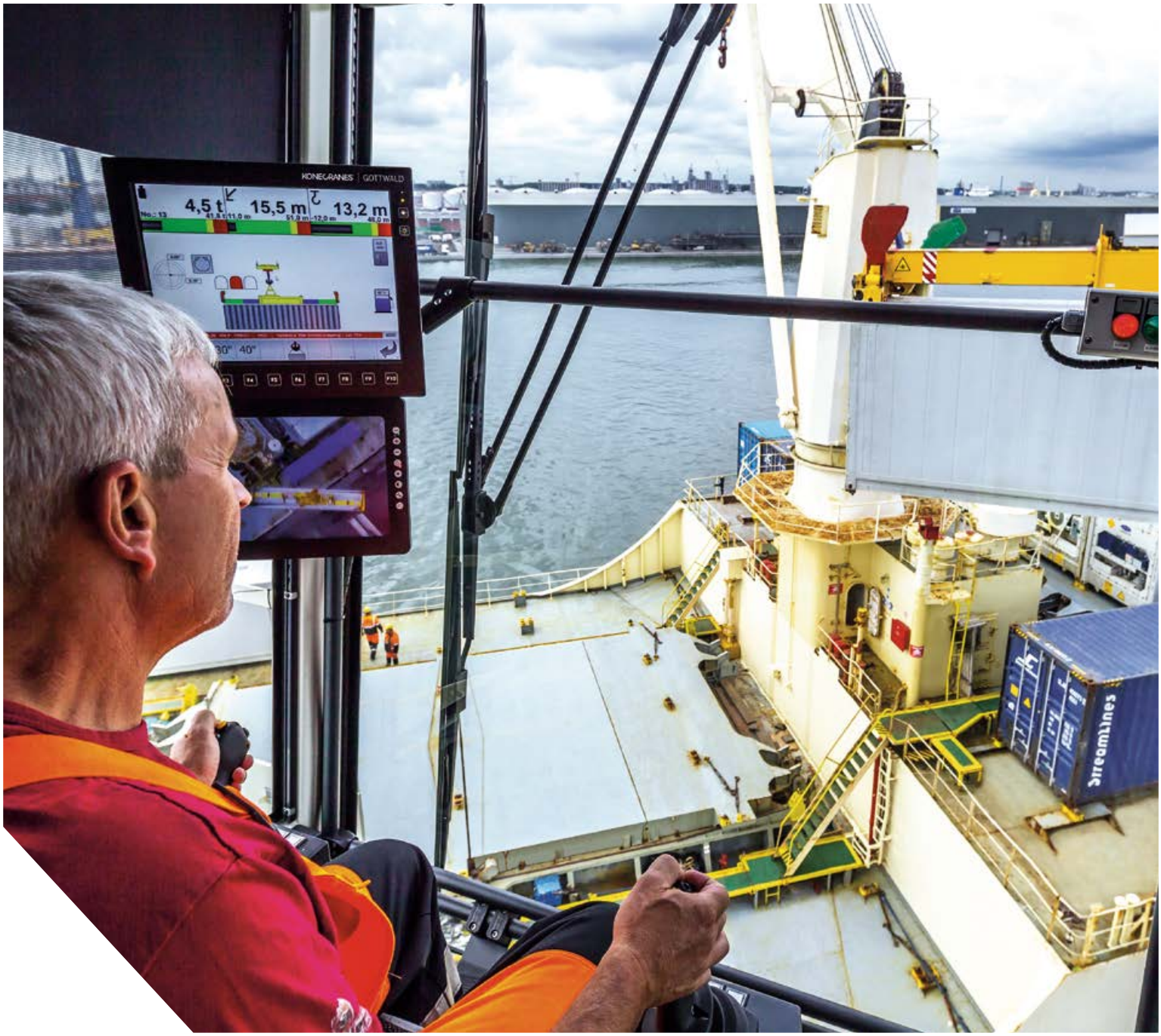
KONECRANES®
Lifting Businesses™

ADVANCED SYSTEMS THAT PAY OFF

SMART CRANE FEATURES



KONECRANES® | GOTTWALD

PRODUCTIVITY THANKS TO ERGONOMICS AND SAFETY

BENEFITS FOR ALL

Konecranes is a leading manufacturer of mobile harbor cranes for productive handling of containers, general, bulk and project cargo in terminals around the world. In addition to proven Konecranes Gottwald rubber-tired cranes, rail-mounted portal harbor cranes and floating cranes are perfect solutions for any port environment.

STRIVING FOR CUTTING EDGE
Konecranes Gottwald Mobile Harbor Cranes are continuously adapted to help you meet changing market requirements. That is why our R&D activities have a systematic focus on productivity, eco-efficiency and ergonomics for your crane operation.

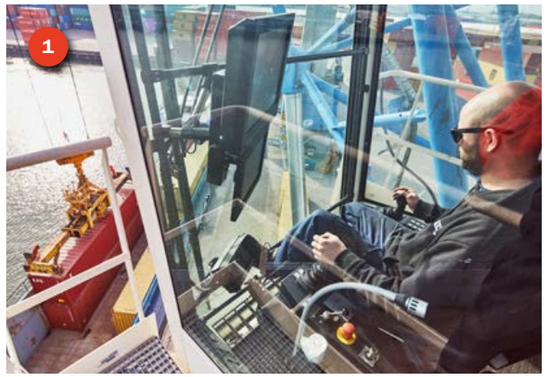
THE COMPETITIVE EDGE FOR TERMINALS
At the human-machine interface, our smart crane features offer benefits that pay off. They make the work of crane operators, service personnel and terminal operators easier, as they increase productivity and make your working day safer.

