

THE MOST EFFICIENT EQUIPMENT FOR ALL CARGO-HANDLING APPLICATIONS

# **MOBILE HARBOR CRANES**



WITH THE ORIGINALS FROM THE INVENTOR

# **ABOVE AND BEYOND**

Konecranes is the inventor and one of the leading innovators of mobile harbor cranes. Since their introduction in 1956, Konecranes has supplied thousands of these diesel-electric cranes to customers around the world. Thanks to their ongoing development and enhancement, Konecranes Gottwald Mobile Harbor Cranes continue to provide ever greater versatility, performance and eco-efficiency for our customers.

# REMARKABLE FOR ALL TERMINALS AND PORT ENVIRONMENTS

Ready for action in no time, our mobile self-contained cranes can operate independently of any quay infrastructure in universal and special terminals. Whether stevedores, port authorities, major shipping terminals, power stations or industrial plants near terminals, our customers use their cranes for all types of applications and in continuous-duty operation, achieving high handling rates. Our cranes are also ideal for start-up operations that wish to utilize the full potential of Konecranes Gottwald Mobile Harbor Cranes right from the outset.

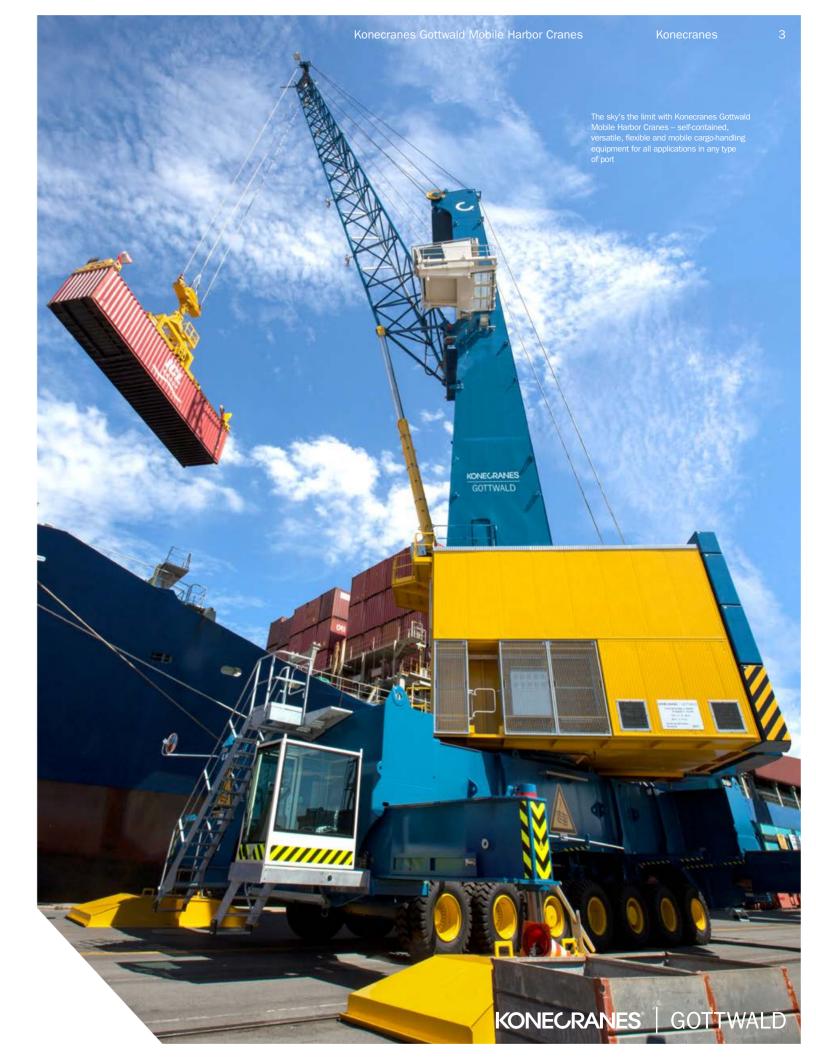
#### **UNIQUE FEATURES**

The cost-effectiveness, short delivery lead-times and low specific investment costs for machinery and infrastructure make Konecranes Gottwald Mobile Harbor Cranes attractive from the start. Our customers benefit from their high quality and reliability, state-of-the-art electric drives and advanced smart crane features and thus enjoy a competitive edge in the cargo handling business in the long term.



Since 1956, we have focused on the diesel-electric drive system generating power on board of the cranes. Thanks to this drive technology, external power from on-shore power grids can be used easily, forming an ideal match, since additional equipment for energy conversion is not required. This improves the eco-efficiency of our cranes further and allows surplus energy to be fed back into the grid.

- A diverse portfolio of mobile habor crane models and variants
- Mobile harbor cranes to serve all types of terminals, vessels and applications
- State-of-the-art, eco-efficient electric drives using the most favorable energy for the future
- Extremely robust and durable cranes
- Low specific investment costs for machinery and infrastructure
- · Short delivery lead-time



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## HIGHLY VERSATILE RANGE OF MODELS AND VARIANTS

# **MOBILE HARBOR CRANE PORTFOLIO**

Over the past 60 years, we have systematically extended the Konecranes Gottwald Mobile Harbor Crane range. We have always remained true to you and to ourselves: maximum customer benefit is also at the heart of our innovation philosophy for the current crane generation.

