

Maritime Cranes



Efficient Solution for Cargo Handling

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LIEBHERR

Presentation outline

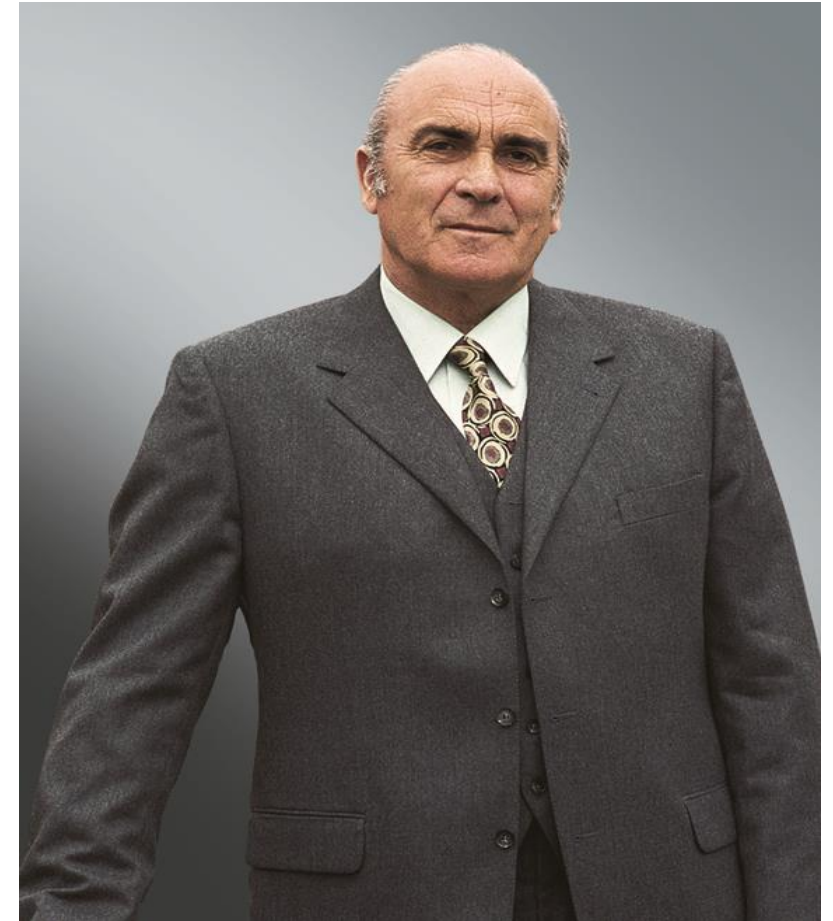
- Liebherr Group
- Liebherr-MCCtec GmbH – Maritime Division
- Product range
- Introduction to Litronic® System
- Introduction to LiDAT® SmartApp



Liebherr – a family business

- Company founded in 1949 by Dr.-Ing. E.h. Hans Liebherr
- The Liebherr Group today:
 - over 140 companies worldwide
 - almost 46,169 employees
 - approximately € 10.551 Billion turnover (2018)
- Decentralized structure with straightforward, autonomous corporate units – divisional structure
- Holding company:
Liebherr-International AG, Bulle/Switzerland

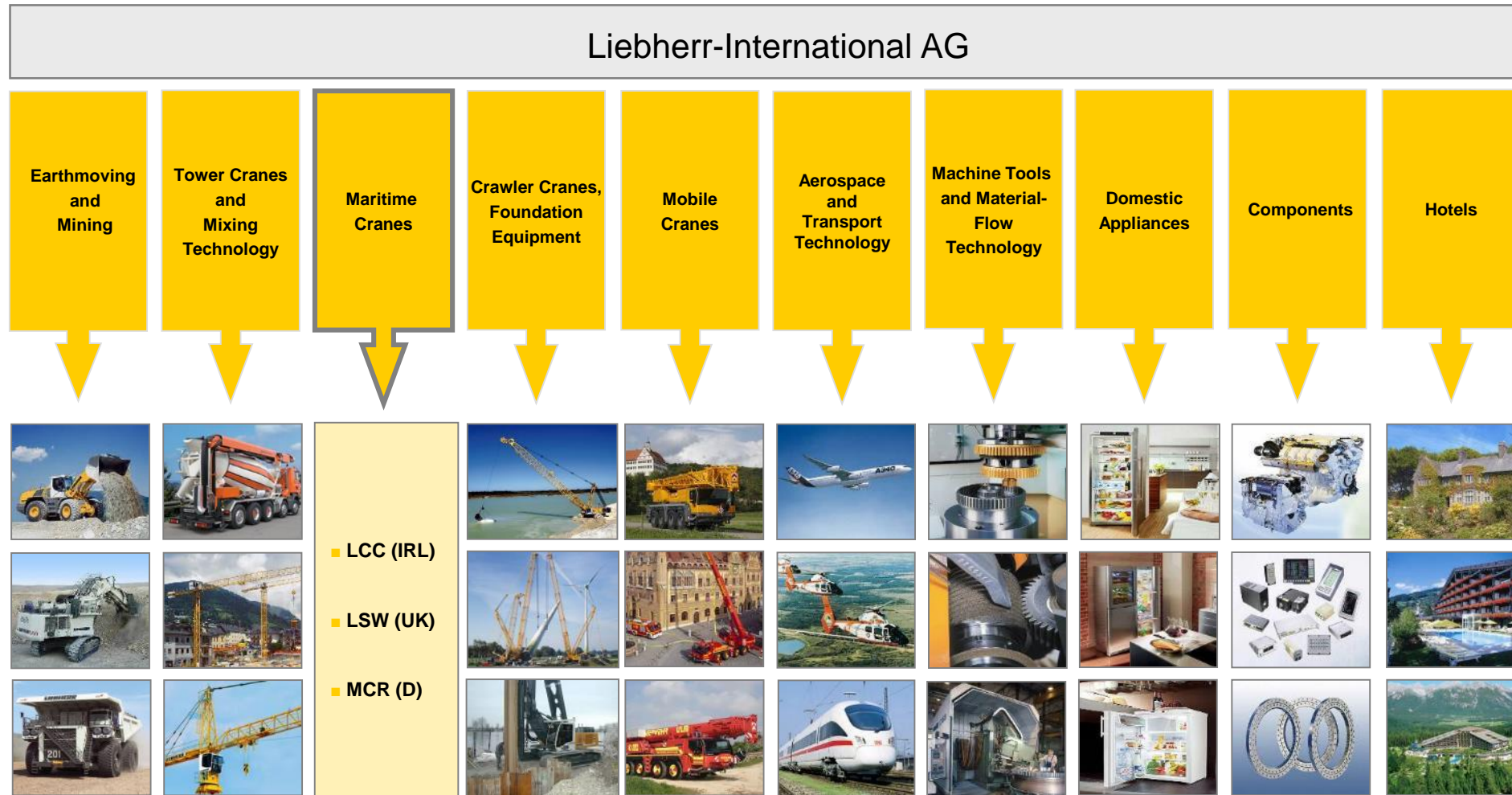
As a high-tech company, Liebherr pursues the goal of making a decisive contribution to shaping technological progress in sectors relevant to the Group. Liebherr invested **€ 586 million** in research and development last year.



