



Engineering Guidelines for Private Siding Design and Construction

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Guidelines for Private Siding Design and Construction

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Foreword

The initial contact for industries requiring a private siding is the Canadian Pacific (CP) Industrial Development group. Industrial Development leads a private siding project from concept to completion and is the main point of contact for the customer.

The CP Engineering department is responsible to approve the engineering design for a private siding. CP may also build a portion of the private siding as required and in accordance with a construction agreement.

The CP generally follows the "Manual of Recommended Practice" of the American Railway Engineering Association (AREMA) unless otherwise specified. All materials for the track work shall comply with applicable specifications and standards of AREMA and CP.

The purpose of this document is to layout the minimum requirements for a private siding design which will allow CP to approve the plan. The document also provides general information about the construction process with CP.

CP requires all contractors to adhere to our "Minimum Safety Requirements for Contractor working on Railway Property" policy which is included in the appendices. Highlighted within the policy is the need for flag protection if work (including survey, construction, etc.) is required on/around CP tracks.

Building Private Trackage and Facilities

Development of detailed design

Once a conceptual review has been completed with Industrial Development, the customer arranges for an engineering consultant to develop a detailed design for their private siding. These drawings are to be signed by a Professional Engineer.

Submission of detailed design to CP

The detailed design drawings prepared by the industry's consultant are to be submitted to Industrial Development for review. The proposed design will be evaluated against CP and AREMA Standards, some of which are outlined in this document. The drawings required for submission are outlined below.

Plan submittals should be in PDF format with 11" x 17" sheet size. A CADD submission may be required depending on the size and complexity of the project.

Review ensures that the design meets CP requirements and CP approval is required before moving to the construction stage.

Construction Process

Upon CP approval of the design, Industrial Development will prepare a construction agreement for execution.

Once the construction agreement is in place, CP will order materials and schedule CP construction forces to perform the work as detailed in the agreement. This usually involves installation of mainline turnouts, signals work, switch heaters, etc.

The customer and its contractors will perform all work beyond the clearance point in accordance with the approved track design and construction agreement. The customer will coordinate its construction work with CP. Customer will be responsible for locating all underground and above ground utilities, and, if required, relocating them or constructing protection around them.

Any deviation or changes from the approved plans that affects either the track work or the structures around the track work must be reviewed and approved by CP.

There is to be no work within the CP ROW without prior authorization from CP.

Completion and Operation

Once construction is complete, an authorized CP employee will conduct a final inspection to ensure CP standards have been met. This must occur prior to commencing operations on the private siding.

A signed private siding agreement is required prior to commencement of operations on the private siding. Industrial Development will prepare the agreement for signature. A plan of the private siding in accordance with example siding agreement plan attached in the appendix section will form a part of the private siding agreement.

Design Standards

Track Curvature

Indicate Beginning of Curve (BC), End of Curve (EC) and spiral points on the track plan. A curve data table must accompany the curve shown on a track alignment drawing.

All curves and turnouts will be shown with their appropriate stationing. Stationing along the railroad tracks will be in feet or meters and be shown in the format of 00+00.00

Minimum distance between reverse curves shall be 100 feet (30 meters).

Curves must have 100 feet (30 m) of tangent between the Point of Curve (PC) and Point of Switch (PS), Bridge End or Road Crossing.

All curves must end at least 60' short of building doors or other objects located where there is a minimum clearance of 8'6". Two (2) inches must be added to the clearance of 8'6" for each degree of curve if the curve ends closer than 60'.

Curves that are greater than 7 degrees 30 minutes will use elastic fasteners and Grade 5 (7"x9"x8.5') ties.

Maximum recommended curvature is 9 degrees 30 minutes. Curvature greater than 9 degrees 30 minutes will require special approval and may be considered only if conditions are such that there is no other viable alternative. These curves will be looked at on a case by case basis. For unit train loop tracks the maximum curvature shall be 7 degrees 30 minutes.

