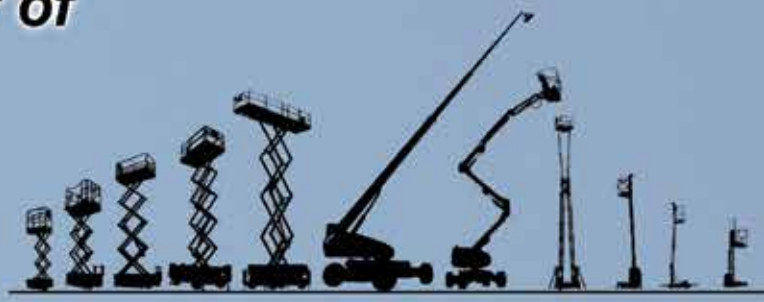
Dingli®

The Expert Manufacturer of ACCESS Equipment



ZHEJIANG DINGLI MACHINERY CO.,LTD.
Add: No.1255 Baiyun South Road. Leidian Town. Deqing Zhejiang
Tel:+86-572-8681688 8681689 Fax:+86-572-8681690
E-mail:market@cndingli.com
export@cndingli.com
www.cndingli.com

IPAF CE CE SGS CE

The complete package

UK-based Brogan Group is one of just a handful of sizeable companies in the country offering a mastclimber rental service, in spite of the growing awareness and their increased take-up over the past 10 years. Although very slow to adopt new ideas and methods, the UK construction industry is gradually recognising the many advantages, including cost and time savings that mastclimbers provide. Mark Darwin talks to Jim Casey, Brogan's mastclimber and hoist operations manager about the company and the industry.

Two Scanclimber SC5000s on the Tower West, Liverpool contract

The last two years has seen a noticeable improvement in awareness and usage. For Brogan this now means that about half of all its access enquiries involve the use of mastclimbers in the overall package. Unfortunately the poor returns in the sector means a general lack of investment in new equipment, resulting in a fairly static national fleet of around 1,500 workable units.

Due to the size and complexity of most building designs, the decision to use scaffolding, hoists or mastclimbers is never straightforward and in many cases can be a combination of all three. For the past 25 years Brogan has grown and expanded from a pure scaffolding company and now offers a complete package of longer term access solutions, including scaffold, hoists and mastclimbers.

Formed in 1988 by James Brogan the company's aim at that time was to become a strategic supplier of contract scaffolding to major UK contractors. Work on high profile projects in London helped to build the company's reputation for service and performance. For several years the company doubled its revenues year on year, expanding its client base and successfully tendering for larger and more prestigious projects.

Like many scaffolding companies, the mid to late 1990s saw Brogan move from tube and coupler to system scaffolding. Its first contract at the University of East London for Carillion consisted of a number of circular student accommodation buildings, ideal for the Cuplok system scaffold that it had selected. During the early years Brogan also opened several depots outside of the UK, including Dublin, Ireland and Vilnius, Lithuania.

"In the early days many of the Eastern European countries used mastclimbers rather than scaffolds and with many Lithuanian workers in the UK - including some working for Brogan - we thought we would set up a scaffold depot and training centre in Vilnius with the hope of modernising the antiquated scaffolding methods in the country," says Jim Casey, Brogan mastclimbers and hoists operations manager. "Experienced scaffold trainers would travel from the UK to Lithuania to train operatives before they came to the UK to work."

The gallows bracket allows the mastclimber to be set up avoiding low level obstructions

Westfield Shopping Centre in Stratford London used a total of 28 mastclimbers

The 120 metre high Tower West building in Liverpool used the gallows bracket so that the mastclimber could be positioned at the second floor level

Over the years the company has had depots in Cork, Liverpool and Manchester. Currently operations in the UK include the head office in New Southgate, North London and a depot in Bedfordshire to support and service operations in the south east. It also has an office and depot in Rathcoole, Dublin, and offices in Dubai and Abu Dhabi.

Having seen mastclimbers in use in Scandinavia and North America and on display at trade shows, Brogan decided to expand its range by investing in the technology, purchasing its first Scanclimber machines in 2005. Scanclimber models are still a major part of Brogan's heavy duty fleet today. Given the wide variety of applications that mastclimbers are used for – from brickwork and cladding to fixing windows – several ranges are required, including heavy, medium and light duty machines. Brogan currently has more than 220 mastclimbers - the majority less than six years old - and in excess of 50 hoists. Scaffolding however still accounts for over 85 percent of the group's £13 million annual revenues.

