicle is an automated track inspection vehicle used to measure, calculate and record geometric parameters of the track. Two types of track geometry inspection vehicles defined below can be used to measure and evaluate track geometry.

#### (a) Light Geometry Inspection Vehicle (LGIV)

(i) A Light Geometry Inspection Vehicle (LGIV) must be capable of measuring:

1. Alignment / Curvature
2. Super elevation / Cross level
3. Gauge
4. Railway Track Safety Rule parameters calculated from these measurements

(ii) Track measurements obtained with these vehicles are considered static geometry measurements, as the vertical load applied to the track is limited to the weight of the vehicle. Allowances must be made for any condition that could result in a greater measurement when the track is under load.

#### (b) Heavy Geometry Inspection Vehicle (HGIV)

(i) A Heavy Geometry Inspection Vehicle (HGIV) must have a vertical wheel load of 10,000 pounds and be capable of measuring:

1. Surface / Longitudinal Profile
2. Alignment / Curvature
3. Super elevation / Cross level
4. Gauge
5. Railway Track Safety Rule parameters calculated from these measurements

(ii) Track measurements obtained with these vehicles are considered dynamic geometry measurements representative of the track in a loaded condition.

4.2 An Electronic Geometry Inspection of all track, except yard track and inactive track, must meet the minimum frequency shown in the following table:

**Track**

**Designated Minimum Electronic Geometry Inspection Frequency Table**

Class of Track	Annual Tonnage (MGT)				
	< 5	5 – 15	> 15 – 35	> 35 – 80	> 80
<b>Class 1</b>	N/A	LGIV – Twice Annually or HGIV – Annually	LGIV – Three times Annually or HGIV – Annually	LGIV – Three times Annually or HGIV – Annually	LGIV – Quarterly or HGIV Twice Annually
<b>Class 2</b>	LGIV – Twice Annually or HGIV – Annually	LGIV – Three times Annually or HGIV – Annually	LGIV – Three times Annually or HGIV Twice Annually	LGIV – Quarterly or HGIV Twice Annually	LGIV – Quarterly or HGIV Twice Annually
<b>Class 3</b>	HGIV – Annually	HGIV – Annually	HGIV – Twice Annually	HGIV – Three Times Annually	HGIV – Three Times Annually
<b>Class 4</b>	HGIV – Twice Annually	HGIV – Twice Annually	HGIV – Twice Annually	HGIV – Three Times Annually	HGIV – Three Times Annually
<b>Class 5</b>	HGIV – Twice Annually	HGIV – Twice Annually	HGIV – Twice Annually	HGIV – Three Times Annually	HGIV – Quarterly
<b>Crossovers *</b>	LGIV – Twice Annually or HGIV – Annually	LGIV – Twice Annually or HGIV – Annually	LGIV – Twice Annually or HGIV – Annually	LGIV – Twice Annually or HGIV – Annually	LGIV – Twice Annually or HGIV – Annually

\* Track geometry inspection is not required on crossovers where track speed is 30 mph or less.

4.3 Missed Segment of Electronic Geometry Inspection

(a) If a portion of track cannot be inspected at the required interval, the railway must, before the expiration of time or tonnage limits:

(i) Inspect that segment of track with a light geometry inspection



vehicle and be governed by the results of that inspection or perform an additional visual inspection per week until the required track geometry inspection frequency can be met and, in the case of Class 3 to Class 5 track the next required track geometry inspection must be completed with a heavy geometry inspection vehicle, or

- (ii) Reduce class of track to bring the track into compliance until such time as a valid track geometry inspection can be made.
- (b) If a portion of a crossover cannot be inspected at the required interval, the railway company must, before the expiration of time or tonnage limits perform a detailed inspection of both turnouts and the track between.

4.4 Upon request by a Railway Safety Inspector, for the lines of track specified in the request, a railway company must provide, within 14 days, a report that summarizes and highlights the following information:

- (a) the number of times the electronic geometry inspection vehicles have inspected the lines of track in the last 365 days or a lesser period of time specified in the request;
- (b) the dates and corresponding electronic geometry inspection vehicle identifications for the inspections in the last 365 days or a lesser period of time specified in the request; and
- (c) for each specific inspection date, the beginning and end mileages for any segments tested within the specified line of track.

## 5. Track - Rail Flaw Inspections

### 5.1 General

A Rail Flaw Inspection is a continuous search for internal rail defects.

- 5.2 (a) A Rail Flaw Inspection must be made of all rails at the minimum frequency shown in the following table except for yard track, inactive track or, in the case of new rail, if within 6 months of installation, it is ultrasonically inspected over its entire length and all defects are removed, the next continuous search for internal defects need not be made until the passage of 100 mgt or three years after the inspection, whichever occurs first.

