



CSXT LIRC Supplemental EA

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07/19/2014 12:51 PM

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4 Attachments



LIRC CWR.pdf 20140719 LIRC operating rules regarding weather issues.docx 20150719 CSXT Response to Climate Change.docx



FD 35523 Letter to Ms. Rutson.pdf

Dave – Attached are CSXT's response to climate change and LIRC's response to weather issues (including its operating rules. CSXT has not developed a response to weather issues over LIRC's line and complies with LIRC's requirements. LIRC does not have a climate change policy.

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LIRC operating rules regarding weather issues

6.10 Precautions against Unusual Conditions

Protect trains, locomotives and other equipment against any known condition that may interfere with their safety.

If any defect or condition that might cause an accident is discovered on tracks, bridges, or culverts, or if any crew member believes that the train or locomotive has passed over a dangerous defect, the crew member must immediately notify the train dispatcher and provide protection, if necessary.

6.11 Storms and Restricted Visibility

When conditions restrict visibility, regulate speed to insure that crew members can observe and comply with signal indications.

In unusually heavy rain, storm or high water, trains, locomotives and other equipment must approach bridges, culverts and other potentially hazardous points prepared to stop until it is safe to resume movement. Advise the train dispatcher of such conditions by first available means of communication.

6.12 Water above the Rail

Do not operate trains or locomotives over track that is submerged in water until the track has been inspected and is known to be safe for movement. Locomotives must not be operated through water that is more than 3 inches above the top of the rail.

CSXT Response to Climate Change

By improving our energy efficiency, providing clean and affordable domestic energy resources, and practicing responsible environmental stewardship, we can spur economic growth, improve quality of life and help address the complex global challenge of climate change.

CSXT considers potential climate change impacts as part of our overall risk management process. We maintain strategic plans to maximize responsiveness to incidents resulting from extreme weather, changing weather patterns or shifting populations. The vast majority of our employees work outdoors and are susceptible to extreme weather conditions and changes; we prepare for such changes through business continuity plans that are adaptable across the 23-state network. CSXT also maintains site specific operating plans and invests heavily in track infrastructure, helping to protect assets from the impacts of extreme weather. For example, in 2013, we initiated a project to raise a portion of our track along the Gulf Coast in preparation for potential severe weather in the area.

By far, railroads are the most environmentally friendly and energy-efficient way to move goods over land. By using rail, customers reduce GHG emissions by approximately 60 to 80 percent, which promotes cleaner air and helps the country reduce its dependence on foreign energy sources. We are taking significant voluntary actions - going beyond our legal requirements - to reduce locomotive emissions (including GHGs) and fuel use.

Louisville & Indiana Railroad

MW101

Procedures for the Installation, Adjustment, Maintenance and Inspection of CWR as Required by 49 CFR 213.118 and 213.119

Effective January 01, 2010

Updated May 13, 2011

Procedures for the Installation, Adjustment, Maintenance and Inspection of CWR as Required by 49 CFR 213.119.

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Desired Rail Neutral Temperature Table – MW101 (H).....	Attached
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Handling and Selecting Replacement Rail – MW101 (J).....	Attached

Notation:

The appendix documents are not part of the procedures for CWR submitted to the FRA but are used as guidance and reference documents. Revisions to the documents in the appendix must be forwarded to FRA for posting with the submitted CWR plan.

Procedures for the Installation, Adjustment, Maintenance and Inspection of CWR as Required by 49 CFR 213.119

This document details the Railroad's policy on installing, adjusting, maintaining and inspecting Continuous Welded Rail (CWR) track. Each chapter details how the Railroad applies its standards and procedures to comply with FRA standards. The following requirements apply to CWR on all main tracks and sidings. These requirements also apply to all other tracks other than main tracks or sidings operating at above Class 1 speeds.

Chapter 1 CWR Installation Procedures

Rail length that exceeds 400 feet is considered CWR. Rail installed as CWR remains CWR, regardless of whether a joint or plug is installed into the rail at a later time. Temperature variations affect rail length. Rail gets longer when it is heated and it gets shorter when it is cooled.

1.1 Desired Rail Neutral Temperature

Rail neutral temperature is the temperature at which a rail is neither in tension nor compression. Designated rail laying temperatures have been established to provide a high rail neutral temperature to prevent track buckling. When laying or adjusting CWR, use the rail laying temperatures (RLT) shown in the table MW101 (H), in the appendix.

1.2 Temperature Differential

The difference between the designated rail laying temperature and the actual rail temperature taken at the time of installation is called the temperature differential. CWR laying and adjusting procedures have been established to compensate for this temperature difference.

1.3 Installing CWR

Follow these general requirements when installing CWR:

Refer to **MW101 (H)** for the designated rail laying temperature for your area.

Take the rail temperature and calculate the expansion required before making adjustments.

Record the rail laying temperature, location and date on approved forms and send copies as instructed. These records may be retained in an electronic format per 213.241. (Refer to, **MW 101 A.**) Gang Foreman is to complete report daily and record the rail laying temperature, location and date on the web of the rail when laying CWR and at the end of each work week send a copy to the Roadmaster and Division Engineer, Keeping one copy for his record.

Rail does not need to be adjusted when the actual rail temperature exceeds the designated rail laying temperature.

Use rail heaters or rail expanders to adjust the rail to the correct length when the actual rail temperature is less than the designated rail laying temperature. Heat the rail evenly and uniformly so that the rail expansion occurs evenly and uniformly throughout its length. If rail is laid at a temperature more than 40° F below the designated rail laying temperature, rail must be adjusted or a speed restriction of 10 mph must be placed prior to rail temperature above designated rail laying temperature. When tight rail conditions exist, be governed by Chapter 7.1.

Chapter 2 Rail Anchoring Requirements

Where the anchoring function is otherwise provided, rail anchors may be omitted. 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. Anchor pattern may be varied as reasonable to avoid placing anchors against deteriorated ties.