Mastclimber investment

After much research Brogan decided to purchase from three different manufacturers, Scanclimber, Camac and Fracco covering its requirement for lightweight, medium and heavy duty machines. With these three brands in the fleet Brogan claims to have the correct sized mastclimber no matter what the contract. The heavier duty machines are used for applications such as brick laying, being able to cope with the heavier loads. They can also be fitted with running rails, gantries and weather protection. Loading jibs/davit are also available on the heavy duty machines. These have a working radius of six metre and a capacity of 550kg with 260 degrees of slew.

"We have been very particular in our choice of equipment when expanding our fleet," says Casey. "There are many cheaper machines available but we decided to stay with the market leaders. Last year we purchased 45 new units and we have been expanding our fleet year on year since the start in 2005. Sometimes clients are aware of their benefits and ask for them specifically, while with other contracts we might suggest that they use mastclimbers as a more time and/or cost effective solution to scaffolding."

"In the UK there are only a handful of sizeable mastclimber companies in the market, although there are a number of companies that run a couple of units in their fleet. Because of the wide variety of access required on many modern contracts a combination of solutions is often the ideal solution. Crash decks and pedestrian access would be done by scaffolding however a great deal of thought and planning has to be given to providing the best solution between scaffolding and mastclimbers depending on the height, length, contract time and schedule of work that needs to be carried out. There is never a straight-forward solution."

"There are many benefits for clients from dealing with just one company for all of its access requirements, particularly when a range of different equipment is needed throughout the contract. It is difficult for smaller companies to offer a decent mastclimber service, and I do not think that this is the way forward for the sector as it requires a great deal of design, installation, certification and accreditation resources. If you only have a few machines you cannot make the

Installing a mastclimber on a tower block refurbishment contract

The 32 storey City Lofts, St Paul's will be Sheffield's tallest building

Mastclimbers can be used internally with similar savings in time and costs

Brogan is one of a handful of sizeable mastclimber companies in the UK

Tower block refurbishment, Newcastle

resulting overhead pay off."

Platform extensions and innovations

Over the years Brogan has worked with mastclimbers manufacturers to develop and improve the product for the UK market. The company has for example designed a mechanical sliding mechanism fixed to the platform - approved by manufacturers - which cantilevers a small platform extension on the inside, allowing workers to get closer to the face of the building. The system was designed by Casey who prior to joining Brogan was a mechanical engineer, designing chassis in the commercial vehicle sector. "The platform extension has been used extensively by clients as it offers a ready-made safe solution for a tricky access problem," says Casey. "Other companies use fixed extensions, however there is a safety issue when manually filling in the gap between the platform and the extension which is repeated when the extension is removed. Our system moves forward and back as one piece, with no gaps between the platform and the extension."

On heavy duty machines with platform widths of 1.6 metres the platform extension can be up to three metres wide and on the lighter units with 1.2 metre wide platforms up to a one metre extension. The sliding platforms can be offered in different shapes, or even profiled, depending on the building shape. One added safety feature of the system is that the main platform can only move when the extension has been fully retracted into the main platform, removing the risk of hitting a person or part of the building.

Slow to change

"UK contractors are slow to change from scaffolding, but mastclimbers now account for about half of all new enquiries, an enormous improvement over the last year or two. Bricklayers in particular are resistant to change and still request scaffolding. However once they have used a heavy duty mastclimber with a five tonne capacity for bricks, muck and tools – they see the benefits of always working at the right height, protection from the weather etc... For window and cladding installation and bricklaying there is also a corner wrap around which gives up to 1.5 metres work platform around the corner of the building."

Scaffold v mastclimbers?

There is no fixed rule about how to decide whether to use scaffold/hoists, mastclimbers or a combination of the two. In the UK for example some companies will say that mastclimbers are generally used on projects more than 20 metres high. With scaffolding cost-effectively limited to around 45 metres, the higher the project the more likely mastclimbers will be used. One example given is of a 100 metre long building with a height of 25 metres i.e. 2,500 square metres where the mastclimber solution is said to offer cost saving in the region of 60 percent. According to Brogan the break point is more dependent on time.

