

Ten ways to help improve overhead crane safety



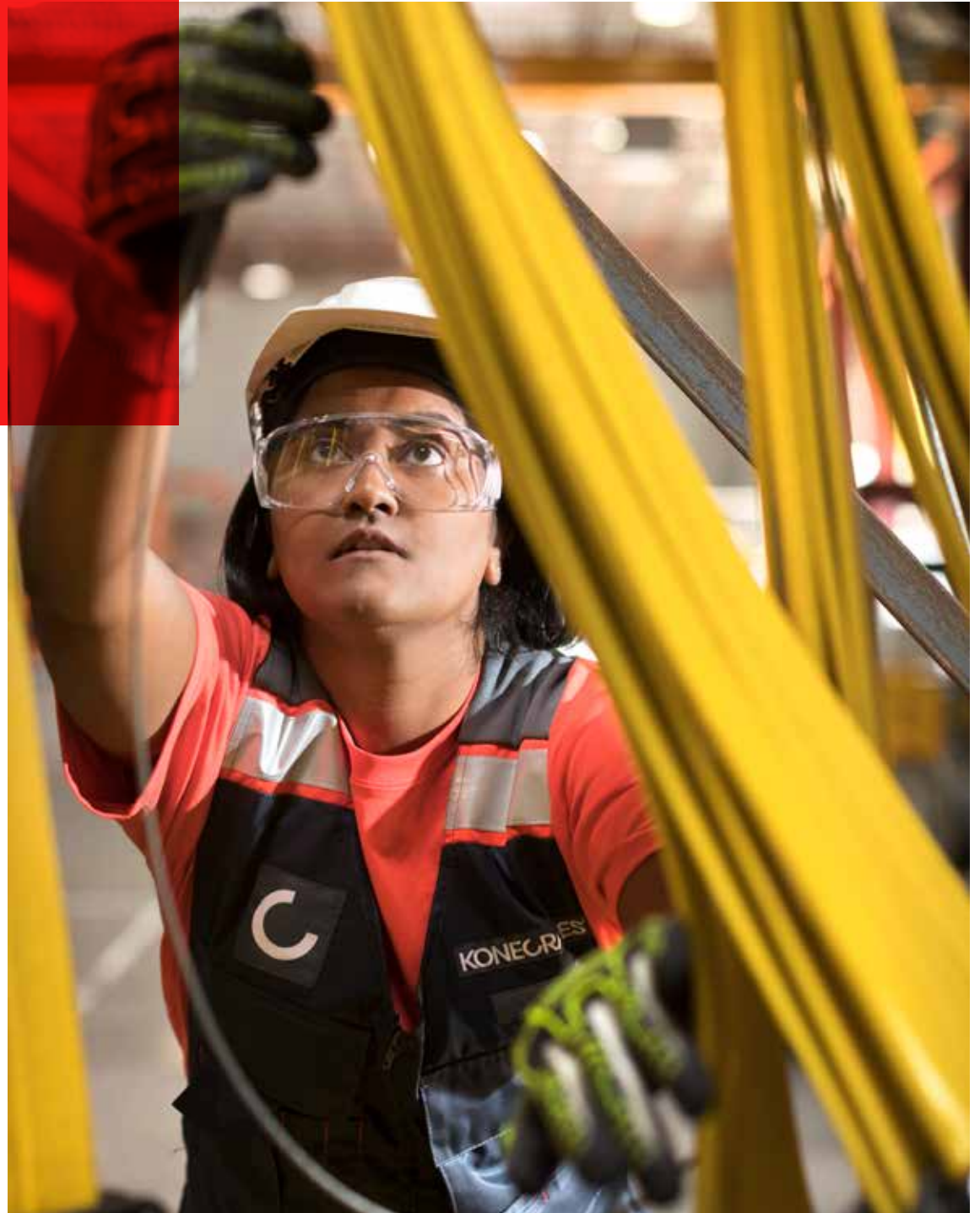
Improving safety and productivity

Every worker around the globe wants to return home safely at the end of each shift. No matter what industry you work in – from steel mills and car assembly plants to paper mills and manufacturers – workplace safety is imperative.

