WayUp

Konecranes and Valtteri Bottas
A winning partnership

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A MAGAZINE ABOUT LIFTING BUSINESSES™ 1/2017
Konecranes is a world-leading group of Lifting Businesses™, serving a broad range of customers, including manufacturing and process industries, shipyards, ports and terminals.

Konecranes provides productivity-enhancing lifting solutions as well as services for lifting equipment of all makes.
Human + Machine

As the pace of innovation continues to advance, we should expect technology to keep transforming the way we live and work. Companies are only beginning to realize the potential of these technological gains, and the most dynamic ones understand that the greatest value of new generation machines lies in their ability to augment – not only automate – work.

At Konecranes, we believe in creating products with intelligent and intuitive features which are not mere extensions of ourselves, but collaborators as well. Human intuition drives machines forward, and in turn these machines enhance our skills and intelligence with data.

In this issue of WayUp, we take a look at our new partnership with Finnish Grand Prix-winning driver Valtteri Bottas. Our business and the motorsports world are similar in many ways, as we both place a strong emphasis on performance, technology, safety and teamwork. I am very excited that we are joining forces with Valtteri, who has all the makings of a true champion and works around the world while remaining true to his roots in Finland.

Our piece on the Industrial Internet of Things, meanwhile, explores what governments in mature economies are doing to promote competitiveness in the so-called fourth industrial revolution. Amid the digital transformation that is set to influence the way entire nations function, people will still play a vital role.

We have also included stories on sensors, automated cranes and battery electric vehicles. These solutions enable people to make better decisions, work more efficiently and more sustainably.

For us at Konecranes, it’s a humans plus machines future, not humans versus machines. While there are risks, as there are with any technology-fueled disruption, the potential benefits outweigh them. This emerging synergy is a force for positive change, boosting our ability to acquire better skills and making jobs more fulfilling.

We hope you enjoy reading WayUp magazine.

Mikael Wegmüller
Editor-in-chief
Konecranes is very pleased to announce a global marketing co-operation agreement with Finnish Grand Prix winning driver Valtteri Bottas. Under the terms of the agreement, Konecranes will be an “Official Partner of Valtteri Bottas” until March 2018.

Konecranes sees strong parallels between the lifting business and the motorsports world, particularly in the areas of equipment (with gears, engines and controls all purpose-built for their respective environments); teamwork (which in both worlds is as much about performance as it is about safety); and technology (which is always at the leading edge).

The partnership was officially unveiled by Konecranes CEO Panu Routila at the company’s annual management conference in Madrid on 16 May. He was joined on stage by Bottas, fresh off the track from the Barcelona Grand Prix over the weekend.

“Valtteri has all the makings of a true champion and we’re very excited to work together with him on this mutually-beneficial partnership,” says Routila. “Around the globe, Konecranes is recognized for being a technology leader, specifically in the areas that are core to any lifting operation: the gears, the motor and the controls. Together with new services such as Konecranes TRUCONNECT for remote monitoring, our business has strong parallels with the motorsports world, where top performance is also dependent on innovative technology, excellent teamwork and relentless focus.”

To see how power meets control, and to enter the Konecranes world of lifting with Valtteri Bottas, visit konecranes.com/powermeetscontrol

Faster problem solving and improved safety with TRUCONNECT

“The cranes’ maintenance cycles can range between two to four weeks, so previously it could take us up to a month to get insight into their condition. Now, with TRUCONNECT, we have automatic access to data and receive notifications of issues quickly.

There was a case a few weeks back where TRUCONNECT notified us of a hoist overload in one of the cranes. With the system in place, I could find out exactly when and where the overload had taken place, and address the issue immediately, making sure the problem would not recur. It’s a good example of how remote monitoring helps us correct issues promptly, ensuring safety.

The main benefits are increased safety and a greatly improved overview of the equipment. We’re able to respond to problems much faster. At the same time, we are only in the early stages of using TRUCONNECT. There is even more potential to be uncovered, when we can integrate more detailed data of the cranes, such as information about brakes and other components. There’s a lot more we can do in the future.”

Ilkka Hurskainen
Cranes and Electrical Technician, Holmen Paper

The number of equipment units connected to the TRUCONNECT remote monitoring service exceeded 14,000 in the first quarter of 2017, and it’s only continuing to rise. TRUCONNECT is a suite of remote service products and applications that provide visibility on crane usage, supporting maintenance operations.

Companies that use TRUCONNECT, like Holmen Paper in Sweden, benefit from valuable information such as the equipment’s running time, work cycles, motor over temperatures, emergency stops and brake condition. Also, with TRUCONNECT Remote Support, they have 24/7 access to crane experts and specialists offering problem solving and troubleshooting. This helps reduce unplanned downtime even further.

Using sensors to collect data, TRUCONNECT serves as an important building block in delivering Lifecycle Care in Real Time. Lifecycle Care is Konecranes’ comprehensive and systematic approach to maintenance, supported by world-class tools and processes.

Businesses from various industries in more than 50 countries are gaining advantages in safety and productivity with TRUCONNECT. The service can monitor both Konecranes and non-Konecranes equipment – from overhead cranes, port cranes and application-specific cranes to lift trucks.
The BOXPORTER RMG is built using a modular design approach that provides the efficiency benefits of standardization while offering opportunities for tailoring with optional features.

Connected
The BOXPORTER RMG comes with TRUCONNECT, a connectivity service that brings together all relevant crane usage data for informed decision-making through a single interface, yourKonecranes.com. This provides the operator and service managers with the clearest view into operations.

