KONECRANES®

6 ways to increase the productivity and reliability of your cranes

Increase your productivity with well-maintained cranes and digital service tools

Manufacturing facilities must maintain a constant flow of materials - from incoming prefab or raw materials all the way to packaging and shipping. When any work interruption is a production loss, the right lifting equipment and service will help keep your workflow running at its best.

Whether your lifting equipment is old or new, having a well-maintained crane increases the reliability of that equipment so it is up and running when you need it. Having the right service and maintenance tools will help make sure that your equipment will be available and reliable.

We live in a world of smart devices and your lifting equipment is no different. From remotely monitoring your crane usage and condition to ordering parts - digital tools bring crane information online, so it is easily accessible anytime and anywhere. Whether you're on the production floor, in an office or on the road you can have visibility into maintenance activities and see how your cranes are performing no matter where you are.

Summary

When cranes are critical to your process, unplanned downtime can be a big financial hit. There are steps you can take now to make sure that your cranes stay reliable and even increase your productivity.

Here are the key takeaways of this white paper:

1. **Maintenance programs** - inspections and preventive maintenance are essential for maintaining your lifting equipment and a program of regular maintenance activities will bring the most benefits.

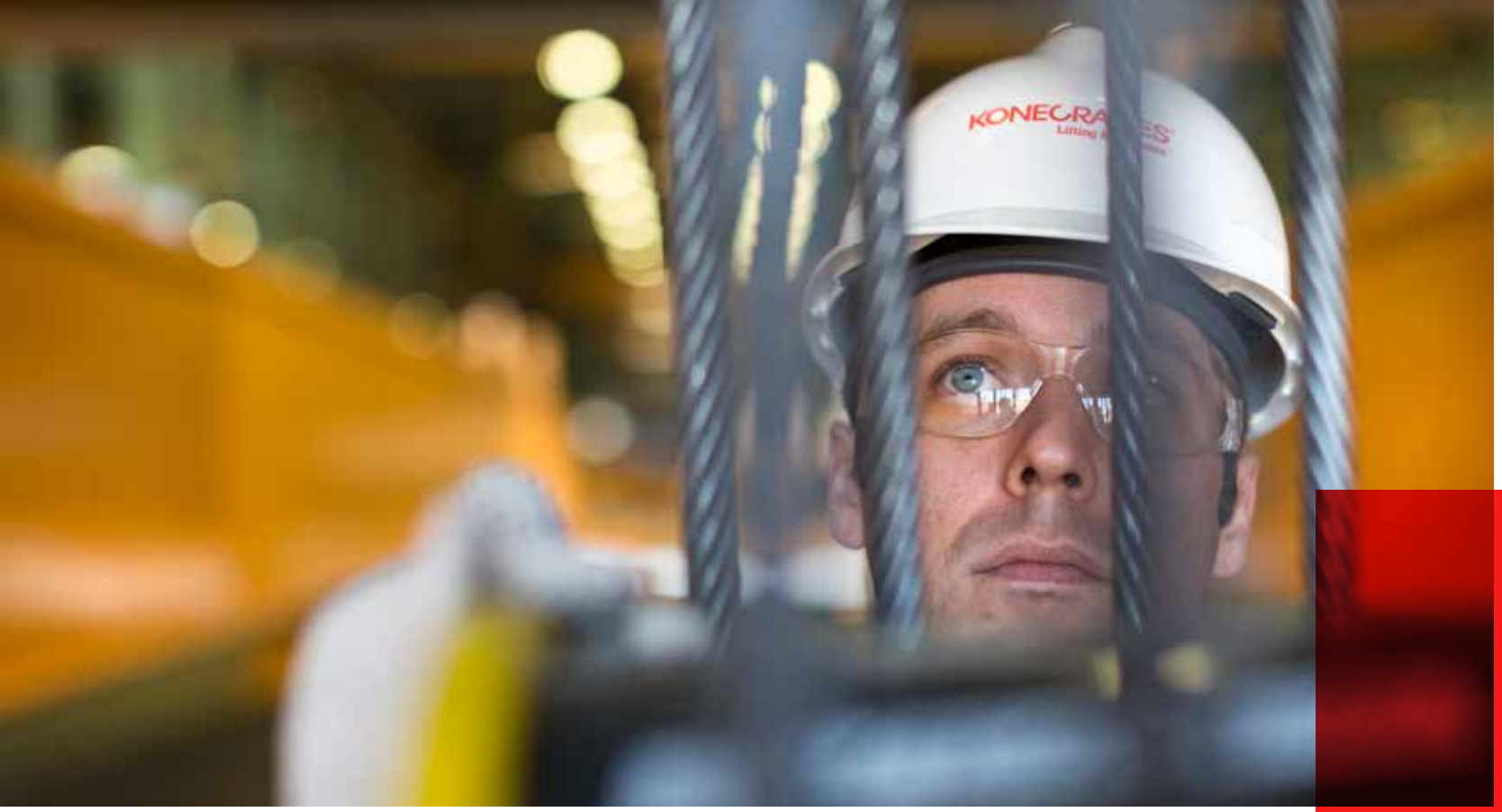
2. **Digital tools for smart service** - from online tools to apps, there are many digital tools that help you stay on top of maintenance issues even when you're not on the production floor.