## MARKET-DRIVEN PRODUCT DEVELOPMENT

In tune with our customers, we know what is happening in terminals around the globe. This has resulted in a unique mobile harbor crane portfolio ranging from the entry-level model to the high-performance crane with applicationspecific variants.

#### DYNAMIC AND EXPANDABLE FUTURE CONCEPT

You can select your crane from this portfolio and successively establish a versatile fleet, too. With Konecranes Gottwald Mobile Harbor Cranes, you are opting for a dynamic, demand-driven, expandable future concept.

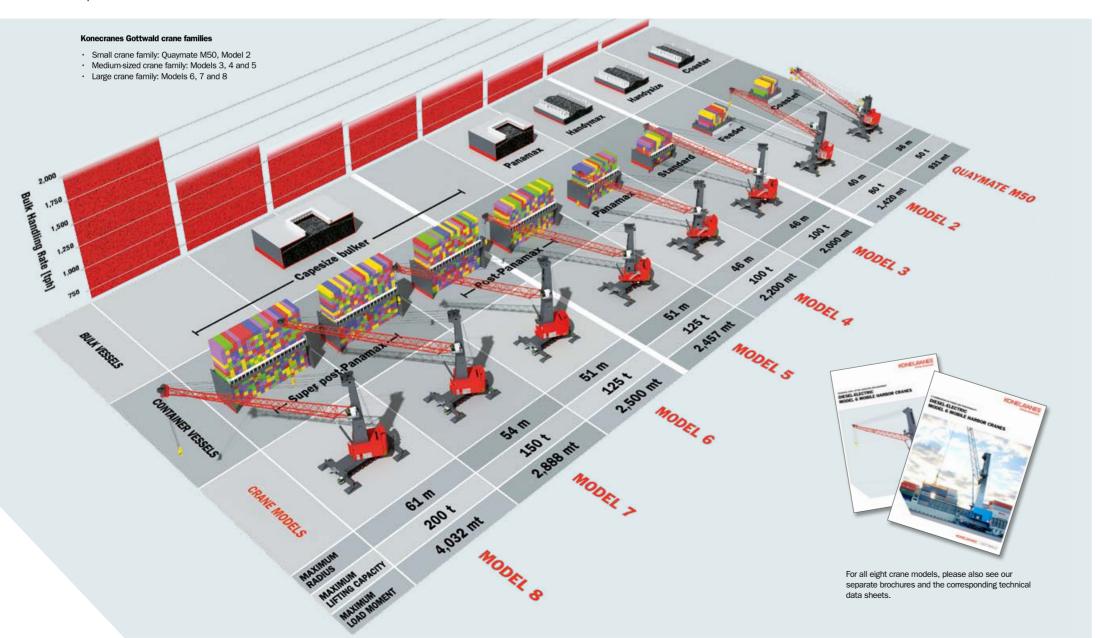
- Our portfolio ranging from the entry-level model to the highperformance crane
- · Three crane families based on the same technology
- Eight models with various lifting capacities, radii and geometric sizes
- Solutions for used mobile harbor cranes that maintain their value







- Model 2 from the small crane family handling containers on a barge in
- Model 4 from the medium-sized crane family as a four-rope grab variant
- Model 6 from the large crane family handling containers on a Panamax vessel





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## FOR ANY KIND OF CARGO

# **ONE SERVES ALL**

We are experts when it comes to requirements relating to serving different types of vessels, integrating equipment into terminal processes and to the various cargo-handling challenges needed to be met by our mobile harbor cranes. That is why our Application Engineering team always has the entire handling system and not just the individual crane in mind, right from the start.

#### **ANALYSIS AND INTEGRATION**

Based on extensive analyses, we can integrate the right Konecranes Gottwald Mobile Harbor Crane for you into any terminal environment. Your crane is tailored to the required application – whether for containers, bulk and general cargo, project cargo and even more.

- So product chains are maintained: container vessels are becoming larger and our cranes are growing with them. With higher towers, radii up to 61 m and powerful lifting capacity curves, our cranes can load and unload containers up to the 20th row
- 2 So energy chains are maintained: many power stations depend on quick coal or pellet discharging for generating electricity. Our cranes handle up to 2,000 t/h.
- 3 So cold chains are not interrupted: to keep fruit fresh, it must be unloaded quickly. Our cranes can help with lifting speeds up to 120 m/min
- 4 So transport chains do not break down: heavy loads must be lifted. Our mobile harbor cranes have lifting capacities up to 200 t.

  In tandem-lift operation, they lift up to a maximum of 400 t.

