TAMBEW ENGINEERING (Pty) Ltd

INTERNALLY JACKED PILE TESTS

SPECIAL METHOD STATEMENT FOR:

Client: *[ClientName]*

Project: *[JobName]*

Test piles: see **1 Introduction** Version date 12 Oct 2014

1 Introduction

This Special Method Statement is to be read together with the document titled: "INTERNALLY JACKED PILE TESTS, GENERAL METHOD STATEMENT"

In the tender document

[JobName]

there are two bill items describing the pile load tests: item Nos 61.36 and B61.56.

In 61.36 there are four pile diameters listed: 1500, 900, 750 and 600mm. All are working piles, to be tested in compression to 1.5 times working load, but the 900mm piles are subsequently required to work in tension. After an internally jacked pile test has been done, compression but not tension can be transmitted past the jack level, therefore this method statement does not deal with the 900mm dia pile test.

In B61.56 the description is: "Testing of piles to or close to failure." To get the largest possible jack force on the pile, three internal jacks will be used in each pile so as to cover a large proportion of the shaft area. Because the total load on the pile is twice the jack force, the use of the internal jacking method will provide a very large total test force on the piles.

Note that in the following sections of this document, unless specifically mentioned, all operations are by Tambew.

2 Construction and installation of the internal jacks

Photograph 1 on page A1 shows a single jack with bearing plates already attached. This type will be suitable for testing the 750 and 600mm dia working piles.

The 1500mm dia working pile and the 900 and 750mm dia test piles will each have three jacks. The bearing plates will be brought to site separately and the jacks and plates welded together on site.

The sequence of operations is then as follows.

1 The reinforcing cage is to be fabricated to a high degree of accuracy by the Piling Contractor or his supplier, using templates for the positions of the longitudinal reinforcing bars that will be supplied by Tambew, and using tight fishline to keep the longitudinal bars straight. These templates are to remain on the cage until it is delivered to site, when it is to be laid on supports that have been carefully prepared by the Piling Contractor (PC) to keep the cage horizontal and straight.
While it is lying on its side the following items are tied by Tambew along its full length on the inside of the cage: (i) two hydraulic hoses; (ii) four tell-tale rod tubes with rods already installed; (iii) two electronic displacement measuring devices' wires.
Note that these hoses, tubes, rods and wires are vulnerable to damage during subsequent operations by the PC, whose responsibility it is to safeguard them.

2 Also while the cage is on its side, a lifting frame (to be supplied by Tambew) is to be clamped at the top of the cage to four equally spaced longitudinal reinforcing bars. If these bars are spliced along their lengths they are to be welded by the PC at the splices before the installation of the hoses and wires.

3 The jack will be brought to site by Tambew and lifted by the PC from the transport onto a horizontal surface prepared by the PC. This can be a layer of sand. For a single jack arrangement, this simply means lifting the jack with its bearing plates onto the level surface. For a multiple jack arrangement, the bottom bearing plate is first placed on the level surface. The jacks are then placed precisely on the plate (by craneage supplied by the PC, supervised by Tambew) and tack-welded in position. Their hydraulic couplings are joined. The top bearing plate is then placed and tack-welded to the jacks.
The electronic displacement measuring devices are installed in the multiple jack assembly at this stage. For a single jack they will be already installed before the jack comes to site.

4 The reinforcing cage is then lifted by the PC and lowered over the jack assembly so that the longitudinal bars go slightly past the top bearing plate and till the tell-tale tubes are resting against the top or bottom bearing plates, as appropriate. Short pieces of steel angle are then welded to the top bearing plate and to the four longitudinal bars that are attached to the lifting frame.
The two hydraulic hoses in the cage are connected to the jack(s) and the electronic displacement devices to their wires.
The two tell-tale tubes that rest on the top plate will have screwed-on end caps during the lift of the cage, which will now be welded to the top plate.
The two tell-tale tubes that rest on the bottom bearing plate will have a thin steel plate tack-welded to the bottom of the tube and with the rest of the joint between thin plate and tube sealed with a fillet of silicon sealant. This thin plate is then welded securely to the bottom bearing plate.