Freedom to choose
Modularity gives an opportunity to choose the rail span and operational width. The crane is delivered in three sizes, S, M and L, with different lifting heights, to cater for all operational needs.

The clearest view
Optimized cabin position offers superb visibility for every container move, intended to improve safety and productivity.

Steady drive
BOXPORTER comes with Active Load Control (ALC), designed to eliminate container sway. It allows the operator to move the spreader, not the crane, when carrying out the loading and unloading tasks.

Smart cabin
Video technology and an advanced graphical user interface give the operator pinpoint control. The cabin monitor displays control information allowing an extended view of the handling action.

Core of Lifting
Key components like motors, gearboxes and the control system are all designed in-house. This contributes to increased reliability and longer crane life.

Financial ease and security with Konecranes RENTALL
Konecranes RENTALL is a new, convenient rental service, where instead of buying, the customer has the option of renting a crane for a fixed period of time - typically three to seven years. It’s all about offering customers flexibility in their operations with predictable costs.

With the new Konecranes RENTALL service, customers pay a fixed monthly fee and ownership of the crane remains with Konecranes. Preventive and routine maintenance, repairs, parts replacement, 24/7 on-call service, and TRUCONNECT Remote Monitoring are all included in the monthly fee.

“Businesses are intrigued by the ease of renting and the financial flexibility of the service,” says Raine Jussila, Product Manager of Konecranes RENTALL.

Jussila says that feedback from customers so far has been positive, encouraging the launch of the service into other markets. Konecranes RENTALL is now available in Finland, Sweden, Norway, the UK, Singapore and Australia.

Cranes are essential for setting up new production or upgrading existing facilities, but they are also a considerable financial investment, especially for smaller businesses. While Konecranes RENTALL is suitable for businesses of all sizes, so far demand has been especially strong among small-to medium-sized companies, Jussila notes.

“With the rental service, the crane is not as big of an investment, but rather, a regular monthly operating expense. Smaller businesses appreciate this alternative to purchasing a crane and being able to pay smaller monthly installments rather than having to make a significant capital investment.”

In addition, the service results in more manageable equipment costs and more time for businesses to focus on the core business, Jussila emphasizes. If there are changes to production, the crane can be upgraded.

Contributing to the circular economy
At the end of the fixed rental period, customers have the option of either continuing the rental agreement, buying the crane at a price stipulated at the start of the rental period, or returning the crane to Konecranes.

Jussila sees potential in extending the lifecycle of the rental fleet by reusing the most essential and valuable parts from the cranes.

“Contributing to the circular economy is important for Konecranes, and this service definitively has the potential of facilitating that through the possible reuse of components from the cranes. This however, depends on how many customers choose to buy the cranes and how many opt to return them,” he explains.

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More stories at wayup.konecranes.com
BUSINESS

ENVIRONMENTAL PRODUCT DECLARATIONS –
Transparent information on products’ lifecycle impacts

Satu Kaivonen, Environmental Specialist, contributes to continuous
development in Health, Safety and Environment (HSE) at Konecranes by
driving strategic priorities in corporate responsibility through practical
actions. She is responsible for managing the implementation of the
ISO 14001 environmental management system in all the company’s
production units worldwide.

What is an Environmental Product Declaration, and what kind of information does it contain?
An Environmental Product Declaration (EPD) is a standardized way of quantifying a product’s envi-
ronmental impact. It is an independently verified and registered document that aims to transparently
communicate information about the impact of the product’s entire lifecycle. So far, Konecranes has five
separate EPDs for different products. These are for the SMARTON bridge crane, the CXT wire rope hoist,
and for our Ports products such as the Rubber-Tired Gantry crane (RTG), and now also for the Automated
Rail-Mounted Gantry (RMG) crane.

In creating Konecranes’ EPDs, we used the general
requirements stated in the standards for Environmental
Product Declarations, ISO 14020 and 14021. We evaluate the lifecycle environmental impacts of
our products covering the production of raw mate-
rials and components, manufacturing, use and main-
tenance, all the way to the disposal of the product, as well as deliveries between each stage. We also
account for products’ energy efficiency as well as carbon emissions during the operating cycle.

EPDs give a quick overview about the relevant
eco-efficient features of a product. While they high-
light our technological expertise, they also point out
the main impact during the lifecycle that we aim to
influence. Konecranes’ ideology about all types of
environmental information or marketing is to always
base them on facts. We are committed to reporting
transparently, and therefore have a third party veri-
fying all the EPD material. In these recent cases, we
have employed the auditing and advisory firm, KPMG.

Why are EPDs relevant to customers?
In today’s market, manufacturers need to back up their
eco-efficiency claims. Our customers need relevant,
credible and transparent information about our prod-
ucts’ environmental impacts, their energy intensity
as well as information on how to operate them more
safely and efficiently. We believe that this is provided
most effectively by EPDs that are made according
to clear standards and verified by external experts.
Outside experts’ verification enhances the transpar-
cy of our claims as well as customers’ trust.

Some of our customers ask us to report carbon
emission data anyway, so the EPD calculations
support this effort. We see EPDs as one way of
addressing customer needs and communicating
about the environmental aspects of our products.
We are determined to continue making EPDs for
relevant existing products as well as new ones.

