Kranlyft Group

MAEDA Mini Cranes

COMPACT AND VERSATILE MINI CRANES AND CRAWLER CRANES BORN FROM JAPANESE TECHNOLOGY

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A glazing robot in action

Most glazing robots have no outriggers and a basic three wheel chassis

IT'S A ROBOTIC WORLD

Over the past 20 or so years a combination of factors has led to the increase in the availability and use of vacuum panel handling equipment on construction sites, particularly for the larger, heavier windows and glazing panels. The greater use of structural glass in commercial and residential buildings and stricter manual handling regulations have all but put an end to the old 'manual labour' method of lifting, moving and installation.

This change has meant that the range of glass handling equipment is now huge. Originally spider, mini pick & carry cranes or telehandlers were used, particularly when equipped with vacuum attachments and cantilever beams etc. However, these are often too sophisticated, overly complex and costly to be used just to install a pane of glass and this is one of main reasons that led to the introduction and wider adoption of lower costs alternatives such as glazing robots.

Their name 'robots' is perhaps a slight misnomer in that these are just simpler, lighter lifting devices, designed to do one task well - lift and manipulate vacuum attachments to install glass panels. They have simple controls and limited set-up requirements, but also tend to be limited to lower lift heights.

Most are positioned using a handlebar steering arrangement at the rear of the machine. With no outriggers and a basic three wheel chassis - two widely spaced wheels at the front and a single or twin steering wheels providing traction and direction at the rear - they are quick and easy to set up although not really suited to rough or uneven ground. And while their design origins are in the glazing industry, they can often be used with different vacuum cups to install other types of materials such as metal or stone façade panels and large floor and wall tiles etc.

TRUE ROBOTIC INSTALLATION

The external renovation of buildings market - cladding and windows - is estimated grow to around €400 billion or more by 2030. Over the next five years it is projected that work in this sector will require more than 300,000 employees, 50 percent more than currently available in an area already short of skilled workers in most countries.

To counter this the Centre Construction Robotics set itself a goal of automating the renovation of building envelopes through robotics, counteracting the shortage of a skilled workforce. The research project MAXX - Mobile Assembly X-System which took the Bauma Innovation Award this year - is a collaborative effort between Construction Robotics at RWTH Aachen University, spider and mini pick & carry crane manufacturer Jekko, along with robotics companies Kuka and Fundermax. It introduces a ground breaking approach to construction automation by implementing a plug and produce system for semi-automated, scaffold free assembly in building refurbishment.

The system comprises a platform with an integrated storage magazine for the façade panels, and a classic robot arm. The platform is suspended from a Jekko spider crane and positioned against the façade. The Kuka robot is equipped with a multi-sensor system that takes the façade panels from the storage magazine and precisely positions and attaches them to the building substructure.

The Kuka robot learns the panel size, joint width and installation process directly from the crane operator who manually installs the first row of panels. The movements, positions and installation procedure are then continued, fully automatically by MAXX for the following rows, panel by panel.

The system includes a world first - the first fully automated robot-crane collaboration with the Kuka robot directly controlling the Jekko crane via 5G. After completing a row of facade panels, the robot reports the next starting position back to the crane and thus controls the crane, raising and locating the platform via 5G to the next starting position of the installation process. The operator therefore does not need to plan or control MAXX, the MAXX professional only needs to perform quality and safety checks such as ensuring that the plates have been correctly inserted into the lifting platform before the work starts.

The system comprises a platform with an integrated storage magazine for the façade panels, and a classic robot arm, suspended from a Jekko spider crane against the façade

Concept of the MAXX - Mobile Assembly X-System

The system does not require a digital building model or robot path planning and can adapt to unusual, shaped buildings. Planning, surveying and scaffolding are also eliminated.

NEW MODELS - NOW

These new robotic systems may well be the future but for now the glass/panel installation sector continues to use existing technology and new products such as the Smartlift SLX 2000 glass handler.

The SLX 2000 has a lift capacity of 1,000kg, lift height of 5.25 metres and 2.75 metres of forward reach. Overall dimensions are just over one metre wide, 1.53 metres high and 2.78 metres long. It has a quick release head for vacuum yoke, winch or pallet forks together with a full remote drive steer and lift functionality. It has a 65 degree tilt backwards and 98 degree tilt forwards together with a 100mm side shift. Power is provided by two 1,500W front wheel motors with about 10 hours run time and an eight hour charge time. Overall weight is 1,900kg.

