

LHM Mobile Harbour Cranes



Optimise your performance with big data analytics

LIEBHERR

Presentation outline

- Overview
- Technical – maritime Technology
 - Auto-Deceleration
 - Sway-free load
 - Intelligent grabbing
 - Maritime telematics
 - Crane Simulator



OVERVIEW LHM range



LHM lightweight series

LHM 120



- Max outreach: 30 m
- Max capacity: 42 t
- Power Pack: 390 kW

LHM 180



- Max outreach: 35 m
- Max capacity: 64 t
- Power Pack: 390 kW

LHM 280



- Max outreach: 40 m
- Max capacity: 84 t
- Power Pack: 390 kW (+Pactronic®)

LHM 420



- Max outreach: 48 m
- Max capacity: 124 t
- Power Pack: 750 kW (+Pactronic®)

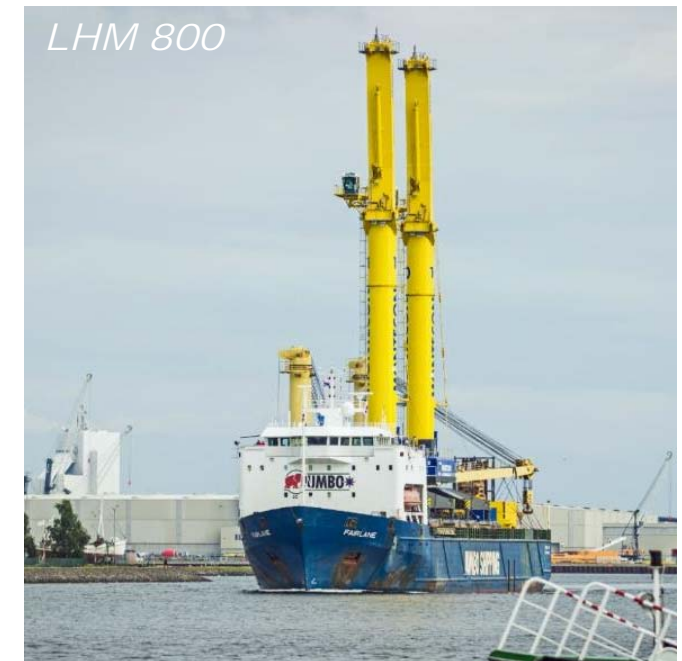
LHM heavyweight series



- Max outreach: 48 / 54 m
- Max capacity: 144 t
- Power Pack: 750 kW (+Pactronic®)




- Max outreach: 50 / 58 m
- Max capacity: 208 t
- Power Pack: 750 kW (+Pactronic®)
- Optional: High rise version



- Max outreach: 52 / 64 m
- Max capacity: 308 t
- Power Pack: 750 kW (+Pactronic®)
- Optional: High rise version

LHM configurations



- **LPS (Portal Slewing)** 
- Space saving
- Rail mounted
- Customized portal



- **LFS (Fixed Slewing)**
- Fixed installation on quayside and jetties
- Space saving
- Economical solution



- **LBS (Barge Slewing)**
- Floating installation
- Transshipment & midstream operations
- Tailor made barges

OVERVIEW

LHM applications



- **Container handling**
- Outreach: 30 - 64 metres (up to 22 container rows across)
- Turnover: Up to 45 container per hour



- **Bulk handling**
- Bulk handling up to Capesize vessels
- Turnover: Up to 2300 tonnes per hour



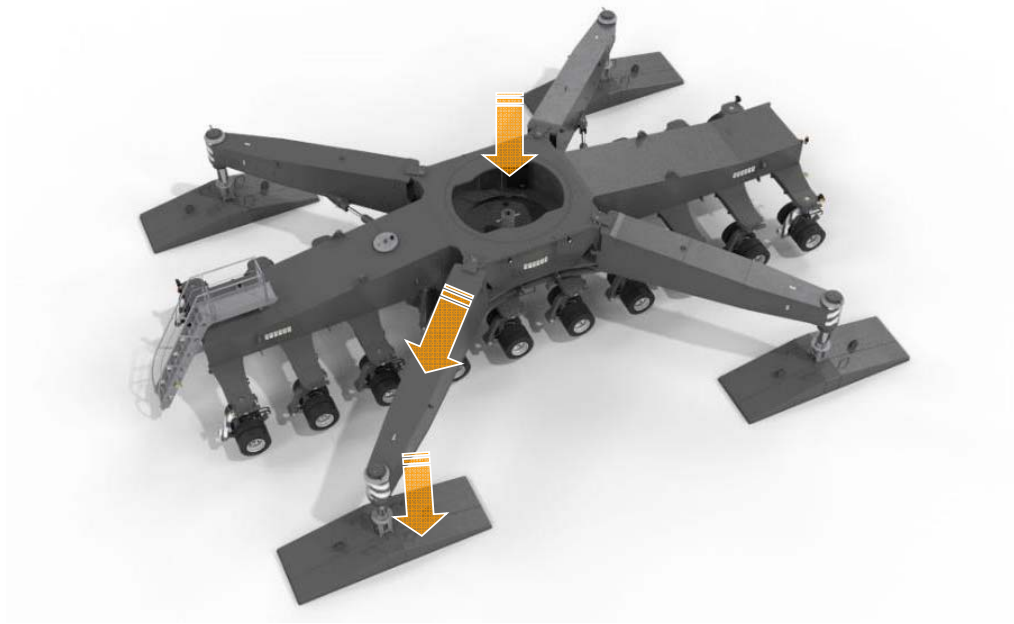
- **Heavy lift & general cargo**
- Lifting capacity: Up to 308 tonnes
- Sycratronic®: Up to 616 tonnes

General arrangement

- Undercarriage
- Slewing platform
- Interior
- Tower
- Boom



Undercarriage



- **X-shaped propping configuration**
- Direct load path from boom tip to quay
- Optimised vertical stability during operation
- Longer service life of the slewing bearing



- Flexibility of the X-shape according to quay requirements
- Increased wheel gauge for more travelling stability
- Optional: Autopropping (all pads on ground) for increased safety

Undercarriage



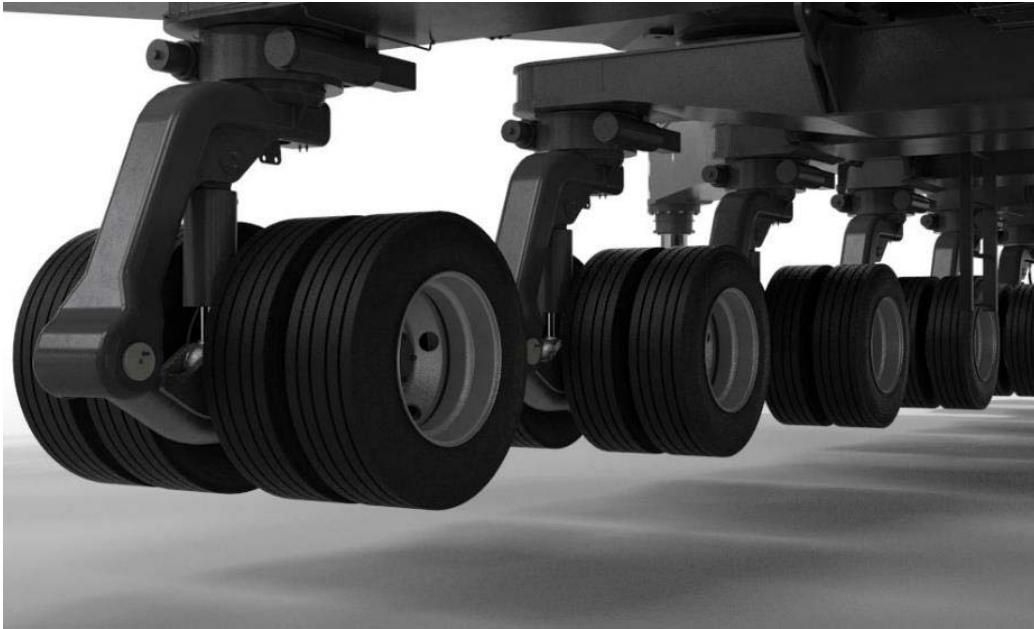
- **Individual wheel sets**

- Longer service life of tyres (standard trailer tyres - no supply bottlenecks)
- Fastest positioning at narrow sites
- Free access for ease of maintenance

