

KONECRANES SERVICE

Maintenance for waste to energy cranes



CARE Preventive Maintenance program

Lifecycle Care is Konecranes approach to maintenance. The foundation of Lifecycle Care is our CARE Preventive Maintenance Program. We tailor the service agreement to your operations taking into account the equipment, its usage, operating environment, duty class, service history, manufacturer's recommendations and statutory requirements.

We have more than 50 years of experience in waste handling and we have 600,000 assets under service agreement. We've used that knowledge and experience to design a preventive maintenance program to improve your equipment safety and productivity through the systematic application of preventive maintenance inspections, compliance inspections where applicable, routine maintenance and remote-monitoring technology.

The CARE program can include your waste handling cranes, hydraulic grabs and maintenance cranes.

MAINMAN™ Planned Maintenance

Visual checks and routine maintenance work such as adjusting and lubricating are performed to help satisfy manufacturer's maintenance instructions.

Oil Change

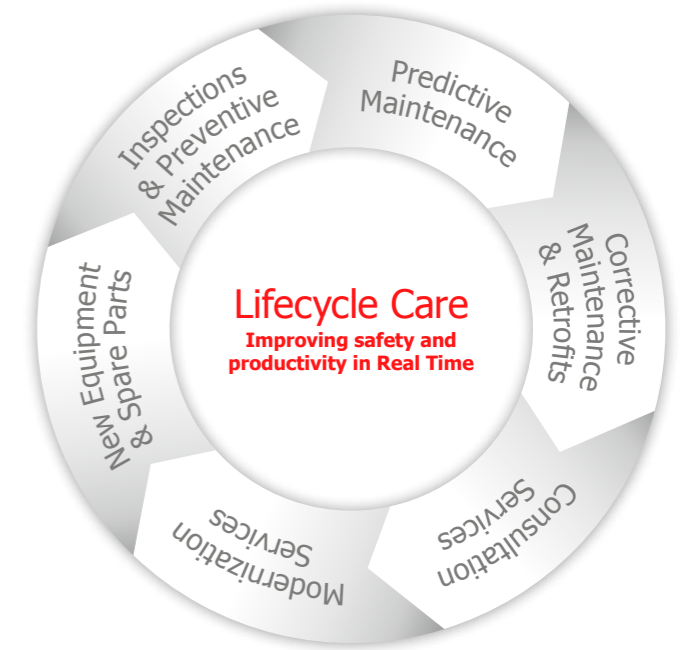
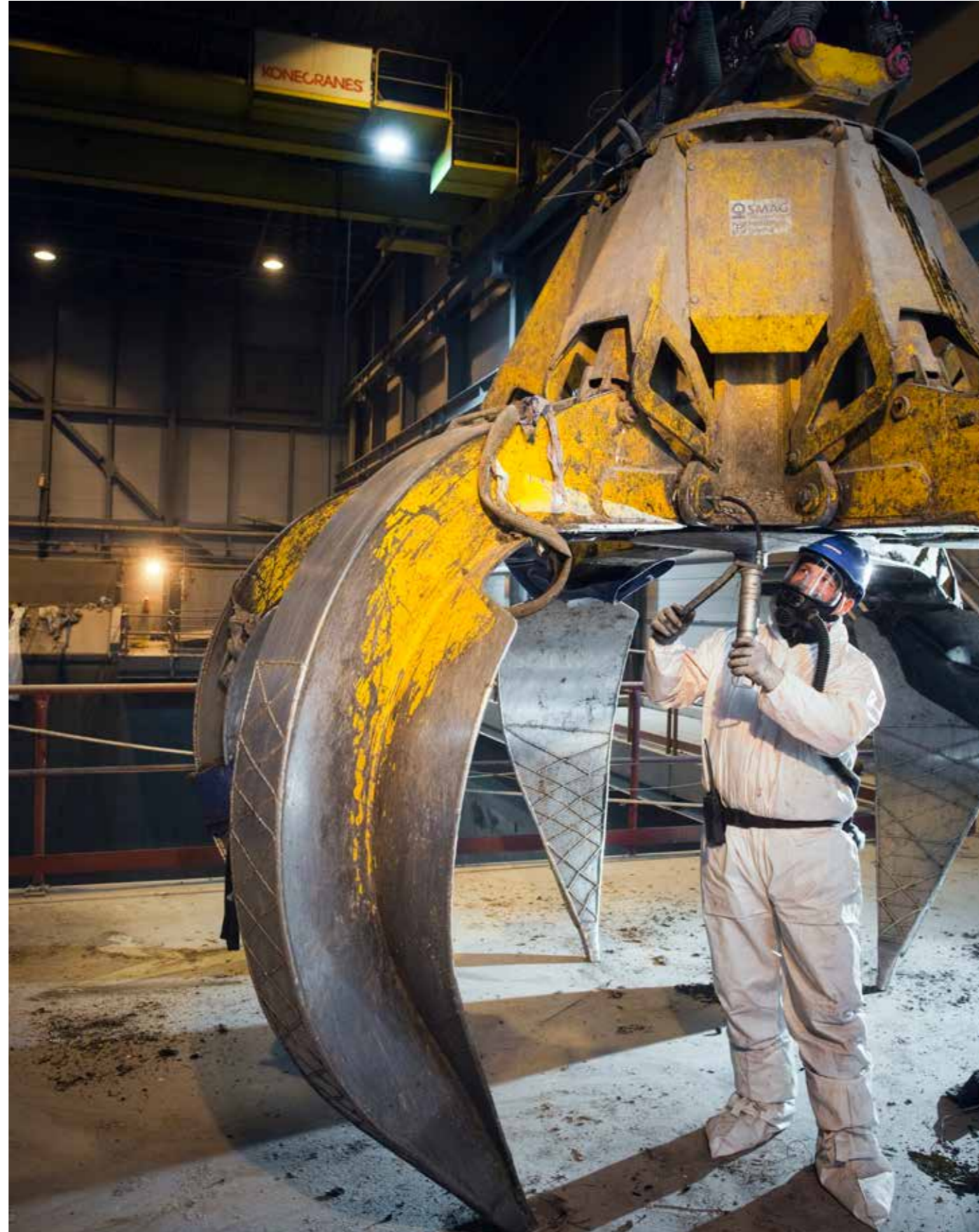
Regular oil changes can help reduce corrosion and wearing of gears and hydraulic units; this can extend the lifespan of these components and help avoid unexpected failures and breakdowns.

