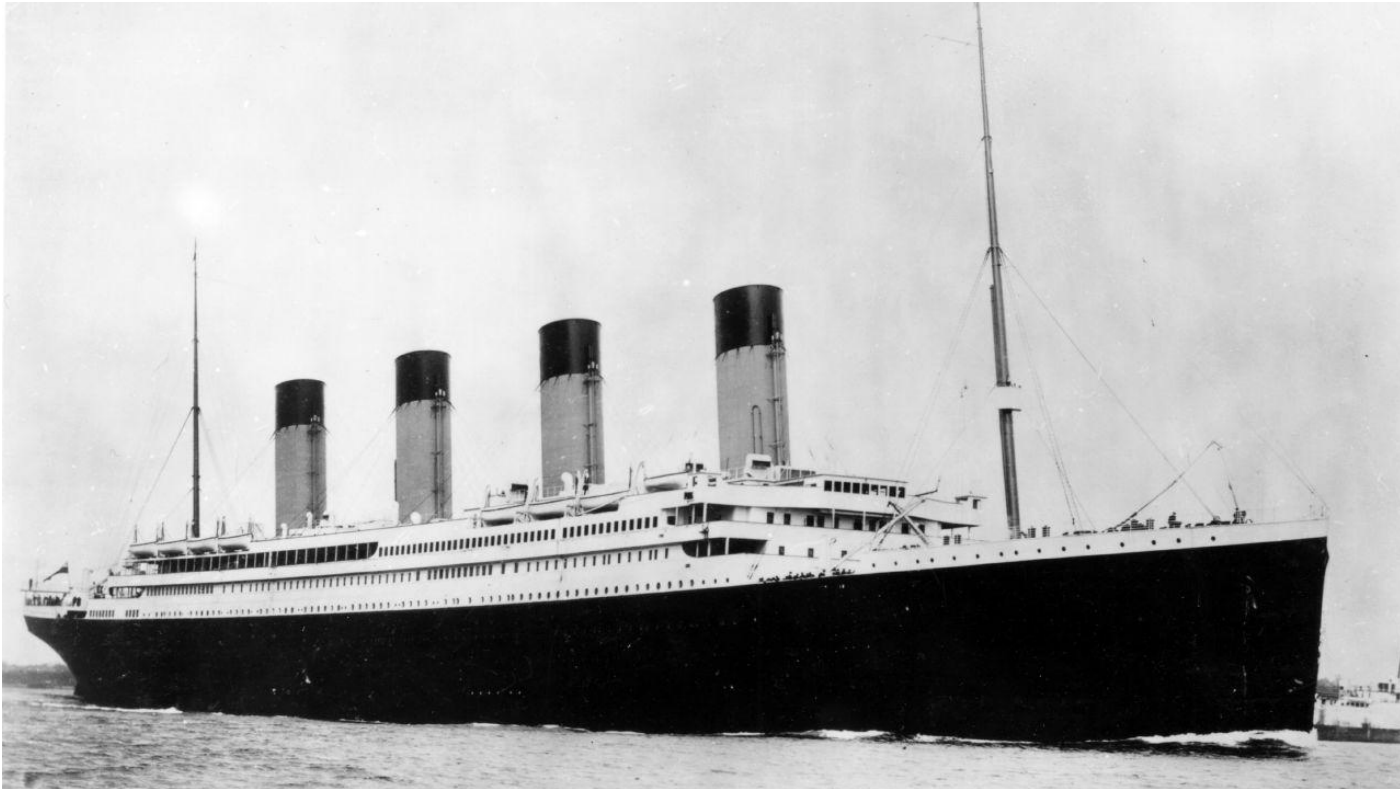


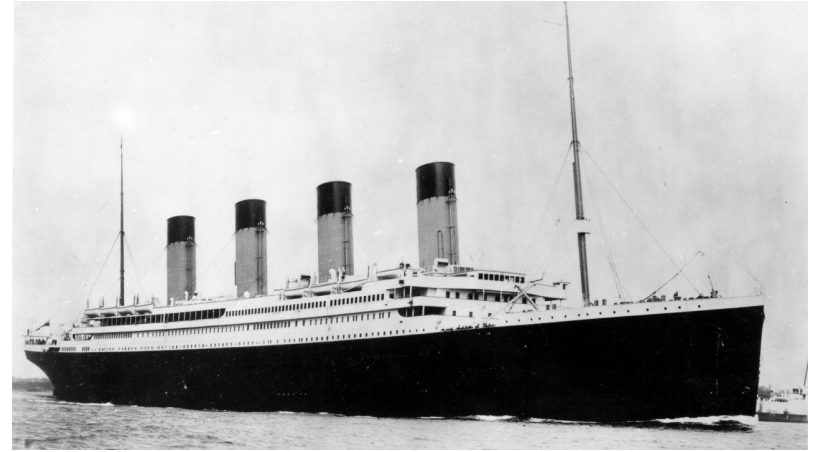
Watertight Bulkheads



What do you know about the Titanic?



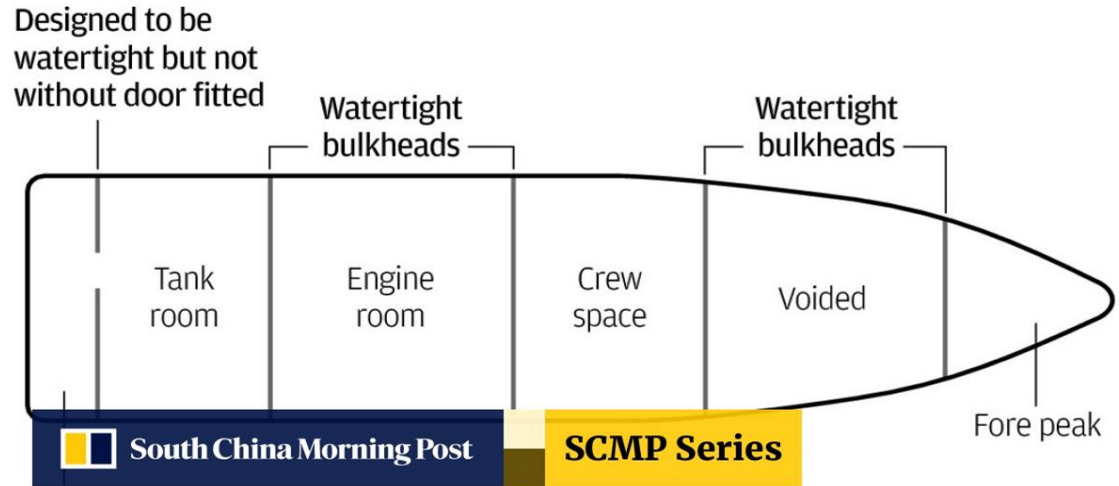
- A floating ship displaces water whose weight equals the ship's weight.
- After the collision, water flooded several compartments near the bow.
- The added water increased the total weight, so the ship settled deeper. Flooding spread and eventually the ship could no longer remain afloat.



Watertight Bulkheads

Watertight bulkheads are walls that divide the inside of a ship into compartments.

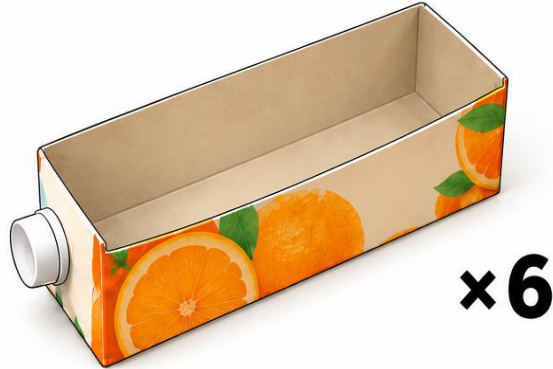
They can restrict flooding to damaged spaces when their seals hold and water cannot pass above them.



