Ontario Northland

Request for Proposals

for

Rail and Tie Installation/Surfacing

Request for Proposals No.: **RFP 2025 101**

Issued: **Friday, November 14, 2025**

Submission Deadline: **Monday, December 15, 2025 at 2:00:00 p.m. EST**

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PART 1 - INVITATION AND SUBMISSION INSTRUCTIONS

1.1 Invitation to Proponents

1.1.1 Invitation

This Request for Proposals (the "RFP") is an invitation by Ontario Northland Transportation Commission (**"**ONTC") to prospective proponents to submit proposals for **RFP 2025 101 - Rail and Tie Installation/Surfacing**, as further described in Section A of the RFP Particulars (Appendix B) (the "Deliverables").

ONTC is an agency of the Province of Ontario that provides reliable and efficient transportation services to northern and rural communities. For over 120 years, the company has provided integrated and impactful transportation services including rail freight, passenger rail, motor coach transportation, rail repair, and remanufacturing services.

ONTC's rail services are vital in maintaining a reliable supply chain in Northern Ontario by connecting freight customers to global economies. The forestry industry, mining operations, farming communities, and manufacturers count on ONTC's services to deliver large volumes across vast distances. The company's 675 miles of mainline track span throughout northeastern Ontario and northwestern Quebec.

ONTC motor coaches connect rural Ontario to major centres providing access to education, medical appointments, shopping, and seamless connections to other transportation providers. The Polar Bear Express passenger train connects Moosonee and Cochrane, Ontario, providing an all-season land link for Indigenous communities on the James Bay Coast.

Improving and repairing transportation equipment is also a large part of ONTC's service offering. We remanufacture and repair locomotives, passenger rail cars, freight cars, and more. ONTC's unique mechanical skillset attracts new business and secures skilled trades jobs in Northern Ontario.

ONTC makes provincial dollars reach further by creating innovative solutions that help drive economic growth sustainably, responsibly, and with future generations top of mind. Throughout the agency, modernization is underway with many exciting projects that will improve how we operate. ONTC employs over 1,000 people including Locomotive Engineers, Motor Coach Operators, skilled tradespeople, and business professionals. Employees work together to improve and deliver services that provide value to the regions served.

Each year, ONTC undertakes a rail infrastructure upgrade program in order to provide safe and reliable train services across northeastern Ontario and northwestern Quebec. ONTC's objective is to upgrade a mixture of rail, ties and turnouts that will require the services of a qualified rail and tie installation contractor.

1.1.2 Proponent Must Be Single Entity

The proponent must be a single legal entity that, if selected, intends to enter into the contract with ONTC. If the proposal is being submitted jointly by two (2) or more separate entities, the proposal must identify only one (1) of those entities as the "proponent". The proponent will be responsible for the performance of the Deliverables.

1.1.3 Bidding System Registration

All proponents must have a vendor account or pay a one-time fee with the electronic bidding system at: https://www.merx.com/. This will enable the proponent to download the solicitation

document, to receive addenda email notifications, download addenda, and submit their proposal electronically through the bidding system.

1.2 RFP Contact

For the purposes of this procurement process, the "RFP Contact" will be:

Nicole Laplante
Procurement Contracts Specialist
555 Oak Street East
North Bay, ON P1B 8L3

Telephone: 705-472-4500 x588
Email: nicole.laplante@ontarionorthland.ca

Proponents and their representatives are not permitted to contact any employees, officers, agents, elected or appointed officials, or other representatives of ONTC, other than the RFP Contact, concerning matters regarding this RFP. Failure to adhere to this rule may result in the disqualification of the proponent and the rejection of the proponent's proposal.

1.3 Accommodations for Proponents with Disabilities

In accordance with the Ontario Human Rights Code, Ontarians with Disabilities Act, 2001 (ODA) and Accessibility for Ontarians with Disabilities Act, 2005 (AODA), ONTC will accommodate for a disability, ensuring full and equitable participation throughout the RFP process.

If a proponent requires this RFP in a different format to accommodate a disability, the proponent must contact the RFP Contact as soon as possible and in any event prior to the Submission Deadline. The RFP in the different format will be issued only to the requesting proponent and all addenda will be issued in such different format only to the requesting proponent.

1.4 French Language Services

In accordance with the *French Language Services Act*, R.S.O. 1990, c. F.32, and Ontario Regulation 544/22, ONTC is committed to providing equitable access to procurement opportunities in both official languages.

While this RFP and associated documents are posted in English, a French version is available upon request. Interested parties may contact the RFP Contact to obtain a French copy.

ONTC shall ensure that the French version is:

(a) Provided in a timely manner; and
(b) Equivalent in content and quality to the English version;

1.5 Contract for Deliverables
1.5.1 Type of Contract

The selected proponent will be required to enter into an agreement with ONTC for the provision of the Deliverables in the form attached as Appendix A to the RFP (the "Agreement").

1.5.2 Term of Contract

The term of the Agreement is to be for a period of five (5) one-year terms, as outlined in Appendix A.

1.6 RFP Timetable

1.6.1 Key Dates

Issue Date of RFP	Friday, November 14, 2025
Deadline for Questions	Tuesday, December 9, 2025 at 2:00:00 PM EST
Deadline for Issuing Addenda	Thursday, December 11, 2025 at 2:00:00 PM EST
Submission Deadline	Monday, December 15, 2025 at 2:00:00 p.m. EST
Anticipated Execution of Agreement	Monday, January 26, 2025
Irrevocability Period	90 calendar days

The RFP timetable is tentative only and may be changed by ONTC at any time.

1.6.2 Site Visit / Pre-Bid Meeting

There will not be a Respondents' Meeting.

1.7 Submission Instructions

1.7.1 Submission of Proposals

Proposals must be submitted electronically through the bidding system at:

https://www.merx.com/

Submissions by other methods will not be accepted.

In the event of any technical issues, proponents should contact the bidding system's technical support:

MERX Customer Support
Phone 1-800-964-6379
Email merx@merx.com

The Proposal shall be uploaded into the bidding system, in PDF format, as one single document, and not have a security password. It is the proponent's sole responsibility to ensure all uploaded documents are not defective, corrupted, or blank and can be opened by ONTC. If the Proposal cannot be downloaded by ONTC, the Proposal shall be rejected.

1.7.2 Proposals to Be Submitted on Time

Proposals must be finalized and fully uploaded in the bidding system on or before the Submission Deadline. The time of receipt of proposals shall be determined by the bidding system web clock. Late submissions will not be accepted by the bidding system and will be disqualified as late.

Proponents are cautioned that the timing of submission is based on when the proposal is received by the bidding system, not when a proposal is submitted by a proponent. As transmission can be

delayed due to file transfer size, transmission speed, or other technical factors, proponents should plan to submit proposals well in advance of the Submission Deadline to avoid submitting late due to technical issues. Proponents submitting near the Submission Deadline do so at their own risk.

The bidding system will send a confirmation email to the proponent advising when the proposal was submitted successfully. If you do not receive a confirmation email, contact the bidding system's technical support immediately.

1.7.3 Proposals to Be Submitted in Prescribed Format

Proposal materials should be prepared and submitted in accordance with the instructions in the bidding system, including any maximum upload file size.

Documents should not be embedded within uploaded files, as the embedded files may not be accessible or evaluated.

1.7.4 Amendment of Proposals

Proponents may amend their proposals prior to the Submission Deadline. However, the proponent is solely responsible for ensuring that the amended proposal is received by the bidding system by the Submission Deadline.

1.7.5 Withdrawal of Proposals

Prior to the Submission Deadline, proponents may withdraw a submitted proposal through the bidding system.

1.7.6 Proposals Irrevocable after Submission Deadline

Proposals shall be irrevocable for the Irrevocability Period, as specified in the RFP Timetable, running from the moment that the Submission Deadline passes.

[End of Part 1]

PART 2 - EVALUATION AND AWARD

2.1 Stages of Evaluation

ONTC will conduct the evaluation of proposals in the following stages:

2.2 Stage I - Mandatory Submission Requirements

Stage I will consist of a review to determine which proposals comply with all of the mandatory submission requirements. Proposals that do not comply with all of the mandatory submission requirements as of the Submission Deadline will, subject to the express and implied rights of ONTC, be rejected. The mandatory submission requirements are listed in Section C of the RFP Particulars (Appendix B).

2.2.1 No Amendment to Forms

Other than inserting the information requested on the mandatory submission forms set out in the RFP, a proponent may not make any changes to any of the forms. Any proposal containing any such changes, whether on the face of the form or elsewhere in the proposal, may be disqualified.

2.3 Stage II - Evaluation

Stage II will consist of the following two (2) sub-stages:

2.3.1 Mandatory Technical Requirements

ONTC will review the proposals to determine whether the mandatory technical requirements as set out in Section D of the RFP Particulars (Appendix B) have been met. Proposals that do not comply with all of the mandatory technical requirements will, subject to the express and implied rights of ONTC, be rejected.

2.3.2 Non-Price Rated Criteria

ONTC will evaluate each qualified proposal on the basis of the non-price rated criteria as set out under Initial Evaluation Criteria in Section F of the RFP Particulars (Appendix B).

2.4 Stage III - Pricing

Stage III will consist of a scoring of the submitted pricing of each qualified proposal in accordance with the price evaluation method set out in Section G of the RFP Particulars (Appendix B). The evaluation of price will be undertaken after the evaluation of mandatory requirements and rated criteria has been completed.

In the event that a proponent's pricing appears to be abnormally low in relation to the Deliverables, ONTC may require the proponent to provide a detailed explanation of the pricing information to account for the low level of price and confirm that all requirements in respect of the Deliverables have been taken into account. If the proponent is unable to satisfactorily account for the abnormally low pricing, ONTC may reject the proposal. ONTC may also reject any proposal that contains unbalanced pricing. Pricing may be considered unbalanced where nominal or significantly understated prices are proposed for some elements of the Deliverables and inflated prices are proposed for other elements of the Deliverables. Unbalanced pricing includes, but is not limited to, "front-loaded" pricing which contains inflated pricing for Deliverables to be provided or completed at the beginning of the contract, offset by understated pricing for Deliverables to be provided or completed later in the contract.

2.5 Selection of Top-Ranked Proponent

After the completion of Stage III, all scores from Stage II and Stage III will be added together and proponents will be ranked based on their total scores. Subject to the reserved rights of ONTC, the top-ranked proponent will be selected to enter into the Agreement in accordance with the following section. In the event of a tie, the selected proponent will be the proponent with the highest score on the non-price rated criteria OR with the lowest price.

2.6 Notice to Proponent and Execution of Agreement

Notice of selection by ONTC to the selected proponent shall be in writing. The selected proponent shall execute the Agreement in the form attached as Appendix A to this RFP and satisfy any other applicable conditions of this RFP, including the pre-conditions of award listed in Section E of the RFP Particulars (Appendix B), within fifteen (15) days of notice of selection. This provision is solely for the benefit of ONTC and may be waived by ONTC.

2.7 Failure to Enter into Agreement

If a selected proponent fails to execute the Agreement or satisfy any pre-conditions of award within fifteen (15) days of notice of selection, ONTC may, without incurring any liability, proceed with the selection of another proponent and pursue all other remedies available to ONTC.

[End of Part 2]

PART 3 - TERMS AND CONDITIONS OF THE RFP PROCESS

3.1 General Information and Instructions

3.1.1 RFP Incorporated into Proposal

All of the provisions of this RFP are deemed to be accepted by each proponent and incorporated into each proponent's proposal. A proponent who submits conditions, options, variations, or contingent statements inconsistent with the terms set out in this RFP, including the terms of the Agreement in Appendix A, either as part of its proposal or after receiving notice of selection, may be disqualified. If a proponent is not disqualified despite such changes or qualifications, the provisions of this RFP, including the Agreement set out in Appendix A, will prevail over any such changes or qualifications in the proposal.

3.1.2 Proponents to Follow Instructions

Proponents should structure their proposals in accordance with the instructions in this RFP. Where information is requested in this RFP, any response made in a proposal should reference the applicable section numbers of this RFP.

3.1.3 Proposals in English

All proposals are to be in English only.

3.1.4 No Incorporation by Reference

The entire content of the proponent's proposal should be submitted in a fixed format, and the content of websites or other external documents referred to in the proponent's proposal, but not attached, will not be considered to form part of its proposal.

3.1.5 Past Performance

In the evaluation process, ONTC may consider the proponent's past performance or conduct on previous contracts with ONTC or other institutions.

3.1.6 Information in RFP Only an Estimate

ONTC and its advisers make no representation, warranty, or guarantee as to the accuracy of the information contained in this RFP or issued by way of addenda. Any quantities shown or data contained in this RFP or provided by way of addenda are estimates only and are for the sole purpose of indicating to proponents the general scale and scope of the Deliverables. It is the proponent's responsibility to obtain all the information necessary to prepare a proposal in response to this RFP.

3.1.7 Proponents to Bear Their Own Costs

The proponent will bear all costs associated with or incurred in the RFP process, including, without limitation, preparation and presentation of its proposal and if applicable, costs incurred for meeting attendance, interviews or demonstrations.

3.1.8 Proposal to be Retained by ONTC

ONTC will not return the proposal or any accompanying documentation submitted by a proponent.

3.1.9 No Guarantee of Volume of Work or Exclusivity of Contract

ONTC makes no guarantee of the value or volume of work to be assigned to the selected proponent. The Agreement will not be an exclusive contract for the provision of the described Deliverables. ONTC may contract with others for goods and services the same as or similar to the Deliverables or may obtain such goods and services internally.

3.1.10 Trade Agreements

Proponents should note that procurements falling within the scope of the Ontario-Quebec Trade and Co-operation Agreement, Canadian Free Trade Agreement, and Comprehensive Economic and Trade Agreement are subject to those trade agreements but that the rights and obligations of the parties will be governed by the specific terms of this RFP.

3.2 Communication after Issuance of RFP

3.2.1 Proponents to Review RFP

Proponents shall promptly examine all of the documents comprising this RFP, and

(a) shall report any errors, omissions, or ambiguities; and

(b) may direct questions or seek additional information

in writing by email to the RFP Contact on or before the Deadline for Questions. No such communications are to be sent or initiated through any other means. ONTC is under no obligation to provide additional information, and ONTC is not responsible for any information provided by or obtained from any source other than the RFP Contact or the bidding system. It is the responsibility of the proponent to seek clarification on any matter it considers to be unclear. ONTC shall not be responsible for any misunderstanding on the part of the proponent concerning this RFP or its process.

3.2.2 All New Information to Proponents by Way of Addenda

This RFP may be amended only by addendum in accordance with this section. If ONTC, for any reason, determines that it is necessary to provide additional information relating to this RFP, such information will be communicated to all proponents by addendum posted in the bidding system. Each addendum forms an integral part of this RFP and may contain important information, including significant changes to this RFP. Proponents are responsible for obtaining all addenda issued by ONTC.

3.2.3 Post-Deadline Addenda and Extension of Submission Deadline

If ONTC determines that it is necessary to issue an addendum after the Deadline for Issuing Addenda, ONTC may extend the Submission Deadline for a reasonable period of time.

3.2.4 Verify and Clarify

When evaluating proposals, ONTC may request further information from the proponent or third parties in order to verify or clarify the information provided in the proponent's proposal. The response received by ONTC shall, if accepted by ONTC, form an integral part of the proponent's proposal.

3.3 Notification and Debriefing

3.3.1 Notification to Other Proponents

Once the Agreement is executed by ONTC and a proponent, the other proponents may be notified directly in writing and shall be notified by public posting, on ONTC's website, of the outcome of the procurement process.

3.3.2 Debriefing

Proponents may request a debriefing after receipt of a notification of the outcome of the procurement process. All requests must be in writing to the RFP Contact and must be made within sixty (60) days of such notification. The RFP Contact will contact the proponent's representative to schedule the debriefing. Debriefings may occur by way of conference call or other remote meeting format as prescribed by ONTC.

3.3.3 Procurement Protest Procedure

Any proponent with concerns about the RFP process is required to attend a debriefing prior to proceeding with a protest.

If, after attending a debriefing, the proponent wishes to challenge the RFP process, it should provide written notice to the RFP Contact in accordance with applicable procurement protest procedures. The written notice must contain:

(a) a clear statement as to which procurement the proponent wishes to challenge;

(b) a clear explanation of the proponent's concerns with the procurement, including specifics as to why it disagrees with the procurement process or its outcome; and

(c) the proponent's contact details, including name, telephone number, and email address.

ONTC will send an initial response to acknowledge receipt of the proponent's notice and indicate the date by which ONTC will provide the proponent with a formal response.

3.4 Conflict of Interest and Prohibited Conduct

3.4.1 Conflict of Interest

For the purposes of this RFP, the term "Conflict of Interest" includes, but is not limited to, any situation or circumstance where:

(a) in relation to the RFP process, the proponent has an unfair advantage or engages in conduct, directly or indirectly, that may give it an unfair advantage, including, but not limited to:

(i) having or having access to confidential information of ONTC in the preparation of its proposal that is not available to other proponents;

(ii) having been involved in the development of the RFP, including having provided advice or assistance in the development of the RFP;

(iii) receiving advice or assistance in the preparation of its response from any individual or entity that was involved in the development of the RFP;

(iv) communicating with any person with a view to influencing preferred treatment in the RFP process (including, but not limited to, the lobbying of decision-makers involved in the RFP process); or

(v) engaging in conduct that compromises, or could be seen to compromise, the integrity of the open and competitive RFP process or render that process non-competitive or unfair; or

(b) in relation to the performance of its contractual obligations under a contract for the Deliverables, the proponent's other commitments, relationships, or financial interests:

(i) could, or could be seen to, exercise an improper influence over the objective, unbiased, and impartial exercise of its independent judgement; or

(ii) could, or could be seen to, compromise, impair, or be incompatible with the effective performance of its contractual obligations.

3.4.2 Disqualification for Conflict of Interest

ONTC may disqualify a proponent for any conduct, situation, or circumstances, determined by ONTC, in its sole and absolute discretion, to constitute a Conflict of Interest as defined above.

An existing supplier of ONTC may be precluded from participating in the RFP process in instances where ONTC has determined that the supplier has a competitive advantage that cannot be adequately addressed to mitigate against unfair advantage. This may include, without limitation, situations in which an existing supplier is in a position to create unnecessary barriers to competition through the manner in which it performs its existing contracts, or situations where the incumbent fails to provide the information within its control or otherwise engages in conduct obstructive to a fair competitive process.

3.4.3 Disqualification for Prohibited Conduct or Breach

ONTC may disqualify a proponent, rescind a notice of selection, or terminate a contract subsequently entered into if ONTC determines in its sole and absolute discretion that the proponent has engaged in any conduct prohibited by this RFP or has otherwise breached the terms of the of the RFP.

3.4.4 Prohibited Proponent Communications

Proponents must not engage in any communications that could constitute a Conflict of Interest and should take note of the Conflict of Interest declaration set out in the Submission Form (Appendix C).

3.4.5 Proponent Not to Communicate with Media

Proponents must not, at any time directly or indirectly, communicate with the media in relation to this RFP or any agreement entered into pursuant to this RFP without first obtaining the written permission of the RFP Contact. Further, proponents must not make any media release, social media or Internet post, public announcement or public disclosure (whether for publication in the press, on the radio, television, internet or any other medium) that relates to the RFP process, the solicitation documents or the Deliverables or any matters related thereto, without the prior written consent of ONTC.

3.4.6 No Lobbying

Proponents must not, in relation to this RFP or the evaluation and selection process, engage directly or indirectly in any form of political or other lobbying whatsoever to influence the selection of the selected proponent(s).

3.4.7 Illegal or Unethical Conduct

Proponents must not engage in any illegal business practices, including activities such as bid-rigging, price-fixing, bribery, fraud, coercion, or collusion. Proponents must not engage in any unethical conduct, including lobbying, as described above, or other inappropriate communications; offering gifts to any employees, officers, agents, elected or appointed officials, or other representatives of ONTC; deceitfulness; submitting proposals containing misrepresentations or other misleading or inaccurate information; or any other conduct that compromises or may be seen to compromise the competitive process provided for in this RFP.

3.4.8 Supplier Suspension

ONTC may suspend a supplier from participating in its procurement processes for prescribed time periods based on past performance or based on inappropriate conduct, including, but not limited to, the following:

(a) illegal or unethical conduct as described above;

(b) the refusal of the supplier to honour its submitted pricing or other commitments;

(c) engaging in litigious conduct, bringing frivolous or vexatious claims in connection with ONTC's procurement processes or contracts, or engaging in conduct obstructive to a fair competitive process; or

(d) any conduct, situation, or circumstance determined by ONTC, in its sole and absolute discretion, to have constituted an undisclosed Conflict of Interest.

In advance of a decision to suspend a supplier, ONTC will notify the supplier of the grounds for the suspension and the supplier will have an opportunity to respond within a timeframe stated in the notice. Any response received from the supplier within that timeframe will be considered by ONTC in making its final decision.

3.5 Confidential Information

3.5.1 Confidential Information of ONTC

All information provided by or obtained from ONTC in any form in connection with this RFP either before or after the issuance of this RFP:

(a) is the sole property of ONTC and must be treated as confidential;

(b) is not to be used for any purpose other than replying to this RFP and the performance of the Agreement;

(c) must not be disclosed without prior written authorization from ONTC; and

(d) must be returned by the proponent to ONTC immediately upon the request of ONTC.

Each proponent shall be responsible for any breach of the provisions of this section by any person to whom it discloses ONTC confidential information.

3.5.2 Confidential Information of Proponent

A proponent should identify any information in its proposal or any accompanying documentation supplied in confidence for which confidentiality is to be maintained by ONTC. The confidentiality of such information will be maintained by ONTC, except as otherwise required by law or by order of a court or tribunal. Proponents are advised that their proposals will, as necessary, be disclosed on a confidential basis to advisers retained by ONTC to advise or assist with the RFP process, including the evaluation of proposals. If a proponent has any questions about the collection and use of personal information pursuant to this RFP, questions are to be submitted to the RFP Contact.

3.6 Reserved Rights and Limitation of Liability

3.6.1 Reserved Rights of ONTC

ONTC reserves the right to:

(a) make public the names of any or all proponents;

(b) make changes, including substantial changes, to this RFP provided that those changes are issued by way of addendum in the manner set out in this RFP;

(c) request written verification or clarification from any proponent and incorporate a proponent's response to that request for clarification into the proponent's proposal;

(d) assess a proponent's proposal on the basis of: (i) a financial analysis determining the actual cost of the proposal when considering factors including quality, service, price, and transition costs arising from the replacement of existing goods, services, practices, methodologies, and infrastructure (howsoever originally established); and (ii) in addition to any other evaluation criteria or considerations set out in this RFP, consider any other relevant information that arises during this RFP process;

(e) reject a proposal that contains abnormally low or unbalanced pricing;

(f) waive formalities and accept proposals that substantially comply with the requirements of this RFP;

(g) verify with any proponent or with a third party any information set out in a proposal;

(h) check references other than those provided by any proponent;

(i) disqualify a proponent, rescind a notice of selection, or terminate a contract subsequently entered into if the proponent has engaged in any conduct that breaches the process rules or otherwise compromises or may be seen to compromise the competitive process;

(j) select a proponent other than the proponent whose proposal reflects the lowest cost to ONTC;

(k) cancel this RFP process at any stage;

(l) cancel this RFP process at any stage and issue a new RFP for the same or similar deliverables;

(m) accept any proposal in whole or in part; or

(n) reject any or all proposals;

and these reserved rights are in addition to any other express rights or any other rights that may be implied in the circumstances.

3.6.2 Limitation of Liability

By submitting a proposal, each proponent agrees that

(a) neither ONTC nor any of its employees, officers, agents, elected or appointed officials, advisors, or representatives will be liable, under any circumstances, for any claim arising out of this RFP process including, but not limited to, costs of preparation of the proposal, loss of profits, loss of opportunity, or for any other claim; and

(b) the proponent waives any right to or claim for any compensation of any kind whatsoever, including claims for costs of preparation of the proposal, loss of profit, or loss of opportunity by reason of ONTC's decision to not accept the proposal submitted by the proponent, to enter into an agreement with any other proponent, or to cancel this RFP process, and the proponent shall be deemed to have agreed to waive such right or claim.

3.7 Governing Law and Interpretation

These Terms and Conditions of the RFP Process (Part 3):

(a) are intended to be interpreted broadly and independently (with no particular provision intended to limit the scope of any other provision);

(b) are non-exhaustive and shall not be construed as intending to limit the pre-existing rights of ONTC; and

(c) are to be governed by and construed in accordance with the laws of the Province of Ontario and the federal laws of Canada applicable therein and the courts of the Province of Ontario shall have exclusive jurisdiction to entertain any action or proceeding based on, relating to or arising from this RFP.

3.8 Power of Legislative Assembly

No provision of this RFP is intended to operate, nor shall any such provision have the effect of operating, in any way, that would interfere with or otherwise fetter the discretion of the Legislative Assembly of Ontario in the exercise of its legislative powers.

[End of Part 3]

APPENDIX A - FORM OF AGREEMENT

The Form of Agreement for Deliverables will be the draft Agreement. This will be provided via Addendum at a later date.

APPENDIX B - RFP PARTICULARS

A. THE DELIVERABLES

1. Introduction

Each year, Ontario Northland Transportation Commission (ONTC) undertakes a rail infrastructure upgrade program in order to provide safe and reliable train services across northeastern Ontario and northwestern Quebec. ONTC's objective is to upgrade a mixture of rail, ties and turnouts that will require the services of a qualified rail and tie installation contractor.

ONTC has divided the work into two types of projects, namely ***Project (A)*** and ***Project (B)***. A summary of these projects has been provided below:

Project (A)

ONTC's rail replacement includes the installation of 9 track miles of continuous welded rail and 2 track miles of new 80' bolted rail. From the 9 miles of continuous welded rail, an estimated 5 miles will be relayed to upgrade lighter rail sections on the system.

ONTC anticipates conducting rail installations, on a yearly basis, at the following locations:

- Temagami Subdivision (CWR and jointed rail)
- Ramore Subdivision (CWR and jointed rail)
- Kirkland Lake Subdivision (CWR and jointed rail)
- Devonshire Subdivision (CWR and jointed rail)
- Kapuskasing Subdivision (relay rail)
- Island Falls Subdivision (relay rail)

It is anticipated that the estimated volume of rail installed per year will be approximately:

- 192,000' of new CWR in 1,600' lengths in 2026, 96,000' of new CWR in 1,600' lengths in 2027 and 2028
- 21,120' of new 80' 115 lb. jointed rail.
- 52,800' of relay 115 lb. rail in varying lengths (39', 78', 80') (released from the CWR installation areas).

These volumes are estimates only and are subject to change. Locations are also subject to change. Respondents should assume installations could occur anywhere on ONTC's 700-mile system.

Project (B)

ONTC has a tie replacement plan for the next 5 years to focus on specific areas across its system. These target areas may change if other circumstances occur (i.e., emergency work, recommendations by a third party). ONTC plans on replacing approximately 45,000 to 52,000 mainline ties and 5,000 yard ties each year. If budget permits, ONTC will also be disposing used ties.

ONTC anticipates conducting railway tie installations at the following locations for years 2026-2028:

Subdivision	2026 Approximate Mileage		2027 Approximate Mileage		2028 Approximate Mileage	
Temagami	46	69	112	138.5	89	112
Ramore	68	86	86	104.3	0	16
Devonshire	-	-	-	-	-	-
Kirkland Lake	-	-	0	30	30	60
Kapuskasing	84	129	-	-	-	-
Island Falls	54	71	150	186	75	105
Yard Work	Hearst / Kidd		Englehart / Moosonee		Rouyn Noranda	

These volumes are estimates only and are subject to change.

Locations are also subject to change. Respondents should assume installations could occur anywhere on ONTC's 700-mile system.

All rail, ties, spikes, anchors, plates, joint bars, bolts and washers are to be supplied by ONTC. The work is scheduled to commence as soon as field conditions permit, and materials are in place. All yearly scheduled work must be completed by **September 30th** of each calendar year.

2. Conditions of the Place of Work

The Place of the Work is located anywhere along ONTC's 700-mile system.

Each proponent must form its own opinions and conclusions with respect to the Work addressed in the RFP Documents. Before submitting a Proposal, investigate the Place of the Work to fully ascertain existing conditions, circumstances and limitations affecting the Work. No allowances will be made for additional costs and no claims will be entertained in connection with conditions which could reasonably have been ascertained by such investigation or other due diligence prior to submitting a Proposal.

3. Scope of Work - *Project A*

ONTC anticipates installing its new CWR and 80' jointed rail on its core freight routes (i.e., Temagami Subdivision, Ramore Subdivision and Kirkland Lake Subdivision). Relay rail will be installed on the Kapuskasing Subdivision, Island Falls Subdivision and in ONTC yards. There will also be a requirement to perform a complete upgrade of mainline turnout that fall within the CWR rail replacement areas.

ONTC anticipates the rail replacement will be carried out on ONTC's 700 miles of track at the following locations:

Subdivision	From Mile	To Mile	Type of Rail
Ramore	**73**	**76.9**	**CWR**
	57	**57.25**	**Bolted**
Kirkland Lake	**0.4**	**2.8**	**CWR**
	2.8	**2.92**	**Bolted**
	32.2	**33.2**	**CWR**
	33.5	**35.6**	**CWR**
Devonshire	**3.5**	**7.1**	**CWR**
	11.5	**13.1**	**CWR**
	14.9	**16.5**	**CWR**
	20.2	**22**	**CWR**
Kapuskasing	**1 mile, location to be determined**		**Relay**
Island Falls	**Start location to be determined**	**134.72**	**Relay**

Additional bolted rail locations will be added to the rail program on the Temagami, Ramore, Kirkland Lake or Devonshire Subdivision.

3.1 Obligations of the Contractor

(1) Mobilize and demobilize equipment to and from ONTC railway. All track units and equipment must be insulated to work in signaled circuits. All equipment radios must also be programmed with ONTC channels and CN20. All track units and equipment shall be equipped with a functioning collision avoidance system.

(2) Complete Item #2, #3, #4, #5, #6, #7, #8, and #9 in Appendix D - Schedule A - Project A - Rail Installation A prior to Items #10, #11, #12, and #13 as rail replaced in Item #2, #3, #4, #5, #6, #7, #8, and #9 is required to complete Items #8, #9, #10, and #11.

(3) All ties, except new ones, in rail replacement areas are to be adzed. The Contractor shall operate the equipment as to conserve ballast. At a minimum, ballast conditions shall be kept to preexisting conditions.

(4) All ties in rail replacement areas must have spike holes plugged chemically. In special circumstances, wood plugs may be used but will require pre-approval from the Manager, Track Programs.

(5) Adhere to all fire protection protocols as detailed in the Industrial Operations Fire Prevention and Preparedness Plan, revised March 16, 2021 (see Appendix K).

(6) Load/Unload rail from rail cars as required. The contractor will be able to move up to five (5) railcars as per the Track Unit Handing Equipment Capacity Chart (see Appendix I). This chart shall be completed and submitted to ONTC's Manager, Track Programs and Track Programs Supervisors daily by the operator or foreman.

(7) Stockpile any old spikes, anchors and plates on right-of-way at a location as instructed by onsite supervisor. Any material shall not be stockpiled near a railroad crossing. The used material shall be stockpiled no longer than three (3) days following the rail installation.

(8) Pick-up new OTM at a work location in order to reuse the material at another work location or delivered back to the proper material yard as instructed by ONTC.

(9) Stockpile replaced rails in proper rail stands as instructed by onsite supervisor. Rails shall not be stockpiled near a railroad crossing. The replaced rail shall be stockpiled no longer than three (3) days following the rail installation.

(10) Replaced rail not suitable for relay must be placed at a location as directed by onsite supervisor. Rails must be cut no longer than 39' and no shorter than 36' and stacked in a proper rail stand according to rail grade and in a location identified by onsite supervisor. Rail identified as scrap must be cut no longer than 39' with no minimum length. The replaced rail shall be stockpiled no longer than 3 days following the rail installation.

(11) Provide all-inclusive pricing per foot of rail installed per subdivision.

(12) Pick-up used 115lb joint bars or re-use in other rail installation areas.

(13) 11" D.S. plates should be picked up and stockpiled for proper disposal. 11" D.S. plates shall not be mixed with other OTM for disposal.

(14) Gauge track in all rail installation areas. Track gauge is 56½".

(15) Place all required slow order flags as instructed by onsite supervisor.

(16) Provide the ONTC onsite supervisor with a daily work report indicating amount of rail installed, in feet. Complete the provided CWR installation sheet (see Appendix K). Report is to include time worked by all employees and must be signed daily by Contractor representative and ONTC onsite supervisor. These reports must be submitted with invoice for payment.

(17) Provide all fuels, lubricants and other consumables.

(18) New spikes, anchors and bolts to be used in all rail replacement areas.

(19) All rail installed shall have joints slotted according to SPC 14. SEC 6. CWR joints shall not be slotted as joints will be welded.

(20) All rail replacement areas shall be regulated, upon completion of rail installation, to fill cribs. Regulating of track shall be completed no later than three (3) days after the rail installation. Regulating of the track shall be completed prior to scheduled days off. The regulator operator is expected the track shoulders to preexisting conditions as per ONTC's standards.

(21) Contractor is to arrange workday so that no more than 14 hours/day are worked in conjunction with the ONTC flagman.

(22) Dismantle and reassemble any crossings as required. The number of crossing timbers to be replaced will be determined ahead of time. The crossing timbers will be delivered on site by ONTC. Any additional crossing timbers required will be invoiced back to the contractor.

(23) Contractor is to arrange traffic protection when dismantling and reconstructing a crossing. Contractor is also responsible for contacting the proper authorities regarding a road closure.

(24) While working in urban areas, the Contractor shall make reasonable efforts to prevent noise disturbance.

(25) Contractor is expected to work during "naturally" occurring work blocks. See Appendix G for Train Service Plan. Contractor will be given a guaranteed minimum 8-hour work block per day (uninterrupted or in two different blocks). A standby rate will apply when this minimum guarantee (i.e., a work block totaling 8 hours per day in one continuous work block or two different blocks) is not obtained.

(26) Contractor shall request, in writing, the need of a work train to move boarding car consist, loaded/empty tie cars, loaded/empty rail cars and box cars. The written request shall be made to ONTC 7 days prior to the work train move being required. The written request shall be made to the Track Programs Supervisor and the Manager, Track Programs.

(27) Contractor shall register their CVOR vehicles to travel by road to Quebec.

(28) Contractor shall provide a qualified signal maintainer on an as-required basis. ONTC will inform the contractor seven (7) days prior to the requirement. The signal maintainer must have experience maintaining and repairing track circuit and motion sensor Grande Crossing Warning Systems on Class 1 railways. Pricing for this work must be outlined at Appendix D - Schedule A - Project A - Rail Installation.

(29) The Contractor shall repair and restore to its preexisting condition any area of damage caused by the Contractor's performance under this Contract. ONTC reserves the right to review the work performed by the Contractor and to direct the Contractor to take certain corrective action if, in the opinion of ONTC, the structural integrity of the track or its operating system is or will be harmed. All costs associated with such corrective action caused by the Contractor's breach of its obligations under this Contract shall be borne by the Contractor. All track work by the Contractor shall be in compliance with ONTC's Manual of Track Requirements (available upon request).

(30) The Contractor shall at all times keep the construction site and surrounding areas clean, safe, and free from the accumulation of waste materials or rubbish resulting from the performance of the Work. The Contractor shall ensure all tools, equipment, and surplus materials are stored in a neat and orderly manner, and that all tracks, and work areas remain unobstructed. If the Contractor fails to perform its site cleanup obligations after written notification from the ONTC, the ONTC may, at its option, perform such services. The costs of this cleanup, including administrative fees, will be charged back to the Contractor and deducted from any payments due or to become due under this Contract.

(31) The Contractor must notify ONTC of any Signal Support requirements before noon on Thursdays, for the upcoming cycle or week.

3.2 Item Specific Obligations

(1) Item #2, #3, #4, and #5 of Schedule A-96,000' (CWR) (Rail on site)

- Cut replaced rail into 36', 39', 40', 78' or 80' lengths as required. Preference will be given to longer rails but Contractor is expected to maximize the overall total length of relay rail.
- Drill cut rail to accommodate 115lb joint bars. (See TS-1111 Technical Specifications attached at Appendix L).
- If required, cut out rail end batter and re-drill rails (rails will be identified by ONTC).
- Load rails on ONTC provided flat cars.
- Change out all existing 11" plates for 14" plates as required.
- Permanent and temporary closure rails must be at least 12' long.
- A 12-feet joint stagger must be applied at all joint locations.
- Rails having cuts or holes made with an oxy-acetylene torch must be saw cut at least 6 inches away from any torch mark on the rail prior to any in track use.
- CWR will be delivered with the two inside holes drilled at each end to facilitate welding. The third hole is not to be drilled.
- Rail expansion is to be achieved through heating and not pulling.
- When heating the rail to the PRTL ensure even distribution of heat over the entire length of the rail.
- Every second tie must be box anchored.
- Box anchor jointed track and/or turnouts connected to CWR strings every tie for 200' in both directions and at any other fixed points.
- All CWR installed must be anchored prior to movement of trains over it.
- Install transition rails to tie into worn rail adjoining new install.
- Replaced rail not suitable for relay must be placed at a location as directed by onsite supervisor. Rails must be cut no longer than 39' and no shorter than 36' and stacked in a proper rail stand according to rail grade and in a location identified by onsite supervisor. Rail identified as scrap must be cut no longer than 39' with no minimum length.
- Weld all CWR joints (Thermite or flashbutt welding) As Per Chapter 4, Part 3 of AREMA (all inclusive).
- Complete the CWR Rail Laying Form for every string, or partial string, installed.

(2) Item #6, #7, #8, and #9 of Appendix D - Schedule A - Project A - Rail Installation - 80'Stick rails (rail on site)

- Replaced rail not suitable for relay must be placed at a location as directed by onsite supervisor. Rails must be cut no longer than 39’ and no shorter than 36’ and stacked in a proper rail stand according to rail grade and in a location identified by onsite supervisor. Rail identified as scrap must be cut no longer than 39’ with no minimum length.
- Joint stagger should be 19’ - 6” and no less than 12’.

(3) Item #10, 11, #12 and #13 of Appendix D - Schedule A - Project A - Rail Installation - Relay rail

- Unload rail from rail cars and distribute.
- Replaced rail not suitable for relay must be placed at a location as directed by onsite supervisor. Rails must be cut no longer than 39’ and no shorter than 36’ and stacked in a proper rail stand according to rail grade and in a location identified by onsite supervisor. Rail identified as scrap must be cut no longer than 39’ with no minimum length.
- Replace all plates in Items #10, #11 and #12 with 14” D.S. plates provided.
- Rail to be distributed in the same order it was picked up to avoid mismatched rails.

(4) Item #14 of Appendix D - Schedule A - Project A - Rail Installation - Install New #11, 115lb Switch (material on railcars at nearest siding)

- Unload switch material, rails and ties from flat cars.
- Switch is not preassembled. Contractor obligations are to build, install, surface, weld the new switch and dismantle the old switch.
- Extra rails may be required to be installed to match the existing rail headwear on the mainline or rail type in the siding/spur outside of the turnout area. Rail should match throughout the entire turnout area (first joint in front of the head blocks to fouling point). Extra rails replaced outside of the turnout area will be paid according to unit prices.
- Replaced switch material must be placed at a location as directed by onsite supervisor. Material will have to be loaded on the ONTC provided flat car.

3.3 Gang Travel

The Respondents mobilization unit price shall include all costs associated with delivering the required equipment to the first work location, according to the respondents work schedule, via the nearest yard/siding. Once the work is fully completed at the first work location, Gang Travel will be paid per mile from the end of the completed work location to the start of the next closest work location. Daily travel to and from the work site from a yard/spur/siding will not be recognized as Gang Travel. Operators travelling track units and equipment shall follow the Track Unit Handling Equipment Capacity Chart (see Appendix I).

For example, the Respondents schedule shows completing the ties from mile 35 to 52 Temagami Sub as their first item. Mobilization would cover the cost to deliver the required equipment to complete the work via the nearest yard/siding. The tie gang then proceeds to work to mile 52. From mile 52, the tie gang would be paid Gang Travel to mile 12 on the Kirkland Lake Subdivision, which is the next closest work location. Gang Travel would be paid from mile 52 Temagami Subdivision (end of work location) to mile 12 Kirkland Lake Subdivision (start of new work location). The tie gang then proceeds to work from mile 12 to mile 35 then

travel to mile 86 Ramore Subdivision. The Gang Travel would be paid from mile 35 Kirkland Lake Subdivision (end of work location) to mile 86 Ramore Subdivision (start of new work location).

Gang Travel will be paid according to the Respondents initial, approved, schedule.

3.4 Obligations of ONTC

(1) Provide flagging protection.

(2) Supply rail, spikes, anchors, plates, joint bars (compromised and regular), bolts and washers via nearest available siding/spur/yard. Spikes and plates will be loose in gondola/air dumps. Due to sightline restrictions, Ramore siding cannot be used to store equipment or material.

(3) Provide flat cars for rail loading as required via nearest available siding/spur/yard. Due to sightline restrictions, Ramore siding cannot be used to store equipment or material.

(4) Following proper written work train request indicated in section 3.1 (21), move boarding car consist, loaded/empty tie cars, loaded/empty rail cars and box cars.

3.5 Boarding Cars

ONTC has one set of boarding cars (the “boarding car consist”) with a total accommodation for 35 occupants. The Successful Respondent will have access to use the boarding car consist.

The contractor shall be responsible for the costs of the operation of the consist including but not limited to maintenance, catering, fuel, water, and waste disposal. Any other items needing replaced that are deemed more than the regular use of the boarding cars will be at the cost of the Contractor. All ONTC property is drug and alcohol free and that policy is to be strictly enforced (see ONTC’s Fit for Duty Policy attached at Appendix K).

3.6 Operational Procedures and Requirements

The Contractor shall be responsible for complying with the Operational Procedures and requirements set out in Appendix K. The Contractor will also be required to adhere to the requirements set out in the Contractor Handbook. The Contractor Handbook will be issued to the Successful Proponent upon award and reviewed at the project kick-off / orientation.

4. Scope of Work - *Project B*

ONTC anticipates the tie installation will be carried out on ONTC’s 700 miles of track at the following locations:

2026								
Subdivision	Temagami		Ramore		Kapuskasing		Island Falls	
Mileage	46	69	68	86	84	129	54	71
Estimated Ties	13,800		10,800		22,500		8,500	
Type of Tie	8’ HW		8’ HW		8’ HW		8’ HW	
Yard Work								

Estimated Yard Ties		1,500	4,000	

2027								
Subdivision	Temagami		Ramore		Kirkland Lake		Island Falls	
Mileage	112	138.	86	104.3	0	30	150	186
Estimated Ties	15,900		10,980		15,000		18,000	
Type of Tie	8’ HW		8’ HW		8’ HW		8’ HW	
Yard Work			Englehart				Moosonee	
Estimated Yard Ties			7,000				2,500	

2028								
Subdivision	Temagami		Ramore		Kirkland Lake		Island Falls	
Mileage	89	112	0	16	30	60	75	105
Estimated Ties	13,800		9,600		15,000		15,000	
Type of Tie	8’ HW		8’ HW		8’ HW		8’ HW	
Yard Work					Noranda			
Estimated Yard Ties					2,000			

In addition, there will be approximately 700 switch ties per year of varying lengths distributed amongst these tie replacement areas.

Surfacing all tie replacement areas. It is estimated that there will be approximately 600,000 feet of surfacing within these tie replacement areas. Unit pricing for the tie installation shall include this surfacing requirement.

Optional Work: Remove and dispose of all used ties from the replacement areas (replaced tie and ties on RoW) to an approved disposal site.

4.1 Obligations of the Contractor

Ties

(1) Mobilize and demobilize equipment to and from ONTC railway. All track units and equipment must be insulated to work in signaled circuits. All equipment radios must also be programmed with ONTC channels and CN20. All track units and equipment shall be equipped with a functioning collision avoidance system.

(2) Replace all ties as identified under this Section 4 Scope of Work.

(3) In order to conserve ballast, when inserting ties into the track, the gap between the rail and the tie shall be no less than ½”.

(4) Tamp all ties that are replaced and any adjacent ties that are left hanging before the end of each working day.

(5) Stockpile used ties on railway right-of-way as instructed by onsite supervisor. Ties shall not be stockpiled near a railroad crossing. Ties shall be stockpiled at a location away from steep banks and waterways so that all ties can be recovered by the scrap tie disposal program.

(6) Replace any 11” single shoulder plates or missing plates with 11” double shoulder plates, or matching tie plates to the area.

(7) Pick-up new OTM at a work location in order to reuse the material at another work location or delivered back to the proper material yard as instructed by ONTC.

(8) Place all required slow order flags as instructed by onsite supervisor.

(9) Distribute and spread ties from bundles to replacement locations from nearest sidings/yard/spur.

(10) Provide the ONTC onsite supervisor with a daily work report indicating amount of ties installed. This report must include time worked by all employees and must be signed daily by Contractor representative and ONTC onsite supervisor. These reports must be submitted with invoice for payment.

(11) Provide all-inclusive pricing per tie installed per subdivision (including surfacing).

(12) Provide all fuels and lubricants.

(13) Contractor is to arrange workday so that no more than 14 hours/day are worked in conjunction with the ONTC foreman.

(14) While working in urban areas, the Contractor shall make reasonable efforts to prevent noise disturbance.

(15) Contractor is expected to work during “naturally” occurring work blocks. See Appendix F ONTC Train Service Plan. Contractor will be given a guaranteed minimum 8-hour work block per day (uninterrupted or in two different blocs). A stand by rate will apply when this minimum guarantee (i.e. a wok block totaling 8 hours per day in one continuous work block or two different blocks) is not obtained.

(16) Contractor shall request, in writing, the need of a work train to move boarding car consist, loaded/empty tie cars, loaded/empty rail cars and box cars. The written request shall be made to ONTC seven (7) days’ prior to the work train move being required. The written request shall be made to the Track Programs Supervisor and the Manager, Track Programs.

(17) Contractor shall register their CVOR vehicles to travel by road to Quebec.

(15) Contractor shall provide a qualified signal maintainer on an as-required basis. ONTC will inform the contractor seven (7) days prior to the requirement. The signal maintainer must have experience maintaining and repairing track circuit and motion sensor Grande Crossing Warning Systems on Class 1 railways. Pricing for this work must be outlined at Appendix D - Schedule B - Project B - Railway Tie Installation/Surfacing.

(16) The Contractor shall repair and restore to its preexisting condition any area of damage caused by the Contractor's performance under this Contract. ONTC reserves the right to review the work performed by the Contractor and to direct the Contractor to take certain corrective action if, in the opinion of ONTC, the structural integrity of the track or its operating system is or will be harmed. All costs associated with such corrective action caused by the Contractor's breach of its obligations under this Contract shall be borne by the Contractor. All track work by the Contractor shall be in compliance with ONTC's Manual of Track Requirements (available upon request).

(17) The Contractor shall at all times keep the construction site and surrounding areas clean, safe, and free from the accumulation of waste materials or rubbish resulting from the performance of the Work. The Contractor shall ensure all tools, equipment, and surplus materials are stored in a neat and orderly manner, and that all tracks, and work areas remain unobstructed. If the Contractor fails to perform its site cleanup obligations after written notification from the ONTC, the ONTC may, at its option, perform such services. The costs of this cleanup, including administrative fees, will be charged back to the Contractor and deducted from any payments due or to become due under this Contract.

(18) The Contractor must notify ONTC of any Signal Support requirements before noon on Thursdays, for the upcoming cycle or week.

Surfacing

(1) Mobilize and demobilize equipment to and from ONTC property. All track units equipment must be insulated to work in signaled circuits. All equipment radios must also be programmed with ONTC channels and CN20. All track units and equipment shall be equipped with a functioning collision avoidance system.

(2) Surface the track behind all tie replacement areas. This must be done immediately following the installation of the ties and at no time be more than 2 miles behind the tie installation crew

(3) Surface all newly installed turnouts.

(4) Provide at minimum two (2) tamper model HARSCO MKIV or Plasser GRM 3000 or better, two (2) mechanical ballast regulator with broom to be used in conjunction with the tie program, and a dynamic track stabilizer. The dynamic track stabilizer shall be used only on continuous welded track.

(5) Compact all joints/curves with a minimum of three (3) tamping head insertions. All other areas to receive a minimum of two (2) tamping head insertions.

(6) Dismantle and reconstruct crossing surfaces located through the tie change areas in order to allow for continuous surfacing. The number of crossing timbers to be replaced will be determined ahead of time. The crossing timbers will be delivered on site by ONTC. Any additional crossing timbers required will be invoiced back to the contractor.

(7) Contractor is to arrange traffic protection when dismantling and reconstructing a crossing. Contractor is also responsible for contacting the proper authorities regarding a road closure.

(8) Responsible for track quality control behind surfacing operation. Items include, but not limited to, picking up downed ties, replacing broken joint bars, addressing high spikes and

adjusting anchors. This requirement is not limited to the tie that is replaced but the entire surfaced track.

(9) Provide the ONTC onsite supervisor with a daily report indicating the amount of track surfaced in feet (Milepost to Milepost), curve superelevation change, if any, and rail temperature. This report must include time worked by all employees and must be signed daily by Contractor representative and ONTC onsite supervisor. These reports must be submitted with invoice for payment.

(10) Provide pricing per hour for any additional out of scope surfacing, including switches (all inclusive).

(11) Provide all fuels and lubricants.

(12) Contractor must ensure that surfacing operation (i.e. Tamper and Regulator) are able to keep up to the tie gang's daily production as per item (2).

(13) Contractor is to arrange workday so that no more than 14 hours/day are worked.

(14) While working in urban areas, the Contractor shall make reasonable efforts to prevent noise disturbance.

(15) Contractor is expected to work during "naturally" occurring work blocks. See Appendix F - Train Service Plan. Contractor will be given a guaranteed minimum 8 hour work block per day (uninterrupted or in two different blocks). A standby rate will apply when this minimum guarantee (i.e. a work block totaling 8 hours per day in one continuous work block or two different blocks) is not obtained.

(15) Contractor shall provide a Qualified Signal Maintainer on an as-required basis. ONTC will inform the contractor seven (7) days prior to the requirement. The signal maintainer must have experience maintaining and repairing track circuit and motion sensor Grade Crossing Warning Systems on Class 1 railways. Pricing for this work must be outlined at Appendix D - Schedule B - Project B - Railway Tie Installation/Surfacing.

(16) The Contractor shall repair and restore to its preexisting condition any area of damage caused by the Contractor's performance under this Contract. ONTC reserves the right to review the work performed by the Contractor and to direct the Contractor to take certain corrective action if, in the opinion of ONTC, the structural integrity of the track or its operating system is or will be harmed. All costs associated with such corrective action caused by the Contractor's breach of its obligations under this Contract shall be borne by the Contractor. All track work by the Contractor shall be in compliance with ONTC's Manual of Track Requirements.

(17) The Contractor shall at all times keep the construction site and surrounding areas clean, safe, and free from the accumulation of waste materials or rubbish resulting from the performance of the Work. The Contractor shall ensure all tools, equipment, and surplus materials are stored in a neat and orderly manner, and that all tracks, and work areas remain unobstructed. If the Contractor fails to perform its site cleanup obligations after written notification from the ONTC, the ONTC may, at its option, perform such services. The costs of this cleanup, including administrative fees, will be charged back to the Contractor and deducted from any payments due or to become due under this Contract.

(18) The Contractor must notify ONTC of any Signal Support requirements before noon on Thursdays, for the upcoming cycle or week.

4.2 Gang Travel

The Respondents mobilization unit price shall include all costs associated with delivering the required equipment to the first work location, according to the respondents work schedule, via the nearest yard/siding. Once the work is fully completed at the first work location, Gang Travel will be paid per mile from the end of the completed work location to the start of the next closest work location. Daily travel to and from the work site from a yard/spur/siding will not be recognized as Gang Travel. Operators travelling track units and equipment shall follow the Track Unit Handling Equipment Capacity Chart (see Appendix I).

For example, the Respondents schedule shows completing the ties from mile 35 to 52 Temagami Sub as their first item. Mobilization would cover the cost to deliver the required equipment to complete the work via the nearest yard/siding. The tie gang then proceeds to work to mile 52. From mile 52, the tie gang would be paid Gang Travel to mile 12 on the Kirkland Lake Subdivision, which is the next closest work location. Gang Travel would be paid from mile 52 Temagami Subdivision (end of work location) to mile 12 Kirkland Lake Subdivision (start of new work location). The tie gang then proceeds to work from mile 12 to mile 35 then travel to mile 86 Ramore Subdivision. The Gang Travel would be paid from mile 35 Kirkland Lake Subdivision (end of work location) to mile 86 Ramore Subdivision (start of new work location).

Gang Travel will be paid according to the Respondents initial, approved, schedule.

4.3 Obligations of ONTC

Ties

(1) Mark ahead of installation all ties (track and switch) to be replaced.

(2) Provide full time supervisor for flagging protection.

(3) Supply required ties and spikes (anchors and plates as required). ONTC will deliver to worksite via nearest siding/yard/spur. Due to sightline restrictions, Ramore siding cannot be used to store equipment or material.

(4) Following proper written work train request indicated in section 4.1.1 (13), move boarding car consist, loaded/empty tie cars, loaded/empty rail cars and box cars.

Surfacing

(1) Provide full time supervision for flagging protection.

(2) Provide all required ballast via work train.

(3) Provide signal maintainers to protect signal system as required.

(4) Provide contractor with all required curve data prior to commencement of contract.

4.4 Boarding Cars

ONTC has one set of boarding cars (the “boarding car consist”) with a total accommodation for 35 occupants. The Successful Respondent will have access to use the boarding car consist.

The contractor shall be responsible for the costs of the operation of the consist including but not limited to maintenance, catering, fuel, water, and waste disposal. Any other items needing replaced that are deemed more than the regular use of the boarding cars will be at the cost of the Contractor. All ONTC property is drug and alcohol free and that policy is to be strictly enforced (see ONTC's Fit for Duty Policy attached at Appendix K).

4.5 Operational Procedures and Requirements

The Contractor shall be responsible for complying with the Operational Procedures and requirements set out in Appendix K. The Contractor will also be required to adhere to the requirements set out in the Contractor Handbook. The Contractor Handbook will be issued to the Successful Respondent upon award and reviewed at the project kick-off / orientation.

B. MATERIAL DISCLOSURES

1. Examination of Site

Proponents are required to satisfy themselves as to existing conditions of the site and must take all site conditions into account in preparing their proposals.

2. Contractor Health and Safety

The successful proponent must be familiar and comply with the Occupational Health and Safety Act (OHSA) and ONTC's Policies.

3. Liquidated Damages

The per diem rate calculated in relation to Section 10.4 of the Supplementary Conditions is $500 for each calendar day of delay beyond the prescribed date for Substantial Performance of the Work until Substantial Performance of the Work is achieved and certified, pursuant to the terms of the Contract.

C. MANDATORY SUBMISSION REQUIREMENTS

1. Submission Form (Appendix C)

Each proposal must include a Submission Form (Appendix C) completed and signed by an authorized representative of the proponent.

2. Pricing

Each proposal must include pricing information that complies with the instructions set out below in Section G of this Appendix B.

Please ensure that all pricing information is uploaded in the Pricing Proposal Envelope only.

3. Bid Security

3.1 Proponents shall provide with their Proposal, Bid Performance Security in one of the following forms:

(a) Irrevocable stand-by Letter of Credit ("**LOC**"); or

(b) Bid bond

(the "**Bid Performance Security**").

The Bid Performance Security shall be:

(a) in the Proponent's own name;

(b) if a bid bond, issued by a surety licensed to conduct surety and insurance business in Ontario;

(c) in a form satisfactory to ONTC;

(d) for a term of at least ninety (90) calendar days after the submission deadline; and

(e) in the amount of ten percent (10%) of the total bid price excluding HST.

The Bid Performance Security is for the benefit of ONTC and will be retained by ONTC to compensate ONTC for the damages it will suffer if the successful proponent fails to provide the Contract Securities (defined in Section 3.2, below) and evidence of insurance and other documents required by this RFP or by the final agreement, or fails to execute the final agreement within the time required by the RFP documents.

The Bid Performance Security of the successful proponent will be returned after the successful proponent delivers to ONTC compliant Contract Securities and evidence of insurance and other documents required by this RFP or by the final agreement and the successful proponent has executed the final agreement, all within the time required by the RFP documents.

The Bid Performance Security of all other proponents shall be returned to the proponents upon the occurrence of the earlier of:

(a) execution by both parties of the final agreement between ONTC and the successful proponent;

(b) the expiry of the 90-day period following the submission deadline;

(c) the cancelation of the RFP process without an award of the contract; or

(d) the disqualification of all Proposals.

3.2 Agreement to Bond

The proponent shall provide with its proposal an agreement to bond issued by a surety company undertaking to provide a fifty percent (50%) Performance Bond and a fifty percent (50%) Labour and Material Bond (the "Contract Securities") in the form prescribed by the *Construction Act*, both to be provided to ONTC by the Successful Proponent following award of the contract.

3.3 Proposals not accompanied by the required Bid Performance Security and the required agreement to bond will be declared non-compliant.

3.4 The Proponent shall include the actual cost of all bonds, with no mark-up, in the Price Proposal.

4. Other Mandatory Submission Requirements

Not Applicable.

D. MANDATORY TECHNICAL REQUIREMENTS

Not Applicable.

E. PRE-CONDITIONS OF AWARD

The selected proponent must satisfy the following conditions and provide the following information with fifteen (15) days of the notice of selection:

(a) The performance bond and the labour and material bond described in the RFP Documents. The form of such bonds shall comply with the requirements prescribed in the *Construction Act*. Refer to the link below for the appropriate form (Form 31 and 32).

https://ontariocourtforms.on.ca/en/construction-lien-act-forms/

(b) Certificates of insurance as specified in the Draft Agreement;

(c) Executed Contractors Health and Safety Responsibility Agreement;

(d) Respondent's Health and Safety, and Environmental Policies; and

(e) A current Clearance Certificate issued by the Workplace Safety and Insurance Board, if applicable.

F. EVALUATION CRITERIA

The following sets out the categories, weightings, and descriptions of the rated criteria of the RFP. Proponents who do not meet a minimum threshold score for a category will not proceed to the next stage of the evaluation process.

Item	Criteria	Weighting	Minimum Threshold
1.TECHNICAL PROPOSAL			
1.0	**Category 1: Experience and Qualifications**	**35**	**15**
1.1	Company Profile	5	
1.2	Project Team	5	
1.3	Project Profiles	15	
1.4	Preferred Customer	5	
1.5	Local Benefit	5	
2.0	**Category 2: Schedule and Methodology**	**35**	**10**
2.1	Schedule	5	
2.2	Narrative, Methodology & Supply Chain	15	
2.3	Health, Safety & Environmental	15	
	Total	**70**	
50% Minimum Threshold to be obtained in Category 1 (15/30), Category 2 (10/20), Category 3 (7.5/15), and Category 4 (5/10) to Proceed to Stage 2 - Pricing Proposal. Proposals which do not meet these minimum thresholds will not be considered further.			
2. PRICING PROPOSAL			
	Pricing	**40**	**n/a**
	Total Points	110	n/a

Technical Proposal Content Requirements

The proponent shall provide a written proposal in PDF format.

The proposal to undertake the project shall include a clear outline, including the general items listed below, but also include other considerations based on the proponent's understanding of the project. Failure to provide the requested information will negatively affect the scoring of the proposal in the evaluation process.

All submissions shall utilize the headings in the Technical Proposal Requirements table provided below, and in the order presented, which align with the Evaluation Criteria. All submissions shall also address the information requirements under each heading. Pricing is not to be provided in the Technical Proposal.

ITEM #	DESCRIPTION
	Title Page
	Table of Contents
1.0	**Experience and Qualifications**

1.1	Proponents shall provide a Company Profile which includes the number of years your company has provided services similar to the scope of work in this RFP. Please describe your company's history, office locations, and corporate operating philosophy and description of the specific services and specialties offered. Proponents shall demonstrate a minimum of ten (10) years' experience in related work with a proven track record of successfully delivering similar projects. Proponents shall include a company profile for any and all Subcontractors being used for the completion of the project.
1.2	Proponents shall provide an organizational chart and full detailed resumes of Qualified Signal Maintainer and all other key personnel, any agents, employees, and subcontractors, who will be assigned to this project, including their roles, responsibilities, and relevant certifications.
1.3	Proponents shall provide a minimum of three (3) project completed in the last five (5) years that demonstrate your experience with rail and tie installation/surfacing. The project descriptions shall include: a) Client name and contact details b) Project scope and value c) Scheduled vs. actual start/end dates d) Description of work performed and use of subcontractors e) Outcomes (e.g., completed on schedule/budget) *ONTC may, in its sole discretion, confirm the Respondent's experience in the projects identified by contacting the named contacts above*
1.4	Proponents shall demonstrate that ONTC is a preferred customer and describe how ONTC will be treated as a preferred customer from project orientation through to completion.
1.5	Proponents must confirm (in Appendix C) that their organization is utilizing Ontario's local workforce, vendors, manufacturers, contractors, and/or apprentices/trainees in achieving the project goals and providing the requested services. Respondents who select 'Yes' will be awarded full points. Respondents who select 'No' but provide supporting details will be awarded half points.
2.0	**Schedule and Proposed Approach**
2.1	Proponents must provide their schedule in Gantt Chart format and identify the critical path.
2.2	Proponents shall provide a detailed written narrative describing the proposed approach to completing the project, including sequencing of tasks, durations, and identification of the critical path. Proponents shall demonstrate that they have the necessary resources in order to complete the work (i.e. workforce/crew and equipment) and confirm that the work shall be completed no later than **September 30th** of each year. Proponents shall describe how they will provide an uninterrupted supply of the required goods and/or services in order to avoid any adverse impact on the project schedule. Proponents must identify any anticipated product delays and build this into the schedule.

2.3	Proponents shall provide their health and safety plan and environmental protection measures for this project. Proponents shall describe how they will manage site safety and compliance with ONTC policies and the Occupational Health and Safety Act. Proponents shall complete the Contractor Health and Safety Responsibility Agreement and the Contractor Safety Pre-Qualification Form attached at Appendix E and provide associated supporting documents (i.e., WSIB Safety Record, Current Clearance Certificate, training and certification records, Past environmental and safety records and Hazardous Material List). *Proponents must pass the Contractor Safety Pre-Qualification. Failure to pass will result in disqualification from the procurement process.*

G. PRICE EVALUATION METHOD

The ranking of proponents will be based on the total score calculated by adding the pricing points to the total points from the technical proposal.

Pricing is worth **40 points** of the total score.

Pricing will be scored based on a relative pricing formula using the rates set out in the pricing form. Each proponent will receive a percentage of the total possible points allocated to price, which will be calculated in accordance with the following formula:

$$lowest\ price \div proponent's\ price\ \times\ weighting = proponent's\ pricing\ points$$

Instructions on How to Provide Pricing

(a) Proponents should submit their pricing information by completing the attached pricing form and including it in their proposals.

(b) Rates must be provided in Canadian funds, inclusive of all applicable duties and taxes except for HST, which should be itemized separately.

(c) Unless otherwise indicated in the requested pricing information, rates quoted by the proponent must be all-inclusive and must include all labour and material costs, all travel and carriage costs, all insurance costs, all costs of delivery, all costs of installation and set-up, including any pre-delivery inspection charges, and all other overhead, including any fees or other charges required by law.

Required Pricing Information

Please complete the costing breakdowns attached at **Appendix D**.

APPENDIX C - SUBMISSION FORM

1. Proponent Information

Please fill out the following form, naming one (1) person to be the proponent's contact for the RFP process and for any clarifications or communication that might be necessary.	
Full Legal Name of Proponent:	
Any Other Relevant Name under which Proponent Carries on Business:	
Street Address:	
City, Province/State:	
Postal Code:	
Phone Number:	
Company Website (if any):	
Proponent Contact Name and Title:	
Proponent Contact Phone:	
Proponent Contact Email:	

2. Sub-Contractor Information

The Bidder shall state all Subcontractor(s) and type of Work proposed to be used for this project. Bidders shall not indicate "TBD" (To Be Determined) or "TBA" (To Be Announced) or similar wording and shall not indicate multiple Subcontractor names for any Subcontractor category in their list of Subcontractors. The Bidder shall state only one (1) subcontractor for each type of work.

List of Sub-Contractors

In the spaces provided below, please list those subcontractors you intend to use:

☐ By checking this box, I confirm that there are no Subcontractor(s) and the Bidder shall perform the project with their "**OWN FORCES**".

Item	*Organization*	*Contact Name*	*E-mail*	*Phone*
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

3. Building Ontario Businesses Initiative and Procurement Restrictions

A - "**Ontario business**" means:

A supplier, manufacturer or distributor of any business structure that conducts its activities on a permanent basis in Ontario which:

i. Has its headquarters or main office in Ontario, or
ii. Has at least 250 full-time employees in Ontario at the time of the applicable procurement process.

Please select one of the following correct statement/s that describes your organization:

☐ Yes, my organization is an "Ontario business" as defined above.
☐ No, my organization is not an "Ontario business" as defined above.

B - "Canadian business" means:

i. A corporation or limited partnership existing pursuant to the Laws of Canada or any of the provinces or territories thereof, and which has ongoing commercial activities in Canada; or
ii. An individual (including sole proprietors) or a general partnership which has a business address in Canada, and which has ongoing commercial activities in Canada.

Please select one of the following correct statement/s that describes your organization:

☐ Yes, my organization is a "Canadian business" as defined above.
☐ No, my organization is not a "Canadian business" as defined above.

C - "Canadian Trade Partner Country" means:

A country that is signatory to one or more of the following trade agreements:

- Comprehensive Economic and Trade Agreement (CETA);
- World Trade Organization's Agreement on Government Procurement (WTO-GPA);
- Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP); or,
- Canada-UK Trade Continuity Agreement (Canada-UK TCA)

Please select one of the following correct statement/s that describes your organization:

☐ Yes, my organization is an "Canadian Trade Partner Country" as defined above.
☐ No, my organization is not an "Canadian Trade Partner Country" as defined above.

D - "U.S. business" means:

A supplier, manufacturer or distributor of any business structure (including a sole proprietorship, partnership, corporation or other business structure) that:

i. has its headquarters or main office located in the U.S., and

ii. has fewer than 250 full-time employees in Canada at the time of the applicable procurement process.

If a Respondent is a subsidiary of another corporation, part 1 of the definition above is met if that Respondent is controlled by a corporation that has its headquarters or main office located in the U.S.

Please select one of the following correct statement/s that describes your organization:

☐ Yes, my organization is a "U.S. business" as defined above.
☐ No, my organization is not a "U.S. business" as defined above.

If the proponent has not demonstrated eligibility with a "No" response to being a U.S. Business, ONTC reserves the right, in its sole discretion, to disqualify the proponent.

D - Local Benefit:

Does your organization commit to utilizing Ontario's local workforce, vendors, manufacturers, contractors, and/or apprentices/trainees in achieving the project goals and providing the requested services?

Yes ☐ No ☐

If no, please provide details.

_____

_____

Bill S-211:

ONTC adheres to, and reports under the Government of Canada's Bill S-211 Fighting against Forced Labour and Child Labour in Supply Chains Act.

1. Is your company required to report under the Government of Canada's Bill S-211 Fighting against Forced Labour and Child Labour in Supply Chains Act? Yes ☐ No ☐

2. Is your company compliant with the Government of Canada's Bill S-211 Fighting against Forced Labour and Child Labour in Supply Chains Act? Yes ☐ No ☐

3. Has your company been involved in forced and/or child labour in the past? Yes ☐ No ☐

   If yes, please provide details including the date and action taken to mitigate.

   _____

   _____

   _____

_____

5. Offer

The proponent has carefully examined the RFP documents and has a clear and comprehensive knowledge of the Deliverables required under the RFP. By submitting a proposal, the proponent agrees and consents to the terms, conditions, and provisions of the RFP, including the Form of Agreement, and offers to provide the Deliverables in accordance therewith at the rates set out in its proposal.

6. Rates

The proponent has submitted its rates in accordance with the instructions in the RFP. The proponent confirms that it has factored all of the provisions of Appendix A, including insurance and indemnity requirements, into its pricing assumptions and calculations.

7. Addenda

The proponent is deemed to have read and accepted all addenda issued by ONTC prior to the Deadline for Issuing Addenda. The onus is on proponents to make any necessary amendments to their proposals based on the addenda.

8. Communication with Competitors

For the purposes of this RFP, the word "competitor" includes any individual or organization, other than the proponent, whether or not related to or affiliated with the proponent, who could potentially submit a response to this RFP.

Unless specifically disclosed below under Disclosure of Communications with Competitors, the proponent declares that:

(a) it has prepared its proposal independently from, and without consultation, communication, agreement, or arrangement with any competitor, including, but not limited to, consultation, communication, agreement, or arrangement regarding:

  (i) prices;

  (ii) methods, factors, or formulas used to calculate prices;

  (iii) the quality, quantity, specifications, or delivery particulars of the Deliverables;

  (iv) the intention or decision to submit, or not to submit, a proposal; or

  (v) the submission of a proposal which does not meet the mandatory technical requirements or specifications of the RFP; and

(b) it has not disclosed details of its proposal to any competitor and it will not disclose details of its proposal to any competitor prior to the notification of the outcome of the procurement process.

Disclosure of Communications with Competitors

If the proponent has communicated or intends to communicate with one (1) or more competitors about this RFP or its proposal, the proponent discloses below the names of those competitors and the nature of, and reasons for, such communications:

9. No Prohibited Conduct

The proponent declares that it has not engaged in any conduct prohibited by this RFP.

10. Conflict of Interest

The proponent must declare all potential Conflicts of Interest, as defined in Section 3.4.1 of the RFP. This includes disclosing the names and all pertinent details of all individuals (employees, advisers, or individuals acting in any other capacity) who (a) participated in the preparation of the proposal; **AND** (b) were employees of ONTC within twelve (12) months prior to the Submission Deadline.

If the box below is left blank, the proponent will be deemed to declare that (a) there was no Conflict of Interest in preparing its proposal; and (b) there is no foreseeable Conflict of Interest in performing the contractual obligations contemplated in the RFP.

Otherwise, if the statement below applies, check the box.

- ❑ The proponent declares that there is an actual or potential Conflict of Interest relating to the preparation of its proposal, and/or the proponent foresees an actual or potential Conflict of Interest in performing the contractual obligations contemplated in the RFP.

If the proponent declares an actual or potential Conflict of Interest by marking the box above, the proponent must set out below details of the actual or potential Conflict of Interest:

11. Disclosure of Information

The proponent hereby agrees that any information provided in this proposal, even if it is identified as being supplied in confidence, may be disclosed where required by law or by order of a court or tribunal. The proponent hereby consents to the disclosure, on a confidential basis, of this proposal by ONTC to the advisers retained by ONTC to advise or assist with the RFP process, including with respect to the evaluation this proposal.

12. Proposal Irrevocable

The proponent agrees that its proposal shall be irrevocable for the Irrevocability Period specified in the RFP, running from the moment the Submission Deadline has passed.

13. Execution of Agreement

The proponent agrees that in the event its proposal is selected by ONTC, in whole or in part, it will finalize and execute the Agreement in the form set out in Appendix A to this RFP in accordance with the terms of this RFP.

14. Travel

To the extent that travel expenses are expressly provided for under the written agreement for the Deliverables, the proponent hereby acknowledges that travel expenses must be approved in advance by ONTC and must be in compliance with the Management Board of Cabinet Travel, Meal & Hospitality Expenses Directive, January 2020 (https://www.ontario.ca/page/travel-meal-and-hospitality-expenses-directive-2020)."

Signature of Proponent Representative

Name of Proponent Representative

Title of Proponent Representative

Date

I have the authority to bind the proponent.

