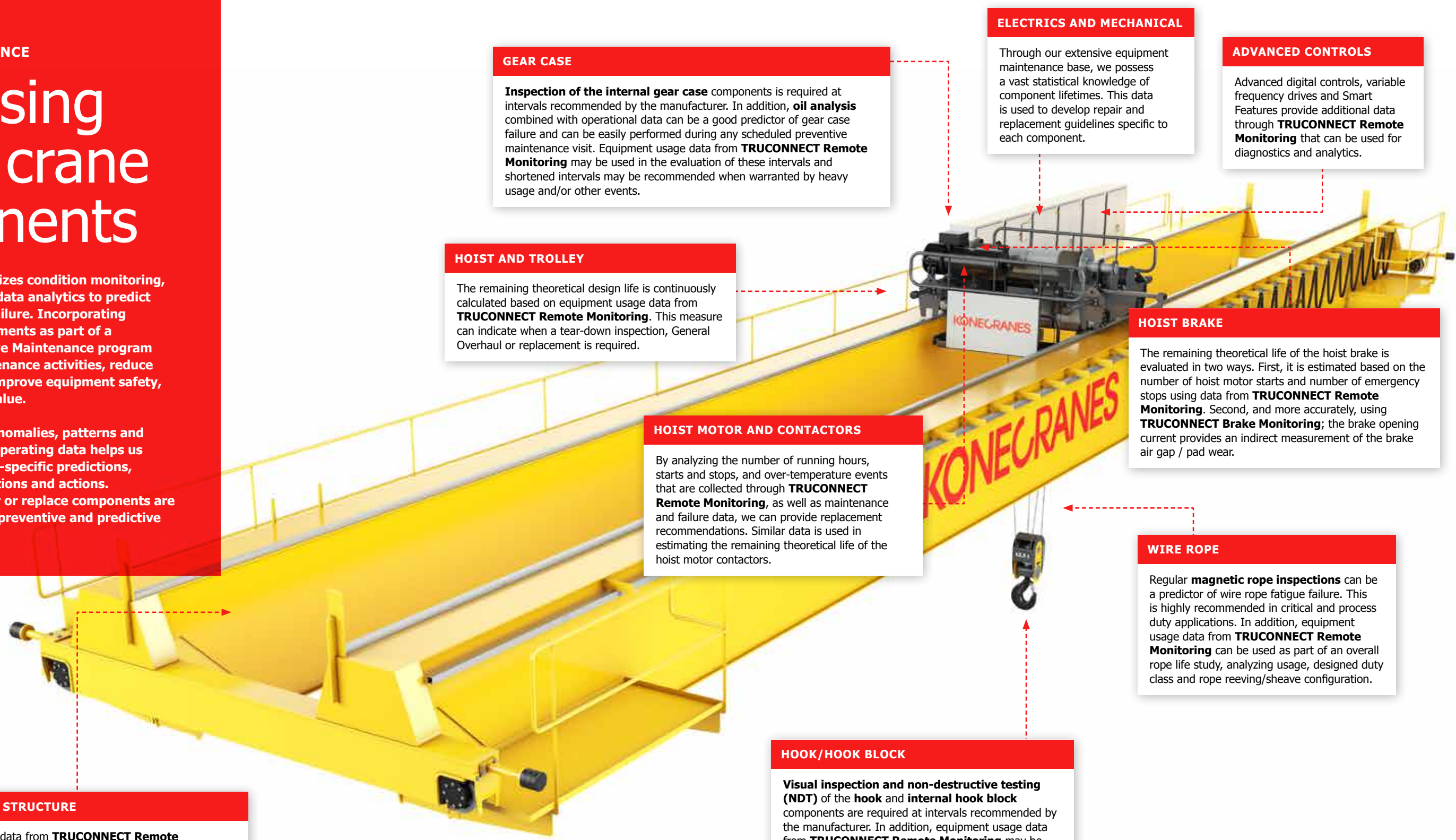


PREDICTIVE MAINTENANCE

Addressing critical crane components

Predictive maintenance utilizes condition monitoring, advanced inspections, and data analytics to predict component or equipment failure. Incorporating predictive maintenance elements as part of a Konecranes CARE Preventive Maintenance program can further optimize maintenance activities, reduce unplanned downtime and improve equipment safety, productivity and lifecycle value.

Analyzing and identifying anomalies, patterns and trends in crane usage and operating data helps us make informed, component-specific predictions, and prioritize recommendations and actions. Recommendations to repair or replace components are driven by a combination of preventive and predictive maintenance activities.



GEAR CASE

Inspection of the internal gear case components is required at intervals recommended by the manufacturer. In addition, oil analysis combined with operational data can be a good predictor of gear case failure and can be easily performed during any scheduled preventive maintenance visit. Equipment usage data from **TRUCONNECT Remote Monitoring** may be used in the evaluation of these intervals and shortened intervals may be recommended when warranted by heavy usage and/or other events.

HOIST AND TROLLEY

The remaining theoretical design life is continuously calculated based on equipment usage data from **TRUCONNECT Remote Monitoring**. This measure can indicate when a tear-down inspection, General Overhaul or replacement is required.

HOIST MOTOR AND CONTACTORS

By analyzing the number of running hours, starts and stops, and over-temperature events that are collected through **TRUCONNECT Remote Monitoring**, as well as maintenance and failure data, we can provide replacement recommendations. Similar data is used in estimating the remaining theoretical life of the hoist motor contactors.

ELECTRICS AND MECHANICAL

Through our extensive equipment maintenance base, we possess a vast statistical knowledge of component lifetimes. This data is used to develop repair and replacement guidelines specific to each component.

ADVANCED CONTROLS

Advanced digital controls, variable frequency drives and Smart Features provide additional data through **TRUCONNECT Remote Monitoring** that can be used for diagnostics and analytics.

HOIST BRAKE

The remaining theoretical life of the hoist brake is evaluated in two ways. First, it is estimated based on the number of hoist motor starts and number of emergency stops using data from **TRUCONNECT Remote Monitoring**. Second, and more accurately, using **TRUCONNECT Brake Monitoring**; the brake opening current provides an indirect measurement of the brake air gap / pad wear.

WIRE ROPE

Regular **magnetic rope inspections** can be a predictor of wire rope fatigue failure. This is highly recommended in critical and process duty applications. In addition, equipment usage data from **TRUCONNECT Remote Monitoring** can be used as part of an overall rope life study, analyzing usage, designed duty class and rope reeving/sheave configuration.

HOOK/HOOK BLOCK

Visual inspection and non-destructive testing (NDT) of the hook and internal hook block components are required at intervals recommended by the manufacturer. In addition, equipment usage data from **TRUCONNECT Remote Monitoring** may be used in the evaluation of these intervals and shortened intervals may be recommended when warranted by heavy usage and/or other events.

CRANE/CRANE STRUCTURE

Equipment usage data from **TRUCONNECT Remote Monitoring**, as well as maintenance and performance histories, will be the foundation of any **Crane Reliability Study** and/or End of Life Study. Due to the availability of data, the time to perform the analysis is shortened, and the results will be inherently more accurate. This enables true fact-based decision making as it comes to modernization or replacement decisions.