Why is Konecranes placing an emphasis on EPDs,
and how do they fit into the company’s strategy?
We place lots of emphasis on the R&D stage, as
almost 80% of our products’ environmental impacts
are determined in the design phase. As a result, our
products’ and services’ environmental performance,
particularly regarding low emissions and high effi-
ciency levels, support our wish to be the market
leader in eco-efficiency in material handling. Kone-
cranes is committed to the Design for Environment
(DfE) approach in product development and the
EPDs are just one deliverable that comes out of that
process – the main result is a high-quality, eco-effi-
cient product.
Today, the milestone of having a million Battery Electric Vehicles (BEVs) in use is already behind us. Will we see the electric car continue to escalate as a trend, and will it emerge as a serious contender for the place of traditional motor vehicles?

Only a decade ago, the number of electric cars on the road was measured in hundreds. As of 2016, Chinese manufacturer BYD alone shipped over 100,000 units. It cannot be denied that BEVs have come a long way.

Morgan Stanley recently predicted that BEVs would comprise seven percent of the global car market by 2025. Others such as Exane BNP Paribas see that figure as conservative, estimating that their share may even reach 11 percent by this point.

While it has been demonstrated that BEVs can be as practical, safe and affordable as the public expects, the market still lacks the policy support necessary for mainstream adoption. In terms of technology, the pace of progress is somewhat faster – even without the economies of scale that wider adoption would confer – and carmakers have recently announced battery ranges exceeding 300 kilometers.

The environmental angle

The sustainability of BEVs in relation to their petrol-powered counterparts is another interesting question. Are they the definitively greener alternative? While detractors have pointed to the manufacturing footprint (typically higher), such a black and white argument fails to state the case accurately.

After taking the undeniably larger emissions due to manufacture into account, and counting them as a cost spread across the life cycle of a BEV, what remains depends entirely upon the electricity used to charge the vehicle, the emissions data of which will reflect the electricity source used. In other words, positive developments in energy production more generally will also accrue with this category of vehicle. Globally, as energy producers enable emission reductions in the energy mix, electric cars will benefit statistically from the same advances.

Hydrogen fuel cell cars as an alternative

While there has been media interest in the hydrogen-fuel-cell-powered car as a competing alternative to BEVs, recent studies have tended to come out in favor of BEVs of emissions reductions.

According to a study conducted by scientists at Stanford University and the Technical University of Munich, the hydrogen vehicle infrastructure provides few additional energy benefits for the community besides...
Konecranes Gottwald automated guided vehicles (AGVs) are unmanned, software-controlled container transporters, which provide an efficient link between the harbor quay and the stackyard in large container terminals.

Having introduced Konecranes Gottwald AGV technology to the market over 25 years ago, the company has been developing the concept continuously ever since. With a constant focus on improving electrical drive power, simplifying construction and reducing vehicle weight while providing higher load capacities, the offering has lately been refined to provide low fuel consumption, high cost-effectiveness and environmentally friendly operation. The same technology used in electric cars has also been employed in Konecranes range of AGVs, with diesel-electric or battery-powered drive systems both available.

In terms of overall costs, the study maintains that BEVs are superior to fuel cell vehicles for reducing emissions, and that to be competitive, hydrogen cars would have to be priced much lower— an unlikely scenario as the prohibitive manufacturing footprint currently stands.

The manufacturing outlook

With confidence growing in BEV solutions, but legislative support for the necessary infrastructure still perhaps a way off, the ball appears to be in the manufacturers’ court. Indeed, public commitments to the cause have been numerous and bold, and a variety of ambitious developments have hit the headlines in the past year.

One of particular interest is the forthcoming announcement of Tesla’s so-called Gigafactory Europe, due in 2017. The company’s Buffalo site has already established itself as the largest production facility for electric battery cells in the western hemisphere, and with a colossal investment at stake, a number of countries, including France, Finland, Portugal and Spain have been actively campaigning to have the new factory located within their jurisdictions.

In Finland, representatives of the western coastal city of Vaasa have been working to convince Tesla Motors of the viability of establishing Europe’s first Gigafactory in the Ostrobothnia region.

Vaasa’s officials have pointed to the city’s strong energy-tech presence, and to its location in relation to the rich lithium deposits of the nearby Kaustinen and Kokkola municipalities. With competing bids from several diverse manufacturing centers across Europe, victory is hardly assured, but success in this initiative would not be the first surprise blow struck by the dynamic Finnish industrial sector.

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The new generation of condition monitoring solutions relies predominantly on sensors and smart algorithms. Simon Jagers, founder of Semiotic Labs, says that soon these systems will evolve into fully automated production lines.

KONECRANES AGVS

SENSORS AND SMART ALGORITHMS: Keys to predictable maintenance

The new generation of condition monitoring solutions relies predominantly on sensors and smart algorithms. Simon Jagers, founder of Semiotic Labs, says that soon these systems will evolve into fully automated production lines.
The role of governments in the Industrial Internet of Things (IoT) race

The Industrial Internet of Things is moving industry toward a platform economy where different businesses and players – industrial companies, their clients, technology providers and possibly financiers from the banking or insurance sectors – come together on a shared platform to create value. Viable business models are, however, only starting to emerge.

Prof. Martti Mäntylä

Simon Jagers, founder of Semiotic Labs, says that soon, however, these will evolve into decision support systems, assisted decision mechanisms and fully automated processes.

