



Timber Crosstie, Industrial Grade Tie, and Switch Tie Specification MW-99001 (Rev. F)

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Timber Crosstie, Industrial Grade Tie and Switch Tie Procurement Specification

- 1.0 **Scope** - This procurement specification establishes the minimum detailed technical requirements for Timber Crossties and Timber Switch Ties for use by CSX. Additionally, section 6.0 has been revised to address Industrial Grade Tie specifications. It is CSX's desire to enter into a long-term contract with suppliers of quality timber crossties and timber switch ties. The suppliers governed by this specification, shall have or establish a quality system that complies with and is certified to the standards set forth in the AAR Specification for Quality Assurance, M1003 (AAR M-1003), or International Quality Standard ANSI 9000 Series (ISO 9001). Requests for modification or deviation from this specification must be submitted in writing.
- 1.1 **Crosstie & Switch Tie Description** - Timber crossties and switch ties are used to secure, anchor and support rail, switch, and other track equipment. As such, the consistent quality of crossties and switch ties is of the utmost importance to CSX for safety and track reliability. The crossties and switch ties acquired under this specification shall be used to meet CSX field requirements for initial installation at new construction locations, replacement at existing sites, and also for modification at existing locations. Crossties and switch ties acquired for use by CSX shall as a minimum meet the material quality, dimensional, and processing requirements of sections 3, 4, and 5 of this specification as directed and applied by the contract.
- 1.2 **Requirements Rating Criteria** - Assignment of specification importance shall be designated by one of the following:
- (C) - Critical Characteristic
 - (M) - Major Characteristic
 - (I) - Incidental Characteristic

This specification covers two types of ties, timber crossties and timber switch ties. As such, in certain instances, functional requirements specified herein may not be applicable to a particular product. In those cases, the supplier shall respond to the requirement as being not applicable, and explain why it is not. In other instances, in lieu of a defined requirement, this specification may ask for data, or a description for relative comparison.

2.0 **Applicable Documents** - The latest issue of the following document forms a part of this standard to the extent specified herein:

- Applicable Federal, State, and local Regulations

In the event of a conflict between the document referenced here and the detailed content of section 3,4, and 5, the detail requirements of sections 3,4, and 5, shall be considered the superseding requirements.

3.0 **Requirements (C)** -

3.1 **General (I)** - The information and requirements included in this section are applicable to timber crossties and switch ties as specified in sections 3.2 and 3.3 respectively of this document.

3.1.1 **Definitions** -

- a) **Decay** - Decay is the disintegration of wood substance material due to the action of destroying fungi. "Blue Stain" shall not be considered as decay and is permissible in any wood used for ties.
- b) **Rot** - Is the decomposition of wood, which occurs due to age, decay, or chemical disintegration.
- c) **Holes** - Within the rail bearing area, a large hole is one more than 1/2 inch in diameter and 3 inches deep. Outside the rail bearing area, a large hole is one which is 1/4 the width of the surface on which it appears and 3 inches deep. Numerous holes are any number equaling a large hole in damaging effect. Such holes may be caused in manufacture or otherwise.
- d) **Knots** - Within the rail bearing area, a large knot is one having an average diameter more than 1/3 the width of the surface on which it appears; but such a knot will be allowed if it is located outside the rail bearing area. Numerous small knots equaling the diameter of a large knot in damaging effect shall equate to a large knot and shall have the same limitations.
- e) **Shake** - A shake is a separation along the grain, most of which occurs between the rings of annual growth (see Figures A, B, & C below).

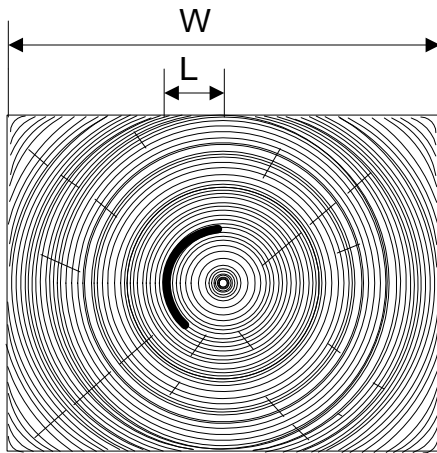


Fig. A

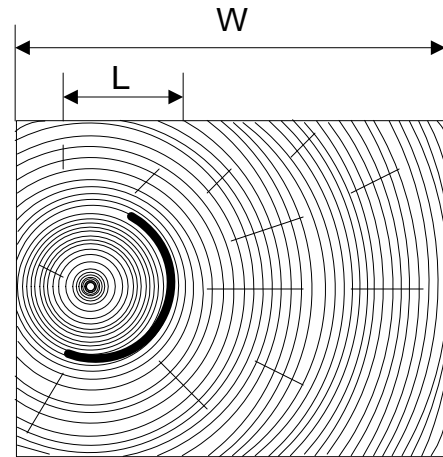


Fig. B

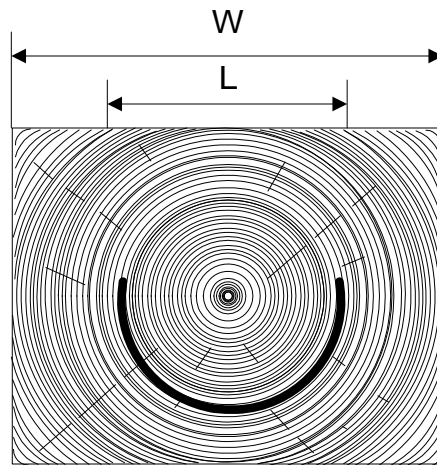


Fig. C

The procedure illustrated in the above diagrams shall be used in determining the length of the shake. One which is not more than $\frac{1}{3}$ the width of the tie shall be allowed, provided it does not extend nearer than 1 inch to any surface. Multiple ring shakes shall not be allowed.

