

KONECRANES SERVICE

TRUCONNECT® Remote Service

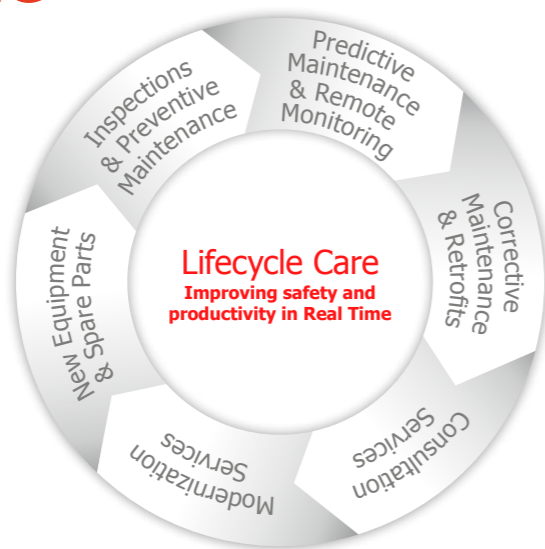




Improving safety and productivity in real time

We provide specialized maintenance services and spare parts for all types and makes of overhead industrial cranes and hoists. Our objective is to improve the safety and productivity of our customers' operations.

Lifecycle Care is our comprehensive and systematic approach to managing customer assets; connecting data, machines and people to deliver a digitally-enabled customer experience in real time.



LIFECYCLE CARE IN REAL TIME

CONNECT

Inspectors and technicians input inspection and maintenance findings when on site. TRUCONNECT remote monitoring continuously gathers condition, usage and operating data and issues safety alerts.

GET INSIGHTS

Comprehensive usage data, maintenance information, asset details and service history are available in near real time on our customer portal, yourKONECRANES.com. Actionable insights can be drawn by observing anomalies, patterns and trends for a single asset or entire fleet.

OPTIMIZE

Sharing our broad knowledge and experience, we provide recommendations, and discuss how each action can optimize operations and maintenance.

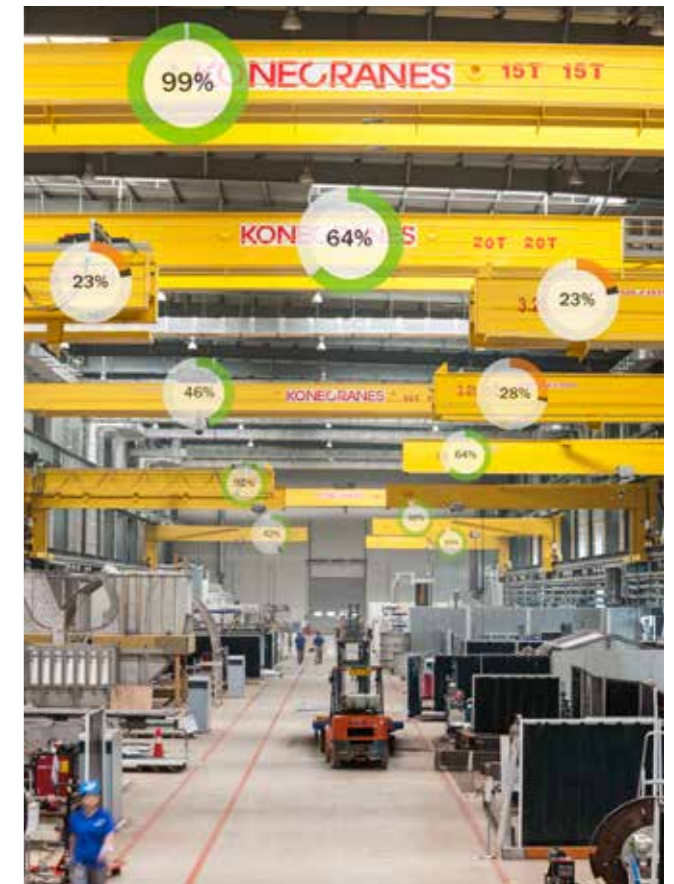
A comprehensive view of equipment maintenance needs and performance

Preventive maintenance is essential for keeping your cranes in top operating condition. TRUCONNECT Remote Monitoring along with a Konecranes CARE Preventive/Predictive Maintenance program provides valuable usage and operating data that can be used along with inspection and maintenance information for a comprehensive view of equipment maintenance needs and performance.

Incorporating predictive maintenance elements including TRUCONNECT Remote Monitoring to a CARE program can further optimize maintenance activities, reduce unplanned downtime and improve equipment safety, productivity and lifecycle value.

