Collision Warning System

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Troy Thompson

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Information Classification: General

Collision Warning System

The Collision Warning System is only an informative system, thus the driver remains always responsible for the safe operation of the machine.

- Kalmar Collision Warning System is a robust system for area surveillance and active obstacle detection in the path of a machine or spreader.
- It is designed to prevent or reduce severity of a collision by informing the driver of a collision by visual and/or audible warnings.
- The system has a high protecting rating, shock and vibration resistance as well as a wide temperature range.

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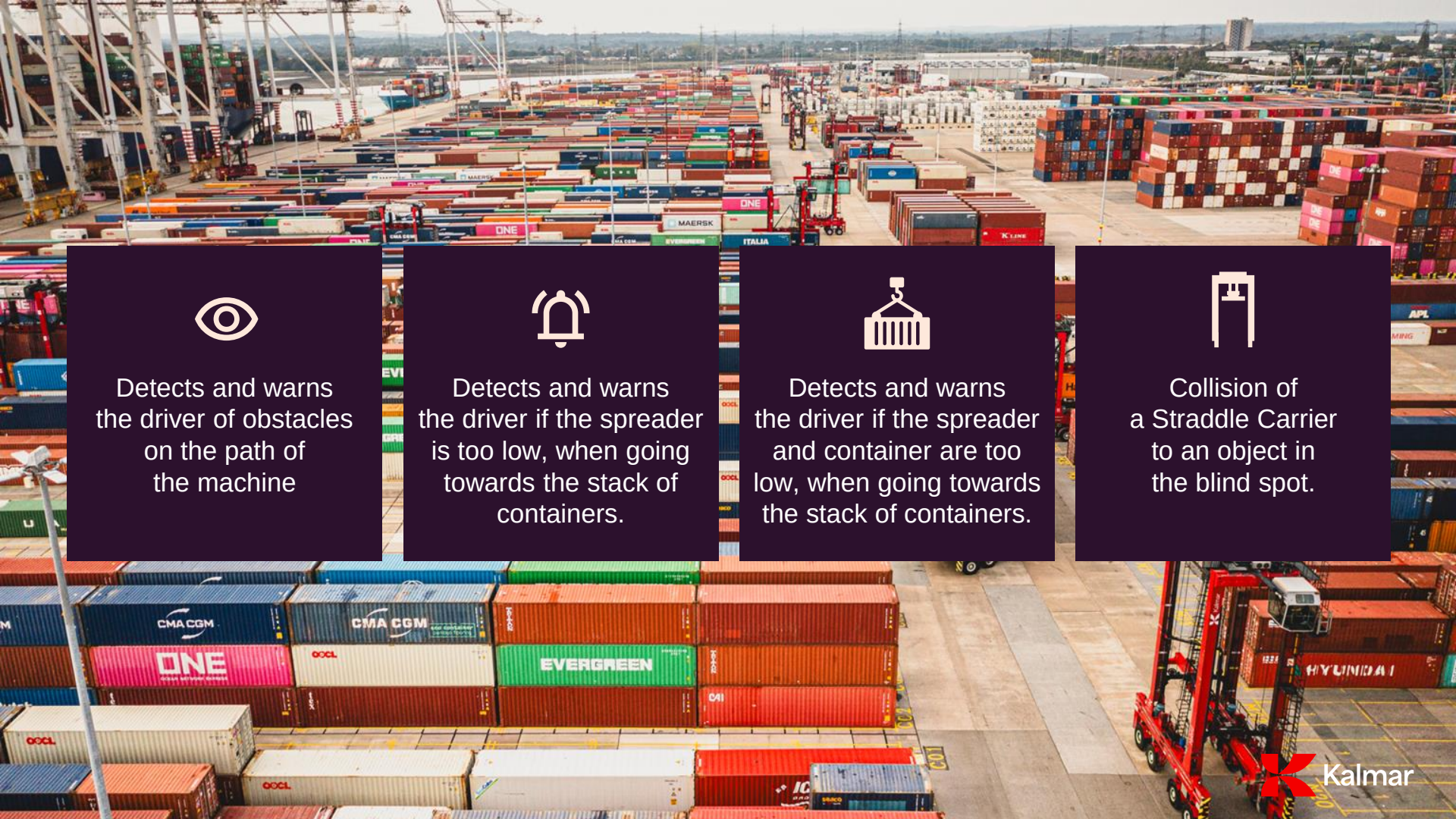

Detects and warns the driver of obstacles on the path of the machine

Detects and warns the driver if the spreader is too low, when going towards the stack of containers.

Detects and warns the driver if the spreader and container are too low, when going towards the stack of containers.

Collision of a Straddle Carrier to an object in the blind spot.

