

WHITE PAPER 1:
THE SOLUTION TRANSFORMATION

Transforming container handling into solution business



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Introduction

This is the first in a series of four White Papers dealing with the transformation of container handling into solution business. The word “solution” can mean almost anything depending on the context. These White Papers will open up its meaning in the context of automated container handling. Today, only around 10% of container terminals have some form of automated equipment. Most terminals are manually operated, and manual operation will be valid far into the future. These White Papers have been written specifically for terminal operators interested in exploring what automation can bring.

The first White Paper deals with the progress of automation and its corollary, digitization and computing, and the transforming role of OEMs such as Konecranes. The second focuses on automation and its field-proven benefits, arguing that the status quo isn’t good enough. The third argues that terminal design is the foundation of container terminal performance, for good or ill. The fourth deals with the transforming nature of service as intelligence and interconnectedness grow between machines and systems in container terminals.

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The solution transformation: ready, steady, go

Container handling in ports is being transformed by increasingly intelligent automation, increasingly accurate sensors, improved computing in the cloud and at the edge, faster connectivity, machine learning, and the drive for more sustainable operation. This transformation covers both how container terminals are built and how they are operated. Container terminal operators and equipment and service suppliers (OEMs) will see their businesses undergo unprecedented transformation in the coming decade.

Container terminal automation has been around since the 1990s. Even so, today less than 10% of container terminals have some form of automated equipment. This presents a huge opportunity in the container handling industry to improve operations, achieve higher financial results, improve safety and run more sustainable operations. Automated container terminals run at up to 40% less OPEX with less container and equipment damage, while achieving a smaller carbon footprint than their manually-operated peers.

All-important logistical concept

In an automated container terminal, performance towards ship, truck and rail is dependent upon the design quality of the entire system. The performance of individual pieces of container handling equipment is just as important as ever, but significant performance improvement can only be realized within the “logistical concept” of the

terminal, that is, in how the different machines and systems work in relation to each other. Here, there are many possibilities to improve container ship turnaround times, yard productivity and truck handling – the whole can be far greater than the sum of the parts.

With this in mind OEMs, who have traditionally been selling equipment and now aspire to become automation leaders, need to transform themselves into solution providers and even beyond – into sellers of container handling productivity. The OEM of the future will have to master many more skills than the mere making of superior container handling equipment. The new competences to master will be found in container terminal simulation, design, automation, system design and engineering, and data-driven optimization. OEMs will have to contribute value much earlier, in the terminal design phase, to ensure that it will live up to the operator’s performance requirements. Later, when the operator is considering equipment retrofits, OEMs will have to contribute expertise in the definition of the retrofit transition path, ensuring that the new, retrofitted technology improves the terminal’s operations with minimal disruption.

Automation and its sister, digitization and computing, are greatly affecting how container terminals should be designed and built, and also how they should be operated and maintained. Container handling equipment operators are leaving equipment cabins and finding new workplaces in remote operating centers – office environments. This move is a fundamental change in the ergonomics of their work, and it increases the value they can give the terminal. One operator can operate multiple container handling machines, and then shift to other tasks when there is a quiet period in the yard.

Different job descriptions

Equipment operators aren’t the only container handling people affected by the automation

transformation. Maintenance staff will encounter a very different job description. Corrective maintenance is transforming into preventive maintenance, and further to condition-based and predictive maintenance. When container handling equipment isn't physically manned, new sensors and diagnostic tools are taking the place of the operator in hearing, feeling and assessing the condition of the equipment asset. Algorithms using pattern recognition and machine learning are increasingly able to assess the technical state of the equipment by means of sensor output and other maintenance-related data, accurately identifying the need for maintenance. Troubleshooting can increasingly be done remotely, based on real-time data streaming from the equipment. Most maintenance actions can be tackled remotely, or even automatically, based on intelligent data interpretation. Increasingly, artificial intelligence will come into play here, processing the vast amounts of data, and proposing follow-up actions. OEMs will need to know their equipment to a much deeper level in order to provide the tools enabling remote trouble-shooting and maintenance.

OEMs have to do much more

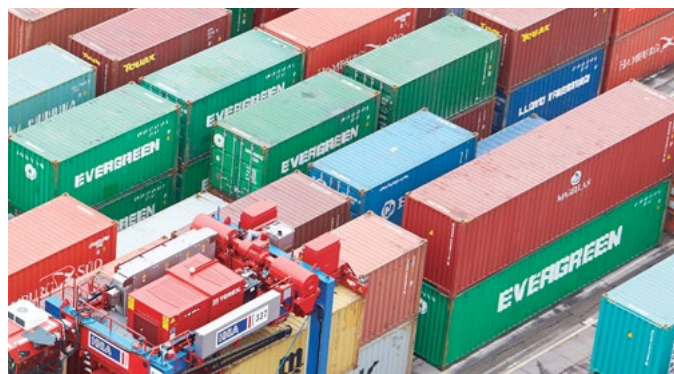
Therefore, the way that OEMs provide service will also have to undergo transformation. Traditionally, the major part of OEM "after-sales" business has come from spare part sales, field service ("greasing") and modernizations (e.g. hybrid drive retrofits). However, in the transformation to solution business, true customer value comes from equipment availability, reliability and productivity. In a digitally connected world, there is almost an infinite number of ways to improve equipment availability and productivity, going far beyond the traditional ways of delivering services. A few examples: just-in-time availability of spare parts (on-site), remote trouble-shooting by OEM experts, continuous machine parameter optimization, and the alignment of operational planning and maintenance planning enabled by the high-quality prediction of maintenance needs.

OEMs need to construct a hardware and software landscape that makes such services possible, while keeping data secure. A likely consequence is that new service business models will emerge, replacing or complementing the traditional ones.


In the near future, all equipment assets will have a constellation of sensors diagnosing the condition of components. Furthermore, all of these assets will be connected and approachable remotely. Data from the assets will flow seamlessly and securely to the cloud. There, it will be continuously analyzed by AI and crunched to predict maintenance needs and improve productivity and performance. If a problem arises that requires trouble-shooting, the OEM experts will soon be there remotely, with the relevant data at hand, to solve even complex problems in support of the terminal's maintenance staff. The OEM will contribute far more to the improvement of terminal operations. Is this just a beautiful vision? No, we're going there right now.

Forward with ambition and courage

OEMs that want to be container handling industry leaders in the future will have to buckle down and undergo their own fundamental transformation. They will have to transform from equipment providers into solution providers. One notable side-effect of automation will be a greatly increased dependence of terminal operators on their terminal systems. To compensate for this dependence, OEMs will have to guarantee high levels of equipment and system availability and performance. Ambitious, courageous OEMs will provide such guarantees as solution providers doing solution business.





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