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DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

SUPPLEMENTAL SPECIFICATION

Section 861—Piling and Round Timber

Delete Section 861 and substitute the following:

861.1 General Description

This section includes the requirements for timber piles and timber poles.

861.1.01 Related References

A. Standard Specifications

Section 863–Preservative Treatment of Timber Products

B. Referenced Documents

ANSI 05.1

National Electrical Safety Code (National Institute of Standards and Technology)

QPL 50

861.2 Materials

A. Definition and Limitation of Defects

Decay: Disintegration of the wood substance due to wood-destroying fungi. The words “dote” and “rot” mean the same as decay. Red heart is a form of decay.

Compression Wood: An abnormal, dense, hard growth frequently occurring on the underside of limbs and leaning trunks of coniferous trees. It is characterized by very wide and eccentric annual growth rings and includes what appears to be an exceptional proportion of summerwood growth.

The contrast in color between springwood and summerwood, however, is usually less in compression wood than in normal wood.

Turpentine Butt: A scar caused from bleeding the trees to obtain turpentine.

Scar: A damaged surface caused from injury to the tree during growth.

Sweep: Deviation of a piece or stick from a straight line measured from the center of one end to the center of the other end. A straight line from the center of the butt to the center of the tip shall lie entirely within the body of the pile.

Short Crook: A crook in which the direction of the piece or stick changes in a very short distance measured lengthwise.

Burst Check: A crack approximately at right angles to the annual rings, usually radial cracks in sticks from the center or from near the center to the outside, or a combination of this crack and a ring shake caused through either seasoning, exposure to high temperature, or the process of preservative treatment.

Unsound Knot: A knot solid across the face, but containing incipient decay.

Cluster Knot: Two or more knots grouped together, the fibers of the wood being deflected around the entire unit.

A group of single knots with fibers deflected around each knot separately is not a cluster, even though the knots may be close together.

Punk Knot: A fungus decay that extends from the interior of the piece of pile to the outside, which when prodded is usually found to contain a snuff-like substance.

Ring Knots: Three or more knots appearing in the same line of circumference, or any foot of length.

861.2.01 Timber Piles

A. Requirements

1. Use round timber piles of any species of wood that will withstand driving and support the load specified. Use plants listed on QPL 50.
2. Soundness

   Use piles of sound wood, free from decay, red heart, or insect attack.

   a. Cedar and Cypress: The butt ends may have a pipe or stump rot hole not more than 1-1/2 in (40 mm) in diameter. Cypress piles may have peck aggregating not more than 1-1/2 in (40 mm) in diameter.

   b. Southern Pine: Piles may have unsound knots less than half the permitted size of a sound knot, providing that the unsoundness does not extend more than 1-1/2 in (40 mm) deep and that the adjacent areas of the trunk are not affected.
3. Density

   a. All piles shall be dense with at least 6 annual rings per 1 in (25 mm) and 1-1/2 in (40 mm) or more of summerwood (the darker, harder portion of the annual ring), as measured over the outer 3 in (75 mm) of butt diameter on a radial line from the pith.

      The contrast in color between summerwood and springwood shall be sharp and the summerwood shall be darker in color.

   b. Piles excluded by the above rule may be accepted provided they have at least four annual rings per 1 in (25 mm) and 1/3 or more summerwood, as measured over the outer 3 in (75 mm) of butt diameter on a radial line from the pith.
4. Knots

   a. Sound knots:

For piles 50 ft (15 m) long or less, and in 3/4 of the length of piles over 50 ft (15 m), measured from the butt	Sound knots less than 4 in (100 mm) or 1/3 the diameter of the pile, whichever is smaller.
For the top 1/4 length of piles over 50 ft (15 m) long	Sound knots less than 5 in (125 mm) or 1/2 the diameter of the pile, whichever is smaller
The size of a knot shall be its diameter measured at right angles to the length of the pile.	

   b. Unsound knots are not permitted except in Southern Pine piles as specified in Subsection 861.2.01.A.2.b.

   c. The sum of sizes of all knots in any 12 in (300 mm) of the pile shall not exceed twice the size of the largest permitted single knot.
5. Holes

   Allow holes that average less than 1/2 inch (15 mm) in diameter if the sum of the average diameter of all holes in any 1 ft² (0.1m²) of pile surface is less than 1-1/2 in (40 mm).
6. Splits and Shakes

   Splits shall not be longer than the butt diameter of the pile.

