New Sea Lock IJmuiden
Topics

• Contractual organization OpenIJ
• Introduction, scope and design principles project
• Facts and figures
• Aerials from the project (historic and current)
• Main construction elements:
  • diaphragm walls, lock heads, lock operation building and lock doors
Contractual situation
Introduction project

• Replacement of the Northern Lock in IJmuiden

• A new, larger sea lock to improve the accessibility of the port of Amsterdam and stimulate the economy in the region

• The new lock is 70 meters wide, 500 meters long and 18 meters deep

• Construction started in early 2016 and the new lock will be available for shipping early 2022
Scope project

• Design, construction and finance the new sea lock

• Clearing the project area, including removal of existing cables and ducts and unexploded ordnance

• 26 years of maintaining the new lock and approach canals

• Dredging to maintain the water bed profiles for the canals of the existing locks

• Maintaining the primary water retaining structure
Design principles project

• Safety first

• Maintain the integrity of the water retaining structure during the construction of the new lock

• Minimise nuisance, hindrance, dust and noise during construction

• Ensure the stability of the existing lock structures
Construction methods

• Inner and outer lock head at maximum height for high water retention

• Minimize vibrations during construction:
  • Lock walls, middle wall and leading wall as diaphragm walls
  • Lock heads built by caisson method
  • Anchoring by grouted anchors
Facts & figures

- 1.650 m diaphragm wall
- 3 sliding gates of 3.000 tons of steel each
- 10.000 tons of sheet piles
- 7.500 tons of tubular piles
- 2.000 anchors
- 290.000 m³ concrete
- 33.000 tons of rebar
- dredging of 4.500.000 m³ of soil
Construction Northern Lock (1921-1928)
Construction Northern Lock (1921-1928)
November 2018
Logistic centre in Amsterdam
New Sea Lock IJmuiden

- Present
- Future

Dimensions:
- Width: 500
- Length: 70
- Height: 18
- Depth: 50

Locations:
- Spuisluis
- Noordersluis
- Zuiderluis
- Middensluis
- Nieuwe grote zeesluis
- Velsertunnel

Map of Noordzeekanaal area.
Diaphragm walls

Excavation of panel to full depth. Excavation is kept filled with bentonite suspension.

Concreting of panels. Stopends and reinforcement cage positioned. Concrete placed through tremie pipe as bentonite is displaced.
Immersion outer lock head

- Dimensions 26 m wide x 81 m tall x 28 m high
- 24/5 immersion activities in two teams
- 24/7 real time monitoring of entire construction
- Unique combination of dimensions and techniques
  - Computer controlled immersion
  - Real-time monitoring
- Daily consultations between designers, engineers and management
Section over outer lock head
Spray jet
First day of lowering the caisson
Real time monitoring
## Real time monitoring

<table>
<thead>
<tr>
<th>Part</th>
<th>Type of sensor</th>
<th>Number</th>
<th>Measuring frequency per day</th>
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<td>Monitoring well sensors</td>
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<td>Deformation coffer dam caisson</td>
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<td>Deformation steel beams in dooropening of the caisson</td>
<td>Distance sensors</td>
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<td>Forces on auxiliary constructions in cofferdam threshold</td>
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<td>Level gauges</td>
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<tr>
<td>Tilt and deformation</td>
<td>Tilt sensors</td>
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<tr>
<td>Position of caisson (roughly)</td>
<td>GPS and total station</td>
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<tr>
<td>Position of caisson (detailed)</td>
<td>Total station</td>
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</table>
Observational method
Design lock gates

Dimensions 12 x 25 x 72 meters
Lock gates during construction
Lock gates “on the move”
Thank you for your attention