

# Mats, pads and common sense

If you are a regular visitor to [www.vertikal.net](http://www.vertikal.net) you will have noticed over the past year or so an apparent increase in the number of cranes and aerial lifts tipping over due to the ground giving way under one or more outriggers. It is hard to believe that the earth has become softer or more fragile, although there is a correlation between rainfall and accidents caused by ground conditions. Ground baked hard by drought will usually be more forgiving than waterlogged ground. It is also hard to believe that operators are shoring or cribbing under outriggers less often than in the past, or that outrigger pad loadings have increased significantly.

The more likely reason for the surge in the number of reports is better communications. The internet has caused a massive increase in the amount of news reported. Now when a crane tips over it is all too soon a subject on various blogs and local news stations. So what we are more likely seeing is just how commonplace accidents from poor outrigger cribbing and set up have always been.

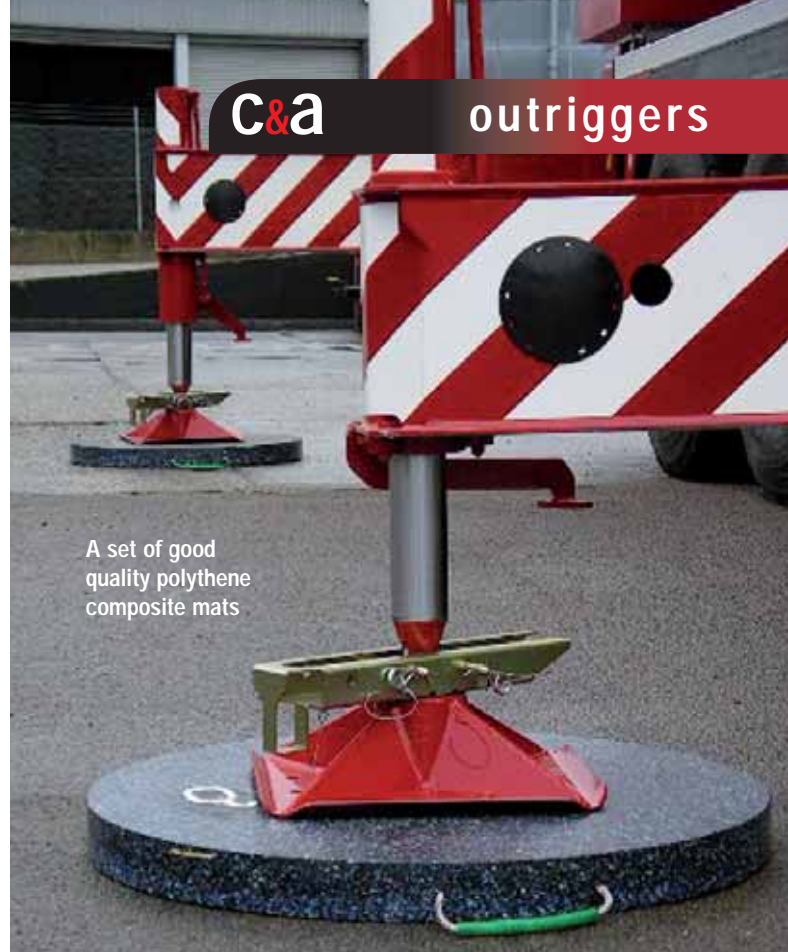
## Who's responsible?

One of the issues that does not help the situation is confusion over who is responsible for the ground conditions. In the UK, CPA rules clearly place this onus on the contractor or developer rather than the crane provider. This even applies to contract lifts, where the contractor is likely to assume that he is paying the crane rental company to take responsibility for

every aspect of the lift. The CPA argues that a crane company should ask about the ground but that only the contractor or developer is able to categorically define and be responsible for the ground conditions.



*Using mats is only the start. They need to be used correctly!*



*A set of good quality polythene composite mats*

Saying this any crane hire company with any pretension to professionalism or any crane driver worth his salt will take the cribbing of outriggers very seriously. Most outrigger accidents would be avoided by taking even the most basic of measures, such as using a purpose designed outrigger mat. Common sense will also help enormously, a good crane or larger truck mounted aerial lift operator will develop the ability to judge ground conditions, developing almost a second sense for spotting when ground conditions might not be what they seem. This is not of course foolproof but it can alert an operator to investigate further or at the very least give the ground a good testing. The biggest

challenge of course comes from hidden underground voids such as septic tanks, but once again there are generally hidden clues to where these might exist. Old brownfield, industrial or residential sites are of course particularly risky.