- **Hydraulic suspension**

- Avoids overloading of individual wheel sets
- Optimum pressure distribution on uneven ground
- 3-Point suspension avoids overloading when travelling above twisted, uneven ground

Undercarriage



- **Less point load to quay structure**
- Optional: Variable number of wheel sets allows further reduction of quay loads



- **Supporting pads**
- Easily removable when travelling through narrow passages
- Optional: Various sizes available to match different quay structures

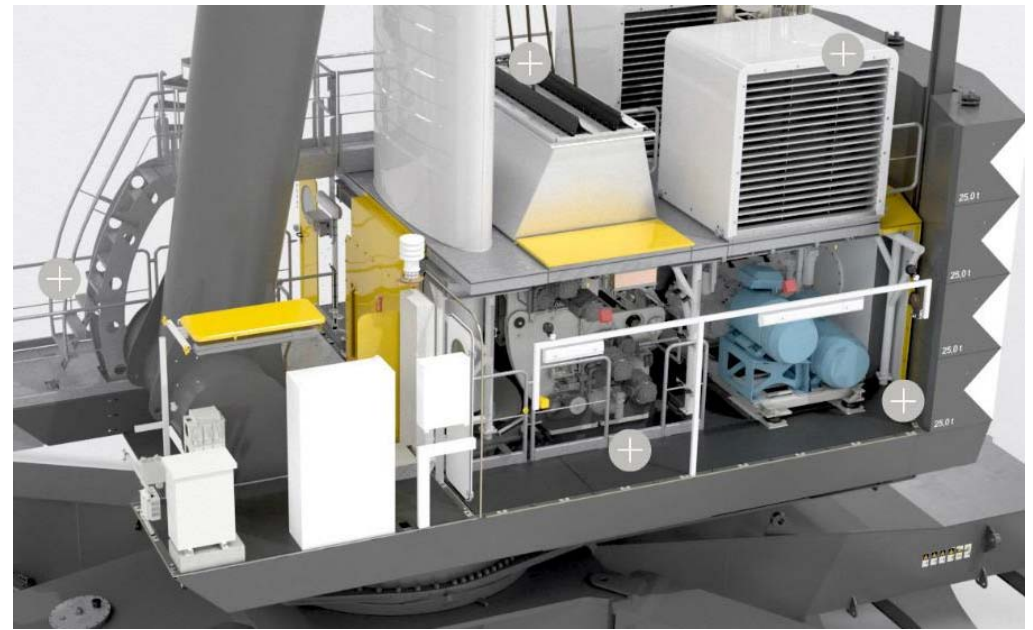
Slewing platform



- **One single floor**
- Less weight
- Simplified maintenance
- Optimum access to all components
- Standardisation of spare parts for all model

- **GFRP housing (glasfibre reinforced plastic)**
- 100% corrosion-free
- Highest noise and vibration insulation
- Less weight

Slewing platform layout



- **One single floor**
- Less weight
- Simplified maintenance
- Optimum access to all components
- Standardisation of spare parts for all model

Safety: Crane structure

■ Hoisting

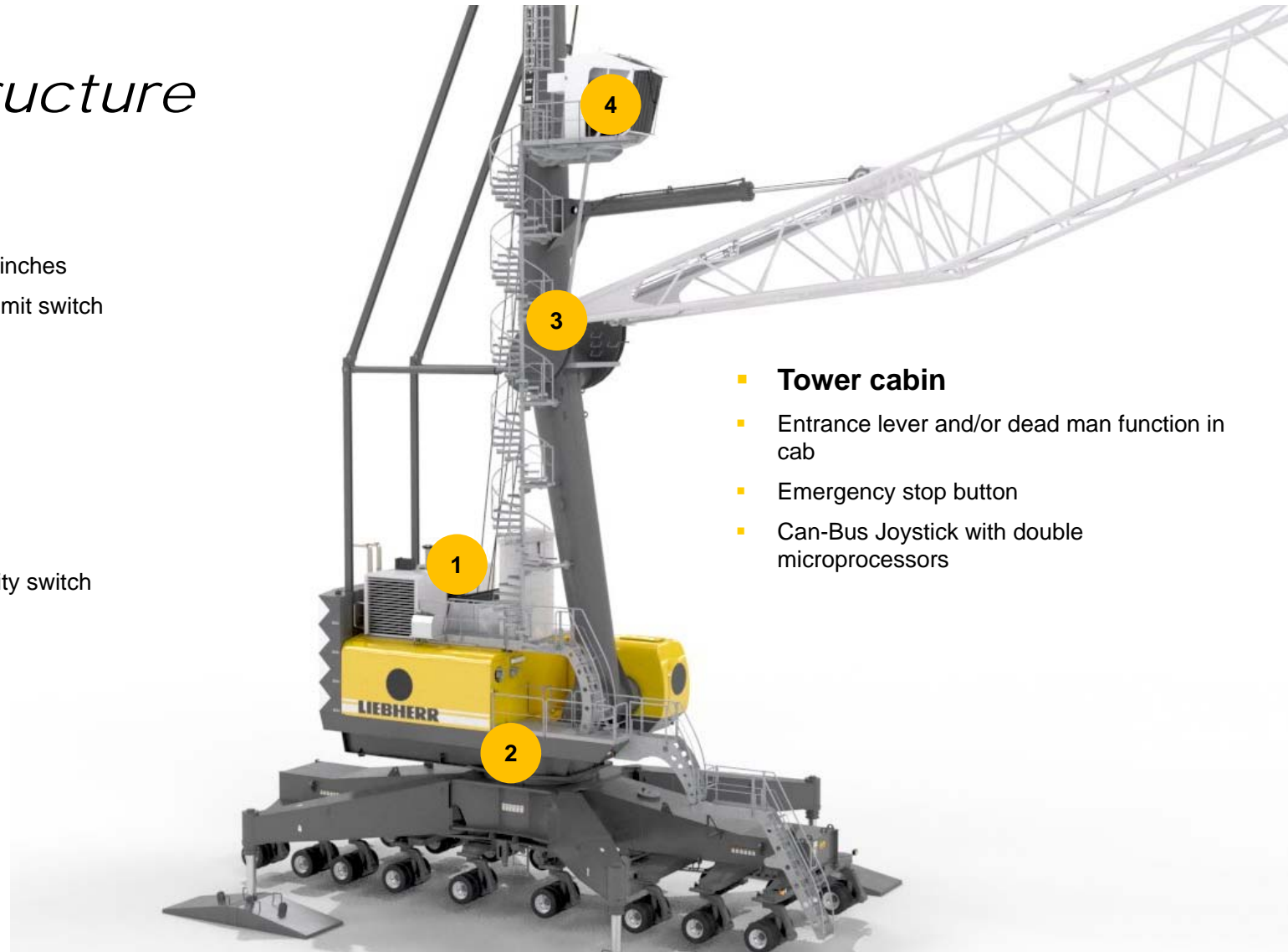
- Redundant load cell for closing and holding winches
- Absolute and incremental transmitter & cam limit switch
 - For closing and holding winches
 - For hoist limit switch
 - For hook anti-block device

