WayUp

A new era for the forestry industry

PAGE 24

How to think like a start-up
PAGE 14

Data is not the new oil
PAGE 17

Our self-driving future
PAGE 19
Is data really the new oil?

WORLD  Our guest writer Wael Elrifai argues whether the similarities between the role of data today and that of oil yesterday are enough to substantiate the comparison.

Innovative bioproduct mill is a world first

BENCHMARK  Metsä Group’s next-generation bioproduct mill opened in Äänekoski, Finland.

How to think like a start-up

BUSINESS  Embracing elements of start-up culture can help big companies keep a fresh, innovative edge in the era of digital disruption.
To be truly transformative, digital technology must be integrated into a company’s operations, culture and most of all, its mindset. Of course, it’s easier said than done.

At Konecranes, we work to constantly challenge the usual. We believe that adopting fresh perspectives is the key to innovation. The IoT enables us to harness data to predict, learn and make near real-time decisions, bringing our equipment to life. That, in turn, allows us to build services that support not only our customers assets but also the operators that use them in a safe and sustainable manner.

We are pleased to feature the world’s first next-generation bioproduct mill in Äänekoski, Finland, in this issue of WayUp. Built by Metsä Group, the brand-new facility uses five of our cranes as well as an automatic train loading system to support the production of 1.3 million tons of pulp per year. Our solution, a more efficient way to load trains, has caught the attention of the global pulp industry.

We also look at how taking inspiration from start-ups can help established players maintain a leading edge and stay relevant in the era of digital disruption. To navigate these shifts, companies need to reconsider their current business models and shake up the ways in which they think and work.

Our stories on the rise of self-driving vehicles, the use of augmented reality, virtual reality and mixed reality in an industrial setting, and why data is not the new oil, all present evidence that the world at large is pivoting to become inherently digital.

For Konecranes, digital technology gives us the tools to make better strategic decisions. It represents an essential building block of our business and encourages us to be more creative with our approach.

It has been a pleasure gathering all these insights for you. We hope that you enjoy reading WayUp magazine.

Mikael Wegmüller
Editor-in-chief
From gantry and bridge cranes to wall console and jib cranes, steel warehousing relies on a variety of lifting equipment. Safety, reliability and efficiency are key: These machines must be able to withstand the pressure of moving hundreds of tons of product, whether it’s 27-meter-long plates, 80-ton coils or 50 mm structural tubing.

For operators of steel warehousing facilities, here are the key points to consider when deciding on the right lifting equipment.

1. Assess your lifting needs
The first step in researching cranes is to study what your requirements are today along with what your business might look like down the line. Start by examining your process, then review your warehouse’s environment thoroughly. Taking care of these will help you focus on the equipment that is the best fit for your facility.

2. Determine your duty classification
All overhead cranes are classified according to the intensity of the load as well as the number of cycles the machine completes in a given period of time. A crane’s classification will range from infrequent service to continuous severe service.

   Use the information collected in the first step to figure out your crane’s classification based on guidelines of the Crane Manufacturer Association of America (CMAA), International Organization for Standardization (ISO), European Federation Standard (FEM), Hoist Manufacturers Institute (HMI) or European Standard (EN).

3. Explore your technology options
A range of technological advancements can be added to warehousing cranes to increase safety and productivity. Konecranes Smart Features such as Sway Control, Target Positioning, Snag Prevention and Hook Centering are especially useful in steel warehousing. Automation and Konecranes TRUCONNECT Remote Monitoring are also worth looking at.

4. Decide on hook attachments
Imperfect attachment and load pairings can cause dangerous, not to mention costly, errors. Fortunately, most overhead cranes can accommodate several types of lifting attachments. For optimal performance, hook attachments must fit the crane correctly and should not exceed the crane’s capacity.

5. Look beyond the crane
What’s not on the crane also matters. An effective preventive maintenance and parts program allows operators to address potential maintenance and safety concerns before they become critical and affect employee safety, productivity and revenue.

A-STRAD – for brown, green and future fields
The automated Konecranes Noell straddle carrier (A-STRAD) is a product of experience gained from supplying over 3,000 Konecranes Noell straddle carriers for manual operation. The A-STRAD has been systematically tested in fully automated live operation, in stacking heights of up to 1-over-3.

Being aware of your lifting equipment’s environment can help you determine the features that can help optimize your operation.

Text: Patricia Ongpin Steffy | Photo: Konecranes

A-STRAD

- **Drive System**
  - Market-leading diesel-electric drive system offers maneuvering precision, also in automated operation.

- **Position Detection**
  - Antennas and receivers communicate with transmitter radio masts sending local GPS signals.

- **Control System**
  - The proprietary Navimatic® navigation system is part of the A-STRAD’s machine control system.

- **Design**
  - The A-STRAD’s machine design is known for its reliability and robustness.

- **Spreader**
  - In-house design and manufacture of the A-STRAD and spreader offer first-rate integration intended for safe and accurate operation.