- f) **Split** - A split is a separation of the wood extending from one surface to an opposite or adjacent surface.
- 1) In unseasoned ties, a split no more than $\frac{1}{8}$ inch wide and/or 4 inches long is acceptable when anti-splitting devices have been applied and the tie is brought back to its original sawn dimensions.
 - 2) In a seasoned tie, a split no more than $\frac{1}{4}$ inch wide and/or longer than the width of the face across which it occurs is acceptable when anti-splitting devices have been applied and the tie is brought back to its original sawn dimensions.

- 3) Multiple splits of no more than a three way split are acceptable.
 - 4) In no instance will a tie be considered acceptable when a split extends into the rail bearing area.
- g) **Checks** -
- 1) **For procurement of seasoned ties:** A check is a "V" shape groove in a tie similar to a cut made with an ax. A check is acceptable provided it is not more than 3/8 inch wide, the depth not greater than 1/2 the thickness of the tie, and does not extend into the rail bearing area.
 - 2) **For treatment of seasoned ties:** A check is acceptable provided it is not more than 1/2 inch wide, the depth not greater than 1/2 the thickness of the tie, and does not extend into the rail bearing area.
- h) **Bark Seams** - Bark seams will not be acceptable if they appear in the rail bearing area. A bark seam or pocket is a patch of bark partially or wholly enclosed in the wood. Bark seams will be allowed provided they are not more than 2 inches below the surface and/or 10 inches long.
- i) **Wood Destroying Insect Infestation** - A wood destroying insect infestation is the presence of insects known to destroy wood and other cellulose materials, such as termites, carpenter ants, etc. If an infestation exists, the type of insect will be identified. If termites are detected, the identification must distinguish between Formosan Subterranean termites, and other termite species.
- 1) All ties shall be inspected for and protected from infestation
 - 2) If an infestation is found, the tie is not acceptable for use on CSX.
 - 3) Ties infected with other than Formosan Subterranean Termites will be disposed of in an appropriate manner determined by the supplier.
 - 4) Ties infested with Formosan Subterranean Termites shall be treated to kill the termites and disposed by burning in an environmentally appropriate facility.
- j) **Slanting Grain** - Except in woods with interlocking grain, a slant in grain in excess of 1 in 15 will not be permitted, and/or if present in rail bearing area.
- k) **Excessive Wane** - Examples of this defect have been

termed in the industry as "Saddlebacks" and "Sledrunners". These conditions in ties shall not be considered acceptable and are illustrated and further defined below.

- 1) **Saddlebacks** - Saddlebacks between the rail bearing area will not be accepted if lack of face is more than $1/2$ the width (see Fig. D, below).
- 2) **Sledrunner** - A sledrunner appearing on the end of a tie will not be accepted if lack of face is more than $1/2$ the thickness and more than 3 inches from end of tie (see Fig. E, below).

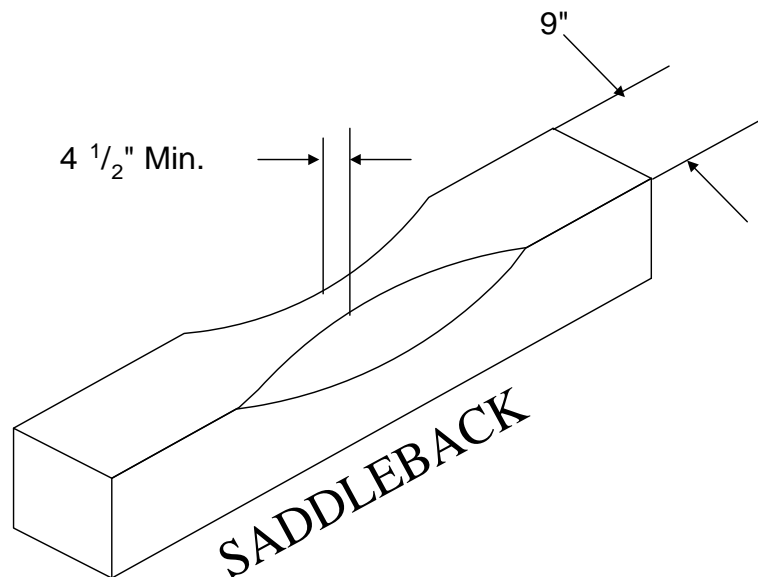


Fig. D

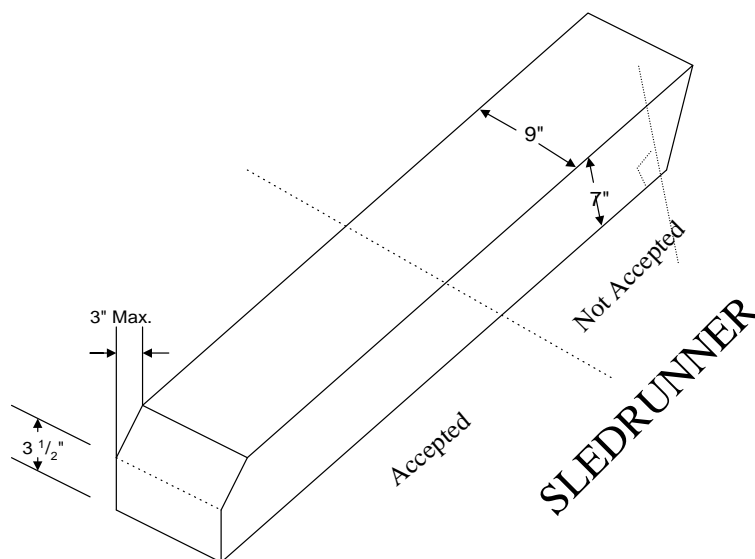


Fig. E

3.2 **Timber Crossties Requirements (C)** -

3.2.1 **Acceptable Materials(C)** - The following types of wood shall be acceptable for the manufacture of timber crossties:

- a) Ash
- b) Beech
- c) Birch
- d) Cherry
- e) Elm
- f) Gum
- g) Hackberry
- h) Hickory
- i) Locust
- j) Maple
- k) Mulberry
- l) Oak {see 3.4.1, b), 5)}
- m) Sassafras
- n) Walnut

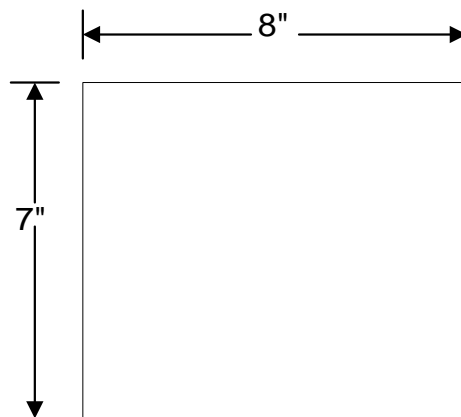
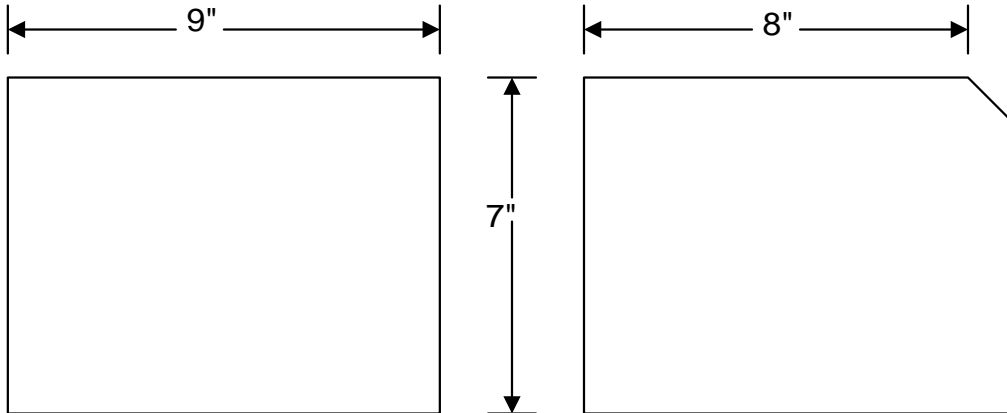
3.2.2 **Physical Requirements(C)** - Except as hereinafter provided, all crossties shall be free from any defects that may impair their strength or durability as crossties, such as decay, rot, large splits, large shakes, slanting grain, large or numerous holes, or knots.

3.2.2.1 **Manufacture** -

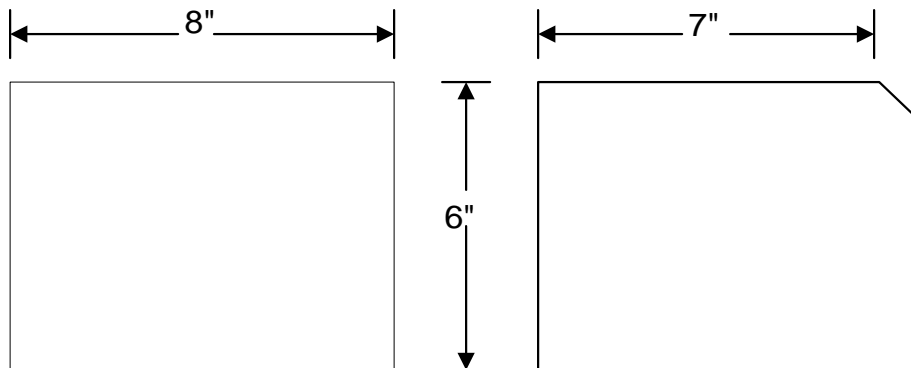
- a) All timber crossties shall be straight, well hewed or sawed, cut square at the ends, have bottom and top parallel and the bark entirely removed prior to treatment.
- b) All standard timber crossties (see 3.2.2.2 for standard dimensions) shall be considered straight when:
 - 1) A straight line along the top from the middle of one end to the middle of the other end lies more than two inches from either side, **and**
 - 2) A straight line along a side from the middle of one end to the middle of the other end lies more than two inches from the top and the bottom of the tie.
- c) A tie is not well hewed or sawed when its surfaces are cut into with score marks more than 1/2 inch deep or when its surfaces are not even.

- d) The top and bottom of a tie will be considered parallel if any difference in the thickness at the ends does not exceed 1/2 inch.
- e) The following size categories shall apply for 7" and 6" crossties:

7" GRADE CROSSTIES



6" GRADE CROSSTIES



1" OF WANE ALLOWED - 20% SQUARE

7" X 8" ALLOWED

3.2.2.2 **Dimensions** -

- a) Except as hereinafter provided, crossties shall measure as follows throughout the rail bearing area. The rail bearing areas as used here and hereafter are defined as those sections of the tie between 20" and 40" from the middle (11" and 31" from its end):
 - 1) Grade 5 - 7" x 9" x 8' 6" Minimum 8" face
 - 2) Grade 4 - 7" x 9" x 8' 6" Minimum 7" face
 - 3) Grade 4 - 7" x 8" x 8' 6" Minimum 7-1/2" face - Maximum 20%
 - 4) Grade 3 - 6" x 8" x 8' 6" Minimum 7" face
- b) Ties more than 1 inch longer or shorter than standard shall be rejected.
- c) The thickness and widths specified are minimums for the standard sizes.
- d) Ties over 1 inch longer, thicker, or wider than the standard size ordered shall be rejected.
- e) All thickness and widths shall apply to the sections of the tie between 20 inches and 40 inches from the middle of the tie.
- f) All determinations of widths shall be made on the top of the tie, which is the narrower of the horizontal surfaces, or the one with no heartwood if both horizontal surfaces are of the same width.
- g) In seasoned ties, thickness and width requirements shall be considered met if not more than 1/4" scant of those specified.