■ Slewing

- Slew Angle Transmitter supervised by proximity switch

■ Luffing

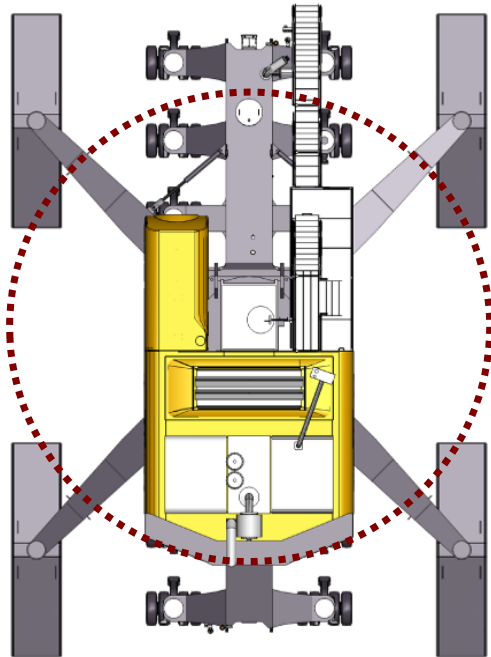
- Redundant Angle Transmitter



■ Tower cabin

- Entrance lever and/or dead man function in cab
- Emergency stop button
- Can-Bus Joystick with double microprocessors

Safety



- Small tail swing radius
- Radius within area of supporting pads



- Safe and comfortable access to tower cab via spiral staircase
- Complete crane access provided with handrails and gates

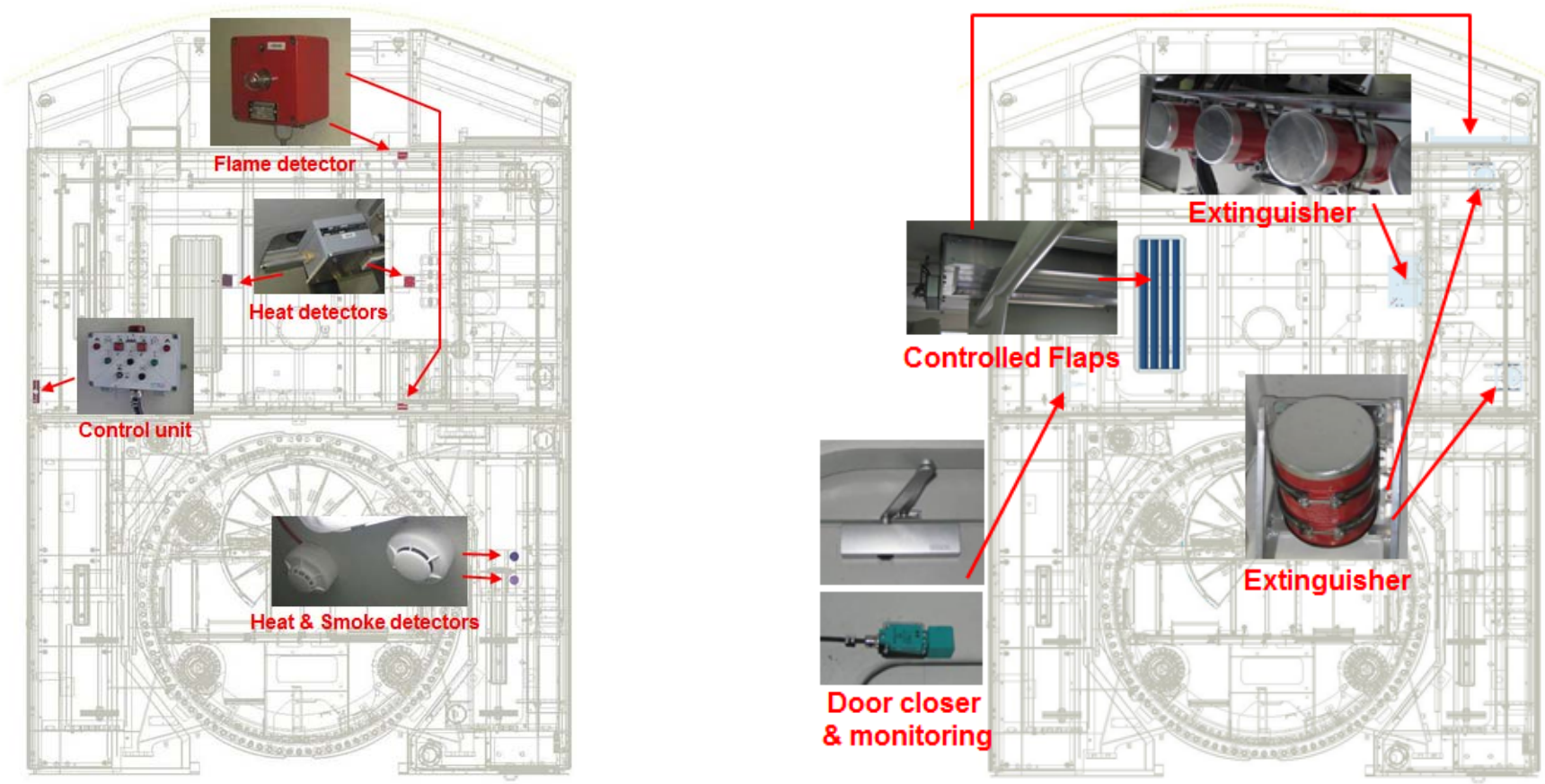


- Optional: Lower cabin
- High position & optimal view
- No safety hazard
- Optional: Radio remote control



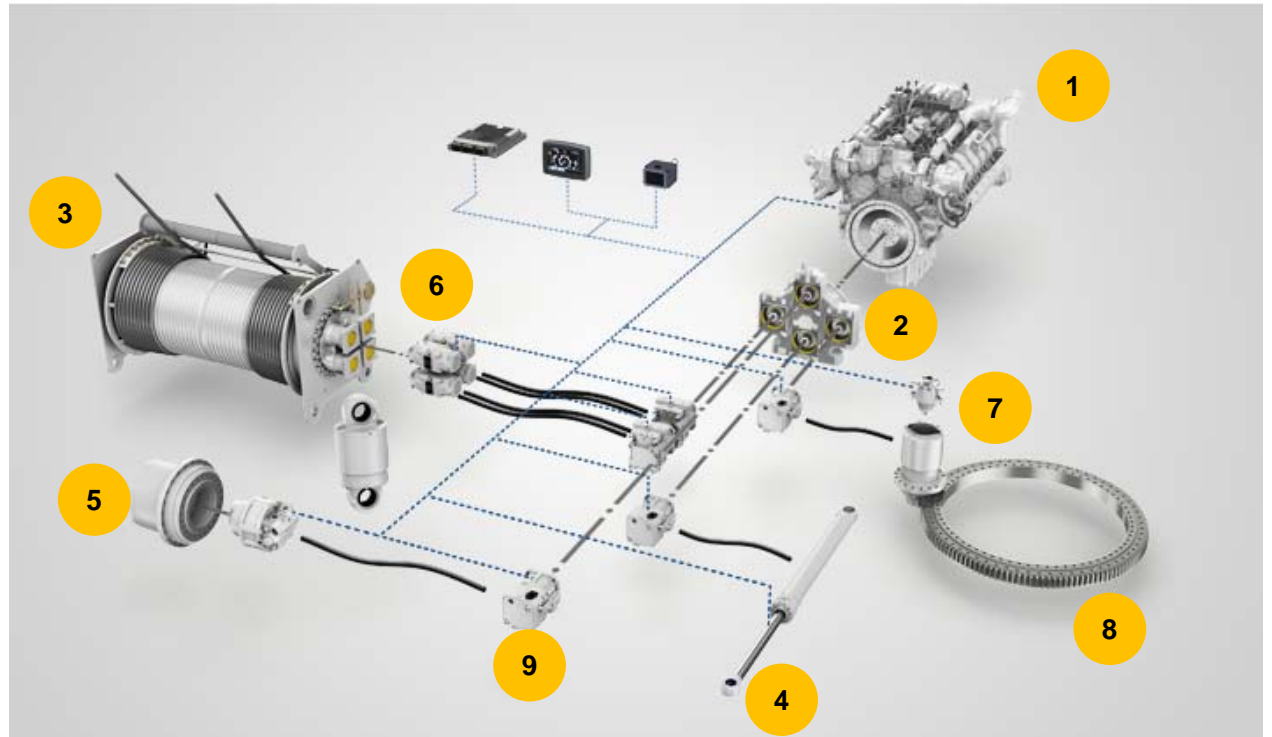
- Emergency descent

Safety: Fire fighting system (optional)