Installation

The following anchoring requirements apply to CWR installation on all main tracks and sidings. These anchoring requirements also apply to all tracks other than main tracks or sidings operating at speeds above class 1.

2.1 Standard Box Pattern

When installing CWR, box anchor every other tie except as outlined in Section 2.2.

2.2 Solid Box Pattern

When installing CWR, box anchor every effective tie at specific locations listed below to provide additional restraint against rail.

Condition	Action
Turnouts Rail crossings , highway crossings at grade & open deck bridges Joints where CWR abuts jointed rail	Anchor every tie for 130 ties in each direction.
Bolted joint installed during CWR installation when using heater, rail stretcher or sufficient ambient temperature.	Within 60 days, weld joint, OR install joint with 6 bolts, OR anchor every tie for 130 ties in each direction.

2.3 Bridge Pattern

When installing CWR, follow these bridge anchoring requirements:

- A. Ballast deck bridges should be anchored with the same pattern as in section 2.1 and 2.2.
- B. Open deck bridges up to 150 feet long should be anchored on every tie and 130 ties away from each headwall on all approaches.
- C. All other bridge structures, apply anchors as directed by the General Manager, Roadmaster or consulting engineer.

Existing anchoring patterns may remain until a rail relay is done on the bridge and where track arrangement does not allow installation of additional anchors.

Maintenance or Rail Repair

2.4 Legacy Patterns

On CWR installations completed before September 21, 1998, existing anchoring may remain if rail is restrained to prevent track buckles. If restraint of rail is not sufficient, rail must be adjusted (by increasing or decreasing the length of rail or by lining on curves) or anchors added to rail.

2.5 Anchor Pattern after Repair

When repairs result in a joint being added to CWR, the anchor pattern shall match the existing pattern in track. At least every other tie will be box anchored for a distance of 130 ties in each direction unless anchoring is otherwise provided or if it would conflict with other track appliance arrangements such as a turnout.

When repairs are made to a stripped joint (pull apart) or failed joint bar, the adjustment or addition of anchors will be as prescribed in the following table.

Condition	Action
Bolted joint in CWR experiencing service failure (stripped joint) or failed bar(s) with gap* present *Gap exists if it cannot be closed by drift pin	1. Weld joint, OR 2. Remediate joint conditions (per Chapter 6.5), replace bolts (new, in-kind or stronger), and weld joint within 30 days, OR 3. Replace failed bar(s), install 2 additional bolts and adjust anchors, OR 4. Replace failed bars, bolts (if broken or missing) and anchor every tie for 130 ties in both directions, OR 5. Add rail (only when necessary)

Chapter 3 Preventive Maintenance on Existing CWR Track

Performing track buckling maintenance can reduce the risk of buckles. When tight rail conditions exist, be governed by Chapter 7.1.

3.1 Maintaining Desired Rail Installation Temperature Range

A record of rail neutral temperature will be maintained where rail has pulled apart, broken or been cut for defect removal. Record the length of the rail end gap and rail temperature in addition to the other required information on the **Rail Separation Form (MW101 (g))** for determining rail neutral temperature.

Rail that has pulled apart, broken or has been cut for defect removal when rail temperatures are at or below 60°F must be readjusted to within the desired rail laying temperature minus 20° (RLT-20°) safe range. If the rail has not been readjusted to at least RLT -20° before rail temperatures exceed the values in the TABLE below, a speed restriction of 10 mph may be placed or if no speed restriction is placed daily inspection must be made during the heat of the day.

Rail break or cut Temperature (°F)	Rail temperature (°F) at which to readjust or apply slow order
60	135
50	130
40	125
30	120
20	115
10	110
0	105
-10	100
-20	95
-30	90
-40	85

After January 1, 2010, locations where rail neutral temperature has been lowered below the safe zone by adding rail must be adjusted to within RLT -20°F or higher within 365 days of the date of the addition (broken rail/pull apart). If rail is added for any reason, measure and record the amount of rail added on the appropriate form (MW101 (b)), so that adjustments can be made, if necessary.

This measurement may be made by the use of reference marks. The use of reference marks includes:

- Marking the locations where rail is to be cut
- Marking the rail outside the limits of the joint bars
- Measure the distance between the reference marks and mark it on the rail or otherwise record it
- Install the rail and re-measure the distance between reference marks
- Record the difference and document the location

Refer to Placing Rail Reference Marks Document MW101 (I)

When welding rail ends together, the required weld gap or rail consumption must be taken into consideration when determining the amount of rail adjustment.

*Where rail has been added to re-establish the desired RLT this requirement need not apply.

3.2 De-Stressing Rail

Rail can be de-stressed by cutting rail out or by re-aligning a curve. When cutting rail out, use this procedure:

1. Use a designated safe procedure to cut rail. It's possible that the rail is under compression and may move unexpectedly. Cut rail to be de-stressed.
2. Remove or reposition anchors or clips for a minimum of 130 ties (~200 feet) in both directions from the cut or up to a restriction that prevents rail movement. (i.e. bridge, switch)
3. Wait until the rails stop moving. The rail ends may need to be trimmed more than one time to allow for expansion.
4. Take the rail temperature away from the cut far enough so that the reading is not affected by the cutting procedure or heated rail zone on the web of rail away from direct sunlight.
5. Compare the measured rail temperature with the designated rail laying temperature

for the territory (MW101 (H)). The difference is the temperature differential.

6. If the actual rail temperature is lower than the Desired Rail Neutral Temperature for the territory, use the table on MW101 (a) to determine the rail amount to be removed based on the total distance the anchors or clips have been removed.
7. If the rail temperature is at least the rail laying temperature, no additional adjustments are needed.
8. Weld the joint or apply joint bars.
9. Replace the rail anchors or clips.
10. Record rail adjustments on the correct form for Rail Added (MW101 (b)) or Rail Removed (MW101(c)) and provide a copy to the Roadmaster.

