

# A New Sea Lock in Terneuzen with the same size lock chamber as the Panama Canal Expansion Project

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Terneuzen, a city in the Netherlands with a little over 55.000 inhabitants, is housing a lock complex with three sea locks connecting the Scheldt River to the Ghent-Terneuzen Canal. This canal is the main waterway to the inland Port of Ghent (Belgium) and is a part of the Rotterdam-Paris inland waterway route, one of Europe's busiest navigated canals.

The current lock complex is showing long waiting times for inland navigation and is since a certain time at its maximum capacity. To improve the access to the ports of Terneuzen (NL) and Ghent (BE), and to facilitate a fluent passage for navigation, the governments of Flanders (the Northern Community in Belgium) and the Netherlands decided in 2012 to build a new and bigger sea lock in Terneuzen. With a lock chamber of 427m by 55m, the New Lock in Terneuzen will have the same size lock chamber as the Panama Canal Expansion Project that became operational in June 2016.

Today, there are 3 locks on the complex: an Eastern (since 1960s), a middle (since 1910) and a Western lock (since 1960s). The New Lock will replace the oldest, but still functional, middle lock, and will be operational by mid-2022 after a building time of 4 years. The lock complex will remain operational throughout the works.

For the construction of this project, a Design and Construct (D&C) tender was put on the market by the Flemish-Dutch Scheldt Commission (Vlaams-Nederlandse Scheldecmissie, VNSC, a partnership between the Netherlands and Flanders for jointly managing the Scheldt estuary). After one year of tendering, the Joint Venture *SASSEVAART* was elected in September 2017 as the contractor for the New Sea Lock in Terneuzen. The contract value is € 753 million incl. VAT. The Joint Venture Sassevaart consists of the Belgian marine contractor group *DEME* (with its companies *DIMCO B.V.* and *Dredging International N.V.* ), the Dutch group *BAM* (with its Dutch company *BAM Infra* and the Belgian *BAM contractors*) and the Belgian Contractor *Algemene Aannemingen Van Laere N.V.*. Also the company *Engie* and the consultants *Arcadis* and *IV-infra* will work on this contract as subcontractors for *Sassevaart*.

In the full paper more details will be given on the tender procedure, the construction phases and how they are designed to have minimal disturbance on the navigation. Also the first works in the field will be discussed. In this abstract, only a few of the design considerations to reduce navigation disturbance are given, along with some numbers to emphasize the magnitude of this spectacular sea lock project in the Southwest of the Netherlands.

## Minimal navigation and construction disturbance

To have minimal spatial impact, it was chosen to build the lock from water and only work within the final contour of the sea lock and its quays. An optimal cost versus space versus navigation disturbance ratio was found by Sassevaart.

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The contract requires that the Eastern and Western Lock should be fully operational at all times, where the middle lock – the one to be replaced – can be taken out of service during the construction period. One of the reasons this tender was won by *Sassevaart* was to keep the middle lock operational for ship classes up to CEMT IVa (or vessels equal in size) for most of the construction period by building a temporary waterway around the construction zone. (Conservative) tender studies proved this will reduce the lost hours of navigation by 50.000 to 75.000, and passing time for ships will be reduced by minimally 25%. This measure has an economical value of minimally € 22 to € 34 million.

Besides this temporary waterway, Sassevaart has chosen to transport only +/- 10% of the soil to be removed from the construction site (net dredging works, about 9 million m<sup>3</sup>. brut dredging works about 13.5 million m<sup>3</sup>) by using the locks. Most of the soil is transported towards the side of the lock where it will be dredged; a large part is transported via pumping lines (both floating and shore lines) over the lock complex. The remaining percentage of soil that is being transported by barges using the lock is shifted as much as possible to the lee hours of the locks.

Sassevaart will also install extra mooring and berthing facilities to improve the waiting quality for the ships.

#### Facts and figures

The New Lock has a lock chamber of 427m by 55m and has a concrete floor at -16.80m above NAP (with NAP the Dutch reference level). The Ghent-Terneuzen Canal has its still water level at +2.13m NAP, whereas the Scheldt River fluctuates between -1.89m NAP and 2.29m NAP in daily situation.

This New Lock will allow passage for large seaworthy vessels of 366m long, 49m wide and a draught of 14,5m.

The expected amounts of concrete are 300.000m<sup>3</sup>, 32.000 tons reinforcement steel, 10.000 tons construction steel for building the lock gates and bridges and another 50.000 tons of construction steel for piling and steel sheet walls.

This New Lock, just as the Western and Eastern locks in the Terneuzen's lock complex that just have been renovated for this purpose, will be operable from a distance.