StormGeo
Freedom to Perform

14 LIFE BELOW WATER

Advanced Sea-keeping: The Answer to Container Loss at Sea

The loss of shipping containers at sea has increased by 67% over the last five years, according to a report by the World Shipping Council. Apart from the millions of dollars in lost revenue, this statistic represents incredible harm caused to the environment.

Estimates for the amount of containers lost vary, however the most recent and widely accepted report is from the World Shipping Council, which polled all its member companies in 2014. These companies make up 80% of the global vessel container capacity.

The report found that for the years 2011, 2012 and 2013, an average 733 containers were lost at sea each year, not including catastrophic events. Including catastrophic events, the average annual loss for these years increases to 2,683 containers.

The two catastrophic events during this period were the 2013 sinking of the MOL Comfort in the Indian Ocean and the 2011 MV Rena grounding off New Zealand. The MOL Comfort incident, considered the worst containership loss in history, resulted in the loss of all 4,293 containers. The MV Rena lost about 900 when it grounded.

Most lost containers will sink, though it can take up to two months for some to reach the seabed. A refrigerated container, buoyed by its insulation, can drift for longer. Not only do low-floating containers create a hazard for other vessels, but if they contain chemicals or pollutants, they will damage the ocean's ecosystem. Statistically, about 15% of containers that fall overboard contain chemicals toxic to marine life. [1]

Some of the reasons for container loss at sea are poor stowage, improper packing, structural failure, poor lashing, severe weather and so-called resonant events: parametric rolling and synchronous rolling.

1,582
Avg. containers lost at sea each year from 2008–2016

15%
lost cargo contains hazardous materials, plastics, fuels & chemicals

450
Life expectancy of a plastic bottle in the ocean (in years)

[1] Port Technology, Edition 56, *Chemicals in containers – problems and risks*

> *BVS Seakeeping Live can predict parametric rolling and advise on changes of course and speed to avoid what could otherwise become a dangerous situation.*
>
> Captain Henry Bromee of Wallenius Marine

THE DIFFICULTY OF FORESEEING RESONANT EVENTS

Paolo Bellezze, Product Manager for Onboard Systems at StormGeo Shipping, explains that unlike ship motions such as pitch, roll and heave, which masters learn to estimate very accurately, resonant events can catch even the most experienced captain by surprise.

"Parametric and synchronous rolling are related to the hull shape, dimensions and current loading condition of a vessel. All of these affect the dynamic stability," says Bellezze.

"On occasions, the vessel is sailing at such a speed and angle to the waves that the wave period and direction relative to the moving vessel will excite the natural rolling period of the vessel, causing her to roll more. In our years providing Seakeeping and Motion logging systems, we've seen a whole spectrum of events—from a 3.5m wave triggering parametric rolling to vessels with 30 degrees of rolling."

HOW TO PREVENT CARGO DAMAGE AND LOSS

Advanced sea-keeping tools, such as Bon Voyage System (BVS), aid in the prevention of cargo loss. These tools use weather forecasts combined with a 3-D model of the vessel to predict resonant events and assist the captain with route planning to avoid potentially damaging conditions.

Captain Henry Bromee of Wallenius Marine explains why BVS is a crucial tool for his crew: "No amount of experience or skill in terms of seamanship can help a captain control this phenomenon. BVS Seakeeping Live can predict parametric rolling and advise on changes of course and speed to avoid what could otherwise become a dangerous situation. With this system onboard, you never need to find yourself in a weather situation you don't want to be in. Yet you're still captain of your own ship."

It is also helpful to have a motion sensor unit (MRU) that accurately measures pitch, roll, yaw and heave. This enables the master to be informed within three hours or less of an impending resonant event. Bellezze notes, "We notify the master through sensor data, not through a best guess based on a weather forecast. Waves at sea don't change all of a sudden—we can detect gradual changes in the waves through the sensor."

"Once the ship's hull and propulsion system are modeled, the vessel's response to the predicted weather can be calculated. The system in place will advise the crew on the likelihood of damaging events and how they can be prevented, while the weight distribution for each voyage is also taken into account."

STAYING ONE STEP AHEAD OF CARGO LOSS

Heavy weather is often cited as the main cause of container loss at sea, but resonant events can occur on flat seas and in favorable weather. "While insurance companies urge vessels to use ship routing to prevent incidents leading to loss of cargo and other catastrophes, this routing is usually provided from the shore. Seakeeping advice made on a vessel by vessel basis is a much better solution," said Bellezze.

An additional benefit of the MRU sensor is that shipping companies can use the data from its logs to help understand container loss incidents, implement better operational practices to prevent them in the future, and update their lashing manuals. ◆