Our cranes are already equipped with smart crane features as standard from the outset. You can take advantage of a wide range of more options for:

- general crane operation
- specific applications as well as
- data evaluation to monitor productivity and identify necessary service work.

SMART CRANE FEATURES

Smart crane features for Konecranes Gottwald Mobile Harbor Cranes provide:
- Ergonomics – the crane is user-friendlier and thus easier to operate
- Efficiency – handling rates are increased, wear is reduced and downtime is minimized
- Safety – damage to crane, load and quay infrastructure is avoided

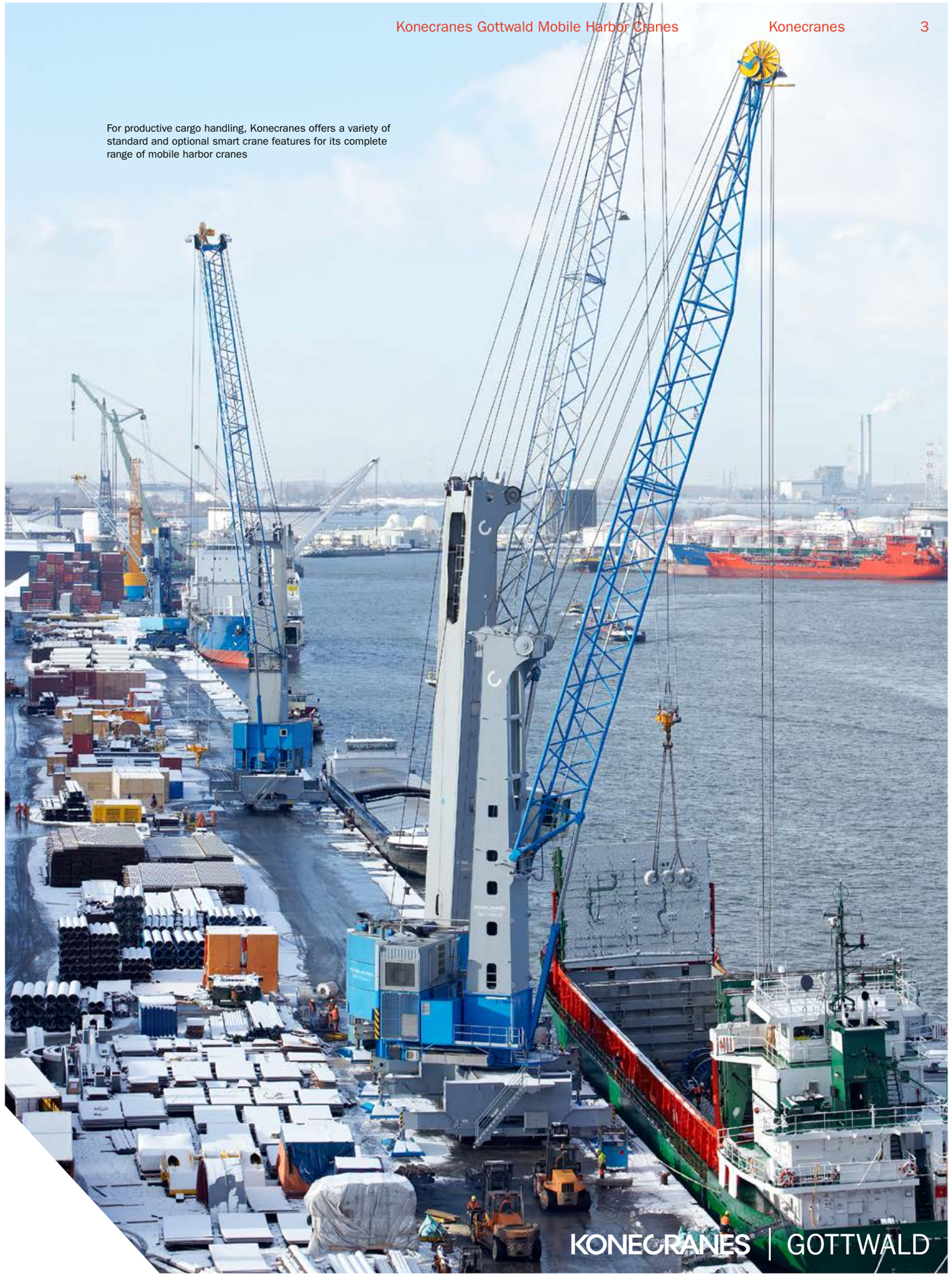


1 Easy-to-understand operation of the mobile harbor crane facilitates the daily work of the crane operator and leads to an increase in handling performance

2 Automatic notification of upcoming maintenance work and high-speed fault analysis make service work much easier

3 Systematic recording and clear analysis of the crane's performance data assist operators in efficient crane operation

For productive cargo handling, Konecranes offers a variety of standard and optional smart crane features for its complete range of mobile harbor cranes



