



CONTAINER CONTROL

HANDHELD TECHNOLOGY FOR CONTROLLING CONTAINER CRANES HAS BEEN DEVELOPED TO MAKE LIFE EASIER FOR OPERATORS

▷ Since containerization took hold in the 1970s, the ISO 668 intermodal shipping container has become ubiquitous – so much so that we just call it a container. The use of standardized formats cut shipping costs, while the container's flexible nature also sees it applied to tasks for which it was never intended – temporary accommodation, civil construction, and even a shopping mall in post-earthquake Christchurch.

While the container-handling facilities have large overhead cranes for loading trucks, how do you load and unload containers onto trucks when no overhead cranes are available? A visionary engineer in New Zealand saw this challenge looming in 1968 and started the company that today bears the name Swinglift.

The rise of side-loading containers

From humble beginnings, the concept of a side-loading container crane was developed, with models handling 20ft (6m) containers, and then more powerful and flexible models that could lift and transport both 20ft and 40ft (12m) types. The acquisition of Swinglift's technology in 2005 by Patchell Industries, a major manufacturer of container trailers,

injected new energy and technology. The export of Swinglift machines has since flourished, and they are to be found in countries throughout Australasia, the Pacific Islands, the UK, mainland Europe, South Africa and the Middle East.

Optimising the ergonomics

The Swinglift range today maintains the 20/40 types, but also includes models with up to 45ft and 40-ton capacity, high-lift double-stackers, specialized units for empty containers, and even a custom long-reach version for wide loads. So when the time came in 2016 to update the control system on the flagship HC4020, and to launch the new dagger-leg variant, Swinglift had a reputation to uphold.

Ian Patchell, group director, says, "We build the strongest, safest, most reliable side-loader with the lightest tare in the world. We have used Autec LK and MK safety remote controls for many years, and they have a proven track record. So when we developed a sophisticated CANopen-based control system for our new models, there was no question about where to look for the best radio control system."

Swinglift chose the new LKNeo-6 model with an MVRCAN CANopen

receiver, and worked with Autec's network of application engineers to optimize the handpiece layout for the control of the machine. Patchell says, "The unmatched strength and stability of our in-line HC4020 comes from the design of the leg-over stabilizer on which the crane pivots. The design is a result of knowing the sequence of operations that must be performed to load and unload a container. Time is money for our customers, so getting the remote control design right was a must. Autec's application engineers have wide experience with off-road machinery, so understood our needs."

The operator controls on the LKNeo remote include a Jibs/Stabs/Aux switch and four multipurpose buttons that change function depending on the selected mode. Color-coding on the modes and button icons make it clear which functions operate in each mode.

Two-stage process

Loading a container onto the HC4020 involves first deploying the two-stage stabilizer legs, using the Stabs switch on the remote. Typically the front and rear cranes are driven together, but it is sometimes necessary to drive them

MAIN IMAGE:
Swinglift machines
can load containers
onto trucks without
the need for an
overhead crane

BELOW: Autec's
LKNeo-6 enables
safe remote
operation of the
Swinglift HC4020



individually to get the correct deployment, especially on sloping ground. The operator can choose which stabilizers are operated using the 'Front-Both-Rear' toggle switch. The machine's control system calculates the position of the stabilizer foot using inclinometers, and can determine when the stabilizer is correctly deployed – either on the ground, or 'kneeling' on another truck for vehicle-to-vehicle loading.

Differential pressure sensors in the crane cylinders allow the control system to determine the approximate load being supported by the cranes, and this is displayed on the remote control screen in tons. When a load is present on the cranes, their motion is prevented unless the stabilizers are correctly deployed. On the remote control, a 'Jibs Available' or 'Jibs Not Available' icon efficiently communicates this status to the operator, using symbols that change both color and shape. This allows the state of the machine to be displayed clearly and intuitively, even for color-blind users.

Once a load is present on the cranes, the stabilizer functions are locked out. This status is again communicated to the operator via icons as 'Stabilizers Available' or 'Stabilizers Not Available'.

Once the container is successfully loaded onto the trailer, the cranes and then the stabilizers are stowed so that they sit inside the container profile. The system monitors that jibs and stabilizers are stowed and shows an 'Okay To Drive' or 'Not Okay To Drive' icon on the remote.

Different speeds available

All the hydraulic operations of the HC4020 other than the 40/20ft traverse are capable of operating at two speeds.

The Autec remote includes dual-depression push-buttons that are pressed to the first depression to engage slow speed, and pressed more firmly to a second click-stop to engage fast speed. Operators welcome this simple, compact and intuitive control.

While the HC4020 can be power take-off enabled, many users opt for the self-contained version powered by an onboard diesel engine. The machine's control system monitors engine health and displays dashboard style icons for the alternator, engine temperature and coolant level on the remote control.

The machine's inclinometers, pressure transducers and presence sensors are monitored for correct operation, and any anomalies are logged as faults. In the event of a problem, the remote control



can display the Alarm icon together with a fault code to aid rapid resolution.

Appropriate for its environment

The Autec LKNeo remote is particularly well suited to the rugged environment in which the Swinglifts operate. Its fiber-reinforced housing and IP65 environmental rating mean it can take the daily blows of life on the road. It is resistant to a variety of oils, chemicals and solvents, and a shoulder strap and pouch keep it protected as it can be slung out of the way when not in use.

Patchell says, "The operators of the new HC4020 really appreciate the intuitive design, the rugged and compact form factor, and the icon-based display. There is a full-color HMI at the rear for control and diagnostics, but it isn't needed for day-to-day operation. The remote gives you the whole machine status at a glance."

Autec's technical director, Antonio Silvestri, agrees, "I think the approach that Swinglift took to this project is indicative of where the industry is headed. Modern machines have complex control systems that monitor machine condition and operator actions with the aim of ensuring correct and safe use. It is increasingly necessary to provide a display on a remote to efficiently communicate that status. From the compact color screen on the LKNeo series, through to the powerhouse 4.3in [11cm] CODESYS programmable display on our Dynamic series, it is something we see more and more demand for."

Swinglift's design and construction team also appreciated the features of the LKNeo remote. For the design engineers, the unmatched safety performance of Autec remote controls was a big advantage. The receiver on the remote can be configured to suit various safety topologies, including four-wire systems. Space is always at a premium in off-road vehicles, so the installation team appreciate the compact size and rugged construction of the MVRCAN receiver, which permit it to be mounted in the open.

As Swinglift continue to innovate, it knows Autec's LKNeo remote control can bring new capabilities when needed. The LKNeo offers several novel options such as the side-mounted enable button and zero-g sensor to disable the remote should it be dropped. Other programmable features such as range limiting or low-power startup can help ensure the operator has correctly identified the machine being controlled and it is within visual range. **ivT**

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