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	DRIVEN TUBULAR STEEL PILING	PGI-MST 1302

Contract Number PR2400276746	Contract Name Cwmavon HC (Heol Crwys)
Signed as Reviewed for Use On This Contract	Print Name Nick Jonathan

1.0 Purpose and Scope

- 1.1 This method statement defines the Company Standard Implementation procedure for the construction of Driven Tubular Steel piles using various joints offered by the company.

2.0 Health and Safety Controls

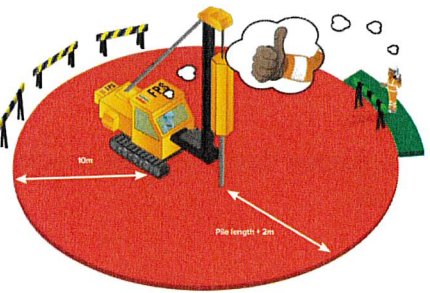
- 2.1 The Site Foreperson shall ensure that all the safety requirements for the piling operator are in place and in accordance with the Company Health and Safety procedures and Risk Assessments.

The preparation for piling operatives shall be in accordance with GEN-WID 1045 - Generic Set-up and Planning

- 2.2 PGI-PMS 1318 – Movement of Steel Tubular Steel Piles (Site Operations)
- 2.3 SAF-WID 1047 – Restricted Zone
- 2.4 FPS Plant Restricted Zones Handbook
- 2.5 Inspection of all lifting equipment before use.

DRIVEN PILING RIGS /VCC/DCIS RESTRICTED ZONE

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 **Red Zone:** The Rig Operator must ensure the rig is placed in a safe condition before an Authorised Person enters the Red Zone. The operator must give a 'Thumbs up' to the Authorised Person wanting access confirming it is safe to enter before they enter the Red Zone.

 **Green Zone:** Rig Operators sight line (safe approach), optimum Rig Attendant position.

Note: People entering the Red Zone must be aware of and consider loads being lifted by the rig and the increased risk of falling objects and plant movements from other plant such as excavators and dumper trucks.


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3.0 Environmental Controls

- 3.1 Operational working hours are stated on the Prestart Site Inspection Form.
- 3.2 COSHH Assessments must be available for all hazardous items used.
- 3.3 Fuel and Oil spill must be cleared as soon as possible. All spills must be reported.
- 3.4 All waste must be disposed of via the correct means.
- 3.5 Vehicle engines must be turned off when not in use.

4.0 Process

4.1 Prior to Commencing Construction

- 4.1.1 The Site Foreperson shall ensure that all the safety requirements for the piling operator are in place and in accordance with the Company Health and Safety Policy.
- 4.1.2 An exclusion zone should be set out around the working area in accordance with SAF-WID 1047 – Exclusion Zones and the FPS Plant Restricted Zones Handbook.
- 4.1.3 Before starting work the piling Foreperson should plan a sequence of work that will allow the safe delivery of piles to the rig, including the hoisting of piles into the rig to avoid where possible previously installed piles.

4.2 Piling Procedure

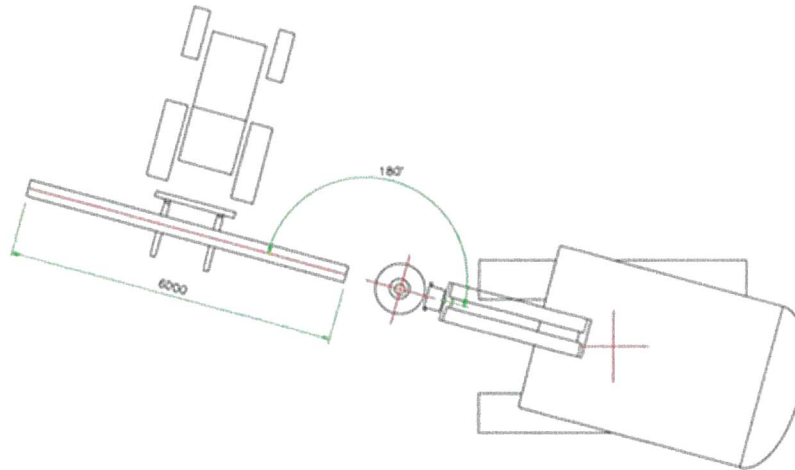
- 4.2.1 An exclusion zone should be set up around the working area in accordance with SAF-WID 1407 – Rig Restricted Zones and the FPS Restricted Zone Guidance.
- 4.2.2 The piling rig shall be precisely located at the position where the pile is to be driven, normally set out by others. The Rebar Safety Cap should be removed from the setting out pin by hand as late as possible ahead of the rig getting to the pin but before the rig is positioned above the pin.
- 4.2.3 The piling rig mast shall be adjusted to the vertical position checked in two places at 90° to each other.
- 4.2.4 The steel pile sections shall be presented using the tube pallet, as described in PGI-PMS 1318 horizontally to the piling rig by a fork truck in a position as close to 180° as possible to the centreline of the body of the piling rig, see figure 1. Consideration should be given to