Grades in industry service tracks shall not exceed 1.5% unless it is a unit train facility in which case the maximum shall not exceed 1.0%. Minimum vertical curve length shall be 200 feet (60 m). The maximum practical grade is dependent on operating and other factors. Vertical curves shall not extend into limits of turnout switch ties.

Turnouts

All mainline turnouts will be furnished and installed by the railroad at industry expense. The railroad will construct track up to the clearance point only. Additional costs for mainline turnout installation could include (but not limited to): fiber cable protection or relocation, signal modifications, power switches, electric locks, and switch heaters.

Turnouts will be located in tangent track and a minimum 100' (30 m) of tangent track must be placed between reverse curves and the point of switch.

Industry will be responsible for building a turnout construction pad for each new turnout as well as road access to each mainline turnout for CP forces to maintain turnout.

Mainline turnouts shall be a minimum of # 11. Unit train and high volume facilities will be required to have a minimum of # 15. Turnouts on industry maintained track shall be minimum #9 with 115# rail, it is recommended that minimum #11 turnouts be utilized on industry track where design permits.

Turnouts will show point of switch (PS), and the turnout number with direction. Include weight of rail and if it is to be new rail or relay rail. (ie. #.15 RH (Right Hand) 136lb New).

Mainline turnouts may be required to have switch machines, switch heaters and be signalized depending on their location.

Grounding

Track(s) being used to unload/load flammable materials shall be properly grounded and bonded.

Grading

Construction of an adequate subgrade will be the responsibility of the customer. The customer should retain a professional engineer to design the subgrade.

The Contractor shall place and compact suitable materials in embankments and shall finish the embankments to the grade, slope and alignment as shown on the plans. Suitable materials shall consist of soils free from organics, debris, and frozen materials. Embankment slopes shall be compacted and dressed to provide a uniform and dense slope.

If unsuitable materials are encountered within the track roadbed areas that will affect stability of the roadbed, they shall be removed. Unsuitable material removed shall be replaced to grade with suitable material and properly compacted.

The Contractor shall operate sufficient equipment to properly compact the embankment. Utilize construction procedures and drainage design that will provide a stable roadbed.

Each layer shall not exceed 6" (150 mm) in loose depth and shall be compacted to the dry density as specified before additional layers are placed. All embankments shall be compacted to a density of not less than 95% of the maximum standard laboratory density, and not more than +4 percentage points above the optimum moisture content. The standard laboratory density and optimum moisture content shall be the maximum density and optimum moisture as determined in accordance with ASTM Designation: D 698 (Standard Proctor Test).

The Contractor shall place a minimum of 8 " (200 mm) of granular sub-ballast which meets the above criteria and contains no material larger than that which will pass through a 3 inch square sieve. Sub-ballast shall be crushed gravel or crushed stone with a minimum 75% of the material having two fractured faces. Sub-ballast must meet the quality requirements of ASTM Designation: D1241 and be approved by the Engineer. Additional sub-ballast may be required as determined by the customer's professional engineer.

All embankments intended to carry rail traffic must be properly constructed to CP's satisfaction. Material must be dry, not frozen, and placed and compacted in appropriate lifts. Fill material placed within four feet (1.2m) of the bottom of the sub-ballast must not be frost susceptible with less than 30% by weight passing sieve No 200. Embankment material within one foot (300 mm) of bottom of sub-ballast shall pass 100% through a U.S. standard 75mm sieve.

Contractor shall build a pad for each mainline turnout so that it can be constructed adjacent to the mainline. Pad shall be connected via roadway so that CP forces can drive to the new turnout location both for construction and maintenance. Dimensions for typical pads are available upon request.

Road Crossing

Road crossing details shall be provided with the proposed plans. These will include a horizontal alignment drawing, vertical profile drawing and a cross section. Drainage away from the crossing area should be established and shown on the plans.

If crossing warning devices are required, they will be shown on the alignment plan.

Crossing surfaces shall be timber plank or concrete construction.

