

SECTION 508 TIMBER PILING

508.1 Description

- (1) This section describes furnishing, treating if required, driving, including preboring if required, and cutting off untreated timber test piling, treated timber test piling, untreated timber foundation piling, treated timber foundation piling, untreated timber trestle piling or treated timber trestle piling.

508.2 Materials

508.2.1 General

- (1) Furnish materials conforming to the following:

| | |
|---------------------------------|---------|
| Structural steel..... | 506.2 |
| Miscellaneous metals | 506.2 |
| Creosote-coal tar solution..... | 507.2.3 |
| Coal-tar pitch, type II..... | 507.2.4 |

508.2.2 Timber Piling

508.2.2.1 General

- (1) Furnish and use timber piling treated or untreated as the contract designates.
- (2) Except as specified otherwise, furnish class A piles.
- (3) Class B piles include all piles incorporated in a trestle, temporary or permanent, supporting railroad traffic.
- (4) Use class C piles only in falsework for structures supporting highway traffic, and for temporary structures supporting highway traffic.

508.2.2.2 Species

- (1) Untreated timber piling consists of any species of wood that withstands driving without showing excessive brooming or splitting.
- (2) Use treated timber piling from one of the following species:

| | | | |
|----------------------|-----------|---------------------|---------------|
| Interior Douglas fir | Jack pine | Coastal Douglas fir | Western larch |
| Southern pine | Oak | Red pine | |

508.2.2.3 Quality Requirements

- (1) Use class A and class B timber piles conforming to the following quality requirements:

508.2.2.3.1 Soundness

- (1) Use piles made of sound wood, free from decay, red heart, or insect attack. Southern yellow pine piles may have unsound knots not exceeding half the allowed size of a sound knot specified below, provided the unsoundness extends to not more than 1 1/2 inches (38 mm) depth and does not affect the adjacent trunk areas. The engineer may accept piles with sound turpentine scars undamaged by insects.

508.2.2.3.2 Knots

- (1) Sound knots in piles 50 feet (15 m) or less in length, and in 3/4 of the length from the butt of piles longer than 50 feet (15 m) are no larger than 4 inches (100 mm) or 1/3 the diameter of the pile at the point they occur, whichever is smaller. Sound knots in the remaining 1/4 of the length of piles longer than 50 feet (15 m) are no larger than 5 inches (125 mm) or 1/2 the diameter of the pile at the point they occur, whichever is the smaller. Measure the size of a knot by taking its diameter at right angles to the length of the pile. The engineer will not accept piles with unsound knots, except in southern pine piles as specified above. The sum of sizes of all knots in any one-foot (300 mm) length of the pile shall not exceed 2 times the size of the largest allowed single knot. The engineer will not accept piles with cluster knots. A cluster knot is 2 or more knots grouped together, with the fibers of the wood deflected around the entire unit. A group of single knots with fibers deflected around each knot separately is not a cluster, no matter how close the knots.

508.2.2.3.3 Holes

- (1) The engineer may allow holes less than 1/2 inch (13 mm) in average diameter provided the sum of the average diameters of all holes in any square foot (0.1 m²) of pile surface does not exceed 1 1/2 inches (40 mm).

508.2.2.3.4 Splits and Shakes

- (1) Ensure splits are not longer than the pile's butt diameter. Ensure that the length of any shake or combination of shakes in the outer 1/2 of the radius of the butt of the pile, if measured along the curve of the annual ring, is not greater than 1/3 the circumference of the butt of the pile.

508.2.2.3.5 Treated Piles, Sapwood

- (1) Ensure that piles intended for preservative treatment have at least one inch (25 mm) of sapwood at the butt end.

508.2.2.3.6 Heartwood and Density

- (1) If using untreated piling in exposed work, the diameter of the heartwood at the butt shall at least equal 80 percent of the diameter of the pile at the butt.

508.2.2.3.7 Peeling

- (1) Peel piles by removing all the outer bark and at least 80 percent of the inner bark, well distributed over the surface of the pile. If piles are receiving preservative treatment, then leave no strips of inner bark wider than 1/2 inch (13 mm).

