AUTOMATIC STACKING CRANE SYSTEMS
MAXIMISE YOUR CAPACITY
Automatic stacking crane systems

Automatic stacking cranes (ASC) are rail mounted cranes used for yard stacking and in-stack transportation of containers in the storage area. ASCs deposit and pick up containers from dedicated transfer areas at both ends of the stack. Stacks are located usually perpendicular to the quayside in order to minimise the travelling distances of feeding equipment.

Straddle carriers, Shuttle Carriers®, Autoshuttles™, trailers or AGVs can be used to transport containers between ship-to-shore cranes and the front-end of the stacks. Road trucks can be directly loaded/unloaded by remote control operators or by Shuttle Carriers® or straddle carriers.

Control and monitoring systems provide an optimized operation enabling constant quality and throughput.

Automation benefits
By introducing automation, it is possible to reduce overall operating costs and increase the utilisation rate of equipment. ASC systems are gaining popularity as they offer high stacking density with low labour usage. ASCs can also be gradually introduced to existing handling systems, such as a straddle carrier operation.

Experienced crane & automation system provider
Kalmar has an extensive experience providing automated container handling systems. Kalmar delivers ASC systems, including the cranes, with all related automation, control and monitoring systems. Kalmar takes care of the turnkey project management from the initial design to final implementation, delivery and after sales support.
Cost effective

An automatic stacking crane (ASC) operation has proven to be cost-effective when total life cycle costs are considered.

Storage capacity is very high resulting in effective land usage. Up to 10-wide container stacks can be maintained with little space between the container slots and stacks since no truck or straddle carrier lanes are needed.

Housekeeping can be done effectively during off peak hours maximising throughput at peak hours.

ASC systems are operated nearly unmanned. However, supervising personnel is required to remotely monitor the operational process. The systems enable constant quality independent of external factors such as visibility or weather, and the process itself limits the possibility of human errors.

Environmentally friendly

ASCs produce very little noise and low emissions per a handled container as the cranes themselves do not emit exhaust or evaporative emissions.

ASCs are electrically powered with AC drives requiring minimum maintenance. With modern drive systems, regenerated power can be fed back to the power net further lowering energy consumption.

ASC systems minimise usage of diesel-powered equipment to be used for additional stacking as they take care of the in-stack transportation of the containers within the terminal. With efficient housekeeping in the stacks, the waiting time of road trucks can be optimised, resulting all together in both low particle and noise emissions.
**Next generation**

Since 1990, Kalmar has supplied three different generations of ASCs for the ECT Delta Terminal in Rotterdam. Operation has been extended to 120 Kalmar ASCs running fully automated 24/7.

Kalmar is supplying 24 of its fourth generation ASCs with related control and safety systems for the first phase conversion of HHLA Container Terminal Burchardkai (CTB) in Hamburg. Stacking blocks consist of three cranes, two small cranes and one larger crane able to pass over the smaller machines.

**Typical characteristics ASC***

- Railspan ............. 6-10 containers wide
- Stacking height .... 1-over-6 containers
- Hoisting speed ....... 45-90 m/min
- Trolley speed ........ 60-90 m/min
- Gantry speed ......... 180-270 m/min

*Exact characteristics are depending upon the terminal's layout and design criteria. Running speeds dependant on stack layout and crane dimensions.

Kalmar is prepared to advise customers on the layout and equipment planning of existing or new terminals when introducing automation.
**System expertise**

Kalmar possesses the experience and knowledge necessary to assist customers in automating new or existing terminals. Port Optimizer®, a simulation tool from Kalmar, illustrates in real time the different handling systems as well as the benefits of each individual system.

From the planning phase all the way to the commissioning of an automated terminal, Kalmar can deliver not only the equipment, but also the design expertise and related automation software required in such projects.

**Automation control system**

The terminal operating system (TOS) is used to manage the machines and the location of containers in the yard. The central ASC control system executes the commands received from TOS, taking into consideration factors such as optimal speed, route and collision avoidance. Accurate automated crane movements are achieved with measuring systems and sensors.

The central ASC control system is monitored by control room personnel. Control stations are used to supervise and control the system as well as handle the remote control systems used for example loading and unloading road trucks.

The automated block areas and the manually operated areas of the terminal are usually physically separated to meet safety requirements and protect those working in the yard. Access to the automated area by service personnel and vehicles is controlled by a separate safety system.

A diagnostics system is used for recognizing, notifying and displaying errors and failures. It is applied to each individual crane, the automation subsystems and the central ASC control system.
FOUR REASONS TO CHOOSE KALMAR

1 / TOTAL COST OF OWNERSHIP (TCO)
Kalmar offers the best cost over lifetime for its customers. Modern and innovative technology together with lasting equipment and comprehensive service ensures Kalmar increases its customers’ productivity. Every day.

2 / GLOBAL NETWORK
Kalmar invests in its sales and service network. Thus Kalmar is a reliable and trustworthy supplier with ability to serve demanding customers.

3 / LOCAL SERVICE
Kalmar practises innovative service development. Because of Kalmar’s local customer service strategy, Kalmar knows its customers’ local conditions, and can provide efficient and effective service in every location.

4 / CONTINUOUS DEVELOPMENT
Kalmar has not stopped at the top, but continuously improves its offering. New services as well as investments in automation and environmentally friendly solutions work for our customers benefit.

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