



Iowa Department of Transportation

SPECIAL PROVISIONS FOR RAILROAD TRACK

Black Hawk County
NHSX-218-7(207)--3H-07

Effective Date
November 18, 2014

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

120205.01 DESCRIPTION.

Railroad Track consists of ties, rails, and fastenings delivered in conformity with the contract documents.

120205.02 MATERIALS.

A. Rail.

New 115 RE rail (115 pounds/yard) will be furnished by Cedar River Railroad (CEDR) and delivered in rail strings of 1000 feet. Rail will conform to Canadian National Railway (CN) Standard TS-1111 and Chapter 4, Part 2 of American Railway Engineering and Maintenance-of-Way Association Manual for Railway Engineering (AREMA). Rail will be head hardened commercial grade.

B. Fastenings.

1. Track Spikes.

Will be furnished by CEDR new per Common Standard 130005.

2. Rail Anchor.

Will be furnished by CEDR new Bar Stock type per CN Standard TS-1313.

3. Joint Bars.

36 inch joint bars will be furnished by CEDR new per CN Standards TS-1201 and TS-1202.
48 inch joint bars will be furnished by CEDR new per AREMA Standard 115RE Rolled Joint Bar.

C. Wood Ties.

Wood ties will be furnished by CEDR and supplied pre-plated per CN Standard TS-514, TIE PLATE SET UP for 115 pound rail and will conform to Chapter 30, Part 3 of AREMA. All ties will be new hardwood species. Wood ties will be sawed not less than 7 inch thick and 9 inch wide.

The length will be 8.5 feet. Splits shall not be longer than 4 inch and not wider than 1/4 inch at either end. Splits longer than 4 inch but not longer than the width of the face in which the split appears, will be acceptable if specified anti-splitting devices are installed with the splits compressed. Any required adzing and drilling for spikes shall be performed prior to treatment.

D. Ballast.

Ballast shall be granite or quartzite and conform to the mainline ballast material requirements in Chapter 2 Part 2 of AREMA.

E. Subballast.

Subballast shall conform to Chapter 1 Part 2 of AREMA.

120205.03 CONSTRUCTION.

A. General.

Track construction not covered specifically herein shall be in accordance with AREMA recommendations and recommended practices. All work shall be supervised by experienced personnel skilled in railroad track construction. Track construction not covered by this specification shall be per AREMA Chapter 5, Parts 4 and 5.

The Contractor shall exercise care in the handling and distribution of track material and in the construction of the track to avoid disturbing the surface of the subballast. Any damage to either the subballast surface or side slopes caused by the Contractor's operations shall be repaired at Contractor's expense and to the satisfaction of the Engineer.

CEDR will unload continuous welded rail from a rail train. CEDR will unload materials within 1 mile of the required locations.

The Contractor shall be responsible for loading and hauling materials from stockpile locations as well as for placing materials at construction locations. Prior to loading materials from stockpiles, Contractor shall inspect materials for damage or irregularities and notify the Engineer of same. If materials are damaged, lost or wasted through Contractor's negligence, poor workmanship or handling, Contractor shall replace said materials in kind at no additional cost to the Iowa DOT.

No additional compensation will be allowed for segregating materials of questionable quality or condition. After inspection by the Engineer, Contractor will be advised if material in question is suitable for use. If material is rejected by the Engineer, the Contractor shall transport the rejected material to location(s) designated by the Engineer.

The Contractor's responsibility for project materials begins at the time the materials arrive on site and continues through its placement into the track structure and until final acceptance of the track by the Engineer. If materials are damaged, lost, or wasted through Contractor's negligence, poor workmanship or handling, Contractor shall replace said materials in kind at no additional cost to the Iowa DOT.

The hardware (Other Track Material) received at the job site shall be protected as required from corrosion by storing under cover or by a protective coating as directed by the Engineer.

Materials which are to be supplied by the Contractor shall conform to the requirements stated in these specifications.

B. Wood Ties.

Wood ties will consist of banded bundles as well as loose stacked ties. Depending on the procedure for handling banded material, it may be necessary for Contractor to inspect ties after loading and hauling from stockpile locations to track construction locations. Any defective ties

discovered after removal of the bands and prior to placement in the track shall be segregated for inspection by the Engineer.