508.2.2.3.8 Cutting and Trimming

- (1) Saw butts and tips square with the axis of the pile. Trim all knots and limbs, or smoothly cut flush with the surface of the pile, except, the contractor may hand trim knots flush with the surface of the swell surrounding the knot.

508.2.2.3.9 Straightness

- (1) A straight line drawn from the center of the butt to the center of the tip shall lie entirely within the body of the pile.

508.2.2.3.10 Taper

- (1) Cut piles above the butt swell and ensure a continuous taper from the point of butt measurement to the tip.

508.2.2.3.11 Twist of Grain

- (1) Twist of grain in any 20 feet (6 m) of length shall not exceed 1/2 of the circumference if measured at the midpoint of length.

508.2.2.4 Dimensions

- (1) Class A or class B timber piles, measured peeled or under the bark, shall conform to the table below, Dimensions of Timber Piles. Additionally, 10 percent of the class A piles in any lot may have circumferences 2 inches (50 mm) less than the tabulated minimum values, and 10 percent of the class B piles in any lot may have diameters 1/2 inch (13 mm) less than the tabulated minimum values.
- (2) The ratio of the maximum to the minimum diameter of the butt of any pile shall not exceed 1:2.
- (3) For class B piles, determine the diameter of a pile at a specified location where the pile is not exactly round either by the average of the minimum and maximum measured diameters, or by dividing the measured circumference by 3.14.

DIMENSIONS OF TIMBER PILES

| SPECIES | LENGTH feet (m) | CLASS A PILES | | | | | | CLASS B PILES | | |
|------------------------------|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | | 3' (1 m) from butt | | | | at tip | | 3'. (1 m) from butt | | at tip |
| | | CIRC. | | DIA. | | CIRC. | DIA. | DIA. | | DIA. |
| | | MIN inches (mm) | MAX inches (mm) | MIN inches (mm) | MAX inches (mm) | MIN inches (mm) | MIN inches (mm) | MIN inches (mm) | MAX inches (mm) | MIN inches (mm) |
| DOUGLAS FIR, LARCH, AND PINE | under 20 (under 6) | 32 (815) | 63 (1600) | 10 (255) | 20 (510) | 25 (635) | 8 (205) | | | |
| | Under 40 (12) | 38 (965) | 63 (1600) | 12 (305) | 20 (510) | 25 (635) | 8 (205) | 14 (360) | 20 (510) | 10 (255) |
| | 40 to 50 incl. (12 to 14.9) | 38 (965) | 63 (1600) | 12 (305) | 20 (510) | 22 (560) | 7 (180) | 14 (360) | 20 (510) | 9 (230) |
| | 51 to 70 incl. (15 to 20.9) | 41 (1045) | 63 (1600) | 13 (330) | 20 (510) | 22 (560) | 7 (180) | 14 (360) | 20 (510) | 8 (205) |
| | 71 to 90 incl. (21 to 26.9) | 41 (1045) | 63 (1600) | 13 (330) | 20 (510) | 19 (485) | 6 (155) | 14 (360) | 20 (510) | 7 (180) |
| | over 90 ^[1] (over 27) ^[1] | | | | | | | | | |
| OAK | under 30 (under 9) | 41 (1045) | 57 (1450) | 12 (305) | 18 (460) | 25 (635) | 8 (205) | 14 (360) | 18 (460) | 10 (255) |
| | 30 to 40 incl. (9 to 11.5) | 41 (1045) | 63 (1600) | 13 (330) | 20 (510) | 22 (560) | 7 (180) | 14 (360) | 20 (510) | 9 (230) |
| | over 40 (over 12) | 41 (1045) | 63 (1600) | 13 (330) | 20 (510) | 19 (485) | 6 (155) | 14 (360) | 20 (510) | 8 (205) |

^[1] Dimensions of all timber piles over 90 feet (27 m) in length are as the plans or special provisions show.

