KONECRANES®
Lifting Businesses™

Low Emission Concept

WHEN LESS IS MORE

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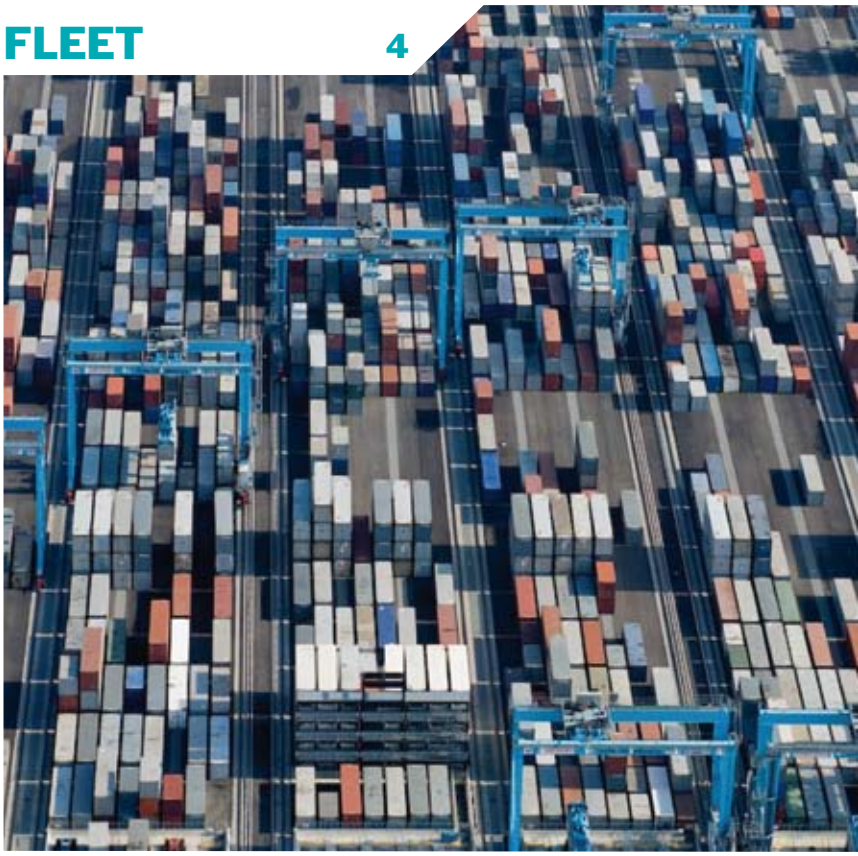


MORE THROUGHPUT – LESS EQUIPMENT

The most effective way to cut emissions is to constantly match the fleet size to your operations. This means that you mobilize only the minimum number of the most effective equipment needed.

To increase your yard throughput you need to make sure the equipment is always in the right place at the right time. In order to reduce the non-value-added activities that cause excessive fuel burn, you need to know how your fleet navigates while performing the tasks.

CONTROL YOUR YARD

The position of the equipment and containers must be known before starting to streamline the fleet's routing. Konecranes utilizes patented technology for the most accurate and real-time equipment location control. Dual antenna based DGPS system is used with yard cranes and sophisticated RAAS technology with reach stackers and straddle carriers. Coverage of the entire yard and container-handling fleet yields the maximum benefit from the system. Konecranes Positioning System can be also retrofitted to all brands. This same system is used for determining the location of the containers in the yard.

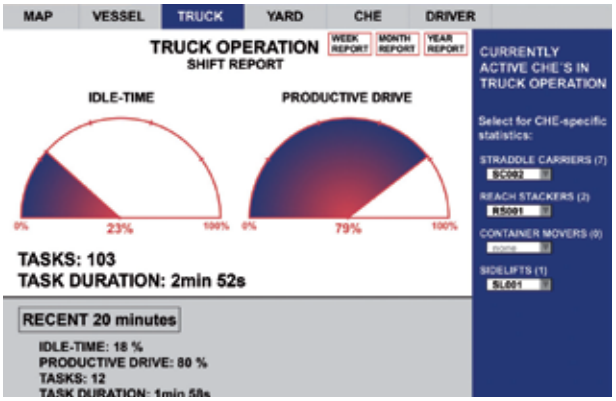
The system can provide various key metrics over a selected time period and can alert the operations staff of potential slowdowns and idling.