Timber ties shall be handled in such a manner as not to damage them, using approved handling equipment. Tie tongs shall be used for this purpose. Pulling timber ties into position with picks or shovels will not be permitted.

Cross ties shall be placed at a spacing of 19-1/2 inches centers. The cross ties shall be placed on the approved finished subballast, perpendicular to center line of track, with the right hand (in the direction of increasing stationing) ends of cross ties being parallel to the center line of track. Each end of the cross tie shall be the same distance from center line of track, except on curves, where cross ties are to be aligned to the inside of the curve. All rail joints/welds are to be suspended between ties.

If spikes are pulled from any timber tie, the hole shall immediately be filled by driving in a treated wood tie plug the full depth of the hole.

The top surface of the timber ties shall be clean and smooth to provide full bearing for tie plates. The bottom of the rail, the tie plate and the wearing surface of the timber tie shall be broom cleaned before the rail is laid.

Wood ties will be supplied pre-plated.

C. Rail.

Continuous Welded Rail (CWR) is rail welded into lengths of 400 feet or more.

The Contractor shall provide such labor, equipment, and tools necessary and required for welded rail track construction.

It will be necessary for the Contractor to move the welded rail strings to the exact location they are to be installed. The Contractor shall furnish such additional equipment and supplies as may be required to adequately distribute welded rail strings. Care must be taken to ensure that strings are laid such that gauge faces of rail are matched according to their previous position in track.

The Contractor shall provide for the movement and handling of and the laying of welded rail strings in such a manner as to avoid damage to new roadbed, subballast, and rail. Care must be exercised to avoid twisting or damaging welded rail strings. . The Contractor shall be responsible for damage to welded rail strings during handling. If, in the opinion of the Engineer, a rail string is damaged and unsuitable for use in track, the rail section shall be replaced solely at the expense of the Contractor and at no expense to the Iowa DOT. The method and equipment used by the Contractor in handling and movement and the laying of welded rail strings will be subject to the approval of the Engineer.

Rail shall be free of dirt and foreign material when installed. Each string of rail placed into the track structure shall be numbered at a point within 10 feet of each end of the rail as it is laid by the Contractor with permanent type marker. Numbering shall be in accordance with the Engineer's instructions.

The Contractor may add additional joints in a solid length of CWR with the approval of the Engineer.

The welded rail strings may be delivered with torch cut ends or torch cut holes in the ends. Rail ends with torch cut holes or torch cut ends shall be removed. Any removal of ends with torched areas shall be accomplished by use of a rail saw a minimum of 6 inches from the edge of the torch cut area. Distance is measured from the cut face to the closest edge of the torch cut or area.

Rail shall be cut square and clean by means of a rail saw and all burrs shall be removed. Torch cut rail will not be allowed to remain in the track. CWR strings shall not be cut to facilitate laying or fitting without written approval of the Engineer.

Assemble temporary track rail joints before fastening rails to timber ties at the joint using joint bars with minimum of 4 track bolts and a spring washer for each bolt, first removing all dirt, loose mill scale, and rust from contact surfaces of joint bars and rails.

1. Holes for track bolts shall be drilled only with an approved type of rail drill. Under no circumstances shall new holes be drilled between two holes already drilled.
2. Rail joints shall be applied so that bars are not cocked between base and head of rail.
3. If necessary to force joint bar into position, strike lower edge of bar lightly with 4 lb. maul. Do not drive bolts in place. Under no circumstances shall rail be struck in web with tool or any metal object.
4. Track Bolts are to be tightened in sequence. Begin at joint center and work out toward ends. Bolts are to be tightened to torques required as per manufacturers recommendation. If a bolt-tightening machine is not used, a standard track wrench with a 42 inch long handle may be used.

Rails less than 12 feet long on curves and 8 feet long on tangents shall not be used except for temporary closures.

Ends of welded rail strings shall be staggered by at least 19 feet-6 inches unless otherwise authorized in writing by the Engineer. Plant welds shall be staggered (to the extent possible) by at least 19 feet-6 inches. The specified rail stagger shall not be required for transition rails installed at turnouts.