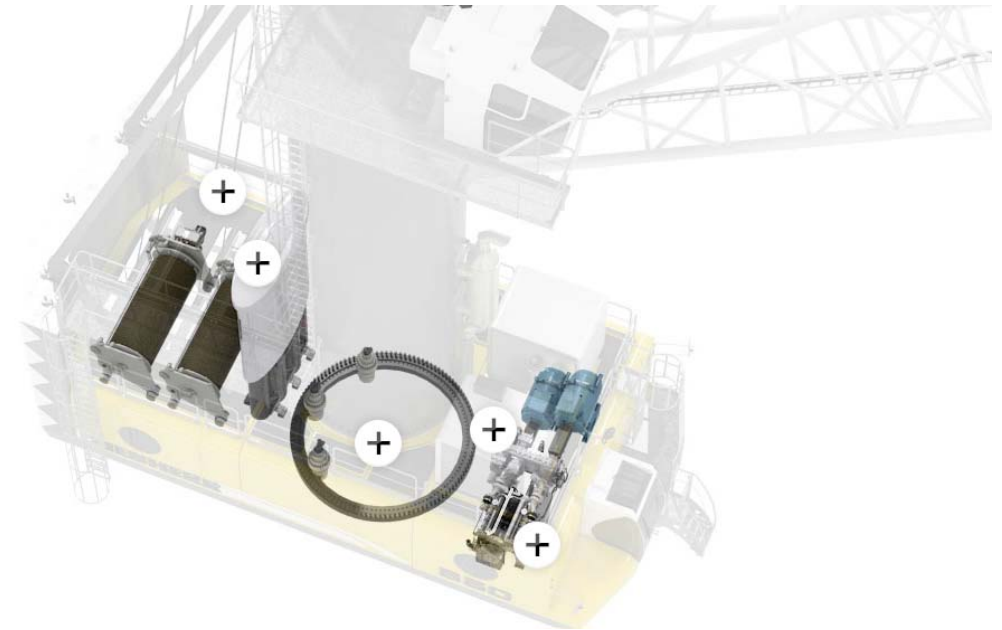
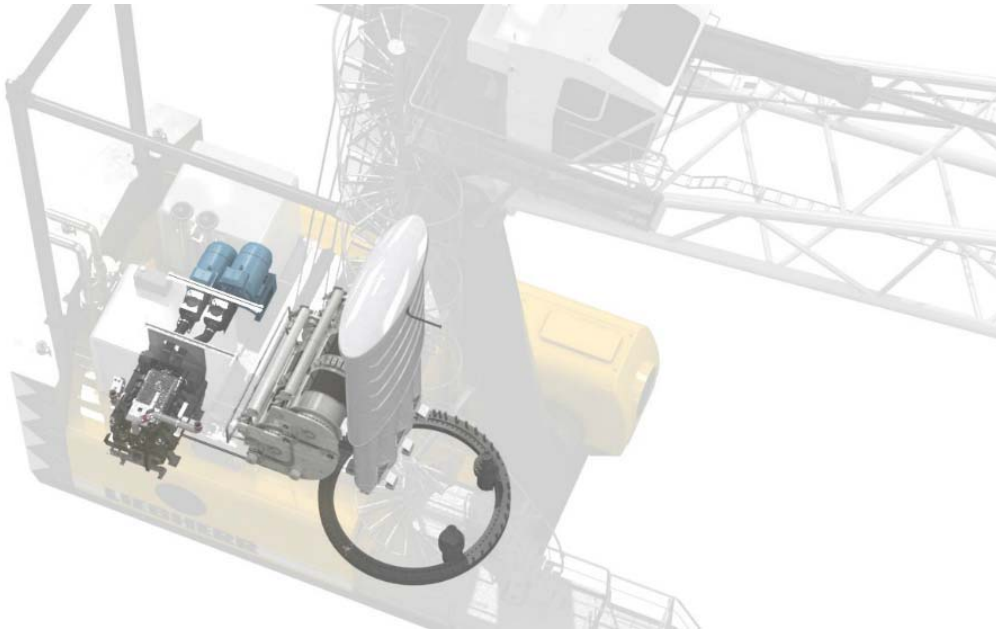


Components in the diesel-hydraulic drivetrain

- Diesel engine
- Transfer cases
- Rope winch
- Hydraulic cylinders
- Travel drive
- Hydraulic motors
- Slewing drive
- Large diameter bearings
- Hydraulic pumps



Drive system



- **Hydrostatic drive system**

- Identical system for all main functions
- Identical components for all main functions
- Maximum reliability due to minimum components
- Simple & easy maintenance and training

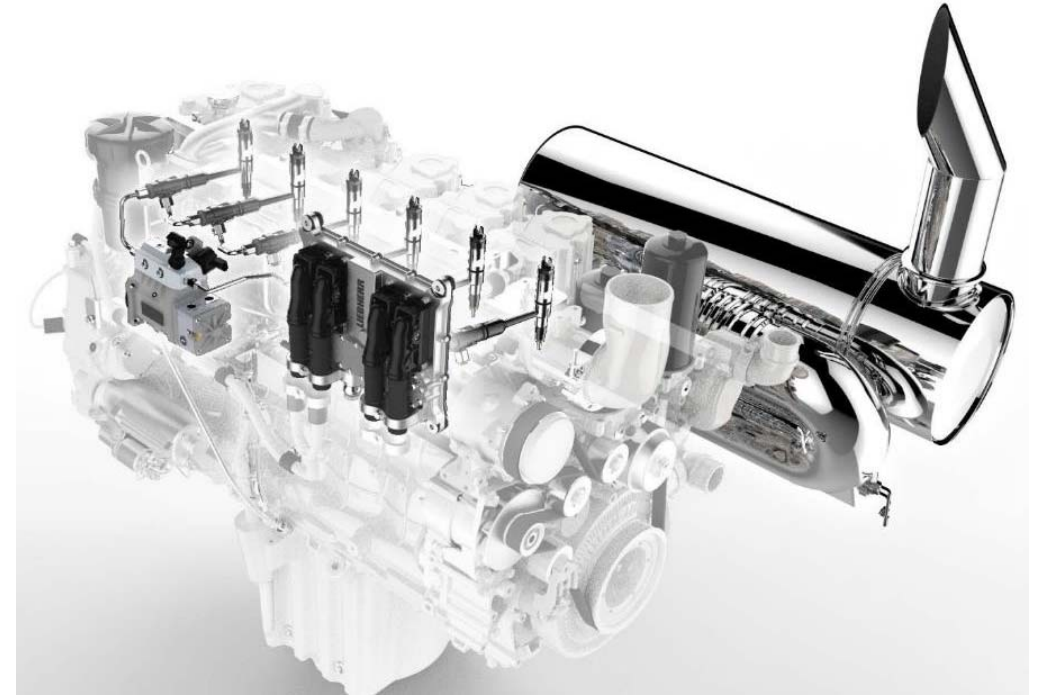
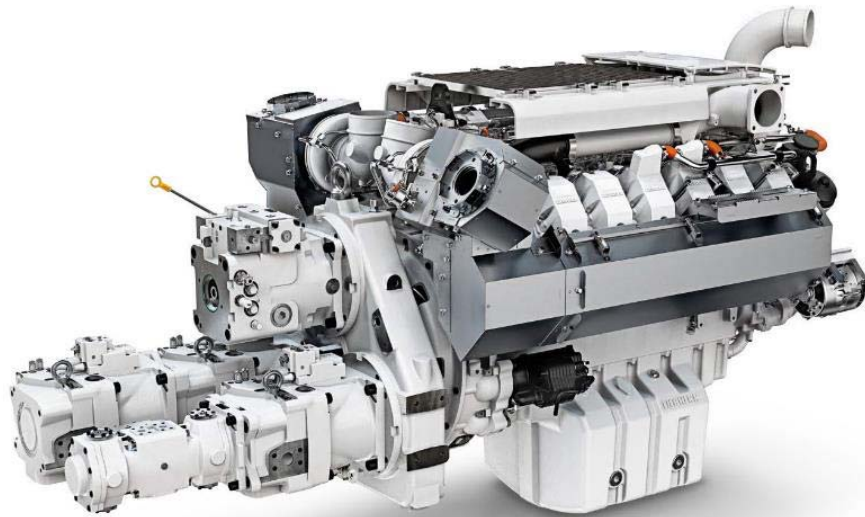
- **Closed hydraulic loops**