508.2.2.5 Class C Piles

- (1) Use class C piles of adequate strength, shape, and dimensions suitable for the purpose intended. Ensure the piling is made of sound wood, free from defects that might impair its strength, in good condition, reasonably straight, and capable of withstanding driving.
- (2) There is no requirement to peel class C piles, but trim all limbs and knots flush with the surface.

508.2.2.6 Treated Piling

- (1) Treat timber piling with one of the following: a creosote-coal tar solution, a pentachlorophenol solution in petroleum solvent, a chromated copper arsenate solution, an ammoniacal copper arsenate solution, or an ammoniacal copper zinc arsenate solution. Apply the solution by the pressure process according to AASHTO M 133, except only treat oak with one of the following: creosote-coal tar, or pentachlorophenol in petroleum solvent. The contractor shall not treat Coastal and Interior Douglas Fir with chromated copper arsenate.
- (2) Unless the engineer directs otherwise, inspect the material before treatment. The engineer will accept material after treatment based on: its condition before treatment, inspection of the treatment procedure substantiated by plant records, the condition of the material after treatment, and on absorption, penetration borings, and visual inspection.
- (3) The department may re-inspect material after delivery and may reject any material that does not comply with specifications.

- (4) If possible, during treatment, sort the piles into groups of each species, and into pieces with approximately equal moisture and sapwood content, and sort to ensure the treating medium contacts all surfaces.

508.2.3 Coal Tar Treated Fabric

- (1) If using cotton fabric for waterproofing, conform to AASHTO M 117-88 for coal tar treated fabric.

508.3 Construction

508.3.1 Ordering Piling

- (1) If the contract contains the Piling Test Untreated Timber or Piling Test Treated Timber bid item, do not order the foundation or trestle piling until driving the timber test piling, as specified below, and the engineer determines from the data obtained the piling lengths to order.
- (2) If the contractor furnishes foundation or trestle piling in lengths other than those the engineer determines necessary, after driving the test piling, the department will not measure or pay for any of the unsatisfactory, unsuitable, or excess lengths of this piling. Do not plead misunderstanding of this requirement because engineer-determined lengths differ from the lengths the plans show.

508.3.2 Test Piling

- (1) Drive at least one treated or untreated test pile, as specified, conforming to class A piling and the length the plans show, for each substructure unit specified.
- (2) Instead of an untreated timber test pile, the contractor may furnish a treated test pile, with the engineer's approval.
- (3) The engineer will determine the location of each test pile for each specified substructure unit. Unless specified otherwise, drive the test piles at locations that allow their use in the finished structure.
- (4) Drive test piling under conditions similar to those prevailing for the foundation or trestle piling. Excavate the site of each test pile to the elevation of the bottom of the footing before driving test piles, and in the case of trestle bents, excavate each test pile site to the finished ground line elevation.
- (5) The engineer will determine the bearing and penetration to drive the test piles.
- (6) If incorporating into the structure as foundation or trestle piling, remove the test piling down to at least 2 feet (600 mm) below streambed or finished ground line.
- (7) The cutoff of a timber test pile is the department's property until all timber piling under the contract are driven.

508.3.3 Driving Equipment

508.3.3.1 General

- (1) Use equipment to drive test piling, foundation piling, or trestle piling conforming to the requirements specified below. Use gravity hammers only with the engineer's permission.
- (2) If required to pile drive to refusal, conform to the design bearing values the plans show for the size or energy rating of the hammer.

508.3.3.2 Gravity Hammers

- (1) At the engineer's request, the contractor shall furnish a certified scale weight for the gravity hammer proposing to use.
- (2) For driving piles to required bearing values up to 35 tons (314 kN) per pile use a gravity hammer weighing at least 3000 pounds (1360 kg). For driving piles to required bearing values up to 50 tons (445 kN) per pile use a gravity hammer weighing at least 4000 pounds (1815 kg). And, for driving piles to required bearing values over 50 tons (445 kN) per pile use a gravity hammer weighing at least 5000 pounds (2270 kg).
- (3) Regulate the fall of a gravity hammer to avoid injuring the pile, preferably not to exceed 10 feet (3 m) and in no case exceed 15 feet (4.6 m).
- (4) Mount the load line on a free drum.