Konecranes Frequent Inspection

This inspection complements your maintenance program to provide additional assurance with safety-critical components between more comprehensive inspections and preventive maintenance visits.

Compliance Inspections

Where applicable, these inspections are designed to satisfy regulatory requirements. Our inspectors and technicians are trained and experienced with your local regulations.



Our approach to maintenance

Lifecycle Care is our comprehensive and systematic approach to maintenance, supported by world-class digital tools and processes. We deliver Lifecycle Care in Real Time by connecting data, machines and people. We use real-time visibility of comprehensive maintenance and usage data combined with our knowledge and experience to deliver safety and productivity improvements to our customers.

Our crane experts apply a systematic Risk and Recommendation Method and a consultative, planning and review process to drive continuous improvement in safety and productivity.

Customer consultation and yourKONECRANES

As part of our consultative approach we perform a Service Review after each service visit to provide you with insight into inspection and maintenance findings and recommended actions.

Once a year or as needed we will conduct a Business Review with your management team. This is an in-depth review of our service relationship – looking at progress, feedback and documented value.

These reviews are performed using live data on our yourKONECRANES customer portal. The information can be viewed at any time and easily shared with colleagues.



Downtime is not an option

Preventive or corrective – we have the services to keep your operations running smoothly.

Optimize oil change intervals

An Oil Analysis assists in deciding the optimal oil change timing for hoisting, traveling and traversing gears. Hydraulic oil can also be analyzed. The service can provide useful information regarding the condition of internal gear components. For example, oil oxidation or metallic particles in oil are potential symptoms of running problems.

An optimal oil change interval is affected by equipment usage and ambient conditions; a calendar-based interval may result in too many or too few oil changes.

An Oil Analysis performed on a regular schedule, such as annually, will show trends in oil quality. Trends in oil condition may reveal defects, such as slowly accumulated fatigue on gear teeth, which may be relevant in planning more thorough inspections, overhauls or replacements.

