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→ Making innovations work



GOTTWALD
port technology 



New horizons

Generating new momentum

To Gottwald, innovation means applying new ideas, the latest developments and state-of-the-art technologies to new products and services that generate added value. As a result, Gottwald has become a byword for innovative products and services for solving materials flow and logistics issues in ports and terminals. Our product range includes cargo-handling equipment from Harbour Cranes and automated solutions for container transport and storage through to software and consulting.

Innovation means staying ahead

Gottwald Port Technology GmbH, a subsidiary of Demag Cranes AG, feels duty bound to maintain the company's innovative and technological leadership position relating to cargo handling in terminals. We pursue an uncompromising policy of continuous development and improvement because solutions for increasing the efficiency of cargo handling require a steady input of new, practically orientated technologies.

Focus on innovation

Two key areas attract particular attention at Gottwald:

- state-of-the-art drive concepts
- technologies for optimising applications

with regard to the specific work processes performed by cargo-handling machinery.

With its innovative products and systems, that have been instrumental in consolidating this company's position in the world market and amongst its customers, Gottwald is continually generating new sustainable momentum.



Hybrid drive for Mobile Harbour Cranes – just one example of innovative Gottwald technology: winner of the International Bulk Journal's IBJ Award 2010 in the "Innovative Technology (Cargo Handling)" category



The electric drive concept used in Gottwald's Mobile Harbour Cranes permits energy-efficient hybrid drives which combine the on-board diesel generator with an energy recovery system



Hybrid drive for Gottwald Mobile Harbour Cranes

Improving energy efficiency



Gottwald uses electric drives for its entire product range, which guarantees best possible efficiency and ecologically compatible operation. Where Mobile Harbour Cranes cannot be powered from the terminal mains, the electric drives used on board the cranes allow the use of energy-efficient hybrid drives.

Two sources of energy

Power is generated by the on-board diesel generator which is combined with electrostatic short-term energy storage as the second energy source. The hybrid drive considerably improves energy efficiency:

- the energy recovered from the cranes' braking actions is stored
- this energy is then made available to the crane's power system for the next work cycle.

The result:

- fuel savings of up to 23.2%*
- improved exhaust levels and smoother running diesel generator.

Energy from storage media

The working cycles of Mobile Harbour Cranes, the typical discontinuous lowering, hoisting and slewing actions coupled with the corresponding acceleration and deceleration motions, require the energy storage medium to store power quickly and also release it quickly when needed.

This is why Gottwald uses electrostatic wear and friction free double-layer capacitors (Ultracaps) as the short-term storage medium. The sturdy high-performance components:

- store the energy as electricity, which provides a high degree of efficiency
- are rated for up to 3 million recharge cycles, making them very durable
- have high power density, which is what Mobile Harbour Crane operation needs.

Dynamic brake resistors

To complement the energy recovery system and to cope with situations in which the energy returned to the crane's power system is not immediately required, Gottwald also fits dynamic brake resistors. This system means that, today, far less excess energy is converted to heat than with earlier systems. The result:

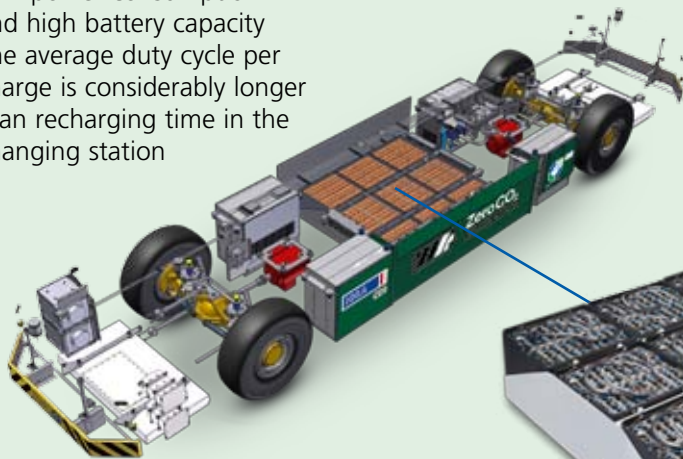
- fuel savings of up to 15.2%*
- considerably improved energy management.

*Achieved under specific deployment conditions and based on experience gained from operating a Gottwald Generation 5 crane over a period of more than one year.