3.2.2.3 **Malformation Tolerances** -

- 3.2.2.3.1 **Decay** - Crossties with decay shall not be acceptable for use or purchase by CSX (See para. 3.1.1, a).
- 3.2.2.3.2 **Rot** - Crossties with rot shall not be acceptable for use or purchase by CSX (see para. 3.1.1, b).
- 3.2.2.3.3 **Holes** - Crossties with large holes or several small holes with diameters equaling a large hole shall not be acceptable for use or purchase by CSX (see para. 3.1.1, c).
- 3.2.2.3.4 **Knots** - Crossties with large knots or several small knots equaling to a large knot within the rail bearing area shall not be acceptable by CSX (see para. 3.1.1, d).
- 3.2.2.3.5 **Shakes** - Crossties with a shake no greater than 1/3 the width of the tie and not nearer than 1 inch to any surface shall be allowed. Multiple ring shakes shall not be allowed (see para. 3.1.1, e).

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- 3.2.2.3.6 **Splits** - Crossties with acceptable splits as defined in para. 3.1.1, f) shall be allowed.
- 3.2.2.3.7 **Checks** - Crossties with acceptable splits as defined in para. 3.1.1, g) shall be allowed.
- 3.2.2.3.8 **Bark Seams** - Crossties with acceptable bark seams as defined in para. 3.1.1, h) shall be allowed.
- 3.2.2.3.9 **Slanting Grain** - Crossties with acceptable slanting grain as defined in para. 3.1.1, i) shall be allowed.
- 3.2.2.3.10 **Excessive Wane** - Crossties with acceptable saddlebacks as defined in para. 3.1.1, j) shall be allowed. Crossties with acceptable sledrunners as defined in para. 3.1.1, j) shall be allowed.
- 3.2.2.3.11 **Wood Destroying Insect Infestation** - Crossties with wood destroying insect infestation shall **not** be acceptable for use or purchase by CSX. See para. 3.1.1, i) for disposition instructions.
- 3.3 **Timber Switch Tie Requirements (C)** -
- 3.3.1 **Acceptable Materials(C)** -The acceptable types of wood for switch ties are:
- a) Oak {see 3.4.1, b), 5)}
 - b) Black gum
 - c) Red gum - provided heartwood does not exceed 50%.
- 3.3.2 **Physical Requirements(C)** - Except as hereinafter provided, all switch ties shall be free from any defects that may impair their strength or durability as switch ties, such as decay, rot, large splits, large shakes, slanting grain, large or numerous holes, or knots.
- 3.3.2.1 **Manufacturing** -
- a) All timber switch ties shall be straight, clean sawed, cut square at the ends, have bottom and top parallel, and the bark entirely removed prior to treatment except as hereinafter provided.
 - b) A timber switch tie less than 15 foot long shall be considered straight:
 - 1) When a straight line along the top from the middle of one end to the middle of the other end lies more than two inches from either side, and
 - 2) When a straight line along a side from the middle of one end to the middle of the other end lies more than two inches from the top and the bottom of the tie.
 - c) A timber switch tie 15 foot long or more shall be

considered straight:

- 1) When a straight line along the top from the middle of one end to the middle of the other end is entirely within the tie, and
- 2) When a straight line along a side from the middle of one end to the middle of the other end lies more than two inches from the top and the bottom of the tie.

6.5 A timber switch tie is not well hewed or sawed when its surfaces are cut into with score marks more than 1/2 inch deep or when its surfaces are not even.

- b) The top and bottom of a timber switch tie will be considered parallel if any difference in the thickness at the ends does not exceed 1/2 inch.
- c) Timber switch ties shall be sawed on four sides.
- d) Except as hereinafter provided, timber switch ties shall not be less than 9 inches wide throughout the section between 12 inches from each end of the tie.

3.3.2.2 Dimensions -

- a) Switch ties shall be 7 inches thick.
- b) Switch ties shall be provided in the quantities ordered from the following lengths:
 - 1) 9'-0"
 - 2) 10'-0"
 - 3) 11'-0"
 - 4) 12'-0"
 - 5) 13'-0"
 - 6) 14'-0"
 - 7) 15'-0"
 - 8) 16'-0"
 - 9) 16'-6"
 - 10) 23'-0"
- c) The rail bearing area shall be defined as "the section of the switch tie between 12" from each end of the tie."
- d) The lengths, thickness and widths specified are minimums for the standard sizes.
- e) Switch ties over 1 inch longer, thicker, or wider than the standard size ordered shall be rejected.
- f) All thickness and widths requirements are minima and

apply to the rail bearing area, which is that section of the tie between 12 inches from each end of the tie.

- g) A maximum of 1 inch wane is allowed in the rail bearing area on top or bottom of the tie.
- h) All determinations of widths shall be made on the top of the tie, which is the narrower of the horizontal surfaces, or the one with no heartwood if both horizontal surfaces are of the same width.
- i) In seasoned ties, thickness and width requirements shall be considered met if not more than 1/4" scant of those specified.