Chapter 4 Monitoring Curve Movement Following Track Surfacing and Lining

4.1 Staking of Curves

Before surfacing and lining a curve on main tracks, stake curve if it is more than 3° and the rail temperature is more than 50°F below the designated rail laying temperature (or is forecasted to be in the next 24 hours).

Stake the curve prior to surfacing and lining. Place at least 3 reference points uniformly spaced around the curve. Reference points shall be no more than 200 feet apart along curves and clear of gang activities and recorded on form MW101 (d) then forwarded to the Roadmaster.

4.2 Inspecting for Curve Movement

Inspect for curve movement periodically after being worked, especially during periods of large temperature changes. Where curve has been staked per Section 4.1 and curve has shifted inward more than a maximum of 3 inches, the curve must be lined out prior to ambient temperatures above or forecasted above 85°F. If curve is not lined out or de-stressed a speed restriction of 10 mph must be placed. When tight rail conditions exist, be governed by Chapter 7.1.

Chapter 5 Placing Temporary Speed Restrictions on Account of Track Work

Place a temporary speed restriction anytime the roadbed or ballast section is disturbed as required in Section 5.4, except where the maximum authorized speed of the track is equal to or less than the required restriction.

5.1 General Requirements

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 sub grade to compact. **Take more restrictive measures when any track conditions warrant.**

5.2 Responsibility for Placing Speed Restrictions

During the work or before returning the track to service, the supervisor or foreman in charge must ensure that:

Gage, surface and alignment have been established.

Crib and shoulder ballast is in place or lateral constraint is otherwise provided.

The rail is anchored per Sections 2 or 3.

5.3 Speed Restriction Length

To minimize running rail and other dynamic forces, trains must have time to brake and adjust slack before entering the disturbed track. For heavy grades, sharp curves or substandard track conditions, extend speed restrictions farther from the work limits, if needed.

5.4 Speed Restrictions for Track Work

When the following track work has been performed, place a speed restriction that complies with the guidelines below.

When rail temperature is above or forecasted to exceed the designated rail temperature within the next 24 hours:

Activity	Maximum Speed	Minimum Duration
Out-of-face installation of ties	10 MPH	4 trains
Undercutting	25 MPH	4 trains
Installing track/switch panels		
Constructing track		
Out-of-face surfacing and lining		
Spot Maintenance	10 MPH	1 train
- Installing ties (no more than 5 ties in 39 ft and no more than 3 consecutive ties) - Surfacing/lining (maximum length of 19'6")	25 MPH	4 trains
Mechanically-stabilized track performed after any of the activities listed above	10 MPH 25 MPH	1 train 2 trains

Note: One freight train equals 32 cars.

Always inspect track prior to removing speed restrictions.

When rail temperature is at or below the designated rail temperature or is forecasted to remain at or below the DRT for the next 24 hours:

Activity	Maximum Speed	Minimum Duration
Out-of-face installation of ties	10 MPH	1 train
Out-of-face surfacing and lining	25 MPH	4 trains
Undercutting		
installing track/switch panels		
Constructing track		
Exception: Spot maintenance may not require a speed restriction.		
Mechanically-stabilized track performed after any of the activities listed above	10 mph 25 MPH	1 train 1 train

Note: One train equals 32 cars.

Note: When rail temperature is less than 50°F, a speed restriction may not be required for any of the above work being performed.

Always inspect track prior to removing speed restrictions.

Chapter 6 Rail Joint Inspections

CWR Joint means any joint directly connected to CWR.

6.1 Class of Track

All CWR joints within the following classes must be inspected on foot:

- Class 2 on which passenger trains operate, and
- Class 3 and higher

6.2 Frequency of Inspections

CWR joints shall be inspected on foot at the following minimum frequencies:

Minimum Number of Inspections Per Calendar Year ¹					
	Freight Trains operating over track with an annual tonnage of:			Passenger Trains operating over track with an annual tonnage of:	
	less than 40 mgt	40 to 60 mgt	greater than 60 mgt	less than 20 mgt	greater than or equal to 20 mgt
Class 5 & above	2x	3x ²	4x ²	3x ²	3x ²
Class 4	2x	3x ²	4x ²	2x	3x ²
Class 3	1x	2x	2x	2x	2x
Class 2	0	0	0	1x	1x
Class 1	0	0	0	0	0
Excepted Track	0	0	0	n/a	n/a
4x = Four times per calendar year, with one inspection in each of the following periods: January to March, April to June, July to September, and October to December; and with consecutive inspections separated by at least 60 calendar days. 3x = Three times per calendar year, with one inspection in each of the following periods: January to April, May to August, and September to December; and with consecutive inspections separated by at least 90 calendar days 2x = Twice per calendar year, with one inspection in each of the following periods: January to June and July to December; and with consecutive inspections separated by at least 120 calendar days. 1x = Once per calendar year, with consecutive inspections separated by at least 180 calendar days.					
¹ Where a track owner operates both freight and passenger trains over a given segment of track, and there are two different possible inspection interval requirements, the more frequent inspection interval applies. ² When extreme weather conditions prevent a track owner from conducting an inspection of a particular territory within the required interval, the track owner may extend the interval by up to 30 calendar days from the last day that the extreme weather condition prevented the required inspection.					

6.3 Identification of Joints

Each CWR joint requiring action as outlined in section 6.5 shall be identified in the field with a highly visible marking. In addition, such joints shall also be identified as to location by specifying the subdivision, milepost, track number and rail (north, south, etc.).

6.4 Switches, Track Crossings, Lift Rail Assemblies or Other Transition Devices on Moveable Bridges

Joints within or adjacent to switches, track crossings, lift rail assemblies or other transition devices on moveable bridges are exempt from the periodic joint inspection requirements provided they are inspected monthly during the required monthly walking inspection of these devices.