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ensuring that the pile section can be safely pulled into the rig, without being obstructed by pre-installed piles etc.

Figure 1



- 4.2.5 Before attaching the sling to the pile section a visual inspection of the sling and all lifting equipment is required if there is any damage/wear or the lifting certificate is out of date this must be replaced. Sufficient slack must be allowed in the winch rope to prevent snatching. The sling should be positioned between 800mm to 1200mm (Dependant on the pile length) from the head of the pile. The piling hammer must be **stopped** and remain stationary before any slack is taken up on the hoist rope and whilst the pile section is being hoisted into the piling helmet.
- 4.2.6 Whilst hoisting a pile section into the rig all personnel should retreat a minimum distance of 2.0m away from the toe of the pile section and ensure that they do not enter the zone between the rig and pile.
- 4.2.7 Using the pile hoist rope, the pile shall be lifted into a near vertical position and the pile head located into the piling helmet. When lifting pile sections longer than 4.0m the pile section should NOT be allowed to enter the driving helmet until the toe of the pile is within 2.0m of the foot of the rig, see figure 2.

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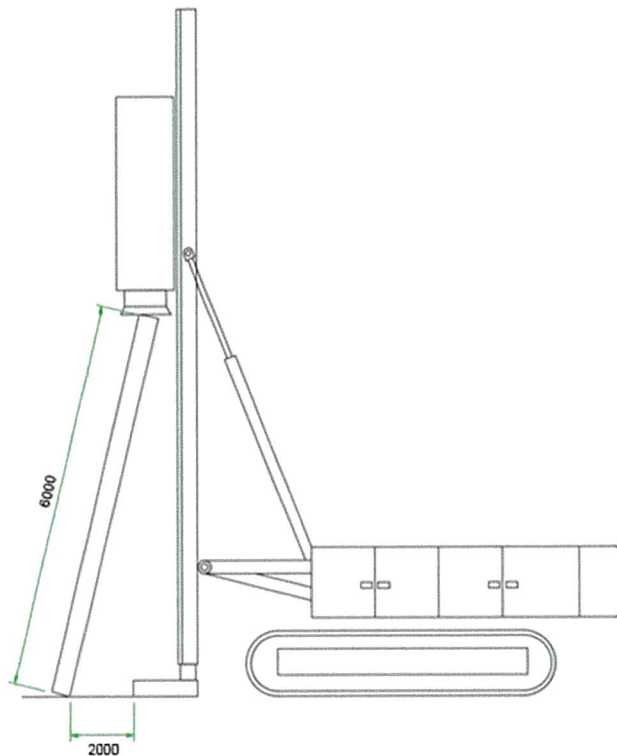


Figure2

4.2.8 The Piling Foreperson shall ensure the steady unhindered progress of the hoist through careful observation and control. During the hoist the rig attendant may enter the restricted zone after receiving the thumbs up signal from the rig operator, but must be at least 2.0m away from the toe of the pile section until the pile section is at the point of entering the helmet. At this stage, the Rig Attendant may assist in manoeuvring the pile section into the helmet.