- Cargo-handling equipment for all your applications
- Holistic concepts to integrate the crane into any infrastructure
- Application-specific classification for a long service life
- Drive power required for the customer's specific cargo-handling applications
- Smart crane features to assist terminal and crane operators
- Consultancy services to find the right lifting gear for all types of applications

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## **CONTAINERS**

# THE BOX-HANDLING CHAMPION

Whether lifting single 20', 30', 40' or 45' ISO containers or two 20' containers in twin-lift mode, serving all types of vessels up to super post-Panamax class and using all manual, semi and fully automatic spreader types, Konecranes Gottwald Mobile Harbor Cranes can handle everything in a container terminal. In particularly large terminals, they assist ship-to-shore gantries with loading and unloading on the stern and bow of the vessel.

#### FOR SYSTEMATIC GROWTH

Our mobile harbor cranes are particularly adaptable to match and grow with container terminals to meet new conditions and challenges. To adjust, they acquire new geometries, including higher towers and longer booms, in order to serve new vessel classes with up to 20 container rows across and nine containers high on deck, for example. State-of-the-art smart crane features, which can be easily integrated into our Visumatic® crane management system to assist the crane operator, provide ever greater productivity and safety.

- Powerful lifting capacity curves enable twin-lift handling with up to 65 t under spreader, even with a wide radius
- Many terminals that began with a single Konecranes Gottwald Mobile Harbor Crane have bought additional cranes, expanding their fleet to increase their handling capacity to meet changing requirements
- With their high lifting capacities, mobile harbor cranes can also load and unload special cargo onto container vessels completely on their own

- Cranes for continuous-duty container operation under particularly tough conditions (24/7)
- High working speeds even when the crane is performing lifting, slewing and luffing motions simultaneously
- A large number of work cycles for especially high handling rates
- Single-lift and twin-lift modes of operation with container weights up to 65 t under spreader
- High lifting capacities for handling special cargo on container vessels









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## **BULK MATERIALS**

# **GRAB THE ADVANTAGE**

Whether handling or transshipping coal, ore or fertilizer arriving on bulk carriers up to Capesize bulker class, our Konecranes Gottwald Mobile Harbor Cranes make use of their full range of flexibility and performance.

Equipped with two hoists and a mechanical four-rope grab, our cranes operate under particularly tough conditions in special bulk terminals – or, as part of the logistics chain, they help to supply power stations, steelworks or fertilizer plants near terminals with raw materials and feedstocks continuously.

#### SPECIALISTS WITH UNIVERSAL FEATURES

The four-rope grab cranes, which have been designed for a long service life with handling rates up to 2,000 t/h, have entered into new fields of application. They have, however, also retained their universal character and handle containers, general and project cargo where required – by the same token, two-rope cranes equipped with motor grabs are also used for handling bulk cargo. To help terminal operators select the right grab for the job, we recommend lifting gear based on the material and density of the bulk material being handled and the types of vessels being served.





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- Ideal for multi-purpose terminals: universal mobile harbor crane with motor grab for bulk handling
- Mobile harbor crane in the four-rope grab variant handling large quantities of bulk material. Application-specific smart crane features can, in turn, considerably increase productivity and safety.
- Powerful lifting capacity curves over the entire radius range enable transshipment of bulk cargo directly from ship to ship by mobile harbor cranes



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## **GENERAL CARGO**

# THE LOGISTICS MASTER

Whether semi-finished steel products, fruit pallets, marble blocks or construction material, Konecranes Gottwald Mobile Harbor Cranes have always been able to handle these types of cargo well, proving their true versatility and flexibility as multi-purpose cranes time and again.

## MADE TO MASTER GENERAL CARGO

Equipped with application-specific lifting gear such as slings, chains, beams, C-hooks or tongs, Konecranes Gottwald Mobile Harbor Cranes are made for general cargo terminals with their special requirements with respect to powerful lifting capacity curves and high working speeds. Two-rope or four-rope cranes can be used flexibly and cost-effectively since their lifting gear can be changed very easily and quickly. State-of-the-art smart crane features can also increase productivity and safety and are easy to integrate into our Visumatic® crane management system.

- A mobile harbor crane fitted with a mechanical spreader is excellent for handling cellulose bales
- 2 Handling big bags is no problem for a Konecranes Gottwald Mobile Harbor Crane
- Thanks to their robustness and powerful lifting capacities, our cranes can load and unload bulky long materials such as tower components for wind turbines

- Mobile harbor cranes providing outstanding flexibility and versatility
- Powerful lifting capacity curves, also for transshipment
- Changing from one type of lifting gear to an other within a matter of minutes
- Advice on specific lifting gear, depending on the geometry and nature of the general cargo being handled