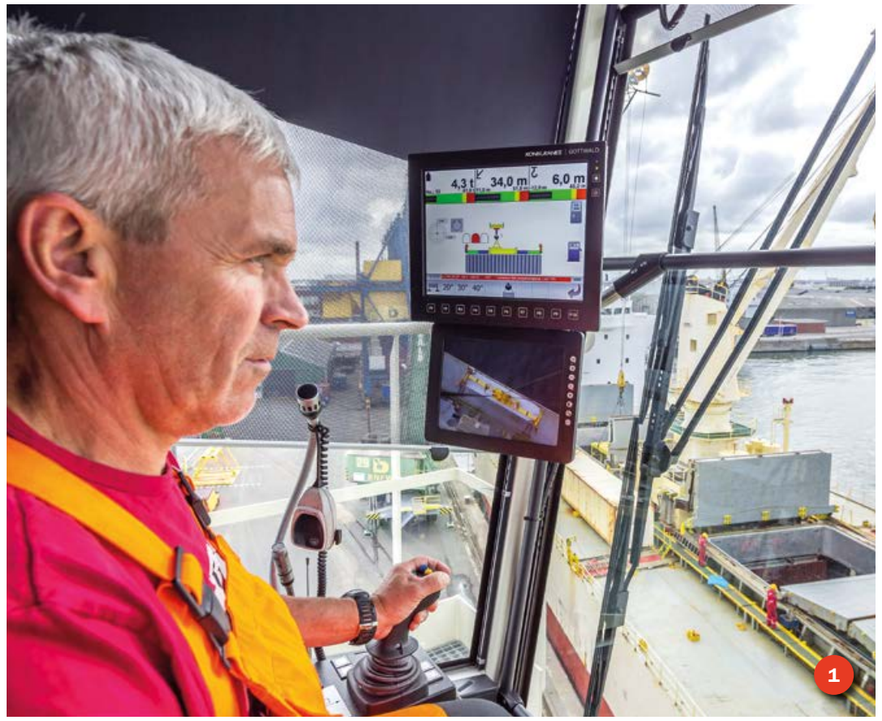
ASSISTANCE SYSTEMS AND DATA MANAGEMENT

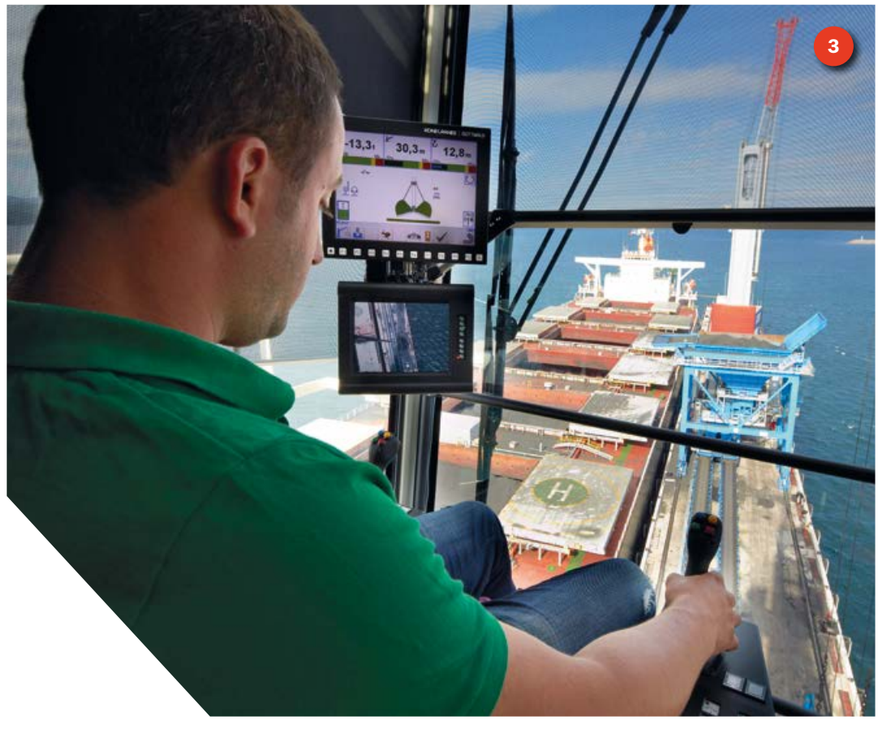
FOR ALL APPLICATIONS

Our advanced smart crane features assist crane operators, service staff and terminal operators with their daily tasks – quickly, easily and in a user-friendly way.

The center of intelligence in the Konecranes Gottwald Mobile Harbor Crane is its Visumatic® crane management system, which controls all crane functions including Konecranes Gottwald Smart Crane Features, and records all relevant crane data. Operators are thus optimally equipped for all applications – from general crane operation and cargo-specific requirements to the recording and evaluation of crane performance data.

1. Supportive: the clearly arranged human-machine interface is the Visumatic crane management system
2. Universal: ergonomic assistance systems to improve efficiency and safety during general crane operation
3. Specific: assistance systems tailored to individual cargo handling requirements
4. Clearly arranged: data management to record and evaluate crane performance data





VISUMATIC®

- Advanced graphical user interface
- Visualization of all major crane functions including operation of smart crane features
- Data recording and evaluation
- Maintenance system with display of the remaining operating hours until the next service interval
- Diagnostics systems with detailed fault and status messages

The icon-based interface of the Visumatic simplifies operation of Konecranes Gottwald Mobile Harbor Cranes for crane operators

VISUMATIC® CRANE MANAGEMENT SYSTEM

AN EYE ON EVERYTHING

The Visumatic crane management system creates transparency by combining industrial PCs with an innovative visualization system. All functions relating to operation, maintenance and performance of the Konecranes Gottwald Mobil Harbor Crane are presented in a structured manner.