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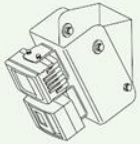
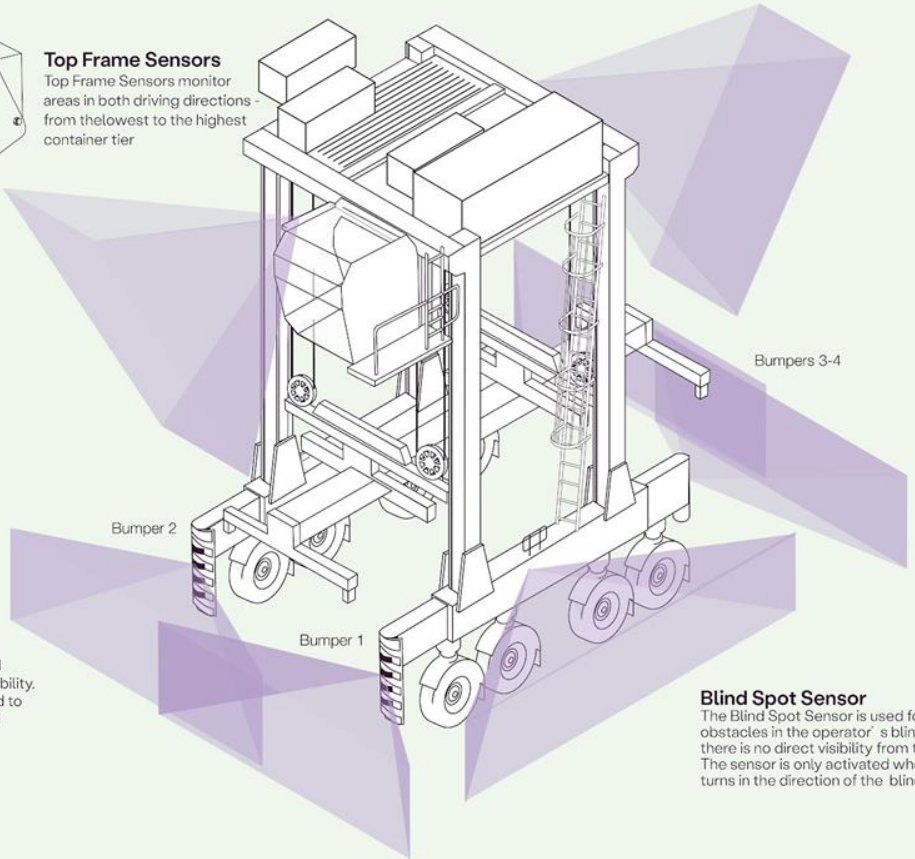
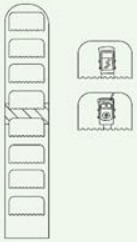
Collision Warning System



Top Frame Sensors
Top Frame Sensors monitor areas in both driving directions - from thelowest to the highest container tier





Bumper Sensors
Bumper Sensors monitor the drive path of the machine and calculates the collision probability. Collision criticality is provided to the driver by visualisation and audible alarms.

Blind Spot Sensor
The Blind Spot Sensor is used for detecting obstacles in the operator` s blind spot, where there is no direct visibility from the cabin. The sensor is only activated when the driver turns in the direction of the blind spot.

Benefits

- Increased Safety
- Decrease of accidents
- Longer lifetime of the machines & less maintenance
- Improved Reaction Time
- Awareness and Alertness
- Insurance Discounts

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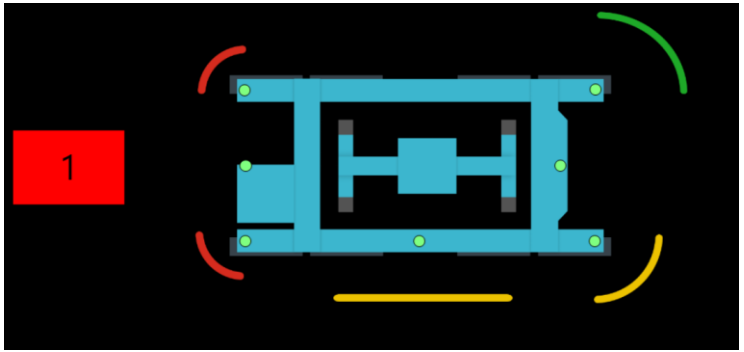
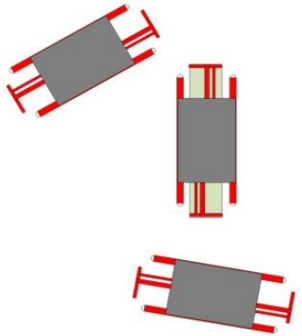
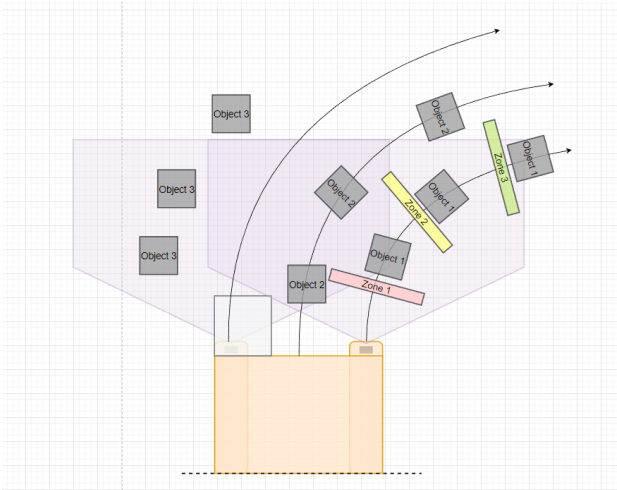
Obstacle detection - apron traffic

- The system is monitoring obstacles on the vehicle projected wheel path
- Vehicle speed information is used to extend the detection range in higher speeds
- If obstacles are detected within the detection range, an alarm is activated

Operator view







Information Classification: General

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Maher

Installed to 55 machines

150 machine to follow

"Nothing is more important at Maher Terminals than safety. We asked Kalmar to develop the Collision Warning System to improve employee safety at one of the busiest container terminals in the world," says Louis Allora, Chief Engineer at Maher Terminals LLC. "Since installing the system, we have seen fewer straddle-to-straddle, straddle-to-vehicle, and straddle-to-container collisions at our terminal. Impact-related maintenance costs and reliability have also improved on the straddle carriers that have the system installed."

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Feeder questions

1. Can you share the experiences and results of implementing the collision warning system at Maher so far?
2. Additionally, is the system designed to be retrofitted onto existing equipment?
3. What is the system’s approach to false positives or false alarms, and how does it ensure that operators are not overwhelmed with unnecessary warnings?

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