Safe Use of AWPs
Guidance on the Assessment of Ground Conditions

Introduction

All AWPs rely on the condition of the ground on which they stand for their stability. This applies equally to those which require the use of jacks or outriggers and those which operate free on wheels. Poor ground may well settle when subjected to the loads of AWP wheels or outriggers and this in turn will result in the machine being out of level and becoming unstable. Consequently it is essential that an assessment of ground conditions is made before travelling, using or setting up an AWP on any surface.

Ground conditions are often only considered for AWPs that require setting up on outriggers before use. Assessment of ground condition is however, equally important for self propelled AWPs, such as booms and scissor lifts, which may be driven along the ground with the platform raised. Moving from hard ground to soft may well cause the machine to go out of level and overturn.

Ground conditions should also be considered when moving stowed AWPs, as soft ground conditions may result in the machine becoming bogged down with consequent recovery costs, delays and loss of production.

During use it is important that operators use the level indicators provided on platforms and take notice of any warnings provided. If the level indicator indicates that the operating limits are exceeded the operator should lower and then reset the machine in a level position. If it is suspected that the outriggers could sink for any reason, regular checks should be made on machine level and adjustments made to outriggers, spreaders, mats etc.

Ground Assessment

The assessment of ground strength can vary from a visual inspection of the ground surface to a full geotechnical survey. In the case of AWPs a visual inspection is often adequate, as outrigger loads are relatively low compared with machines such as mobile cranes. However, it is essential that the assessment is made by persons with adequate knowledge and experience to know when further expert advice and assessment is required.

Site Categories

Sites can be split into a number of categories to highlight the most likely hazards that need to be considered:-

<u>Greenfield sites</u>

- No previous construction activity
- Particular problem areas are adjacent to rivers, estuaries and flood plans where soft alluvial deposits and high groundwater tables can be expected

<u>Beaches</u>

- Low sand density and/or high/variable water table create difficult conditions.

<u>Filled construction sites (Brownfield sites)</u>

- Unknown previous conditions, e.g. basements, poorly filled open pits, storage tanks, variable and compacted fill

Paved areas (Roads, pavements, paths & car parks)

- These can look deceptively strong but may have been laid on weak ground underneath
- If a road is regularly used by heavy commercial vehicles and shows no sign of distress then it will be less of a concern than a lightly trafficked car park or estate road
- Footpaths always demand further investigation as there may be weaker material or shallow services underneath thin surfacing
- Edges of paved areas are usually weak

Town center sites

- Expect underground hazards e.g.: basements, sewers, tunnels, live services, poorly backfilled trenches, manholes inspection chambers etc.

Ground Condition Hazards

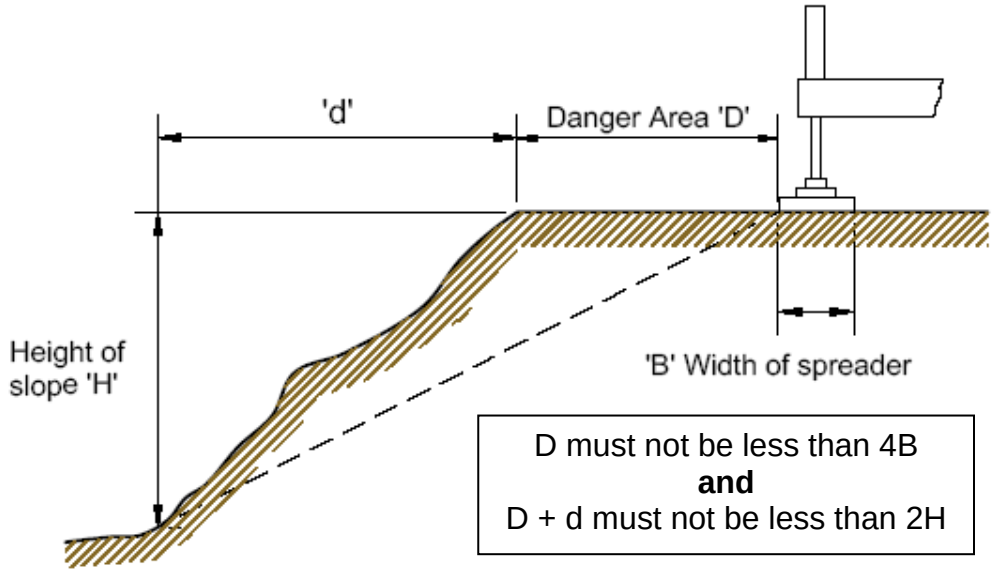
Some typical ground condition hazards that may be encountered are:-

Uncompacted Fill

Soil or other fill material might be piled along the line of a backfilled trench without being compacted. Cracking of the ground along the line of the trench is an indication of uncompacted fill.

Proximity to Excavations

AWPs should not be positioned near to the edge of trenches and other excavations as these are likely to collapse without warning. If the machine needs to be used close to the edge of a slope or excavation, with the outriggers or wheels in the “danger area”, an engineering assessment must be by a competent geotechnical engineer before the AWP is set up and operated.