At road crossings the set-back distance for storing rail cars on multiple adjacent tracks (track centers less than 25') is 250 feet from the edge of roadway. For single tracks, the setback distance varies for each state and is regulated by the appropriate state/provincial agencies. 150 feet from the edge of roadway is the minimum, however, operating conditions may require greater distances.

Buildings and Restricted clearances

Clearance refers to the distance from the track to the nearest obstruction.

Vertical clearances are measured parallel to the plane of the top of rails.

Lateral clearances are measured from the track center and at right angles to the plane of the top of rails.

In the USA, legal clearance requirements are defined by each state. Chapter 28 of the AREMA manual contains reference tables showing various legal clearance requirements by state.

In Canada, refer to CP plan PSSTD005 "Industrial Track Guidelines Clearance Diagram".

Proximity to buildings, fences, or other fixtures that could cause restricted clearances requires approval and shall be shown on a separate plan with the appropriate section and alignments. The distance between a train and an object alongside the tracks is not to be less than the specified minimum clearance.

A cross-section of every restricted clearance area shall be submitted for approval by CP with the appropriate clearance envelope shown on the cross-section. This includes but is not limited to platforms, fixed loading docks, doors, fences and buildings. Any structures adjacent to the rail way right-of-way (ROW) should be shown on the plan view.

Drainage

Drainage generated from the industrial siding should not negatively impact the railway.

Culverts and other sub-grade structures will be shown and size and type of pipe material and granular material proposed should be noted. Drainage details for the entire project are required if the drainage affects the railway. Attached is the CSP culvert standards used by CP.

All culverts maintained by CP shall be a minimum 36" (900mm) in diameter. All culverts maintained by the customer shall be a minimum of 24" (600mm) in diameter. The top of any culvert shall be a minimum of 3' (0.9m) below the base of rail. Culvert ends shall extend a minimum of 3' (900mm) from the embankment, unless a headwall is used. All culverts installations shall conform to the latest editions of CP standard plans B-1-4950-1 and -2.

Maintenance structures or chambers shall not be located within 45 feet (15m) of track centerline, and shall be designed for access and maintenance without the need for positive track protection

Where inlet structures must be within 33 feet (10m) of track centerline, they shall be designed in manner which prevents their interference with normal track maintenance and snow clearing activities. Drainage structures under tracks shall be straight, and shall be designed with sufficient slope to prevent the buildup of sediment in sections under tracks.

Corrugated Metal Pipe:

Corrugated, galvanized, steel pipe shall be in accordance with the latest edition of CP standard plans B-1-4950-1 and -2.

Concrete Pipe:

Concrete pipe 24" (600mm) or over in diameter shall conform to the latest edition of A.S.T.M. specifications C76-61T, Class IV, for reinforced concrete culvert, storm drain and sewer pipe.

Where two culverts of differing composition are joined together, that joint must be grouted. When joining a new culvert to an existing railroad culvert, the new culvert must have the same inside diameter as the existing culvert.

Where culverts require extension, the contractor shall first clean and inspect the existing culvert to confirm that it is suitable for extension. In addition, the contractor must confirm that the existing culvert is of suitable size for the catchment area and storm flows at the time of design. Undersized pipes must be replaced. If extending corrugated pipes, couplers shall be in accordance with CP standard plans B-1-4950-1 and -2. CP may require that existing culverts be replaced instead of extended depending on age, condition, hydraulics, etc.

Headwalls and handrails:

Head walls are to be installed where required to provide proper slope stability. Unless otherwise authorized, headwalls shall be cast-in-place or pre-cast concrete.

Galvanized steel handrails are required on all headwalls and wing walls where the vertical drop is 3' (1.0m) or greater, regardless of their distance from the track. All handrails must be outside the track clearance envelope.

Utilities

All utility relocation and/or protection is the responsibility of the customer. All utilities (proposed and existing) affecting the track work shall be showing on the plan. Also note if it is a gas pipe line or power lines crossing under the tracks as well as the appropriate encasement for such utilities. If the industry proposes new utilities to run under CP property they will need to enter into utility crossing agreements to Real Estate Department.

