

The protecting barrier

Protecting the Eastern Scheldt flora and fauna

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A barrier was needed to protect the Dutch coast and its hinterland from the fierce storms of the North Sea, but such a barrier would have destroyed a unique estuary environment with all its flora and fauna. A lively social debate in the seventies led to the Dutch parliament in 1979 approving the building of a storm surge barrier with moveable gates. These gates would allow the microenvironment within Eastern Scheldt estuary to be maintained while protecting the land from storms. In 1986 ABB commissioned a complex redundant system for the control of the 62 gates of the barrier. After 18 years of failure-free service, this system has been upgraded to the modern Industrial IT architecture during the fall of 2004.

Bursting of the dikes

In February 1953, disaster struck. A large part of South-West Holland, especially the province of Zeeland, was hit by the pounding surge of the North Sea flooding the lowlands and killing nearly 2000 people. To avoid another catastrophe of this magnitude, the Delta commission was appointed and within one year the Delta plan was enacted. Dikes and dams were built or strengthened to close off the raging and unrelenting sea. This ambitious public works program shortened the Dutch coastline by 700 kilometers, creating an entirely new landscape of beaches, sandbars, lakes and recreational areas, all protected from the tide and the sea by fixed barriers. The Delta Works program was implemented along the coastline from Rotterdam to Antwerp during a period

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Eastern Scheldt storm surge barrier with its unique sand dunes.



of some 30 years. One of the last parts to be protected from the impact of the North Sea was the Eastern Scheldt estuary in the south of Holland 1.

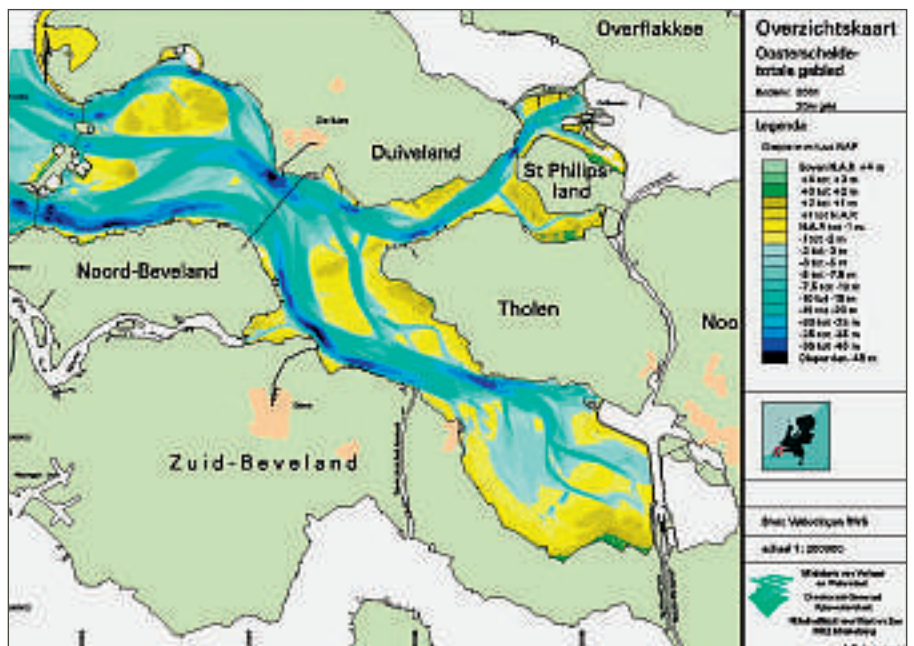
Saving the Eastern Scheldt estuary

The unique ecology of the Eastern Scheldt estuary became a political agenda item during the 1970's leading to an

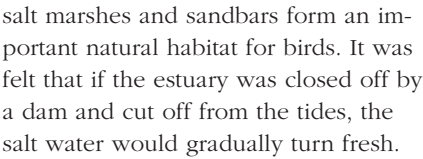
intense environmental debate. 2 shows the location of the estuary in the southern part of Holland. The clean salty seawater provides rich feeding grounds for many kinds of animals. Fish use the estuary as a nursery. Unique plants grow in this fertile microenvironment. Large-scale oyster, cockle and mussel farming also takes place there. Mudflats,

2

Eastern Scheldt estuary with the storm barrier constructed in three parts between two islands.



The Eastern Scheldt storm surge barrier.



ecological and environmental debate that led to the decision to build a Storm Surge Barrier with movable gates rather than permanently dividing the estuary from the sea.