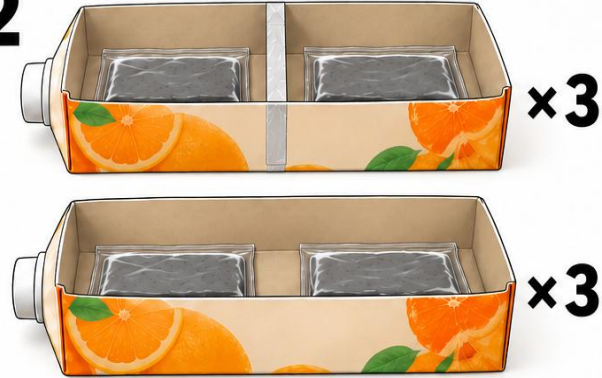
Prepare the model ships

Cut open six similar cartons. Fit and seal a bulkhead in three; leave three without one.

1



2



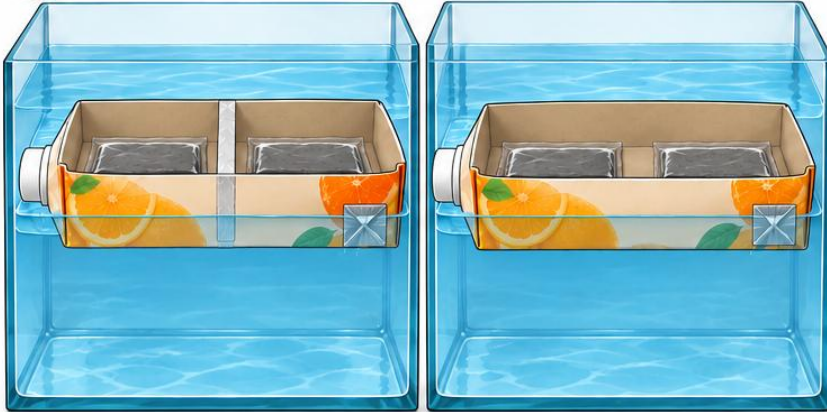
Check each divider for leaks, then empty and dry the boats.

Float and test both models

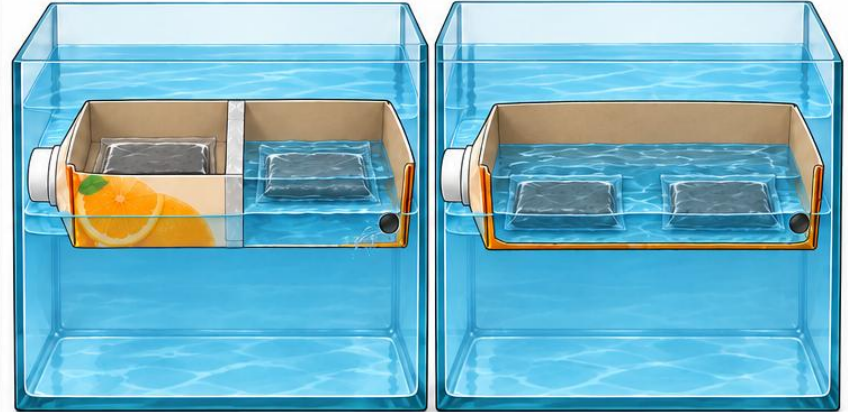
3 FLOAT BOTH MODELS

4 TEST BOTH MODELS

3



4



Each panel: bulkhead on left, no bulkhead on right. The cutaways show possible results.

Method

1. Put flat bags of clay in matching positions. Match the complete boats' mass and balance.
2. Make equal-sized holes at the same end of each boat, about 1.5 cm above the bottom. Cover it with waterproof tape.
3. Float a boat. Check the hole is below the waterline, then remove the tape and start the timer.
4. Record where the water spreads and stop when outside water reaches the rim, or after 5 minutes. Note any capsizing.
5. Test three fresh boats of each type and compare the results.

