

|| GBMS - SensoriumC system

the challenge

Container stacks collapsing at sea cause severe damage, both environmentally and economically. Incidents due to collapsing stacks have been in the media a lot lately. Whether it was about the Dutch beaches being washed up with litter from the MSC Zoe incident in 2019, the enormous quantity of lost containers in the Pacific with the ONE Apus incident in 2020 and the consequential temporary decommissioning. Or the various incidents where containers stacks caught fire, allegedly preceded by a stack failure. Larger ships, increasingly unpredictable severe weather conditions and an ever-growing pressure on the ship's crew to arrive in time has led to an increase of the number of containers lost.

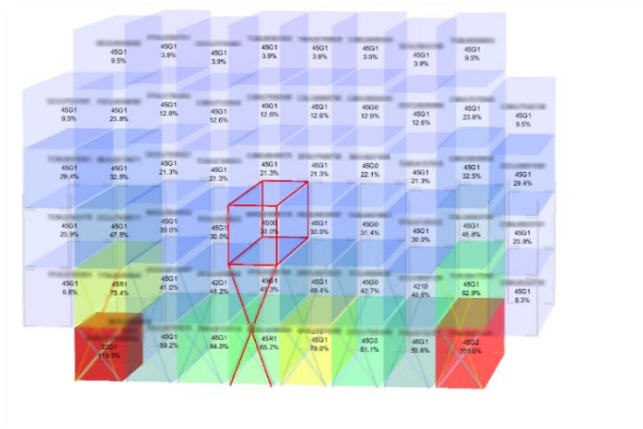
Numerous investigations like those of the Dutch Safety Board (OVV), the German BSU and the Panama Maritime authority, the Maritime investigation Board (MIB) and the AMSA have shown that crew of container vessels are hardly aware of the forces acting in container stacks and in the lashing. Once the ship has set sail, lashing is checked regularly when weather conditions allow. However, when weather deteriorates, the crew cannot go outside to check. Especially during night-time, visibility of the cargo is very limited. Even if the crew can inspect the cargo, they still are unable to tell whether a stack is reaching its safety limits or not when a ship is experiencing large motions. This is where GBMS has set out to change things.



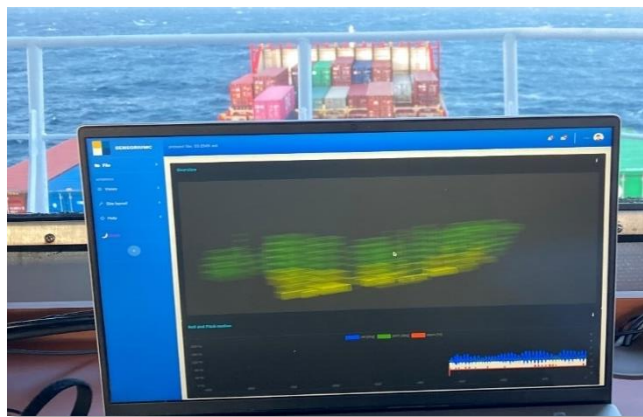
Beaches of Schiermonnikoog, 2019, (source ANP)

the innovation

When you drive your car on the highway, the speedometer tells you what speed you are driving. If you go too fast, you slow down. Imagine not having a speedometer and not knowing you are passing the speed limit or not. This is the current situation for crew on board container ships with regards to container stack loads. When caught in bad weather there is no way to tell whether the cargo is safe and the voyage can be continued or measures should be taken, like altering course and arriving later at the planned destination.



Our SensoriumC system is exactly this, a speedometer, but for container stack and lashing loads. In real time it evaluates racking loads, corner post loads, lashing tension and many more parameters to allow for the crew to stay informed.

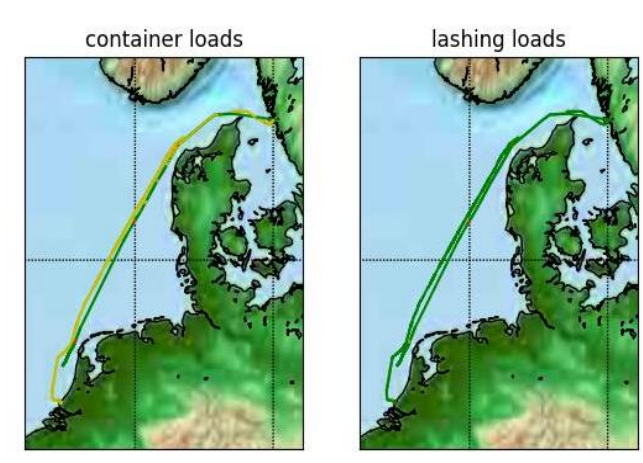


SensoriumC is used in three stages of a voyage.

Before the containers are loaded, the system is utilised to check for compliance with class rules and the CSM of the ship and other inspections of the stowage plan.

During the voyage, safety levels in the stacks and lashings are shown in real time. SensoriumC acts as a decision support system to aid the captain and crew in making objective decisions during severe circumstances.

Afterwards, reports are made with the logged data that can be used by quality assurance departments for hindcast and optimisation purposes.



how it was implemented

GBMS is a start-up sparked by the damage caused due to several container loss incidents. Initially thinking along the lines of adding sensors to containers, we eventually realized the biggest bang for buck would be a ship mounted system. We deemed this system SensoriumC, a sixth sense for crew on board container ships.

At the heart of SensoriumC lies GBMS's proprietary 3D solver for stack and lashing loads. Together with the ship layout, the stowage plan per voyage (container positions and weights as contained in the BAPLIE-file) and a dedicated set of motion sensors installed on the ship, SensoriumC can provide real time feedback on the stack and lashing loads.

Installation of the system on board a ship is very easy and can be done as a retrofit. Before installing the system onboard, the layout of the ship is programmed into the software by GBMS as well as the ships specific class rules and CSM requirements.

The practical application of the tool was tested onboard the OOCL Rauma of JR-Shipping. During several sea-trials the system measured the ship motions and calculated the stack and lashing loads. During the voyages, the crew gave feedback on the development which led to features saving them time instead of being confronted with yet another task. Which led to this remark from the crew: "Now I've seen the future."

result

The crew welcomed the speed at which they could check the cargo, and the insights they obtained from the system while sailing. Them being confident in a secure loading of the ship makes shipping of containers safer.

The liner's office was happy to be able to supply the crew with modern tools to increase the onboard safety and safety awareness. Even opening the possibility to take in more cargo and applying alternative lashing methods to secure the containers even better. While on the other hand being alerted on stacks that looked safe when compared to the SCM but were unknowingly exposed to a larger wind area than anticipated. Simple rearrangements could therefore increase the actual safety margins.

conclusion

Our prototyping phase now comes to an end. With all the collected feedback we are finalizing our first delivery of the SensoriumC system which should set sail at the end of 2022 or beginning of 2023.

With the SensoriumC captains' decision support system we filled a gap in the information to the crew. The system enables a thorough checking of the loading plan before sailing. While sailing it provides independent information to the crew and the liner on status of the containers and lashings, and on the severeness of the conditions on which the crew can take any evasive actions when needed. After sailing, the system provides Q&A reporting to show compliance with regulations after any voyage.

In future the system will be extended with features to further improve safety at sea and tools to reduce the workloads for the crew.

At GBMS we are dedicated to reducing the loss and damage of containers at sea. With SensoriumC and our future planned developments, we will save costs for liners, insurers, and cargo owners while at the same time helping to protect the environment.



Joris Brouwer (GBMS) and James Manisan (first officer JR-shipping) during an inspection using the SensoriumC system

Information on the GBMS team can found at <https://www.gbms.nl>