

Steady as she goes

The tower crane market has suffered more than most over the past two years, but is finally showing some signs of life as high rise construction begins to pick-up some pace in many countries. As the tower crane approaches 100 years of development, we look at the slow but steady progress over the years and at a few more radical developments - some of which caught on and some which have not - rounded off with a look of some new products and interesting applications.

Tower crane development in recent years has been more evolutionary than revolutionary. The last really big - practical - idea to hit the mainstream market was probably the advent of the 'flat top' or 'topless' tower crane, which in recent years has replaced many small to middle range classic saddle jib cranes. The flat top's main advantages are faster, easier erection due to the elimination of the top mast and pendants and lower overall height above the hook. Although the height difference is not quite as great as many would have you believe, for critical overhead height applications such as airport work every centimetre is critical so shaving a metre or two from the total height is much appreciated.

However even this development has been more of a trend than a radical breakthrough. German company Ridinger of Mannheim had 'the high house crane' which used a pole-type tower and what



Ridinger built a flat top crane in the 1950's

was essentially a flat top design as early as 1958. SGME used a flat top design with a combined sliding jib/back jib, but it was Linden that took it mainstream with its 8000 model in the 1970's. This was later copied and developed by others helping the concept really gather pace over the past 10 years or so. Development of the modern tower crane has been a slow-burn affair throughout its 100 year history, although Wolffkran, with some justification, will claim that the 100th anniversary celebrations are not due until 2013. The first tower cranes - luffing jib cranes - emerged from companies such as Morris and Bastert in 1910 and Julius Wolff in 1913. The Morris crane was more of a development of the traditional building cranes in use at the time, which used a heavy-duty scaffold tower with a davit jib fitted to the top to raise stone blocks and other building materials on the large public buildings going up at the time. The Wolff on the other hand, was far closer in design and concept to a modern bottom slewing tower crane.

It would seem that the tower crane



The tower and davit was the predecessor of the tower crane

C&a tower cranes



The first flat top - the Linden Alimak 8000



Wolffkran can certainly claim to be the oldest tower crane manufacturer with this from 1913.

has been a critical tool for building contractors for at least 50 years and as such it is not something they are prepared to risk 'messing with' by adopting changes or developments that are too radical. Hence the slow but steady improvement rather than the step changes we have seen in the mobile crane world over the years. So while the modern tower crane is a completely different animal from those built just 20 years ago, its basic design concept has hardly changed at all, perhaps because the original concept was right in the beginning. It also explains how 25 and 30 year old units are still accepted on many high-profile job sites.

This Morris and Bastert top slewing crane from 1910 is almost a tower crane?



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Two jibs better than one?

New, radical ideas that have been floated in recent years include the GG crane, a twin jib model using mostly standard components but with jib tip propellers to power the slew, thus avoiding passing the structural stress of slew start ups and stops down the jib.

The concept originated about 40 years ago but a modern version made it into the iron at this year's Bauma. While many were intrigued by the radical nature of the concept, most were quick to spot the pitfalls of such a large tail-swing and slow to conjure up any real benefits.

A flourishing new idea

One new concept that really did take off very quickly was the Jost compact hydraulic luffers. Mounted to a standard tower the jib is luffed by a hydraulic cylinder rather than cables. The two point rigid connection between turntable and jib, as well as the fact that the counterweight is dynamic, allows

fair number of Magni S46 at work in congested city sites where nothing else will fit. Seeing demand growing as space becomes evermore limited, London-based City Lifting worked with Artic Crane in Sweden to develop a new version, the 84 tonne/metre Raptor 84. The first two cranes are currently working in London with a third due to arrive shortly. The advantages of the folding crane, long popular in dockyard applications, are the small out of service dimensions of just four metres and its ability to lift loads right in against the tower. This is an obviously advantage particularly if the only location for the crane is within the building's footprint.

The old and the new

A Tornborgs Magni S46 folding jib crane owned by Vertical Transport is seen below right working alongside two large Comedil luffing jib tower cranes on a new world class Cancer Centre building for the



The twin jib GG Crane with jib tip propellers to power the slew was a dominant exhibit at this year's Bauma

the crane to have an incredible out of service radius and avoid the risk of the jib blowing back over rear. The simple, easy to erect crane took off very quickly in those markets where over-sailing is an issue, mostly in the UK through distributor MTI.