3. **Parts** - keeping spare parts in inventory can be both a time and money saver.

4. **Retrofits** - a relatively easy and economical way to add current productivity-enhancing features and technologies to a crane.

5. **Modernizations** - when production ramps up or changes, a crane may need a modernization to maintain productivity.

6. **Consultation services** - can give you insights into safety, production and further improvement opportunities.



Maintenance programs

The right preventive maintenance program can have a significant impact on the performance and reliability levels of your cranes. Regular inspections and preventive maintenance activities help identify risks and opportunities for improvement while supporting compliance.

Crane inspections are designed to assess the safety of equipment, detect wear and tear and identify maintenance needs for safe, productive operation. Inspections can also verify that your equipment complies with current local standards and regulations, helping you avoid costly fines and disruption of operations.

The most effective preventive maintenance programs are those that are customized or tailored to the environment in which the cranes operate. It is also beneficial to develop a comprehensive plan of scheduled repairs and advanced services that take a deeper look at your crane and its components in order to implement predictive maintenance.

With predictive maintenance, preventive maintenance is supplemented with condition monitoring, advanced inspections and analytics. Data provides insights which drive recommendations and actions. A cycle of "data, insights, actions" begins, and as this cycle repeats over time, maintenance predictions become faster and more precise. When you add pre-authorized repairs, needed work can be performed proactively, saving you both time and money.

A good crane service program will point out safety and production risks and include recommendations for improving the safety, productivity, application or useful life of the asset.

Digital tools for smart service

Online customer portal for maintenance information - any time and any place

An online customer portal can provide the information you need to help make informed maintenance decisions. A quick look can show you open safety and production risks as well as remote monitoring condition alerts and a fleet view can help you pinpoint which assets need the most attention.

A good crane service provider will use the information on the customer portal to consult with you on your service activities. The information in the portal should be easy to understand and presented in a visual format so you can easily see issues that need attention.

Having all your crane maintenance information in one place provides visibility and a complete view of your assets. Information can be accessed from any mobile-enabled device, so you don't need to be in the office to check on your lifting equipment and maintenance activities. You can easily retrieve and share documents, reducing the need for paper forms and storage.

A customer portal supports maintenance planning and decision making with inspection and maintenance information and remote monitoring data made available in real-time.

Digital tools for smart service

Remote Monitoring helps you keep up on maintenance issues even when working remote

Remote monitoring is a key element of predictive maintenance and is used to collect equipment condition and usage data. Remote monitoring data combined with your inspection and maintenance data on a customer portal gives you a comprehensive view of equipment maintenance needs and performance.

Analyzing and identifying anomalies, patterns and trends in remote monitoring data helps you make informed maintenance decisions and prioritize actions.

Remote monitoring gives you knowledge of the remaining design working period (DWP) and remaining service life of selected components such as hoist, brakes, structures and contactors – so you can take care of issues before they lead to unplanned downtime.

Alerts indicate production risks that can result in crane stoppage or production downtime. Production-critical risks can include motor overheating, inverter faults and control system faults.

Usage and operating information can be used to assess crane condition. Operating statistics show how different crane operating patterns affect the safe operation and condition of the crane and the service life of critical components. Operating patterns can significantly influence the service life and safety of individual components.

Digital tools for smart service

Buying parts online saves time

When you need parts or even pre-configured lifting equipment, ordering online saves you valuable time. An e-commerce store with spare parts and accessories for all types of makes and models of cranes and hoists makes procuring spares for your fleet easy. Being able to view OEM parts, equivalent parts and even complementary products gives you a lot of options. And the ability to save lists of parts you order often and sharing them with other users from your company can also save time.

