Intelligent intermodal solutions ensure safe and sustainable transport of goods

International trade is constantly changing its ways and requirements for how goods handling should be managed. Terminal development is already being challenged by containerization, automation of ports, increasing volumes of transport and the trend towards combined traffic. Hence, the question of how to interlink logistic processes and available and developing intermodal solutions is the hot topic amongst terminal operators. Finding the right answer to this question is the key to their future success.

Ports are competing with each other to attract international trade traffic. This competition is not about today, but tomorrow. If you are able to provide an efficient interlink between different modes of logistical processes as well as transportation modes, you will be amongst the winners.

We understand terminal operations from both the business as well as equipment perspective. This means that Cargotec technology meets the requirements of both maritime and inland terminal and port operators. Our integrated solutions meet today’s and future demands, seamlessly.

DEDICATED INTERMODAL HANDLING EQUIPMENT

Cargotec’s dedicated intermodal technology has proven the right choice for the increasing number of new intermodal terminals in transferring goods from road to rail, barge and other means of transport.

Facing growing demand for more efficient supply chains and the increasing combination of rail and road transport, we have developed the right equipment selection to enable efficient transhipment of goods at different transport interfaces. Cargotec’s equipment can always be adapted to individual customer needs.

Our dedicated equipment for intermodal handling includes Reachstackers, RTG and RMG cranes, Straddle Carriers, as well as full services for them.

SUSTAINABLE SOLUTIONS

Cargotec’s Pro Future™ is a special brand for environmentally friendly equipment that passes criteria set for energy efficiency, power source, emissions, noise pollution and recyclability. With the help of Pro Future™ solutions, customers can genuinely develop more sustainable operations and reduce fuel consumption.

Cargotec’s equipment and service solutions are rated against five ecological decision-making drivers: source of power, energy efficiency, emissions, noise pollution and recyclability. We believe in rendering transportation more sustainable through our equipment and actions.
Demand for higher efficiency with environmental sensitivity

INTERMODAL TERMINALS ON THE INCREASE

Demand for moving traffic from road to rail, barge and other means of transport is increasing rapidly at the moment. This is due to various environmental reasons, but also because the existing road infrastructure is struggling to handle increasing traffic volumes. This means that more intermodal terminals will be developed in the future. These terminals will require equipment for handling containers, trailers and swap bodies. Such equipment is needed for loading and unloading of railcars and road trucks, transportation and storage in yards.

CHOICE OF HANDLING SYSTEM

The choice of handling system normally depends on several criteria, such as required storage capacity vs space available, labour costs, required selectivity both in vessel and landside operation, shape of terminal, ground limitations and size of operation. Because Cargotec works together with port consultants, we can provide services accurately tailored for your needs.

MORE GOODS ON THE MOVE

Many ports are now or will soon struggle to meet increasing demands on their capacity, in order to handle growing volumes of goods. Intelligent solutions, adapted to manage logistics while meeting environmental requirements, are in demand. The success stories of the ports of Hellberg (Sweden) and Tacoma (US) are inspiring as well as proven cases where Cargotec’s know-how provided sustainable, smart business solutions.

FUTURE TERMINALS ARE PLANNED TODAY

In order to meet these growing demands, terminal operators need to plan their future well ahead. Kalmar Terminal Development® is available to assist our customers not only in planning new terminals for future needs, but also improving the efficiency of existing terminals.

With our wide customer base and product range, we are in an ideal position to collect, analyze and use operational information, so that each application can be handled individually.

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Application</th>
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</thead>
<tbody>
<tr>
<td>Normal wheelbase reachstackers</td>
<td>Loading and unloading of railcars on first railtrack, short distance transport</td>
</tr>
<tr>
<td>Long wheelbase reachstackers</td>
<td>Loading and unloading of railcars on first and second railtrack, short distance transport</td>
</tr>
<tr>
<td>RTG cranes</td>
<td>Loading and unloading of railcars on up to 4 parallel rail tracks, stacking, loading and unloading of road trucks</td>
</tr>
<tr>
<td>Straddle/shuttle carriers</td>
<td>Loading and unloading of railcars (requires special layout), short distance transport</td>
</tr>
<tr>
<td>Terminal tractors</td>
<td>Long distance transport</td>
</tr>
</tbody>
</table>
Reachstackers with unrivalled flexibility

GENERAL
Reachstackers are widely used in intermodal operations due to their flexibility: they can be used for all functions such as loading and unloading of railcars and road trucks, for transportation, and for stacking containers in yards. One or two rail tracks can be accessed from the side. If second rail access is required, a longer wheelbase reachstacker is needed. With a combihandler spreader, trailers can be handled easily. Reachstackers or lift trucks can be moved easily between the rail and yard operations. Long wheelbase reachstackers can also be used for loading and unloading containers directly on and off barges.