Workplace incidents can result in devastating injuries and fatalities. The cost of equipment replacement and lost production time can be staggering. A properly maintained crane in the hands of a trained operator helps create a safer and more productive work environment.

A proactive preventive maintenance program is crucial to maximizing safety, however there are several other improvements to consider when looking to increase safety. The addition of safety technologies can make crane operation safer for both people and equipment; and inspections and advanced services can help uncover safety issues so they can be addressed quickly.

The steps you take to increase the safety of your operations can also help increase your productivity. For instance, by controlling loads through sway control or variable speed control technology allows crane operators to focus more of their attention on placing loads as quickly and accurately as possible. Additionally, remote monitoring provides maintenance staff the essential information they need for replacing essential parts at the right time. This reduces the risk of equipment failure and lost production time.





Inspections

Crane inspections are essential for safe operations. It is important to know which types of inspections your equipment needs because inspection types can vary.

Crane inspections can verify that equipment complies with current standards and laws, helping companies avoid costly fines and disruption of operations. Regularly scheduled inspections can assess the safety of equipment, detect wear and tear and identify maintenance needs.

In some countries there are no statutory requirements for compliance inspections. But inspections are still vital for ascertaining the condition of the equipment and to check for

deficiencies and deviations from manufacturer recommendations that may cause a risk to the safe use of your equipment.

A crane professional can help you determine the type and frequency of inspections your cranes need. Depending on the age, type, duty cycle of the crane, and working environment, regulations may require more intensive inspections – including internal inspections and nondestructive testing of components.

Inspections should be performed by trained and qualified inspectors who understand local regulations and requirements and can also provide recommendations for repairs or replacements.

INSPECTION TYPES

Inspection requirements vary around the world - but these are common types of statutory compliance inspections:

ELECTRICAL INSPECTION: Inspects electrical components of equipment for deficiencies.

MECHANICAL INSPECTION: Inspects mechanical components of equipment for deficiencies.

INITIAL INSPECTION: Inspects equipment for deficiencies before a new crane is taken into use, a crane that has not been used for a long period of time, a crane that was moved to another location or major modifications were made.

PERIODIC INSPECTION: Inspects equipment for deficiencies with frequency based on equipment usage and operating environment.

FREQUENT INSPECTION: Inspects safety-critical components of equipment between periodic inspections and planned maintenance visits.

MAJOR INSPECTION: Inspects equipment for deficiencies typically after the first 10 years of service.

LOAD TEST: Verifies that equipment is capable of lifting and moving a rated load through all designed motions.

Preventive Maintenance

An active preventive maintenance program plays an important part in helping keep equipment in a safe and efficient state which in turn helps improve safety. An effective preventive maintenance program consists of inspections, routine maintenance and repairs. Properly done preventive maintenance can reduce the likelihood of failures that can result in injury or fatalities.

While most crane manufacturers provide scheduled maintenance guidelines or recommendations to help equipment perform as expected during normal operation, the most effective preventive maintenance programs are those that are customized or tailored to the environment in which the cranes operate. At a minimum, crane usage, the environment, duty classification, and local regulations and compliance should be taken into account along with manufacturer recommendations.

Complex and technical tasks should be carried out by professionals, either from the operator's own team or from dedicated crane service companies.

Keep in mind that an improperly maintained crane poses possible consequences in terms of safety as well as production losses: Many issues may arise if a crane is not properly maintained – failed bearings, worn wire ropes, failed brakes and a variety of electrical problems. A well-kept crane can provide a longer operational life and lower the risk of safety issues.

An effective preventive maintenance program can help address potential maintenance issues before they compromise employee safety, result in production downtime, and negatively impact revenue.





Parts

Replacing parts before they cause a breakdown helps prolong the life of a piece of equipment, reducing failure and helps avoid personnel injury or property damage.

Wearing parts replacement

A good preventive maintenance program includes wearing parts replacement. This makes it more efficient to replace parts before the end of their estimated lifetime or if they are broken. Parts can be replaced on a predetermined schedule or based on

their condition. Replacing wearing parts helps increase safety by replacing parts before they wear out and thereby contribute to equipment failures.

