A NEW DAWN FOR CRANE TECHNOLOGY

David Moosbrugger, Managing Director, Kuenz

We at Kuenz have witnessed worldwide success and we firmly believe this is based on a philosophy of innovation, as our engineers consistently strive for a better alternative solution. In our industry, everything is in motion at present – that is our slogan for Kuenz – and why we must constantly improve our products in order to offer an excellent product for the industry time and again. Subsequently, more than 25% of Kuenz employees have an engineering degree.

AUTOMATION IS THE FUTURE

The future in the container handling industry is automation. We know that the basis for a well working automated crane is a proper mechanical concept and key performance indicators. We measure these on the mechanical side (stiffness of the crane and rope tower), via intelligent travelling drive units, accurate manufacturing of all components and self-adjusting systems (such as rope adjusting during lifting).

Maintenance costs and time is getting more and more vital in automated terminals, so beside the cost, the human risk is increased when people need to enter an automated terminal to tend to cranes.

Therefore, we have a long-term commitment to long lasting components and several developments have been made in the area of maintenance with regard to critical parts such as ropes and wheels. Patented solutions are used on Kuenz container cranes, offering a lifetime of more than 10 years on wheels and more than 5 years for ropes.

KUENZ ASCS

In the past most of cranes have been operated manually. The first automated cranes introduced by Kuenz were installed in Hamburg, with 52 automated cranes operating there since 2001. Stacking there is fully automatic and the interface zones are operated semi-automatically. Other automation projects carried out by Kuenz followed, and among those are the 56 cranes for APMT MVII, 8 cranes for GCT in Vancouver and the 32 cranes for APMT in Tangier which will be delivered shortly.

In recent years, the major challenges for stacking cranes in ports have been positioning accuracy, interfaces to neighboring machines, speed and performance criteria. The stacking area has been fully automated, and the exchange area on the water and land side mostly semi-automated (depending on the layout of the terminal).

Remote operating stations are used to do manual loading and unloading of trucks or other vehicles. Usually, approximately 5 to 8 cranes per remote operating desk have been used in terminals. The newest Kuenz stacking crane generation is equipped with sensors and cameras which are able not only to handle containers in the stack, but to load and unload containers to trucks or other vehicles.

Cranes are therefore running fully automatically for a very high degree and therefore it has been possible to reduce the remote operating stations from a ratio of 5 to 10 cranes per station to almost 25 cranes per remote operating station. The mechanical concept has been optimized to an ideal cost-performance ratio as described above – one indicator is that on the most modern Kuenz stacking cranes, only 4 service technicians are needed to maintain and inspect 50 cranes.

The future challenge for stacking cranes in automated terminals will be in the optimization of the product, fast integration possibility in existing terminals, and of course, implementing automated loading and unloading of trucks.

KUENZ INTERMODAL CRANES

The development of intermodal container cranes has been quite different in the last 20 years when compared with stacking cranes in ports. The challenges within intermodal yards have been the size of cranes, speed of cranes, sound levels and performance. Only in the last 5 years has automation become a huge topic.

Kuenz installed the first remote operated container crane for intermodal use in 2005 for the Warsteiner Brewery; the crane is fully automated in the stack and is operated remotely above trains. The main challenge in implementing automation in intermodal terminals is detecting and protecting people which are working in the yard.

People are constantly in the yard performing different tasks, in North America it is mainly the locking and unlocking of IBC's (twistlocks) and moving trains in and out. In Europe, the tasks where people are still needed include train operations, but also inspection and maintenance. Therefore the key for automation is detecting and protecting people so the cranes can work independently while people are performing tasks.

Kuenz, with its supplier, developed a system which is able to detect people and constantly observe where they are. This system is based on a combination of a DGPS and RFID system. The systems are able to detect people and vehicles even if a line of sight is not available. A safety zone is built around the vehicles and people, and then the information is transferred to the yard controller, cranes and to the TOS system.

All the systems have the necessary information and the cranes can be moved safely around people and vehicles to the final destination. Independent from the TOS and yard controller, the people and vehicle detection system can always stop the crane in case the crane is too close to a person or vehicle.

The crane technology for finding the final target (for example, the laser and camera systems) is heavily based on the stacking crane technology and therefore proven. Fields of development are the loading of containers onto rail cars and road trucks.

Two intermodal yards in the US and Canada will go online later in 2017, the stacks are fully automated and the loading and unloading of trains and trucks is done remotely. The remote operating desk looks very similar to the ones used in the ports.

The first fully automated intermodal crane will be installed by Kuenz in 2017 / 2018 in Germany. In this project, it is not only the stack that will be automated, but also the loading and unloading of trucks and trains. For exceptional handling, a remote operating station will be used.

The main benefits for customers include: more predictable moves per cranes, nicer 'office-style' environment, and running hours from cranes evenly split. In the past, the middle cranes in intermodal terminals have seen the most hours of use because during off-peak time not all cranes have been operational.

The challenges in the future for intermodal terminals will be the loading of trucks and trains and, of course, optimizing the people and vehicle detection system.

ABOUT THE AUTHOR

David Moosbrugger is Managing Director of Kuenz. David is in charge of the engineering and R&D group at Kuenz. Before becoming Managing Director of Kuenz, David worked in engineering, project management and sales for several years. He also lived several years in the US, working for Kuenz America, Inc.

ABOUT THE ORGANISATION

Kuenz was founded in 1932 by Hans Kuenz who succeeded in creating a significant and successful mechanical engineering company in a very short period of time. The company started out manufacturing tower construction cranes. The focus later shifted towards manufacturing container cranes, followed by hydro power equipment. Kuenz is one of the oldest and most prestigious mechanical engineering companies in Austria.

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