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## Thames Barrier

A few weeks ago I visited the Thames Barrier in South London to see the gates in operation on one of their monthly tests. The day was cold, but bright and dry, so I looked forward to being able to view all the gates across the river. Following their provisional time schedule on their website, we made an effort to get there early but on arrival saw that one of the gates was already closed. We walked further along past the barrier. A short while afterwards, we heard a siren go off and noticed that the smaller landward barrier, which normally rests aloft, had been lowered. We rushed back to our first viewing place, on the downriver side of the installation, in order to get in a good position for some photographs.

I am not quite sure what I expected, maybe a giant wall of steel surging out of the murky waters amidst a pile of foam, waves and sloshing sounds, suitably dramatic to match the importance of the work that it was built to do. It was nothing of the sort. The curved gate rose extremely slowly from its position on the riverbed, and its progress towards the surface could be tracked by observing the rotation of the circular trunnion shaft, with its rows of protective wooden rubbing strips, which enabled us to see how far round its quarter circle it had travelled. Eventually a very thin black line grew out of the water and became thicker and thicker. Seagulls flew over it, as if they were in a hurry to get through the gap. Some ducks were swimming about at the base of the piers and, as the mighty gates rose in ultra slow motion, not the slightest little wave came their way to disturb their meanderings. This is of course exactly as the designers planned it, so that there is no disturbance to ships or shore through unexpected waves caused by its operation.

The siren sounded before each gate started moving, but I don't think it was for visitors with cameras, although it was a handy signal to switch on, point and zoom in. We saw one of the barriers go

up and down twice and we joked amongst ourselves that maybe they had to check something again, a bit like going back to the house before a day's outing, to make sure that you really have locked up properly. Using their own computer models of the conditions, supplemented by information from the Meteorological Office, the National Tidegauge Network, coastal stations and other sources, the necessity to use the barrier can be forecast 36 hours in advance. During this time the Duty Controller has to make his decision and, if the barrier is to be deployed, he must advise river traffic and users, instruct the closure of the smaller gates on the tributaries, and then close the barrier itself just after low tide. The normal sequence is to close the landward gates first and proceed towards the centre. The gates are opened some time during the next low tide, when the water level is the same on both sides.

London's flood defences were rebuilt after the North Sea floods of 1953, when a high spring tide combined with a heavy storm travelling round the coast of Scotland resulted in a swell of high water being funnelled southwards, affecting Holland, Belgium and down the east coast of Britain. There was no night-time radio broadcasting, and areas already affected had their telephone lines destroyed and so could not warn those further down the coast. Sea defences were breached, the land inundated, and people and their homes were swept away at night without warning. Residents had no chance to make plans to evacuate or prepare in any way. The only means of communication in the areas were amateur radio operators who formed a voluntary network. Loss of life included those on ships and fishing vessels that were lost at sea. After this catastrophe, in Holland the Delta Works scheme was planned to protect their land from inundation via the river estuaries, and in the United Kingdom improved flood defence plans were drawn up, with the Thames Barrier designed to safeguard the City of London.

## Thames Barrier

The pier engine houses are the best-known and recognised part of the installation and are constructed of timber frames with a cladding of steel sheets. There are ten gates spanning the river, six navigable ones, with their rising gates resting on the riverbed and four non-navigable ones at the banks whose gates are kept aloft and then lowered when required. The rising gates are made of hollow cells, so that air and water can enter and leave as the gates change position. Each rising gate weighs fifteen hundred tonnes and the gate arm attached to the trunnion shaft weighs eleven hundred tonnes, most of which is solid steel blocks to counterbalance the weight of the gate. Each shaft is rotated by a rocking beam, using an oil hydraulic system powered by 190-horsepower electric pumps. Underneath each gate is a curved concrete cill, the largest of which weighs ten thousand tons. Underneath the cills are pairs of service tunnels running between the piers containing power cables, services and drains. The riverbed between the piers is protected by a filter layer of 6-tonne rocks to prevent the scouring of the bed as the water flows faster between the piers.

Since it became operational in 1982, the Thames Barrier has been raised over one hundred times. Smaller gates on other tributary rivers along the Thames are also operated in conjunction with the main barrier. Its protection works both ways, as floodwaters from upstream can also pose a threat if they are prevented from flowing away to the sea by an oncoming high tide. Closing the gates keeps the tide waters out, thus retaining the low level on the upstream side of the barrier and giving the floodwaters more room to collect safely, before being released on the following low tide.

I lived near the Thames for many years, with my home overlooking the town of Greenwich and the river valley. The river seemed to represent not only the backbone of the City of London, but also a more natural and uncontrollable element of the landscape. It appears to be well tamed, with the jetties and miles of warehouses, factories and ships making full use of the watery highway, and the embankments and riverside paths seemingly defining its boundaries. But I knew that rivers are by nature not willing to be tamed and on a wild stormy night of heavy rain I would sometimes imagine looking out of the window at first light to see the whole river valley under a sheet of silent grey water, not really possible with the 50 metre height difference between the river and the flat high ground along whose edge the houses in our road were situated. My anxious flight of imagination was easily dismissed, but those who live in the areas threatened by Thames flooding might find it reassuring to visit the barrier on one of its test days, to see the means of their protection in action. (1195 words)