- Sensitive operation
- Unaffected by environmental conditions
- Less hydraulic oil needed
- Braking energy is fed back to power pack

- **Hydraulic concept**

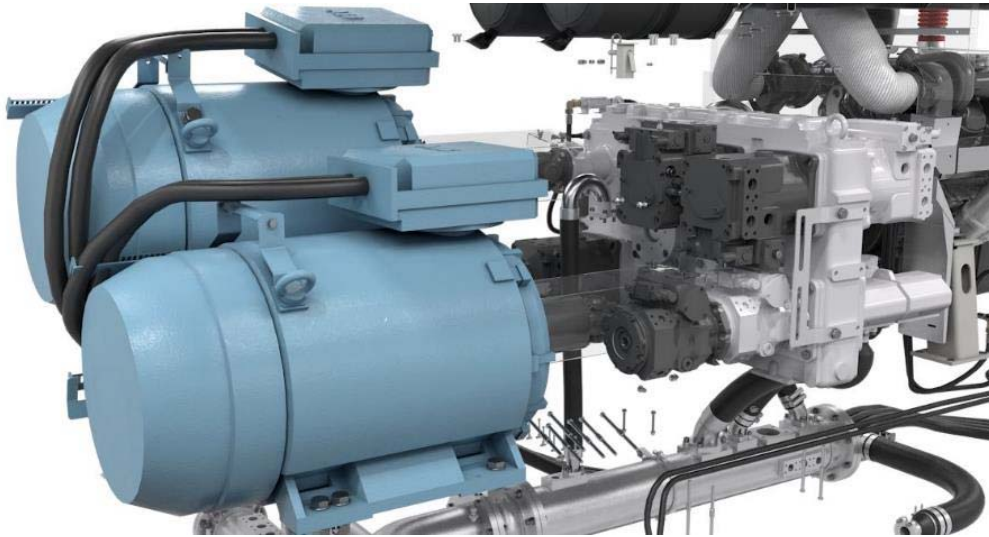
- Ambient working temp. -25°C (-40°C) to +45°C
- Small moment of inertia
- Fastest ac- & deceleration
- Less installed power necessary

Diesel engine



- **LIEBHERR diesel engine** 
- Variable rpm / optimized power output
- Highest efficiency
- Less fuel consumption (eco-control)
- Emission class: EU stage IV / EPA tier 4 final
- **System expertise**
- Common rail injection system
- Electronic engine control unit
- Exhaust gas aftertreatment
- **Optional: SCR system**
- Measurably less fuel
- Considerably lower nitrogen oxide
- Simplified maintenance
- „Detier“ – resale to non-regulated areas

E-drive (optional)



- **Prime mover - electric motor**

- Highest efficiency
- Less energy consumption / optimized power output
- Reduction of noise emissions
- Maintenance-free

- **LV main supply**

- 400V, 50Hz, 3 phases + earth
- 440V, 60Hz, 3 phases + earth

- **HV main supply**

- Any HV from 3kV to 20kV possible
- Will be transformed to LV by a HV stepdown transformer onboard the crane

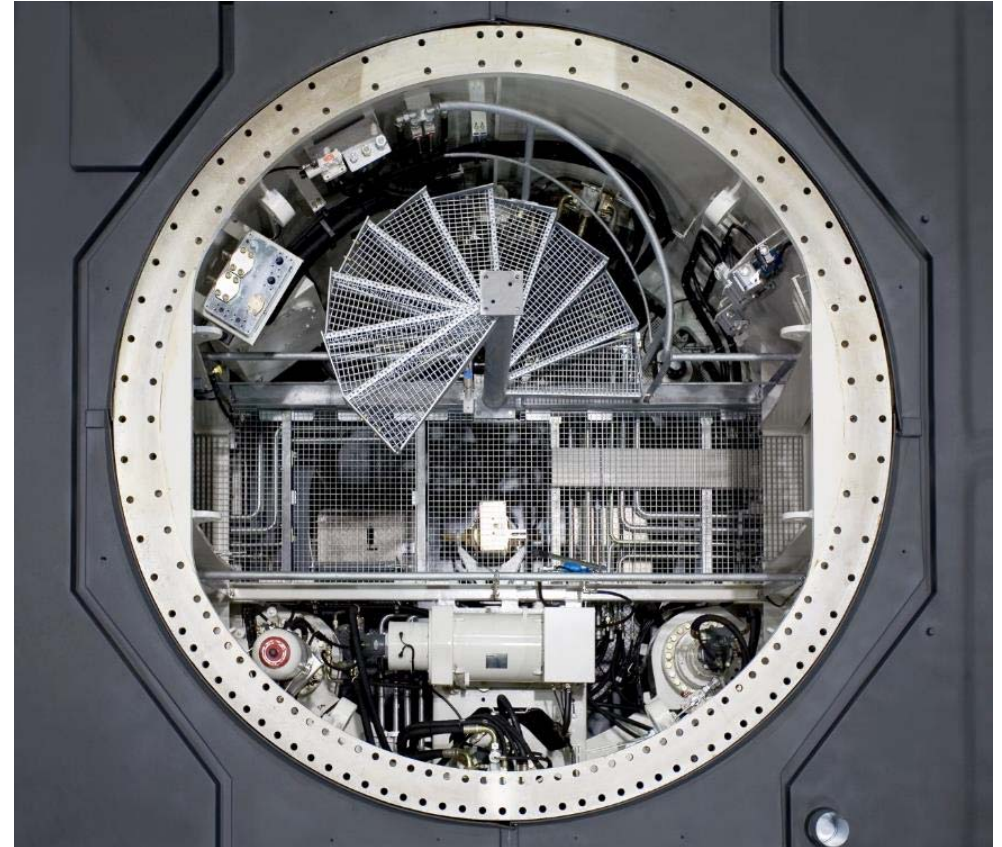
Pactronic® hybrid drive system (optional)



- **Optional: Pactronic® Accumulator**
- Maintenance-free (visual inspection every 10 years)
- Unaffected by ambient temperature
- 100% recyclable
- **30% more turnover**
- Increased hoisting & lowering speeds
- Higher turnover with identical prime mover
- Shorter docking times for vessels
- **30% less fuel/energy consumption**
- Energy recirculation (100% energy storage)
- Increased efficiency
- Further reduced exhaust emissions

Electric power supplies

- **Onboard power supply (AC)**
 - Synchronous generator (200 kVA) driven by the crane hydraulics)
 - Autonomous internal 400/230VAC power supply of crane for:
 - Load lifting devices
 - Crane lighting & heating
 - Auxiliaries
- **Onboard power supply (DC)**
 - Battery System (maintenance free)
 - Alternator (120A) driven by diesel engine
 - Independent & autonomous 24VDC power supply for:
 - Electronic
 - Sensors
- **Auxiliary land supply**
 - 5-pole socket (400V, 50/60Hz, 3 phases + neutral + earth)
 - Onboard transformer to adapt any other land supply voltage
 - Electrical power supply during standstill for:
 - Anti-condensation
 - Lighting, heating & air-conditioning
 - Option: spring loaded cable reel (50m supply cable 5x6mm²)



Hoisting winches



- **Winch**

- 2-rope or 4-rope configuration
- Optimised rope diameter for less swing masses
- Application-oriented configurations

- **Hoisting gear**

- Planetary gearbox
- Low weight and low masses of inertia
- Shortest response time up to 120 m/min