3.3.2.3 **Malformation Tolerances** -

- 3.3.2.3.1 **Decay** - Switch ties with decay shall not be acceptable for use or purchase by CSX (See para. 3.1.1, a).
- 3.3.2.3.2 **Rot** - Switch ties with rot shall not be acceptable for use or purchase by CSX (see para. 3.1.1, b).
- 3.3.2.3.3 **Holes** - Switch ties with large holes or several small holes with diameters equaling a large hole shall not be acceptable for use or purchase by CSX (see para. 3.1.1, c).
- 3.3.2.3.4 **Knots** - Switch ties with large knots or several small knots equaling to a large knot within the rail bearing area shall not be acceptable by CSX (see para. 3.1.1, d).
- 3.3.2.3.5 **Shakes** - Switch ties with a shake no greater than 1/3 the width of the tie and not nearer than 1 inch to any surface shall be allowed. Multiple ring shakes shall not be allowed (see para3.1.1, e).
- 3.3.2.3.6 **Splits** - Switch ties with acceptable splits as defined in para. 3.1.1, f), shall be allowed.
- 3.3.2.3.7 **Checks** - Switch ties with acceptable splits as defined in para. 3.1.1, g), shall be allowed.
- 3.3.2.3.8 **Bark Seams** - Switch ties with acceptable bark seams as defined in para. 3.1.1, h), shall be allowed.
- 3.3.2.3.9 **Slanting Grain** - Switch ties with acceptable slanting grain as defined in para. 3.1.1, i), shall be allowed.
- 3.3.2.3.10 **Wood Destroying Insect Infestation** - Switch ties with wood destroying insect infestation shall **not** be acceptable for use or purchase by CSX. See para. 3.1.1, i) for disposition instructions.

3.4 **Tie Processing (C)** -

- 3.4.1 **Unloading and Inspection (I)** - Ties shall be unloaded and passed through a double-end trim saw, which shall expose

interior defects and assures uniform length for mechanical handling at the plant and subsequently in the field.

- a) The inspection shall include both ends and all four sides for possible defects.
- b) Either a manual or semi-automatic unloading/ inspection system shall record the grade and specie and route the ties into bays designated as follows:
 - 1) Oak Main Line {see 3.4.1, b), 5)}
 - 2) Oak Branch Line {see 3.4.1, b), 5)}
 - 3) Mixed Hardwood Main Line {see 3.4.1, b), 5)}
 - 4) Mixed Hardwood Branch Line {see 3.4.1, b), 5)}
 - 5) White Oak - It is the intent of CSX to restrict the use of white oak ties for both Crosstie and Switch Tie application in the Southeastern part of the United States. This restriction is being made to minimize and eliminate the occurrence of accelerated deterioration of ties made of white oak in this region. Either mixed hardwood ties or red oak ties shall be shipped to those locations designated by CSX. Red oaks shall be separated from mixed oaks in quantities as directed by CSX.
 - 6) Industrial Grade ties that meet the requirements of section 6.
 - 7) Culls - All ties not meeting minimum standards for mainline or branchline ties.
- c) Ties, which do not meet this specification, are separated as rejects or culls and handled as directed by CSX Purchasing and Materials in the agreement.

3.4.2 Incising (I) -

- a) Ties shall be incised on four sides not less than ½ inch in depth.
- b) Incising shall cover from **end-to-end** on each side of the tie.
- c) At least 90% of the teeth contacting the tie shall be in place in each incisor head.
- d) **All** ties shall be incised.

3.4.3 Stacking (I) - Grade ties shall be stacked to provide proper air seasoning.

- a) Two to four inches of space shall be left between the ties so as to make continuous flues through the pile or stack.

- b) The foundation shall be stacked a minimum of 14" off the ground on treated or other suitable material to prevent transfer of decay.
- c) No more than ten stacks or piles shall be placed side by side in a continuous row.
- d) A space of at least three feet shall be left between the rows of ties, except where shed drying is used.
- e) Firebreaks shall be maintained in accordance with the fire protection plan as established by plant management and approved by local government.
- f) The grounds and storage area shall be clear of debris, vegetation, and well drained (No standing water).
- g) When possible, rows shall be placed with the open side in the general direction of the prevailing wind.
- h) Each row shall carry information painted on the outside of the stack for the purpose of inventory record. Information shall include:
 - 1) pile or row number
 - 2) quantity
 - 3) specie
 - 4) date
 - 5) ownership

3.4.4 **Seasoning (C)** - Ties being air seasoned shall be held in stack until the amount of moisture in the wood will permit acceptable penetration and retention of preservative. In general, oak seasons in ten months and mixed hardwoods in six months.

- a) The maximum acceptable moisture content in oak shall be 50% using two inch increment borings.
- b) The maximum acceptable moisture content in mixed hardwood shall be 40% using two inch increment borings.

3.4.5 **Boring and Branding (C)** -

- a) Seasoned ties to be treated shall be re-inspected before treatment.
- b) Ties that are damaged or split beyond the limitations of this specification shall be removed
- c) Ties shall be branded for identification using 1 ½ inch lettering, having cutting edges 1/8 inch wide, and impregnated ¼ inch into the end of each tie.
- d) Branding shall include ownership, origin and year treated.

- e) Ties shall have a visible saw kerf mark or some other approved marking to designate the sap side of the crosstie. Borate dual treated ties will be identified with a double kerf mark and "B" inserted on one end of the tie. Double kerf marks should be 3/8 inch to 1/2 inch apart. The "B" may be part of the brand or nailed into the end of tie.

3.4.6 Selective End Plates (C) -

- a) Seasoned ties which are split no more than 1/4 inch wide and with the split extending from one surface to another, shall be clamped and end-plated back to its original sawn dimensions, then returned to the material flow.
- b) Unseasoned ties, which are split no more than 1/8 inch wide and/or 4 inches long, shall be clamped and end plated back to its original dimensions, then returned to the material flow.
- c) Ties, which cannot be returned to acceptable dimensions, shall be rejected.