## If in doubt test the ground

An operator of a small to medium size crane can always test the ground by taking the weight of the load (but keeping it close to the ground) over each outrigger jack, ideally at a greater radius than the lift.

This of course is more of an insurance helping confirm that information given by the contractor is reliable. When any doubt exists a good operator will also use the largest mats he can, thus spreading the load over a wider area and keeping ground bearing pressures down. We recommend that mats are always used unless setting up on a purpose built test pad. Even then it is a good habit to get into.

## So which mats.

Wood, steel, nylon, polythene all can be good as long as they are designed and specified for the job. When buying wood cribbing it is very important to buy from a supplier that understands the application and supplies timber specifically for the job. He will only provide fine grade hardwood timber that will

# outriggers



A superb steel outrigger mat on Eisele's new 103 metre Wumag WT1000.

both withstand the pressures involved and will not quickly develop cracks that allow water to penetrate and then start the freeze thaw process that will quickly make the wood unsafe for the job at hand.

On larger wood cribbing, steel strapping on ends and high levels of preservatives will massively extend its safe working life. The same applies to larger timbers for use as crawler crane mats and access trackways.



A well planned set up for a challenging lift over a new metro station. A precast concrete pad removes the slope, a large purpose-built wood mat and two reinforced I beams with clamps then spread the load onto a vertical beam.

## Buy the best, its cheaper!

When it comes to nylon or better still, polythene, the simple rule is buy the best. Good quality mats will last the life of the crane and cost a lot less over the long term, not to mention the peace of mind they bring. Suppliers of good quality mats will usually be happy to customise your pads in a wide variety of ways, including supplying the colour you want, branded with your company logo.

They can also provide non-slip or friction surfaces, for example you might specify a pad with a rough texture on one side to grip the ground, while the other is smooth to allow flop-down outriggers to slide as they lift the machine. Also make sure that pads are fitted with

suitable handles for the size and weight. This might be rope or chain handles or simple cut-out hand grips. Finally you might want to have holes cast or drilled in to match with retaining pins or bolts on the deck of your crane or lift.



Pads should have good hand grips, making them easy to carry.

## Temporary tracks

The conversion of Europe's mobile crane rental fleet from truck mounted cranes to All Terrain crane has helped conquer the challenges for cranes to gain access to construction sites with bad ground conditions. However high axle loads and gross vehicle weights still create access problems on the worst sites or when crossing unprepared ground in emergency situations.

Those challenges are even greater when working in residential areas. With between five and eight tonnes on a single tyre and gross weights of between 30 to 95 tonnes, a crane or big truck mounted lift can wreak havoc with driveways, lawns or kerbs. Thankfully there are an increased range of products on the market to smooth the way. The original purveyor of such products was Trakway, now Eve Trakway. The company made its way renting out what was a patented aluminium roadway that it simply rolled out from the back of a truck. The



Eve Trakways new K panels form a temporary road over farm land.

company which was the subject of a Management Buy Out from Babcock in 2006, also provides heavy duty standard panels for heavier cranes and can construct custom designed lifting platforms from standard components. Rola-Trac takes a different approach to providing heavy duty temporary roads for cranes and lifts. It has a system it calls I-Trac which is made up of 0.8 square metre interlocking composite panels which weigh 15kg each. Rola-Trac says that a single man can lay up to 100 square metres an hour.

## When things go wrong

As we have already said, improper cribbing under outriggers is the single biggest cause of accidents with cranes and aerial lifts. When you allow for the fact that the majority of aerial lifts are now self propelled, the statistics become even more shameful - shameful because it is an accident that is usually easily avoided, caused by poor planning and most often of all by laziness and/or ignorance.

The following are some recent examples of what can go wrong when operators do not bother to take the ground conditions into consideration.

### Operator loses life.

A 100 tonne crane working at an offshore fabrication yard on Bintan Island, Indonesia tipped over when one of the outriggers punched a hole in what seemed like good ground. Sadly the operator, who worked for the crane's owner, Tat Hong, was hit in the head by a flying outrigger pad as he jumped from his cab. He was reported as



Rola-Trac's I-Trac can handle the largest cranes

dead on arrival at hospital. In this case if he had stayed in the cab he would most likely have survived.