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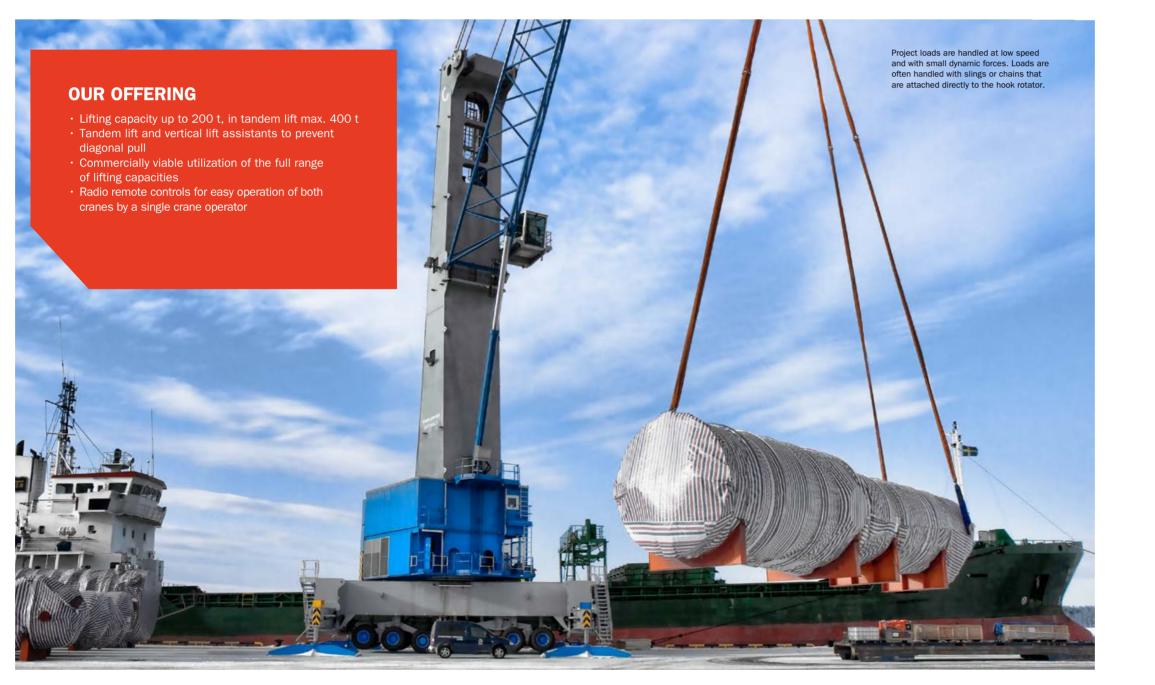
## PROJECT CARGO

# **HEAVY MADE LIGHT**

Whether for gas and steam turbines, generators, wind turbines or yachts, high lifting capacities and high precision for safe handling of heavy and/or bulky project cargo are vital. With mobile harbor cranes from Konecranes, operators of universal terminals can extend their offering and gain further potential by acquiring manufacturers of heavy machinery located close to the port as customers.

#### **COMBINED PERFORMANCE IN TANDEM LIFTS**

Our mobile harbor cranes combine maximum crane performance with high safety standards - even more so when the lifting capacities of two cranes are combined in tandem lift. With the help of our advanced smart crane features, such as the tandem lift assistant, it is possible to utilize the maximum lifting capacities of both cranes and avoid downrating usually required for tandem lifts.









- sing lifting beams, the mobile harbor crane can load and unload train wagons, comotives, yachts and other bulky cargo
- A tandem lift with two Konecranes Gottwald cranes of different generations here heavy cargo is discharged from a low loader
- wo large cranes handle up to 400 t in tandem-lift operation without adverse ffects on safety. The Konecranes Gottwald Tandem Lift Assistant makes



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## READY FOR MORE APPLICATIONS

# SPECIAL FOR SPECIAL PURPOSES

Thanks to their versatility and flexibility, Konecranes Gottwald Mobile Harbor Cranes have opened up multiple new fields of application in the port and beyond – thus living up to their reputation as universal cargo-handling equipment.

## **CONTAINERIZED BULK CARGO**

The increasing need to handle bulk containers using container-turning equipment which rotates 360° on its longitudinal axis or inclines 45° to its transverse axis, for emptying the containers into the vessel, is also one of the new fields of application for Konecranes Gottwald Mobile Harbor Cranes.

## HANDLING CARGO WITH MAGNETS

This type of lifting gear is used, for example, for handling steel products with commercially available magnets including electro-permanent magnets. A special control system module available as an option provides direct current and takes over control of the magnets. The operating parameters are very much like those for general cargo handling.

- The operating parameters for handling bulk using container-turning equipment are very much like those for container handling
- Mobile harbor crane unloading tank containers from freight cars and positioning these directly in the stack
- Mobile harbor crane as a supply unit for the high scrap storage facility of a steel plant. In continuous-duty operation, it carries out a particularly large amount of lifting work here.
- 4 Konecranes Gottwald Mobile Harbor Cranes can be fitted with various types of lifting gear for handling steel products. These include commercially available magnets such as electro-permanent magnets.