SITUATION-SPECIFIC CONTROL
With the Visumatic, the crane can be operated either via a monitor in the tower cab or a radio remote control, depending on the situation. This allows the crane operator to control the most important crane functions from outside the crane, to have a better view of the machine, the cargo handled and the terminal environment, for example.

ICON-BASED OPERATION
The Visumatic comes in many languages, whereby user-friendly, icon-based and thus simple operation provide considerable assistance to the crane operator. In combination with an industrial PC, which is equipped with software and a classic database, the system provides comprehensive information. This includes an overview of maintenance intervals important for service, or performance data that are particularly relevant for terminal operators. The Visumatic crane management system assists operators, for example, by:

- providing visualization and control of the hook rotator and lifting gear such as spreaders and grabs,
- calibrating response behavior of the joysticks, adapted to the cargo being handled or personal preferences of the crane operators,
- adjusting screen brightness according to the time of day.

1 User-friendly and easy mobile harbor crane operation to increase handling rates

2 High-speed fault analysis in the superstructure and thus acceleration of the necessary service work

3 Better visibility from outside using radio remote control, when changing the lifting gear or during crane travel, for example

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READY-FOR-ACTION THANKS TO A VERSATILE PROPPING SYSTEM

ALL-ROUND STABILITY

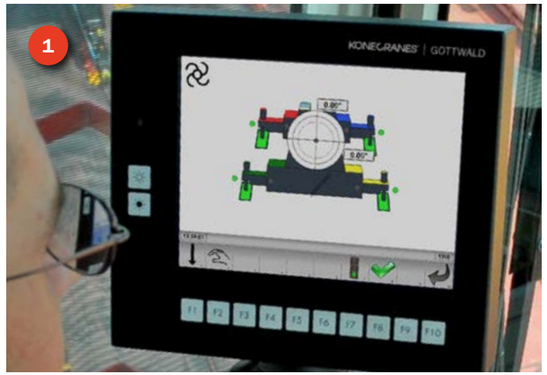
Besides productivity and versatility, safety is trump when it comes to operating Konecranes Gottwald Mobile Harbor Cranes. This starts with the propping system, for which we offer a set of smart crane features.

AUTOMATIC PROPPING SYSTEM
All Konecranes Gottwald Mobile Harbor Cranes feature a smart propping system, which extends the stabilizer beams, lowers the stabilizer pads and levels the crane in an automated manner. This ensures your crane is safely ready for action in no time.

ADJUSTABLE PROPPING BASE
On narrow quays or surfaces with different load limits, it is not always possible to extend the stabilizer beams completely. Therefore, the propping base of our mobile harbor cranes can be adapted accordingly and stored in the Visumatic® crane management system for consistent positioning.

PAD LOADING LIMITS
Pad loading limits prevent overloading of weaker quay structures. For this purpose, different lifting capacity curves are stored in the Visumatic, and can be switched to if necessary.

TRAVELING WITH EXTENDED STABILIZER BEAMS
Cranes can be moved along short and level paths with stabilizer beams extended, alongside the vessel, for example. This means the crane is ready again quickly and leads to increased handling rates.



1 The automatic propping system extends the stabilizer beams, lowers the stabilizer pads and levels the crane

2 Konecranes Gottwald Mobile Harbor Cranes can also be moved on short and level paths when the stabilizer beams are extended

SMART PROPPING SYSTEM

- Easy adaptation to weaker and narrower quay infrastructures
- Greater safety in crane operation
- Ready for action in no time
- Significant increase in handling rates

Thanks to the versatile propping system, Konecranes Gottwald Mobile Harbor Cranes can also be operated on narrow quays

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FROM LIFTING HEIGHT TO WORKING RADIUS

ALL-ROUND SAFETY

Everyday terminal work involves many requirements: from repeated crane movements and demanding quay infrastructures to interaction with other equipment. Our smart crane features assist crane operators in these situations for fast, simple and therefore cost-effective cargo handling.

ANTISWAY SYSTEM
The antisway function that can be switched on or off as needed ensures better control of the load in the slewing and luffing motions typical for mobile harbor cranes. The antisway system is not only beneficial for operators with little experience, but also assists senior staff.

LIFTING HEIGHT LIMITING FUNCTION
In predefined working areas, the crane operator can define both the maximum lifting height (e.g. above a hopper) and the maximum lifting depth (e.g. floor of the cargo hatch). The hoist then stops automatically, avoiding unnecessary lifting motions and collisions.

SEMI-AUTOMATIC POINT-TO-POINT HANDLING MOTION
With repeated crane movements, when transferring bulk material from the cargo hatch to the hopper, for example, the crane operator can define both end positions and thus simplify crane operation. Slewing and luffing between these two positions is semi-automated for more productive handling.

