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LACK OF APPLIED LOAD INFORMATION

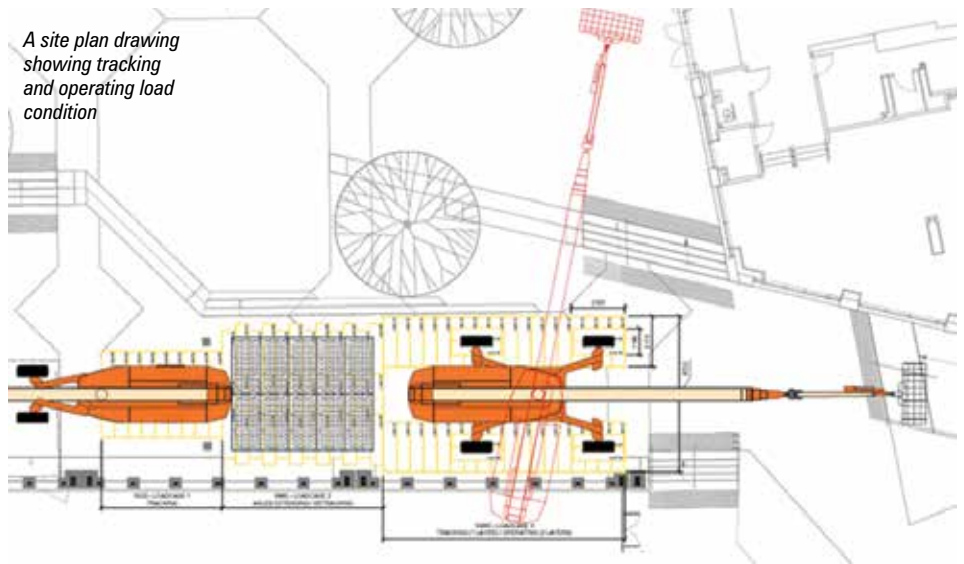
Accident data from the IPAF accident reporting data base shows that platforms that overturn typically result in the death or serious injury of the platform's occupants. In other words, if you are in a platform that overturns, you are likely receive life changing injuries or die.

Many such incidents could have been avoided had the correct mats or track been specified and most importantly used. However the availability of concise, easily understood information regarding outrigger or wheel loadings/ground bearing pressures is not readily available. This is particularly the case when using heavier platforms.

Dan Westgate of Brilliant Ideas/Alimats is all too familiar with challenges when trying to propose the right sized mats. "Most access rental companies provide a specification/data sheet which has been abbreviated or part extracted from the manufacturers Owner's Manual, but in most cases key information is missing. The machine weight is normally provided, and in some cases, a maximum ground bearing pressure expressed as force or load over area such as kN/m^2 or kg/cm^2 but this is not enough. Expressing maximum ground bearing pressure as kN/m^2 or kg/cm^2 in relation to wheel loads is misleading, as it is actually applied as a concentrated point load - albeit over the small contact area of the wheel."

"When we request machine specification sheets from enquiries generated by rental companies, we have found that the maximum applied ground bearing pressure value is given but the applied force/load contact area not shown at all, so the value is useless. The track width information - amongst other things - is also often missing. There are always two types of load cases to consider - when the machine is tracking and

A site plan drawing showing tracking and operating load condition



when it is operating - when checking that the machine specified is suitable for site conditions. We then need to establish - via the temporary works design - if any additional load spread or ground improvement is required."

WHAT INFORMATION SHOULD BE INCLUDED IN RENTAL COMPANIES' SPECIFICATION/DATA SHEETS?

"The information we require includes machine weight, track width, wheelbase, maximum wheel loads and wheel contact area and the load information may require two values for each case.

In our opinion you shouldn't have to hunt for this information on specification/data sheets. For example, maximum wheel loads should jump off the page! It should also be expressed as a value that is more relatable so instead of kg/cm^2 how about total kilograms or tonnes? Providing the wheelbase and track width dimensions also ensures analysis can be carried with regards crossover of load spread between wheels, this could result in a load spread platform in lieu of typical outrigger mats below each wheel. The websites of most platform manufacturers generally provide guidance on the wheel loads



and in most cases the most pertinent load case is when the platform is operating as the load exerted is concentrated, similar to a mobile cranes' outriggers. On many larger boom lifts the axles are retracted for transport and extended once on site which adds another load factor on supporting ground."

Some manufacturers do publish point loading charts on their websites. Niftylift is one such company, the notes on its Point Loading charts

state: 'Point loadings are the total weight of the machine and operators, supported on the area of one foot or tyre and multiplied by a factor of 60 percent. We have found this to be a very close approximation to the Realistic Point Loading figure and can be worked to as an absolute. If additional factors of safety are required, they should be added to this figure'.

Westgate is not amused at some of the information in certain manufacturers' manuals or

websites. "In my humble opinion the information on some manufacturers' websites is dated and poor," he says. "I have sent my views on this to at least one and so far, have had no reply."