5 When the jack is successfully attached to the reinforcement cage, the concreting of the pile by the PC can begin. Concrete is poured into the hole up to 200mm above the level at which the

bottom of the jack's assembly must be installed.
NOTE: (i) It is assumed that the entry of water into the pile hole is sufficiently slow that tremie placing is not required. If a tremie is likely to be necessary, a different sequence of placing the reinforcement cage incorporating the tremie will be needed. (ii) The concrete must be of such a specification that it will develop sufficient strength during the time available between the pile installation and its testing, to withstand the local stresses imposed by the jack(s) through the bearing plates.

6 The reinforcing cage with the jack attached at its bottom is then lifted into the pile hole. Under its own weight it will sink a long way into the first pour of concrete, therefore it must be supported by the PC at ground level in such a way that the bottom plate of the jack assembly is 200mm below the top of the concrete.

7 The crane and the lifting frame are now detached from the reinforcement cage and the rest of the pile filled to the required level by the PC.

3 Testing

Photograph 2 on page A2 shows the surface arrangement for testing on a previous internally-jacked test. For the present tests the following instrumentation is proposed.

(i) One dial gauge and one electronic LVDT on opposite sides of the top surface of the pile to measure the vertical movement there.
(ii) Two electronic displacement transducers on the jack to measure the total (up + down) expansion of the jack.
(iii) One dial gauge and one LVDT on the tops of the tell-tale rods attached to the bottom plate of the jack.
(iv) Ditto the top plate of the jack.
Note that the three dial gauges and three LVDTs will be supported by a beam, itself supported by two steel rods driven into the ground 6m apart.
(v) Remotely located surveyor's level to monitor vertical movement of the supports to the beam.
(vi) Bourdon (i.e. analogue dial) pressure gauge and electronic pressure gauge to measure the hydraulic pressure, and hence load force, in the jack.

All instrumentation and its support will be protected from sun and rain. All electronic instruments will be measured by two computer-based dataloggers, one as back-up to the other.

The loading will be according to the client's specification. The preference of the Tambew pile testing engineer is to follow the "Quick load test method" of ASTM D1143 "Standard Test Method for Piles Under Static axial Compressive Load", because it can be done without working at night with its attendant risks. However the "British option" of SANS1200F:1983 has also been allowed for in the tendered prices.

Note that while Tambew has primary responsibility for all testing operations, if the test extends after dark the PC is to ensure security and adequate lighting for the safe continuation of the

testing process.

After the test measurements are completed, all equipment will be removed from site by Tambew but the hydraulic hoses and electronic displacement instruments' wires are to be carefully preserved by the PC in case a re-test is called for. For example to investigate the increase of the pile's capacity with time.

4 Grouting up of jacks in working piles

When instructed by the PC, Tambew will pump a slow setting epoxy with a greater density than the hydraulic fluid into one of the hydraulic hoses leading to the jack. This will displace the hydraulic fluid out of the other hose. When only epoxy emerges from the outlet hose the jack(s) will be full of epoxy and the pumping will stop. A sample of the emerged epoxy will be kept to show that it sets satisfactorily.

5 Presentation of results

This will be primarily by graphs showing at least the following.

(i) Jack force v. movement of the shaft above the jack.
(ii) Jack force v. movement of the shaft (and pile base) below the jack.
(iii) Equivalent head load v. head displacement graph.

In addition to these graphs a written report will be given describing the actual process, emphasising any differences from the intended method.

Photograph 1

Single jack assembly, complete with bearing plates. 5000 kN jack capacity.

Photograph 2

Arrangement of measuring equipment during test.

Note: Click here to back to the website: http://tambew.com/internally-jacked-test/