- Investigation into your special requirements
- Cost-effective solutions for your special fields of application
- Consulting services about all types of lifting gear
- Cranes approved by Konecranes for the transport of people

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#### **MOBILE HARBOR CRANES AT A GLANCE**

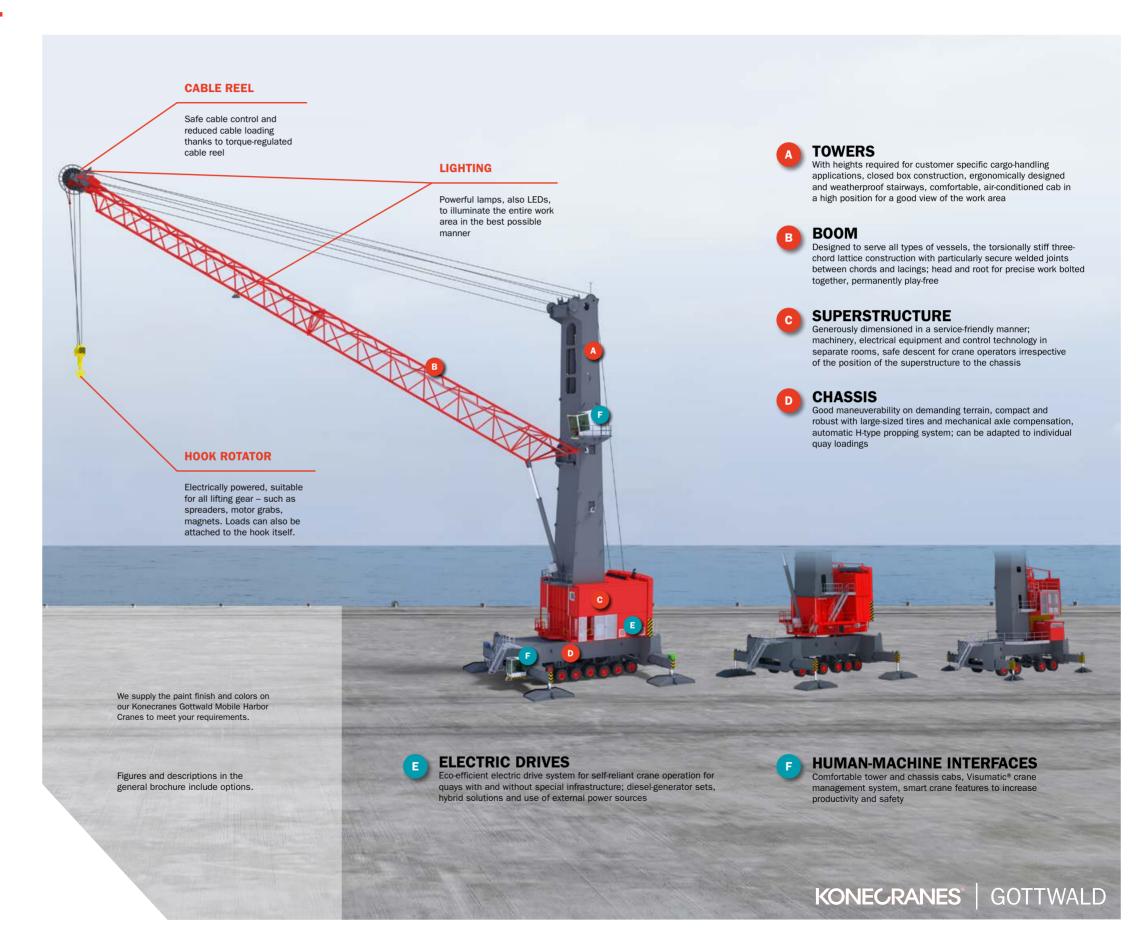
# ALL-ROUND EXCELLENT DESIGN

Our mobile harbor cranes are designed and fitted to serve all sizes of vessels and all kinds of cargo under tough conditions in terminals. This is why all cranes are based on a series of shared technological features, design principles and mechanical components. Our focus has been on extreme sturdiness, durability, user-friendliness and easy accessibility for service work.

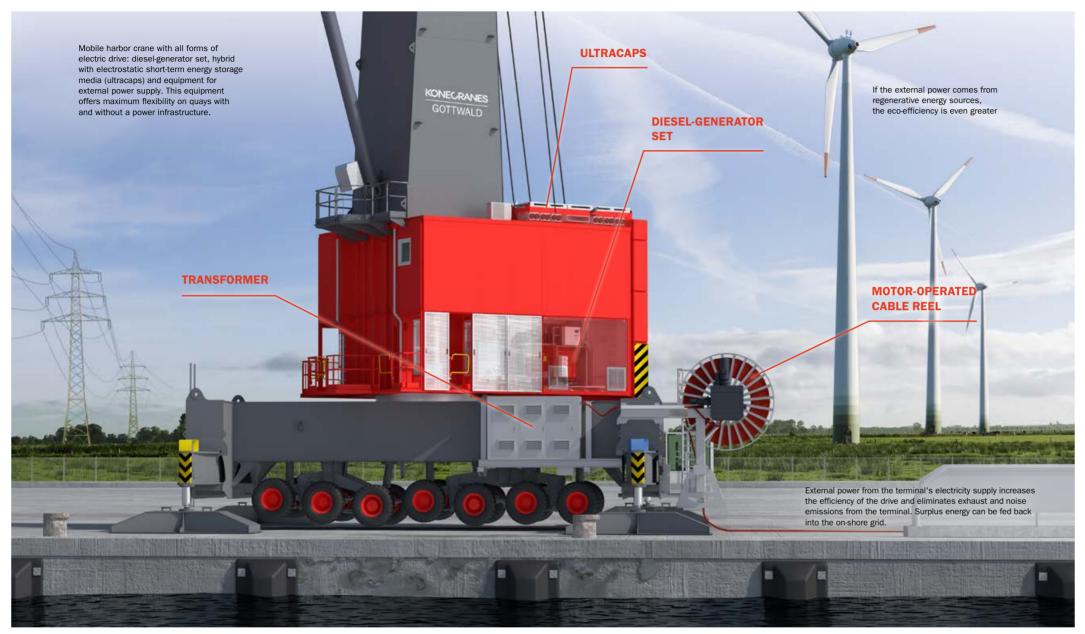
#### **IDEAS AND TECHNOLOGY CREATE CUSTOMER BENEFIT**