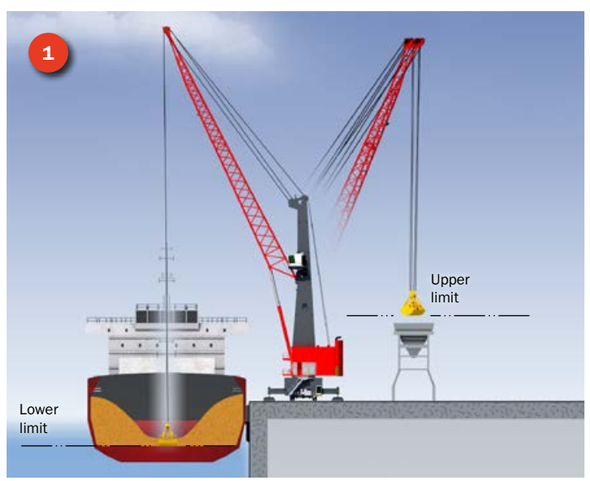
SLEWING ANGLE AND RADIUS LIMITING FUNCTION
When two or more cranes are working alongside a vessel in a confined space, the slewing angle and radius limiting function helps to prevent collisions. This makes the work of the crane operator safer.

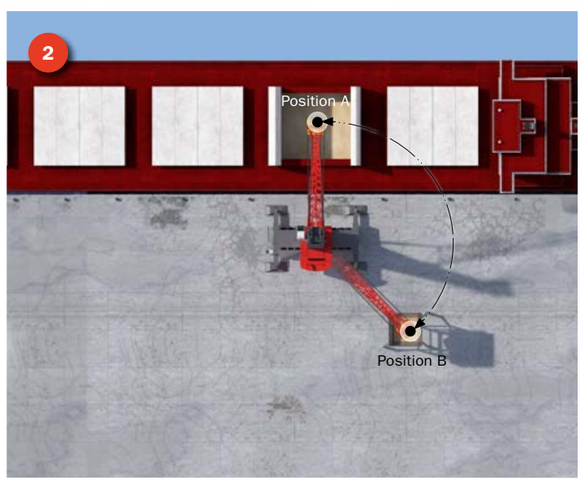
X-Y CONTROL
The joystick motions for slewing and luffing can be converted into a Cartesian coordinate system with X and Y axis. The fine positioning of general and project cargo helps with efficient and safe handling.

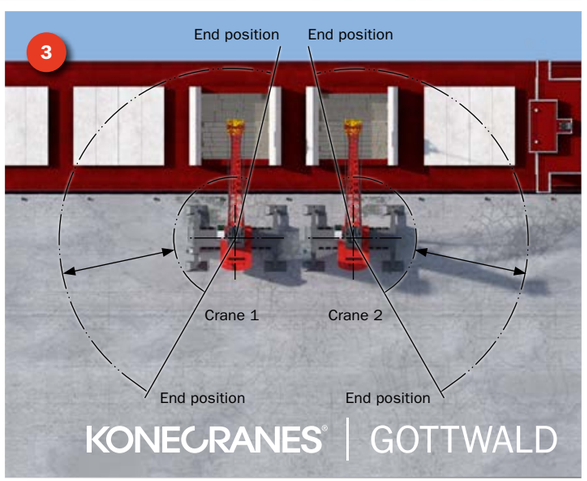
When operating several cranes alongside one vessel, the slewing angle and radius limiting function provides greater safety

SAFE AND EASY-TO-OPERATE

- The crane operator can control the crane movements better and easier in crane operation
- The crane operator can define working ranges and repeated position points easily, thus increasing productivity and safety







1 The lifting height limiting function prevents inefficient crane movements and collisions with the vessel or the equipment on the quayside

2 Semi-automatic point-to-point handling motion simplifies crane operation for repeated crane movements, and thus increases productivity and safety

3 The slewing angle and radius limiting function prevents collisions when operating two cranes in a very narrow space, for example

FOR FASTER AND SAFER CONTAINER AND GENERAL CARGO HANDLING

EVERYTHING UNDER CONTROL

Konecranes offers application-specific assistance systems for mobile harbor cranes. With these, you have greater control over your handling of containers and general cargo.

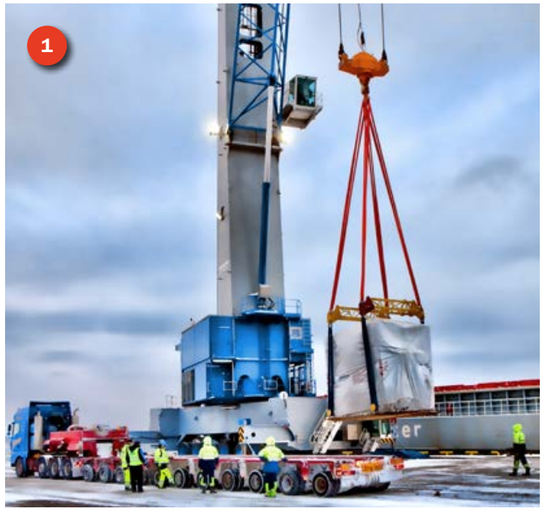
VERTICAL LIFT ASSISTANT
The vertical lift assistant assists the crane operator with lifting general and project cargo. Sensors ensure that the boom head is positioned exactly above the load. This prevents the load from swaying when lifted off the ground, thus increasing safety and handling speed.