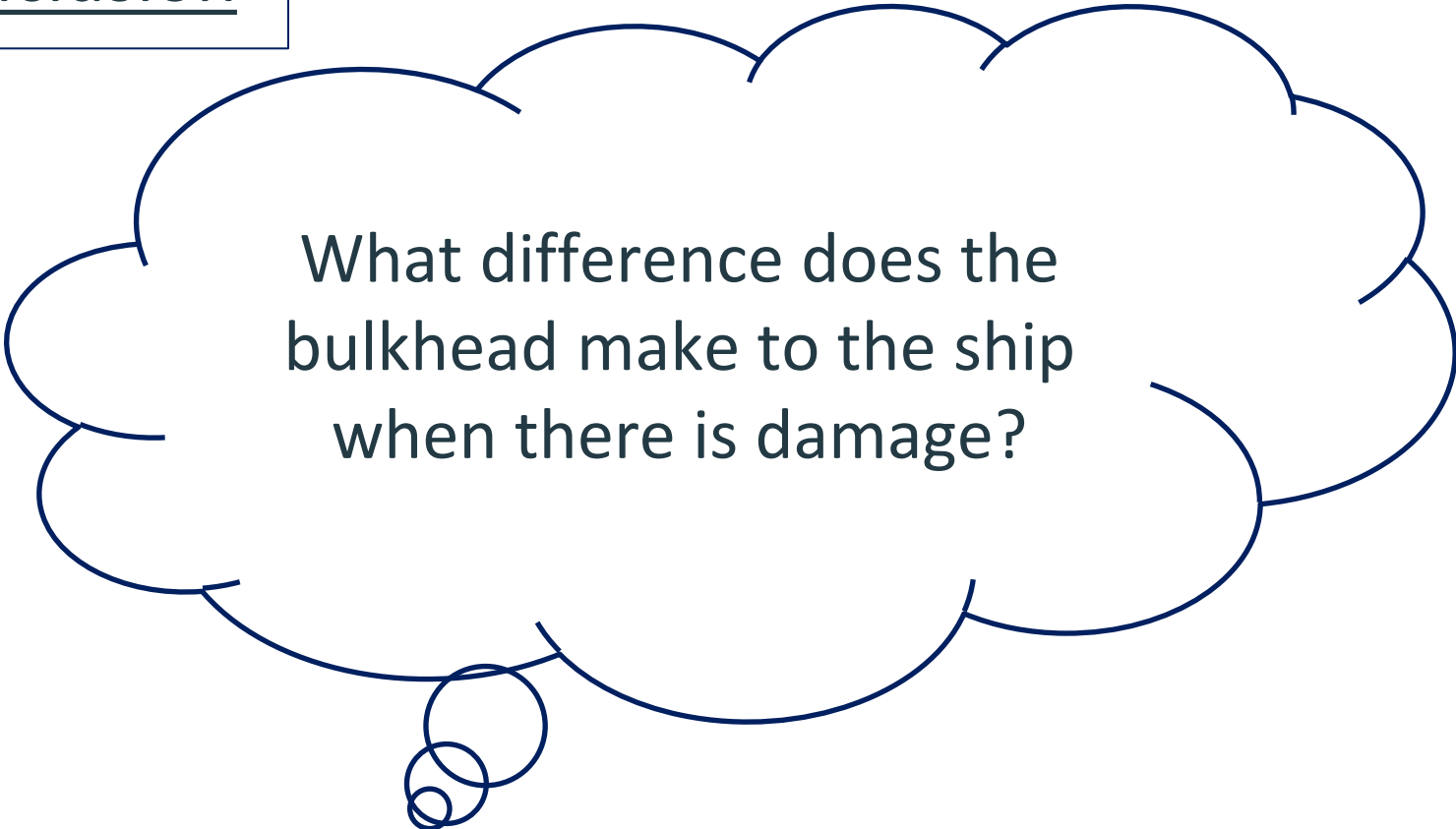
Variables

Independent variable: presence or absence of a bulkhead

Dependent variable: time until the outside water reaches the rim; record where water spreads and whether the model stays afloat.

Control variables: model size, total mass and balance, hole size and position, starting waterline and water depth.

Conclusion



What difference does the
bulkhead make to the ship
when there is damage?

The watertight bulkheads on the Titanic

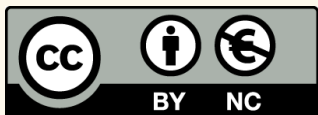
Titanic had 15 major transverse watertight bulkheads, dividing the lower hull into 16 main compartments. Some openings had watertight doors.

The collision damaged several forward compartments. Five flooded heavily; damage also extended into the next compartment.

As the bow settled deeper, water could flow above the tops of bulkheads into further compartments. The carton model has just one hole, so it simplifies what happened.



Remembering Titanic



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