RAIL OPERATION
Reachstackers load and unload railcars and transport containers between rail and yard. This concept reduces the overall amount of equipment needed, as there is no waiting between different types of equipment. A distance of approximately 20 metres is required alongside the rail for reachstackers to operate.

MAIN DATA
- Reachstackers are used for all functions: loading and unloading of railcars and road trucks, transportation and stacking in the yard.
- Estimated productivity for container handling:
  - Loading and unloading of railcars: 15 – 30 moves per hour depending on travel distances
  - Stacking: 12 moves per hour
  - Loading and unloading of road trucks: 10 moves per hour
- Note: actual productivity rate depends on the application and should be estimated case by case.

YARD AND LANDSIDE OPERATION
Reachstackers stack containers in block stacks. A typical stack size is 4 deep, allowing 90 or 60 container rows to be stacked in each side. Empty containers can be stacked deeper, if no selectivity is required. Approximately 15 – 30 metre aisles (depending on the wheelbase) are required between stacks. Reachstackers load and unload road trucks in the aisles between the stacks.

PRODUCTS
Kalmar’s reachstacker range varies from a 6 metre wheelbase to an 8 metre wheelbase, depending on the required lifting capacity at distance and whether containers or trailers being handled. Kalmar is the leading reachstacker manufacturer in the world and Kalmar DRF450 is the most popular reachstacker model, both in intermodal terminals and ports.

PORT OF TRELLEBORG
Trelleborg Hamn AB, in Sweden, offers its customers efficient intermodal handling from rail. Additionally, it provides RoRo operations from six ferry lines incoming from Germany and Poland. A combination of Kalmar reachstackers and terminal tractors has been an excellent choice for this high performance intermodal handling port. 2010 was one of the port’s best years ever. Around 18,000 lifts were carried out in the port’s combi terminal using just three Kalmar reachstackers. Right now, the port is planning for a major expansion with the vision of becoming the most environmentally friendly port in the Baltic Sea, supported by Cargotec’s sustainable solutions. Another aim is to increase intermodal handling with a new combi terminal on a 3.5 km new pier.

Note: actual productivity rate depends on the application and should be estimated case by case.
Yard Cranes for high number of rail tracks

GENERAL
RTG cranes can be used both for loading and unloading of railcars and road trucks and for stacking containers in yards. Up to four rail tracks can be covered simultaneously and containers can also be stored at the side of rail tracks. RTG cranes are most effective when high numbers of railcars are handled systematically.

RTG cranes can be moved between rail and yard operations. Reachstackers can also be used within the same terminal, when higher flexibility is required. Terminal tractors are needed for longer distance moves.

RMG cranes are commonly used in large rail operations, as several tracks can be covered simultaneously. With cantilevered RMG cranes, road truck traffic can be easily separated from rail operations.

RAIL OPERATION
RTG or RMG cranes load and unload railcars and terminal tractors transport containers between the rail and the yard. Reachstackers can also be used for shorter distances.

MAIN DATA
- Yard cranes are used for loading and unloading of railcars and road trucks. RTG cranes are also used for stacking in the yard.
- Terminal tractors are used for transportation.
- Reachstackers can also be used for short distances.
- Estimated productivity in container handling:
  - Loading and unloading of railcars: 30 moves per hour
  - Block work: 20 moves per hour
  - Loading and unloading of mast trailer: 15 moves per hour
- Note: Actual productivity rate depends on the application and should be estimated case by case.

YARD AND LANDSIDE OPERATION
RTG cranes can also be used for stacking containers in block stacks, which results in very high storage capacities. RTG cranes load and unload road trucks in the aisles between the stacks.

