

Welcome to the Working Platform Guidance Webinar

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Working Platform Guidance Webinar

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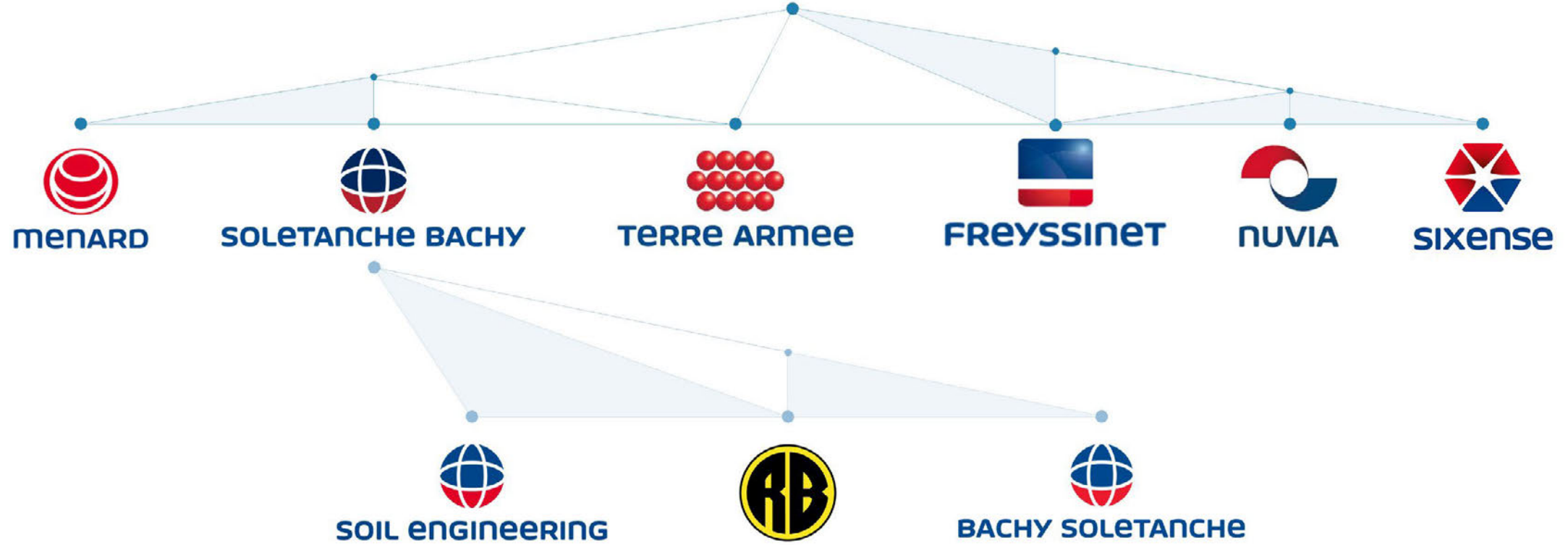
01