A product that was ahead if its time?

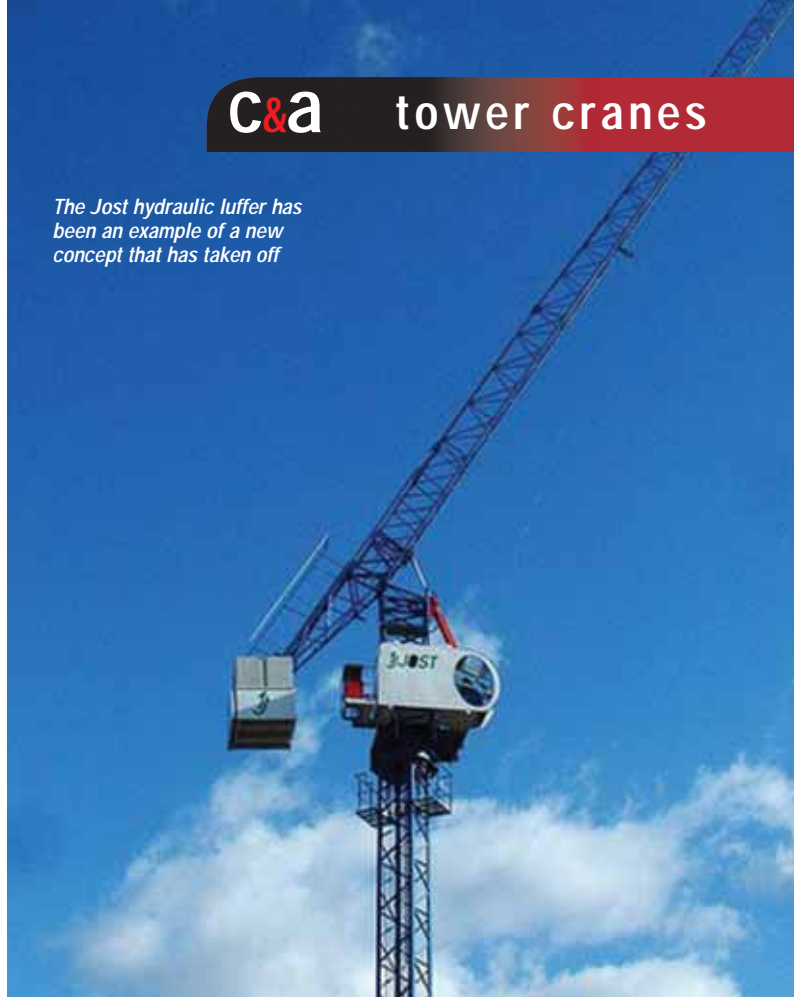
More recently an old concept - the articulated or folding jib crane - has re-emerged using modern technology. As with the topless concept this appears to have originated in Scandinavia when Tornborgs Maskinfabrik of Lindås in southern Sweden launched the Magni S46 46 tonne/metre crane in 1961 and dubbed it a jack-knife crane. Although the product sold well in certain markets, the last fabrications were made in 1982 but the last only assembled in 1991. In spite of their age there are still a