Floors Cellars and Basements

Many floors, cellars and basements are incapable of bearing the weight of an AWP and could collapse without warning. The strength of floors and location of cellars and basements must be taken into account when siting AWPs.

Paved Areas

Paved areas can look deceptively strong but might have been laid on weak ground underneath. Footpaths should be considered to be suspect as there could be weaker material or shallow services underneath the surfacing.

If a road is used regularly by heavy commercial vehicles and does not show any signs of distress it is of less concern than a lightly trafficked car park or estate road.

> *As an indication of relative bearing pressures, a car tire exerts a pressure of approximately 2.4 bar (35 lb/in2) whereas a typical AWP outrigger without a spreader pad may well generate a pressure in excess of 13.8 bar (200 lb/in2).*

Underground Services

Sewers, drains, manholes, gas and water mains, etc. might be damaged by the weight of an AWP or could even collapse and cause the AWP to become unstable or overturn.

Weather Conditions

Heavy or prolonged rain can alter ground conditions and cause sinking of outriggers or wheels. If it is suspected that the ground supporting an AWP is getting softer regular checks should be made on machine level and the appropriate adjustments made to outriggers, packing mats etc. Regular checks should be carried out when frozen ground is thawing out since frozen ground can appear to be much firmer than it actually is.

Outrigger Foundations

The area of the foot attached to the outrigger of an AWP is relatively small and consequently generates high pressures on the ground. Most soils, unmade ground and some paved and tarmac covered areas are not capable of supporting these pressures and some form of foundation or spreader pad is often required to reduce the pressure to an acceptable level. It is therefore strongly recommended that suitable spreader plates should always be used under the outrigger feet irrespective of the apparent ground conditions.

In addition, very poor ground conditions may require the advance preparation of additional foundations, such as timber mats, proprietary mats, steel grillages or concrete pads, before the AWP outriggers are deployed. If timbers are used these must be in good condition and of adequate thickness (not scaffold boards).

The diagrams on the next page give example of good and bad practice in the positioning of outriggers.

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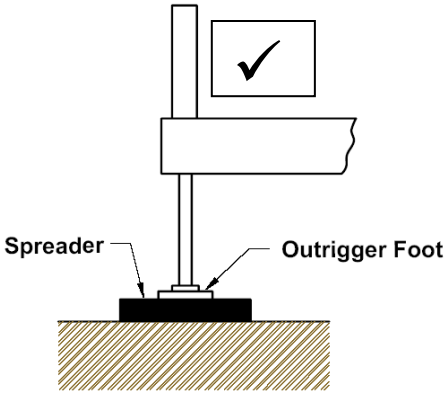
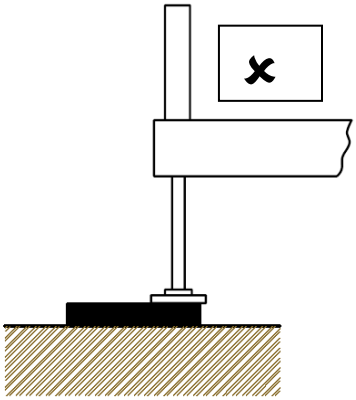
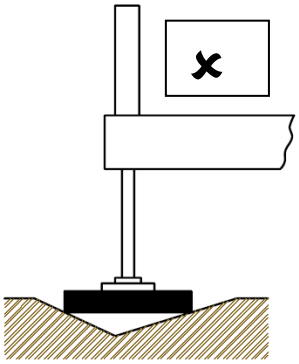
Examples of Good and Bad Practice



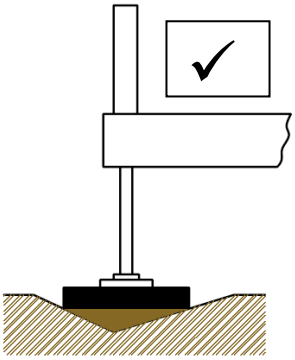
Correct



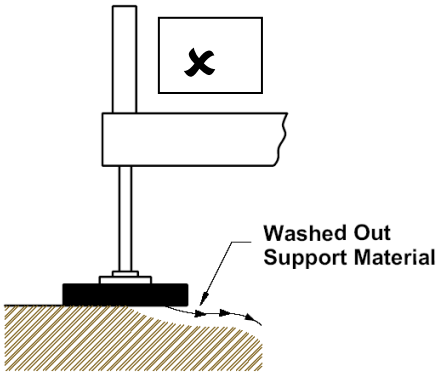
Foot not centered on spreader



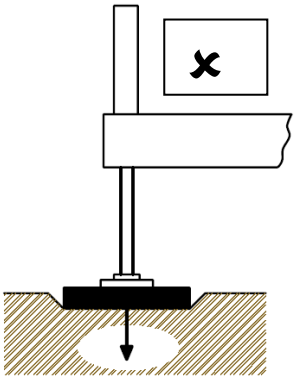
Spreader over hollow



Hollow filled in



Loose material washed out by rain



Outrigger positioned over void

Detailed advice on assessment of ground conditions, calculation of bearing pressure and selection of spreader plates is given in the Construction Industry Research and Information Association (CIRIA) publication Crane Stability on Site, C703, 2003.