- **Laser Technology**
  - Laser technology provides fine positioning and collision protection in the container stack yard.
Energy intensity reduction target achieved ahead of time

Konecranes has reached its energy intensity reduction target considerably ahead of schedule. The original aim was to improve energy efficiency intensity (MWh/sales) by ten percent between 2013 and 2020. Konecranes achieved this goal by 2016.

"Konecranes continuously aims to improve energy and resource efficiency. The reduction of energy consumption intensity is one of our strategic initiatives regarding environmental responsibility and linked to our value of sustained profitability. That’s why we’re thrilled to report that real improvements have already been accomplished," says Lisa Jackson, Safety and Environmental Specialist at Konecranes.

"In addition to saving natural resources and reducing pollution, energy efficiency provides us with productivity improvements and monetary gains," she notes. "Even though the targets have already been achieved, the energy efficiency work continues, and new targets will be set.”

"Since 2013, more than 40 energy-efficiency projects have been reported: investments in heat recovery, insulation and lighting, as well as projects related to behavioral change and fuel-efficient driving," Jackson says. "One great example is our factory in Jejuri, India, where solar panels were installed on the factory roof. According to estimates, the solar panels will cover 67% of the factory’s energy needs, reducing its carbon footprint by approximately 1,100 CO₂e tons (i.e. 67%) annually.”

Increased insulation and lighting efficiency in Zaporozhye

In addition, action has been taken in the Zaporozhye factory in the Ukraine to save electricity and reduce heat losses.

"During this year, we have reduced heat losses by installing 29 new windows and insulating walls in the administrative building and in part of the factory," says Marina Morskaya, Head Ecologist at PJSC Zaporozhcran. Next year, we aim to further reduce heat losses by replacing more windows, as well as the gate in the components production facility.

Further savings in electricity are also planned. "Mercury lamps are gradually being replaced with LED lamps in production and office premises. To save electricity and reduce the loss of compressed air, we are planning to install a control system for the supply compressed air system," Morskaya continues.

Results through engagement in Hämeenlinna

As for Finland, the Hämeenlinna factory has been striving to decrease energy consumption through continuous monitoring and employee engagement.

"We have measured our energy consumption since 2012 and managed to decrease our energy use year after year," says Harri Ylä-Soinimäki, Safety and Environmental Manager at Konecranes Hämeenlinna. "Nowadays we consume approximately 2,000 MWh less energy yearly in Hämeenlinna. That is 20% less energy compared to 2012. Here in cold Finland, one detached house uses 20,000 kWh energy in a year, so with that 2,000 MWh we could warm up 100 houses.”

"Much of the actual environmental work is just little things like turning off the main power when a machine is not needed. However, even the biggest investments, like changing the old factory lights to new, brighter LED lights, installing heat recovery systems and changing the factory doors to quicker, more energy efficient ones, have paid off rather quickly," Ylä-Soinimäki explains.

"Taking care of the environment is an integral part of the culture at the Hämeenlinna factory, and we constantly try to make our culture even better and increase our environmental awareness. For example, we give environmental training to all personnel – summer trainees and subcontractors included – and encourage them to make environmental observations. Each observation is a ticket in our monthly lottery,” Ylä-Soinimäki says. “It is very important that all personnel take part in environmental matters. In fact, often the best ideas come from employees," he concludes.
What happens during a Konecranes inspection?

Konecranes offers a variety of inspections to increase crane safety and reliability. But what exactly happens during an inspection?

"Inspections and other proactive preventive maintenance procedures are carried out to identify risks and opportunities for improvement while supporting compliance," explains Henri Luotonen, Product Group Manager at Konecranes Service Product Management. In many countries, local regulations require compliance inspections.

"However, preventive maintenance and regular inspections beyond the scope of regulatory requirements are a smart investment because they can improve safety and productivity," Luotonen points out.

"Unplanned, costly downtime can be avoided by preventing sudden breakages. Moreover, inspections can be scheduled to suit production’s demands," he continues.

Lifecycle Care is Konecranes’ comprehensive and systematic approach to maintenance, which aims at maximizing the productivity of uptime and minimizing the cost of downtime. The extensive service offering includes inspections and preventive maintenance programs.

Early detection

"It’s important to catch any defects as early as possible. One should bear in mind that regulations set the minimum level for inspections, not the maximum. Especially with cranes that are critical in terms of safety and production, preventive maintenance inspections and routine maintenance are a must. Konecranes’ trained and qualified inspectors and technicians evaluate risks, identify improvement opportunities and provide recommendations for further action," Luotonen says.

+ PRO TIPS

Depending on the size and complexity of the crane, the inspection may take less than an hour or almost an entire day. The smaller the crane, the swifter the inspection.

The inspection can be carried out smoothly when the inspector is allowed a safe and easy access to the crane. The team can work with the customer to choose an appropriate inspection time.