The design selected has three barrier sections between two islands. In total there are 62 movable steel gates ³, each 45 meters wide. The gates are mounted between pillars resting on a strong foundation. Under normal weather conditions they are wide open allowing the tide to move freely. During severe storms in the stormy season from October to April, they are fully closed to protect the lowland from flooding (perhaps twice a year). Built to last for more than 100 years, the gates with their singular priority to close whenever a storm hits needed a complex redundant control system. ABB was given the order for this in 1983 and Queen Beatrix inaugurated the barrier in October 1986.

Each gate is equipped with a Local Control Computer system (LCC). Supervising the 62 LCCs is a CCC – Central Control Computer. The original order for the LCCs consisted of 252 MP100 and 126 MP200 connected in a redundant configuration with an additional 8 MP200 and 4MV 850 for the CCC. The total installed I/O count exceeds 25,000 signals. After 18 years of successful operation, the owner (the Government of Public Works and Transport: department of Rijkswaterstaat or RWS), decided the time had come to modernize the system. In 2003, a revamp order was given to ABB Holland to replace the old components with Industrial IT products.

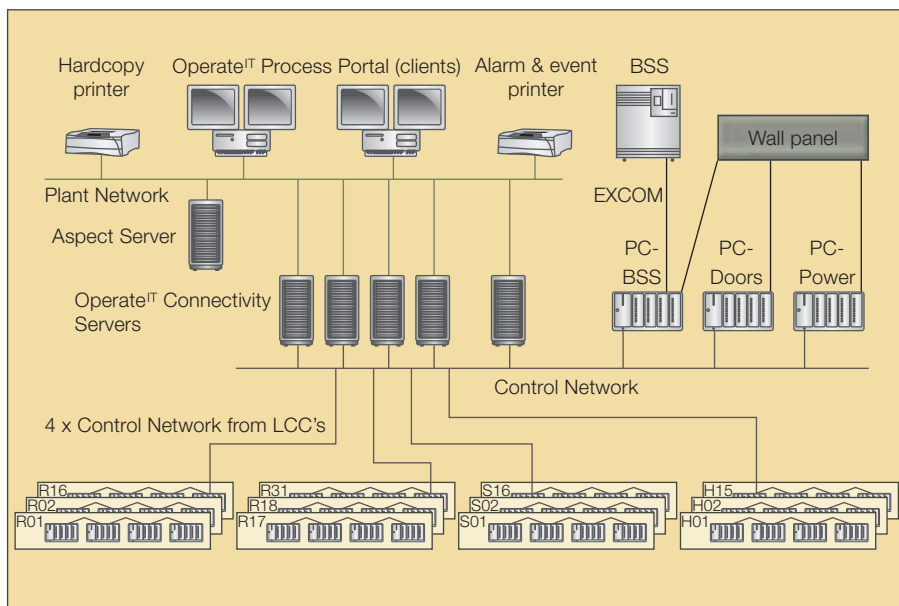
In close cooperation with Mr. Jan Bosland and Mr. Jan Lindenbergh from Rijkswaterstaat, Directie Zeeland, an inventory of required activities was made during the stormy season, during which

Configuration of LCC with AC800 M units.



5

CCC configuration.



period no major maintenance work of the barrier was allowed. The new solution was scheduled to be in operation by October 2004. A step by step approach was chosen in which each gate is

equipped with an engineered, produced and tested Industrial IT control panel.

The Eastern Scheldt storm surge barrier is now equipped with a modern control system that is ready to go to battle during inclement weather conditions.

The gates are refitted one at a time – this permits the closing of the gates during the renovation in case extreme weather condition in combination with high sea levels should occur. In August 2003, one of

the LCCs was replaced with the new Industrial IT control panel. 4 depicts the LCC configuration with AC800M modules which replace the old MP100 units.

After successful in-situ testing, ABB proceeded to install the other 61 panels. The complete task includes 250 AC 800M controllers with Process Portal A as HMI. The supervisory level was also reconfigured and modernized as part of the project. 5 shows the configuration which replaces the old CCC system.

The software that had operated the gates for 18 years without failing had to

be transferred to the new hardware without having to reprogram all units. Being able to accomplish this was the key factor for granting the revamping project to ABB. Using CoLT (Control Language Translator), the ABB Master software could be reused and RWS and ABB secured the reliability of the barrier, saving costs in software engineering.

Equipped for decades of service

A poster, 6, used in the exhibition room at the Eastern Scheldt barrier speaks of the trust RWS has placed in ABB. In September 2004, the new Industrial IT based control system took over responsibility from the successful old servant of 18 years.

The Eastern Scheldt storm surge barrier is now equipped with ABB's new Industrial IT control system and is ready to go to battle during inclement weather conditions and to protect the Dutch and their environment from flooding for several decades to come.

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The water was up to here, Tom! – from a poster at the Eastern Scheldt visitor center.



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