"If the contract needs the access system for more than 20 weeks then it is probably going to be cheaper with scaffolding," says Casey. "However it depends on the type of job and the scheduling of the works. There is of course an additional cost of a hoist and driver which has to be added into the scaffolding quote to move materials up and down to the work levels and the materials then have to be distributed from the hoist to the place of work. When all this is taken into account it tends to work out at the 20 weeks contract length, rather than heights or lengths."

Other factors may include the aesthetics of the different solutions, particularly important on large tower block refurbishment or work on historic or landmark buildings. Residents or sightseers don't want to look at a scaffold every day, whereas a mastclimber is only seen when the platform is working. When the platform is retracted it is often difficult to see the masts in place on the elevations. There is also less repair work to the building when using a mastclimber because of the reduced number of anchor points.

Installing external cladding to Alberta House - the £25 million East London affordable housing scheme

Trinity Walk Shopping Centre, Wakefield, Yorkshire

No room on the ground

Brogan also has the capability to design, fabricate and manufacture custom work equipment when required. One such contract requiring a cantilevered gallows bracket system which allowed the mastclimber to be sited at the second floor level was on the 34 storey, 120 metre high Tower West building in Liverpool.

The glazing contractor, working for main contractor Carillion, required two mastclimbing work platforms to be erected to the full height of the structure on the North elevation. However due to site boundaries and restrictions at ground level it was not possible to base the machines

Mastclimbers being used on the M6 Ramp car park at the Westfield Shopping Centre, Stratford

on the ground floor so a cantilevered gallows bracket system was used, allowing the machine to be based at second floor level.

In partnership with Scanclimber's design team, the Gallows bracket was designed to support the machine base load of 12 tonnes fixed through the 450mm thick reinforced concrete structure wall with high tensile steel 20mm diameter threaded rod and spreader plates.

The bracket exerted a force of seven tonnes horizontally onto the permanent structure and the bracket had to be designed to ensure its dimensions between the fixing points did not clash with the existing vents, voids and reinforcement that had been formed in the concrete face.

Safety first

"We are very strict when it comes to safety. Fortunately the mastclimber sector in the UK has a good safety record with very few incidents. Sadly some other countries do not have our vigilance when it comes to operating and maintaining equipment," says Casey. "A fatal incident in Spain a year or two ago highlighted the problems that can arise from a lack of maintenance and machine abuse. However we understand that at that time, anyone could have rented the mastclimber in the same way as renting a lawnmower although this has now changed."

We only use directly employed labour to erect or dismantle machines and all our employees are fully trained and competent go through our IPAF mastclimber training centre in London. Operatives are either trained on site or at our training centre and have to go through the basics of safe operation, visual checks, levelling, moving the platform and the rescue plan in the event of a failure. We also run our own transport fleet and the trucks are equipped with heavy duty Palfinger loader cranes to help with loading and unloading of equipment should no site crane be available."

Double stacked

There are some contracts that can benefit from double stacked mastclimbers – two platforms on the same mast. It is not very common and only used on very tall buildings where different trades are working at different levels at the same time. "Brogan has carried out contracts in the past however when you explain to the client that platforms must be at least three metres apart, you must have deck protection for the lower platform, and then ask how will the materials get to the upper platform it is often not as appealing as it first seemed," says Casey. "It has to be well thought out – and for most recent enquiries there have been more cost effective solutions."

"It is also usually more beneficial to have several machines on a façade rather than – if it were possible – one long platform. This is because different trades work at different speeds and each would tie up the platform for different times at different levels. It is also far better from a cost point of view to have several smaller mastclimbers along a façade rather than one or two longer platforms."

More competition?

With the increased popularity of the mastclimbers are more companies likely to enter the sector?

"I think it is highly unlikely even with the growing popularity, that there will be more rental companies entering the market," says Casey. "Most existing companies will expand their own fleets but at the moment there are major barriers to entering the market, while current pricing strategies adopted by certain players limits growth and investment. What may be more likely is further consolidation amongst the larger companies. We are here for the long haul so we would not rule out an acquisition if the price and products were right – we never say never. Most rental companies will also continue to use existing manufacturers for products because compatibility allows more flexibility and also makes servicing and training easier."