   The length of any shake or combination of shakes in the outer half of the radius of butt of the pile, when measured along the curve of the annual ring, shall not exceed 1/3 the circumference of the butt of the pile.
7. Sapwood

   Piles to be treated with preservative shall have at least 1 in (25 mm) of sapwood at the butt end.
8. Heartwood

   a. In untreated piles for use in exposed work, the diameter of the heartwood at the butt shall be at least 8/10 of the diameter of the pile at the butt.

   b. If high heartwood content is required for untreated foundation piles, the Plans will specify the ratio of heartwood to total diameter.
9. Peeling

a. Peel piles by removing all of the outer bark and at least 80 percent of the inner bark, well distributed over the surface of the pile.
b. If piles will be treated with preservative, do not leave inner bark wider than 1/2 in (15 mm).
c. Do not remove more than three annual rings of the solid wood.

10. Cutting and Trimming
    a. Saw butts and tips square with the axis of the pile.
    b. Trim or smoothly cut all knots and limbs flush with the surface of the pile or the surface of the swell surrounding the knot.
11. Straightness

    In general, a straight line from the center of the butt to the center of the tip shall lie entirely within the body of the pile.

    If specified, the Department can accept long piles for foundations (but not for trestles) if the straight line lies partly outside the body of the pile. The maximum distance between the line and the pile shall not exceed 0.5 percent of the length of the pile or 3 in (75 mm), whichever is smaller.
12. Taper

    Cut piles above the butt swell so it has a continuous taper from the point of butt measurement to the tip.
13. Twist of Grain

    Do not allow spiral grain to exceed 180 degrees of twist when measured over any 20 ft (6 m) section of the pile.
14. Limits of Defects
    a. Piles shall not have short crooks that deviate more than 2-1/2 in (65 mm) from straightness in any 5 ft (1.5 m) length.
    b. Burst checks in piles shall be less than 1 in (25 mm) wide, measured at the outside, and shall not extend over 12 in (300 mm) long.
15. Circumferences, Diameters, and Lengths
    a. The circumferences of piles measured under the bark shall have the minimum and maximum values in Table 1 (metric Table 1) for the class specified. No more than 10 percent of the piles in any shipment may have circumferences 2 in (50 mm) less than the tabulated minimum values.

       NOTE: Requirements for tip circumference of piles that are longer than the required length may be applied at the tip end of the required length.
    b. The ratio of the maximum to the minimum diameter at the butt of any pile shall not exceed 1.2.
    c. Individual piles may vary from the length specified by ± 12 in (300 mm) in piles shorter than 40 ft (12 m), and ± 2 ft (600 mm) in piles 40 ft (12 m) or longer.
    d. The average length of all piles of a specified length in each lot shall not be less than the length specified.