As a technological pacesetter, we combine our own wealth of ideas with technologies available on the market, which we use in smart solutions for our products, turning these into benefits for our customers. For instance, these solutions include all possible electric drive variants – diesel-generator set, hybrid, power from the terminal's electricity supply (all can also be used in a crane) – and advanced smart crane features. We are also ideally equipped to meet more stringent environmental and ergonomic requirements.

- Mobile harbor crane designs for all sizes of vessels, types of cargo and terminals
- · Robust, service and user-friendly design
- All types of electric drives
- · Operator-friendly human-machine interfaces
- Smart use of technology already available on the market
- A large selection of standard and optional equipment



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## MOST MODERN ELECTRIC DRIVES

# UNSURPASSED ECO-EFFICIENCY

Our drive system is eco-efficient as it is powerful, costeffective and environmentally compatible. This is because Konecranes Gottwald Mobile Harbor Cranes are operated with the most favorable energy for the future: electrical power.

#### DIESEL-GENERATOR DRIVE

Throughout our complete mobile harbor crane range, we use highly efficient diesel engines for on-board power generation. These include diesel engines fitted with SCR exhaust technology, which meet the requirements of EPA Tier 4f and EU Stage V standards.

#### **ENERGY-SAVING TECHNOLOGIES**

The hybrid drive makes our diesel-electric drive system even more cost-effective by saving the energy recovered during the crane's lowering and braking motions in an intermediate storage media and making it available to the on-board power grid for the next work cycle.

You can achieve even greater eco-efficiency from our cranes when the electric drives are supplied with power from the shore grid – an ideal match as the power does not need to be converted between the power connection and the crane. Energy recovered from the crane's lowering and braking motions can be fed back into the on-shore grid.

- 1 Highly-effective diesel-generator set with a state-of-the-art engine
- 2 For hybrid operation, robust, durable ultracap modules supplement the diesel engine
- 3 Energy efficiency maximized: no energy conversion required when the crane is supplied with external power from the terminal's grid; energy recovered

- State-of-the-art, eco-efficient electric drives
- Diesel-generator set, hybrid technology, external power supply
- External power supply equipment for all grids
- Surplus energy can be fed back into the on-shore grid
- Preparation of the crane for operating with external power from the grid at a later point in time



#### **ERGONOMIC DESIGN AND ASSISTANCE SYSTEMS**

# **KEYS TO PRODUCTIVITY**

Konecranes Gottwald Mobile Harbor Cranes

Our operator cabs ergonomically designed in every respect and our wide range of smart crane features integrated into our Visumatic® crane management system reflect the importance we attach to the human-machine interface. In addition to simplifying the work of the crane operator, these help to increase productivity and ultimately improve safety.

#### A PLEASANT PLACE TO WORK

Our spacious tower cab positioned high on the tower, where the crane operator performs all crane functions, is air-conditioned and feature various equipment for safe, comfortable work. The Visumatic® crane management system provides clearly arranged graphic symbols for intuitive operator guidance. A camera on the boom head ensures a close-up view of the work area via the work monitor in the cab.

A chassis-mounted cab equipped with a radio remote control allows all the crane functions to be operated and offers the crane operator an excellent view during crane travel operation.

#### ADVANCED ASSISTANCE SYSTEMS FOR:

- · semi-automated point-to-point handling mode
- · fine positioning of the load or hook rotator by means of X-Y control

#### WORKING RANGE CAN BE DEFINED FOR:

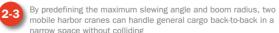
- · lifting height
- · slewing angle and radius
- · land-side load lowering

#### **INFORMATION SYSTEMS AVAILABLE**

Our hold totalizing feature improves loading management, giving crane operators information about the number of lifts or the handling volume per cargo hatch when handling bulk. Our self-learning grab filling level control helps the crane operator to fill the grab in the best way possible and thus increases handling performance and reduce vessel-berthing times.