Current developments in condition monitoring enable Condition Based Maintenance (CBM) regimes. CBMs address challenges at both the demand and supply sides of the maintenance equation. On one hand, asset owners can schedule maintenance before breakdowns occur or when performance desists. In doing so, they minimize both planned and unplanned downtime. On the other hand, original equipment manufacturers and maintenance service providers can offer uptime guarantees and “power by the hour” models based on remote online condition monitoring systems. Both benefit from insight into the condition of assets.

The new generation of condition monitoring solutions relies predominantly on sensors and smart algorithms. Sensors are constantly becoming cheaper, better and smaller due to innovations in the smart phone industry. The resulting influx of data provides fuel for the development of better algorithms that predict when and why equipment fails. Over the next couple of years, we’ll see these systems evolve from smart filters via decision support systems and assisted decision applications into fully automated production lines.

How smart filters work

Smart filters enable maintenance professionals to focus on assets that require attention. These filters use sensor data and turn it into patterns of behavior. Using self-learning algorithms, these systems indicate which assets exhibit healthy behavior patterns and which don’t. Maintenance professionals use this information to focus on assets that are suspect instead of spending time on inspections of healthy assets.

Over time, smart filters evolve into decision support systems. Algorithms underpinning smart filters learn to recognize patterns and label them according to failure causes. Further analysis uncovers the time to live for these assets. With this information about when and why equipment fails, maintenance professionals can decide which actions to take to minimize downtime and operational risk.

The future of human intervention

Converging systems lead to assisted decision applications. Suppose your decision support tool identifies a failing motor and the cause and time of the upcoming failure. If that application is integrated with your scheduling tool, is aware of demand forecasts, and can verify spare part availability from your supplier’s system, then the application will be able to schedule the optimal time for mitigating actions.

A human operator subsequently reviews and approves these suggested actions before they are initiated. With the ever-increasing quality of sensors and algorithms, human intervention will soon prove to be unnecessary. When that time comes, we’ll see the advancement of fully automated systems that operate production lines.

Investing in sensor technology

Filters, decision support systems and fully automated shop-floors – all of these rely on the availability of quality data. From a condition monitoring point of view, data from Programmable Logic Controllers (PLCs) and Supervisory Control and Data Acquisition (SCADA) systems is often insufficient to deliver high accuracy and timely warnings.

To capitalize on the smart condition monitoring developments, it is essential to start investing in sensor technology for existing assets and purchase new equipment from vendors that equip assets with high quality sensing systems. It might be the best investment you’ll make this year.

Simon Jagers
Founder, Semiotic Labs

Jagers is seen as one of the leading voices in the field of artificial intelligence-driven maintenance. His company specializes in reducing unplanned downtime by combining sensors, machine learning algorithms and domain knowledge on an online platform that predicts when and why equipment fails.

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Governments, especially in mature economies, are waking up to the possibilities of the industrial internet. But are they creating the right conditions to capitalize on what is being called the next industrial revolution?

Although perhaps the consumer side of the Internet of Things – from smart homes and self-driving cars to wearable devices – generated greater media hype, the focus has recently shifted to its implications on industry. Heralded as the new frontier of digital disruption, the Industrial Internet of Things – or IIoT – is expected to be a game changer. It is set to shake up the way businesses – even entire economies – work, transforming such pivotal industries as manufacturing, agriculture, mining, transportation and healthcare.

Accenture estimates that the Industrial Internet could add more than 14 trillion dollars to the global economy by 2030. “Winning the Industrial Internet of Things,” the consulting group’s report from 2015, suggests that early adopters – be they companies or nations – stand to make considerable gains in terms of productivity and competitiveness. In other words, the IIoT could deliver huge economic rewards, but only to countries prepared to capitalize on its growth.

It’s no wonder then that governments around the world are aspiring to lay the foundations for a successful IIoT strategy. But what exactly does it mean when industry goes digital? And what role do these governments play in the transition to the next era of industrialization?

**Shifting industrial logic**

The IIoT involves combining industrial hardware with digital software. Machines and devices are fitted with data-collecting sensors and linked to clever programs to analyze big sets of data. Equipped with sensors and connected to a network, industrial production lines, factories and supply chains can be managed and inventoried by computers in real time, and more transparently and efficiently than before. For instance, equipment breakdowns and maintenance needs can be detected preventively, increasing productivity and improving worker safety. And these are only the first steps.

Beyond efficiency gains and cost savings, the creation of intelligent networks that govern industrial production enables the emergence of new business models and revenue streams.

“Instead of manufacturing concrete products, industrial companies can start to deliver abilities or outcomes.”

**Greater cooperation is key**

However, moving to new, data-driven business models is not something individual businesses can do alone. It requires a more collaborative approach than the traditional industrial model.

“The IIoT is moving industry toward a platform economy, where different businesses and players—industrial companies, their clients, technology providers and possibly financiers from the banking or insurance sectors—come together on a shared platform to create value. Viable business models are, however, only starting to emerge,” Mäntylä says. It seems that the industrial internet is now at a threshold. While the raw technological conditions for its wide adoption are in place (according to an estimate by Huawei, the number of sensors and smart devices worldwide is expected to reach 100 billion as early as 2025), and efficiency gains are already being made, the truly transformative IIoT revolution is only starting and will require more fundamental changes in the way companies operate.

As value creation through the use of data requires a supporting ecosystem, businesses can’t do it alone.

To spur on the next phase of development and greater cooperation in IIoT, several international development projects and initiatives are afoot around the world.