Multifaceted product range



Divisional structure



Liebherr-MCCtec GmbH

MCCtec

**Ireland
(LCC)**



**Germany
(MCR)**



**U.K.
(LSW)**



- Employees: 4600
- 40 sales and service stations

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.



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,



Ship Cranes

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



Floating Transfer Solutions

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

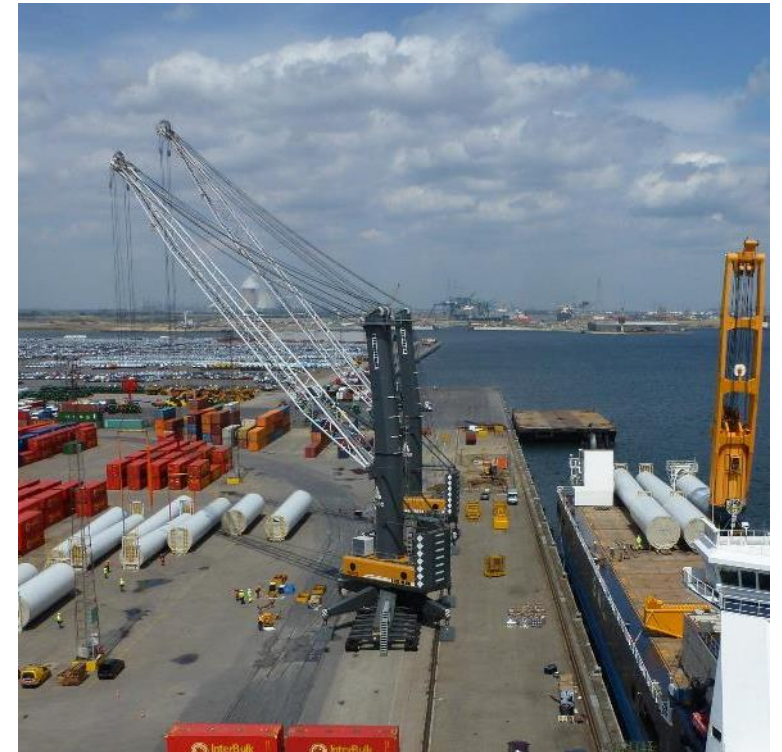
Mobile Harbour Cranes



- Container handling
- Outreach up to 64 metres



- Bulk handling



- Heavy lift & project cargo
- Lifting capacity up to 308 tonnes

Fixed & Travelling Cargo Cranes



- Travelling Cargo Cranes (TCC)



- Fixed Cargo Cranes (FCC)

Reachstacker



- **Stacking: LRS 545**
- Lifting capacity: 42 / 34 / 21 tonnes
- Stacking height: 5 / 5 / 4



Gantry cranes & straddle carriers



- Stacking: Rubber tyre gantry cranes



- Stacking: Rail mounted gantry cranes



- Stacking: Straddle carriers

Container Cranes (STS)



- From 8 up to 25 container rows across

Offshore Cranes



- **BOS: Board offshore cranes**



- **MTC: Mast type cranes**



- **RL: Ram luffing cranes**

* 1) Bottom supported: Concrete and steel jacket, jack-up platforms/vessels
2) Floating installations: FPSO, FSU, semi sub, pipe layer, buoy handle

Offshore Cranes



- RL-K: Ram luffing knuckle boom cranes



- CAL: Crane around the leg

Offshore Cranes

- “Liebherr is to build its largest ever offshore crane for DEME’s new vessel, Orion” March 2017



Ship Cranes



- **CBB: Wire luffing ship cranes**
- Lifting capacity: up to 1000 tonnes
- Outreach: up to 42 metres



- **CBW: Cylinder luffing ship cranes**
- Lifting capacity: up to 90 tonnes
- Outreach: up to 43 metres



- **Special design ship cranes**
- Lifting capacity: up to 40 tonnes

Floating Transfer Solutions (FTS)



- **CBG: Four-rope grab cranes**
- Lifting capacity: up to 45 tonnes
- Outreach: up to 36 metres

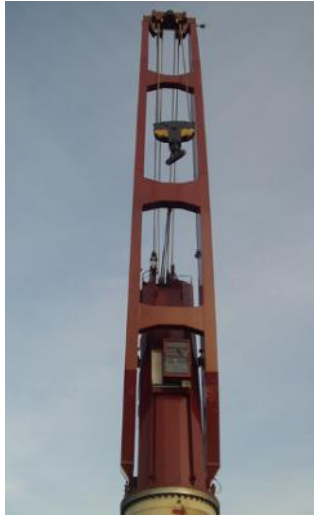


- **MPG: Double girder slewing cranes**
- Lifting capacity: up to 45 tonnes
- Outreach: up to 38 metres