Nicked or gouged rail shall be rejected and replaced as directed by the Engineer at the sole cost of the Contractor.

Upon completion of a day's work, all rail laid must be fully spiked, bolted and anchored, unless approved protective measures are in place.

D. Turnout Construction.

The Contractor shall provide such labor, equipment, materials not supplied by CEDR, superintendence, and tools required for turnout construction.

1. Install turnouts in accordance with the appropriate standard plans.
2. New Turnouts will be furnished in panels. #10 turnouts will consist of three sections; Rail gaps at turnout panels shall be bolted.
3. Minimum 16 **inch** tie plates are to be used in turnout construction.
4. All switch ties must be as laid out on standard plans, properly spaced and square to through track.
5. The turnout stock-rail must be bent horizontally, as shown on the standard plan. Only standard carbon and 3HB rail, in 115 **pound** section or smaller, may be field bent with an approved bender. For safety reasons, under no circumstances are head hardened rails or rails greater than 115 **pound** to be bent in the field.

6. Ensure the switch point fits snugly against the stock rails for the entire length of the planed portion. Points will not overhang gauge plates nor be more than one inch back from front edge. Running surface of points will be **1/4 inch** above stock rail, as measured at the location where the distance between gauge face of stock rail and gauge face of switch point when tight against the stock rail is 4 1/2 **inches**.
7. Bolt switches, frogs and guard rails fully. Provide washers and cotter pins for bolts. Grade 8 bolts are identified by six radial lines on the head of the bolt and are to be tightened as per:

Size of Bolt		Torque
Inches		Ft-Lb.
1		840
1-1/4		1675
1-3/8		2500

8. All turnouts must be fully spiked or fastened with tie screws and clips. Spikes are to be fully driven or timber tie screws drawn down.
9. Switch stands for hand throw turnouts will be located as per instructions issued by CEDR.
10. Switch stands must be plumb, securely spiked, bolted or lagged to the head block ties. They must also be secured with lock or keeper as supplied.
11. Standard throw of switch points as measured at the No. 1 switch rod and at the No. 5 switch rod of turnouts equipped with auxiliary throw mechanism must be set in accordance with the appropriate standard plan.
12. Switch rods and transit clips must not contact the side of the tie or the slide plate.
13. All switch stands must be equipped with the appropriate reflectorized target assembly (in some locations a double bladed target tip is required). Target assemblies shall be properly adjusted to display green when the switch is lined for the normal route and yellow when lined for the diverging route.
14. Except the bolt under the switch stand, install switch rod bolts and connecting rod bolts with the nut on the upper side to permit ready inspection of the cotter pin.
15. Install the connecting rod bolt under the switch stand with the head on the upper side.
16. Cotter pins are to be installed on all connecting and switch rod bolts.
17. Position the handle on the switch stand so that when the switch is in the normal position it faces away from the frog and the track, and moves in the same direction as the points when the switch is lined for the diverging route. Switch handles of rigid switch stands will be adjusted such that they cannot be placed in locking position with normal pressure when 1/8 inch shim placed between point and stock rail at first rod.
18. Lubricate switch stands, switch plates, connecting rod bolts and spring frogs properly after assembly.
19. Stock rails must be properly seated in the switch plate, have no lateral movement in the plates and switch plates have no movement on the ties.
20. Care must be taken in adjusting braces to avoid over-driving and rotating the stock rails out of the seat of the plate.

21. Flangeways must be clear of obstructions and not less than 1 1/2 inches deep, not less than 1 3/4 inches wide and not more than 2 inches wide.
22. Guard Check Gauge: The minimum distance from the gauge line of a frog to the guard line of its guard rail or guarding face, as measured across the track at right angles to the gauge line is 4 feet 6 1/4 inches.
23. Guard Face Gauge: The maximum distance between guard lines as measured across the track at right angles to the gauge line is 4 feet 5 1/8 inches.
24. Fully anchor the rail on both tracks through turnouts except where anchors will interfere with switch points. Fully anchor for 200 feet in both directions beyond the turnout.
25. Once installed, line new turnouts for through movement and spike the switch point. Switch points shall remain spiked until inspected by a CEDR Track Supervisor.
26. At turnouts and elsewhere as needed, connect rail to turnouts using 136#/132# or other compromise rails or compromise joints, to be paid under the Construct Track item. CEDR will furnish the transition rails in approximately 25 foot lengths.