APPENDIX D - COSTING BREAKDOWN

A. Schedule A - Project A - Rail Installation

Unit Prices listed in this Schedule are based on the use of specified materials to be supplied by ONTC. All of the prices listed below are to be included in the Final Agreement Price and do not include HST. Total proposal price shall include all labour, subcontractor fees, Products (excluding materials supplied by ONTC), services, tools, equipment, equipment fuel, equipment repairs ,the operation of the boarding car consist (including but not limited to maintenance, catering, fuel, water, and waste disposal), tool rental fees, handling costs, profit, bonding costs, site access preparation including construction of a crossing (if required), environmental protection and control costs, removal of debris, waste and rubble, cleanup and restoration of site, taxes and all other overhead related charges and incidentals necessary for the total completion of the Work and shall hereinafter be referred to as Final Agreement Unit Prices

Item #	Description	Unit	Qty	Unit Price 2026	Unit Price 2027	Unit Price 2028
1	Mobilization to site	L.S.	1	$	$	$
2	New CWRTemagami Subdivision	Ft	1	$	$	$
3	New CWR Ramore Subdivision	Ft	1	$	$	$
4	New CWR Kirkland Lake Subdivision	Ft	1	$	$	$
5	New CWR Devonshire Subdivision	Ft	1	$	$	$
6	New Bolted Rail Temagami Subdivision	Ft	1	$	$	$
7	New Bolted Rail Ramore Subdivision	Ft	1	$	$	$
8	New Bolted Rail Kirkland Lake Subdivision	Ft	1	$	$	$
9	New Bolted Rail Devonshire Subdivision	Ft	1	$	$	$
10	Relay Rail Ramore Subdivision	Ft	1	$	$	$
11	Relay Rail Kapuskasing Subdivision	Ft	1	$	$	$
12	Relay Rail Island Falls Subdivision	Ft	1	$	$	$

13	Rail Installation - Various Yards	Ft	1	$	$	$
14	Install New #11, 115lb Switch as per Drawing B-1412	L.S.	1	$	$	$
15	Build New #11, 115lb Switch as per Drawing B-1412	L.S.	1	$	$	$
16	Relay Rail Preparation – Various Locations	Ff		$	$	$
17	Replace Guard Rails on a Bridge (as required)	L.S	1	$	$	$
18	New Insulated Rail or Insulated Joints (as required)	L.S	1	$	$	$
19	Standby Rate	Hr.	1	$	$	$
20	Gang Travel	Mi.	1	$	$	$
21	Demobilization	L.S.	1	$	$	$
22	Weld CWR Joints	Ea.	1	$	$	$
Optional Work						
23	Signal Maintainer on an as-is required basis.	Hr.	1	$	$	$
24	New Bolted Rail Island Falls Subdivision	Ft	1	$	$	$

B. Schedule B - Project B - Railway Tie Installation/Surfacing

Unit Prices listed in this Schedule are based on the use of specified materials to be supplied by ONTC. All of the prices listed below are to be included in the Final Agreement Price and do not include HST. Total proposal price shall include all labour, subcontractor fees, Products (excluding materials supplied by ONTC), services, tools, equipment, equipment fuel, equipment repairs ,the operation of the boarding car consist (including but not limited to maintenance, catering, fuel, water, and waste disposal), tool rental fees, handling costs, profit, bonding costs, site access preparation including construction of a crossing (if required), environmental protection and control costs, removal of debris, waste and rubble, cleanup and restoration of site, taxes and all other overhead related charges and incidentals necessary for the total completion of the Work and shall hereinafter be referred to as Final Agreement Unit Prices.

Item #	Description	Unit	Qty	Unit Price 2026	Unit Price 2027	Unit Price 2028
1	Mobilization to Site	L.S.	1	$	$	$
2	Tie Installation - Temagami Subdivision	Ea.	1	$	$	$
3	Tie Installation – Ramore Subdivision	Ea.	1	$	$	$
4	Tie Installation - Kirkland Lake Subdivision	Ea.	1	$	$	$
5	Tie Installation - Devonshire Subdivision	Ea.	1	$	$	$
6	Tie Installation - Kapuskasing Subdivision	Ea.	1	$	$	$
7	Tie Installation - Island Falls Subdivision	Ea.	1	$	$	$
8	Tie Installation - Various Yards	Ea.	1	$	$	$
9	Tie Installation - Various Yards, Sub Track	Ea.	1	$	$	$
10	Switch Ties - Mainline	Ea.	1	$	$	$
11	Switch Ties - Various Yards	Ea.	1	$	$	$
12	Surfacing (out of scope)	Hr.	1	$	$	$

13	Standby Rate	Hr.	1	$	$	$
14	Gang Travel	Mi.		$	$	$
15	Demobilization	L.S.	1	$	$	$
Optional Work						
16	Remove and Dispose of used ties from tie replacement area This item will not be considered in the evaluation	t.	1	$	$	$
17	Remove and Dispose of used ties from mile 70 to mile 186 Island Falls Sub. This item will not be considered in the evaluation.	t.	1	$	$	$
18	Signal Maintainer on an as-is required basis.	Hr.	1	$	$	$
19	Tie Installation - Agrium Subdivision	Ea.	1	$	$	$
20	Tie Installation - Pagwa Subbdivision	Ea.	1	$	$	$

APPENDIX E - HEALTH, SAFETY AND ENVIRONMENTAL

A. Health and Safety Policy

Ontario Northland

DATE FORMALIZED April 2016 **REVISED** February 2023	**Health and Safety Policy**

POLICY STATEMENT

In keeping with our value of *Safety. Full Stop*. Ontario Northland Transportation Commission (ONTC) / Nipissing Central Railway (NCR) is committed to providing a safe and healthy work environment. Safety is core to everything we do. We don't settle for less, for our people or our customers, even when operating pressures make it difficult to do so.

As part of developing a safety culture, we will collectively strive to prevent accidents and incidents through a risk-based approach with the goal to continuously improve. Employees are required to report safety concerns immediately and can do so without fear of reprisal, while management ensures all employees receive quick follow-up.

We will adopt the latest in systems to improve the reporting, investigation, and implementation of corrective actions, close-out, and trend analysis of accidents and incidents. We will communicate safety and encourage engagement at all levels of the organization, such as during tailgates, briefings, and meetings.

The success of ONTC/NCR safety programs will be ensured through the collective and cooperative efforts of all, including management, employees, unions, and Workplace Health and Safety Committees. All ONTC/NCR members will jointly participate in safety, health and loss prevention initiatives to ensure a safe and healthy workplace for all employees.

Chad Evans
President and CEO

SAFETY. FULL STOP.

CONTRACTOR HEALTH AND SAFETY RESPONSIBILITY AGREEMENT

In submitting this Proposal, I/We, on behalf of, _____
(legal name of company)

certify the following:

(a) I/We have a health and safety policy and will maintain a program to implement such policy as required by clause 25(2) (j) of the *Occupational Health and Safety Act*, R.S.O. 1990, c.O.1, as amended, (the "OHSA").

The requirements in (a) do not apply to employers with five (5) or less employees.

(b) With respect to the Services being offered in this Proposal, I/We and on behalf of our proposed sub-consultants, acknowledge the responsibility to, and shall:

(i) fulfill all of the obligations under the OHSA and ensure that all work is carried out in accordance with the OHSA and its regulations;

(ii) ensure that adequate and competent supervision is provided as required under the OHSA to protect the health and safety of workers; and

(iii) provide information and instruction to all employees to ensure they are informed of the hazards inherent in the work and understand the procedures for minimizing the risk of injury or illness.

(c) I/We agree to take precautions reasonable in the circumstances for the protection of worker health and safety, as required under the OHSA.

Dated at _____ this _____ day of _____, 202_.

An Authorized Signing Officer _____

(Key Contact)

(Title) _____

(Telephone Number) _____

(Firm's Name) _____

(Firm's Address) _____

C. Contractor Safety Pre-Qualification Form

Ontario Northland

Contractor Safety Pre-Qualification Form

	ONTC Use
1. Company Identification:	
Company Name: _____ Telephone: _____	
Mailing Address: _____ Fax: _____	
_____ E-mail: _____	
2. Form of Business:	
☐ Sole Proprietor ☐ Partnership: ☐ Corporation	
3. Officers: Years with the Company	
President / CEO _____ _____	
Vice President _____ _____	
Treasurer	
Who is the manager most responsible for health and safety?	
Name: Title:	
4. How many years has your business operated under its current name? _____	
5. Under Current Management Since (Date)	
6. Parent Company Information	
Parent Name:	
City: Province / State: Postal / Zip Code:	
Subsidiaries:	
7. Insurance Contact Information	
Title: Telephone: Fax:	
8. Insurance Carriers: Type of Coverage: Telephone	
_____ _____ _____	
_____ _____ _____	
_____ _____ _____	
_____ _____ _____	
9. Organization:	
Describe the nature of the work your company specialized in:	
☐ _____ ☐ _____	
☐ _____ ☐ _____	
☐ _____ ☐ _____	
☐ _____ ☐ _____	
☐ ☐	
10. Are any of the above services that you perform normally subcontracted to others? ☐ Yes ☐ No	

11. Health and Safety Performance			
a) Are any of the above services that you perform normally subcontracted to others?	☐ Yes	☐ No	
b) Can you provide a Workplace Safety & Insurance Clearance Certificate?	☐ Yes	☐ No	
c) Is your company experience rated (CAD-7, NEER)? If yes attach CAD-7 reports for the last 3 years and go to item e). If no, complete item d).	☐ Yes	☐ No	
d) Has an employee of your company suffered a fatal accident or "critical injury" as defined by the *Ontario Occupational Health & Safety Act*? Please provide for the last 3 years: i) total number of lost time accidents by rate group, ii) total number medical aid accidents, iii) total number of hours worked by each rate group	☐ Yes	☐ No	
e) Has your company ever been subjected to a Workwell Audit? If yes, what was your final score? _____	☐ Yes	☐ No	
f) Are there judgements, claims or suits pending or outstanding against your company?	☐ Yes	☐ No	
g) Have you received any regulatory (MOL, MOE, etc.) orders and/or prosecutions in the last 3 years? If yes, provide details of all prosecution and fines for the past 3 years on a separate sheet.	☐ Yes	☐ No	
h) Do you have involvement in provincial safety associations such as the Infrastructure Health & Safety Association (IHSA) and/or Workplace Safety & Prevention Services (WSPS)? If yes, please name:	☐ Yes	☐ No	
_____			
_____			

12. Health and Safety Program and Procedures:			
a) Do you have a written health and safety policy? If yes, include a copy.	☐ Yes	☐ No	
b) Do you have a written health and safety program?	☐ Yes	☐ No	
c) If so, are the following elements addressed?	☐ Yes	☐ No	
i. Participation by all levels in the organization	☐ Yes	☐ No	
ii. Accountabilities & responsibilities for managers, supervisors and employees	☐ Yes	☐ No	
iii. Adequate resourcing for meeting health and safety requirements	☐ Yes	☐ No	
iv. Hazard identification and control	☐ Yes	☐ No	
v. Health and safety performance measurement and evaluation	☐ Yes	☐ No	
vi. Corrective actions implementation	☐ Yes	☐ No	

13. Health and Safety Program: Does the health and safety program include procedures and practice documents such as:			
a) Hazardous Energy Control, Lock-out – Tag-out	☐ Yes	☐ No	

b) Confined Space Entry	☐ Yes	☐ No	
c) Working at Heights, Fall Protection	☐ Yes	☐ No	
d) Personal Protective Equipment (PPE)	☐ Yes	☐ No	
e) Portable / Electric Power Tools			
f) Vehicle Safety	☐ Yes	☐ No	
g) Compressed Gas Cylinders	☐ Yes	☐ No	
h) Electrical Equipment Grounding Assurance	☐ Yes	☐ No	
i) Powered Industrial Vehicles (forklifts, cranes, etc.)	☐ Yes	☐ No	
j) Heavy Construction Equipment (excavators, backhoes, bulldozers, etc.)	☐ Yes	☐ No	
k) Excavation and Trenching	☐ Yes	☐ No	
l) Housekeeping	☐ Yes	☐ No	
m) Accident / Incident Reporting and Investigation	☐ Yes	☐ No	
n) Hazard / Unsafe Condition Identification, Reporting and Communication	☐ Yes	☐ No	
o) Workplace Hazardous Materials information System (WHMIS)	☐ Yes	☐ No	
p) Emergency Action Plan / Evacuation Plan	☐ Yes	☐ No	
q) Spill Response / Reporting	☐ Yes	☐ No	
r) Respiratory Protection	☐ Yes	☐ No	
s) Designated Substances Management	☐ Yes	☐ No	
t) Waste Staging / Disposal	☐ Yes	☐ No	
u) Traffic Control	☐ Yes	☐ No	
v) Hearing Conservation	☐ Yes	☐ No	
14. Do you have a policy/procedure for terminating contracts of subcontractors who do not comply with the requirements of the *Occupational Health & Safety Act,* associated regulations and / or company safety rules?	☐ Yes	☐ No	
15. Do your employees read, write and understand English to the degree that they can safely perform their tasks without the aid of an interpreter? (*If no, provide a description of your plan to assure that they can safety perform their tasks*)	☐ Yes	☐ No	
16. Do you have personnel certified in Emergency First Aid and CPR on site? If yes, provide copies of certificates of training for site personnel proposed for the project?	☐ Yes	☐ No	
17. Do you have First Aid kits available to your staff?	☐ Yes	☐ No	
18. Does your company use a formalized Health and Safety Plan for conducting large projects?	☐ Yes	☐ No	
19. Does the company conduct pre-placement medical examinations?	☐ Yes	☐ No	
20. Is task-adequate PPE provided to workers?	☐ Yes	☐ No	

21. Are employees trained in PPE care, use and maintenance?	☐ Yes	☐ No	
22. Do you have a corrective actions process for addressing individual health and safety performance deficiencies	☐ Yes	☐ No	
23. Equipment and Manuals:			
a. Do you conduct inspections on operating equipment (e.g. excavators, cranes, forklifts, vehicles, etc.) as per regulatory requirements?	☐ Yes	☐ No	
b. Do you maintain operating equipment in compliance with regulatory requirements?	☐ Yes	☐ No	
c. Do you maintain applicable pre-use inspection and maintenance certification records for operating equipment?	☐ Yes	☐ No	
d. Are records available upon request	☐ Yes	☐ No	
24. Subcontractors			
a. Do you use health and safety performance criteria in the selection of contractors?	☐ Yes	☐ No	
b. Do you require your subcontractor to have a written health and safety program?	☐ Yes	☐ No	
c. Are your subcontractors included in	☐ Yes	☐ No	
i. health and safety orientation	☐ Yes	☐ No	
ii. health and safety meetings	☐ Yes	☐ No	
iii. workplace inspections	☐ Yes	☐ No	
iv. health and safety audits	☐ Yes	☐ No	
d. Does the company have a policy for the termination of contracts of subcontractors who do not comply with the Occupation Health and Safety Act, regulations under the Act, contractor rules, programs, protocols policies or procedures?	☐ Yes	☐ No	
e. Does the company have a progressive discipline policy for employees and subcontractors?	☐ Yes	☐ No	
25. Health and Safety Training			
a. Are you aware for the regulatory training requirements for your employees?	☐ Yes	☐ No	
b. Have your employees received the required health and safety training?	☐ Yes	☐ No	
c. Do you have specific health and safety training for supervisors?	☐ Yes	☐ No	
d. Do you keep records of health and safety training for employees?	☐ Yes	☐ No	
e. Are records of health and safety training available on request?	☐ Yes	☐ No	
26. Job Skills			
a. Have employees been trained in appropriate job skills?	☐ Yes	☐ No	
b. Are employee job skills certified where required by regulation or industry standard?	☐ Yes	☐ No	

c. Are certificates available upon request? ☐ Yes ☐ No

27. Health and Safety Supervision

a. Does the company have a health & safety coordinator? ☐ Yes ☐ No

b. Who is the highest ranking safety professional in the company ☐ Yes ☐ No

I agree that the above information is true and correct to the best of my knowledge. I also agree to follow all terms and conditions of the Contractor Safety Program at all times while performing work for ONTC. I understand that supporting documentation may be requested for due diligence verification purposes.

Name: (Please print) _____ Title: _____

Signature: _____ Date: _____

APPENDIX F - ONTC TRAIN SERVICE PLAN / PROPOSED NORTHLANDER SERVICE SCHEDULE

The attached Train Service Plan is in effect and is subject to change.

Train Service Plan

Effective on or about
Apr 30th, 2023

revision to 214 ord time - 313/514 - 419 ord time

Northward Direction | **Southward Direction**

No 451 SMTWTFS				No 450 SMTWTFS
?	Dpt	Toronto (Mac Yard)	Arr	?
11:30	Arr	North Bay	Dpt	21:00

No 113 --TWTFS				No 214 --TWTFS
13:00	Dpt	North Bay	Arr	11:30
			Dpt	07:00
17:00	Arr	Englehart	Ord	06:30

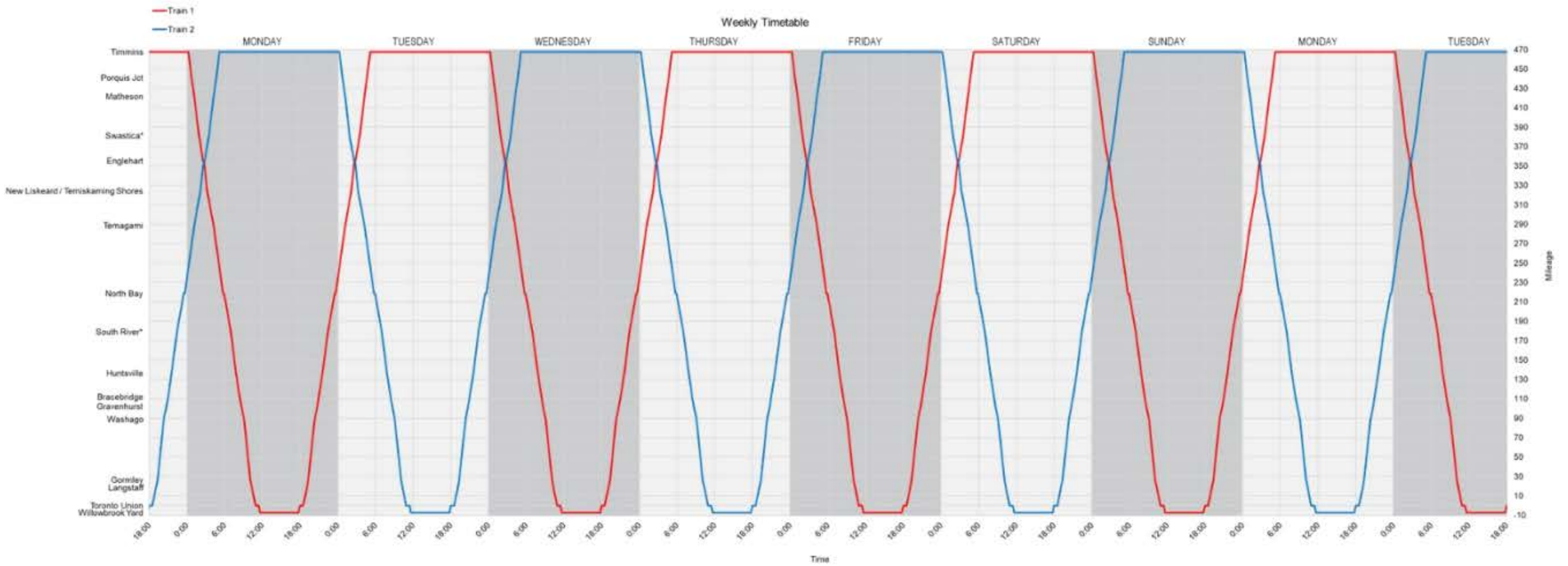
No 211 SMTWTF-	No 213 -M-W-F-	No 207 S-T-T--			No 308 S-T-T--	No 414 -M-W-F-	No 512 SMTWTF-
13:00	12:30	04:30	Ord	Englehart	14:00	21:30	22:30
13:30	13:00	05:00	Dpt				
16:30			Arr	Noranda	Dpt		19:30
				Porquis			
		08:30	Arr	Kidd	Dpt	10:30	
				Cochrane	Dpt		
	16:45		Arr		Ord	17:30	

No 313 S-T-T--					No 514 -M-W-F-
13:00	Ord	Cochrane	Arr		12:00
13:30	Dpt				
16:30	Arr	Kapuskasing	Dpt		09:00
17:00	Dpt		Arr		08:30
			Dpt	Hearst	06:30
19:00	Arr		Ord		06:00

not to be ordered before 0600

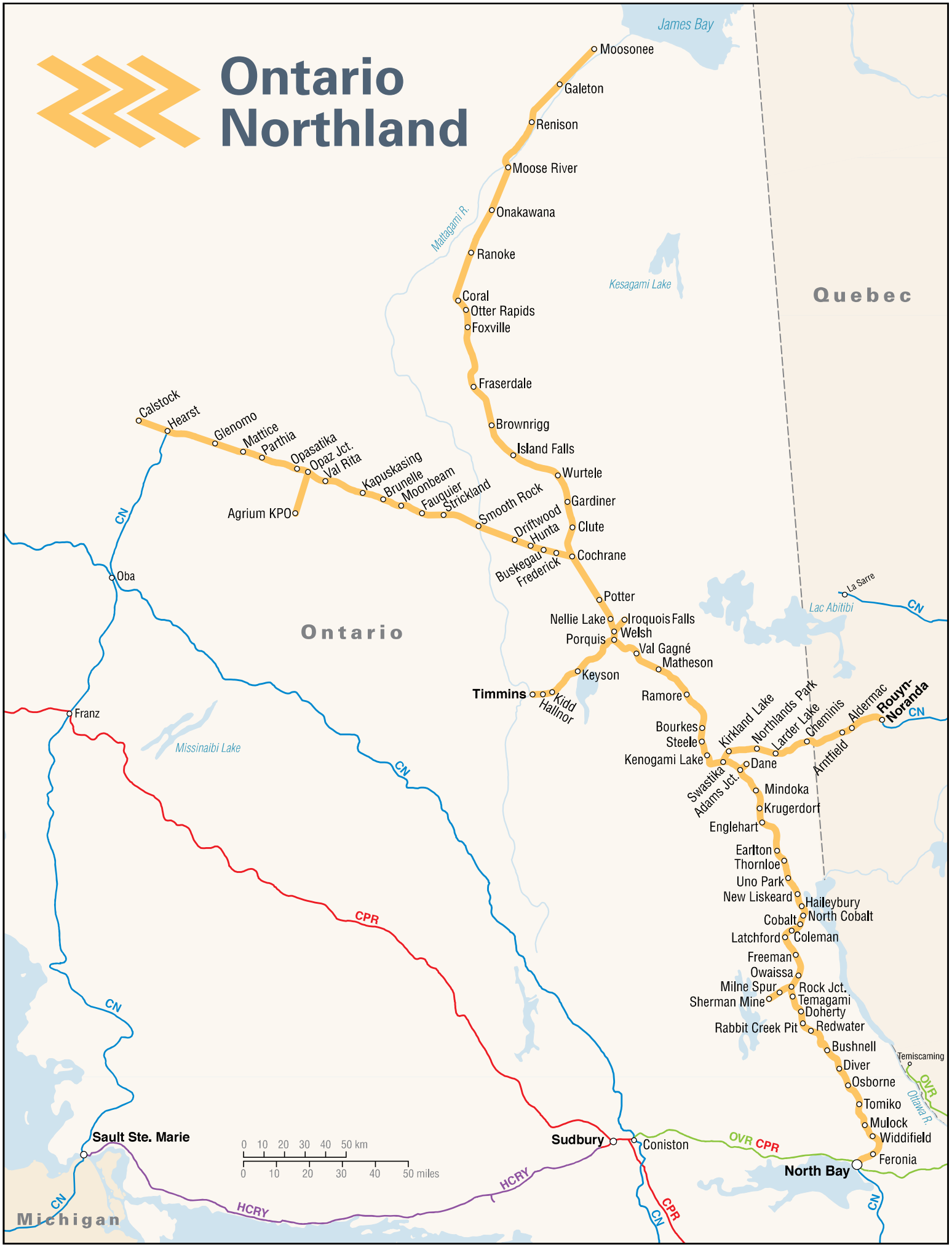
Polar Bear Express | **Polar Bear Express**

Freight	June 25, 2023 to Oct 20, 2023	Oct 17, 2022 to June 23, 2023			Oct 17, 2022 to June 23, 2023	June 25, 2023 to Oct 20, 2023	Freight
No 419 -M-W-F-	No 423 SMT-TF-	No 421 -MT-TF-			No 622 -MT-TF-	No 624 SMT-TF-	No 620 -M-W-F-
00:01	08:00	08:00	Ord	Cochrane	22:00	22:00	23:30
00:30	09:00	09:00	Dpt				
					17:00	17:00	18:30
05:30	14:00	14:00	Arr	Moosonee	16:15	16:15	18:00


Train 1
Train 2
Weekly Timetable
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
SUNDAY
MONDAY
TUESDAY
Timmins
Porquis Jct
Matheson
Swastica*
Englehart
New Liskeard / Temiskaming Shores
Temagami
North Bay
South River*
Huntsville
Bracebridge
Gravenhurst
Washago
Gormley
Langstaff
Toronto Union
Willowbrook Yard
Time
Mileage

APPENDIX G - ONTC MAP

The attached map represents ONTC's 700-mile system. Work may take place anywhere on this system.


Ontario Northland
James Bay
Moosonee
Galeton
Renison
Moose River
Onakawana
Ranoke
Mattagami R.
Kesagami Lake
Quebec
Coral
Otter Rapids
Foxville
Fraserdale
Brownrigg
Island Falls
Wurtele
Gardiner
Clute
Cochrane
Potter
Smooth Rock
Driftwood
Hunta
Buskegau
Frederick
Strickland
Fauquier
Moonbeam
Brunelle
Kapuskasing
Agrium KPO
Opasatika
Opaz Jct.
Val Rita
Parthia
Mattice
Glenomo
Hearst
Calstock
CN
Oba
Ontario
Franz
Missinaibi Lake
CN
CPR
CN
CN
Sault Ste. Marie
Michigan
HCRY
HCRY
0 10 20 30 40 50 km
0 10 20 30 40 50 miles
Sudbury
Coniston
OVR CPR
CPR
CN
North Bay
CN
Feronia
Widdifield
Mulock
Tomiko
Osborne
Diver
Bushnell
Temiscaming
OVR
Ottawa R.
Redwater
Rabbit Creek Pit
Doherty
Temagami
Rock Jct.
Milne Spur
Sherman Mine
Owaissa
Freeman
Coleman
Latchford
North Cobalt
Cobalt
Haileybury
New Liskeard
Uno Park
Thornloe
Earlton
Englehart
Krugerdorf
Mindoka
Swastika
Adams Jct.
Dane
Kenogami Lake
Steele
Bourkes
Ramore
Matheson
Val Gagné
Welsh
Porquis
Iroquois Falls
Nellie Lake
Timmins
Kidd
Hallnor
Keyson
Lac Abitibi
La Sarre
CN
Rouyn-Noranda
CN
Aldermac
Arntfield
Cheminis
Larder Lake
Northlands Park
Kirkland Lake

APPENDIX H - TRACKS UNIT HANDLING EQUIPMENT CAPACITY CHART

Ontario Northland

TRACK UNIT HANDLING EQUIPMENT - CAPACITY CHART

DATE: _____

OPERATOR: *(print name)*	**SIGNATURE:**
HELPER: *(print name)*	**SIGNATURE:**
FOREMAN / EMPLOYEE IN CHARGE: *(if applicable -- print name)*	**SIGNATURE:**

Review and complete the checklist on opposite page each time cars are added or setout.

- Document must be retained for at least 30 days as part of your job briefing.

- *Helper* must review and sign for the document to be considered complete.

- Only Operators who have successfully completed the required *Track Unit Handling Equipment and Air Brake Training* are permitted to move rail cars.

- Operators **MUST** have access to the subdivision schematics, including all track grades expected along the route.

- Train line air **MUST** be used when moving cars.

- Operators **MUST** adhere to "Track Unit Speed" as per ON's CROR.

- A maximum of 2 railcars may be handled simultaneously by a track unit handling equipment under normal operations. Handling 3 - 5 railcars may only be made with prior approval from The Director, Rail Infrastructure.

Chart indicates maximum number of rail cars that may be handled (empty or loaded) by various track units, based on track grade and rail conditions.

TRACK UNIT HANDLING EQUIPMENT LIMITATION ON CARS BASED ON MAXIMUM GRADE

TRACK UNIT TYPE		Rail Condition	0%	0.50%	1.00%	1.50%	2.00%	2.50%
Boom Truck w/ Knuckle		Dry or Wet	2 cars					
Brandt Truck		Dry	5 cars	5 cars	5 cars	4 cars	3 cars	2 cars
		Wet	5 cars	5 cars	4 cars	3 cars	2 cars	1 cars
Brandt Tool with Rear Engine	5 mph	Dry or Wet	2 cars	2 cars	1 car	1 car	0 cars	
Brandt Tool with Rear Engine	10 mph	Dry or Wet	2 cars	2 cars	1 car	0 cars		
Brandt Tool with Rear Engine	15 mph	Dry or Wet	2 cars	1 car	0 cars			
Brandt Tool with Rear Engine	20 mph	Dry or Wet	2 cars	0 cars				
Brandt Tool w/o Rear Engine	5 mph	Dry or Wet	1 car	1 car	1 car	1 car	0 cars	
Brandt Tool w/o Rear Engine	10 mph	Dry or Wet	1 car	1 car	1 car	0 cars		
Brandt Tool w/o Rear Engine	15 mph	Dry or Wet	1 car	1 car	0 cars			
Brandt Tool w/o Rear Engine	20 mph	Dry or Wet	1 car	1 car	0 cars			
Trackmobile 11 with Weight Transfer		Dry	5 cars	5 cars	5 cars	5 cars	4 cars	3 cars
		Wet	5 cars	5 cars	5 cars	4 cars	3 cars	3 cars
Trackmobile 11 without Weight Transfer		Dry	5 cars	5 cars	4 cars	3 cars	2 cars	2 cars
		Wet	5 cars	3 cars	3 cars	2 cars	2 cars	1 car
Trackmobile 5500 with Weight Transfer		Dry	5 cars	5 cars	5 cars	5 cars	5 cars	4 cars
		Wet	5 cars	5 cars	5 cars	5 cars	4 cars	3 cars
Trackmobile 5500 without Weight Transfer		Dry	5 cars	5 cars	4 cars	3 cars	3 cars	2 cars
		Wet	5 cars	4 cars	3 cars	3 cars	2 cars	2 cars

Ontario Northland

TRACK UNIT HANDLING EQUIPMENT - OPERATING CHECKLIST

- Equipment must never be handled without all air brakes coupled and operational.

- The Track Unit must only be used to handle Infrastructure related equipment and must not be used to handle occupied service equipment.

- Caution must be used approaching all public and private road crossings giving the Right of Way to road traffic.

- The Track Unit must not be operated on the rail without the amber flashing light in the ON position.

- A *No. 1-A Brake Test* must be completed by Track Unit Operator.

Complete checklist below and retain as part of job briefing.

LEAKAGE TEST

	Check Box
Fully charge cut of cars (15 min.)	☐
Place accurate pressure gauges on rear glad-hand and slowly open angle cock.	☐
Gauge should read approximately 90 PSI.	☐
Initiate a 15 PSI brake pipe reduction to apply brakes	☐
Observe hand gauge reading – it should read 75 PSI.	☐
Cut out brake valve on track unit or close angle cock between RCM and first car.	☐
Wait 1 minute and measure brake pipe leakage rate on hand gauge for 1 minute.	☐
Allowable leakage to be no more than 5 PSI per minute on hand gauge.	
If leakage is greater than 5 PSI per minute, repair or set out defective car.	☐
Cut in track unit brake valve or open angle cock between track unit and first car.	☐

BRAKE APPLY and RELEASE TEST - PROCEDURE VERIFY

	Check Box
Confirm handbrakes are fully released, install hand gauge on glad-hand of the last car.	☐
Initiation a brake reduction of 26 PSI or full service brake application.	☐
Walk cars and observe brake pistons fully extended (brake applied).	☐
Release Brakes - observe pistons fully retracted.	☐
Initiate emergency brake application - confirm 0 PSI on gauge and brake applied.	☐
Remove hand gauge - close angle cock of rear car and recover emergency application.	☐

Do the tests pass? **YES** ☐ **NO** ☐

- A Brake Status Report must be completed by the Track Unit Operator whenever a Track Unit Handling Equipment is on track.
- Brake Status Reports must be maintained throughout each tour of duty and filed for the duration of their cycle.

Operations are contingent upon the Track Unit's capacity to safely handle the total combined weight of the railcars adhering to the capacity chart.

☐ **1 Car** ☐ **2 Cars** ☐ **3 Cars**
☐ **4 Cars** ☐ **5 Cars**

Per Infrastructure Special Instructions 6.1, a running brake test (DTS) must be made by the Operator after setting on the track and after lifting equipment. Multiple brake tests may be required depending on conditions.

DISTANCE TO STOP (DTS) TEST(S)

Must be documented below and retained for the duration of the cycle.

TIME	LOCATION (Mileage, Subdivision)	ORIENTATION OF TRAVEL F = Forward R = Reversed	OPERATING SPEED	BRAKING DISTANCE	PAYLOAD (e.g., all loaded, all empty, 1 loaded and 1 empty)	RAIL CONDITION (e.g., frost, wet, snow, ice, leaves)	DIRECTION OF TRAVEL (N or S)

APPENDIX I - CWR LAYING AND DESTRESSING FORM

2025 Rail Program **CWR Laying and Destressing Record** **Subdivision:** _____

Mile	E or W Side	Date	String No.	Rail Weight	Manufacturer	Year	Actual Rail Temp.	Temp Destress to	Rail legnth ft	GPS Location	Remarks

APPENDIX J - POLICIES AND PROCEDURES

The Successful Proponent will be required to adhere to the following ONTC Policies and Procedures while under contract with ONTC, and which are attached to this Appendix J.

TITLE
Industrial Operations Fire Prevention and Preparedness Plan
SIG-8 - Reporting Damage to Signals Components
ONTC Fit for Duty Policy
JP/IS - 5 Job Procedure - Setting Track Units On or Off at Road Crossings
Sub-Part C - Track Geometry Management Plan
Appendix G - Ontario’s Industrial Operations Protocol on Fire Prevention and Suppression
ONTC Blue Signals/Flags Procedure

Appendix G. Ontario's Industrial Operations Protocol on Fire Prevention and Suppression

a) Fire Suppression Equipment

If mechanical equipment is operating on the site, a serviceable fire extinguisher must be located on each piece of equipment or within 5 metres of it. The purpose of the fire extinguisher is to put out fires starting on the equipment itself.

Wildland fire suppression equipment may also be required on an operation. Unless deemed low risk, a backpack pump is required on or within 30 m of every piece of heavy machinery and at the location of any hot work. A serviceable pressurized water delivery system located on a machine can replace the requirement for a backpack pump. A backpack pump consists of a flexible or rigid container containing at least 18 litres of water with a short rubber hose and a single action hand pump to disperse the water. They must be immediately available to take quick action on a small fire while they can still be effective. Figure Appendix G – 1 identifies the number of backpack pumps that are required depending on the industrial operation or activity.

As the number of pieces of heavy machinery increases in the operation, additional fire suppression equipment may be required. Equipment caches, or units of fire equipment, must be stored in a central location within a 10 km radius of the operation(s) and available to be transported quickly to any worksite when a fire is detected. These equipment caches must consist of a minimum of a pumping unit (which includes intake and output hose, tools and gas) and at least 3 shovels and other fire suppression equipment that the industry may have in place. Figure Appendix G – 1 describes the fire suppression equipment required according to the operation. Staff must know how and where to access the equipment and how to use the equipment once at the worksite. The equipment must be checked on a regular basis to ensure that it is in working order.

Operation Type	Backpack Pump Requirements	Additional Suppression Equipment Requirements
10 or more pieces of heavy machinery being operated within a 10 km radius if no more than 5 are equipped with tire chains, metal tracks or skids.	1 per machine located on or within 30 metres of where the machine is being used, or 1 pressurized water delivery system per machine	1 fire equipment cache containing at least one pumping unit and 3 shovels
6 or more pieces of heavy machinery being operated within a 10 km radius equipped with tire chains, metal tracks or skids.	1 per machine located on or within 30 metres of where the machine is being used, or 1 pressurized water delivery system per machine	1 fire equipment cache containing at least one pumping unit and 3 shovels
Hot work	1 per hot work operation, located within 3 metres of the operation	None required
Rail cutting, welding or grinding, thermite welding, switch crossing grinding	1 per operation located within 3 metres of the operation	If fire intensity code is A, B or C, a water delivery system with a minimum of 90 gallons of water onsite
Rail production grinding	4 per grinding operation	A water delivery system with a minimum of 1000 gallons of water onsite

Figure Appendix G – 1 – Suppression Equipment Required by Operation

b) Fire Suppression Capabilities

Anyone working in a forest area that is expected to use fire suppression equipment must be trained to use that equipment. Operations that meet the “trained and capable” standard outlined below may qualify to work longer during higher fire danger periods and not have to modify their operations as often or as significantly, as they should be trained and capable to respond to any fires that start.

"Trained and Capable" operations must meet each of the following criteria:

1. **Prevention**: Implementation of an effective prevention program for the type of operation, as outlined in the fire plan.

2. **Suppression**: Fire suppression equipment onsite to meet the minimum requirements laid out in Table 1.

3. **Communication**: The ability to communicate and report fires immediately and to obtain updated information on the fire danger.

4. **Immediately** means two-way radio or telephone capabilities from the site to the company or local MNRF Fire Management Headquarters.

5. **Training**: A minimum 25% of all staff involved in industrial operations on the worksite must be trained and proficient to the MNRF SP105 standard if an equipment cache is not required or to the SP106 standard if an equipment cache is required.

- Industry will implement refresher training to ensure that their staff are proficient with the material covered within the SP105 and SP106 course.

Operations that do not meet all of the above criteria will be considered to be not trained and capable operations and their operations may be restricted more frequently as the fire danger increases.

c) Communications

Communication capabilities are essential to ensure an appropriate response to a wildfire, and to obtain the most current information for determining the requirement for operational modifications or mitigation efforts.

Ontario Northland staff must be able to contact the RTC office so they may contact the MNRF to report fires. This communications link must also function in both directions as MNRF staff may need to provide our personnel with updated hazard information or contact them to obtain additional information. While a direct link is preferred, in some cases, our field operations will have to communicate with MNRF through the RTC and vice versa. The fire plan clearly lays out the procedure along with pertinent phone numbers and contact names.

Our “Fire Plan” is updated and distributed across the system each year prior to the start of each fire season. It is also available through your SharePoint (‘OneDrive’).

d) Determining Modifications and Mitigations to Industrial Operations

When the worksites are snow free, our must be modified, or mitigation steps taken as fire danger increases to reduce the risk of igniting a wildland fire. The steps in determining when and how operations should be modified or mitigated by considering the fire hazard and risk of ignition from the operations include:

1. **Determine the Fire Risk Category (Appendix G (e))** of the operations being conducted.

2. **Consider Mitigation of Operations to Lower the Fire Risk Category**.

3. **Determine the Forest Fire Fuel Group** at the worksite.

4. **Determine the Fire Intensity Code** for the next day.

5. **Determine the Operational Modifications** for the next day.

The following provide details and background information regarding each of these steps.

A field guide to the industrial operations protocol is available from your supervisor and contains the tables and charts required for daily interpretation and application of the protocol in the field.

e) Determine the Fire Risk Category of the Operation

Operations are categorized into four levels of operational risk:

- Very High Fire Risk Operations
- High Fire Risk Operations
- Moderate Fire Risk Operations
- Low Fire Risk Operations

The fire risk categories are based on the potential for the operation to create a spark (e.g., presence of stones or bedrock when using heavy machinery equipped with metal parts that may come in contact with the stones), or other sources of ignition (e.g., hot work).

Operational modifications (i.e., restrictions on hours of work) are not required for low fire risk operations unless extreme fire danger or a wildland fire event requires forest closure or an Emergency Area Order restricting access to some areas of the forest.

Figures Appendix G – 1, 2 and 3 outline the fire risk for common industrial operations on sites with surface stoniness of <15% and >15% respectively. If the operation in question is not included in Figures Appendix G – 1, 2 and 3, you are to contact the Manager, Standards Compliance and Training, your supervisor or you may contact the local Fire Management Supervisor (FMS) for advice in determining the fire risk category of that operation.

Any operation working exclusively on mineral soil, clay or gravel (e.g., on roads and landings, where there is no continuous fuel component) is classified as low risk.

However, in the case of hot work, there must be no forest fuel or other continuous flammable material within eleven metres of the hot work operation.

Operation - <15% Stoniness	Risk Category
▪ Hot work: welding, torch or saw cutting of metal and grinding, operations involving open flame ▪ Thermite welding ▪ Rail production grinding ▪ Switch crossing grinding ▪ Operation that uses heavy machinery equipped with metal parts that may come into contact with rocks or similar material in the normal course of operation and cause a spark, e.g., equipment with tire chains or metal tracks or skids such as rubber-tired skidders with chains, bulldozers or drill rigs; machines with rotary cutting heads; mechanized site preparation; mechanical tending with chain flails and mowers; hydro-axe ▪ Geophysical surveys using a power generator (e.g., induced polarization)	High Fire Risk Operations
▪ Blasting without mats ▪ Delimbing, slashing felled trees with heavy machinery ▪ Slash piling ▪ Using a portable sawmill ▪ Stripping of the forest floor and surface vegetation with heavy machinery ▪ Any drilling operation that does not use water as a coolant/flushing agent and where the area has not been cleared of the forest floor and surface vegetation.	Moderate Fire Risk Operations
▪ Building, spreading and shaping sub-grade with a backhoe or excavator ▪ Graveling/grading roads ▪ Bulldozer flattening of sub grade (mineral soil) ▪ Stream work: water crossing installation/ repairs, bridge work, stream rehabilitation ▪ Portable chipping ▪ Loading wood or gravel and hauling ▪ Using chainsaws or brush saws ▪ Blasting with mats ▪ Using all-terrain vehicles (wheels or rubber tracked) ▪ Using heavy machinery with rubber tires (no chains) ▪ Manual industrial operations (e.g., tree planting and tending, claim staking, line locating, surveying and manual stripping) ▪ Pitting and trenching with mechanical equipment, including the use of a channel saw, where the forest floor and surface vegetation has been removed for at least 3 metres from the site. ▪ Any drilling operation that uses water as a coolant/flushing agent or is carried out where the area has been cleared of the forest floor and surface vegetation The following railway operations: ▪ Surfacing, tie installation, under-cutting, gauging, spiking, gophering	Low Fire Risk Operations

Figure Appendix G – 2 – Fire Risk Categories / Surface Stoniness Less Than 15%

Operation - >15% Stoniness	Risk Category
▪ Operation that uses heavy machinery equipped with metal parts that may come into contact with rocks or similar material in the normal course of operation and cause a spark, e.g., equipment with tire chains or metal tracks or skids such as rubber-tired skidders with chains, bulldozers or drill rigs; machines with rotary cutting heads; mechanized site preparation; mechanical tending with chain flails and mowers; hydro-axe ▪ Stripping of the forest floor and surface vegetation with heavy machinery	Very High Fire Risk Operations
▪ Hot work: welding, torch or saw cutting of metal and grinding, operations involving open flame ▪ Thermite welding ▪ Rail production grinding ▪ Switch crossing grinding ▪ Blasting without mats ▪ Operations using a channel saw where the forest floor and surface vegetation has not been removed to a distance of at least 3 metres. ▪ Geophysical surveys using a power generator (e.g., induced polarization)	High Fire Risk Operations
▪ Delimbing or slashing with heavy machinery ▪ Portable sawmills ▪ Slash piling ▪ Building, spreading and shaping sub-grade with backhoe/excavator ▪ Operations using 3 or more brush saws ▪ Using heavy machinery with rubber tires (no chains) (e.g., forwarders, skidders) ▪ Drilling operations that do not use water as a coolant / flushing agent and where the area has not been cleared of the forest floor and surface vegetation	Moderate Fire Risk Operations
▪ Graveling/grading roads ▪ Bulldozer flattening of sub grade (mineral soil) ▪ Stream work: water crossing installation/ repairs, bridge work, stream rehabilitation ▪ Portable chipping ▪ Loading wood or gravel and hauling ▪ Operation using chain saws and/or no more than 2 brush saws ▪ Blasting with mats ▪ Using all-terrain vehicles (wheels or rubber tracked) ▪ Manual industrial operations (e.g., tree planting, claim staking, line locating, surveying, manual stripping) ▪ Pitting and trenching with mechanical equipment, including the use of a channel saw, where the forest floor and surface vegetation has been removed for at least 3 metres from the site. ▪ Any drilling operation that uses water as a coolant/flushing agent or where the area has been cleared of the forest floor and surface vegetation The following railway operations: ▪ Surfacing, tie installation, under-cutting, gauging, spiking, gophering	Low Fire Risk Operations

Figure Appendix G – 3 – Fire Risk Categories / Surface Stoniness Greater Than 15%

f) Mitigation of Operations to Lower Fire Risk Category

Certain measures can be taken to lower the fire risk of some operations. These will typically only be taken on operations where the worksite is very small as presoaking large areas is likely not cost effective.

During periods of elevated fire danger, some high or very high-risk operations, which occur on localized areas, can be conducted safely by mitigating the immediate worksite/work area to minimize the chance of causing a wildland fire. Mitigating the worksite can be done in a number of ways including removing flammable material in the area, modifying the flammable material so that it is no longer flammable (e.g., soaking with water/foam) or shielding the flammable material from sparks and other potential ignition sources. Another key part of mitigation is the organized patrolling of the area after the operation is complete while having immediate access to suppression equipment and a means of reporting any fires that are discovered.

The following mitigation activities will allow the fire risk category of operations other than hot work, rail production grinding and switch crossing grinding to be rated two fire risk categories lower (e.g., very high risk becomes moderate risk, high and moderate risk becomes low) before operational modifications are applied:

- Soak the operational area with water or a fire suppression foam mixture using backpack pumps or another water delivery system prior to commencing the operation.
- Keep the operational area in a wet condition during the operation.
- Assign at least one person to monitor the area during the operation to watch for possible fire ignitions and to take action on any fires that do ignite.
- After operations are complete, soak the operational area with water or a fire suppression foam mixture using backpack pumps or another water delivery system.
- Actively patrol the area for at least one hour after the operation has concluded. If a fire is discovered, notify RTC / MNRF and, if it safe to do so, extinguish any fires that are found.
- Ensure individuals monitoring the area or conducting patrols have the ability to immediately report a fire to RTC / MNRF and do so.

In addition to the measures described above, hot work, rail production grinding and switch crossing grinding also require the use of non-combustible shields designed to catch any and all material capable of igniting a fire. Taking all of these precautions will result in hot work, rail production grinding and switch crossing grinding being considered a moderate fire risk category operation.

It may be beneficial to plan to mitigate some operations because operations that are categorized as, or mitigated to, low risk do not require a fire prevention and preparedness plan, are not required to modify hours of work and do not require any additional fire suppression equipment. However, we must ensure that operations that require mitigation to categorize them as low risk fire operations must be mitigated or the requirements for our fire prevention and preparedness plan, fire suppression equipment and operational modifications apply.

g) Determine the Forest Fire Fuel Group

Fire danger is a general term used to describe the potential for wildland fires to start and spread. It is in part determined by the physical characteristics of the wildland fuels. The classification of wildland areas into general "forest fire fuel groups" is based on site characteristics and provides an initial indication of the potential fire behaviour, should a fire ignite.

Five forest fuel groups (Figure Appendix G – 4) have been developed using information from the 16 benchmark fuel types defined within the Canadian Forest Fire Behaviour Prediction (CFFBP) System. These fuel groups are used to classify the work area that will be operated on each day/shift at the forest stand or site level. The fuel group is determined by observing the nature of the stand/site, such as the amount and condition of conifer/deciduous vegetation, presence of understory vegetation, ladder fuels, etc. Site-specific forest fire fuel groups are determined using the forest fire fuel group decision keys found in your field guide or in Appendix C in the Industrial Operations Protocol on the Ontario MNRF website.

Fuel Group	Hazard Level	Description of Vegetation
1	Very Low	Deciduous species and live grass-dominated stands
2	Low	Deciduous dominated mixed woods (<35% conifer), spruce-lichen woodlands, mature red and white pine, conifer on peat/organic soils
3	Moderate	Mixed woods (35-64% conifer), mature jack pine and self-thinned and pruned spruce
4	High	Mature upland boreal spruce without conifer understory, conifer plantations and mixed wood stands with >64% conifer
5	Very High	Mature upland boreal spruce with conifer understory, natural immature conifer stands, mixed wood stands with dead balsam fir, cured grass and slash-dominated sites

Figure Appendix G – 4 – Forest Fire Fuel Group Descriptions

If the work area is made up of more than one fuel group, use the highest fuel group that represents at least 20% of the work area. (e.g., work area is made up of 25% fuel group 2, 50% fuel group 3 and 25% fuel group 4 – use forest fire fuel group 4 to determine modifications). Alternatively, the modifications can be determined for each fuel group and applied to each fuel group area as the operation progresses through them.

Seasonal Conditions Adjustment to Fuel Group

Seasonal conditions, spring (leaf-off) and summer (leaf-on), also play a role in determining the appropriate fuel group to use (e.g. determining the fuel group to be a higher or lower hazard). Use the latest MNRF "*Industrial Fire Intensity Code Report*" available on the Ontario government internet at http://www.ontario.ca/environment-and-energy/fire-intensity-codes , to determine if the weather station representing the worksite area is in leaf off (spring) or leaf on (summer) conditions, or contact the local Fire Management Headquarters.

Site specific keys (found in your field guide or in Appendix C in the Industrial Operations Protocol on the Ontario MNRF website) provides a number of decision keys to determine the appropriate forest fire fuel group to use. They provide for applicable adjustments (+1/-1) to raise or lower the forest fire fuel group based on seasonal conditions and understory plants to determine the final fuel group.

h) Determine the Fire Intensity Code

Another important factor in determining fire danger is weather, which in combination with wildland fuel type determines the ease of ignition, rate of spread, and difficulty of control of a wildland fire. This protocol uses the Fire Intensity Code (FIC) as the key indicator of rate of spread and difficulty of control and therefore overall danger if a wildland fire should start. Fire intensity is directly related to suppression difficulty and the need to prevent and extinguish fires as soon as possible.

The fire intensity codes range from A (highest), through to E (lowest).

Fire Intensity Code	Level of Fire Danger	Fire Type (fire characteristics) (Typical suppression tools and tactics)
A	Extreme Fire Danger	Continuous crown fire, medium to long range spotting, major fire runs possible • Indirect attack and burn-out operations
B	Very High Fire Danger	Intermittent and continuous crowning • Indirect attack and burn-out operations
C	High Fire Danger	Intermittent crown fire with spotting • Pumps on flanks, air tankers/ bucketing on head
D	Moderate Fire Danger	Surface fire with torching • Pumps and hose with air support (bucketing or tankers)
E	Low Fire Danger	Smouldering and creeping • Hand tools and backpack pumps

Figure Appendix G – 5 – Fire Intensity Code Relation to Potential Head Fire Intensity and Suppression Capability

The available report shows each MNRF weather station, whether the area is considered in leaf on or leaf off conditions and the calculated fire intensity code for each fuel group. The MNRF will normally publish the Fire Intensity Code reports by 4 pm EDT by the following methods:

- **Internet**: http://www.ontario.ca/environment-and-energy/fire-intensity-codes
- **Telephone**: Fire Management Headquarters in each MNRF district will provide a recorded telephone message containing the Fire Intensity Codes by fuel group and weather station. The following link will provide contact information for the Fire Management Headquarters across the fire region. http://www.ontario.ca/page/fire-management-offices

These codes are distributed across the system during the fire season, in addition, the fire indices contact the weather station applicable to the mileage operations are taking place as it relates to the fuel group. It is the responsibility of staff to know the fire intensity codes for the weather stations used by each worksite daily. If the fire intensity code report is not available, the local Fire Management Headquarters must be contacted to obtain the fire intensity codes.

i) Determining Operational Modifications

Fire Risk Category	Fire Intensity Code	Work Modifications **Not** Trained **and / or** **Not** Capable	Work Modifications Trained **and** Capable
Very High-Risk Operation	**A**	**SD**	**SD**
	B	**SD**	**RS**
	C	**SD**	**SS**
	D	**P**	**P**
	E	**P**	**P**
High Risk Operation	**A**	**SD**	**RS**
	B	**SD**	**SS**
	C	**SS**	**P**
	D	**P**	**P**
	E	**P**	**P**
Moderate Risk Operation	**A**	**SD**	**SS**
	B	**SS**	**SS**
	C	**P**	**P**
	D	**P**	**P**
	E	**P**	**P**
Low Risk Operation	**A, B, C, D & E**	**P**	**P**

Figure Appendix G – 6 – Fire Intensity Codes and Work Modifications per Risk

P = Prevention (Normal Operations)
Wildfire prevention is a part of normal operations and at a minimum, the requirements identified in the Forest Fires Prevention Act and Outdoor Fires Regulation must be followed. These should be identified in the operation's fire plan if one is required.

SS = Short Shift
Operations are not permitted between 1200 and 1900 hrs local daylight savings time. Prevention measures still apply and a dedicated patrol* of the area must be carried out for one hour after operations shut down. Workers conducting the dedicated patrol must immediately report fires that are detected.

RS = Restricted Shift
Operations are not permitted between 0800 and 2200 hrs local daylight savings time. Prevention measures still apply and a dedicated patrol* of the area must be carried out for one hour after operations shut down. Workers conducting the dedicated patrol must immediately report fires that are detected. Water sources close to operations should be identified prior to commencing any operations.

SD = Shutdown
Operations are not permitted starting at 0600 hrs local daylight savings time on the first day of shutdown. Operations will remain suspended until conditions change, and Prevention, Short Shift or Restricted Shift is indicated. Prevention measures still apply and a dedicated patrol* of the area must be carried out for one hour after operations cease. Workers conducting the dedicated patrol must immediately report fires that are detected. Once this initial patrol is complete, lower risk operations working in the vicinity can offer dedicated fire patrols during the shutdown period.

*Personnel assigned to patrol a worksite are expected to move as much as required to continually assess the entire worksite for fires. If a fire is discovered, they are required to first notify RTC / MNRF of the fire and its location and then, if it is safe to do so, try to extinguish the fire.

Reissued: September 20, 2021

To: All Infrastructure Department Employees

SIG – 8
Reporting Damage to Signals Components

There have been incidents over past winter and summer work seasons where Signal Department equipment was damaged, likely by Snowfighter wings or track equipment. The extent of the damage was NOT reported at the time and in some cases unauthorized repairs were made that were discovered later by Signals staff. ALL Infrastructure employees are reminded that ANY damage to Signals equipment, whether it be in-track or wayside components, MUST be promptly reported to either the Maintainer or Technician on that territory or to the S&C Manager directly. Safety at crossings and properly working detector equipment is critical to our railway. In addition, any attempt to make emergency repairs without the involvement of Signal department personnel could result in inoperative signals that may not be detected until after an incident occurs.

Please note, the directive to report any failures or damaged caused by the public remains in place. We all depend on this equipment for our own and the public's safety.

The contact number and territories for all Signals staff is as below.

Kurtis Westbrook – Signal Maintainer (Cochrane to Hearst)
(Cell) 705-266-3421

Vacant - Signal Maintainer (Mi.56.5 to 109.3 Ramore Sub, Devonshire Sub)
(call the Relieving Signal Maintainer for the interim)

Austin Talbot - Signal Maintainer (Englehart to North Bay)
(Cell) 705-303-2387

Shawn Harman - Signal Maintainer (Englehart - Rouyn – Mi 32 RSD)
(Cell) 705-544-3046

Mike Emmell – Relieving Signal Maintainer (System-wide relief)
(Cell) 705-544-3343

Craig Jennings – Signal & Communication Technician (AEI Readers, Train Radio)
(Cell) 705-679-3041

Michael Rennie, Manager Signals & Communications (Cochrane)
(Office) 705-272-5338 ext. 620
(Cell) 705-271-6588

M. Rennie
Manager, Signals & Communications

DATE FORMALIZED January 18, 2019 REVISION DATE: June 10, 2024	FIT FOR DUTY POLICY	Policy Reference 6-ZD

POLICY STATEMENT

No person under the influence, or carrying, intoxicating liquor / a drug or narcotic substance, or experiencing the secondary effects of same shall enter or knowingly be permitted to enter and / or use Ontario Northland property, facilities, equipment or vehicles.

PURPOSE

Ontario Northland is committed to the safety and well-being of our Employees, our customers, other individuals affected by the actions of our Employees, the public, and the environment. Further, Ontario Northland complies with legislated requirements, and is committed to the prevention of illegal activities within our operations. Every Employee of Ontario Northland has a responsibility to safeguard the trust and safety of the public by ensuring compliance with this Policy.

This Policy is intended to:

- establish Ontario Northland's standards and expectations with respect to be fit for duty;
- clarify the respective responsibilities of Ontario Northland and its Employees to ensure an drug and alcohol-free working environment;
- outline the consequences for non-compliance with this Policy;
- provide consistent guidelines for all Employees to follow;
- identify, assist and where appropriate, accommodate Employees who may have substance use disorders (including for example a drug and/or alcohol related dependency);
- identify, assist and where appropriate, accommodate Employees who may have a medical condition requiring a prescribed medication with the potential to impact fit for duty;
- implement appropriate remedial or corrective action for Employees who violate this Policy, noting that each case will be assessed on its individual merits;
- this policy supplements, but does not modify the General Safety Rule 1.1, Canadian Rail Operating Rules (C.R.O.R) Rule G. Nothing in this policy reduces the requirements of Rule G.

1.0 SCOPE

1.1 EMPLOYEES

This Policy applies to all Employees, of Ontario Northland Transportation Commission (ONTC) or Nipissing Central Railway (NCR) (ONTC and NCR hereinafter collectively referred to "Ontario Northland").

1.2 CONTRACTORS

All contractors (which include subcontractors) will be notified of the applicable provisions of this Policy. Contractors will be expected to comply with and enforce these requirements in respect of their Employees, subcontractors, etc.

2.0 DEFINITIONS

Alcohol - The intoxicating agent in beverage alcohol, ethyl alcohol, or other low molecular weight alcohols including methyl and isopropyl alcohol. Beverage alcohol includes but is not limited to beer, wine, distilled spirits and very low alcohol products (e.g. beer with 0.5% alcohol by volume).

Company Property - Means equipment, materials, buildings, facilities, machinery and vehicles owned, leased, rented or used by Ontario Northland.

Contractor/Subcontractor - Any person or entity providing services to Ontario Northland, providing services in connection with Ontario Northland's operations or providing services on Ontario Northland's workplace, pursuant to a contract. This includes contractors, subcontractors and the Employees of contractors and subcontractors.

Drug - A drug includes recreational drugs and medications:

> **Recreational Drug**: Includes controlled drugs and substances, illegal drugs, and legal drugs, including recreational marijuana, taken without the prescription or authorization of a regulated health professional. The intentional misuse of prescription or non-prescription medication comes within the category of recreational drugs.
>
> **Medication**: Prescription and non-prescription drugs used for the treatment of an illness, injury or a medical condition. A prescription drug must be prescribed or authorized by a regulated health practitioner. A non-prescription or "over-the- counter" drug does not require a prescription or authorization, but it must be used for the purpose of treating an illness, injury or a medical condition.

Employee - All Employees of Ontario Northland, including full-time, part-time, temporary and spare Employees, individuals employed pursuant to fixed term or indefinite contracts of employment, and, for the purposes of this Policy, all students, volunteers and interns.

Fit for Duty - An Employee who is fit for duty is capable of performing their duties in a safe, productive and efficient manner, free from the adverse effects of drug and alcohols. An Employee impaired by drugs and alcohol is not fit for duty. The impairing effects include acute impairment, the after-effects and the withdrawal symptoms associated with drug or alcohol use.

Extreme Fatigue - Physical or mental exhaustion that reduces an individual's alertness such that a safety hazard is created or results in the inability to safely perform work.

Safety Sensitive Position - Refers to any position, including Safety Critical positions as defined by the Railway Safety Act, or are governed by the Ministry of Transportation of Ontario, in which individuals have a key and direct role in Ontario Northland's operation and where performance impacted by alcohol, drugs (which includes medications) or extreme fatigue could result in a significant incident, or could affect the health, safety, or security of the Employee, other employees, customers, members of the public, other individuals, property, or the environment.

For a list of positions, please see Appendix B: Safety - Sensitive Positions

Substance Abuse Professional (SAP) - This is an individual with knowledge of and clinical experience in the diagnosis and treatment of drug and alcohol related disorders. The SAP will assess if the Employee has an alcohol or drug dependency, make recommendations regarding education and treatment, and recommend a return-to-duty monitoring program including unannounced testing. If someone holds a safety critical position, this may include an assessment by an Addictions Medicine Physician in accordance with Railway Medical Rules.

Workplace - Any land, property, structures, facilities, premises, location, Ontario Northland vehicle and equipment owned, leased, operated or otherwise controlled by Ontario Northland or any other place at, upon, from or near which an Employee works in the course of their duties.

3.0 RESPONSIBILITIES

3.1 EMPLOYEE

Ontario Northland has standards of performance (Standards) that all Employees must satisfy. Employees must read, understand their responsibilities under and observe this Policy. Each Employee is required to sign the ***Fit for Duty Policy Acknowledgement*** which will be placed in his/her Employee file.

Prohibited Conduct

Employees are prohibited from the following while on duty (which includes working hours and break times) or while they are attending at the Workplace or attending at or operating Company property:

1. Engaging in the use, consumption, distribution, possession or manufacture of drugs and alcohol, subject to the exceptions in this Policy with respect to medications. This will include all cannabis-derived treatments, preparations, or recreational products, including CBD.

2. Being unfit for duty due to the consumption of drugs and alcohol.

Fit For Duty & Reporting Responsibilities

All Employees are expected to comply with the following:

1. Report to work fit for duty and remain fit for duty during their working hours and break times;

2. Immediately notify a supervisor or manager if the Employee is, or believes they are, unable to report for work fit for duty or remain at work fit for duty;

3. Immediately notify a supervisor or manager if the Employee, in good faith, believes that another Employee or contractor who they reasonably believe is under the influence of drugs and/or alcohol or has violated or otherwise believes is violating this Policy;

4. Cooperate with any investigations into breaches or potential breaches of this Policy. In addition to the above requirements, all Employees are reminded that they have a legal obligation under Part II, Section 126 (1) (g-h) of the Canadian Labour Code to report to their employer or supervisor the existence of any hazard of which they either know or suspect.

On-Call / Subject to Duty

Employee's on-call or subject to duty must refrain from drugs or alcohol use and Employees must be fit for duty, while they are on-call or subject to duty. If an Employee is unfit for duty due to drug or alcohol use or any other reason, and the Employee is called in to report for duty, it is the responsibility of the Employee to decline the call to work.

Break Times

Employees must not consume drugs and/or alcohol during the workday, which includes during break times. This requirement applies to all Employees including telecommuting Employees working from home. Employees are, however, permitted to use medications during the workday, provided that the medication will not affect fitness for duty and the medication is required for a legitimate medical reason. Please see the Medications section below for the applicable rules.

Medications

- If an Employee requires a medication for a legitimate medical reason, the Employee must ensure that the medication will not affect the Employee's ability to report for and remain at work fit for duty. To fulfill that responsibility, it may be necessary for the Employee to determine from their doctor or pharmacist whether the medication has the potential to affect the Employee's ability to be fit for duty.

- If the medication may affect fitness for duty, the Employee has an obligation to report that concern to their supervisor/manager and/or Human Resources for review.

- If an Employee has taken a medication and, as a result, is unable to report for work or remain at work fit for duty, the Employee must immediately report this to a supervisor or manager.

- If accommodation is required, Ontario Northland will make every effort to accommodate the Employee in accordance with human rights legislation. The Employee will be required to provide medical documentation in accordance with health care information confidentiality and privacy laws to substantiate accommodation requests and facilitate appropriate accommodation.

Prevention, Assistance & Treatment

- Substance use disorders are treatable illnesses. Early prevention and treatment are key to rehabilitation. If an Employee has or believes they may have a substance use disorder, the Employee should seek professional assistance. In addition, Employees should encourage co-workers to access professional assistance if the Employee knows or has reason to believe the co-worker has or is developing a substance use disorder.

- Employees are encouraged to use counselling and treatment services available to them through the Ontario Northland's Employee & Family Assistance Program (EFAP) and/or the community - 1-888-814-3327.

- If an Employee has a substance use disorder, the Employee should notify a supervisor, manager and/or Human Resources. Prompt disclosure of a known or potential substance use disorder ensures that the Employee will be directed to EFAP, a SAP or other resources, if the Employee has not already accessed such assistance, and it also ensures the facilitation of appropriate accommodation required by the Employee, the Employees' recovery, and the health and safety of

the Employee and the workplace.

- An Employee who self - discloses a substance use disorder will not be disciplined or terminated from employment as a result of the disclosure. In addition, the decision to self-disclose will not become a part of the Employee's personnel file. However, it is necessary that the Employee make that disclosure promptly and before engaging in any Policy violation. If an Employee refrains from disclosing a substance use disorder and subsequently engages in a Policy violation (e.g., by attending at work unfit due to drug or alcohol use), the Employee cannot avoid the disciplinary consequences of that Policy violation by disclosing a substance use disorder after the fact.

- It is the responsibility of an Employee undergoing treatment for a substance use disorder to actively participate and comply with their treatment and post treatment monitoring programs.

Driving Offences

Employees must:

- Immediately report any loss of driving privileges to their manager or supervisor if driving a vehicle or operating on track equipment is necessary in the performance of their duties.

- Immediately report any charges of intoxicated driving or driving under the influence while operating a company vehicle or equipment.

- Co-operate with any investigation into a violation of this Policy, including testing for drug or alcohol use as allowed for under this Policy.

Unfit for Duty Investigations and Investigations of Potential Policy Violations

- If there are reasonable grounds to believe an Employee is attending at work unfit for duty, the Employee will be relieved of duty pending an investigation. Each situation will be assessed on a case-by-case basis. Consideration will be given to whether there has been a Policy violation and, if so, the appropriate discipline. Consideration will also be given to whether the Employee requires accommodation.

- If there are immediate medical concerns, arrangements will be made for medical attention, as required.

- Depending on individual circumstances, before being permitted to return to work, the Employee may be required to provide medical documentation confirming they are fit for duty and/or medical documentation setting out the individual's medical restrictions, if any.

- The Employee will comply with requests for drug and alcohol testing pursuant to the Drug and Alcohol Testing provisions set out below in this Policy.

Searches & Inspections

- Ontario Northland may conduct searches with or without prior notice for drugs or alcohol when there is reasonable cause to believe they are present on company premises, or within company owned, leased or operated equipment or vehicles. This includes personal belongings on company premises or within company owned, leased or operated equipment or vehicles.

- All Employees, contractors, subcontractors, and anyone operating company property are subject to inspection on the grounds of reasonable cause.

Consequences of a Policy Violation

- In all situations involving potential breaches of this Policy, an investigation will be conducted to determine whether a Policy violation has occurred. An Employee suspected of being in violation of this Policy may be removed from duty pending the completion of an investigation.

- If it is determined that an Employee violated this Policy, the Employee may be subject to discipline, up to and including termination of employment.

- Employees with positive drug test results, positive alcohol test results, and Employees that refuse to test are in violation of this Policy and may be subject to discipline, up to and including termination of employment. See below for the Drug and Alcohol Testing provisions of this Policy.

Confidentiality

Ontario Northland will maintain Employee confidentiality, including the confidentiality of Employee medical information, as required by law.

3.2 MANAGERS & SUPERVISORS

Managers and supervisors of Ontario Northland are responsible for promoting a workplace free from the safety risks associated with drugs and alcohol, and shall comply and carry out the following responsibilities:

- Managers and supervisors shall work with and support Employees who seek assistance from their health care providers for dealing with substance abuse or dependence issues. Managers and supervisors may also refer the Employee to the Employee and Family Assistance Program (EFAP), while maintaining strict confidentiality.

- Managers and supervisors shall participate and complete any training related to this Policy.

- Managers and supervisors shall seek to identify, investigate and address any situations where an Employee appears to be unfit for duty, under the influence of drugs and/or alcohol in the workplace or appears to be suffering from a potential substance use disorder.

- Managers and supervisors shall immediately deal with and investigate reports of potential impairment or unfit for duty situations in the workplace.

- Following an incident or "near-miss" situation, supervisors and managers should assess whether drug and alcohol testing is required based on criteria in the ONTC Guide and/or under this Policy. When possible, this decision will be made with another supervisor or manager of higher authority.

- When there is reasonable cause to believe an Employee is unfit for duty due to drugs or alcohol, supervisors and managers should assess whether drug and alcohol testing is required based on criteria in the ONTC Guide and/or under this Policy. When possible, this decision will be made with another supervisor or manager of higher authority.

- Managers and supervisors shall decide, based on a reasonable cause standard, in what situations

a search of company property for drugs or alcohol is warranted, and are required to contact Human Resources before taking such action when possible.

- Managers and supervisors shall also ensure that all Employees, contractors and subcontractors working on Ontario Northland property read and are aware of this Policy.

3.3 HUMAN RESOURCES

Human Resources shall:

- facilitate, support, and assist in the implementation of this Policy.

- work with managers, supervisors, Employees, and trade unions to support and implement treatment and return to work programs.

- assist managers and supervisors in investigating and addressing workplace situations involving substance abuse and dependence, and in identifying any necessary accommodation options.

3.4 DRUG AND ALCOHOL AWARENESS & ACCOMMODATION

To help ensure a safe, drug and alcohol-free workplace, Ontario Northland shall:

- Provide educational/training to managers and supervisors regarding the signs of impairment and how to perform an observational inspection of Employees' appearance and/or behaviour. Managers and supervisors will also be trained on how to evaluate suspicions of the consumption of drugs and/or alcohol;

- Provide copies of and inform all Employees of the Policy, awareness regarding the responsible use of alcohol and other drugs, recognition of drug or alcohol problems, and resources available to assist Employees with drug or alcohol problems;

- Recognize substance use disorders, which may include drug and alcohol dependencies, as disabilities. As part of its commitment to accommodation, Ontario Northland will allow for the Employee and Family Assistance Program to provide assistance for Employees with drug and/or alcohol problems;

- Every effort will be made to provide reasonable accommodation to Employees whose legitimate use of medication may impact their ability to perform their duties;

- Impose corrective action on Employees who violate their responsibilities under this Policy;

- Take reasonable measures to ensure that Employees who are unfit or potentially unfit and unable to drive home safely are provided with alternative transportation.

4.0 ALCOHOL & DRUG TESTING

Below are the circumstances in which Ontario Northland may require an Employee to undergo drug and alcohol testing. The reasonable cause testing, post-incident / near-miss testing provisions apply to Employees in Safety-Sensitive positions. Follow-Up testing provisions apply to all Employees.

4.1 REASONABLE CAUSE TESTING

Reasonable cause testing applies where there are reasonable grounds to suspect an Employee is unfit due to drugs and/or alcohol. This may include but is not limited to: smelling alcoholic beverages and/or marijuana on breath, slurred speech, glassy and/or red eyes, unsteadiness in walking or standing, flushed face, disorientation or drowsiness and mood changes.

Before being asked to undergo testing, the Employee will be taken to a private area and interviewed. In the event the Employee cannot provide a reasonable explanation for their behaviour, or the supervisor or manager reasonably remains of the belief that the Employee is not fit due to drugs and alcohol, the supervisor will ask the Employee to participate in reasonable cause drug and alcohol testing.

