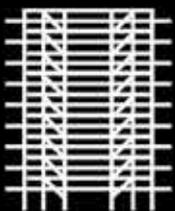
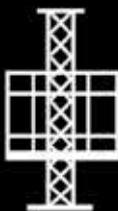


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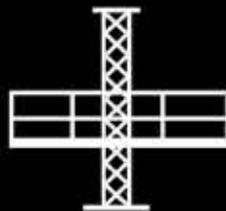
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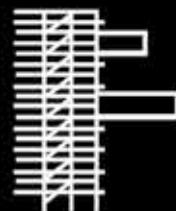
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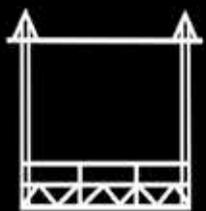
COMMON TOWERS



MAST CLIMBERS



CRANE DECKS



CRADLES

Mastclimbers continue to grow

Over the past decade or so, the mastclimber market has continued to grow - albeit at a slow by steady pace - particularly in countries such as the Netherlands, Scandinavia, the UK, Eastern Europe, North America and Australia where usage was already significant.

Mastclimbers remain the 'best kept secret' in the working at height market but might this finally change with an upsurge in the number of tall buildings being constructed in so many cities, including London where the number of tall buildings has increased to more than 540 thanks to a flood of planning approvals. According to a survey by the New London Architecture (NLA) 'London Tall Buildings', high rise buildings are becoming the new norm for the UK capital with a six per cent rise in the number of buildings over 20 storeys planned for the city since last year. The rate of new approvals is also up 14 percent. Residential accounts for 90 percent of the buildings planned.

Globally there are now around 1,500 buildings of 200 metres or more but surprisingly - or worryingly - nothing that high has ever been demolished. The tallest tower

ever to be voluntarily demolished was New York's Singer Building, which was 187 metres high, or 41 storeys. However whether it is the construction of a new tower or the external maintenance and repair, mastclimbers and hoists are invaluable to move men and materials to the work area.

In Europe most mastclimbers are AC electric powered rack and pinion drive, while in North America the more popular heavier duty models tend to be powered by gas or diesel power packs with latch or ratchet type climbing mechanisms. As most buildings are regular shaped with straight facades, they are ideal for the basic mastclimber, however platforms can be adapted to work around all manner of corners, balconies, curves and shaped structures. They can also be inclined at a variety of angles or even curved for applications such as cooling towers.



High rise buildings are becoming more popular globally



Fraco ACT-8

Mastclimbers are now produced all over the world with manufacturers including Alimak Hek, Maber, Alba, Electroelsa, Camac, Geda, Stros, Böcker, SAE Climber and Scanclimber in Europe and GJJ, Dingli and TDT and others in China.

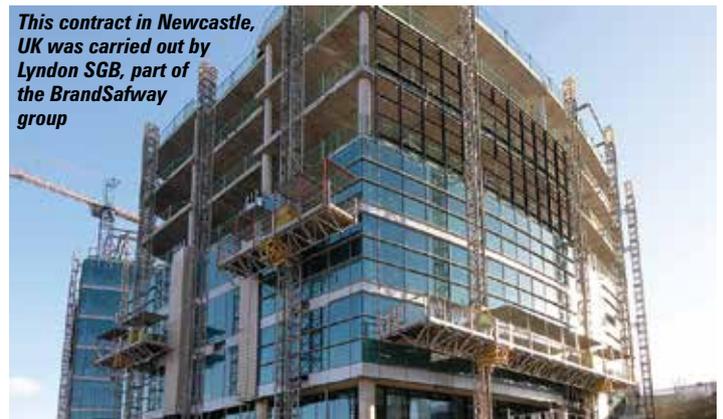
North America has three main mastclimber manufacturers - AGF Access Group/Hydromobile, Fraco and Klimer - all of them based in Canada. However earlier this year US-based suspended access and scaffold rental group BrandSafway announced plans to acquire the AGF Access Group which owns, Winsafe, Hydro Rents, IEQ, Jamco Construction and Noxxent in addition to Hydro Mobile.

