

More mats

The topic of outrigger mats has been covered in Cranes & Access for the past three years or more, with our coverage over the last 18 months turning into a mini campaign to encourage operators of cranes and aerial lifts use them every time outriggers are deployed. This followed the realisation that a large proportion of the accidents caused by the ground failure underneath outriggers were the result of a total absence of any attempt to spread the pad loadings over a wider area.

Last month's article seems to have hit a nerve and generated an unprecedented response from you our readers. As a result we felt we should run a follow up covering the points raised along with some new material that we have received or could not find space for in the last issue.



c&a outriggers

Bespoke mats

We were contacted by Seward Wyon the crane and equipment fabricators, which has seen a strong uptake in demand for its range of fabricated steel mats for cranes to meet customer demand for a rigid mat that was not too heavy, for both handling and travel weight reasons. The company is also increasingly designing and fabricating mats to specific requirements, using the correct grade of steel and a calculated design to provide specific outrigger load distributions.



Seward Wyon has seen a significant increase in demand for outrigger mats that are specifically designed and fabricated for purpose

Where's the justice?

One call came from a UK company which was fined when a crane toppled last year. It pleaded guilty to one of three charges - on the advice of a solicitor - in order to minimise the potential fines, in spite of disagreeing with any of the charges.

However, the company management was particularly riled by the fact that they knew of other crane collapses that have gone undiscovered or unreported and therefore not prosecuted by the HSE. The managing director asked the question 'should the HSE be told about every accident even if no-one was injured?' and 'why are some prosecuted and not others?' Certainly not all accidents are reported.

He told us that pads (perhaps not big enough) had been used in his lift and that the ground had been solid when tested showing no sign of movement under the outriggers. He did acknowledge though, that if he had his time again he would have placed cribbing under the outriggers and established the weight of the lift more accurately - the prime reason for the accident.



Mats need to be of a decent size, and preferably significantly larger than the crane pads

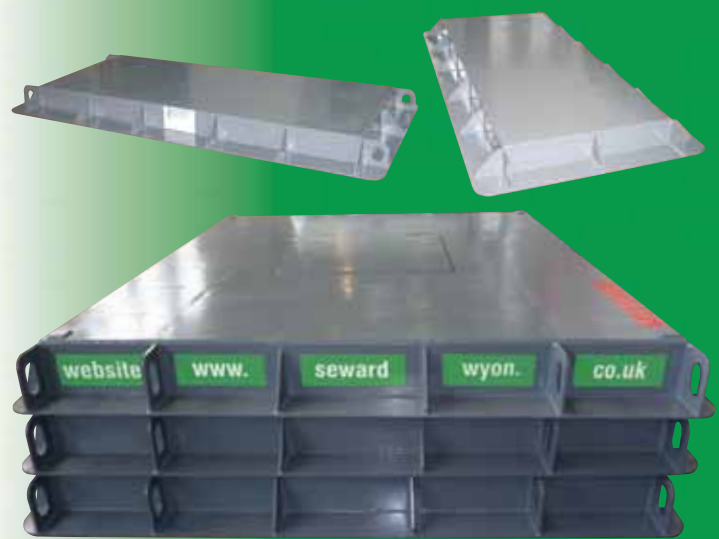
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When outrigger mats are not the problem

Many of you will have seen the photographs of a brand new 250 tonne Liebherr All Terrain crane that collapsed into the basement of a new building in Sydney Australia. We must have received them from more than 30 different readers as they circulated the worldwide web.

The first question that most people raised was why was this crane, operated by one of the most safety conscious crane companies in Australia - if not the world - not using outrigger mats to spread the load? The other one was "what was such a heavy crane doing on a suspended floor in the first place?"

We contacted John Gillespies, an owner of the crane company and chairman of the Australian crane association. He was unable to say too much, due to the obvious legal situation, but did provide a few clear undisputed facts that helped us along with a number of other sources, to produce the following report.

semi-trailers to drive on. The slab was also approved for a 250 tonne crane to drive on, in order to set up for the placement of the concrete panels.

Gillespies was called in to lift and position more than 300 tilt-up panels weighing up to 30 tonnes each and was involved with the planning of the project for some three months, prior to the commencement of any lifting. As the panels were poured on site, the positioning of the crane was critical. Gillespies therefore worked out the precise position of the crane for every single lift and supplied the full data and subsequent outrigger pad loadings to its client, a sub-contractor working for the main contractor.



caption the new 250 tonne Liebherr had already lifted 14 panels from this location...when...

than 200 panels had been successfully lifted into place over a period of 15 days, from eight of the positions. Each position had been clearly marked out in advance with painted locations, complete with 'X' centre spots, for each outrigger jack with structural supports placed under each 'X'. On the first two visits to site the company's six year old 250 tonne Liebherr had lifted from six of the positions, on the third visit Gillespies sent its brand new 250 tonne Liebherr and as with the previous sequences it was also due to lift from three different locations.

Having successfully carried out a number of lifts from two different locations over a three day period the new crane moved to position number nine and set up exactly as before, with no outrigger mats or cribbing as per the contractor's engineers explicit instructions.