### Track

**Designated Minimum Rail Flaw Inspection (RFI) Frequency Table**

Class of Track	Annual Tonnage (MGT)				
	< 5	5 – 15	15 – 35	>35 - 80	>80
<b>Class 1</b>	N/A	N/A	N/A	N/A	N/A
<b>Class 2</b>	Once every 2 years	Annually	Annually	Twice Annually	Three Times Annually
<b>Class 3</b>	Annually	Annually	Annually	Three Times Annually	Four Times Annually
<b>Class 4</b>	Annually	Twice Annually	Three times Annually	Four times Annually	Five Times Annually
<b>Class 5</b>	Annually	Twice Annually	Three times Annually	Five Times Annually	Five Times Annually

- (b) In the case of Class 2 track where Passenger trains are operated, track must be inspected at least annually with a Rail Flaw detector.

- (c) The maximum interval of days following the previous Rail Flow Inspections is as follows:

<b>Frequency</b>	<b>Maximum number of days between inspections</b>	<b>Minimum number of rail flaw inspections in a calendar year</b>	<b>Minimum number of rail flaw inspections in winter period<sup>1</sup></b>
Annually	500	1	N/A
Twice Annually	300	2	N/A
Three times Annually	250	3	1
Four times Annually	200	4	1
Five times Annually	175	5	2

<sup>1</sup> Winter period means November 15 to March 31.

- 5.3 For Class 2 track carrying 3 to 5 MGT annually, with less than 100 lbs rail weight and authorized car loading 263,000 lbs or greater, the rail must be tested at least annually with a rail flaw detector.
- 5.4 For Class 4 or 5 track, with 100 lbs rail weight and authorized car loading 286,000 lbs or greater, the rail must be tested twice annually with a rail flaw detector.
- 5.5 Rail in sidings and crossovers, where track speed is 25 mph or greater, the rail must be inspected annually.
- 5.6 Inspection equipment must be capable of detecting defects between joint bars in the area enclosed by joint bars.
- 5.7 Each defective rail must be marked and highly visible.
- 5.8 Missed Segment of Rail Flaw Inspection
- (a) If the operator assigned to operate the rail defect detection equipment determines that, due to rail surface condition and or other reasons, a valid search for internal defects could not be made over a particular length of track, the test on that particular length of track cannot be considered as a search for internal defects under this section.
- (b) If a valid search for internal defects cannot be conducted for reasons described in a), the railway company must, before the

expiration of time or tonnage limits

- (i) Conduct a valid search for internal defects, or
- (ii) Reduce class of track to bring the track into compliance until such time as a valid search for internal defects can be made, or
- (iii) Remove the rail from service.

## 6. Yard Track - Inspections

### 6.1 General

- (a) Maximum track speed on a yard track is 15 mph.
- (b) A yard must be designated as classified or unclassified.
- (c) Classified yard must be classified into one of the four categories. These categories must be based on frequency of track use, volume of traffic and risk associated with the movement of trains and equipment. Railway companies must classify the category for each track and when requested, must provide a copy to a Railway Safety Inspector. Categories for yard track must be based on the following criteria:

(i) **Category 1**

Heavily used tracks including:

- Through, bypass tracks and core routes.
- Lead tracks where movements are entering, leaving or travelling through a yard carrying more than 500 cars daily.

(ii) **Category 2**

- Locomotive main shop lead tracks
- Main hump lead tracks
- Switching yard leads

(iii) **Category 3**

Moderately used tracks including:

- Industrial leads
- Switching yard tracks and receiving and departure tracks which are used to yard or depart trains.
- Tracks carrying more than 100 cars daily.

**(iv) Category 4**

Lightly used tracks including:

- Storage Tracks
- Shop Tracks
- Service Tracks
- Industrial Tracks.

6.2 Visual Inspections

- (a) Unclassified yard track must be inspected monthly
- (b) All classified yard track must be visually inspected at the minimum frequency specified in the following table:

**Yard Track**

**Designated Minimum Visual Inspection Frequency Table**

<b>Category</b>	<b>Type</b>	<b>Frequency</b>
Category 1	Track	Twice monthly
Category 2	Track	Monthly
Category 3	Track	Quarterly
Category 4	Track	Twice annually

- (c) In instances where a yard track cannot be physically traversed, a single track in Category 2, Category 3 or Category 4 may be inspected from a vehicle operated on an adjacent roadway provided the following conditions are met:
- (i) The vehicle is operated by a person other than the inspector.
  - (ii) The operating speed must allow the inspector to identify defects.
  - (iii) The inspector's visibility remains unobstructed.
  - (iv) Any portion of track obstructed by equipment must be inspected on foot.
  - (v) The track being inspected is located within 30 feet (9.144 m) from the roadway.
  - (vi) If a track is inspected from an adjacent roadway, next required track inspection must be completed by operating the vehicle on track or

by walking.

- (d) A vehicle, such as an All Terrain Vehicle, straddling the track may be used to inspect yard tracks. This vehicle must be operated on the track being inspected at a speed that allows the inspector to identify defects.