Ditch the paper for an app for daily inspections

Crane users can quickly and easily record their findings when performing pre-shift and/or pre-lift inspections with an app for daily inspections. Daily inspection records are then accessible on the customer portal, where combined with maintenance history and condition data collected from selected components with remote monitoring, provides a comprehensive view of the condition of an asset in one easily accessible place. This data assists in planning maintenance actions and provides an audit trail of performed daily inspections.

Getting the right parts quickly can help reduce downtime during preventive maintenance or repairs.

Spare parts

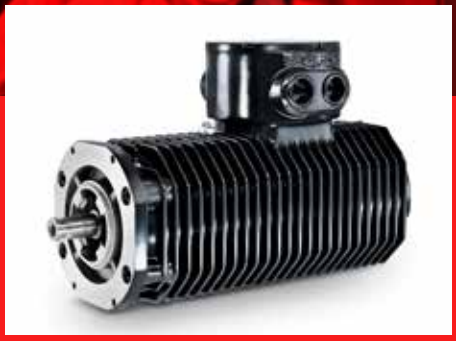
The right parts at the right time

When cranes are critical to your process, unplanned downtime can be extremely costly. Keeping spare parts in inventory can help you reduce and manage crane-related risks to your operation.

If a critical crane goes down, do you know the cost of that downtime? If you're measuring downtime in minutes – can you wait even a day for a part to arrive? Partnering with a crane service provider who has the experience and know-how to help you put together a plan for spare parts can help you maximize the uptime of the crane for production.

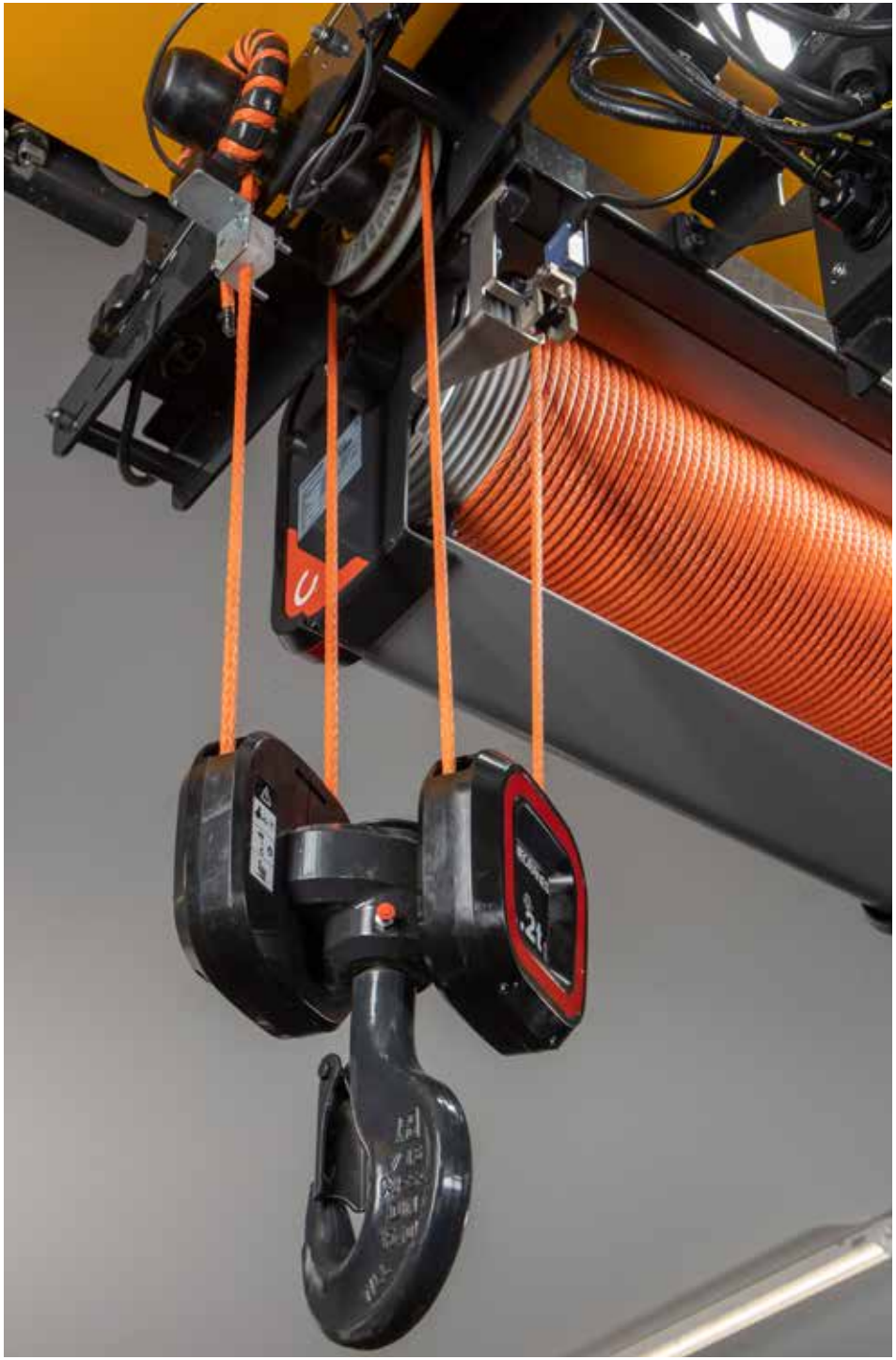
Highly skilled spare part specialists can define a parts package based on experience and data about the fault rates of different components. Having remote monitoring data for service life estimates and operating statistics is also highly beneficial.