Structures (Bridges, Pits and Scales)

Any structures proposed along the rail alignment must be approved by CP and must have the necessary design calculations (if requested) and plans submitted.

Steel and concrete bridges shall be designed, fabricated and constructed in accordance with the latest editions of the CP "Requirements for the Design of Steel and Concrete Bridges Carrying Railway Traffic in Canada" and the CP "Requirements for the Design of Steel and Concrete Bridges Carrying Railway Traffic in the United States". These CP concrete and steel bridge standards are based on Chapter 8 (concrete superstructures, substructures and foundations) and Chapter 15 (steel superstructures) of the AREMA Manual for Railway Engineering.

Pits (including unloading pits) below the track shall be designed in accordance with AREMA Chapter 8 (substructures and foundations) and Chapter 15 (steel superstructures). No joints in running rail shall be permitted over the pit. The top of the concrete pit walls shall be true and level to provide full bearing for the running rails.

Scales shall be designed, fabricated and constructed in accordance with the latest edition of the Association of American Railroads (AAR) Scale Handbook.

Plans for any proposed associated track or civil work must also be submitted for approval.

All calculations (if requested) and plans must be signed, sealed and approved by a licensed Professional Engineer.

Any work being done within 50 ft (15.25m) from the main line will require a flagman from the railroad at all times during the construction period. (See Flagging Requirements below.)

Drawing Standards

Plan View of new track(s):

Show complete description of all proposed track, including mainline or lead track stationing, curvature, milepost location and size (#9, #11, #15) of proposed or future turnouts, car capacities, and location of bumping posts and derails. Include at least one existing fixed object (road crossing, point of switch) to assist with location of the new track.

All curvatures, horizontal or vertical, shall be accompanied by a curve data tables including BC,EC,TS,ST,SC,CS points, spiral lengths, degree of curve and length of curve.

Show location of clearance point, railroad property line and pertinent property corners, and any previously dedicated railroad easements. Ex: "Sta 1+85.0 Clear Pt"

Track centers shall be clearly labeled.

Note length of storage capacity of each track (clear length).

Show the location of present or proposed buildings including locations of unloading doors, ramps or docks. Show clearance from centerline of track to any building or obstruction within 50' (15 m) of the centerline of track. AREMA clearance envelopes shall be shown for all structures around/adjacent to the tracks.

Show all existing track using railroad stationing, and locate all obstructions such as poles, utilities, ditches, and road crossings.

Ditch flow lines shall be shown on the plans or on a separate overall site drainage page.

Note the type of signal protection at grade crossings and location of insulated joints (where applicable), and whether modifications to any of these facilities are required.

Note weight of rail in existing and proposed tracks, and list materials to be used for proposed tracks by both the railroad and contractor.

Furnish Milepost and Subdivision in the Title Block, along with name of Industry and date of plan preparation (including current revision date). Contact information for engineering firm should also be included on plans.

All information is to be in English units in the US. Metric units will be acceptable in Canada. All plans will show scale and north arrow. Plan submittals should be in PDF format with 11" x 17" sheet size.

Profile View and Cross Sections of new track(s):

Include profile of top/rail of new track and ground line at centerline of track. Include profile of existing track(s).

Include cross-sections for proposed tracks and existing affected tracks. Cross sections shall be shown for every 100' (30m) of track and at each culvert, bridge, or structure impacting the clearance envelope.

Cross sections shall show proposed top of rail, ditches, culvert locations and sizes including length and cover from base of rail.

Show drainage structures, if required, with invert elevations and ditch profiles. Suggested scales for drawings:

- Profiles: 1" = 50' horizontal and 1" = 5' vertical
- Cross Sections: 1"=10' horizontal and vertical

Plan sheets should be easy to read, please eliminate clutter such as excessive contours, utilities that are not relevant to the railroad portion of the project, etc.

