



...then the VersaCrane TC36000 owned by Deep South Crane and Rigging of Baton Rouge, Louisiana.

Pushing the capacity boundaries?

Major manufacturers looking at larger lift capacity cranes are doing so in conjunction with specialist heavy lift contractors using their undoubted practical 'day-to-day' experience. As always, there are exceptions....

Tragic events over the last six months remind us of the real and present dangers involved with big cranes and heavy lifts when something goes wrong. Within the space of two months, two of the largest cranes operating in

North America - the VersaCrane TC36000 owned by Deep South Crane and Rigging of Baton Rouge, Louisiana and a 1,100 tonne Lampson Translift crane working at the Black Thunder Mine in north east Wyoming - collapsed leaving four dead and one seriously injured. As yet the causes have not been formally identified, but like the recent peak in tower crane accidents, it is a worrying trend/coincidence and does nothing to help the heavy lift industry.



In less than two months, two of the largest cranes operating in North America collapsed. First the 1,100 tonne Lampson Translift working at the Black Thunder Mine in north east Wyoming...

Developments resulting in lifting capacities in excess of 4,000 tonnes have transformed the industry where only 50 years ago a mobile crane lifting five tonnes was a big lift. As we see in the article 'In the beginning....' which deals with the development of a very early heavy lift crane in the early 1960's, cranes that push the lift capacity boundaries have historically been built by the heavy lift companies themselves rather than specific crane manufacturers. The VersaCrane and the Lampson were both in-house design and builds.

Heavy lift contractors have the extensive practical experience but do they have the latest state of the art resources and design/build experience to match the Terex/Liebherr/Manitowoc's of this world? The advent of CAD (computer aided design) finite element stress analysis and sophisticated computer modelling, not to mention experience with the latest high tech materials will reduce the variation of any design differences which may result in additional safety factors, which in light of recent events may not be a bad thing. However, we all know that even the best designed and built crane can get into trouble with a less experienced operator, one that is having an 'off day' or when a set of exceptional circumstances come along.

Later this month (September) another sizeable crane is being launched - designed and built by ALE Heavy-Lift, the Dutch subsidiary of British-based heavy lift contractor ALE. A full report on the new 4,300 tonne (96,000

tonne metre load moment) unit will feature in next month's issue of Cranes & Access, however, we have managed to obtain some advance information which makes interesting reading.

The AL.SK90 'lifting machine' can be equipped with a standard winching system for weights up to 600 tonnes and a strand jack system for loads up to 4,300 tonnes. Transportation is mainly in standard 20ft and 40ft shipping containers, each with a maximum weight of 36 tonnes and assembled using minimum resources which include one 300 tonne crawler and one 150 tonne telescopic crane, an eight tonne forklift and a three tonne telescopic handler and one 30 metre platform. Personnel needed includes four SK technicians, four specialist riggers and six local riggers.



The AL.SK90 'lifting machine' can be equipped with a standard winching system for weights up to 600 tonnes and a strand jack system for loads up to 4,300 tonnes.

The AL.SK90 uses locally available ballast material such as sand or gravel which is loaded using a wheeled loader into specially reinforced 40ft open-topped containers. Each ballast container weighs 100 tonnes and up to 40 containers can be used. The ballast radius varies between 22-32 metres with low ground pressure of 36 tonnes per square metre beneath the ballast and mast foot.

Hoist speeds are 150 metres per hour using the winch system or just eight metres per hour using the strand jacking system. Slewing speed is 28 metres per hour loaded increasing to 50 metres pre hour unloaded.



Demand for the single boom configuration CC8800-1 means that the Twin will not be seen until next year.

But why do lift companies still feel the need to do their own thing? It seems that the perception is that crane manufacturers are not keeping pace with the demand for lifting larger loads and that contractors are not keen to pool resources with other heavy lift specialists for fear of giving away hard-earned experience.