508.3.3.3 Air, Steam, or Diesel Hammers

- (1) If the engineer requests, the contractor shall furnish authentic data for the hammer the contractor proposes to use as follows:
 - For air or steam hammers, furnish the ram weight, the ram stroke, the hammer's rated energy in foot-pounds (joules) per blow, and the number of blows per minute at the rated energy.
 - For diesel hammers, furnish the ram weight, the hammer's maximum rated energy in foot-pounds (joules) per blow, and the normal number of operating blows per minute.
- (2) The hammer's energy rating in foot-pounds (joules) per blow shall at least equal E in the following formula, except that the minimum rated energy shall equal 7200 foot-pounds (9760 joules) per blow:

$$E = 0.15 (45.72) P$$

Where:

E = Hammer energy rating, in foot-pounds (joules) per blow

P = Required bearing of pile, in pounds (kN).

- (3) Reduce the maximum energy rating the manufacturer furnishes for diesel hammers by 25 percent in order to comply with the above formula.
- (4) If driving to required bearing, operate the hammer at the rate of blows per minute, or within the range of the rate, according to the manufacturer's recommendation.

508.3.3.4 Leads

- (1) All hammers require leads. In general, construct pile driver leads to give the hammer freedom of movement, and hold them in position by guys or stiff braces to ensure pile support during driving.
- (2) Rig the swinging leads to maintain the hammer's travel in line with the axis of the pile and to give adequate support to drive the pile within the accuracy tolerance specified.
- (3) Piles not driven within the specified accuracy tolerance are subject to removal and replacement at the no expense to the department.
- (4) Use inclined leads to drive batter piles.
- (5) Except if driving piles through water, make the leads long enough to not require a follower.

508.3.3.5 Followers

- (1) Use followers only if driving piles through water and only with the engineer's permission. If using followers, make one pile from each group of 10 a pile long enough to drive without a follower and use it to determine the average bearing capacity of the group. The contractor shall furnish this pile's extra length over the normal ordered length at no expense to the department. The contractor may drive piles through water with engineer-approved underwater driving hammers instead of furnishing extra length piling.

508.3.3.6 Water Jets

- (1) If using water jets, ensure a sufficient number of jets, and a volume and pressure of water at the jet nozzle to freely erode the material next to the pile. Ensure a plant capacity capable of operating 2 jet nozzles simultaneously with at least 100 pounds per square inch (690 kPa) pressure each. Before reaching the final penetration withdraw the jets and drive the piles with the hammer to secure the final penetration and bearing.
- (2) Do not use water jets while driving piling through roadway embankments.

508.3.3.7 Caps

- (1) If necessary to protect the pile against damage during driving, equip the top of the pile with a driving cap of a size and type that serves the purpose. Use a shock block of engineer-approved type and size on the upper side of the driving cap, if necessary. Generally, follow the pile hammer manufacturer's recommendations with respect to driving caps and shock blocks.

508.3.3.8 Collars

- (1) Provide collars or bands to protect piles against splitting or brooming if necessary.

508.3.4 Storing and Handling

- (1) Store and handle the piles in a manner that avoids injury to the piles. Take care not to break the surface of treated piles. Do not use chains, cant hooks, dogs, pike poles, or other pointed tools. Carefully trim cuts or breaks in the surface of treated piling and then cover with 3 applications of a compatible

preservative material. Use a preservative and application method conforming to AWWA Standard M4. Apply each succeeding application at least 2 hours after the previous.

- (2) Fill bolt holes with a compatible preservative material.