Wheel loads for larger self-propelled platforms can be very high for example a platform weighing 20 tonnes can impose a point load of 12 tonnes in the worst case position. It is also important to note that this might not be when the boom is fully extended and loaded, it might also be with the boom retracted fully elevated with just one person in the platform and the counterweight slewed over one wheel. Most accidents we see reported on www.vertikal.net show the ground collapsing under a rear wheel.





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CASE STUDY

JLG 1500 SJ BOOM

"Even though the JLG specification sheet we received within an enquiry for a high profile job in London showed more information than most, it is only when you revert to the 224 page owner's manual - which I downloaded from the internet - that it is possible to calculate or understand the ground bearing loads in greater detail," says Westgate. "The machine width is shown on the specification sheet but strictly speaking this is not the 'track width' which is the centre of one wheel to the centre of the opposite wheel and to work this out you need to know the wheel/tyre width, which is only available from the owner's manual."

"Page 183 of the manual states the maximum tyre load is 12,973kg (circa 13 tonnes) which in our view is a far more reliable value than 7.95kg/cm² - given on the aforementioned data sheet - and it also states the foam filled tyre width of 45.7cm."

Therefore, using the values on the JLG 1500 SJ data sheet:

Maximum Ground Bearing Pressure	7.95kg/cm ²
Machine Weight	22,000kg
Wheelbase	3.81 metres
Maximum wheel load	12,973kg

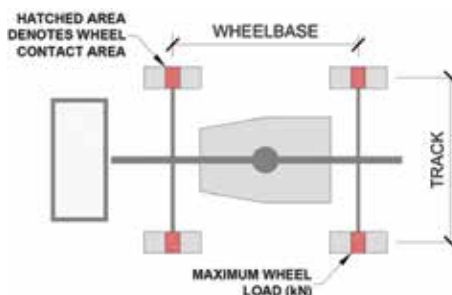
From this you can calculate the following:

Force or load contact area	$12,973 \div 7.95 = 1631.82\text{cm}^2$
Load contact footprint	$1,631.82 \div 45.7 = 35.7\text{cm}$
Therefore	45.7cm x 35.7cm

"From here it is far easier to ascertain if a load spread or ground improvement solution is needed. In my view all rental companies should show the key values taken from the owner's manual on their specification/data sheets to ensure a temporary work check can be carried out more efficiently and ensure the data is expressed in a more reliable way to the less informed. I do not even think these data sheets need to get any bigger, currently they seem to be more like a marketing document than a specification/data sheet."

"Obtaining outrigger loads from crane hire companies is seamless, why is this not the case with access platforms?"

"It should also be noted that the owner's manuals are not all readily available to download for all



Information to calculate the load contact footprint

machines and subsequently you can be left making assumptions or missing key information. Why is this the case?"

Scissor lifts:

"What should be highlighted with scissor lifts is the misconception that the loads are equal on a scissor - they are not. On most machines, the higher the platform is elevated the more concentrated the load is on one end of the machine. I also have examples of data sheets with incorrect information on them."



Spider cranes and spider lifts:

"In some scenarios with regards spider cranes and spider lifts, travel/tracking can be more onerous, especially on narrow track models, which concentrates the machine's weight on a small area. Enquiries for these types of machines are typically just for the operating condition on outriggers and not when tracking. What concerns us the most with these types of machines is that they are often used on suspended floors!"



SUMMARY

"Rental companies need to update their abbreviated specification/data sheets and until they do guidance on powered access loadings should always be sought from the machine manufacturer - assuming the owner's manual is actually available - and all temporary works designs should be carried out by a competent temporary works engineer." ■



How it should be done: Power-Pad HD Lite mats being used on a Tadano ATF 220G5



Some of the real life examples found on site

NEW OUTRIGGER MAT GUIDANCE

At the end of September, the UK based Temporary Works Forum published a new guidance document that sets out best practice for the assessment and management of outrigger loadings for equipment including cranes, aerial work platforms and 360 degree telehandlers.



For contracts, outrigger loadings is a specific part of the wider management of this type of equipment. It is a potentially complex area of temporary works with the interface between the outrigger, outrigger mat and the underlying ground structure and load bearing capacity. It can require coordination - often at short notice - between several designers, contractor's staff and equipment suppliers, all of whom may work remotely.

The new document provides a comprehensive overview of outrigger mats and load spreading requirements and good practice, highlighting the steps that should be taken to avoid ground failure issues due to excessive point loadings.

The aim of the publication is to provide clarity regarding the selection of outrigger mats to spread the maximum outrigger loadings to the minimum required bearing area and follows an extensive survey and investigations by staff at Kier construction's Professional Services division, who toured the company's sites - mostly in Northern England, Scotland and Northern Ireland - looking at real life habits and openly reporting their findings.