Other devices should be kept from disturbing the inspector or risking their safety. In order to prevent accidents due to falling objects, access under the crane under inspection should be restricted.

He provides a rundown of some of the typical measures that are taken at a Konecranes inspection:

1. Inspectors carefully examine the parts of the crane that if broken, could pose safety or production risks. Over time, moving parts can wear out from use and environmental factors can strain the crane. Sometimes the operator’s actions may cause extra abrasion or other damage to the crane.

2. Most inspections are visual and operational: inspectors look for signs of leakage, fractures, wear and corrosion. Methods vary according to the type of inspection selected by the customer. Initial and major inspections are typically more extensive than frequent or periodic ones.

3. Besides sight, inspectors put other senses to work. They listen to the crane while it is running to make sure it sounds right. They feel for any abnormal vibrations. Furthermore, they always carry out a test drive.

4. During periodic inspections, internal components that require disassembly are typically not inspected. Nevertheless, Konecranes technicians can open up safety-critical components, if the customer requests.

5. In addition to assessing the condition of the equipment, inspectors can give recommendations on how to enhance safety and productivity. For example, improving the lighting of the crane can improve safety.
AR, VR and MR show immense promise in industrial settings

For Industrial Design Manager Johannes Tarkiainen, augmented reality (AR) and virtual reality (VR) show immense promise, particularly in their potential to elevate the user experience. Tarkiainen’s innovative projects with Konecranes have been recognized for the quality of their design, garnering the renowned Red Dot Award, for example.

What’s the difference between AR and VR?
The main difference is in the user’s feeling of presence. AR augments or overlays digital content onto the live, real-world scene. In contrast, VR is an immersive, realistic simulation where what you see, hear, and even feel is very different from the actual world around you, making your perception of the real world fade out.

How relevant are these technologies for Konecranes, and how is the company approaching them?
AR and VR have the potential to make an immense impact on how people work and interact in the future. It’s likely that the digital content that is now available through smart phones, for example in field service operations, may soon be used in industrial settings through wearable, hands-free devices like smart glasses.

It’s truly exciting to consider the effect that new and futuristic concepts and technologies like these will have on lifting industry use cases. The focus of AR and VR concepts at the moment is on the digital content as well as on the user’s experience of it, the way a person feels about using the technology or handling maintenance tasks or sharing information with it.

Today at Konecranes, we are able to create advanced product experiences by means of AR and VR. We have many examples of these, including our remote operating station and the jib crane augmentation in customer facilities.

What is the potential of AR and VR for Konecranes’ business?
We’re living in the era of digitalization, so these technologies are really interesting for Konecranes’ operations. They can potentially transform the way we operate, communicate and learn. Virtual learning or training is another highly interesting area where we can apply AR and VR technologies.

Where does VR and AR fit into the design process and user experience?
VR typically fits in the early design phase, when the design alternatives are being reviewed. It’s a means for obtaining a first taste of the design of a new product – virtually. Imagine if you could share experiences of something new virtually, in the months or even years before an actual, live version of it exists? Users’ experience of VR is currently on the level that it is generating good results and encouraging users to use it even more.

In what ways would mixed reality (MR) be relevant within a manufacturing context?
Mixed reality is a relevant technology in modern manufacturing environments, thanks to MR’s realistic character. In MR, virtual objects augment the real world and coexist with physical objects. There can be plenty of useful information available for the users in the manufacturing context. Contextual, real-time and visual information can improve productivity in manufacturing processes. For example, finding and adopting instructions or recognizing the correct parts can be a time-consuming and tedious task. This is just one example in which MR can make a real, positive difference in a more traditional process.

“Contextual, real-time and visual information can improve productivity in manufacturing processes.”

TEXT: GINO DE LA PAZ | PHOTO: TONI PARKKONEN
Large industrial companies do not necessarily love change and unpredictability. They have a great product or service – perhaps the reason they got big in the first place – and they would prefer to keep on doing what they are good at.

Unfortunately, given today’s rapid digital transformation, it simply won’t be enough, says Pekka Sivonen, Director of Digitalisation at Tekes.

“The big things that are coming – artificial intelligence, the platform economy and blockchain technology – will each change the world in more fundamental ways than the internet has. No industry or process will remain the same, and no company can survive these shifts by sticking to current ways of thinking and doing business,” states Sivonen.

Instead, he says that companies need to actively challenge their current business models and look for new innovations outside their own walls. In short, they need to think more like start-ups.

According to Sivonen, here are five ways in which established organizations can embrace a start-up mentality:

Start from scratch

“The biggest issue with big companies is that they are quite invested in their existing products and business models. It can lock them into old ways of thinking and seeing the world,” says Sivonen.

Start-ups, on the other hand, are not as committed to the status quo, so their perspective is influenced more by what could be than by what already is.

“They begin with a blank slate. Instead of improving the current business model, companies should blow up the entire model and start from scratch. This means trying to find new, surprising partnerships and bringing in out-of-the-box thinking.”