“What the industrial internet allows is a shift from linear value chains to network-based value creation,” says Professor Martti Mäntylä from the Industrial Internet campus at Aalto University. “Instead of manufacturing concrete products, industrial companies can start to deliver abilities or outcomes.”

Greater interoperability of different intelligent systems, new security frameworks, and open, global standards as well as real world implementation of new solutions to test their viability are all needed to drive innovation forward.

All this calls for cooperation between industry players and stakeholders such as software developers, academia and governments. Policymakers, for instance, need to create a legislative framework that motivates businesses to develop the IIoT while also protecting data security.

**Industrial Internet in the US, Industrie 4.0 in Germany**

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In the US, the effort has been mostly business-led with the Industrial Internet Consortium, founded in 2014 by AT&T, Cisco, General Electric, IBM, and Intel, bringing...
industry players together to accelerate the development and adoption of industrial internet technologies.

In Europe, the European Commission has been active in supporting regional cooperation and the digitalization of industries, and is pushing for regulatory walls to be torn down to bring about an EU-wide digital single market. Concrete measures proposed include speeding up the development of common standards in areas like 5G communication networks and cybersecurity, and modernizing public services.

In terms of individual governments in Europe, Germany has been in the vanguard with Industrie 4.0. The strategic initiative brings the public and private sectors and research institutions together to advance Germany’s competitiveness in the so-called fourth industrial revolution. Its premise is that, much like steam power and mechanized production did in the late 18th century, electric power and mass production in the early 1900s, and information technology and automation since the 1960s, Industrie 4.0 will revolutionize industrial production and societies.

Germany’s Industrie 4.0 approach focuses on building smart factories, in which intelligent machines make decentralized decisions about production and maintenance. It seeks to build on Germany’s strengths, such as its highly advanced automotive industry, but enhancing them with new IoT possibilities such as strong customization of products through flexible production.

“Wider collaboration

While it may seem like countries are trying to oust each other in the race towards the next industrial revolution, there is also significant cooperation across these different national and regional development initiatives. The German Industrie 4.0, for instance, has entered into collaborative agreements with the US-based Industrial Internet Consortium, Japan’s Robot Revolution and Made in China 2025, and is involved in an EU-wide program called “Digitizing European Industry.”

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A joint approach only makes sense. Successfully reaping the benefits of IoT is not a zero-sum game but a collective effort across global value chains. Much of it requires that products and programs created and owned by different companies in different parts of the world are able to connect to each other and share data. This, in turn, calls for the creation of global standards and legal frameworks agreed upon internationally.

As Mantyla puts it, “Making the industrial internet work is not rocket science. All the building blocks exist. Now it’s really more about creating interfaces so the different parts fit together.”

Where do people fit in?

As companies and governments develop ways to adapt to and benefit from the IoT, there is also concern about how the fourth industrial revolution will affect the labor force. With autonomous machines running by smart software, will Industry 4.0 need people at all?

Indeed, some claim that as greater automation and artificial intelligence are applied to industry, many jobs, especially the lower-skilled ones, are likely to become redundant. And the remaining ones will probably require learning new skills to enable working alongside smart machines, and adapting to advanced technology. A Deloitte research report entitled “Essential Skills for Working in the Machine Age” outlines the situation:

“...There’s never been a better time to be a worker with special skills or the right education, because these people can use technology to create and capture value. However, there’s never been a worse time to be a worker with only ‘ordinary’ skills and abilities to offer, because computers, robots and other digital technologies are acquiring these skills and abilities at an extraordinary rate. Others insist that though jobs will change, there will still be plenty of work – and that it will actually be increasingly engaging and productive. Accenture’s research, for instance, suggests that the next generation of digital technology could also benefit workforces of the future by augmenting their abilities: technology can help less skilled workers perform more demanding tasks. One thing is clear, whether you’re at the helm of a company, a country, or just your own career, preparing for the fourth industrial revolution by ensuring digital literacy and being adaptable to quickly-changing conditions will likely pay off.”

Successes reaping the benefits of IoT is not a zero-sum game but a collective effort across global value chains.

3 FACTS

1. IoT sensors and devices are expected to surpass mobile phones as the largest category of connected devices in 2018.

2. Machine-to-machine (M2M) connections are expected to grow to 27 billion by 2024.

3. Of the companies involved in IoT, two-thirds name interoperability and security as their greatest challenges.
Improving the country’s infrastructure has been a top priority for the Indonesian government under President Widodo’s leadership, and a great deal of investment has been committed to upgrading the archipelago’s ports network. The aim — to boost Indonesia’s competitiveness as a hub for container traffic in Southeast Asia.

“Indonesia is investing enormously in its transport and logistics infrastructure, including ports, to continue its sustainable economic development. The Pelindo projects are central to the whole plan,” explains Bobby Dayoh, Senior Manager of Pelindo III.

At the time of its inauguration, Lamong Bay Terminal in Surabaya, East Java, was referred to as the jewel in Pelindo III’s crown — an apt description, given the degree of investment allocated to perfecting its technological systems.
In 2013, Konecranes delivered an automated container handling system to Lamong Bay which included a total of 20 Automated RMG (ARMG) cranes, 10 Ship-to-Shore cranes and five Straddle Carriers.

“Konecranes offers quality products that meet our requirements with a competitive price. Konecranes also constantly innovates its products to answer container terminal needs,” Dayoh says. “For these reasons, we also chose Konecranes as our partner for the second project.”