MAXIMIZE PRODUCTIVITY, REDUCE EMISSIONS

The objective is to minimize redundant driving and to maximize the efficiency and productivity of the equipment fleet. In other words, to reduce any redundant activity – and that, in turn, translates to a direct cut in emissions.

It's not only about doing the tasks right, but doing the right tasks.

CAN BE APPLIED TO ALL TYPES OF CONTAINER HANDLING EQUIPMENT



Example screen shots from CHE monitoring and positioning systems.

Dual Antenna System for fast recovery and better accuracy.

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WORK FASTER – LESS POWER

THERE ARE SEVERAL FACTORS CONTRIBUTING TO EQUIPMENT ENERGY CONSUMPTION

NO HYDRAULICS

Eliminated hydraulics means reduced back power consumption due to effective non-hydraulic pumps.

This has been the case with all Konecranes RTGs since 1995.

FAST LOAD POSITIONING

There is no need for “inching” when your crane is equipped with a good load positioning system. A great deal of energy is saved when the driver doesn’t need to move the whole crane or trolley when positioning the load.

Konecranes RTG incorporates the market’s most efficient horizontal fine-positioning feature. The container can be picked by moving the spreader within a mere 30-cm radius from the target.

WEIGHT OF THE EQUIPMENT

The Konecranes trolley is equipped with intelligent solutions eliminating the need for separate machinery. The trolley structure is light, yet stable and robust.

INTELLIGENCE IN THE BASIC DESIGN

Several functions in Konecranes’ products are designed to use no universal shafts, chains, or belts, and that means lower energy consumption and fewer spare parts. All the motors in yard cranes, for example, are directly connected either to the gantry or to the trolley traverse gear boxes.

DEDICATED DRIVE SYSTEM

Generic, all-purpose electric drives typically don’t take into account the unique torque pattern required in lifting operations. Konecranes’ electric drives provide immediate response times and highest speeds with lower power requirements. Optimizing the use of power results in reduced energy consumption.

SAVE 150,000 LITERS OF HYDRAULIC OIL

- Hydraulic Oil for Anti Sway (530 l)
- Hydraulic Oil for Wheel Pivoting with RTGs (800 l)
- Hydraulic Oil for Head Block Slew (200 l)
- Change Interval 1,000 hours
- Equals Eliminated 7,500 liters of Hydraulic Oil Every Year* (And No Oil Leakage)
- Oil Savings Alone Equals ~150,000€ with 8% NPV and ~300,000€ with 0% NPV*
- Cost Savings from Eliminated Hydraulic Spares Equals: ~ 100,000€ with 8% NPV and ~ 200,000€ with 0% NPV*

TOTAL SAVINGS OF ~250,000€/RTG
in investment with 8% Net Present Value*

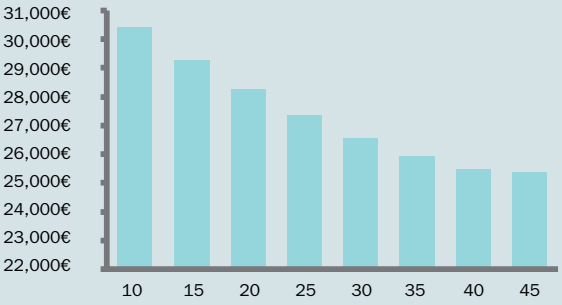
*20-year life time, 5,000 hours operation, hydraulic oil price 2€ / L assumed. No labor and maintenance downtime costs included.

KONECRANES FUEL SAVER (RTG)

In close collaboration with diesel engine manufacturers, we have developed a fuel-saving system for RTGs that yields fuel savings of up to 25-30%. The Konecranes fuel-saving system optimizes the efficiency and the fuel consumption of the diesel generator by adjusting the engine's RPMs according to the actual power requirement. The diesel engine is driven with optimal efficiency at all operating points, eliminating high-speed idling, completely and guaranteeing constant, full-scale productivity. Finally, crane performance is not compromised with Konecranes Fuel Saver; standard speeds still apply.