In spite of this the major manufacturers are building larger and larger cranes. Terex Demag launched its 3,200 tonne (43,900 tonne metre) CC8800-1 Twin last October with the first unit being bought by Al Jaber Heavy Lift which had a pivotal role in its development. Currently the unit

is fully booked in single mast configuration so it will be next year before we see the Twin in operation.

Manitowoc followed up with its more targeted and radical GTK1100 - with 76 metre telescopic tower on a cruciform base and topped with a slewing 60 metre five section telescopic boom which was developed with a large input (and orders) from German crane company Wiesbauer and a new 2,300 tonne Model 31000 with moving counterweight tray shown at Conexpo this year. US steel erection and heavy crane rental company Bulldog Erectors placed the first order for the machine immediately after the machine launch, so we assume it also had an input into its design and performance.

The 31000 includes the Variable Position Counterweight (VPC) which automatically extends when more counterweight moment is needed during the lift. Because the VPC never touches the ground under normal working conditions, the amount of ground preparation work needed with a typical lift-enhancing attachment is greatly reduced. The VPC also allows for pick-and-carry of all rated loads, making it much easier to manoeuvre around the job site. The VPC extends from the rear of the crane and ranges from just over 8.38 metres when fully retracted to 28.95 metres when fully extended.



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The single boom Model 31000 has a maximum configuration of 90 metre main boom and 102 metre luffing jib.

The Model 31000 is mounted on four separate trunion-mounted tracks, rather than the traditional two, which Manitowoc says provides the lowest possible ground bearing pressure with reduced matting requirements and site preparation time as well as allowing the crawler tracks to oscillate during travel to provide uniform load distribution.

The single-boom Model 31000 is available in a variety of configurations. The main boom ranges from 55 - 105 metres with a maximum combination of 95 metre of main boom and 24 metres of jib. Luffing jib configurations range from 36 metres to 102 metres. Maximum combination is 90 metres main boom and 102 metres luffing jib. Once on site, the Model 31000 can be erected with a Model 2250 as an assist crane, a 24 metre aerial work platform and a telehandler.

Meanwhile Liebherr has announced that it is working on a 2,000 tonne crawler crane for launch at the next Bauma, its current flagship is the 1,350 tonne LR11350. Knowing Liebherr the new crane, planned as a conventional single boom model, will grow in capacity by the time it is unveiled in 2010.

Always following rather than leading, the Chinese crane manufacturers are generally still in the smaller capacity range. However, Sany launched its 900 tonne crawler earlier this year and is said to be developing a 1,600 tonne and even a 3,200

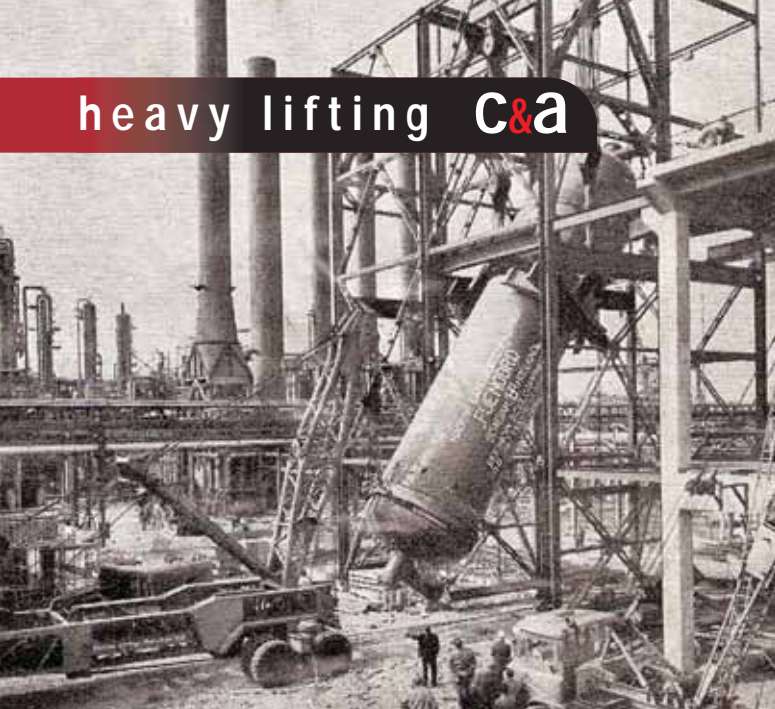
tonne capacity model. Foton Lovol - unknown in the UK - used Bauma to show a model of its planned 1,000 tonne FQUY crawler rated at 21,000 tonne metre.