**7. Yard Track - Turnout Inspections**

**Walking Inspections**

- 7.1 Walking inspection of Yard Turnouts installations must meet the minimum frequency shown in the following table:

**Yard Track**

**Designated Minimum Turnout Inspection Frequency Table**

<b>Category</b>	<b>Type</b>	<b>Frequency</b>
Category 1	Turnouts	Twice Monthly
Category 2	Turnouts	Monthly
Category 3	Turnouts	Monthly
Category 4	Turnouts	Quarterly

And,

- 7.2 Detailed inspection of all yard track turnouts in yard track of Category 1 must be completed annually.

**8. Yard Track - Electronic Geometry Inspections**

- 8.1 All tracks in Category 1 must be inspected annually for deviation in gauge and crosslevel using a Light Track Geometry Inspection Vehicle or other such device capable of measuring recording and evaluating these geometry parameters. Track measurements obtained with these vehicles are considered static geometry measurements. Allowances must be made for any condition that could result in a greater measurement when the track is under load.

## **9. Yard Track - Rail Flaw Inspections**

- 9.1 A continuous search for internal rail defects must be completed annually in all rails of Category 1 yard track.
- 9.2 A continuous search for internal rail defects must be completed annually in rail lighter than 100 lbs in leads of Category 2 yard track.
- 9.3 If an inspection cannot be performed, the maximum speed must be limited to 10 mph.

## **10. Inspection Records**

- 10.1 Each railway company to which these rules apply must keep a record of each inspection required to be performed under this subpart for one year after the inspection. Each railway must keep record of annual tonnage for each subdivision and when requested, provide the previous year's annual tonnage to a Railway Safety Inspector. These records must also be available at the local geographic engineering office in Canada.
- 10.2 Each record of an inspection under Part II, Subpart F sections 2, 3, 6 and 7 must be prepared on the day the inspection is made and signed by the person making the inspection. Records must specify the track or tracks inspected, the date of inspection, location and nature of any deviation from the requirements of TSR, and the remedial action taken by the person making the inspection. In the case of more than one track, track inspection records must indicate all track(s) included in the inspection and indicate which track(s) were traversed by the vehicle or inspected on foot.
- 10.3 Each record of an Inspection under Part II, Subpart F sections 4, 5, 8 and 9 must specify the date of inspection, the location and nature of any defects found, the remedial action taken and the date thereof, and the location of any segments of track not tested per Part II, Subpart F sections 4 and 5. The railway company must retain a rail inspection record for at least two years after the inspection and for one year after the defect is removed.
- 10.4 Notwithstanding TSR Part II Subpart F Subsection 10.2, where a railway company chooses to use electronic joint bar inspection to fulfill the requirements under TSR Part II Subpart F Subsection 2.6, each record of an Inspection must specify the date of inspection, the location and nature of any defects found, the remedial action taken and the date thereof. The railway company must retain a rail inspection record for at least two years after inspection and for one year after the defect is removed.
- 10.5 For purposes of compliance with the requirements set out in subsections 10.1, 10.2, 10.3 and 10.4 above, the railway company may retain records in an electronic system provided that:
  - (a) The electronic system is designed so that the integrity of each

electronic record is maintained through the application of security measures, including means, to uniquely identify the person who made the inspection as the author of that record. No two persons must have the same electronic identity;

- (b) The electronic storage of each record must be initiated by the person making the inspection by the end of the next day following the completion of that inspection;
  - (c) The electronic system must ensure that no electronic record can be modified in any way, or replaced, after the record has been transmitted and stored in the electronic system;
  - (d) Any correction or amendment to an electronic record must be electronically stored and retained apart from the electronic record it corrects or amends. Such correction must only be used to correct a data entry error in the original electronic record. The electronic system must uniquely identify the person who made the correction;
  - (e) The electronic system must provide for the maintenance of inspection records as originally submitted without corruption or loss of data;
  - (f) All electronic records must be kept available to the persons who performed the inspections and to persons performing subsequent inspections.
- 10.6 Each railway company required to retain inspection records under this section, when requested by a Railway Safety Inspector, must produce and provide copies of requested inspection records in the format specified, including corrections or amendments to those records as deemed necessary to monitor compliance. Where a railway company receiving such request is unable to provide the records immediately, the railway company must, without delay, take all reasonable measures to provide the records.

## **11. Inspection Equipment**

- 11.1 Each railway company must develop and adhere to procedures ensuring the quality of the measurements collected electronically by inspection systems used to meet the requirements of TSR Part II Subpart F. For each applicable inspection system, the railway company shall at a minimum:
- (a) Adhere to documented calibration procedures which specify instrument verification procedures and the required frequency at which they must be performed; and
  - (b) Maintain the inspection system such that measurements accurately represent field conditions.
- 11.2 The railway company must provide the procedures referenced in Part II



subpart F Subsection 11.1 above to Transport Canada upon request.