

SPECIFICATIONS FOR DRIVING PRECAST CONCRETE PILES

1016. 1. DESCRIPTION

The work will consist of handling, locating, aligning and driving precast concrete piling and cutting off piles at the required elevations. It will also include building up piles to the required elevations where necessary and splicing of concrete piles when called for on the plans.

1016. 3. SUPPLY OF MATERIALS

Precast concrete piles will be supplied by the Minister at the source(s) of supply specified in the Special Provisions.

1016. 5. PILE DRIVING EQUIPMENT

Pile driving equipment to be used by the Contractor shall be of such capacity that the required bearing and penetration will be obtained without damage being done to the piles.

If the Contractor can demonstrate conclusively that special methods, other than providing a higher capacity hammer, are necessary to advance the pile to the required penetration, such supplementary methods will be subject to the Engineer's approval and will be paid for on an Extra Work basis.

Pile driver leads shall be used to support the piles while they are being driven. Leads shall be of sufficient length to be firmly supported on the ground. The use of hanging or swinging leads will not be allowed unless they can be held in a fixed position during the driving operations. Batter piles shall be driven with inclined leads.

The Contractor shall furnish the Engineer with the manufacturer's specifications and catalogue for all mechanical hammers used, showing the data necessary for computing the bearing value of piles driven. Gravity or drop hammers shall be weighed in the presence of the Engineer, or a certificate of mass shall be furnished to the Engineer. Hammers so weighed shall have the exact mass marked on them. Gravity hammers shall weigh at least 1.5 t but in no case shall the mass of the hammer be less than the combined mass of the pile and pile cap.

The heads of concrete piles shall be protected by a cap of a design approved by the Engineer. The bottom of the cap shall have a recess with a cushion of rope or other suitable material next to the pile head, and the top of the cap shall have a timber shock block.

1016. 7. CONSTRUCTION METHODS

7.1 Handling and Storage of Piling

The handling and storing of precast concrete piles shall be done in a careful manner to avoid damaging the piles. Concrete piles shall be lifted at the points indicated on the plans.

The Contractor, in handling or lifting the piles, will not be permitted to drag them along the ground.

If piles are damaged due to the Contractor's handling operations, the Contractor shall, at his own expense, replace all damaged piles with piles meeting the Department's specifications.

1016. 7. CONSTRUCTION METHODS (Cont'd)

7.2 Location and Alignment of Piles

The piles shall be driven in the positions shown on the plans or as directed by the Engineer. Piles shall be driven vertically unless shown otherwise on the plans. Batter piles shall be driven to the batter specified and shall not be jacked or pulled into their final positions.

7.3 Driving Precast Concrete Piles

Piles shall be driven to the depths indicated on the plans or to other depths as directed by the Engineer. All piles excessively spalled, crushed or broken through negligence or carelessness in driving operations shall be replaced by the Contractor at his own expense, unless in the estimation of the Engineer, the damage is so slight that the pile can be repaired properly by the Contractor at his own expense.

The Contractor shall drive all piling in the sequence specified by the Engineer to minimize pile upheaval. If upheaval does occur, the Contractor shall redrive the lifted piles to the required elevations. The Contractor shall excavate material which has boiled up during pile driving operations.

Preboring will not be allowed unless it is approved in writing by the Engineer.

7.4 Cutoff of Piles

If a cutoff is necessary, or anchorage of the pile into the cap is specified, the concrete at the top of the pile shall be chipped off neatly and perpendicular to the axis of the pile to the required elevation. The projecting steel reinforcing or the stress wires, or both, shall be left to act as anchorages into the concrete substructure units, either being bent down into the unit, if necessary, or cut off to leave at least 40 bar diameter lengths of reinforcing steel or 1.0 m of stress wires, or both, projecting into the unit, or as directed by the Engineer in the field.

7.5 Build-Ups

When ordered by the Engineer, reinforced concrete piles (not prestressed) shall be built up in accordance with the following:

The concrete at the head of the pile shall be cut away to a depth of 40 diameters of the bar size of the vertical reinforcing steel. The final cut of the concrete shall be perpendicular to the axis of the pile. Reinforcement similar to that used in the pile or as directed by the Engineer shall be fastened firmly to the projecting steel. The necessary form work shall be placed up to the required cutoff elevation with care being exercised to prevent leakage along the pile. The concrete shall be of the same mix design as that originally used in the pile. Immediately prior to placing concrete, the top of the pile shall be covered thoroughly with an epoxy resin of a type approved by the Engineer. The forms shall remain in place for at least 3 d. Piles which have been built up shall not be driven further.

