



Structures

Thames barrier



How does flooding in London happen?

1. Flooding from the river source

When there is precipitation at the source of the River Thames in Kemble, it takes a while to reach London. If there is also heavy precipitation in areas where there are tributaries of the Thames as well as in London, then there is potential for floods (especially when combined with a high tide – as the river is affected by tides in London).

2. Flooding from the North Sea

When there is a storm in the North Sea, surges can happen which means that sea levels are higher than normal. Additionally, when there are high tides, there is often not much room for much more water in the river in Central London.

Tidal, tides: marée(s)

Storm surges: ondes de tempête

Tidal surge : raz de marée

Q1- Put an arrow on the map to indicate the direction of the river flow



History – Designing flood defense

Over the centuries London has been subject to serious flooding.

In 1928, 14 people died and thousands were made homeless when a tidal surge poured over the Thames embankment.

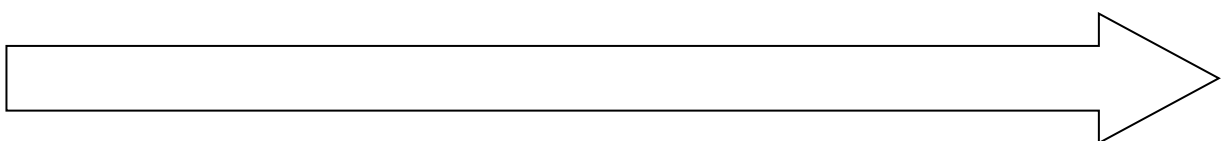
It wasn't until 1953 however, after the North Sea Flood killed 307 people in the UK, that plans were made to defend London from future floods.

Lengthy debates ensued about how to create a barrier that could both defend against tidal surges and let ships pass through. The breakthrough came in 1966 when Sir Hermann Bondi was commissioned by the Government to write a report on flood defense; he concluded that a moveable barrier was the best solution.

Construction on the Thames Barrier began in 1974 and it was officially opened a decade later.

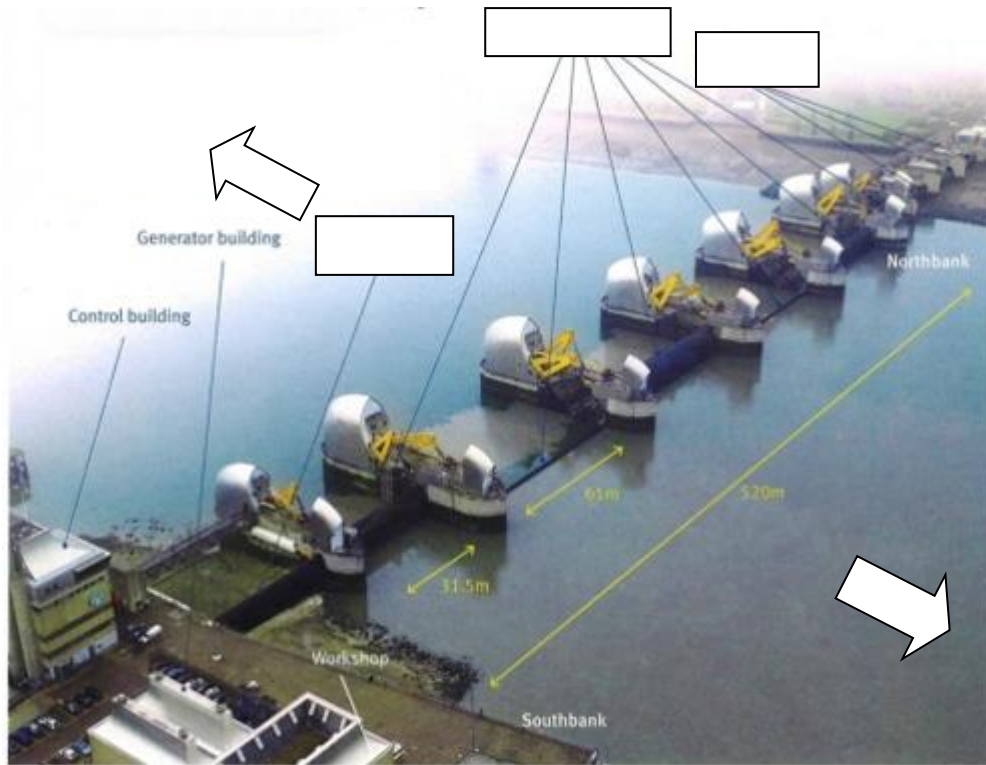
The barrier was originally designed to last up to the year 2030. Recent analysis suggests that even with sea level rise from anticipated climate change the barrier will be sufficient protection until 2060-70.