Therefore, inspect these locations on a minimum monthly basis and include in the inspection and report on the following:

At switches:

- All joints from and including the insulated joints at the signals governing movement entering and leaving the control point or interlocking.
- If there are no signals at the switch location, include as a minimum all joints from the point of the switch to the heel of the frog.

At cross-overs:

- All joints in track between switches.

At track crossings:

- All joints from and including the insulated joints at the signals governing movement entering and leaving the control point or interlocking.
- If there are no signals at the track crossings, include as a minimum all joints that are between or connected to the crossing frogs.

At lift rail assemblies or other transition devices on movable bridges:

- All joints immediately attached to the rail assembly or transition device.

Should a cracked or broken joint bar be discovered during the monthly inspection of any of the above locations, a Fracture Report must be completed as per section 6.7.

6.5 Rail Joint Conditions

When inspecting CWR joints on foot in track listed in 6.1, inspectors must watch for (but not be limited to) the following rail joint conditions outlined in the table below. When such conditions are found, the appropriate action must be taken as outlined.

Rail joint condition	Action¹
Visible cracks in joint bar	Replace bar
Loose bolts	Tighten bolts
Bent bolts	Replace bolts OR Re-inspect as per 6.2
Missing bolts ²	Replace bolts
Tie(s) not effectively supporting joint	Tamp tie(s) Replace or repair tie(s) OR Conduct follow-up inspections every other week until repaired/removed
Broken or missing tie plate(s)	Replace tie plate(s) OR Conduct follow-up inspections every other week until repaired/removed
Deteriorated insulated joint	Replace/repair joint OR Conduct follow-up inspections every other week until repaired/removed
Rail end batter (More than 3/8" in depth and more than 6" in length measured with a 24" straight-edge)	Repair by welding joint or removing rail OR Conduct follow-up inspections every other week until repaired/removed
Rail end mismatch reaches limits specified by 49 CFR 213.115	Weld or grind
Longitudinal rail movement greater than 2"	Add or adjust rail anchors, tighten bolts, add or remove rail at appropriate time OR Conduct follow-up inspections every other week until repaired/removed
Wide rail gap greater than 1.5"	Adjust rail gap and secure joint OR Conduct follow-up inspections every other week until repaired/removed
Joint vertical movement (profile) that exceeds 75% of the allowable threshold for the designated class of track ³	Surface joint OR Conduct follow-up inspections every other week until repaired/removed
Joint lateral movement (in a curve or spiral) that reaches 3/4" ³	Correct lateral movement OR Conduct follow-up inspections every other week until repaired/removed

Notes:

- 1 Action may also consist of placing a speed restriction or removing the track from service.
- 2 A minimum of 2 bolts per rail must be in place at each joint.
- 3 Joint lateral and vertical movement is the apparent visible movement measured at the joint.

6.6 Embedded Joints

Permanently Embedded Locations

Where such locations exist, it is not necessary to disassemble or remove the track structure (e.g., remove pavement or crossing pads) to conduct an inspection of CWR joints. Make every effort, to the extent practicable, to inspect the visible portion of joints in these structures.

Temporarily Buried Locations

Joints may sometimes be temporarily buried (e.g., where ballast or similar material is in the middle of the track and along the track) and therefore unavailable for inspection. Where CWR joints are buried (e.g., by ballast), wait for the completion of the track work before conducting joint bar inspections.

6.7 Inspection Records

On-Foot Periodic and Follow-up Inspection Reports

Document each on-foot periodic and follow-up inspection on the date of the inspection by noting the following information:

- A. Date
- B. Limits of the inspection
- C. Location and nature of CWR joint conditions specified in section 6.5
- D. Corrective or Remedial action
- E. Name and signature of inspector

Fracture Reports

Track subject to inspections under **213.119**, must have a Fracture Report (MW101 (f)) completed for every cracked or broken CWR joint bar that is discovered during the course of an inspection conducted to comply with:

1. Track Inspections (213.233),
2. Inspections of switches, turnouts, track crossings, lift rail assemblies or other transition devices on moveable bridges (213.235),
3. Periodic and Follow-Up CWR Joint Inspections (213.119(g)).
4. The Fracture Report shall be prepared on the date the cracked or broken joint bar is discovered.

**Refer to Fracture Report Form
MW101 (f)**

Chapter 7 Extreme Weather Inspections

For purposes of forecasting or initiating extreme weather inspections and conversions of rail temperature in relation to ambient temperatures use the following conversions:

- In hot weather rail temperature will be equal to ambient (air) temperature plus 30°F.
- In cold weather rail temperature is equal to ambient (air) temperature.

7.1 Hot Weather Inspections

On main tracks hot weather inspections must be performed as directed by the Roadmaster or other designated person when the rail temperature is forecast to exceed the designated rail laying temperature.

Perform inspections during the heat of the day - primarily between 12 noon and 6 p.m.

Inspectors will inspect for signs of tight rail conditions, including:

- Kinky or wavy rail
- Rail canting or lifting out of tie plates
- Shiny marks on the base of the rail indicating that the rail is running through anchors and spikes
- Gaps in ballast at the ends of ties
- Churning ballast and ties

When tight rail conditions are present such as above, a speed restriction of 10 mph must be placed or track removed from service until repair or adjustment is made.

Inspectors will pay special attention to the following locations:

- Recently disturbed track
- Track at the bottom of sags
- Locations where heavy braking occurs
- Fixed track structures, such as turnouts and bridges
- Locations where rail has been repaired or welds made

7.2 Cold Weather Inspections

On main tracks, cold weather inspections must be performed as directed by the Roadmaster or other designated person when the rail temperature is forecast to drop 95°F below the Designated Rail Neutral Temperature for the region.