So while many major manufacturers are now looking at the more specialist, larger lift capacity cranes, they are doing so in conjunction with specialist heavy lift contractors. Perhaps this is the best compromise - using the contractors' undoubted practical 'day-to-day' experience combined with the proven design and construct experience of the crane manufacturers. And given that the contractor is willing to purchase at least one of the developed machines, it seems to be a win-win situation all round.

However while the big three focus on 1,600 to 3,200 tonnes the big lifters such as Mammoet and ALE are thinking in the 4,000 to 5,500 tonne range. When the ALE AL.SK90 is officially launched, it will be interesting to see whether it is solely for use within the group or will be made available to other 'competitor' contractors. Both Lampson and Deep South have sold examples of their big cranes to outsiders, while Mammoet and ALE seem less keen on the idea.



Chinese manufacturers are building bigger and bigger cranes. Here Foton Lovol showed a model of its planned 1,000 tonner and Sany is said to be developing a 1,600 tonner and a 3,200 tonne crane.



The Keppel tails in a 200 tonne chemical reactor vessel for Shell Chemicals in Carrington. The Keppel carried around 65 tonnes while two 125 tonne blocks and winches carried the rest.

In the beginning...

Today we tend to be a little blazé about heavy lifting. The 100 tonne crane has almost become a taxi crane, while even a 1,000 tonner - although still a rare beast - is not that exotic. 50 years ago it was all quite different.



Some time ago we had a letter from Vic Holloway who was in at the start of the UK crane hire industry in 1948. Now 89, he recounts how crane hirers, under pressure for ever larger cranes from customers, pushed manufacturers to design and build bigger cranes and how when it was not possible you simply designed and built one yourself. Some things never change!

Dear Mr Sparrow

My attention was caught by your spotlight on 'Heavy Lifting' as I was very much a pioneer in this field and would like to draw attention to a technique and related machine which, for reasons which I will explain, has been overlooked.

First allow me a nostalgic look back to outline the origins. After my war service in R.E.M.E I joined contractors Tarslag as mechanical engineer in charge of construction equipment. A sewer contract in Thirsk in 1948 required lifting equipment. Although crawlers were on the market, there were no handy wheeled machines although five tonne lorry mounts had been developed for RAF war service. I was buying a lot of scarce plant at Ministry Of Supply sales then and successfully bid £400 and £450 for two of them. They were unfamiliar in the construction

business and would have been sold at contract completion except my local engineer, Les Haynes, found a hire for them which turned out to be so profitable that I went and bought some more. Thus, without realising it, starting the lorry mounted crane hire business in the UK.

There followed 20 years of remarkable growth, during which we were pressing manufacturers, particularly Steels Engineering of Sunderland (Coles), to make ever larger capacity cranes as customers pressed us to handle bigger and bigger on-site loads. We took prototype machines as they were developed up through 10, 15, 20 and 25 tonnes, with plenty of adventures along the way, particularly with the 40 tonner which seemed monstrous in its early form, but was superseded by an improved 50 tonner and so it went on.

We expanded on the crest of a wave forming a specialist company - Mobile Lifting Services - offering engineering services and plant installation as well as crane hire. I can recall recovering the capital cost of a 20 tonne crane in one year's operation. Other companies followed our lead and I promoted a trade association - The Lorry Mounted Crane Association - of which I became chairman. We took over several rivals establishing a dozen depots throughout Britain. Huge increases in lifting capacity were being achieved with 'blocked' duties, but there were significant calls for horizontal movement beyond the limits of radial operation. Providing this by repeatedly re-positioning blocked machines was inefficient. Such cases could arise when placing motorway bridge

with a turntable/fifth wheel fitted. The project to build the huge Barbazon aircraft had been abandoned at the time and I was able to snap up the two special cranes built for it. They provided engines, generators and winch gear. After remarkably few teething troubles the prototype went into service carrying out lift-and-carry jobs well beyond the capacity of anything else available.