Q2- Complete the timeline



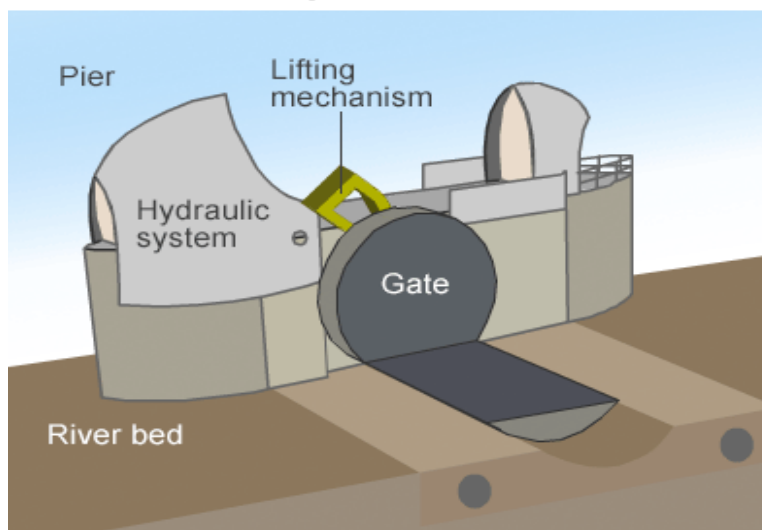
How does the barrier work?

Q3: Label the picture with the words: *Falling radial gates, rising sector gates, pier, East, West*

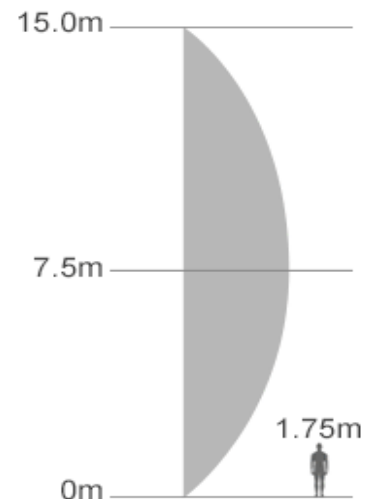


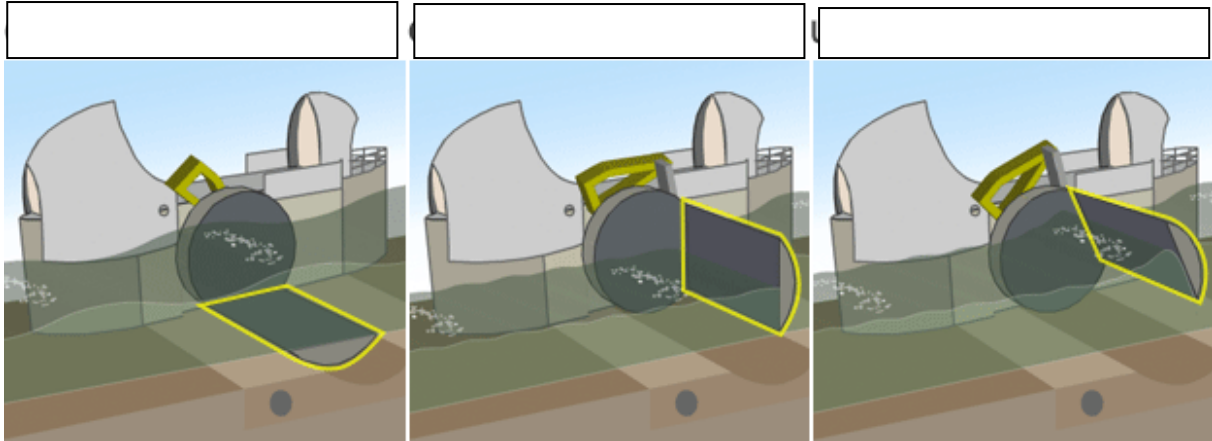
In non-flood conditions, the gates lie flat on the river bed, allowing free passage of river traffic.

Thames barrier explained



Scale of barrier gates





Q4- label the pictures with: *underspill position, open position, closed position*

- **Open** - Allows the Thames to flow freely and ships to pass through the gates
- **Closed** - Creates a solid steel wall preventing water flowing upstream towards the capital
- **Underspill position** - Allows a controlled amount of water to pass under the gate and up the Thames

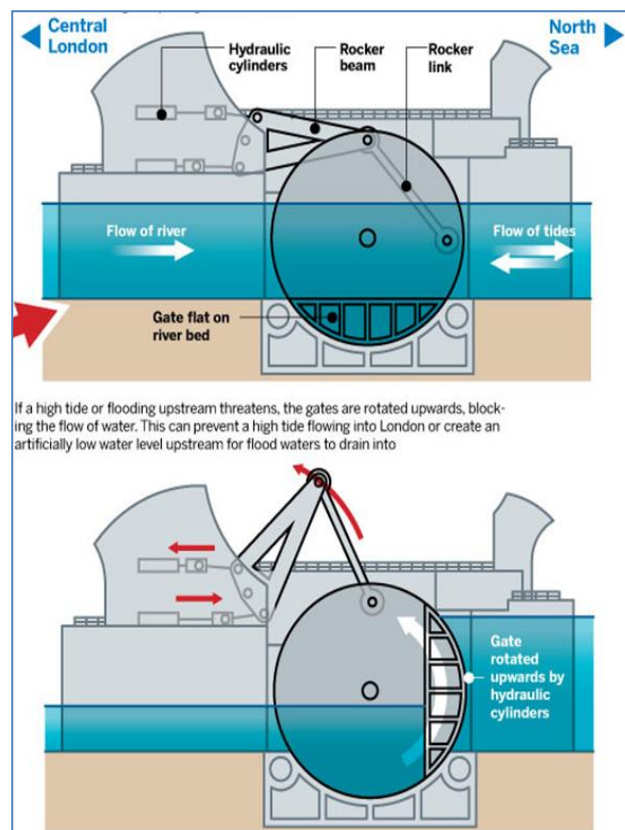
The barrier, made up of 10 steel gates, reaches 520m (1,700ft) across the river. When open, the gates lie flat on the river floor and close by being rotated upwards until they **block the river**. The four main gates span 61.5m and weigh more than 3,000 tonnes each. The barrier is closed just after low tide to create an empty "reservoir" for the river flow to fill up. It takes 75-90 minutes to close it, starting with the gates on the outside until the middle gates are shut.