3.4.1 Tramming (I) -

- a) Prepared ties shall be loaded on trams and secured with wire banding or chains and counted.
- b) The number of ties on each tram shall be counted, verified, and recorded on a tram ticket or plant order.

3.4.8 Treatment (C) - Ties shall be treated using AWPA Standard P2 creosote, or using a creosote/petroleum blend with the petroleum based creosote component not to exceed 25%, to obtain 7 pounds per cubic foot net retention for oak, and 8.5 pounds per cubic foot for mixed hardwood governed by treating specifications outlined in 3.4.8.1, 3.4.8.2, and 3.4.8.3. All treatment solutions must have a valid U.S. EPA label stating the formulation can be used for "RR tie treatment" and has no "ground contact/railroad tie use pattern or exterior use restrictions" listed on the U.S. EPA- registered product label. EPA product labels shall be submitted to CSX Purchasing & Materials and Engineering Standards for initial confirming approval prior to first time use and should be made available for inspection when requested. Anytime it becomes necessary to change formulation products, supplier shall submit the EPA product label to CSX Purchasing & Materials and Engineering Standards for review and acceptance prior to treating ties for CSX use.

- a) In Canada and the specific states listed in this paragraph, ties may be treated using a CPS/C6 petroleum solution with a maximum of 50/50 blend. Illinois,

Indiana, Kentucky, Massachusetts, Michigan, New Jersey, New York, Ohio, Pennsylvania, Rhode Island.

- b) Borate Dual Treatment - Mixture of borate and creosote must be compatible with AWPAs Standard Specifications, and products in use must have valid U.S. EPA labeling, to obtain 6 pounds per cubic foot net retention creosote for oak and mixed hardwoods. Ties must meet minimum .274 PCF Disodium Octaborate Tetrahydrate (DOT) per crosstie to obtain 1.0 pound of borate per standard crosstie and ranging up to 2.0 pounds per 16' switch tie. To account for variations in treatment methods used, minimum retentions may be demonstrated by gauge or titration. The use of borate treated mixed hardwoods should be maximized in the severe and high rot zones as depicted in the "Decay Hazard Map of U.S."
- c) Hot oil treatment minimum hours outlined in 3.4.8.1.b.1 not required for borate dual treated ties.

3.4.8.1 **Rueping Process (AWPA-C-6)(C)** - Properly air seasoned ties (crossties, switch ties, and crossing panels) that meet the moisture content requirements shall be treated using the Rueping process.

- a) The creosote shall be maintained at a minimum average of 180°F during the pressure period and pressurized to a maximum of 200 psi for mixed hardwood and 220 psi for oak.
- b) The specific treating parameters will vary with the age and construction of the treating plant. The supplier shall have available for CSX inspection the parameters for his operations. For acceptance the set up parameters must comply with the following:

- 1) Hot Oil Treatment: Oak 180° F/6 hour minimum
MHW 180° F/4½ hour minimum
- 2) Creosote Pressure: 180 - 220 PSI
- 3) Temperature: 180° - 210° F
- 4) Vacuum: Not less than 22" of mercury

3.4.8.2 **Boulton Drying (C)** - This process shall only be used for ties produced from trees felled within the previous ninety days (three months) and do not meet the moisture content specified in 3,4,4 above.

- a) Ties shall be trammed with each layer separated by 3/8 inch minimum sticker placed at each end of the ties.

- b) The ties shall be heated and boiled in oil under vacuum in the treating cylinder until the moisture content of the wood is low enough to allow proper treatment and meet the requirements of Paragraph 3,14 AWP C-6.

3.4.8.3 Inspection of Treating Sheets and Graph(C) -

- a) When the ties are being treated, the plant operator shall maintain a log and a graph, or a graph only if treating controls are automatic, of the following parameters:
 - 1) time (no greater than 15 minute intervals)
 - 2) temperature
 - 3) pressure
 - 4) vacuum
 - 5) creosote tank contents

In the event graph equipment becomes inoperable, inaccurate, or graph becomes illegible, Contractor must cease treatment of ties for CSX until equipment is repaired.

- b) The contractor shall upon request from CSX provide the log and graph, and the tram ticket for review and inspection.
- c) For oak crossties, switch ties, and crossing timbers, a net retention of at least seven pounds per cubic foot, unless refusal takes place.
- d) For mixed hardwood crossties, a net retention of at least eight and one half pounds per cubic foot is required, unless refusal takes place.

3.5 Nail Plates (C) - Nail Plates shall be the approved method used to control splitting in ties for CSX.

3.5.1 Nail Plate application -

- a) Ties shall be selectively nail plated prior to treatment.
- b) Nail plates shall be applied to both ends of any tie plated.
- c) Application of nail plates shall be subject and limited to ties with the maximum split dimension per paragraph 3.1.1, f), of this specification.
- d) Ties to be end plated shall have flat, smooth, sawn ends with no spurs.
- e) Nail end plates shall be applied by a mechanical device capable of exerting sufficient pressure to close splits bringing the tie back to its original sawn dimensions

and with capacity to drive a nail end plate into the end of the tie using a pressure plate.