So why don't you know about it? Why wasn't development continued?

Well sadly it's an old story. Businesses run on a mixture of technical and commercial considerations. Perhaps I over-emphasized the former, whilst Tarmac, which bought Tarslag in 1958, concentrated on the latter and seized the opportunity of a



The Keppel could pick and carry up to 80 tonnes at almost 8ft (2.5m) radius or 9.5 tonnes at 55ft (16.5m) radius all to 66 2/3rd of tipping

beams or tailing-in the lower ends of large refinery columns or towers.

Resolving to overcome this problem I conceived and built a prototype crane around 1960 to carry a maximum load - initially 80 tonnes - free on wheels. We called it the Keppel after a tall tower to the admiral's memory, standing next to our depot in Rotherham.

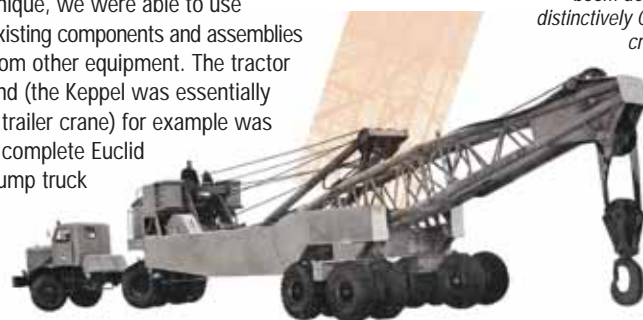
To design and develop such a machine from scratch does sound ridiculously ambitious, but although the assembled machine was unique, we were able to use existing components and assemblies from other equipment. The tractor end (the Keppel was essentially a trailer crane) for example was a complete Euclid dump truck

good profit by selling MLS to Richards & Wallington, our major competitor. R&W was already over-extending itself in terms of borrowed capital and soon collapsed. No-one then had the interest, time or ability to foster the Keppel and no doubt it went on the scrapheap? I wonder where?

Yours truly,

V L. Holloway

The Keppel was essentially a trailer crane using Euclid dump truck components. Note the boom design. Distinctively Coles cranes



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The Liebherr LR11350 - with a 60 metre SDB main boom, back-mast and suspended counterweight configuration, working at a 22 metre radius with 350 tonnes of counterweight - uses massive slings and a spreader beam to lift the 300 tonne assembled pile off of the stands. It then slowly tracks to the edge of the dock wall where it lowers the massive tube into the water until the flotation point is found. The operator then slews left to float the slings free, allowing the tube to be towed out to flats where it is hammered into the sea bed by the heavy lift vessel, Svanen.

The Liebherr LR11350 then returns to the storage yard for its next lift - a tower base to be lifted into the vertical position ready for the access gantry fitted. The LR11350 is connected to the top end of the base while the LR1300 tails it in. Once vertical the LR11350 carries the tower base to a cordoned off

Big Liebherr does piles

The largest crawler crane in the UK available for general hire is Weldex's Liebherr's 1,350 tonne capacity LR11350. The crane is currently on site at the Port of Mostyn working for Danish contractor M T Hojgaard to supply and install foundation piles weighing between 140 tonne to 300 tonne for the Robin Rigg off-shore wind farm in the Solway Firth, Scotland.

The unit previously completed the onshore assembly work for the Rhyl Flats wind farm off the coast of Wales with Siemens Wind Power. Turbine installation has just begun and will continue well into 2009.