Get a head start on corrective maintenance

Standby Service has been designed to enable a quick start for corrective maintenance in emergency cases by making trained and qualified service personnel available for troubleshooting and/or repair. Personnel in Standby Service have access to 24/7 spare part ordering services and global technical support.

The right parts at the right time

Preauthorized Repairs has been designed to get small repairs or adjustments arranged and completed quickly and efficiently with a blanket authorization to perform corrective maintenance up to a certain amount.

Preauthorized Repairs are intended to be completed during inspection or preventive maintenance visits without the need to go through the purchase process separately each time.

Wearing Parts Replacement has been designed to replace wearing parts, at a fixed price, before the end of their estimated lifetime or if they are broken. Wearing parts can be replaced according to a predetermined schedule or based on their condition as determined by Konecranes during maintenance work. Wearing Parts Replacement includes replacement labor and supply of parts and components.

Konecranes Parts Packages are specifically designed according to your application and usage requirements. Our parts experts provide you with a comprehensive parts package which is based on our experience and your individual needs.

Our parts package includes critical and wearing parts as well as an option to include investment parts such as motors, gearboxes and inverters. Having parts on hand will help you reduce and manage crane-related risks for your operation.

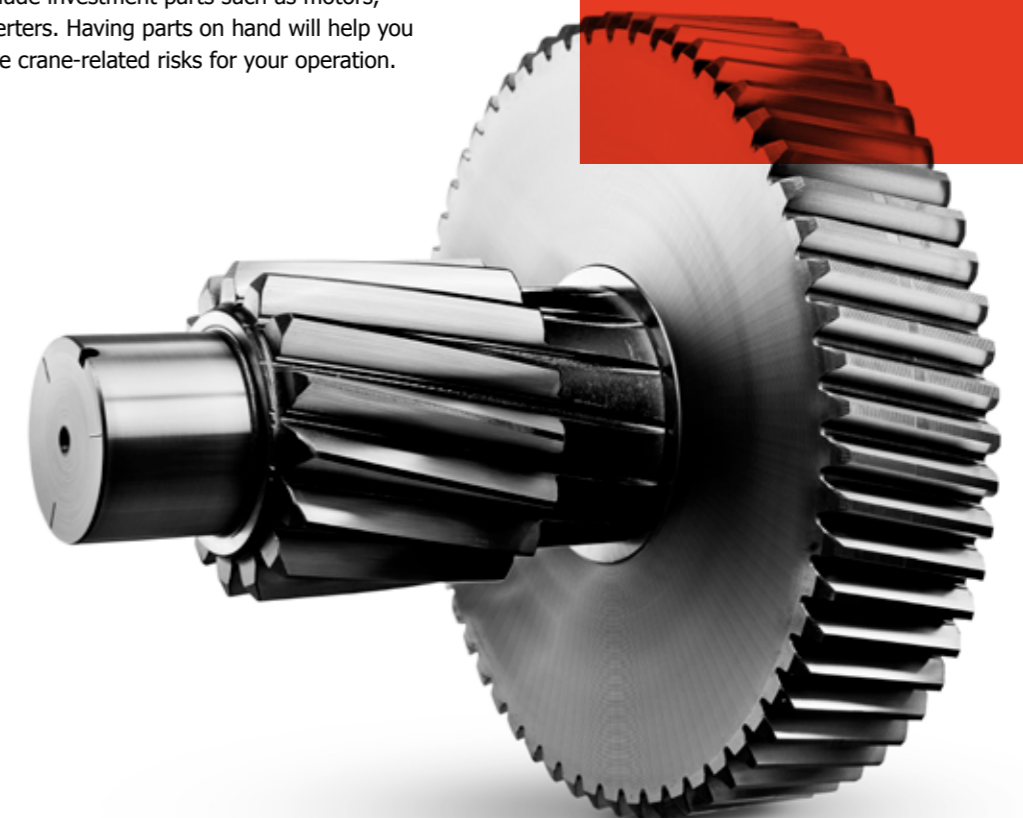
CONSULTATION SERVICES

HOW MUCH LIFE IS LEFT IN YOUR CRANE?

The Crane Reliability Study looks at the current condition and remaining life of your crane. A team of trained and experienced Konecranes specialists gather detailed information about your crane, perform an inspection using specialized tools and methods and conduct an engineering analysis.