Smartlift - a Danish company formed in 2008 by Ole Kobæk and Jan-Erik Ørum-Petersen - specialises in vacuum and multi lifters. In spring 2023, Søren Mosevang took over as chief executive having acquired a majority stake in the business. He has since acquired all of Ole Kobæk's shares and manages the company with Jan-Erik Ørum-Petersen.

The company will have an SLX 2000 glass handler on display at Vertikal Days in September, in partnership with its UK dealer CPS Lift. Speaking of its relationship John Burton of CPS said: "As a Smartlift Dealer, it's always exciting to see how year after year, Smartlift continues to innovate and enhance the capabilities of glass lifting equipment. This year is especially exciting with the launch of the all-new SLX 2000 glass manipulator. In my view, the SLX 2000 is perfectly suited for curtain wall installers. It offers an impressive horizontal reach of 2.75 metres and features a fully remote controlled, motorised gimbal type vacuum head. This allows a single operator to push heavy curtain wall glass through an aperture, rotate and precisely position it - all without assistance. Another standout feature is the quick fix crane winch which allows the SLX 2000 to be rapidly converted into a compact pick & carry crane. This added versatility makes it an incredibly valuable tool on site."

INTERNAL USES

As well as installing large glass/cladding panels on the outside of a building, glazing robots are increasingly being used to install large ceramic tiles in domestic rooms in houses, apartments and flats. Sone of these modern ceramic wall and floor tiles are really large such as 1.2 by 2.4 metres in size, and larger - and are therefore difficult to install due to their size and weight. Vacuum lifters with foam rubber suction cups are ideal for lifting, moving and the safe laying of this

The new Smartlift SLX 2000 has a lift capacity of 1,000kg, lift height of 5.25 metres and 2.75 metres of forward reach

The SLX 2000 is fully remote controlled

HIRD GLASS SPECIALISTS

As glass handing equipment has grown in importance and new manufacturers arriving on the scene a number of rental companies have added glass handling equipment to their rental fleets and developed established specialist divisions. This is particularly true in countries where equipment rental is particularly well developed such as the Benelux region, Nordic countries, the UK and France. In the UK companies such as GGR and Hird have really developed their specialisation in this area, with the two coming at it from different directions. GGR started out in glass handling added spider cranes and over the years a wide range of other specialist handing equipment.

Hull based Hird on the other hand was a classic crane, and later access rental company which has developed into a specialist in the pick & carry crane market over the past 30 years or so. This has taken it into the spider crane market along with glass and materials vacuum lifting equipment, while still keeping its hand in the powered access market.

Its sales range includes Winlet glazing robots, vacuum lifters, the ErgoMover transport trolley, glazing manipulators, Kappel counterweight balancer and lifter/beams counterbalance floor cranes and glass trolleys.

At the recent FIT Show - the UK's window, door, flat glass, hardware and components industry show - Hird exhibited several products, but the product that seemed to generate most interest was the new Winlet 785 dual circuit window and glass installer with hydraulic slewing head. The battery powered Winlet 785 with wired remote control combines a pick & carry crane ability for glass panels up to 785kg. Maximum lift height is almost four metres with a maximum forward reach of 2.5 metres at which point it can handle 100kg with its four, 410mm diameter suction cups. Features include intelligent load monitoring, a multifunction control panel and optional twin front wheels for use in more arduous terrain. The unit is also easy to adapt to carry other materials including granite, concrete, plasterboard, steel panels or plates, tiles and wooden panels and doors.

Hird's Carl Cooper said: "We also showed the Winlet 400TL with hydraulic head rotation and the new wireless remote control that impressed many visitors with its multi-function operation and smooth proportional control for precise movements."

The 400TL is a relatively new product that features all the latest technology but is aimed

The battery powered Winlet 785 with wired remote control combines a pick & carry crane ability for glass panels up to 785kg

A glazing robot installing large ceramic tiles indoors

One Lot Tower cranes Sale

Type	Quantity	Height
Liebherr 280 EC-H 12	10	50 m
Liebherr 250 EC-B 12	4	50 m
Liebherr 200 EC-H 10	22	50 m
Liebherr 202 EC-B 10	7	50 m
Liebherr 154 EC-H 6	4	50 m
Liebherr 150 EC-B 6	2	50 m
Liebherr 63 K	2	
Liebherr 50 K	1	
Other	6	50 m

Spare Parts. Undercarriages, Jib sections, Hoist winches, tower sections 256, 200, 120 Hc

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at lighter loads having a maximum capacity of 415kg. It is fitted with the versatile Winlet manipulator head and has the latest two section boom with a maximum reach of 3.65 metres at which point it can lift 215kg. Side lift capacity is 200kg, while the overall weight is 942kg.