Performance parts

For cranes in critical process applications, performance parts can be more durable than regular parts. Performance parts are engineered for a more demanding environment and include gears, motors, wheels, hooks, drums and more.

HOOK LATCH TRIGGER

An easy way to increase safety for your operators is to add a hook latch trigger. The trigger locks the latch in an open position, leaving the operator with both hands free to attach or detach the load. The latch closes automatically after the load is attached.



When used properly, the latch trigger can reduce or remove the tendency of an operator to interfere with the latch using tape, zip ties or other temporary fastening, encouraging safer and faster load setup.



Operator Training

Training operators in the safe and effective use of a crane is an investment in the safety of employees and the workplace. Crane accidents cause injuries to operators, workers on the job site and even people nearby. The majority of crane accidents are caused by human error which may result in safety risks and uncontrollable downtime. Accidents can be minimized or prevented through proper training and crane usage.

Crane safety techniques for crane operators include being trained in the specific crane model or models that they will be using. The operator must have a thorough knowledge and understanding of the operating manual and to be able to fully follow instructions in the manual.

The crane operator also must be knowledgeable and proficient in safely rigging the crane, know how to maintain control of the load at all times, and be able to recognize potential hazards and know how to avoid them.

Other crane safety techniques that should be included in training include ways to control load swing, the primary rules of safe crane operation, knowledge of local crane operator regulations, understanding and ability to demonstrate all hand signals, precision lifts and accurate load spotting, and ability to identify and understand all major crane components and assemblies.

Studies show that a high percentage of crane breakdowns result from human error – the operator using the equipment incorrectly or ineffectively, leading to premature wear and malfunction.

Crane Retrofits

Retrofits are a relatively easy and economical way to add current features and technologies to your existing overhead crane. Retrofits can improve crane safety and ease-of-use with improved control interface options and safety components.

LED lighting upgrade

The LED Lighting Upgrade is one of the fastest, least-expensive ways to make your crane safer, while cutting energy consumption by up to 60% per crane.

Because light distribution in LED lights is more focused, the crane operator is less likely to get blinded by the light when looking at the load. It also makes it much easier for operators to keep their eyes on the load and avoid obstacles.



Radio control upgrade

Improved crane safety, greater productivity, more flexibility: radio controls for cranes offer crane operators all of these benefits and more across a range of applications. Not only can radio controls free operators from the confines of a cab, but from crane pendant control cables as well.

Radio controls mean operators can work away from loads. This creates a safer working environment, reducing the risk of injury when loads are being moved. Radio controls also offer crane operators a wider view of the work area surrounding the crane, as they have the ability to walk around and view the load from various angles and vantage points to make sure the load path is obstruction-free, and personnel are out of harm's way.

Operators can walk in closer for load setting and positioning. Radio crane controls enable operators to easily move around obstacles on the facility floor. In contrast, the cable of a push button pendant station can get hung up on machinery and other objects in the facility as the operator follows a load.



Modernizations

Technology that improves safety is developing more rapidly than ever before. Since your overhead crane was first built, safety regulations may have changed. A modernization can help you comply with current safety regulations and may reduce the risk of downtime, injuries or damage to facilities, materials or products.

As crane components age, safety may be compromised even as the crane continues to function. Here are three modernizations that can help increase crane safety:

Update electrical control systems: Electrical control is the heart of a crane, and where advances in technology are most keenly felt. As well as helping you stay compliant with today's regulatory requirements and industry standards, modernization of control systems increases the availability of spare parts and technical support.

Replace mechanical components: The same component platform that is used in new cranes can be used in a modernization. So the safety, lifting capacity and energy consumption of brand new crane mechanics can be used in reconditioned equipment.

Assess and modify the steel structure: Detailed analysis of an older crane structure is required to help maintain the safety of a crane and reduce the potential hazards faced by operators and maintenance personnel alike. This is carried out to identify areas of wear and fatigue, and results in recommendations for repairs and reinforcements to sustain the safe use of the crane well into the future.

Advanced services

Sometimes a more detailed evaluation is necessary than can be performed during regular inspections and preventive maintenance. Advanced services can uncover critical issues using the most current technology and trained specialists to take a deeper look at your crane and its components.

