

|| DP WORLD - ITV Twist Lock Sensor Detection System

the challenge

Terminal Yard is handled by Auto Rail Mounted Gantry [ARMG] cranes and container receipt and delivery as well stacking is completely done in auto mode. One single unpinned twist lock could lead to stack collapse during auto handling of containers, leading to fatal or multiple property damage incidents.

Container Twistlock detection sensors are installed on all ITV's (Internal Transfer Vehicle). These alert drivers to any twistlocks attached to vessel discharged container corner castings prior delivering the container to container stacking yard, with alarm beep sound and red LED light indicators mounted on the trailer as well as a light inside the cabin.

Even after installing, there are cases of ITV drivers not responding to the alarms and light indicators, due to carelessness or being engrossed in their job or neglecting it as a fault indicator especially during foggy weather or while drizzling and even sometimes indicator lights might get fused.

This can lead to high possibility of Container twistlocks reaching the container stacks in Yards, where unpinned twist locks can get attached to underneath containers and be lifted together during ARMG crane Auto operations, that could fall from height causing multiple property damages, possible injuries and even fatalities, if it had dropped over the vehicles like ITV/third party trucks etc. which are waiting for container to deliver/receipt or even passing vehicles on the roadways whilst the stack collapses.



the innovation

To bulletproof the twist lock detection system and prevent errors, the twist lock detection system has been integrated with the VMT (Vehicle Mounted Terminal) which is inside the ITV's cabin (the VMT lets the driver know the container receipt and delivery locations).



On receiving the vessel discharged container this integration system will do the following:

1. Upon detecting unpinned twist lock on the container, VMT screen will block the appearance of yard location to ground the container.
2. ITV Driver will get yard location only upon removal of twist locks from the container corner casting at pinning station
3. Moreover, pop-up message on VMT screen is displayed, advising driver to "Go to Pinning Station" to unpin the twist lock.



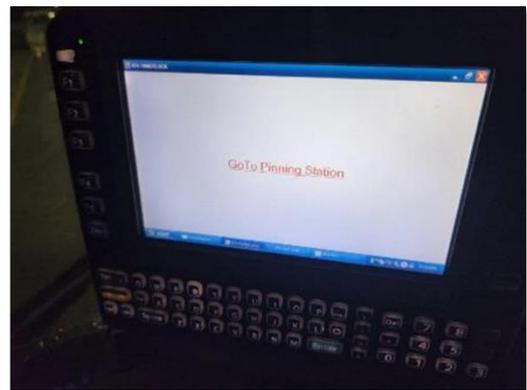
Due the system enhancement, the issue of containers reaching the yard with unpinned locks has been resolved completely.

how it was implemented

A twist lock detection laser sensor, equipped on all ITV trailer beds, emits a laser beam which is reflected back by reflectors mounted on brackets. If any foreign object, such as twist locks or stacking cones are present in the laser beam path, communication is interrupted triggering the alarm for presence of twist locks to ITV driver. On its own however, this system was not fully effective. Many instances were encountered of containers reaching the stacking yard with unpinned twist locks. So, the twist lock detection system has been enhanced by incorporating the detection system into the VMT.



Linking it to the VMT as an added feature has reduced the probability of a container with twist locks being delivered to the yard to ZERO. The system is developed in such a way that it is activated only when the ITV receives vessel discharging container.



result

The system has been active since July 2022 and since installation there have been **NO** near-miss or incidents involving property damage reported. It has completely eliminated the

incidents related to containers with unpinned twistlocks reaching the stacking yard during auto handling of containers. There used to be major incidents involving multiple containers damage including the cargo as well near miss incidents due to containers delivered to yard with unpinned twist locks. Due to the system enhancement, there have been ZERO instances and a zero probability of containers with twist locks being delivering to yard has been achieved.

conclusion

The incident records declined drastically related to unpinned twist locks as well reduced claims of property damage. The enhancement is expected to reduce the accident related cost and insurance premiums for upcoming years and the return on investment is immense. Due to the enhanced system in the VMT which disables the grounding yard location if all twist locks are not removed, the ITV driver has only one option, namely, to clear the locks in order to see the grounding location in VMT.