Having these parts on hand means repairs can be made immediately getting you back up and running in no time and minimizing the cost of downtime.



CRITICAL, WEARING AND INVESTMENT PARTS

A parts package typically includes critical parts such as a hoist brake, hoist/trolley coupling, inverter parts; wearing parts such as rope, rope guide, limit switch; and even investment parts such as motors, gearboxes and inverters.



Retrofits

Retrofits are an efficient option to replace components or add current technology to your existing overhead crane. Common retrofits include replacement of hoists, components, electrics and/or controls, addition of new features, and/or technology upgrades and updates. Retrofits typically require minimal downtime, engineering and pre-planning.

Radio controls

Improved user ergonomics reduces strain for the operator helping to increase productivity in your process. Radio controls can also save the operator time eliminating the need to walk from a pendant to the load to rig countless times in a shift.

Variable Speed Control (VFD)

The precise and infinitely variable speed selection reduces jerking and load swing for enhanced operator efficiency and productivity.

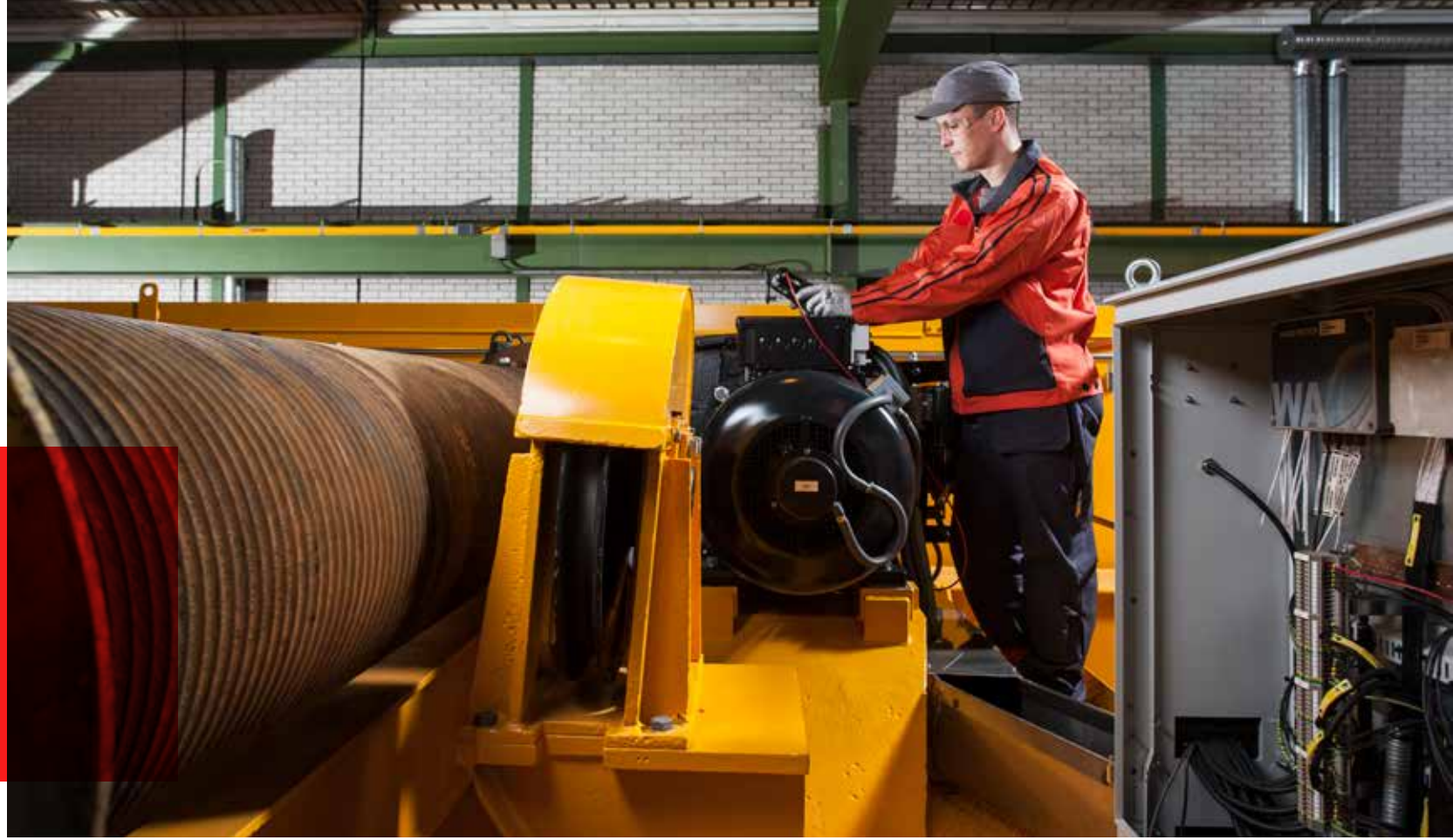
Side Pull Prevention

A side pull occurs when the hoist lifts something that has not been placed directly beneath it. Side pull can cause damage to the drum, rope and rope guides and is a common cause of breakdowns. Side Pull Prevention has been designed to stop hoisting motion when side pulling is detected.

Wire rope hoist

When a hoist has reached the end of its productive design life, it can be more efficient and cost-effective to replace the entire hoist instead of just replacing components. A new hoist also allows you to take advantage of new technologies such as remote monitoring or smart features such as Hook Centering and Snag Prevention. Replacing a hoist at the right time and with the right product can bring significant improvement to the reliability of the equipment as well as the safety and productivity of the operation.

Upgrade a crane to meet new demands as a cost-saving alternative to replacing it



Modernizations