Artic Crane's Raptor brings a modern twist to the Magni S46

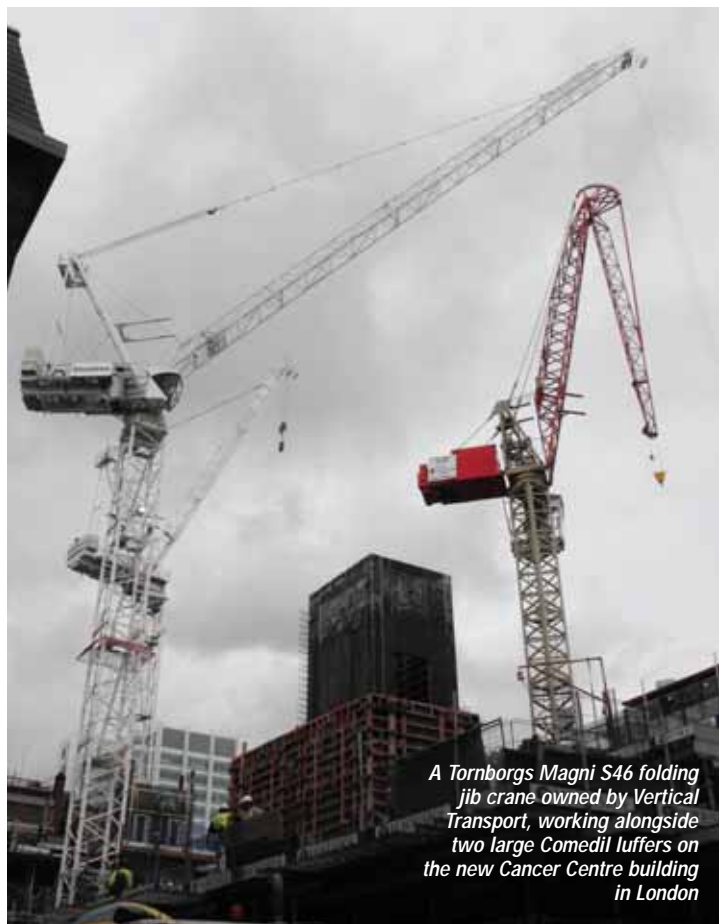
C&a tower cranes

The Jost hydraulic luffer has been an example of a new concept that has taken off



UCL Cancer Institute on Huntley Street, London. Located on the site of the former Elizabeth Garrett Anderson and Obstetric Hospital it will cover a gross internal floor area in excess of 14,800 square metres

and features an internal courtyard and atrium. Skanska will construct the building using a reinforced concrete frame which will include high quality bronze cladding and curtain wall system.



A Tornborgs Magni S46 folding jib crane owned by Vertical Transport, working alongside two large Comedil luffers on the new Cancer Centre building in London



WOLFFKRAN

Welcome to
the Hotel Bella

Foto: JA-hatten

Copenhagen is soon to be enriched by an architectural masterpiece: the Bella Sky Hotel. Built with the strength of WOLFFs and the spirit of a cranesational team. More cost-effective construction – worldwide: that is WOLFFKRAN's mission. To find out more about the power of the leader of the pack in the field of cranes: www.wolffkran.com

Der Leitwolf. *The leader of the pack.*



Something completely different

Another folding jib tower crane to surface in recent years is the Cobra, conceived as a partnership between Swiss tower crane service company Yerly and professor Jacques Bersier from the University of Applied Sciences Western Switzerland, in Fribourg. The first prototype was manufactured in March 2005 and the company exhibited at Intermat 2006. The largest incarnation of the concept is the 638 which boasts a 60 metre maximum jib tip radius, with 4.5 tonnes capacity, a two metre minimum radius and sliding counterweight design that keeps the torsional stresses on the tower to a minimum allowing a smaller tower to be used than for a conventional crane.

match the load and/or radius. For example when a load is on the hook and is being trolleyed out, the counterweight trolley travels in the opposite direction, keeping the forces on the tower in balance. This is similar in many ways to Manitowoc's moving counterweight on its new 31000 crawler crane. Most tower crane people we have spoken to are sceptical of its practicality, on the grounds of complexity and potential to go wrong, while acknowledging that it would bring clear benefits.

A new tower crane brand

Earlier this year Luxembourg-based MTI unveiled its new flat top tower crane range, the MTT 110-6, 140-8, 180-10 and 220-12. The cranes - manufactured by an experienced subcontractor in Germany - have been designed to maximise

The Cobra folding jib crane with sliding counterweight



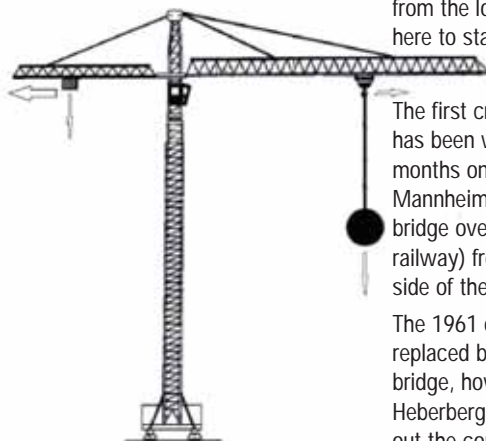
An idea that is too radical?

