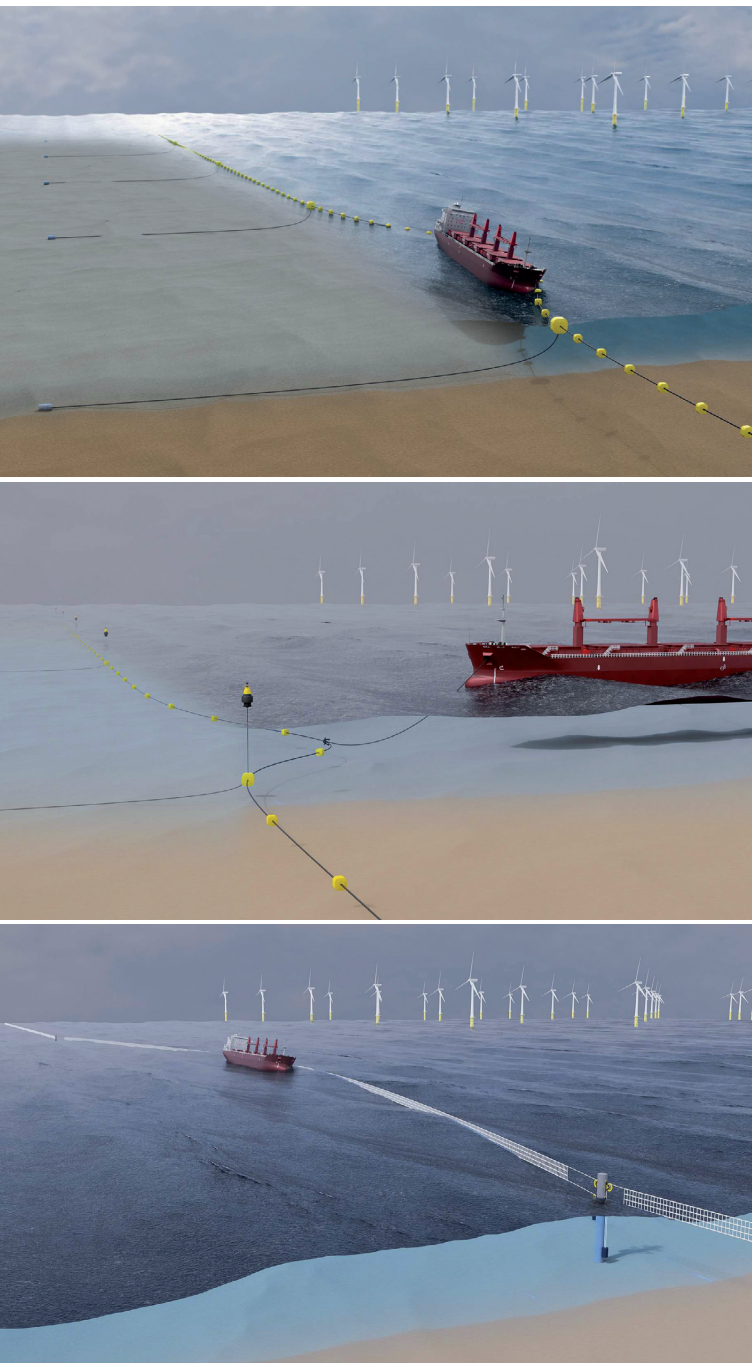
“Crash barriers at sea” to shield wind farms

COLLISION RISK | Marin, a Dutch maritime research institute, has revealed that by 2030, the risk of a turbine being hit by a ship will increase to around 1.5 to 2.5 times a year. The institute is now focusing closely on the problem, which is becoming increasingly urgent as offshore wind plays a rapidly expanding role in the energy mix. This source of power is likely to undergo accelerating expansion in the years ahead, with around 2,500 wind turbines likely to be installed on the North Sea before 2030, according to Marin estimates.



Three sets of concepts for maritime crash barriers between shipping routes and wind farms were modelled Source: Marin

The scale of the collision risk is steadily rising. In January, a drifting handymax bulk carrier, *Julietta D*, first collided with a tanker before crashing into a transformer platform and a turbine foundation at the *Hollandse Kust Zuid* wind farm that is currently being built. Accidents like these cause various risks, including the turbine falling onto the vessel, endangering the ship, its crew, and the environment.

On average, close to seven vessels lose power and start drifting on the North Sea each month, Marin estimates. Accidents can be avoided by dropping anchors, but this requires crew intervention often in difficult circumstances. Another option is the deployment of emergency towing vessels (ETVs) to take the drifting ship to safety, while ship supervision can be enhanced to include more precise vessel traffic management.

According to Marin’s Traffic Safety team leader, Yvonne Koldenhof, these initiatives are probably not sufficient. “The accident involving the *Julietta D* shows the real dangers posed by vessels adrift. Even with current resources such as ETVs, it’s difficult to avoid these kinds of incidents.”

The institute’s general director, Bas Buchner, explained. “Our mission statement includes both marine safety and sustainable sea use. That means more than simply drawing attention to the dangers; it means going in search of solutions to prevent accidents. We were keen to do this in tandem with experts from the offshore sector and that’s why we opted for an open innovation project. We gave it the working title “crash barriers at sea” because many wind farms are planned near traffic separation schemes: the freeways of the sea.”

Together with other maritime experts, Marin announced three sets of concepts for maritime crash barriers between shipping routes and wind farms at a recent workshop. The first idea is based on a string of surface buoys secured by drag anchors. A second concept involves a smart suspension net between fixed poles. And a third is an anchored underwater hook line designed to catch the anchor of a drifting vessel.

Following the construction of scale models of the three concepts, they were tested in Marin’s Offshore Basin in March. The aim was to see whether any of the three ‘crash barrier’ systems could deflect a scale model comparable to the *Julietta D* in storm conditions.

The results were positive. Marin’s Offshore project manager, William Otto, revealed that all three approaches are capable of intercepting the vessel. “The drag anchors of the buoy string dissipate the drift energy evenly, so that the vessel stays afloat across the waves. The anchored underwater hook heads the vessel into the waves, so reducing roll. That means the vessel remains in place while being exposed to relatively low forces. The smart suspension net initially showed too much droop, but with a bit of fine-tuning, we were able to get this functioning too. Over the coming months we will go on to assess the various pros and cons of these systems.”

Parties involved in the project, which received significant international attention, included Bluewater Energy Services, Mooreast, Vuyk Engineering, Heerema Marine Contractors, Boskalis, GustoMSC, KRVE (Rotterdam Boatmen), Pinkster Marine Hydrodynamics, Huisman Equipment, Orca Offshore, and SBM Offshore.