Predictive maintenance utilizes condition monitoring, advanced inspections, and data analytics to predict component or equipment failure. Recommendations to repair or replace components are driven by a combination of preventive and predictive maintenance findings.

Analyzing and identifying anomalies, patterns and trends in TRUCONNECT data helps us make informed, component-specific predictions, and prioritize recommendations and actions.



Anomalies are abnormal events that can show up as faults and should be addressed promptly as they occur. A good example is an overload. Knowing precisely when an overload has occurred is the first step in identifying its cause and taking steps to prevent it from happening again.



Patterns are recurring events that might show up on a daily, weekly or monthly basis, or follow some other correlation. A pattern of excessive starts or emergency stops can indicate a need for inspections because these actions can cause components to wear faster.



The study of **trends** can help uncover targets for safety and productivity improvement. Data charts and graphs provide visual cues of things that are increasing or decreasing. Analyzing data behavior over time supports investment decisions and the development of predictive maintenance.

TRUCONNECT Remote Service

TRUCONNECT is a suite of remote service products and applications to support maintenance operations and drive improvements in safety and productivity. It is an important building block in delivering Lifecycle Care in Real Time and the foundation for predictive maintenance.



WHAT IT DOES

BENEFITS

DATA

AVAILABILITY

RECOMMENDED FOR

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.

- Supports predictive maintenance
- Maintenance actions can be planned based on estimated component condition i.e. estimated remaining life
- Provides knowledge of the remaining design working period (DWP) and remaining service life of selected components such as hoist, brakes, structures and contactors
- Provides asset usage and operating information that is used to assess crane condition and safety
- Notifies you of brake service life, hoist overloads, emergency-stops and over-temperature occurrences through text or email alerts, allowing for prompt response

Collected data varies depending on asset make and model but typically covers:

- Condition and expected service life of critical components
- Running time
- Lifted loads
- Motor starts
- Work cycles
- Emergency stops
- Additional TRUCONNECT options allow certain assets to be equipped with hoisting brake and/or inverter monitoring

Can be delivered with new Konecranes cranes such as CXT hoists, CXT SMART, SMARTON, UNITON, new waste to energy cranes and select engineered cranes, to sites where mobile network coverage is available.

The remote service hardware can also be retrofitted on some existing cranes including Konecranes equipment, Demag hoists with SafeControl, and non-Konecranes brand hoists.

A single crane or an entire fleet. Ideal partner to a preventive maintenance program and a requirement in order to effectively implement predictive maintenance.

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.

- Provides visibility to brake condition between normal inspection visits
- Helps minimize the risk of load drop with the detection of brake faults
- Helps you avoid unnecessary brake disassembly for inspection
- Enables predictive brake maintenance
- Assists in further optimization of maintenance activities to reduce unplanned downtime and to improve equipment safety, productivity and lifecycle value

- Indirect measurement of brake air gap status and friction material wear
- Alerts of electrical faults
- Alerts of mechanical faults

Delivered with new SMARTON, UNITON AND RTG cranes.

A retrofit is available for Konecranes CXT, SMARTON, UNITON, RTG and selected engineered cranes, to sites where mobile network coverage is available.

Can also be retrofitted on existing cranes, including non-Konecranes brands, if the crane is equipped with electromagnetic disc brakes.

Ideal for cranes in heavy use, especially if safety is a high priority. Brake Monitoring information is used in predictive maintenance and can also be used for brake maintenance planning.

TRUCONNECT Wire Rope Monitoring

Reveals both visible exterior defects as well as internal defects that are not detectable with a visual inspection.

Specialized and patented sensors continuously monitor the wire rope while the crane is in normal operation and alerts via text or email occur when rope condition deteriorates below set limits.

- Know the condition of your wire ropes in an instant and at any time
- Helps you discover defects that are not visible in periodic inspections
- Assists in reducing the risk of load drop and other safety risks related to wire ropes
- No shutdown needed to inspect rope condition
- Offers potential to optimize rope change intervals – plan ahead to have the wire rope replaced during a planned shutdown
- Rope safety can be monitored remotely without interrupting crane operations

- Condition of the wire rope
- Number of broken wires and risk indicated with traffic light indicators
- Detailed view of rope defects and location in the full rope length

Can be pre-installed on new ETO cranes with a wire rope diameter of 22-28 mm.

Wire Rope Monitoring is available as a retrofit for Konecranes SMARTON cranes.

Ideal for cranes in process critical use, especially if safety is a high priority.