BrandSafway is an increasingly large conglomeration of scaffold, hoist and mostly non mobile access equipment rental and contracting operations, having already

incorporated Harsco Infrastructure, SGB, Spider and Hünnebeck. In the past year or two it has also added Sheedy Hoist in California, Century Elevators in Texas and Cabrillo hoists in Southern California, along with Taylor's Hoists/Lyndon Scaffolding in the UK and most recently Massachusetts-based Bowline.

Based in L'Assomption, Quebec, AGF operates two manufacturing facilities in Canada along with 24 sales and rental branches across North America. The company provides turnkey solutions for both small scale and multi-billion dollar construction and refurbishment projects. Established in 1948, the group employs around 2,500 staff across 11 countries.

AGF's Winsafe division supplies suspended access and fall



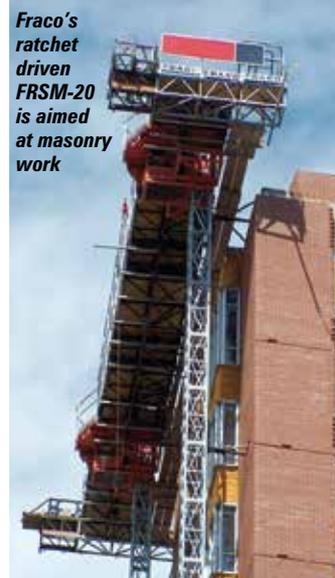
This contract in Newcastle, UK was carried out by Lyndon SGB, part of the BrandSafway group



The Fraco ACT-8 is aimed at general contractors



protection systems, while its Hydro Mobile division manufactures four series of mastclimbers, each with specific users and applications in mind. The M-Series mastclimbers - billed as the company's workhorse - are aimed at high capacity masonry, demolition and heavy block and stonework and are a ratchet driven, broad platformed product particularly suited to heavy



Fraco's ratchet driven FRSM-20 is aimed at masonry work



The lighter duty KlimerLite is available in single and twin mast versions

duty work. The company's F-Series is designed for projects over 30 metres high, the P-Series for smaller jobs in tight spaces, while the electrically powered S-Series is aimed at general multi-trades work. Fraco - also based in Quebec - supplies a range of hoists and mastclimbers including the ACT-8 for general contractors covering work as varied as repointing, glazing, metal framing, restoration and demolition on everything from

buildings and chimneys to dams and bridges. The company's FRSM-20K ratchet driven platform is aimed at masonry work on projects up to 25 metres in height, and the rack and pinion FMC-3 single mast platform is aimed at restoration and other light construction work. Ontario-based Klimer Platforms provides transport platforms and three mastclimbers. The single and twin mast KPM-8, designed for masonry and concrete restoration



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Alimak's new Scando 650 FC-S with increased capacity and space

hoist and building maintenance access equipment manufacturer Alimak - one of the global leaders - has launched several new products including an upgraded, high capacity Scando 650 FC-S hoist, and an extra large hoist door and wireless call system at Conexpo earlier this month. The Scando 650 FC-S has an increased payload, larger car size and upgraded electronics. The extra wide vertical sliding hoist door has been developed to improve productivity. Mounted on the hoist car long side it has an opening 4.2 metres wide by 2.5 metres high - 60 percent larger than its previous largest door. The new configuration allows easy unloading directly from a truck into the hoist car using a forklift therefore reducing site storage space and freeing up tower crane time.

and repair as well as glazing, drywall and mechanical work. The lighter duty KlimerLite is available in single and twin mast versions and mainly used for masonry, glazing, waterproofing and other restoration work such as architectural surface repairs. Klimer recently acquired the manufacturing rights for US-based Hydek mastclimbing work platforms, which is a "low cost mastclimber for high volume masonry work."

Swedish international mastclimber,

AliCall is a new wireless call system between the hoist car and landings improving usability as the operator can view the designated landings directly on a screen. The system supports up to 128 landings and has automatic call clearing at each landing. Alimak claims that it will reduce installation costs through shorter installation time and less hard wiring. The company has also launched a new online gallery of BIM object files.