Much of the site investigation work was carried

out by temporary works advisor Jemma Quin, who presented her findings along with engineering manager Alistair Ringer at the recent Crane Safety Event in London. They looked at a wide range of equipment from small loader cranes to lattice crawler with capacities of more than 1,000 tonnes. As you might expect, most issues were found on the smaller cranes and equipment. However, once they spotted a poor outrigger set-up or load spreading issue, they began digging further and often unearthed a whole litany of other failings from the lack of a lift plan or risk assessment to inappropriate crane or lift selection etc.

The introduction says: 'This guidance sets out best practice for the assessment and management of outrigger loading. It aims to align with - and signpost to - existing good guidance on the wider management of construction equipment operations and temporary works. It seeks only to complement existing guidance and good practice relating to the calculation of maximum outrigger load and minimum required bearing area.'

It highlights concerns regarding the stated capacity of some outrigger mats/systems in a safety bulletin and makes specific

recommendations to address those concerns, along with more general recommendations regarding outrigger mats in all materials.

THE DOCUMENT IS DIVIDED INTO TWO MAIN PARTS.

Part A describes the assessment process which should be overseen by the Appointed Person (AP) and/or Temporary Works Coordinator (TWC) to determine the maximum outrigger load, determining the required bearing area and then selecting a suitable outrigger mat.

Part B contains guidance developed for Temporary Works Designers (TWD), when undertaking assessment of the outrigger mat or mat arrangement described in Part A and aims to address the interaction between the mat and the underlying ground which, if not appropriately considered, can lead to incompatibility between the two and overestimate of the outrigger mat's capacity. It provides a 'lower bound' approach which enables the capacity of proprietary outrigger mats to be pre-calculated without foreknowledge of the ground conditions on which they will be deployed.

The TWF Guidance is available as a free download from www.twforum.org.uk



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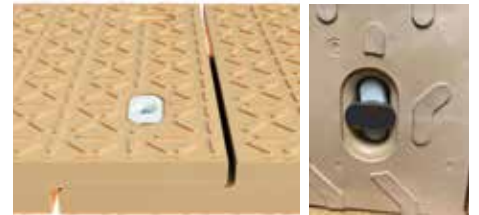
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SPARTAN COMPOSITES SYSTEM7

Four years ago, Justin Thelin of US-based Spartan Mat - a significant producer of wood mats - started to develop a lighter, stronger and longer lasting 2.4 x 4.3 metre composite mat as an alternative to wood. The result saw the launch of its System7 product last year.



Speaking of the development Thelin says: "The weight of large wood mats creates logistical challenges. Wood is also naturally prone to break apart or rot after two years or so, so safety is always in question - you just don't know where you are in the life cycle of a wood mat, and users run the risk of failure and all the dangers associated with this. The only solution was to utilise modern materials to make something better."

Thelin and his partners formed Spartan Composites, acquiring a facility and manufacturing equipment in Rockledge, Florida and hiring industry specialists and engineers who created the System7 mat system following a three year research and development programme.

The new system makes some substantial and bold claims, including 'the lightest composite mat on the market and the strongest, rated at well over 600psi/422 tonnes/square metre. It also utilises a patented ZeroSkid technology and locking pins, which eliminates curling problems associated with other composite mats'.

The mats also come with standard UV protection

and an anti-static additive package. The mats link together and are designed to be 'easily connected to one of the most common mats in the industry and to any other mat systems with simple cross over sections'.

It says that the mats are 100 percent recyclable, do not absorb contaminants and are designed for a 10 to 15 year practical life cycle. The System7 mats use a compartmentalised internal structure, so if it is punctured, water will only penetrate that specific area and not run through the rest of the mat.

Each 2.4 x 4.3 metre mat is 108mm thick and weighs 470kg, about a half to a third of an equivalent wood mat allowing more mats to be carried on a truck or trailer and making them easier to move. The useable size after allowing for overlapping and interlocking is 2.1 x 4.0 metres. The System7 overlapping/underlapping design concept and connection is said to provide a smooth even transfer of loads imposed by equipment traveling across the mats. The company says it has sold more than 10,000 System7 mats so far this year and the original team of three has grown to more than 80 employees. ■



DICA ACQUIRES SLATTRAX

US outrigger mat and ground protection specialist Dica has acquired the SlatTrax ground protection system from Minnesota based Property Props. The SlatTrax system links heavy duty recycled HDPE plastic slats via a unique 'spine and capture joint' that allows the tracking to be easily rolled/folded and also create curved tracks.

DICA has taken over all ongoing operations for the SlatTrax brand, while founder owner and manager Gary Ringus remains involved as a consultant and a manufacturer's representative during the transition.

Dica chief executive Kris Koberg said: "This acquisition is a natural expansion of the DICA brand. SlatTrax provides temporary worksite access, minimises damage to lawns and gives crews a stable work surface. Durable and easy to handle it is a unique solution for companies working with light and medium duty equipment. Earlier this year we moved to a new facility which doubled our production capacity which will enable us to increase SlatTrax product availability and shorten lead times. We are building inventory and soon, all standard products will be available to ship from stock."



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