The notion of a sliding counterweight is also the subject of a recent Brazilian patent application. While moving counterweights have been a feature of many luffing jib cranes they have not been adopted for mainstream regular saddle jib cranes although it is not an alien concept in the sector. The patent application makes a strong case for the concept, stating the fact that it allows either significantly smaller tower, lighter counterweight or higher capacities. The idea is simple and inherently possible with modern electronics. The counterweight would be mounted onto a trolley on the back jib placed right up against the tower when the jib is unloaded. The counterweight trolley is controlled by a microprocessor linked into the cranes rated capacity limiter and adjusts automatically to

transport efficiency as well as being fast and easy to erect.

The cranes also feature the latest generation of frequency controlled slew and hoist drives for smooth sensitive and efficient operation.

Reinhold Bräuner of MTI-Lux said



A Brazilian patent application argues the case for sliding counterweights on saddle jib cranes.



Note how the Cobra's counterweight slides down the back mast track



The MTT 180-10



The MTT180-10 is working on the new bridge without disrupting rail traffic

the problem with the tower crane market at the moment is the low rental rates due to an over capacity in many markets.

"We have been buying and selling new and used tower cranes for many years, shipping them all over the world. Doing this allows you to really understand the good and the bad aspects of each manufacturer's products, both when new and after a few years of use," he said. "We also saw that a crane that combined the best features from each manufacturer, but was simple and reliable to use and with a keen price would do well. So we set out to design a range with special focus on being easy and cheap to transport and set up, with the latest controls and motors. Most important of all though was to offer a good quality product with a price that allows rental companies to make money from the low rates that are probably here to stay for some time."

percentage of high speed ICE trains which run almost around the clock. The crane is set up right beside the tracks and between an array of overhead cables. The safety requirements of the Deutsche Bahn for working alongside and over the tracks are stringent and involve a tight working envelope for the crane which is controlled by a sophisticated 3D working area limiter.



The MTT tower is set up close to the tracks.



The Mannheim site is very congested.

The first crane, an MTT 180-10 has been working for the past six months on an unusual job site in Mannheim replacing a concrete road bridge over the Ried Railway (marsh railway) from Frankfurt on the north side of the city.

The 1961 concrete bridge is being replaced by a new, wider, steel bridge, however the contractor, Heberberger Bau, is required to carry out the construction of the piers and supports without disturbing any rail traffic. This is one of the busiest lines in Germany with a high

The new bridge will provide more traffic lanes into Mannheim while increasing the width for the rail track and clearance height for trains. Progress on the bridge replacement is running ahead of schedule and the 750 tonne steel bridge will be lifted into place over two weekends in December.

Red Wolffs of London

While a recession usually strips a capital city of its tower cranes, there are currently plenty of units visible on the London horizon, as new high rise construction transforms the city skyline. Among the tower cranes are a fair number from Wolffkran – the inventor of the modern tower crane. Its products have been a common sight in London for many years, thanks to its relationship with HTC which runs a fleet of more than 200 units.

Getting close at Imperial

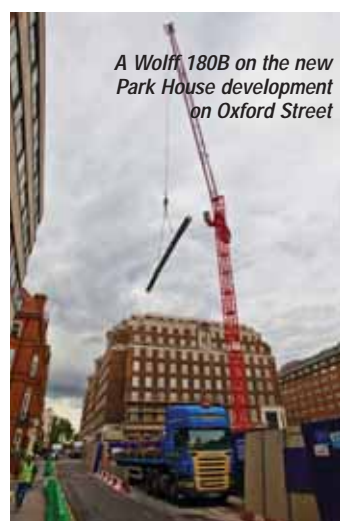
Bovis Lend Lease has two of HTC'S Wolff 180B luffing jib cranes on the new 'L' Block development of Imperial College London's Hammersmith Campus. The new six-storey building, due to open in 2012, will be a flagship facility for Imperial's Academic Health Science Centre. Erecting tower cranes at the site was complicated by space limitations and the fact that adjoining buildings - including Hammersmith Hospital, the medical school and residential properties - will be occupied throughout the build schedule. An advantage of the 180B is the short tail-swing of the 34 tonne counterweight. The lift capacities of 12 tonnes at 21 metres and 2.3 tonnes at 55 metres also proved ideal for the project. The cranes also employed an innovative foundation anchoring solution, using a cross frame base secured with Macalloy bolts more commonly used to anchor wind turbines. According to HTC, this allowed 75 tonnes of base ballast to be used rather than the 120 tonnes required for conventional foundation anchoring.