Hydro Mobile F series twin mastclimbers



Hydro Mobile M series bridge extension

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Common towers

With an increasing number of new skyscrapers and tower developments, the demand for new, more efficient high level access equipment is growing. One solution is to use Common Towers - so called because they are provided for the use of everyone on a project.

A common tower is a temporary structure tied to a high rise building during construction to provide a common means of access for all trades and goods while reducing the need to leave openings in the building. Goods and passenger hoists can be attached to all three of the open sides of the tower, which might also incorporate an escape staircase.

By positioning hoists and temporary staircases in one concentrated area of the building, works such as cladding can be carried out more efficiently on the rest of the building unhindered, apart from the one section where the common tower ties in. This system also allows for the fit out of the lower floors to commence earlier while the building is still under construction.

Fit out can also be carried out rapidly as the tower/hoist combination allows contractors to fully exploit floor level openings and optimise the use of the floor heights when distributing cladding

and installing prefabricated pods. The deck level can be set either flush with the slab level or above it, depending on requirements.

One example is the Madison Tower development in London's financial district, Canary Wharf, where mastclimber and scaffold contractor Brogan has installed a common tower developed by Welsh specialist CAS Scaffolding, which includes a twin passenger/goods hoist and a Colossus hoist developed specifically for Brogan by Czech manufacturer Stros. The CAS common tower was chosen due to its ability to accommodate the height of the prefabricated bathroom pods which the contractor wanted to get into the building via the Colossus hoist, rather than take up valuable tower crane time.

Brogan began work in February 2018 and is currently working on level 42 out of 54 storeys of The Madison Tower, being built by Balfour Beatty for developer LBS Properties. Work is due for completion towards the end of this year.

The Madison Tower common tower includes a twin passenger/goods hoist and a Colossus hoist



Balfour Beatty's façade manager on the project Jack Bird says: "The Madison project has two large programme critical components - the bathroom pods and the curtain wall stillages - both of which must be transported vertically and distributed to the floor plate by the Colossus hoist which has been specifically sized to ensure the largest pods - measuring 2.7 by 2.8 by 2.55 metres - can be delivered safely to site."

The electrically powered Colossus is one of the largest of its kind

currently on the market with a length of five metres and a width of 3.1 metres it can carry 40 passengers or 4,000kg of equipment to a height of 350 metres at a speed of 40 metres per minute. The Colossus together with twin passenger/goods hoist and a staircase all run off the common tower to provide access to the building through an entry point just three metres wide. This means that the amount of façade and internal finishes that must be left unfinished is kept to a minimum.

Nuclear site mastclimbers

Canada's AGF Access Group has won a contract to design and supply 12 Hydro Mobile mastclimbers for the Vogtle nuclear power expansion project near Waynesboro, Georgia, USA for Bechtel Power Corporation.

The order includes two dual F2 mastclimbers and eight M2 mastclimbers which will provide access around the Shield Buildings at the nuclear facility. The M2s provide capacities of up to 10 tonnes and an operating speed of just under a metre a minute, while the F2 can travel up to 11.5 metres a minute with a maximum capacity of 1,590kg.

The F2 can be split into two separate platforms, each travelling independently on one side of the mast tower set up as needed for construction and transport for both units three and four at the Shield Building. A separate contract will include all site services such as supervision, training and technical support.



Vogtle nuclear expansion project



Hydro Mobile F2 mastclimbers



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Climbing the property ladder

There are few housing developments more prestigious than the £360 million Royal Warwick Square in Kensington, London, where St Edward Homes - part of the Berkeley Group - is building 375 luxury apartments.

Being involved early in the process allowed specialist access and scaffolding contractor Brogan Group to suggest a mix of access solutions including 58 mastclimbers, numerous single and twin passenger/goods hoists and scaffolding.

However the prime central London location has its challenges being a tight site bordered on its west side by the Network Rail track. The four block building sits less than three metres from the railway fence which meant the mastclimbers had to be built and delivered to site pre-erected and then craned into position. Positioning the mastclimbers has been difficult with various machines on gantries or propped over existing vehicle ramps and access routes.