KEEP YOUR CRANE RUNNING SMOOTH AND STRAIGHT

Cranes that are straight, square and aligned experience less repair costs and are more reliable. CraneQ™ Crane Geometric Survey and RailQ™ Runway Survey work together for a total look at crane and runway geometry.





Connect with your crane

TRUCONNECT® is a suite of remote service products and applications to support maintenance operations and drive improvements in safety and productivity.

TRUCONNECT Remote Monitoring collects condition, usage and operating data from control systems and sensors on an asset and provides alerts of certain anomalies. Remote Monitoring data is used in maintenance planning and in predicting possible component or equipment failure.

TRUCONNECT Brake Monitoring uses a condition monitoring device to collect the status of brake air gap,

mechanical and electrical faults from the electromagnetic disc brakes. The service provides visibility into current brake condition, estimates remaining service life and indicates brake faults. Brake Monitoring information is used in predictive maintenance and can also be used for brake maintenance planning.

TRUCONNECT Remote Support provides 24/7 access to a global network of crane experts and specialists, offering problem solving and troubleshooting to help reduce unplanned downtime.

Your data – online, any time

TRUCONNECT usage data is viewable on our cloud-based customer portal – yourKONECRANES.com. When you have a maintenance agreement with us, your maintenance data and asset details from MAINMAN are also available on the portal, giving you a transparent view of events and activities over any selected time interval.

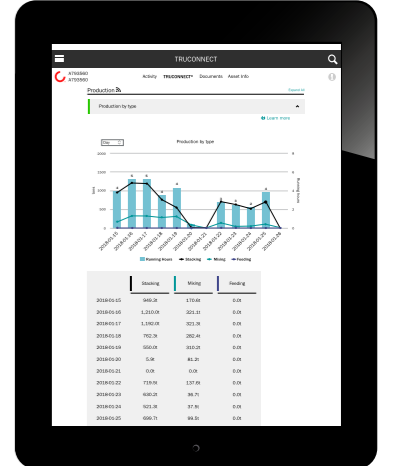
Aggregated data can be viewed, analyzed and shared quickly, for a single asset or an entire fleet. Insights can be drawn by observing anomalies, patterns and trends, helping you make informed maintenance decisions.

yourKONECRANES data

TRUCONNECT

A **Production** section shows the material flow and waste sufficiency in the bunker and production statistics by all or an individual crane. This allows you to see if production process are appropriate and what production types are mainly operated by the cranes.

A production table shows the total production volume in tons distributed according to the process tasks in a selected reporting period. This table highlights stacking, mixing and feeding.



The **Alerts** section highlights safety critical alerts and production critical alerts. It also provides a Pareto analysis that displays and ranks the most important causes of alerts related to safety and the usability of the crane.

Safety-critical alerts indicate a safety risk to the crane or its operation. Safety-critical risks can include emergency stops, overloading, brake faults and safety limits.

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

Operating Statistics show the crane operation modes and functionality of crane features and crane automation.

This section is designed to promote appropriate operation and production process in order to achieve optimal results in terms of the crane efficiency, service life and maintenance costs of the crane investment.

Maintenance

If you have a service agreement, the portal provides you with quick access to all your service activity – including:

- Inspection and maintenance findings
- Overview of open safety and production risks, plus TRUCONNECT safety, production and condition alerts
- Asset lists that can be filtered with a variety of criteria
- Electronic reports suitable for sharing or printing
- Calendar of completed and upcoming service activities
- Intervals and frequency of service
- Assets and service products included in your agreement

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 2017, Group sales totaled EUR 3,136 million. The Group has over 16,000 employees at 600 locations in 50 countries. Konecranes shares are listed on the Nasdaq Helsinki (symbol: KCR).

© 2019 Konecranes. All rights reserved. 'Konecranes', 'Lifting Businesses' and  are either registered trademarks or trademarks of Konecranes.

This publication is for general informational purposes only. Konecranes reserves the right at any time, without notice, to alter or discontinue the products and/or specifications referenced herein. This publication creates no warranty on the part of Konecranes, express or implied, including but not limited to any implied warranty or merchantability or fitness for a particular purpose.



Learn more

Visit [konecranes.com](https://www.konecranes.com) to learn more about Konecranes Service and Konecranes equipment for the waste-to-energy industry.