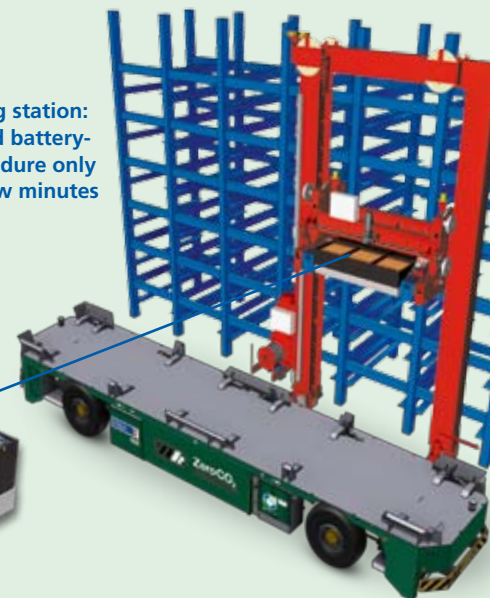
Battery powered drive train:

- Low power consumption and high battery capacity
- The average duty cycle per charge is considerably longer than recharging time in the changing station



High-performance, fully recyclable lead batteries are used to power the AGV

Battery changing station:
the automated battery-change procedure only takes a few minutes



Taking a load off the environment, lowering operating costs



Exhaust free, economical drive technologies are at the focal point of research and development work today. And with good reason: as the costs of fossil fuels increase, so do the environmental pollution requirements. It was against this backdrop that Gottwald developed battery powered drives for AGV Automated Guided Vehicles.

The concept

High-performance battery cells replace the diesel engine, generator and ancillary equipment of a conventional AGV, which considerably simplifies the drive train. To enable automated changing, the battery cells are stored in a change-frame slung below the container platform of the Battery AGV. The fully-automated battery changing and charging station is included in the development.

Eliminating exhaust fumes

The battery-powered drive reduces local exhaust emissions to zero. The batteries can, of course, be recharged using electricity generated from renewable sources. In addition, noise levels are significantly cut.

Minimising operating costs

Assuming the current level of fuel and electricity prices, the operating costs for a fleet of AGVs can be radically reduced. This can be achieved thanks to the high efficiency of the system and extremely low energy requirements when the vehicle is at a standstill.

Outlook for the future

Gottwald's Battery AGV concept can equally well be applied to other mobile cargo handling machines – whether in terminals or other locations. Excellent prospects for a technology that is not only efficient but also clean.



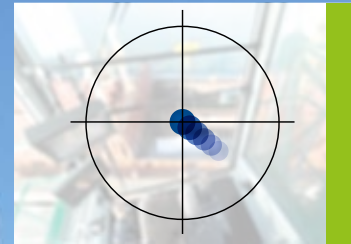


Rope inclination sensors automatically guarantee that the ropes are positioned exactly vertically above the load

The Vertical Lift Assistant is especially useful when the crane driver does not have a clear view of the load



The Visumatic® crane management system enables the crane driver to monitor the Vertical Lift Assistant visually



The Tandem Lift Assistant enables safe lifts with the full capacity of both cranes up to 400 t

Gottwald Lift Assistants

Handling loads safely



Handling heavy, large or bulky loads, such as the components used in the wind turbine or heavy plant industries, is increasing worldwide. By introducing the smart control systems Vertical Lift Assistant and Tandem Lift Assistant, Gottwald has developed its Mobile Harbour Cranes to meet the ever more demanding needs of these applications.

The Assistants increase accuracy and safety during moves and enable the full rated hoisting capacities of the cranes to be exploited during tandem lifts.



Outsized cargo require tandem lifts

Vertical Lift Assistant

The Vertical Lift Assistant provides support for the crane driver as it monitors individual hoists. With the aid of sensors at the tip of the boom, the control system ensures automatically that the ropes are positioned exactly vertically above the load.

This results in the prevention of sway as the load is lifted off the ground which, in turn, reliably prevents damage to extremely valuable components.

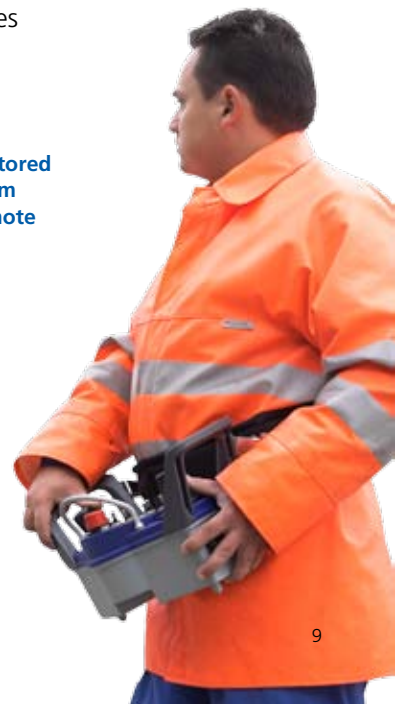
Tandem Lift Assistant

The computer controlled Tandem Lift Assistant guarantees that the hoisting actions of the two Mobile Harbour Cranes are perfectly synchronised.