At the front of the site, some of the blocks are also very close to the main road and pedestrian walkway which required careful

planning when it came to installing the mastclimbers which are a mix of single and twin two tonne capacity machines, reaching a height of up to 28 metres. To date Brogan has installed, handed over and thoroughly examined 41 of the mastclimbers, two single hoists and a twin hoist.

Mastclimbers have also been installed on two new blocks where scaffolding was originally specified allowing multiple trades to work at numerous locations simultaneously keeping the programme of works on schedule. The machines can also be erected and dismantled rapidly, which allows the client to proceed with surrounding works unhindered.

Royal Warwick Square is part of the larger Warwick Road scheme involves the creation of more than 1,000 homes, a new school and landscaping across seven acres of Kensington and Chelsea.



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Toronto tragedy highlights deficiencies

C&A

mastclimbers

A number of fatal mastclimber collapses in North America - including one in Toronto which killed two bricklayers at a condominium project in 2015 - have highlighted regulatory inspections, structural testing, safety training, adherence to procedures and ongoing work to harmonise standards. Saul Chernos investigates.

No sooner was the Ontario Ministry of Labour notified of the Toronto collapse than the provincial regulator issued an immediate stop work order and launched an investigation that culminated in charges a year later under the Ontario Occupational Health and Safety Act.

Venice Construction, a local contractor, pleaded guilty to failing to ensure an elevated work platform had clearly visible signage and Klimer Platforms - which manufactured and installed the platform - acknowledged failing to ensure machinery, tools and equipment were maintained in a

condition that did not endanger a worker. Each company was fined \$85,000 plus a 25 percent victim surcharge, while the ministry dropped more than a dozen remaining charges. Klimer pled guilty to items relating to the maintenance and inspection of the KPM-8 mastclimber it had installed.

While the guilty pleas meant no trial would be held, the incident still proved trying in other respects. On being told of the accident Klimer president James Gordon went straight to the site and the company furnished training and other documentation requested by the ministry for its investigation.



"There were several contributing factors," he said. "The unit had been in use for seven years prior to the collapse and investigators found pre-

existing weld fractures. The tragedy is a reminder of the importance of ongoing inspections as well as understanding load requirements."

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Specific load charts

As a result of the incident Gordon recommends configuration specific load charts. "Quite often you will see a load chart with five or six configurations," he said. "For the average person that can be really confusing. If you were to simplify and just have a load chart for the specific configuration, I believe that would be much easier for users to interpret. Furthermore, users need to review load charts whenever a platform is relocated and the configuration changes or whenever load charts or loading itself changes. In this case the equipment was overloaded to the point of failure."

In the same year Klimer was involved in another fatal incident when a KlimerLite platform collapsed during dismantling following completion of an 11 storey building in Raleigh, North Carolina. Three men died and litigation pointed to loads exceeding those recommended by the American National Standards Institute (ANSI) and industry practice.

"Good method statement procedures might have prevented the Raleigh collapse," said Gordon. "They give a step by step method for installing equipment safely and what should be done if there are local hazards."

There have been other fatalities. In 2006, workers were dismantling a Fraco mastclimber after completing a stone façade in Boston when the platform fell 13 storeys landing on a busy street, killing three people

including a pedestrian. While the Occupational Safety and Health Administration (OSHA) cited the general contractor, Fraco tracked the situation closely.

In Canada there are three mastclimber manufacturers and all three offer product training. However Jacques Lainé, Fraco senior advisor of corporate affairs and marketing considers this vital. "We have competency cards and you cannot operate and install the platform if you haven't been trained. When a card is due to expire, we will make contact to re-issue the card and if carry out additional training if needed."

Regulatory oversight can also play a role. The Toronto collapse occurred just five days before Ontario's labour ministry initiated a training standard included in new Working at Heights legislation.

"This mandatory standard is intended to ensure that construction employees are sufficiently familiar with safety when working at heights, including hazard identification, ladder safety, personal protective equipment and the relevant rights and responsibilities," said Gordon.

Non-destructive testing

The Canadian Standards Association currently prescribes non-destructive testing after 10 years with annual structural tests and frequent inspections by a competent person who may deem further testing necessary.