(It was clearly important that all loads were transferred through the concrete to the supports and not spread over the floor). Once the crane was set up in the new position by the three man crew, the subcontractor and main contractor both signed-off on confirmation that it was in precisely the correct position over the painted crosses and free to start lifting.

Fourteen panels

were lifted and placed according to plan but when the 15th was lifted the crane telescoped the load out and one of the outriggers suddenly broke through the slab, causing the boom to come down onto one of the erected panels where it came to rest.

The crane remained in that position for around an hour before the entire slab gave way dumping the crane six metres to the ground floor below.

There were at least six men working on the ground floor when the outrigger first punched through and at that time all of the structural supports were reported as still standing upright. It seems that one of the supports was not correctly positioned. While this seems obvious, it has not categorically been confirmed as the case. Photos taken on mobile phones before the crane crashed through the floor are not clear enough to confirm it.



The crane ended up on the ground floor, note the structural supports

The crane has now been recovered using two of Gillespies Liebherr's, a 400 and a 250 tonner. Given the wide coverage of the initial accident cameras were banned during the recovery, but a photographer employed by WorkCover Authority NSW did take photos, which will be available on conclusion of any investigations or prosecutions. We hope that in due time we will be able to publish them.

While the accident raised a lot of interest due to the dramatic nature of the photographs, there are a number of lessons to be learnt by all of us. The positive fact is that no one was killed or seriously injured, although the operator did twist his ankle on jumping clear of the crane.



An outrigger punched through the concrete floor



The crane tipped and the boom came to rest on a panel



After an hour the whole slab gave way

The building concerned is about 300 metres long by 100 metres wide and is made up of a ground floor slab and a first floor, six metres above which will accommodate factory units built with tilt-up concrete panels. The concrete floor has been post tensioned and designed for large

The main contractor engaged specialist engineers to work out the location of structural supports under the post tensioned first floor slab in order to support the crane for each and every lift which involved 12 different lifting positions. All was progressing well and more

When outrigger support is the main challenge

Heron Tower is destined to be one of the tallest buildings in London and occupies the entire footprint of a small site bounded by public roads on all four sides. Three Comedil tower cranes from Select have been installed within the site to erect the main structure.

However, their 16 tonne maximum lifting capacities were not adequate to cope with some massive steel columns that will form the basement level of the new building. The individual columns weigh over 40 tonnes each and with hardly any space within the footprint of the building, the crane for the columns had to sit outside of the boundary.

The only solution was to locate the crane in Houndsditch, a street that runs along the site of the moat that bounded the original city wall, however this presented its own problems as the road width was narrower than the outrigger spread of any crane capable of managing the loads.

Structural steel contractor, Severfield Reeve, called on Ainscough Crane Hire to solve the problem and assist with the planning and approval required for the use of such a large crane in a confined space. Ainscough produced a



Setting up for this job required 10 men over two days

plan to utilise an 800 tonne capacity Demag AC2000 All Terrain crane, with the outriggers on one side sitting over a utility tunnel while the other two outriggers would need to sit on special structures to cope with a four metre drop to the base of the excavated site.

With Houndsditch temporarily closed to vehicles, but open to pedestrians, the entire area of the road and nearside footpath was covered in a 100mm thick sand/cement dry mix, over which a double layer of Trax heavy duty aluminium roadway panels was laid. Below each roadside outrigger five 7.5 metre x 2.2 metre steel mats were positioned, bridged by an 11 metre x three metre steel mat sitting on Ethafoam pads, to give an effective bearing area of 97 square metres. This arrangement brought the bearing pressure on the road surface down to 1.65 tonnes per square metre, which proved acceptable to the authorities.

The height of this multiple arrangement of load spreading mats meant the wheels of the crane had to be at least 750mm above the original road level in order for the outrigger legs to swing out into their working positions. This was achieved by reversing the crane up a temporary ramp onto a raised pad constructed from timber crane mats.

On the other side where the outriggers were swung out over the excavations, Severfield Reeve designed and fabricated two four metre high structural steel trestles, these sat on two purpose built concrete pads covered with heavy steel outrigger mats. Ainscough's normal steel outrigger mats were fitted to the top of the trestles thus providing a stable base to support the crane.

Two four metre trestles were made to support one side of the crane



Installing the complex configuration of mats and road protection and the crane itself took 10 men a total of two days, with 10 truckloads of equipment being required. The AC2000 was configured with a 55.5 metre main boom equipped with Sideways super lift and 160 tonnes of counterweight, allowing it to lift the 40 tonne steel columns at the required radii up to 40 metres.

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Bigfoot – The Correct Tool for the Job

David Milne MD - Liebherr UK.

When you weigh up the small cost involved in providing a stable support for the outriggers in comparison to the high capital equipment cost involves, it makes perfect sense.

Nylacast also manufacture and supply the Littlefoot outrigger for the lorry mounted cranes, again proven in the field.

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The Correct Tool for the Job

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"Our customers experience with Nylacast mats has been first rate, they have been our preferred supplier for many years now and we would always recommend them without reservation or hesitation"

David Milne MD - Liebherr UK.

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