Plans shall normally be submitted as PDF's, however CP reserves the right to request CAD format drawings.

Railroad Work Description:

Example: "Construct 185 track feet including a #15-136 lb mainline turnout from point of switch to clearance point and adjust signals accordingly."

Industry Contractor Work Description:

Example: "Construct remaining track from clearance point to end, place bumping post, install timber crossing and signs, perform all grading, install all drainage structures, install double switch point derail."

Operating Plan

Prepare a diagram (does not have to be to scale) and narrative showing in-bound and out-bound switching plans and lengths of tracks to be used. There should also be a plan included on how typical switching will be performed inside the plant to load/unload the rail cars, where inbound and outbound cars will be spotted, motive power planned for the facility, etc.

Material Standards

Rail

New or number one relay 112 lb. or heavier rail, free of defects shall be used. Heavy rail or specialized rail may be required for some installations. All rails shall be in standard 39' lengths or longer unless tying into a switch, scale or other obstruction in which case no rail shall be shorter than 19 feet. Rail joints shall be staggered a minimum of 12 feet. If it is not possible to avoid a joint less than 12 feet, then that joint must be field welded by a qualified welding contractor. Thermite and flash-butt welds must be placed in crib area between ties. Transition rails or compromise joints at the CP-Customer interface are the responsibility of the customer. Continuous welded rail (CWR) will need to be de-stressed as soon as possible after laying. An abrasive rail saw will be used to cut rail—no torch-cutting. There shall not be more than 1/8" mismatch in the railheads at all joints.

Replace Existing Light Rail

If there is any existing rail located in the industry track lighter than 85lb. it should be replaced with at least 112 lb. rail. Any other issues that may exist in the track should be addressed. (Surface/ballast, replace poor ties, install/replace other track material and reduce any sharp curvature that may exist in the track.)

Ties

Timber cross ties shall be new, minimum 7" x 8" x 8.5' treated hardwood with anti-splitting devices as necessary. Ties shall be placed on a maximum 22" centers (except in unit train facilities where there shall be maximum 20" centers). Cross ties on horizontal curves that are more than 7 degrees 30 minutes shall be 7" x 9" x 8.5' treated hardwood with anti-splitting devices as necessary. Switch ties shall be new, 7" x 9" treated hardwood with anti-splitting devices.

Steel ties are spaced at 24" centers with 8" ballast section and can be used with timber ties. Steel ties should not be used within 200 feet of a signal circuit identified by insulated joints.

Ballast

Prepared ballast shall consist of crushed stone composed of hard and durable particles free from injurious amounts of deleterious substance. The type and gradation of ballast material shall comply with AREMA Specification Grade 4. The ballast section shall be a minimum of 8" below bottom of tie. The ballast shall also extend level 1 foot beyond the ends of the ties before breaking to a maximum 2:1 slope. All tie cribs shall be filled to top of tie. If track centers are less than 18 ft (5.5 m) center to center, the entire space between the tracks shall be filled to top of tie with ballast.

Sub-ballast

A minimum of 8" of sub-ballast shall be placed on top of the finished grade. This material may be pit run or granular relatively free of clay and other debris. This material must be constructed to 95% compaction.

Joint Bars

New or secondhand joints, free of foreign material and without injurious defects, and with 4 or 6 bolt holes, conforming to AREMA requirements, may be furnished to fit rail section for which they are designed. Bolt holes must be drilled with proper equipment. Torch-cutting of bolt holes is not allowed.

New or secondhand compromise joints of manufactured type (welded or homemade are not acceptable), free of foreign material and without injurious defects, shall be furnished and used where rail section (weight or design) changes. Rail section by weight shall not be compromised where difference in weight is in excess of 25 lbs. When this becomes necessary, a rail of some weight between the two different rail sections in excess of 25 lbs. shall be used and the compromise made in two steps. The length of the medium-weight rail should be 39 feet where practical.