1016. 7. CONSTRUCTION METHODS (Cont'd)

7.6 Piles Cut off Too Low or Driven Too Low

(a) Prestressed Concrete Piles

A prestressed concrete pile, which in the estimation of the Engineer has had a detrimental amount of concrete broken off below the required cutoff elevation, shall be chipped away by the Contractor until the entire end face of the pile is perpendicular to the longitudinal axis. Where the top of such a pile would still be embedded in a footing or cap, the following procedures will apply:

- (i) For a cap which is exposed to view, the bottom surface of the cap shall be lowered by the distance that the lowest pile is below the required cutoff elevation.
- (ii) For an unexposed footing, an area 1.0 m by 1.0 m centered on the pile axis shall be lowered by the same distance that the pile is below the required cutoff elevation.

When the top of a shortened prestressed concrete pile is below the bottom surface of a footing or cap, the Contractor shall lower the bottom surface of the substructure unit such that the lowest pile shall be embedded a distance equal to that shown on the plans.

The bottom surfaces of caps and footings shall be treated in the same manner as outlined above for cases where prestressed concrete piles have been driven below the required cutoff elevations.

If extra reinforcing steel is required, it shall be provided and placed by the Contractor as directed by the Engineer in areas where a cap or footing has to be lowered. The Engineer's decision in this matter will be final and binding on the Contractor.

(b) Reinforced Concrete Piles

Reinforced concrete piles, which in the opinion of the Engineer have had a detrimental amount of concrete broken off below the required cutoff elevations or which have been driven below the required cutoff elevations, shall be corrected by either constructing build-ups or by lowering the bottom surface of a cap or footing as outlined previously, whichever is ordered or permitted by the Engineer.

The Contractor will be responsible for all costs involved in constructing build-ups or in lowering the bottom surface of a footing or cap resulting from concrete piles having been driven too low or having to be shortened due to their being improperly cut off, except that in cases where the Engineer orders the driving of the piles to an elevation lower than that shown on the plans, the Department will pay for all costs incurred by the Contractor in constructing build-ups or in lowering the bottom surfaces of the caps or footings on the basis of Extra Work.

7.7 Splicing

Splicing shall be done in accordance with the details shown on the plans and as follows:

Before welding over previously deposited metal, the slag shall be cleaned off. This requirement shall apply to successive layers, successive beads, and to the cratered area when welding is resumed after any interruption.

1016. 7. CONSTRUCTION METHODS (Cont'd)

7.7 Splicing (Cont'd)

Preheating of the splice plates to a minimum temperature of 40⁰ C will be required if the air temperature is below freezing.

Welding of the splices shall be done by either:

- (i) Welders qualified in accordance with the requirements of AWS D1.1 or
- (ii) Welders holding a valid CWB Welder's ticket or
- (iii) Welders holding a valid "Welders Licence" as issued by the Mechanical and Engineering Division, Department of Labour, Province of Manitoba.

7.8 Log Borings

Foundation data shown on the plans is primarily for design purposes and the Department does not guarantee that the information is free from errors or discrepancies. Soil information available in the Bridge Engineer's Office may be perused upon request.

1016. 9. METHOD OF MEASUREMENT

Driving precast concrete piling will be measured on a lineal metre basis. The length to be paid for will be the total number of lineal metres of piling unloaded and stock-piled at the site or authorized by the Engineer, less 85% of the total number of lineal metres of piling cut off after driving. Cutoffs will be measured by the Engineer in the presence of the Contractor. Unless directed otherwise by the Engineer, pile cutoffs will become the property of the Contractor and shall be removed by him from and out of sight of the right-of-way.

Splicing of precast concrete piles will be measured on a unit basis and the number to be paid for will be the total number of splices performed by the Contractor and accepted by the Engineer.

1016. 11. BASIS OF PAYMENT

Driving precast concrete piles will be paid for at the Contract Unit Price per lineal metre for "Driving Precast Concrete Piles" measured as specified herein, which price will be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification, unless otherwise provided for in this Specification.

Splicing of precast concrete piles will be paid for at the Contract Unit Price for "Splicing Precast Concrete Piles", measured as specified herein, which price will be payment in full for performing all operations herein described and all other items incidental to the work included in this Specification, unless otherwise provided for in this Specification.