- **LBS: Barge slewing cranes**
- Lifting capacity: up to 144 tonnes
- Outreach: up to 52 metres

Litronic[®] Control System



Litronic® Control System

- Complete hardware manufactured by Liebherr Lindau (Germany)
- Software designed by Liebherr Werk Nenzing
- Lifetime guarantee for spares
- Integrated modem for data transfer (LiDAT®)
- Machinery data recording
- Preventive and remote maintenance
- Integrated fault finding for quick troubleshooting
- Temperature tested for -40 °C to +80 °C
- Shock load tested for 32g
- Closed housing, resistant against dust and humidity
- 15 languages selection



Litronic® Control System

Online screen information

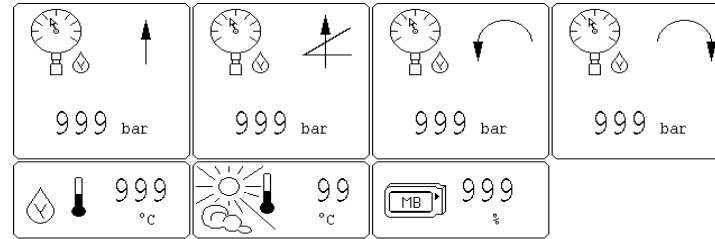
- Load indication
- Load limitation
- Operation mode
- Pre-selected hoist
- Slew angle
- Limits
- Rope speed
- Environment



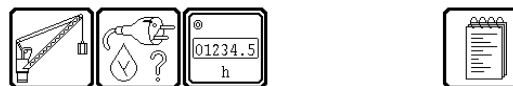
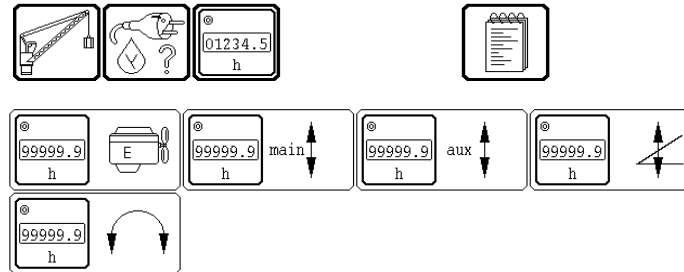
Litronic® Control System

Online screen information

- Working condition monitoring



- Individual & interactive recording of working hours for individual maintenance planning