London's steel wall

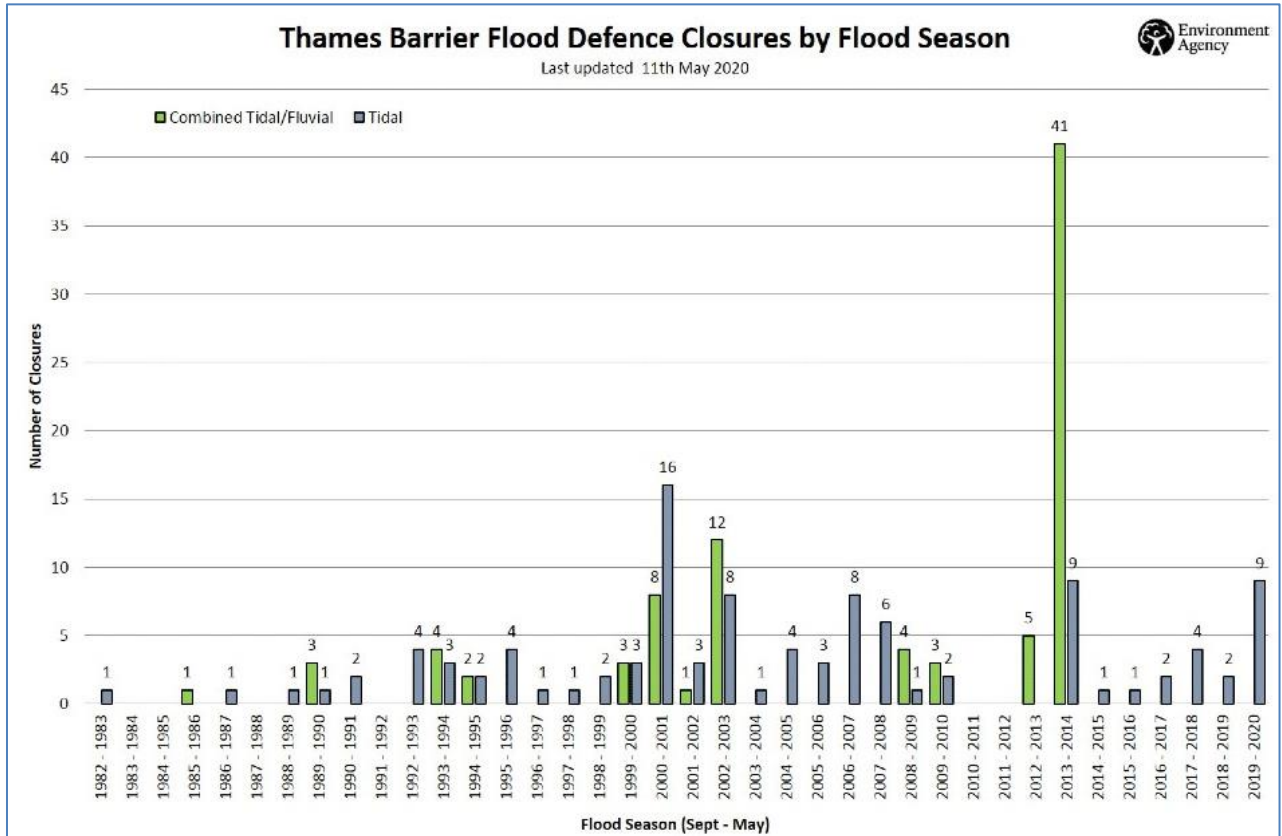
The floodgates are circular segments in cross section that are turned by enormous, hydraulic rocker beams.

What is clever about the design is that the floodgates can be raised to allow some water to flow underneath so that the upstream and downstream equilibrium can be maintained as much as possible.

The Thames Barrier is only be reopened once the water level upstream of the barrier matches the level downstream.



How often is it used?



Q5- Describe the graph. How can you explain it?

Climate change

Climate change affects us all, but how do designers approach the problem of rising water levels? There are some examples below.

Q6- What's your opinion on these designs?