508.3.5 Driving

508.3.5.1 General

- (1) Unless specified otherwise, drive piling with a gravity hammer if allowed, single-acting hammer (air or steam), double-acting hammer (air or steam), differential-acting hammer (air or steam), diesel hammer, or with a combination of water jet and hammer.
- (2) Coordinate the pile driving and concrete placement operations so that no damage or displacement occurs to concrete in any substructure unit because of pile driving operations in any other unit.
- (3) Do not drive foundation or trestle piles for a substructure unit until the excavation for them is complete. Remove any material forced up within the limits of the footing to correct elevation before placing masonry in that footing, the contractor shall remove this material at no expense to the department.
- (4) Drive piles without varying more than 1/4 inch per foot (6 mm per 300 mm) from the vertical or from the batter the plans show, except drive piles for trestle bents so that placing the cap on the piles does not induce excessive stress. Ensure that foundation piles are within 6 inches (150 mm) of the position the plans show after driving.
- (5) Taper pile tips to a point not less than 4 inches (100 mm) square.
- (6) Drive piles so that the cutoff is at least 8 inches (200 mm).
- (7) Do not use followers to drive piling except as specified for piling driven through water.
- (8) Do not splice foundation and trestle piling.
- (9) If driving adjacent piles causes foundation or trestle piles to rise, drive them down again if the engineer requires.
- (10) Correct all damaged or misplaced piles, at no expense to the department, either by removing and replacing the pile, or by driving a second pile adjacent to the damaged or misplaced pile, as the engineer approves.
- (11) Drive piles continuously to the required bearing, unless the engineer approves discontinuous driving. The engineer may review discontinuous driving at the end of the initial driving. Perform subsequent driving as the engineer directs. For the purposes of this subsection, consider discontinuous driving as an interruption to driving a pile that lasts 3 hours or more.
- (12) Drive piles in a cluster circumferentially, starting at the inside of the cluster and proceeding toward the outside.

508.3.5.2 Bearing Value

- (1) Drive piles to a bearing value not less than that the plans show with hammers conforming to 508.3.3.
- (2) Compute theoretical bearing values according to the following formulae:

$$P = 2WH/(S + 0.5) \text{ for gravity hammers}$$

$$P = 2E/(S+0.2) \text{ for air, steam, or diesel hammers}$$

Where:

P = Safe bearing value in pounds.

W = Weight of ram or striking parts of hammer in pounds.

H = Height of fall of ram or striking parts of hammer in feet.

S = The average penetration in inches per blow for the last 5 to 10 blows for gravity hammers and the last 10 to 20 blows for air, steam or diesel hammers.

E = Energy in foot-pounds per blow.

$$P = (FH)/[6(S + 12.7)] \text{ for gravity hammers}$$

$$P = E/[6(S+5.08)] \text{ for air, steam, or diesel hammers}$$

Where:

P = Safe bearing value in kilonewtons.

F = Force of ram or striking parts of hammer in kilonewtons.

H = Height of fall of ram or striking parts of hammer in millimeters.

S = The average penetration in millimeters per blow for the last 5 to 10 blows for gravity hammers and the last 10 to 20 blows for air, steam or diesel hammers.

E = Energy in joules per blow.

Where:

- For Single-acting air or steam hammers, $E = WH$.
- For double-acting or differential-acting air or steam hammers, E equals the hammer manufacturers rated energy per blow operating at the designated number of blows per minute.
- For diesel hammers with unrestricted ram rebound, $E = WH$. Use hammers with an attached gauge for measuring H.
- For diesel hammers with an enclosed ram, E equals the average equivalent energy in foot-pounds (joules) taken from the gauge attached to the hammer and recorded during the period when the average penetration per blow is recorded. Provide these hammers with a gauge and applicable charts to evaluate the equivalent energy produced under any driving condition.

(3) The above formulae are applicable only if:

1. The gravity hammer has a free fall.
2. The head of the pile is not broomed or crushed.
3. The penetration is reasonably quick and uniform.
4. No follower is used.
5. There is no noticeable bounce after the blow. If there is a noticeable bounce, deduct twice the height of the bounce from H to determine its value in the above formulae.

(4) Consider the bearing values of piles determined by the above formulae effective only if they are less than the crushing strengths of the piles. Take into consideration: the character of the soil penetrated; driving conditions; the distribution, sizes, and lengths of the piles involved; and the computed load per pile during determination of the reliability of driven piles.

(5) If using water jets in connection with the driving, determine the bearing value by the above formulae from the results of driving after withdrawing the jets.