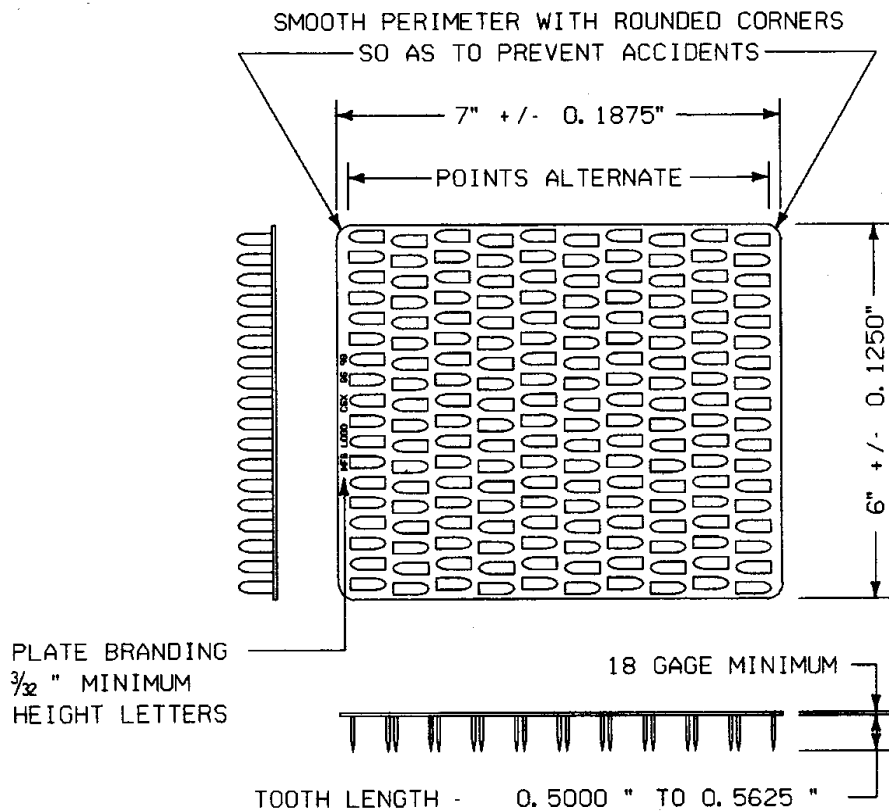
- f) Nail end plates shall be centered on the split(s) as practicable and securely applied against the end of the tie.
- g) No part of the nail end plate shall protrude beyond the edge of the tie. The nail end plate shall be positioned to avoid projecting over the edge of tie having the maximum permissible wane. If this is not practical, the protruding edge of the nail end plate shall be ground off, bent over and hammered into the tie, or otherwise treated to remove the potential for hand injuries.
- h) Exposed edges of installed nail end plates shall be checked for any burrs and snags made during application, and if found, removed by grinding, filing, or other means to eliminate potential hand injuries when installing the ties.

3.5.2 Nail Plate Design (C) - (see Figures 3.5.2-1 and 3.5.2-2).

- a) The material for nail plates shall be structural steel, ASTM A653, grade 40, 18-gage minimum and hot dipped galvanized, ASTM A924, coating designation G60.
- b) The size of the plates and number of teeth per plate shall be as shown on the attached drawings, "Nail Plates for Main Track Ties" and "Nail Plates for Side Track Ties".
- c) Nail end plates shall be branded in 3/32 inch minimum height letters to include plate manufacturers name or symbol, CSX, plant (two letters), and year (two digits).

Examples of Plant Location Designations:

<i>Florence</i>	<i>CSX</i>	<i>FL</i>	<i>99</i>
<i>Green Springs</i>	<i>CSX</i>	<i>GS</i>	<i>99</i>
<i>Guthrie</i>	<i>CSX</i>	<i>GU</i>	<i>99</i>
<i>Montgomery</i>	<i>CSX</i>	<i>MO</i>	<i>99</i>



NOTES.

MATERIAL SPECIFICATION, STRUCTURAL STEEL, ASTM A653, GRADE 4, 18 GAGE MINIMUM, AND HOT DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A924, COATING DESIGNATION G60.

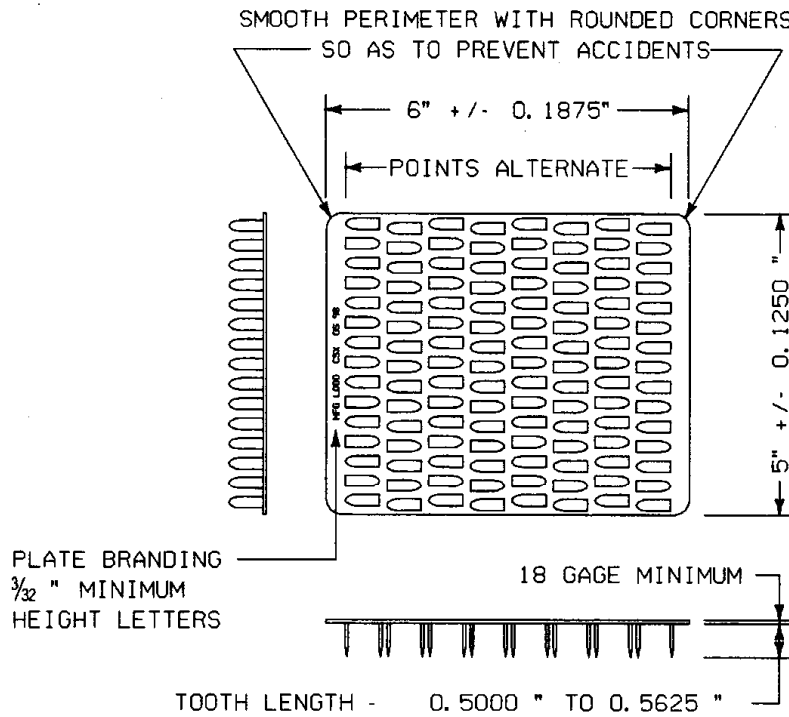
NUMBER AND ALIGNMENT OF ROWS TO BE DETERMINED BY THE PLATE MANUFACTURER. A MINIMUM OF 180 TEETH OR A MINIMUM DENSITY OF 4.1 TEETH PER SQUARE INCH OF MEASURED PLATE AREA, WHICHEVER PROVIDES THE GREATEST NUMBER OF TEETH, IS REQUIRED.