Hoisting winches

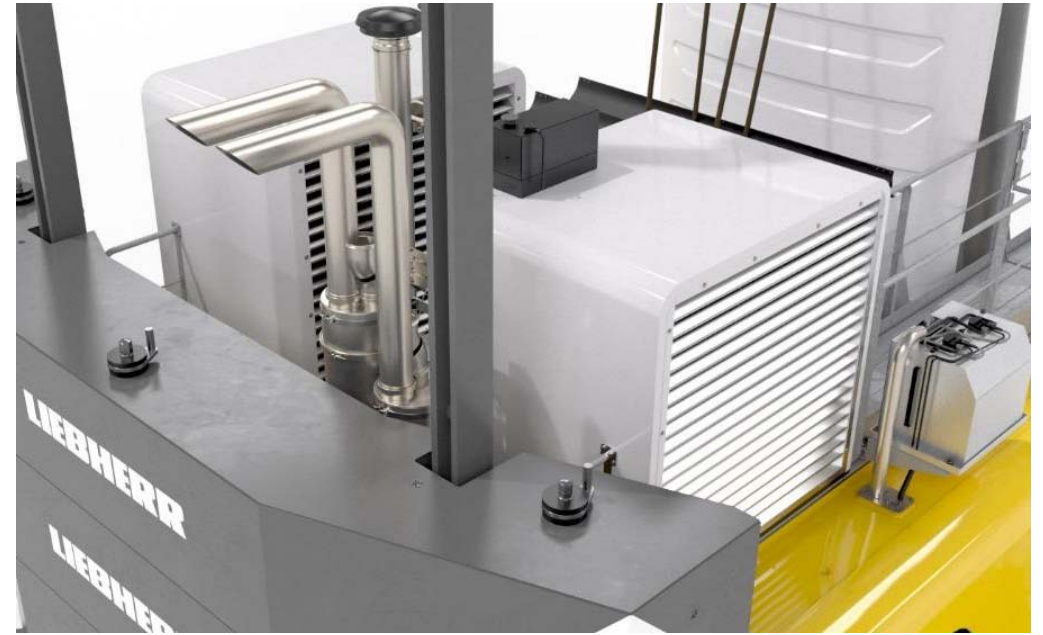


- **Winch suspension**
- Less vibration
- Reduction of noise power level = 4 dB(A)



- **Safety**
- Slack rope & overwinding protection
- Spring-loaded holding brakes (maintenance free)

Cooling system



- **Cooling system**
- Energy-saving (Howden fan)
- Lowest noise level
- Main cooling air flow is conducted externally
- Optional: Cyclone filter (filtration efficiency: 99.5-99.9%)

- **Howden fans**
- Temperature-controlled
- Decreased & regulated rpm
- Higher lifetime

Tower & boom



- **Tubular tower design**
 - High stiffness and torsion resistance
 - Longer service life of slewing bearing
 - Weatherproof access to tower cabin
- **4-chord boom**
 - Utmost stability
 - Longer service life of boom
 - Shockproof flange connection
- **Luffing cylinder**
 - Maintenance-free
 - Protected from load
 - No risk of buckling (only tension force)
 - Protected in boom parking position

Operator cabin



- **Tower cabin**
- Optimum visibility (forward mounted)
- 70% glass proportion
- Climate Control

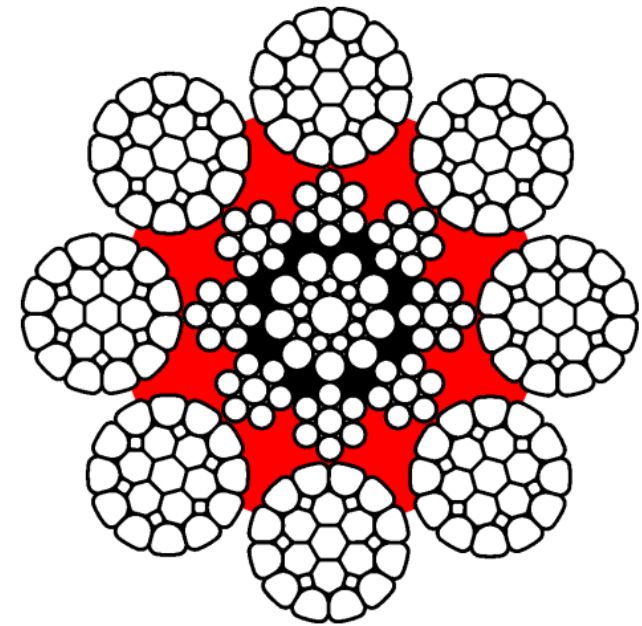


- **Comfort**
- Designed inline with highest ergonomic principles
- Comfortable & noise free environment
- Driver's seat with adjustable arm rests
- Control desk, joy-sticks and monitor are ergonomically arranged

Cable reel & ropes



- **Cable reel on boom tip**
- Hydraulically driven
- Maintenance free / unsurpassed lifetime
- No brake adjustment required



- **Ropes**
- High breaking force / galvanized steel wires
- Compacted strands for excellent resistance to abrasion
- Plastic impregnation for long life time
- Rope with radial elastic inside strands

Maritime Technology – intelligent Control



Intelligent grabbing


The algorithm-based system detects the properties of the bulk commodities and optimises the grab filling rates at any outreach.

SmartGrip 



Hybrid drive

The energy storage system ensures double lifting speeds and a significant reduction in fuel and emissions.

Pactronic 



Synchronised lifting

One system, two cranes and only one crane operator: Sycratronic brings the deployed cranes together as one functioning unit.

Sycratronic 



Sway-free load

Ongoing calculations anticipate the path of the load. Pendulum movements are compensated for before they develop.

Cycoptronic / Teach-In / Vertical Line Finder 



Auto-deceleration


Lowering speed control assistant for less impact on cargo and equipment as well as increased safety.

Soft Touch Down 



Crane simulator

Our simulators ensure efficient and realistic operator training for the entire maritime product portfolio.

LiSIM 



Maritime telematics

Optimise your performance with big data analytics

LiDAT smartApp 

Further optional equipment



Radio remote control

The radio remote control combines user-friendliness and functionality. All crane movements are easy to control, also from outside the cab (vs lower cabin – p. 14).



Tower extension

The position of the boom hinge point and the tower can be increased by up to 12 metres. This optimises not only the operator's view, but also the range of the crane.



Supporting pad system

In order to take into account the different designs of quays and to evenly distribute the load, the shape and size of the supporting pads can be varied.



Central lubrication

The central lubrication system requires less maintenance. Relevant crane parts are automatically and independently lubricated by electric pumps.



Cyclone filter system

Our cyclone filters achieve a filtration efficiency of up to 99.9 percent. For extra protection against dust.



Low-temperature equipment

Special equipment packages enable reliable handling in icy regions. Also under extreme conditions with temperatures below -50° Celsius.



Economy software

Whether idling or under full load, EcoMode reduces the engine speed to the required minimum. This reduces emissions, material wear and operating costs.



Electric drive

The entire range of LHM models can be equipped with an electric main drive – for more environmental friendliness. A high-voltage or low-voltage connection is required for this drive.



Overload monitoring system

System for monitoring and avoidance of misuse. Guarantees less maintenance, less wear & tear and a longer lifetime of the crane.



Noise protection

There is a special protection package for use in areas with strict noise level requirements. With the reinforced soundproofing of the machine room, further noise reduction (+50%) is achieved.



Individual wheel sets

Ground pressures of six tonnes for each wheel are not exceeded in the standard configuration. Additional wheel sets can also be mounted to further reduce the ground pressure.



Other special equipment

Do you need special equipment? Simply contact us! Liebherr mobile harbour cranes are used worldwide and have many other options.



Lightning

Customised LED lighting configurations for you operations.



Painting

Additional layer of protective coat/painting, Customer-specific painting & logo on request.

