

# Sinking boat

## More Details

### Why do ships float?

A ship does not sink if its density is less than the density of the water it floats in. What matters is not only the density of the building material used, but the total density of all parts of the ship. Therefore, a ship made of steel can still float, even though steel is more dense than water: the ship contains a lot of air so that the average density of all parts (air + hull + cargo) is still lower than the density of the water. Air has a lower density than water, which is why air in water rises to the top – it floats, so to speak, on the water. Wood is also less dense than water, but more dense than air, which is why wood falls down in air but rises to the top when placed in water.

### Why do air bubbles sink ships?

If the water under the ship contains air bubbles, the total density of water plus air bubbles affects the buoyancy of the ship.

The boat in our experiment is tared so that its density is only just below the density of pure water, but above the density of water and air in combination. Therefore, it can no longer float in the water containing air.

Once the air bubbles disappear, the ship begins to rise again.

## Bermuda Triangle and Dead Sea

In the Bermuda Triangle, between Florida, the Bermudas and Haiti, ships and entire fleets disappear without a trace over and over again in seemingly mysterious ways. This unusual accumulation of accidents has been the cause of wild speculation. Are extraterrestrials involved or are primeval creatures, casting a spell on seamen, responsible for their fate?

The explanation is probably quite simple: there are large deposits of gas under the sea area of the Bermuda Triangle. Underwater earthquakes and landslides cause gas to rise at irregular intervals. A ship floating in these waters would sink, just like the model in our experiment. And since a real ship, unlike our model, would be filled with water, it would not rise back to the surface.

An inverted effect can be observed in the Dead Sea: here the water density is not reduced by air bubbles but increased by the high content of salt in the water. As a result, objects that sink in “normal” water do not sink in the Dead Sea. Therefore, a person can relax and read the newspaper while floating in water without the risk of sinking (Fig. 1).



Fig. 1: Reading the newspaper in the Dead Sea.