- Comfortable, ergonomically designed cabs
- Excellent human-machine interface
- Visumatic® crane management system
- Advanced smart crane features to simplify the work of the crane operator
- Information systems to improve the loading
- Suitable for all Konecranes Gottwald Mobile Harbor Cranes



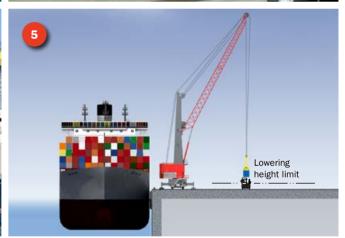


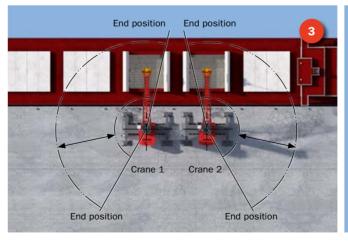
















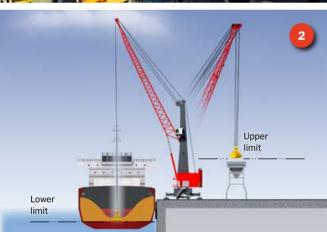


- management and the grab filling, for example

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#### MORE COMPELLING BENEFITS

# **SUPPORT AND CONNECTIVITY**

Not only smart crane features but also interconnection, logistical and informational integration systems assist terminal and crane operators, even with highly application-specific challenges for Konecranes Gottwald Mobile Harbor Cranes. This means that further potential is exploited and handling processes are increasingly optimized.

#### ASSISTANCE FOR TANDEM LIFTS

Our tandem lift assistant prevents lateral forces and torques acting on the boom by means of a vertical lift assistant. Crane motions are synchronized, thus making it possible to exploit full lifting capacities when using two cranes for handling project cargo.

- Continuous-duty bulk handling with mobile harbor crane and hopper.

  Semi-automated point-to-point handling mode and antisway system help the crane operator to achieve higher handling volumes.
- Remotely controlled project cargo lift mastering two cranes in a tandem lift. Full lifting capacities can be exploited when our tandem lift assistant is applied.
- The verifiable weighing system on the boom head allows the crane to calculate the handling weight precisely. The crane turns into a certified weighing device for commercial purposes.
- Machine-to-machine integration with mobile harbor crane and reach stackers: The crane acts as the main input and output points in the terminal and can be logistically linked to various types of handling equipment for horizontal container transport and storage

# OUR OFFERING

- Vertical lift and tandem lift assistants
- Verifiable weighting systems as an integral part of the crane
- Interconnection with factory remote systems
- Machine-to-machine integration features

#### **VERIFIABLE WEIGHING SYSTEM**

The verifiable weighing system as an integral part of our crane makes terminal operators independent of additional equipment and allows them to determine precisely the actual weight of bulk handled. The mobile harbor crane is not only a load handling machine, but at the same time a certified weighing device for commercial purposes.

#### HANDLING EQUIPMENT CONNECTIVITY

We provide support for your mobile harbor crane. Via the Internet and wireless mobile network connection, we can access the control system of your crane remotely to perform diagnostics, maintenance and repair work and continuously monitor working conditions and process parameters. Our portfolio also includes machine-to-machine integration features and communication systems linked to downstream equipment.

# **A VARIETY OF CRANE TYPES**

Konecranes Gottwald Mobile Harbor Crane technology today stands for far more than the rubber-tired mobile harbor crane. We have long since transferred this proven technology to other types of cranes, such as rail-mounted or rubber-tired portal or floating cranes. This has resulted in a crane modular system with a multitude of crane types that can be perfectly integrated into various infrastructures.

#### PORTAL CRANES AND FLOATING CRANES

The assemblies above the roller bearing slew ring are the same for all cranes. Underneath, diversity is king. Our rail-mounted or rubber-tired portal cranes have established themselves on the market in the same way as Konecranes Gottwald Floating Cranes. The recipe for success is combining standard features, on the one hand, with individual design, on the other. This creates cost, delivery lead-time and service benefits for our customers.