Dayoh refers to another industry-first order that Pelindo III commissioned from Konecranes in 2014, this time, for Phase 1 of an Automated Rubber Tired Gantry (ARTG) system, including eleven ARTG cranes. These were successfully ramped-up for commercial operation in Terminal Petikemas Semarang, Pelindo III’s container handling facility in Central Java, by the end of 2016.

During the implementation of phase 1, Konecranes received Pelindo III’s order for phase 2 of the project. It is anticipated that nine more ARTG cranes will be delivered to the terminal by the end of 2017.

All the pieces of the puzzle

According to Konecranes’ project managers, Mika Rapeli and Tommi Saarinen, the delivery to Lamong Bay was instrumental in Konecranes’ journey to becoming a provider of completely automated systems. In container handling, the solution provider’s goal is to offer totally automated solutions. The continued trust of Pelindo III demonstrates Konecranes’ ability to supply all the pieces of the automation puzzle.

“We have delivered hundreds of ARMG cranes, but the delivery to Lamong Bay Terminal was the first Konecranes Automated Stacking Crane system with our own automation technology. We were determined to make a success of this project,” Saarinen says.

“This project proves again that we are a leading automation supplier. We have the technical know-how, the mindset and a deep understanding of what the customer needs. This is about fully delivering on the promise of automation: increasing the safety, productivity and predictability of the customer’s operations,” Saarinen asserts.

Rapeli is pleased with the attention that the project has brought to the Konecranes ARTG: “We are very excited that our ARTG system has taken its first steps and is now running. New customers have been showing considerable interest in it, so the future looks bright.”

At the facility’s inauguration, Mr. Prasetyadi, President Director of Lamong Bay Terminal, was equally optimistic:

“Thanks to the reliability, productivity, predictability and safety provided by our Konecranes automated container handling system, we will provide our shipping line customers with uninterrupted, reliable container flow. This will be the key to build up business success in Indonesia and South-East Asia,” Prasetyadi said.

From design to final testing

A wide range of field expertise came into play in both projects. Rapeli and Saarinen describe the cooperation between Konecranes and Pelindo III as successful and productive.

“Open dialogue and a constructive attitude between all parties was a must. A vital factor has been our ability to keep to the schedule and fulfill the technical requirements of this very demanding automation project,” says Rapeli.

According to Saarinen, a highlight of the project was Konecranes’ ability to exceed expectations in the technical performance of the automated system: “The automation

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Lamong Bay Terminal’s automated container handling system includes improved Remote Operating Stations (ROS)
design team went above and beyond their normal responsibilities. They were intimately involved in the design and extensive pre-testing of sub-systems and integrated systems in Konecranes’ automation R&D facilities. “Furthermore, bringing the commissioning and final testing of the system on-site with the same key individuals was a way of ensuring that the implementation went very well. Stakeholder management likewise played an important role in the success of this project,” Rapeli recalls. Rapeli recalls that while there were highlights during the project execution, there were some obstacles as well. These were solved with creativity, flexibility and hard work. Emphasizing the importance of combining global thinking and local cultural understanding, Rapeli says that “in any other market, you must listen to the customer, show respect and keep your promises,” Rapeli says. “The general sentiment I witnessed while I was in the country was one of ambition and eagerness to develop and adopt the latest and greatest technologies,” he recalls. 

**Lamong Bay Terminal**

Lamong Bay Terminal, Indonesia’s first automated container handling facility, was opened as part of the nationwide freight transport improvement program. The terminal will increase the Surabaya port’s annual capacity from 1.5 million twenty foot equivalent units to 3.5 million TEUs. When the port is operating fully, the total capacity will be 5.5 million TEUs.

**Pelindo III**

PT Pelabuhan Indonesia III (Pelindo III) is a port operator, and one of Indonesia’s largest state-owned enterprises. It manages 43 ports with 16 branches throughout seven provinces in Indonesia, including Central Java, East Java, Bali, West Nusa Tenggara, East Nusa Tenggara, Central Kalimantan, and South Kalimantan.

**3 FACTS**

1. With a population of 260 million spread across 17,000 islands, Indonesia constitutes the world’s 10th largest economy.
2. In its 2016 budget, the Indonesian government earmarked the highest amount ever allocated to infrastructure development, approximately US$ 22.9 billion.
3. Indonesia has more than 24 state-owned enterprises (SOEs) operating across different sectors. These can potentially borrow from the financial markets to fund infrastructure projects, for example.

Source: World Bank

**CHALLENGE & SOLUTION**

ENABLING CRANES’ SENSORS TO SELF-CLEAN

**Location:** Hyvinkää, Finland. Challenge: Moisture or dust can keep cranes’ optical sensors from functioning properly. **Solution:** Innovate a nanotech coating to keep sensors clean and dry.

In 2013, Konecranes was in the process of developing fully automated cranes that were highly dependent on sensors. At that time, sensors were becoming even more valuable as a component for reliable crane operation. Hannu Jyväsjärvi, Chief Electrical Engineer in Rail Mounted Gantry (RMG) and Automated Stacking Cranes (ASC) at Konecranes, had been working on ASC projects and seen the problems first hand – cranes operating in difficult environments, exposed to rain, dust, mist and other conditions which impaired their sensors’ performance. Jorma Merimaa, Chief R&D Engineer, who is involved in crane projects and developing camera systems, had observed similar challenges in his work in the field. Clearly, a solution was needed.