Helps maintain safety and productivity, even as production demands increase

Crane modernizations can help solve a dilemma that many companies face: being caught between the conflicting realities of ramping up productivity to stay competitive and having to operate within budgetary constraints that limit new equipment purchases.

Crane modernizations can provide you with the additional production capacity needed in a fiscally responsible way that also makes prudent use of material resources. Modernizations build upon the existing structure and viable components of the original crane.

Modernizations can be performed multiple times on a piece of heavy-duty lifting equipment to substantially extend its lifespan and useful service. Plus, most modernizations can be planned in stages; this allows for smaller outages and budget commitments while achieving substantial returns on investments and gains in productivity.

If you are looking to increase crane capacity, your first step is defining the capacity required for your new production or process plan. And, it is generally wise to look beyond your immediate needs. You could save your company money in the long run by taking into account projected business growth and planning a crane capacity increase to satisfy your long-range needs.

Crane modernization ultimately helps companies lift more material, faster. As systems age, production can slow. Also, aging cranes may require more maintenance, whereas modernized cranes typically need less maintenance. Well-maintained and more productive systems help companies achieve a better return on their investment in the long-term.

Consultation services

Whether you are considering a modernization or you have questions or concerns about your crane structure, runway, rope or hook - there are a variety of services that can give you insights into safety, production and further improvement opportunities.

Crane Reliability Study

Before beginning a modernization, an engineering assessment should be done to study the current condition of the crane and provide an estimate of the remaining design life. The assessment can give you an accurate picture of the current condition of your crane and highlights possible maintenance and modernization needs.