Inspectors will inspect for:

- Broken rails
- Pull-aparts
- Wide gap between rail-ends
- Cracked or broken joint bars (conventional and insulated)
- Bent bolts
- Curve movement
- Canted rail

Speed Restrictions for Cold Extremes:

- A. If ambient temperature drops 25°F or more in previous 24 hours **AND** the low temperature is 20°F or below, **THEN** place a 25 MPH slow order on track.
- B. If ambient temperature drops 25°F or more in previous 24 hours **AND** the low temperature is 5°F or below, **THEN** place a 10 MPH slow order on track.

Place speed restriction between midnight and 7:00 AM at a minimum. After 7:00 AM when the track has been inspected the speed restriction may be removed.

If a speed restriction is required due to extreme cold weather, track forces must inspect the track at the first opportunity and make appropriate repairs or modifications.

Chapter 8 Training

All employees responsible for the inspection, installation, adjustment or maintenance of CWR track **must complete training on CWR procedures every calendar year**. In addition, they shall be provided a copy of these procedures and accompanying documents. A list of those employees qualified to supervise restorations and inspect track in CWR territory will be maintained and made available to FRA upon request. Training programs will address but not be limited to the following:

- CWR installation procedures
- Rail anchoring requirements when installing CWR
- Preventive maintenance on existing CWR track
- Monitoring curve movement following track surfacing and lining
- Placing temporary speed restrictions **on** account track work
- Rail joint inspections
- Insufficient ballast
- Extreme weather inspections
- Recordkeeping

Chapter 9 Recordkeeping

9.1 Report of CWR Installations

Rail temperature, location and date of CWR installations must be recorded on the prescribed form and must be retained for at least one year after installation.

9.2 Report Maintenance Work in CWR

Because track maintenance can disturb the lateral and longitudinal resistance of the track, records of the following must be kept until corrections or adjustments are made:

- Rail that is added or removed for any reason, including repair of broken or defective rail, pull-aparts and welding of rail joints.
- Where curve has been staked and has shifted inward more than a maximum of 3 inches.
- CWR installation or maintenance work that does not conform to these written procedures.
- A record of rail neutral temperature will be maintained where rail has pulled apart, broken or been cut for defect removal.

Roadmaster or other designated person must monitor these records to ensure necessary corrections and adjustments are made.

9.3 Plan Document(s)

A copy of this plan and revisions, appendices, updates and reference materials must be readily available at every job site where personnel are assigned to install, inspect or maintain CWR.

End of Procedure

LIRC

Appendices

for

**Procedures for the Installation, Adjustment, Maintenance and
Inspection of CWR**

Maintenance of Way Department
CWR RECORD OF RAIL LAYING
WEEKLY REPORT

Division _____

Line Name _____

Date Laid MM/DD/YY	Track Number	Rail N,S,E,W	Milepost From	Mile Post To	Measured Rail Temp	CWR String Length	Adjustment From Table	CWR Event

- Note – Measured Rail Temperature is rail temperature taken before heating.

Target Neutral Temperature for LIRC is 95°.

Length of Unrestrained Rail

Temperature Difference in Degrees	400'	600'	800'	1,000'	1,200'	1,400'	1,600'
5°	1"	1"	1"	1"	1"	1"	1"
10°	1"	1"	1"	1"	1"	1"	2"
15°	1"	1"	1"	2"	2"	2"	2"
20°	1"	1"	2"	2"	2"	3"	3"
25°	1"	2"	2"	2"	3"	3"	3"
30°	1"	2"	2"	3"	3"	4"	4"
35°	1"	2"	3"	3"	4"	4"	5"
40°	2"	2"	3"	3"	4"	4"	5"
45°	2"	2"	3"	4"	5"	5"	6"
50°	2"	3"	3"	4"	5"	6"	7"
55°	2"	3"	4"	5"	6"	6"	7"
60°	2"	3"	4"	5"	6"	7"	8"
65°	2"	3"	4"	5"	6"	7"	8"
70°	3"	4"	5"	6"	7"	8"	9"
75°	3"	4"	5"	6"	7"	9"	10"
80°	3"	4"	5"	7"	8"	9"	10"
85°	3"	4"	6"	7"	8"	10"	11"
90°	3"	5"	6"	7"	9"	10"	12"
95°	3"	5"	6"	8"	9"	11"	12"
100°	3"	5"	6"	8"	10"	11"	13"

Adjustment Calculation: Inches to Expand = Rail Length in feet X Temp Difference (Desired – Existing) X .000078.

Instructions: Gang Foreman is to complete report daily and record the rail laying temperature, location and date on the web of the rail when laying CWR and at the end of each work week send a copy to the Roadmaster and General Manager, Keeping one copy for his record.

Foreman _____

Employee No. _____

Roadmasters Instructions: Roadmaster will verify the proper expansion for CWR strings and mark any reported installation as an event for destressing when conditions allow.

MW101(A)

REPORT OF RAIL ADDED TO CWR

Roadmaster _____

Division _____

Line Name _____

Item #	Date MM/DD/YY	Track Number	Rail N,S,E,W	Milepost Location	Measured Rail Temperature	Amount of Rail Added	Reason For Adding Rail

Instructions: Gang Foreman is to complete report and forward to Roadmaster anytime rail is added to CWR track, when thermite welding, installing a plug, or changing a defective rail. Adding rail to CWR should be avoided whenever possible. Roadmaster will monitor locations where rail has been added to CWR to determine if adjustment is necessary.

Foreman Name _____

Employee Number _____

Roadmaster Instructions: After inspecting locations where rail is added to CWR, the roadmaster will complete the following section for items qualifying as CWR track events.

Item #	Action to close Rail Added CWR Event	Date MM/DD/YY	Date/Initials D.E.Review	Date/Initials Eng.Track Rev.

Record Of Rail Removed From CWR

Roadmaster _____ Division _____ Line _____

Date MM/DD/YY	Track Number	Rail N,S,E,W	Milepost Location	Measured Rail Temperature	Amount Of Rail Removed	Reason For Removing Rail

Instructions: Gang Foreman is to complete report and forward to Roadmaster anytime rail is removed from CWR track, when thermite welding, repairing sunkinks, or changing a defective rail. Unless necessary to make CWR rail adjustment, removing rail from CWR should be avoided whenever possible. Roadmaster will monitor locations where rail has been removed from CWR to determine if additional adjustment is necessary.