Our Business

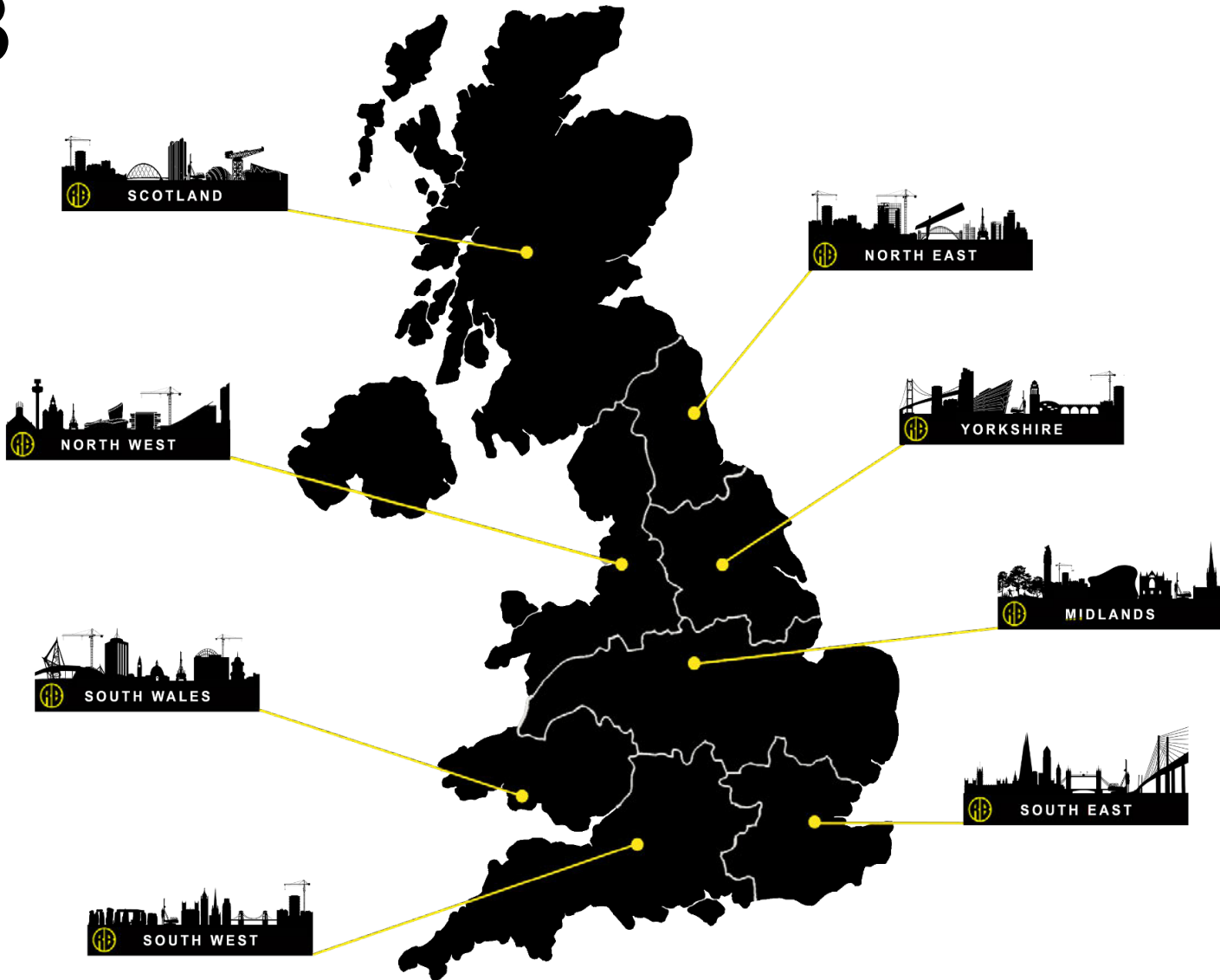




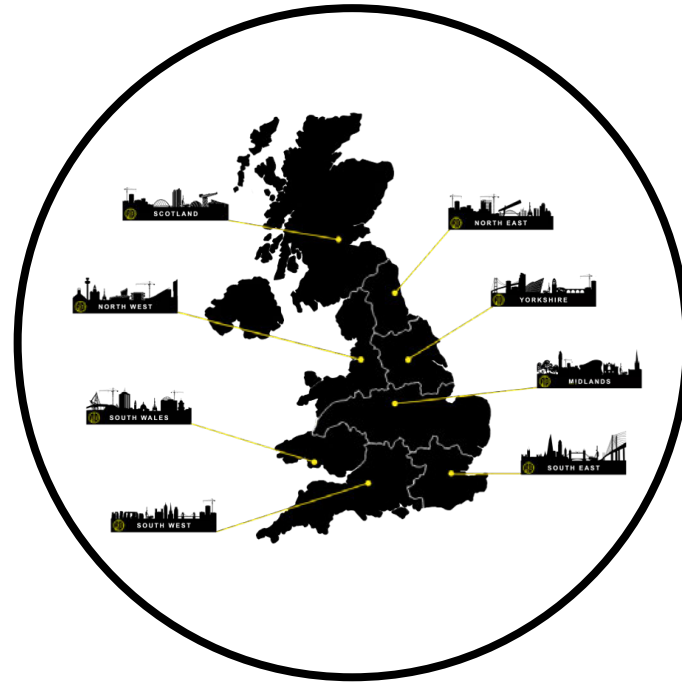
SOLETANCHE FREYSSINET



About RB



About



Years of experience...