Crane rail analysis and geometry survey

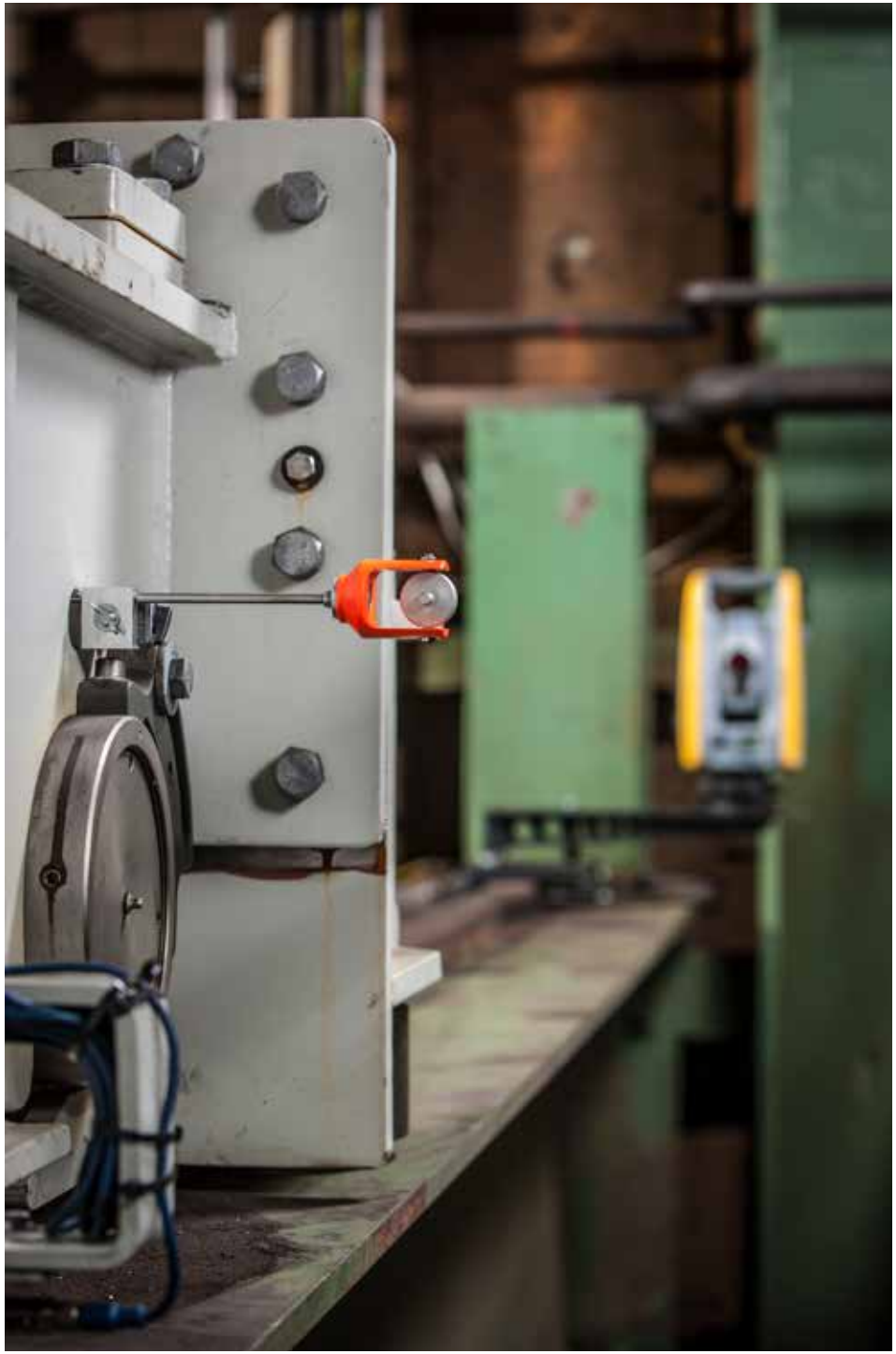
Misaligned overhead crane runways cause wear on crane wheels, wheel flanges, bearings and rails. Left uncorrected, they can result in accidents, failure or derailment of overhead cranes and can lead to loss of productivity and costly downtime required for repair and replacement of expensive parts.

A rail survey looks at the alignment of your crane rail and provides information on runway span, straightness, elevation and rail-to-rail elevation. A crane geometric survey assesses the alignment and square of a crane by looking at wheels, guide rollers, end trucks, girders, and other components of the crane.

Together these services can give you a complete view of crane and rail geometry and a plan for corrective actions.

Rope and hook analysis

A rope analysis can provide improvement possibilities to extend rope or reeving component life. A hook analysis can reveal whether declining fatigue life poses any risk of failure in the continued use of the crane and can give more detailed information than Design Working Period (DWP) calculations of the hoisting machinery.



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. In 2019, Group sales totaled EUR 3.33 billion. Including MHE-Demag, the Group has around 18,000 employees in 50 countries. Konecranes shares are listed on the Nasdaq Helsinki (symbol: KCR).

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