

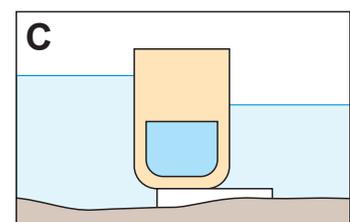
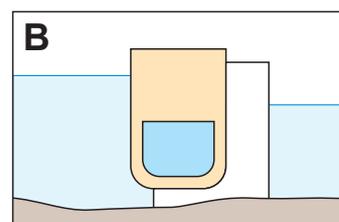
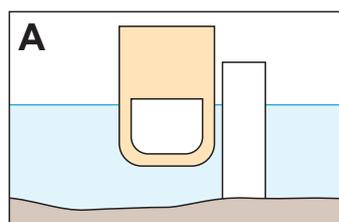
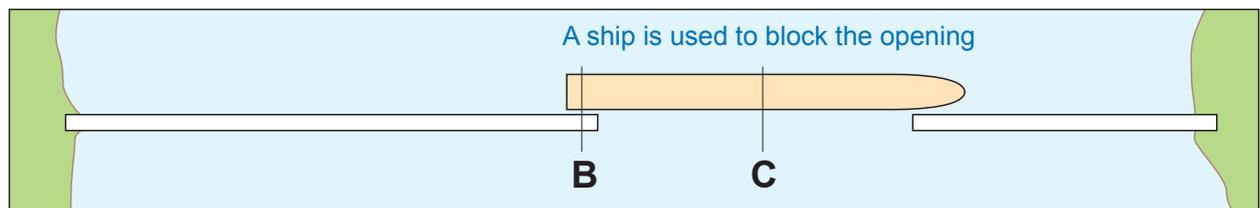
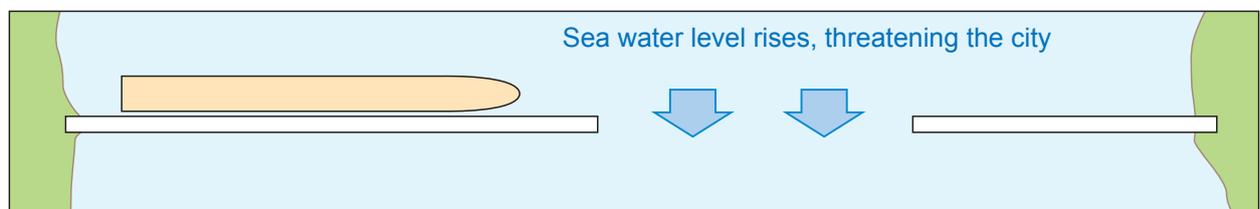
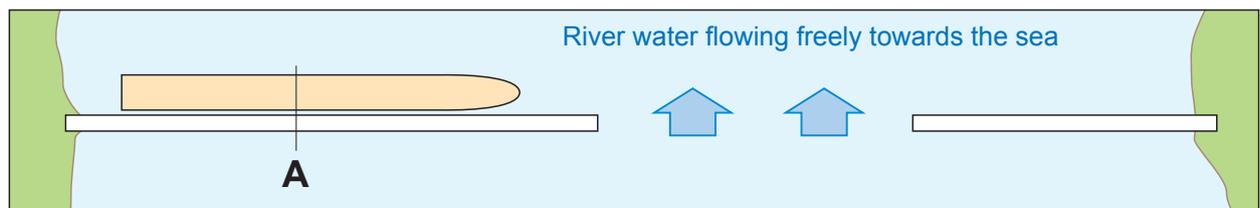
Seaseal Storm Surge Barrier

A brief presentation

Many coastal cities suffer from flooding when winds, low air pressure and tide coincide, and the problem will escalate in the future due to rising sea levels. Therefore, storm surge barriers have been constructed to protect some cities (London, Saint Petersburg, Rotterdam), while others are on the way, like in Venice. Many other cities around the globe consider to follow in the years to come, but the extremely high costs is a major deterrent.

Building a protective barrier across the harbour entrance is a very costly project, but it is the gates that are the biggest technical challenge and cost the most. The free openings need to be wide and deep enough to allow for commercial navigation, but still be able to close without problems. This requires giant mechanic constructions with moving parts the size of a hydroelectric power plant.

My idea is to instead use a purpose constructed ship as sluice gate. Such a solution make use of well-known (ship building) technology, it allows for openings that are both wide and deep, and it eliminates the need for costly large scale mechanics. It only requires one moving part and that is the ship.



The geometry of the ship's hull matches that of the opening. To close the storm surge barrier the ship is positioned in front of the opening and submerged onto a sill by taking in water, either in certain ballast tanks or directly in the hull. When the storm has passed the ship is pumped dry and returns to its ordinary quay berth.

An important feature of the concept is that the ship is designed for other purposes when not serving as sluice gate, i.e. during 99% of the time. Moored alongside a quay in the city center it provides valuable space for commercial activities, like restaurants, shops, gyms etc. It may also serve as a floating multistory parking garage. Hereby the "sluice gate" will more or less pay for itself, which means a substantially lower total cost for the project, compared to a more traditional solution with stationary gates having one function only.

The idea of using a ship hull as a flood gate is not entirely new. There are a couple of patents focusing on this, of which one has expired and the other one is targeting technical details, but I have developed the overall concept further, and have now applied for an own patent. I am addressing issues like how to use the ship's propulsion plant to also be able to pump water from the harbour to the sea, right through the hull. Many ports are located at a river mouth, and may instead face flooding from the river should the outlet to the sea be blocked too long. Also an international PCT patent application has been filed recently.

My aim is that the concept should be standardized in that a limited number of ship sizes would cover the needs of the seaports of the world, from small scale barriers, where ship lengths of 50 meters or less will be enough, to large scale barriers where you may need lengths of 200 meters or more (Gothenburg, Copenhagen, New York). When the ship is taken to a dry dock for repair or maintenance, a similar hull is provided meanwhile.

To commercialize the idea competence and services from different areas are needed. An infrastructure construction company is needed for the permanent parts of the barrier, including the opening and its underwater concrete parts, a shipyard is needed for the ships and someone working with property development is needed to develop the ship's second (or first) role as a floating building in the city center.

Of course it would be preferred to have one single actor with an own ability to manage all parts of the projects. Such a company would then also need to have enough financial strength to match the size of the projects, enough credibility to be on speaking terms even with big cities, and an ability to sell the concept world-wide, hereby in fact creating a new market. The concept has been named "Seaseal".

Uddevalla, a Swedish coastal city where storm surges recurrently cause flooding, has become interested and a prestudy is now carried out.



Sigurd Melin