With visual inspection, critical component condition cannot always be verified due to crane configuration and/or obstruction. Failure of components can lead to dropped loads, damage to critical equipment, injury, and even fatalities. More in-depth inspections and analysis can uncover issues that may lead to component failure.

Design life

Regular inspections help identify risks and support compliance, but their frequency and scope are not enough to catch failures caused by wear, structural fatigue and stress fractures in machineries. The likelihood of such failure increases closer to the end of design life. Knowing the remaining design life of your crane and its components gives you an estimate of the limit for safe operational life, based on actual usage.

Crane reliability

An engineering assessment that studies the current condition of your crane and provides a theoretical estimate of its remaining design life can help you when dealing with an aging crane, changes in production or safety issues.





Runways, wheels and running components

Cranes should be able to travel along their runway rails without binding or with a minimum amount of skew. Their overall performance depends on certain factors, including the condition of the runway and its alignment. Poor rail alignment can cause a chain reaction, eventually leading to unnecessary wear and tear of wheels and rails, and structural fatigue. A runway survey delivers an in-depth view of the alignment and condition of crane runway rails, including measurements of span, straightness, elevation and rail-to-rail elevation.

Steel structures

The steel structures of your crane should shoulder the weight of your lifting operations. Those structures are subjected to fatigue as loads are lifted, and as theoretical fatigue life ends, safety can be compromised. An analysis of the steel structure of your crane can give you an accurate picture of the remaining theoretical fatigue life and help identify defects.

Wire ropes

Wire ropes are one of the most critical parts of your wire rope hoists, and they can contain hundreds of individual wires. Broken wires on the rope exterior can be found by visual inspections, but the condition of the core and inner wires cannot be seen. To evaluate the safety of a wire rope, you need to know what's happening both on the outside and on the inside. A rope inspection utilizing magnetic-inductive leakage technology can provide accurate data of the rope's interior and exterior condition.

Hooks, couplings, gearbox

Undetected defects and/or deficiencies in load-bearing or safety-related components can lead to catastrophic failure. Utilizing visual inspection as well as non-destructive testing (NDT) and other technologies can help uncover defects and deficiencies in critical components.



Remote monitoring

Safety is smart and digital: Real-time visibility into your equipment usage and condition goes a long way in making your operations safer.

Remote Monitoring collects condition and usage data for select crane components and indicates safety-related occurrences, ranging from the trolley steel structure and hoist brake to overloads and motor stops due to overheating.

It can also indicate when the crane is being operated incorrectly, or outside established norms. For example, motor over-temperature data may show excessive operation at slow speeds, too many starts in a short time frame, or a hoist motor that is being used above its design class. Accessing this information can help you pinpoint the cause of the problem and design the most appropriate response. In this case, it could