Focus on new services, not products (Hint: Data is the key)

“Technology will change, but business models will change even more,” says Sivonen.

Many start-ups don’t produce a physical product at all, but provide a new way to serve the fundamental customer need behind existing products. So instead of making cars, for example, they might look at how to solve people’s need for mobility. Instead of motors, you might sell power by the hour.

“More and more, we will buy things as services instead of paying for a physical product. Data is the key to this change. You need to have as much data as possible on your products to be able to turn them into services.”

Experiment more and test on a shoestring budget

A start-up mentality also involves the willingness to experiment – often going from idea to first trial quickly – with minimal resources.

“Engineering organizations are often too focused on getting things perfect before testing them. Start-ups are much better at bootstrapping and rapid prototyping.”

“Engineering organizations are often too focused on getting things perfect before testing them. Start-ups are much better at bootstrapping and rapid prototyping.”
Why data is not the new oil

The analogy between data and oil has fascinated both technology industry thinkers and marketing types. But are the similarities between the role of data today and that of oil yesterday enough to substantiate the comparison? Or is the analogy inaccurate in framing a phenomenon that is not yet very well understood? Wael Elrifai, Senior Director of Enterprise Solutions with Hitachi Vantara, makes the case for the latter.

Encourage risk-taking and celebrate failure

One of the biggest differences between start-ups and large corporations revolves around company culture. “In a quickly changing environment, you should make decisions faster, be agile and challenge conventions. The Six Sigma ideal of ensuring success through flawless processes doesn’t necessarily achieve this very well. People should be encouraged to take risks, and failure should be rewarded as much as success. This mentality comes more naturally for start-ups and is harder for larger groups to foster,” Sivonen explains.

Don’t be afraid of start-ups – work with them

He points out that big companies can’t really expect to change into agile risk-takers overnight. Instead, they can begin to collaborate with start-ups to infuse their organization with new energy and novel ways of thinking.

“Many corporations are, in fact, starting to include these ecosystem functions that work with and speak the language of start-ups. I believe this type of cooperation will be key in finding the next big innovations.”

KONECRANES COOPERATES WITH MARIA 01

Maria 01 is a start-up hub based in Helsinki, Finland. With 90 members, it occupies the former Maria hospital campus, providing a community, home base and meeting spot for tech entrepreneurs and investors to build future solutions.

The center is also a part of a wider Corporate Start-up Co-creation project aimed at designing new start-up–corporate collaboration models. Konecranes partnered with Maria 01 in 2017, and has already identified several groups to work with.

“With the partnership, we have true insider access to the world of start-ups, and with help from Maria 01 experts, we can work effectively with them. We can also utilize the unique Maria 01 premises to arrange events and training sessions,” says Ari Kiviniitty, Chief Technology Officer at Konecranes.

“Partnering with Maria 01 helps us to explore our interface towards the start-up ecosystems.”

“Encourage your people to take risks and reward failure as well as success.”
Countless articles in respectable publications have hailed data as “the new oil.” Now I appreciate a colorful metaphor as much as the next engineer, but I’m concerned that this comparison could lead some people down the wrong path.

Some of the key properties of oil are that it’s a fossil fuel and a finite resource. Its price is subject to market valuations depending on supply and demand. It’s a raw material that can be converted into energy and can also be turned into many other products, from garbage bags to asphalt.

On the other hand, unlike oil, data isn’t one specific thing or form factor. Data is just a code used to describe something. Data can come in many forms, such as text, numbers or dates. It can also be part of a video stream, structured in tables or freeform in documents.

Data, in addition, is an infinite resource. This sounds significant, but it also raises a unique set of problems compared to those of finite resources. For one thing, to derive value and make predictions from data, useful signals that trigger events and decisions need to be separated from massive amounts of irrelevant background noise. This is very important in the world of IoT because sensors generate high volumes of this noise. These signals, however, are essential for predictive maintenance and other use cases.

Data’s boundlessness also means that it’s not subject to laws of supply and demand. The extent to which data turns into commercially valuable insight depends on how signals are extracted from noise and on how algorithms are made contextually smarter over time – either through human intervention or machine learning.

**A resource that keeps on giving**

So far, data can’t be converted into energy, at least not in any practical way. Data can however, be refined, or in other words, cleaned and structured, and analyzed, or converted into information. Once analyzed and presented to people, it can be used for decision making. The quality of data-driven decisions can have a huge material impact on business.

Data can be considered a raw material, but with some important differences. For example, unlike oil, the same piece of data can be reused in different applications over and over again without eroding in value. Take my Facebook login details, for instance, which can be used to access a number of different apps on my phone.

Interestingly, in Latin, data is the past participle of the verb “to give.” Indeed, data will be a resource that keeps on giving. There are already many cases in transportation, industrial manufacturing, shipping and cities where data saves money, prevents injuries and improves services. But please, comparisons to oil must stop.