The Wolff 180B has a short tail-swing which was an advantage on this job site

Lifting on Oxford Street

Another Wolff 180B is working for Land Securities on the Park House redevelopment on Oxford Street, the first new build on Europe's busiest shopping street in 40 years. The building occupies an entire city block and will include retail, office and residential space when completed in November 2012. Working initially with demolition contractor Keltbray and principal contractor Mace Group, the crane was installed with an expendable base foundation anchor that will ultimately form part of the new building. Rigged with three falls of cable, the crane has 18 tonnes capacity at 17 metres and 5.6 tonnes at 40 metres. HTC says that it is achieving 98 percent availability during the site's 15 hour day, seven days a week shifts.



A Wolff 180B on the new Park House development on Oxford Street

At the Café Royal

Meanwhile, in nearby Regent Street, HTC has provided Mace with two Wolff luffing jib cranes - a 100B and a 180B - for the £160 million redevelopment of the Café Royal by Israeli hotel group Alrov. The famous building, adjacent to Piccadilly



A Wolffkran 7532 at work on the Battersea Reach project

Circus, is being redeveloped into a five star hotel, business centre and retail space scheduled for completion in March 2012. The project involves extensive temporary works within the special architectural and historic interest Grade One listed building. The 100B has a capacity of six tonnes at 23 metres or 2.6 tons at 40 metres, while the 180B is configured for 12 tonnes at 24 metres and six tonnes at 40 metres.



Wolff 100B and 180B at London's Café Royal

The South Bank Show

On the South Bank of the Thames, an HTC Wolff 7532 saddle jib crane with a capacity of 12 tonnes at 30.5 metres and 6.1 tonnes at 55 metres, is working for developer St George and Stephenson Construction on Battersea Reach in Wandsworth, the residential development of individual tiered towers designed by Broadway Malyan.



The Wolff 180B luffers are able to get in close to the building's footprint

HTC's general manager Alex Lowe said: "This business is all about credibility, safety, service and delivery. Our reputation in these areas has made us the lifting partner of choice for a number of leading developers and contractors. We seek to maintain this position through continuous improvement and investment in our people and equipment. Wolffkran is the tower crane manufacturer of choice, with strong and reliable products that are an ideal fit with our 'be the best' culture. As a result, our fleet is 100 percent Wolff, which in turn offers a number of benefits, most importantly safety, thanks to familiarity and consistency. Components are also interchangeable, helping reduce our parts inventory and the cranes also share a common interface, which benefits our training programmes and in-house servicing and diagnostic facilities."



A Wolff luffing jib crane working on the partial demolition of Marcol House at the top of Regent Street

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Lucky 13 for Potain

Thirteen Potain cranes are now working on the new multi-use development Le Albere in the city of Trento in northern Italy. They include an MDT 98, two MDT 218 A and eight MDT 178 topless city cranes as well as one MD 208 A and one MD 238 A from Potain's standard top-slewing range.

Sabino Riefoli of Manitowoc Italy said: "It is unusual to see such a large number of tower cranes on one job site in this part of Italy. Designed by world-renowned Italian architect Renzo Piano, the three year development is the most prominent construction project in the region and will completely transform the district with new homes and businesses. Our cranes were selected because it is high-profile and the contractor wanted to ensure efficiency and reliability."

The cranes have capacities ranging from six to 12 tonnes with hook heights of between 28 and 61 metres, working daily transporting general building materials. They will remain on site until the project is completed in early 2012.

Main contractor Colombo Costruzioni has specified Top Tracing, Potain's anti-collision and controlled zone programme, essential given that 11 of the 13 cranes have overlapping operating zones. Colombo Costruzioni owns some of the cranes, but most are



One of the Potain MDT topless cranes on the Le Albere project in northern Italy

rented from GB Mancini Noleggi, which has been buying Potain cranes for more than 20 years.