PLATE FLATNESS, CONCAVITY OR CONVEXITY MEASURED WITH A STRAIGHT EDGE AND TAPER GAGE ACROSS EITHER THE WIDTH, LENGTH OR DIAGONALS ON THE TOOTHLESS SIDE SHALL NOT EXCEED 0.03125".

BRAND LOCATION TO BE SELECTED BY MANUFACTURER OF PLATE.

NAIL PLATE
FOR MAIN TRACK TIES

Figure 3.5.2-1



NOTES.

MATERIAL SPECIFICATION, STRUCTURAL STEEL, ASTM A653, GRADE 4, 18 GAGE MINIMUM, AND HOT DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A924, COATING DESIGNATION G60.

NUMBER AND ALIGNMENT OF ROWS TO BE DETERMINED BY THE PLATE MANUFACTURER. A MINIMUM OF 120 TEETH OR A MINIMUM DENSITY OF 4.0 TEETH PER SQUARE INCH OF MEASURED PLATE AREA, WHICHEVER PROVIDES THE GREATEST NUMBER OF TEETH, IS REQUIRED.

PLATE FLATNESS, CONCAVITY OR CONVEXITY MEASURED WITH A STRAIGHT EDGE AND TAPER GAGE ACROSS EITHER THE WIDTH, LENGTH OR DIAGONALS ON THE TOOTHLESS SIDE SHALL NOT EXCEED 0.03125".

BRAND LOCATION TO BE SELECTED BY MANUFACTURER OF PLATE.

NAIL PLATE
FOR SIDE TRACK TIES

Figure 3.5.2-2

3.6 **Environmental (C)** -

3.6.1 **Environmental Regulations** - All material shall comply with current environmental regulations.

3.6.2 **Disposal Hazards** - Material posing a possible disposal hazard, such as preservatives, insecticides or other sensitive disposables, shall be indicated in documentation and presented at the supplier vendor forum.

3.7 **Safety (C)** - The supplier shall observe all applicable Federal, State, and Local safety and operating rules and regulations.

3.8 **Workmanship (C)** - All ties and related components shall be manufactured, finished and comply with all AAR, and FRA standards for workmanship and/or certification.

4.0 **Quality Assurance Provisions (C)** -

a) The supplier shall be responsible for insuring that the delivered ties meet the requirements as identified in the applicable paragraphs of this specification and as directed in the contract agreement.

b) CSX also reserves the right to perform ad-hoc no notice inspections at the manufacturing plant or in the field to evaluate ties for quality and conformance with this specification.

c) Final acceptance of ties shall be based on destination inspection by CSX at the location designated by CSX in the agreement.

5.0 **Transportation (M)** - CSX shall provide transportation direction with each order. The supplier shall ship via truck or rail to destinations as directed by CSX with each order.

6.0 **Industrial Grade Crosstie Requirements (C)** -

6.1 **Acceptable Materials(C)** - Species accepted as grade ties only must conform to the same requirements as outlined in section 3.2

6.2 **Dimensions** -

a. Size- 7"X8" and 7"X9" (+/- 1")

b. Length- 8' to 8'6"

c. Face- 6" minimum in the rail bearing area

6.3 **Malformation Tolerances** -

6.3.1 **Rot** - Decay greater than 2" in diameter and 3" deep within the rail bearing area will be rejected. Decay outside the rail bearing area will be limited to 3" including both ends shall be allowed.

6.3.2 **Holes** - 2" in diameter and 3" deep inside the rail bearing area and up to 3" in diameter outside the rail bearing area shall be allowed.

6.3.3 **Knots** - Up to 4" within the rail bearing area two thirds the width of the tie outside the rail bearing area shall be allowed.

6.3.4 **Shakes** - Up to ½ the width of the end of the tie and not appearing on any face and does not affect the spike holding ability of the tie shall be allowed. The end of the tie is not considered a face.

6.3.5 **Splits** - Up to 1/8" and up to 8" long shall be allowed.

6.3.6 **Checks** - Check is not a split. Seasoning checks are permitted 3/8" wide and ½ the thickness of the tie.

6.3.7 **Bark Seams** - Permitted up to 2" in depth and 10" long anywhere in the tie.

6.3.8 **Wood Destroying Insect Infestation** - Ties with wood destroying insect infestation shall **not** be acceptable for use or purchase by CSX.

6.3.9 **Worm Hole** - Not considered a defect.

6.3.10 **Cross or Spiral Grain** - Except in species with interlocking grain, ties having cross, slant, or spiral grain greater than 2" in 15" of length will be rejected.

6.3.11 **Wane** - Permitted on all surfaces. Up to 5" outside the rail bearing area, wane within the rail bearing area is defined in section 6.2 as "Face" above.

6.4 **Manufacturing** -

- a) A tie will be considered straight when a straight line from the middle of one end to a corresponding point on the other end is no more than 2" from the surface at all times.
- b) The top and bottom of a tie will be considered parallel if any difference at the sides or ends does not exceed 2".
- c) A tie is not well sawn when the surfaces are cut with score marks more than 1" deep within the rail bearing area and no more than 2" deep outside the rail bearing area.
- d) Stump pull and sloped ends are acceptable unless the tie exceeds the criteria for "split" and cannot be properly end plated.

6.5 **Quantity** - Maximum allowable of 6% Industrial Grade ties mixed with grade ties.

Issued

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