"I believe the current CSA standard



has done a good job on managing this issue," said Gordon. "Routine magnetic testing sounds reasonable but may not be practical or feasible in terms of costs and logistics given that the platforms typically rent for periods of three to five months."

John Ferreira a health and safety representative with Local 183 of the Laborers' International Union of North America believes that mandatory magnetic weld testing every time a platform is erected at a particular site would be a significant safety advancement.

"The rules in Ontario are probably some of the best worldwide, however enforcement under the Occupational Health and Safety Act and the regulations regarding machinery and safety in general are not enforced properly," he said. "Despite Toronto's diverse, multicultural population, inspectors are often unable to communicate with the people they are supposed to protect and governments need to increase the frequency of routine inspections."

James Wilkinson, president of Wilkinson Technical Services and former senior official with the Ontario labour ministry, currently chairs the Canadian Standards Association's technical committee for mastclimbing work platforms. He says safety and training rules are relatively consistent across

Canada, although enforcement mechanisms often differ. In the US, regulation varies from state to state and even municipally. New York City and Chicago, for example, are extremely stringent on engineering requirements, while others do not require an engineer to be involved at all.

"At the time of the 2006 Boston collapse, local and Massachusetts state governance did not specifically address mastclimbers," said Wilkinson. "There was a lot of regulatory work following that accident, working with the SIA - the Scaffold and Access Industry Association - in the US and ANSI to develop more specific standards. Training by and large, is reasonably well done in North America, and national and international standards bodies continue to work towards harmonisation."

"There is still some work to do with respect to maintenance," he said, "such as the deterioration of structural components, the frequency of non-destructive testing and X-rays of welds, how the structures are set up, the kind of inspections that need to be done and training requirements for operators and erectors."

Digital tools

Digital tools can also help generate computerised, project specific designs and analyses.



Three men died and litigation pointed to loads exceeding those recommended by the American National Standards Institute (ANSI) and industry practice



KlimerLite platform collapsed during dismantling following completion of an 11 storey building in Raleigh, North Carolina



Users need to review load charts whenever a platform is relocated and the configuration changes

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"Printout data can include base outrigger loads, mast tie forces and tie locations to the structure, mast tower heights, and platform layouts with allowable material and equipment loadings," said Gary LeBlanc, an engineer with GA Masonry in Breslau, Ontario. "This is a vital tool for the contractor and engineer to verify and ensure that the supporting structure for the work platform is adequate along with the types and suitability of the mast tie-ins."

There are however calls for increased collaboration between platform manufacturers and end users.

"In America over the past 25 years there has been an average of about one serious accident or fatality a year," said Kevin O'Shea, director of safety and training with AGF Access Group. "When we look at citations that have come from those incidents, one of the big issues is training. The number of people trained is considerable, but a transient workforce is

problematic. A lot of the work force is here today and gone tomorrow. Representatives from the rental company go back to a site and find that many workers have been replaced by people with no training. It's an issue we encounter all the time."

"Factor in a typical can-do attitude where crew members think they are capable of doing whatever they are asked, but unclear about actual responsibilities. They might even believe they are addressing their responsibilities under the regulations, but unfortunately they don't discover they have a problem until after an accident has occurred."



In America over the past 25 years there has been an average of about one serious accident or fatality a year

10 daily steps for work platform safety:

- Strictly follow manufacturer instructions and guidelines for installing, operating, maintaining and dismantling platforms.
- Use engineered set-up drawings when required.
- Inspect all platforms daily before use for overall condition, including outrigger jacks and cribbing, decks and planks, fluid levels and lifelines. Look for any loose, cracked or damaged components.
- Know the weights of all materials, workers and equipment that may be placed on the platforms and never overload a platform.
- Ensure controls and travel limit switches are functional.
- All workers, including platform erectors, should be fully trained and certified.
- Ensure fall protection equipment is worn when guardrails or planks are removed.
- Don't add unauthorised components without manufacturer approval.
- Ensure all areas underneath platforms remain clear of obstructions.
- Be aware of platform usage restrictions in respect to adverse weather conditions and excessive wind speeds.

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