Together with Chief Engineer Ari Nieminen, who works in R&D projects and machine testing, they began investigating solutions in nanotechnology, a discipline where, for the past decade, rapid advancement had been made in special coatings. The team considered using the desirable properties of certain chemical substances by building them onto surfaces. The method they ultimately honed in on was that of treating sensors’ surfaces with a protective nanotech coating. They began exploring coating substances some years ago, and following several rounds of testing over about ten months, found a viable solution.

**Enlisting the fire brigade**

One step of the testing involved unusual participants – the voluntary fire brigade of the town Hyvinkää, an important center for Konecranes’ R&D activities, and the location of the company’s global headquarters. Fire trucks were needed as tests were being carried out in the late summer, when it was dry and testing naturally required rain or at least water from fire hoses in the absence of rain. “They came with their fire trucks and pumps, and hosed water skywards to simulate rain,” Nieminen recalls with amusement.

A few months later, the hydrophilic coating for sensors, which had been developed fully in house at Konecranes, was applied to ten ASC cranes due for delivery to a customer operating in the port industry in Southeast Asia.

Other applications

Today, the technology is in use in various crane projects that utilize optical sensors. Konecranes has patented the coating solution, which is available to the company’s customers.

Nanotechnological coating substances are not cost prohibitive, making the solution feasible for many needs. However, the coating must be applied by an experienced technician, adjusting it to the type of sensors being treated. The original development concentrated on laser sensors, but there are other applications. “It can be used in other kinds of sensors such as camera-based ones. The windows of cranes’ operator cabins could be one potential application in future,” Nieminen says. Konecranes R&D is exploring further applications for nano-coatings on different types of surfaces, such as glass, painted metal, plastics and more.

**THE TEAM**

Ari Nieminen, Chief R&D Engineer, has worked in R&D projects and material testing at Konecranes since 1989. Jorma Merimaa, Chief R&D Engineer, has been involved in crane projects and developing camera systems at Konecranes since 1988. Hannu Jyväsjärvi, Chief Electrical Engineer active in RMG and ASC projects, has worked at Konecranes since 1988.
Building on its growing experience in the 3D printing of metals, Konecranes’ R&D department continues to conduct research and spread knowledge on the technology within the company. The relatively new manufacturing method offers interesting possibilities in customized parts and next-generation products.

3D printing, also called additive manufacturing, has been a topic of interest in technology circles, with some observers predicting that the process will usher in the next industrial revolution. In its early years, attention-grabbing demos presented what was technically possible with the new method. More concrete production applications soon followed. An example of a real-life application is ultra-light shapes that are already in use in the aircraft industry. With 3D printing, material is only added exactly where it is needed, making it possible to produce shapes that are both strong and light. This means that producing even costly aircraft components using the method could eventually solve,” Koskinen says.

“With other production methods, the key is to gain a proper understanding of it and take advantage of it where it excels.”

Prototyping with 3D Printing

3D printing of plastic has already been in active use by Konecranes’ Research & Development team, particularly in prototyping. However, metal 3D prints cannot be used for prototypes – except for testing form and function – because the strength properties of metal prints do not equal those of the castings being used in serial production.

“We invest in the reliability and safety of our products, and we will not take risks with regard to component durability. We could only prototype with metals if the final piece was also meant to be made by printing metal. Conversely, 3D printing is the only way to prototype parts that would eventually be manufactured using the same method,” Koskinen explains.

For Konecranes, what is truly interesting is the potential for true next-generation products. “New shapes allow product designers to optimize different things, be it lightness, toughness, price or weather durability,” Koskinen says.

Digital-Physical Combination creates value

Koskinen sees the role of 3D data becoming more important as it increases the opportunity for warehousing to be done digitally, making it possible for certain spare parts and other components to be stored as software models and printed out on demand.

“Studying the possible advantages of this relatively new manufacturing method is in line with Konecranes’ aim to be the leading technology company. Frankly, we don’t know where all this is going to lead yet, but we’re convinced that it’s a must for us to be at the forefront and experiment,” he asserts.

“Right now, 3D printing only makes sense for relatively small and complex parts. However, costs are going down. It will be possible to manufacture even larger metallic parts using 3D printing in the near future. We are prepared for that,” says Koskinen.

Ari Koskinen is a Quality Engineer working in Service Parts Quality at Konecranes. In addition to participating in quality development programs, Koskinen works with the product management team to solve quality issues in the global spare parts business.
Imagine grabbing a hook and guiding it into position by simply pulling it, with the crane and trolley following smoothly after you. Konecranes Rope Angle Features provide crane operators with handy solutions for everyday lifting challenges, from snags to load swing.

When installed on a crane, an inclinometer – also known as a tilt sensor – measures the angle of slope or tilt of an object with respect to gravity. This instrument makes it possible to prevent snags, enables a hoist to lift a load straight up, and reduces and controls load sway.

Konecranes Rope Angle Features, which are available as a bundle, include:

- Hook Centering, which greatly reduces side pull during lifting by positioning the bridge and trolley directly over the load.
- Snag Prevention, which stops all crane movement if the hook, sling or load is detected to be caught on an object.
- Follow Me, which allows the crane to be moved above the load by simply guiding the hook by hand.

In addition, the inclinometer makes the following techniques possible for certain cranes:

- Active Sway Control, which manages the bridge and trolley’s acceleration and deceleration and limits load swing to a minimum.
- Assisted Load Turning, which is based on continual measurement of the rope angle, resulting in much simpler and less risky load turning on the ground by using one hoist.

