

SECTION 20130

TIMBER CROSSTIES AND SWITCH TIES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Section includes specifications for timber crossties and switch ties in track construction, including special trackwork. Installation of timber ties is specified in Sections 20400, Track Construction, and 20500, Special Trackwork.

1.02 REFERENCE STANDARDS

- A. Caltrain Standard Drawings
- B. American Railway Engineering and Maintenance of Way Association (AREMA):
 - 1. Manual for Railway Engineering (Manual)
- C. American Wood-Preservers' Association (AWPA):
 - 1. P1 Standard for Creosote Preservative
 - 2. P2 Standard for Creosote-Petroleum Oil Solution
 - 3. P4 Standard for Petroleum Oil for Blending with Creosote
- D. West Coast Lumber Inspection Bureau (WCLIB):
 - 1. Standard Grading Rules, Number 17 (WCLIB Rules)

1.03 SUBMITTALS

- A. Certificates of Compliance for preservative treatment, ascertaining conformance with the approved preservative within one week of completion of testing.
- B. Inspection Certificate from the WCLIB for grading compliance prior to application of preservative treatment.
- C. Certificate of Compliance from manufacturer or suppliers certifying that the materials delivered to the site are in compliance with the requirements of this Section. Include supporting test results.

1.04 STORAGE AND HANDLING

- A. Handle ties carefully to avoid damage in accordance with the AREMA Manual, Chapter 30, Part 3, Section 3.5, The Handling of Ties from the Tree Into the Track.

- B. Stockpile new ties only where directed by the Engineer. Band ties with minimum of two bands in 12-tie bundle, and stack to a maximum of 3 bundles high, with slating between layers of bundles, and at a maximum height of 12 feet.
- C. Choose storage locations with proper security, access, and drainage. Stack ties tightly and off the ground for storage to prevent them from becoming warped or damaged.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Ties shall be new oak or mixed hardwood with kerf mark to indicate heart wood side.
- B. Timber crossties and switch ties shall have a cross-section of 7 by 9 inches, subject to the following:
 - 1. Standard crossties shall be 7-inch, No 1 grade, 9 feet 0 inches long.
 - 2. Transition/grade crossing crossties shall be 7-inch, No 1 grade, 10 feet 0 inches long.
 - 3. Switch ties shall be full length, measuring full thickness and width throughout. Ties up to 1 inch wane or less will be inspected on an individual basis. Ties with more than 1 inch wane will be rejected. Ties with thickness and width more than 1/8 inch thinner or narrower than the specified size will be rejected.
 - 4. Head block switch ties for manual throw turnouts shall be 8 by 12 inches.
 - 5. Head block switch ties for power operated turnouts shall be 8 by 10 inches.
- C. Do not use industrial grade crossties.
- D. Any special timber ties for open-deck bridges shall be as specified and as shown in the Contract Documents.

2.02 TIMBER REQUIREMENTS AND BASIS OF REJECTION

- A. General: Ties shall be fabricated from sound, straight, live timber, free from any defects that may impair their strength or durability, such as bark, splits, shakes, large or numerous holes or knots, pitch seams, pitch rings or other imperfections.
 - 1. Ties with any type of decay or insect damage are not acceptable.
- B. Except as specified in this Section, only those imperfections that are within the limits of the AREMA Manual will be allowed.

- C. Rejection of ties for holes and knots: Ties with holes and knots (as defined below) between 20 and 40 inches from its middle will be rejected. Ties with these defects outside the rail bearing area may be rejected at the discretion of the Engineer.
 - 1. Large hole: More than 1/2 inch in diameter and 3 inches in depth within, or more than 1/4 of the width of the surface on which it appears, and 3 inches deep outside, the sections of the tie between 20 inches and 40 inches from its middle.
 - 2. Numerous holes: Any number of holes equaling a large hole in a damaging effect.
 - 3. Large knot: One whose average diameter exceeds 1/4 the width of the surface on which it appears.
 - 4. Numerous knots: Any number which, in total, equals a large knot in damaging effect.
- D. Shakes which are more than 1/3 the width of the tie will be allowed provided it does not extend nearer than 1 inch to any surface.
- E. Except in woods with interlocking grain, ties with a slant grain in excess of 1 in 15 will be rejected.
- F. A check is a separation of the wood due to seasoning which appears on one surface only. Do not count the end as a surface. Ties with continuous checks whose depth in a fully seasoned or treated tie is greater than 1/4 the thickness and longer than 1/2 the length of the tie will be rejected.

2.03 TIE FABRICATION REQUIREMENTS

- A. Ties shall be well sawed on all four sides and cut square at the end to the full dimensions specified. Straight and opposite faces shall be true and parallel.
- B. Crossties and switch ties which comply with the following shall be considered straight:
 - 1. Horizontally when it is concave or convex no more than 1 inch.
 - 2. Vertically when it is concave or convex no more than 1/2 inch.
- C. A tie will not be considered well sawn when its surfaces are cut into with scar marks more than 1/2 inch deep or when its surfaces are not even.
- D. The top and bottom of a crosstie or switch tie shall be considered parallel if any difference in the thickness at the sides or ends does not exceed 1/2 inch.

2.04 END PLATES

- A. All crossties and switch ties shall be end plated on both ends.

2.05 SEASONING

- A. Crossties shall be seasoned in accordance with AREMA Manual, Chapter 30, Part 3, Section 3.5, The Handling of Ties from the Tree into the Track, and Section 3.6, Wood Preserving.
- B. Pre-boring and dapping of crossties and switch ties shall be done prior to treatment to minimize splitting when driving spikes and provide preservative penetration around the spike holes. The boring pattern shall conform to the spiking pattern shown on the Caltrain Standard Drawings. Field boring of switch ties will be permitted if the hole is provided a method of preservative treatment approved in advance by the Engineer.
- C. Bore from the top surface of the tie; bore shall not penetrate the bottom surface.

2.06 INCISING

- A. Incise crossties and switch ties on all four sides in the pattern specified in the AREMA Manual, Chapter 30, Part 3, Section 3.7, Specifications for Treatment.

2.07 PRESERVATIVE

- A. Preservative shall be in accordance with AWPA P3. Petroleum for blending with creosote shall comply with the AWPA P4.
- B. Preservative applied to switch ties shall conform to AWPA P1.
- C. Pressure treat ties in accordance with the empty cell process with a 50/50 to 40/60 creosote/petroleum base to a minimum retention of 7 pounds per cubic foot of wood, or to refusal retention.
- D. Creosote-petroleum treatment solution shall be per AREMA Manual, Chapter 30, Part 3, Section 3.7.2, Treatment, and Section 3.7.4, Preservatives.
- E. Apply the preservative only after the ties have a moisture content of 40 percent or less.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation, perform a final visual inspection of the ties to ensure all ties to be installed are bored, branded, incised, and without defects.

3.02 INSTALLATION

- A. Install ties in accordance with Sections 20400, Track Construction, 20500, Special Trackwork, and 20300, Crosstie Replacement, as applicable.

END OF SECTION