PILING



**GROUND
IMPROVEMENT**



**FOUNDATION
SYSTEMS**



**RESTRICTED
ACCESS**



Working Platforms

One third of dangerous occurrences reported by FPS members are related to working platforms. Every dangerous occurrence and every 'near miss' involving the platform is a potential fatality.

A working platform is a temporary geotechnical structure that provides foundation for construction plant. They are designed to provide a stable and safe working area during the site operations and tracking across site.



02

Rig Bearing Pressures



Rig Bearing Pressures

- The importance of the stability of all equipment, large or small when working on construction projects is undeniable. As the image shows, the consequences of unstable platforms can be devastating.
- BRE Report BR470 Working Platforms for Tracked Plant.
- Standardised FPS Rig Loading Spreadsheet created.
- Updated Rig Track Pressure Calculation Tool released 2015

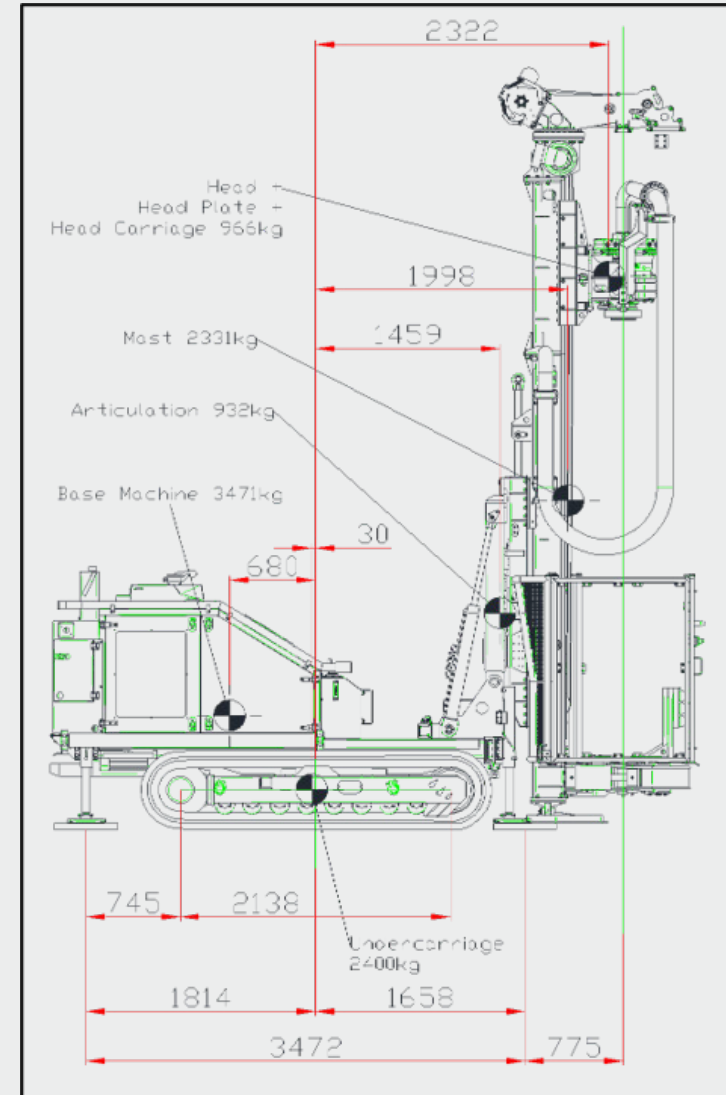


The user of this spreadsheet shall input data into the relevant yellow boxes on this worksheet and on all of the other relevant worksheets.



Rig Bearing Pressures

- **Rig Bearing pressures for RB Designed & externally purchased rigs.**
- **The calculation tool requires machinery data for:**
 - Sub assembly mass and relative centre of gravity,
 - Track area the loads are spread over,
 - Additional forces exerted on the machinery in operation.
- **Data is assessed for a multitude of standard operating conditions.**
 - BRE Case 1 - Standing, Travelling & Handling
 - BRE Case 2 - Penetration & Extraction



Rig Bearing Pressures

- **Common Issues**
 - Overly front heavy equipment,
 - Excessively powerful carriage systems,
 - Jack legs under powered or foot plates too small,
 - People just not filling in the initial data correctly.
- **Frequent Misconceptions**
 - It's a lightweight machine why is the ground pressure so high?
 - The biggest number in the UDL summary is the worst, right?
 - But I'm only doing small piles we will never use the extraction forces quoted!
- Once the data from the Track Pressure Tool has been correctly entered and an accurate summary sheet is available this can then move forward to the platform design team.