4.2.9 NOTE - Under no circumstances should hands be placed on the lifting chain whilst hoisting piles. Should any person enter the restricted zone, or the rig attendant be closer than described above or the pile likely to collide with any obstruction, the Foreperson will immediately stop the auxiliary hoist. Where an obstruction such as a pre-installed pile prevents the pile section from being safely hoisted into the rig the pile section should be safely lowered to the ground, chain disconnected and a forklift used to reposition the pile so that it can be safely hoisted into the rig. Alternatively, where access for a forklift is not available the pile section should be lowered onto a chock on the ground and pinch bared into a position where it could be safely hoisted into the rig.

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- 4.2.10 Once the pile section head is located in the piling helmet the toe of the pile section is lowered to just clear of the catch plate on the footplate and subsequently manually guided and lowered into footplate. To prevent a trapping accident, extreme care should be taken to ensure that the pile does not kick backwards during this procedure.
- 4.2.11 The pile shall be checked for verticality on achieving a penetration of 1.0m; adjustment shall be made for verticality if required.
- 4.2.12 To prevent damage to the pile, care must be taken to ensure the hammer blow is always axial to the pile, and the pile therefore struck square to its axis.
- 4.2.13 The pile driving cycle is continued either at the same location by the addition of further pile sections (see section 4.6), dependent upon the length and/or set specified for the pile, or at a new location. When an addition section is required, top of driven pile should be left at a convenient height to allow the aligning of the joint.
- 4.2.14 When removing the hoist rope hook from the vertical pile section the hammer **must stop** driving the pile. There should be sufficient slack in the winch rope prior to unhooking to determine that the pile is not slipping under its own weight. Once unhooked the rig attendant shall then retreat to a safe position (see FPS Plant Restricted Zones Handbook) and the operator shall retreat to a safe distance of ideally 3m away from the hammer before pile driving re commences.
- 4.2.15 When tracking the piling rig to a new pile location, the Piling Foreperson, assisted by their rig attendant is to physically check and evaluate the risks and decide whether existing precautions are adequate or whether more should be done. Where the rig movement is by radio/remote control the operator is to be situated at such a distance from the machine to enable constant 360o visibility/awareness. The rig attendant is to assist in achieving the safe movement of the rig and guaranteeing segregation of pedestrians and other traffic. Additionally, a close monitoring of the piling mat and its integrity is to be maintained whilst the rig moves to the next pile position.
- 4.2.16 The RB piling rig is fitted with a quiet hammer set up. There are buffers and voids contained within the hammer to control the noise that escapes (see attached data sheet). Piling operations hours are 0800-1600 hrs Monday to Thursday and 0800-1300 hrs Friday. The works should take approximately 10 working days to complete.

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4.3 Jointing

- 4.3.1 Pile sections shall be jointed using collars and threads inherent in the casing, or a spider/spud joint or other joints selected from the range offered by the Company, whichever has been specified.
- 4.3.2 If machined joints are to be used for the jointing of tubes, the following must be followed.
- 4.3.3 The operatives must offer the joint up to the ends of the tubes to be jointed to determine the wall thickness of the tubes. If there is any doubt over the wall thickness, then different tube section must be selected.
- 4.3.4 Once it is agreed that the joint would locate suitably, the first section is to be winched into place and driven to a maximum of 700mm above platform level.
- 4.3.5 The joint is then placed into the previously driven section and the hammer must be lowered onto the joint, and the joint is to be hammered into the middle ring, the hammer is then raised and the next section winched into place and then lowered onto the secure joint and then continue with driving of the pile.
- 4.3.6 This method must be used on all machine joints used.
- 4.3.7 Where a pile is installed with a spider/spud joint is less than 1m below piling platform level, a record should be made and highlighted to the client to ensure the pile is supported while cropping/cutting activities take place, especially where excavation is required.