Track Bolts, Nuts, & Lock Washers:

Track bolts and nuts shall be installed conforming to AREMA Specifications. Bolts will be correct size and length to fit rail. One lock washer conforming to AREMA Specifications or equivalent locking nut shall be installed on each track bolt.

Insulated Joint Bars

Insulated joint bars shall be required if the track being installed is in an area that affects crossing signals, derail circuits, protection for flammable liquid loading and etc. Insulated joints shall be new pre-bonded type approved by the railroad such as Portec or LB Foster joints.

Tie Plates

Tie plates may be new or secondhand, double shoulder, free of injurious defects and foreign material, conforming to AREMA Specifications, and shall fit rail being used. Plates must have the correct punching to fit the base of rail used. No tie plates with slotted holes will be permitted.

Rail Anchors

New rail anchors, sized to fit the rail section, 16 per 39 foot rail, box anchored shall be used on all tracks. Additional rail anchors or change in anchor pattern may be required on some installations. Rail anchors shall be of a drive on type so that they can be applied and removed without a special tool. CWR shall be box anchored every other tie.

Spikes:

New 5/8" x 6" cut track spikes shall be installed. All spikes shall conform to AREMA requirements.

Turnouts – Industry Tracks

All turnouts shall be new or in good serviceable condition (less than 1/8" wear) with at least 115# rail and shall meet all AREMA specifications for Number 9 or greater turnouts.

Switch stands

Switch stands shall be either Racor 36E or National Track work Model 1004A with 39" ground throw (back saver) handles.

All stands are subject to final inspection and acceptance by CP's Engineering Department personnel. All stands must be manufactured so that they can accept the Standard CP Target per Plan H-1-D-13 dated 6/22/88.

Derails

Derails must be installed where there is any possibility of equipment which has been left standing on tracks other than main tracks or sidings from being moved in such a way so as to obstruct a main track or siding. This includes but is not limited to industry tracks that move their cars, bulk facilities that use gravity to drop cars, industries with track higher than the connecting CP track, etc. Derail signs must be placed at each derail. Standard for such a sign will be furnished upon request.

Double switch point derails

A double switch point derail must be installed on the industrial track before it joins the CP track when:

- A locomotive, track mobile or other means is used to move cars on industrial track
- When speed of the equipment to be derailed could exceed 10 mph.
- Where there is a descending grade toward the main track or when it is necessary to place a derail on the inside of a curve.
- Where it is connected to the signal system

Double switch point derails will be placed a minimum of 65 ft (19.81m) beyond the 14 ft (4.27m) clearance point away from the point of switch. Adequate rail anchorage must be provided to prevent rail creep. Where a power derail is required (typically when the mainline turnout is powered) the derail must be a double switch point derail.

Bumping Post

Either bumping posts or wheel stops may be installed at the end of all spur tracks as requested by the industry unless specified otherwise by the railroad. Bumping posts shall be Hayes Model WD or equal, earthen bumping posts are not permitted.

When the track ends at a building wall or other facility that might be damaged in case of bumping post failure, the railroad may require that a concrete bumping post be constructed per railroad's plans, copies of which will be furnished upon request.

Road Crossings

The standard for a road crossing surface installed and maintained by CP is concrete plank placed on 10-ft. switch ties. Also, ten 10-ft. switch ties are placed on both ends of the crossing, replacing any standard cross-ties. For crossings installed and maintained by the Customer, concrete plank is recommended, with a full-depth timber surface also acceptable.

Construction Standards

General

All work shall be of good quality in materials, equipment and workmanship and shall conform in every respect with the specifications and instructions. Final track construction must meet all applicable FRA requirements for the applicable class of track.

Ties:

Ties will be unloaded and handled in such a manner as not to damage ties, using appropriate handling equipment. Ties will be placed at design on the finished subgrade, perpendicular to center line of track, with the right hand ends of ties being parallel. Exception: On curves, align the ties to the inside of the curve. All joints are to be suspended between ties.