“In the past when there were no technical solutions available for these problems, side pulling had to be minimized manually by the operator,” says Tuomas Rekola, Product Manager at Konecranes. “After working with the Rope Angle Features, it’s now easier to manage load sway or dangerous side pulls.”

While the core idea, measuring the rope angle, might sound simple, a lot of work was needed before a practical solution suitable to customers’ needs was ready.

“Besides measuring the angle, these features had to constantly analyze the user’s commands to activate the correct one for the situation. Is the rope angle too wide because the load is off-center, which can then be resolved with Hook Centering? Or does the user wish the crane to follow them to another position?” Ari Lehtinen, Manager of Automation at Konecranes, describes the process.

After experimenting with the new components, Konecranes engineers had to come up with ways to make the rope angle features work on the shop floor, simplifying workflow instead of giving the operator more procedures to follow. Only after thorough investigation was the product ready to be tested in a real environment, where its usability underwent a true trial.

The engineers also had to see to it that these advanced technologies could be installed on new or existing cranes which have unique requirements. While the Hook Centering, Snag Prevention and Follow Me features are available as a separate add-on package for standard cranes, Active Sway Control and Load Turning demand the increased controllability of the crane control system. They are typically utilized in PLC-controlled “Smart” cranes.

“All these features are based on measuring how much the hook has moved in comparison to the trolley. The challenges come with setting the sensors up, calibrating them, and handling special situations. Everything must be thoroughly documented to make certain that the sensors and features are working properly,” adds Lehtinen.

These smart features might sound futuristic, but they are already in use, helping operators work more efficiently, enabling faster load cycle times and safer operations, and protecting loads from snags and sway. “Our customers have been really enthusiastic about being able to solve these universal lifting challenges with this simple, easily installed application,” concludes Rekola.

Smart features help operators work more efficiently, enabling faster load cycle times and helping improve safety.
THE CORE OF LIFTING
IN PRACTICE

The Core of Lifting is the heart of Konecranes’ thinking when it comes to components and their compatibility. In contrast to other crane providers who buy generic components – such as motors, gears, controls – and combine them, Konecranes has greater control over the performance of the final product in its totality.

Uneven dimensioning can lead to weight imbalance, a slower dynamic response, and higher inertia – all of which can disrupt a crane’s lifecycle. This can be prevented when components are sized to work together without further adaptation.

LNC 225

The LNC 225 gearbox, seen here with a rope drum, is a prime example of the Core of Lifting at work. This is a critical component of our Active Load Control system, which is designed to eliminate container sway on Konecranes container cranes – such as the RTG, RMG, ARMG, ARTG, among others – as they work in container stacks at container ports. The two components shown are designed and made to work together in perfect balance.

KHW 325

This gearbox forms a vital part of the structure of a Konecranes RTG crane. There are eight of them on a 16-wheel Konecranes RTG, two rubber tires per gearbox, a unit called a “bogie”. The bogies on a Konecranes RTG can turn individually, making it easy to move the RTG from one container stack to another.
Have you ever paused to consider the journey that brings your favorite fruit to your local supermarket’s shelves? Take the banana, for instance.

The wildly popular Cavendish variety of banana, which is sold in markets across Europe and North America, is grown in tropical and subtropical countries in Asia, Africa and Latin America. Its supply chain is complex, with numerous challenges. Among them, how to ensure that the delicate fruit arrives in pristine condition and in the perfect state of ripeness from the distant plantation where it was grown?

Speed and temperature are just two of the factors that must be considered at every stage of transport. Equipment in ports needs to be reliable, fast and capable of handling sensitive cargo. Therefore, it is no surprise that Konecranes’ Gottwald mobile harbor cranes are in demand for handling fruit pallets at many terminals.

For example, pictured here is a diesel-electric Konecranes’ Gottwald Model 4 mobile harbor crane that is currently in operation at HHLA Frucht- und Kühlzentrum’s multi-purpose terminal in Hamburg.

The mobile harbor crane can be moved on the quayside, and has a maximum lifting capacity of 100 tons and an outreach of up to 46 meters. Its high working speed translates to high productivity – a critical factor when handling fruit like bananas, which must be kept at a low temperature.

“With the Konecranes Gottwald crane, we can efficiently unload not only the growing number of containers that are now being transported aboard fruit vessels, but also fruit pallets,” says Axel Hoeckrich, Managing Director of HHLA Frucht- und Kühlzentrum GmbH.

“Since the crane is very versatile, it also increases our ability to develop new business activities. With this state-of-the-art crane, we are strengthening the fruit port of Hamburg, which is already one of the most important sites for fruit handling and trade in Germany,” Hoeckrich says.

3 FACTS

1. Bananas are the world's most widely exported fresh fruit and a major staple food for millions of people in developing countries. By value of production, they are the fourth most important food crop after wheat, rice and corn.

2. The Cavendish variety accounts for about half of global banana production. Two reasons for its dominance are its long shelf-life and ease of transport.

3. Because the monoculture of genetically identical Cavendish banana plants worldwide makes the variety vulnerable to a disease outbreak, attempts are being made to create an alternative through hybridization and genetic engineering.
Konecranes is a world-leading group of Lifting Businesses™, serving a broad range of customers, including manufacturing and process industries, shipyards, ports and terminals.

Konecranes provides productivity-enhancing lifting solutions as well as services for lifting equipment all makes.