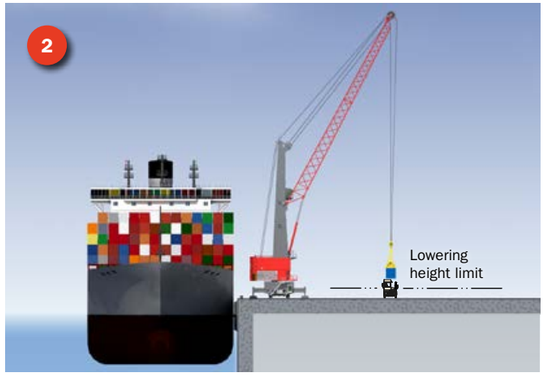
SPREADER SELECTION
The Visumatic® allows spreaders to be put into operation quickly. The data of the spreader types available in the terminal are stored in the crane management system and the joystick controls are defined automatically.

SPREADER TOWER ADJUSTMENT
With loaded containers, the center of gravity is not necessarily in the middle. Crane operators can use the Visumatic to control the lateral movement of the spreader tower to balance the center of gravity – and thus achieve safe and faster handling.

LAND-SIDE LOWERING FUNCTION
Using the land-side lowering function, the crane operator sets the height of the container set-down position on the quay floor or over a vehicle and the associated working area on the quay. The lowering motion of the container is automatically decelerated before reaching the height of the set-down position in order to avoid damage to the container, the quay or the vehicle.

Konecranes Gottwald Smart Crane Features offer greater operation ease and safety for productive container handling





WORKING IN A CONTROLLED WAY

- Avoidance of swaying motions when lifting general and project cargo
- Simple control of various spreader types
- Center of gravity compensation for the spreader during container handling
- Safe depositing of containers on the quay floor or above vehicles

1 The vertical lift assistant prevents swaying when the crane is lifting general and project cargo off the vehicle/the ground

2 The land-side lowering function makes it easier to place containers gently on the quay floor or on terminal tractors without damaging the vehicle and the material

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ASSISTANCE SYSTEMS FOR GRAB CONTROL

- Efficient grab filling through basic tensile force setting function and grab filling level check
- Safe direct truck loading through prevention of overloads
- Ergonomic operation for the crane operator thanks to predefined selection options in the visualization system

Konecranes has developed specific smart crane features to assist crane operators in continuous-duty bulk handling

SMART GRAB CONTROL FUNCTIONS

GETTING A GRIP ON BULK

In addition to two-rope cranes that handle bulk cargo with motor grabs, our four-rope grab cranes have been developed for continuous-duty bulk handling with mechanical grabs. These provide handling rates of up to 2,000 t/h*.

Konecranes offers several specific smart crane features to monitor and control the various grab types available in the terminal.

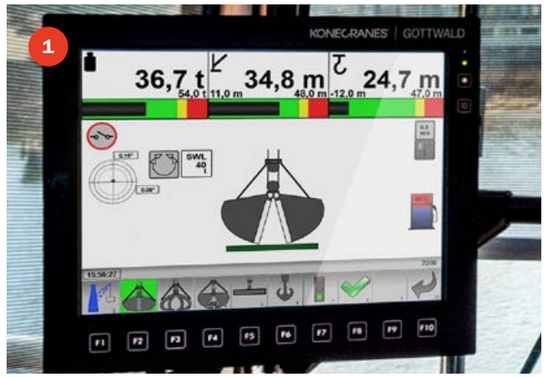
GRAB TYPE SELECTION
The grab types used are stored in the Visumatic® crane management system. The respective joystick controls are defined automatically.

REMAINING GRAB LOAD DISPLAY
When trucks are loaded directly by a mobile harbor crane, the remaining grab load display assists the crane operator. This ensures that the vehicle is loaded safely and overloading is avoided.

BASIC TENSILE FORCE SETTING FUNCTION
By setting the basic tensile force of the ropes for certain grab types or bulk materials, overloads and associated switch-offs can be avoided. This is important for filling the grab properly.

GRAB FILL-LEVEL CONTROL
The auto-adaptive grab fill-level control optimizes grab filling during regular unloading processes. This increases the handling rate while at the same time reducing wear.

*Depending on operation conditions



1 With the Visumatic crane management system, the joystick controls are quickly adjusted to the respective grab type

2 The remaining grab load display helps crane operators to load trucks in a more controlled manner

3 The optimum grab-fill level means higher handling rates with less wear on cranes and ropes

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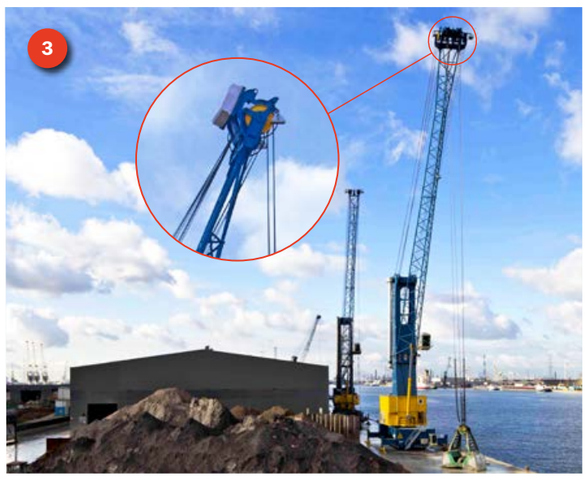
Konecranes Gottwald Portal Harbor Cranes serve bulk carriers up to Capesize Bulker class. Smart crane features allow unloading schedules to be complied with and the actual handling volume to be recorded.



