

FEDERATION OF PILING SPECIALISTS SAFETY ALERT

The below information has been issued on behalf of the FPS to make others aware of the potential risks and possible precautions to take in order to avoid these.

Date/Time of Incident:

Incident 1: 25/3/21
Incident 2: 17/4/21

Type of Incident:

Incident 1: High potential near miss
Incident 2: High potential near miss

Nature of Incident/Injury:

Temporary Works Failure

Details of Incident:

Incident 1: An excavator mounted mast rig was tracking into position to install stone columns, when the front of the machine began to sink into the platform. The operator tried to back the machine out but the front of the machine continued to sink unevenly. The operator decided to lower the mast forward onto the ground to stabilise the machine and avoid it turning over.

Incident 2: An RTG rig (configured in CFA mode- 19 m depth of treatment) was tracking on a previously installed and levelled working platform when the ground in front of the tracks started to collapse causing the rigs tracks to sink. This then resulted in the rear of the machine raising between 0.5-0.8m.

Root cause (if known):

In both incidents testing had verified the platform installation and working platform certificates were in place for the plant being utilised. Both sites had been active for over 5 weeks with no prior issues reported with regards to the platform stability.

Incident 1: The incident occurred in an area of the site where up to 1.5 m of filled had been placed prior to the platform being constructed. It is reported that the platform design in this area had not considered the strength of the upfill material.

Incident 2: The site had been raised by 2 m with uncontrolled mixed fill. The upfill had been placed in advance of the main works under a separate contract. The platform design had assumed a minimum strength for the fill but in the area of the platform failure the fill material appears to have been softer than that assumed by the temporary works designer (TWD).

Action Taken:

Incident 1: The operator decided to lower the mast forward into a horizontal position onto the ground to stabilise the machine and avoid it turning over. A recovery specialist (under the control of the PC) was appointed to stabilise the rig. It took 5-6 days to plan the recovery and prepare the area for the recovery. The rig was recovered with no damage.

Incident 2: To prevent the rig from leaning forward any further, various excavators were used to support the counterweight and the tracks (holding them down). A recovery specialist (under the control of the PC) was appointed to

stabilise the rig and recover the rig on the same day of the event. The rig is being examined for damage.

Lessons Learnt:

Both sites had been raised by up to 2 m by the placement of mixed soil fills to a degree of compaction which was significantly below 95% compaction. The fill had been placed to the specification and only verified by post placement testing on a wide grid.

- The placement of the fill must be specified and verified through testing as the fill is placed. The frequency of testing should be determined by the engineer to ensure a high degree of certainty in compliance with the specification, particularly where fills are not placed to 95% compaction.
- It is recommended that fill material is placed to 95% compaction, particularly for mixed and cohesive soils where heavy piling plant is to be utilised.

Incident 1: the fill material, particularly its strength had not been taken into consideration in the platform design:

- The TWD had not taken into consideration the strength of the fill material, which was lower than the in-situ on the site.

Incident 2: The area where the rig sank was identified as being an area of fill with a lower strength than that specified for the fill material and assumed in the platform design.

- No installation details were provided to the PC with regards to the fill placement. The PC had carried out testing of the fill and platform on a wide grid; >30m.
- Handover information (strengths, specifications, tests etc) should have been provided by the client with regards to the placement of the fill 3 months prior to the PC taking possession.
- The platform should be designed using the lower bound parameters following more rigorous testing of the fill material.
- More rigorous testing of the platform was undertaken following the incident – every grid position (6 m grid)
- A heavy vibrating roller was run across each tested area prior to moving plant.
- The original soft spot and any subsequent soft spots (identified from the rigorous testing and by deflection from the roller) were removed by the PC and replaced with granular material.

Conclusions for sites filled prior to piling operations:

- Fill material should ideally be placed to 95% compaction. Where a lower degree of compaction is specified the testing regime should be intensified.
- Filling should be controlled and verified so that there is a very high degree of certainty in the lower bound values.
- Any PC taking control of a recently filled site should request the specification of placement and validation of the fill placement.
- Platforms should be tested on a much tighter frequency than normal.
- The TWD should confirm that they have considered the fill material and that the lower bound strength of the fill material has been considered.