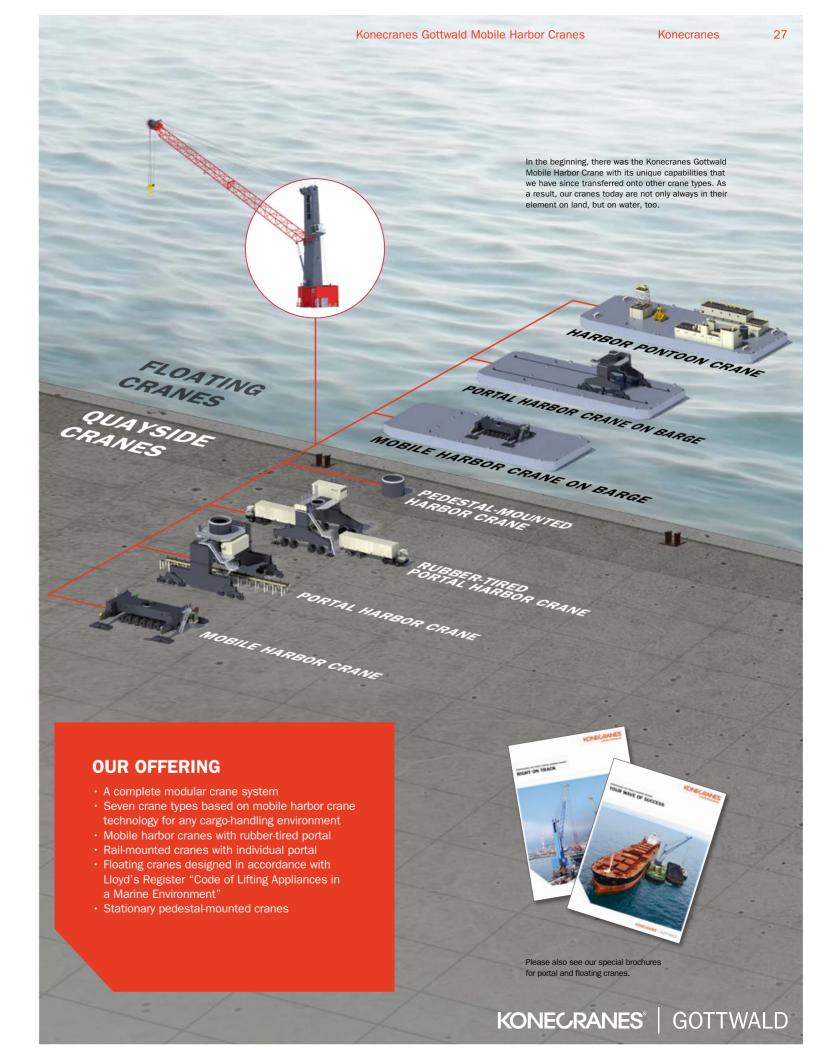








- With a classical approach: self-contained rubber-tired mobile harbor cranes can be used throughout the entire port
- When on rails: conveyor belts are operated under portal cranes. Or trains or terminal vehicles are moving.
- When quays are few and far between: floating cranes undertake transshipment in ports, on rivers and, ever more frequently, on the open sea
- When quays are narrow: rubber-tired portal cranes allow unimpeded passage of terminal vehicles



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## ARRIVING IN PERFECT CONDITION

# TRANSPORT VARIANTS

We have been manufacturing Konecranes Gottwald Mobile Harbor Cranes for the global market at our facility in Düsseldorf, Germany, for 60 years. From there, we deliver all over the world. How we transport the machine in question depends largely on the conditions in the destination port.

#### **CUSTOMIZE YOUR CRANE TRANSPORT**

The crane can be transported fully erected or precommissioned or ready for operation per heavy-load vessel. Or we supply you with the main components pretested in the factory, including the chassis and superstructure, tower and boom, assemble and commission the crane on site at your terminal. If the destination port is within a short distance, we load the main components onto a motor coaster that arrives at your terminal without further transshipment.

- At the destination in no time: main crane components are loaded onto a motor coaster at the River Rhine Port in Düsseldorf. When short sea shipped, they arrive directly at the terminal on such a vessel.
- Quickly from quay to quay: once they have been commissioned, Konecranes Gottwald Mobile Harbor Cranes can be used anywhere in the port
- 3 Konecranes Gottwald Mobile Harbor Cranes manufactured in China like the Quaymate M50, are shipped fully erected via the deep water connection of our facility.

- Individual transport options
- Either fully erected, pre-commissioned or ready-foroperation cranes
- Supply of main components, assembly and commissioning in your terminal
- Options for self-collection of the crane from the transshipment port
- Support with transporting used cranes

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## **MOBILE HARBOR CRANES IN THE BEST HANDS**

# **LIFE CYCLE SUPPORT**

We place the highest value on ease of service and maintenance when engineering and developing our mobile harbor cranes for you. Thanks to easily accessible maintenance points, our robust cargo-handling equipment is user-friendly. Our expertise is complemented by the use of components from globally renowned manufacturers.

## **WE MAINTAIN AVAILABILITY**

We help to ensure that the availability and productivity of Konecranes Gottwald Mobile Harbor Cranes do not diminish. Our global service organization is close to the customer in all time zones and language regions and offers maintenance and repair expertise combined with fast spare parts supply.

# WE PRESERVE YOUR CRANE'S VALUE OVER MANY YEARS

Because we built your Konecranes Gottwald Mobile Harbor Crane and know it best, it goes without saying that we are the ideal partner for your crane throughout its entire life cycle. With our comprehensive Service portfolio, your crane remains state of the art, its service life increases and its value is preserved over many years.

- To train crane operators, we combine innovative simulation technology with genuine crane components: our stationary simulator at the Düsseldorf facility in action
- 2 All machinery and components in Konecranes Gottwald Mobile Harbor Cranes are easy to access
- We adapt your mobile harbor cranes to new cargo-handling requirements. For instance, we increased the height of the towers on existing cranes so that vessels with more container layers can be unloaded on deck.

- Life cycle support
- Global service organization
- Fast provision of spare parts
- Retrofits and upgrades
- Crane operator training, also using a simulator, training programs for service staff











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

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