UNLOADING MONITORING AND WEIGHING SYSTEM

SYSTEMATIC HANDLING

Konecranes offers numerous smart solutions for bulk handling. These go beyond assistance systems for grabs. Semi-automatic point-to-point handling motion and lifting height limiting function help improve bulk transfer to stockpiles or via hoppers. When several cranes work together, the slewing angle and radius limiting function provides greater safety. There are also other features that increase safety and handling rates.

CARGO HOLD TOTALIZING FEATURE

Bulk carriers are unloaded on the basis of a detailed unloading schedule. The Visumatic® can display up to ten cargo hatches and visualize the respective quantity of bulk material unloaded. This enables the crane operator to adhere to the unloading schedule quickly and safely.

VERIFIABLE WEIGHING SYSTEM

Terminal operators must document the quantities actually handled for particularly valuable bulk cargo and for accurate invoicing of the handling work. Konecranes offers a verifiable weighing system for its mobile harbor cranes that accurately measures the actual weight of the bulk cargo during the unloading process itself. The crane is not only a load handling machine, but at the same time a certified weighing device for commercial purposes.

1. Semi-automatic point-to-point handling motion for repeated crane movements increase handling performance
2. With the cargo hold totalizing feature, the quantities unloaded from up to ten cargo hatches can be visualized and monitored in a controlled manner according to the unloading schedule
3. The verifiable weighing system on the boom head records the actual handling volume very accurately during the work cycle

SUPPORTIVE SYSTEMS

- Clear visualization and control of the systems in the Visumatic crane management system
- Easy compliance with unloading schedules for bulk carriers
- Directly integrated into the work cycle to achieve higher handling rates

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TANDEM LIFT ASSISTANT FOR HEAVY PROJECT CARGO

POWER OF TWO

Konecranes Gottwald Mobile Harbor Cranes demonstrate their versatility with bulky and/or heavy loads. Project cargo up to 400 t can be handled in tandem lift with two cranes.

With the X-Y control and the vertical lift assistant, crane operators always have the project cargo well under control. Both features simplify operation of the crane and prevent unnecessary crane movements. This provides the basis for efficient tandem lifting with two mobile harbor cranes.

TANDEM LIFT ASSISTANT
The tandem lift assistant helps to synchronize the motions of two cranes. Only one crane operator is required for operation, either from the tower cab or by radio remote control. This makes handling of very heavy project cargo safe and easy.

This feature is designed so that the maximum lifting capacities of both cranes can be utilized. For safety reasons, prescribed downrating for manual lifting are no longer required with the tandem lift assistant. In addition, when using a special lifting beam, cranes of different sizes can each be used with their maximum lifting capacity.

TANDEM LIFT ASSISTANT

- Smart synchronization of two cranes
- Easy control of both cranes by a single operator
- Utilization of the maximum lifting capacities of both cranes, even if the mobile harbor cranes are different in size

1 By utilizing the maximum lifting capacities of both cranes, particularly heavy project cargo of up to 400 t can be handled

2 Thanks to the tandem lift assistant and a special lifting beam, cranes of different sizes can also be used, each with maximum lifting capacity. In addition, both cranes can be moved synchronously by a single operator using radio remote control.

Konecranes Gottwald Tandem Lift Assistant simplifies the handling of bulky and particularly heavy project cargo

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DATA MANAGEMENT FOR MOBILE HARBOR CRANES

ALWAYS UP TO DATE

Smart crane features not only assist crane operators, but service personnel and terminal operators. Thanks to the easily accessible crane data, maintenance intervals can be monitored, service work/error analyses simplified and handling rates evaluated more quickly.

OFFLINE DATA MANAGEMENT

Konecranes Gottwald Mobile Harbor Cranes provide an open interface to the Visumatic® crane management system as standard. Data can be easily read out and, for example, transferred via USB stick.

PRINT FUNCTION

An automated print function is available for recording the handling performance. The relevant data can be defined individually and the crane operator can simply bring a print-out created after the end of the shift from the electrics room.

EMAIL FUNCTION

In combination with a mobile phone connection, automated emails can be set up to provide important crane data such as handling performance, fuel tank filling level and maintenance interval achieved. The period and the type of data can be individually defined. Terminal operators thus have a simple and regular overview of this data.