Wael Elrifai Senior Director of Enterprise Solutions, Hitachi Vantara

Wael Elrifai is a thought leader, book author and public speaker focusing on big data, IoT, data science and machine learning. He has advised corporate and government clients across North America, Europe, the Middle East and East Asia across a number of industry verticals, and has presented at conferences worldwide.

## “Dark data” and the laws of supply and demand

Another challenge brought about by data’s endless nature involves figuring out how to manage and use available useful data, including so-called dark data. Gartner defines “dark data” as the information assets organizations collect, process and store during regular business activities, but generally fail to use for other purposes—example, analytics, business relationships and direct monetizing. Information assets are often hidden in dark data, which is why many companies hang on to it for compliance reasons. It’s expensive and risky to store and secure thin data, so organizations are now exploring ways to derive more value out of their dark data.
However, with several key players moving forward with the idea at the same time – from tech companies such as Google and large automotive manufacturers to rental and ride-sharing companies such as Uber and Lyft, as well as cities and municipalities around the world – it seems like the dawn of the driverless car era is drawing ever closer.

Business Insider says that 2020 will kick off the decade of self-driving car advancements, while Forbes predicts that 10 million self-driving cars will hit the road by then.

In test settings, the technology is already functional. In a world where human drivers and driverless vehicles would co-exist, however, legal constraints and safety concerns remain the major obstacles to robot drivers entering the mainstream. “The most difficult part for robots is that traffic is a social phenomenon. While they are far better at abiding by rules, they are clumsier at interpreting the human aspects of driving. Robots don’t know where to bend the rules according to unwritten customs and how to read the intentions of human drivers from subtle cues,” explains Iisakki Kosonen, Staff Scientist at Aalto University who specializes in Intelligent Transportation Systems. He has been closely involved in Helsinki’s robot bus experiment.

In ports, driverless vehicles are already in use

While we wait for robot cars to hit the roads, in industrial
settings such as factories, mines and ports, semi-automated and fully automated vehicles have already become part of everyday operations: “In many ways, industrial environments are ideal – or at least easier – for autonomous driving. They are closed and highly structured environments in which routes and driving tasks are standardized, and surfaces are most often flat. It’s a much simpler problem to solve than public traffic, which is more complex and dynamic,” explains Visala.

In other words, when it comes to such environments, they are structured and easier to interpret, and there are fewer of those unpredictable human-related variables to possibly take into consideration. For instance, in container terminals, cargo consists of standardized containers and the routes of self-navigating vehicles can be pre-planned. The entire area can also be mapped out and controlled by a smart terminal operating system. Furthermore, it’s easier for a private port operator to move forward with automation adoption than it is for public officials. “A private operator can act faster and decide to invest in the smart infrastructure needed for autonomous driving. In the public sphere, it usually takes large infrastructure investments that are up to political budget deliberations as well as new legislation that allows for self-driving vehicles,” adds Kosonen.

Thus, in a number of international ports, automated vehicles already perform many of the routine driving tasks with minimal input or intervention from human beings.

“Container handling automation is a megatrend in ports, with a history going back at least ten years,” confirms Svend Videbaek, Product Marketing Specialist at Konecranes. Konecranes is quite involved in this, offering a range of semi-automated and fully automated vehicles for container handling. These include automated straddle carriers and spanners, automated terminal trucks and automated guided vehicles (AGVs) for horizontal transport in container yards.

“The Konecranes Gottwald AGV was the first AGV to go into service at a container terminal – the Port of Rotterdam – in the mid-1980s. Now, we provide these machines with lithium-ion battery technology, helping ports become more eco-efficient,” says Videbaek.

Automation brings eco-efficiency and safety to ports

There are various drivers for adopting automation, including self-driving vehicles, at ports. For one, automated container handling equipment is often able to handle container traffic faster and with more precision than equipment driven by humans. Automation is intended to give the terminal operator more control over logistics and contribute to more predictable and reliable operations, since it is easier to plan and track the movement of containers.

A single person can remotely monitor several different self-driven vehicles. Still, savings are realized not only through reduced labor costs, but also through shorter times, more consistent and predictable service quality, and increased safety, since automation minimizes the potential for human error.

Autonomous vehicles are built to optimize efficiency in acceleration, braking, and speed, helping to increase fuel efficiency and reduce emissions. Most will be electric, reducing dependence on fossil fuels. Moving toward automated operation is a way for ports to address environmental concerns and promote the use of renewable energy.

As container flows coming off container ships increase and shipping lines demand better performance from container terminals, partial or full automation will likely become a must for many ports. Though Videbaek admits that automation is not a cure-all in container handling, he believes it will be much bigger in the future.

“Eventually, major container terminals around the world will all become fully automated – hardly anyone in the industry disputes this. However, getting there will involve a lot of evolution covering technology, public infrastructure, and regional or even continental cooperation between countries. The drivers for the effort are clear: more eco-efficient, safer and cleaner worldwide transportation of containers, those boxes that today carry about 75% of the world’s goods,” Videbaek says.