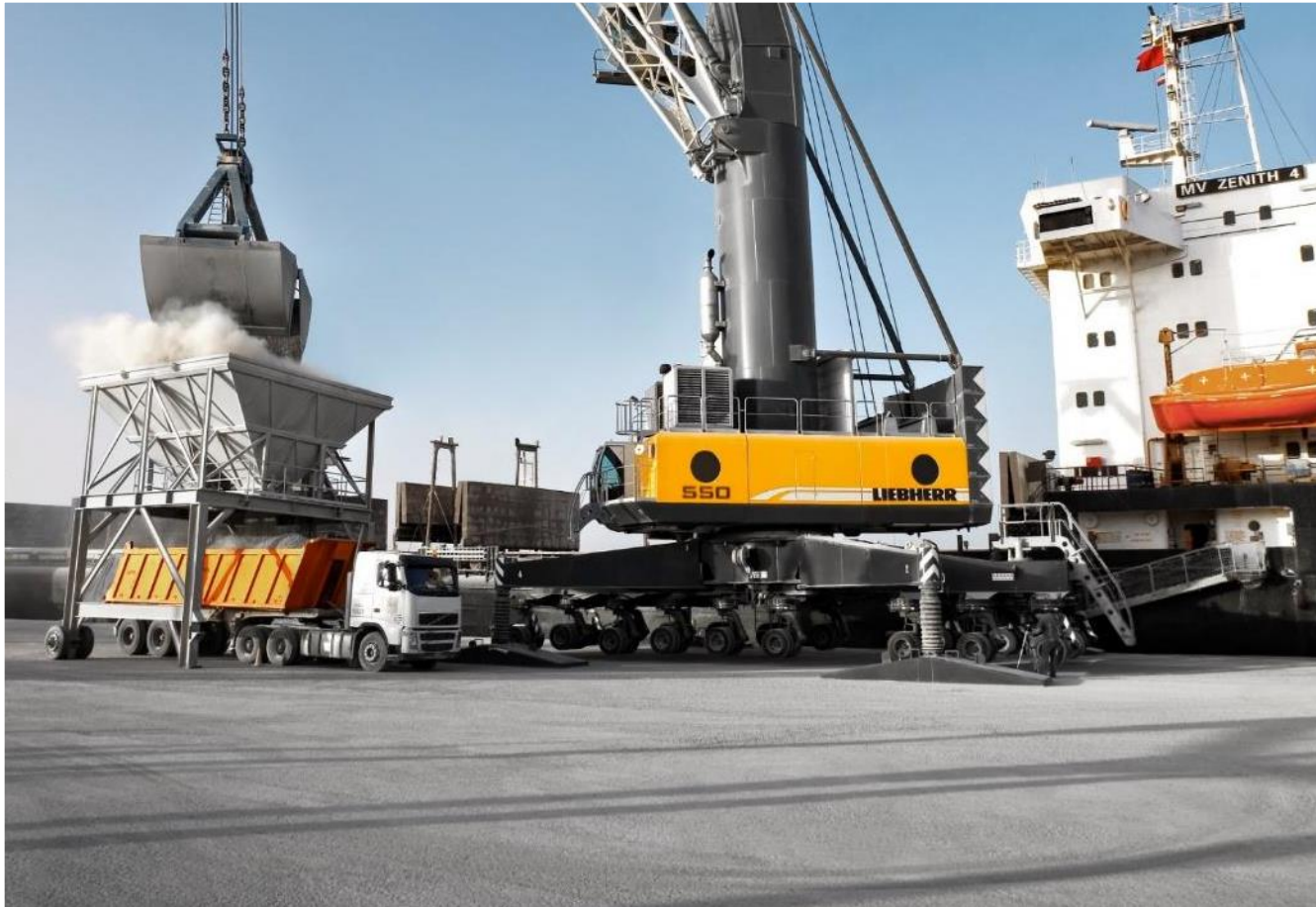


LiDAT[®] smartApp

SmartApp – Leveraging on technologies to increase productivity

LIEBHERR

LiDAT® smartApp Content



- What it is
- Technical description
- Packages
- Business Cases & Benefits

LiDAT® smartApp

What it is

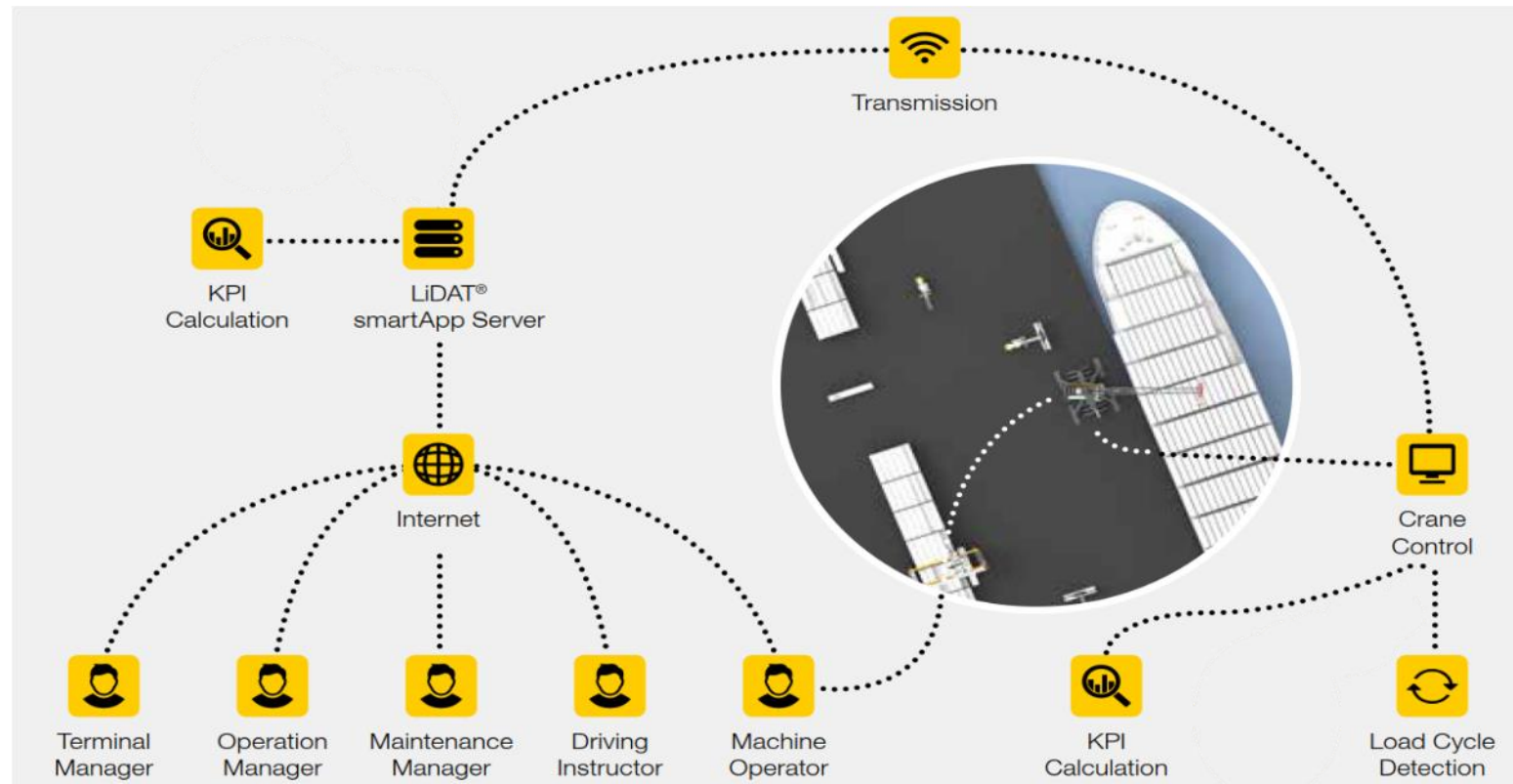
The screenshot displays the LiDAT smartApp interface for a scenario named 'MV Patricia'. The interface is organized into several panels:

- General Information 'MV Patricia':**
 - Machine Type: 4* LHM 550, 1* LHM 600
 - Time Range: from 2018-01-21 08:00 to 2018-01-23 18:07
 - Data Coverage: exact 100%
 - Handled Cargo: sum 114,694 t, count 4,905 cycles
- Operation:**
 - Waiting Time: avg 31 s
 - Wind Speed: avg 4.0 m/s
 - Performance: sum 504 t/h, count 22 cycles/h
 - Operation Mode: main Four Rope Grab
- Optimization:**
 - Waiting Time: sum 18 %
 - Crane Utilization: avg 74 %
 - Hoisting Gear Speed: avg 50 %
 - Load Path: avg 87 m
 - Slewing Angle Path: avg 110 °
 - Luffing Path: avg 19 m
- Location:** A map showing the location of the MV Patricia in the North Sea, near Denmark and Germany.
- Machine Health:**
 - Fuel Level: min of latest 59 %
 - AdBlue Level: min of latest 0.0 %
 - Hydraulic Oil Level: min of latest 51 %
 - Overloads: sum 77 per cyc
- Load Recorder:**
 - Turnover: sum 88,783 t, count 3,316 cycles

- IT-solution for analysing and optimising cargo handling processes
- Optimised for mobile devices
- Real-time overview of the equipment status and the progress
- Significant reports in PDF to download
- Transparency of processes by figures and charts
- Comparability of cranes and processes across locations
- The Optimization Package additionally recommends specific optimisation actions.

