Gard advises on stack collapses

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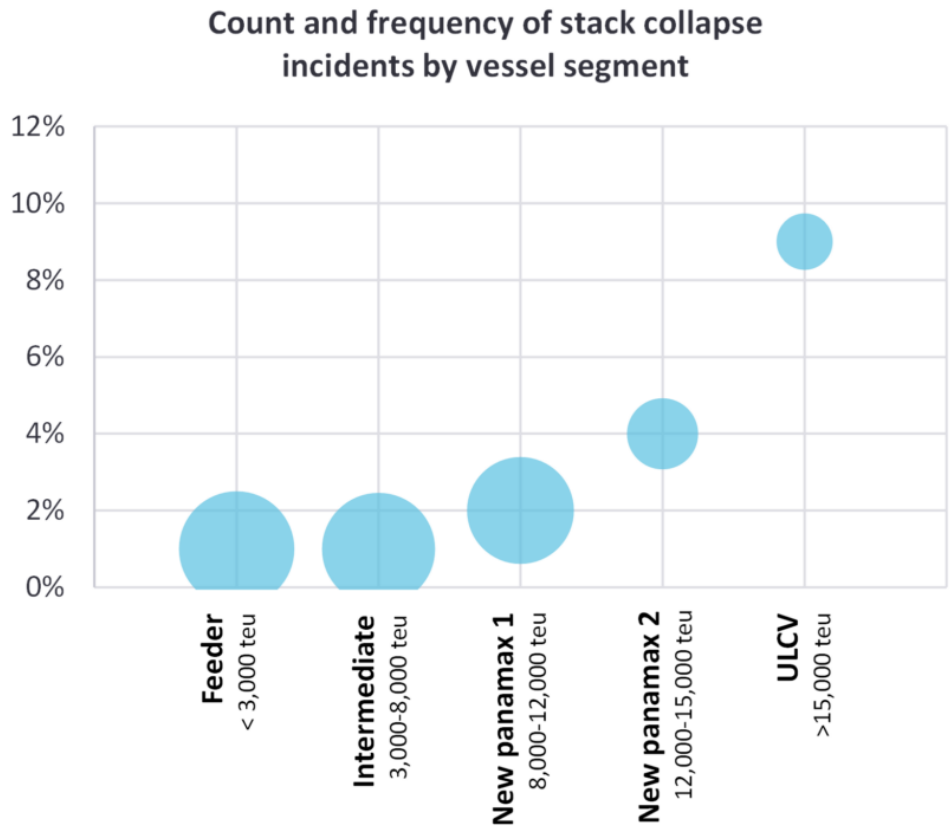
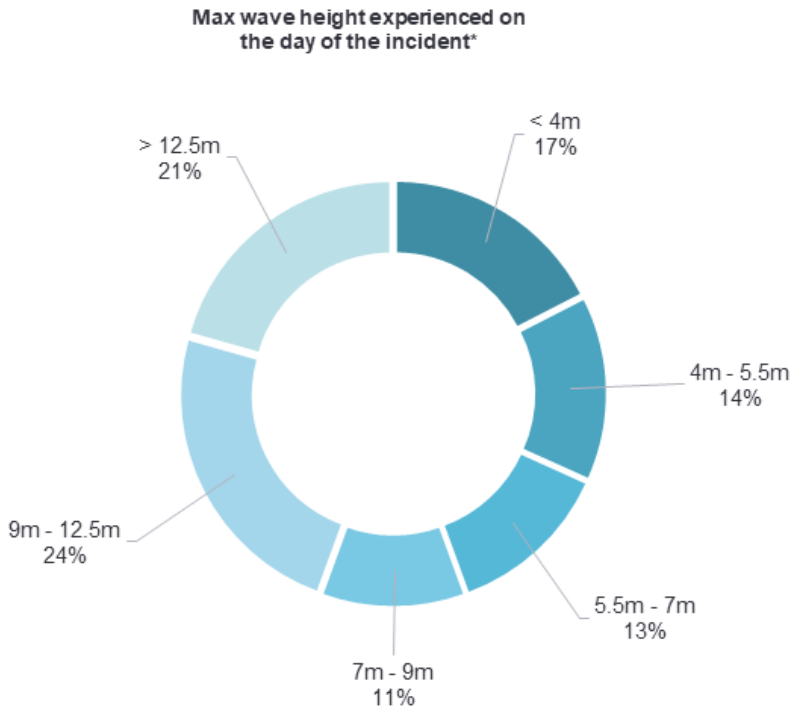
In a new study, Norwegian P&I club Gard has delved into the impact of weather on container stack collapses. The findings show the impact of progressively increasing wave height, the quantified risk of high waves, and variance in weather exposure among different operators.

To contribute to the industry understanding and to help prevent losses, Gard studied all cases of stack collapse where Gard was involved as a P&I insurer between 2016 and 2022 as well as looking at the weather data.



The study shows stack collapses are more likely on larger boxships. The six-year average claims frequency for stack collapses on feeder vessels stood at 1%, whereas for ships above 15,000 teu, it rises to 9%.

Half of all incidents studied took place in seas with wave heights exceeding 7 m. Accidents tend to take place after a ship has been in progressively worse weather for up to a week, a situation where lashings might have loosened but bad weather prevents crew from checking all the cargo fittings.



Despite spending 95% of their time in calmer waters, the relatively small percentage of time boxships spend in adverse conditions significantly amplifies the risk of incidents, potentially up to 20 times higher.

Examining the global container fleet, roughly 3.4% are exposed to such weather at any given time, the study shows with ships in the 8,000 to 12,000 teu range having a higher exposure to wave heights of 7m and above.

The study also highlights how some container operators or owners are more exposed to the risk of adverse weather than others, stemming from differences in operators' risk tolerance and the internally defined weather thresholds for the vessels.

Poorly maintained lashing and securing equipment were also cited in the study as contributing factors to the stack collapse phenomenon which has seen so many boxes end in the world's oceans in recent years. Corroded sockets and lashing eyes rank among the top three findings in Gard's condition survey data for containerships.

Prolonged exposure of the vessel to rough weather could lead to deterioration of cargo securing within the container, potentially leading to cargo breaking loose and

shifting within the container, the study explained. This, in turn, adds additional forces on the container stack.

An earlier report on the same topic by NorthStandard, another P&I club, looked at the large beams of megamaxes – the 23,000 teu class ship type – whereby they have relatively large metacentric heights, meaning the vessels are very stable and therefore stiff. This in turn can result in very high rolling accelerations when the weather deteriorates, generating similarly high loads in the container lashing and securing gear.

Almost all container stack collapses at sea occur in rough weather with strong winds, NorthStandard noted. When fully loaded, the deck stacks on modern containerships present additional windage areas over 25 m high. Combined with large freeboards, the stacks act like giant sails to amplify a ship's motions as the weather deteriorates, further adding to lashing and securing loads.

The report went on to discuss parametric rolling, a phenomenon where sudden heavy rolling occurs in head or following seas. Although very rare, it tends to affect vessels such as containerships which have large bow and stern flares. Parametric rolling can trigger violent rolling of over 30° in a very short period of time. Such violent rolling can lead to extreme loads on container lashing and securing gear.

For beam and quarter waves, if a containership's natural roll period synchronises with the experienced wave period, resonance can occur resulting in similarly violent rolling motions.

Larger, stiffer container vessels tend to have shorter natural roll periods that more closely match the periods of the wave spectrum. This in turn increases the risk of synchronous rolling and over-loaded container lashing and securing gear.