The automation of container handling is also likely to go beyond ports, as experiments with automated ships and self-driving truck convoys are currently underway.

Will the future be completely driverless?

Ultimately, robots could be much better drivers than humans, according to a paper by the Eno Transportation Center, a US-based think tank that promotes policy innovation in the transportation sector. They do not break traffic rules. They do not get sleepy, distracted or agitated behind the wheel or have too many drinks before driving. Most of the four D’s that are said to cause accidents – distraction, drowsiness, drunk driving and driver error – could be completely eliminated by using robot drivers. According to Business Insider, self-driving cars could potentially save thousands of the over 1.2 million lives lost to traffic accidents each year.

As self-driving vehicles could operate non-stop, we would need far fewer cars – and almost no parking lots. With a smart traffic control system guiding the self-driving vehicles, traffic could be balanced much more effectively, reducing much of the congestion that now plagues congested cities.

“Self-driving vehicles could change the entire logic of car ownership. People might no longer need their own car, but could buy mobility as a service according to need,” Kosonen says.

So, are we headed towards a fully driverless future? Probably not

“My educate guess is that the change will be slow, and there will be a lengthy transition period where self-driving vehicles are restricted to closed areas. The first public ones are likely to be certain city regions or strips of highway that can be certified, fully mapped and controlled by a smart traffic system,” says Kosonen. “The cars may also have a remote-control system, where a human operator can take over if needed.”

As far as less urbanized areas are concerned, self-driving vehicles may still be far off in the future. “It will be a long time before every little country road is sufficiently digitized,” Kosonen points out.

To those fearing the loss of millions of driving-related jobs, experts assure us that the driverless future will still require humans, but they will be needed for different kinds of tasks.

“Their roles will change, but humans can never be fully replaced by machines. No system is perfect, so there will be new problems for people to solve with the help of technology,” concludes Visala.
Äänekoski is situated in the Central Finland region and features some 170 lakes. A town with a long industrial history, pulp and board have been produced there since the 19th century. The new bioproduct mill was built on the present mill site, where it serves the existing forest industry. It replaced a pulp mill, which, opened in 1985, was nearing the end of its life cycle. The new mill’s production capacity is nearly three times greater than that of the previous pulp mill of Äänekoski. Construction of the first next-generation bioproduct mill commenced in 2015. In October 2017, it was inaugurated by Sauli Niinistö, President of Finland. At EUR 1.2 billion, it represents the largest investment in the history of the Finnish forest industry.

METSÄ GROUP’S INNOVATIVE BIOPRODUCT MILL IS A WORLD FIRST

Demand for bioproducts is growing rapidly. In August 2017, the world’s first next-generation bioproduct mill was started up as planned in Äänekoski, Finland. Built by Metsä Group, the world-class mill’s annual pulp production capacity is 1.3 million tons. In addition to delivering five industrial cranes to the mill, Konecranes built a pioneering automatic train loading system for pulp units.

Text: KRISTIAN ORISPÄÄ | Photos: METSÄ GROUP
Wikström explains that at the core of the Äänekoski project are three pillars which have been present in all stages of its design and development.

The first is environmental efficiency. Even though its production capacity is nearly three times higher than the previous pulp mill of Äänekoski, the bioproduct mill is operating within the same emission limits and wastewater conditions of the previous mill’s environmental permit. The second is energy efficiency. The new mill maximizes the amount of energy that can be sold to consumers. Annually, it produces 2.4 times more electricity than it consumes, and it is increasing the share of renewable energy in Finland by more than 2 percentage points.

Lastly, the bioproducts themselves played a key role in design and development. The focus on efficiency and sustainability is present in every aspect of the next-generation facility.

**Design and development factors**

Wikström explains that at the core of the Äänekoski project are three pillars which have been present in all stages of its design and development.

The first is environmental efficiency. Even though its production capacity is nearly three times higher than the previous pulp mill of Äänekoski, the bioproduct mill is operating within the same emission limits and wastewater conditions of the previous mill’s environmental permit. The second is energy efficiency. The new mill maximizes the amount of energy that can be sold to consumers. Annually, it produces 2.4 times more electricity than it consumes, and it is increasing the share of renewable energy in Finland by more than 2 percentage points.

Lastly, the bioproducts themselves played a key role in design and development. The focus on efficiency and sustainability is present in every aspect of the next-generation facility – from the production process to the equipment installed. For example, the automatic train loading system and other cranes delivered by Konecranes are specifically designed to support the efficiency objectives of the overall project.

**World-class mill**

Alongside the automatic train loading system, Konecranes delivered five industrial cranes. These are in the debarking and production line, dryer and power station.

“The new automatic train loading system is working well and helping to enable the safe and efficient loading of trains at the new mill,” reports Arto Hujanen, Director and Head of Paper and Forest Industry at Konecranes. “Working together as part of the production process, the cranes and train system play a critical role in keeping operations flowing smoothly.”