Still a lack of awareness

Main contractors are still learning about mastclimbers although this is improving as construction and planning managers move between projects and spread the word. Perhaps one of the main factors restricting their growth is the amount of support and back-up required. A mastclimber cannot just be hired out as an item of equipment – there has to be an approved design and then erection and dismantling by trained specialists. "We are already busy but if we win just five percent of our existing enquiries then the mastclimbers will be very busy," adds Casey. "Because of this we are currently looking for skilled mastclimber and hoists employees in addition to trainees that have the correct qualifications. The future for mastclimbers looks really healthy."

A 17m wide, 26m high mastclimber on the £311m Pinderfields Hospital development in Pontefract

Westfield Shopping Centre, Stratford London was a particularly interesting and tricky contract using a total of 28 mastclimbers working on the main ceiling of the pedestrian walkway. The mastclimbers were used so the contractor could work on the whole ceiling rather than installing a very large bird cage scaffold. The speed of erection was a major factor as the contract had to be completed very rapidly. Client changes meant units had to be moved rather than dismantled and Brogan devised a bespoke jacking system and used castors to slide the machines into new positions.

The brand new STEIGER® TBR 220

Maximum job (RÜSSEL®) versatility
RÜSSEL® swivelling range: 185°
RÜSSEL® length: now 2.2 metres
(38 cm longer than before)

Compact dimensions
Total length: 6.92 m
Total height: 2.99 m

Planning to invest in a replacement?
The new TBR 220 has virtually all of the performance features previously available only in the 7.49 t category.

EURO 6 compatible!
Innovative steel fabrication technique offsets the heavier EURO 6 chassis of tomorrow.

RUTHMANN
professionals at work

Innovative new model Autumn 2013

Interchangeable work cage system
For the first time in the 3.5 t category: aluminium and polyester work cages can easily be exchanged within minutes.

Navigate with great precision
The low height of the work cage console allows operators to get extremely close to objects. Installations and repair work can be carried out safely and efficiently.

New boom system with fully integrated
Telescopic cylinder and power supply are integrated internally in the solid, state-of-the-art steel boom.

RUTHMANNSTEIGER® **TBR 220** www.ruthmann.de/tbr220en

	22.00 m		185°		1.40 x 0.70 m		2.99 m		6.92 m
	16.40 m		450°		230 kg		5°		≤ 3.5 t

Ruthmann GmbH & Co. KG
Von-Braun-Straße 4 | 48712 Gescher-Hochmoor | GERMANY | Phone: +49 2863 204-0 | Fax: +49 2863 204-212
Internet: www.ruthmann.de | E-mail: export@ruthmann.de

Elevators over the Amazon

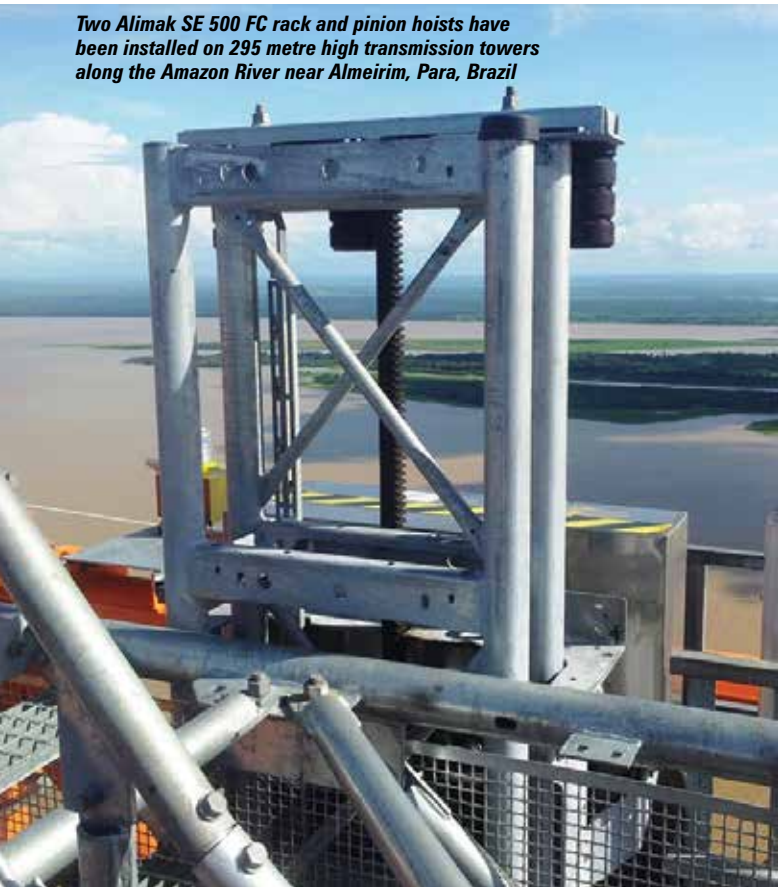
Two Alimak SE 500 FC rack and pinion passenger hoists have been installed on 295 metre high transmission towers along the Amazon River near Almeirim, Para, Brazil to provide access for critical servicing and maintenance.

