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Photo courtesy of Georgia Ports Authority

# Container Crane Masters

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BY HENRIK SEGERCRANTZ

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The Port of Savannah, owned and operated by the Georgia Ports Authority, is one of the most successful container ports in the U.S.

*Maritime Reporter visited the global head office of Konecranes Plc in Hyvinkää, Finland, to find out about the latest developments in the container handling industry. Konecranes is a major global port lifting equipment supplier, and Dr. Hannu Oja, Director of Port Technology, is a well-known veteran in the business, having worked with Konecranes since 1985.*

“In the overall global environment we work in, container shipping volumes continue to grow, container ships are getting bigger, and container handling cranes need to get bigger in step with the increasing size and capacity of the container port terminals, which have to be optimized for the peak loads.” Dr. Oja describes how the arrival of the very large capacity container vessels has put pressure on the logistical chain. The container terminals have had to invest in larger overall size and capacity, and larger container handling equipment, which has resulted in consolidation among terminal operators. “When the peak load used to be, say, 10,000 TEU it is now 20,000 TEU. The new mega-sized container ships exceeding 18,000 TEU in capacity can only use certain ports due to their size, draft and capacity. Recently, even the International Transport Forum (ITF) has expressed doubt about the wisdom of introducing these mega-sized vessels.” The huge new container ships require a very efficient feeder system (roads and

railways) to and from the container port to distribute the containers. "Smaller vessels, say 14,000 TEU in size instead of 20,000 TEU, can access more ports, which can compete for the business, and provide a faster turnaround time and better land logistics. The business scenario has been upended, lately," Oja summarizes.

"Then, of course, we have the effects of the current global market trends. Container volumes between China and the U.S. have not grown in recent years at the pace of earlier years, which of course raises the question: will the capacity of all these new big vessels be used?" Among the terminal operators, consolidation has been taking place and new alliances have been formed in order to optimize volume and resources. "This is a constantly changing business landscape."

Currently the global market is in recession in some areas, but not everywhere. "Substantial growth has occurred in the United States and West Africa, for example, in recent years," Oja points out. He describes how some major investments have been made in Asia, in Indonesia for example, while the European market has been very challenging for quite a long time, with almost no investment in new capacity except in Rotterdam. The container shipping routes are evolving, not least through the widening of the Panama Canal, which will change the competitive positioning of the East Coast and West Coast ports of the United States. Also, rail container traffic in the U.S. has increased greatly.

Konecranes supplies lifting equipment and service to a wide range of industries globally under several brand names. The company is among the biggest lifting equipment providers in the world within most of its product segments. Through its remote service centers and the world's most extensive crane service network, Konecranes is the market leader in crane service. The company produces most of the crane types used in container ports, including the big ship-to-shore container cranes. There are different types of container terminal depending on the container handling equipment type. In the U.S. and the Far East, rubber tired gantry cranes, or RTG cranes, are common, capable of stacking up to five containers high. Rail mounted gantry (RMG) cranes move on rails and are typically used in container ports with automated container handling systems. In Europe, straddle carriers are common. These are rubber-tired machines that transport one container at a time and to stack up to four containers high. Reach stackers are heavy-duty lift trucks used to handle containers in inter-modal container terminals - inland terminals that deal with road, rail or river-based container traffic. Konecranes is a major supplier of lift trucks for container handling.

Konecranes is in the top echelon of Western suppliers of ship-to-shore (STS) cranes, the biggest container cranes in the container port. Chinese manufacturer ZPMC is the market leader in this crane type, with a global share of some 65 percent. In the RTG crane market, Konecranes is among the top three leading suppliers. In the automated RMG crane type, which moves

on rails, it is the second biggest supplier on the market. The research and development work takes place in Finland where the key components are also produced. The manufacturing of bigger and heavier components, as well as assembly, typically take place near the final destination. Employing some 12,000 people, Konecranes sales totaled EUR 2,126 m EUR in 2015. Some 40 percent of the company's revenue comes from service operations; about 60 percent of revenue comes from equipment sales. The company has some 600 service locations in 50 countries, servicing around 450,000 pieces of lifting equipment, most of which are manufactured by companies other than Konecranes.

There are some 2,000 container ports in the world. Of these, some 500 to 600 ports handle 200,000 TEU to 250,000 TEU annually. Over the years, Konecranes has gained a good foothold in a number of markets. The United States is one of the strongest markets for the company. "Our way of doing business is based on building long customer relationships, where we want to be among the first the customer calls when there is a need for upgrading and expansion," Oja says. "A good example of this is the Port of Savannah, Georgia, operated by the Georgia Ports Authority (GPA). The GPA has been our client since the end of the 1980s. Currently, they have 22 of our ship-to-shore container cranes with 8 in the delivery pipeline, and 136 of our RTG cranes with 10 in the delivery pipeline. In 2015, the Port of Savannah handled around 3.7 m TEU. Savannah's Garden City container terminal is the biggest single container terminal in the United States - although there are bigger container ports. Savannah is a very efficient port. It has been increasing its volume year after year."

The development of container handling technology has been incremental. With the larger container ships came more efficient container handling systems. "Perhaps the most remarkable development has been seen in increasing automation," Oja notes.

He describes how container ports today, in most cases, have manned container cranes, but it's possible today to fully automate most yard crane operations, with human intervention occurring only at certain phases from a remote operating center in the port's control center.

Quayside operations, loading and unloading the container ships with ship-to-shore cranes, is still mainly done by human crane operators.

That said, remotely controlled ship-to-shore cranes have been taken into use successfully in the last couple years. Development in this area is speeding ahead.

There are bottlenecks, however. The shipping container was developed back in the 1960s, and the ships carrying the containers have not changed much since that time when it comes to their loading and unloading.

It is quite challenging to automate this part of the container handling process. "Here we have not seen that much development yet."

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**Dr. Hannu Oja**  
Director of Port Technology  
Konecranes



Photo courtesy of Henrik Segercrantz



Photo courtesy of Konecranes

The TRUCONNECT Remote Service Control Station at Konecranes HQ in Finland and one of three such stations placed around the world.

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The various parties should interact more to promote more efficient methods enabled by new technologies,” Mr. Oja points out.

The development of automated horizontal container transportation from the quayside to the container yard, using automated guided vehicles (AGVs), and incorporating automated stacking and automated road truck loading and unloading, was started in the 1990s by the HHLA Container Terminal Altenwerder (CTA) pilot project in Hamburg. Today, there are a handful of such automated container terminals. In the United States, a container terminal of this type is being developed in Los Angeles.

During its visit to Konecranes Headquarters, Maritime Reporter & Engineering News also got a look at the TRUCONNECT Remote Service Control Station, one of a total of three

such stations located on three continents, together providing 24/7 remote monitoring of more than 10,000 cranes and lifting systems worldwide.

The functioning of Konecranes crane installations around the world are monitored, and information is extracted on their condition. A need for preventive maintenance can be identified, for example, when a roller bearing is getting hot. A software problem can be analyzed and also fixed remotely.

For the time being Konecranes is biding its time regarding decisions to be made related to the ongoing merger process between Konecranes and U.S. lifting and material handling solutions company Terex Corporation. The merger plan was announced last year. In January this year, a Chinese company expressed an interest in acquiring Terex by making a share purchase offer.