4.2 POST- INCIDENT TESTING

As part of its investigation into any work-related incident, Ontario Northland may require that an Employee submit to drug and alcohol testing. Before requiring a test, there will be a preliminary assessment to determine whether the Employee's acts or omissions may have caused or contributed to the incident. As part of that assessment, the Employee concerned and, if applicable, any witnesses to the incident will be interviewed. Consideration will be given to whether other factors, such as
equipment failure, inclement weather, or other environmental factors, clearly caused the incident. If such factors do not appear to be the cause a supervisor or manager may ask the Employee to submit to post-incident drug and alcohol testing.

Transportation Arrangements for Reasonable Cause & Post-Incident Testing

For reasonable cause and post-incident testing, if an Employee must attend off-site for the test, appropriate transportation will be arranged. If the Employee's test results are not immediately available (e.g., if the Employee's drug test result is pending **or inconclusive**), arrangements will be made for the Employee's transportation home.

Procedure Following Reasonable Cause & Post-Incident Testing

An Employee who is asked to take a reasonable cause or post-incident test will be relieved from duty pending the results. Should both the alcohol and drug test be negative the employee will return to duty without loss of pay.
Should either the alcohol and drug test be positive the employee may be held out of service with pay and a formal investigation will be conducted as soon as possible.

4.3 CERTIFICATION TESTING

Applicable to Employees when in non-safety sensitive positions transferring into safety-sensitive positions. An offer of a safety-sensitive position to an Employee in a non-safety sensitive position will be conditional upon the Employee passing a drug and alcohol test. The Employee must pass the test to transfer into the safety-sensitive position. A positive test result or a refusal to test will render the Employee ineligible for the position.

4.4 RANDOM TESTING

Ontario Northland employees will not be subject to random testing, unless they are employed as a motor coach operator who operates or could operate a motor coach into the United States.

4.5 FOLLOW-UP TESTING

Post Treatment

As part of their return-to-work agreements, an Employee who has completed a treatment program for a substance use disorder may be required to pass a return to work drug and alcohol test and be subject to periodic, unannounced testing for a specified period of time. Such testing will support an employee's recovery and monitors the individual's progress and commitment towards rehabilitation.

Post-Violation

As part of their return to work agreements, an Employee who has violated the Policy may be required to pass a return to work drug and alcohol test and be subject to periodic, unannounced testing for a specified period of time.

4.6 REFUSAL TO TEST

Employees are expected to comply and cooperate with requests to undergo drug and alcohol testing. A refusal to do so constitutes a violation of this Policy. Examples of refusals include:

- failing to provide an adequate specimen sample ***(e.g.*** urine**, oral fluid**) for a drug test without a valid medical explanation;
- failing to provide adequate breath for an alcohol test without a valid medical explanation;
- failing to submit to a test when requested to do so;
- adulterating or tampering with a specimen provided for testing;
- engaging in any conduct which obstructs the testing process.

4.7 PROCEDURES & METHODS OF DRUG AND ALCOHOL TESTING

- A positive alcohol breath test is a result of 0.04 Blood Alcohol Concentration (BAC) or higher. If the initial test reports a positive result, Employees will be required to test again 15 minutes after the initial test to confirm results. Any Employee who has a breath alcohol test result of 0.02 to 0.039 BAC will be removed from work until it is safe to return (at least before their next work day or shift) and may be subject to appropriate discipline.

- Drug testing will be administered by a urine sample or an oral fluid sample.

- The tables below set out the initial and confirmation cut-off levels applicable to the classes of drugs that will be tested for with urine and oral fluids.

Table 1 Urine drug concentration limits	
Drugs or classes of drugs	**Confirmation concentration equal to or in excess of ng/mL**
Marijuana metabolite	15
Cocaine metabolite	100
Opioids: • Codeine • Morphine • Hydrocodone • Hydromorphone • Oxycodone • Oxymorphone	 2000 2000 100 100 100 100
6-Acetylmorphine	10
Phencyclidine	25
Amphetamines: • - Amphetamine • - Methamphetamine • - MDMA1 • - MDA2	 250 250 250 250

Table 2 Oral Fluid concentration limits	
Drugs or classes of drugs	**Confirmation concentration equal to or in excess of ng/mL**
Marijuana metabolite (THC)	10
Cocaine metabolite • Cocaine or Benzoylecgonine	8
Opioids: • Codeine • Morphine • Hydrocodone • Hydromorphone • Oxycodone • Oxymorphone	 40 40 40 40 40 40
6-Acetylmorphine	4
Phencyclidine	10
Amphetamines: • - Amphetamine • - Methamphetamine • - MDMA1 • - MDA2	 50 50 50 50

- If the laboratory determines that the specimen provided for drug testing contains drug concentration levels at or above the specified confirmation cut-off level, the result will be considered "non-negative" and will be reviewed by an independent Medical Review Officer (“MRO”).

- The MRO will provide the Employee with a chance to provide a reasonable, medical explanation for the non-negative result.

- The MRO will then determine whether to report the result to Ontario Northland’s designated individual as a positive result, a negative result, **a negative with a safety concern,** a cancelled result, or a refusal to test. Positive results and refusals to test are considered violations of this Policy. Negative results and cancelled results are not Policy violations.

Attachments and Supplementary Documents:

Appendix A: Fit for Duty Policy Acknowledgement

Appendix B: Safety Sensitive Positions

APPENDIX A

Fit for Duty Policy Acknowledgement

You acknowledge that you have reviewed this Policy and you understand that you must comply with the Policy. You further acknowledge that you are committed to protecting yourself, your co-workers and the workplace against safety risks arising from drugs and alcohol.

Employee Name (PRINT): _____

Employee Signature: _____

Date: _____

APPENDIX B

Safety Sensitive Positions
Updated September 14, 2023

Safety Sensitive Position: Refers to any position, including Safety Critical positions as defined by the Railway Safety Act, or are governed by the Ministry of Transportation of Ontario, in which individuals have a key and direct role in Ontario Northland's operation and where performance impacted by alcohol, drugs (which includes medications) or extreme fatigue could result in a significant incident, or could affect the health, safety, or security of the employee, other employees, customers, members of the public, other individuals, property, or the environment.

All employees, including Supervisors, Managers, who may be required to perform safety-sensitive duties from time-to-time, or to temporarily relieve in a safety-sensitive position, are included.

BUSINESS UNIT	**POSITION**
Station Operations & Express Freight	• Chef • Steward/Waiter • Warehouseman • Terminal Support
Guest Services	• CSSA
Bus Fleet & Facilities Maintenance	• Dispatch/Controller • Facilities Coordinator • Mechanic - Bus • Storesperson • Shop Foreman • Supervisor Motor Coach Operator • Sr Fleet Manager • Sr Manager Motor Coach Operations • Motor Coach Trainer • Operations Supervisors • Fleet and Safety Compliance Co-ord. • Manager Operations Supp & Control • Maintenance Planner
Bus Operations	• Motor Coach Operator
Signals & Communications Systems	• Signal & Communications Technician • Signal Maintainers • Lead Signal Maintainer • Manager Signals & Communications
Track & Structures (Infrastructure)	• Assistant Track Maintenance (Forman) • All Foreman positions.

	• B&B Foreman Line Gang • District Manager • Extra Gang (Forman) • Machine Operator Taking a Clearance • Maintainer Work Equipment Shop • Rail Lubrication Operator Maintenance • Snowplow Foreman • Snowplow Wingmen • Spreader Foreman • Spreader Wingmen • Structures Program Manager • Superintendent Maintenance of Way • Track Inspector/Supervisor • Track Technician/labour • Track Program Manager • Truck Driver
Rail / RRC / Stores	• All Cleaners • All Skilled Trades and Apprentices • Engine Attendant • Engine Watchmen • Material Handler/Forklift Operator • Production Worker • Quality Assurance • Storesperson • Stockkeeper • Supervisor Equipment • Supervisor Metal Fabrication • Supervisor RRC • Supervisor Shop Maintenance • Watchman • Work Cell Leader • Truck Driver • Superintendent Equip. Mtce. • Stores Supervisor • Sr Manager Strategic Procurement • Manager Inventory & Warehousing
Rail Transportation/Training & Regulatory Affairs	• Manager, Rail Traffic Control • Conductors & Trainman • Rail Traffic Controller • Janitor • Locomotive Engineer • Equipment Trainer • Field Trainer

Reissued: April 7, 2004

To: All Engineering Department Employees

JP/IS – 5
Job Procedure: Setting Track Units On or Off at Road Crossings

Preamble

Setting hi-rail vehicles on/off at public crossings has the potential for an accident to occur with an oncoming highway vehicle. Therefore, the following procedure was developed in an effort to minimize those risks.

Job Procedure

1. Proceed to a suitable safe location (low traffic area and good visibility for road traffic). Activate the track unit's flashing beacon and four-way flashers if so equipped.

   Since reflectorized safety vests are to be worn while on duty, they must be worn before getting out of the vehicle at the crossing.

2. If a crossing is so equipped, flashing lights must be activated to warn any oncoming traffic.

3. Before fouling the crossing with the hi-rail vehicle, ensure that there is no oncoming road traffic or that the traffic in the area is stopped. When it is safe to do so, move onto the crossing to raise or lower the hi-rail gear.

Note: If there is more than one person accompanying the hi-rail unit, the second person should stop the traffic using the red flag from the flagging kit. At night the red flag should be replaced with a red fusee.

The following is a list of road crossings that are deemed high risk for setting track units on or off and should be avoided, with the exception of an emergency. When using these crossings, use "Extreme Caution".

Temagami Subdivision

Mile 1.36 - Hwy 11/17 - Trans Canada/North Bay
Mile 80.74 - Roosevelt Rd. South
Mile 105.73 - Lakeview Ave./Haileybury
Mile 111.56 - Radley Hill Rd.
Mile 112.65 - Whitewood Ave./New Liskeard
Mile 113.41 - Hwy 11/New Liskeard

Sherman Spur
Mile 1.14 - Hwy 11

Ramore Subdivision
Mile 57.82 - Hwy 572/Road to Holtyre
Mile 66.36 - 4th Ave./Matheson
Mile 86.35 - Hwy 11/Porquis
Mile 94.08 - Hwy 610/Barber's Bay
Mile 100.44 - Hwy 610/Dugwall

Kirkland Lake Subdivision
Mile 0.3 - Hwy 66/Swastika
Mile 6.31 - Hwy 66/Kirkland Lake
Mile 10.86 - Hwy 66/Morris Kirkland
Mile 33.50 - Hwy 117/Mount Chemis
Mile 35.78 - Hwy 117/Copper Creek
Mile 50.77 - Ranger Rd. 7/Evain
Mile 56.32 - Hwy 117/101

Devonshire Subdivision
Mile 0.78 - Hwy 67/Porquis
Mile 5.04 - Hwy 578/Nellie Lake

Iroquois Falls Subdivision
Mile 5.65 - Main St./Iroquois Falls
Mile 6.16 - Hwy 67 (Ambridge Drive)/Iroquois Falls
Mile 6.21 - Hwy 67 (Ambridge Drive)/Iroquois Falls

Kapuskasing Subdivision
Mile 17.47 - Hwy 11/Driftwood
Mile 68.44 - Brunelle Rd./Kapuskasing
Mile 128.55 - Hwy 11/Hearst

Mallette Spur
Mile 3.3 - Hwy 11/Smooth Rock Falls
Mile 3.32 - Main St./Smooth Rock Falls

Island Falls Subdivision
Mile 0.31 - 3rd Ave./Cochrane

J.H. Huisjes
Superintendent M/W

SUB-PART C. TRACK GEOMETRY MANAGEMENT PLAN

1. Scope

a) The following prescribes the requirements for the gauge, alignment, and surface of track and the elevation of the outer rails and speed limitations for curved track.

2. Geometry Standards

a) All track must meet or exceed the track geometry standards defined in this *Manual* and the *Track Safety Rules*, for all track in Canada.

b) Track geometry standards are defined for five classes of track based upon maximum allowable operating speeds for freight trains and passenger trains.

   i. Figure Sub-Part A-1 in Part II – 1 – Classes of Track: Operating Speed Limits

c) The requirements specify 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 standards, may require remedial action to provide for safe operations over the track.

d) Track geometry can be measured by track geometry vehicles or by hand measurement. When unloaded track is measured to determine compliance, the amount of any rail movement that occurs while the track is loaded must be added to the measurements taken.

   i. Should any of the following symptoms occur in the track, assume rail movement will occur;

   - Hanging ties
   - Excess adzing
   - Tie plates nose-diving towards the field side
   - Loose or missing bolts
   - High, missing, bent or throat cut spikes
   - Batter or bent rail ends
   - Engine burns
   - Corrugated rail
   - Worn or missing tie plate shoulder, ice built up in plates
   - High water and clogged ditches and
   - Cluster of bad ties

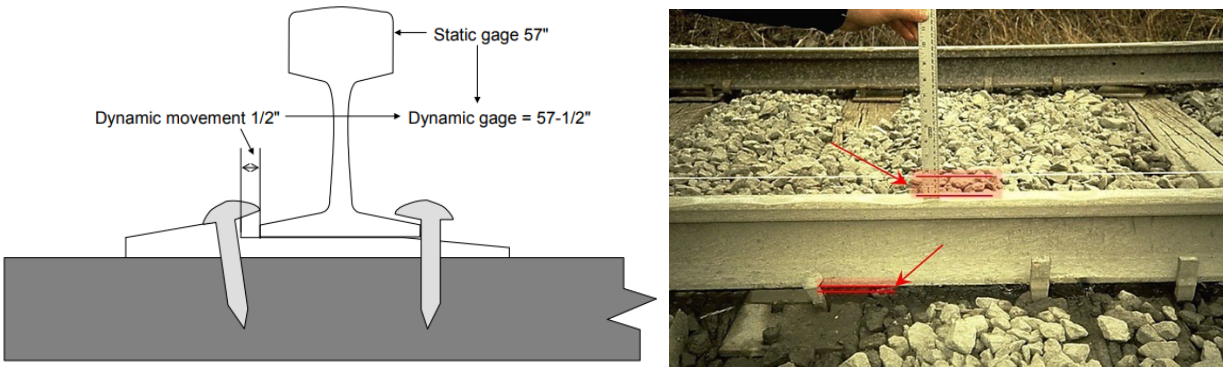


Figure SUB-PART C – 1 – Examples of Rail Movement Affecting Gauge (left) and Affecting Surface (right)

e) Locations where track measurements do not meet the track geometry standards for the class of track are considered defective. Track defects must be protected by speed restrictions and repaired as soon as possible.

3. Responsibility

a) The Track Supervisor (Inspector) is responsible for:

i. Checking deterioration in track geometry between track evaluation car tests,

ii. Ensuring that track geometry is maintained within the track geometry standards or providing appropriate track protection.

b) Track conditions must equal or exceed the track geometry standards for the class of track as laid out in this *Manual* and *Transport Canada's* *Rules Respecting Track Safety.*

c) Where conditions on track do not comply with these requirements action must be taken to:

i. Bring the track into compliance,

ii. Reduce speed to such that is in compliance,

iii. Halt operations over the track or,

iv. Operate under the authority of a qualified Track Supervisor (Inspector) or Manager

- Notwithstanding the above, in the case of Class 1 track that is not in compliance with these Rules, operation under the authority of a Track Supervisor (Inspector) for not more than 30 days. This does not apply where defective rails are involved.

4. Gauge

a) Gauge is measured between the heads of the rails at right angles to the rails in a plane 5/8" *(16 mm)* below the top of the rail head.

b) Standard gauge is 56 ½" *(1,435 mm)*.

c) Gauge must be within the limits prescribed in the following table:

Class of track	The gauge must be at least *(inches and millimeters)*	But not more than *(inches and millimeters)*
Excepted track	N/A	58 1/4" *(1,480 mm)*
1	55 3/4" *(1,416 mm)*	58" *(1,473 mm)*
2	55 3/4" *(1,416 mm)*	57 3/4" *(1,467 mm)*
3	56" *(1,422 mm)*	57 3/4" *(1,467 mm)*
4 and 5	56" *(1,422 mm)*	57 1/2" *(1,461 mm)*
Yard Track Category 1 & Category 2	55 3/4" *(1,416 mm)*	57 3/4" *(1,467 mm)*
Yard Track Category 3 & Category 4	55 3/4" *(1,416 mm)*	58" *(1,473 mm)*

Figure SUB-PART C – 2 – Gauge (inches and millimeters)

d) Gauge at Wayside Inspection Systems (WIS) should be as tight as possible conforming to track standards. Maximum loaded gauge at WIS sites should not exceed 56 3/4" *(1,442 mm)*.

5. Portable Track Loading Fixture (PTLF) Guidelines

a) The Portable Track Loading Fixture (PTLF) is an easy-to-use, manually operated track inspection tool designed to test the lateral strength of railroad crossties and fastening systems.

Figure SUB-PART C – 3 – Portable Track Loading Fixture

b) The PTLF applies the 4,000 pounds of lateral force necessary to measure changes in gauge under load.

c) Its insulated design will not shunt track signals.

d) While you may use this tool to aid in track inspections or to test the effectiveness of repairs, it is recommended to be used when any of the following conditions exist:

   i. Within joint areas where there are symptoms (e.g., movement of the plates, gaps at the end of ties, defective ties)

   ii. Where there are 3 or more consecutive defective ties

   iii. Where there are symptoms in any curve

   iv. Where the static measurement (including all rail movement measurements OR the measurement added to simulate rail movement found in our MTR) differs by ¼" *(6 mm)* or more from 56 ½" *(1,435 mm)* and there are symptoms (defective ties, plate cutting, poor surface, etc.)

   v. Where the static measurement (including all rail movement measurements OR the measurement added to simulate rail movement found in our MTR) differs by ½" *(13 mm)* or more from 56 ½" *(1,435 mm)* and there are NO symptoms; meaning all track conditions within 31' of the gauge variance are found to be in good condition (e.g., non-defective ties, good surface and line)

e) Directions for its use is as follows:

   i. Measure and record initial static (unloaded) track gauge using approved measuring device.

ii. Ensure the PTLF is not damaged and in good working condition. Before applying pressure, ensure that all personnel are advised and are well clear to avoid possible injury from kick-back of rail or tool.

iii. Place the PTLF over a crosstie, between rails, so that the shoes on each end rest on the rail base. Ensure PTLF ends engage the area of the rail web near the base and the cylinder side head's long side is facing up as shown in Figure SUB-PART C – 5 – Portable Track Loading Fixture

Note: Placement in track locations other than rail base is unacceptable.

iv. Apply hydraulic pressure to ram and increase load incrementally to 4,000 psi.

CAUTION: DO NOT EXCEED 4,000 psi. EXCESSIVE PRESSURE MAY DAMAGE THE PTLF AND CAUSE PERSONAL INJURY.

v. Observe the movement of the rail, tie plates and fastener components to assess which components contribute to poor track strength or gauge restraint conditions.

vi. Measure and record PTLF loaded gauge and compare to the limits specified in Sub-Part C – Track Geometry, Section 4 – Gauge.

vii. Before releasing pressure, ensure that all personnel are advised and are well clear to avoid possible injury from kick-back of rail or tool.

viii. Release PTLF hydraulic pressure.

ix. After the load is released, measure the gauge to which the track returns. This gauge, referred to as *exercised gauge*, can be slightly different from the unloaded gauge.

- *Exercised gauge* is useful to assess track strength and its ability to maintain and restore gauge.

Note: The difference between the loaded gauge and *exercised gauge* is the rail displacement.

x. After PTLF release, ensure rail is properly seated in affected tie plates.

6. Variation in Gauge

a) When the gauge is less than 56 inches *(1,422 mm)* and the change in gauge over a distance of 20 feet *(6,096 mm)* or less on either side of the defective location exceeds 1 ½ inches *(38 mm)*, train speed must be reduced according to Class 1 track speed.

7. Gauge Rods

a) Do not use gauge rods as a permanent replacement for ties to correct a gauge problem on main track and main track sidings,

b) Gauge rods are prohibited within a crossing circuit,

c) In yards and spurs, gauge rods may be used to assist in maintaining gauge in areas where additional strength is needed (for example, in yard turnouts and in areas of high curvature or wye tracks) but must not be used in lieu of ties,

d) Gauge rods may be used as a temporary repair on main track and main track sidings when it is impractical to perform a proper repair,

e) Temporary gauge rods are to be removed as quickly as practical and not remain in Main track for more than one year,

f) Gauge rods in main track are to be inspected monthly on foot,

g) 16 inches *(406 mm)* of the gauge rod will be painted in the center of the track and be highly visible,

h) Gauge rods applied on main track are to have their location (additionally, its GPS when possible) and number used, documented in the applicable record, which is to be kept up to date.

i) The date the gauge rods are removed will be documented on the same record.

8. URGENT Defects

a) URGENT defects are considered *Safety Critical Maintenance* requiring repairs and / or speed restrictions placed to protect traffic.

b) Only *Quality Assurance (QA)* personnel, not involved with the repair, are to verify the repairs have been completed to standards.

c) A geometry defect must be treated as an URGENT defect if;

i. The measurement meets or exceeds the threshold for the class of track as prescribed in Figure SUB-PART C – 6 – URGENT Defects, or

ii. The defect is reported as URGENT by the Track Evaluation Car (may be identified with a "U" on the report), or

iii. The following combination track surface defects meeting or exceeding the thresholds as prescribed in Figure SUB-PART C – 6 – URGENT Defects,

- Alignment and Surface: Alignment as measured from a mid-ordinate of a 31-foot chord when found within 11 ft from uniform profile on either rail that is measured from the mid-ordinate of a 62-foot chord.
- Alignment and Warp 31: Alignment as measured from a mid-ordinate of a 31-foot chord when found within 11 ft from the difference in cross level between any two points less than 31 ft apart on a spiral.

d) The District Manager, or their designate, must immediately take any action considered necessary to provide full protection for any track condition to be treated as URGENT. Immediate action includes;

i. Repairs are made bringing the track back into compliance and repairs have been verified by QA personnel with any applicable speed restrictions in place prior to next train,

ii. Reduce speed to such that is in compliance,

iii. Halt operations over the track or,

iv. Operate under the authority of a qualified Track Supervisor (Inspector) or Manager

- Notwithstanding the above, in the case of Class 1 track that is not in compliance with these Rules, operation under the authority of a Track Supervisor (Inspector) for not more than 30 days. This does not apply where defective rails are involved.

URGENT DEFECT THRESHOLDS *(inches and millimeters)*	CLASS 1	CLASS 2	CLASS 3	CLASS 4	CLASS 5
FREIGHT	*10*	*25*	*40*	*60*	*80*
PASSENGER	*15*	*30*	*60*	*80*	*95**
Wide Gauge	1-1/2" *(38 mm)*	1-1/4" *(32 mm)*	1-1/4" *(32 mm)*	1" *(25 mm)*	1" *(25 mm)*
Narrow Gauge	3/4" *(19 mm)*	3/4" *(19 mm)*	1/2" *(13 mm)*	1/2" *(13 mm)*	1/2" *(13 mm)*
Variation in Gauge	1 5/8" *(41 mm)*	1 1/2" *(38 mm)*	1 1/8" *(29 mm)*	7/8" *(22 mm)*	5/8" *(16 mm)*
Surface 62'	3" *(76 mm)*	2-3/4" *(70 mm)*	2-1/4" *(57 mm)*	2" *(51 mm)*	1-1/4" *(32 mm)*
Warp 62'	3" *(76 mm)*	2-1/4" *(57 mm)*	2" *(51 mm)*	1-3/4" *(45 mm)*	1-1/2" *(38 mm)*
Warp 31'	2" *(51 mm)*	1-3/4" *(45 mm)*	1-1/4" *(32 mm)*	1" *(25 mm)*	3/4" *(19 mm)*
Runoff 31'	3-1/2" *(89 mm)*	3" *(76 mm)*	2" *(51 mm)*	1-1/2" *(38 mm)*	1" *(25 mm)*
Alignment 62' in Curves	5" *(127 mm)*	3" *(76 mm)*	1-3/4" *(45 mm)*	1-1/2" *(38 mm)*	5/8" *(16 mm)*
Alignment 62' in Tangent	5" *(127 mm)*	3" *(76 mm)*	1-3/4" *(45 mm)*	1-1/2" *(38 mm)*	3/4" *(19 mm)*
Alignment 31' in Curves	N/A	N/A	1-1/4" *(32 mm)*	1" *(25 mm)*	1/2" *(13 mm)*
XLV from Design Tangent / Curve	3" *(76 mm)*	2" *(51 mm)*	1-3/4" *(45 mm)*	1-1/4" *(32 mm)*	1" *(25 mm)*
XLV from Design Spiral	1-3/4" *(45 mm)*	1-1/2" *(38 mm)*	1-1/4" *(32 mm)*	1" *(25 mm)*	3/4" *(19 mm)*
Reverse Elevation	3" *(76 mm)*	2" *(51 mm)*	1-3/4" *(45 mm)*	1-1/4" *(32 mm)*	1" *(25 mm)*
Design Speed / Vmax	3" *(76 mm)*	3" *(76 mm)*	3" *(76 mm)*	3" *(76 mm)*	3" *(76 mm)*
Rock & Roll Surface	7/8" *(22 mm)*	3/4" *(19 mm)*	3/4" *(19 mm)*	5/8" *(16 mm)*	1/2" *(13 mm)*
Rock & Roll Crosslevel	1-1/4" *(32 mm)*	1" *(25 mm)*	1" *(25 mm)*	7/8" *(22 mm)*	3/4" *(19 mm)*

URGENT - Combination Alignment and Surface Defect Thresholds *(inches and millimeters)*		CLASS 1**	CLASS 2	CLASS 3	CLASS 4	CLASS 5***
	FREIGHT	*10*	*25*	*40*	*60*	*80*
	PASSENGER	*15*	*30*	*60*	*80*	*95**
Alignment and Surface Combination *Any part of one defect must be within 11' of the other defect to be considered a combination defect.*	**Alignment 31'**	N/A	1" *(25 mm)*	7/8" *(22 mm)*	7/8" *(22 mm)*	N/A
	Surface 62'	N/A	1-1/2" *(38 mm)*	1-1/4" *(32 mm)*	1-1/4" *(32 mm)*	N/A
Alignment and Warp 31' Combination *Any part of one defect must be within 11' of the other defect to be considered a combination defect.*	**Alignment 31'**	2" *(51 mm)*	1-1/4" *(32 mm)*	1" *(25 mm)*	3/4" *(19 mm)*	N/A
	Warp 31'	1-3/4" *(45 mm)*	1-1/4" *(32 mm)*	1" *(25 mm)*	3/4" *(19 mm)*	N/A

*100 mph for LRC Trains

**Individual Class 1 track surface thresholds provide a sufficient level of safety for the combination of alignment and uniform profile therefore specific combination defect thresholds are not required.

***Individual Class 5 track surface thresholds as defined provide a sufficient level of safety therefore specific combination defect thresholds in class 5 track are not required.

Figure SUB-PART C – 4 – URGENT Defects (inches and millimeters)

9. NEAR URGENT Defects

a) Geometry defects that are within 1/8" *(3 mm)* of the Urgent threshold are classed as NEAR URGENT defects.

b) NEAR URGENT defects are to be inspected and remedial action taken within 30 days. If the defect is not corrected within 30 days, a speed restriction will be applied reducing it to the next lower class of track.

c) NEAR URGENT defects may be identified by an "N".

NEAR URGENT DEFECT THRESHOLDS *(inches and millimeters)*					
	CLASS 1	**CLASS 2**	**CLASS 3**	**CLASS 4**	**CLASS 5**
FREIGHT	*10*	*25*	*40*	*60*	*80*
PASSENGER	*15*	*30*	*60*	*80*	*95**
Wide Gauge	1-3/8" *(35 mm)*	1-1/8" *(29 mm)*	1-1/8" *(29 mm)*	7/8" *(22 mm)*	7/8" *(22 mm)*
Narrow Gauge	N/A	N/A	N/A	N/A	N/A
Variation in Gauge	N/A	N/A	N/A	N/A	N/A
Surface 62'	2-7/8" *(73 mm)*	2-5/8" *(67 mm)*	2-1/8" *(54 mm)*	1-7/8" *(48 mm)*	1-1/8" *(29 mm)*
Warp 62'	2-7/8" *(73 mm)*	2 1/8" *(54 mm)*	1 7/8" *(48 mm)*	1 5/8" *(41 mm)*	1 3/8" *(35 mm)*
Warp 31'	1-7/8" *(48 mm)*	1-5/8" *(41 mm)*	1-1/8" *(29 mm)*	7/8" *(22 mm)*	5/8" *(16 mm)*
Runoff 31'	3-3/8" *(86 mm)*	2-7/8" *(73 mm)*	1-7/8" *(48 mm)*	1-3/8" *(35 mm)*	7/8" *(22 mm)*
Alignment 62' in Curves	4-7/8" *(124 mm)*	2-7/8" *(73 mm)*	1-5/8" *(41 mm)*	1-3/8" *(35 mm)*	1/2" *(13 mm)*
Alignment 62' in Tangent	4-7/8" *(124 mm)*	2-7/8" *(73 mm)*	1-5/8" *(41 mm)*	1-3/8" *(35 mm)*	5/8" *(16 mm)*
Alignment 31' in Curves	N/A	N/A	1-1/8" *(29 mm)*	7/8" *(22 mm)*	3/8" *(10 mm)*
XLV from Design Tangent / Curve	2-7/8" *(73 mm)*	1-7/8" *(48 mm)*	1-5/8" *(41 mm)*	1-1/8" *(29 mm)*	7/8" *(22 mm)*
XLV from Design Elev Spiral	1-5/8" *(41 mm)*	1-3/8" *(35 mm)*	1-1/8" *(29 mm)*	7/8" *(22 mm)*	5/8" *(16 mm)*
Reverse Elevation	2-7/8" *(73 mm)*	1-7/8" *(48 mm)*	1-5/8" *(41 mm)*	1-1/8" *(29 mm)*	7/8" *(22 mm)*
Design Speed / Vmax	N/A	N/A	N/A	N/A	N/A
Rock & Roll Surface	N/A	N/A	N/A	N/A	N/A
Rock & Roll Crosslevel	N/A	N/A	N/A	N/A	N/A

Figure SUB-PART C – 5 – NEAR URGENT Defects (inches and millimeters)

*100 mph for LRC Trains

10. Interpolation of Speeds Between Track Classes

a) When a defect is detected during a track geometry car inspection, for a period of 72 hours after the inspection, linear interpolation to determine the speed of the temporary slow order may be used to protect the defect.

b) Records of slow orders or reason for not imposing one must be maintained.

c) When the 72 hours expires and the track defect has not been repaired, the slow order must be revised to those of the acceptable track Class.

d) Figures SUB-PART C – 9 and C – 10 may be used to determine the maximum temporary speed restriction to be applied, for a one class speed reduction only, for a period of 72 hours.

FREIGHT SPEED MPH	WIDE GAUGE *(inches)*	ALIGNMENT *(inches)*			SURFACE *(inches)*	WARP *(inches)*		CROSSLEVEL *(inches)*		RUNOFF *(inches)*
		Tangent 62'	Curve 62'	Curve 31'		31' Spiral	62' Tangents Curves & Spirals	Tangent & Curves	Spiral	
10	58	5	5	N/A	3	2	3	3	1-3/4	3-1/2
15	57-7/8	4-1/4	4-1/4	N/A	2-7/8	1-7/8	2 -5/8	2-5/8	1-5/8	3-5/16
20	57-13/16	3-5/8	3-5/8	N/A	2-13/16	1-13/16	2-5/16	2-5/16	1-9/16	3-1/8
25	57-3/4	3	3	N/A	2-3/4	1-3/4	2	2	1-1/2	3
30	57-3/4	2-1/2	2-1/2	1-1/4	2-9/16	1-9/16	1-7/8	1-7/8	1-3/8	2-5/8
35	57-3/4	2-1/8	2-1/8	1-1/4	2-3/8	1-3/8	1-13/16	1-13/16	1-5/16	2-5/16
40	57-3/4	1-3/4	1-3/4	1-1/4	2-1/4	1-1/4	1-3/4	1-3/4	1-1/4	2
45	57-11/16	1-11/16	1-11/16	1-3/16	2-3/16	1-3/16	1-5/8	1-5/8	1-3/16	1-7/8
50	57-5/8	1-5/8	1-5/8	1-1/8	2-1/8	1-1/8	1-1/2	1-1/2	1-1/8	1-3/4
55	57-9/16	1-9/16	1-9/16	1-1/16	2-1/16	1-1/16	1-3/8	1-3/8	1-1/16	1-5/8
60	57-1/2	1-1/2	1-1/2	1	2	1	1-1/4	1-1/4	1	1-1/2

Figure SUB-PART C – 6 – Freight Speed – Allowable Temporary Speed Restrictions for Test Car Defects

PSSGR. SPEED MPH	WIDE GAUGE *(inches)*	ALIGNMENT *(inches)*			SURFACE *(inches)*	WARP *(inches)*		CROSSLEVEL *(inches)*		RUNOFF *(inches)*
		Tangent 62'	Curve 62'	Curve 31'		31' Spiral	62' Tangents Curves & Spirals	Tangent & Curves	Spiral	
15	58	5	5	N/A	3	2	3	3	1-3/4	3-1/2
20	57-7/8	4-1/4	4-1/4	N/A	2-7/8	1-7/8	2-5/8	2-5/8	1-5/8	3-5/16
25	57-13/16	3-5/8	3-5/8	N/A	2-13/16	1-13/16	2-5/16	2-5/16	1-9/16	3-1/8
30	57-3/4	3	3	N/A	2-3/4	1-3/4	2	2	1-1/2	3
45	57-3/4	2-3/8	2-3/8	1-1/4	2-1/2	1-1/2	1-7/8	1-7/8	1-3/8	2-1/2
50	57-3/4	2-1/8	2-1/8	1-1/4	2-3/8	1-3/8	1-13/16	1-13/16	1-5/16	2-5/16
55	57-3/4	1-15/16	1-15/16	1-1/4	2-5/16	1-5/16	1-3/4	1-3/4	1-1/4	2-1/8
60	57-3/4	1-3/4	1-3/4	1-1/4	2-1/4	1-1/4	1-3/4	2	1-1/4	2
65	57-11/16	1-11/16	1-11/16	1-3/16	2-3/16	1-3/16	1-5/8	1-5/8	1-3/8	1-7/8
70	57-5/8	1-5/8	1-5/8	1-1/8	2-1/8	1-1/8	1-1/2	1-1/2	1-1/8	1-3/4
75	57-9/16	1-9/16	1-9/16	1-1/16	2-1/16	1-1/16	1-3/8	1-3/8	1-1/16	1-5/8

Figure SUB-PART C – 7 – Passenger Speed – Allowable Temporary Speed Restrictions for Test Car Defects

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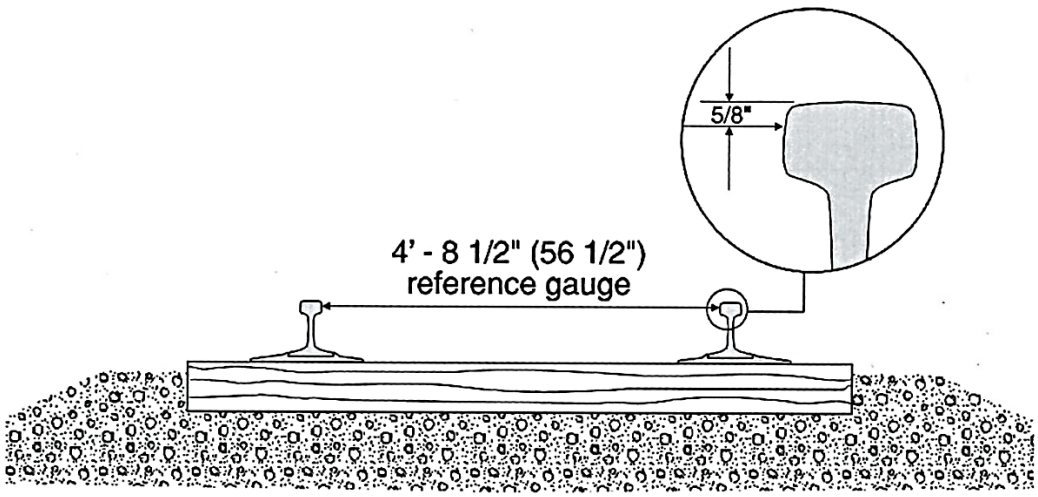
11. Track Defects

11.1 Track Defects – Gauge

Following are 3 gauge defects for track;

- Wide Gauge
- Narrow Gauge
- Variation in Gauge

Gauge is measured at 5/8” *(16 mm)* below the rail head as shown in the following Figure



Track Gauge

Figure SUB-PART C – 8 – Gauge Measurement Visual

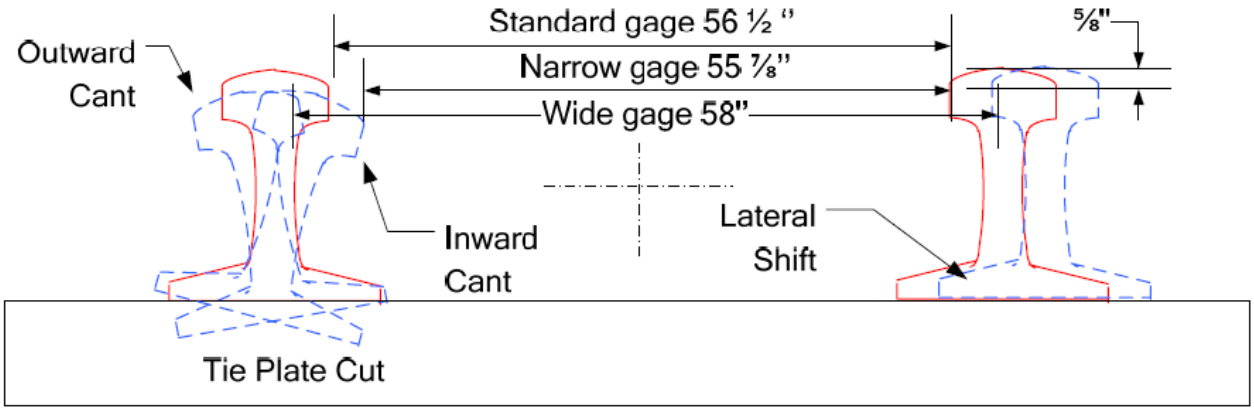


Figure SUB-PART C – 9 – Effects of Plate Cutting and Lateral Shift on Gauge

a) Wide Gauge Defects

i. When the gauge of track is greater than the normal designed standard as a result of poor installation or due to wear and deterioration of part(s) of the track structure, wide gauge can and will occur.

WIDE GAUGE	Class 1	Class 2	Class 3	Class 4	Class 5
Freight Speed MPH	*10*	*25*	*40*	*60*	*80*
Passenger Speed MPH	*15*	*30*	*60*	*80*	*95*
URGENT	1-1/2” *(38 mm)*	1-1/4” *(32 mm)*	1-1/4” *(32 mm)*	1” *(25 mm)*	1” *(25 mm)*
NEAR URGENT	1-3/8” *(35 mm)*	1-1/8” *(29 mm)*	1-1/8” *(29 mm)*	7/8” *(22 mm)*	7/8” *(22 mm)*

Figure SUB-PART C – 10 – Wide Gauge Defects (inches and millimeters)

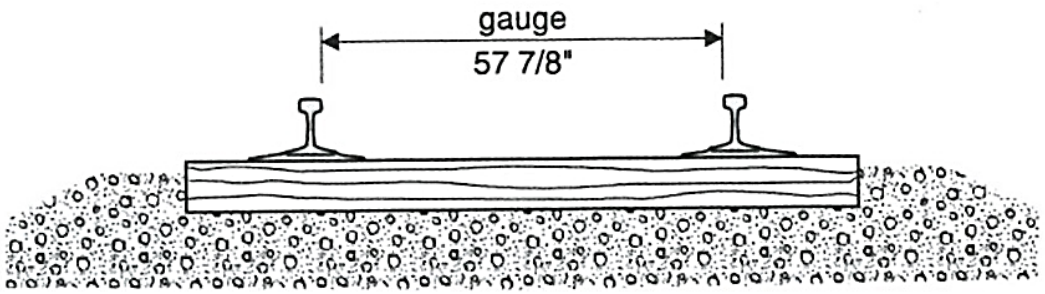


Figure SUB-PART C – 11 – Wide Gauge Example

ii. Gauge that is wide by 1/2" *(13 mm)* or greater results in increased rail surface damage. Any Urgent defect must either be corrected or protected and then corrected. Wide gauge can become serious once it reaches the Urgent threshold. The track can spread, the rail can roll over and the wheels drop between the rails, resulting in derailment.

iii. Identifying Wide Gauge in track

- A standard track gauge is required to check for wide gauge conditions keeping in mind the measurements taken are considering static (not under load). Look for,
  - Poor tie condition or cluster of bad ties
  - Centre bound track and / or hanging ties
  - Nose diving tie plates
  - Worn tie plate shoulders and spike holes
  - Ice build-up on tie plates
  - Canting rail
  - Loose or missing bolts
  - Battered joints

- In addition to the previous, check the following;
    - Step on the tie ends on the low side of the curve. If you hear the plates clank on the high side, the track is centre bound.
    - Place a lining bar on the inside base of the rail, near the track gauge. Push on the bar and watch for movement at the rail's base. This will occur due to poor ties and / or worn plate shoulders, worn spike holes and / or neck worn spikes.

b) Narrow Gauge Defects

i. When the gauge of track is less than the designed standard, the gauge is considered narrow or tight. It is important that correct gauge be maintained in the frog and switch area. On tangent track, narrow or tight gauge contributes to unstable ride, truck hunting, wheel, and rail wear.

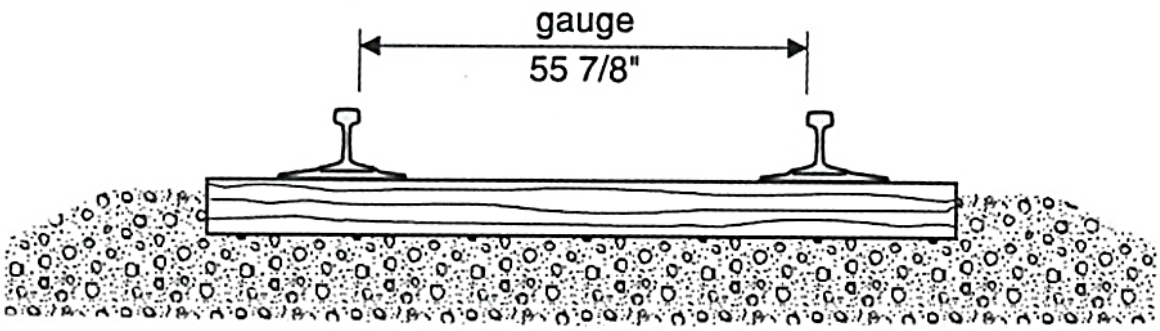


Figure SUB-PART C – 12 – Narrow Gauge Example

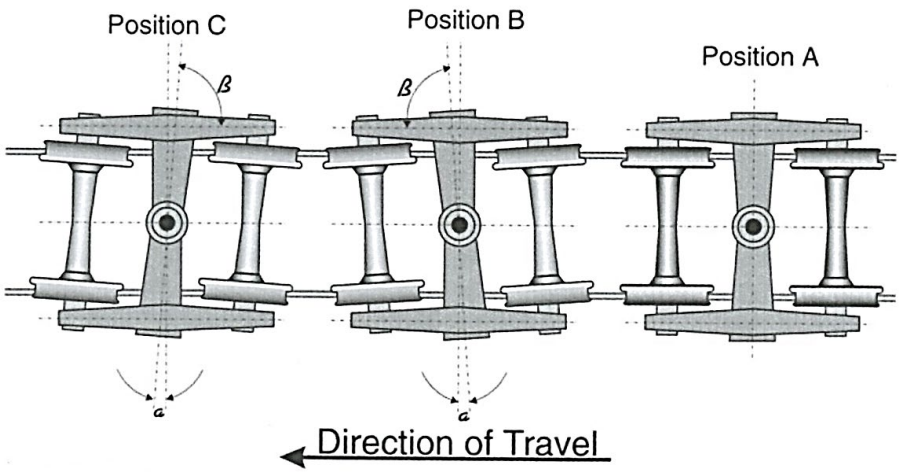


Figure SUB-PART C – 13 – Truck and Wheelset Movement

NARROW GAUGE	Class 1	Class 2	Class 3	Class 4	Class 5
Freight Speed MPH	*10*	*25*	*40*	*60*	*80*
Passenger Speed MPH	*15*	*30*	*60*	*80*	*95*
URGENT	3/4" *(19 mm)*	3/4" *(19 mm)*	1/2" *(13 mm)*	1/2" *(13 mm)*	1/2" *(13 mm)*

Figure SUB-PART C – 14 – Narrow Gauge Defects (inches and millimeters)

ii. Identifying Narrow Gauge in track

- If the track gauge does not fit the track, the gauge of the track is narrow or tight. A tape measure may be required to identify the defect value.
- In addition to the above, check the following;
  - Skewed ties
  - Canting of rail inwards

- Rail was laid too tight
- Excessive adzing
- Cluster of bad ties
- Broken tie plates

c) Variation in Gauge Defects

i. Variation in Gauge is when the gauge is less than 56” *(1,422 mm)* and the change in gauge over a distance of 20’ *(6,096 mm)* or less on either side of the defective location exceeds 1 1/2" *(38 mm)*, train speed must be reduced according to Class 1 track speed.

VARIATION IN GAUGE	Class 1	Class 2	Class 3	Class 4	Class 5
Freight Speed MPH	*10*	*25*	*40*	*60*	*80*
Passenger Speed MPH	*15*	*30*	*60*	*80*	*95*
Variation in Gauge	1 5/8" *(41 mm)*	1 1/2" *(38 mm)*	1 1/8” *(29 mm)*	7/8” *(22 mm)*	5/8” *(16 mm)*

Figure SUB-PART C – 15 – Variation in Gauge Defects (inches and millimeters)

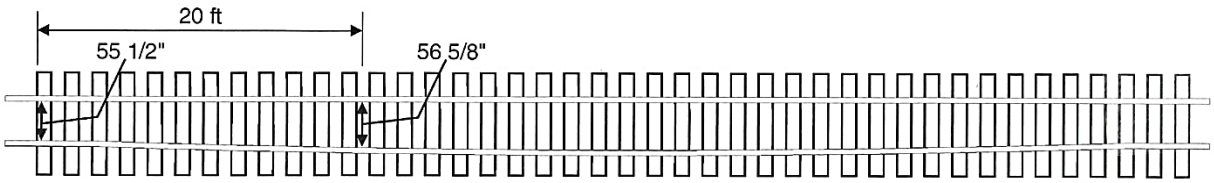


Figure SUB-PART C – 16 – Variation in Gauge Class 3 Example

ii. Identifying Variation in Gauge in track

- Sighting along the gauge side of the affected rail and using a tape measure to measure gauge

iii. Understanding the Effects of Variation of Gauge

- Where there is a variation of gauge over a distance of 20 feet *(6,096 mm)* or less, the angle between the wheel flange and the gauge corner of the rail will increase
- As one rail move inward, it forces the axle over towards the opposite rail, and where tight (narrow) gauge occurs, it may mean that rail is already in contact with the throat of the wheel.

11.2 Track Defects – Alignment

Following are 3 alignment defects for track;

- Alignment 62’ in Tangent
- Alignment 62’ in Curve
- Alignment 31’ in Curve

Alignment is measured over a 31’ or 62’ foot base line along the left and / or the right rail. Defects are taken at the mid-chord ordinate (MCO).

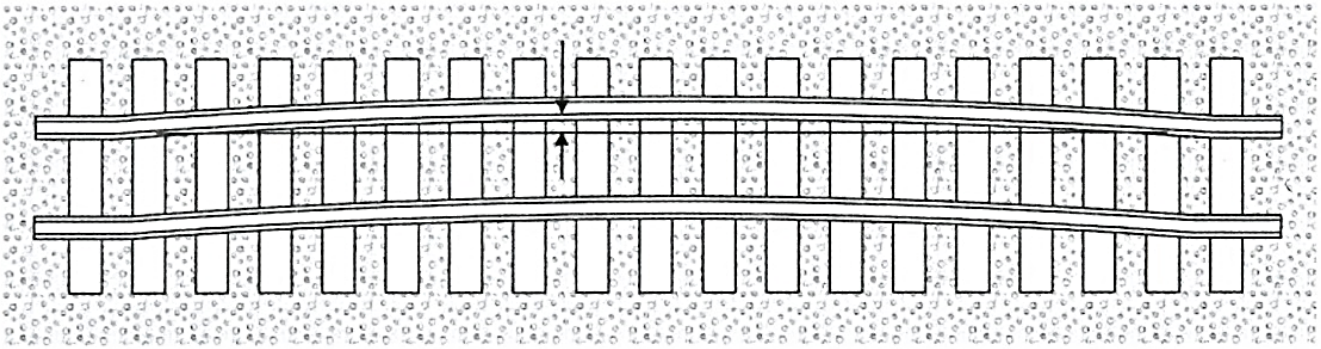


Figure SUB-PART C – 17 – Alignment Defect Example

a) Alignment 62’ in Tangent Defects

i. If the alignment on tangent track, measured at the midpoint of a 62’ chord, with the ends placed 5/8” *(16 mm)* below the top of the rail, deviates from tangent more than the value in the following table, it will be reported as a defect.

- The end of the line must be points on the gauge side of the line rail, 5/8” *(16 mm)* 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

ii. This defect causes the wheels to kick outwards, placing additional stress on the rail and ties and if severe, may cause the wheel to climb the rail.

ALIGNMENT 62’ in TANGENT	Class 1	Class 2	Class 3	Class 4	Class 5
Freight Speed MPH	*10*	*25*	*40*	*60*	*80*
Passenger Speed MPH	*15*	*30*	*60*	*80*	*95*
URGENT	5” *(127 mm)*	3” *(76 mm)*	1-3/4” *(45 mm)*	1-1/2” *(38 mm)*	3/4" *(19 mm)*
NEAR URGENT	4-7/8” *(124 mm)*	2-7/8” *(73 mm)*	1-5/8” *(41 mm)*	1-3/8” *(35 mm)*	5/8” *(16 mm)*

Figure SUB-PART C – 18 – Alignment 62' in Tangent Defects (inches and millimeters)

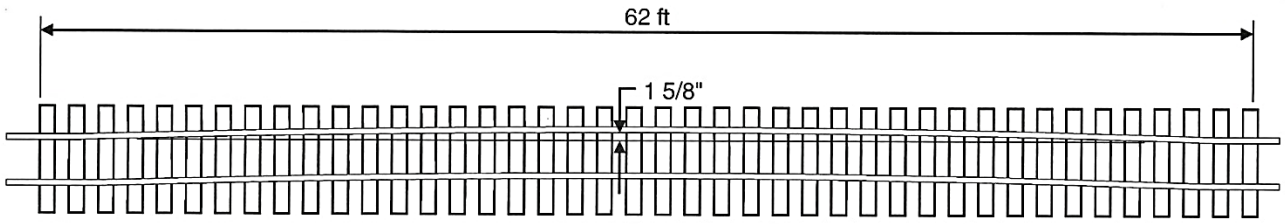


Figure SUB-PART C – 19 – Alignment in Tangent Track Example

iii. Identifying an Alignment Defect in Tangent Track

- Most cases you can see this defect by sighting along the gauge side of the rail then measured with a stringline.
- In addition, look for the following;
  - Hanging ties
  - Tie plates nose diving
  - Loose or missing bolts
  - High, missing, bent or throat cut spikes
  - Batter or bent rail ends
  - Worn or broken plates, ice build-up in plates
  - High water
  - Cluster(s) of bad ties

iv. Correcting Alignment 62’ in Tangent

- If defect is in a switch area,
  - Rail braces may require correction
- If defect is on a bridge,
  - The track may have to be spike lined
- Defects occurring in hot weather may require rail to be cut out
- Defect could be at a bad joint showing a slight swing
- If the defect is long, it may require correcting by lining the track with equipment

b) Alignment 62’ in Curve Defects

i. If the alignment on either or both rails in a curve or spiral, measured at the midpoint of a 62’ chord, with the ends placed 5/8” *(16 mm)* below the top of the rail, deviates from more than the value in the following table from the design alignment for the specific curve or spiral, it will be reported as a defect.

- The ends of the chord must be points on the gauge side of the outer rail, 5/8” *(16 mm)* below the top of the railhead

ii. This defect causes the wheels to kick outwards, placing additional stress on the rail and ties and if severe, may cause the wheel to climb the rail.

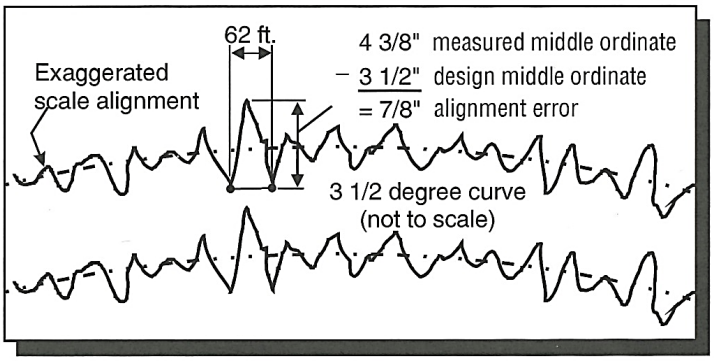


Figure SUB-PART C – 20 – Alignment 62' in Curve Defect Example

ALIGNMENT 62’ in a CURVE	Class 1	Class 2	Class 3	Class 4	Class 5
Freight Speed MPH	*10*	*25*	*40*	*60*	*80*
Passenger Speed MPH	*15*	*30*	*60*	*80*	*95*
URGENT	5” *(127 mm)*	3” *(76 mm)*	1-3/4” *(45 mm)*	1-1/2” *(38 mm)*	5/8” *(16 mm)*
NEAR URGENT	4-7/8” *(124 mm)*	2-7/8” *(73 mm)*	1-5/8” *(41 mm)*	1-3/8” *(35 mm)*	1/2" *(13 mm)*

Figure SUB-PART C – 21 – Alignment 62' in Curve Defects (inches and millimeters)

iii. Identifying an Alignment Defect in Curve

- If short (a few feet long), it may be located at a joint or where there may be a slight swing in the track within the curve and using the stringline method.
- In addition, look for the following;
  - Hanging ties
  - Excessive adzing
  - Tie plates are nose diving
  - Loose or missing bolts
  - High, missing, bent or throat cut spikes
  - Battered of bent rail ends
  - Worn or broken plates, ice build-up on plates

- High water
- Cluster(s) of bad ties

iv. Correcting Alignment 62’ in Curve

- Curve lining, spike lining or gauging may be some of the methods required to correct the defect; lining equipment may be required, and rail may need to be cut out.

c) Alignment 31’ in Curve Defects

v. A 31’ chord is particularly necessary for determining short alignment deviations. A 62’ chord may be “blind” to short alignment conditions, where a 31’ chord can detect those defects.

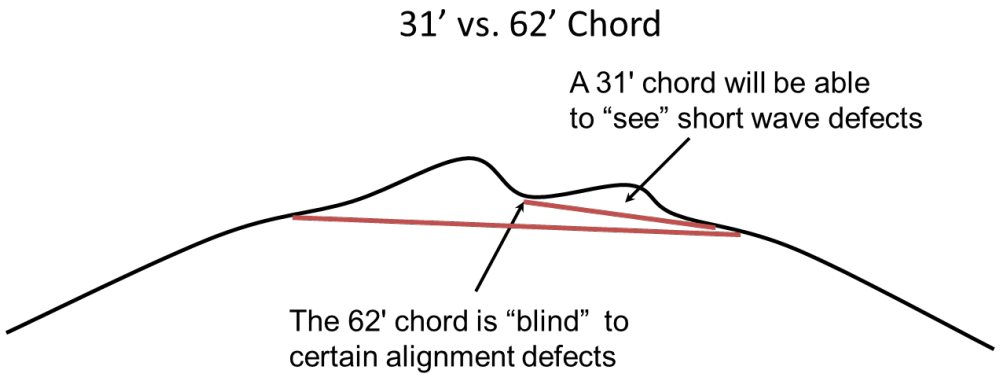


Figure SUB-PART C – 22 – Alignment 31' vs Alignment 62’ Curve Defects

vi. If the alignment on either or both rails in a curve or spiral, measured at the midpoint of a 31’ chord, with the ends placed 5/8” *(16 mm)* below the top of the rail, deviates from more than the value in the following table from the design alignment for the specific curve or spiral, it will be reported as a defect.

- The ends of the chord must be points on the gauge side of the outer rail, 5/8” *(16 mm)* below the top of the railhead

vii. This defect causes the wheels to kick outwards, placing additional stress on the rail and ties and if severe, may cause the wheel to climb the rail.

ALIGNMENT 31’ in a CURVE	Class 1	Class 2	Class 3	Class 4	Class 5
Freight Speed MPH	*10*	*25*	*40*	*60*	*80*
Passenger Speed MPH	*15*	*30*	*60*	*80*	*95*
URGENT	N/A	N/A	1-1/4” *(32 mm)*	1” *(25 mm)*	1/2" *(13 mm)*
NEAR URGENT	N/A	N/A	1-1/8” *(29 mm)*	7/8” *(22 mm)*	3/8” *(10 mm)*

Figure SUB-PART C – 23 – Alignment 31' in Curve Defects (inches and millimeters)

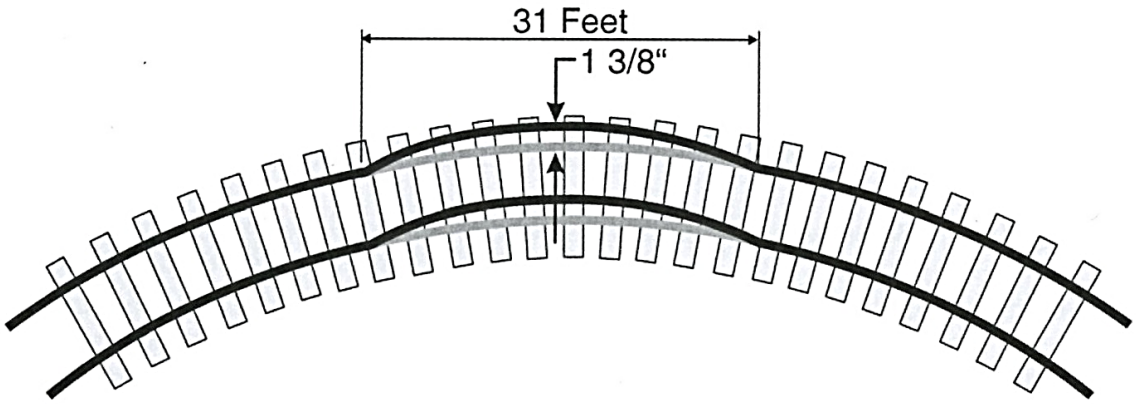


Figure SUB-PART C – 24 – Alignment 31' in a Curve Example

viii. Identifying an Alignment Defect in Curve(s)

- If short (a few feet long), it may be located at a joint or where there may be a slight swing in the track within the curve and using the stringline method.
- In addition, look for the following;
  - Hanging ties
  - Excessive adzing
  - Tie plates are nose diving
  - Loose or missing bolts
  - High, missing, bent or throat cut spikes
  - Battered of bent rail ends
  - Worn or broken plates, ice build-up on plates
  - High water
  - Cluster(s) of bad ties

ix. Correcting Alignment 31’ in Curve(s)

- Curve lining, spike lining or gauging be some of the methods required to correct the defect; lining equipment may be required, and rail may need to be cut out.

11.3 Track Defects – Surface

Following are 3 surface defects for track;

- Surface 62’
- Runoff 31’
- Rock and Roll Surface (RR/Surface)

Surface is measured over a 31’ or 62’ foot base line along the top of left and / or the right rail. Defects are taken at the mid-chord ordinate (MCO). In this case there may not be excessive cross level because both rails are going down a uniform amount.

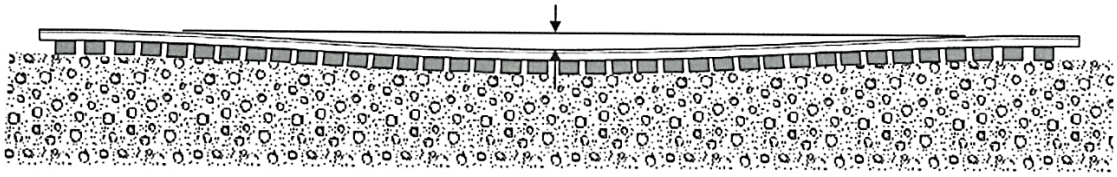


Figure SUB-PART C – 25 – Surface Defect Example

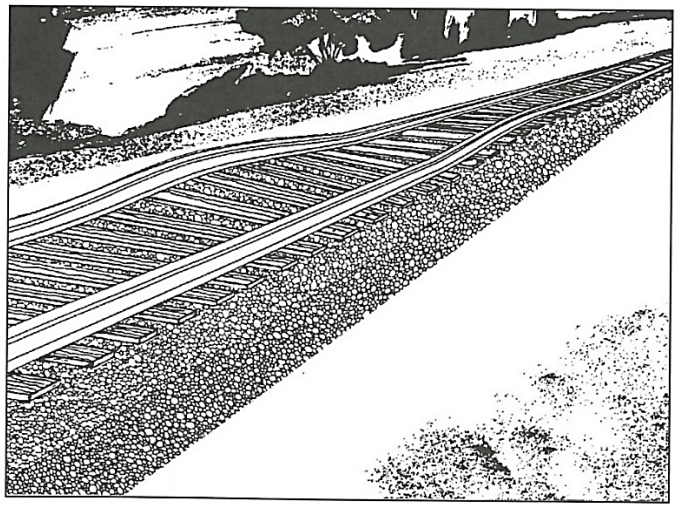


Figure SUB-PART C – 26 – Surface Defect Example

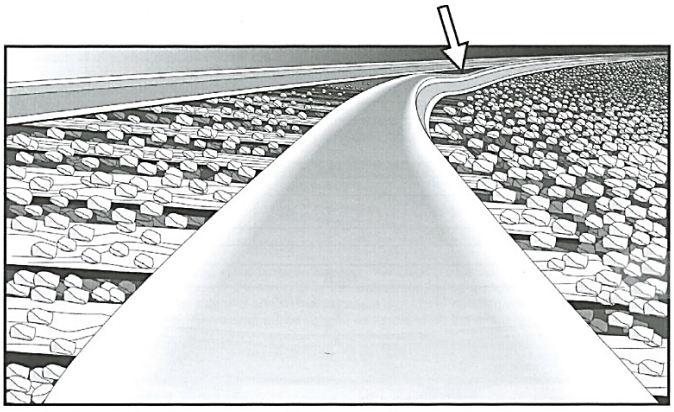


Figure SUB-PART C – 27 – Low Spot Visible - Low Side of Curve Example

a) Surface 62’ Defects

i. If the surface, measured at the midpoint of a 62’ chord strung along the top of the rail exceeds the value shown in the following table, it will be reported as a defect

ii. This defect may cause cars to bounce on their springs causing wheel unloading; if the defect is severe, uncoupling may occur.

SURFACE 62’ MCO	Class 1	Class 2	Class 3	Class 4	Class 5
Freight Speed MPH	*10*	*25*	*40*	*60*	*80*
Passenger Speed MPH	*15*	*30*	*60*	*80*	*95*
URGENT	3” *(76 mm)*	2-3/4” *(70 mm)*	2-1/4” *(57 mm)*	2” *(51 mm)*	1-1/4” *(32 mm)*
NEAR URGENT	2-7/8” *(73 mm)*	2-5/8” *(67 mm)*	2-1/8” *(54 mm)*	1-7/8” *(48 mm)*	1-1/8” *(29 mm)*

Figure SUB-PART C – 28 – Surface 62' Defects (inches and millimeters)

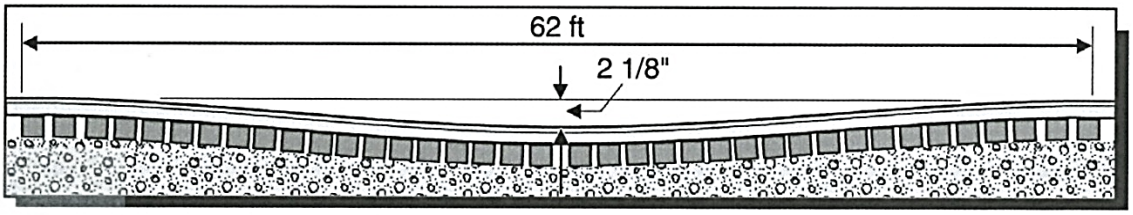


Figure SUB-PART C – 29 – Surface 62' Example

iii. Identifying a Surface 62’ defect;

- Check both rails for a vertical drop (sag) or raise (peak)
- May appear as a shallow spot or hump in the track
- In addition, look for the following;
  - Hanging ties
  - High, missing, bent or throat cut spikes
  - Battered of bent rail ends
  - Engine burns
  - Corrugated rail
  - High water, clogged ditches
  - Cluster(s) of bad ties
  - Failed culvert

iv. Correcting Surface 62’ MCO Defects

- Will require surfacing or shimming depending on the season; tamping rock or ballast under the track to remove the surface problem. If more than an isolated spot or two, surfacing the entire track may be necessary with equipment.

b) Runoff 31' Defects

i. If the runoff in the track surface measured over 31' exceeds the value shown in the following table, a defect will be reported

ii. Can occur in both rails or will occur in one rail

iii. This defect can cause suspension springs to unload rapidly, causing wheel unloading, and perhaps derailment

iv. May be found off a road crossing or at the end of a surfacing lift or bridges

v. Conditions created by track degradation (e.g., settlement or frost heaves) are to be addressed using the uniform profile parameter

RUNOFF 31'	Class 1	Class 2	Class 3	Class 4	Class 5
Freight Speed MPH	*10*	*25*	*40*	*60*	*80*
Passenger Speed MPH	*15*	*30*	*60*	*80*	*95*
URGENT	3-1/2" *(89 mm)*	3" *(76 mm)*	2" *(51 mm)*	1-1/2" *(38 mm)*	1" *(25 mm)*
NEAR URGENT	3-3/8" *(86 mm)*	2-7/8" *(73 mm)*	1-7/8" *(48 mm)*	1-3/8" *(35 mm)*	7/8" *(22 mm)*

Figure SUB-PART C – 30 – Runoff 31' Defects (inches and millimeters)

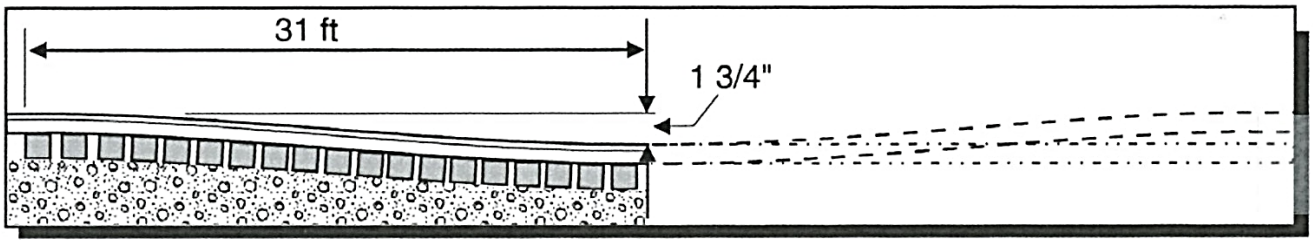


Figure SUB-PART C – 31 – Surface Runoff 31' Defect Example

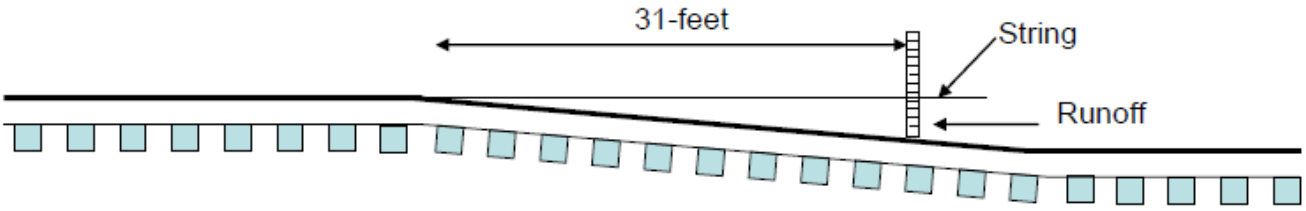


Figure SUB-PART C – 32 – Surface Runoff 31'

vi. Identifying a Runoff 31’ defect;

- Sighting each individual rail, the defect will appear as a drop or raise in the track surface

vii. Correcting Runoff 31’ Defects

- Will require surfacing or shimming depending on the season; tamping rock or ballast under the track to remove the surface problem. If more than an isolated spot or two, surfacing the entire track may be necessary with equipment.

c) Rock and Roll Surface (RR/Surface) Defects

i. If five or more consecutive alternating changes in surface measurement exceeds the value listed in the table for that class of track, it will report as an URGENT defect

ii. There is no direct relation between defect size and track speed

iii. Dynamic loading will increase with speed

iv. This defect causes rolling stock, usually empty cars, to rock and is more typical at speeds of 13 to 21 mph

v. A pattern of low joints (or over-peaked joints) can cause cars to roll, bounce and rock so that the wheels could lift from the rail and derail

ROCK AND ROLL SURFACE	Class 1	Class 2	Class 3	Class 4	Class 5
Freight Speed MPH	*10*	*25*	*40*	*60*	*80*
Passenger Speed MPH	*15*	*30*	*60*	*80*	*95*
URGENT	7/8” *(22 mm)*	3/4" *(19 mm)*	3/4" *(19 mm)*	5/8” *(16 mm)*	1/2" *(13 mm)*
NEAR URGENT	N/A	N/A	N/A	N/A	N/A

Figure SUB-PART C – 33 – Rock and Roll Surface Defects (inches and millimeters)

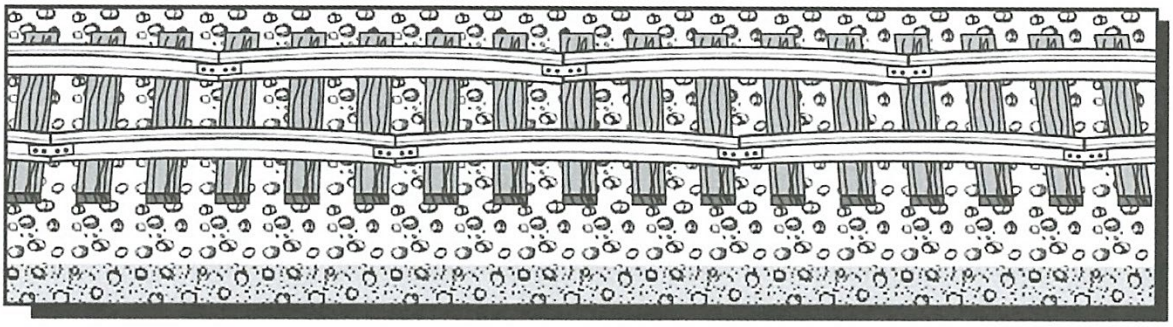


Figure SUB-PART C – 34 – Rock and Roll Surface Defect Example

vi. Identifying a Rock and Roll defect;

- Look for a series of low joints; three or more on one rail plus three or more on the opposite rail
- In addition, look for the following;
  - Hanging ties
  - Pumping ballast
  - Mud on side of rails in joint areas
  - Water near the track

vii. Correcting Rock and Roll Defects

- Will require surfacing correction of each rail depending on the season; tamping rock or ballast under the track to remove the surface problem. If more than an isolated spot or two, surfacing the entire track may be necessary with equipment.