This system enables compliance with ISO 12480-1 (Cranes – safe use) and does not require lifting restrictions to be applied, as is often the case. Crane owners benefit from the unrestricted lifting capacity of both Gottwald cranes; so even very heavy loads weighing up to 400 tonnes can be dealt with.

The Tandem Lift Assistant consists of the Vertical Lift Assistant and a special safety and monitoring control system. This sophisticated technology compensates for such risk factors as unequal loads on the two cranes, lateral pull, overturning moment or differences in speeds.

Tandem lifting only needs to be monitored by one single crane driver – either from inside one of the crane cabs or by remote control from the ground





The measuring transducers for the weighing system were fitted to the modified boom head of the crane by Gottwald

Weighing range: up to 63 t
(static single load)

Accuracy: 0.25%
(automatic use when handling bulk)



Verifiable weighing system for Gottwald Harbour Cranes

Direct weighing



In the bulk handling industry, it is essential to be able to record reliably the quantities handled by means of weighing, to enable realistic invoicing. This is frequently effected by means of officially verified weighing systems integrated in hoppers or belt conveyors. The drawback is that this equipment cannot always be integrated in the handling process, where handling is ship-to-ship, for example.

Gottwald has now developed an officially verifiable weighing system that allows the bulk materials to be automatically weighed directly on the crane during the handling process.

Transparent weighing process

A special terminal in the crane cab displays the current weight and, in compliance with weighing laws, stores

it long-term in a tamperproof manner. This enables the necessary weighing documents to be printed directly.



The system has been approved by the German Physical Laboratory (PTB)



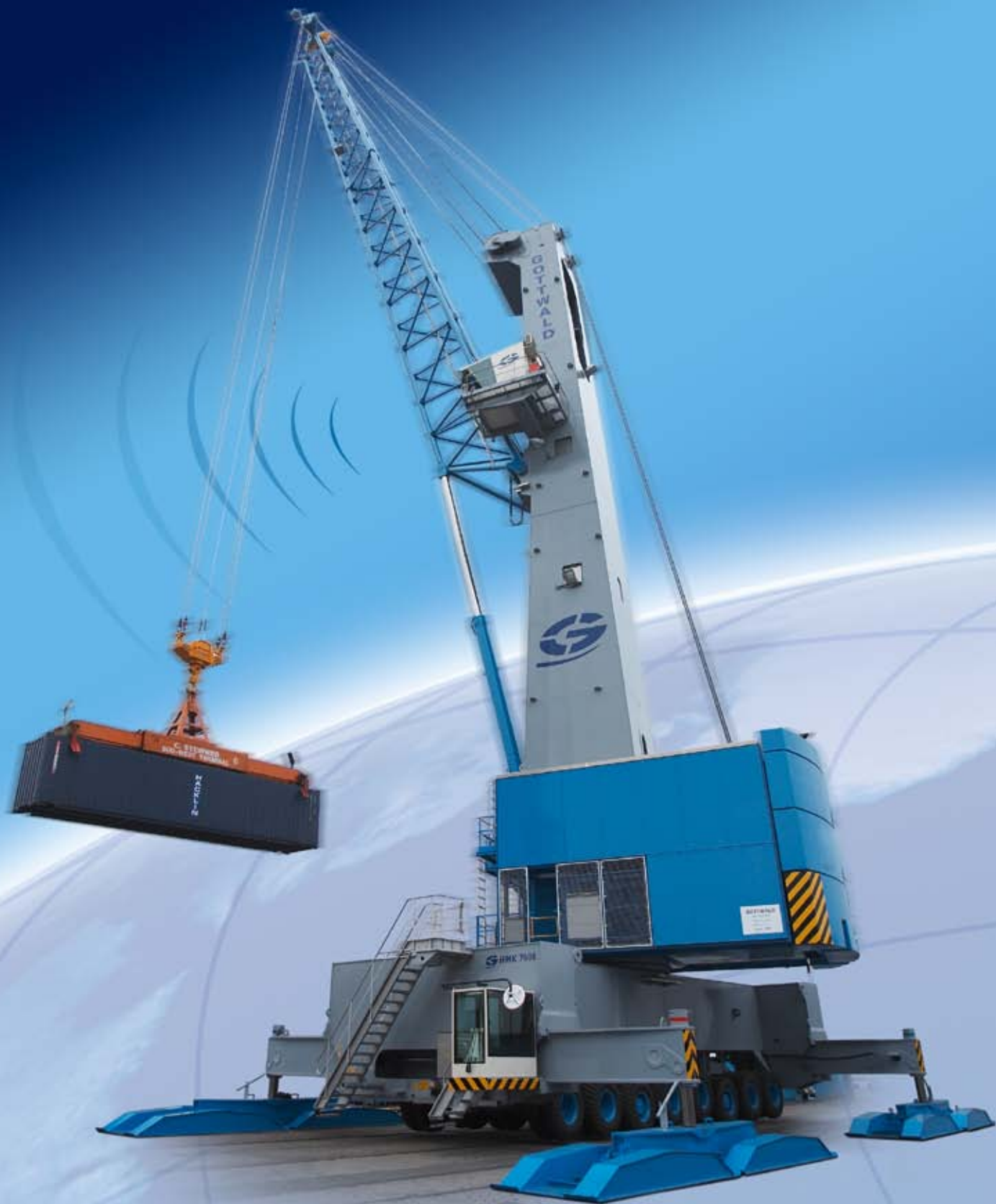
Additional work steps for the weighing process, e.g. with hoppers, are not required with Gottwald's load weighing system