SAVE TRUCKLOADS OF OIL WITH FUEL SAVER

Annual savings*
(25-ton containers, 5,000 op. hrs/year)

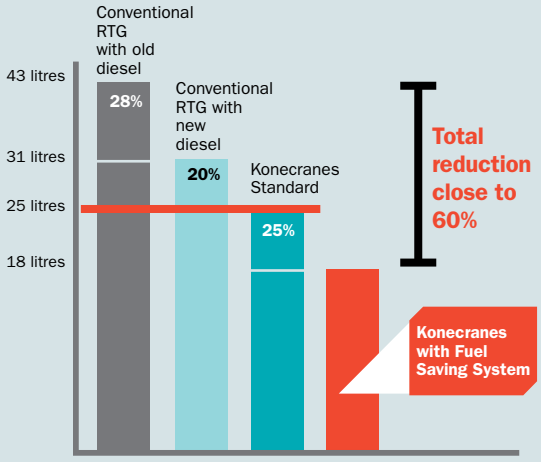


*With standard high-speed specification

Saving 103 liters/day
= 37,600 liters/year
Fuel price 0.8€/liter

SAVING:
80€ / DAY
29,200€ / YEAR

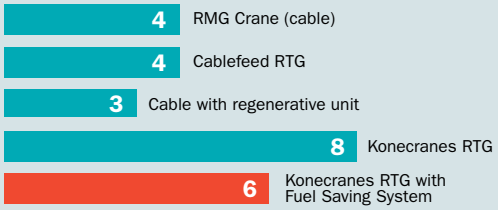
RECOGNIZE THE BENCHMARK



Indicative oil consumption in heavy operation
(25 containers per hour, 40 ton lifts)

ENERGY TO BE PURCHASED

kWh per cycle (Tier II machine)



Tier III diesel engine adds up to 20-25% oil consumption

Indicative oil consumption in heavy operation
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MORE POWER – LESS FUEL

When producing energy, large units have a better efficiency ratio than small ones, such as a combustion engine, and burning fossil fuels is not the only option for generating the energy needed in RTG yard operations. Konecranes has developed a method enabling RTG container handling with energy taken from the electric network grid, where it is produced economically in power plants that take advantage of economies of scale. With the help of DGPS, the benefits of an RMG can now be applied to RTGs also.

NEW ELECTRICITY-FED CRTG

cRTG, the new electricity-fed RTG by Konecranes, is equipped with a cable reel, a feeding cable and a transformer station, which feeds low-cost electricity from the grid to the crane. Using energy through the cable, the crane can be operated on one stack, and the feed point can be either at one end of the operating area or at the center.

The travel distance is dependent on the supply voltage. An operation area of up to 730 m can be reached if the feed point is at the end of the stack, or up to 1,460 m if the feed point is in the middle point of the stack.

MOVING BETWEEN STACKS

To move the cable-reeled cRTG crane between stacks, the feeding cable is connected via a plug and a receptacle, and an auxiliary diesel generator unit is used.

The generator generates enough energy to turn the wheels and drive the crane from stack to stack. Both trolley and low-speed hoist operations are available. Once the crane is in its new position, the electrical power feeding is connected and switched on again.

REGENERATIVE BRAKING

Using energy from the electric network is not the only thing that the Konecranes cRTG crane is capable of. Just like the RMGs, it can also act as a small power plant, taking the electricity generated during braking action and feeding it back to the grid. Thus, braking energy is not wasted. The terminal benefits from it because, ultimately, less energy from the power station is needed.