Foreman Name _____

Employee Number _____

REPORT OF CURVE MOVEMENT DURING SURFACING

Line Name _____

[illegible]

Employee Number _____

RECORD OF DISTURBED COLD WEATHER TRACK EVENTS WITH POTENTIAL OF TIGHT TRACK

[illegible]

Employee Number _____

CWR JOINT BAR FRACTURE REPORT		TYPE OF INSPECTION ☐ PERIODIC JOINT INSPECTION (213.119[g][5][i]) ☐ TRACK INSPECTION (213.233) ☐ TURNOUT INSPECTION (213.235)	
RAILROAD: _____		SUBDIVISION: _____	
DATE FOUND: ____ / ____ / 20____		ANNUAL MGT: _____	TRACK #: _____
☐ TANGENT ☐ CURVE ____ degrees ☐ LOW/INNER RAIL ☐ IN SPIRAL ☐ HIGH/OUTER RAIL		RAIL SECTION(S): ____ / ____	
ANNUAL JOINT INSPECTION FREQUENCY FOR THIS SEGMENT: ☐ 1x ☐ 2x ☐ 3x ☐ 4x ☐ OTHER: _____		DATE OF LAST JOINT INSPECTION: ____ / ____ / 20____	

BAR TYPE (check all that apply)	☐ STANDARD	☐ INSULATED	☐ COMPROMISE
NUMBER OF HOLES: ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8			

FIELD SIDE BAR BROKEN THROUGH Check location of break: ☐ CENTER ☐ INNER BOLT HOLE ☐ OTHER CRACKED Check location(s) and record length(s): ☐ TOP CENTER _____ inches ☐ BOTTOM CENTER _____ inches ☐ INNER BOLT HOLE _____ inches ☐ OTHER BOLT HOLE _____ inches ☐ OTHER (describe) _____ inches	GAGE SIDE BAR BROKEN THROUGH Check location of break: ☐ CENTER ☐ INNER BOLT HOLE ☐ OTHER CRACKED Check location(s) and record length(s): ☐ TOP CENTER _____ inches ☐ BOTTOM CENTER _____ inches ☐ INNER BOLT HOLE _____ inches ☐ OTHER BOLT HOLE _____ inches ☐ OTHER (describe) _____ inches
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GAP BETWEEN RAIL ENDS _____ INCHES RAIL END BATTER OR RAMP ☐ NORTH or ☐ EAST RAIL END _____ INCHES HIGH _____ INCHES LONG ☐ SOUTH or ☐ WEST RAIL END _____ INCHES HIGH _____ INCHES LONG TREAD MISMATCH _____ INCHES JOINT VERTICAL MOVEMENT _____ INCHES	
--	--

<u>IF JOINT IN CURVE or SPIRAL:</u>	
GAGE RAMP	_____ INCHES OUT _____ INCHES LONG
GAGE MISMATCH	_____ INCHES
JOINT LATERAL MOVEMENT	_____ INCHES

OTHER COMMENTS:

Rail Separation (Pull-a-Part Reporting) (Circle or Enter the Required Information)

1. Subdivision: _____
 2. Employee ID or SS # _____
 3. Mile Post _____ Track No. _____ 1 2 3 4 5 6 7
Main Line____ Siding____ Yard____ Crossing____
 4. Date of failure ____/____/____ Rail L / R (*Face increasing Mile Post to determine*)
 5. Rail Weight: _____ lbs. Track Alignment Rail: Hi____ Low____ Tangent____
 6. Bolts Sheared: Y / N Joint Bar Length: _____ 4 Hole / 6 Hole
 7. Number of Bolts Sheared: _____ 0 1 2 3 4 5 Bolt Grade: _____ 2 / 5 / 8
 8. Slipped Through Anchors: _____ Y / N
 9. Distance Pulled Apart: (inches) _____
 10. Pull-a-part Time: _____ Ambient Temperature: _____ ° F
 11. Designated Rail Laying Temperature: _____ ° F
 12. Found by: Engineering Employee / Signal / Train Crew / Other _____
 13. Anchor Pattern: _____ Every Other Tie (EOT) / _____ Every Third Tie / _____ Every Tie
_____ Other _____
 14. Anchor or Clip Type: _____ Pandrol Concrete / _____ Pandrol Wood / _____ Other _____
_____ Safelok / _____ Channel Lock/ _____ Unit
 15. Rail Type: _____ Jointed / _____ CWR / _____ Turnout
 16. Tie Type: _____ Wood / _____ Concrete / _____ Other
 17. Comments: _____

 18. Corrected: _____ Y / N
 19. Remedial Action: _____ Speed: _____
 20. Correction Method: _____
Date: _____ / _____ / _____
 20. Joints: _____ Added / _____ Eliminated / _____ Neither Number: _____
Track: _____ Track / _____ Switch _____
 21. Rail: _____ Added / _____ Subtracted / _____ None Inches: _____ Permanent: _____ Y / N
- Copy provided to Roadmaster: _____ Y / N Date: _____ / _____ / _____**

Desired Rail Neutral Temperature

Zone area	From	MP	To	MP	Subdivision	If Rail Temp Below	Before spiking and an- chor- ing, Rail must be heated to:
all						90° F	95° F