11.4 Track Defects – Crosslevel

Following are 3 crosslevel defects for track;

- WARP 62’
- WARP 31’
- Rock and Roll Crosslevel (RR/XLV)

Crosslevel is a comparison of the tops of parallel rails. A low spot, on one rail in tangent track, causes variation between the two rails and has to be brought back to zero. Curve elevation is a form of crosslevel variation required to counteract centrifugal force when a train passes through a curve. Track twist is the transition from tangent to curved track designed into a curve’s spiral or easement to accommodate the change from zero elevation on tangent track to the superelevation of the curve. See “**Curve Easement and Elevation**”.

a) WARP 62’

i. If the difference in crosslevel between any two points less than 62’ apart on tangents, spirals or in curves exceeds the value in the following table for that class of track, a defect will be reported.

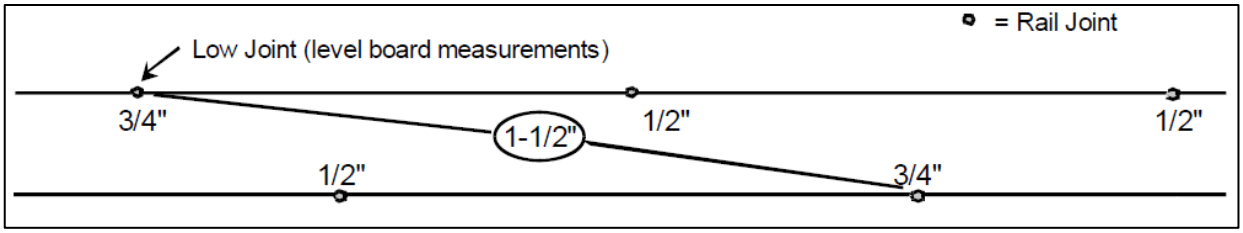
- Subtract largest and smallest same rail measurements within 62’
- Add opposite rail measurements within 62'

ii. A rail car will tend to lean over as it rides over the low spot (on one side) unloading the wheel on the opposite side, or the diagonally opposite wheel. Where one end of the car is going down in a low spot on one side and the other end of the car is going down on the opposite side.

iii. If the maximum change in crosslevel between two points within specific distances along the track

RATE OF CHANGE 62’ / WARP 62’	Class 1	Class 2	Class 3	Class 4	Class 5
Freight Speed MPH	*10*	*25*	*40*	*60*	*80*
Passenger Speed MPH	*15*	*30*	*60*	*80*	*95*
URGENT	3” *(76 mm)*	2-1/4” *(57 mm)*	2” *(51 mm)*	1-3/4” *(45 mm)*	1-1/2” *(38 mm)*
NEAR URGENT	2-7/8” *(73 mm)*	2 1/8” *(54 mm)*	1 7/8” *(48 mm)*	1 5/8” *(41 mm)*	1 3/8” *(35 mm)*

Figure SUB-PART C – 35 – WARP 62' Defects (inches and millimeters)



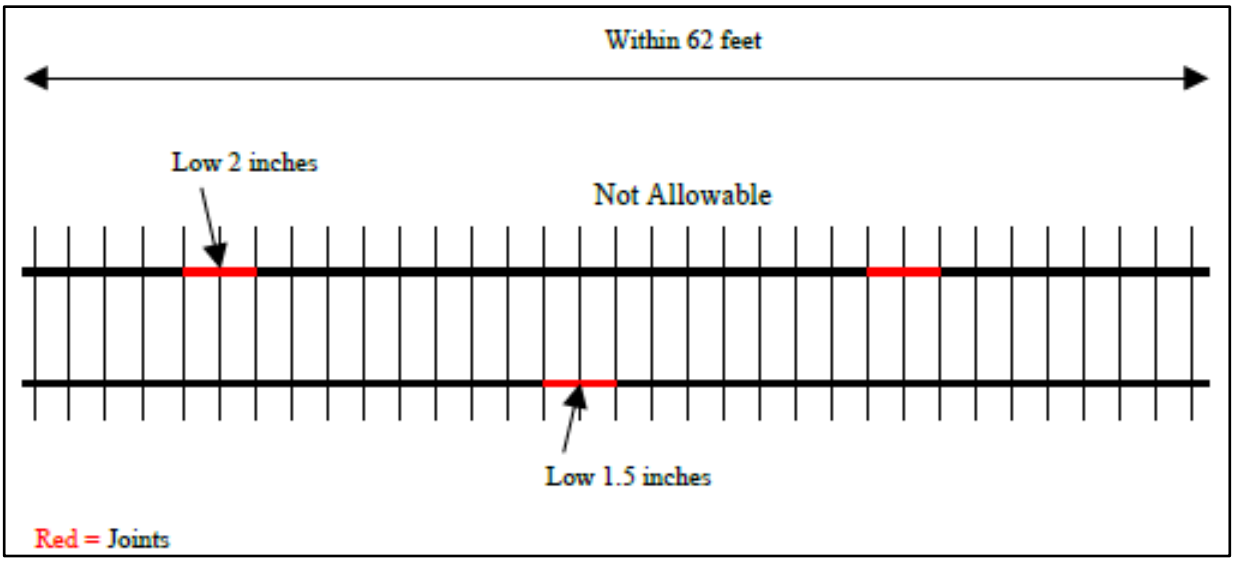
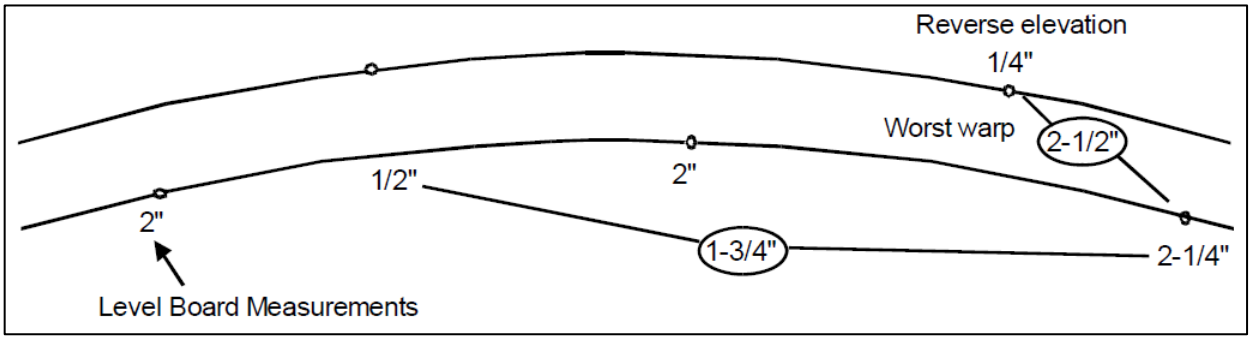


Figure SUB-PART C – 36 – Warp 62' Examples (tangent)



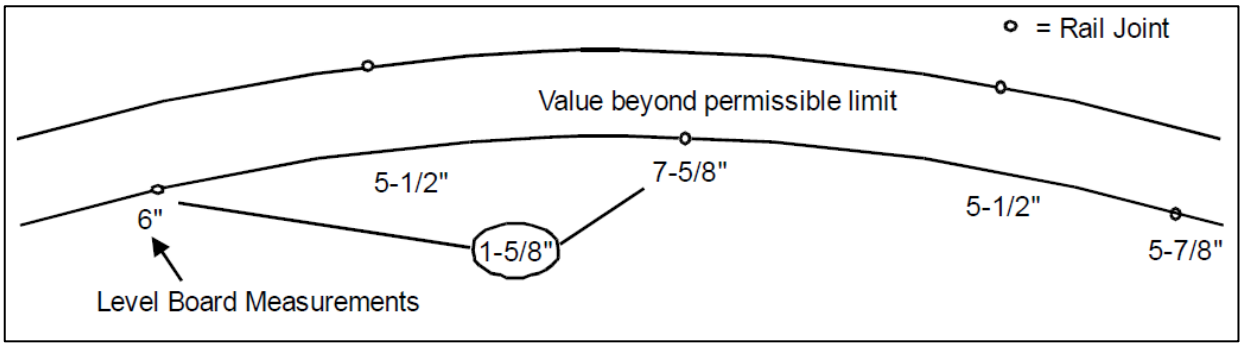


Figure SUB-PART C – 37 – Warp 62' Examples (curves)

iv. Identifying a WARP 62’ defect;

- Measure for warp by checking the cross level on one side and adding that measurement to where it is low on the other side within 62’ of each other
  - In tangent, either rail can be the grade (reference) rail, however the same rail must be used throughout
  - In curves and spirals, the low rail is used as the grade (reference) rail
- Take note of the unloaded measurements seen in the field or adding the applicable cross-level measurement as indicated in Figure SUB-PART C – 2 – Static Measurements Outside a Joint or Figure SUB-PART C – 3 – Static Measurements in a Joint
- Can occur as a low spot on one side of the track with another defect accompanying it.
- Can occur by two joints within 62’ of each other but on opposite rails; the combination of their values (one high and one low) will affect the crosslevel variation.

v. Correcting WARP 62’ Defects

- Surfacing once the variation has been found

b) WARP 31'

i. If the difference in crosslevel between any two points less than 31' apart in spirals exceeds the value as shown in the following table, a defect will be reported.

ii. As you approach the full body in a curve, the spiral's superelevation increases

iii. Occurs in spirals only

iv. A low spot in a spiral can unload a wheel which is simultaneously in heavy flanging while the truck is turning in the spiral

SPIRAL CROSSLEVEL 31'	Class 1	Class 2	Class 3	Class 4	Class 5
Freight Speed MPH	*10*	*25*	*40*	*60*	*80*
Passenger Speed MPH	*15*	*30*	*60*	*80*	*95*
URGENT	2" *(51 mm)*	1-3/4" *(45 mm)*	1-1/4" *(32 mm)*	1" *(25 mm)*	3/4" *(19 mm)*
NEAR URGENT	1-7/8" *(48 mm)*	1-5/8" *(41 mm)*	1-1/8" *(29 mm)*	7/8" *(22 mm)*	5/8" *(16 mm)*

Figure SUB-PART C – 38 – WARP 31' Defects (inches and millimeters)

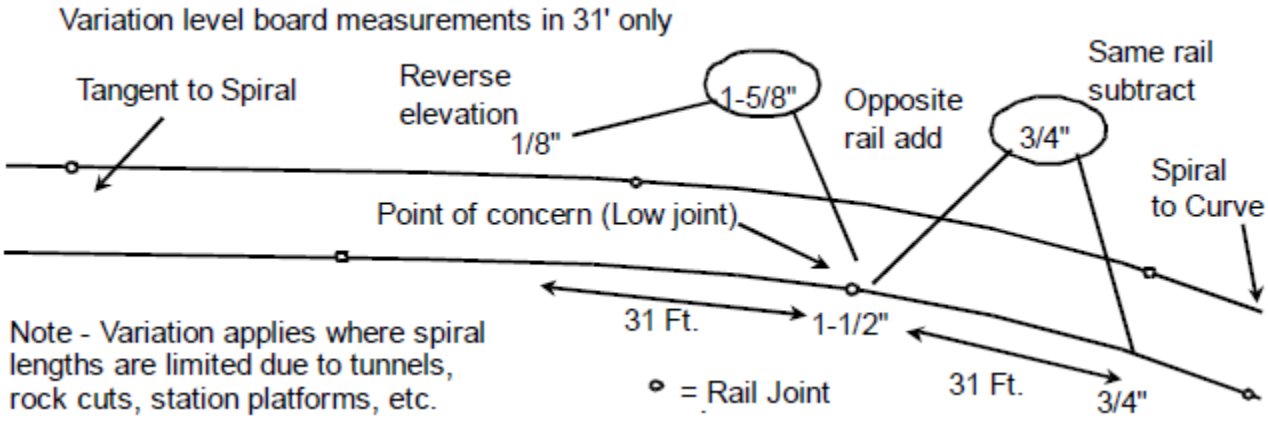


Figure SUB-PART C – 39 – WARP 31' Example

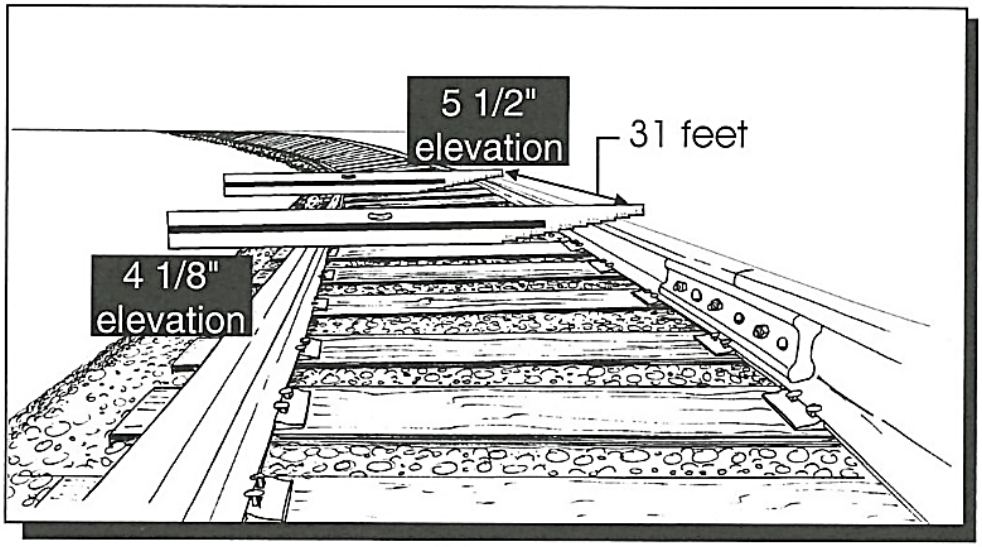


Figure SUB-PART C – 40 – WARP 31' Example

v. Identifying a WARP 31’ defect;

- A low joint or something similar may have caused this defect
- Can be difficult to spot by eye
- In spirals, the low rail is used as the grade (reference) rail
- Take note of the unloaded measurements seen in the field or adding the applicable cross-level measurement as indicated in Figure SUB-PART C – 2 – Static Measurements Outside a Joint or Figure SUB-PART C – 3 – Static Measurements in a Joint

vi. Correcting WARP 31’ Defects

- Care must be taken when correcting this defect to ensure another crosslevel defect is created

c) Rock and Roll Crosslevel (RR/XLV)

i. Not to be confused with Rock and Roll Surface defect which involves 6 or more consecutive alternating changes in surface measurements.

ii. If three consecutive alternating changes in crosslevel measurements exceed the values as shown in the following table for that class of track, it is an URGENT defect.

iii. A pattern of crosslevel defects over a distance of 45’ to 65’ coinciding with the length of the car’s truck centre spacing may cause a car to rock excessively on its springs, causing the wheels to lift from the rail.

iv. No direct relation between size of defect and track speed class.

v. Dynamic loadings will increase with speed.

vi. May cause a rocking condition in some types of rolling stock, usually an empty car and is more typical at speeds between 15 to 25 mph.

ROCK AND ROLL CROSSLEVEL	Class 1	Class 2	Class 3	Class 4	Class 5
Freight Speed MPH	*10*	*25*	*40*	*60*	*80*
Passenger Speed MPH	*15*	*30*	*60*	*80*	*95*
URGENT	1-1/4” *(32 mm)*	1” *(25 mm)*	1” *(25 mm)*	7/8” *(22 mm)*	3/4" *(19 mm)*
NEAR URGENT	N/A	N/A	N/A	N/A	N/A

Figure SUB-PART C – 41 – Rock and Roll Crosslevel Defects (inches and millimeters)

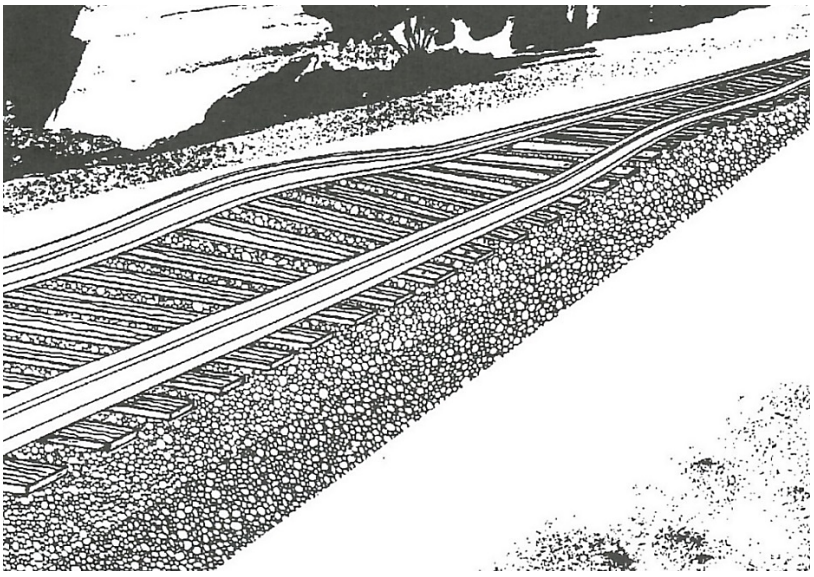


Figure SUB-PART C – 42 – Rock and Roll Crosslevel Defect Example

vii. Identifying a Rock and Roll Crosslevel defect;

- A series of ups and downs which are opposite to the other rail over a short distance
- In addition to the above, look for the following;

- Poor subgrade conditions
- Poor ballast and pumping ballast
- Hanging ties
- Water near the track
- Heavy frost heaves in cold weather

viii. Correcting Rock and Roll Crosslevel Defects

- Correct the surface of each rail.

11.5 Track Defects – Design

Following are 5 design defects for track;

- V_{MAX} Defect (Design Speed)
- XLV from Design Tangent Defect
- XLV from Design Curve Defect
- XLV from Design Spiral Defect
- Reverse Elevation

Over many years, the reliance was placed on tampers to smooth the tracks, they also may have deviated from its original design that would be seen by the experienced Foreman who would eye longer than 62'. As a general rule, when curves are tamped and lined, the operator should try to take the curve back to the curvature and elevation specified on the curve list.

a) V_{MAX} Defect

i. If the posted speed exceeds the calculated design speed because the curvature is too sharp and / or the superelevation is not enough for the authorized speed, it will report an URGENT defect

ii. If inadequate superelevation, a passing train could cause the high rail to be pushed outwards resulting in wide gauge or even rail rollover

iii. The maximum allowable speed is calculated using the average curvature through the body of the curve (excluding the spiral) and the average elevation, allowing 3" unbalanced elevation through the body of the curve

iv. One cause of inadequate curve elevation is when the ends of curves are run-off

v. If run-off occurs in a curve, use the actual minimum elevation when computing the maximum allowable operating speed for that curve

- Speed restrictions posted by the geometry test car are not the speed for the class of track but is the exact speed the curve is designed for; therefore, round this speed off to the next lower number in multiples of 0 and 5 (e.g., 37 to 35, 33 to 30 and 30 to 30); never increase the speed until the defect is corrected

DESIGN SPEED	Class 1	Class 2	Class 3	Class 4	Class 5
Freight Speed MPH	*10*	*25*	*40*	*60*	*80*
Passenger Speed MPH	*15*	*30*	*60*	*80*	*95*
URGENT	3" *(76 mm)*	3" *(76 mm)*	3" *(76 mm)*	3" *(76 mm)*	3" *(76 mm)*
NEAR URGENT	N/A	N/A	N/A	N/A	N/A

Figure SUB-PART C – 43 – Design Speed (VMAX) Defects (inches and millimeters)

vi. Identifying a V_{MAX} defect;

- Check the rails, ties and fastening for early signs of possible rail rollover
- Rail is both heavily curve worn and poorly lubricated
- Use a track level to confirm incorrect superelevation

vii. Correcting V_{MAX} Defects

- Will most likely need to be corrected using tamping / lining equipment account longer sections of the curve geometry require remedial action
- At times, a small spot may be causing the defect (e.g., low joint) and can be corrected with track maintenance
- May also be caused by excessive curvature caused by bunching up steel at the spiral to curve location

b) Design Elevation Tangent (XLV from Design Elevation Tangent) Defect

i. If the elevation in tangent deviates from zero elevation by more than the value shown in the following table, a defect will be reported.

DESIGN ELEVATION TANGENT	Class 1	Class 2	Class 3	Class 4	Class 5
Freight Speed MPH	*10*	*25*	*40*	*60*	*80*
Passenger Speed MPH	*15*	*30*	*60*	*80*	*95*
URGENT	3” *(76 mm)*	2” *(51 mm)*	1-3/4” *(45 mm)*	1-1/4” *(32 mm)*	1” *(25 mm)*
NEAR URGENT	2-7/8” *(73 mm)*	1-7/8” *(48 mm)*	1-5/8” *(41 mm)*	1-1/8” *(29 mm)*	7/8” *(22 mm)*

Figure SUB-PART C – 44 – Design Elevation Tangent (XLV from Design Tangent) Defects (inches and millimeters)

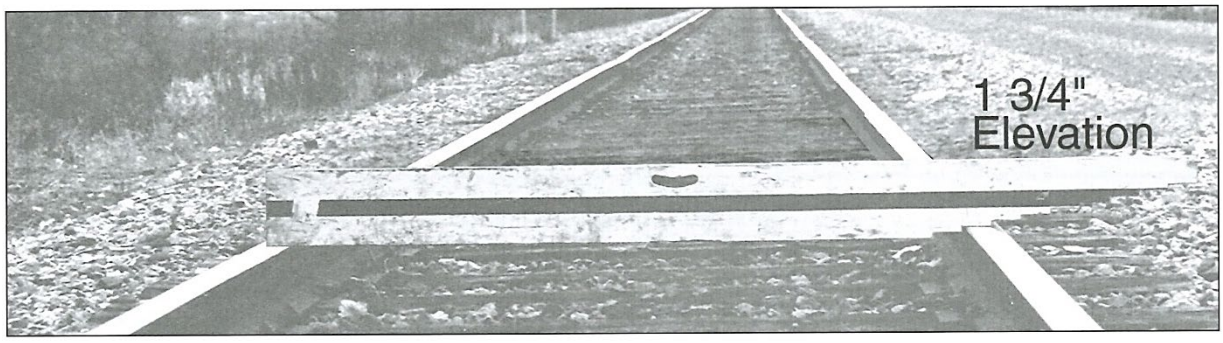


Figure SUB-PART C – 45 – Design Elevation Tangent Defect Example

ii. Identifying a Design Elevation Tangent defect;

- Using a track level, to identify the difference in elevation between the grade rail and the opposite rail, measured at right angles
  - Either rail can be the grade (reference) rail in tangent track however, the same rail must be used throughout

iii. Correcting Design Elevation Tangent Defects

- Use a tamper to lift and tamp the rail that has lost elevation

c) XLV from Design Elevation Curve Defect

i. If the elevation in a curve deviates from designated elevation on curves between spirals by more than the value shown in the following table, a defect will be reported.

XLV FROM DESIGN ELEVATION CURVE	Class 1	Class 2	Class 3	Class 4	Class 5
Freight Speed MPH	*10*	*25*	*40*	*60*	*80*
Passenger Speed MPH	*15*	*30*	*60*	*80*	*95*
URGENT	3” *(76 mm)*	2” *(51 mm)*	1-3/4” *(45 mm)*	1-1/4” *(32 mm)*	1” *(25 mm)*
NEAR URGENT	2-7/8” *(73 mm)*	1-7/8” *(48 mm)*	1-5/8” *(41 mm)*	1-1/8” *(29 mm)*	7/8” *(22 mm)*

Figure SUB-PART C – 46 – XLV from Design Elevation Curve Defects (inches and millimeters)

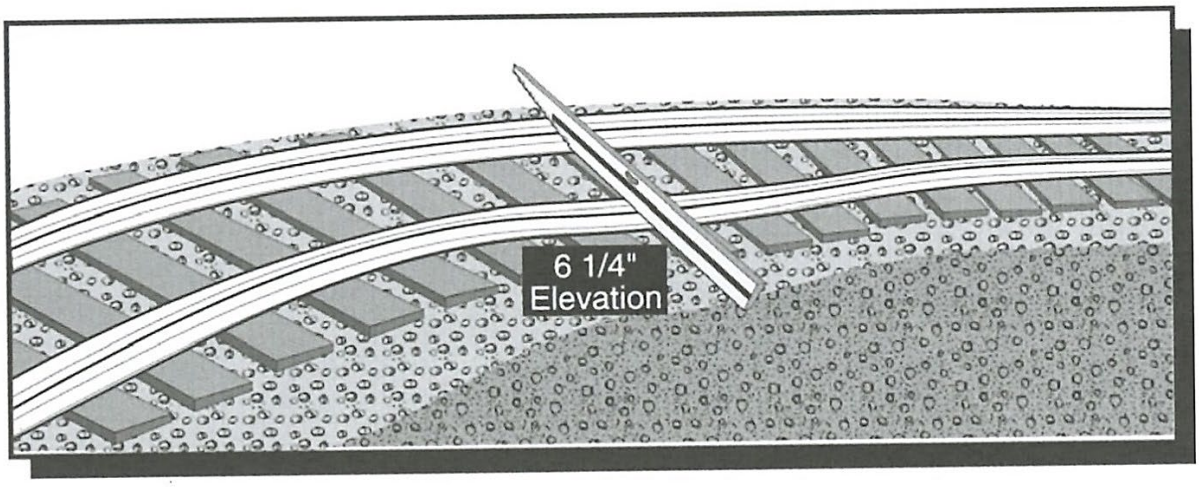


Figure SUB-PART C – 47 – XLV from Design Elevation Curve Defect Example

ii. Identifying a Design Elevation Curve defect;

- Place track level at the low point using the low rail as the grade (reference) rail to identify the difference between the 2 rails and design, taking note of the unloaded measurements seen in the field.

iii. Correcting Design Elevation Curve Defects

- Ideally, use a tamper to lift and tamp the rail that has lost elevation

d) XLV from Design Elevation Spiral Defect

i. If the elevation in a spiral deviates from designated elevation through the spiral(s) by more than the value shown in the following table, a defect will be reported.

XLV FROM DESIGN ELEVATION SPIRAL	Class 1	Class 2	Class 3	Class 4	Class 5
Freight Speed MPH	*10*	*25*	*40*	*60*	*80*
Passenger Speed MPH	*15*	*30*	*60*	*80*	*95*
URGENT	1-3/4” *(45 mm)*	1-1/2” *(38 mm)*	1-1/4” *(32 mm)*	1” *(25 mm)*	3/4" *(19 mm)*
NEAR URGENT	1-5/8” *(41 mm)*	1-3/8” *(35 mm)*	1-1/8” *(29 mm)*	7/8” *(22 mm)*	5/8” *(16 mm)*

Figure SUB-PART C – 48 – XLV from Design Elevation Spiral Defect (inches and millimeters)

ii. Identifying a Design Elevation Spiral defect;

- Place track level at the low point using the low rail as the grade (reference) rail to identify the difference between the 2 rails and design, taking note of the unloaded measurements seen in the field.

iii. Correcting Design Elevation Spiral Defects

- Ideally, use a tamper to lift and tamp the rail that has lost elevation

e) Reverse Elevation (RV ELV) Defect

i. If the elevation in a curve is reversed from the curvature direction by more than the values shown in the following table, a defect will be reported. This defect is to identify locations in a curve where the high rail sagged and has less elevation than the low rail. This type of defect can occur in areas of shallow curvature or in turnouts as a result of poor ballast / sub-grade. Other design defects are generally within this curve. This defect may cause the cars to lean over.

REVERSE ELEVATION	Class 1	Class 2	Class 3	Class 4	Class 5
Freight Speed MPH	*10*	*25*	*40*	*60*	*80*
Passenger Speed MPH	*15*	*30*	*60*	*80*	*95*
URGENT	3” *(76 mm)*	2” *(51 mm)*	1-3/4” *(45 mm)*	1-1/4” *(32 mm)*	1” *(25 mm)*
NEAR URGENT	2-7/8” *(73 mm)*	1-7/8” *(48 mm)*	1-5/8” *(41 mm)*	1-1/8” *(29 mm)*	7/8” *(22 mm)*

Figure SUB-PART C – 49 – Reverse Elevation (RV ELV) Defect (inches and millimeters)

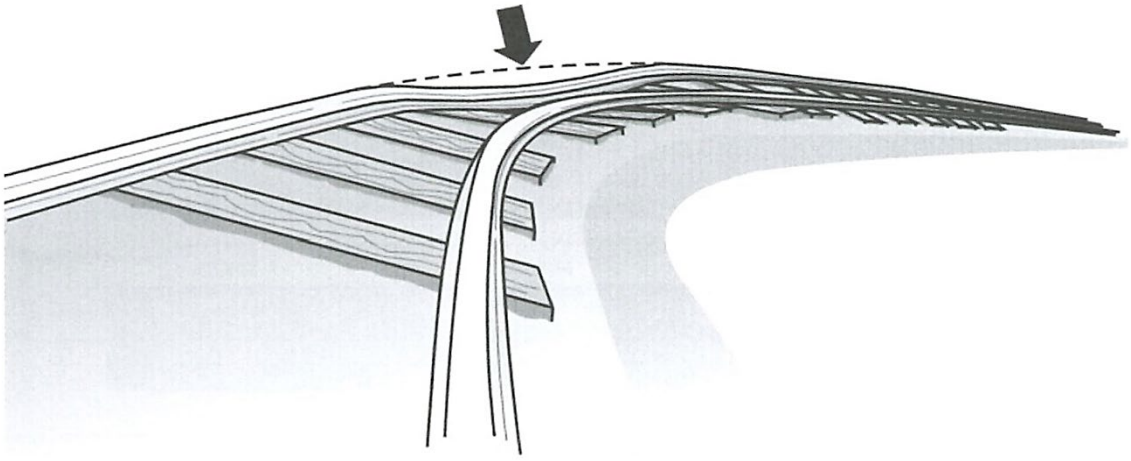


Figure SUB-PART C – 50 – Reverse Elevation Defect Example

ii. Identifying a Reverse Elevation defect;

- This defect can appear as a low spot on the high rail or a high spot on the low rail. In some areas (shallow curves or throughout most of the curve), you may not see it by eye. The use of a track level is required taking note of the unloaded measurements seen in the field.

iii. Correcting Design Elevation Spiral Defects

- Ideally, use a tamper to lift and tamp the rail that has lost elevation

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12. Curves

12.1 Curves – Easement, Elevation and Speed Limitations

a) The degree of a curve is determined by stretching a 62-foot chord on the gauge side of the outer rail of the curve. The distance in inches between the centre of this chord and the gauge side of the rail is the degree of the curve.

- If a 31-foot chord is used, the mid-ordinate in inches must be multiplied by 4 to obtain the degree of curve.

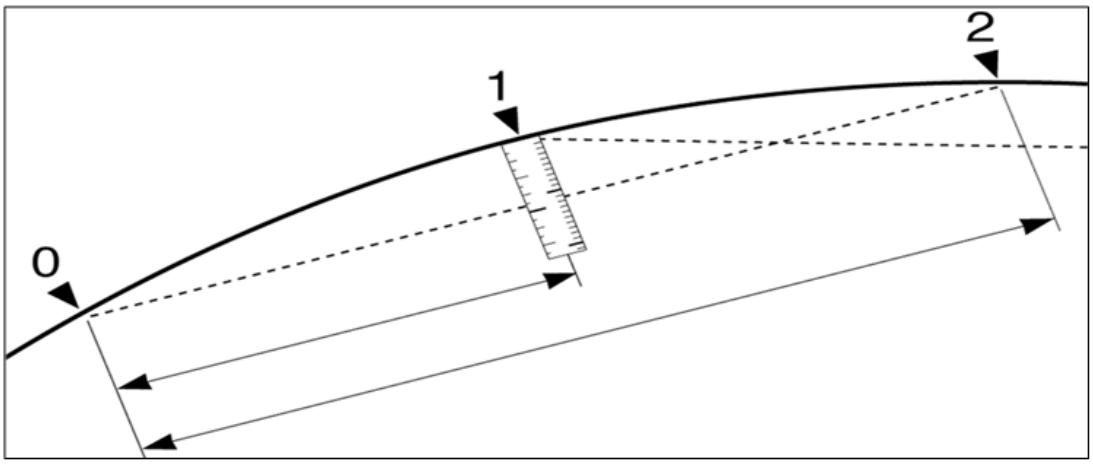


Figure SUB-PART C – 51 – Degree of Curve Measurement

b) On main tracks, spirals or curve easements must be installed between tangents and all curves of 1° and over, and between any two parts of a compound curve if these differ by 1° or more.

- Spirals provide a transition in both curvature and elevation.
- The length of the spiral between a tangent and a curve, or between two parts of a compound curve should be the length shown in the Curve Easement Table for each inch of curve elevation (taking into account the speed of the fastest train).

Refer to Figure Sub-Part C – 66 – Curve Easement Table

12.2 Curves – Determining Elevation

a) The Director, Rail Infrastructure is responsible for determining the proper elevation for each curve and curve elevations may only be changed on his authority,

b) Curve elevations are not permitted to be set to more than 5 inches *(127 mm)* installed, unless directed by the Director, Rail Infrastructure.

c) The maximum cross level on the outside rail of a curve may not be more than 7 inches *(178 mm)* on any track.

d) Curves exceeding 6 inches *(152 mm)* cross level must be monitored and have a remedial action plan to bring it back to 6 inches *(152 mm)* or less cross level.

e) The proper curve elevation for a particular curve is based on the degree of the curve and the maximum authorized speed of the fastest train on that curve.

f) The outside rail on a curve may not be lower than the inside rail except as provided by Figure Sub-Part C – 4 – URGENT Defects.

12.3 Curves – Using Curve Elevation Tables

a) The amount of elevation required is determined from the Curve Elevation Tables. These give the desired curve elevation for a given curvature and train speed, and alternatively, give the train speed for a given curvature and curve elevation.

b) In practice, railroads generally do not operate trains at balanced speed; that is, train speeds are set to move the resultant force toward the outer rail, resulting in an unbalance typically less than 3 inches.

c) Unbalance, or cant, deficiency is the theoretical amount of elevation that would have to be added to the existing elevation to achieve a balanced condition.

12.4 Curves – Maximum Allowable Speed (V_{MAX})

a) The maximum allowable speed *(V_{MAX})* for any curve is calculated using:

$$V_{MAX} = \sqrt{(Ea + Eu) / 0.0007 \times Dc}$$

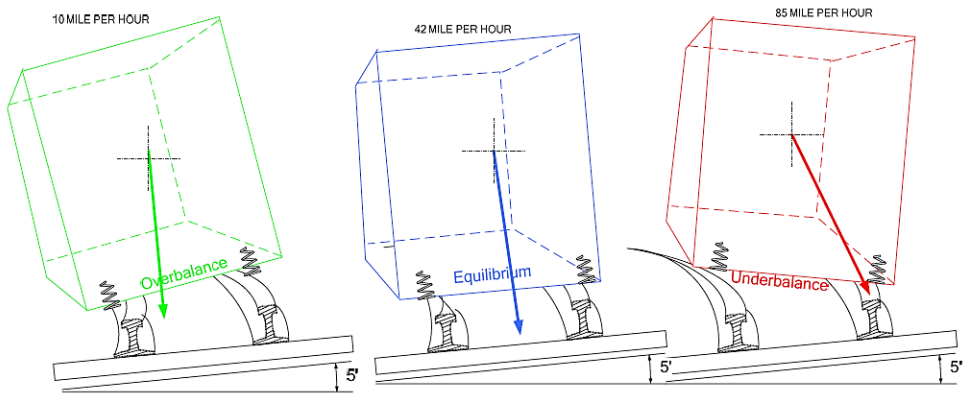
Where:

V_{MAX} = Maximum allowable operating speed *(miles per hour)*
Ea = Actual elevation of the outside rail *(inches)*[1]
Eu = Maximum allowable unbalanced condition
Dc = Degree of curvature *(degrees)*[2]

[1]To calculate V_{MAX} only, Ea (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.

[2]Degree of curvature is determined by averaging the degree of curvature over the same track segment as the elevation.

The maximum Eu to use: Freight - 3 inches *(76 mm)*
Passenger - 3 inches *(76 mm)*



4° Curve with 5" Superelevation

Figure SUB-PART C – 52 – Three Examples of Balance Conditions

12.5 Curves – Balanced Elevation

- Balanced or equilibrium speed in mph for a given curve degree and elevation.
- Maximum elevation on a curve for a given timetable speed.

Curve Elevation Balanced													
Elevation of Outer Rail													
Inches	**0**	**½**	**1**	**1 ½**	**2**	**2 ½**	**3**	**3 ½**	**4**	**4 ½**	**5**	**5 ½**	**6**
Millimeters	***0***	***13***	***25***	***38***	***51***	***64***	***76***	***89***	***102***	***114***	***127***	***140***	***152***
Degree of Curve	**MAXIMUM ALLOWABLE OPERATING SPEED (M.P.H.)**												
0-30	-	38	54	66	76	85	93	100					
1-00	-	27	38	47	54	60	66	71	76	81	85	89	93
1-30	-	22	31	38	44	49	54	58	62	66	70	73	76
2-00	-	19	27	33	38	43	47	50	54	57	60	63	66
2-30	-	17	24	30	34	38	42	45	48	51	54	47	59
3-00	-	16	22	27	31	35	38	41	44	47	49	52	54
3-30	-	15	21	25	29	32	35	38	41	43	47	48	50
4-00	-	14	19	24	27	30	33	36	38	41	43	45	47
5-00	-	12	17	21	24	27	30	32	34	36	38	40	42
6-00	-	11	16	19	22	25	27	29	31	33	35	37	38
7-00	-	11	15	18	21	23	25	27	29	31	32	34	35
8-00	-	10	14	17	19	22	24	25	27	29	30	32	33
9-00	-	9	13	16	18	20	22	24	26	27	29	30	31
10-00	-	9	12	15	17	19	21	23	24	26	27	29	30
12-00	-	8	11	14	16	18	19	21	22	24	25	26	27
15-00	-	7	10	12	14	16	17	19	20	21	22	23	24

Equilibrium speed on a curve is the speed at which the resultant of the weight and the centrifugal force is balanced resulting in equal vertical loads on the high and low rail.

Figure SUB-PART C – 53 – Curve Elevation Table – Balanced

12.6 Curves – 1 Inch Underbalanced Elevation

- Preferred speed for freight trains in mph for a given curve degree and elevation.
- Preferred elevation on a curve for a given freight train timetable speed.

Curve Elevation 1" *(25 mm)* Underbalanced													
Elevation of Outer Rail													
Inches	**0**	**½**	**1**	**1 ½**	**2**	**2 ½**	**3**	**3 ½**	**4**	**4 ½**	**5**	**5 ½**	**6**
Millimeters	***0***	***13***	***25***	***38***	***51***	***64***	***76***	***89***	***102***	***114***	***127***	***140***	***152***
Degree of Curve	**MAXIMUM ALLOWABLE OPERATING SPEED (M.P.H.)**												
0-30	54	66	76	85	93	100							
1-00	38	47	54	60	66	71	76	81	85	89	93	97	100
1-30	31	38	44	49	54	58	62	66	70	73	76	79	82
2-00	27	33	38	43	47	51	54	57	60	63	66	69	71
2-30	24	30	34	38	42	45	48	51	54	57	59	61	64
3-00	22	27	31	35	38	41	44	47	49	52	54	56	58
3-30	21	25	29	32	35	38	41	43	46	48	50	52	54
4-00	19	24	27	30	33	36	38	41	43	45	47	49	51
5-00	17	21	24	27	30	32	34	36	38	40	42	44	45
6-00	16	19	22	25	27	29	31	33	35	37	38	40	41
7-00	15	18	21	23	25	27	29	31	32	34	35	37	38
8-00	14	17	19	22	24	26	27	29	30	32	33	35	36
9-00	13	16	18	20	22	24	26	27	29	30	31	33	34
10-00	12	15	17	19	21	23	24	26	27	29	30	31	32
12-00	11	14	16	18	19	21	22	24	25	26	27	28	29
15-00	10	12	14	16	17	19	20	21	22	23	24	25	26

The recommended speed on a curve for freight trains, requiring 1" higher elevation for equilibrium.

Figure SUB-PART C – 54 – Curve Elevation - 1" Underbalanced

12.7 Curves – 2 Inches Underbalanced Elevation

Curve Elevation 2" *(51 mm)* Underbalanced													
Elevation of Outer Rail													
Inches	**0**	**½**	**1**	**1 ½**	**2**	**2 ½**	**3**	**3 ½**	**4**	**4 ½**	**5**	**5 ½**	**6**
Millimeters	***0***	***13***	***25***	***38***	***51***	***64***	***76***	***89***	***102***	***114***	***127***	***140***	***152***
Degree of Curve	**MAXIMUM ALLOWABLE OPERATING SPEED (M.P.H.)**												
0-30	76	85	93	100									
1-00	54	60	66	71	76	81	85	89	93	97	100		
1-30	44	49	54	58	62	66	70	73	76	79	82	85	88
2-00	38	43	47	50	54	57	60	63	66	69	71	74	76
2-30	34	38	42	45	48	51	54	57	59	61	64	66	68
3-00	31	35	38	41	44	47	49	52	54	56	58	60	62
3-30	29	32	35	38	41	43	46	48	50	52	54	56	58
4-00	27	30	33	36	38	41	43	45	47	49	50	52	54
5-00	24	27	30	32	34	36	38	40	42	44	45	47	48
6-00	22	25	27	29	31	33	35	37	38	40	41	43	44
7-00	21	23	25	27	29	31	32	34	35	37	38	40	41
8-00	19	22	24	25	27	29	30	32	33	35	36	37	38
9-00	18	20	22	24	26	27	29	30	31	33	34	35	36
10-00	17	19	21	23	24	26	27	29	30	31	32	33	34
12-00	16	18	19	21	22	24	25	26	27	28	29	30	31
15-00	14	16	17	19	20	21	22	23	24	25	26	27	28

Figure SUB-PART C – 55 – Curve Elevation - 2" Underbalanced

12.8 Curves – 3 inches Underbalanced Elevation

- Maximum permissible speed for trains operating speed in mph for a given curve degree and elevation. As per the *Rules Respecting Track Safety*, *Transport Canada* approval is required if the level of cant deficiency is greater than 3".

Curve Elevation 3" *(76 mm)* Underbalanced													
Elevation of Outer Rail													
Inches	**0**	**½**	**1**	**1 ½**	**2**	**2 ½**	**3**	**3 ½**	**4**	**4 ½**	**5**	**5 ½**	**6**
Millimeters	***0***	***13***	***25***	***38***	***51***	***64***	***76***	***89***	***102***	***114***	***127***	***140***	***152***
Degree of Curve	**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

The maximum permissible speed on a curve for trains requiring 3" higher elevation for equilibrium.

Figure SUB-PART C – 56 – Curve Elevation - 3" Underbalanced

12.9 Curves – 4 inches Underbalanced Elevation

- As per the *Rules Respecting Track Safety*, *Transport Canada* approval is required if the level of cant deficiency is greater than 3".

Curve Elevation 4" *(102 mm)* Underbalanced													
Elevation of Outer Rail													
Inches	**0**	**½**	**1**	**1 ½**	**2**	**2 ½**	**3**	**3 ½**	**4**	**4 ½**	**5**	**5 ½**	**6**
Millimeters	*0*	*13*	*25*	*38*	*51*	*64*	*76*	*89*	*102*	*114*	*127*	*140*	*152*
Degree of Curve	**MAXIMUM ALLOWABLE OPERATING SPEED (M.P.H.)**												
0° 30'	107	113	120	125	131	136	141	146	151	156	160	165	169
1° 00'	76	80	85	89	93	96	100	104	107	110	113	116	120
1° 15'	68	72	76	79	83	86	89	93	96	99	101	104	107
1° 30'	62	65	69	72	76	79	82	85	87	90	93	95	98
1° 45'	57	61	64	67	70	73	76	78	81	83	86	88	90
2° 00'	53	57	60	63	65	68	71	73	76	78	80	82	85
2° 15'	50	53	56	59	62	64	67	69	71	73	76	78	80
2° 30'	48	51	53	56	59	61	63	65	68	70	72	74	76
2° 45'	46	48	51	53	56	58	60	62	64	66	68	70	72
3° 00'	44	46	49	51	53	56	58	60	62	64	65	67	69
3° 15'	42	44	47	49	51	53	55	57	59	61	63	65	66
3° 30'	40	43	45	47	49	52	53	55	57	59	61	62	64
3° 45'	39	41	44	46	48	50	52	53	55	57	59	60	62
4° 00'	38	40	42	44	46	48	50	52	53	55	57	58	60
4° 30'	36	38	40	42	44	45	47	49	50	52	53	55	56
5° 00'	34	36	38	40	41	43	45	46	48	49	51	52	53
5° 30'	32	34	36	38	39	41	43	44	46	47	48	50	51
6° 00'	31	33	35	36	38	39	41	42	44	45	46	48	49
6° 30'	30	31	33	35	36	38	39	41	42	43	44	46	47
7° 00'	29	30	32	34	35	36	38	39	40	42	43	44	45
8° 00'	27	28	30	31	33	34	35	37	38	39	40	41	42
9° 00'	25	27	28	30	31	32	33	35	36	37	38	39	40
10° 00'	24	25	27	28	29	30	32	33	34	35	36	37	38
11° 00'	23	24	25	27	28	29	30	31	32	33	34	35	36
12° 00'	22	23	24	26	27	28	29	30	31	32	33	34	35

Figure SUB-PART C – 57 – Curve Elevation - 4" Underbalanced

12.10 Curves – 5 inches Underbalanced Elevation

- As per the *Rules Respecting Track Safety*, *Transport Canada* approval is required if the level of cant deficiency is greater than 3".

Curve Elevation 5" *(102 mm)* Underbalanced													
Elevation of Outer Rail													
Inches	**0**	**½**	**1**	**1 ½**	**2**	**2 ½**	**3**	**3 ½**	**4**	**4 ½**	**5**	**5 ½**	**6**
Millimeters	*0*	*13*	*25*	*38*	*51*	*64*	*76*	*89*	*102*	*114*	*127*	*140*	*152*
Degree of Curve	**MAXIMUM ALLOWABLE OPERATING SPEED (M.P.H.)**												
0° 30'	120	125	131	136	141	146	151	156	160	165	169	173	177
1° 00'	85	89	93	96	100	104	107	110	113	116	120	122	125
1° 15'	76	79	83	86	89	93	96	99	101	104	107	110	112
1° 30'	69	72	76	79	82	85	87	90	93	95	98	100	102
1° 45'	64	67	70	73	76	78	81	83	86	88	90	93	95
2° 00'	60	63	65	68	71	73	76	78	80	82	85	87	89
2° 15'	56	59	62	64	67	69	71	73	76	78	80	82	84
2° 30'	53	56	59	61	63	65	68	70	72	74	76	77	79
2° 45'	51	53	56	58	60	62	64	66	68	70	72	74	76
3° 00'	49	51	53	56	58	60	62	64	65	67	69	71	72
3° 15'	47	49	51	53	55	57	59	61	63	65	66	68	70
3° 30'	45	47	49	52	53	55	57	59	61	62	64	65	67
3° 45'	44	46	48	50	52	53	55	57	59	60	62	63	65
4° 00'	42	44	46	48	50	52	53	55	57	58	60	61	63
4° 30'	40	42	44	45	47	49	50	52	53	55	56	58	59
5° 00'	38	40	41	43	45	46	48	49	51	52	53	55	56
5° 30'	36	38	39	41	43	44	46	47	48	50	51	52	53
6° 00'	35	36	38	39	41	42	44	45	46	48	49	50	51
6° 30'	33	35	36	38	39	41	42	43	44	46	47	48	49
7° 00'	32	34	35	36	38	39	40	42	43	44	45	46	47
8° 00'	30	31	33	34	35	37	38	39	40	41	42	43	44
9° 00'	28	30	31	32	33	35	36	37	38	39	40	41	42
10° 00'	27	28	29	30	32	33	34	35	36	37	38	39	40
11° 00'	25	27	28	29	30	31	32	33	34	35	36	37	38
12° 00'	24	26	27	28	29	30	31	32	33	34	35	35	36

Figure SUB-PART C – 58 – Curve Elevation - 5" Underbalanced

12.11 Curves – 6 inches Underbalanced Elevation

- As per the *Rules Respecting Track Safety*, *Transport Canada* approval is required if the level of cant deficiency is greater than 3".

Curve Elevation 6" *(102 mm)* Underbalanced													
Elevation of Outer Rail													
Inches	**0**	**½**	**1**	**1 ½**	**2**	**2 ½**	**3**	**3 ½**	**4**	**4 ½**	**5**	**5 ½**	**6**
Millimeters	*0*	*13*	*25*	*38*	*51*	*64*	*76*	*89*	*102*	*114*	*127*	*140*	*152*
Degree of Curve	**MAXIMUM ALLOWABLE OPERATING SPEED (M.P.H.)**												
0° 30'	131	136	141	146	151	156	160	165	169	173	177	181	185
1° 00'	93	96	100	104	107	110	113	116	120	122	125	128	131
1° 15'	83	86	89	93	96	99	101	104	107	110	112	115	117
1° 30'	76	79	82	85	87	90	93	95	98	100	102	105	107
1° 45'	70	73	76	78	81	83	86	88	90	93	95	97	99
2° 00'	65	68	71	73	76	78	80	82	85	87	89	91	93
2° 15'	62	64	67	69	71	73	76	78	80	82	84	85	87
2° 30'	59	61	63	65	68	70	72	74	76	77	79	81	83
2° 45'	56	58	60	62	64	66	68	70	72	74	76	77	79
3° 00'	53	56	58	60	62	64	65	67	69	71	72	74	76
3° 15'	51	53	55	57	59	61	63	65	66	68	70	71	73
3° 30'	49	52	53	55	57	59	61	62	64	65	67	69	70
3° 45'	48	50	52	53	55	57	59	60	62	63	65	66	68
4° 00'	46	48	50	52	53	55	57	58	60	61	63	64	65
4° 30'	44	45	47	49	50	52	53	55	56	58	59	60	62
5° 00'	41	43	45	46	48	49	51	52	53	55	56	57	59
5° 30'	39	41	43	44	46	47	48	50	51	52	53	55	56
6° 00'	38	39	41	42	44	45	46	48	49	50	51	52	53
6° 30'	36	38	39	41	42	43	44	46	47	48	49	50	51
7° 00'	35	36	38	39	40	42	43	44	45	46	47	48	49
8° 00'	33	34	35	37	38	39	40	41	42	43	44	45	46
9° 00'	31	32	33	35	36	37	38	39	40	41	42	43	44
10° 00'	29	30	32	33	34	35	36	37	38	39	40	41	41
11° 00'	28	29	30	31	32	33	34	35	36	37	38	39	39
12° 00'	27	28	29	30	31	32	33	34	35	35	36	37	38

Figure SUB-PART C – 59 – Curve Elevation - 6" Underbalanced

12.12 Curves – Designing Elevations

a) Where there are adjacent tracks on a curve, the elevation on the outer track must not be more than the elevation on the inner track. The exception is if the distance between track centres have been increased to make up for the difference in curve elevation.

b) On a spiral or curve easement between a tangent and a curve, the elevation must increase uniformly (evenly) from the end of the tangent, where both rails are at the same level, to the beginning of the curve. On a spiral / easement between two parts of a compound curve, the elevation must increase uniformly from the end of the flatter curve to the beginning of the sharper curve.

c) Where a spiral or curve easement has not been installed between a tangent and a curve, the curve elevation must extend to the end of the curve. It must also decrease uniformly on the tangent until the opposite rails are at the same level. Where a spiral / easement has not been installed between two parts of a compound curve, the elevation for the sharper curve must extend to the point of connection with the flatter curve. It must also decrease uniformly until it reaches the proper elevation for the flatter curve.

d) Where possible, existing reverse curves should be separated by tangent of at least 78' *(23,774 mm)* in length, unless specially authorized by the Director, Rail Infrastructure. New designs should be separated by tangent of at least 100' *(30,480 mm)* in length.

e) Curve geometry must be maintained to comply with TC Rules Respecting Track Safety Sub-Part C – Track Geometry

f) Where the distance between adjacent curves is not large enough to meet the requirements of paragraphs 13.12 d) and e) that distance must be used to best advantage in proportion to the elevations of the adjoining curves. In certain instances, you may have to reduce the maximum permissible train speed so that you do not go beyond the maximum rate of change of elevation for any given speed.

g) Design rates of change in elevation are based on train encountering no more than 1-1/4" *(32 mm)* change in curve elevation per second of travel time. The minimum length of easement required for the above conditions is shown in Figure Sub-Part C – 66 – Curve Easement Table, below. Whenever possible, the length of easement for a 1" *(25 mm)* change of elevation should be extended to more than 39' *(11,887 mm)*.

h) Using a greater superelevation than required will result in the weight of slower trains being transferred to the low rail causing damage to the low rail.

i) Using a lesser superelevation than required will result in faster trains producing greater lateral forces through the curve. This can increase gauge widening and gauge face wear.

12.13 Curves – Rate of Change of Elevation

a) When redesigning or resetting a curve, and the resources to re-adjust are available, the rate of change of curve elevation must not be more than:

- 1" *(25 mm)* in 60' *(18,288 mm)* on all newly constructed tracks.
- 1" *(25 mm)* in 60' *(18,288 mm)* on all relocated tracks (where possible).
- 1" *(25 mm)* in 45' *(13,716 mm)* in all relocated tracks where 1" in 60' is not workable.
- 1" *(25 mm)* in 39' *(11,887 mm)* as an absolute maximum in all other tracks.

CURVE EASEMENT TABLE			
Speed in MPH	**Length in Feet Required for Each Inch (mm) Change in Elevation**		
	1" in 60' *(25 mm in 18,288 mm)*	**1" in 45'** *(25 mm in 13,716 mm)*	**1" in 39'** *(25 mm in 11,887 mm)*
20 or lower	60	45	39
25	60	45	39
30	60	45	39
35	60	45	41
40	60	47	47
45	60	53	53
50	60	60	60
55	65	65	65
60	70	70	70
65	76	76	76
70	82	82	82
75	88	88	88
80	94	94	94
85	100	100	100
90	106	106	106

Figure SUB-PART C – 60 – Curve Easement Table

Easement lengths that are more than 60', 45' and 39' are based on a rate of change of elevation of 1-1/4" (32 mm) per second of time.

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13. Surfacing and Lining

13.1 Surfacing and Lining – General

a) Except in cases of emergencies and precautions are taken, no out-of-face surfacing and lining will be performed if the rail temperature is above the PRLTR.

b) Do not raise track more than necessary to maintain good surface. Individual lifts should not exceed 3" and overall raises exceeding 6" are to be avoided unless authorized by the Director, Rail Infrastructure.

c) When the track is raised during surfacing operations, do not allow the rate of change in surface, e.g., the rate of run-out, to be more than the rate shown in Figure Sub-Part D – 1 – Run-Out Gradient.

d) Special attention is to be given to the surface and line of track at the approaches to bridges, culverts, switches, diamonds, road crossings and tunnels.

e) Signals must be notified when surfacing around insulated joints, switch machines, crossing protection equipment or other signal devices, care must be taken to prevent damage to bond wires, conduits, or other signal connections to the track. Particular attention is to be given to Wayside Inspection Systems (WIS).

f) Ensure brooming and regulating operations do not damage adjacent property especially at highway underpasses and pedestrian walkways.

g) To prevent centre bound track, avoid tamping tie centres.

h) Whenever it is necessary to disturb the ballast to permit surfacing and lining, whether it is manual or mechanical, restore the ballast shoulder and fill the ballast cribs before returning the track back to train service.

i) To control harmonics on Class 2 through 5 jointed tracks with staggered joints, the cross-level differences shall not exceed 1 ¼ inches *(32 mm)* 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 section. For 79 ft or 80 ft rails, this subsection is not applicable.

j) 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 operation over the track.

13.2 Surfacing and Lining – Clearances

a) When surfacing or lining track where overhead or lateral clearances are involved (e.g., at approaches to the ends of bridges; or alongside signals, fuelling stations and platforms), the general level of the track, its alignment, its curve elevation, and its distance from adjacent tracks must not be changed without the authority of the Director, Rail Infrastructure.

b) Where permanent reference points are situated to indicate the location and elevation of the track, they must be adhered to.

13.3 Surfacing and Lining – CWR Territory

a) Work requirements and speed restriction requirements associated with surfacing and lining in CWR territory are given in Sub-Part D – Section 7.8 – Prevention of Track Buckling.

b) The work requirements and speed restrictions for Surfacing and Lining in CWR territory also apply in jointed territory.

13.4 Surfacing and Lining – Concrete Tie Track

a) Prior to surfacing or mechanized tie replacement on a main track CWR curve which is more than 3°, the curve must be staked per Sub-Part D – Section 7.7.1. – Surfacing and Lining in CWR Territory.

b) When surfacing is performed in concrete tie track:

- Adjust tamper head limit switches to ensure the correct penetration of the tamping tools below the tie.
- Ballast regulator plow blades must be adjusted to ensure no impact of the fasteners.
- Upon completion of ballast regulating, inspect the fastening system and replace the missing or damaged fasteners.

c) The work requirements and speed restrictions for Surfacing and Lining in CWR territory also apply in jointed territory.

d) Concrete ties should be inspected for signs of center bound condition.

- This condition is represented by transverse cracks visible in the middle third of the tie.

13.5 Surfacing and Lining – Ballast Stabilization

Ballast stabilizing machines have a relatively large mass (approx. 60 tonnes). This enables it to transmit the large vertical forces required into the track structure concurrently with horizontal oscillations of the track to produce a controlled settlement of the ballast.

The frequency of oscillation, vertical loading and machine work speed are variables which have an effect on the degree of stabilisation obtained. All three factors can be varied and monitored as required.

The operation should be done taking into consideration the operating techniques and instructions issued by the manufacturer.

The objective of ballast stabilization is to accelerate the compaction of newly tamped ballast, a process which occurs naturally under traffic. Stabilization improves track lateral stability, and reduces the need for speed restrictions. Stabilization can be achieved in one of two ways:

a) With a ballast compactor, which uses vibrating plates to apply pressure directly onto the ballast surface; or

b) With a Dynamic Track Stabilizer (DTS), which imparts a horizontal vibration (normally at about 35 cycles per second) and a static vertical load onto the rails.

- Produces a homogenous compaction of the entire ballast bed which ensures that any cavities underneath the ties are reduced, and
- A re-arrangement and consolidation of the ballast bed may be achieved.

14.5.1 General Guidelines

a) Dynamic Track Stabilization (DTS) is typically equivalent to about 100,000 gross tonnes of rail traffic.

b) Only stabilize track which has been recently tamped, and which has good quality ballast.

NOTE: Stabilization has no beneficial effect elsewhere.

c) With dynamic track stabilization, ties and fastenings must be in good condition, to satisfactorily resist the loadings applied to them.

d) Bring a dynamic track stabilizer to its operating frequency as quickly as possible and while the machine is moving – avoid low frequency vibrations.

e) Use of dynamic track stabilization on or within 10 m of bridges, spans, concrete structures, or buildings is restricted unless authorized by the Director, Rail Infrastructure. These authorizations are to be reviewed in conjunction with the asset condition assessment reports.

f) Do not stabilize over or near structures, weak formation, or other areas which may not adequately withstand vibration.

g) Use of stabilizers in tunnels is prohibited.

h) When track is being tamped with multiple lifts, stabilize the ballast after each lift.

14.5.2 Operating Restrictions

Vibrating forces generated by the machine can be quite powerful and under certain conditions may excite critical vibration frequencies in nearby structures, although most structures have critical frequencies in the low portion of the stabilizer's vibration range.

When starting the vibration units,

a) The units should be engaged onto the rails and

b) Brought up to the required vibrating frequency as quickly as possible.

Conversely, when stopping the vibration units,

a) They should be stopped as rapidly as possible.

This will prevent any possible critical vibration frequency ranges from being prolonged.

Starting and stopping the vibration units should occur only when the machine is moving.

In order to avoid possible damage to structures or the machine itself, the stabilizer should not be used:

a) On any track with heavily fouled or cemented ballast;

b) On open top bridges;

c) On ballast top timber bridges and steel trough bridges;

d) In tunnels;

e) On track within 5m of multi-storey buildings;

f) On concrete slab track and over pits;

g) Over any level crossing that has not been recently tamped;

h) At locations near old or fragile signalling equipment as specified by Signals and Communications;

i) Through turnouts, crossovers and diamonds and similar locations where the track has not been recently tamped and then only with care and with the roll clamps open;

j) Through platforms where the ballast between tie ends and the platform wall is heavily fouled.

14.5.3 Conditions Required for Effective Stabilizing of Track

Under the following conditions, a DTS may be used provided the following conditions are met,

a) Requirements of Sub-Part D – Section 7 – Continuous Welded Rail (CWR) are adhered to.

b) Applicable temporary speed restrictions per Sub-Part D – Section 7.9 Placing Temporary Speed Restrictions Account Track Work are applied.

c) Area DTS is performed is in CWR territory with 115 lbs rail or greater.

d) Ballast should be relatively clean and free flowing. The machine should not be used on heavily fouled or cemented ballasted track.

e) DTS is performed following tamping, and travels over the track at a continuous speed no more than 2 mph. It should also work far enough behind preceding machines so that its operation is not hampered by slower production machines or by any problems with the machines ahead.

- Ballast must be disturbed prior to using the stabiliser so that it can flow under the actions of the machine. For best results the track should be ballast cleaned and/or tamped prior to stabilising.
- The track must be regulated to fill cribs and form shoulders so that there is sufficient ballast to allow for ballast loss due to settlement of the ballast during the stabilising process.

f) Rail to tie fastenings must be sound so that the horizontal oscillation generated by the machine can be transmitted through the rails and sleepers into the ballast.

g) The track must be in the required position and to desired standard prior to stabilizing. The machine can correct some minor faults in top and superelevation but is not designed to correct major faults in track geometry or poor quality after tamping.

h) If the total raise will be more than 4”, perform the raise in at least 2 lifts with the DTS being utilized in between lifts.

i) DTS puts the track panel and ballast into a targeted horizontal vibration, while applying a static vertical load.

j) Shoulders and cribs restored to ensure optimal frictional resistance to dynamic loading.

k) Sufficient rail anchors and fasteners are applied to resist longitudinal forces.

l) Surface, line and gauge restored.

m) Except in cases of emergencies, no out-of-face surfacing and lining, rail replacement or tie renewal will be performed if the rail temperature is above the PRLTR.

14.5.4 Use of Ballast Stabilizing Machines

The ballast stabilizing machine should finish its run-out ramp. For example, at zero pressure and vibrators turned off whilst moving, no closer than 10 metres from the nearest extremity of a bridge abutment or return wingwall. The reverse is to apply at the start of the operation. For example, when moving away from the structure.

The machine may travel over:

a) Brick or masonry under-bridge spans over 5 metres long where the parapets directly contain the ballast;

- Concrete bridges are acceptable

b) Structurally sound masonry or other types of culverts less than 5 metres span but only if the culvert has a minimum of 1 metre cover between the top of the culvert and the underside of the ballast bed;

c) Modern pre-stressed concrete reinforced concrete or steel under-bridge, only with concrete piers and abutments and only where these substructure elements have been constructed/renewed at the time of the deck construction.

d) Also refer to Section 14.5.1 e)

This specification assumes bridge components are free of structural defects.

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SUB-PART D. TRACK STRUCTURE

Scope: This subpart prescribes the requirements for ballast, tie, track assembly fittings and the physical conditions of rails.

1. Ballast

1.1 Ballast – Conditions

a) Ballast: General

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

- Restrain the track laterally, longitudinally, and vertically under dynamic loads imposed by railroad equipment and thermal stress exerted by the rails;
- Transmit and distribute the load of the track and railroad rolling equipment to the subgrade;
- Provide adequate drainage for the track; and
- Maintain proper track cross-level, surface, and alignment.

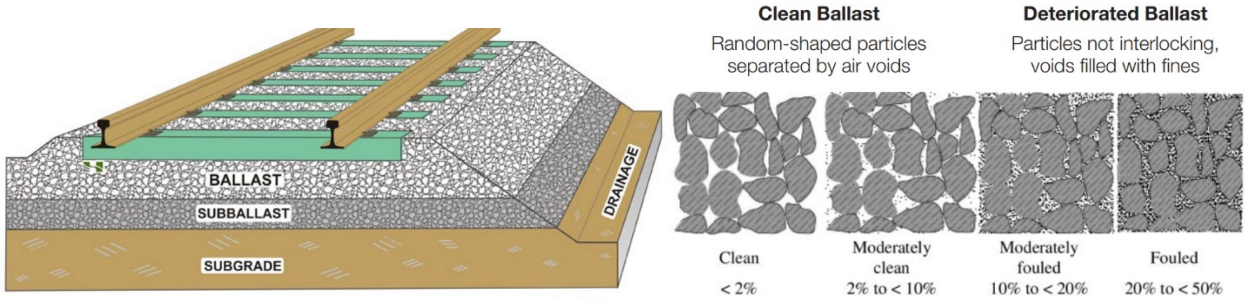

Figure SUB-PART D – 1 – Sub-Grade, Sub-Ballast, Ballast, Drainage and Clean vs. Deteriorated Ballast

b) Track Construction

i. For new construction use the Current Specification for Ballast to select and prepare ballast materials.

ii. For new construction ensure that the ballast section when complete conforms to design specifications.

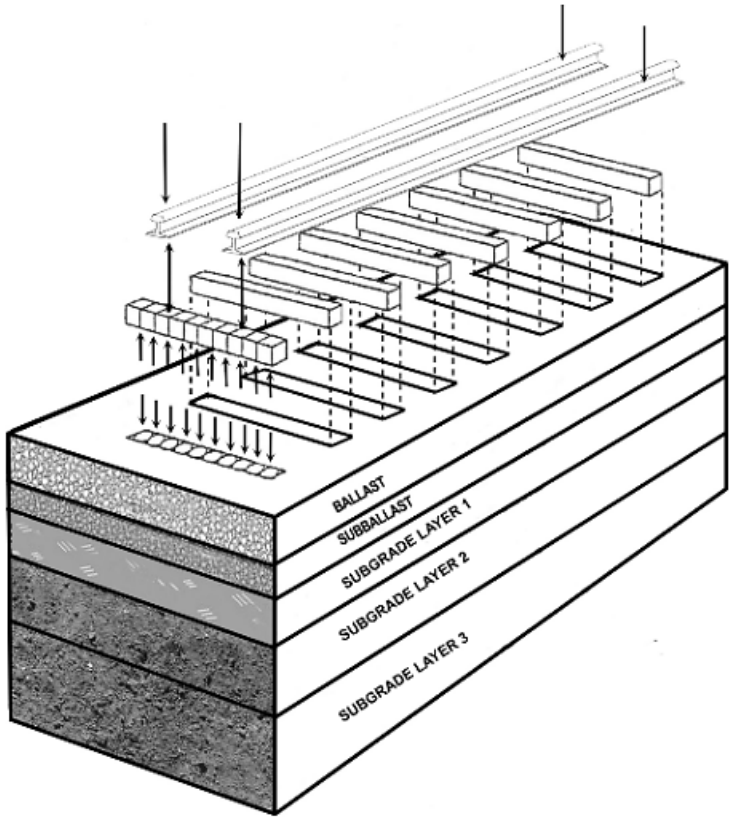

Figure SUB-PART D – 2 – Materials of Sub-Grade, Sub-Ballast, and Ballast Layers

c) Contaminated Ballast

i. Areas that have become contaminated so that they no longer allow water to freely drain must be identified so that they can be corrected,

ii. Each Fall, the District Manager may prepare a list of contaminated ballast areas in his territory. This list is to be forwarded to the Director, Rail Infrastructure who will determine the appropriate corrective action.

1.2 Ballast – Preparation

a) Clearances

i. Obtain approval from the Director, Rail Infrastructure for any planned ballasting operation that will reduce line clearances.

ii. Report to the Director, Rail Infrastructure all track raises or re-alignments that may affect line clearances.

b) Bridges

i. If bridges are within the section of track planned for re-ballasting, bridge spans must be raised, or plans made to undercut each bridge approach for a sufficient distance to permit a safe, smooth riding run-out. The Director, Rail Infrastructure must approve the course of action.

c) Public Crossings

i. At public crossings, re-ballasting must be done without risk or major inconvenience to the public.

ii. Advise the road authority of the nature and extent of the work to be done.

iii. Arrange for the installation of barricades, warning lights, and other safety devices to protect people and vehicles using the crossing.

- The Railway Association of Canada (RAC) Circular #13, located in your SharePoint ('OneDrive'), offers information on the proper steps in providing protection at crossings.

1.3 Ballast – Ballasting and Undercutting – Special Precautions

a) Track Buckling

i. Take all necessary precautions to avoid track buckling. Pay close attention to the temperature when planning to use under-track plows, sleds and undercutters. Fill cribs and restore shoulders with new ballast as soon as possible.

b) Transitions / Run-Out Gradients

i. The transition or run-out gradients must be made on tangent track and must be fully tamped and level to provide a smooth transition from newly ballasted track to old ballast. In no case can the rate of run-out be more than that shown in table below:

MAXIMUM TRANSITION OR RUN-OUT GRADIENT	
Max. Permissible Train Speed	**Rate of Run-out**
90 miles per hour	One inch in 105 feet
80 miles per hour	One inch in 95 feet
70 miles per hour	One inch in 85 feet
60 miles per hour	One inch in 70 feet
50 miles per hour	One inch in 60 feet
40 miles per hour	One inch in 45 feet
30 miles per hour	One inch in 35 feet
20 miles per hour	One inch in 25 feet
10 miles per hour	One inch in 15 feet

Figure SUB-PART D – 3 – Run-Out Gradient

c) Ballasting Cross Sections

i. Cribs filled to a minimum of 1" *(25 mm)* below the top of tie,

ii. No ballast left on top of ties, spikes, and tie plates,

iii. Shoulder ballast for jointed rail to be minimum of 6” *(152 mm)* out from end of tie before sloping,

iv. Shoulder ballast for CWR track and concrete tie track to be minimum of 12” *(305 mm)* out from end of tie before sloping.

v. Ballast for concrete tie track should be to a minimum depth of 12” *(305 mm)*.

d) Track Geometry

i. Throughout the entire process (the unloading of ballast, the first operation of trains, the final raising and tamping of the track, the return of traffic to normal track speed) the following track geometry must be maintained:

- The maximum cross level on the outside rail of a curve may not be more than 7 inches *(178 mm)* on any track.
- Curves exceeding 6 inches *(152 mm)* cross level must be monitored and have a remedial action plan to bring it back to 6 inches *(152 mm)* or less cross level.
- The difference in curve elevation between any two points 60 feet *(18,288 mm)* apart must not be more than 1 ½ inches *(38 mm)*, with the tie and rail taken into account.

e) Unloading Ballast

When unloading ballast:

i. Only the amount of ballast planned and required should be unloaded in the correct location minimize distribution required for ballast regulators.

ii. Unlock and break open doors only when the car is not moving.

iii. Cars should be unloaded to ensure even weight distribution in the car.

iv. In superelevated curves, ensure the cars are unloaded evenly to avoid overturning cars to the low side of the curve.

v. Ensure ballast does not contact the axles or truck frames of the cars or flows over the ball of the rail, lifting the car causing derailment.

vi. In the center of the track, a hardwood tie may be placed ahead of the leading axle of a loaded ballast car to plow off ballast.

vii. Remove ballast from switches and stock rails, cribs with switch rods and flangeways of frogs, crossings or guard rails which could impede passage of flangeways.

viii. Control ballast flow near road crossings or bridges.

ix. Cars must be completely empty and doors in the locked position before release.

- Inspect the inside of the car to ensure it is completely empty with no ballast on the hanging on the side slopes.
- Ballast attached to the sides of the car, or unevenly distributed in the car, requires load leveling or equalization before moving the car.
- Unevenly loaded cars can result in a possible walk off derailment.

x. Cars with doors that cannot be opened must be reported.

xi. Pushing imbalanced load(s) of a car(s), as a result of dumping rock on one side of the track or rock sticking to the side of a car(s), are to be avoided when going into or through a curve or turnout.

f) Freshly Dumped Ballast

i. Take care to ensure that freshly dumped ballast does not extend more than 2-1/2 inches *(64 mm)* above the top of the rail. This will prevent damage to equipment and reduce the risk of derailing light rail cars.