There was also a lot of interest in the ErgoMover Lift & Go - a self-propelled wheeled material transport carrier that can be fitted with the demountable glass carrying A frame. According to Cooper several customers liked the smooth operation of the wheeled carrier in comparison to the tracked models more widely available.

The Lift & Go is battery powered with a hydraulically lift and tiltable flatbed and four wheel steering with controls mounted on a drawbar type arrangement for easy handling of materials on site. Maximum capacity is 1,500kg, while the overall length with the drawbar/ handle stowed is 1.82 metres, a little less if removed. It can move loads of up to three metres long, while the maximum platform lift height is 715mm, overall weight is 311kg and maximum travel speed 6kph. A second version called the ErgoMover Manipulator, is able to set down stacks of plasterboard on trestles and can raise a stack of plasterboard to the vertical position. Maximum capacity is slightly lower at 1,100kg and the weight is heavier.

Hird also carries around 30 different sizes of glass vacuum lifters from the 135kg capacity, two suction pad MT2 through to the 8,000kg Kappel Hydraulica 8000 - one of the largest capacity standard vacuum lifters on the market. Weighing just over two tonnes it has 28 suction cups of 520mm diameter and features 360 degree electric powered lockable rotation and 90 degrees remote tilting from vertical to horizontal, dual independent vacuum circuits with four vacuum reserve tanks and four non-return valves with an audio visual low vacuum alert enabling it to manipulate and position the largest and heaviest glass panels. The company's seven curved glass lifters range is topped by the 2,100kg capacity Hydraulica 2100 Curved.

CAPACITY AND WEIGHT CALCULATIONS

Often when talking about capacity we think only of the weight of the load. However, when handling glass the support the frame supplies is equally important. Load capacity ratings include a safety factor to cover most variations, such as the slip resistance due to contamination on the glass or pads, and dynamic weight magnification when cranes or hoists do not operate smoothly. Support requirements depend on the angle of the glass during the lift and the thickness of the glass.

The 400TL is a relatively new product that features all the latest technology but is aimed at lighter loads

The lifter's pad spread must be large enough to provide adequate support for the glass

Charts are available indicating the allowable overhang from the pad edge to the edge of the glass based on the carrying angle and thickness of the glass. The lifter's pad spread must be large enough to limit the overhang and provide adequate support for the glass.

To calculate the minimum pad spread dimensions you need to subtract twice (2x) the allowable overhang from the overall dimensions. For example, glass measuring 2.0 metres by 1.5 metres and 4mm thick that will be tilted from flat (90 degrees) to vertical (0 degrees) can be calculated as follows:

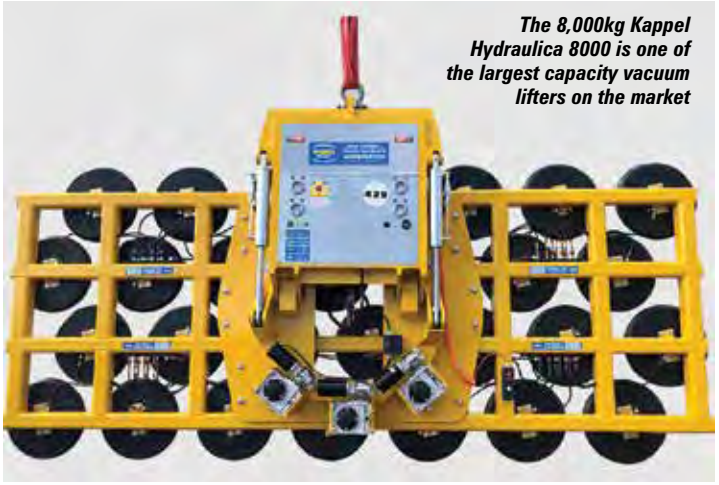
Using the minimum overhang chart, the allowable overhang is 508mm. This figure is multiplied by 2 = 1,016mm. Subtract this figure from the length and width of the glass i.e. 2,000 - 1,016 and 1,500 - 1016 which gives 984mm and 484mm respectively. Therefore, the minimum pad spread is 984mm x 484mm.