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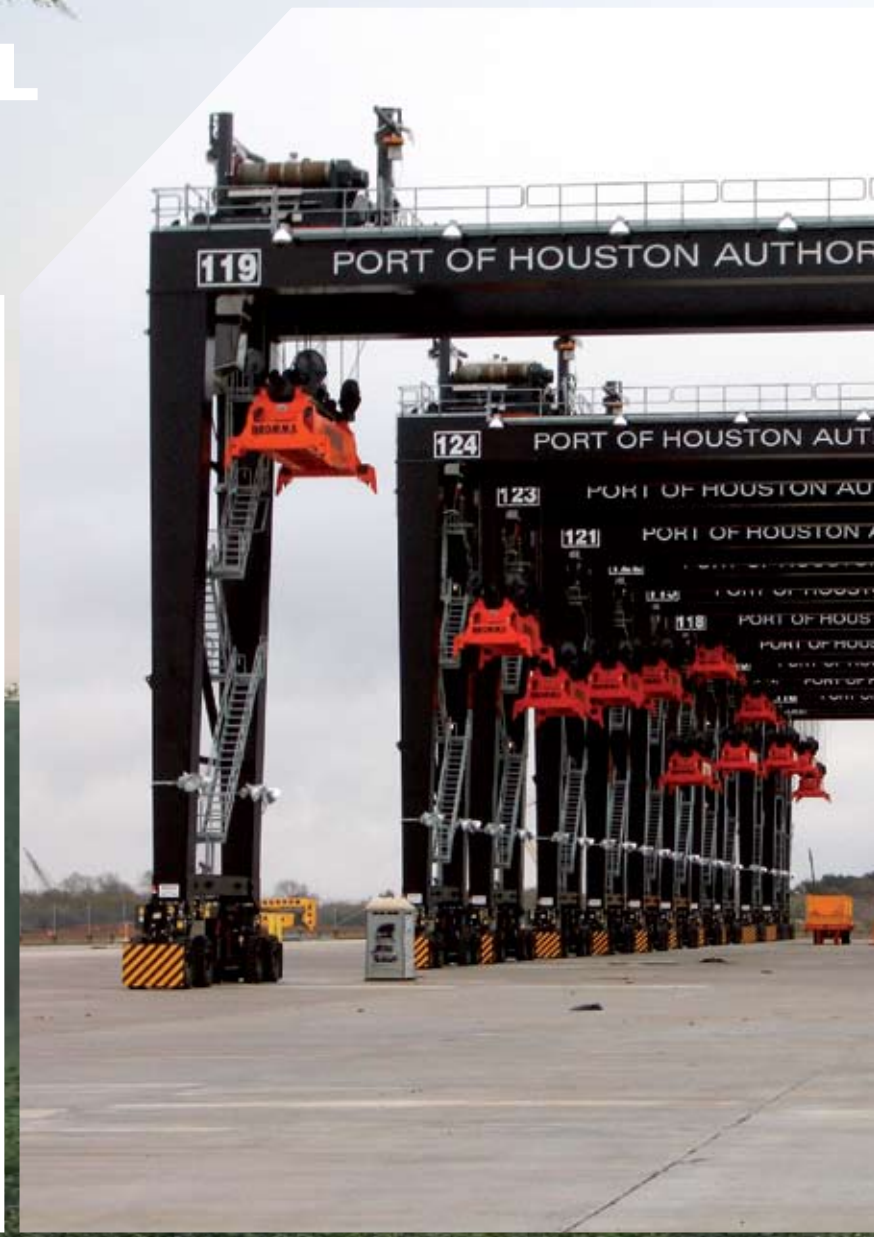
MORE ENVIRONMENTAL CREDITS – LESS EMISSIONS

Emissions control is a vital part of the crane design and manufacturing process. International legislation is leading the way, and our operations are governed by the off-road emissions regulations, which will become stricter over the next years.

The European Stage III B directive and the Tier 4 limit in the USA will require that exhaust after-treatment systems be installed in all machinery sold in Europe and the USA. Konecranes has delivered catalytic converters in its cranes for a number of years because they are very effective in filtering out particulate matter from fuel exhaust gases. This means we are prepared for future regulatory demands – and beyond. Efficient emissions control using the latest purification technologies is a top priority for us.

SCR (selective catalytic reduction) solutions allow ca 80% NOx reduction. Also possible for retrofit purposes with certain limitations. Ask more information from www.konecranes.com/portcontact



RANGE OF THE MOST EFFICIENT AFTER TREATMENT SOLUTIONS FOR KONECRANES RTGs

DOC Diesel-Oxidation Catalyst
PM 20-30% reduction

pDPF Partial-DieselParticulate Filter PM 30-60% reduction

DPF Diesel-Particulate Filter PM >90% reduction

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INDUSTRIAL CRANES


NUCLEAR CRANES


PORT CRANES


HEAVY-DUTY LIFT TRUCKS


SERVICE


MACHINE TOOL SERVICE

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 and machine tools of all makes. In 2009, Group sales totaled EUR 1,671 million. The Group has 9,800 employees at 545 locations in 43 countries. Konecranes is listed on the NASDAQ OMX Helsinki Ltd (symbol: KCR1V).

SET FOR TOMORROW

Konecranes continues developing the sustainability of its lifting equipment by, for example, improving the design of cranes and crane components, and by enhancing software for fleet management. Maintenance is a crucial part of the whole package for the equipment to function efficiently.

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