03

Site Assessment and Design



Design

Understanding the variables:

- 1) Define the Rig bearing pressures and dimensions
- 2) Characterisation of subgrade properties.
- 3) Characterisation of working platform properties.

Check the support of the **subgrade** alone

Check the support of the **platform** alone

Determine the **platform thickness**
and any **geosynthetic**



Subgrade properties

- Ground conditions within near surface 2m sufficiently characterised through:

-Phase 1 desk study

-Phase 2 Ground Investigation

Trial Pits

Insitu and Lab testing to determine strength parameters

Hand Shear Vane	Direct Shear Tests	Tri-axial Tests	Correlation with SPT (N)	Correlation with CPT
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Ground water monitoring

Identification of hard spots and localised weaker zones

- Plate load tests
- Identification of any Cut and Fill and Piling platform Level
- Less available data greater platform = thickness



Platform Properties

- Specification of platform material:

Free draining granular material

No organic/degradable material

>35° angle of friction

<5% Fines (lower the better)

- Geosynthetic Reinforcement

- Geogrids can be used to strengthen the platform:

- Tensile strength of reinforcement specified for design



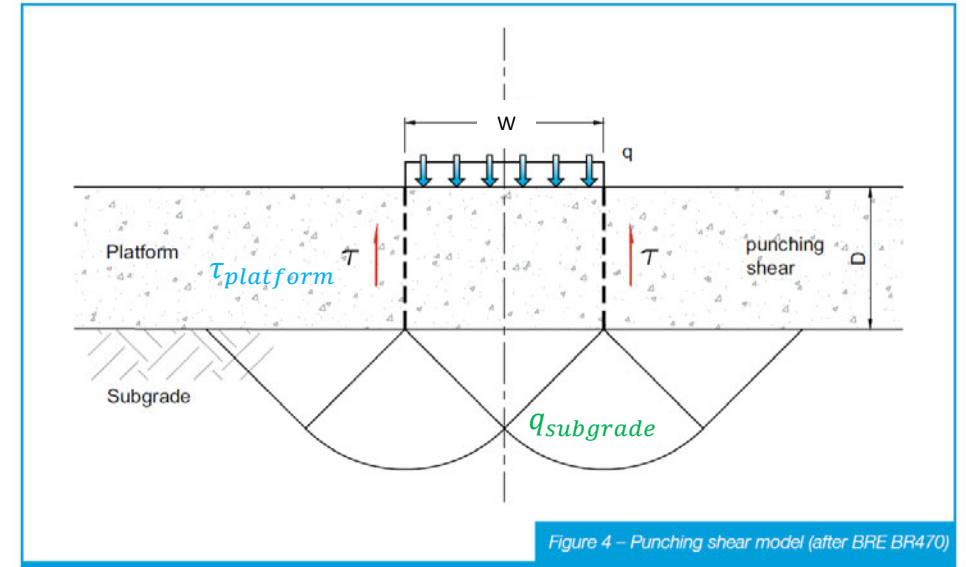
Design Calculation Methods

- Based on footing punching through a strong granular layer (platform) overlying a weak subgrade (cohesive or Granular).
- The bearing resistance is considered as the sum of the shear required to punch through the strong granular layer and the bearing capacity of the subgrade.

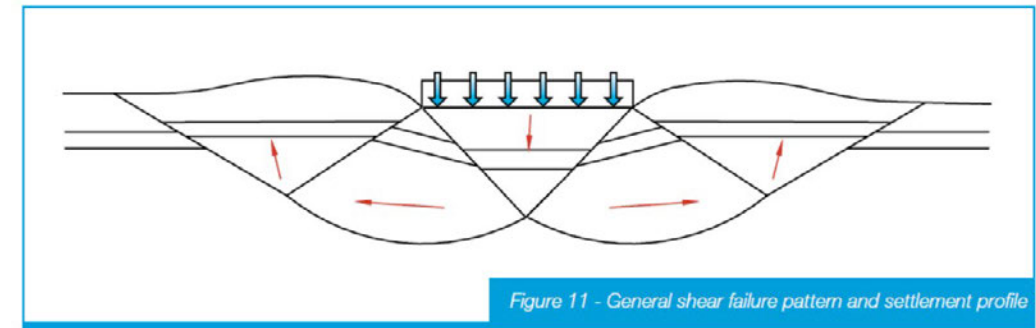
$$R = q_{subgrade} + \tau_{platform} > q_{Rig}$$