LiDAT® smartApp

Technical description



- The relevant data transmitted to the LiDAT® smartApp server
- Authorised users can access and download the processed data via LiDAT® smartApp
- Liebherr handles the setup and support of the transmission link, hosts the data and maintains the software during the active user subscription

LiDAT® smartApp Basic

Scenarios > My scenario

General Information 'My scenario' >

Machine Type	4 * LHM 550
Time Range	from 2018-03-16 13:09 to 2018-03-16 14:09
Data Coverage	at least 100 %
Handled Cargo	sum 998 t count 41 cycles

Operation >

Waiting Time	avg
Wind Speed	avg
Performance	sum
Performance	count
Operation Mode	main Four Rope C

Location >

Machine Health >

Fuel Level	min of latest
AdBlue Level	min of latest
Hydraulic Oil Level	min of latest
Overloads	sum

Overview of four machines:

- LHM 550 - 999001 (Bemelde Ra)**: Latest Timestamp 6 minutes ago, State Working, Operating Hours 6,121 h, Fuel Level, AdBlue Level, Hydraulic Oil Level, Licenses.
- LHM 550 - 999004 (Pösch, Restock, Germany)**: Latest Timestamp 3 min ago, State Working, Operating Hours 5,171 h, Fuel Level, AdBlue Level, Hydraulic Oil Level, Licenses.
- LHM 550 - 999003 (Bemelde Nenzling, Austria)**: Latest Timestamp 8 hours ago, State Working, Operating Hours 7,218 h, Fuel Level, AdBlue Level, Hydraulic Oil Level, Licenses.
- LHM 550 - 999002 (Bemelde Nenzling, Austria)**: Latest Timestamp, State Working, Operating Hours 9,564 h, Fuel Level, AdBlue Level, Hydraulic Oil Level, Licenses.

LiDAT smartApp for demonstration purpose only

Scenarios > My scenario > Operation

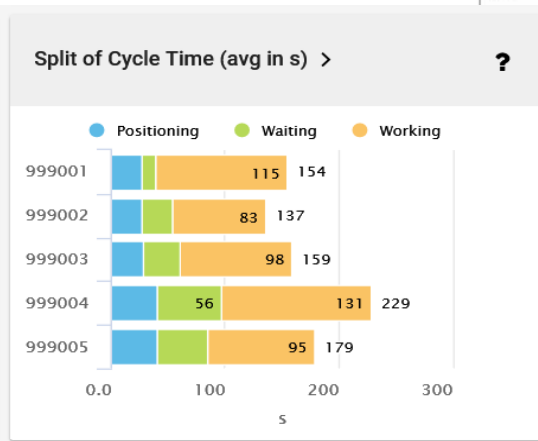
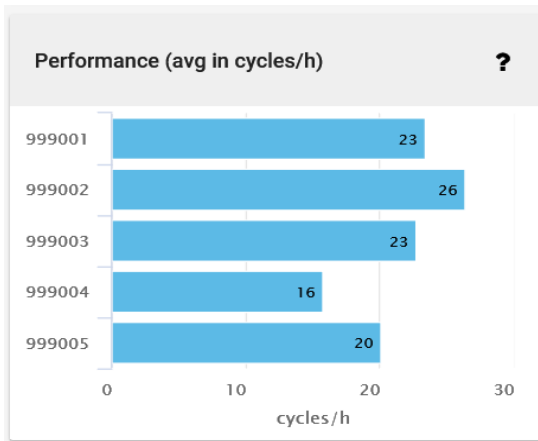
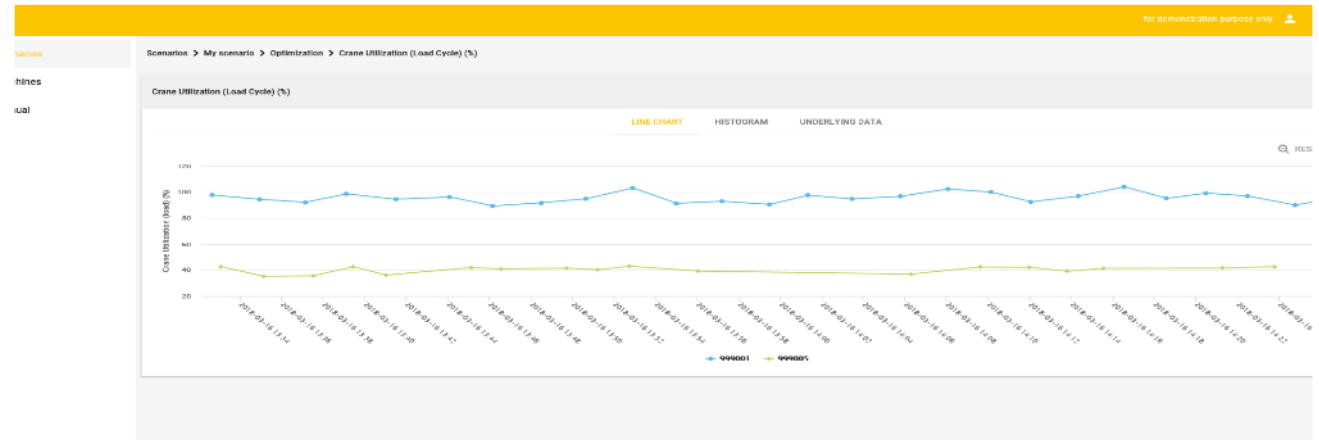
Machines Manual

Handled Cargo (sum in t)	Handled Cargo per Hatch (sum in t)	Performance (avg in t/h)	Performance (avg in t/cycle)
999001: 884	Match 1: 884, Match 2: 884	94%	4%
999002: 884	Match 1: 884, Match 2: 884	11%	1%
999003: 884	Match 1: 884, Match 2: 884	11%	1%
999005: 884	Match 1: 884, Match 2: 884	11%	1%