E. Rail Anchor.

All cross ties shall be anchored in a box pattern on every other tie except at permanent joints not welded, adjacent to jointed rail and at turnouts & non glued insulated joints. They shall be anchored at every tie for a distance of 200 feet. The same ties on opposite rails shall be boxed.

1. Only the proper tools or machines may be used when applying or removing anchors. The use of spike mauls is prohibited.
2. Anchors shall be installed from gauge (inside face) to field side (outside face) of rail to ensure full bearing surface against the side of the tie, bearing against the adjacent tie and remain tight on the rail. Anchors must be on the same side of the same tie on both rails. Ties are to be at right angles to the rail before applying anchors. Anchors improperly installed shall be removed and applied correctly without additional charge by the Contractor. Anchors shall only be removed when the rails are still in the track.
3. Anchors must be fully driven; however, care must be taken to avoid over-driving as this may fracture or spread the metal, resulting in loss of holding power. Any rail anchor that is fractured or with metal spread shall be rejected and replaced with another anchor at the Contractor's expense.
4. Anchors shall be installed only after the track has been raised, lined, and ties re-spaced, following all ballast operations and de-stressing of the welded rail.
5. Care must be exercised in the spacing of anchors to ensure that no anchors are located on any tie under or adjacent to the ends of a rail joint bar or thermite weld.

F. Track Spikes.

Uniform track gauge must be maintained when spiking and must be checked by use of a standard track gauge.

The right hand rail going in the direction of increasing stationing shall be spiked to cross ties, and the opposite rail shall be brought to standard gauge of 4 feet 8 1/2 inches measured at right angles between the rails, 5/8 inches below the top of rail. Gauge shall be checked at every third tie by using a tested and approved track gauge. Curves shall have gauge widened in accordance with the following table:

<u>Degree of Curve</u>	<u>Gauge</u>
10 degrees or less	4 feet, 8 1/2 inches
Greater than 10 degrees	Increased 1/16 inch per degree of curvature above 10 degrees

Spikes shall be driven only with a standard spike maul, pneumatic or hydraulic spiking hammer or spiking machine.

Cross ties shall be spiked in accordance with the current ENGINEERING TRACK STANDARDS FIGURE 1: SPIKING PATTERNS (see Plans). Cross ties shall be spiked with a minimum of three rail holding spikes on each rail, two on the gauge side and one on the field side of the base of rail, or as shown in ENGINEERING TRACK STANDARDS FIGURE 1: SPIKING PATTERNS (see Plans), staggered so that the outside spikes for each rail are on the same side of the tie.

All spikes shall be started and driven vertically with the face of the spike in contact with the base edge of the rail and so driven as to allow 1/8 to 3/16 inch space between the underside of the head of the spike and the top of the base of the rail. In no case shall the spikes be overdriven or straightened while being driven. When spikes are driven by machine, work shall be closely supervised to see that they are driven with a hammer centered exactly over each spike head and drive the spike vertically. Set the stop on the machine to prevent overdriving.

No spike shall be within 2 inches of the end of a joint bar, or in slots of skirted joint bars if present. Do not strike rail directly with a maul, either on top when driving, or on side to obtain track gauge.

Withdraw spikes that are incorrectly driven and fill holes by driving a treated tie plug to full depth of hole. Locate replacement spike at another hole in tie plate.

G. Ballast.

Contractor shall unload and place all crushed rock ballast material, surface, tamp, line, finish surface, regulate, and power broom new track constructed. All tracks shall be surfaced and tamped as soon as possible after unloading and placing ballast.

Ballast shall be placed as shown on the drawings. Ballast shall be compacted by approved tamping methods to hold track firmly in place. All tamping operations shall be performed with an approved power tamper machine.