508.3.5.3 Penetration

(1) For foundation piling, drive piles at least 10 feet (3 m) below the streambed elevation or original ground if using pile bents, or at least 10 feet (3 m) below the bottom of footings or original ground elevation, whichever is lower, unless the plans specify otherwise or the engineer specifically allows in writing. The engineer may require preboring to achieve minimum penetration.

508.3.5.4 Cutting Off Piles

- (1) After completing foundation or trestle pile driving for a substructure unit, saw the tops off all pilings in the unit true to the plane the plans show. Apply one coat of a compatible preservative treatment to the resulting preliminary sawed surface, and 3 coats to the resulting final cutoff sawed surface. Use a preservative and application method conforming to AWPA Standard M4. Allow at least 2 hours between applications.
- (2) All pile cutoffs, except lengths the contractor orders to facilitate the work and the extra lengths required if using followers are department property. They shall remain department property until all timber piling under the contract is driven.

508.3.5.5 Prebored Holes

(1) If the plans or contract special provisions require prebored holes, make them the length or depth the plans show. Unless directed otherwise, make the diameter of the hole approximately the same as the diameter of the pile. If boring holes through roadway embankments that exceed the diameter of the piling, backfill them with sand after driving the piling.

508.3.6 Piling for Trestle Bents

- (1) In addition to the general requirements for timber piling, conform to the following requirements for piling for trestle bents:
- (2) Carefully, select the size of the piles for each bent to avoid any undue bending or distortion of the sway bracing without cutting the piles.
- (3) Drive the piles as accurately as possible, in the correct location, and to the vertical lines or batter, the plans show. If a pile is driven out of line, straighten it without injury before cutting off or bracing. Remove and replace all piles damaged in straightening at no expense to the department. Do not shim the tops of piles.
- (4) Use suitable clamps on treated piles to support staging or other construction facilities, and under no circumstances bolt, spike, or nail construction facilities to treated piling.
- (5) Place a piece of sheet zinc, of the dimensions and thickness the plans show, on the top of each pile that receives a cap. Before placing the zinc, treat the top of the piling as specified for cut surfaces in 508.3.4.
- (6) Coat the tops of treated piles in wings with alternate layers of hot coal-tar pitch, conforming to 507.2.4, and coal-tar treated fabric, conforming to 508.2.3, using 4 applications of pitch and 3 layers of fabric. Make the fabric cover at least 6 inches (150 mm) larger in dimension than the diameter of the pile and neatly fold down over the pile, secure in place with zinc coated wire and large-headed zinc coated nails. Place at least 7 wrappings of wire around the piling, over the fabric. Draw the wire tight and secure with zinc coated nails or staples. Neatly trim the edges of fabric to line below the wire. Apply the pitch to the piling beneath the turned down wrapping as well as to the top and completely mop the entire fabric.
- (7) Fill holes bored in treated piling with a compatible preservative treatment.
- (8) Insert a tight-fitting treated plug into all holes not used for bolts, rods, etc.

508.3.7 Salvaged Pile Cutoffs

- (1) During the progress of construction and before ordering the piling for a unit, the engineer may order the contractor to furnish any or all piling for the unit by driving suitable salvaged cutoffs accumulated under the contract.
- (2) After driving all the timber piling under the contract, all cutoffs not salvaged and used in the work become the contractor's property for disposal.

508.4 Measurement

508.4.1 Timber Test Piling

- (1) The department will measure the Piling Test bid items as a single lump sum unit for each structure acceptably completed. Each unit measured equals the number and length of untreated timber test piling the plans show for the structure.

508.4.2 Timber Piling Delivered

- (1) The department will measure Piling Untreated Timber Delivered and Piling Treated Timber Delivered by the linear foot acceptably completed. The measured quantity equals the sum of the nominal lengths of piling the engineer ordered based on test piling driven. The department will not measure for payment additional lengths the contractor ordered to facilitate the work. The department will not measure test piles incorporated in the finished work as foundation or trestle piling.
- (2) If piling are driven through water and one pile in each group of 10 is required to be extra long for determining the group bearing capacity, the department will not measure the extra length of this pile over the nominal ordered length for the group.