1.4 Ballast – Ballasting and Undercutting in CWR Territory

a) Requirements

i. Work requirements and speed restriction requirements associated with ballasting and undercutting in CWR territory are given in Sub-Part D – Section 7.8 – Prevention of Track Buckling.

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2. Ties

2.1 Ties – Timber Ties in Track

a) Existing tie type, length, and spacing may remain in place until programmed tie replacement or ballast renewal is performed.

b) Installed centered with the track and square with the rail, with the end of the tie approximately 18 ½ inches from the field edge of the rail base.

c) Installed in tracks Class 2 and above at 20 3/8” *(518 mm)* centers

d) Installed at 21 1/4" *(540 mm)* centers in Class 1 tracks.

e) Prevented from becoming centerbound.

f) Surfacing on timber tie track must be in accordance with Sub-Part C – Section 14 – Surfacing and Lining.

2.2 Ties – Timber Tie Spacing during Bridge Work

a) Maximum clear span of ties on bridges with unsupported running rail*;

- 115 lb rail – 24” *(610 mm)*

**Smaller rail sections must be as per and approved by a Bridge Engineer*

2.3 Ties – Timber Tie Defects

a) Each 39’ segment of track must have a sufficient number of cross ties which in combination provide support that will hold gauge, surface, and alignment.

b) Defective ties (other than concrete) are defined as those that are:

i. Broken through,

ii. Split, or otherwise damaged, to the extent that it will allow the ballast to work through, or will not hold spikes or rail fasteners,

iii. Plate cut more than 2” *(51 mm)*,

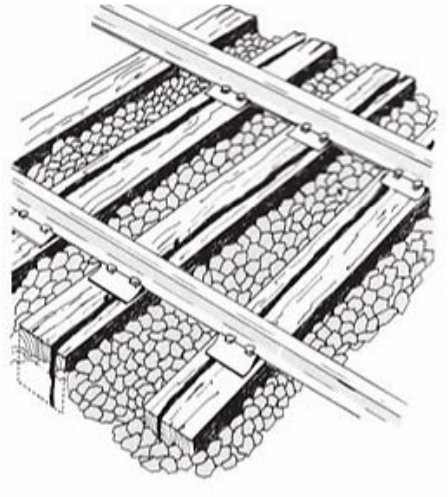
iv. Tie cut more than 40% of tie thickness, or

v. So deteriorated that the tie plate or base of rail can move laterally 1/2" *(13 mm)* relative to the tie.

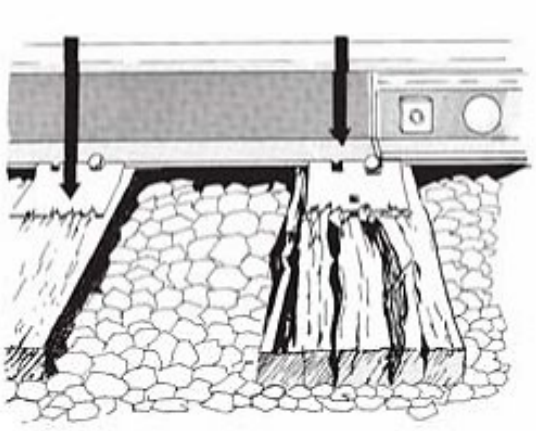
vi. Not holding surface, line, or gauge.

Figure SUB-PART D – 4 – Examples of Tie Damage / Defects (other than concrete)

Tie Split End to End
- tie will not hold spikes or rail

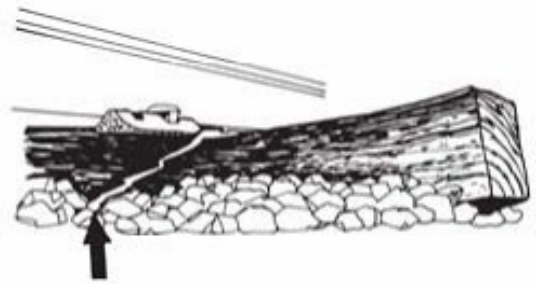


Spike Killed or Crushed
- sign of spreading track

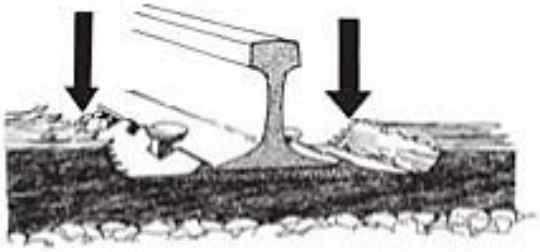


Decayed Tie

Broken Tie Under Rail Base

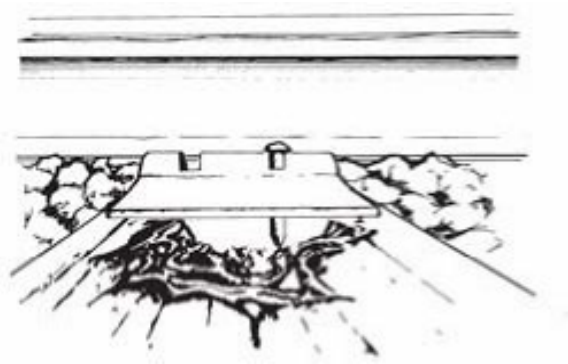


Tie Cut More Than 40% of Thickness

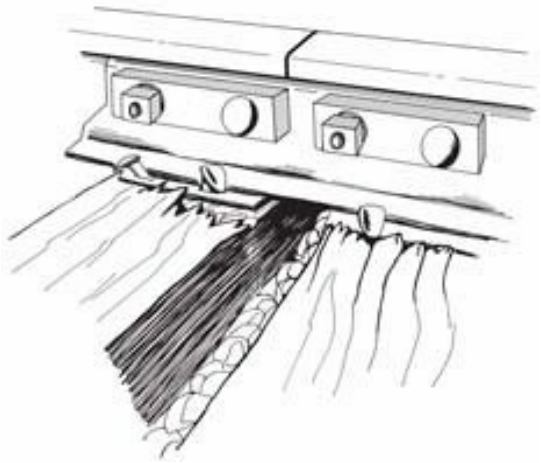


Tie Adzed to a Depth of 2” or Greater

Burnt Tie

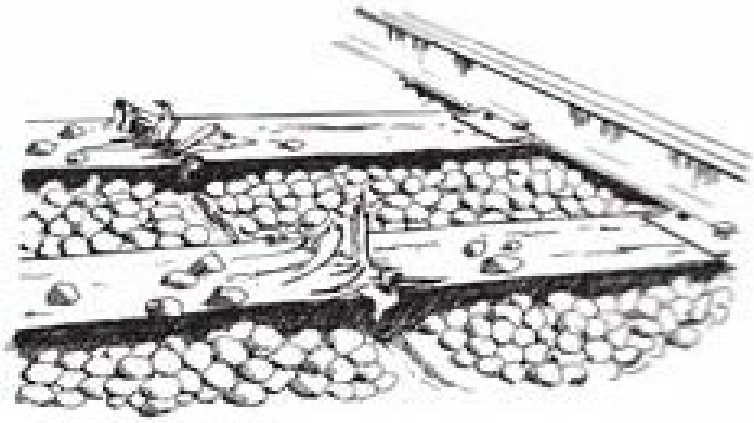


Spike Killed, Crushed of Decayed



Damaged Tie

- Depth of 2” or more due to derailments, dragging equipment or fire



2.4 Ties – Concrete Ties – General

a) Each 39-foot segment of track must have a sufficient number of non-defective ties which in combination provide support that will hold gauge, surface, and alignment.

b) Surfacing on concrete tie track must be in accordance with Sub-Part C – Section 14 – Surfacing and Lining.

c) Concrete tie performance is reduced where there is inadequate support:

i. The track holds water or is muddy.

ii. Drainage of water and replacement of fouled ballast should extend approximately 12" below the bottom of tie.

iii. There are impacts from rail conditions.

- Joints should be welded as soon as possible.
- Surface irregularities such as corrugated rail, crushed heads, wheel burns, etc. should be removed as soon as possible.

2.5 Ties – Concrete Tie Installation

a) Concrete ties shall be installed:

i. With tie centers at maximum 24".

ii. With a minimum 12" of clean, well draining ballast under the bottom of the tie.

iii. With 12" of shoulder ballast.

iv. Not installed within 20' of an open deck bridge which is more than 50' long.

- At the direction of the Director, Rail Infrastructure, twelve 11' hardwood ties will be installed as transition ties off the bridge backwall.

b) Transition ties,

i. At the transition from wood ties to concrete ties, at the direction of the Director, Rail Infrastructure, install a transition tie set consisting of four each 9' *(2,800 mm)*, 10' *(3,100 mm)* and 11' *(3,400 mm)* hardwood ties spaced 20" *(508 mm)* with the 11' ties adjacent to the concrete ties.

- While the transition tie set is preferred, twelve 10' timber transition ties spaced 20" *(508 mm)* apart are acceptable in lieu of the timber transition tie set.

ii. Permanent transition tie sets shall not be placed within horizontal curves nor within spirals. The distance between transition tie sets and spirals (TS and ST geometry points) and simple curves (BC and EC) shall be the greater of:

- Preferred minimum: 200' *(61,000 mm)*
- Absolute minimum: 40' *(12,200 mm)*

iii. Any values lower than 200' *(61,000 mm)* must be reviewed and approved by the Director, Rail Infrastructure.

iv. Installation of permanent transition tie sets within 40' *(12,200 mm)* of spirals or in full body of curves must be reviewed and approved in writing.

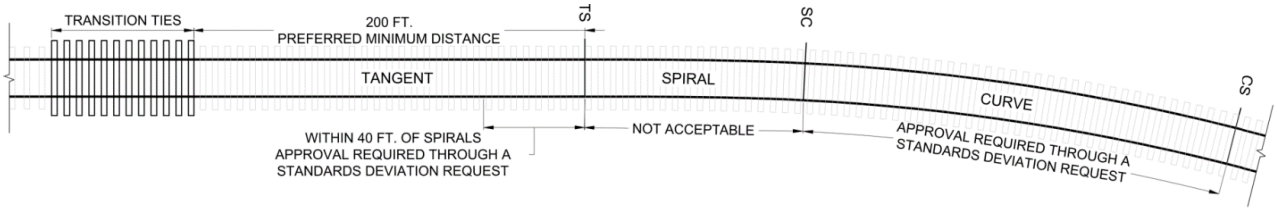


Figure SUB-PART D – 5 – Location of Permanent Transition Tie Sets

c) Concrete ties shall have the correct clips, pads and insulators applied at the time of installation.

d) No ties shall be installed when the rail temperature is above the PRLTR unless directive by the Director, Rail Infrastructure who must specify all necessary precautions to be taken such as mandating the use of a stabilizer, increased inspections, more restrictive speed restrictions or limiting work to emergency applications.

2.6 Ties – Concrete Tie Defects

a) Defective concrete ties are defined as those that are:

i. Broken through or deteriorated to the extent that the stressing tendon material is visible, or shows signs such as loss of tension in pre-stressing wires or crumbling concrete;

ii. So deteriorated or broken off in the vicinity of the shoulder or insert so that the fastener assembly can either pull out or move laterally more than 3/8” relative to the crosstie;

iii. So deteriorated that the base of either rail can move laterally more than:

- 1/2” relative to the crosstie on tangent track or curves of less than 2°;
- 3/8” relative to the crosstie on curves of 2° or greater

iv. Bottom of the tie is worn to the extent that pre-stressing wires are exposed.

v. So deteriorated or abraded at any point under the rail seat to a depth of 1/2” or more. An abraded tie is no longer defective if repairs to the tie have been performed;

vi. So deteriorated such that the crosstie's fastening or anchoring system, including rail anchors, is unable to maintain longitudinal rail restraint, or maintain rail hold down, or maintain gauge due to insufficient fastener toe load; or

vii. Less than two fasteners are present on the same rail. Except where fastener placement impedes insulated joints from performing as intended, the fastener may be modified or removed, provided the crosstie supports the rail.

b) A cracked tie should not be confused for a defective tie. A concrete tie is not considered defective until the crack extends through the entire tie or runs through the shoulder. Tie end damage caused by handling, ballast regulators or impacts does not make the tie defective.

Figure SUB-PART D – 6 – Broken Through Concrete Tie (left) **and Transversely Broken Concrete Tie Between Rails** (right)

2.7 Ties – Joint Tie Requirements (Timber and Concrete)

a) Note that each 39-foot segment has approximately 22 ties.

b) Ensure that at least the number of non-defective ties shown in the following table:

MINIMUM NON-DEFECTIVE TIES PER 39 FT		
CLASS OF TRACK	**Tangent and Curves No Greater Than 2°**	**Turnouts and Curves Greater Than 2°**
Class 1	5	6
Class 2	8	9
Class 3	8	10
Class 4, 5	12	14

Figure SUB-PART D – 7 – Minimum Non-Defective Ties per 39'

c) For Class 1 or Class 2 lines,

i. Ensure that each rail joint is supported by at least one non-defective tie, with a tie plate, whose centerline is within 24 inches *(610 mm)* either side of the rail joint location.

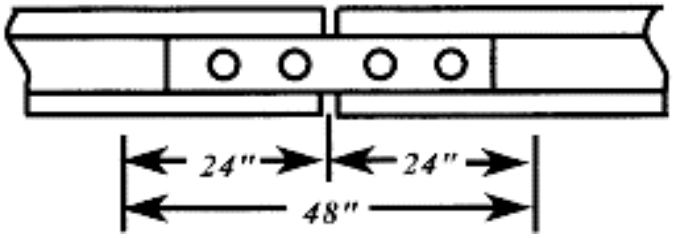


Figure SUB-PART D – 8 – Class 1 and Class 2 - Non-Defective Tie Spacing in a Joint - Within 24"

d) For Class 3 through Class 5 track,

i. Ensure that each rail joint is supported by at least one non-defective tie, with a tie plate, whose centerline is within 18 inches *(457 mm)* either side of the rail joint location.

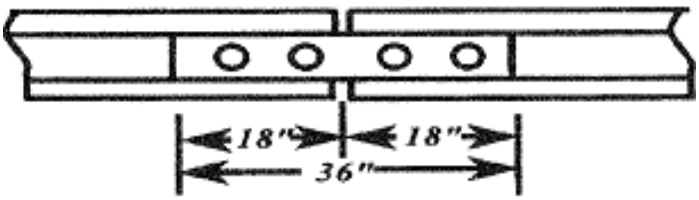


Figure SUB-PART D – 9 – Class 3 through Class 5 - Non-Defective Tie Spacing in a Joint – Within 18"

e) For Class 2 through Class 5 track,

i. Ensure that there are not more than 2 defective ties in adjacent positions in the joint area.

f) Where the above tie conditions are not met, local forces must spot in ties or train speeds must be restricted to bring the track into compliance.

2.8 Ties – Maintenance (Timber and Concrete)

a) When renewing ties, maintain the surface, line, and gauge of the track.

b) Immediately tamp the new tie so as to make its bearing surface match that of the adjacent ties.

c) Do not insert tie plates, pads, etc. after the tie has been tamped.

d) For timber ties, when a spike is pulled, plug the spike hole in the tie with a wooden tie plug or approved chemical tie compound. When re-spiking, drive the spike into the plug (if possible).

e) A spot program should be undertaken when there is a high frequency of;

   i. Four or more consecutive defective ties,

   ii. Three or more consecutive defective ties in a curve greater than 2°; or

f) Defective ties in the joint area.

g) When renewing ties, regardless of method of installation;

   i. Coordinate work with Signals if at insulated joints, within the limits of signalized crossings or signals and communications equipment (e.g., wayside detectors),

   ii. Correct gauge where required,

   iii. Where required, no more ballast than is absolutely necessary should be removed from the crib or shoulder,

   iv. All ties installed must be spiked and anchored, the ballast shoulders restored, and the ties properly tamped before the close of each day. Any adjacent ties that may be left hanging should also be tamped; and

   v. When necessary to allow trains to operate through tie gang renewal areas during working hours,

      - Not more than three consecutive ties on tangent track or two consecutive ties on curved track can be left unspiked,
      - Ties on either side of all joints must be spiked, and
      - Speed must be limited to a maximum of 10 mph.

   vi. In preparation for the following day tie installation the spiking pattern may be reduced to a minimum of 2 rail holding spikes (one gauge and one field) per plate on each tie to be removed,

   vii. Hard and softwood ties should not be mixed on the main track except when changing from one category to another (e.g., curve to tangent).

h) When piling ties for pick-up or disposal, place them:

   i. At a safe distance from the track, clear of the wing of ballast regulators.

   ii. On the opposite side of the track from any wire line (if possible).

   iii. Every effort should be made to ensure they will not activate an automatic warning system when picking up or disposing them.

   iv. Where they will not block key sight lines.

v. Where they will not present a hazard to employees.

vi. Away from streams, rivers, environmentally sensitive or drainage systems.

2.9 Ties – Inspection – General

a) Examine ties in track as early as possible each year to determine their condition. Identify and include on a tie count list any ties that are candidates for renewal based on current condition. Include ties that are defective as in Sub-Part D – Section 2.3 – Timber Tie Defects, Sub-Part D – Section 2.4 – Concrete Tie Defects, and Sub-Part D – Section 2.10 – Concrete Tie Inspection and Maintenance.

b) Include timber ties that exhibit the following conditions:

i. Split end-to-end,

ii. Adzed or plate cut more than 2 inches,

iii. Severely crushed,

iv. Spike killed, or

v. Severely decayed.

c) Do not use a pick or other sharp instrument on the top of the timber tie when testing ties.

d) The Track Supervisor (Inspector) may prepare a mile-by-mile list showing the number of ties that are defective on main tracks, 1/5 of the track miles each year to complete all main tracks every 5 years,

e) Renewal ties should be marked and recorded for which programmed tie renewal is planned for the following year.

2.10 Ties – Concrete Tie Inspection and Maintenance Considerations

a) For concrete ties, the following conditions must be reported to the Supervisor, immediately:

i. Any derailment of equipment on concrete ties, whether damage is noticeable or not.

ii. Any significant abrasion or wearing away of the tie in the rail seat area.

iii. Any loose shoulders.

iv. Any cracking of the tie if it shows signs of continuing deterioration, or if the cracking could affect the ability of the tie to hold the cast shoulder in place.

v. Any significant rate of failure of rail clips that cannot be explained by damage from an outside source (e.g., dragging of equipment, a ballast regulator, etc.).

b) Special attention must be paid to the condition of concrete ties in areas of derailment damage. Note the presence and growth of surface cracks or progressive deterioration of the tie.

c) Rail Seat Abrasion

i. Rail seat abrasion occurs when the concrete in the rail seat area is abraded away by the introduction of moisture. The abrasion erodes the surface of the tie under the rail resulting in loss of restraint by the clip, rail cant and gauge widening.

ii. Inspection for signs of rail seat abrasion on concrete ties is critical. Indications of rail seat abrasion are:

- Tie pads curling, squeezing out, or bleeding at the sides or ends of the rail seat.

- Tie pads worn through or indenting into the surface of the rail seat.
- Excessive rail cant.
  - Each degree of cant is equal to 1/8" *(3 mm)* of gauge widening.
- Signs of rail running through the clips or missing clips.
- Displaced or missing insulators.
- Concrete dust or slurry adjacent to the tie pad.

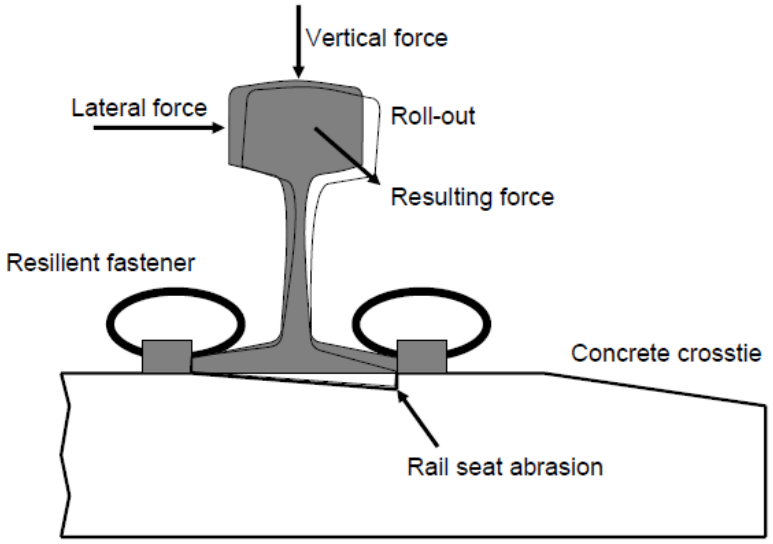


Figure SUB-PART D – 10 – Concrete Tie Rail Seat Abrasion

iii. When signs of significant rail seat abrasion appear, inspect the rail seat by unclipping the rail, jacking the rail up, removing the insulators and pads and examining the rail seat.

d) During rail replacement, tie pads must be removed, and the rail seat examined for abrasion.

e) Inspect the fastening system of concrete ties:

i. Replace sprung or damaged clips.

ii. Shoulder insulators should be firmly seated with the post between the cast shoulder and the base of the rail.

- Insulators that are twisted or cracked should be replaced.
- Shoulder insulators that have a post which is excessively thinned will cause wide gauge and need to be replaced.

f) Tie pads should be inspected for signs of tearing, thinning or wear. Correct pad thickness helps maintain required clip loading. Replace worn or defective pads.

g) Shoulder insulators must not be forced or driven in place. Use a rail positioner to provide the suitable gap for installation.

h) Wide post insulators can be installed on the field side shoulder to correct gauge widening.

i) Use care when applying heat to the rail during relays or adjusting a pull apart. Remove the insulator if necessary and reapply after heating. Always inspect both the insulator and pad after heat has been applied to the rail.

2.11 Ties – Installing Track and Switch Ties in CWR Territory

a) Tie Replacement in CWR Territory

i. No ties will be installed when the rail temperature is above the PRLTR unless directed by the Director, Rail Infrastructure. The Director, Rail Infrastructure must specify all necessary precautions to be taken,

ii. In CWR territory the maximum number of consecutive track ties that can be renewed in a single pass shall be:

NUMBER OF CONSECUTIVE TIES (in CWR)		
	Tangent and Curves No Greater Than2°	**Curves Equal or Greater Than 2°**
With a Junior or Production Tamper	5	4
With Hand Tamping or Hydraulic Tools	3	2

Figure SUB-PART D – 11 – CWR Territory - Maximum # of Ties Renewed in a Single Pass

iii. Switch ties in CWR territory may be replaced in a single pass provided the appropriate speed restriction is applied.

iv. Crossing ties in CWR territory replaced as part of crossing rehabilitation may all be changed in a single pass provided;

- Crossing surface is replaced immediately following tie renewal,
- Crossing approaches are restored and are of sound condition; and
- The appropriate speed restriction is applied.

v. Hard and softwood ties should not be mixed on the main track except when changing from one category to another (e.g., curve to tangent).

b) Speed Restriction Requirements in CWR Territory

i. Speed restriction requirements associated with installing track and switch ties in CWR territory are given in Sub-Part D – Section 7.8 – Prevention of Track Buckling.

3. Tie Plates

3.1 Tie Plates – General

a) The use of new or second-hand tie plates shall be as directed by the Director, Rail Infrastructure, however;

i. Broken or damaged tie plates must not be reused,

ii. Tie plates with excessively worn spike holes or shoulders should not be reused.

- Square spike holes or round screw spike holes worn more than ¼”
- Tie plate shoulders worn more than ¼”

3.2 Tie Plates – Installation

a) Tie plates must be installed so that;

i. The plates have full, even bearing on the ties,

ii. The field side plate is square against the field side base edge of the rail,

iii. The plate is centered on the tie,

iv. The rail is canted toward the center of the track (if applicable),

v. Each plate has the same cant.

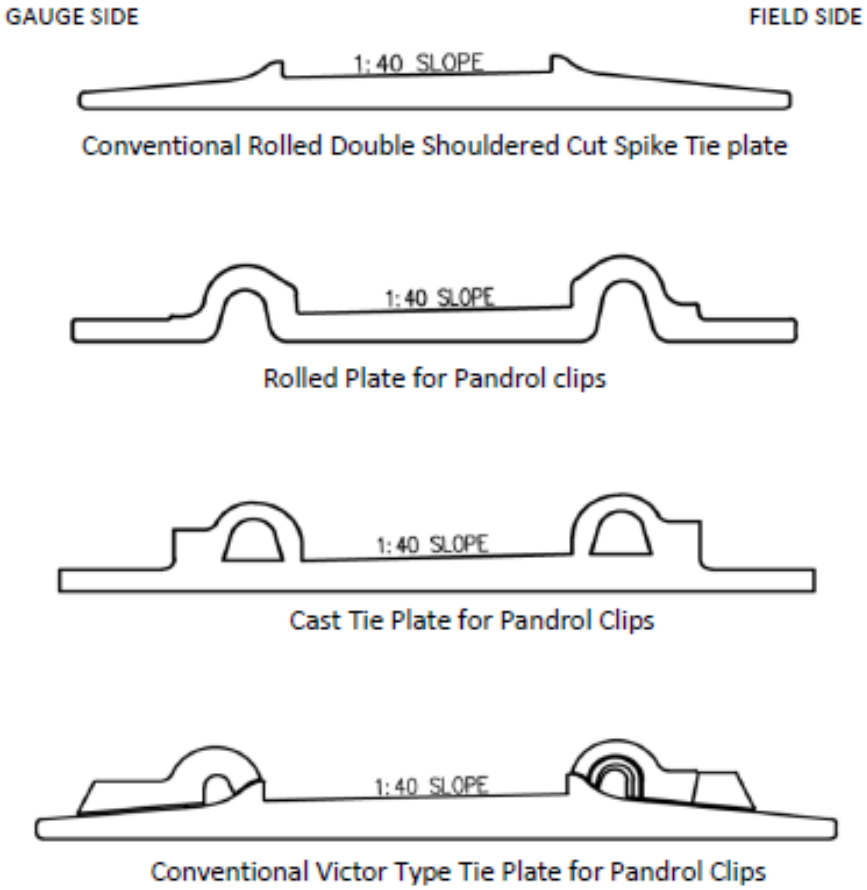


Figure SUB-PART D – 12 – Various Tie Plates and Cant

b) In Classes 3 through 5 tracks where timber crossties are used there shall be tie plates under the running rails on at least eight (8) of any ten (10) consecutive ties,

c) Ensure that there are no metal objects that cause concentrated loading solely supporting the rail between the rail and the tie plate. This includes the tie plate shoulders and spike heads,

d) Torch cutting of tie plates is not permitted,

e) 14” tie plates shall be used with 115 lb rail on all main track curves in excess of 3°.

3.3 Tie Plates – Jointed Track

a) Replace missing or broken tie plates as necessary to effectively maintain gauge.

b) Existing tie plates may remain in place until a rail relay is performed.

4. Spikes

4.1 Spikes - Patterns

a) Each rail shall be spiked as per the appropriate spiking pattern,

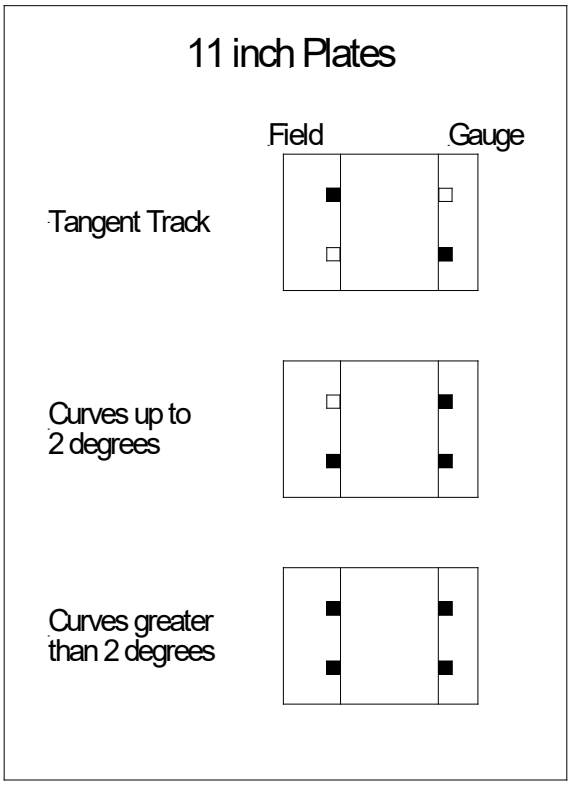


Figure SUB-PART D – 13 – Spiking Patterns – 11" Plates

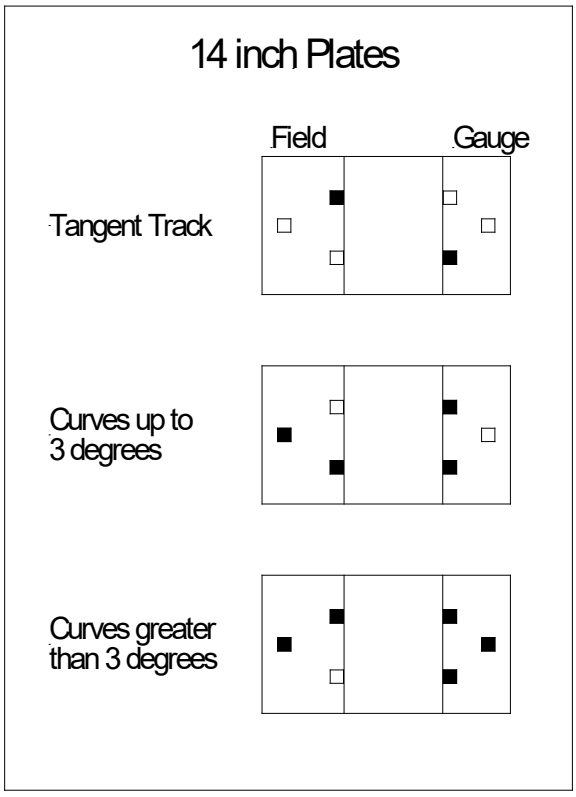


Figure SUB-PART D – 14 – Spiking Patterns - 14" Plates

b) Drive spikes vertically with the face of the spike in contact with the base edge of the rail, except spikes against insulated joints, which will be installed with heads turned away from the joint bar and not in solid contact with the joint bar.

c) No fastenings may be installed at insulated joints in a manner that may short circuit the track circuit,

d) Spikes will be driven to a depth such that the spike head is within 3/16" *(5 mm)* of top of the rail base. Every effort should be made not to overdrive spikes,

e) Spikes should not be driven at the ends of insulated joint bars in any manner that would cause the insulated joint bar to become electrically connected to the rail,

f) Spikes will be driven only with a standard spike maul, pneumatic or hydraulic spiking hammer or spiking machine,

g) Spikes will not be driven within 2 inches *(51 mm)* of the end of, or in the slots of, skirted (slotted) joint bars.

4.2 Spikes – Pulling

a) When pulling spikes, a spike lifter will be used when spikes cannot be loosened with a claw bar,

b) Spike between the running rail and guard rails, as well as spikes in tight areas around heel blocks and frogs will be removed using a four-ball spike puller and claw bar,

c) Claw bars will not be struck with mauls or other tools.

4.3 Spikes – Considerations in Jointed Track

a) Use spike lengths and spiking patterns that meet the ONTC standard.

b) When rails over 39' in length are laid on single-shoulder tie plates, use 6 spikes per tie, or preferably, use dual shoulder plates.

c) Replace missing and broken spikes as necessary to effectively maintain gauge.

d) Existing spiking patterns may remain in place until a rail relay or tie program is performed.

e) When broken spikes are found in curves, carry out an inspection of the whole curve and adjacent tangent to ensure that no dangerous spike condition exists. Special attention must also be paid to the condition of tie plates when performing the inspection. Unusual wear patterns and broken plates indicate other problems exist.

4.4 Spikes – Sizes for Shimming

a) 6 ½" spike for ½" shims

b) 7 ½" spike for 1 ½" shims

c) 8 ½ spike for 2 ½" shims

d) 9 ½" spike for 3 ½" shims

5. Anchors

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

5.1 Anchors – General

a) Do not substitute alternate types of rail anchors unless the substitution is approved by the Director, Rail Infrastructure,

b) Only use rail anchors in the rail section for which they are intended. All rail anchor designs must be approved by the Director, Rail Infrastructure,

c) Use approved rail anchors that are all the same type when installing out-of-face. Anchors used to replace or support existing anchors should also be of the same type as those in the track section, if possible.

d) In all cases, at locations where track or rail movement occurs due to heavy traffic on grades, to train braking or to soft sub-grade, install additional rail anchors as required to restrict movement of the rail.

5.2 Anchors – Application

a) Anchors should be applied uniformly along the rail against ties,

b) To avoid tie skewing, anchors must be installed in the same direction against the same tie on the opposite rail. Ties should be at right angles to rail before applying anchors,

c) Anchors will be applied to the gauge side of the rail when practicable,

d) When it is necessary to adjust rail anchors by hand and if the anchor is 1” or less from its proper position, it can be driven along the rail. Otherwise, you must remove the anchor and reapplied.

e) When changing rail or renewing ties, all anchors removed must be reapplied,

f) Sprung or damaged rail anchors will not be installed,

g) Use only the proper tools or machines when applying or removing anchors in order to avoid damaging the anchor or the risk of injury. The use of spike mauls is prohibited. Anchors should be removed from the rail while the rail is still in track,

h) When installing anchors, ensure the anchor is fully engaged on the rail base, with the rail base inside the lip of the anchor. Rail anchors must not be overdriven,

i) Do not install anchors within 2” from the edge of any field weld to prevent nicks or gouges with the heat affected zone of welds,

j) Do not install anchors on the rail opposite joints,

k) Do not install rail anchors where they will interfere with bond wire, boot legs, insulated joints, or other signal or track appliance,

l) Rail anchors are not to be used on shimmed track. Anchors removed during shimming shall be replaced promptly when shims are removed

5.3 Anchors – Turnouts

a) Turnouts should be fully anchored to the extent possible in both jointed and CWR track.

5.4 Anchors – Requirements in CWR Track

a) In CWR track, rail anchors will be installed in a box pattern on every other tie except;

   i. At permanent joints within CWR (joints that will not be welded), then every tie will be box anchored for a minimum distance of 200’ each direction from the joint,

   ii. When jointed rail abuts CWR, a minimum of 200’ of rail on either side immediately adjacent to the joint will have every tie boxed anchored,

   iii. At turnouts, non-glued insulated joints and crossing frogs, every tie will be box anchored for a minimum distance of 200’ each way from the turnout or joint,

b) When CWR is installed on a bridge, the Director, Rail Infrastructure will provide an anchor plan for the bridge

5.5 Anchors – Requirements in Jointed Track

a) In jointed rail, the minimum number of evenly spaced anchors for restraint in both directions are;

Class of Track	No. of Ties to Box Anchor (39’ or Shorter Rails)
1	Every 4th Tie
2 and 3	Every 3rd Tie
4 and 5	Every 2nd Tie
No. of Ties to Box Anchor (40’ or Longer Rails)	
Every 2nd Tie	

Figure SUB-PART D – 15 – Anchor Application Spacing

b) At a joint, box-anchoring spacing may be adjusted to avoid box anchoring a tie adjacent to the joint.

c) When required, install additional anchors on the jointed track to prevent track movement.

d) When laying bolted rail do not allow trains to pass over unanchored track except in an emergency. Then, the following must be done before allowing a train to pass over the track:

   i. Inspect the track,

   ii. Place a speed restriction of not more than 10 mph, and

   iii. Advise train crews to not use dynamic braking during movement over the track.

e) Existing anchor patterns may remain in place until a rail relay or tie program is performed.

f) Replace missing or broken anchors as necessary to effectively control movement of the rail.

g) Re-apply or replace anchors removed during track maintenance work upon completion of the work.

h) Re-apply anchors after shims are removed from track.

i) At locations where track or rail movement occurs, for example due to heavy traffic on grades, train braking or soft sub-grade, install additional rail anchors to control movement of the rail.

5.6 Anchors – Requirements for Wayside Inspection Systems (WIS)

a) Every tie should be box anchored for a minimum distance of 100' *(30,480 mm)* on each side of the inspection system unless otherwise specified by standard plan.

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6. Rail

6.1 Rail – General

a) Do not install rails shorter than 12 feet *(3,658 mm)* in length in main track unless authorized by standard plan.

b) Do not use rail or joint bars that have been cut with a torch or that has holes that have been made with a torch. Torch cut rail must be clearly marked.

c) Use a drill to make boltholes in the field. Never use a torch to burn boltholes.

d) When cutting rail for re-use, make the cut at least 6 inches *(152 mm)* from any torch mark on the rail.

e) Whenever possible, maintain a minimum stagger of 12 feet *(3,658 mm)* between bolted joints and/or the welds.

f) Replacement rails should be planned so there should be no more than 4 field welds on the same rail per 39' of track.

g) Lay rail to the standard gauge as per Sub-Part C, Section 2 – Gauge.

h) In order to maintain correct gauge, at least every fourth tie must be gauged on tangents and every third tie on curves.

i) Plug all spike holes properly.

j) Rail must not be struck with a spike maul, steel hammer or similar tool.

k) When cutting rail, the saw cut must be made:

   i. With a saw properly secured to the rail,

   ii. Square and perpendicular to the rail axis with a variation not to exceed 1/8" *(3 mm)* and all burrs removed,

   iii. Centered in the crib, if possible, at least 4" *(102 mm)* from the side of the tie,

   iv. No closer than 3" *(914 mm)* to a plant weld or field flash butt weld,

   v. No closer than 6" *(1,829 mm)* to a thermite weld

l) If a field or flash butt weld is being cut out, make cut at least 3" *(76 mm)* away from the weld to remove the heat affected zone.

m) Ensure the rail cut, and resultant joint, do not cause a joint tie defect per Sub-Part D, Section 2.7 – Joint Tie Requirements (Timber and Concrete).

6.2 Rail – Handling and Unloading

a) Dragging rail along the track is prohibited unless ALL of the following conditions are met:

   i. Dragging rail 80' *(24,384 mm)* or greater in length, shall be done only with appropriate rail handling devices;

   ii. When dragging continuous welded rail,

      - Maximise the use of rail dollies for continuously welded rail when possible;

      - When dragging on track place blocking to prevent impacting switches or road crossings.

   iii. A thorough job briefing, and field level assessment is conducted;

- If during fire season, the most restrictive fire prevention protocol for the area(s) the rail is to be dragged must apply using the Industrial Operations Protocol

iv. If there is risk of fire (e.g., sparks from steel and rock or steel and steel contact),

- At least one employee will remain on site to monitor and patrol area of the site until they are certain there is no fire risk.
  * The employee(s) are equipped with a backpack pump and have means of communication (e.g., radio, cell);
  * In areas where the rail is to be dragged over more than one bridge and the bridges are in close proximity, one employee can be used to patrol the area if they are able to patrol actively and sufficiently both.
- Any open deck bridges will be wetted down prior to making the move;

v. The rail is not dragged faster than 5 mph and 3mph across open deck bridges; and

vi. Inspect for damage to track components (e.g., anchors, spikes, ties, plates, etc.) and crossings behind the movement, especially in curves and turnouts.

vii. Once at the install site, a thorough visual inspection of the entire length of the rail for any defects is conducted.

6.3 Rail – Protection of Worn Rail

a) Rail that reaches Line C wear in Appendix A – Rail Wear Limits & Rail Management Decision Zones must be removed from track, or train speed must be restricted to a speed as near as possible to equilibrium speed, while not exceeding the maximum allowable speed for the class of track, until the rail can be changed out. Note that if rail change-out cannot be done within 30 days, or within 60 days on Class 2 track that does not carry passenger or dangerous commodity traffic, then a further speed restriction to 10 MPH must be applied.

Refer to Line limits in Appendix A – Rail Wear Limits & Rail Management Decision Zones.

b) Where rail wear has resulted in joint bars being heavily impacted by wheel flanges, the joint must be welded, or a high clearance bar or compatible worn bar must be applied. Train speed must be restricted to a speed as near as possible to equilibrium speed until the joint is welded or a high clearance bar is applied.

6.4 Rail – Protection of Defective Rail

a) All rail defects noted in Sub-Part D, Section 6.5 – Rail – Defects and Protection Codes detected visually or by using rail flaw detector cars, including defects temporarily repaired by the application of joint bars, must be monitored within 30 calendar days of their detection and at least monthly thereafter, until change out of defective rail.

b) Rail defects noted in Sub-Part D, Section 6.5 – Rail – Defects and Protection Codes and Sub-Part D, Section 6.9 – Rail – Rail Surface Management Plan are considered Safety Critical Maintenance. Only Quality Assurance (QA) personnel, not involved with the repair, are to verify the repairs have been completed to standards.

6.5 Rail – Defects and Protection Codes

6.5.1 Bolt Hole Crack – BHO / BHJ

<table>
<tr><th colspan="4">Bolt Hole Crack – BHO or BHJ</th></tr>
<tr><th>Contractor's Designation</th><th>Defect Size*
(inches and millimeters)</th><th>Protection Code per Section 6.6</th><th>Ways to Reduce Frequency of Defect Occurring</th></tr>
<tr><td rowspan="3">BHO / BHJ
(outside of joint or in joint area)</td><td>Cracked Out</td><td>1</td><td rowspan="3">Joint elimination

Keep bolts tightened.
Tamp up joints.

Build up rail ends by welding.

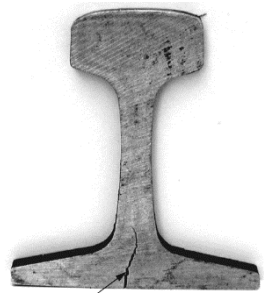
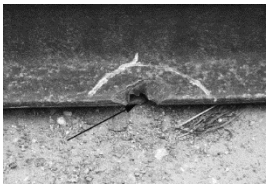
Use proper drilling fixture.

Regularly change drill bits.</td></tr>
<tr><td>More than 1/2" but not Cracked Out
(More than 13 mm but not Cracked Out)</td><td>4</td></tr>
<tr><td>1/2" or less
(13 mm or less)</td><td>8</td></tr>
<tr><td colspan="4"><u>All noted rail defects</u> detected visually or by using rail flaw detector cars, including defects temporarily repaired by the application of joint bars, <u>must be monitored within 30 calendar days of their detection and at least monthly thereafter,</u> until change out of defective rail.</td></tr>
<tr><th colspan="3">Appearance in Track</th><th>Defect Cause</th></tr>
<tr><td colspan="3"> 
Bolt hole cracks originate at a bolt hole in a joint or at a former joint location (e.g. thermite weld) or any holes drilled in rail for any purpose. These cracks can radiate outwards at an angle towards both head and base. In the past bolt hole cracks have progressed from the first bolt hole from the end of the end of the rail at an angle approximately the 45-degree maximum shear plane. In harder premium rails, bolt hole cracks are not regularly seen growing at a large range of angles, some close to vertical, and to emanate from the 2nd or 3rd drilling.</td><td>Loose joint bars, battered rail ends, and bad ties in the joint area. Another key initiator is a nick or burr introduced in the drilling of bolt hole by a dull drill bit or an off-center drilling.</td></tr>
</table>

* % of head covered by defect or crack length in inches.

Figure SUB-PART D – 16 – Bolt Hole Crack

6.5.2 Broken Base – BBO / BBJ

Broken Base – BBO or BBJ			
Contractor's Designation	**Defect Size***	**Protection Code per Section 6.6**	**Ways to Reduce Frequency of Defect Occurring**
BBO / BBJ (outside of joint or in a joint)	N/A	9	Avoid mishandling rail, striking rail with sharp tools.
All noted rail defects detected visually or by using rail flaw detector cars, including defects temporarily repaired by the application of joint bars, must be monitored within 30 calendar days of their detection and at least monthly thereafter, until change out of defective rail.			
Appearance in Track		**Defect Cause**	
   	Base breaks are also called broken bases or base fractures. Base breaks are rarely found by rail flaw detector cars unless they have progressed under the rail web, as the ultrasonic signal is only transmitted through the rail web. Base breaks can be recognized as a crack starting near the junction between the base and the web, and extending either along the axis parallel to the rail, curving outwards to the base, or as a half-moon shape of break	Base breaks develop outwards under the flexural action of the rail from a seam, segregation, or inclusion near the base/web fillet, or inwards from a nick on the edge of the rail. Base breaks also result from derailments or from damaged wheels that have run along the base of the rail, contacting rail anchors.	

* % of head covered by defect or crack length in inches.

Figure SUB-PART D – 17 – Broken Base

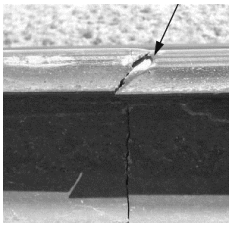
6.5.3 Broken Rail or Ordinary Break – BR

Broken Rail or Ordinary Break – BR			
Contractor's Designation	**Defect Size***	**Protection Code per Section 6.6**	**Ways to Reduce Frequency of Defect Occurring**
BR	N/A	1	Destress Surfacing
All noted rail defects detected visually or by using rail flaw detector cars, including defects temporarily repaired by the application of joint bars, must be monitored within 30 calendar days of their detection and at least monthly thereafter, until change out of defective rail.			
Appearance in Track		**Defect Cause**	
  Ordinary Break No Visible Defect	Partially or completely broken through, without evidence of a fissure or other type of rail defect that may have caused the break.	High tension in rail, skid flats, out of round wheels, shelled wheel treads.	

* % of head covered by defect or crack length in inches.

Figure SUB-PART D – 18 – Broken Rail or Ordinary Break

6.5.4 Damaged Rail

Damaged Rail			
Contractor's Designation	**Defect Size***	**Protection Code per Section 6.6**	**Ways to Reduce Frequency of Defect Occurring**
N/A	N/A	7	
All noted rail defects detected visually or by using rail flaw detector cars, including defects temporarily repaired by the application of joint bars, must be monitored within 30 calendar days of their detection and at least monthly thereafter, until change out of defective rail.			
Appearance in Track			**Defect Cause**
 Damage from wheel slipping  Impact Damage from Broken Wheel	Any rail broken or injured by wrecks, broken, flat, or unbalanced wheels, slipping, or similar causes.		

* % of head covered by defect or crack length in inches.

Figure SUB-PART D – 19 – Damaged Rail

6.5.5 Defective Field Weld or Defective Plant Weld – DWF or DWP

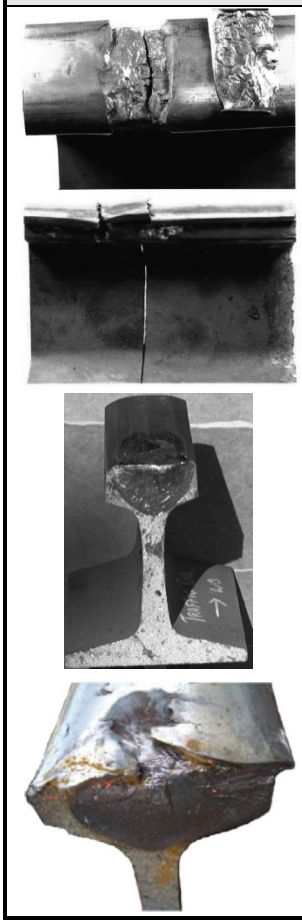
Defective Field Weld or Defective Plant Weld – DWF or DWP			
Contractor's Designation	**Defect Size***	**Protection Code per Section 6.6**	**Ways to Reduce Frequency of Defect Occurring**
DWF (CO) DWP (CO)	Cracked Out, or 81 – 100%	1 or 10	Destressing. Proper shearing, grinding and handling. Prevent gouges in finish grinding. Thermite welding crucible must be dry. Use of proper welding kit for metallurgy. Sufficient preheat and cooling time when welding. Avoid use of damaged tools.
DWF (L) DWP (L)	41 – 80%	4 or 7	
DWF (M) DWP (M)	21 – 40 %	4 or 7	
DWF (S) DWP (S)	0 – 20%	4 or 7	
All noted rail defects detected visually or by using rail flaw detector cars, including defects temporarily repaired by the application of joint bars, must be monitored within 30 calendar days of their detection and at least monthly thereafter, until change out of defective rail.			

Appearance in Track		Defect Cause
  Grinder Gouge  Flash Butt Weld – Shear Drag   Weld Collar Oblique Break	Weld defects in the rail head are difficult to detect but can be found by rail flaw detector cars. They cannot be inspected visually until the transverse defect has cracked out to show a vertical crack on the side of the rail head. Web fractures may have one of several characteristic shapes, variously referred to as "flat cracks", "horseshoe breaks", "S" breaks, "H" breaks, or "big dipper failures."	In the head of the rail, the origin may be a slag inclusion or oxide entrapment. In the web, fracture may be the result of gouges left from poor finish grinding or from residual stresses in the rail, as in the case of a split web. In many cases, the cause may be poor fusion due to improper preheat or excessively rapid cooling.

* % of head covered by defect or crack length in inches.

Figure SUB-PART D – 20 – Defective Field Weld or Defective Plant Weld

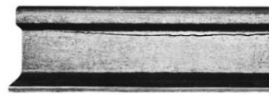
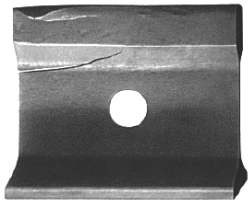
6.5.6 Engine Burn – EBF

Engine Burn Fracture - EBF			
Contractor's Designation	**Defect Size***	**Protection Code per Section 6.6**	**Ways to Reduce Frequency of Defect Occurring**
EBF	100 % (Cracked Out)	1	Prevent wheel slippage. Proper engineer training, Proper traction levels on grades and the use of sanding when wheel slippage.
	81 – 99%	2	
	21 – 80 %	5	
	0 – 20%	7	
*See *Repair Note 3 per Section 6.6* in addition to the above Protection Codes			
All noted rail defects detected visually or by using rail flaw detector cars, including defects temporarily repaired by the application of joint bars, must be monitored within 30 calendar days of their detection and at least monthly thereafter, until change out of defective rail.			
Appearance in Track		**Defect Cause**	
	Flat spot on the rail, hairline cracks may be visible on the side of the head, beneath the engine burn area, in the vicinity of an engine burn on the surface, and at right angles to the running surface. Cracks can be visible on either side of the head (field, gage) or in the fillet. Broken pieces will show the burn surface with transverse separation and will have no nucleus. Defects may exist at one, two, or three planes anywhere along the burn area. A horizontal separation will generally start at running surface slanting downward.	Engine burn fractures are caused by repeated wheel impacts at the site of an engine burn due to excessive wheel slip. Rail metal under an engine burn is usually thermally damaged and susceptible to fatigue. The underlying defect associated with the engine burn can be difficult to detect because the rail head surface conditions can prevent detection before failure. Conventional ultrasonic sound detection can be blocked by the rail surface conditions. Growth may be normal or rapid before sudden failure of the rail section through the head, and into the web and base. Complete fracture normally results in a transverse break. Identification of internal rail flaw is not visible until it reaches surface (Cracks Out).	

* % of head covered by defect or crack length in inches.

Figure SUB-PART D – 21 – Engine Burn Fracture

6.5.7 Head and Web Separation – HWO / HWJ

Head and Web Separation – HWO or HWJ			
Contractor's Designation	**Defect Size*** (inches and millimeters)	**Protection Code per Section 6.6**	**Ways to Reduce Frequency of Defect Occurring**
HWO / HWJ (outside of joint or in joint area)	Cracked Out	1	Keep bolts tightened. Build up battered rail ends. Inspect rail when replacing crossing. Maintain good joint support.
	More than 3" *(More than 76 mm)*	6	
	1/2" to 3" *(13 mm to 76 mm)*	4	
	Less than 1/2" *(Less than 13 mm)*	8	
All noted rail defects detected visually or by using rail flaw detector cars, including defects temporarily repaired by the application of joint bars, must be monitored within 30 calendar days of their detection and at least monthly thereafter, until change out of defective rail.			
Appearance in Track			**Defect Cause**
  	Separation of the head and web of the rail through the fillet area under the head is termed a "Head and Web Separation". Head and web separations may also occur at highway crossings. They are recognized by irregular lines running longitudinally along the fillet or parallel to the head / web fillet. They can also be recognized by a dead sound when tapped with a hammer. In the joint area the crack may be obscured by angle bars.		Head and web separations may occur due to eccentric loading of the rail head, the action of the joint bar in poor rail joints or because of corrosion fatigue where the rail head joins the web.

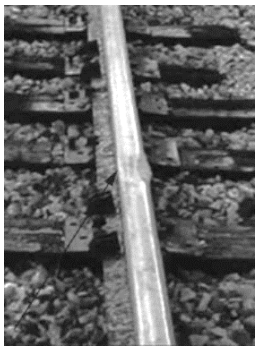
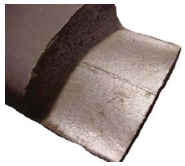
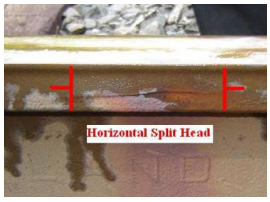
* % of head covered by defect or crack length in inches.

Figure SUB-PART D – 22 – Head and Web Separation

6.5.8 Horizontal Split Head – HSH / HSJ

Horizontal Split Head – HSH or HSJ			
Contractor's Designation	**Defect Size*** (inches and millimeters)	**Protection Code per Section 6.6**	**Ways to Reduce Frequency of Defect Occurring**
HSH / HSJ (outside of joint or in joint area)	Cracked Out	1	Remove rails with same heat number if defects persist. Slot rail ends.
	More than 12" *(More than 305 mm)*	3	
	2" to 12" *(51 mm to 305 mm)*	4	
	Less than 2" *(Less than 51 mm)*	Monitor within 30 days and monthly thereafter until repaired / replaced per Section 6.3 a	

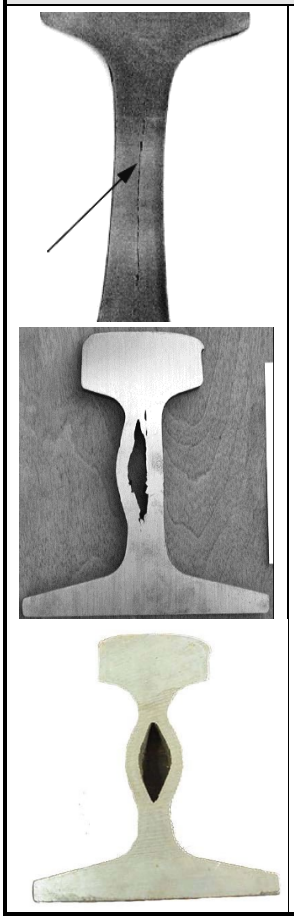
All noted rail defects detected visually or by using rail flaw detector cars, including defects temporarily repaired by the application of joint bars, must be monitored within 30 calendar days of their detection and at least monthly thereafter, until change out of defective rail.

Appearance in Track		Defect Cause
   	Horizontal split heads can sometimes be detected visually as they can cause a local flattening of the rail head which would cause a dark spot in contrast to the adjacent shiny running band. When it cracks out, it can be seen as a hairline horizontal crack on the way down from the top of the rail.	A horizontal split head is a progressive longitudinal fracture along a plan parallel to the rail surface. The origin is at an internal seam, segregation or inclusion introduced in the steel making. It usually grows rapidly but may stop at the end of the seam or at a weld.

* % of head covered by defect or crack length in inches.

Figure SUB-PART D – 23 – Horizontal Split Head

6.5.9 Piped Rail – PRO / PRJ

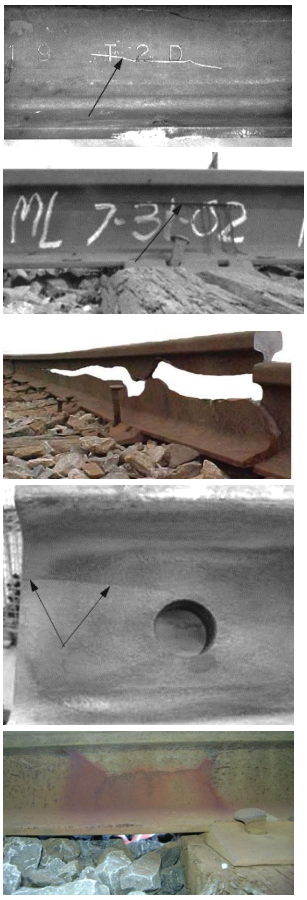
Piped Rail – PRO or PRJ			
Contractor's Designation	**Defect Size*** (inches and millimeters)	**Protection Code per Section 6.6**	**Ways to Reduce Frequency of Defect Occurring**
PRO / PRJ (outside of joint or in joint area)	Cracked Out	1	Remove rails with same heat number if defects.
	More than 3" *(More than 76 mm)*	6	
	1/2" to 3" *(13 mm to 76 mm)*	4	
	Less than 1/2" *(Less than 13 mm)*	8	
All noted rail defects detected visually or by using rail flaw detector cars, including defects temporarily repaired by the application of joint bars, must be monitored within 30 calendar days of their detection and at least monthly thereafter, until change out of defective rail.			
Appearance in Track		**Defect Cause**	
	Piped rails are seen in older steels. When fully progressed, they can be seen as a bulging of the web on either side or both sides, possibly with shallow cracks on the bulging surface. A slight sinking of the rail head may also be seen.	Piped rails are the result of a longitudinal seam or cavity in the web of the rail, typically found in older rails. Piped rails are generally not a serious defect unless the web has bulged or where the pipe has progressed into a weld.	

* % of head covered by defect or crack length in inches.

Figure SUB-PART D – 24 – Piped Rail

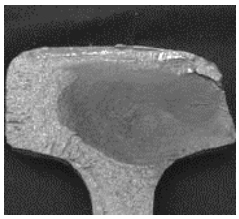
Split Web – SWO or SWJ			
Contractor's Designation	**Defect Size*** (inches and millimeters)	**Protection Code per Section 6.6**	**Ways to Reduce Frequency of Defect Occurring**
SWO / SWJ (outside of joint in joint area)	Cracked Out	1	Avoid mishandling rail, striking with sharp tools.
	More than 3" *(More than 76 mm)*	6	
	1/2" to 3" *(13 mm to 76 mm)*	4	
	Less than 1/2" *(Less than 13 mm)*	8	

All noted rail defects detected visually or by using rail flaw detector cars, including defects temporarily repaired by the application of joint bars, must be monitored within 30 calendar days of their detection and at least monthly thereafter, until change out of defective rail.

Appearance in Track	Defect Cause
 Split webs are longitudinal or occasionally transverse cracks along the side of the web and extending into or through it. Often, they can be recognized as a "bleeding" crack in the web.	Split webs will occur because of a bad stamping of the rail identification numbers or due to a nick or a gouge in the rail. Split webs usually grow rapidly in the joint area.

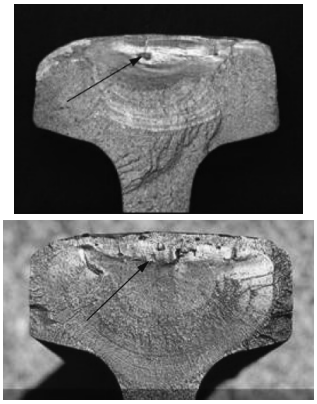
* % of head covered by defect or crack length in inches.

Figure SUB-PART D – 25 – Split Web

Transverse Defect or Detailed Fracture - TDD			
Contractor's Designation	**Defect Size***	**Protection Code per Section 6.6**	**Ways to Reduce Frequency of Defect Occurring**
TDD (CO)	100 % (Cracked Out)	1	Grind gauge corner with production rail grinder to provide relief. Run for a period with lubricators. Destress. Improve tie condition.
TDD (L)	41 – 99%	2 or 9	
TDD (M)	21 – 40%	3 or 9	
TDD (S)	0 – 20%	9	
*See *Repair Note 1 per Section 6.6* in addition to the above Protection Codes			
All noted rail defects detected visually or by using rail flaw detector cars, including defects temporarily repaired by the application of joint bars, must be monitored within 30 calendar days of their detection and at least monthly thereafter, until change out of defective rail.			
Appearance in Track		**Defect Cause**	
  Detail Fracture from Shelling   Detail Fracture from Head Check	The distinguishing features of a transverse defect are the crystalline center or nucleus and the nearly smooth surface of the development which surrounds it. Transverse defects (TD's) are usually found by ultrasonic or induction testing cars but will occasionally reach the surface where they can be identified by cracks on the side or corners of the rail head.	Overloading of gauge corner due to loss of rail, cant, insufficient relief of gauge corner location interfering with throat of wheel. 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. Detail fractures are more common in dirty rail steels and in areas where the rail is in tension. Starts from rail surface cracking and grows inwards.	

* % of head covered by defect or crack length in inches.

Figure SUB-PART D – 26 – Transverse Defect or Detailed Fracture

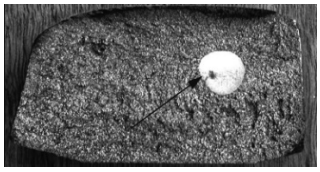
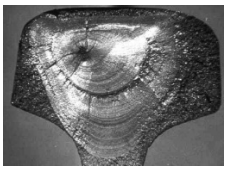
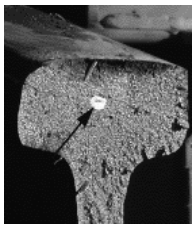
Transverse Defect Under a Weld Repair – DFW or TDW			
Contractor's Designation	**Defect Size***	**Protection Code per Section 6.6**	**Ways to Reduce Frequency of Defect Occurring**
DFW or TDW (CO)	100 % (Cracked Out)	1	Complete removal of rail surface defect, cleaning of slag between weld passes, maintaining interpass temperatures and accurate pre and post heating of the rail.
DFW or TDW (L)	41 – 99%	2 or 9	
DFW or TDW (M)	21 – 40%	3 or 9	
DFW or TDW (S)	0 – 20%	9	
*See *Repair Note 1 per Section 6.6* in addition to the above Protection Codes			
All noted rail defects detected visually or by using rail flaw detector cars, including defects temporarily repaired by the application of joint bars, must be monitored within 30 calendar days of their detection and at least monthly thereafter, until change out of defective rail.			
Appearance in Track		**Defect Cause**	
 Detail Fracture under Weld	A transverse separation associated with a weld repair is a progressive fracture in the head of the rail that initiates from an inclusion or stress crack resulting from a weld repair rail re-surfacing. The defect will typically initiate at the interface between the weld filler metal and parent metal of the rail section. It then progresses transversely into the rail head. Develops substantially at right angles to the running surface at engine burn or electrode burn that have been resurfaced by welding. No evidence of a transverse defect is visible until the defect reaches the rail surface.	The defect is a result of improper welding techniques, usually during the cleaning phase, associated with the repair of engine burn or electrode burns. It can also be a result of improper cooling which may create martensite and thermal cracks. Transverse separation will initiate from inclusions or heat affected zone (under-bead cracking) of the weld.	

* % of head covered by defect or crack length in inches.

Figure SUB-PART D – 27 – Transverse Defect Under a Weld Repair

6.5.13 Transverse Fissure or Compound Fissure – TDT

Transverse** Fissure or Compound Fissure - TDT			
Contractor's Designation	**Defect Size***	**Protection Code per Section 6.6**	**Ways to Reduce Frequency of Defect Occurring**
TDT (CO)	100 % (Cracked Out)	1	Change out non-Mackie or non-control cooled rail.
TDT (L)	41 – 99%	2	
TDT (M)	21 – 40%	7	
TDT (S)	0 – 20%	7	
*See *Repair Note 1 per Section 6.6* in addition to the above Protection Codes			
All noted rail defects detected visually or by using rail flaw detector cars, including defects temporarily repaired by the application of joint bars, must be monitored within 30 calendar days of their detection and at least monthly thereafter, until change out of defective rail.			

Appearance in Track		Defect Cause
   Transverse Fissure   Compound Fissure	The term "transverse fissure" describes a transverse defect that has nucleated from a more central location in the railhead. The distinguishing features of a transverse defect are the crystalline center or nucleus and the nearly smooth surface of the development which surrounds it. Transverse defects (TD's) are usually found by ultrasonic or induction testing cars but will occasionally reach the surface where they can be identified by cracks on the side or corners of the rail head.	Transverse fissures are usually the result of trapped hydrogen or other imperfections in rail steel and usually not found in modern rails. Multiple transverse fissures often occur in the same rail. Compound Fissures could start from the rail surface or internally and has multiple angles or fracture faces.

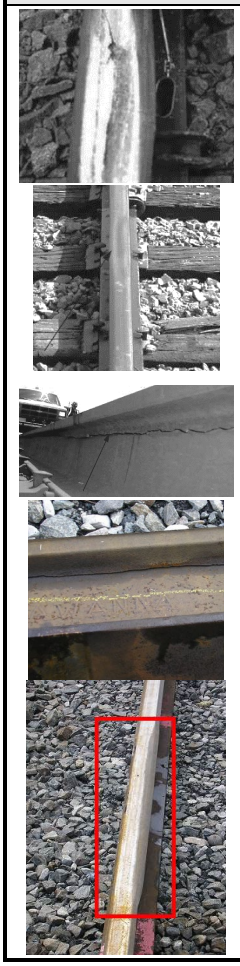
* % of head covered by defect or crack length in inches.

** Transverse defects occurring in non-Mackie and non-control cooled rails are subject to the same rules applying to transverse fissures, except that the entire length of rail must be changed out in all cases.

Figure SUB-PART D – 28 – Transverse Fissure or Compound Fissure

Vertical Split Head – VSH or VSJ			
Contractor's Designation	**Defect Size*** (inches and millimeters)	**Protection Code per Section 6.6**	**Ways to Reduce Frequency of Defect Occurring**
VSH / VSJ (outside of joint or in joint area)	Cracked Out	1	Grind rail to center wheel contact band over rail web. Remove rails with same heat number if defects persist.
	More than 12" *(More than 305 mm)*	3	
	2" to 12" *(51 mm to 305 mm)*	4	
	Less than 2" *(Less than 51 mm)*	Monitor within 30 days and monthly thereafter until repaired / replaced per Section 6.3 a	
*See *Repair Note 2 per Section 6.6* in addition to the above Protection Codes			

All noted rail defects detected visually or by using rail flaw detector cars, including defects temporarily repaired by the application of joint bars, must be monitored within 30 calendar days of their detection and at least monthly thereafter, until change out of defective rail.

Appearance in Track		Defect Cause
	Top of rail view may show a dark streak on the running surface. Widening of the head for the length of the split. The side of the head to which the split is offset may show signs of sagging or drooping. Rust streak on the fillet under the head. Separation progresses longitudinally and vertically (parallel to side of head) for some distance, then gradually turns outward to head, gage or field side. In advanced stages, a bleeding crack will be apparent at the head fillet. Eventually, one or both ends of the vertical split head will turn to the gage or field side with rust and/or cracks. Growth is usually rapid, once the seam or separation has opened anywhere along its length. It continues rapidly until the split begins to turn outward.	Vertical split heads are progressive longitudinal fractures where the head of the rail separates vertically along a seam, segregation, or inclusion in the rail, usually near the middle of the head. The separation may progress rapidly up to the full length of the rail before gradually turning out to field or gauge. Occasionally a vertical split head may also pass through a weld to find the same seam that was rolled into an adjacent rail. Vertical split heads grow because of the shearing action of wheels riding to field or to gauge. Residual tensile stresses may also play a role. Vertical split heads occurring in rails with moderate wear are primarily the result of poor steelmaking. While vertical split heads are usually associated with dirty steel, they will progress faster in heavily worn rails that have flattened in service.

* % of head covered by defect or crack length in inches.

Figure SUB-PART D – 29 – Vertical Split Head

6.6 Rail – Protection Code Description and Repair Notes

a) All noted rail defects, including those temporarily repaired by the application of joint bars, must be monitored within 30 calendar days of their detection and at least monthly thereafter, until change out of defective rail.

b) The following lists the specific protection codes used in the column four of the table of Rail Defects and Protection Codes with a description of the protection associated with each code.

PROTECTION CODE DESCRIPTION	
Code	**Explanation of Protection Codes**
1	Assign an employee qualified in Movement Over a Rail Break to visually supervise each operation over defective rail. Apply Movement Over Broken Rails policy per Sub-Part D, Section 6.7 Rail – Authorizing Movement over Rail Breaks
2	Assign a qualified Track Supervisor (Inspector) to visually inspect. Once inspected that person may authorize operation to continue without continuous visual supervision at a maximum of 10 mph for up to 24 hours prior to another such visual inspection or replacement or repair of the rail. After joint bars have been applied, allow trains to operate over this defect at 30 mph.
3	Assign a qualified Track Supervisor (Inspector) to visually inspect. Restrict the operation of trains to not more than 10 mph. Defective rails must be replaced as soon as possible.
4	Limit operating speed over defective rail to that as authorized by a qualified Track Supervisor (Inspector). The operation of trains must be restricted to not more than 30 mph or maximum allowable speed under the class of track, whichever is lower.
5*	Assign a qualified Track Supervisor (Inspector) to visually inspect. Restrict the operation of trains to not more than 10 mph until weld repair bars applied. Then, limit the operating speed to not more than 40 mph or maximum allowable speed under the class of track, whichever is lower, and if rails are not replaced within 3 days, lower the operating speed to 10 mph.
6	Restrict operation of trains to not more than 30 mph as designated by a qualified Track Supervisor (Inspector) or maximum allowable speed under the class of track, whichever is lower, and visually inspect by a qualified Track Supervisor (Inspector) in not more than 10 days.
7	Restrict the operation of trains to not more than 30 mph apply joint bars within 10 days. Then, limit the operating speed to not more than 40 mph or maximum allowable speed under the class of track, whichever is lower.
8	Restrict operation of trains to not more than 50 mph or maximum allowable speed under the class of track, whichever is lower, and if rails are not replaced within 72 hours, lower the operating speed to 35 mph or maximum allowable speed under the class of track, whichever is lower.
9	Apply joint bars and restrict operation of trains to not more than 30 mph or a maximum allowable speed under the class of track, whichever is lower. As a general note, in applying joint bars, 2 bolts per rail end are to be used in the outer most holes.
***10**	Assign a qualified Track Supervisor (Inspector) to visually inspect. Apply joint repair bars and restrict operation of trains to no more than 30 mph or maximum allowable speed under the class of track, whichever is lower, and if rails are not replaced within 24 hours, lower the operating speed to 10 mph.

Figure SUB-PART D – 30 – Description of Protection Codes

*When the rail defect extends through a weld, a section of rail must be cut out when making either emergency or permanent repairs. Note, these repairs must be made in accordance with ONTC Standards.

Code	Repair Note Actions
1	When changing out the defective rail, remove from the track all rail showing gross distortion of the rail section (for example, heavy flow) plus all rail with evidence of rail shelling, occurring in the same rail. Ensure to cut at least 6" away from any weld.
2	When changing out the defect, replace the entire rail and inspect to ensure that the defect has not traveled through the weld into an adjacent rail.
3	Engine burns should be repaired by replacing minimum 12' of rail in CWR or by replacing the rail in jointed track.

