Port & Terminal Technology 2018 | 10th International Conference & Exhibition

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Agenda

- Horizontal Transportation
- Yard Cranes
- Automated Terminals
- Conclusions





Eco-efficiency Becentier a standard in cargo handling operations.

Need to reduce emissions and noise in the port.

- Environmental legislation for CO₂ and NO_X
- Economic drivers
- Local pressure groups





Emissions at container terminals.

Average breakdown of emission sources in a container terminal.







Emissions at container terminals.

Typical means to reduce air emissions produced by container handling equipment







Terminal Tractors



Electric Terminal Tractors

- Lower your environmental impact.
- Improved driver experience due to less noise, vibrations and fumes, making it safer to operate indoors and out.
- Advanced battery technology to meet duty cycles.
- Eco-efficient electric terminal tractors will save you money, enhance your businesses reputation and prepare you for a low carbon future.





Straddle/Shuttle Carriers

The future is here, now...



Hybrid solutions

- Approx. 80% of straddle carriers currently deployed worldwide are diesel-electric machines
- Hybrid systems account for a significant portion of new units sold, and are rapidly becoming the default choice for terminals
- Hybrid machines typically operate on battery power with their engines switched off up to 30-40% of the time.
- The most efficient hybrid straddle carriers on the market consume up to 40% less fuel than diesel-powered models, and emit on average over 50 tons less CO₂ per year.





Measured results from Virginia, 3 Hybrid Straddle Carriers

50% Reduced Fuel consumption

- Machine 1: 10.25 l/hr (2.7 gal/hr)
- Machine 2: 9.33 l/hr (2.5 gal/hr)
- Machine 3: 9.66 l/hr (2.6 gal/hr)

Reduced maintenance

 These machines have on average ~3000 hybrid hours, while the engine hours are at ~2000. So there has been 2 PM services instead of 3. In US 1000 hour maintenance cost is around \$3000 labor and \$2000 parts

Performance

 Hybrid machines perform as part of fleet with no difference in container moves/hour





Fast Charge – Fully Electric

- Fully electric equipment decreases noise levels and enables eco efficiency.
- The latest generation of horizontal transport equipment includes fully electric straddle and shuttle carriers,
- The fast charge technology enables charging at idle times during the equipment work cycle





Kalmar FastCharge™

- Industry first fully electric machine with fast charging capability
- Locally emission free
- High machine availability through flexible charging sequences
- Digitalization brings huge potential in overall energy efficiency





Yard Cranes – RTG's

Note: ASC (and STS) not discussed since they are always fully-electric powered



RTG Electrification

- Rubber-tired gantry cranes (RTG's) are the most popular equipment choice for container stacking. With a global installation base of some 8,000 machines, approximately 60% of the world's container terminals use RTGs.
- RTG electrification is a major trend at container terminals worldwide.
- In addition to cost savings due to reduced fuel consumption at the terminal, RTG electrification significantly decreases emissions on-site.
- The two major options for RTG electrification are bus bar and cable reel systems, each with their own pros/cons.





Hybrid solutions

- Approx. 90% of RTG's currently deployed worldwide are diesel-electric machines
- Hybrid systems account for a significant portion of new unit discussions and future planning.
- No infrastructure changes required.
- Retrofit is possible.
- Hybrid machines operate on battery power with their engines switched off typically up to 40-50% of the time.
- The most efficient hybrid RTG's on the market consume up to 60% less fuel than diesel-powered models.





Fully-electric battery powered RTG's?

- While the concept seems promising, we still need battery technology to further develop
- Is Fast Charge a viable option for RTG's?
- Infra-requirements could limit this potential (massive power requirements)
- Perhaps it will be here sooner than we think...
- Integration of 5G and proprietary WLAN system make hybrid-battery and fully-electric battery powered RTG's much more attractive, especially for terminals considering/planning for future automation.





Equipment Automation

What role does Automation play in the electrification of container terminals?



Equipment Automation reduces emissions

- Automation reduces fuel consumption and therefore also emissions – by removing inefficiencies and optimizing fleet sizes.
- Automated equipment is always driven optimally, which saves fuel, reduces emissions and contributes to extended equipment lifespans.





Conclusions / Final Thoughts

Where do we go from here?



What does the future hold?

- The future is here, now, in Horizontal Transport
- The future is nearer than we might think on the yard crane side of the business
- Full ROI needs to be looked at (not just fuel & maintenance)
- How does wireless technology accelerate us?
- Can we really eliminate diesel?
- Can we implement standards in electrification?
- How does automation accelerate electrification?
- Can we become more modular as an industry?
- How does the Teslaization accelerate us?





Making your every move count.