



STACK OPERATIONS IN AN INTERMODAL RAIL TERMINAL USING RTGS

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Traditionally on the North American Railroads Rubber Tired Gantry (RTG) cranes are used to load and unload trains. In addition, the chassis used for trucking are provided from a chassis pool. This means the chassis carrying the container, on the road, is not owned by the trucking company and therefore not designated to a specific trucking company or even to a specific truck.

Given this fact there is a big advantage in regard of the possibility to pre-load containers on chassis before the truck arrives at the terminal for pick up. The downside of this system is that the operator of the Intermodal terminal is responsible for the chassis in order to keep them road worthy and operational.

Looking at Intermodal operation in a rail yard, the traditional way to move containers from a rail car and onto a rail car is what is called a wheeled operation.

In such a wheeled operation traditionally an RTG is spanning across up to two rail tracks and up to two loading lanes. No stacking underneath the crane is done.

Therefore, chassis capacity and chassis parking space needs to be sufficient to intermediate store containers in the container yard till it is picked up by a road Truck.

On the equipment side Terminal Tractors are needed to haul chassis in between the chassis parking area and the crane loading lane.

CURRENT EQUIPMENT SITUATION

In such an Intermodal rail operation the crane used for train loading and unloading process needs to have the capability to lift one container above one container on the train. This is what is called a 1 over 1 operation.

As well in such an operation, there is no need for the RTG crane to move in the direction of the rail track with considerable speed. This as the chassis is parked next to the rail car being loaded or unloaded.

Further due to the crane is spanning just over the rail track and the chassis loading lane, no ground stacking is considered and the crane span is typically between 40ft and 60ft.

CURRENT OPERATION IN INTERMODAL TERMINALS HAVING CONTAINER STACKS UNDERNEATH THE CRANE

There are terminals already utilising the capability of lifting containers on to a ground stack instead of utilising chassis as container storage. Therefore, the crane needs to span over a stacking area, in addition to the rail track and the chassis-loading lane.

This will already significantly increase the crane span of the crane and as well the crane lifting height.

The benefit of this operation is mainly the reduction of chassis on the terminal and the required chassis parking area.

Utilising a perpendicular parking underneath the cantilever of the gantry crane will significantly densify the chassis staging capacity.

Further as moving containers from the container stack to the rail car, it is required that the crane is capable of moving with a considerable speed (up to 400 ft./min) in the direction of the rail track. This as the rail car is most likely not next to the container in the container stack and therefore the crane needs to bring the container from the stack to the railcar.

What we see as per today is mainly using Rail mounted Gantry Cranes (RMG) for this kind of operation.

Intermodal terminals in North America having much bigger train length (up to 16,000 ft or 4,877m) and longer loading tracks (between 3,000ft/915m and 6,000ft/1,829m) compared to Europe.

Given this consideration it also means that the track length served by an individual lifting crane needs to be longer as well. Due to this RMGs are mainly used in high capacity Intermodal Yards.

NEW CAPABILITY OF THE FREERIDER RTG

As described above certain capabilities of traditional RTGs restricting the utilisation of a container stack in an intermodal application.

Therefore, stability of the load on the crane (anti sway) and the capability of traveling in gantry direction at a considerable speed (up to 400 ft/min) is essential for such an operation. The gantry speed is required as the time within a moved used for gantry travel is the major factor influencing cycle time and therefore terminal productivity.

Given the new capabilities of the Freerider RTG, stacking operation with an RTG becomes feasible. This even as the RTG crane has to travel an extended range in order to bring a container from the container stack to the rail car. Therefore, travelling with a loaded container, using high speed, is essential to this operation.

Again, traveling time is one the main factors influencing terminal productivity. Further due to the design of the Freerider, much bigger span can be utilised in order to accommodate a container stack underneath the crane.

Container stack operations can be optimized in shuffling containers expected to be loaded soon. This moving a container from a lower tier to a more accessible storage position is called Housekeeping. The Freerider provides automation capabilities, doing this Housekeeping automated during low terminal utilisation time. Further the automation features can be extended to remote operation or as far as to a nearly fully automated intermodal yard operation. Therefore, the capabilities of the Freerider RTG is at least keeping up with the automation features an automated RMG is providing today.

HYBRID TERMINAL OPERATION

The operation of a terminal based on mixed ground stacking in combination with a chassis operation is also called hybrid operation.

In a hybrid operation containers which are destined to leave the terminal within a short time are loaded onto chassis. Containers which are predicted to stay longer at the terminal are being moved to the ground stack.

Such a hybrid operation reduces significantly the space required in order to park loaded chassis and as well the movement of chassis by using Terminal Tractors.

Another important component of such a hybrid operation is the predictability of container pickup and delivery. The more accurate the prediction on the truck arrival is, the more preparation work on the container stack can be done. This means low gate traffic hours can be used to re shuffle containers in the stack.

The ultimate saving in cost are the reduced footprint at a given terminal capacity as a capital expense, or the ability to increase terminal capacity at an existing footprint.

Further reducing equipment, used to stage chassis at the parking area, will also significantly reduce operational costs. Stacking capability means also offering container storage as a paid service to the customer.

Even in such a hybrid operation re shuffling of containers is required, this can be done during low traffic hours. Preparing for

upcoming predicted truck traffic will spread out the workload within the terminal more evenly. Having containers positioned at their optimum loading position will reduce truck dwell time.

SUMMARY POINTS

- With the capability of the Freerider RTG a ground stacking operation at intermodal terminals is feasible.
- Travel speed with a loaded crane is essential for productivity.
- Automation is feasible with the Freerider RTG.
- Load stability is needed for handling the container stack.
- Substantial saving in cost are the reduced footprint, due to the Hybrid operation, at a given terminal size.
- Reducing equipment, as less Terminal Tractors are benefiting operational costs.
- RTGs are an alternative solution at lower capacity terminals.
- RTGs offering advantages in brown field installations in reducing civil work.

ABOUT THE AUTHOR

Walter Leiler has been with Kuenz for more than 30 years. From 2001 until 2004 Leiler was based in Raleigh, NC, and was involved in establishing the branch office there for the company. He returned to Raleigh in 2019 to cover the North American crane market. He has been in sales and project management for 20 year and was project manager for automation projects including CTA Hamburg, GCT Vancouver and CSX Transportation.

ABOUT THE ORGANIZATION

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 the western region of Austria.

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