



**Temporary Works
forum**

Promoting best practice in
the construction industry.

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Static Load Pile Tests

A number of responses have been received from members in reply to the following question:

- Q. Would you consider that a static load pile test would come under the banner of 'temporary works' and thus be managed by the TWC via TW Register, design brief, independent design check, etc.?**

Introduction

The comments received relate to the use and safety of 'Maintained Load Tests' (MLT). These tests are carried out using reaction piles or kentledge systems. There have been examples of failure for both types of test.

The consensus is that some aspects of static load pile testing should be treated as 'temporary works' and the planning take into account the recommendations made in BS 5975: 2019, Sections 1 and 2.

Extracts

The following extracts are from responses made by members:

1. I would very much consider a static pile test as an item of temporary works. Most piling contractors will have their own fabricated steel test beams, but the design thereof and associated anchors and jacking arrangements would need to be checked by the principal contractor. The HSE document SIM 02/2010/04¹, 'The management of temporary works in the construction industry', recommends jacking schemes as 'High Risk'. I would include pile tests in this category.
2. Pile testing is a highly-controlled operation in its own right with plant and permanent works and I would say that the TWC [is] not best placed to coordinate it.

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¹ http://www.hse.gov.uk/foi/internalops/sims/constrect/2_10_04.htm
(accessed 29.10.19)

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3. A pile test is temporary works and needs to be managed. However, piling subcontractors should already have well-developed designs and procedures for the equipment they use and how the test is carried out. Most will be tested as relatively low risk as they can be considered to be “standard details” (as the equipment is used time after time). The PC should ensure the sub-contractor has the procedures and designs already in place and ensure that they do what their standard procedure and design requires. The only bespoke design that is required is for the anchorage system as this depends on site-specific ground conditions.
4. Pile testing imposes temporary proof load conditions and is, therefore, temporary works. Design and design check action should be proportionate to the scale and complexity of the operation and development of a safe system of work for the entire operation is key. Much of this will be repeat activity to test house standing procedures but fine-tuned for each site and each pile location. The package should be mindful that previous incidents have involved sudden release of energy and flying components acting under tensile load but the majority of pile testing incidents are actually transport and plant related – such as the tester killed by slewing/tracking/travelling plant or vehicle.
6. I would say yes, particularly if the pile test involves temporary anchor piles, spreader beam, etc. I'd expect all design briefs, design calculations, checks, drawings, implementation, permits, etc. to be dealt with by the piling sub-contractor, but coordinated by the TWC to make sure all work is carried out by competent people and coordinated with any other activities.
7. Yes, it is temporary works - tonnes of ballast/cranage/potential for collapse. It is about risks; risks to the public and contractor. I would assess it as 'low risk' if collapse could not affect others and there was room for an exclusion zone to be in place. I would assess it as 'very high risk' if the site was constrained and collapse onto public domain or infrastructure, e.g. live railway could occur.
8. Yes, elements of it – installation and removal not the actual load test.
9. A static pile test will involve the use of piles/kentledge to provide resistance to a temporary load applied to a test pile. This is temporary works, no question!

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10. The static test itself and the equipment required are definitely temporary works:
 - a.) the piles being the permanent works loaded in a temporary condition;
 - b.) the equipment being engineered equipment supporting the loading operation.
11. Static load test on piles is temporary works and should be on the [temporary works] register, etc.
12. I would consider [it] temporary works. A standard design could be used.
13. Definitely. A static pile load test is temporary works and must be managed by the TWC. There is the design of:
 - a.) the tension piles, or ground bearing capacity beneath the kentledge support steelwork;
 - b.) the capacity of the load spreader beams and stiffeners, or kentledge support grillage;
 - c.) the strand or rebar/Macalloy bars cast into the tension piles and the dimensional control needed to ensure they are compliant with design; and
 - d.) the jacks, (which also may have a stability risk).

A tension pile test arrangement has a tremendous amount of potential energy stored when loaded up. I recall that there have been fatalities when the energy was released by elements of the arrangement either failing or tipping due to bad component alignment.

14. I would have thought that the static pile load test would come under the ITP [inspection and testing plan] for the pile installation. If the pile is permanent works then the TWC won't necessarily be involved and to add them into the equation for testing alone may create an additional (unnecessary) interface.
15. Yes. I would consider all the structure to be temporary works, most probably of the 'highest risk' category. However, I would not consider the test procedure to be temporary works. There will also be aspects such as plant platforms to consider (on which to stand piling plant and cranes on).

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16. Any members or structures that have to perform a structural function in the temporary condition can be classified as temporary work. This therefore should include grillages, load transfer beams, anchors, stability of kentledge blocks, safety platforms, [and] temporary platforms/steps for access and inspection that are required for the pile load testing.
17. The pile testing is a highly-controlled operation in its own right with plant and permanent works and I would say that the TWC is not best placed to coordinate it.

Recommendation

The feedback covers many aspects of the testing process and suggests that the systems used should come under the banner of 'temporary works' and be managed by the TWC.

The Federation of Piling Specialists (FPS)² identify a number of key safety issues that must always be considered in the planning and execution of pile load tests:

- preparation and maintenance of test area;
- lighting;
- load application limits; and
- site operative instructions;

This includes:

- agreed method statements and risk assessments;
- suitable access for operatives;
- checks prior to loading; and
- a designed platform for lifting plant (ground bearing pressure).

Useful references

BS 5975:2019, Code of practice for temporary works procedures and the permissible stress design of falsework (Sections 1 and 2)

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² Handbook on Pile Load Testing, Federation of Piling Specialists (FPS), 2006, <https://www.fps.org.uk/content/uploads/2017/05/06-02-27-load-testing-handbook-2006.pdf> (accessed 30.10.19)



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