Hujanen says that traditionally, trains have been loaded by forklifts from the side of the train wagon. “Issues with this method include the risk of accidents and lost time incidents, as well as damage to pulp units, to name a few. The automatic train loading system helps to reduce the need for people to work in the loading area,” he elaborates.

“With an annual production capacity of 1.3 million tons of high-quality pulp, bioenergy and various other bioproducts, including for example tall oil, turpentine, and product gas, among others, the bioproduct mill is the largest wood-processing plant in the Northern Hemisphere,” says Camilla Wikström, Senior Vice President of Production at Pulp Business of Metsa Fibre, a subsidiary of Metsa Group. “Pulp is experiencing growth at a rate of 1 to 1.5% per year, and demand is on the rise especially in Asia.”

From an economic perspective, the bioproduct mill is expected to boost Finland’s income from exports by EUR 0.5 billion per year. In terms of creating employment, its effect throughout the value chain within the country will be 2,500 jobs, of which 1,500 are new jobs. The most significant effects on employment are anticipated to be gained in the forest industry and transport.

**Safer operations**

No one is allowed in the loading area when the crane is operating in automatic mode. The automatic crane system has an interface which controls personnel access to the area, and is used to prevent entry to the loading bay when automatic mode is in use. The cranes are equipped with a driver cabin allowing manual operation if necessary.

At the bioproduct mill, Metsä Group is also taking advantage of the benefits offered by Konecranes’ TRUCONNECT remote service. Support centers are available 24/7 to help solve any possible issues and offer expertise to help reduce any downtime.

“If an alert is raised, the crane will send data in real-time so Konecranes experts can see exactly what is happening. An alert will also be issued to the maintenance staff on call at that moment,” Hujanen states. “We have teams working around the clock in support centers...
Located 3 kilometers from the Port of Tianjin, northern China’s largest port and the main maritime gateway to Beijing, is China Master Logistics (CML) Tianjin. The facility is part of CML’s considerable service network, which covers major cities in China.

In 2016, in a move to increase business, CML Tianjin decided to augment its equipment fleet to help meet its daily stowage and handling capacity of 45,000 TEU (Twenty Foot Equivalent Unit). Business at CML Tianjin spans everything from depot services to warehousing and consolidation logistics, and these additions needed to be smart, on top of being able to withstand the demands of daily use. The answer came in the form of three Konecranes Empty Container Handlers (ECH).

“We are in Tanggu, in the Binhai New Area district of Tianjin Municipality – the main special economic zone of northern China – and it’s very busy here,” says Zhang Tao, Deputy Manager, Technical Department, at CML Tianjin. “We wanted to solve the issue of increasing our business, so we acquired container handlers from Konecranes because of the quality associated with the brand.”

Konecranes ECHs can sense the load and customize the lifting power to the weight of the load, thus reducing fuel consumption. Thanks to a wide mast, these machines are able to lift eight containers high. Hoses and cables are kept to a minimum, contributing to a reduction in maintenance costs and a boost in uptime.

Liu Yu has been operating the ECH since its purchase. “The Konecranes ECH is fuel-efficient,” he shares. “I drive it eight hours per day and five days a week. Compared to machines from other equipment brands I’ve used in the past, it’s more comfortable, the working speed is much faster and there is very little downtime with it.” Konecranes has a long history of working with the world’s leading container ports, terminals and logistics yards, all of whom are expert buyers and operators of container lift trucks. “Our customers demand a lot of us, and we have established a track record of meeting their requirements year after year,” says Cindy Shi, Marketing Manager, Port Cranes, APAC, at Konecranes. “We are happy that companies such as CML have placed their trust in us.”

Location: Tianjin, China. Challenge: Improve efficiency to increase business at a busy container facility. Solution: Robust equipment that can adapt its lifting power to the weight of the load.
A VFD is a type of motor controller that controls the speed and torque of an electric motor by varying the frequency and voltage supplied to it. Widely used in crane applications, a VFD offers a vast array of benefits, including reduced load swinging and more precise control of movements, among others. Since a spare VFD is sometimes stored for extended periods of time between uses, it must be reformed to recondition the electrolytic capacitors – a primary section of a VFD’s main power circuit – and restore their condition to prepare for operation.

Konecranes new Variable Frequency Drive Reforming service helps keep your variable frequency drives (VFDs) ready when they are needed, without having to remove them from your facility.

**Power without the bulk**
“VFDs can be bulky, especially when talking about bigger pieces of lifting equipment, such as process cranes or port cranes, meaning it does not make sense to ship the VFDs off-site. And yet, the reforming previously had to be provided by a trained specialist, since the power sources to do the job off-the-shelf are fully manual. As such, you would have to have expertise in this field,” explains Aspelin. The main challenge for Konecranes was to create a power supply that was capable of doing all this at a compact size. “We realized we could develop our own device following our specs, make it smaller and portable, and then distribute these all over the world so we did not have to send a specialist from a dedicated service location to do this job,” he continues. Now fully automated and portable, the new device has “the knowledge of the specialist” built into it.