Figure SUB-PART D – 31 – Repair Notes

6.7 Rail – Authorizing Movement over Rail Breaks

a) This requirement expands upon practices outlined in Sub-Part D, Section 6.6. – Rail – Protection Code Description and Repair Notes and has been developed to provide specific criteria for a qualified employee to authorize a train or engine to proceed safely over rail breaks,
   - For the purpose of this, a rail break shall be considered a complete break of the rail,

b) A train or engine must not be permitted to operate over a rail break when any of the following conditions exists:
   - The rail break is in a tunnel or on a bridge,
   - For supervised moves, the rail break is within 500 feet *(152,400 mm)* of a bridge or tunnel,
   - For unsupervised moves, the rail break is within 500 feet *(152,400 mm)* of a bridge or tunnel,
   - The ties on either side of the break are defective, crushed, or split in the tie plate area,
   - Cracks are observed radiating from the broken rail ends,
   - The rail break occurs in an area of unstable grade,
   - The offset (overhang) is greater than 2 inches *(51 mm)*,
   - The gap is greater than 3 1/2 inches *(89 mm)*,

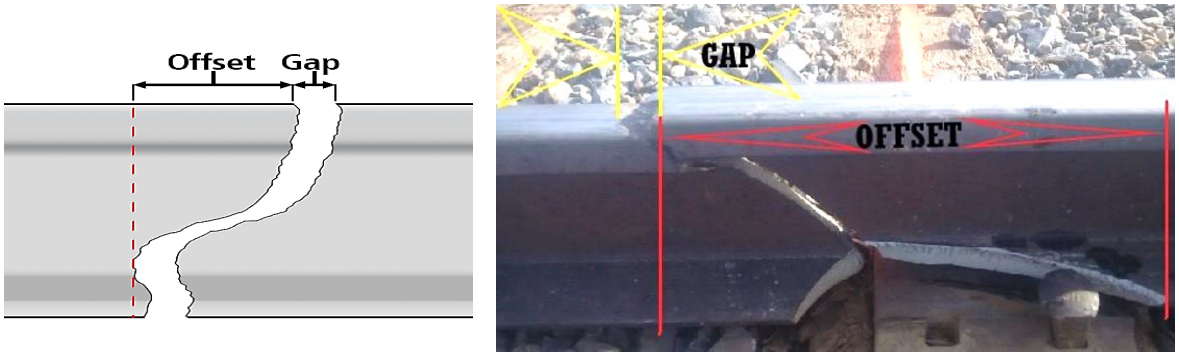


Figure SUB-PART D – 32 – Movement Over a Rail Break - Offset and Gap Measurement Visuals

   - In the case of a joint area, the break extends beyond the limits of the joint bar, or
   - The break occurs in an area in which the Superintendent, Maintenance of Way has specified that movements over rail breaks are not permitted.

c) Where none of the above conditions exist and joint bars are installed with at least one bolt through the center of the break, trains or engines are allowed to operate over the break at a speed not exceeding 10 miles per hour,

d) When none of the conditions outlined in item (b) exist and the gap size is too small to allow for the installation of joint bars with one bolt through the center of the break (less 1 1/8" *(29 mm)*) trains may be permitted to operate over the broken rail at a speed not exceeding 5 miles per hour, under a supervised movement,

e) If the break is at a weld location and bolt holes exist, splice bars, or temporary weld bars must be installed with at least one bolt in each rail end,

f) The condition of the rail break, splice bars, and supporting ties, must be visually observed as the train or engine operates over the break,

g) The requirement for supervision of the train movement over the rail break may be waived if the rail break is a significant distance from a location where the employees' vehicle can be cleared, for example, where there is no other track, grade crossing or road nearby, or where access by foot is impeded by adverse weather conditions provided the following regulatory requirements are met:

- The rail break is either,
  - An ordinary break,
  - A complete break where there is a sign of a transverse fissure or compound fissure, or
  - A complete break at a defective weld,
- Splice bars must be installed,
- The condition of the rail break, splice bars and supporting ties must be inspected prior to each movement over the break,
- Not more than 24 hours has elapsed since the initial inspection of the defect (defects must be repaired within 24 hours of detection), and

h) A 5-mph speed restriction must be applied in accordance with the applicable operating rules:

i) The Rail Traffic Controller (RTC) must be notified, in a clear manner, as to how the restriction is to be applied. One of the following methods must be used;

- Flags placed in accordance with CROR Rule 843/43,
- By the use of an approved rail break sign, or
- When flags or an approved rail break sign are not available, restrictions must be applied between two identifiable locations.

j) Records of these rail breaks must be kept for a period of at least 1 year and include the following information:

- The mileage and subdivision where each rail break occurred,
- The measured gap and offset at the rail break, and
- The type of rail defect.

k) Repairs must be completed within 24 hours from the time the defect is first inspected.

l) Temporary Gap Rail Inserts are allowed if the following conditions are met;

Figure SUB-PART D – 33 – Temporary Gap Rail Insert

- Used only if there are no evident signs of a longitudinal defect such as a vertical split head, horizontal split head, split web or a head web separation,

- Insert rail is of the same weight with head and flange wear difference no more than 1/8” *(3 mm)*,
- Insert rail is free from defects and has been UTT tested,
- Hole is drilled in the middle of the insert prior to cutting to ensure insert will be centered in the gap,
- Within the Maximum Gap range as shown below. The offset of a broken rail can be trimmed to allow for installation of an insert and bolt,
- Sum of the gaps between the parent rail and the insert ends does not exceed ¾” *(19 mm)*,
    - Installed so that it is approximately centered within, and secured with joint bars, or a bolt may be installed through the joint bar and between the rail end and the insert rail with a maximum gap of ¾” *(19 mm)* between the opposite end of the insert rail and the other rail end.
- Constantly monitored during all moments over the location by a qualified employee who has established communication with the train,
- Protected by the speed restrictions as shown in the below table,
- Inspected and bolts tighten, if required, after each movement is made over the location,
- Removed when permanent repairs are made, but no longer than 24 hours after installation.

Maximum Allowable Speed over a Temporary Rail Gap Repair	
Maximum Speed	**Maximum Gap Range Allowed for 100 lbs / 115 lbs Rail**
10 mph	Up to 4” *(152 mm)* Gap
5 mph	4” to 8” *(100 mm to 203 mm)* Gap **or** any Curve

Figure SUB-PART D – 34 – Maximum Allowable Speed with a Temporary Gap Rail Insert

6.7.1 Rail – SUPERVISED Movements over Rail Breaks

If the condition of the rail break, splice bars, and supporting ties, can be visually observed as the train or engine operates over the break, use the following flow chart to determine the appropriate action:

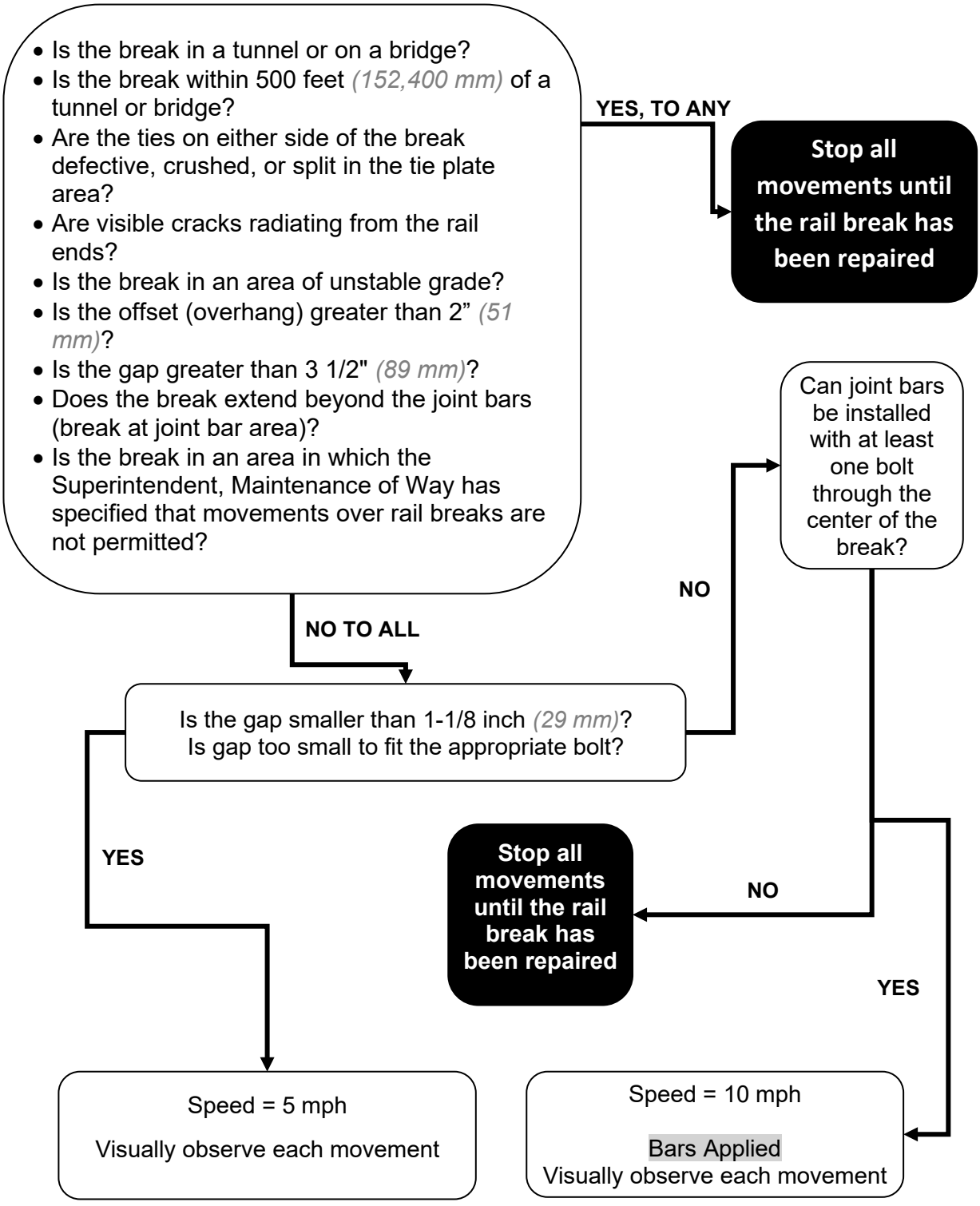


Figure SUB-PART D – 35 – Movement Over Rail Breaks - SUPERVISED

6.7.2 Rail – UNSUPERVISED Movements over Rail Breaks

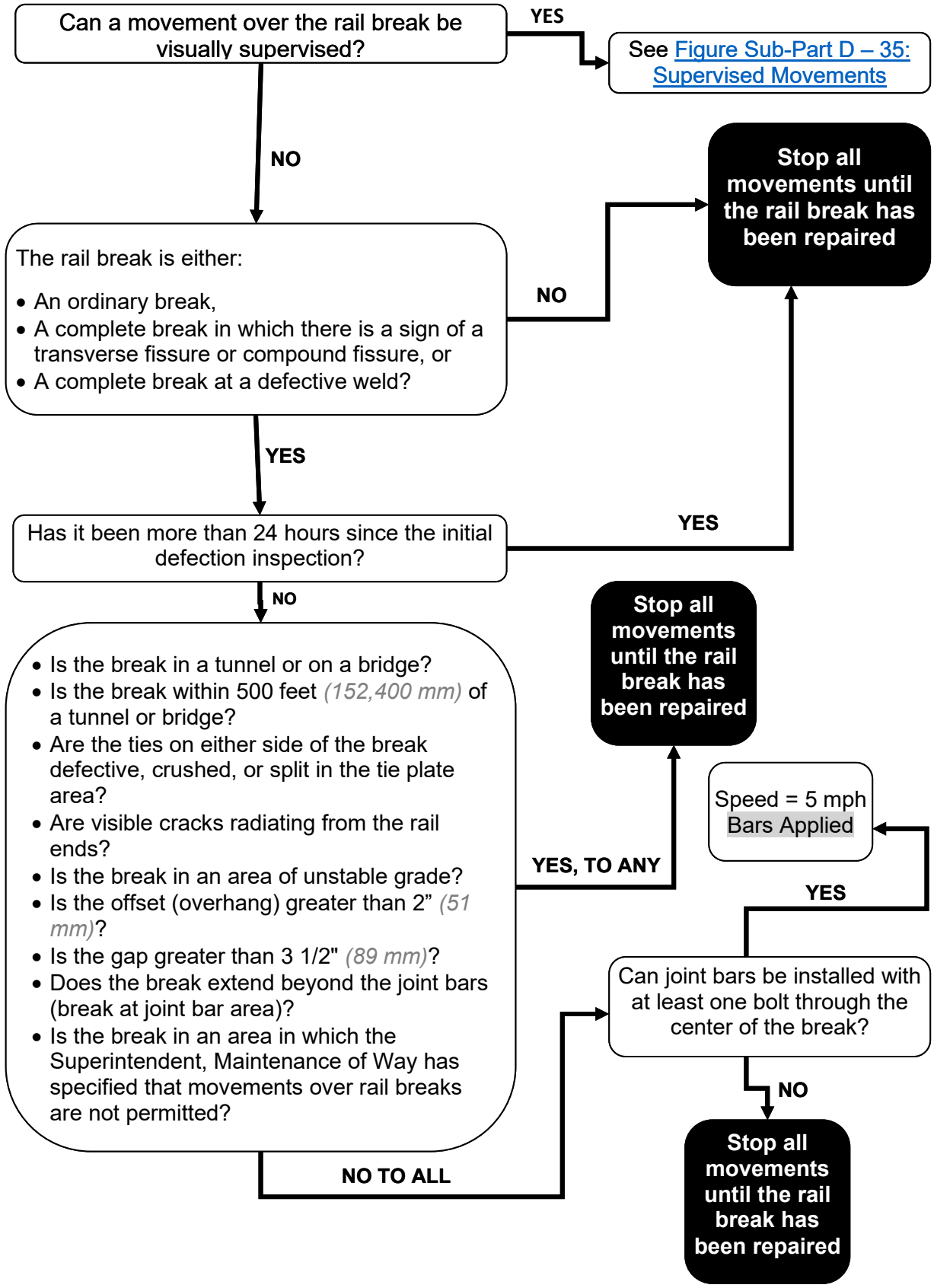


Figure SUB-PART D – 36 – Movement Over Rail Breaks – UNSUPERVISED

6.8 Rail – Inspection of Broken Rail

a) When any broken rail is found on a main track or siding, the Track Maintenance Foreman or whichever employee first arrives at the location, must inspect the track for 300 feet *(91,440 mm)* in each direction from the break, looking for pieces of equipment and for damage to the rail or track, e.g., wheel marks.

6.9 Rail – Rail Surface Management Plan

a) Rail defects noted in Sub-Part D, Section 6.5 – Rail – Defects and Protection Codes and Sub-Part D, Section 6.9 – Rail – Rail Surface Management Plan are considered Safety Critical Maintenance. Only Quality Assurance (QA) personnel, not involved with the repair, are to verify the repairs have been completed to standards.

b) The following criteria shall be used in restricting the operating speed over Corrugation, Crushed Heads, Localized Surface Collapse, and Rail End Batter until such time as they can be corrected.

Depth of Surface Defect		**Remedial Action** *(NOTE: Section 6.9 c) for Class 3 and higher in addition to the below)*
Rail Wear is 0% to 75% of Vertical Condemning Limit *(100 lbs – Less than 5/16" vertical wear 115 lbs – Less than 1/2" vertical wear)*	**Rail Wear is Greater Than 75% of Vertical Condemning Limit** *(100 lbs – 5/16" or greater vertical wear 115 lbs – 1/2" or greater vertical wear)*	
Less than 3/16" *(<5 mm)*	Less than 1/8" *(<3 mm)*	Monitor until Repaired
3/16" to 5/16" *(5 mm to 8 mm)*	1/8" to 3/16" *(3 mm to 5 mm)*	TSO 30 mph until Repaired or Replaced
Greater than 5/16" *(>8 mm)*	Greater than 3/16" *(>5 mm)*	TSO 10 mph until Repaired or Replaced
Corrugation, regardless of length or depth, that prevents a valid internal search for defects by rail flaw test equipment.	Speed restricted to Class 1 until Repaired (e.g., grinding) and Retested, or Replaced, or Rail Flaw Detection Tested	

Note: *The vertical condemning limit for 100 lbs is 7/16" vertical wear and 115 lbs is 11/16" vertical wear.*

Figure SUB-PART D – 37 – Rail Surface Defects (inches and millimetres)

c) Crushed Heads, Localized Surface Collapse, and Rail End Batter on Class 3 track and higher, measuring 1/8" *(3 mm)* or greater will be monitored by local forces monthly until repaired or replaced.

d) A record of inspection location, date and measurement taken must be maintained.

e) Crushed Heads, Localized Surface Collapse, and Rail End Batter defects shall be determined using a straight edge and a taper gauge per the following diagrams. Management of corrugation is dependent upon ability perform a proper test to detect internal rail defects.

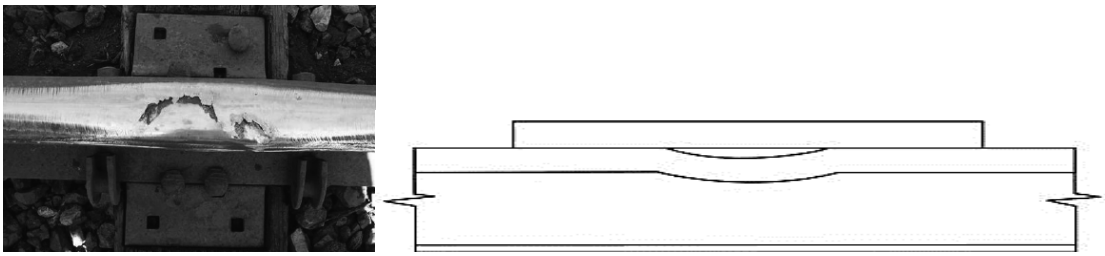


***Figure SUB-PART D – 38 – Crushed Head** (left) **and Straight Edge Placement** (right)*

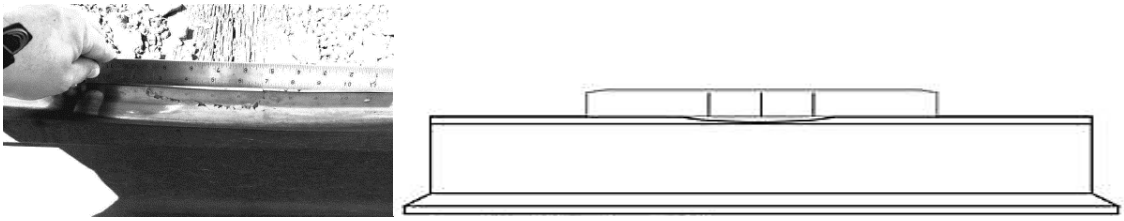


Figure SUB-PART D – 39 – Localized Surface Collapse Straight Edge Placement

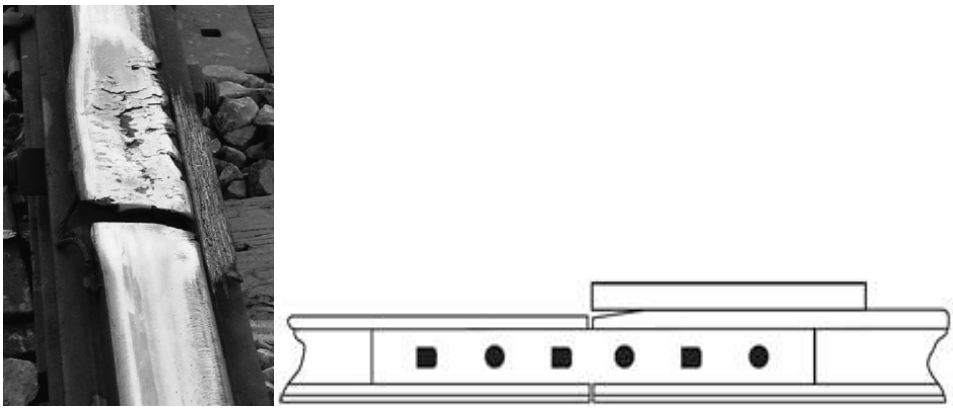


***Figure SUB-PART D – 40 – Rail End Batter** (left) **and Straight Edge Placement** (right)*

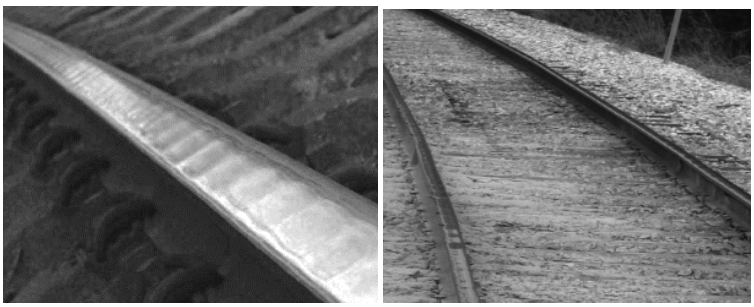


Figure SUB-PART D – 41 – Corrugation Example

6.10 Rail – Identification

a) Rail branding is the raised letters and numbers along the web of the rail. Rail stamping is on the opposite side of the web and has indented letters and numbers.

i. Branding identifies rail weight or section, manufacturer, manufacturing method, year and month rolled

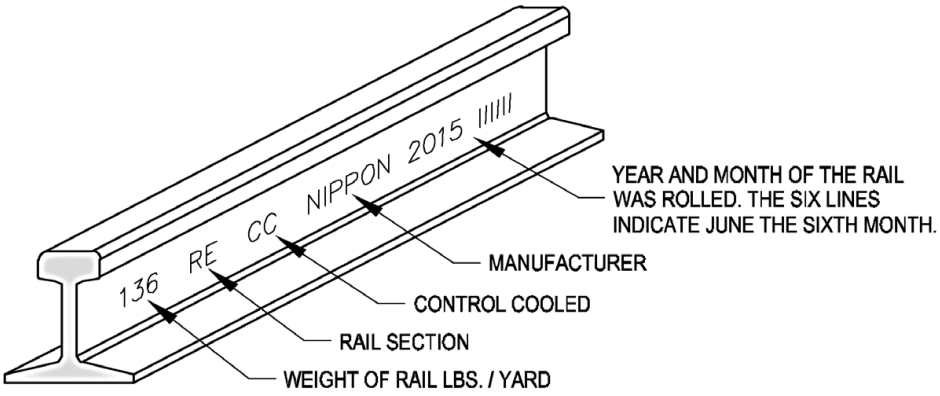


Figure SUB-PART D – 42 – Rail Branding

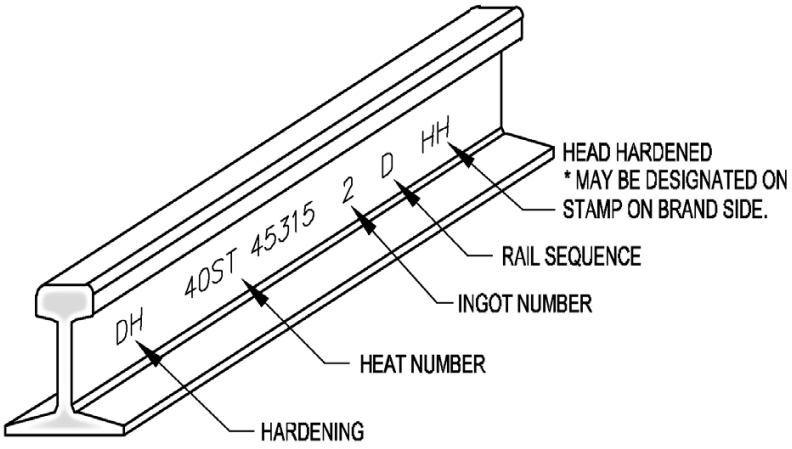


Figure SUB-PART D – 43 – Rail Stamping

ii. Stamping identifies heat, ingot and rail sequence in manufacturing process

iii. Rail hardness is identified by branding or stamping:

Branding / Stamping	Rail Hardening
Blank	Standard Strength
SS	Standard Strength
3HB	Standard Strength
IH	Intermediate Hardness
IHHS	Intermediate Hardness High Strength
HH	Head Hardened
FHH	Fully Hardened
DHH	Deep Head Hardened

Figure SUB-PART D – 44 – Rail Hardness Branding / Stamping

6.11 Rail – Removal

a) When removing a defective rail, remove the full length of the rail if the following apply:

   i. Non-Mackie or non-control-cooled rails are being removed from the track because of transverse fissures

   ii. Mackie or control-cooled rails are being removed from the track because of:

   - Vertical split heads outside the joint area
   - Transverse fissures or transverse defects accompanied by gross distortion of the rail section (for example, heavy flow or evidence of rail shelling)

b) In territory laid with Mackie, CC or VT rail keep only rail with the corresponding brands or stamps on the rail racks.

c) For each rail removed from the track because it is broken or has a defect, document the information in the applicable record. The exception is rail defects found and reported by the rail flaw detection cars.

d) Rail removed from track that is defective or that is otherwise unfit for relay in track, and cannot be improved by treatment, must be classified, and marked as scrap (XXXX). It must be stored for removal in a location that is apart from the racks where maintenance and relay rail plugs are stored.

6.12 Rail – Wear Limits and Rail Management Design Zones

See Appendix A

6.13 Rail – Classification

a) When released from track, rail must be properly classified to ensure the best possible use with these general rules,

- New Rail
  - New rail is laid in primary main lines.
- Premium Rail
  - New Premium Rail is laid where authorized by the Director, Rail Infrastructure,
  - Premium Rail has an increased resistance to wear because of its chemical composition and special hardening process,
  - Premium Rail should not be mixed with Intermediate Rail due to the different wear rate.
- Intermediate Rail
  - Intermediate Rail is used in the majority of applications at *Ontario Northland* due to our relatively low annual gross tons of traffic.

b) The classification, description and marking of rail are as follows;

RAIL		
Classification	**Description**	**Marking**
New Rail	Rail not previously used in service, to be laid where allowed	N/A
Main Line Rail	Rail previously in service that is fit for relay in Main Lines	One white spot
Branch Line Rail (Agrium and Iroquois Falls Subdivisions)	Rail previously in service that is fit for relay in main track on Branch Lines	Two white spots
Yard, Siding and Pagwa Spur Rail	Rail previously in service that is fit for relay in subsidiary tracks	Three white spots
Repair Rail	Rail previously in service that is fit for repair of defective rails in Main or Branch Lines	Orange “R”
Scrap Rail	Rail that is unfit for relay due to wear or internal defects	Four “X” (XXXX)

Figure SUB-PART D – 45 – Marking of Rail Released from Track

c) Any partly worn rail that is intended to be re-used in track must,

- Be center marked for lifting,
- Be classified,
- Have the vertical and gauge wear values written on the web of the rail,
- Be neatly stacked, rail section, in identifiable stands for each. For rail stands along the right-of-way, ensure the area allows for accessibility year-round but doesn't interfere with operations,
- Have the latest ultrasonic test time information marked on the web of the rail approximately 3' (three feet) from the end of the rail by minimum of two-inch-high letters with a paint stick. The marking will indicate "UTT" and the date of the last ultrasonic test, preferably on the gauge side.
  - Rail which has not been UTT tested and is to be used in track, shall
    - Have a 10-mph speed restriction placed, and
    - Be inspected weekly, until it has been ultrasonically tested.

d) Main Line Rail

- Main Line Rail released from track is classified as follows;
  - The rail is a 115 lb or heavier section,
  - The rail is without known defects,
  - The rail's wear is not more than the limits for Main Line rail shown on Figure Sub-Part D - 45,
  - The rail's end batter is 1/16 inch *(2 mm)* or less,
  - For previously worn jointed rail only, the clearance between the back of the new joint bars and the web of the rail is 3/16 inches *(5 mm)* or more – measured at the lower fillet,
  - The rail is 20 feet *(6,096 mm)* or longer unless it has been cut shorter for a special purpose.
- Unless authorized by the Director, Rail Infrastructure, only 115lb RE rail will be used for relay rail in Main Line or Branch Line track programs.

RAIL CLASSIFICATION
115 lb. RE Rail

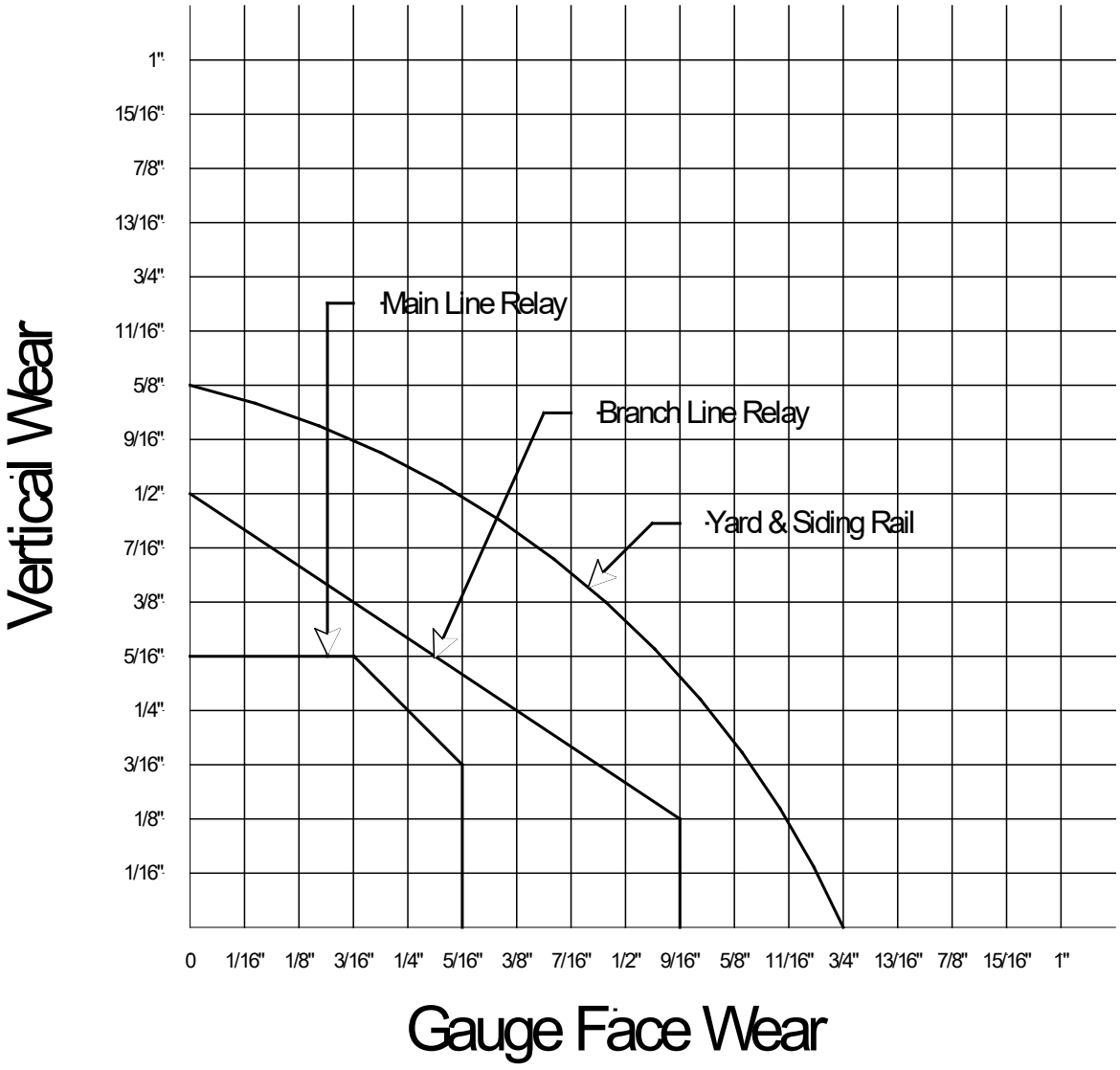


Figure SUB-PART D – 46 – 115 lb RE Rail Wear (Vertical and Gauge)

e) Branch Line Rail

- Lighter rail may be used as Repair Rail in Branch Lines when used for repair purposes.
- Branch Line Rail released from track is classified as follows;
  - The rail is a 115 lb or heavier section (lighter rail may be classified as branch line rail when required for repair purposes on existing branch lines),
  - The rail is without known defects,
  - The rail has only bends that can be straightened easily,

- The rail wear is not more than the limits identified for Branch Line Rail in Figure Sub-Part D - 45,
- The rail's end batter is 1/8" *(3 mm)* or less,
- For previously worn jointed rail only, the clearance between the back of the new joint bars and the web of the rail is 1/8" *(3 mm)* or more, measured at the lower fillet,
- The rail is 20' or longer unless it has been cut shorter for a special purpose.

f) Yard and Siding Rail released from track is classified as follows;

- The rail is an 85lb or heavier section (lighter rail may be classified as siding rail when required for repair of existing sidings or yard tracks),
- The rail is without known defects, sharp bends or excessive wear which make it unsuitable for use,
- The rail is 20' or longer unless it has been cut shorter for a special purpose,
- The rail wear is less than the limits permissible for Yard and Siding Rail as identified in Figure Sub-Part D - 45.

g) Repair Rail

- Repair Rail released from track is rail of suitable length and wear condition so that it will fit in curves or tangent track without producing a condition of rail end mismatch.
- Repair Rail must not exceed limits of Line B wear in Appendix A.

h) Scrap Rail

- Scrap Rail is any rail with defects that would render it unsuitable for use in track,
- Rail of any weight with wear exceeding Line C wear in Appendix A is considered Scrap Rail

6.14 Rail – Marking Rail Removed from Track

a) Rail released from track will be marked according to Figure Sub-Part D – 44,

b) All rail removed from track must be handled in one of the following ways:

i. If not suitable for re-use (scrap), then
   - The rail must be marked as scrap by marking four X's (e.g., XXXX) on the rail.

ii. If suitable for re-use and 10 MGT or less traffic has run over the rail since it was last ultrasonically tested, then
   - The rail must be marked to identify its length and grade classification.
   - Grade Classifications are contained in Sub-Part D – Section 6.13.

iii. If more than 10 MGT of traffic has run over the rail since the last ultrasonic test,
   - The rail must be retested prior to being identified for re-use.
   - Grade Classifications are contained in Sub-Part D – Section 6.13.

iv. If the rail has a detected defect, then
   - The rail must be marked as per rail flaw detector instructions.

v. Defects which are cut out must be marked as scrap.

c) The classification markings will be placed on the web of the rail approximately 4’ from the end,

d) Rail released that has low head wear, but excessive end batter is to be classified to the higher classification and marked for cropping,

e) Rail to be cropped should be painted on the appropriate end in orange paint for approximately one foot,

f) Repair Rails should have their head wear measurements marked on the top of the rail, near one end using a permanent paint stick or other device immediately over the “R”.

6.15 Rail – Dye Penetrant Testing (DP)

The use of dye penetrant testing on rail ends is recommended to ensure that defects have been removed when making rail repairs or changing rail.

DP kits may include cleaning solvent, dye penetrant spray and developing spray. Keep DP kit warm during cold weather for best use. Always follow the instructions of the manufacturer.

Figure SUB-PART D – 47 – Dye Penetrant Testing Kit

a) Any time the in-track rail (parent rail) is saw cut when repairing or replacing rail, careful examination of the adjacent rail ends should be performed by the use of dye penetrant to ensure that defects do not exist in the parent rail.

b) Confirmation that defects do not exist in the parent rail ends will be achieved by:

   i. Dye penetrant testing of the exposed rail ends remaining in track (parent rail), or

   ii. Dye penetrant testing of the ends of the rail that came out of track. This method may help speed up the repair.

Note: Method (i) is preferred.

c) Where rail ends have not been confirmed to be defect free by the use of dye penetrant, a 10-mph speed restriction should be considered until the rail ends have been DP tested or ultrasonically tested.

   i. This speed restriction may only be removed under the authority of the Track Supervisor (Inspector), after it has been ascertained that the rail has been tested.

d) Recommended use of Dye Penetrant (DP) follows;

i. Clean the saw cut surface by spraying the cleaner solvent then wiping the surface with a clean rag.

Figure SUB-PART D – 48 – Cleaning of Saw Cut Rail Surface

i. Apply Dye Penetrant Spray to the saw cut rail surface and let it stand for approximately 5 minutes or until dry,

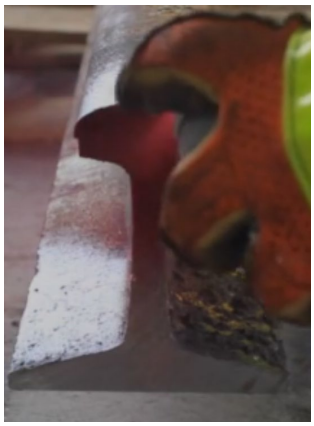


Figure SUB-PART D – 49 – Application of the Dye Penetrant Spray

ii. Then spray some cleaner solvent onto a rag and clean the dye penetrant from the saw cut rail surface.

Figure SUB-PART D – 50 – Cleaning the Dye Penetrant Spray from the Rail Surface

iii. Shake Developer Spray for approximately 1 minute and apply to the saw cut rail surface.

iv. Let dry.

v. Red lines or spots showing through the white developer will indicate defects remaining in the rail.

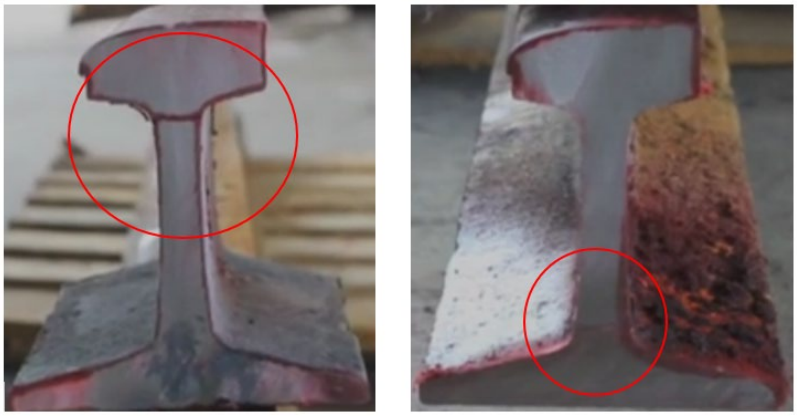


Figure SUB-PART D – 51 – Dye Penetrant Developer Indicating Rail Defect Remain

6.16 Rail – Bolted

6.16.1 Rail Expansion

a) Make an expansion allowance at each rail joint for the changing length of the rail due to the changing rail temperature.

b) No expansion allowances are needed where bolted rail abuts continuous welded rail.

c) Measure the rail temperature of each rail laid with an approved thermometer.

ii. To measure the rail temperature, place the thermometer on the base of the rail near the web away from the wind and out of the direct rays of the sun.

iii. The use of an infrared temperature measurement tool is acceptable, hold the device 18” from the rail web.

d) Provide the proper space allowance for expansion by placing shims of metal, fiber, or wood between the ends of the adjoining rails as each rail is laid, except at insulated joints. These shims must be left in place until the line of rail is fully bolted and spiked. If rail anchors are provided, do not remove the shims until the rail line is anchored at least 10 rail lengths beyond the joint.

e) The following figure shows the expansion allowances for various lengths of rail at different rail temperatures (in degrees Fahrenheit):

	EXPANSION ALLOWANCE *(inches and millimeters)*					
LENGTH OF RAIL	**0”** *0 mm*	**1/16”** *2 mm*	**1/8”** *3 mm*	**3/16”** *5 mm*	**1/4”** *6 mm*	**5/16”** *8 mm*
30’ to 50’	Above 85°F	65° to 85°F	40° to 64°F	20° to 39°F	0° to 19°F	Below 0°F
51’ to 90’	Above 85°F	74° to 85°F	61° to 73°F	48° to 60°F	35° to 47°F	Below 35°F
	RAIL TEMPERATURE (Fahrenheit)					

Figure SUB-PART D – 52 – Rail Expansion Allowance per Rail Temperature

6.16.2 Rail End Mismatch

a) Where rail end mismatch exceeds 1/8” *(3 mm)* on the top or the gauge side of a rail joint, it shall be repaired promptly by grinding, welding, or replacement of the rail.

Note: Every effort should be made to avoid grinding and instead replace the worn rail (having it marked for restoration of rail profile by welding) or welded in track to restore the worn rail’s profile.

Except, joints to be thermite or butt welded will not be built up.

b) Until such time as these repairs are made, movements over the mismatch shall not exceed the speed for the appropriate class of track, as prescribed by the following table:

Class of Track	Maximum Mismatch on Top of Rail	Maximum Mismatch on Gauge Side of Rail
1	1/4" *(6 mm)*	1/4" *(6 mm)*
2	3/16" *(5 mm)*	3/16" *(5 mm)*
3, 4, and 5	1/8" *(3 mm)*	1/8" *(3 mm)*

Figure SUB-PART D – 53 – Rail End Mismatch (inches and millimetres)

6.16.3 Joint Securement

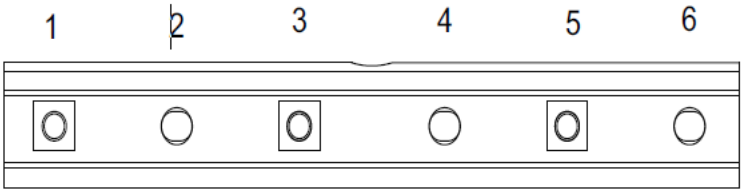


Figure SUB-PART D – 54 – Example of 6-Hole Joint Bar Bolted

a) Conventional Jointed Track: Each joint shall have at least 4 bolts and with at least 2 in each abutting rail in Classes 2 through 5 track and with at least 2 bolts in Class 1 track, with at least 1 in each abutting rail.

b) CWR Track: Each rail shall be bolted with at least 4 bolts at each joint and with at least 2 in each abutting rail.

c) Use standard, compromise, or high-relief six-hole joint bars for all rails over 39' unless otherwise specified.

d) Track bolts should be retightened after 1 to 3 months and as necessary thereafter.

e) Corrosion resistant lubricant should be applied to bolt threads prior to the application of the nuts. This will reduce the variation in thread friction and promote uniformity of tension obtained.

f) Bolts are to be applied from the middle going outward alternating sides of the joint. For a 6-hole joint back, tightening sequence would be as follows: 3 – 4 – 2 – 5 – 1 – 6 referencing the numbers noted in Figure SUB-PART D – 54 – Example of 6-Hole Joint Bar Bolted above.

g) When tightening bolts, ensure that the joint bars are seated properly and tighten bolts to proper specification.

h) Replace missing bolts as soon as conditions permit.

i) Existing joint bars may remain in place until a rail relay is performed.

j) Rail bolt holes will be located using the correct indexing bar. The indexing bar will be placed so that the edge of the indexing bar matches the end of the rail,

k) Only joint bars of the correct design for the rail section, drilling pattern and bolt type will be used,

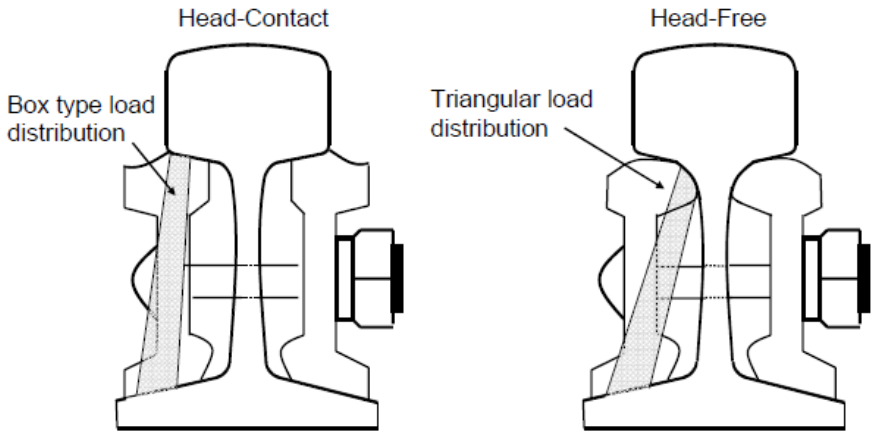


Figure SUB-PART D – 55 – Conventional and Head-Free Joint Bar Design Load Difference

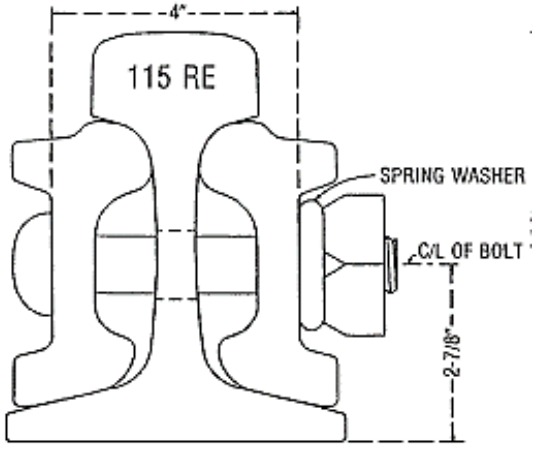


Figure SUB-PART D – 56 – Joint Bar Assembly for 115 RE

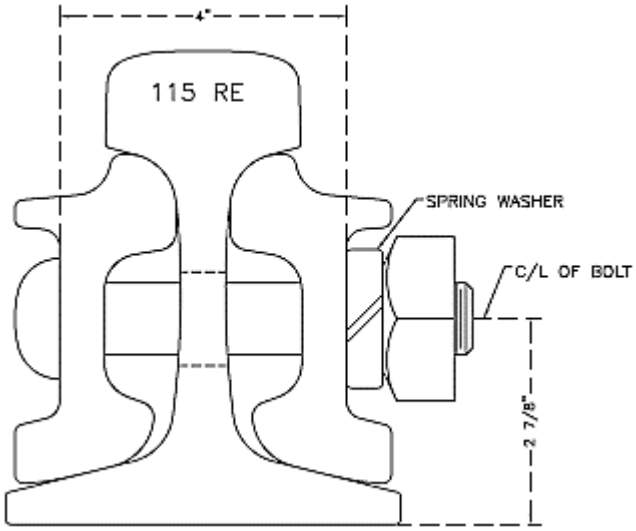


Figure SUB-PART D – 57 – Clearance Joint Bar Assembly for 115 RE

l) Rail flow at the bottom of the rail head, especially in curves, may need to be ground off prior to installing joint bars. Joint bars must not be ground.

m) All joints in must be inspected at a minimum frequency of that shown in Sub-Part F – Section 10,

n) Joint bars that are cracked or broken must be replaced.

   i. On the occasion that the bars cannot be immediately corrected then place a speed restriction of not more than 10 mph under the authority of a qualified person.

      Except, 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.

   ii. Joint bars that are cracked or broken between the middle two bolt holes regardless of the class of track must be replaced immediately, or the Movement Over Rail Break Policy must be applied.

o) Rail joints should be slotted (e.g., straight slot then a 3 mm bevel) to prevent flowed rail and chipped joints,

p) Where 33-to-39-foot panels are installed and three or more consecutive square joints exist, speed will be limited to that of Class 3 track.

q) Use a drill to make boltholes in the field. Never use a torch to burn boltholes.

6.16.4 Insulated Joints

a) Defective insulated joints must be repaired or replaced promptly,

b) Signal forces must report defective insulated joints to track forces promptly,

c) Signal forces must advise the track forces of the location of insulated joints for proper signal operation. The location must not be changed without the approval of Signals,

d) Encapsulated (coated) insulated joints are to be used in jointed rail sections,

e) Fibre bars may be used in light rail sections,

f) Plates must be used with all insulated joints on wood track ties. Insulated tie plates will be used on ties within 2" *(51 mm)* of the end post of an insulated joint,

g) Insulated joints should be suspended, that is, the end post should not be over a tie,

h) Rail ends where insulated joints are to be installed must conform to the following;

   i. The end face shall be saw cut and bolt holes drilled to the proper size and location for the rail section,

   ii. All rough edges and burrs shall be removed from the end face and the bolt holes,

   iii. Batter shall not exceed 1/32 inch *(1 mm)*,

   iv. The heights of the adjacent rails shall not differ by more than 1/16 inch *(2 mm)*.

i) All rust, scale, dirt, or other foreign matter must be removed from the rail joint area and from the joint bars before the joint is installed

j) If the end post projects above the top of rail, it must be trimmed so that the top is below the top of rail, but not exceeding 1/8 inch *(3 mm)* below,

k) Track near insulated joints shall be adequately anchored. Non-glued insulated joints will be considered as joints and will be anchored to the correct standard,

l) Rail anchors must not be applied on the sides of ties adjacent to bootlegs,

m) Rail end overflow must be removed at insulated joints by slotting. The gap should be filled with silicone sealer to prevent the influx of dirt and grinding material,

n) After welding, insulation must not be replaced until the rails have cooled,

o) Insulated joints no longer required must be removed from track as soon as possible.

6.16.5 Compromise Joints Bars and Compromise Rails

a) Compromise joint bars connect two rails of different weights together. They are constructed such that the bars align the running surface and gauge sides of different rails' sections.

b) There are two kinds of compromise joint bars:

- Directional (Right or Left hand) compromise bars are used where a difference in the width of the head between two sections requires the offsetting of the rail to align the gauge side of the rail.
- Non-directional (Gauge or Field Side) compromise bars are used where the difference between sections is only in the heights of the head or where the difference in width of rail head is not more than 0.125" at the gauge point. The gauge point is the point on the gauge side of the rail exactly 0.625" below the top of the rail.

c) To determine the hand of the joint, face the joint from the center of the track. When the larger rail section is on the left side of the joint, it is the left hand joint. When the rail of larger section is on the right, it is the right hand joint.

d) A compromise joint bar set consists of one gauge side and one field side bar.

e) The rail sections that the compromise joint bar will fit are indicated at each end of the bar.

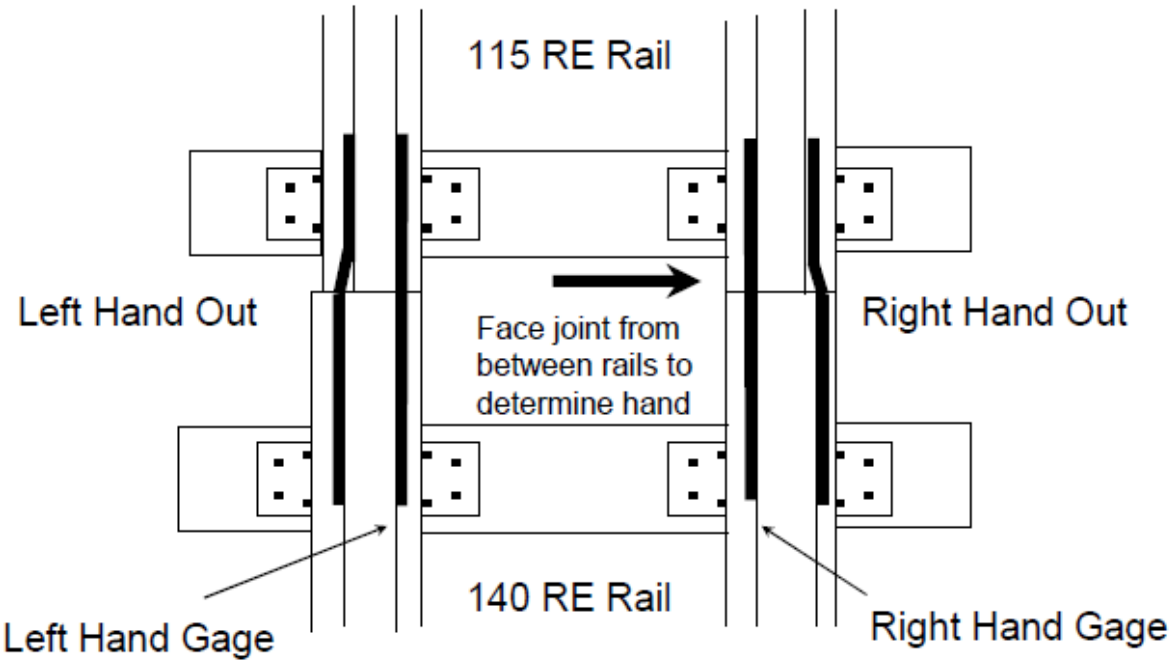


Figure SUB-PART D – 58 – Compromise Joint Bars 115 RE Rail to 140 RE Rail

f) Compromise joint bars must not be modified from its initial design to fit a different rail section.

g) Compromise joints bars should not be installed,

   i. In turnouts, or

   ii. Within 20 feet of an,

   - Open deck bridge,
   - Turnout,
   - Highway crossing, or
   - Railroad crossing.

h) Compromise joint bars must be painted blue for ease of recognition.

i) Compromise rails consist of a single piece of rail, with a forged transition from one rail section to another.

j) Compromise rails may be universal or “handed”, depending on the rail sections, and are identified just as a joint would be.

k) Compromise rails will be fully supported and tamped with the correct size tie plates under the corresponding rail section.

6.16.6 Use of Torch-Cut Rail – Emergency Only

a) If a torch-cut rail is used in the track in an emergency, use it for the passage of emergency equipment only.

   - A slow order of 10 miles per hour must be maintained until the rail is changed.

b) The torch-cut rail must be replaced before regular train operations can continue.

6.16.7 Work in Jointed Rail

a) To prevent track buckles in jointed rail, restrictions laid out in Sub-Part D – Section 7.9 are to be followed upon completion of work.

6.16.8 Weld Repair Bars

a) Wrap or weld repair bars are only to be used to temporarily bolt around a broken rail or failed or suspect weld.

6.17 Rail – Guard Rails

6.17.1 Installation of Interior Guard Rails

a) Guard rails must be installed at the following location;

   i. All bridges that have supporting structure extending above the top of the ties,

   ii. All bridges that have the underside supporting structure protruding beyond the deck of the bridge,

   iii. All bridges that cross major roadways (two lane paved highway or greater),

   iv. All bridges that cross commercially navigable waterways,

   v. All bridges longer than 100'.,

   vi. All bridges with curves 2° and over,

   vii. Any other locations designated by the Director, Rail Infrastructure.

b) Guard rails should be considered, where piers of overhead structures are within 17' of centerline of track, there are no crash walls, and the track speed is greater than 10 mph,

c) Existing guard rails that are not required per the above criteria, may not be removed without notifying the Director, Rail Infrastructure,

d) Guard rails shall be installed as per Standard Plans,

e) Guard rails will be spiked with two spikes per tie, without tie plates on every tie.

f) Guard rails should not be higher and no lower than 2" from the top of the running rail.

6.17.2 Temporary Removal of Guard Rails

a) Whenever guard rails are temporarily removed on main track to accommodate track or bridge work, a temporary speed restriction of 10 mph is required.

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7. Continuous Welded Rail (CWR) Management Plan

7.1 CWR – Responsibilities

a) All track forces must properly protect and promptly report any unusual conditions observed developing in CWR to the Track Supervisor (Inspector) or District Manager.

b) All supervisory personnel including Track Maintenance Foremen and Track Supervisors (Inspectors), on whose territory CWR is laid, must be familiar with the causes, high-risk conditions, and work as well as slow order requirements to avoid track buckles as summarized in the Sub-Part D – Section 7.8 – Prevention of Track Buckling.

c) All employees responsible for the maintenance or inspection of CWR must be trained and qualified in the maintenance of CWR.

d) Effective January 1, 2026, the PRLT at Ontario Northland is 90°F *(32.2°C)* and the PRLTR is 90°F plus 15°F *(32.2°C plus 8.4°C)*.

- Up to December 31, 2025, the PRLT is 85°F *(29.4°C)* and the PRLTR is 85°F plus 15°F *(29.4°C plus 8.4°C)*.

As a guideline, on a sunny day, the rail temperature can be 30°F, or 17°C warmer than the ambient temperature. Cloud cover, wind and precipitation can reduce this difference.

7.2 CWR – Handling and Unloading CWR (Recommended Method)

a. CWR is transported and unloaded by specially designed rail trains. Preparation is critical in unloading rail efficiently. Unloading strings as close as possible to their final position in the track reduces the amount of rail handling necessary.

The procedures described in this *Recommended Method* outline the rail renewal process and the actions that must be undertaken with the utmost regard for safety.

There are five major steps in the CWR delivery and unloading process

1. **Planning for Rail Renewal**
   - i. Pre-project planning (conducted months prior to the job)
     - Includes emergencies, work environment, materials required, project impediments, work site access, etc.
   - ii. Pre-project planning (conducted weeks before the job)
     - Includes track protection requirements and work blocks
   - iii. Pre-block planning (conducted prior to the work)
     - Includes material and equipment readiness, job briefing, field level risk assessment.
2. **Preparation**
   - i. Overhead contact systems shall be de-energised and grounded on each side of the working limits prior to commencing the loading or unloading of any rail.
   - ii. Preparation is key to safely and efficiently unloading rail. In addition, to all the planning and recognized “Best Practices” involved, the following essential

preparation will help maintain a safe and productive work environment. Unloading CWR has many inherent risks associated with it. It is therefore essential that a proper and thorough job briefing be performed. The job briefing(s) and Field Level Risk Assessment will include the entire unloading gang, AND the work train crew. It is of utmost importance that all employees engaged in the unloading of CWR have a clear understanding of:

- The type of track protection and work limits provided
- The work to be performed
- The roles and responsibilities of all employees involved
- The identification of all immediate or potential hazards and identifies controls to minimize the risk associated with the identified hazards.
- A communication plan must be established for all personnel involved in the unloading process. An understanding of this plan must be confirmed with all employees
- Utilization of the proper tools for the job
- The proper procedures for unloading CWR as outlined in this recommended method.

iii. Ensure all hardware is present and inspected prior to use

iv. Ensure unloading area has been visited prior to arrival of the rail train to evaluate any safety of other site limitations

v. Rail Unloading Hardware

Figure SUB-PART D – 59 – Rail Shoe (used to pull rail through the threader box)

Figure SUB-PART D – 60 – Rail Grip (used to anchor rail to track structure)

Figure SUB-PART D – 61 – End of One Rail Connected to the Beginning of Another Rail Being Unloaded

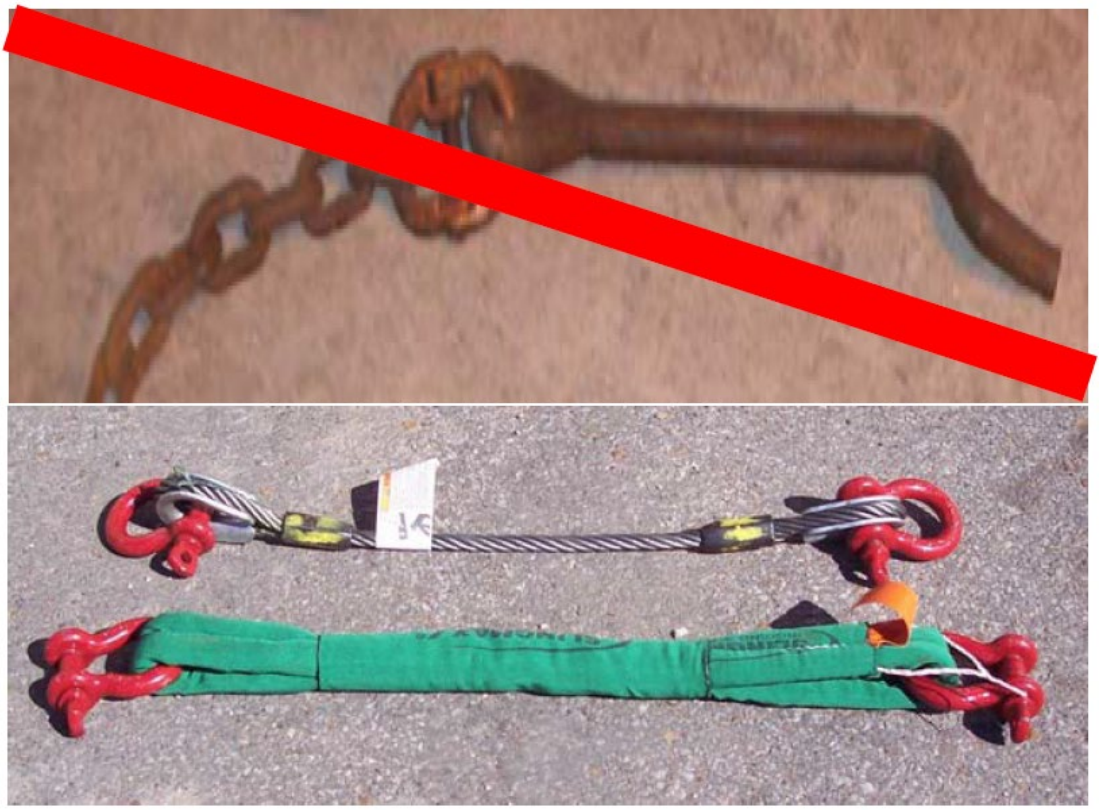

Figure SUB-PART D – 62 – Do Not Use Chains or Pigtails for Rail Unloading; Use Nylon Slings or Steel Cables

vi. The equipment owner and operator are responsible for ensuring that all rail unloading equipment and hardware is in good working condition

vii. Winch cables, clevises, turnbuckles, nylon slings, rail grips, head pullers, and steel cables should be present and in good working condition. Verify that the electric impact wrench and generator are operational on the anchor car. Also ensure that the generator has fuel and that there is an extension cord in place.

viii. Ensure all location details are known, including:

ix. List of unloading locations (should be previously marked in field).

x. Obstructions at unloading area (crossings, bridges, turnouts, steep embankments, high-degree curves, etc.).

xi. Exact length(s) of rail required at each location and side of track on which it is to be unloaded.

xii. Identify prior to the work block which rails require holes to be cut into the ends to facilitate rail shoes or clevis, this may have to be done at both ends of the rail where multiple strings will be unloaded in succession.

3. <u>Set Up Ramp and Threader Cars</u>

i. To place the CWR beside the track, two specialized cars are utilized to guide the rail into position.

- Ramp Car: Contains adjustable height rollers (movable tables) to match the height of the tier from which rail is being unloaded. This allows the proper angle to be maintained for rail fed through the threader car. This prevents the rail from binding or kinking.
- Threader Car: Used to guide rail off the rail train to its final position on the shoulder of the track. It does so by threading it through adjustable roller "threader boxes" mounted on the sides of the car.
- Anchor Car: The anchor car secures the rail in place during transit. This car is located near the mid-point of the train. The rail is held place on the anchor car by a plate that is secured with bolts. The electric impact wrench supplied in the toolbox on the anchor car can be used to remove the bolts.

ii. Threading Rail

- The following procedure is followed to thread rail through the ramp and threader cars, prior to the actual unloading of rail:

<u>Step 1:</u> Spot end of threader car at beginning of desired rail-unloading location.

<u>Step 2:</u> Attach rail shoe to leading end of the rail to be unloaded.

<u>Step 3:</u> Guide winch cable(s) through threader box, through threader cone, over moveable tables, and connect to rail shoe (which is already attached to rail to be unloaded).

<u>Step 4:</u> Remove bolts and plates (located at anchor car) from leg of rail to be unloaded.

<u>Step 5:</u> Winch rail over adjustable tables, and through threader cone. Ensure rollers are adjusted for the size of the rail section.

<u>Step 6:</u> Attach head-puller assembly onto rail and winch through final threader box. Head puller assembly may have to be reset to complete this task.

To reduce the risk of personal injury, unloading personnel must not be allowed on the unloading cars or in the vicinity of the winch cables while rail is being threaded. The only exceptions to this are the winch operator, and the employee controlling the height of the adjustable tables.

4. Unloading Rail

i. The following procedure is applicable once the rail has been threaded through the threader boxes (as described in Part 3 above). If rail is being unloaded on both sides, perform the following procedure for each rail and unload rails simultaneously:

Step 1: Ensure end of threader car is located at beginning of desired final rail location.

Step 2: Attach rail grip to the rail base between the ties of the "in-track" rail.

Step 3: Attach cable and turnbuckle between rail grip and rail being unloaded. Ensure turnbuckle is adjusted to shortest position so that any tension from the unloading process can be released by lengthening it.

Step 5: Slowly move train in the direction that will pull the rail off the train. Unload slowly as to not overheat rollers or cause unnecessary wear. **DO NOT EXCEED 10 MPH WHILE UNLOADING RAIL.** Considerations to height of embankment, track curvature, etc. must be considered when deciding upon an appropriate unloading speed.

Step 6: Stop the train when the end of the threader car reaches the end of the desired unloading location.

Step 7: When rail unloading is finished at a particular location, the rail grip will be retrieved by the employees who installed it. This is accomplished by lengthening the turnbuckle to remove any tension, then removing the rail grip from the in-track rail.

ii. Place rail as close to the location of installation as possible.

iii. When practicable, unload rail 6 feet or more from the centerline of track

iv. Separate and offset rail ends to allow by-pass if the rail expands

v. Minimize the number of cuts in a string

vi. If unloading more than one string of rail at a particular location, insert this step between Steps 5 and 6 of the instructions for unloading a single string of rail (listed above).

- Stop the train; do not try to connect the second string until the movement has come to a complete stop. An additional string can be connected to the trailing end of a string being unloaded. This connection is depicted in Figure SUB-PART D – 60 of this document.
- The speed of the movement while threading the second or trailing rail must be slow and controlled (not to exceed 5 mph).
- The rail shoe must fit entirely over the face of the trailing rail. The length of cable or nylon sling between two rails connected to be unloaded must not exceed three feet. The operator of the ramp car must ensure that the rail being pulled from the rail train is properly supported as it approaches the threader car.

vii. In some cases, a complete string of rail is not required at the location. This will require that the rail will need to be cut in place utilizing an oxy-acetylene torch. Should this be required follow these recommendations:

- Only qualified employees are to utilize oxy-acetylene torches
- Perform supplemental Job Briefing (conditions changed)
- Identify personnel required to be in the vicinity and ensure all other employees are clear of the area.
- Identify the "line of fire" of the suspended rail, looking ahead to the point at which the cut is complete, where will the rail fall, where will the rail swing.
- Designate and equip employees to watch for sparks and extinguish embers, hot slag or fires that may ignite.

5. <u>Moving to the Next Unloading Location</u>

i. Secure remaining rail on train prior to moving to a new location

ii. The initial process of threading rail through the ramp and threader cars is time consuming in comparison to the time it takes to unload one string (generally in the vicinity of 40 minutes to thread and 20 minutes to unload per string). Therefore, it is advantageous to keep rail threaded through the unloading cars as often as possible. In some cases, this may be done while in a siding, waiting for track time. Proper track protection must be in place.

iii. Limiting the amount of travel between unloading points, e.g., unloading rail at locations that are near one another, can greatly reduce the amount of set up time required. However, DO NOT leave rail in the threader boxes unless moves are short. When traveling with rail in the threader boxes, restrict speeds to a maximum of 15 mph if train is making a reverse movement and 25 mph if train is making a forward movement. Please ensure that the locomotive engineer is aware that no sudden stops are to be made at any time. All movements must come to a controlled stop. If rail is fully on the racks (not in the threader box) and anchors and plates applied, the train may travel at track speed.

Rail Unloading Scenarios	
If...	**Then...**
The end of the leg being unloaded is near - Only a short piece is left on the train	Unload the entire leg, OTHERWISE cut the rail with an oxy-acetylene torch to the required length.
Next unloading area is close - No greater than 1 mile away	Travel at slow speed with rail in threader box, to next location. Threader box must be tight against the threader car, and rail secured if possible.
Next unloading area is not close	Cut hole in rail, install clevis to secure rail to side of threader car before moving to next unloading area or if possible, re- install the anchors in the centre of the train.

Figure SUB-PART D – 63 – CWR Rail Unloading Scenarios

7.3 CWR – Before Laying

Lay CWR only if:

7.3.1 Ballast in CWR

a) The ballast is of sufficient quantity and quality to restrain the track laterally under dynamic loads imposed by railroad equipment and thermal stress exerted by the rails.

7.3.2 Ties in CWR

a) The tie condition and spacing is sufficient to ensure that gauge, surface, and alignment can be maintained to within the limits for the specific class of track as prescribed in Sub-Part C, Section 2.

7.4 CWR – Laying

7.4.1 Rail Temperature: When Laying CWR

a) Unless advised otherwise by the Director, Rail Infrastructure, effective January 1, 2026, the PRLT (preferred rail laying temperature) at ONTC is 90°F *(32.2°C)*,

- Up to December 31, 2025, the PRLT is 85°F *(29.4°C)* and the PRLTR is 85°F plus 15°F *(29.4°C plus 8.4°C)*.

b) CWR will be installed and anchored within the PRLTR (preferred rail laying temperature range). At ONTC, effective January 1, 2026, this is the PRLT plus 15°F (90°F to 105°F / *32.2°C to 40.5°C*). If this cannot be achieved, the rail must be destressed.

- Up to December 31, 2025, the PRLT is 85°F *(29.4°C)* and the PRLTR is 85°F plus 15°F *(29.4°C plus 8.4°C)*.

c) Measure the rail temperature of each CWR string laid with an approved thermometer.

- To measure the rail temperature, place the thermometer on the base of the rail near the web away from the wind and out of the direct rays of the sun, or
- Use an approved infrared sensor held 18” from the rail web is acceptable,

d) When rail temperature is below the minimum preferred rail laying temperature, heat CWR to the preferred laying temperature or pull CWR so it reaches the same length it would be if it was unrestrained at the preferred laying temperature. Ensure even distribution heat over the length of the rail installed to ensure uniform expansion.

e) Use rail vibrators or tap the tie plates to assist rail movement

f) On concrete tie track, monitor heat to avoid damaging pads or insulators

g) Where rail is installed below the preferred rail laying temperature, for example when laying rail in cold weather and the PRLT cannot be achieved, the rail must be restressed before the rail temperature reaches the PRLT or 40 °F above the temperature at which the rail was laid, whichever is lower. If this can not be completed prior to the rail temperature increase an inspection should be conducted in the heat of the day, applicable speed restrictions placed until destressing can occur.

h) Monitoring the movement of rail when installing CWR:

- Prior to making the first cut, or breaking a joint of a previous day's relay, place a match mark from the field side base of the rail that will remain in track to an unanchored tie plate.
- Measure the rail temperature and length of the rail to be installed.
- Determine the total expansion required from the table of APPENDIX A based on the difference between the PRLT and the current rail temperature.
- All previous temperature markings on the rail must be painted over.
- Place match marks, on the field side web, at 200-foot intervals.
- Write the distance (usually 200-foot stationing), distance interval, date, pre-heat rail temperature, rail movement at the 200-foot station and rail anchoring temperature at each station on the field side web.
- String (leg) number, relay date, pre-heat rail temperature, anchored temperature, and string length will be written at the end of each string, on the field side web, and documented in the applicable record.

7.4.2 Joints: When Laying CWR

a) Bolt each joint in CWR with at least four bolts, and with at least two bolts in each abutting rail.

b) Use standard, compromise, or high relief six-hole joint bars in CWR territory where an approved design exists.

c) Use six-hole joint bars with at least four bolts installed on standard joints that are planned to be eliminated through field welding. To facilitate welding, the two middle holes of the joint should not be drilled. A joint gap not exceeding 3/8" *(9.5 mm*) is to be left.

d) Use six bolts per joint on joints located in turnouts, diamonds, crossovers, and bridges, as well as in compromise joints and insulated joints.

e) Transitions to existing rail will have vertical and gauge mismatch appropriate for the class of track.

7.4.3 Anchoring: When Laying CWR

a) Rail anchors or clips must be installed immediately behind the rail heater at the PRLT.

b) Rail anchored within the PRLTR should not require further adjustment.

c) Rail anchored below the PRLT must be adjusted or protected before hot weather.

   i. If CWR is installed at a temperature more than 40°F below the PRLT, track must be inspected, and applicable speed restrictions applied prior to the rail temperature reaching the PRLT.

d) Box anchor CWR at every second tie for restraint in both directions, this includes where joints are planned to be field welded in Class 3 through Class 5 track.

e) Anchors may not be applied where they will interfere with signal or other track appliances, where they are inaccessible for adjustment or inspection or on rail opposite a joint.

f) For Class 1 through Class 5 track, where joints will not be field welded, box anchor every tie for 200’ in each direction from the joint.

g) For Class 1 and 2 track, the Director, Rail Infrastructure may exempt the requirement to box anchor every tie for the first and last 200’ of each CWR string.

h) Box anchor jointed track connected to CWR strings every tie for 200’. When necessary, install additional anchors on the jointed track to prevent track movement.

i) Anchor rail through turnouts and other special track work connected to CWR according to the applicable Standard.

j) Box anchor each approach to a turnout and each approach to a track crossing (diamond) at every tie for a distance of 200’ away from the turnout or track crossing.

k) Wayside Inspection Systems (WIS) should be box anchored every tie for a minimum of 100’ *(30,480 mm)* in each direction,

l) When installing CWR, insulated joints (poly or pre-bond) are to be box anchored every tie 200’ in each direction.

m) Do not allow trains to pass over unanchored CWR except in an emergency. Then, the following must be done:

   i. Inspect the track,

   ii. Place a speed restriction of not more than 10 mph, and

   iii. Advise train crews to not use dynamic braking during movements through or near the work location.