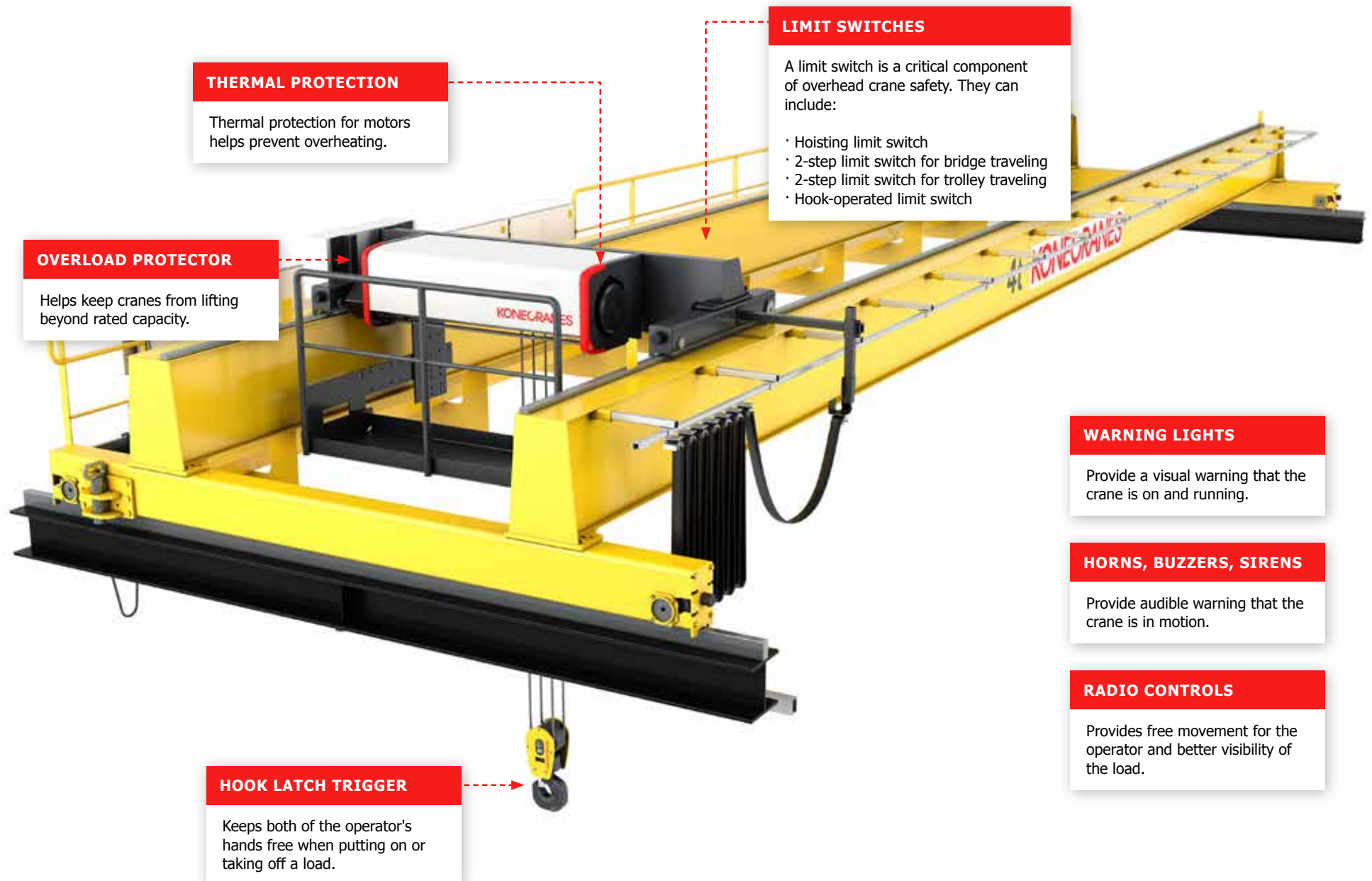
be more operator training, additional maintenance to overhaul the worn parts, or a review to make sure that the equipment still suits your current production and operating demands.

Email or text alerts allow for prompt response to issues. For example, if you receive an alert that a hoist brake is wearing faster than expected, you have an opportunity to change the friction materials before an issue occurs, protecting both people and production.

Having easy access to all your remote monitoring data is essential. An online portal showing aggregated data allows you to view, analyze and share information quickly. Insights can be drawn by observing anomalies, patterns and trends, helping you make informed maintenance decisions.



Features to look for in a new crane or add to an older crane



Safety features for intelligent lifting

Whether you are buying a new crane or looking to update an existing crane, consider adding safety features to help make your operations safer and more productive.

Software based safety features are designed to improve safety and reduce load cycle times by giving you total control over material handling in your production process.

A more efficient operator increases productivity by saving time and money as load cycle times go down. Because the control system optimizes your crane movement, the crane and its components are subject to less wear and therefore could last longer. Most importantly, the chance of human error is reduced, so safety is enhanced.



Load control features

Load control features are designed to improve the crane operator's safety and productivity by allowing them to make smooth, controlled movements on the crane more easily. These features can include:

Sway control to limit load sway and help with precise load positioning

Shock load prevention to allow for smooth load pick-up.

Slack rope prevention to help keep ropes from going slack and slipping out of the hook block.

Positioning and area control features

Positioning and area control features help crane operators to position the load more efficiently and accurately, as well as adapt the working area of the crane to the physical layout of your production line. These features can include:

Target positioning for creating pre-set target positions for the crane to drive itself toward.

Protected areas for creating no-go places to protect valuable production machinery or busy working areas.



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