Located near the equator the towers are the tallest of their kind in South America and are part of the 1,191km high voltage line running from the Tucuruí Dam in the State of Pará, to Manaus in Amazonas and carry three 500 kV and two 230 kV power lines over the Amazon River.

The 500kg capacity elevators have lift heights of 289 metres and must cope with extreme heat, humidity and heavy rain. Alimak Hek working for contractor, Isolux Corsan installed and commissioned the pair earlier this year, allowing service and maintenance personnel to access power cable stays and aircraft warning lights located on each tower. Alimak says its rack and pinion drive system offers advantages over wire rope and hydraulic elevators - by carrying its own machinery the elevator does not require a machine room or load-bearing elevator shaft. It also claims a safety advantage over traction elevators because in a power outage, the car uses gravity and a centrifugal brake system to descend back to the nearest landing at a controlled speed. Should the passenger car exceed the rated descent speed, it is stopped automatically by a safety brake.

The 500kg capacity elevators which have lift heights of 289 metres have to cope with extreme heat, humidity and heavy rain.

Two Alimak SE 500 FC rack and pinion hoists have been installed on 295 metre high transmission towers along the Amazon River near Almeirim, Para, Brazil



Märker cement works

Geda has installed an SH 2000 industrial lift at the Märker cement works in Harburg, Germany.
The lift travels 70 metres up the preheater tower and is used for essential maintenance work during production - 24 hours a day, seven days a week. The 1.55 metre by 2.8 metre lift has a rated load of 2,000kg and enough space to transport bulky, heavy parts easily and safely up or down the tower. The lift has been specially adapted to withstand the difficult conditions - very high temperatures and large volumes of dust from the cement making process. On each of the nine landings special landing level safety gates and landing enclosures ensure extra safety at the entry and exit points.

The lift travels 70 metres up the preheater tower and is used for essential maintenance work during cement production

Geda has installed an SH 2000 industrial lift at the Märker cement works in Harburg, Germany

Subscribe to cranes & access

Vertikal.net

Subscribe online at www.vertikal.net

The **only way** to guarantee that you receive **every** issue

Subscription Application Form

Please complete this form and either fax back on +44 (0) 1295 768223 or +49 (0) 7618 866814 or post to The Vertikal Press, PO Box 6998, Brackley. NN13 5WY, UK. Tel: +44 (0)8448 155900

Name _____

Company _____

Job Title _____

Telephone _____

Address _____

Zip/Postcode _____

Country _____

Telefax _____

Email _____

Please start my one year subscription to Cranes & Access at the rate of:

- £40.00/€60 (UK and Irish addresses only) ☐
- €75.00 (Rest of Europe) ☐
- $110.00 / £60.00 (Other regions) ☐
- I enclose a cheque made payable to The Vertikal Press ☐
- Please invoice me ☐
- I enclose an international money order ☐
- Please charge to my credit card ☐

Name _____

Card number _____

Expiry date _____

Security code _____

Ship mast refurbishment

Harsco Infrastructure supplied six, twin-mast mastclimbing work platforms to help refurbish the Hawene Brim Floating Production, Storage and Offloading vessel.

Harsco Infrastructure has provided mastclimbers for a major ship refurbishment project in Scotland. The company supplied six, twin-mast Hek MSHF mastclimbers to help clean, repair, blast and repaint the 66,538 tonne Haewene Brim - a Floating Production, Storage and Offloading (FPSO) vessel - owned and operated by Bluewater Energy Services.