Verified load measurement

The special design of the load weighing system, in conjunction with additional sensors and specifically developed algorithms, enables such factors as acceleration and frictional forces or vibrations to be eliminated.

The accuracy achieved by the Gottwald load weighing system as a result complies with OIML R 107-1* (Filling and Discontinuous Totalising Automatic Weighing Machines), accuracy category 0.5.

*In Europe and many other countries, this approval is based on guidelines issued by the International Organisation of Legal Metrology (OIML)



Brief overview of the information and diagnostics system

- Web reporting: direct access to production and diagnostic data
- Remote desktop: saves time in maintenance and monitoring for the customer
- Remote assistance: allows rapid support from the manufacturer
- Further expansion stage with additional control hardware: enhancement of productivity through comprehensive, user specific diagnostics and analyses as well as direct link to other IT systems

Gottwald's information and diagnostics system

Increase availability, maximise usage



To improve the productivity of the logistics chain even further, terminal operators are increasingly interested in:

- direct access to production data
- transparency as regards the operating status of cargo handling machines
- rapid support by the manufacturer.

The answer is Gottwald's information and diagnostics system which provides customers with enormous potential for increasing efficiency through the intelligent use of data.

Networked Mobile Harbour Cranes

By implementing internet links throughout our product range, we have created a solid platform for our information and diagnostics system.

Even freely mobile cargo handling machines, such as Mobile Harbour Cranes, can be just as reliably linked to a broadband cellphone based internet connection. And, as regards the security of data, Gottwald's IT specialists have created solutions to prevent unauthorised access.

Intelligent use of data

The crane driver, service staff, maintenance and repair teams, production staff, logistics and management – each target group requires different sets of data to enable them to do their job properly – tailored to their tasks, always available and in the right format. This is exactly what Gottwald's information and diagnostics system does, which enables customers:

- to boost machine availability
- to optimise processes
- to increase safety.

Open system

Gottwald's information and diagnostics system is an open system, which allows not only several Harbour Cranes but also other mobile or stationary terminal machines to be linked – worldwide and irrespective of the manufacturer, provided the technical infrastructure exists. Status, production and operating data are visualised across locations almost in realtime, analysed, interpreted and immediately processed.



Focus on value to the customer

Generating success



We rate our own success by the success achieved by our customers, which is why we focus on integrating added value for the customer as we develop our products.

We then implement it through competitive solutions and flexible handling machines to enable economical and, at the same time, environmentally aware operation.

Think ahead

Develop, try, analyse, realise, optimise. Gottwald treads the path from the initial idea through to the market launch of its innovative products while pursuing a policy of partner-like exchange of ideas with its customers. This mutually beneficial, continuous process leads repeatedly to convincing results – from detailed individual solutions to entire systems.

Consolidating continuity

As the technological leader in Mobile Harbour Cranes and pacesetter in terminal automation, we never cease to exploit the potential for optimisation of systems, products and their drive concepts.

Terminal owners benefit from the best innovations we have to offer not only when they invest in new equipment, existing handling machines can often be retrofitted and brought up to the current state of the art.

In this way, we at Gottwald ensure that continuous technical innovation also benefits Gottwald products that have proven their worth in daily use over many years.



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