

Electrifying RTGs: improving productivity and savings



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In the container terminal arena, it could be argued that rubber-tyred gantry cranes (RTGs) are the workhorses of the industry, since they are one of the most ubiquitous pieces of equipment used for container handling. The main contemporary challenges for RTGs have revolved around how they interface with a number of yard terminal tractors in the transportation of containers. Currently, the average number of gross container moves per hour is eight, and with the increasing demands for faster productivity, efficiency and safe operations, many terminals are seeking ways to improve.

In recent years, due to the high costs of fuel, attempts have been made to reduce the utilisation of RTGs. For many container terminals, RTGs constitute one of the largest users of diesel fuel, which can represent as much as 50% of total energy costs. One of the major attempts practiced by terminals aimed at negating this outlay has been to introduce hybrid motors and electrification.

Electrification

The introduction of cables and reels to electrify RTGs was first considered in China, and the first electrified rubber-tyred gantry crane (eRTG) was unveiled at Shekou Container Terminal (SCT) in August, 2008.

As China is considered the largest market for RTGs, representing nearly 60% of the world's fleet, its main motivation has been on identifying improvements. One such technology that has been trialled is the use of the 'high wire' system. The Port of Shanghai practiced this by installing 40km of overhead wires to power 130 RTGs. The main obstacle in further developing this type of technology was the large costs for the civil works required for the installation of steel towers to hang overhead wires throughout the container yard. This led to other solutions for full

Eco'Logical' facts from an eRTG solution from a container terminal operator - - Georgia Ports, US

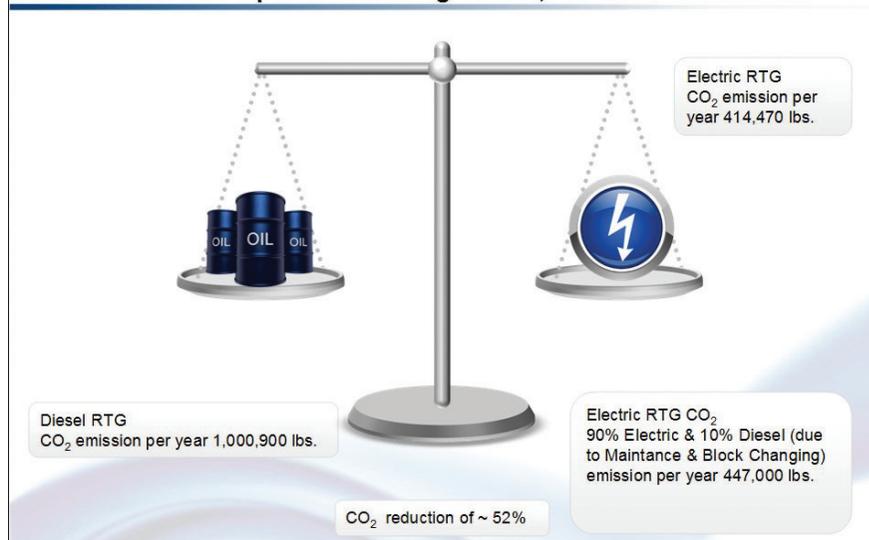


Figure A

electric RTGs being quickly identified and implemented, such as cable reels and conductor bars.

The concept of an eRTG with a plug-connection was a relatively simple one. Electrical energy is provided through a conductor-rail system running alongside a container block. The support structure of the conductor rail also includes guidance for a collector trolley. A towing rope attached to the travelling RTG pulls the trolley, which holds the current collectors for three-phase and earth connection. A cable and a plug maintain the connection between the RTG and the rail system. The plug-in method is proven as a practical, safe and reliable system, with several hundred installations world-wide.

In Figure A, an illustration is given in which data from a real container terminal was analysed by comparing its current fleet of diesel-powered RTGs with RTGs retro-fitted with electricity.

Many container terminal operators view conductor rail solutions as a significant

improvement. Also, with advances in smarter terminal operating systems (TOS), improved education and training for RTG staff, the management of container terminal yards now requires smart solutions that are part of an overall system, rather than operating with stand-alone solutions.

Challenges for terminal operators

The importance of RTG solutions to integrate easily and seamlessly with current RTG systems is deemed by many experts to be paramount for any retrofitting project. As the retrofitting of an existing RTG can be a complex project, the container management decisions are driven by operational requirements. Some of the major challenges raised by container terminals in using cable reels include:

- Significant additional weight and possibly mechanical structural modifications on the RTG
- The need to unplug and plug-in again to change aisles