Environment & design



- **Prime mover**
 - Diesel engine
 - Eco control
 - E-drive
- **Power transmission**
 - Pactronic
 - Closed hydraulic circuits
 - Temperature-controlled fan technology
 - Lubricants & operating liquids
- **Design**
 - Noise insulation
 - Low weight of components
 - Sustainable manufacturing
- **Improved controls**
 - Cycoptronic
 - Sycratronic
 - SmartGrip
- **Improved logistics**
 - LiDAT smartApp
 - Crane position finder



Transport

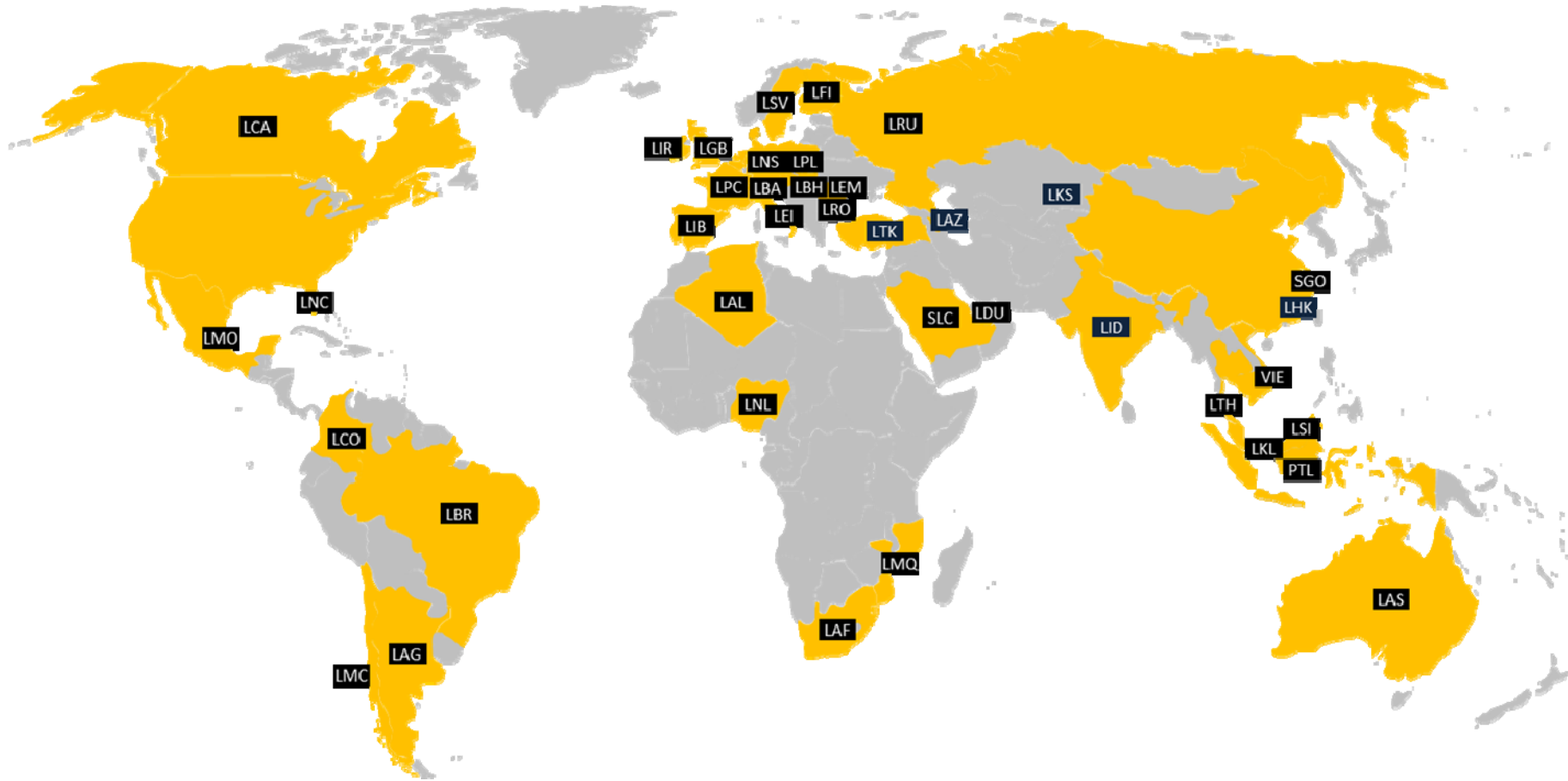


- Fully assembled

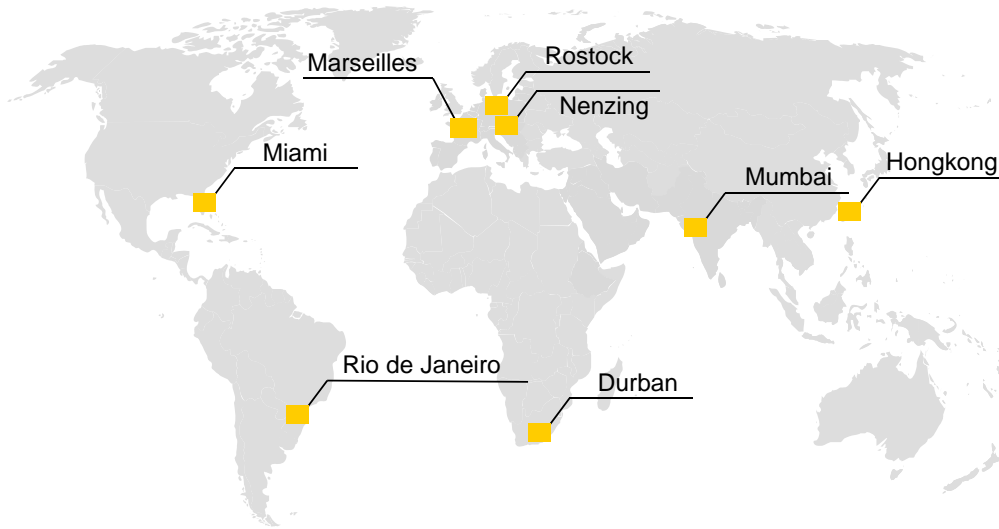


- Semi assembled

Customer service



Maritime Training Centres



- **Training for crane operators**

- The crane operator can acquire comprehensive theoretical and practical knowledge. This is the foundation for safe and correct operation of the crane.

- **Training for service technicians**


- Our customers' service staff receive comprehensive training on how to maintain Liebherr cranes properly. This gives the customers the skill and knowledge to perform maintenance tasks themselves.

- **Training for fleet park managers**

- The task force leader or fleet park manager receives compact instruction, which is necessary for efficient use of the numerous software packages.