Top surface of ties shall be clean and smooth to provide full bearing for tie plates. Lay wood ties with heartwood face down, and if not possible to determine position of the heartwood, lay the widest surface of the tie down.

If spikes are pulled from any tie, hole shall be filled by driving in a treated wood tie plug the full depth of the hole or by using AREMA grade epoxy filler. Boring or adzing of ties shall be kept to a minimum.

Tie Plates

Double-shouldered tie plates will be used on all ties and set in position with cant surface sloping inward, making sure they are firmly seated and have full bearing. After rails are in place the shoulder of plates shall be in full contact with outside edge of rail base.

Rails

Assemble joints before fastening rails to ties, using joint bars with full number of track bolts and spring washer for each bolt, first removing loose mill scale and rust from contact surfaces or joint bars and rails. Under no circumstances must rail be struck in web with tool or any metal object.

In laying secondhand rail, care must be taken to minimize or eliminate rail end mismatch at the joints.

The right-hand rail facing in direction of increasing construction shall be spiked to ties, and the opposite rail shall be brought to gage of 4' 8-1/2", measured at right angles between the rails, in a place 5/8" below top of rail. A track gauge manufactured for the purpose of measuring gage should be used rather than a tape measure. Gage is to be checked at every third tie. Do not strike rail directly with a maul, either on top when driving spikes, or on side to obtain track gage.

Rail shall be laid with staggered joints.

Continuous welded rail (CWR) will need to be de-stressed as soon as possible after laying. A full record of "Neutral Temperature of Welded Rail as Laid" will be completed and presented to the Roadmaster at time of final track inspection.

Spiking

Rail shall be fully spiked promptly after laying. Spikes shall be set vertically and square with the rail, and so driven as to allow about 1/8" space between underside of head and rail base. On tangent, four spikes shall be used on each tie; on curves, two degrees to eight degrees,

six spikes, one on the outside and two on the inside of each rail; and on curves above eight degrees, eight spikes, two on the outside and two on the inside of each rail shall be used. Spikes shall not be placed less than two inches from the edge of the tie. The spikes shall be staggered so that the outside spikes in each tie will be near the same edge of that tie, and the inside spikes near the opposite edge with the position of the spikes the same on all ties.

Ballast and Surfacing:

Raise track by means of jacks placed close enough together to prevent excessive bending of rails or strain on joint. Lift both rails simultaneously and as uniformly as possible. Power jack may also be used. Each track raise shall not exceed 4" with ties tamped prior to additional raise.

Unload and level down ballast by most practical means. Perform tamping, using power tamping machines wherever possible, or manually, using approved AREMA tamping tools appropriate for type of ballast being placed. Tamp each layer of ballast from a line 15" inside each rail, on both sides of and to the ends of ties. Center area between these limits shall be filled lightly with ballast but not tamped. At turnouts and crossovers, tamp ballast uniformly for full length of ties. Tamping shall proceed simultaneously at both ends of same tie, making sure ballast is forced directly under the ties and against sides and ends of ties.

Dress ballast in conformance with dimensions shown on drawings, placing additional ballast material as necessary. When placing crossing surface up to the track it is important to make sure water drains away from the track. This will prevent pooling and freezing which create hazardous walking conditions. Lines should be painted 10 feet parallel to the centerline of track on both sides to serve as visual reminder of the track's foul zone. Crushed rock or fabric should be placed over the ties to keep the pavement from adhering to them. Flange ways need to be kept clean to allow wheels to contact top of rail at all times.

Flagging Requirements

Any work being done within 15.25m (50 ft) from the main line will require a flagman from the railroad at all times during the construction period. This flagging will be billable to the Industry unless other arrangements are made. The railroad requires at least 7 working days notice in advance in order to assign a flagman to the project. No work is to be done until the flagman has arrived and a job briefing has been held. Such notice does not guarantee that a flagman will be available on the date requested. CP restricts overtime used on 3rd party work and as such may require the 3rd party to cover the cost of any additional flagman necessary to minimize overtime.