Placing Rail Reference Marks

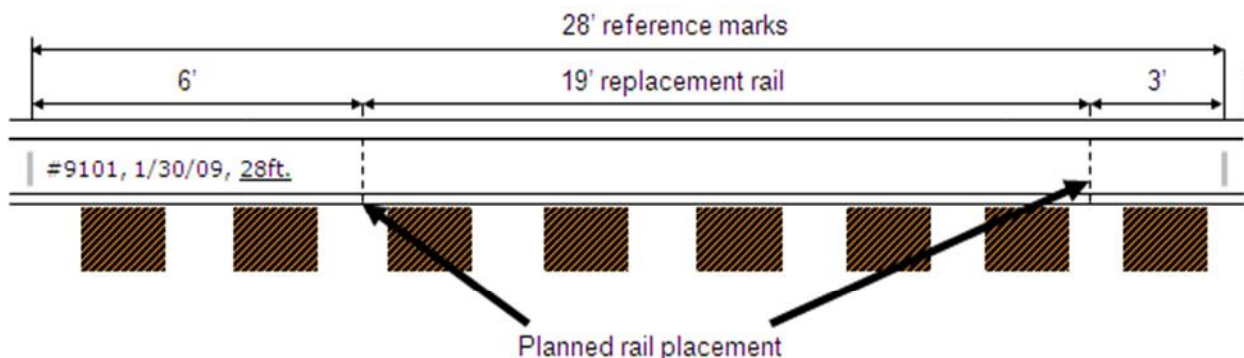
Placing rail reference marks is a method of measuring the amount of rail added or subtracted in CWR territory.

Reference marks must be utilized prior to cutting CWR for any reason.

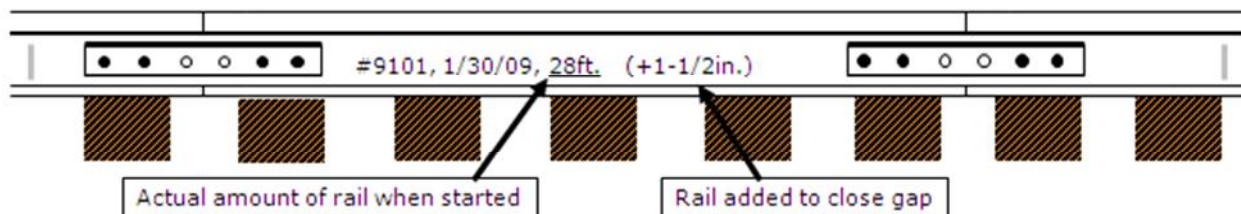
Use the following guidelines when placing reference marks.

- Use a permanent white metal marker or paint stick (not soapstone) to record reference marks.
- Place reference marks on the field side of the rail, down the web, across the base and across the tie plate or tie concrete tie shoulder.
- Reference marks should be at least 3' from where the cut is made so that joint bars will not cover the marks.
- The distance between reference marks, gang number and date must be written on the field side web of the rail.
- Record rail that has been added as a plus (+) measurement and rail removed as a minus (-) measurement.
- When rail has been added to the track, ensure rail anchors are installed correctly. After rail has been removed anchors must be applied and adjusted.
- Document the location on MW101(b) Report of Rail Added to CWR and send a copy to the roadmaster who will arrange for later adjustment if needed.
- Any rail added during temporary repairs must be removed when making permanent repairs.

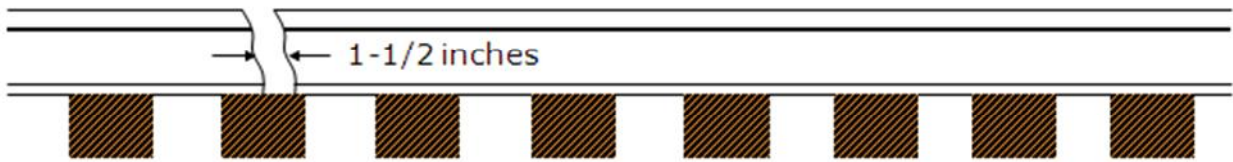
When adding a replacement rail to repair a rail defect that has not separated, determine where to cut the rail to ensure that the cuts align with the tie cribs. Measure at least 3 feet from each rail cut mark, before the rail is cut, and place reference marks on the web and base of the rail to record the total distance between the reference marks.



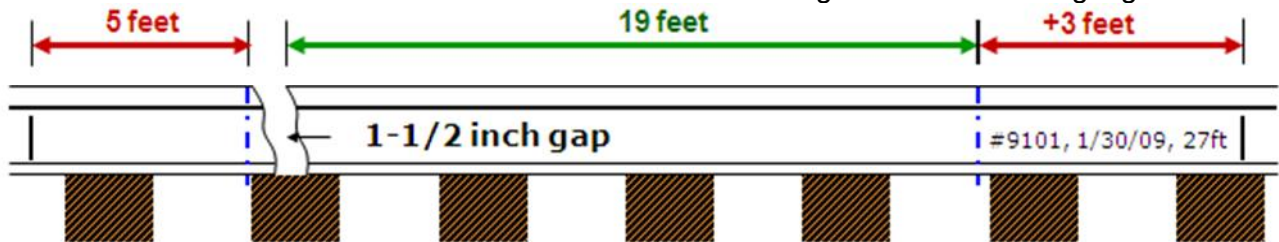
In the example below, when the rail was cut, the rail gapped open 1 ½". The replacement rail was installed and after the joint bars were applied the distance between the reference marks is now 28 feet 1 ½ inches. Document the 1 ½" added as a (+) measurement. The 1 ½" of rail added must be removed when the permanent repair is made.