$$q_{subgrade} = \begin{cases} 0.5 \gamma'_s W N_{\gamma s} s_{\gamma} & \text{(granular)} \\ c_u N_c s_c & \text{(cohesive)} \end{cases} \quad \begin{array}{l} \text{Bearing} \\ \text{Capacity} \\ \text{Resistance} \end{array}$$

$$\tau_{platform} = \left(\gamma_p D^2 / W \right) K_p \tan \delta s_p \quad \begin{array}{l} \text{Punching} \\ \text{Shear} \\ \text{Resistance} \end{array}$$



Failure mechanism for platform overlying weaker subgrade.



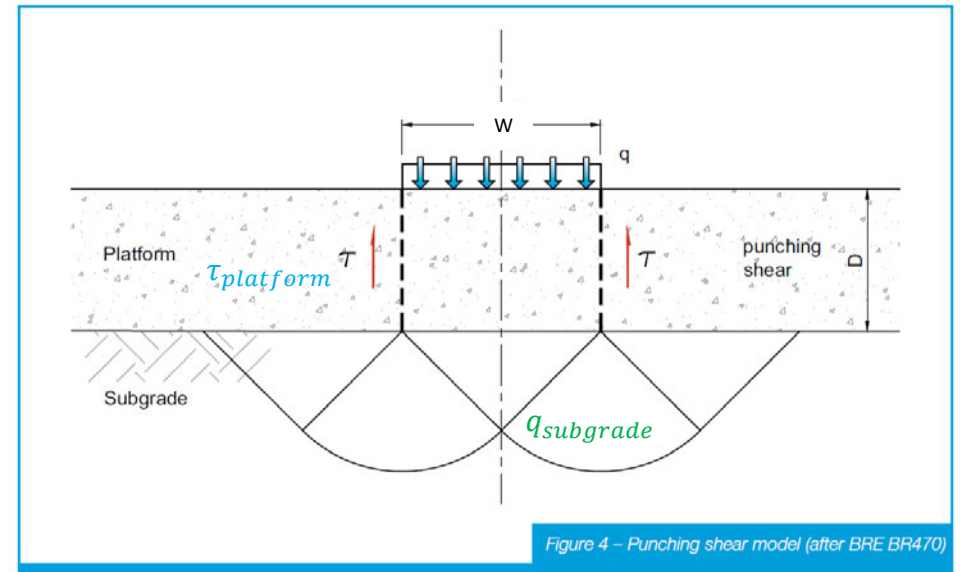
General shear failure for granular material.

Design Calculation Methods

- Check support of subgrade alone
- Check support of platform material alone
- Determine required thickness of platform
- Use of geosynthetic reinforcement
- Final platform evaluation

$$q_{subgrade} > q_{Rig}$$

$$R = q_{subgrade} + \tau_{platform} > q_{Rig}$$



$$q_{subgrade} = \begin{matrix} 0.5 \gamma'_s W N_{\gamma s} s_{\gamma} \text{ (granular)} \\ c_u N_c s_c \text{ (cohesive)} \end{matrix} \quad \begin{matrix} \text{Bearing} \\ \text{Capacity} \\ \text{Resistance} \end{matrix}$$

$$\tau_{platform} = \left(\gamma_p D^2 / W \right) K_p \tan \theta s_p \quad \begin{matrix} \text{Punching} \\ \text{Shear} \\ \text{Resistance} \end{matrix}$$