"Given that this was a time-critical project, the use of scaffolding to provide access was not practical as it would have taken far too long to install and then strike," said Harsco site service manager, Joe Smith. "There would also have been issues with the space required to construct the scaffold. Mastclimbers were ideal as they could be put into place in a fraction of the time."

The mastclimbers were also well suited to the physical profile of the ship as it has an unusual, 252 metre long flat-bottomed hull with smooth, vertical sides. The refurbishment process involved different stages - high-pressure cleaning and shot-blasting, prime coating and specialist painting which had to be carried out in strict sequence. Each platform was 25 metres long and stood freely on a mobile chassis reaching heights of 25 metres with each having a top tie installed for additional support. This allowed the contractor full height and uninterrupted access to the ship's hull.

The maintenance work on Haewene Brim took place in a dry dock at Nigg Yard near Invergordon in Scotland. The dock itself had to be drained before the mastclimbers could be installed. In order to keep the overall project schedule as short as possible, Harsco assembled the machines offsite, and delivered them to Nigg Yard fully assembled, allowing for quick installation with the support of an on-site crane.

"I found the mastclimbers to be very practical and productive for shipyard work," said Alec Angus, hull & tanks supervisor for Bluewater Energy Services. "They eliminated a great deal of time that would have incurred using scaffolding, self-propelled access platforms and other access methods to high areas."

"The mastclimbers were used to access the starboard side first, and then moved to the port side," adds Joe Smith. "That meant that we had to be very flexible and responsive to the changing needs and timings that we encountered during the 26 day project."

Harsco also provided a number of self-propelled booms for access to the more difficult-to-reach areas around the bow and the stern.

Hoists reach new heights

Brookfield Multiplex installed three high-speed Alimak construction hoists at The Tower, One St George Wharf, London. At a height of 185 metres it is one of the tallest residential buildings in Europe.

Three high-speed Alimak construction hoists were installed at The Tower. At a height of 185 metres it is one of the tallest residential buildings in Europe.

Two of the hoists - the 100 metres a minute, 3,200kg capacity Scando 650 FC-S 100 - are specifically designed to speed up construction time and save costs with a full height transit time reduced to just 90 seconds, compared to more than four minutes using standard hoists. The hoists also incorporate VFC drives which have improved levelling accuracy and power savings of around 30 percent.

The hoists are installed in conjunction with a common tower system which is manufactured from aluminium alloy to minimise weight and has a five metre square footprint, yet is capable of running multiple hoists simultaneously. This access system allows all material and personnel transportation to be concentrated in one area, which streamlines loading efficiency at ground level.

The hoist system installed at The Tower also incorporates a three by 4.6 metre 'Mammoth' hoist with a capacity of 5,500kg, which was used for the fast movement of larger materials. All hoists can be operated simultaneously.

The common tower solution provides a clear (five by five metres) landing space at each floor to allow the safe and easy movement of materials in and out of the hoists. Only the common tower - and not the hoists - is tied directly into the building, allowing external cladding to be applied to the whole building during construction with the exception of the 4.5 metre access openings at each level. As a result there are far fewer panels to replace at the end of the project, which dramatically speeds up de-rigging.

The hoist system installed at The Tower also incorporates a three by 4.6 metre 'Mammoth' hoist with a lift capacity of 5,500kg for the fast movement of larger materials

The 100 metres per minute, 3,200kg capacity Scando 650 FC-S 100 - are specifically designed to speed up construction time and save costs with a full height transit time reduced to just 90 seconds

We are proud to introduce
our ***new web site***.
Discover our range and the amazing
PLAYGROUND interactive area.