WEB-BASED ACCESS

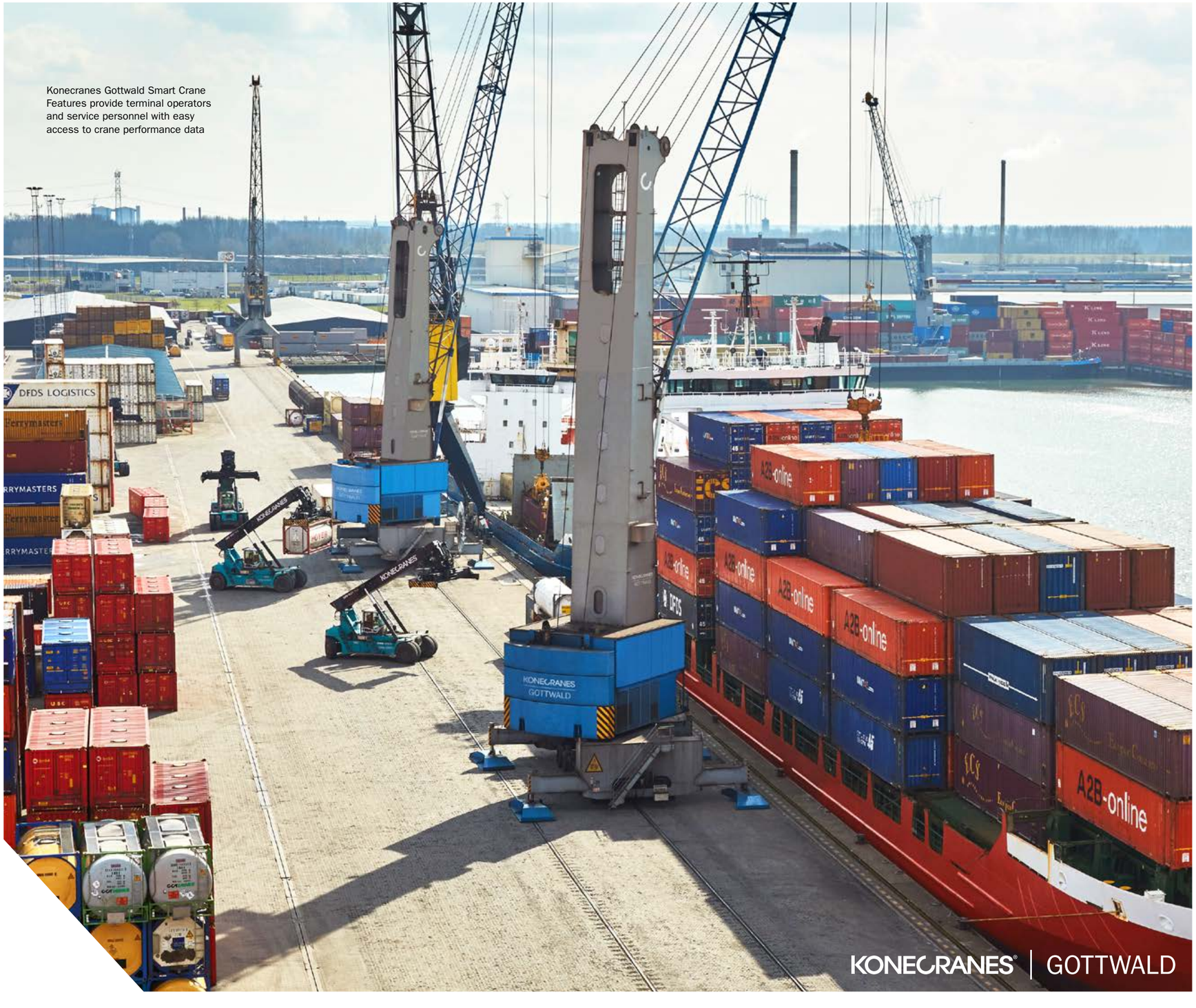
Thanks to the mobile phone connection, web-based access can be set up for customers via a secure data server. Terminal operators and service personnel can monitor the most important crane data conveniently from their own workstation.

REMOTE WORKSTATION

Based on the web-based access, a secure remote workstation can also be set up for operators. In addition to monitoring, this also allows direct intervention in the crane management system, for example, for service purposes.

DATA MANAGEMENT ONLINE AND OFFLINE

- Simple readout of data via an open interface
- Easy data transfer through email function and web-based access
- Remote crane access for service purposes via a remote workstation



Konecranes Gottwald Smart Crane Features provide terminal operators and service personnel with easy access to crane performance data

OUR SERVICE

- Advice on selection of suitable smart crane features for the respective application
- Retrofitting of existing equipment to use smart crane functions
- Simple update of crane software via the remote crane access

Our experts advise on selection of smart crane features that make sense for the application in question

RETROFITTABLE AND SERVICE-FRIENDLY

SIMPLY SMART

Konecranes develops its smart crane features with the same intensity as its crane models and types. The smart crane features are recommended for new equipment and our experts advise operators on selection of suitable features for the individual applications.

It is possible to provide more than just new cranes with advanced smart crane features. Existing machines can also benefit from these features, which can be fitted during an upgrade, depending on the control system used. Konecranes additionally offers a range of other services to operators of mobile harbor cranes.

TRAINING
Konecranes offers a wide variety of training courses for crane operators and service personnel. The training course content is divided into individual blocks and adapted to the previous experience and existing expertise of the trainees. In this way, efficient training results are achieved.

REMOTE CRANE ACCESS
In addition to remote access for operators via a mobile phone connection in the crane and a secure server, Konecranes Service can also be integrated. Highly qualified employees can, for example, connect from the production site and provide fast, simple and direct support with fault analysis and troubleshooting. Moreover, software updates can be installed remotely for Konecranes Gottwald Mobile Harbor Cranes as and when required.

1. Many smart crane features can also be retrofitted to existing Konecranes Gottwald Mobile Harbor Cranes
2. Coordinated training course content for service personnel
3. Direct access for Konecranes Service personnel to crane data for fault analysis and software updates via remote crane access

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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. Konecranes has 16,200 employees at 600 locations in 50 countries. Konecranes shares are listed on the Nasdaq Helsinki (symbol: KCR).

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