$$* q_{platform} = 0.5 \gamma'_p W N_{\gamma p} s_{\gamma} \text{ (granular)}$$

$$* R = q_{subgrade} + \tau_{platform} + T_{Geogrid}$$

$$T_{Geogrid} = 2 T_d / W_d$$

Table A3 Values for loading factors γ_q

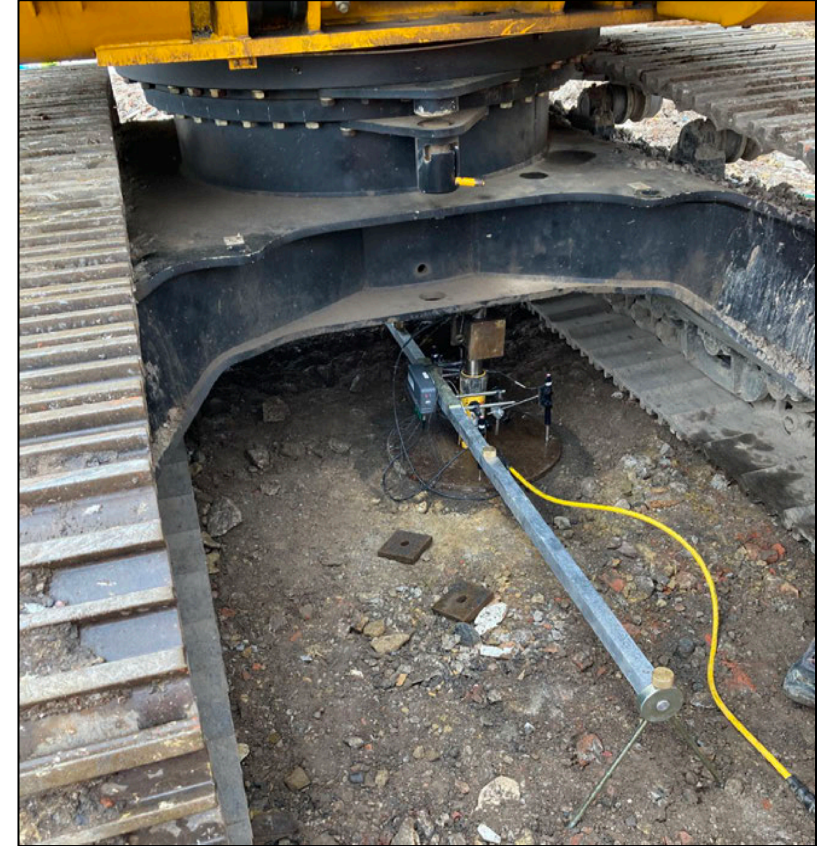
Loading condition	Platform required	
	No	Yes
Case 1	2.0	1.6
Case 2	1.5	1.2

Limitations:

- Slopes > 1:10
- Soft clay (<20kPa)
- Very stiff clay (>80kPa)

Installation, testing & validation

- Remove topsoil and soft spots within the Subgrade
- Appropriate specification as per the design (thickness, geogrid)
- Compaction methods (Specification for Highways)
- Testing carried out to verify platform installation:
 - Plate Load Tests:
 - To maximum rig bearing pressure
 - With a maximum acceptable plate displacement in the order of 1.5% of plate diameter.
 - A rate of testing of one test per 100m² is often adopted.



04

Operational
aspects &
maintenance



Working Platform Certificate

- Details:
 - Rig details
 - Proposed working area
 - Designer of working platform
 - Verification test type
- Puts the responsibility on the Principal Contractor
- To be signed before commencement on site



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Working Platform Certificate

FEDERATION
OF PILING
SPECIALISTS

Project Name	
Contract Number	
Work Area Covered by this Certificate	

(A sketch or marked up pile layout drawing may be attached to this certificate. Include haul roads and gridlines)

Part 1 - WORKING PLATFORM DESIGN (INCLUDING RAMPS AND ACCESS ROUTES)

Equipment to be used on site (inc: Pumps, Cranage etc.):	
Maximum plant loading	

(Note: BR470 'Working Platforms for Tracked Plant: Good practice guide to the design, installation, maintenance and repair of ground-supported platforms' is available from IHS BRE Press - Tel 01344 328 038)

Designer Name		Contact Number	
Designer Organisation			
Specification of testing required to verify the	Give details		

The HSWA 1974 and CDM Reg 2015 require the Client is to ensure that those you propose to appoint are able to demonstrate that they can deliver the project for you in a way that secures health and safety. Principal Contractor to appoint competent Designers in respect of Working Platform design. This legislation explains how competence can be assessed by reference to professional qualifications or professional memberships and by reference to practical experience of the design of working platforms. Principal Contractors **must** be satisfied that a competent Designer has been appointed by them in accordance with the relevant legislation before they complete and sign the WPC.