FOCUS ON DETAILS

Visit us at:
www.cmclift.com

cmc AERIAL PLATFORMS

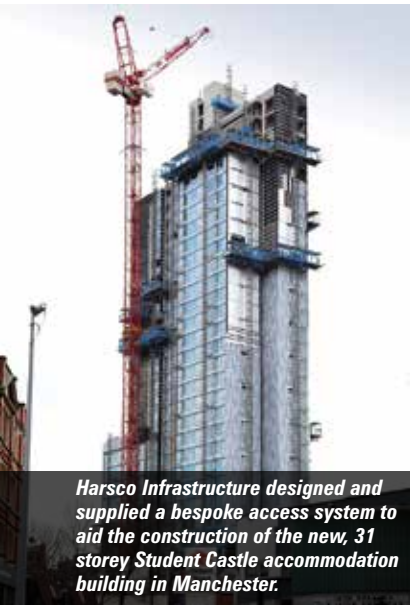
S.P. 231 Km 1+900 - 70026 Modugno BA - Italy
Tel. +39 080 53 26 606 - mail: info@cmclift.com

cmc AERIAL PLATFORMS

Self Control System

Manchester castle development

The Student Castle project in the heart of Manchester has been helped with a double-decked mastclimber from Harsco Infrastructure. Working with main contractor Shepherd Construction, Harsco designed and supplied the bespoke system to provide access to all external elevations, allowing the architectural panels to be easily applied to the 31storey student accommodation block.



Harsco Infrastructure designed and supplied a bespoke access system to aid the construction of the new, 31 storey Student Castle accommodation building in Manchester.

The Student Castle - adjacent to Manchester Oxford Road rail station - has a complex building profile with variations in height, projections and recesses. Mastclimbers were proposed as they provide clear, unobstructed access to all areas of the facade, while allowing the transport of materials to the working area to be unimpeded.

A mix of single and double mast platforms in 17 positions around the exterior of the building were installed, some reaching up to 100 metres in height. Of the 17 platforms, six were 'double deck' allowing two different operations to take place simultaneously. Several of the mastclimbers installed were mounted on roof areas at various points around the structure, requiring carefully engineered load-bearing support structures.

Of the 17 platforms six were 'double deck' - two independent platforms on the samae mast - allowing two different operations to take place simultaneously.

While most platform access solutions force the user to lower the whole platform to base level to enter and exit the platform, Harsco's system allowed the team working on this project to access platforms from the upper floors of the building. As a result, the main contractor reported improved efficiency.

World class teaching hospital

When the first patients arrive in the new Stockholm University Hospital Nya Karolinska in Stockholm in 2016, awaiting them will be customised patient care in one of the most modern university hospitals in the world.

The Multilift P6 is the smallest in the range with a capacity of 650kg or six people, lift speed of 24 metres per minute and maximum lift height of 100 metres.

When complete, the pioneering hospital will have 600 in-patient beds and a capacity of up to 1,600 patient visits per day. The Karolinska Hospital Project will also set new environmental benchmarks - its innovative heating and cooling system as well as the use of solar and wind energy are integral aspects of the design. The project is being financed by a co-operation between public and private investors and at a cost of 14.5 bn Swedish Krona and covering 32,000 square metres is Sweden's biggest building and the world's biggest hospital building project that has ever been built using PPP financing model.

Construction work is being carried out by Swedish construction company Skanska. On site there will be 400 temporary construction site containers used both as offies and work containers. These are placed on top of each other forming a complex several storeys high. Swedish law states that in buildings with at least three storeys, a hoist must be installed during construction work to transport people and materials. Skanska opted on two Geda Multilift P6-hoists. And each of the 10 tower cranes is equipped with Geda 2 PK operator hoists.

The Multilift P6 is the smallest in the range with a capacity of 650 kg or six people, lift speed of 24 metres per minute and maximum lift height of 100 metres. One of the machines at the Karolinska Hospital is used to transport people and loads on the scaffold staircase tower of the Skanska work and office containers as well as an emergency hoist to quickly transport any injured people down using a stretcher. The second hoist is installed on the containers at the Skanska service centre.

The two GEDA Multilift P6 devices were also equipped with electric unloading ramps. At the exit level the unloading ramp can simply be opened by pressing a button – a solution that saves both power and particularly back strain.

Thanks to the ten Geda 2 PK crane operator hoists the crane operators are quickly lifted to their cabins. The GEDA 2 PK is designed to transport 2 people, whereas the maximum load is 200 kg. This allows, if necessary, the transportation of material for maintenance work to the top. The lifting speed is 25metres per minute and the maximum lifting height for the hoist is 150 metres. The car has a ramp which makes the step onto the crane perfectly safe. The crane operator hoist can also be used in an emergency recovering or saving unconscious or sick crane operators.

Construction work on the project should be completed by 2016.