Handled Cargo (count in cycles)	Handled Cargo per Hatch (count in cycles)	Operation Mode (count in cycles)	Performance (avg in cycles/h)
999001: 25	Match 1: 25, Match 2: 25	Four Rope Grab: 25, Spreader: 14	27
999002: 25	Match 1: 25, Match 2: 25	Four Rope Grab: 25, Spreader: 14	27
999003: 25	Match 1: 25, Match 2: 25	Four Rope Grab: 25, Spreader: 14	27
999005: 25	Match 1: 25, Match 2: 25	Four Rope Grab: 25, Spreader: 14	27

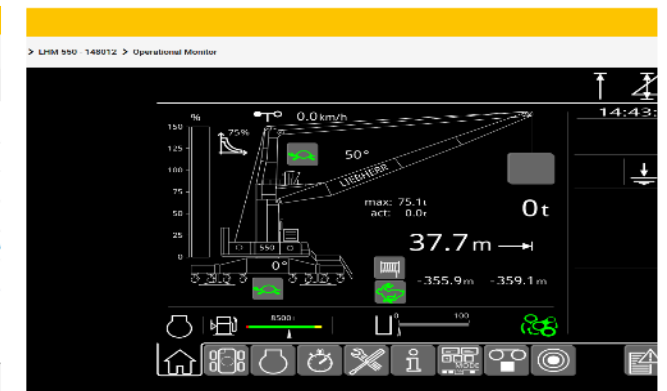
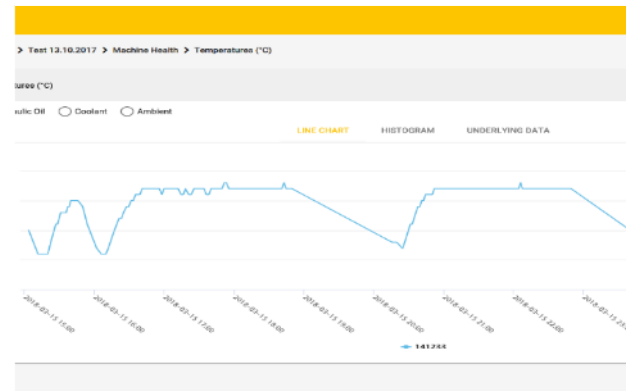
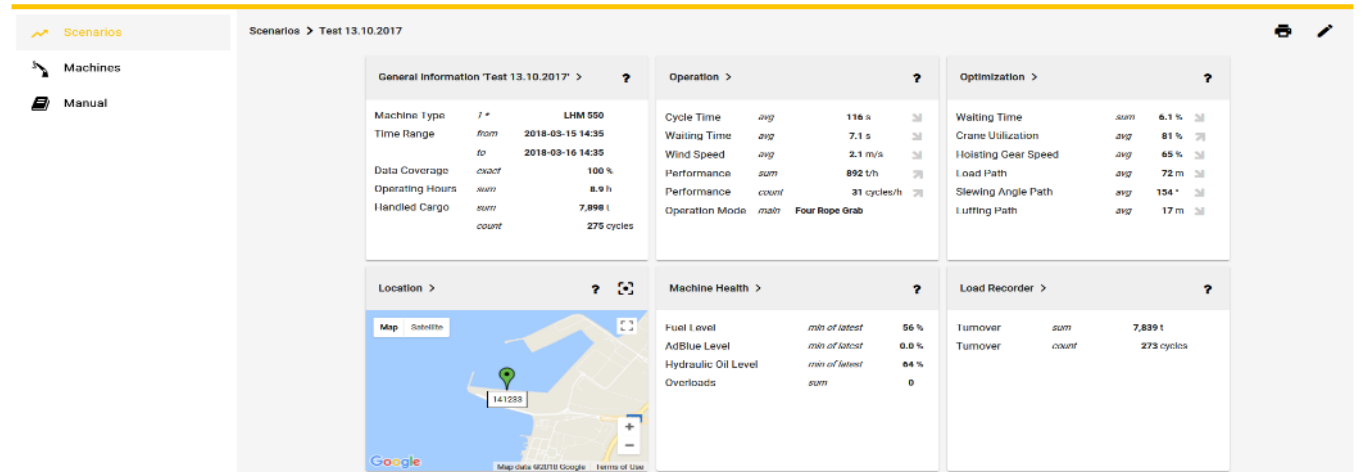
LiDAT® smartApp Optimisation

- Extended dashboard relating to operational and optimisation key performance indicator
- Extended reports relating optimisation key performance indicator
- Load recorder data analysis
- Position Optimizer



LiDAT® smartApp Maintenance

- Display of important operating data (e.g. operation hours, fluid levels)
- Higher machine availability by improved planning of maintenance and fill-up
- Remote support by Operation Monitoring, Crane control display visible via user interface
- Teleservice