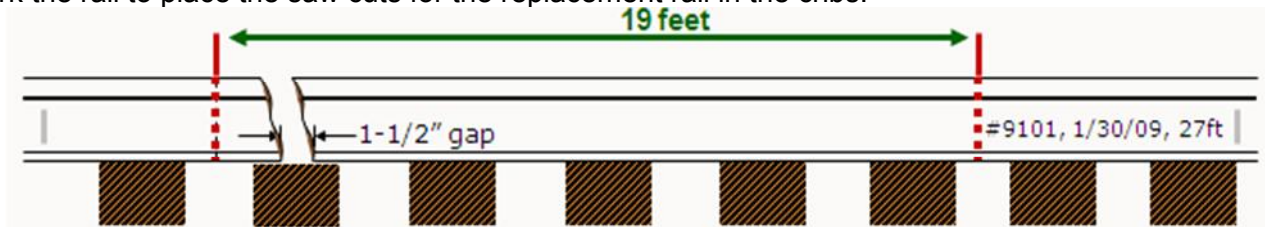
In cases of pull-a-parts and service failures where the rail has gapped open, the distance marked on the web of the rail must not include the gap in the rail. The reference marks should always indicate the original distance, (amount of rail) between the marks before the break or pull-apart occurred. In this example the gap is 1 1/2" wide and the break is crooked.



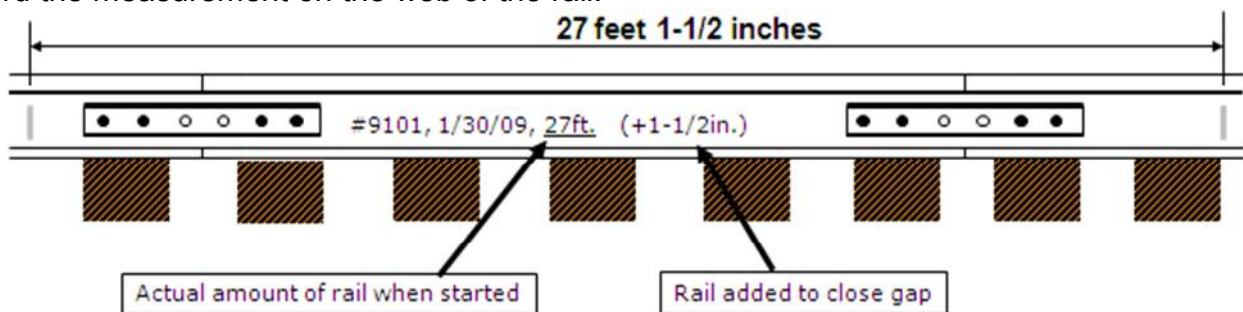
To properly apply reference marks, measure back from one end of the break at least 3 feet and mark the rail. Measure in the other direction from the opposite end of the break the length of replacement rail plus an additional 3 feet and mark the rail. In this example there is 27' of rail between the reference marks. Record this on the web of the rail along with the date and gang #.



Mark the rail to place the saw cuts for the replacement rail in the cribs.



Once the repair is completed, measure the distance between the reference marks and record the measurement on the web of the rail.



Handling and Selecting Replacement Rail

When rail has been cut with a torch, before placing joint bars or welding the rail you must remove at least $\frac{1}{2}$ inch of rail from the torch cut ends. Allow torch cuts to cool at least 2 minutes before saw cutting so saw blades will not warp from the heat of the torch cut.

If more than 30 minutes have elapsed since the torch cut was made saw cut at least 6 inches from the torch cut end.

Rail joints must not be made where torch marks in the rail are present.

The torch cut shall be a minimum of 4' from a plant or factory weld and 6' from a field weld.

1.1 Plug Rails

When necessary to make rail repairs on the main line or controlled sidings that require the addition of rail to the track, use the following table to determine the minimum length of plug rail to be used:

Track Geometry	Minimum Length Plug Rail
Tangent	11'-0"
Curves less than 3 Degrees	18'-0"
Curves 3 Degrees and over	30'-0"

Track geometry and other physical conditions should be considered that might require the length of plug rails to be increased or decreased. If the length installed is less than these minimums, location and condition will be reported to the Roadmaster and/or Track Supervisor.

1.2 Bolt Holes

No bolt holes will be drilled within 3 inches of another bolt hole. No weld will be made within 5 inches of an existing bolt hole.

1.3 Temporary Repairs

Temporary repairs to rails may be made without compliance to these procedures. When temporary repairs are made using less than these procedures, all trains must be inspected over the temporary location.

1.4 Replacing Defective or Broken Rails.

a. Selecting Replacement Rail

When using a second hand rail, select and install replacement rail that provides the best possible match on both the gage side and the running surface. Visually inspect

the rail for any defects. Install rail of the same metallurgy. Do not install standard carbon rail in curves with premium or head hardened rail. Make every effort to use a rail from a known origin that has had a successful ultrasonic test prior to its removal from the track. If replacement rail is of an unknown or suspicious origin and has not been ultrasonically tested, a 10 mph slow order must be placed on this rail until an ultrasonic test can be made and it is verified that there are no internal defects.

Install rail plugs in continuous welded rail territory that is as long as or longer than the minimum lengths specified in section 1.1 above. Insure that joints to be welded fall in the center of the ballast crib.

b. Handling of Scrap Rail and Rail Removed from the track.

When changing rail in the field, such as behind a detector car, make every effort to take the old rail to the appropriate storage area when the work is complete, or at the end of the shift. If this is not possible, move the rail to a location on the right-of-way that is not in the walkway but that is accessible for recovery with a boom truck. Remove rail left in other than a storage area as soon as possible.

A notch torched at the defect must mark rail that has been removed from the main line due to a defect, and this rail must be put in an appropriate scrap location.

Scrap rail must not be used in the main line as replacement rail, but must be marked by a torch or the use of a paint stick to insure that it is not used again.

c. Defects that Condemn Entire Rail

Scrap any rail (bolted or welded) that contains any of these defects:

- Transverse defect
- Vertical split head
- Piped rail

If a conventional bolted rail contains any defect listed above, do not crop or reuse that rail in any track. If rail in continuous welded rail territory contains any of the defects listed above, cut the rail out of the track from weld to weld, including the welds. Defective rail must be marked as specified in item b above and scrapped.

d. Temporary repairs to Rail Condemning Defects

Temporary repairs to defects listed in c. may be made by applying joint bars bolted only through the outermost holes as per 49 CFR part 213 section 213.113.