The Contractor shall direct the unloading and distribution of ballast and shall be fully responsible for all aspects of the unloading and distribution, subject to approval by the Engineer. All costs associated with any equipment derailed during ballasting, including repairs to damaged railway equipment shall be the responsibility of the contractor.

If ballast is delivered by rail car, when unloading ballast in the center of the track, a plow tie may be used in order to evenly spread ballast and prevent excessive rock from accumulating on the rail and possibly derailling cars. After unloading ballast, all cars shall be completely empty and doors closed and locked prior to being released.

Power tamping machines are to be used throughout all track construction. Manual tamping will not be allowed. The use of a ballast compactor together with the power tamping machines may be used with the written permission of the Engineer.

1. Tamping machines shall be automatic multi-tooled with a minimum of 4 tamping feet per rail and have automatic profile reference beams of not less than 75 feet.

2. Each tool shall have a tamping pressure sufficient to close the ballast beneath each tie. The foot of each tool shall be a minimum of 1 1/2 by 3 inches at all times.
3. A junior tamping machine less the reference beam may be used in conjunction with a lead machine provided that all other characteristics of the lead machine are the same on the junior tamper. The tamping machine with the reference beam shall tamp a minimum of every second tie.
4. Any proposed ballast compaction equipment shall be approved by the Engineer.
5. No part of the track structure shall be raised more than 3 inches in any one lift. New track construction shall be worked more than once and the Contractor shall apply additional ballast to conform to the ballast cross section shown within the Typical Track Section.
6. Each lift is to be tamped from a line 16 inches inside each rail on both sides of and to the ends of the ties. Center area between these limits shall be filled lightly with ballast but not tamped. Tamping shall proceed, simultaneously, at both ends of the tie making sure ballast is forced directly under the ties and against the sides and ends of the ties.
 - a. Too many insertions with a power tamper may cause a center bound track condition. Generally two squeezes per tie up to 1 1/2 inches of raise with one additional insertion and squeeze for each additional 1 inch of raise is preferred.
 - b. When the track has been raised to within 2 inches of final grade, the final lift shall be made by raising the track up to grade stake elevation, making necessary allowance for settlement. The ballast shall be applied under the ties for their entire length.
7. During raising and tamping, if any crib area is void of ballast below the bottom of the tie the area of the track is to be re-tamped following the application of additional ballast.
8. While raising and tamping track, levels shall be constantly used to ensure correct surface and cross-level.
 - a. Contractor shall finish each point on the track to within a maximum of 1/4 inch deviation from zero cross-level on tangent. Average cross-level on tangent and superelevation on curves will be as specified.
 - b. Contractor shall finish the track so that the difference in cross level between any two points less than 62 feet apart on tangents and on curves between the spirals must be no more than 1/2 inch. Variations in cross level on spirals in any 31 feet shall not be more than 3/8 inch. Track shall be finished so that the deviation from uniform profile on either rail at the mid-ordinate of a 62 foot chord may not be more than 5/8 inch.
 - c. Contractor shall finish the track so that the horizontal alignment between any two points 62 feet apart on tangent track will deviate from a straight line by no more than 3/8 inch. Mid ordinate of a 62 foot chord between two points on the gauge side of the outer rail will be one inch per degree of curve with an allowable tolerance of plus or minus 5/8 inch.
9. After track has been brought to true surface, elevation, and grade, it shall be given a final lining and placed in true alignment and grade conforming to the elevations and alignment according to the plans and the ballast dressed to the design ballast cross section.
10. When raising track, the Contractor has a tolerance of $\pm 1/4$ inch to the design grade as long as requirements of this Section are met. If not raised to the established grade, the Contractor shall unload ballast in sufficient quantity and continue to surface the track to comply with the tolerances.
 - a. All ties shall be straightened and re-spaced as necessary immediately prior to unloading ballast for the final raise.
 - b. If the Contractor raises the track too high to comply with the allowable tolerances, Contractor shall, at his expense, excavate the ballast sufficiently to lower the track and then surface the track again to bring it within tolerance.