LiDAT® smartApp

Package overview

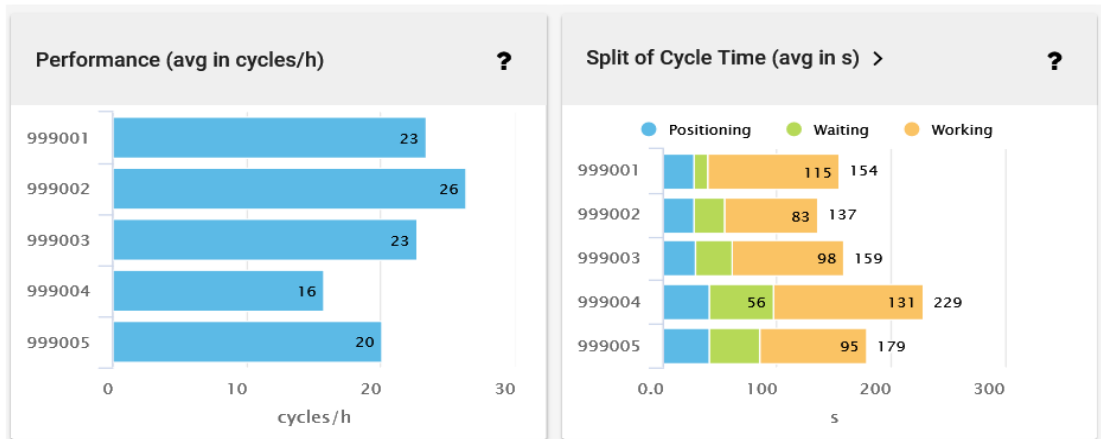
	Basic	Maintenance	Optimisation
Machine Data			
Current Location, Dataset and Environment	◆		
Current Operating Hours and Resources		◆	
Process Data (Scenario)			
General Information (machines, location handled cargo, operation hours, data coverage)	◆		
Machine Health (filling levels, temperatures)		◆	
Operation KPIs (Handled Cargo, Performance, Cycle Time, Wind Speed)	◆		
Operation KPIs (Split of Cycle Time, Handled Cargo per Hatch)			◆
Optimization KPIs (Crane Utilization, Gear Speed, Split of Cycle Times, Load Path, Outreaches, Luffing Path, Slewing Angle Path, Drive Configuration)			◆
Machine Reports			
Dashboard Report (Location, Environment, and Dataset)	◆		
Dashboard Report (Resources and Operating Hours)		◆	
Machine Use	◆		
Machine Logbook	◆		
Safety Report	◆		
Customer Maintenance Planner	◆		

LiDAT® smartApp

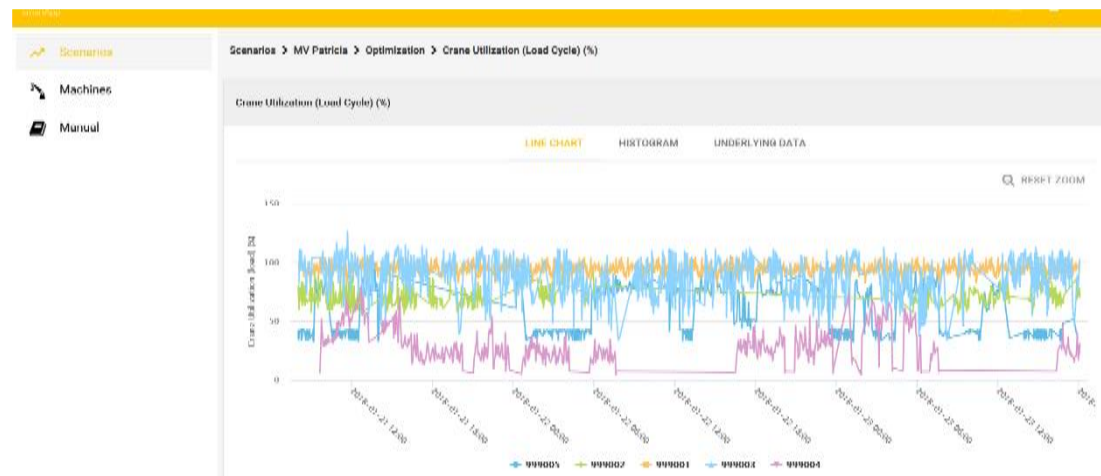
Package overview

	Basic	Maintenance	Optimisation
Process Data Report (Scenario)			
General Information, Operation, Data Coverage, Handled Cargo, Operating Hours, Operation Mode, Performance, Wind Speed, Cycle Time	◆		
Machine Health		◆	
Optimization (Split of Cycle Time, Handled Cargo per Hatch, Crane Utilization, Gear Speed, Load Path, Luffing Path, Slewing Angel Path, Drive Configuration, Outreaches, Turnover per Hatch)			◆
Features			
Operation Monitoring		◆	
Load Recorder			◆
Teleservice		◆	

LiDAT® smartApp Business Cases and Benefits



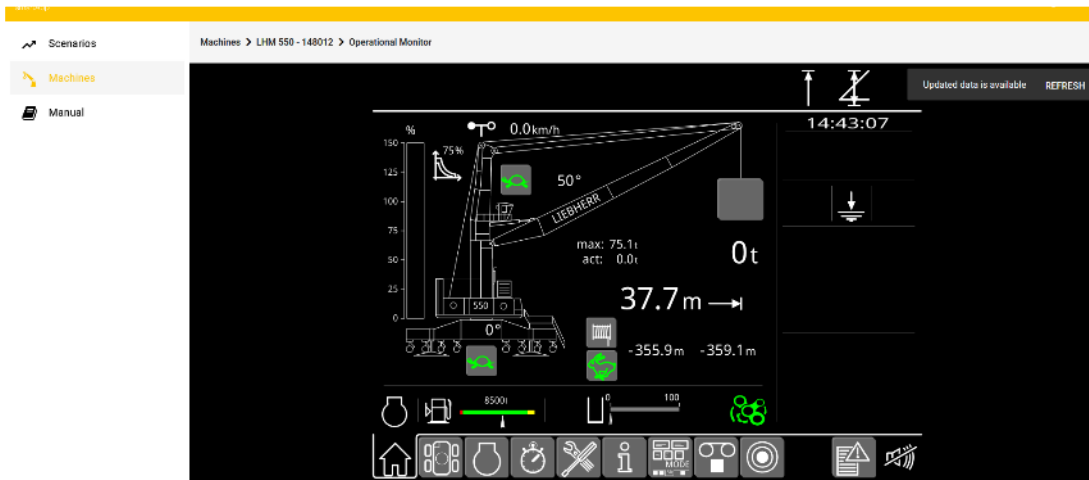
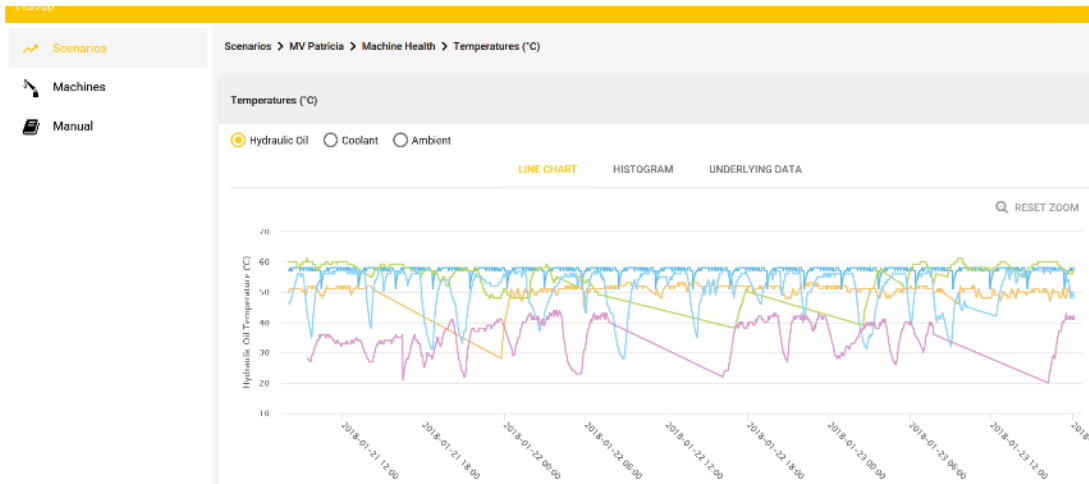
Comparison: Direct comparison of multiple cranes during definable time periods with the feature „Scenario“