7.4.4 Tie Plates: When Laying CWR

a) Use double-shoulder tie plates for rail lengths longer than 90’ and rail weight 100 lb or heavier.

7.4.5 Spiking: When Laying CWR

a) Use spike lengths and spiking patterns that meet the requirements outlined in Sub-Part D – Section 4 – Spikes.

b) Each spike hole of the tie will be plugged, preferably with chemical plugging compound

7.5 CWR – After Installation

7.5.1 Documentation of CWR Laid

a) Prepare and retain for 3 years a record of all CWR strings laid indicating:

   i. Date,

   ii. String number,

   iii. Weight of rail,

   iv. Manufacturer,

   v. Year of rail,

   vi. Temperature at which the rail was laid,

vii. Mileage location, and

viii. Whether the string was E or W rail.

7.6 CWR – Bridges

7.6.1 Bridge Considerations and CWR

a) Do not lay CWR on any bridge, unless the Director, Rail Infrastructure has confirmed the bridge conditions meet the requirement for laying CWR,

b) Bolted joints in connecting strings of continuous welded rail must not be located on bridges. Also, they must not be located on roadbed approaches within 300' of the ballast walls at either end of the bridge.

7.6.2 Anchors for CWR on Bridges

a) If CWR is to be laid on a bridge, the Director, Rail Infrastructure will provide an anchor plan for that bridge.

b) On open deck bridges with CWR on the approaches, box anchor every tie for a distance of at least 200' starting 20' back from the back wall on each approach.

7.6.3 Fastenings for CWR on Bridges

a) The installation of all new and replacement decks on open deck bridges is the responsibility of the Director, Rail Infrastructure and is to be carried out in accordance with applicable standards.

7.7 CWR – Maintenance

7.7.1 Surfacing and Lining in CWR Territory

a) Where the track will be surfaced by tamping machine, at a rail temperature of 50°F *(10°C)* or lower:

i. The employee responsible for the surfacing work must set reference stakes over the full length of each curve of 3° or greater before track is surfaced. Set 3 or more stakes no more than 200' apart and clear of work activity so they will not be disturbed.

ii. The Track Supervisor (Inspector) must ensure that reference measurements are taken 1 week after each curve is surfaced.

iii. The Track Supervisor (Inspector) must ensure that all curves with an average inward movement of 1" *(25 mm)* or more are corrected before hot weather arrives. This is done by restoring the curve to its proper alignment, or by cutting the rail and re-stressing it.

b) Where it is necessary to surface track when the rail temperature is, or is expected to be, more than 15°F above the preferred rail laying temperature (PRLT) perform additional track inspections while surfacing and behind surfacing work.

c) Do not spike line in CWR territory if possible. Never spike line track when the rail temperature is above the preferred rail laying temperature.

d) Refer to Sub-Part C, Section 14.5 – Surfacing and Lining – Ballast Stabilization if a ballast stabilizing machine (e.g., Dynamic Track Stabilizer) is being utilized.

7.7.2 Ballasting and Undercutting in CWR Territory

a) When track has been skeletonized, take steps to restore the track to its original line as soon as possible.

b) Where the track will be skeletonized at a rail temperature of 70°F *(20°C)* or lower:

   i. The employee responsible for the ballasting or undercutting work must set reference stakes over the full length of each curve before track is surfaced. Set 3 or more stakes no more than 200' apart and clear of work gang activity so they will not be disturbed.

   ii. The Track Supervisor (Inspector) or Manager must ensure that reference measurements are taken 1 week after each curve is surfaced.

   iii. The Track Supervisor (Inspector) must ensure that all curves with an average inward movement of 1" *(25 mm)* or more are corrected before hot weather arrives. This is done by restoring the curve to its proper alignment, or by cutting the rail and re-stressing it.

c) Do not permit the movement of trains over skeleton track, except for work trains unloading ballast. The work train operations may be made at 5 mph and only after ensuring that all ties are spiked, and all rail anchors are applied.

d) When new ties are installed, re-apply anchors in accordance with the ONTC's standard anchor pattern.

e) As a guideline if the total raise in CWR territory will be more than 4", perform the raise in at least 2 lifts. Allowing enough time between lifts to permit rail traffic to compact the ballast.

f) Refer to Sub-Part C, Section 14.5 – Surfacing and Lining – Ballast Stabilization if a ballast stabilizing machine (e.g., Dynamic Track Stabilizer) is being utilized.

7.7.3 Joints for Maintenance of CWR

a) Bolt each joint in CWR with at least four bolts, and with at least two bolts in each abutting rail.

b) When tightening bolts, ensure that the joint bars are seated properly and tighten bolts securely.

c) Replace missing bolts as soon as conditions permit.

d) Use standard, compromise, or high-relief six-hole joint bars in CWR territory unless otherwise specified.

7.7.4 Temporary and Permanent Joints: Maintenance and Inspection in CWR

CWR is defined as any rail with a length of over 400'.

Where CWR currently exists, or where new or partly worn CWR is being installed, the intent should be to maintain the CWR in existing lengths or to create or increase the length of CWR by eliminating permanent and temporary rail joints.

a) Temporary joints within or joining adjacent lengths of CWR must comply with Part 1, Section 3.56 which indicates they,
   - Have all holes are drilled and bolted using a 6-hole joint bar with 4 bolts installed in the outer most holes of the joint to facilitate welding.
   - A joint gap not exceeding 3/8" *(10 mm)* is to be left.
   - Must be welded or made into Permanent Joints within 3 (three) years of being installed.

b) Permanent joints within or joining adjacent lengths of CWR must comply with Part 1, Section 3.56 which indicates the following,
   - Permanent Joints are fully drilled and bolted using a 6-hole joint bar, at a minimum.
   - Every tie is box anchored for a minimum of 200' *(6,100 mm)* in each direction.

c) Records of the location, date of installation, date of inspection, and date of removal of all temporary joints must be maintained by the District Manager.

d) As per Sub-Part F, Section 10, a walking track inspection of all joints will be done yearly at a minimum.

7.7.5 Spikes for Maintenance or Upgrading of CWR

a) Replace missing and broken spikes as necessary to effectively maintain gauge.

b) Existing spiking patterns may remain in place until a rail relay is performed.

c) When broken spikes are found in curves, carry out an inspection of the whole curve and adjacent tangent to ensure that no dangerous spike condition exists.
   - Special attention must also be paid to the condition of tie plates when performing the inspection. Unusual wear patterns and broken plates indicate other problems exist.

7.7.6 Anchors for Maintenance of CWR

a) Existing anchor patterns may remain in place until a rail relay is performed.

b) Replace missing or broken anchors as necessary to effectively control movement of the rail.

c) Re-apply or replace anchors removed during track maintenance work immediately upon completion of the work.

d) Where replacement rails are installed, re-apply, or replace the anchors that were removed. Box anchor every tie on both the repair rail and the adjoining CWR for 200' each direction. Anchors must bear on the same tie when box anchoring on every tie.

e) At locations where track or rail movement occurs, for example due to heavy traffic on grades, train braking, or soft sub-grade, install additional rail anchors to control

movement of the rail. Record these trouble areas and forward the information to the Track Supervisor (Inspector) and the District Manager.

7.7.7 Tie Plates for Maintenance of CWR

a) Replace missing or broken tie plates as necessary to effectively maintain gauge and to ensure proper support of the rail.

7.7.8 Shims for Maintenance of CWR

a) Do not use shims with total thickness greater than 2-1/2" *(64 mm)* in CWR territory, unless protected by a slow order restricting trains to less than 2/3 the authorized timetable speed.

b) Further protection may be required when shims are installed in sensitive locations such as at the approaches to bridges, the spirals in curves, at or near turnouts and at road crossings,

c) Do not remove shims if the rail temperature is more than the preferred rail laying temperature.

7.7.9 Maintenance of Thermal Stress in Rail

Continuous welded rail may drift into tension or compression, so that it is stress free at some temperature outside the preferred rail laying temperature range, as a result of such activities as track surfacing, tie renewals, ballast cleaning, track lining, and curve rail renewal.

Even if the track is not worked on, the rail can shift and go out of destress as a result of rail breaks, emergency brake applications, worn or defective anchors, poor quality or insufficient ballast, Permanent Slow Order locations, or soft subgrade. On vertical curves and gradients, rail is generally seen to move slowly downhill, resulting in an excessively low stress-free temperature at the bottom and an excessively high stress-free temperature at the top.

a) Continuous welded rail must be maintained so that it is in a state of zero thermal stress in between the PRLTR.

b) Precautions must be taken to monitor the length of rail installed during rail changes and repairs. Whenever practicable, rail will not be added to CWR track.

c) When a rail is to be changed, reference marks will be made on the web of the rail prior to cutting the CWR. They should be on each side of the location where the cut is to be made and where the mark will not be covered by joint bars or removed by changing the rail. All previous marks should be painted over.

d) The MW Supervisor (Inspector) will be responsible for the locations and amounts of rail that is added or removed.

e) Any locations where rail is added below the PRLTR, the rail should be destressed prior to a rail temperature increase greater than 40°F or 22°C above the RLT.

f) Restress CWR laid at temperatures below the minimum preferred rail laying temperature range when rail heaters are not available before the rail temperature reaches 40°F above the temperature at which the rail was laid.

g) Restress CWR laid at temperatures more than 15°F above the maximum preferred rail laying temperature before winter. Where it is not possible to restress CWR laid at temperatures more than 15°F above the maximum preferred rail laying temperature before winter, then take other action such as apply additional rail anchors, fully drill and bolt joints, or apply slow orders to mitigate the risks of pull aparts, of rail string-lining and of rail tipping in plates at low temperatures.

h) See Appendix B for Destressing and Restressing Rail – Recommended Methods.

7.7.10 Repair of Pull-Aparts, Broken and Defective Rails in CWR

a) When repairing pull-aparts, broken or defective rails, to the extent that is practicable, ensure that the amount of rail that is put in the track equals the amount of rail removed.

b) It is very critical to remove rail added during cold weather repairs before the rail temperature exceeds the adjusted rail laying temperature.

c) Documentation of the information in the applicable record is required for each pull-apart and for each repair of CWR that involves the adding or removing of rail.

d) Monitor repairs where rail was added or removed as temperatures change and protect track with a slow order if required.

e) At locations where a pull apart has occurred a second time within the same season, fully drill and bolt the joint and box anchor every tie for a minimum of 200’ in both directions.

7.7.11 Repairing Pull-Apart of 3” or Less – Method 1

At a minimum, include the following steps, or alternatively the steps listed in Method 2 below, for the repair of a pull-apart of 3” or less:

a) Use a rail puller to pull the rail together.

b) Apply a minimum of 4 bolts (2 bolts in each abutting rail) in each joint.

c) Re-apply or replace displaced anchors.

d) Document the information in the applicable record.

7.7.12 Repairing Pull-Apart of 3” or Less – Method 2

At a minimum, include the following steps, or alternatively the steps listed in Method 1 above, for the repair of a pull-apart of 3” or less:

a) Cut in a permanent replacement rail of a minimum 12’ in length.

b) Lay the replacement rail with the maximum allowable joint gap.

c) Use six-hole joint bars at each joint, where applicable.

d) Apply a minimum of 4 bolts (2 bolts in each abutting rail) in each joint.

e) Re-apply or replace displaced anchors.

f) Document the information in the applicable record.

7.7.13 Repairing Pull-Apart of More than 3 inches

At a minimum, include the following steps for the repair of a pull-apart of more than 3”:

a) Cut in a permanent replacement rail of a minimum 12’ in length.

b) Lay the replacement rail with the maximum allowable joint gap.

c) Use six-hole joint bars at each joint, where applicable.

d) Apply a minimum of 4 bolts (2 bolts in each abutting rail) in each joint.

e) Re-apply or replace displaced anchors.

f) Document the information in the applicable record.

7.7.14 Repairing Broken Rail (not detected by Rail Flaw Detector)

At a minimum, include the following steps for the repair of a broken rail:

a) Cut in a permanent replacement rail of a minimum 12’ in length.

b) Install proper joint gaps as per Sub-Part D – Section 6.16.1.

c) Use six-hole joint bars at each joint, where applicable.

d) Apply a minimum of 4 bolts (2 bolts in each abutting rail) in each joint.

e) Re-apply or replace displaced anchors.

f) Document the information in the applicable records.

7.7.15 Repairing Defective Rails (detected by Rail Flaw Detector) with a Replacement Rail

At a minimum, include the following steps for repairing a defective rail with a replacement rail:

a) Cut in a permanent replacement rail of a minimum 12’ in length.

b) Install proper joint gaps as per Sub-Part D – Section 6.16.1

c) Use six-hole joint bars at each joint, where applicable.

d) Apply a minimum of 4 bolts (2 bolts in each abutting rail) in each joint.

e) Re-apply or replace displaced anchors.

f) Document the information in the applicable record.

7.8 CWR – Buckled Track

This section lists the Requirements for inspection, track work and slow orders to reduce the risk of track buckling in CWR territory (and as applicable in joint track territory).

a) Except in cases of emergencies, no out-of-face surfacing and lining, rail replacement or tie renewal will be performed if the rail temperature is above the PRLTR.

b) As a guideline, rail temperature will be 25 to 30°F above the ambient temperature.

c) Track buckling is a constant threat during times of high or rapidly rising temperatures. It is of particular concern on CWR territory in the spring and early summer.

7.8.1 Indicators of Potential Track Buckle

a) Watch for indicators of potential track buckling problems such as:

i. Wavy rail.

ii. New line deviations, such as short flat spots in curve or kinks in tangent track.

iii. Gaps or voids in ballast at end of ties.

iv. Rail base not properly seated in the plates.

v. Rail running through the anchors that may require restressing, resetting anchors and/or installing additional anchors.

vi. Churning of ballast caused by tie movement resulting in gauge and line kinks.

vii. Longitudinal movement of switch point in relation to stock rail, resulting in improper switch adjustment.

Figure SUB-PART D – 64 – Small Misalignment in Curved Track *(left)* **and Evidence of Misalignment with Movement at Tie Ends** *(right)*

7.8.2 Locations Prone to Track Buckling

a) Pay particular attention to the following locations that are more prone to track buckles:

i. Curves

ii. Bridge approaches

iii. Grade crossings

iv. Crossings with other railroads (diamonds)

v. Bottom of a heavy grade

vi. Spots where the subgrade is soft or wet

vii. Rock cuts where rail temperatures may be extremely high

viii. Areas having a history of lateral instability

ix. Recently disturbed track e.g. tie replacements, surfacing, new turnouts, etc.

x. Locations where track work has been undertaken in cold weather and rail has not been adjusted, rail anchors not applied, or ballast not restored

xi. Previous track buckle not permanently repaired

7.8.3 Protection of a Track Buckle or Imminent Track Buckle

a) A track buckle is an emergency situation. When a track buckle is detected, immediately take the following steps until the condition is corrected:

i. Stop all traffic through the area until temporary / permanent repairs are complete, or

ii. Have a qualified employee inspect the buckled location, determine that the track is safe for the passage of trains, and then supervise the passage of each train over the location at a maximum of 10 mph until temporary repairs are complete.

- When there are indications that a track buckle may be about to occur (see Sub-Part D – Section 7.8.2), immediately take the following steps to protect train traffic until the condition is corrected:
  - Place a 10-mph slow order, or
  - Stop rail traffic if the situation warrants.

b) Inspect track protected by a heat slow daily while the order is in effect.

c) Conduct inspections during the heat of the day.

7.8.4 Temporary Repair of a Track Buckle

a) Place the track in the best possible alignment where the track will not move and where it will provide clearance for train operation at 10 mph.

b) Protect temporary repairs with a 10-mph slow order until permanent repairs are complete.

7.8.5 Permanent Repair of a Track Buckle

a) Take corrective actions that address the root cause, prevents recurrence, and allows for train operation at authorized timetable speed. Permanent repairs could involve:

- Apply new or additional anchors,
- Add ballast to shoulder and cribs,
- Replace defective ties
- Tamp, surface, line and regulate,
- Cut out rail and restress.

b) A qualified Track Supervisor (Inspector) must re-inspect permanent repairs to track buckles in the heat of the day and verify the effectiveness of repairs before returning track to authorized timetable speed.

c) When rail is removed in repairing a track buckle, document the information in the applicable record.

7.8.6 Track Buckle Reporting

a) The track condition and its repair(s) must be documented in the applicable record.

- A Track Buckle Report is no longer required.

7.9 CWR – Temporary Speed Restrictions Account Work

7.9.1 General Requirements

a) Requirements apply to jointed track territory as applicable.

b) Place a temporary speed restriction as per Figure SUB-PART D – 65 – Temporary Speed Restrictions for Track Work.

c) Speed restrictions ensure safe train operations until the affected track stabilizes. Restrictions need to stay in place to allow the ballast to consolidate, rail compressive forces to equalize and the subgrade to compact.

d) Take more restrictive measures when conditions warrant.

7.9.2 Responsibility for Placing Speed Restrictions

a) During the work or before returning the track to service, the qualified foreman / supervisor in charge must ensure the following:

i. Adequate gauge, surface, and alignment have been established.

ii. Sufficient crib and shoulder ballast is in place.

iii. The rail is properly anchored.

iv. Turnout is within standards.

7.9.3 Speed Restrictions Length

a) To minimize running rail and other dynamic forces, trains must have time to brake and adjust slack before entering the disturbed track.

b) To ensure trains reach the desired speed before entering the affected track, place speed restrictions at least 0.1 mile in each direction from the outside limits of the affected track.

c) For heavy grades, sharp curves, or substandard track conditions, extend speed restrictions farther from the work limits, if needed.

7.9.4 Speed Restriction Requirements while Carrying Out Track and Switch Tie Renewals

Apply the following speed restrictions in order to prevent track buckling while carrying out track and switch tie renewals:

a) When traffic must pass before all ties are fully plated, spiked, and anchored, and before all newly installed ties are tamped, ballast cribs filled, and shoulders pulled up the following must be done:

   i. Inspect the track,

   ii. Place a speed restriction of not more than 10 mph, and

   iii. Advise train crews to not use dynamic braking during movement over the track.

b) When tie renewals are complete, before traffic can pass ensure that conditions laid out in Figure SUB-PART D – 65 – Temporary Speed Restrictions for Track Work satisfied and place the associated restrictions:

Temporary Speed Restrictions for Track Work				
Type of Work	**Temperature**	**TSO in CWR without Dynamic Stabilizer**	**TSO in CWR with Dynamic Stabilizer**	**TSO in Jointed Rail**
Rail Laying (Continuous (out-of-face))	Any	1 train at 10 mph then inspect, if ok, then, 1 train at 25 mph then inspect, if ok, then track speed	N/A	1 train at 25 mph then inspect, if ok, then track speed
Spot Tie Renewal Spot Surfacing Shoulder Cleaning	At or above PRLT *(85°F or greater)* *(Effective 2026-01-01 - 90°F or greater)*	2 trains at 25 mph then inspect, if ok, then track speed	N/A	1 train at 25 mph then inspect, if ok, then track speed
	Below PRLT *(less than 85°F)* *(Effective 2026-01-01 - less than 90°F)*	Inspect If ok, then track speed	N/A	Inspect If ok, then track speed
Mechanized Tie Renewal Continuous Surfacing *Turnout Replacement Ballast Cleaning / Undercutting Track Surfacing and Lining	At or above PRLT *(85°F or greater)* *(Effective 2026-01-01 - 90°F or greater)*	1 train at 10 mph, then inspect, if ok then, 10 trains at 25 mph, then inspect, if ok, then track speed	2 trains at 30 mph, then inspect, if ok then track speed.	1 train at 10 mph then inspect, if ok, 5 trains at 25 mph then inspect, if ok, then track speed
	Between PRLT and 40°F below the PRLT *(Between 45°F and 85°F)* *(Effective 2026-01-01 - between 50°F and 90°F)*	1 train at 10 mph, then inspect, if ok, then, 5 trains at 25 mph, then inspect, if ok, then track speed	Inspect, if ok then track speed.	1 train at 10 mph then inspect, if ok, 2 trains at 25 mph then inspect, if ok, then track speed
	40°F or more below the PRLT *(45°F or lower)* *(Effective 2026-01-01 - 50°F or lower)*	2 trains at 25 mph, then inspect If ok, then track speed	Inspect, if ok then track speed.	1 train at 25 mph then inspect, if ok, then track speed

Note 1: Train is defined as freight or a mixed train; Passenger trains are not to be counted for provisions of this table.
Note 2: Do not remove speed restrictions in the heat of the day.
Note 3: In the interpretation of Maximum Speed, the Timetable may dictate a more restrictive speed.
Note 4: Work performed to address an URGENT defect(s) must be inspected by Quality Assurance personnel, per Sub-Part C, Section 8 – URGENT Defects.
***Reminder:** If it is a newly constructed mainline, a Category 1 yard turnout, or a Special Track Work a 10 mph TSO applies until a **Detailed Turnout Inspection** has been completed, in addition to the required TSOs noted above.

Figure SUB-PART D – 65 – Temporary Speed Restrictions for Track Work

c) Before placing any speed restrictions, a qualified Foreman or Track Supervisor (Manager) must inspect all track work.

d) Once the required trains have passed over the track, re-inspect the track in the heat of the day before returning the track to authorized timetable speed. The qualified employee will modify / remove the slow orders.

IMPORTANT: There may be conditions where further speed restrictions are required. The person in charge of the work must ensure that field inspections on the completed work are carried out and that areas of concern are identified and protected.

e) Do not increase speeds in the heat of the day.

f) For spot tie replacement by hand in CWR territory, it is not necessary to apply a speed restriction if **all** the following conditions are satisfied:

SPEED RESTRICTIONS – SPOT TIES	
CONDITION	**MAXIMUM SPEED**
1. At most two adjacent ties are replaced, and 2. The four ties on each side of the replaced ties are undisturbed; and not hanging, anchor pattern is complete, and anchors are in good condition, effective and tight, and 3. Installing new ties should disturb the track as littles as possible, jacking of track should be to minimum, base of plates on newly installed ties upon completion of install should be even with (0" below or at more 1/4" *(6 mm)* above) base of plate on adjacent undisturbed tie, and 4. The ambient temperature is less than 80°F *(27°C)* and is expected to stay less than 80°F *(27°C)* for 48 hours, and 5. Newly installed ties are fully plated, spiked, anchored, and tamped. Cribs are full and shoulders restored.	**Authorized Timetable Speed**

Figure SUB-PART D – 66 – Speed Restrictions - Spot Ties

If any of the above 5 conditions are not satisfied, the appropriate speed restrictions as laid out in Figure SUB-PART D – 65 – Temporary Speed Restrictions for Track Work are to be applied.

7.9.5 Speed Restriction Requirement when Surfacing and Lining in CWR Territory

Apply the following speed restrictions in order to prevent track buckling while surfacing and lining:

a) When traffic must pass before all ties have been tamped and run outs made and before all cribs have been filled with ballast and all shoulders have been pulled up the following must be done:

   i. Inspect the track,

   ii. Place a speed restriction of not more than 10 mph, and

   iii. Advise train crews to not use dynamic braking during movement over the track.

b) When surfacing and lining, before traffic can pass ensure that the conditions are satisfied and place the associated speed restrictions detailed in Figure SUB-PART D – 65 – Temporary Speed Restrictions for Track Work

c) Before placing any speed restrictions, a qualified Foreman or Track Supervisor (Inspector) must inspect all track work. Once the required trains have passed over the track, re-inspect the track in the heat of the day before returning the track to timetable speed.

   IMPORTANT: There may be conditions where further speed restrictions are required. The person in charge of the work must ensure that field inspections on the completed work are carried out and that areas of concern are identified and protected.

d) Do not increase speeds in the heat of the day.

e) When surfacing by hand or by machine in CWR territory, it is not necessary to apply a speed restriction if **all** the following conditions are satisfied:

SPEED RESTRICTIONS – SPOT SURFACING	
CONDITION	**MAXIMUM SPEED**
1. The surfacing performed is restoration of the track surface, cross-level and alignment through short stretches of track, not more than 19' 6" *(5,900 mm)* in length, when a continuous raise is not necessary, and 2. The lift is 1" *(25 mm)* or less, and 3. The track is not identified as a high-risk track buckle location, and 4. The track is tangent or of curvature less than 1° 30 min. and the ambient temperature is less than 80°F *(27°C)* and is expected to stay less than 80°F *(27°C)* for 48 hours, or The track is of curvature 1° 30 min. or more and the ambient temperature is less than 70°F *(21°C)* and is expected to stay less than 70°F *(21°C)* for 48 hours.	**Authorized Timetable Speed**

Figure SUB-PART D – 67 – Speed Restrictions - Spot Ties

If any of the above 4 conditions are not satisfied, the appropriate speed restrictions as laid out in Figure SUB-PART D – 65 – Temporary Speed Restrictions for Track Work are to be applied.

7.9.6 Speed Restriction Requirements when Ballasting and Undercutting in CWR Territory

Apply the following speed restrictions in order to prevent track buckling while ballasting and undercutting:

a) When traffic must pass before all ties have been spiked, all rail anchors have been applied and all ties on the newly ballasted track and run outs have been tamped the following must be done:

   i. Inspect the track,

   ii. Place a speed restriction of not more than 10 mph, and

   iii. Advise train crews to not use dynamic braking during movement over the track.

b) Where track is re-ballasted by skeletonizing track, before traffic can pass ensure that the conditions are satisfied and place the associated speed restrictions detailed in Figure SUB-PART D – 65 – Temporary Speed Restrictions for Track Work

c) Before placing any speed restrictions, a qualified Foreman or Track Supervisor (Inspector) must inspect all track work. Once the required trains have passed over the track, re-inspect the track in the heat of the day before returning the track to timetable speed.

   IMPORTANT: There may be conditions where further speed restrictions are required. The person in charge of the work must ensure that field inspections on the completed work are carried out and that areas of concern are identified and protected.

d) Do not increase speeds in the heat of the day.

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8. Turnouts and Track Crossings

8.1 Turnouts and Track Crossings – General

a) A turnout is a combination of a switch, a frog, the rails necessary to connect the switch and the frog, two guard rails (unless it is a self-guarded frog), and a switch stand for operating the switch.

b) A turnout begins with the switch and ends with the frog.

c) A turnout is usually referred to by its number (frog angle or number). For example, a #10 turnout uses a number 10 frog.

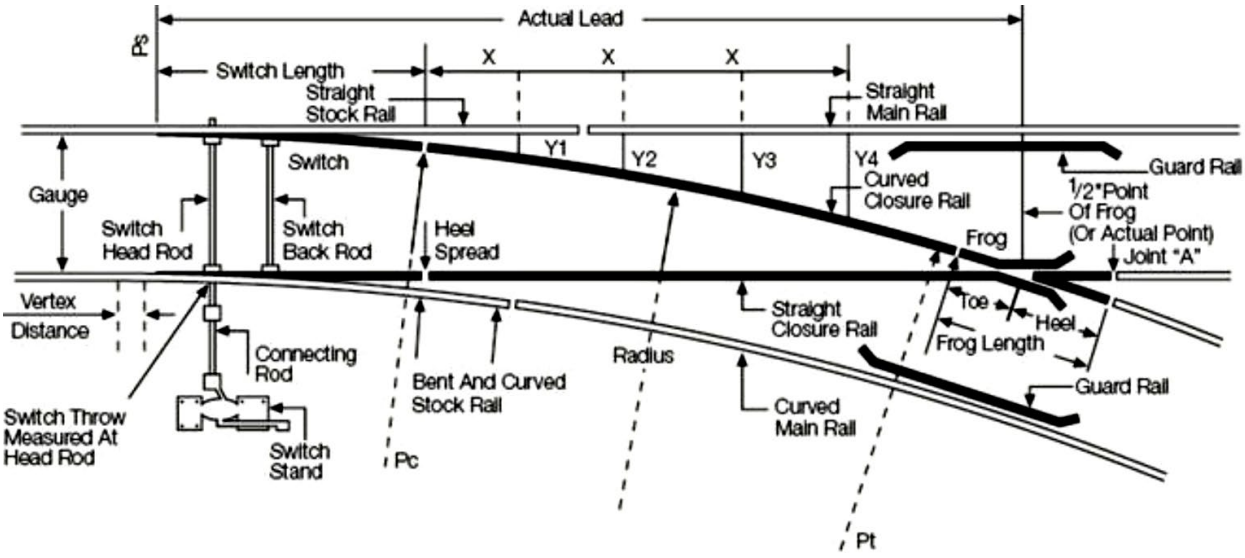


Figure SUB-PART D – 68 – Turnout Components

d) In turnouts and track crossings (diamonds), the fastenings must be intact and maintained so as to keep the components securely in place. Each switch, frog and guard rail must be kept free of obstructions that may interfere with the passage of wheels.

e) Turnouts are to be inspected in accordance with Sub-Part F, Section 11.

8.2 Turnouts and Track Crossings – Signals System

a) Care will be taken when working around turnouts to avoid interfering with Signals Systems:

i. Use extreme care not to short across an insulated gauge rod, insulated gauge plate or insulated joints, when using any tool that conducts electricity such as a track wrench, shovel, ballast fork, tie tongs or metal broom,

ii. At locations where snow-clearing devices are installed, use extra precautions because of the possibility of creating a short circuit through the metal ductwork.

8.3 Turnouts and Track Crossings – Installation

a) Turnouts must not be installed or renewed on main track curves, except in special cases as authorized by the Director, Rail Infrastructure,

b) Power, Dual Control, Spring and Electrically Locked switches shall be installed only at locations approved by the Director, Rail Infrastructure,

c) When turnouts are being constructed, trains should not be permitted to move in a facing point direction until;

i. The frog is properly protected by a guard rail,

ii. The main track switch point is lined and locked against the stock rail.

- If the points cannot be lined and locked, points must be secured with an approved switch point clamp and spiked.
  - When spiking a point, the gauge plate must have an appropriate hole intended for point securement.
  - The tie must be sound enough to secure the point.

d) <u>Switch stand requirements are as follows,</u>

i. Switch stands should be plumb and be securely spiked, bolted or lagged to the head block ties, stands on spring switches shall be securely bolted to the head block ties,

ii. Main track switch stands shall be of an approved rigid type,

iii. On other than main track, approved rigid, or safety stands may be used,

iv. Semi-automatic stands of an approved type may be used on yard tracks only where speeds do not exceed 15 MPH,

v. Approved rigid stands must be used with spring switches, or where operating stands are used with derails,

vi. New and rebuilt switch stands may be supplied with ergonomic switch handles,

vii. Switch stands must be located so as to conform to approved plans,

viii. Low stands must be used where stands are to be located between tracks having track centres 18’ or less,

ix. Switch stands and switch machines must be placed, wherever possible, on the closed point side of the track, so the connecting rod is in tension, when the switch is set for the normal position,

x. The handles on all high switch stands should be positioned so that when the switch is in the normal position the handle faces away from the frog and away from the track. When the switch is lined over for the diverging route the handle should move in the same direction as the points,

xi. When installing parallel or ground throw switch stands, the operating level must point toward the frog for normal position.

xii. Switch stands must be equipped with the proper reflectorized target according to CROR and be in an effective condition.

e) <u>Switch rods and connecting rod bolts requirements are as follows,</u>

i. Must be inserted with the nuts on the top side and secured with cotter pins,

ii. Ensure the connecting rod jaw openings, bolt holes and bolts correctly match the switch rods.

iii. The connecting rod bolt under the switch stand must be installed with the head of the bolt on the upper side,

f) Stock rails and switch points requirements are as follows,

i. Switch points shall fit snugly against the stock rails for the entire length of the planed portion.

ii. Turnout stock rails shall be horizontally bent as shown on the standard plan. An approved rail bender shall be used for bending rails.

iii. Stock rails are properly seated in the switch plate having no lateral movement in the plates and that switch plates have no movement on the ties.

iv. Care must be taken in adjusting braces to avoid over-driving and rotating the stock rails out of the rail seat of the plate.

v. Switch points must be installed directly opposite each other.

vi. Adequate rail anchors must be installed to resist rail movement.

vii. Switch points should not overhang the gauge plate nor be more than 1" *(25 mm)* back from the edge of the gauge plate.

g) Switch point protectors,

i. Switch point protectors or switch point guards of an approved type may be installed, to protect the switch point where the speed on any route through the turnout does not exceed 15 mph.

Figure SUB-PART D – 69 – Examples of Switch Point Protector and Guard

ii. Care must be taken when installing to ensure that the protector fits properly against the rail and that any flowed metal on the gauge side of the straight stock rail is ground off,

iii. Condition of switch point protector must be in serviceable condition. If you see contact on the switch point, this may be a sign that the protector needs repair or replacement.

iv. Switch point protectors that attach to the tip of the switch point (as shown in Figure Sub-Part D – 70) are no longer acceptable for use at ONTC.

Figure SUB-PART D – 70 – Prohibited Switch Point Protector

h) Ballast,

i. Will be cleaned from cribs to a depth adequate to prevent contact with rods and to facilitate winter switch maintenance and drainage.

i) Locks and keeper requirements are as follows,

i. All main track stands must be equipped with an approved switch lock in good working order and properly chained to the stand on high mast switch stands or to the ties on low mast switch stands.

ii. Switch stands on other than main tracks are to be equipped with a hook type keeper unless otherwise directed,

iii. On all main track hand operated switches, high security switch locks must be installed,

iv. At locations where vandalism is a concern, high security switch locks may also be installed as directed by the Director, Rail Infrastructure on the following,

- Hand operated switches on other than main tracks,
- Other devices such as derails, electric switch locks, foot pedals, push button operation panels, etc.

v. Switch Point Locks:

- Approved switch point locks must be installed on all manually operated main track switches (except spring switches) seen as facing points from a highway crossing at grade where all the following conditions exist;
  - The crossing is not protected by gates, and;
  - The train speed is 50 mph or faster (30 mph where sight lines are poor), and;
  - The switch is within 200 ft of the crossing.
- Where switch point locks are installed, the switch will be identified by painting the top of the switch stand castings white.

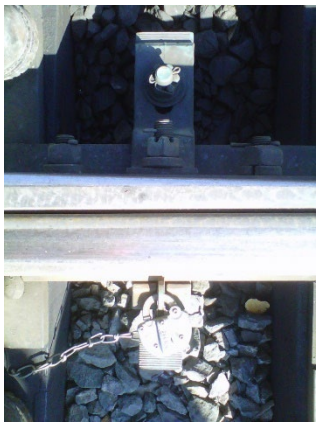


Figure SUB-PART D – 71 – Switch Point Foot Pedal Lock

8.4 Turnouts and Track Crossings – Maintenance

8.4.1 General Maintenance of Turnouts

a) The Signal Maintainer shall be present when any planned work, which may interfere with the functioning of the signal apparatus, is being performed.

b) Insulation in switch rods, and gauge plates shall be maintained in good condition at all times.

c) Switch stands, switch plates, connecting rod bolts, and spring frogs shall be kept properly lubricated to provide easy movement and to protect against excessive wear.

d) Switch stands, targets, masts, connecting rods and all other component parts must be kept in good operating condition and must have defective parts repaired or replaced immediately.

e) The application of heat or mechanical methods to repair bent or twisted switch stand masts is not permitted.

8.4.2 Switch Stand

a) Check the switch lock or keeper.

b) Check that the stand is securely fastened to the headblock ties.

c) Ensure that mast bearing areas are well lubricated.

8.4.3 Switch Target

a) Check the condition of reflectorized targets.

8.4.4 Eyebolt

a) Check the relative movement between the handle and top casting, and between the top casting and mast. When the relative movement becomes so great as to require excessive extension of the eyebolt from the mast barrel, the switch stand must be replaced.

b) When excessive eyebolt wear affects the quality of service provided by the switch stand, replace it – return the old one to the Yard for rebuilding.

8.4.5 Connecting Rod

a) Inspect the connecting rod for excessive wear in bolt holes.

b) Check connecting rod bolts to ensure that the nut and cotter pins are in place.

Near Point	Far Point	Crank Eye on Stand	Clevis on Connecting Rod
Fits Properly	Too Tight	Screw In	Screw In
Fits Properly	Too Loose	Screw Out	Screw Out
Too Tight	Fits Properly	Screw In	Screw Out
Too Loose	Fits Properly	Screw Out	Screw In
Too Tight	Too Tight	Screw In	None
Too Loose	Too Loose	Screw Out	None

Figure SUB-PART D – 72 – Switch Adjustment

8.4.6 Switch Rods

a) Switch rods and transit clips should have sufficient clearance so as not to contact the side of the tie or the slide plate.

b) Check switch rods for excessive wear in bolt hole areas.

c) Check insulation in insulated rods.

d) Check for excessive wear on rod clips, rod clip bolts and on the connecting rod bolt.

8.4.7 Switch Points and Stock Rails

a) Gaps in switch points, regardless of size, are unacceptable.

b) Points must fit tightly against the entire planed portion of the stock rail.

c) Metal flow on switch points and stock rails shall be kept ground off to maintain proper gauge and to prevent chipping of these parts.

- Flow should not exceed 1/16” *(2 mm)* on switch point or gauge side of stock rails.

d) Stock rail on the turnout side must be properly bent to provide a good fit for the switch point.

e) Chipped or broken switch point tips must not have a thickness greater than 3/16” *(5 mm)*,

f) Switch point tip is not less than 1/2" *(13 mm)* below the top of the stock rail,

g) Switch points are square to each other and not overhang the gauge plate by more than 1” *(25 mm)*.

h) Every effort must be made to replace the defective switch point and stock rail.

i) A mainline switch point will only be welded upon the direction of the Superintendent, Maintenance of Way.

j) Switch points are manufactured such that the running surface is higher than the stock rail, as measured at the location where the distance between the gauge side of the stock rail and gauge side of the switch point, when tight against the stock rail, is 4-1/2" *(114 mm)* as shown in Figure Sub-Part D – 73. This ensures the proper vertical clearance as shown in Figure Sub-Part D - 74.

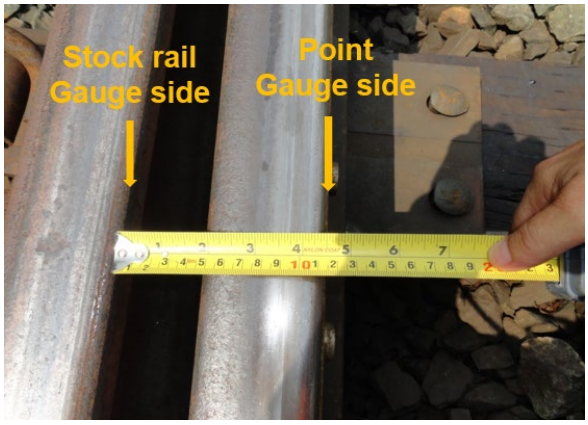


Figure SUB-PART D – 73 – 4-1/2" Point

Figure SUB-PART D – 74 – Effective Vertical Clearance at the Switch Point

- When this vertical dimension is reduced by wear to 3/16" *(5 mm)*,
  - The location must be monitored for signs of wheel contact on the stock rail.
  - Where contact is evident, the switch point must be renewed.

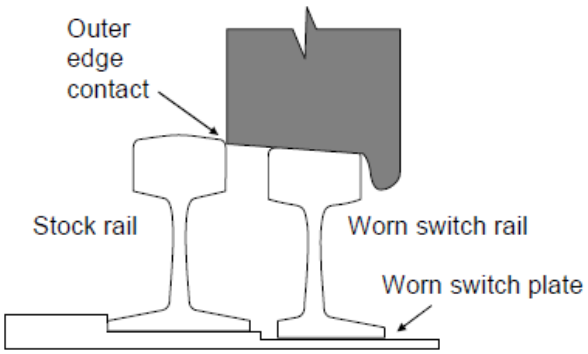


Figure SUB-PART D – 75 – Wheel Contact of Stock Rail

- In a new installation, the top of the point will be at least 1/4” *(6 mm)* above the top of the stock rail at the 4-1/2” *(114 mm)* point between the switch point and stock rail.
  - To provide the proper vertical clearance when the switch point is worn, it is necessary to use a stock rail that is equally worn.

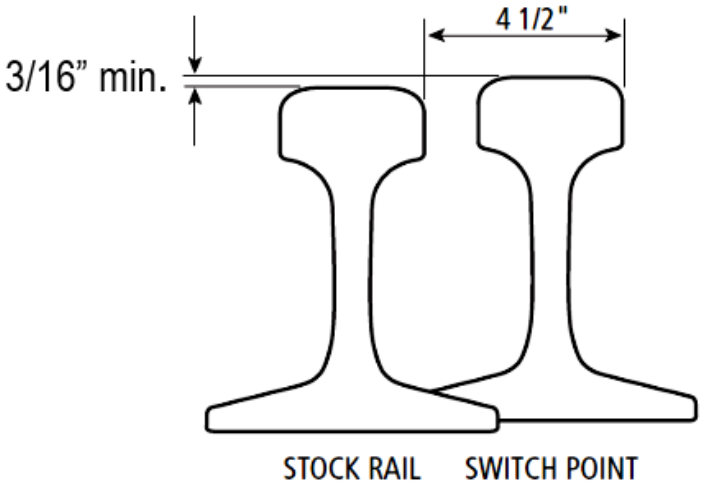


Figure SUB-PART D – 76 – Switch Point / Stock Rail Minimum Clearance

k) Ensure that points and stock rails are of the same rail section (e.g., Samson point with Samson stock rail)

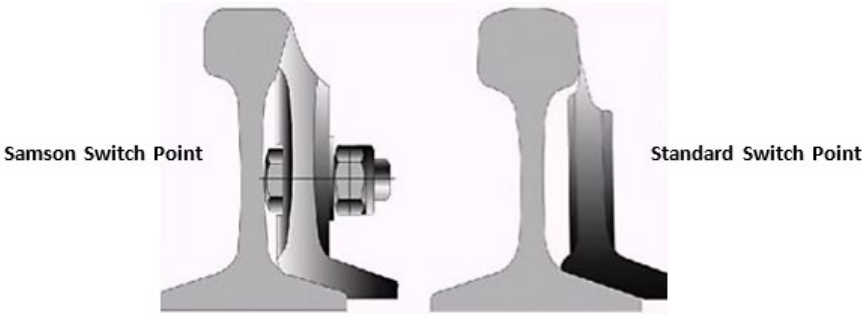


Figure SUB-PART D – 77 – Samson vs. Standard (“knife-edge”) Switch Point and Stock Rail

8.4.8 Ties

a) Maintain good tie condition under the heel assembly.

b) Ties must be installed and maintained in accordance with the layout shown on the standard plan.

c) Check the number of ties in the turnout. During major tie renewals, the number must be brought up to standard.

d) Ties are to be square to the through track in lateral turnouts.

e) Ties are to be well tamped throughout the turnout.

f) Ties must hold surface, line and gauge and are no longer useable when they are:

   i. Broken through,

ii. Split, or otherwise damaged, to the extent that it will allow the ballast to work through, or it will not hold spikes or rail fasteners,

iii. Plate cut more than 2" of the tie thickness, or

iv. So deteriorated that the tie plate or base of rail can move laterally 1/2 inch relative to the tie.

8.4.9 Tie Plates

a) Broken, bent or missing plates are to be replaced

b) Shoulder plates, or plates with cut rail seats, worn to the extent that the seat width is more than the nominal design width by 1/8 inch *(3 mm)* must be replaced.

c) Gauge plates with defective insulation must be reported to the Signal Maintainer.

d) Rails are to be properly seated in the gauge and riser slide plates and that rail braces are tight and well driven, but not overdriven to the extent that rail is canted inward.

e) Riser slide plates and spring frog plates are to be properly lubricated to permit free movement of switch points and spring wing rail.

f) All other plates are properly seated with shoulders bearing firmly against the rail base.

8.4.10 Heel Blocks

a) Replace bolts where required and maintain them in a tight condition.

8.4.11 Cotter Pins

a) All cotter pins are to be in place.

8.4.12 Frogs

A frog is a track component used at the intersection of two running rails to provide support for wheels and passage for their flanges, thus permitting wheels on either rail to cross the other intersecting rail.

a) <u>General:</u>

i. Ensure that frogs are maintained in accordance with the appropriate standard plan and instructions for frog maintenance.

ii. Check the frog for alignment and lateral movement.

iii. If the frog is removed, you must remove the guard rail as well or protect against it.

iv. Frog is supported throughout on well tamped and sound ties.

v. Evaluate cracks or breaks in frog castings or rail defects in the non-running portion of wing rails in terms of their potential effect on the safe passage of rolling stock. In particular, when making the evaluation:

- Determine if there is a loss or imminent loss of wheel guidance due to a loss of functional integrity.
- Should not consider cracks or breaks in a manganese frog casting that do not affect the safe passage of rolling stock to be a defective condition. If a severe crack, or a series of cracks, creates a condition where the breaking out of a piece of the casting is imminent,
- Cracks or wear that develop into a loss of functional integrity should be addressed.

b) Guard Rails at the Frog:

A guard rail is installed parallel to the running rail opposite a frog to form a flangeway with the rail and to hold wheels of equipment to the proper alignment when passing through the frog.

i. Guard rail bolts and fasteners must be intact and tight.

ii. Guard rail wear surfaces must not be worn more than 5/8" *(16 mm)*.

iii. Guard Check Gauge Purpose: Ensures wheels are able to pass through the frog without one of the wheels (the right wheel in Figure SUB-PART D – 78) striking the frog point.

- In Figure SUB-PART D – 78, there are two key dimensions:
  - "Wheel check," is the distance between the two wheels plus the wheel flange thickness at the gauge line (5/8" below the running surface); and
  - "Guard check gauge," is the distance between the gauge line of a frog to the guard line (a line along the side of the flangeway nearest to the center of the track and at the same elevation as the gauge line) of its guard rail or guarding face, measured across the track at right angles to the gauge line (a line 5/8" below the top of the center line of the head of the running rail, or corresponding location of the tread portion of the track structure).
- As the example illustrates in Figure SUB-PART D – 78, guard check gauge must be greater than or equal to the measurements in Figure SUB-PART D – 79, so there will be a "flange-frog point gap" between the right wheel and frog point interface, when the left wheel flange passes against the guard rail. This ensures the right wheel does not strike the frog point. The distance between the guard rail and the gauge side of the running rail should be 1 7/8".

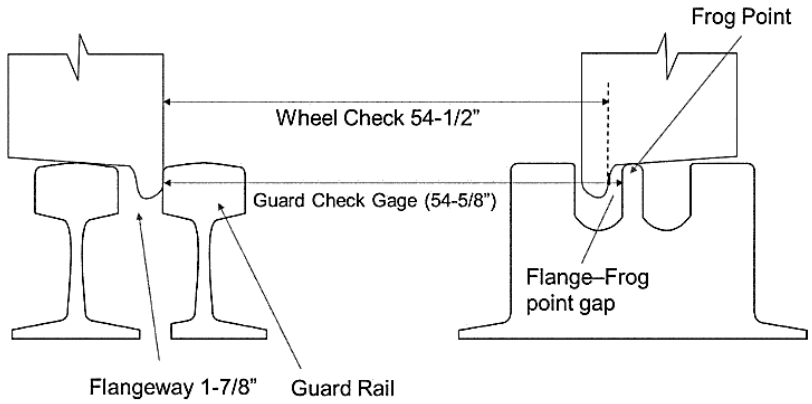


Figure SUB-PART D – 78 – Guard Check and Guard Face (account for Wheel Measurement)

iv. Guard Check and Guard Face Lateral Settings: Must be within the limits prescribed in Figure SUB-PART D – 79 and further illustrated in Figure SUB-PART D – 80 when measured at the 1/2" point of frog:

Class of Track	Guard Check Gauge MINIMUM	Guard Face Gauge MAXIMUM
1	**54 1/8”** *(1,375 mm)*	**53 1/4”** *(1,353 mm)*
2	**54 1/4"** *(1,378 mm)*	**53 1/8”** *(1,349 mm)*
3, 4	**54 3/8”** *(1,381 mm)*	**53 1/8”** *(1,349 mm)*
5	**54 1/2"** *(1,384 mm)*	**53”** *(1,346 mm)*

Figure SUB-PART D – 79 – Guard Rail Lateral Limits (inches and millimeters)

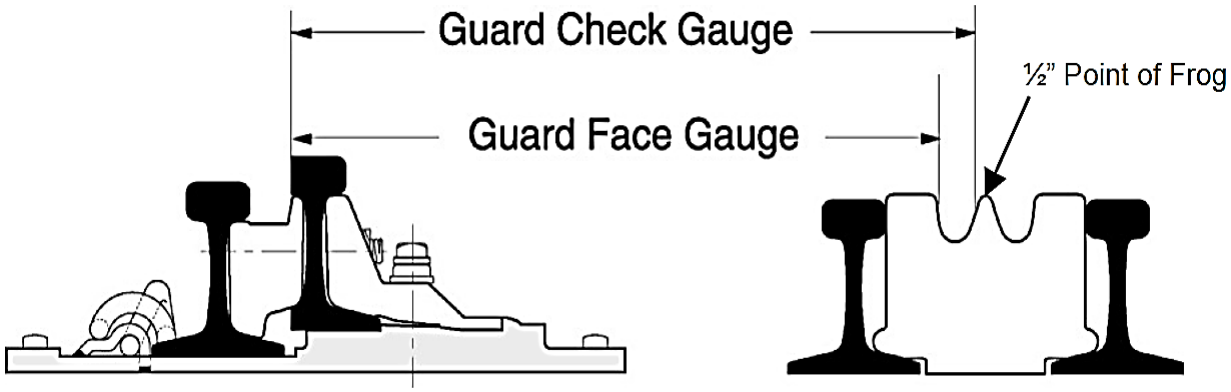


Figure SUB-PART D – 80 – Guard Check Gauge and Guard Face Gauge Measurement Locations

c) Frog Point:

i. Check for wheel flange contact on the point.

ii. Check whether the point is worn vertically to the maximum wear limit allowed by standard plan at the actual point of the frog.

iii. The maximum wear limit is 1/2" *(13 mm)* from the top of the frog. If worn to the maximum it must be repaired or replaced.

- Measurement is taken by use of a straight edge and a special gauge for point wear.

iv. If a frog point is chipped, broken, or worn more than 5/8” *(16 mm)* down and 6” *(152 mm)* back, restrict operating speed over the frog to not more than 10 mph.

Note: Ensure the guard rail is within standards. Possible result of a severely worn frog point and a worn or loose guard rail is that a wheel may “hit” the point and climb to the wrong side of the frog.

d) Tread Portion of Frog:

i. If the tread portion of the frog casting is worn down 3/8” *(10 mm)* or more below the original contour, operating speed must be limited to 10 mph until the frog is repaired or removed.

ii. The tread of the frog is considered to be any portion that is contacted by the tread of the wheel except for portion of the frog from the actual point to a position 6 inches back towards the heel.

iii. As shown in Figure SUB-PART D – 81, the measurements of the portion of the tread further back than the 6-inch position may be taken by placing a straightedge positioned longitudinal or transverse. Figure SUB-PART D – 81 shows a rail bound manganese frog design with an actual frog point that is 3/16" lower than the tread portion.

- A frog built without manganese (e.g., composed of 'T' rails called a bolted rigid frog) will have a point with a similar profile. Called a depressed point, the tread will taper up to the top of the rail profile in the direction toward the frog heel in a distance equal to one-half the frog number in inches, but not less than 5 inches.

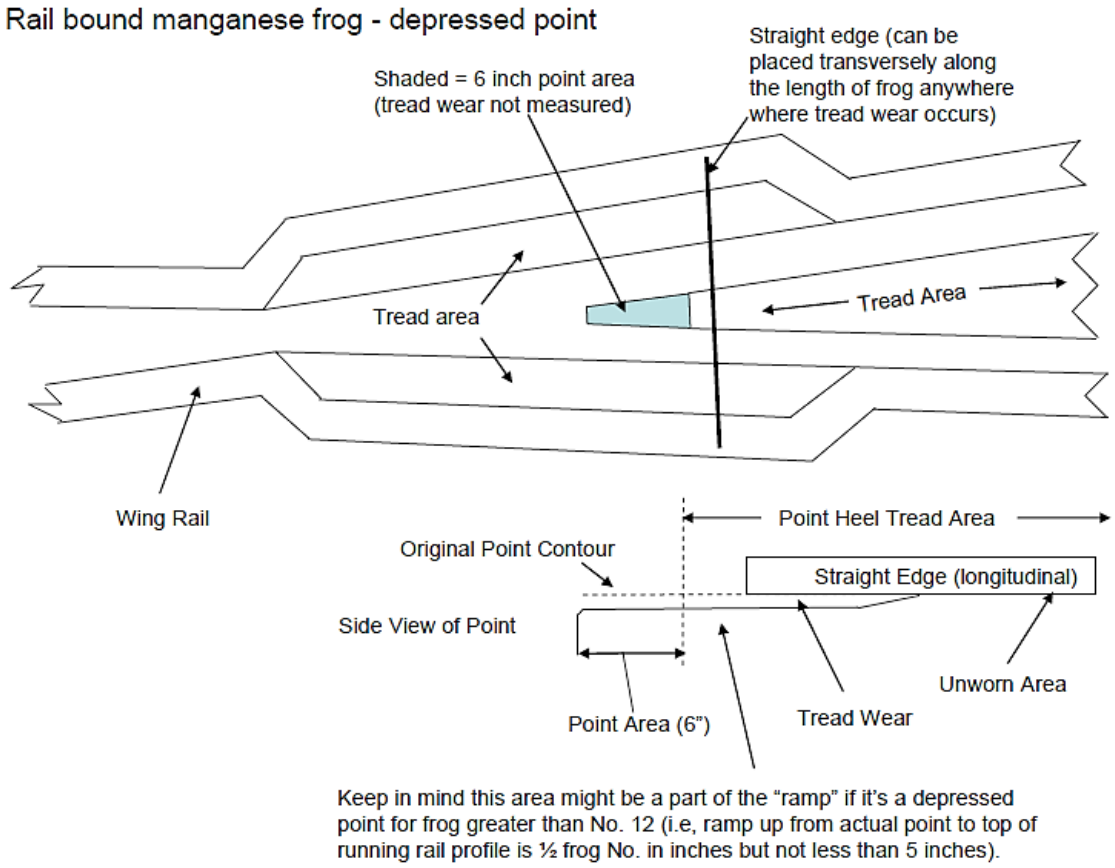


Figure SUB-PART D – 81 – Tread Portion

e) Bolts:

i. Check for loose bolts in the frog and in the rail joint connections.

f) Flangeways of Frog:

i. The flangeway depth must not be less than 1-1/2" *(38 mm)*.

ii. At higher speeds with a flangeway depth of less than 1-1/2" *(38 mm)* the wheel flange could "bottom out" in the flangeway and result in severe damage to the frog.

iii. Inspecting with a Check Gauge:

- If the check gauge contacts the bottom of the flangeway, worn frog surfaces must be repaired or the frog removed.

iv. Inspecting with a Straight Edge and Measuring Tape:

- If you do not have a check gauge, place a straight edge across the frog at the area of concern.
- Measure the space between the underside of the straight edge to the bottom of the flangeway and the space between the underside of the straight edge and the tread.
- As shown in Figure Sub-Part D - 82, subtract the tread value from the flangeway value to obtain the actual flangeway depth.

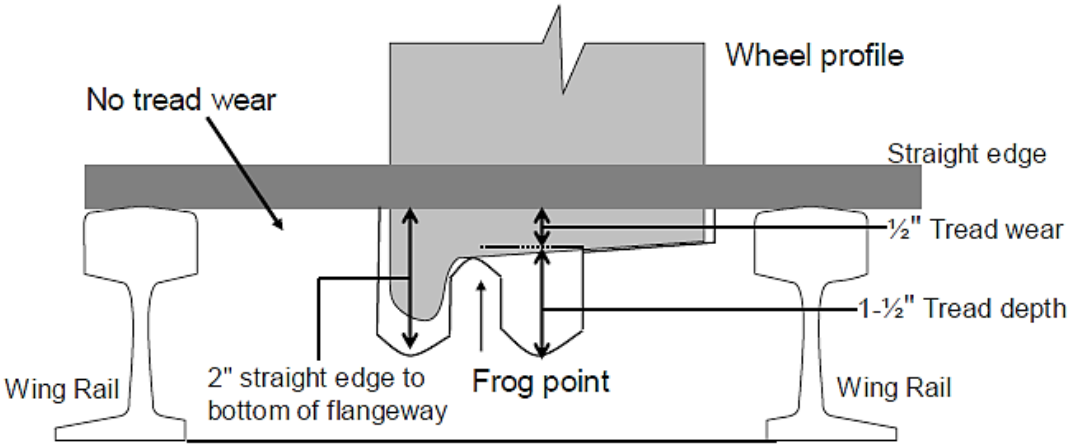


Figure SUB-PART D – 82 – Flangeway Depth Measurement with a Straight Edge

g) Self-Guarded Frogs

i. Check that the side wear measurement on raised self-guarded frog does not exceed 3/8" *(10 mm)*.

- Observe the condition of the frog point, and where there is evidence of wear caused by wheel flanges contacting the frog point, take measurements to determine compliance with this section.
- To determine the amount of wear on a raised guard, measure the thickness at a portion where there is wear. Compare this measurement to a portion where there is no wear and the difference between the two is equivalent to the amount of wear.

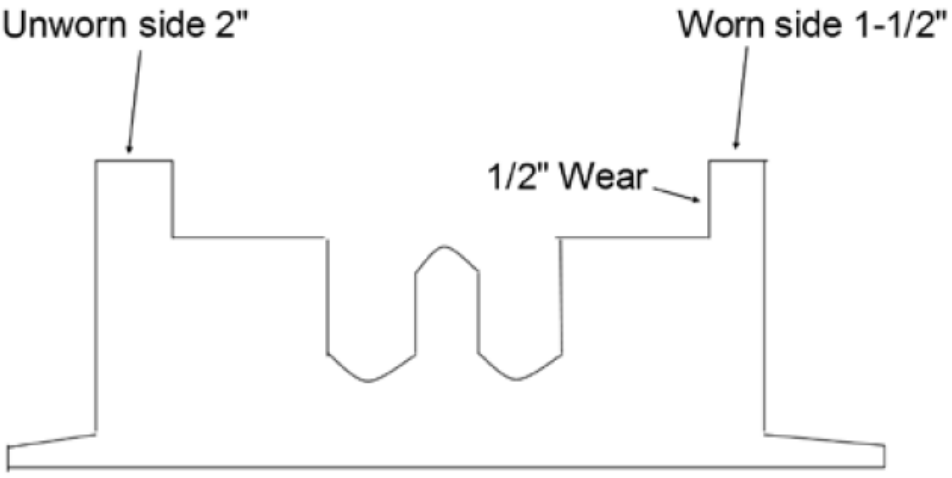


Figure SUB-PART D – 83 – Self-Guarded Frog – Raised Guard Wear Example

ii. Self -Guarded Frogs are <u>not</u> permitted in tracks where speeds exceed 15 mph.

- Speeds in excess of this can result in excessive lateral forces such as wheels 'kicking' or in extreme cases, wheels climbing up the raised guard.

iii. If repairs are made to a self-guarded frog without removing it from service, the guarding face must be restored before rebuilding the point.

- This precaution is necessary due to the potential for a wheel flange striking the frog point.

h) <u>Spring Frogs</u>

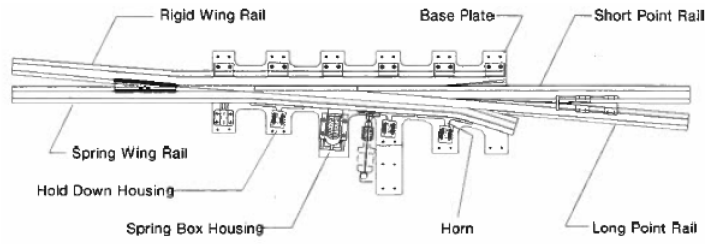


Figure SUB-PART D – 84 – Spring Frog

i. Do not put any part of your body between the spring wing rail and the point rail unless the spring is securely blocked open.

ii. Care must be taken when lifting the frog with a tamper as the rail base hooks may bend the frog base plate. Hand jacks MUST be utilized on the outside rails of the turnout to assist in lifting the frog.

iii. Where hand tamping of ties is performed, only 16" on either side of the rail is to be tamped; the centre of the tie must not be tamped.

iv. Check for loose deck bolts on the hold-down housings and brace stops.

v. The toe of each wing rail must be solidly tamped and fully and tightly bolted

vi. Ensure that a clearance of 1/16 inch *(2 mm)* to 1/4 inch *(6 mm)* is in place between the top of the horn and the hold-down housing. The top of the horn must be parallel to the inside of the top of the housing.

vii. Check to see that the spring wing rail bears evenly on all base plates. This can be checked by noting wear marks on the plates.

viii. When the wing is fully opened, the flangeway opening is at least 1-3/4” *(45 mm)* but not more than 1-7/8” *(48 mm)*.

ix. Having a 3/8” *(10 mm)* to 1/2" *(12 mm)* gap between the frog point and the wing rail. Beyond the tip, the wing rail and frog body shall be a tight fit.

x. The retarder shall hold the wing open for 1 to 3 minutes.

xi. Check the toe block assembly for:

- Correct bearing of the spring wing rail with respect to the block.
- Cracks in the toe block.
- Bolt hole cracks in the spring wing rail (the bent and counter-bored joint bar must be removed).
- Excessive wear on the shoulder bolts, sleeve, or bolt holes in the rail.

xii. Check the spring for sufficient tension. The nut on the spring bolt should be adjusted to a torque of not less than 10 lbs. and not more than 15 lbs. The correct assembly housing is shown on the standard plan.

xiii. Ensure that cotter pins are in place at both ends of the spring bolt.

xiv. Check that the spring wing rail is in correct contact with the point rail.

xv. The outer edge of a wheel tread may not contact the gauge side of the spring wing rail.

xvi. Before leaving the work site, clean the spring wing rail plates.

xvii. Apply a lubricant to the base plates.

xviii. Check the operation of the wing rail to ensure that the base plate has not restricted the horn clearance.

xix. Check to make sure the wing rail closes without sticking.

8.4.13 Bolts

a) Ensure that the bolts throughout the complete turnout are installed according to Standard Plan. They must be tightened to full specifications approximately 6 weeks after initial installation and annually after installation.

b) When installing bolts in turnouts, lubricate bolts by completely immersing the threads of bolts in new / used motor oil.

c) When installing guard rail bolts, the tapered washer should be installed on the guard rail side.

d) All new special track work 100 lb. or less will be assembled using Grade 5 bolts. All new special track work 115 lb. or greater will be assembled using Grade 8 bolts,

e) Grade 5 bolts can be identified by three (3) radial lines on the head of the bolt. Grade 8 bolts have six (6) radial lines,

f) Whenever grade 8 bolts are used, each bolt must be equipped with a hardened steel washer.

Note: All torques listed are for lubricated bolts using a graphite-based lubricant.

Size of Bolt (inches)	1”	1 1/16”	1 1/8”	1 1/4"
Torque – ft - lbs	670	850	1200	1600

Figure SUB-PART D – 85 – Torque to be Applied to Grade 5 Bolts for Special Track Work

Size of Bolt (inches)	1”	1 1/4”	1 3/8”
Torque – ft - lbs	840	1675	2500

Figure SUB-PART D – 86 – Torque to be Applied to Grade 8 Bolts for Special Track Work

8.4.14 Gauge

a) Measure track gauge throughout the turnout at locations from 4 to 6 ties apart, starting 10’ ahead of the turnout. This includes the entire siding curve leading from the turnout track.

b) Maintain gauge throughout the balance of the turnout. If there is evidence of movement of the tie plates, then consider and calculate the gauge under load.

c) Gauge is measured between the heads of the rails at right angles to the rails in a plane 5/8 inch *(16 mm)* below the top of the rail. Standard gauge is 56-1/2 inches *(1,435 mm)*.

d) Gauge must be within the limits prescribed in the following table:

Class of track	The gauge must be at least *(inches and millimeters)*	But not more than *(inches and millimeters)*
Excepted track	N/A	58 1/4" *(1,480 mm)*
1	55 3/4" *(1,416 mm)*	58" *(1,473 mm)*
2	55 3/4" *(1,416 mm)*	57 ¾" *(1,467 mm)*
3	56" *(1,422 mm)*	57 ¾" *(1,467 mm)*
4 and 5	56" *(1,422 mm)*	57 ½" *(1,461 mm)*
Yard Track Category 1 & Category 2	55 3/4" *(1,416 mm)*	57 ¾" *(1,467 mm)*
Yard Track Category 3 & Category 4	55 3/4" *(1,416 mm)*	58" *(1,473 mm)*

Figure SUB-PART D – 87 – Gauge (inches and millimeters)

e) Variation in Gauge is when the gauge is less than 56” *(1,422 mm)* and the change in gauge over a distance of 20’ or less on either side of the defective location exceeds 1-1/2 inches *(38 mm)*, train speed must be reduced according to Class 1 track speed.

8.4.15 Rails

a) Examine rails for surface defects and signs of internal defects.

8.4.16 Rail Anchors

a) Check that track is properly anchored adjacent to and through turnouts, in accordance with the ONTC standard plan.

b) Adequate rail anchors must be installed to resist rail movement and / or skewing of switch points.

8.4.17 Ballast

a) Good ballast and proper drainage are necessary in order to maintain good surface and line through the turnout. Ensure there is even ballast section with tie cribs full, except in the switch point area during the winter.

b) Ballast section is in accordance with the standard plan.

c) A good drainage ditch should be present on both sides of the track.

8.4.18 Surface

a) Observe surface irregularities by sighting along the underside of the head of rail. Start well before the switch points and move ahead as necessary to observe the entire length of the turnout.

b) Pay special attention to the surface of the turnouts, particularly at the frog since the surface has a direct effect on service life.

8.4.19 Alignment

a) Observe irregularities in alignment of turnouts in tangent track by sighting along the gauge side of the rail, on the frog side of the turnout, from a position well before the switch points.

b) Search for irregularities in alignment of turnouts in curved track by observation or by stretching a 62-foot cord along the gauge side of the outer rail of the curve and measuring the offsets at the center of the cord.

c) Observe the curved closure rails for uniformity of curvature.

8.4.20 Cross Level

a) Measure cross level throughout the turnout at locations from 4 to 6 ties apart.

b) Maintain cross level to match the cross level of the track in which the turnout is located.

8.5 Turnouts and Track Crossings – Railway Crossings at Grade (Diamonds)

8.5.1 Installation of Diamonds

a) Crossings will be installed according to the plans supplied for each crossing,

b) Avoid damage to crossing frogs when handling, placing, and lifting. When necessary to use jacks on crossings, they should be applied to the frog properly, not to the arm rails,

c) Installation of guardrails in advance of the crossing will be at the discretion of the Director, Rail Infrastructure.

8.5.2 Maintenance of Diamonds

a) Subgrade under crossings must be well drained.

b) Clean crushed rock ballast will be kept well tamped so that the surface of the frog is maintained at a uniform grade with the approaches.

c) Only approved ballast shall be used,

d) If the tread portion of a casting is worn down more than 3/8" *(10 mm)* below the original contour (below level corners where diamond crossing corner pads have been ground off), operating speed over that crossing may not be more than 10 mph.

e) Crossings must be fully bolted. All bolts will be provided with spring washers or hardened steel flat washers as indicated on the manufacturer's plan and will be kept tightened to the torque shown in Section 8.4.13. - Bolts

f) Reversible crossing inserts may be transferred between corners to equalize wear,

g) Movable point crossings will be adequately lubricated with an approved lubricant,

h) Crossings will be kept free of snow, ice, and other obstructions,

i) Crossing ties will be sound and firmly tamped for the entire length of the tie on both routes of the crossing,

j) All crossings will be adequately protected at all times with spare components to ensure continued operation.

INDUSTRIAL OPERATIONS
FIRE PREVENTION AND PREPAREDNESS PLAN

April 1, 2025 – March 31, 2030

Ontario Northland

This plan has been prepared for submission to the Ministry of Natural Resources and Forestry (MNRF), Aviation, Forest Fire and Emergency Services (AFFES) in accordance with the requirement under section 21 of the Outdoor Fires Regulation.

Additionally, it is communicated to the Société de protection des forêts contre le feu (SOPFEU) for Quebec, the sole organization designated by the Minister of Public Security for wildfire protection under Section 150.1 of the Fire Safety Act in the Province of Quebec, and those along applicable line works.

Comments: Rail-RegulatoryandCompliance@ontarionorthland.ca
Website: ontarionorthland.ca
Company Representative: Paul-Andre Lajeunesse, Director – Rail Infrastructure

Updated: 2025-03-31

Table of Contents

1.0 General

Company: Ontario Northland Transportation Commission

Focus of operations: Railroad

General location of operations: North Bay to Moosonee with connections to Swastika east to Rouyn-Noranda, Porquis Jct. west to South Porcupine, and Cochrane west to Hearst and Calstock

This Plan is updated as outlined in the track standards.

Track patrols and temporary speed restrictions due to hot weather are arranged as outlined in the track standards.

Vegetation and other hazards are managed as outlined in the track standards.

Communication of this Plan, including those related to production grinding, and records related to the communications and comments received are as outlined in the track standards.

Operations by risk category:

Risk category	Operations
Very high fire risk	Operations that use heavy machinery equipped with metal parts that may come into contact with rocks or similar material in the course of normal operations and cause sparks.
High fire risk	Hot Work; welding, torch or saw cutting of metal and grinding, operations involving open flame. Thermite welding. Rail production grinding. Switch cross grinding.
Moderate fire risk	
Low fire risk	Surfacing, tie installation, under-cutting, gauging, spiking, gophering

2.0 Fire Prevention Planning

The following measures will be undertaken to ensure compliance with the *Forest Fires Prevention Act:*

- All camps, mines mills and dumps will have the area surrounding the camp, mine, mill, and dump cleared of flammable debris for a distance of at least 30 metres.
- All brush, debris, non-merchantable timber, and other flammable material resulting from land clearing will be safely disposed of through piling and burning, chipping or other fire safe method.
- Any fire started by the operation will be reported to the MNRF without undue delay.
- Staff will be instructed on the rules around smoking during the fire season and the proper disposal of smoking materials.
- All burners, chimneys, engines, incinerators, and other spark-emitting outlets will be equipped with an adequate device for arresting sparks.

The following measures will be undertaken to ensure compliance with the *Outdoor Fires Regulation*.

- No fire will be started outdoors unless the conditions will allow the fire to burn safely from start to extinguishment.
- Fires started outdoors will be monitored until extinguished.
- Brush and debris will be burned in accordance with section 2 of Ontario Regulation 207/96 or any issued fire permit.
- Fires burned in an incinerator will comply with section 3 of Ontario Regulation 2017/96.
- Grass and leaf litter will be burned in accordance with section 4 of Ontario Regulation 207/96 or any issued fire permit.
- Burning will cease when fire permits are suspended or during restricted fire zone periods.
- Equipment or machinery being operated for industrial purposes within a forest area will be equipped with a serviceable fire extinguisher rated at least 6A80BC.
- Staff operating chainsaws or brush saws will do so in accordance with section 10 of Ontario Regulation 207/96.
- Staff operating equipment or machinery in a forest area during the fire season will do so in accordance with section 11 of Ontario Regulation 207/96.
- Filled backpack pumps will be carried on or located within 30 metres of every piece of heavy equipment, and whatever else required by Table 1 of the IOP.
- Our operations do not require additional fire suppression equipment.

