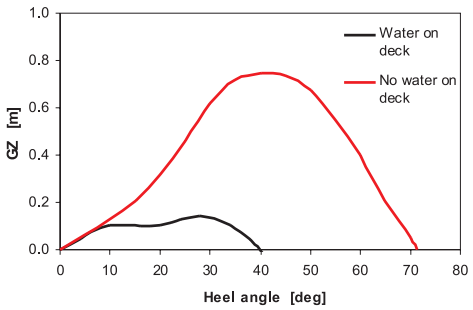
Concern rises with Dongedijk re-investigated

Container feeder "Dongedijk" before its capsize.



Stability curve of the "Dongedijk" at the time of the accident.

Following an investigation into the container feeder "Dongedijk" which capsized in 2000, recent research carried out by Delft University of Technology (DUT) and MARIN, has revealed that present day stability regulations may not necessarily ensure vessel safety.

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In perfectly calm weather the 93 m "Dongedijk" capsized when the vessel had just left Port Said. The Dutch Shipping Council investigated the accident and concluded that the ship was overloaded and that IMO stability criteria issues were not being met. Later the captain and first officer were blamed for negligence.

Although there is no dispute about these conclusions, the Dutch Ministry of Transport asked DUT to broaden the investigation into the hydromechanic safety of small container vessels. The project re-investigated the "Dongedijk" incident and also analysed the capsize risk in adverse weather conditions. The first phase, which consisted of calculations and numerical simulations, found that the design of the vessel is critical in a maximum load condition. The stability does not increase when the heel angle increases from 10 to 20 degrees. The combination of overloading, trim and changing course, caused the water to flow on deck with only five degrees of heel; this reduced the stability of the ship significantly. Next to this, water accumulated on the aft part of the main deck due to the speed of the vessel. Both effects were sufficient for the ship to heel more than 20 degrees. Containers were submerged and started being filled with water. Water also flowed into the engine room through the vent openings.

Model experiments vital

Simulations were carried out to assess the stability of the ship sailing in waves. The loading condition was such that it satisfied all IMO stability criteria. As a result of studies into the capsize risk of frigates, MARIN has many years experience in this area. FREDYN, the resulting software, was used to investigate the capsize probability. Results suggest that the risk is higher than expected and also higher than deemed acceptable. The primary cause of simulated capsize events is the loss of stability when a wave, with a length similar to that of the ship, passes the vessel from astern and the crest is amidships.

The ministery of Transport has been notified. MARIN strongly recommends verifying findings through model experiments, because numerical tools can never be 100 percent reliable and because these conclusions clearly suggest that present day stability regulations may not ensure the safety of the ship in all conditions.