

Visit report 11/12/2016: West Closure Complex

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Thursday the 11th of October, we visited this morning the West Closure Complex where we got a tour around the complex. The project is part of the drainage system of New Orleans. In 2005, Hurricane Katrina emphasizes the hazard of hurricanes when it made landfall with catastrophic consequences. After this event the United States Army Corps of Engineers began the daunting task to restoring the city and make a plan to prevent New Orleans against flooding and hurricanes in the future. From this, a new drainage system was designed with among others the West Closure complex. The project consists of a pump station, a large navigable sector gate, sluice gates and several floodwalls and levees. No other pump station in the world is of this size and has the capability to discharge 550 cubic meters per second. In other words, the pumping station can fill an Olympic-size pool in less than 3 seconds. The structural features of the project reduce the risk associated with a storm surge event that has a one percent chance of occurring in any given year, so a 100-year storm surge. The total construction value for the West Closure Complex was about \$1.1 billion.

When we arrived at the project location a dark smoke cloud overshadowed the West Closure Complex, first we thought it was a fire but it turned out that they were testing the 11 pumps, each driven on 5444 horsepower Caterpillar engines. Later we were told that they do not limit the CO₂ emission, obviously they see it not as an important issue. Every two weeks the system is tested. The pumps will therefore be turned on for 45 minutes and the sector gate will be closed, which takes only 7.5 minutes to close. Compared to the Netherlands the frequent testing seems to be very often, in particular when knowing the amount of diesel what is used for this purposes. For instance, the Maeslantkering is closed only once a year for testing. On the other hand, it is of course very important that everything is working well, in particular in the hurricane season. Maintenance they take very seriously, it takes about 3 months to complete all the testing to look if everything works fine, after which they start again. For maintenance on the sector gate they can close half of the 69-meter width sector gate, which makes it possible for ships to passing by at any moment. Also they can lift components out of the sector gate and transport to a dry dock for maintenance.



Figure 1. Caterpillar engines for the pumps.

The reason that the sector gate can be closed in only 7.5 minutes is that when high water is coming and the sector gate need to be closed, vessels with dangerous goods must be able to enter safely which can take some time. After which they are safe the sector gate can be closed very fast which makes it more flexible. In front of the pumping stations some mooring places are present, however last year a mooring attempt by a vessel went wrong. Today they were still busy with renovate the mooring place. The sector gate can be closed by a hydraulic system, which makes it a quite simple but effective system. A backup eclectic engine is also present to close the gates when the hydraulic system fails.

When a serious hurricane is passing by there is a safe house inside the pumping station, where also the control room is located. The safe house is protected by a 1-foot-thick concrete wall with can withstand wind speeds up to 220 miles per hour. There is always enough fuel that people can live up to 7 days in this safe house. When a hurricane is approaching, there is 220.000 dollars of fuel present in the storage tanks, this seems to be enough to run on full power for a while. A great advantage of the West Closure Complex is that it is completely independent, because it operates on its own. The pumping system working in groups, with a minimum number of 3 engines to run the pumps. There are also 4 back-up engines present when a pump fails.



Figure 2. Outflow of the pumping station.

When the sector gate is closed during a storm event, the pumps can discharge about 550 m³/s. The pumping station is always able to discharge at a maximum level, even there is a water surge at the outflow side, the pumping station can work on full power. This in contrast to the other pumps we visited earlier this week at the Permanent Canal Closures and Pumps Project.

The last time when the system was used was in 2012, when Hurricane Isaac made landfall. This hurricane was not as big as Hurricane Katrina but the system did work well.