To calculate the weight of the glass, multiply the area - length x width in metres - and multiply it by the thickness in millimetres. Then multiply the total by 2.5 for the total weight in kilos.

For example: a 2.0 by 1.8 metre by 10mm thick glass would weigh: 2 x 1.8 x10 x 2.5 = 90kg.

Knowing the weight and minimum pad spread allows users to lift glass safely by specifying using the correct equipment. ■

The ErgoMover Lift & Go is a self-propelled wheeled material transport carrier



The 8,000kg Kappel Hydraulica 8000 is one of the largest capacity vacuum lifters on the market

The extraordinary CMC S20

Outstanding performance anytime, anywhere

GIS 2025
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THE SPECIALIFT

CURVED GLAZING UNIT INSTALL WITH A 3D HEAD

The tricky installation of multiple large, curved glazing units below building overhangs and soffits on luxury apartments/ townhouses in Chelsea, London, required several innovative solutions including the choice of equipment, crane positioning and the sequence of operations.

Open to the public for the first time in more than 150 years the development repurposed a disused site and required the installation of curved glazing units at both the North and South entrances of the building. Challenges included: working in close proximity of the façades and the building, a shallow trench in the main lift area, installation below existing building overhangs and soffits, proximity to pedestrians and the lifting of the curved glazing units.

After completing a site survey, lift plan and risk assessment GGR - which claims to be Europe's leading supplier of such specialist lifting equipment, with the largest fleet of glass handling equipment - recommended a six tonne Unic URW-706 spider crane along with a Libro 1000 3D Head Overhang Beam.

The six tonne URW-706 has a lift height of 19.5 metres and a retracted travel width of 1.67 metres making it relatively easy to cordon off without taking up too much of the pedestrian walkways. Using its outriggers, the URW-706 was able to set up over the shallow trench eliminating one of the potential issues.

The Unic URW-706 and Libro1000 3D Head installing the curved glazing units

The 3D head provided 60 degree powered tilt, and 40 degrees left and right of centre slewing as well as powered 95 degree rotation

The overhang issue was solved using the radio remote controlled Libro 1000 3D Head which provided smooth access to the façade opening and successfully manoeuvred and manipulated the glazing panels into the final installation position. The Libro was ideal as it combined both glass lifting and control together with the capability to install materials below building overhangs with a depth of up to three metres. The unit can install materials to a depth of 3.68 metres, but with a reduced capacity of 400kg. The 3D head provided 60 degree powered tilt, and 40 degrees left and right of centre slewing as well as powered 95 degree rotation allowing the glazing to be precisely fitted underneath the building overhang. The unit has a 1,000kg capacity, weighs 1,472kg and has balance control via a rack and pinion counterweight saddle.

REPLACING GLAZING AT A LONDON ACADEMY

A suitable lifting solution needed to be found to replace a glazing unit weighing 226kg, located 11 metres above the entrance of the City of London, Highbury Grove secondary school building. UK glazing specialist GGR suggested a Unic URW-7035C 'Cube Crane' and a four pad vacuum lifter. The crane features a three section lower boom which can be set at 85, 90 and 95 degree angles, topped by five section jib which luffs down to the horizontal for a sort of tower crane effect with a radius of almost 14 metres and a capacity of up to 380kg at an under boom height of over 10 metres. It can also erect this set up within its overall length, making it extremely versatile and able to deal with some of the most restricted access and confined lifting projects.

Located next to a busy main road, the Cube Crane - with an overall width of 1.5 metres when stowed - was easily delivered within the restricted lane and pavement/sidewalk closures with the tightest access point just 1.7 metres wide. The crane was set up near the confined building entrance at the top of steps leading down to the doorway. With the multi position outriggers extended the crane was able to lift the replacement glazing unit to the second floor at a height of 11 metres, well within its 21.17 metre maximum lift height. The crane also had more than the 6.3 metre lift radius required to cope with the distance between the crane's set up position and final glazing installation position. The crane can also lift almost a tonne at a 6.4 metre radius, and with its radio remote control with bi-axis joysticks and feedback display, the operator had total control of each crane movement.

Installing the 226kg pane

A Unic URW-7035C 'Cube Crane' and a four pad vacuum lifter was use to replace a glazing unit weighing 226kg, located 11 metres above the entrance of the City of London, Highbury Grove secondary school building