4.4 The Pile Set

- 4.4.1 In simple terms the final set is a measure of physical performance compared with a calculated requirement, where the depth of pile penetration is measured over a given number of blows (10) by a known force (hammer weight x distance dropped).
- 4.4.2 The required sets and anticipated pile design lengths shall be given to the Site Foreperson in writing prior to the commencement of piling construction.
- 4.4.3 Where instrumentation is available on the rig, this should be used to measure sets, although a daily manual check is good practice
- 4.4.4 Where instrumentation is not available, a manual set should be taken.

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4.4.5 If a Steel Dolly is required to take a final set, this must be handled by mechanical means i.e., forklift truck or rig auxiliary line. The Dolly must not be moved manually.

4.5 **Measuring a Manual Set**

- a) Stop the Hammer.
- b) The competent machine operator is to mark the Pile in an accessible point i.e. the Pile, frame, or cage, by whatever means, from a firm surface, such as the rig foot.
- c) The competent machine operator to retire to the maximum distance possible for safety.
- d) Undertake the designated number of blows, (usually 10), at a given hammer drop height.
- e) Cease Operation.
- f) The competent machine operator is to return to the Pile position and physically measure the depth penetration.
- g) Repeat the operation until desired set is achieved. Make Pile entry on Piling Log Sheet.

4.5.1 Where the pile set is achieved at a pile length which varies by more than 1m from the anticipated pile design length the Piling Foreperson shall notify the Operations Supervisor, record the event on the piling records and await instruction regarding the acceptability of the pile as driven. The Operations Supervisor shall treat such events as Site Design Changes in accordance with DES-WID 0401.

4.6 **The Pile Re-strike**

- 4.6.1 A retaking of a pile set undertaken as long as possible after the piles construction, and at least 24hrs after, to ensure that the dynamic resistance of the pile has not decreased over a period of time.
- 4.6.2 An overnight re-strike is not acceptable on contracts of longer duration.
- 4.6.3 A minimum of 5 re-strikes per day will be carried out. On larger contracts a minimum of 5% of the total number of piles will be re-struck.
- 4.6.4 Unless the piles are founded on Rock (including chalk) or Dense Gravel, re-strikes will be taken over 10 blows, on randomly selected piles unless otherwise specified. The re-strike set shall be equal to, or

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less than the set at end of drive. Only where the piles are founded on Rock (including chalk) or Dense Gravel can the number of blows be reduced to a minimum of 3.

- 4.6.5 In the event that a pile re-strike produces a set which is greater (slacker) than the pile set at end of drive the Piling Foreperson shall notify the Operations Supervisor, record the event on the piling records and await instruction from the Operations Supervisor. The Operations Supervisor shall treat such events as Site Design Changes in accordance with DES-WID 0401.

4.7 Pile Testing

- 4.7.1 Dynamic Testing - As well as traditional methods of testing, we offer dynamic testing of piles using the Pile Driving Analyser operated by personnel who are experienced in pile testing. This widely used and accepted technique offers an economical and rapid method of pile testing to satisfy any statutory or specified requirements.
- 4.7.2 Static Load Testing - Where testing is included in the Bill of Quantities, we have only allowed for testing vertical piles. Working piles to be tested should be selected clear of obstructions sufficiently early in the contract to enable testing to be carried out and completed during the main piling works.
- 4.7.3 No work by any person shall be carried out on or adjacent to the piles until such times as the Piling Protection Certificate for the Sub-contract works has been issued by Roger Bullivant Limited.

4.8 Visual Inspection

- 4.8.1 Where the rig is to leave site without an as built survey of the pile positions, the Rig Operator must conduct a visual check along the line of piles and call the Area Office if it appears that a pile may require checking.

4.9 Records

- 4.9.1 The Company shall retain copies of all piling records.
- 4.9.2 Where possible the Site Foreperson shall obtain a signature from the Client or their representative on the record sheets as an agreement to the accuracy of the recorded data. If a signature cannot be obtained the Foreperson must notify the area office before leaving site.
- 4.9.3 Penetration records are to be taken of the first pile on every contract. Subsequently, 3% of the total number of contract piles will be recorded in the same manner, with a minimum of 3, but preferably 5.

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- 4.9.4 In addition, should any variation in the length occur, further penetration records are to be taken as appropriate

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