The Le Albere project covers 11 hectares and is located on the site of a former Michelin tyre factory. The new development will provide 300 new apartments, 30,000 square metres of offices, shops and hotels, 2,000 underground parking spaces, five hectares of public parks, a 22,000 square metre science museum along with streets and plazas.



There are now 13 Potain tower cranes on the new development which covers 11 hectares

China Comansa's build LNG tank

Three Chinese-built Comansa Jie cranes are currently working on an extension to the Fujian liquefied natural gas power plant, owned and operated by the China National Offshore Oil Corporation, the third largest oil company in the country. The original plant which opened in 2007 is located in the city of Putian, in the province of Fujian. This project is due to complete next August.

The three cranes, manufactured at the Hangzhou plant of the Linden Comansa/ JIE Holding Group joint venture, are building two new tanks with a combined capacity of more than 600 million litres of liquefied natural gas.

The cranes include two, 21 CJ 290 and one 21 CJ 210, with maximum capacities of 18 tonnes. The final height of the tanks will be 52 metres, so the two CJ 290s are working with hook heights of 57.6 and 63.1 metres, while the 210 has been erected to a height of 69.6 metres. All three are free standing.

The Comansa Jie joint venture was set up by the two partners in 2006 and currently produces five basic models of flat top Linden Comansa tower cranes, the 21CJ550, 21CJ400, 21CJ290, 21CJ210 and the 10CJ140.



The three Comansa Jie cranes around an LNG storage tank

Prison break for Liebherr

A new prison facility in Pamplona, Spain is using 10 Liebherr tower cranes - seven 130 EC-B 6 FR. ionic flat-top and three 90 LD saddle jib cranes.

The new complex of twelve buildings is being built on the outskirts of the town by the consortium of Ferrovial-Agroman and Azysa and is scheduled for completion by the end of 2011. The new 1,200 inmate facility replaces an out-dated building in Pamplona city centre and comprises a closed section and buildings for people being held overnight.

All the cranes on site are mounted on foundation anchors with hook heights of between 16 and 40

metres and maximum lifting capacities of up to six tonnes. The flat-top cranes have a maximum outreach of 60 metres and the LD cranes 45 metres, both have jib tip capacities of 1,400kg. The high sensitivity drives of the flat-top cranes are controlled by means of frequency converters with an integrated anti-swing damping system, which provides smooth operation and keeps load swinging movements to a minimum. Influences from the wind and the load are detected electronically and adjusted for by automatic compensation movements, something which is a great advantage in this region of Spain.

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Cranes for Turkey

Four large Potain special application tower cranes are working on a major hydropower dam project in Turkey for the country's utility giant Boyabat Elektrik Üretim. The \$1 billion Boyabat Dam - located in the northern province of Sinop - will significantly expand Turkey's capability to generate power and help meet the growing demand for electricity.

The Boyabat contract uses two MD 1100 and two MD 2200 cranes, Potain's largest and most powerful special application tower cranes custom-built for the project.