Part 2 - VERIFICATION BY PRINCIPAL CONTRACTOR

The working platform detailed above has been designed, installed to the design and, if specified, tested to safely support the equipment detailed in Part 1 above. The limits of the platform have been clearly identified on site as necessary. The material from which the Working Platform has been constructed has been tested and does not contain any asbestos or any other material which is detrimental to health.

The working platform will be REGULARLY INSPECTED, MAINTAINED, MODIFIED, REPAIRED, and REINSTATED to the as-designed condition after any excavation or damage, throughout the period when the equipment is on the site. A completed copy of this certificate signed by an authorised person from the Principal Contractor shall be given to each user of the working platform prior to commencement of any works on site.

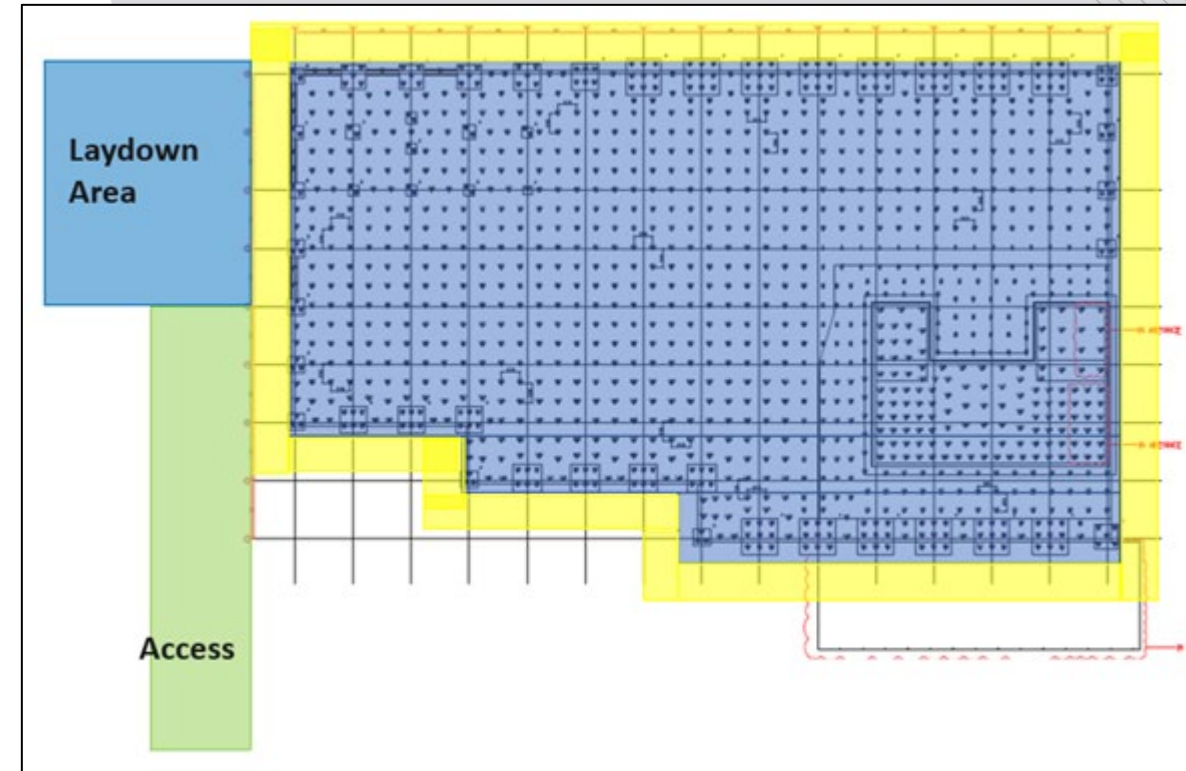
Name & Position		Date	
Organisation			Signature

The HSE has worked closely with the FPS to develop this initiative and supports the principle of reducing accidents by the certification of properly designed, prepared and maintained working platforms