On the Rhyl Flats project, pile tubes and tower base sections for each of the 25, 3.6 megawatt turbines were brought into the port by barge. Weldex was responsible for



unloading and placing them in a specially prepared storage area, before moving them into the assembly area before reloading for transport out to the wind farm site.

Weldex used a 300 tonne Liebherr LR1300 and a 550 tonne Kobelco SL6000 to lift and carry the 230 tonne tubular piles down the yard and to place them onto the assembly stands. The LR1300 was then used to lift and place a massive steel plug with a diameter of over four metres into each end of the tubes. These are then tested to ensure a water tight seal at each end of the tube.

230 tonne tubular piles are carried down the yard and placed into assembly stands.

area where it is placed on timber-baulks. A 100 tonne Liebherr LR1100 fitted with a fly jib and equipped with a suspended man basket lifts fitters onto the top of the base to secure the access platform. Once complete the bases are loaded onto barges and towed out to site. The LR11350 is also booked onto other offshore wind farm projects through to 2010. Such is the demand for heavy lift cranes from this work that owner Weldex says it will be adding similar cranes to its fleet.



A tower based being lifted into the vertical ready for the access gantry to be fitted

Building our Future



The removal of Britain's first pre-stressed bridge involved lifting 40 metre by 10 metre deck and support beams.



Pre-stressed out

Britain's first pre-stressed concrete bridge which joins the two sides of the Tyler Valley near Abertillery, has recently been removed by Neath-based Cuddy Group after surveys discovered significant deterioration.

Originally dating back to Victorian times - but demolished in the 1940s before reconstruction in 1951 - the bridge was condemned in 1999 after corrosion of steel tendons in the supporting beams below the reinforced concrete deck were considered too dangerous to allow its continued use.

Work, which lasted five months, included the removal of the 40 metre x 10 metre pre-stressed concrete concrete bridge deck and ten support beams which were lifted out with a Liebherr 1,000 tonne crane from Ainscough Crane Hire.

Cuddy had to build a bespoke platform to support the huge crane as well as import 400 tonnes of granite material to form the crane's

access ramp. This is still on site to provide access for the next stage of the work which uses a 500 tonne crane.

Approximately 800 tonnes of rubble, consisting of concrete, bulk block, masonry and steel, was taken off site during the demolition with 99 percent being crushed and recycled for reuse on other projects.

Peter Smith, Cuddy's senior contracts manager said: "From day one, this was certainly an extremely unusual and challenging job. The site location in the heart of the town, in such close proximity to homes and offices, meant that health and safety considerations were of optimum importance."

"The size of the crane and the way the beams were lifted out from the structure, coupled with the space restrictions within which the team worked, meant that the job had to be carried out with meticulous attention to detail and with the utmost care."

Spread it

When planning to lift a bulky heavy load, many lift planners think of lifting beams first in order to spread the slings connecting to the load while keeping the overall height of the rigging down.

These days however it is usually the crane's capacity, rather than its height that is the limiting factor and lifting beams need to be very heavily constructed in order to withstand the bending forces applied.

Spreader beams on the other hand while taking up more height, only have to bear compression forces, something that steel does very

well without excessive material. In fact shape and size are as important as the quantity of material. As a result they tend to be a great deal lighter and a lot less expensive.

Modulift has carved out a niche for itself in the spreader beam market and has increasingly expanded its range of modular bolt together spreader beams and now says that it can cope with loads of up to 3,000 tonnes and lengths of up to 53 metres, using versions of its standard product which can then be modified for each lift.

Spreader beams can cope with loads up to 3,000 tonnes and up to 53 metres long.



AC 800 in Ireland

William O'Brien Plant Hire recently purchased a Terex AC800, a crane capable of lifting 800 US tons (700 tonnes at three metres.) The crane will mainly be used in the erection of wind turbines, as well as other specialised heavy lift projects - seen here lifting with a 1000 tonne crawler and 300 tonne mobile. The AC800 can with special attachments lift 800 tonnes at 1.5 metre radius.