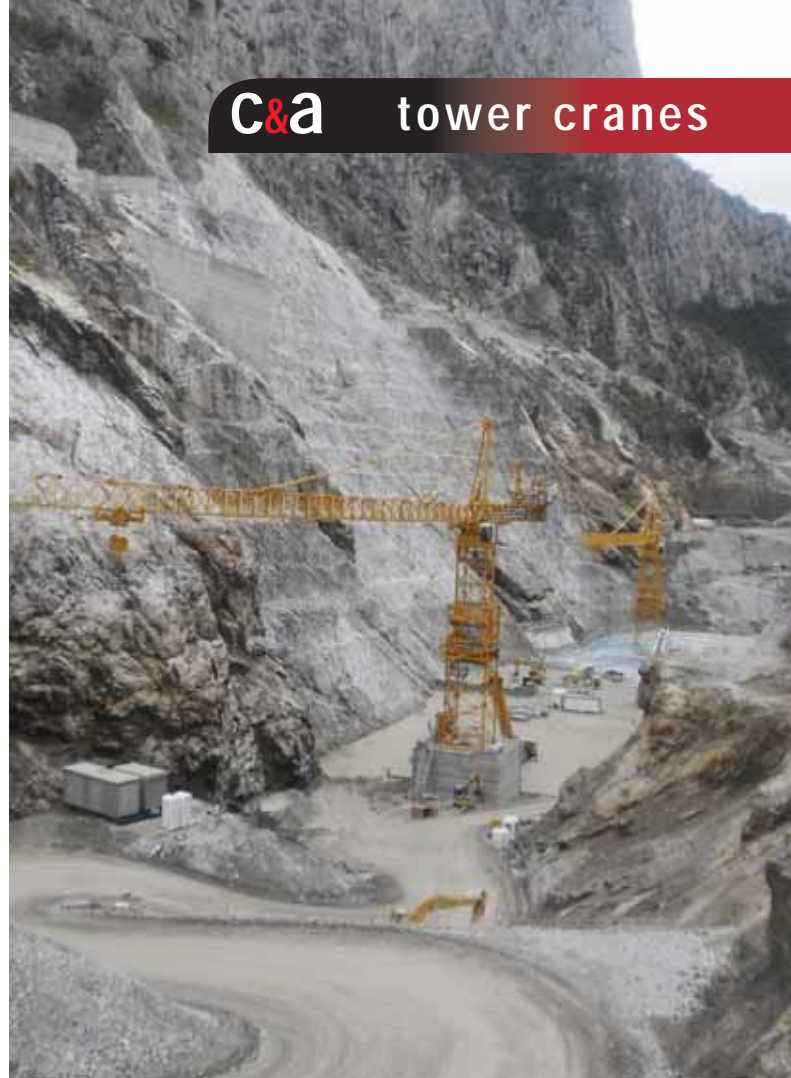
"Each project is different, and we often modify our designs to achieve the best performance for the given application," said Thibaut Le Besnerais, vice president of special application cranes at Manitowoc. "We also sent a highly experienced team of engineers for each installation to supervise the erection and ensure the customer gets the most benefit from the cranes."

Main contractor, Doğu İnşaat, purchased the cranes specifically for the project. The construction work is being carried out in sections with the cranes helping position a conveyor system used to place the 2.7 million

cubic metres of concrete required for the dam. In addition to moving the conveyor trusses, the cranes are also lifting reinforcement bar, penstocks and other components as well as pouring concrete using six and nine cubic metre buckets.

The Potain MD 2200s have a maximum capacity of 64 tonnes and are working with the full 85 metre jibs with a 20 tonne capacity at the tip. Both will climb as construction progresses and by the end of the project reach heights of 104 and 225 metres respectively. Both cranes are equipped with elevators for the operators, set inside the mast system.

The Potain MD 1100 cranes have a maximum capacity of 40 tonnes



Two of the Potain special application cranes working on the \$1 billion Boyabat dam project in Turkey. There are a total of four Potain cranes on the job.

and rigged with 55 metre jibs with 20 tonnes tip capacities. One MD 1100 will eventually reach a working height of 120 metres and the other 137 metres.

When the 54 month build is completed, the Boyabat dam will

stand 195 metres high and span more than 262 metres across the Kizilirmak River, generating more than 1.5 billion kWh of electricity per year - around 10 percent of Turkey's total electricity demand.

New and old in Gdańsk

Linden Comansa's dealer in Poland, Corleonis, has supplied a Comansa LC5211 flat-top crane to help with the construction of a new, €12 million Maritime Culture Centre, extension to the Polish Maritime Museum in Gdańsk.

The Centre has been designed to blend in with the surrounding buildings of the historic old town and will host temporary and permanent exhibitions as well as housing workshops and offices. The LC5211 has a maximum lift capacity of five tonnes and for this contract has been erected with its smaller 3.8 metre cross section tower (rather than

4.5 metre), with a 31.9 metres under hook height and a 37.5 metre jib.

The new centre is being built near the Żuraw, a wooden port crane dating from 1367, now part of the Maritime Museum. The original crane - destroyed by fire and rebuilt around 1445 - was used to place ship masts and load cargo as well as functioning as an entrance



The Linden Comansa LC5211 alongside Żuraw, the medieval port crane building

gate to the city.

The building consists of two brick towers with a wooden structure in between where the lifting

mechanism is located. The current Żuraw is a reconstruction of the original which was almost completely destroyed during World War II.