Table 1
Circumferences and Diameters of Timber Piles

	3 ft (900 mm) from butt	At tip, minimum

	Minimum		Maximum			
Length	**Circumference**	**Dia. (approx.)**	**Circumference**	**Dia. (approx.)**	**Circumference**	**Dia. (approx.)**
Feet (meter)	**In (mm)**	**In (mm)**	**In (mm)**	**In (mm)**	**In (mm)**	**In (mm)**
	Douglas Fir, Hemlock, Larch, Pine, Spruce, or Tamarack					
Under 40 (12)	38 (950)	12 (300)	63 (1575)	20 (500)	25 (625)	8 (200)
40 to 50 (12 to 15)	38 (950)	12 (300)	63 (1575)	20 (500)	22 (550)	7 (175)
51 to 70 (15.1 to 21.4)	41 (1025)	13 (325)	63 (1575)	20 (500)	22 (550)	7 (175)
71 to 90 (21.5 to 27.5)	41 (1025)	13 (325)	63 (1575)	20 (500)	19 (475)	6 (150)
Over 90 (27.5)	41 (1025)	13 (325)	63 (1575)	20 (500)	16 (400)	5 (125)
	Oak and Other Hardwoods, Cypress					
Under 30 (9)	38 (950)	12 (300)	57 (1425)	18 (450)	25 (625)	8 (200)
30 to 40 (9 to 12)	41 (1025)	13 (325)	63 (1575)	20 (500)	22 (550)	7 (175)
Over 40 (12)	41 (1025)	13 (325)	63 (1575)	20 (500)	19 (475)	6 (150)
	Cedars					
Under 30 (9)	38 (950)	12 (300)	69 (1725)	22 (550)	25 (625)	8 (200)
30 to 40 (9 to 12)	41 (1025)	13 (325)	69 (1725)	22 (550)	25 (625)	8 (200)
Over 40 (12)	41 (1025)	13 (325)	69 (1725)	22 (550)	22 (550)	7 (175)

NOTE: If the pile length is 25 feet (7.6 m) or less, a minimum circumference of 34 in (850 mm) and minimum diameter of 11 in (275 mm) at a point 3 ft (900 mm) from the butt are required.

16. Branding and Inspection
    a. Ensure the pile length and the diameter of the butt and tip are branded in the butts of the piles.
    b. Legibly brand the Preliminary inspection date in the tips.

B. Fabrication

Seasoning and Preservative Treatment: Where required, season and treat according to Section 863.

C. Acceptance

The Department will reject the pile based on any of the following defects:

- Decay
- Deep scars
- Unsound knots
- Punk knots
- Ring knots
- Cluster knots
- Compression wood (if readily identifiable based on ordinary visual inspection)

The Department may accept piles with sound turpentine scars undamaged by insects, provided they meet all other requirements.

D. Materials Warranty

General Provisions 101 through 150.

861.2.02 Timber Poles

A. Requirements

1. Select timber poles from plants listed on QPL 50.
2. Ensure that the poles that meet the requirements of the latest revision of ANSI 05.1, in the National Electrical Safety Code published by the National Institute of Standards and Technology, with the following exceptions:
   a. Section 2 Definitions—Modify the "Short Crook" definition as follows:

      "Any localized deviation from straightness within any section 5 ft (1.5 m) or less in length shall not be more than 1 in (25 mm) when measured with a straightedge parallel to the long axis of the pole."

   b. Section 4 Material Requirements, 4.4.9 Shape (1), (a)—shall read as follows:

      "For poles 50 ft (15 m) and shorter, of all species except northern white cedar, a straight line joining the edge of the pole at the butt and the edge of the pole at the top, in 90 percent or more of those poles supplied, shall not be distant from the surface of the pole at any point by more than 1 in (25 mm) for each 10 ft (3 m) of length between these points. In the remainder of those poles supplied (10 percent), the poles may have a deviation of 1 in (25 mm) for each 6 ft (1.8 m) of length when measured as above."

   c. Section 4 Material Requirements, 4.4.9 Shape (2)—shall read as follows:

      "Sweep in two planes (double sweep) - NOT PERMITTED."
3. Use the class and length specified on the Plans.
4. You may peel poles by machine, except that poles more than 55 ft (17 m) long may be debarked and trimmed by hand in lieu of machine peeling. Trim so that you preserve the buttressing effects of all overgrown knots.
5. Unless otherwise specified or indicated on the Plans, frame poles with flat roofs and slab grains.
6. Frame, drill, and machine poles as necessary before preservative treatment.

B. Fabrication

Seasoning and Preservative Treatment: Where required, season and treat according to Section 863.

C. Acceptance

General Provisions 101 through 150.

D. Materials Warranty

General Provisions 101 through 150.