TRUCONNECT Remote Support

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

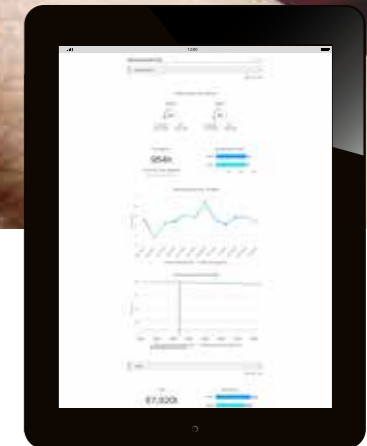
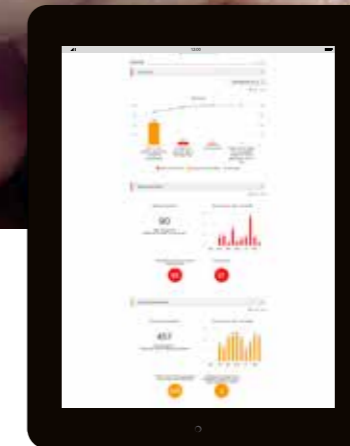
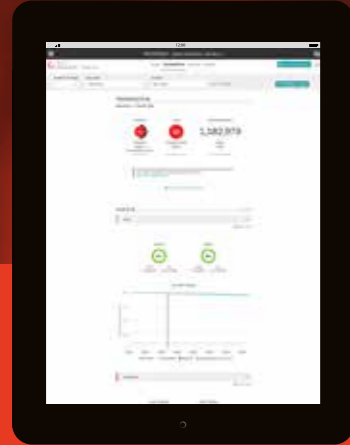
In controlled circumstances, two-way communication with the machines and their operators can be established in order to expedite corrective action.

- Short lead time to begin troubleshooting helps minimize downtime
- Troubleshooting for problems that require high-level technical expertise
- Quick response support for even extremely remote locations
- Support 24/7 from one easy point of contact, available by phone
- Helps identify the need for corrective on-site maintenance actions and spare parts which may eliminate unnecessary site visit

- Konecranes Global Technical Support has remote access to crane diagnostic unit for fault history and events

Available on rubber-tired gantry cranes and select Programmable Logic Controlled (PLC) engineered industrial or standard cranes in selected regions.

Ideally suited for extremely remote locations. Complements a preventive maintenance program for critical ETO cranes.



TRUCONNECT data on yourKONECRANES

yourKONECRANES.com

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

TRUCONNECT data is presented in easy-to-read graphs with thorough explanations including common or likely causes, what you should be concerned about and recommended actions.

TRUCONNECT safety, production and condition alerts are highlighted in the **Overview** section of yourKONECRANES allowing you to quickly see assets that need attention.

TRUCONNECT alert data is summarized in the **Business Review** section letting you see anomalies, patterns and trends over a specific time frame.

Each connected asset has a **TRUCONNECT page** that includes a summary of events, conditioning monitoring, alerts and operating statistics.

Summary

The Summary section shows the main items that require attention in each category:

Condition: The shortest current service life of a component

Alerts: The cumulative number of alerts in the review period

Operating Statistics: The current most significant problem that could affect the safe operation or condition of the crane

Condition Monitoring

This section shows the current condition of components, any risks related to safety and production, and the estimated remaining service life based on usage history. Condition monitoring can also be used to check the component replacement frequency, which provides a clear indication of upcoming maintenance needs and how changes in the operator's actions affect the service life of components. This information can be used for predictive maintenance and to plan and schedule preventive maintenance in order to improve safety and reduce unplanned downtime.


Alerts

Safety-critical alerts and production-critical alerts are highlighted in this section. **Safety-critical alerts** indicate a safety risk to the crane or its operation. Safety-critical risks can include emergency stops, overloading and brake faults. **Production-critical alerts** indicate production risks that result in crane stoppage or production downtime. Production-critical risks can include motor overheating, inverter faults and control system faults. The **Pareto analysis** displays and ranks the most important causes of alerts related to the safety and usability of the crane.

Operating Statistics

This section shows 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. This section also shows usage rate differences between different hoists and the subsequent differences in their remaining service life. This section is designed to promote appropriate operation in order to achieve optimal results in terms of the safety, service life and maintenance costs of the crane investment.

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. The Group has more than 16,000 employees at 600 locations in 50 countries. Konecranes shares are listed on the Nasdaq Helsinki (symbol: KCR).

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Visit konecranes.com to learn more about TRUCONNECT Remote Service, yourKONECRANES customer portal and CARE Program.