

Loading Cargo

You will need

Round plastic bottle
Square plastic container
Tank of water
Wooden chips
Modelling material
Scissors

Many ships look as though they are top heavy, so how come they don't capsize?

When the ship tips over, the hull on that side sinks into the water. On the other side it rises up out of the water. The water creates more upthrust on the side that sinks in, pushing the ship upright again. The more one side of the hull sinks in, the greater the resistance, the harder it is for the hull to tip over further.

A catamaran is extra stable because it has double hulls against which the water can push.

The position of the cargo in the hull of the ship is very important. Heavy cargo high up on the deck makes ship top heavy and more likely to tip over. Heavy cargo low down in the hull gives the ship stability.

Cargo that can move is dangerous, because it could slip to one side of the ship causing it to tip suddenly.

You will be able to test the weights in square and rounded hulls in this experiment.

1. You will need one round shaped container
Cut a strip to make a hold.



2. You will need an open square container about the same size.

3. Put both containers in a tank of water

4. Gradually load one side of each bottle hull with wooden blocks. Which one is more stable?



5. Now load the square hull with wooden blocks.

6. Push down one side of the hull.
You will notice how the hull tries to stabilize itself.

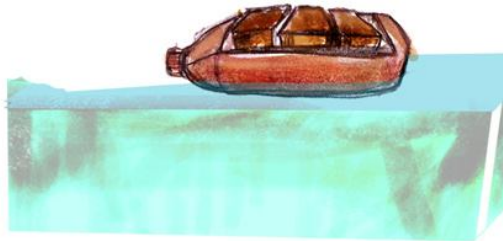
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7. To stabilize the round hull, press some lumps of clay into the bottom of the hull. This adds weight. It is called **Ballast**.

8. Now reload the hull with wooden blocks.

Can you see how the modelling material ballast low down in the hull has made the craft stable?



When a round shaped hull tips to to one side, there is very little change of hull underwater. This makes the shape is unstable.

Meanwhile when the square hull tips to one side there is great change in the amount of hull underwater on that side. This makes it more stable.