Analysis: Detailed analysis of cargo handling process in real-time.

LiDAT® smartApp

Business Cases and Benefits



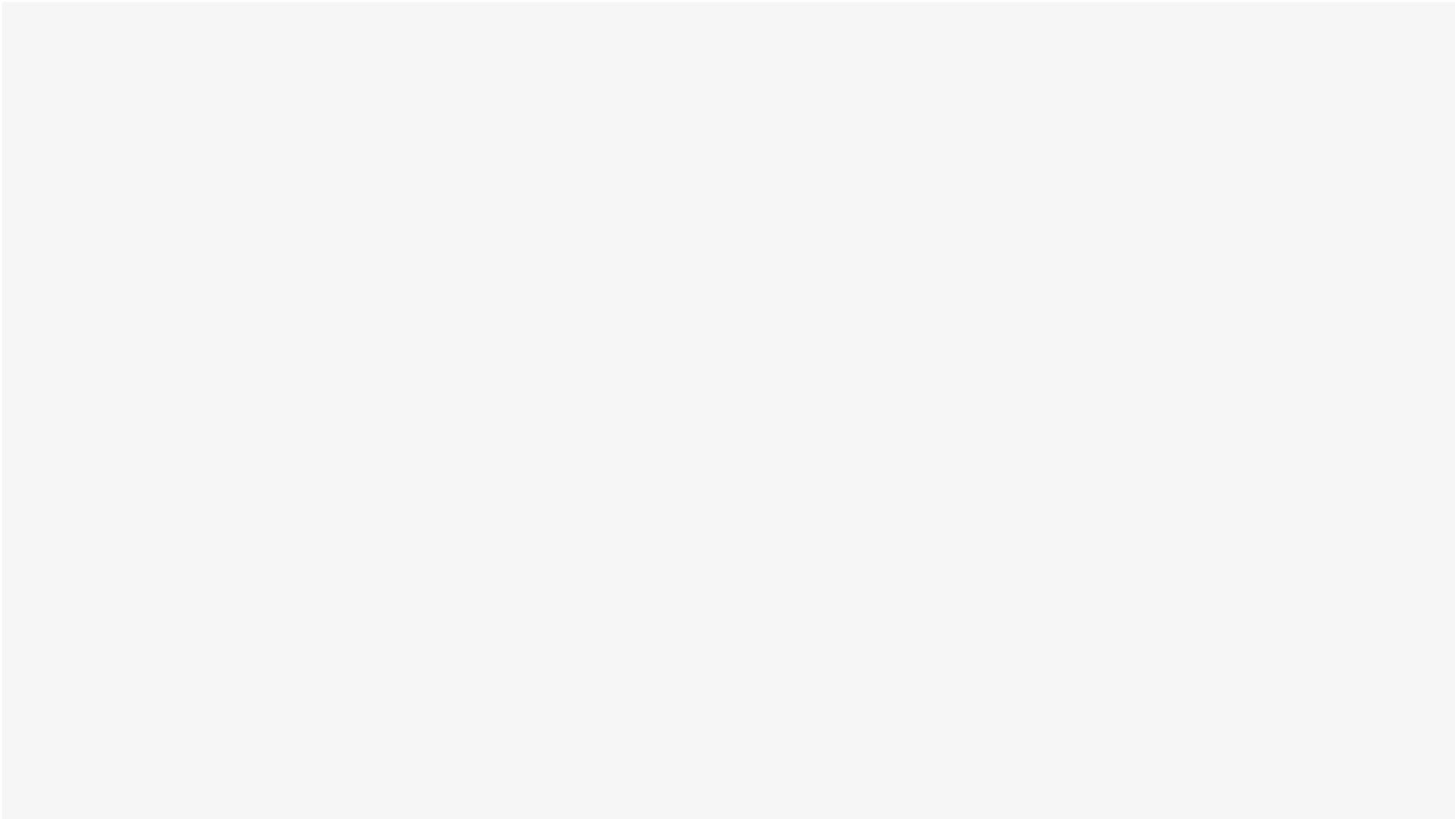
Tracking: Comprehensive, informative data collection on process and machine status



Direct access: Information obtained directly from crane control system rather than from external sensors



Web app: Intuitive web application, available for different devices





***Thank you for your attention
Booth 11***