PRODUCTS
The Kalmar RTG crane range varies from a 4+1 to 9+1 block size, with 1 over 3 or 1 over 6 high stacking. A 1 over 3 stacking height is ideal for loading and unloading of railcars, if no stacking is required. The Kalmar E-One RTG crane features a low emission diesel engine and is fitted with an electric trolley, wheel turning and spreader. It contains fewer critical mechanical components and therefore runs less risk of opportunity for mechanical failures.

The E-One features an impressive service interval of up to 1,000 hours for both the crane and the engine. A zero emission RTG crane with no diesel engine is also available, which should be optimal for intermodal operation, in which frequent changes of blocks are not normally required. Kalmar’s Smarttrail® automatic steering and container positioning verification system both increases productivity and helps to avoid misplaced containers.

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PORT OF TACOMA, U.S.

Cargotec has supplied seven CSC 340 straddle carriers for the Port’s on-dock intermodal rail operations. The units have been used to load and unload double stack container cars at Tacoma’s extensive on-dock rail facility. Facilities at the Port of Tacoma include four dockside intermodal rail yards, operated by Tacoma Rail. There are also excellent highway connections and ample land available for development. Strategically located on the West Coast of North America, the port handles more than 70 percent of the marine cargo moving between the 48 lower States and Alaska.

GENERAL

Straddle Carriers are designed for fast and safe operation and to guarantee high productivity with low operation costs. The Straddle Carrier terminal layout is easy to change according to traffic requirements.

Because the Straddle Carrier works independently, there is no need for any supporting terminal equipment. It can be used for all functions: loading and unloading of railcars and road trucks, as well as the transportation and stacking of containers in the yard. Straddle carrier can be mixed between the rail and yard operations. Long distance moves are easily handled using straddle carriers.

RAIL OPERATION

A straddle carrier loads and unloads railcars. It is able to transport a container over another on a railcar, or over two containers on a twin-stack railcar. Productivity in loading/unloading of railcars is approximately 15 containers per straddle carrier per hour. No buffer areas are needed close to the loading/unloading area.

YARD AND LANDSIDE OPERATION

The straddle carrier transports containers to the stacking area. It can stack ISO containers of all sizes. Typically containers are stacked 2-high or 3-high, in a monumental with extremely limited space at 4-high. A high stacker can be used to further increase stacking density. The straddle carrier loads and unloads rail trucks. It can also drive over and load a container onto a trailer. When unloading containers, the carrier picks the container up off the trailer and transports it directly to the stacking area.

PRODUCTS

The Kalmar Straddle Carrier has the most rigid frame on the market and is the best solution for heavy use. A large ergonomically designed W-type cabin ensures good visibility and high usability. Basic Kalmar Straddle Carrier models are hydrodynamic driven CSC and electrical driven ESC W machines and covers 3- and 4-high machines. The range covers lifting capacities of 40 and 50 tons. The Straddle Carrier spreader is equipped with floating ISO-type twistlocks and can handle both single lift and twin lift operations.

Yard and landside operation

Straddle carriers operate independently

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Kalmar Straddle Carriers are used for all functions: unloading and stacking of containers and road trucks, transportation and stacking in the yard.</td>
</tr>
<tr>
<td>Estimated productivity for container handling:</td>
</tr>
<tr>
<td>- Loading and unloading of railcars and road trucks: 10-15 containers per hour depending on travel distance</td>
</tr>
<tr>
<td>- Rail stacker: 15-20 containers per hour</td>
</tr>
<tr>
<td>Note: actual productivity rate depends on the application and should be estimated case by case.</td>
</tr>
<tr>
<td>Storage capacity is approximately 750 TEU per yard, based on 3-high stacking.</td>
</tr>
<tr>
<td>Optimum solution for medium and large-size operations, when high flexibility and fast transportation is required.</td>
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Global presence and local service bring our solutions closer to our customers.

Cargotec improves the efficiency of cargo flows by offering solutions for the loading and unloading of goods on land and at sea – wherever cargo is on the move. Cargotec’s main daughter brands for cargo handling are Hiab, Kalmar and MacGregor. In addition, Cargotec’s global network offers extensive services that ensure the continuous and reliable performance of equipment. www.cargotec.com