(The AC800 is not marketed by Terex Demag. Its largest standard mobile is the AC700 which is rated at 700 tonnes at three metre radius. Ed)



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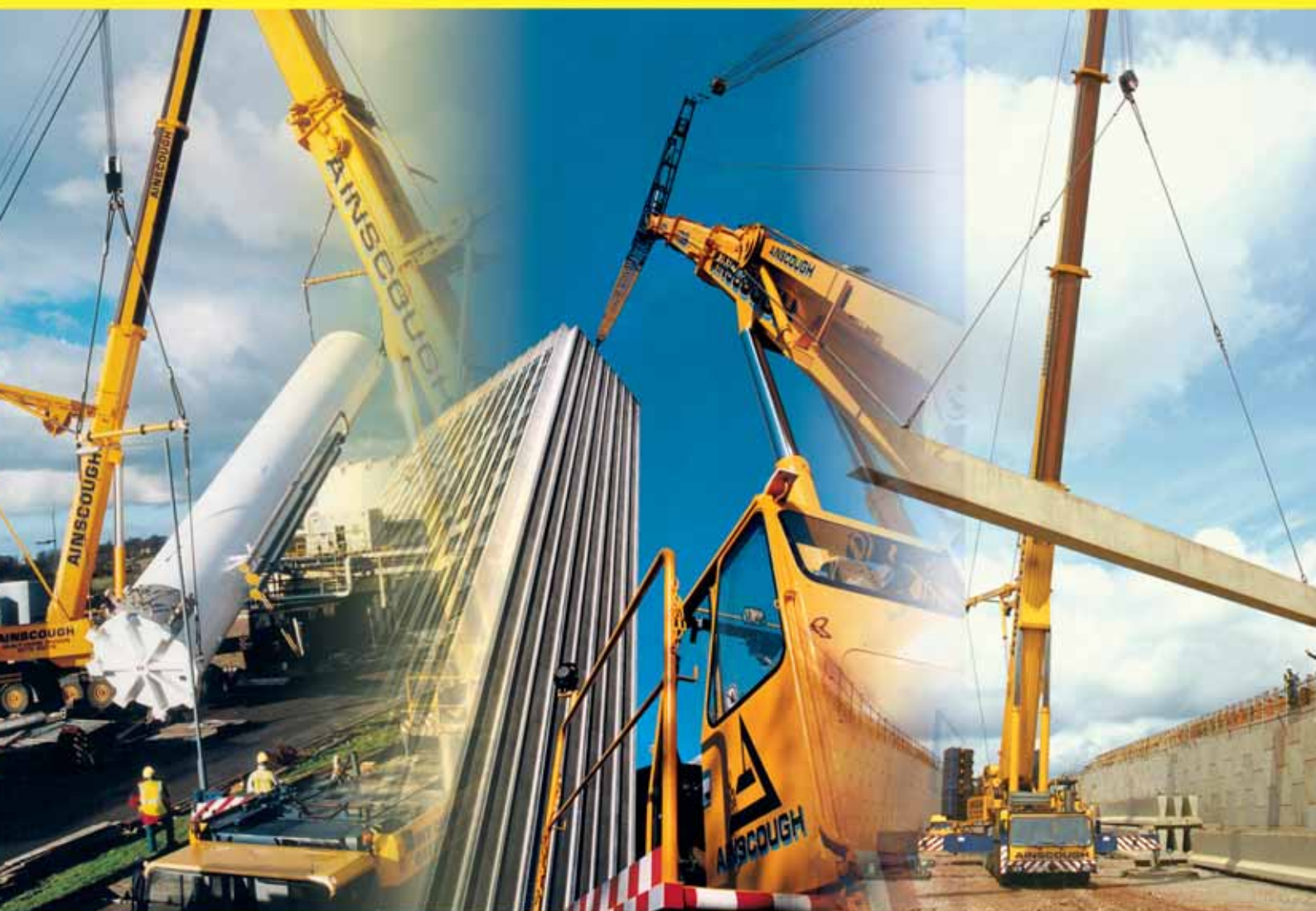
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