The following are additional measures that will be undertaken to prevent wildland fires:

Prior to the next day's operation supervisors / employees will:

- Determine the minimum fire suppression equipment needed based on the type of operation they are conducting.
- Determine the fire risk category / operational risk.
- Determine the initial forest fire fuel group that they will be working in.
- Determine "leaf on / leaf off" conditions from Fire Intensity Code Reports.
    - Adjust Fuel Group based on "leaf on / leaf off" and other modifications.
- Determine the closest weather station to the area they will be working in.
- Access the MNRF Fire intensity Code Report for the closest weather station for the work location.
    - via the internet @ https://www.ontario.ca/page/fire-intensity-codes or;
    - by telephone through the corresponding Fire Management Headquarters responsible for the weather station.
- Determine the fire intensity code for the worksite fuel group they will be working in.
- Determine the work modifications for the next day.
- Modify or mitigate operations as necessary.

Refer to the Field Guide to the Industrial Operations Protocol and Regulation.

Notes:

- If the work scheduled for the day will involve several different forest fire fuel groups, the highest hazard forest fire fuel group will be utilized.
- If the work for the day will transition across several different weather station areas. The fire intensity codes for the highest reporting weather station will be utilized.
- Additionally, the Canadian Wildland Fire Information System (CWFIS), and the Société de protection des forêts contre le feu (SOPFEU) for Quebec, reports fire danger levels. If

levels differ for the given area among these various reports, the more restrictive is to apply.

Rail Cutting, Welding or Grinding, Thermite Welding: High Fire Risk Category

- A Minimum of 1 filled backpack pump will be located within 3 metres of each individual operation.
- If the fire intensity code for the work site is A, B or C a water delivery system with a minimum of 340 litres of water will be on site.
- Vehicles are equipped with fire extinguishers.

The operations will be considered a **MODERATE FIRE RISK** if in addition to the above the following are in place at the time of the operation.

- Prior to operations the worksite will be soaked with water or a fire suppression foam mixture before the operation begins and after the operation are completed for the day and will keep the worksite in a wet condition during the operation.
- At least one worker will be assigned to monitor the worksite while the operation is being carried out to watch for sparks or other signs that a fire has been ignited and to take immediate action to halt the spread of fire if it is safe to do so.
- At least one worker will be employed to actively patrol the worksite for at least one hour after the operation is completed for the day and extinguish any fires they may find if it is safe to do so.
- Workers engaged in monitoring or patrolling will be equipped with a device capable of immediate two-way communication with the local fire management headquarters and ensure that any fires that may occur are immediately reported to the Ministry.
- Workers will put in place non-combustible screens designed and able to catch any and all material capable of producing fire ignition.

Switch Cross Grinding: High Fire Risk Category

- A minimum of 1 filled backpack pump will be located within 3 metres of each individual operation.
- If the fire intensity code for the work site is A, B or C a water delivery system with a minimum of 340 litres of water will be on site.
- Vehicles are equipped with fire extinguishers.

The operations will be considered a **MODERATE FIRE RISK** if in addition to the above the following are in place at the time of the operation.

- Prior to operations the worksite will be soaked with water or a fire suppression foam mixture before the operation begins and after the operation are completed for the day and worksite will be kept in a wet condition during the operation.
- At least one worker will be assigned to monitor the worksite while the operation is being carried out to watch for sparks or other signs that a fire has been ignited and to take immediate action to halt the spread of fire if it is safe to do so.
- At least one worker will be employed to actively patrol the worksite for at least one hour after the operation is completed for the day and extinguish any fires they may find if it is safe to do so.
- Workers engaged in monitoring or patrolling will be equipped with a device capable of immediate two-way communication with the local fire management headquarters and ensure that any fires that may occur are immediately reported to the Ministry.
- Workers will put in place non-combustible screens designed and able to catch any and all material capable of producing fire ignition.

Rail Production Grinding: High Fire Risk Category

- A minimum of 4 backpack pumps will be located on site where the production grinder is operating.
- A water delivery system with a minimum of 3,750 litres of water will be on site where the production grinder is operating.
- The production grinding supervisor will notify the administrative Fire Management Headquarters and Regional Prevention Compliance Specialist in addition to local fire services of the applicable area of its intention to conduct Rail Production Grinding a minimum of 24 hours in advance, but not more than 48 hours in advance, of the operation taking place.
    - Notification records must include;
        - The date and time of the notification,
        - The way it was provided,
        - The name of the person who was contacted and,
        - Any recommendations that were given by the fire service and, if a recommendation was not followed, the reason(s) for not following it.
    - This notification will include;
        - Contact information
        - The hours of operation of the grinding operation.
        - Suppression equipment and manpower resources on hand.
        - Ease of ignition associated with the operation and fire starts during the last operating period.
- At the end of each shift the production grinding supervisor will notify the administrative Fire Management Headquarters and the Regional Fire Prevention Specialist of their;
    - Progress during the last shift
    - Any operational concerns that they may have including ease of ignition and fire starts during the last operating period.
    - Where they expect to be grinding within the next operational period.

Mechanical Brushing: Very High Fire Risk Category

- A minimum of 1 backpack pump will be located within 30 metres of each machine.

Other:

- Local assigned high rails are equipped with a minimum of backpack pumps, foaming agent, pails, shovels, and a fire extinguisher.

In addition to the suppression equipment requirements above;

- A fuel performance catalyst (FPC) is added to the locomotives fuel year-round for the purpose of reducing emissions.
- Ongoing locomotive exhaust screen inspections to be completed prior to and during the fire season each year.

Emergencies Due to Exigent circumstances:

As per section 23(2) of Ontario Regulation 207/96 if operations are immediately necessary to ensure public safety or due to exigent circumstances the company must complete industrial operations outside the provisions of “Part II, Industrial Operations” the company will;

- Immediately notify the appropriate Fire Management Headquarters of the location and type of work being completed as well as the suppression resources on hand.
- Ensure that a “pumping unit” with a minimum of 800 feet of hose is on site.
    - The amount of hose on site must be sufficient to reach and cover the work area.
- Identify a water source of sufficient quantity or ensure that there is enough water on site to meet the requirements of the work being completed.

- Ensure that a minimum 4-person, trained crew is available on-site during operations to wet the work site down or take immediate action should a fire start.
- Ensure that at least one individual with two-way communications is available to monitor operations for fire and immediately report the fire without delay.

Note: Depending on the circumstances a Ministry of Natural Resources and Forestry Fire Officer may request that additional resources or actions be taken to ensure that all wildland fire concerns are addressed.

Definitions of Operational Modifications:

P = Prevention (Normal Operations)
Wildfire prevention is a part of normal operations and at a minimum, the requirements identified in the *Forest Fires Prevention Act* and Outdoor Fires Regulation must be followed. These should be identified in the operation's fire plan if one is required.

SS = Short Shift
Operations are **not** permitted between 1200 and 1900 hrs local daylight savings time. Prevention measures still apply and a dedicated patrol* of the area must be carried out for one hour after operations shut down. Workers conducting the dedicated patrol must immediately report fires that are detected.

RS = Restricted Shift
Operations are **not** permitted between 0800 and 2200 hrs local daylight savings time. Prevention measures still apply and a dedicated patrol* of the area must be carried out for one hour after operations shut down. Workers conducting the dedicated patrol must immediately report fires that are detected. Water sources close to operations should be identified prior to commencing any operations.

SD = Shutdown
Operations are **not** permitted starting at 0600 hrs local daylight savings time on the first day of shutdown. Operations will remain suspended until conditions change, and Prevention, Short Shift or Restricted Shift is indicated. Prevention measures still apply and a dedicated patrol* of the area must be carried out for one hour after operations cease. Workers conducting the dedicated patrol must immediately report fires that are detected. Once this initial patrol is complete, lower risk operations working in the vicinity can offer dedicated fire patrols during the shutdown period.

*Personnel assigned to patrol a worksite are expected to move as much as required to continually assess the entire worksite for fires. If a fire is discovered, they are required to first notify MNRF of the fire and its location and then, if it is safe to do so, try to extinguish the fire.

For the purposes of this Plan, Railway Subdivisions will be aligned with the following MNRF Fire Weather Stations:

On an annual basis the weather stations and subdivision alignment will be reviewed with MNRF to ensure they are correct.

Subdivision	Mileage Range	Station	Station Name	Fire Management Headquarters
Temagami Sub	0 - 35	TRM	Trout Mills	North Bay
	35 - 78	MTN	Marten River	North Bay
	78 - 134	LOO	Loon Lake	North Bay
	134 – end of sub	KLK	Kirkland Lake	Timmins
Kirkland Lake Sub	0 - 33	KLK	Kirkland Lake	Timmins
	33 – Noranda	See note below		
Ramore Sub	0 - 51	KLK	Kirkland Lake	Timmins
	51 - 79	ABL	Abitibi Lake	Timmins
	79 – end of sub	TIM	Timmins	Timmins
Iroquois Falls Sub	0 - 2	TIM	Timmins	Timmins
	2 – end of sub	COC	Cochrane	Cochrane
Devonshire Sub	0 – 2	TIM	Timmins	Timmins
	2 – end of sub	COC	Cochrane	Cochrane
Kapuskasing Sub	0 - 25	COC	Cochrane	Cochrane
	25 - 47	OKE	Oke	Cochrane
	47 - 101	KAP	Kapuskasing	Cochrane
	101 – end of sub	HEA	Hearst	Cochrane
Kapuskasing Sub - AGR	0 - 11	KAP	Kapuskasing	Cochrane
	11 – end of sub	RUF	Rufus Lake	Cochrane
Island Falls Sub	0 - 22	COC	Cochrane	Cochrane
	22 – 76	ILF	Island Falls	Cochrane
	76 – 116	SMO	Smokey Falls	Cochrane
	116 - 187	STG	Stringer Lake	Cochrane

Note: If the fire danger level is not available on the SOPFEU website and/or the Canadian Wildland Fire Information System, prevention measures suitable for at least a moderate fire danger level is to be used.

3.0 Fire Preparedness

Our operations are to be considered trained and capable.

80% of our field staff are trained and proficient to the pertinent fire suppression level.

Training is delivered by in house trainers. Includes, the protocol to determine fire risk for the location's conditions, type of work occurring, and fire suppression equipment and / or adjustments to shifts that may be required. Additionally, fire prevention and suppression techniques, such as hazards (fuels, weather, environmental conditions, health, and safety, etc.), water application, fire break construction and maintenance, fire pump inspection, operation and troubleshooting along with proper hose handling (e.g., SP105/106 for rail operations).

Any fire(s) detected are to be communicated as outlined in the track standards and, if applicable, per *Canadian Rail Operating Rule 125 – Emergency Communication Procedures*. Then, reasonably actioned with fire suppression equipment available (e.g., fire breaks, shovels, and backpack pumps / water pumps on fires of flame lengths < 1.5 m). The Rail Traffic Control office would communicate to the fire service applicable as required.

In addition to the backpack bumps and equipment caches identified in Section 2.0 the following equipment is available for fire suppression:

ONTC LOCATION OF FIRE FIGHTING EQUIPMENT – 2025

LOCATIONS	*Shovels*	*Pails*	*Crew Cab Hi-Rail*	*Backpack Pumps*	*Foaming Agents*	*200 Gallons of Water*	*Spark Shields*	*Boom Truck Hi-Rail (with 200 gallons of water)*	*100' Hose*	*Honda Pump*	*Wajax Pump (with 800' Hose)*
North Bay North Section	X	X	X	X	X		X				
Temagami Section	X	X	X	X	X		X		X		
Temagami MP 72											X
Rouyn Section	X	X	X	X	X		X				
Rouyn MP 60											X
Englehart Section	X	X	X	X	X	Boom Truck	X	X	Boom Truck	Boom Truck	
Englehart MP 0											X
Matheson Section	X	X	X	X	X		X				
Porquis Section	X	X	X	X	X		X				
Cochrane Section	X	X	X	X	X	Boom Truck	X	X	Boom Truck	Boom Truck	
Cochrane MP 0											X
Otter Rapids Section	X	X	X	X	X		X				
Otter Rapids MP 93.5											X
Moose River Section	X	X	X	X	X		X				
Moosonee Section	X	X	X	X	X		X				
Kapuskasing Section	X	X	X	X	X		X				
Hearst Section	X	X	X	X	X		X				
2- Welding Trucks	X	X	X	X	X		X				
Gang #94	X	X		X	X		X		X	X	

This equipment will be checked for serviceability on a yearly basis and maintained in serviceable condition throughout the fire season. Records of any maintenance and required annual inspections must be maintained

The wildland fire hazard will be monitored daily by accessing forecasted weather conditions, the Canadian Wildland Fire Information System (CWFIS), Department of Natural Resources (NRCAN), fire indices, and the fire intensity codes. Intensity codes representing the operational area will be determined and modification/mitigation will be made as required by the Outdoor Fires Regulation 207/96.

4.0 Communications

The process for field operations to communicate with MNRF staff will be through the RTC's office by radio or telephone. The RTC will contact MNRF. The process for MNRF to contact field operations will be by calling the RTC's office and they will relay the message by radio.

The company will ensure that all employees working in field operations will be aware of the standard fire prevention measures as well as the fire hazard and specific fire prevention processes that may entail. The company will do this by emailing and/or faxing the information to the locations in the field before the end of the previous business day.

Any fire(s) identified by company personnel are to be communicated as outlined in the track standards and, if applicable, per *Canadian Rail Operating Rule 125 – Emergency Communication Procedures*. Then, reasonably actioned with fire suppression equipment available (e.g., fire breaks, shovels, and backpack pumps / water pumps on fires of flame lengths < 1.5 m). The Rail Traffic Control office would communicate to the fire service applicable as required.

4.1 Positive Protection

When a fire occurs on a railway line works, the Ministry of Natural Resources and Forestry will request positive protection form the railway following the MNRF Process for Securing Positive Protection along Railway Rights-of-Way which can be found in Appendix I.

To secure positive protection along the right-of-way, the Ministry of Natural Resources and Forestry Sector Response Officer must contact the RTC office by telephone 705-544-2292 ext. 141.

4.2 Notification and Requests for Information

When a fire occurs on a railway line works the Ministry of Natural Resources and Forestry will notify the railway of the occurrence using the "**Notification and Request for Information for a Fire on Railway Property"** form found in Appendix II.

5.0 Annual Fire Prevention and Preparedness Plan Update

5.1 Annual Operations

This update applies to the 2025 fire season for **Ontario Northland**

The following shows the operations being undertaken by area this season.

TASK AND LOCATION	TIMEFRAME	Weather Station Code(s)
Temagami Subdivision		
• Install 8.87 miles of new CWR and 80' bolted rail at the following locations o Miles 11.24 – 11.8 o Miles 23 – 28.5 o Miles 78.11 – 78.87 o Miles 96 – 97 o Miles 110.6 – 111.2 o Miles 70.66 – 70.91 o Miles 71.62 – 71.82	April - May	TRM MTN LOO
• Turnout Replacement at Tomiko North and South	September - October	TRM
• Install approximately 12,000 ties between Miles 69 – 89	August- September	MTN LOO
• Complete required tie change outs in switches / sidings as required		
• Anchoring various locations		
• Joint elimination / welding program – Miles 112 to 138.5	April - May	LOO KLK
• Gauging as required		
• Distribute rock from Rabbit Creek Pit to various locations for surfacing		
• Scrap tie disposal – various locations	April - October	
• Rail grinding – various locations	November - December	

TASK AND LOCATION	TIMEFRAME	Weather Station Code(s)
Ramore Subdivision		
• Install 9.06 miles of new CWR and 80’ bolted rail at the following locations o Miles 54 – 57 o Miles 80.5 – 85 o Miles 88 – 89.3 o Miles 37.26 – 37.52 o Relay Rail in Porquis Yard and Miles 104.32 – 109.7	May – July August (Relay)	KLK ABL TIM
• Install new turnouts at the following locations o Ramore, North and South o Matheson, North o Porquis Yard, 2 turnouts o Hallnor, 2 turnouts o Porcupine, North and South o Sergeant Propane	September - October	ABL TIM
• Install approximately 8,400 ties between Miles 54 - 68	July - August	ABL
• Anchoring various locations		
• Joint elimination / welding program – various locations	May – December	KLK ABL TIM
• Gauging as required		
• Distribute rock from Jardine Pit to various locations for surfacing		
• Scrap tie disposal – various locations	April - October	
• Rail grinding – various locations	November - December	

TASK AND LOCATION	TIMEFRAME	Weather Station Code(s)
Kirkland Lake Subdivision		
• Install 0.46 miles of new 80’ bolted rail at the following locations o Miles 4.91 - .09 o Miles 5.14 – 5.29 o Miles 6.29 – 6.42	July	KLK
• Anchoring various locations		
• Crop and Pull to remove battered joints – various locations		
• Gauging as required		
• Distribute rock from Jardine Pit to various locations for surfacing		
Devonshire Subdivision		
• Install 3.3 miles of new CWR at the following locations o Miles 0.8 – 4.1	July	TIM COC
• Distribute rock from Potter Pit to various locations for surfacing		
Kapuskasing Subdivision		
• Install approximately 15,000 ties between Mile 56 – 84 and Kapuskasing Yard	May - June	RUF
• Complete required tie change outs in switches / sidings as required		
• Joint maintenance at various locations		
• Anchoring various locations		
• Crop and pull to remove battered joints – various locations		
• Gauging as required		
• Distribute rock from Val Rita Pit to various locations for surfacing		

TASK AND LOCATION	TIMEFRAME	Weather Station Code(s)
Island Falls Subdivision		
• Install 3 miles of relay rail at the following locations ○ Miles 139.1 – 142.1	July - August	STG
• Install approximately 12,000 ties between Miles 126 - 150	June - July	STG
• Complete required tie change outs in switches / sidings as required		
• Anchoring various locations		
• Crop and pull to remove battered joints – various locations		
• Gauging as required		
• Distribute rock from Coral Pit to various locations for surfacing		

5.2 Wildland Fire Reporting

Ontario Northland is responsible for the suppression of wildland fires originating from company operations if it is safe to do so. All fires will be reported immediately to the local fire service using the appropriate MNRF Wildland Fire Reporting number.

Northwest Region – 310-Fire (3473) or (807) 937-5261 (Fire Reporting only)

Northeast Region – 310-Fire (3473) or (705) 564-0289 (Fire Reporting only)

Southern Region – local municipal fire department (911) or MNRF at (705) 564-0289

Quebec Region (border to Noranda) - 1-800-463-FEUX (3389) or 9-1-1

5.3 Company and MNRF Contacts

*Quebec – SOPFEU 1-800-463-FEUX (3389) or 9-1-1

Provincial Fire Contact	
Acting Prevention & Prescribed Burning Coordinator	Karla Krupica
	Address: 300 Water Street, Peterborough ON, K9J3C7
	Phone Number: Mobile: 437-243-8096
Fire Prevention & Education Program Advisor	Name: Hillary Winstanley
	Address: 300 Water Street, Peterborough ON, K9J3C7
	Phone Number: 705-313-0779
Prevention and Compliance Team Lead	Name: Lori Skitt
	Address: PO Box 850, 95 Ghost Lake Rd. Dryden, ON P8N 2Z5
	Phone Number: 807 937-7410, Mobile: 807-323-1279
NER Regional Fire Contact	
NER Fire Prevention & Compliance Specialist	Name: Jeremy Verdiel
	Address: 6150 Skyline Drive, Garson, ON, P3L 1W3
	Phone Number: 705-564-5389, Mobile: 705-561-6348
NER Fire Intelligence Specialist	Name: Lyle Lacarte/Miguel Berthiaume
	Address: 6150 Skyline Drive, Garson, ON, P3L 1W3
	Phone Number: 705-564-6011/6025
	Intel Desk during fire season: 705-564-6075
NER Duty Officer	Dan Leonard/Mike Jackson
	Address: 6150 Skyline Drive, Garson, ON, P3L 1W3
	Phone Number: 705-564-6049/6012
	Duty Desk During Fire Season: 705-564-6076
NWR Regional Fire Contact	
NWR Fire Prevention & Compliance Specialist	Paul Chandler
	Address: PO Box 850, 95 Ghost Lake Rd. Dryden, ON P8N 2Z5
	Phone Number: 807 937-7257, Mobile: 807-220-1878
NWR Fire Intelligence Specialist	Barry Graham/Kendra Saville
	Address: PO Box 850, Ghost Lake Rd. Dryden, ON P8N 2Z5
	Phone Number: 807 937-7314/7407
	Intel Desk during fire season: 807-937-7219
NWR Duty Officer	Rick Payne/Chris Sakamoto
	Address: PO Box 850, Ghost Lake Rd. Dryden, ON P8N 2Z5
	Phone Number: 807 937-7212/7239
	Duty Desk During Fire Season: 807-937-7240

Subdivision and Mileage	MNR Contact	MNR Contact
	Fire Management Supervisor	**Sector Response Officer**
Temagami Sub	Name: James Zacher	Location: North Bay
Mi 0.0 - 118.3	Address: 40 Voodoo Cresent	SRO Phone Number: 705-475-5623
	North Bay, ON P1C 0B7	
	Office: 705-475-5536	Fire Intensity Codes:
		Phone Number: 705-475-5609
		Toll Free: 866-619-5079
Temagami Sub	Name: Joel Legasy	Location: Timmins
Mi 118.3 - 138.2	Address: Ontario Government Complex,	SRO Phone Number: 705-235-1306
	Hwy. 101 East, P.O. Bag 3090	
Ramore Sub	South Porcupine, ON P0N 1H0	Fire Intensity Codes:
Mi 0.0 - 77.0	Office: 705-235-1368	Phone Number: 705-235-1374
Ramore Sub		
Mi 94.0 - 113.0		
Kirkland Lake Sub		
Mi 0.0 - 33.5		
*Mi 33.5 – 60.04 Quebec	SOPFEU 1-800-463-FEUX (3389) or 9-1-1	
Ramore Sub	Name: Richard Perin	Location: Cochrane
Mi 77.0 - 94.0	Address: 3-2 Hwy 11 south,	SRO Phone Number: 705-272-7135
	Cochrane, ON P0L 1C0	
Iroquois Fall Sub	Office: 705-272-7141	
Mi 0.0. - 6.0		Fire Intensity Codes:
		Cochrane - Phone Number: 705-272-7148
Devonshire Sub		Hearst - Phone Number: 705-362-4346
Mi 0.0. - 27.0		
Kapuskasing Sub		
Mi 0.0. - 128.0		
AGR Mi 0.0 - 17		
Island Falls Sub		
0.0 - 187.0		

The following lists the **Ontario Northland** contacts:

Name	Position	Location	Phone number
*Railway Traffic Controller		Englehart	1-800-558-4129 (24 hours per day) rtc@ontarionorthland.ca and mrtc@ontarionorthland.ca
Paul-Andre Lajeunesse	Director Infrastructure	Englehart	Office (705) 472-4500 ext. 124 Cell (705) 499-7386 Fax (705) 475-5033 paul-andre.lajeunesse@ontarionorthland.ca
Jeremy Girard	Superintendent Maintenance of Way	Cochrane	Office (705) 472-4500 ext. 616 Cell (705) 347-0058 Fax (705) 272-4802 jeremy.girard@ontarionorthland.ca
Chad Martin	District #1 Manager	Temagami Sub Ramore Sub Kirkland Lake Sub Iroquois Falls Sub Devonshire Sub	Office (705) 544-2292 ext. 125 Cell (705) 545-0725 Fax (705) 544-2297 chad.martin@ontarionorthland.ca
Brad White	Track Patrol	North Bay Yard and Customer Tracks Mile 0.0 to Mile 25.1 Temagami Sub	Cell (705) 544-3125 Fax (705) 472-1890 brad.white@ontarionorthland.ca
Vince Gagne	Track Patrol	Mile 25.1 to Mile 138.5 Temagami Sub	Cell (705) 545-0927 vincent.gagne@ontarionorthland.ca
Calvin Mills	Track Patrol	Englehart Yard Mile 0.0 to Mile 67.37 Ramore Sub	Cell (705) 545-0680 calvin.mills@ontarionorthland.ca
Tyler Chartrand	Track Patrol	Mile 0.0 to Mile 60.04 Kirkland Lake Sub Rouyn-Noranda Yard	Cell (705) 303-7146 tyler.chartrand@ontarionorthland.ca
Shawn Giroux	Track Patrol	Porquis Yard and Kidd Yard Mile 67.37 to Mile 109.7 Ramore Sub Mile 0.0 to Mile 27.18 Devonshire Sub Mile 0.0 to Mile 6.40 Iroquois Falls Sub	Cell (249) 313-0189 Fax (705) 272-4802 shawn.giroux@ontarionorthland.ca
Noble Stow-Gore	Relieving Track Patrol	District 1	Cell (705) 545-1308 noble.stow-gore@ontarionorthland.ca
Dennis Gill (Interim) Dave Lallier	District #2 Manager	Kapuskasing Sub Agrium Sub Pagwa Sub Island Falls Sub	Office (705) 472-4500 ext. 632 Cell (705) 477-1104 Fax (705) 272-4802 dennis.gill@ontarionorthland.ca dave.lallier@ontarionorthland.ca
Paul Loder	Track Patrol	Cochrane Yard Mile 0.32 to Mile 68.0 - Kapuskasing Sub Mile 27.18 to Mile 28.05 - Devonshire Sub	Cell (705) 498-5291 Fax (705) 272-4802 paul.loder@ontarionorthland.ca
Miguel Deschamps	Track Patrol	Kapuskasing Yard and Hearst Yard Mile 68.0 to Mile 129.1 Kapuskasing Sub Agrium Spur Mile 0.0 to Mile 22.5 Pagwa	Cell (705) 272-9445 Fax (705) 272-4802 miguel.deschamps@ontarionorthland.ca
Richard Ferguson	Track Patrol	Mile 0.0 to Mile 93.5 Island Falls Sub Otter Rapids - all tracks	Cell (705) 367-6362 Fax (705) 272-4802 richard.ferguson@ontarionorthland.ca
William Solomon	Track Patrol	Moosonee Yard Mile 93.5 to Mile 187.88 Island Falls Sub	Cell (705) 336-8412 Fax (705) 336-2089 william.solomon@ontarionorthland.ca
Anthony Tverdal	Relieving Track Patrol	District 2	Cell (249) 313-1012 anthony.tverdal@ontarionorthland.ca

* Designates the main emergency contact in the company for AFFES.

5.4 Contacts for Notification and Request for Information for a Fire on Railway Property

Ontario Northland requests that the "Notification and Request for Information for a Fire on Railway Property" forms be emailed to the following individuals:

Name	Phone Number	E-mail Address
Rail Traffic Controller	705-544-2292 ext.141	rtc@ontarionorthland.ca
Jeremy Girard	705-347-0058	jeremy.girard@ontarionorthland.ca
Wendy Middaugh	705-544-2292 ext.134	wendy.middaugh@ontarionorthland.ca and mrtc@ontarionorthland.ca

Information requested by the Ministry of Natural Resources and Forestry will be provided by Jeremy Girard, Superintendent Maintenance of Way to the Ministry of Natural Resources and Forestry contact identified on the form.

6.0 Fibre Optic Cable Locations

TEMAGAMI SUBDIVISION

Buried Beside Track		
From Mile	To Mile	Track Side
3.06	3.37	West
3.37	46.05	East
46.05	69.9	West
69.9	110.5	East
110.5	112.43	West
112.43	112.65	Both
113.41	113.5	Both
113.5	138.23	Both

RAMORE SUBDIVISION

Buried Beside Track		
From Mile	To Mile	Track Side
0.6 (No 5 track North Yard)	1.88	Both
1.88	25.9	Both
26.33	112.36	Both
112.36	116.0 (end of rail)	Both

KIRKLAND LAKE SUBDIVISION

Buried Beside Track			**Aerial**	
From Mile	To Mile	Track Side	From Mile	To Mile
North Leg of Wye Switch Swastika	5.19	West		
0.3	5.42	East	5.42	6.31
6.31	10.8	East	10.8	10.9
10.9	35.55	East	35.55	36.05
36.05	56.3	East	56.3	56.35
56.35	57.75	East		

IROQUOIS FALLS SUBDIVISION

Buried Beside Track		
From Mile	To Mile	Track Side
0.08	5.65	West

DEVONSHIRE SUBDIVISION

Buried Beside Track		
From Mile	To Mile	Track Side
Tool house Porquis	0.78	1 on West (between mainline and No1 Track
End Ramp Porquis	0.78	2 on East (beside Devonshire Sub siding and Town siding)
0.78	5.05	1 on West
0.78	5.05	1 on East
5.05	28.2	1 only West
Note: At Cochrane follows No 5 Track, Icehouse Track and Shed Track and crosses under 4 tracks north of the station through a duct.		

ISLAND FALLS SUBDIVISION

Buried Beside Track		
From Mile	To Mile	Track Side
0.30	0.31	East
0.64	31.5	East
31.5	93.11	West
93.11	94.5	East
94.5	124.0	West
124.0	186.04	East

KAPUSKASING SUBDIVISION

Buried Beside Track		
From Mile	To Mile	Track Side
0.4	27.68	East
27.68	67.98	West
67.98	69.46	East
70.5	126.59	West
126.59	128.3	East

APPENDICES

Appendix I

Notification and Request for Information for Fire on Railway Property Form

1. Fire Information

MNRF District: MNRF Fire Number:

Railway Company: Subdivision: Mileage:

Date and Time Fire Reported to MNRF:

Detected by:

2. Notification

This is to advise you that the Ministry of Natural Resources and Forestry is taking action to suppress a fire which occurred along the railway right-of-way. The information is as follows:

Fire Burning on: North ☐ South ☐ West ☐ East ☐ Side of track

Present Fire Condition: Not Under Control Present Fire Size: ha

Out Date (if known): Final Size (if known): ha

MNRF Resources Used: Yes ☐ No ☐

Personnel:

Equipment:

Aircraft:

Other:

Railway Resources Used: Yes ☐ No ☐

Personnel:

Equipment:

Other:

General Comments/ Recommendations:

3. Information Request

To aid in our Investigation of a fire which occurred along the railway right-of-way, please provide the following information to the MNRF Official identified below:

1) Identification number of the last 3 trains that passed the above mileage before the fire was reported.
2) Direction of travel of each train
3) Identification of the locomotive(s) operating under power in each train

Train ID Number	Time	Locomotive(s) under power	Dir. of travel	Video (saved/retained)
_____	_____	_____	_____	☐Y ☐N
_____	_____	_____	_____	☐Y ☐N
_____	_____	_____	_____	☐Y ☐N

4) Identification number of the first train to pass the above mileage ***after*** the fire was reported.

Train ID Number	Time	Locomotive(s) under power	Dir. of travel	Video (saved/retained)
_____	_____	_____	_____	☐Y ☐N

Name of Railway Company Official:
Title:
Email:
P.O. Box or Street Address:
City: , ON
Postal Code:
Telephone Number:

Completed information request should be directed to:

Name of MNRF Official:
Title:
Email:
P.O. Box or Street Address:
City: , ON
Postal Code:
Telephone Number:

Date and Time:

cc. hillary.winstanley@ontario.ca, jeremy.verdiel@ontario.ca and paul.chandler@ontario.ca

Appendix II

Ministry of Natural Resources and Forestry (MNRF) Process for Securing Positive Protection along Railway Rights of Way

In order to provide direction to MNRF staff and ensure a consistent approach to engaging in fire suppression activities along railway rights of ways, the following process will be followed by MNRF staff.

Upon the report and confirmation of a fire along a railway right of way the MNRF Sector Response Officer (SRO) for the Sector responsible for the fire will;

1) Confirm the location of the fire with the MNRF Incident Commander.
2) Contact the railway (RTC / Railway contact) as per the direction provided in the Railway Fire Prevention and Preparedness Plans.
3) Advise of a fire on the right of way, location and condition.
4) Verbally request Positive Protection.
5) Request that (RTC / Railway contact) contact the SRO directly when a TOP / OCS Authority has been issued and be provided with the following information:
    a. Permit / Authority Reference #;
    b. Foreman (Permit / Authority Holder) Name;
    c. Foreman Contact Phone #;
    d. Location where positive protection has been put in place;
6) The SRO will also request that the Foreman (Permit / Authority holder) contact him / her directly to confirm that;
    a. Positive Protection is in place
    b. Positive protection is in the correct location.
7) Once Positive Protection has been confirmed with the Foreman (Permit / Authority holder) the Sector Response Officer will;
    a. Contact the Incident Commander (MNRF) onsite.
    b. Advise that positive protection is in place and location.
    c. Provide the Incident Commander the contact information for the Foreman (Permit /Authority holder).
8) The SRO will document the request on the MNRF “Positive Protection Request form”.
9) MNRF (Sector Response Officer / Incident Commander) will notify the Foreman (Permit / Authority holder) when positive protection is no longer required.

Note:

1. Until such time that the Sector Response Officer (MNRF) has confirmation from the Foreman (Permit / Authority holder) that positive protection is in place, MNRF Fire Personnel will remain a distance of 15 metres (50 ft.) back from the edge of the ties along the rail line. This includes the landing of a helicopter on railway tracks or rights of ways.
2. During this time water bombing / bucketing operations may take place on the ROW, if deemed necessary and safe to do so by the Air Attack Officer or Pilot in Command as per MNRF guidelines.
3. MNRF Staff will abide by standard railway safety procedures and maintain situational awareness even when positive protection is in place.
4. Once the Foreman (authority / permit holder) is on site and has been in contact with the Incident Commander and it is determined safe to do so, trains may be able to access the working area under the protection of the Foreman (authority / permit) holder.

Appendix III

Railway Positive Protection Request Form

Railway Company Name: _____ Fire #: _____

Railway Contact # (RTC – CP Police): _____

Positive Protection Request (Time / Date): _____

Location of Positive Protection Request (Sub / Mile):_____

TOP / OCS (Permit / Authority) reference #:_____

Foreman Name: _____Contact #: _____

Location of TOP / OCS in place: From Mile: _____ to Mile: _____

Subdivision: _____

Confirmed with Foreman TOP/OCS in place & location (Time / Date): _____

Incident Commander (IC) Name: _____

Confirmation with I.C. that Positive Protection in place (Time / Date) _____

Request for Positive Protection removal by (MNRF) name: _____

Cancellation (Date /Time / Foreman): _____

Personnel must remain clear of the tracks a distance of 15 meter (50 feet) from the edge of the railway ties until the Sector Response Officer receives confirmation from the Foreman that Positive Protection (TOP / OCS) has been issued and in place. This includes the landing of a helicopter on railway tracks or rights of way.

Steps for SROs to follow:

1) Verbally notify the designated railway company contact as per fire plan (RTC / CP Police) of the location, track mileage, and condition of the fire occurrence and request Positive Protection.
2) Verbally request to be contacted by (RTC / CP Police) when TOP / OCS Authority has been issued to get Authority #, Foreman name and contact info and where positive protection will be in place.
3) Verbally request that the Forman issued the (Permit / Authority) contact you directly.
4) **"SRO's *must* communicate directly with the Foreman who holds the permit / authority and confirm that Positive Protection is in place and confirm location."**
5) Once confirmed by the foreman, contact the Incident Commander, advise that positive protection is in place and where, and provide IC with Foreman contact information.
6) Only after Positive Protection is confirmed with the Foreman can crews work closer to the tracks. (Standard rail safety measures must be adhered to by all personnel.)

- Positive Protection Request Form(s) should be completed as required and appended to the Notification of Fires on Railway Rights of Way when submitted to railway.

- When no longer required a request to the foreman should be made to remove positive protection and documented on request form.

Terms and Definitions

Positive Protection: A term used by the railway industry to identify that protection is in place for track work or a track condition. Positive protection is provided by a Foreman who has been issued a TOP/OCS Clearance for a specific area of the track and who, once issued a TOP / OSC has complete control of that section of track.

Track Occupancy Permit (TOP) / Occupancy Control System Clearance (OCS) is issued by the RTC to an employee of the railway qualified under the Canadian Rail Operation Rules to hold such authority. The authority ensures the limits and tracks identified in the permit are positively protected from allowing train movements to enter the affected limits. In certain circumstances train movements may be allowed into the affected limits ONLY under the direction of the foreman named in the permit. TOP / OSC authority numbers will end with the initial of the RTC who issued the authority.

Occupancy Control System (OCS) is a method of control used to move train traffic over a territory. OCS territory uses clearances (permission) issued by the RTC to trains and foreman (usually between whole miles) to allow occupancy of a section of track. Unlike CTC which uses signals.

Centralized Traffic Control System (CTC) is a method of control used to move train traffic by the use signal indication and routing. CTC uses signal blocking by ways of a TOP issued by the RTC to protect track work and track machines. Signal indication is the authority required by train into a control block. TOP's are issued mostly between controlled block signals.

Permit/Authority Holder (Foreman) – is an individual who works for a railway company and who has/given authority over a specific section or area of a rail line through the issuance of a TOP or OCS. The occupancy holder should be onsite and is a supervisor or foreman.

RTC: Rail Traffic Controller.

Controlled Block Signal is a signal capable of displaying stop indication.

Blue Signals/ Flags Procedure

Procedure No. HSP-007 **Date Issued: February 7, 2014**	**Revision:** **Date:**
Approved By: **H&S Mgmt Co-chair**	**Approved By:** **CMO/ VP**

PURPOSE AND SCOPE

Signals are used to ID equipment undergoing repair or maintenance on live tracks. Blue signals are required when working between, underneath and on top of equipment outside of shops, but can be used anywhere when safety may be in doubt. These blue signals are used by shop employees, contractors and customers.

RESPONSIBILITIES

The Supervisor is responsible for ensuring this procedure is adhered to. Employees are to follow the instructions included in this safe operating procedure as well as any additional instructions given by his or her supervisor.

PROCEDURE

Transport Canada Operating Rules (RAC)

- Recommended Blue Flag Specifications:
  a. Blue flags shall be blue in color and clearly distinguishable from both sides.
  b. The dimension of the blue flag should be a minimum of 14 inches by 10 inches. Blue flag should be at a minimum height of 18 inches from the top of the rail to the bottom of the flag.
  c. The blue flag must be maintained in good condition
- Supervisor may appoint a competent person to set up and remove blue signal protection.
- Blue signal to be placed between the switch and first car ensuring it is far away from the switch as to not interfere with said switch. When blue flagging equipment, where possible place flag a minimum of one car length from equipment and refer to C.R.O.R. Rule 26 on placing equipment in front of a blue signal
- When working in yards or high traffic areas, employees should be in communication with persons responsible for switching and carry a radio to monitor traffic.
- Repair work is any work performed in the red zone between, underneath, and on top.
- Adjoining track may be blue-flagged also if there is a hazard while performing duties and also if the employee will foul said track.

REFERENCES

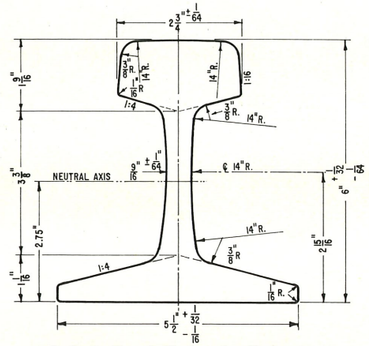
RAC - Best Practice Circular No. 12- Blue Flag April 1, 2010
Rule 40 - Collective Agreement between ONTC and UNIFOR

REVISION RECORD

Description of Change	*Date*
Original Issue	2/7/14

APPENDIX K - DRAWINGS / TECHNICAL SPECIFICATIONS

Description	Date
TS - 1111	December 1, 1972
SPC 14 - Rail Slotting	April 1, 2000
S-124 - Standard Rock Ballast Section	July 4, 1936
B-1412 - ONR 22 Foot Number 11 Standard Turnout	October 21, 2011

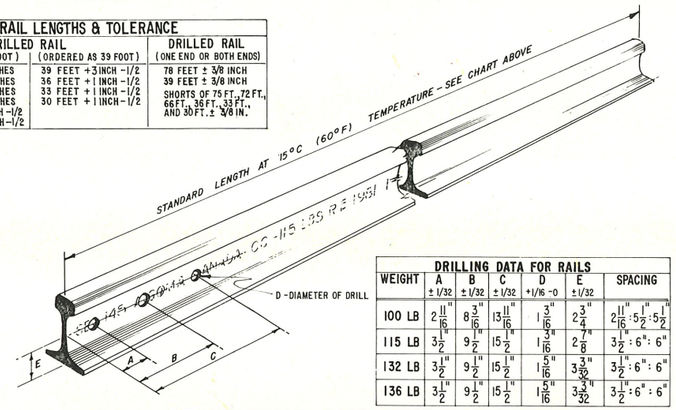


MOMENT OF INERTIA 48.9
SECTION MODULUS HEAD 15.0
SECTION MODULUS BASE 17.8
CALCULATED WEIGHT LB/YD. 100.4

AREA: HEAD ..... 3.64 SQ. IN.
WEB ..... 2.29 SQ. IN.
BASE ..... 3.91 SQ. IN.
TOTAL ..... 9.84 SQ. IN.

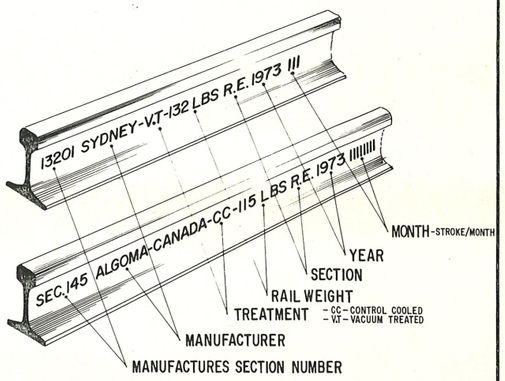
100 LB. ARA-A RAIL

RAIL LENGTHS & TOLERANCE		
UNDRILLED RAIL (ORDERED AS 78 FOOT)	UNDRILLED RAIL (ORDERED AS 39 FOOT)	DRILLED RAIL (ONE END OR BOTH ENDS)
78 FEET ± 6 INCHES	39 FEET +3 INCH -1/2	78 FEET ± 3/8 INCH
75 FEET ± 3 INCHES	36 FEET + 1 INCH -1/2	39 FEET ± 3/8 INCH
72 FEET ± 3 INCHES	33 FEET + 1 INCH -1/2	SHORTS OF 75 FT., 72 FT., 66 FT., 36 FT., 33 FT., AND 30 FT. ± 3/8 IN.
66 FEET ± 3 INCHES	30 FEET + 1 INCH -1/2	
39 FEET + 1 INCH -1/2		
33 FEET + 1 INCH -1/2		

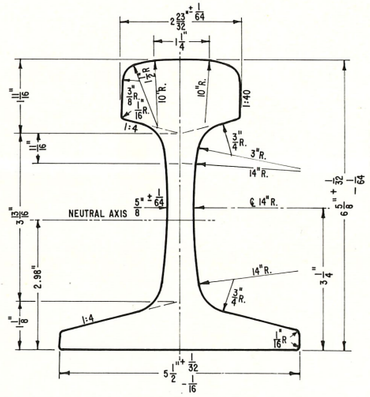


DRILLING DATA FOR RAILS						
WEIGHT	A ± 1/32	B ± 1/32	C ± 1/32	D +1/16 -0	E ± 1/32	SPACING
100 LB	2 11/16"	8 3/16"	13 11/16"	1 3/16"	2 3/4"	2 11/16" : 5 1/2" : 5 1/2"
115 LB	3 1/2"	9 1/2"	15 1/2"	1 3/16"	2 7/8"	3 1/2" : 6" : 6"
132 LB	3 1/2"	9 1/2"	15 1/2"	1 5/16"	3 3/32"	3 1/2" : 6" : 6"
136 LB	3 1/2"	9 1/2"	15 1/2"	1 5/16"	3 3/32"	3 1/2" : 6" : 6"

STANDARD DRILLING & LENGTHS



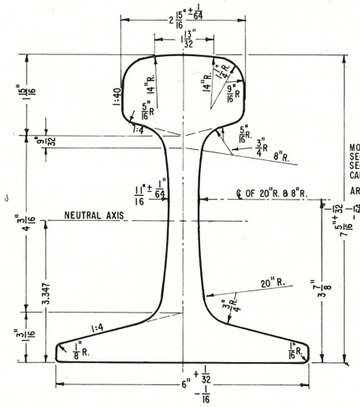
THE ABOVE "RAIL BRAND" FIGURES ARE ROLLED INTO THE WEB OF THE RAIL TO A MINIMUM HEIGHT OF ONE INCH AND THE SEQUENCE SHOWN. ON THE 39 FOOT AND SHORTER RAILS BRAND TO APPEAR A MINIMUM OF THREE TIMES, ON 66 TO 78 FOOT LENGTH RAILS BRAND TO APPEAR A MINIMUM OF FIVE TIMES.



MOMENT OF INERTIA 65.6
SECTION MODULUS HEAD 18.0
SECTION MODULUS BASE 22.0
CALCULATED WEIGHT LB/YD. 114.7

AREA: HEAD ..... 3.91 SQ. IN.
WEB ..... 3.05 SQ. IN.
BASE ..... 4.29 SQ. IN.
TOTAL ..... 11.25 SQ. IN.

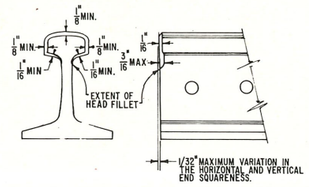
115 LB. R.E. RAIL



MOMENT OF INERTIA 94.9
SECTION MODULUS HEAD 23.9
SECTION MODULUS BASE 28.3
CALCULATED WEIGHT LB/YD. 136.2

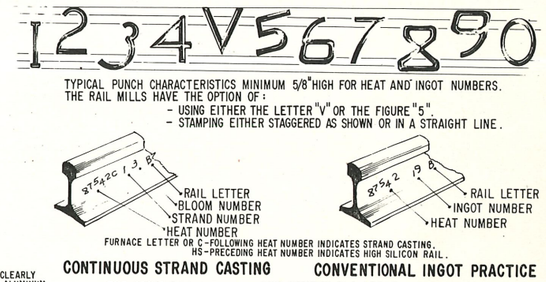
AREA: HEAD ..... 4.86 SQ. IN.
WEB ..... 3.62 SQ. IN.
BASE ..... 4.87 SQ. IN.
TOTAL ..... 13.35 SQ. IN.

136 LB. R.E. RAIL



ALL BURRS CAUSED BY DRILLING SHALL BE CAREFULLY REMOVED.
ALL DRILLED ENDS OF RAIL TO HAVE CORNERS OF HEAD INCLUDING FISHING FILLETS BEVELLED APPROXIMATELY AS SHOWN.
UNDRILLED RAIL ENDS TO HAVE BURRS & FINS REMOVED.

FINISHING OF RAIL ENDS



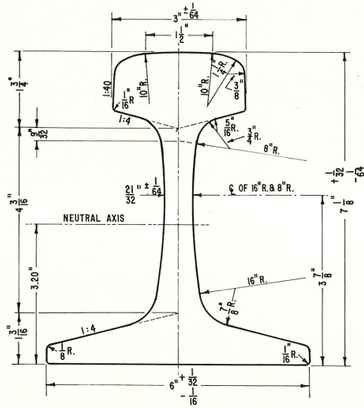
TYPICAL PUNCH CHARACTERISTICS MINIMUM 5/8" HIGH FOR HEAT AND INGOT NUMBERS.
THE RAIL MILLS HAVE THE OPTION OF :
- USING EITHER THE LETTER "V" OR THE FIGURE "5".
- STAMPING EITHER STAGGERED AS SHOWN OR IN A STRAIGHT LINE.

FURNACE LETTER OR C - FOLLOWING HEAT NUMBER INDICATES STRAND CASTING.
HS - PRECEDING HEAT NUMBER INDICATES HIGH SILICON RAIL.

CONTINUOUS STRAND CASTING **CONVENTIONAL INGOT PRACTICE**

THE ABOVE CONVENTIONAL AND CONTINUOUS LETTERING TO BE STAMPED INTO THE WEB OF THE RAIL, CHARACTERISTIC STYLE PER THE ABOVE AND THE SEQUENCE SHOWN. THIS CODING TO APPEAR ON THE OPPOSITE SIDE TO THE RAIL BRAND AND A SIMILAR NUMBER OF TIMES AS THE RAIL BRANDING.

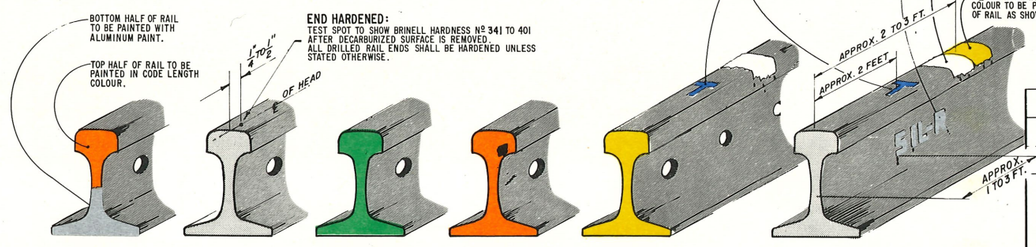
BRANDING & STAMPING



MOMENT OF INERTIA 88.2
SECTION MODULUS HEAD 22.5
SECTION MODULUS BASE 27.6
CALCULATED WEIGHT LB/YD. 132.1

AREA: HEAD ..... 4.42 SQ. IN.
WEB ..... 3.66 SQ. IN.
BASE ..... 4.87 SQ. IN.
TOTAL ..... 12.95 SQ. IN.

132 LB. R.E. RAIL



CLASSIFICATION AND PAINT MARKING CODE

NOTES: 1. THIS DRAWING FORMS PART OF RAIL SPECIFICATION 12.3 LATEST ISSUE.
2. THIS DRAWING CANCELS DRAWINGS S10C-9.2; 9.3; 9.7, -9.9, -18.1, -18.3, AND -25.1

No	Date	Revision
2	JUNE '77	CORRECTION 1-13/32" WAS 1-9/64" (136 LB. R.E. RAIL)
1	15 AUGUST '75	136 LB. RAIL ADDED. STAMPING FOR CONTINUOUS STRAND CASTING ADDED.

Standard / Norme

100 LB. ARA-A, 115, 132 & 136 LB. R.E. RAIL

RAIL

SECTIONS - DRILLING - CLASSIFICATION & BRANDING

Drawn / Dessin GWM — Checked / Vérification NAM — Approved / Approbation — Chief Engineer

Office of Chief Engineer
Bureau de l'Ingénieur en chef

Date 1 DECEMBER 1972 — Drawing Number / Dessin numéro TS-1111

5.3. Switch Point Guards and Protectors

Inspect switch point guards and protectors on a regular basis.

6.0 Slotting Rail Joints

a. Inspect rail ends every 6 months and slot according to the following procedures. (Insulated rail joints require a more frequent inspection and slotting schedule.)

b. Do not use slotting wheels or stones more than 5/32 inch thick.

c. Avoid nicking or cutting into joint bars with the slotting wheel.

d. Slot the rail joint from the center of the rail to the gauge and field sides.

e. Match the slot of the rail end to the contour of the rail.

f. Include the gauge face of rails in curves when you are slotting.

g. Remove any overflowed metal at the rail end. If a bulge occurs at the rail end, remove it before grinding the set-back.

h. When rail is cut, it should be ground according to the procedures illustrated in *Figure 14-8*, before assembling the joint.

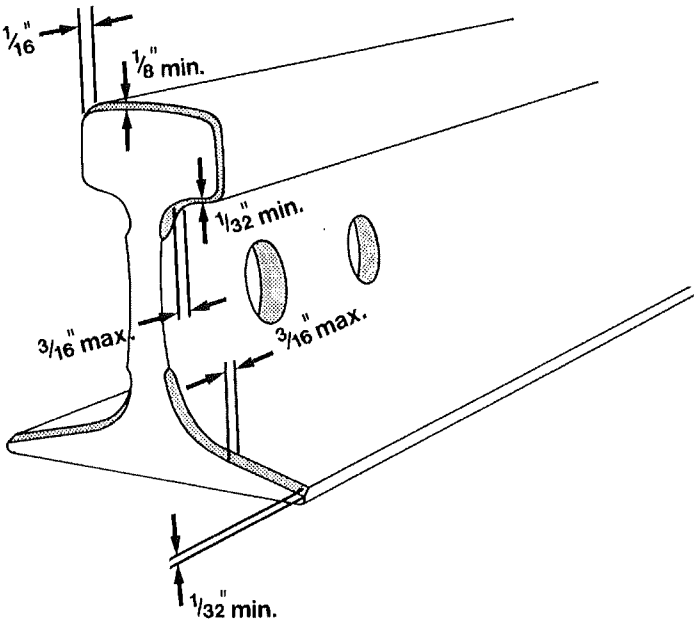


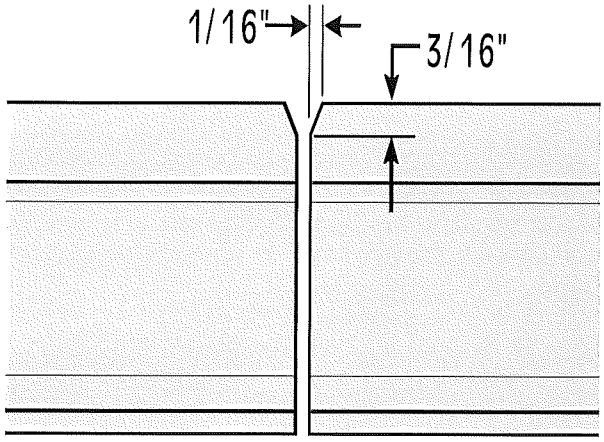
Figure 14-8

6.2. Slotting Open Rail Joints

a. Grind the set back or chamfer on each rail end separately.

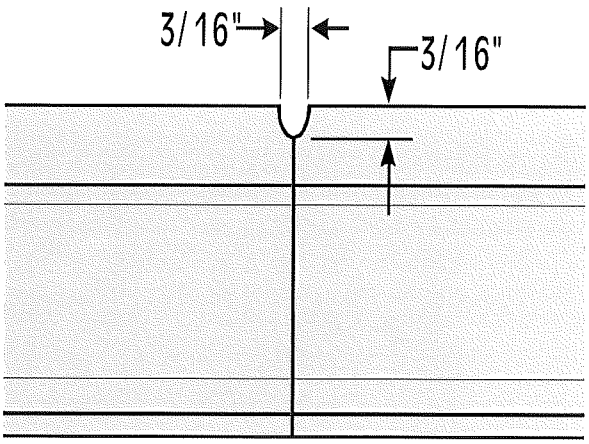
b. Remove any flowed metal and/or weld deposit from the rail end before grinding the set back or chamfer.

c. Chamfer each rail end horizontally between 1/16 inch and 3/32 inch. Chamfer each rail end down approximately 1/4 inch.



Slotting Open Rail Joints

Figure 14-9



Slotting Closed Rail Joints

Figure 14-10

6.3. Slotting Closed Rail Joints

a. Center the slotting wheel between the rail ends to remove an equal amount of metal from each rail end.

b. Remove approximately 3/32 inch from each rail end to a depth of approximately 1/4 inch.

6.4. Slotting Insulated Rail Joints

a. Do not damage the end post.

b. Chamfer the ends of the rails according to the procedures illustrated in *Figure 14-11*.

c. Sweep out any metal filings away from the end post.

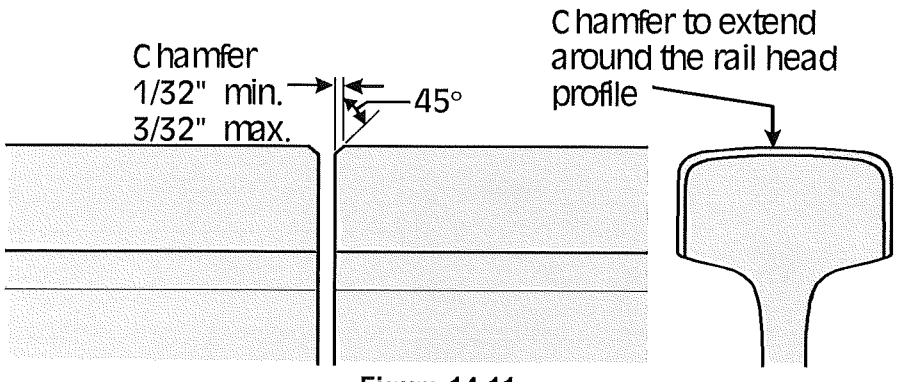
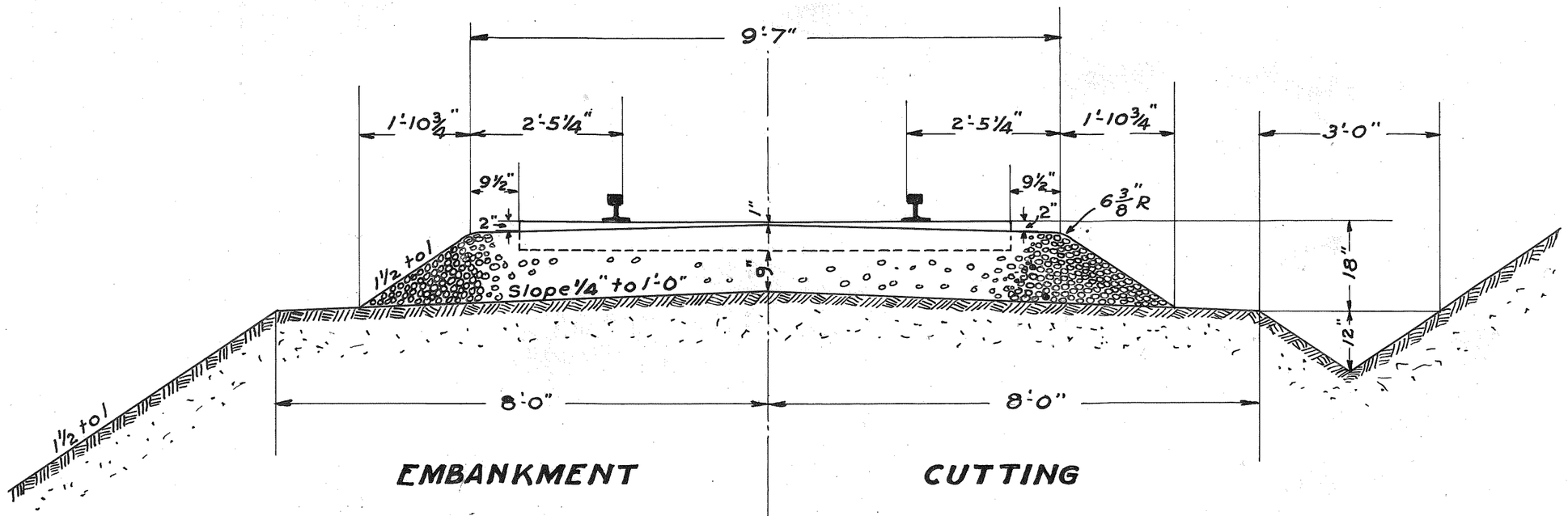


Figure 14-11



13'-4½" SECTION

2400 yds. Broken Stone per mile.

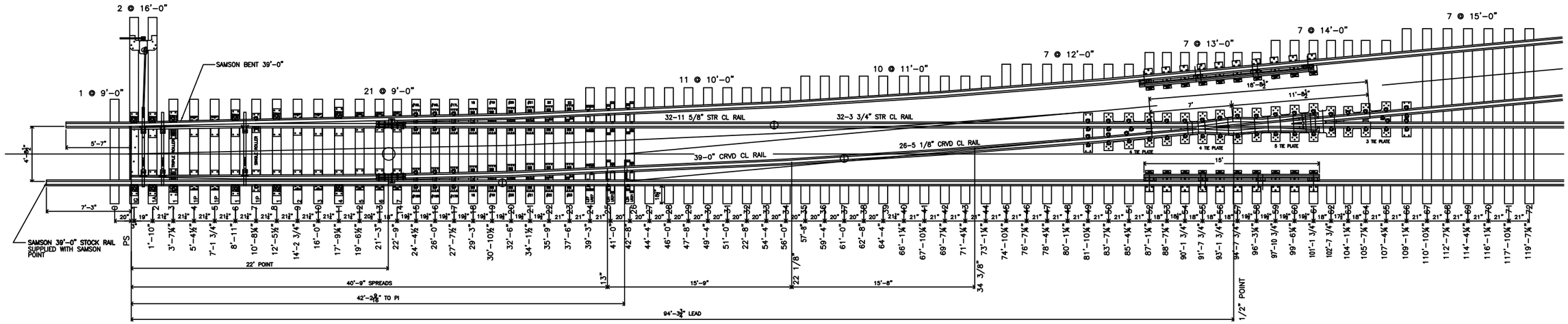
TEMISKAMING & NORTHERN ONTARIO RAILWAY.
ENGINEERING DEPT. - NORTH BAY. ONT.

STANDARD ROCK BALLAST SECTION

Corr:- Appr:-

Eng. Main of Way — S.B. Clement — Chief Engineer

Scale:- ½" = 1'	July. 4 - 1936	DRAWING NO. S-124



NOTES

1. 115RE HH RAIL
2. #11 RBM FROG 18' 8 1/2" OAL DRILLED 3 1/2 x 6 x 6
3. 22' 0" SWITCH POINTS SAMSON & KNIFE AREA 115 UNIFORM RISER
4. 15' 0" AREA 504 GUARD RAILS W/WELDED SHOULDER PLATES 3/4 x 8
5. BOLTLESS ADJUSTABLE BRACE AND GAGE PLATE, 1 x 8 PLATE
6. MILLED 1P PLATES & WELDED SHOULDER SLIDE AND HEEL PLATES
7. MILLED PANDROL TURNOUT PLATES & HTTP
8. FROG PLATES AS SHOWN 4 & 5 TIE DESIGN, 3/4" PLATE
9. CLOSURE RAIL LENGTHS AND TIES LISTED FOR REFERENCE
10. LEFT HAND TURNOUT SHOWN
11. SINGLE SAMSON TURNOUT HAS SAMSON POINT ON STRAIGHT TRACK WITH BENT STOCK RAIL KNIFE POINT FOR TURNOUT TRACK

OPTIONAL COMPONENTS

A. SCHWIHAG TURNOUT ROLLERS
   - TIE #3, BRACED: TRIPLE ROLLER
   - TIE #7, NOT BRACED: SINGLE ROLLER
B. 3 EACH INSULATED ADJUSTABLE SWITCH RODS
C. 1 EACH INSULATED #1-G PANDROL ADJUSTABLE GAGE PLATE WITH CLIPS

Bill of Materials
115RE #11 New Turnout
Single Samson Point

Qty	UOM	Description
1	each	Railbound Manganese Frog complete with the following plates:
1	each	5-tie integral base plate
2	each	4-tie integral base plate
1	each	3-tie integral base plate
2	each	Single plates.
		All frog plates will be furnished with Pandrol shoulders and Pandrol clips. The frog plates in the body of the frog will be e-clipped to the frog.
1	pair	15' AREMA Guard Rails complete blocks, bolts, and standard AREMA guard rail plates
1	pair	22' Uniform-Riser Double Reinforced Switch Points with single side-jaw clips; one point Samson and one point Knife-cut
3	each	Non-Insulated Adjustable Switch Rods
1	each	Non-Insulated #1-G Pandrol Adjustable Gage Plate with clips
10	each	Pandrol Adjustable Braced Plates with clips
12	each	Pandrol Adjustable Braces
10	each	Standard AREMA Shoulder Slide Plates (6 ea. #1 P, 2 ea. #2, 2 ea. #3)
2	each	Plain Plates
4	each	Heel Plates
18	each	Pandrol Turnout Plates for tie numbers 15 through 23
12	each	Hook Twin Tie Plates for tie numbers 24 through 26 (2 ea. L27, 2 ea. LR27, 4 ea, L31, 4 ea. LR31)
1	pair	5-Hole Floating Heel Block Assemblies Complete
1	each	39' Undercut Stock Rail with vertex bend
1	each	Racor 31-B Switch Stand with 6' connecting rod
192	each	15/16" x 6" Screw Spikes

Bill of Materials
115RE #11 New Turnout
Double Samson Point

Qty	UOM	Description
1	each	Railbound Manganese Frog complete with the following plates:
1	each	5-tie integral base plate;
2	each	4-tie integral base plate;
1	each	3-tie integral base plate; and
2	each	Single plates.
		All frog plates will be furnished with Pandrol shoulders and Pandrol clips. The frog plates in the body of the frog will be e-clipped to the frog.
1	pair	15' AREMA Guard Rails complete blocks, bolts, and standard AREMA guard rail plates
1	pair	22' Uniform-Riser Double Reinforced Switch Points with single side-jaw clips; both points Samson
3	each	Non-Insulated Adjustable Switch Rods
1	each	Non-Insulated #1-G Pandrol Adjustable Gage Plate with clips
10	each	Pandrol Adjustable Braced Plates with clips
12	each	Pandrol Adjustable Braces
10	each	Standard AREMA Shoulder Slide Plates (6 ea. #1 P, 2 ea. #2, 2 ea. #3)
2	each	Plain Plates
4	each	Heel Plates
18	each	Pandrol Turnout Plates for tie numbers 15 through 23
12	each	Hook Twin Tie Plates for tie numbers 24 through 26 (2 ea. L27, 2 ea. LR27, 4 ea, L31, 4 ea. LR31)
1	pair	5-Hole Floating Heel Block Assemblies Complete
1	each	39' Undercut Stock Rail with vertex bend
1	each	39' Undercut Stock Rail - Straight
1	each	Racor 31-B Switch Stand with 6' connecting rod
192	each	15/16" x 6" Screw Spikes

Tie Dimensions and Quantities

	Tie No.	Length	Tie Spacing	Dist. From PS to CL of Tie	Length & Qty
POINT AREA – CRITICAL TIE SPACING	1	16'	3.00	0'-3"	2@16'
	2	16'	19.00	1'-10"	
	3	9'	21.25	3'-7 1/4"	
	4	9'	21.25	5'-4 1/2"	
	5	9'	21.25	7'-1 3/4"	
	6	9'	21.25	8'-11"	
	7	9'	21.25	10'-8 1/4"	
	8	9'	21.25	12'-5 1/2"	
	9	9'	21.25	14'-2 3/4"	
	10	9'	21.25	16'-0"	
	11	9'	21.25	17'-9 1/4"	
	12	9'	21.25	19'-6 1/2"	
	13	9'	20.50	21'-3"	21@9'
	14	9'	18.00	22'-9"	
	15	9'	19.50	24'-4 1/2"	
	16	9'	19.50	26'-0"	
	17	9'	19.50	27'-7 1/2"	
	18	9'	19.50	29'-3"	
	19	9'	19.50	30'-10 1/2"	
	20	9'	19.50	32'-6"	
	21	9'	19.50	34'-1 1/2"	
	22	9'	19.50	35'-9"	
	23	9'	21.00	37'-6"	
FROG AREA – CRITICAL TIE SPACING	24	10'	21.00	39'-3"	
	25	10'	21.00	41'-0"	
	26	10'	20.00	42'-8"	
	27	10'	20.00	44'-4"	
	28	10'	20.00	46'-0"	
	29	10'	20.00	47'-8"	11@10'
	30	10'	20.00	49'-4"	
	31	10'	20.00	51'-0"	
	32	10'	20.00	52'-8"	
	33	10'	20.00	54'-4"	
	34	10'	20.00	56'-0"	
	35	11'	20.00	57'-8"	
	36	11'	20.00	59'-4"	

Tie Dimensions and Quantities

Tie No.	Length	Tie Spacing	Dist. From PS to CL of Tie	Length & Qty
37	11'	20.00	61'-0"	10@11'
38	11'	20.00	62'-8"	
39	11'	20.00	64'-4"	
40	11'	21.25	66'-1 1/4"	
41	11'	21.00	67'-10 1/4"	
42	11'	21.00	69'-7 1/4"	
43	11'	21.00	71'-4 1/4"	
44	11'	21.00	73'-1 1/4"	
45	12'	21.00	74'-10 1/4"	7@12'
46	12'	21.00	76'-7 1/4"	
47	12'	21.00	78'-4 1/4"	
48	12'	21.00	80'-1 1/4"	
49	12'	21.00	81'-10 1/4"	7@13'
50	12'	21.00	83'-7 1/4"	
51	12'	21.00	85'-4 1/4"	
52	13'	21.00	87'-1 1/4"	
53	13'	18.00	88'-7 1/4"	
54	13'	18.50	90'-1 3/4"	
55	13'	18.00	91'-7 3/4"	
56	13'	18.00	93'-1 3/4"	
57	13'	18.00	94'-7 3/4"	
58	13'	19.50	96'-3 1/4"	
59	14'	19.50	97'-10 3/4"	7@14'
60	14'	19.50	99'-6 1/4"	
61	14'	19.50	101'-1 3/4"	
62	14'	18.00	102'-7 3/4"	
63	14'	17.50	104'-1 1/4"	
64	14'	18.00	105'-7 1/4"	
65	14'	21.00	107'-4 1/4"	
66	15'	21.00	109'-1 1/4"	7@15'
67	15'	21.00	110'-10 1/4"	
68	15'	21.00	112'-7 1/4"	
69	15'	21.00	114'-4 1/4"	
70	15'	21.00	116'-1 1/4"	
71	15'	21.00	117'-10 1/4"	
72	15'	21.00	119'-7 1/4"	

No.	Date	Revision 7	By
7	20120813	Corrected offset dimensions	BRW
6	20120302	Chg table decimals to fract	BRW
5	20120213	Changed tbl heel blks, sw pts	BRW

TRK–STDPL

ONR 22 FOOT NUMBER 11 STANDARD TURNOUT

VER:27.0
MOD BY:Brian Wheeler
D:20130107
minor edit of #18 turnout plate

-

CHK BY: PL
DR. BY: BRW
DATE: 20111021

1 : 1 0 0 CAD.NO.
FILE
DWG. NO.
B–1412

APPENDIX L - ONTC SIGNALS AND COMMUNICATIONS CALL LIST

ONTARIO NORTHLAND - SIGNALS AND COMMUNICATIONS

Call List - Regular Hours (0700 - 1500, Mon to Fri)

Headquarter	Seniority #	Signal Maintainer (SM) / Technician (Tech)	Section - Sub/MP	Contact Info
Cochrane	SM 1	Genevieve Jennings	Devonshire Sub MP 0.0 - 28.05, Ramore Sub MP 56 - 109.7	705-272-9219
	SM 2	Ramkrishan Singh	Kapuskasing Sub MP 0.0 - 128.55, Island Falls Sub MP 0.0 - 186.2	249-313-0401
	SM3	Seamus O'Connor	Reliever - Cochrane	705-303-3937
	Tech 1	Kurtis Westbrook	Kapuskasing Sub MP 0.0 - 128.55, Island Falls Sub MP 0.0 - 186.2, Ramore MP 56 - 109.7	705-266-3421
Englehart	SM 1	Mike Emmell	Ramore Sub MP 1 - 56, Kirkland Lake Sub MP 0.0 - 60	705-544-3353
	SM 2	Austin Talbot	Ramore Sub MP 0 - 1, Temagami Sub 0.0 - 138.5	705-303-2387
	SM 3	Milne Wreggitt	Reliever -Englehart	705-544-3257
	Tech 1	Craig Jennings	Ramore MP 0.0 - 56, Kirkland Lake Sub MP 0.0 60, Temagami Sub MP 0.0 - 138.5	705-679-3041

Management	Kevin Dube	Maintenance/Project	705-335-1013
Management	Justin Porter	Maintenance/Project	249-313-0293

Steps for Emergency Trouble Calls - Regular Hours (Radio, RTC, Software)	
1	Call the S&C Technician responsible for the section as indicated in the call list. (If there is no answer, proceed to step 2)
2	Call the next available S&C Technician (If there is no answer, proceed to step 3)
3	Call the S&C Management
Steps for Emergency Trouble Calls - Regular hours (Crossing, Hot Box Detector, Switch or other)	
1	Call the Signal Maintainer responsible for the section as indicated in the call list. (If there is no answer, proceed to step 2)
2	Call the next available Signal Maintainer based on seniority order within the same headquarter. (SM1,SM2,SM3...) (If there is no answer)
3	Call the S&C Management