11. When track is lifted or jacked, care must be exercised by the Contractor to avoid stressing or permanently bending the rail, joints, or turnout components.
12. When surfacing through a turnout with boltless adjustable rail braces, switch points and stock rails will be blocked to prevent displacement of stock rail from the switch plate.
13. Tamp turnout ties for 16 inches on each side of main and turnout rails. Headblock ties shall be tamped as above with no voids under remainder of tie.
14. Turnout tie cribs shall be full except to prevent contact with rods and to provide drainage as required.
15. Contractor shall correct any hanging or skewed ties that are result of his tamping and raising the track. Tie plates shall be positioned so that the shoulder is against the outside base of rail for the entire length of the shoulder.
 - a. Contractor shall plug and re-drive all high or loose spikes and shall plug and replace all spikes removed.
 - b. Contractor shall replace and/or adjust all tie plates and rail anchors knocked off, worked loose, or damaged during the surfacing and regulating. The anchors shall remain matched across from each other on each rail. Tie plates shall remain square to the tie.
16. Contractor shall provide the ballast section as shown in the Typical Track Section. No dirt or foreign materials will be allowed into the ballast section.
17. After track has been brought to true surface, elevation, and grade it shall be given a final lining and placed in true alignment conforming to design and the ballast shall be trimmed neatly to the dimensions and widths of the Typical Track Section.
 - a. Cribs shall be filled to top of tie.
 - b. No ballast will be left on top of ties, spikes, fasteners and plates.
18. Surplus ballast shall be spread evenly along the ballast slopes. Dressing of the ballast by placing earth higher than the toe and thus preventing proper drainage shall not be permitted. After all ballast placement has been completed, the track shall be given a complete power broom finish with approved machinery. Contractor shall ensure that the top of ballast rock matches the top of tie surface and that no excess ballast remains on either the top of rail, top of tie, base of rail, or top of tie plate, spike or anchor or roadway crossing surface.
19. Contractor shall exercise caution while regulating ballast shoulders so as to avoid track misalignments and to avoid obstructing adjacent drainage ditches, structures, or culverts with ballast, dirt, vegetation, or other material.
 - a. If Contractor obstructs an adjacent drainage ditch, structure, or culvert, Contractor shall initiate the cleaning of those as soon as possible.
 - b. Contractor is responsible to ensure that the partially ballasted track in his work area does not buckle out of alignment. If a misalignment of the track occurs as a result of the Contractor's operations, Contractor shall make corrections at no expense to the Contracting Authority.

H. Subballast.

Subballast shall be placed per Chapter 1 Part 2 of AREMA.

Subballast shall be placed in uniform horizontal lifts of not more than 6 inches and thoroughly compacted using approved compaction equipment. Each subballast lift shall be compacted sufficiently to obtain an in place density of not less than 95% of the laboratory maximum dry density.

120205.04 METHOD OF MEASUREMENT.

Measurement will be as follow:

- A. Rail (Railroad).**
Track linear feet shown in the contract documents.
- B. Railroad Ballast.**
Ballast will be measured per ton, satisfactorily placed.
- C. Railroad Subballast, Furnish & Place.**
Subballast will be measured per ton, satisfactorily placed.
- D. Track Shift.**
Track linear feet shown in the contract documents.
- E. Install No. 10 Turnout.**
Per each shown in the contract documents.
- F. Remove No. 10 Turnout.**
Per each shown in the contract documents.

120205.05 BASIS OF PAYMENT.

Payment will be the contract unit price as follows:

- A. Rail (Railroad).**
 - 1. Per track linear feet.
 - 2. Payment is full compensation for furnishing incidental items and installing all ties, fasteners, rail, accessories, and joint bars.
- B. Railroad Ballast.**
 - 1. Per ton.
 - 2. Payment is full compensation for furnishing, installing and tamping of ballast.
- C. Railroad Subballast, Furnish & Place.**
 - 1. Per ton.
 - 2. Payment is full compensation for furnishing and installing subballast.
- D. Track Shift.**
 - 1. Per track linear feet.
 - 2. Payment is full compensation for shifting track.
- E. Install No. 10 Turnout.**
 - 1. Per each.

2. Payment is full compensation for assembly and installation of turnout.

F. Remove No. 10 Turnout.

1. Per each.

2. Payment is full compensation for removal of turnout.