Amazingly in this case steel outrigger mats were available but were lying in a pile by the side of the crane, there was also plenty of space here to have 'tested' the ground.



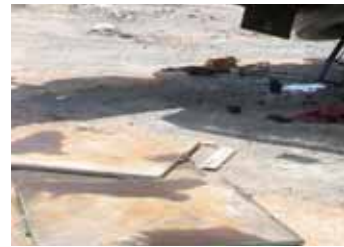
One outrigger punched through the ground.



Clearly the pad was too small on its own.



The ground looked OK on the surface.



Steel mats were lying unused by the crane.



November 2006 - Victoria Canada - An 18 tonne boom truck lifting a hot tub over a house into the rear garden, tipped over when one of its outriggers punched through the driveway into an old septic tank. The tub dropped striking Johnson and placing him into intensive care. The roof of the house was also badly damaged.



**April 2007:** A 40 tonne crane slipped off its home-made/make-do outrigger mats and tipped over in a street in Silema, Malta damaging buildings. Thankfully the operator was only slightly injured and no bystanders were involved.



**April 2007 Newbury, UK:** An Italmec Ragno R16 was trimming trees when the edge of a loose bricked drive gave way resulting in the outriggers slipping off the drive causing the lift to tip, injuring

operator Phil Cantrey, an employee of J.P. Hardy Forestry. No outrigger mats or cribbing had been used.



*The 360 ton crane nearly ended up in the cellars and caused chaos in downtown Chicago.*

**May 2007:** A 360 ton crane belonging to Imperial Crane of Chicago was just beginning a routine lift of an air conditioning unit onto a roof in downtown Chicago when the outriggers under the counterweight crashed through the road. The crane was rigged with main boom fully retracted at maximum elevation and full luffing jib. As the crane tipped backwards the boom and jib crashed into the building behind, causing extensive damage to the upper floors. Imperial Crane said that the City, which issued a permit to close the street allowing the lift to go ahead, did not mention that the street was built over a void. Vice president Wes Austin was quoted as saying: "Nobody told us the alley was vaulted, it is always a scary thing for a crane company." A spokesman for the City's Office of Emergency Management and

Communications, would confirm only that the company had the proper permit. Although a city official said: "It was obvious from grills on the street that the roadway was vaulted underneath, it's up to a crane operator to determine if a crane is too heavy for the road."



**June 2007:** a truck mounted lift owned by ES Access but operated by a trained, self-drive customer, tipped onto Athena House, in Clifton Moor, home of the Crown Prosecution Service. Three men in the basket were rescued from the roof, shaken but unharmed.



**July 2007:** A 50 tonne Kato NK500 truck crane, owned by Titan crane hire of New Zealand, had just started lifting steel roof trusses at a site in Taurenaga, when the ground gave way. It turned out was set up over an old septic tank which collapsed. The crane missed traffic on a main road but the boom caused extensive damage to the three-storey building and scaffolding. The boom had to be cut up to remove the crane.



**September 2007:** This Grove TMS475 owned by Fussey Engineering punched a hole in the dock at Immingham a few weeks ago, thankfully no one was hurt.

**Coping with slippery slopes**

Cranes or lifts with outriggers are particularly adept at setting up in slopes, although this often requires well planned cribbing. Lifting equipment with spider type outriggers can level up much steeper slopes. The Chill Factor - a new indoor ski slope being built in Manchester by Sir Alfred McAlpine - presented a major challenge even for the spider. The facility has two slopes- the nursery slope with a gradient of 10 degrees and the steeper main slope at just over 15 degrees. A mix of Teupen and Omme spider lifts were used to gain access over the slopes. The Teupen Leo 23GT models were helped to level up with some factory designed wedge shaped outrigger mats to allow the machine's pads to remain level. The Omme lifts had pads that were able to cope with slopes of up to 21 degrees. Given the steepness and the fact that the concrete surface of the slopes were smooth and slippery, non-slip rubberized mats were used under the pads and the machines were fitted with anchor lines attached to eyebolts at the top of the slopes.



*The Teupens were equipped with special wedge shaped outrigger mats.*



*The Ommes were able to handle the 15° slope but used the non slip mats.*



**Surrey:** Spotted in a high street in Surrey this August - stacked blocks used as outrigger cribbing on a 20 metre truck mount.

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