**Supporting business continuity**
Using this smaller, fully-automated portable DC power source, an electrician reforms the capacitors in the DC-bus of a customer’s VFD. The electrician then issues a certificate of service and labels the VFD. The certificate includes the date of the next recommended reform, should the VFD remain idle for another year. The VFD Reforming service also includes a visual inspection in an effort to identify faulty devices and to make recommendations for corrective actions. These services help customers be prepared in case of future incidents that could affect the continuity of their business, by attempting to keep those VFDs ready for service when they are required, without ever removing them from a facility.

It’s one thing when a crane’s VFD breaks down. It’s another when the spare device that was stored in case of emergency has not been kept in a ready-to-use condition. Placing a backup VFD that has not had its capacitors revived annually could result in a failure when put into use. “It’s the VFDs that are stocked as spares that potentially create some risk,” concludes Aspelin. “When you blow a spare, you can potentially face significant downtime for the crane. Now we are able to provide the service cost-efficiently and conveniently on-site.”

**BIO**
- Saku Aspelin is responsible for managing the Consultation Services offering of Konecranes globally.
- He has also held positions in R&D and Global Product Management.
- Aspelin started his career with Konecranes as a technician in 2002.

**3 ADVANTAGES**
1. No need to ship the VFDs to another location. The benefits of this new service come from cost-efficient revitalization at customers’ respective sites.
2. Spare VFDs are in ready-to-use condition if and when you need them.
3. Aims to identify faulty spare VFDs before they cause prolonged downtime.
The performance of large Li-Ion batteries and charging methods has improved considerably in recent years, prompting further developments in battery-powered Automated Guided Vehicles (AGVs).

For terminal facilities that operate AGVs, Konecranes now offers a battery with even greater efficiency at lower dead-weight. The Li-Ion batteries in the new generation of Konecranes Gottwald AGVs and Lift AGVs fully charge in 1 to 2 hours – approximately four times faster than lead-acid batteries.

Charging can be done with the batteries inside the vehicle using an automated quick charger. In addition, the batteries can be recharged up to three times more than their predecessors, and can be recycled at the end of their life.

After years of experience in developing battery-powered AGVs, Konecranes has gained a systems’ approach to the electric drive line. The result is a powerful, long-life Li-Ion battery, a dedicated quick charging method, and management and navigation software to control and monitor the AGV fleet and their batteries.

The Li-Ion battery is composed of high-quality cells and control units from the automotive industry which do not require an additional complex cooling system. In addition, the design concept allows Konecranes to offer customer-specific battery sizes.

KEY ADVANTAGES of the Konecranes Gottwald AGV with Li-Ion battery drive

1. Allows a flexible, step-by-step application in terminals that are already operational.
2. Sustainable design with zero exhaust emissions in the terminal and low noise emissions.
3. Low operating cost due to high energy efficiency and minimal maintenance.
A CRANE MAKEOVER TO ENABLE ROCKET SCIENCE

One of many DLR locations, the Lampoldshausen site researches liquid chemical rocket propulsion systems such as the Ariane launcher. At the height simulation test bench, P4, rocket engines are tested under space-like conditions. In preparation for the tests, several tons of sensitive components such as filters, flaps and pipes must be moved. In this procedure, a slewing crane is used on the roof of the almost 12-meter-high P4 building.

The crane lifts the components, some weighing more than five tons, from a truck bed, and moves them right to the building’s door. The crane system must be able to withstand extreme weather conditions such as snow, wind, rain and temperatures ranging from -5°C to +40°C on the roof of the P4.

Konecranes helped DLR modernize test bench P4’s outdated crane system from 1964. The reinforced crane now carries loads of up to 5 tons with a reach of 15 meters. With a reach of 10.3 meters, even the transport of up to 7.5 tons is possible. Its electrical and mechanical systems received a comprehensive update, intended to extend the crane system’s life while significantly reducing operating costs. Frequency-controlled drives have replaced the two DC motors on the slewing gear and trolley, making it possible to control the crane smoothly at optimum speed and to move the system’s parts safely and precisely. Also, with a new protective coating and a sliding roof to shield the control cabinets from the elements, the crane will be able to endure the weather conditions on the roof of the P4 over the long term. Non-slip sheets on the bars and staircases, as well as a new railing, also aim to boost safety.

10 TONS

The Ariane 5 launch system at work in 2012 in Kourou, French Guiana.

3 FACTS

1. European nations agreed on the Ariane program in 1973, enabling independent access to space. It has since become one of Europe’s most successful technology programs.
2. Helping to create a reliable and competitive launch system, launch vehicles like the Ariane are an important element in European and German space strategy.
3. Part of the Ariane program, the Ariane 5 is Europe’s most powerful rocket. In service since 1996, it has built a proven track record.
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 and machine tools of all makes.