Lifetime

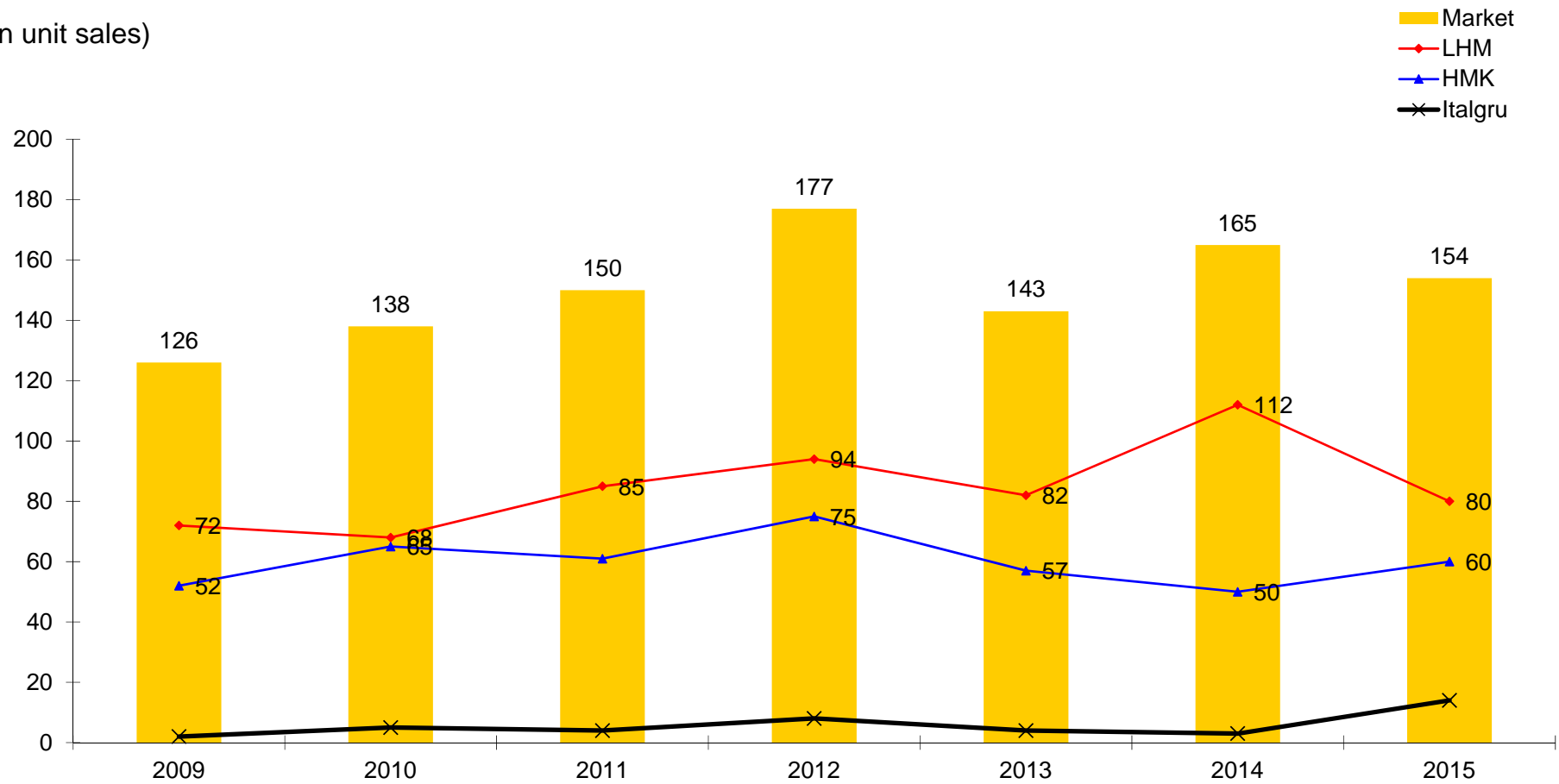
Installation	Type	Country	Hours
08.05.1989	1300	South Korea	63,120
24.01.1998	250	Turkey	57,700
20.01.1998	250	Turkey	57,600
23.08.1993	1200	South Korea	54,520
15.07.1998	400	Colombia	53,816
18.11.1993	1200	Vietnam	50,140
17.06.1992	1300	South Korea	49,390
29.12.1995	1300	South Korea	49,285
17.04.1999	320	South Korea	45,200
08.07.1994	1300	Vietnam	43,390
02.04.2001	400	Indonesia	42,301
11.10.2004	320	India	42,231
01.08.2003	150	Turkey	41,700
04.02.1994	1300	Vietnam	40,963
03.04.2002	400	Indonesia	40,040
10.12.1999	400	Paraguay	39,850
28.05.2001	320	Guatemala	38,307
02.05.2001	320	Guatemala	37,933
...

- Lifetime and classification 

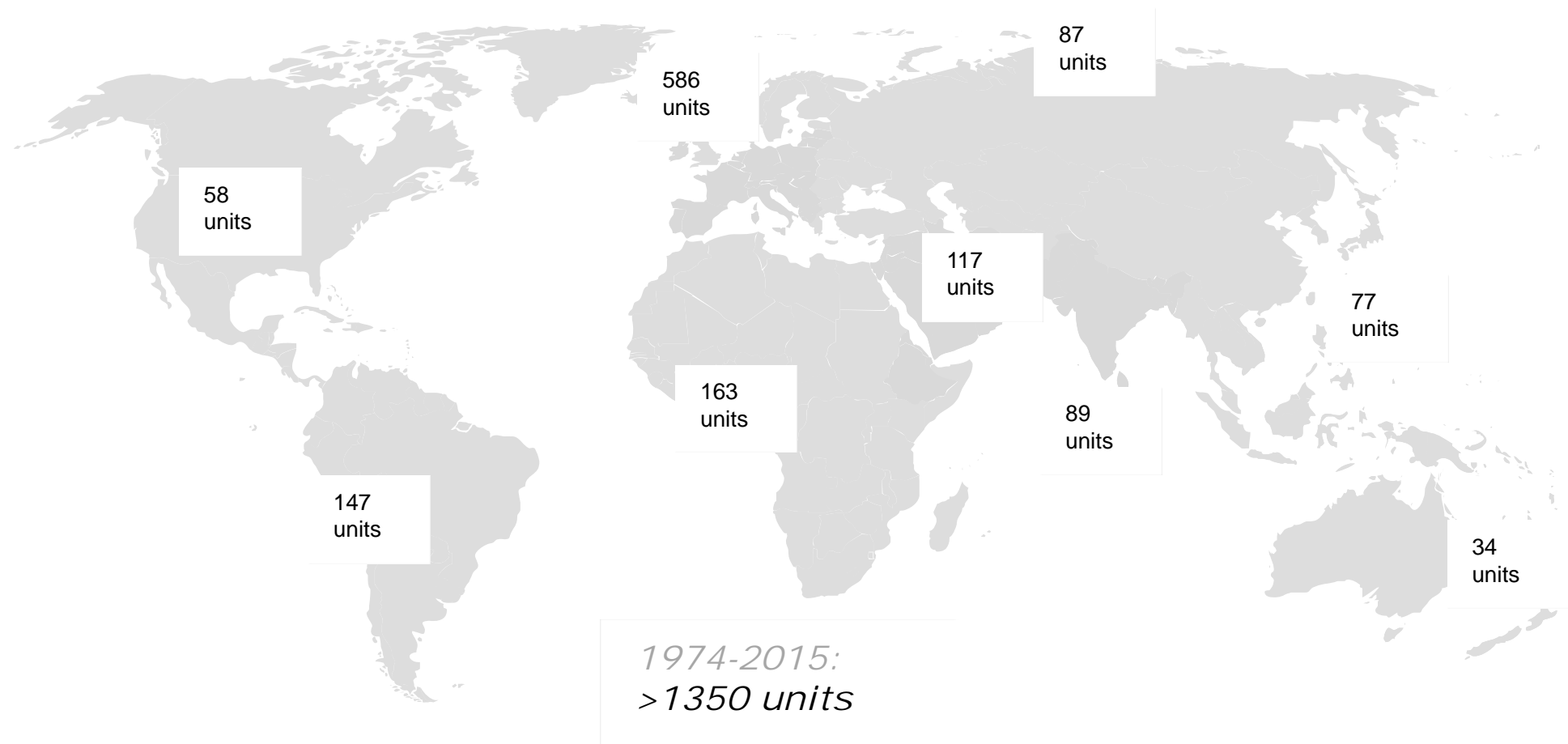


LHM Market share

(in unit sales)



Worldwide deliveries



Liebherr maritime cranes



Port equipment

The diverse product range offers optimal solutions for handling of materials in seaports and inland ports. Mobile, rail-linked and permanently installed cranes and stackers enable freight transportation with state-of-the-art technology.

> Port equipment



Offshore cranes

The series of offshore cranes comprises innovative rope luffing gear cranes. The high technology cranes are offered in a wide range of sizes and are adapted to cater for customer-specific requirements,

> Offshore cranes



Ship cranes

The ship cranes series offer material handling solutions on a wide array of vessels as well as solutions for barges and transhippers. The product range comprises wire luffing and cylinder luffing ship cranes, grab-, gantry- and heavy lift cranes.

> Ship cranes



Floating transfer solutions

With a comprehensive range of innovative pontoon and barge cranes for use on transhippers or barges, Liebherr offers efficient customer-specific and tailor-made solutions for all kinds of material handling.

> Floating transfer solutions

*Thank you
for
your attention*

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 - L4.2 [Smartgrip](#)
 - L4.3 [LiSIM](#)
 - L4.4 [Pactronic](#)
 - L4.5 [Sycratronic](#)
 - L4.6 [LiDAT SmartApp](#)
 - L4.7 [Cycoptronic](#)
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