

# Float or Sink?

How do captains know how to safely load their ships?

Have you ever tried floating in the ocean? In your bathtub? Which was easier? You might have noticed it is easier to float in saltwater than freshwater.

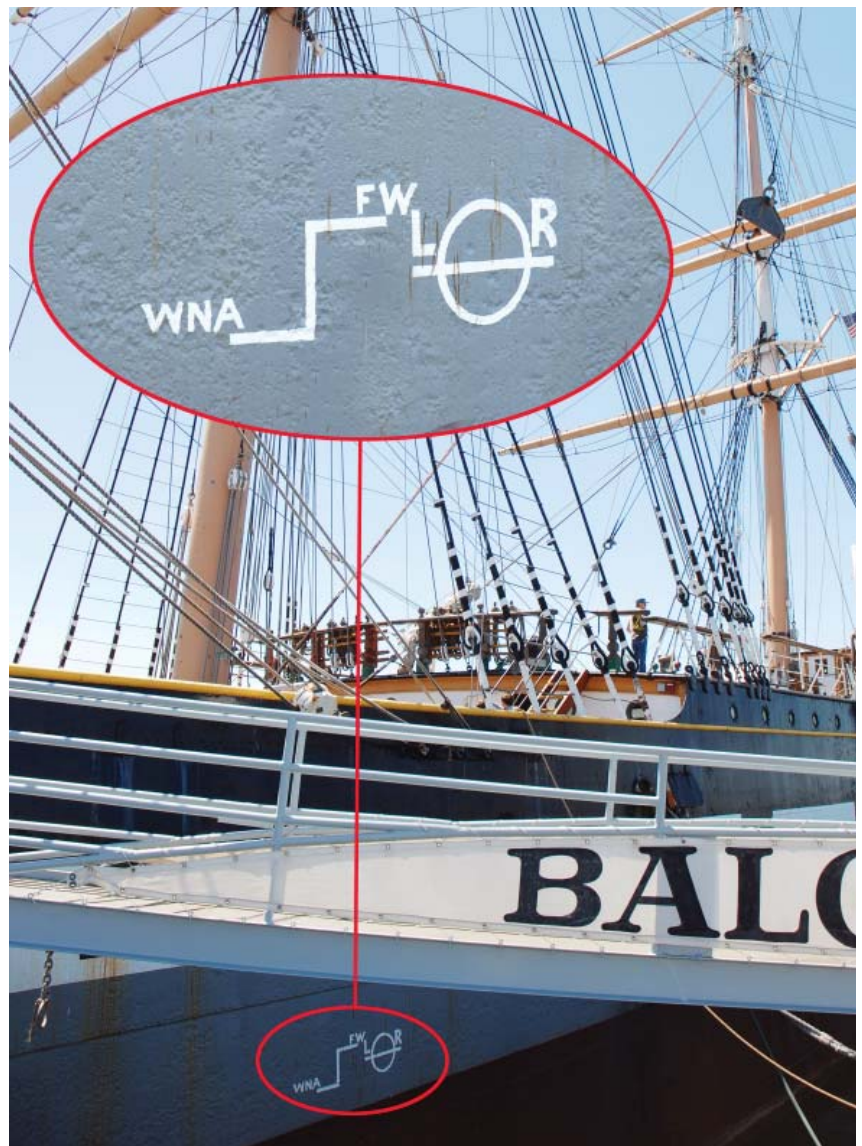
It is easier for ships to float in saltwater, too. Two properties of water -- temperature and salinity (saltiness) -- affect how deep a ship's hull will float below the water's surface. Warm, salty water is easiest to float in, but not all ships stay in warm, salty water as they move cargo around the world. How do captains know their ships will stay afloat from one port to the next?

Imagine you are the captain of a gigantic cargo ship. You loaded your ship in a saltwater port in Japan, traveled across the entire Pacific Ocean, and are heading to a freshwater port in the San Francisco Bay to unload.

As you travel from saltwater to freshwater, your ship's hull will sink deeper into the water. Your ship could be in danger if the load is too heavy. It could run aground, break a hole in the hull and, and, worst of all, leak fuel and oil into the water. In the 1860s, overloading was a big problem. Some ship owners filled their ships with more cargo than they could safely carry. Over and over again these "coffin ships" sank. Many sailors died and the cargo sank to the bottom of the sea. Some ship owners did not care if they lost a ship or two.

Samuel Plimsoll (1824-1898) did care, and was troubled by this thoughtless disrespect for sailors' lives. He devised a simple line to mark on the side of a ship to show the lowest level it should sit in the water. Owners could safely load a ship until it reached this line, but no further.

The idea of load lines dates back to ancient Greece and Rome, but there were no laws in Plimsoll's time requiring them to be on ships. Plimsoll fought for years to pass a law, the Merchant Shipping Act of 1876,



requiring ships owners to put load lines on ships and to use them. Plimsoll's idea, known as the Plimsoll Mark, is still used all over the world.

**Next time you see a container or cargo ship up close, look for the Plimsoll Mark on its side. Is the ship in freshwater or saltwater? Is it safely loaded? Now you know how to tell!**

Photo: This is the Plimsoll Mark on the port (left) side of *Balclutha*. The horizontal lines show how deep a ship can be loaded with cargo in different waters. If the ship was in fresh water (FW), she could be loaded (sinking down lower) until the water was even with the line below FW. If she was in salt water, then she could be loaded to the line below WNA (Winter North Atlantic).