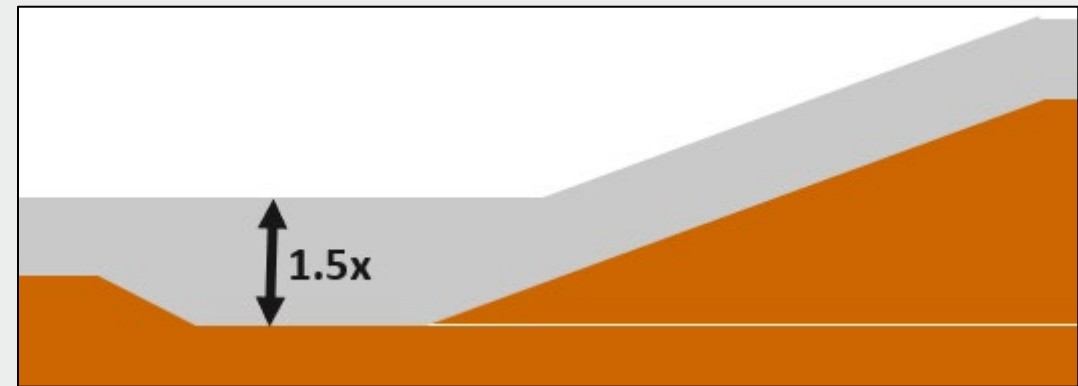
Piling Platform Limits

- Who is responsible for the piling platforms and access?
- Piling Platform limits (2m past footprint of the building where possible)
- Piling platform limits should be clear (marked out or fenced off if necessary)
- Any services should be identified and clearly marked



Access

- Haul Roads and Ramps to be installed to same spec as the piling platform, these will also provide access to any trades that will carry out the follow-on works
- Ramps need to be no steeper than 1 in 10
- At the base of the Ramp the piling platform should be 50% thicker to accommodate increased stress and wear



Lay Down Area

- Lay down area should be on level ground and large enough to store materials required
- Should be near the work area and a safe unloading area
- Storing materials on piling platforms can cause deterioration leading to remedial work or reinstatement of the piling platform



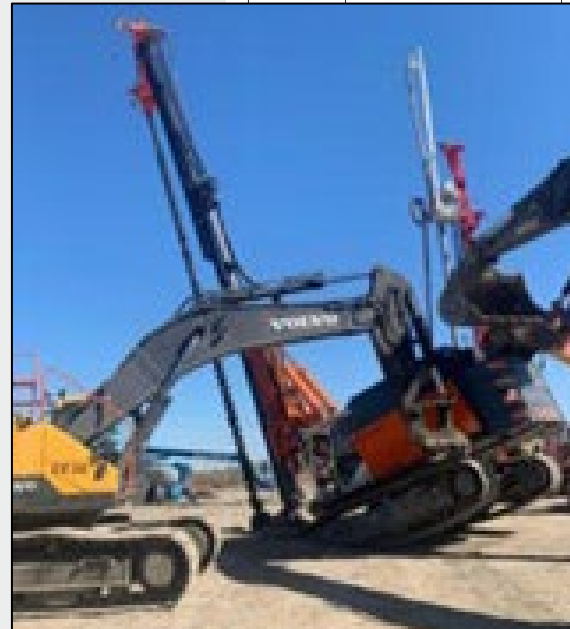
Free Draining



- Materials ideally <5% (less fines the better)
- Platforms constructed with 6F2 have potential to cause us the most problems if the materials are not quality checked upon delivery.
- Using better quality materials can have benefits (these can be reused elsewhere on site)
- If not free draining, then provisions should be made to pump out water if required (pump, somewhere to pump water to, suitable length of hose, fuel etc)



Platform Maintenance

- Platforms should be inspected daily
- Water and slurry can hide Hazards
- Any excavations need to be reinstated to the piling platform design and recorded on the daily inspection log
- Soft spots can result in the rig overturning
- Right to say No and stop work



 www.roger-bullivant.co.uk Working Platform Regular Inspection Log (FPS/WPC/4D) 

The working platform has been inspected prior to handover and provides safe access for people and plant. All necessary maintenance, modification, repair or re-installation of the working platform is to the as-designed installed condition. If necessary, a revised Working Platform Layout Drawing has been issued to the specialist contractor.

DATE	ORGANISATION	NAME & POSITION	SIGNATURE	COMMENTS (include key details of alteration, modification, maintenance, repair, date of next inspection, and whether or not revised drawing issued etc. as appropriate)



Thank you for listening! Any questions?

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