508.4.3 Timber Piling Driven

- (1) The department will measure Piling Untreated Timber Driven and Piling Treated Timber Driven by the linear foot acceptably completed. The department will not measure test piles incorporated in the finished work as foundation or trestle piling.
- (2) For foundation or bearing piling the quantity measured equals the sum of the lengths left in place below cutoff.
- (3) For piling for trestle bents, shear booms, and pile clusters, the quantity measured equals the sum of the lengths left in place below the ground surface as it existed before driving started. For timber abutments,

consider the ground surface to be the bottom of excavation for timber backing. For trestle bents, consider the ground surface to be the existing or constructed streambed.

508.4.4 (Vacant)

508.4.5 Preboring Timber Piling

- (1) The department will measure Preboring Timber Piling by the linear foot acceptably completed. The department will not measure holes for test piling separately.

508.5 Payment

508.5.1 General

- (1) The department will pay for measured quantities at the contract unit price under the following bid items:

| <u>ITEM NUMBER</u> | <u>DESCRIPTION</u> | <u>UNIT</u> |
|--------------------|--|-------------|
| 508.0100 | Piling Test Untreated Timber (structure) | LS |
| 508.1000 | Piling Untreated Timber Delivered | LF |
| 508.1300 | Piling Untreated Timber Driven | LF |
| 508.1600 | Piling Treated Timber Delivered | LF |
| 508.2000 | Piling Treated Timber Driven | LF |
| 508.3000 | Piling Test Treated Timber (structure) | LS |
| 508.4000 | Preboring Timber Piling | LF |

- (2) If, under 508.3.1, the contractor furnishes piling of a different length than engineer determines necessary, the department will not pay for any of the unsatisfactory, unsuitable, or excess lengths of this piling.
- (3) The department will not make any additional payment for treated piles substituted for untreated piles as allowed under 508.3.2.
- (4) The department will not pay for piling from salvaged cutoffs, as allowed under 508.3.5, except for preparing and pointing the pile for driving as specified under 508.5.2.
- (5) If the engineer requires preboring, but the contract does not contain the Preboring Timber Piling bid item, the department will pay for preboring as extra work.

508.5.2 Timber Test Piling

- (1) Payment for the Piling Test Untreated Timber bid items and the Piling Test Treated Timber bid items is full compensation for, treating if required, all excavating necessary to drive test piling not included within the limits of the Excavation for Structures bid items; for providing and driving the test piling; for removing any test piling not incorporated in the finished structure; for cutting off the test piling that is incorporated; and for disposing of the removed piles or pile cutoffs, regardless of length, not salvaged and used in the work.

508.5.3 Timber Piling Delivered

- (1) Payment for Piling Untreated Timber Delivered and Piling Treated Timber Delivered is full compensation for providing, treating if required, and delivering acceptable piling.
- (2) The department will pay for preparing and pointing of salvaged pile cutoffs, that the engineer designates for use as piling, at a price per piling prepared and pointed. The department will determine this price by multiplying the contract unit price for Piling Untreated Timber Delivered and Piling Treated Timber Delivered by 5 for US standard measure projects (2 for SI metric projects). The department will pay for preparing and pointing under the Preparing and Pointing Salvaged Timber Pile Cutoffs administrative item. Payment for preparing and pointing salvaged pile cutoffs is full compensation for providing all labor, tools, equipment, and incidentals necessary to prepare the salvaged pile cutoff for driving.

508.5.4 Timber Piling Driven

- (1) Payment for Piling Untreated Timber Driven and Piling Treated Timber Driven is full compensation for preparing, framing, driving and cutting off piling; for disposing of pile cutoffs not salvaged and used in the work; for treating cuts and abrasions; and for removing and disposing of upheaved material.

508.5.5 Preboring Timber Piling

- (1) Payment for Preboring Timber Piling is full compensation for boring; for providing and placing necessary backfill material; and for disposing all material excavated by boring.