Mainport Rotterdam
Maasvlakte 2 Project

Hard sea defence 'Partnering result'

Soft sea defence (beach & dunes)
Contract 1

- 27 February 2008
- DCM: Design, Construct & Maintenance
- Requirements Chart - Verification Matrix
- Approximately € 1.1 billion, lumpsum
Contract 1
Stage 1, 2013
**Scope Contract 1**
*Contract breakwater and first harbor areas (Stage 1)*

- Hard Sea defence: 3.5 km
- Sandy coast: 7.3 km
- Harbor basin: 530 ha
- Harbor areas: 700 ha
- Quay walls: 3.5 km
- Roads: 13 km
- Railways: 14 km

- 240 million m$^3$ of sand
- 7 million tons of rock
- 20,000 concrete blocks (40 tons each)
Last stage - 2030
Planning

2006  2008  2013  2018  2023

Design  Construction  Maintenance  Ready for use  Completion

Sea defence  Sea defence

Maintenance
Division of risk

- **PMV2**
  - Change of scope outside initial requirements
  - Damage to the works by heavy storm (more than 1/50 jaar = chance smaller than 2% per year)
  - Location of sea defence
  - 5 primary licenses + planning permission

- **PUMA**
  - Durability of the construction
  - All other construction risks
  - Design sea defence and soil conditions
  - All other licenses
Hard Sea defence MV2
Total length 3,5 km

Storm 1/10.000 jaar +5,3m

msl=0

+14m
December 2008
Rocks
Delivering at Yangtzehaven
Risk Management PUMA

- **Objective:** create a risk aware organisation through keeping insight in risks en control measures.
  
  Goal → reduction of failure costs

- **Risk definition:** Uncertain events which influences achievement of objectives positive (Opportunity) or negative (Risk).

- Open communication is essential

- Risk-owners manage the risks and the action-takers are responsible for the preventive actions.
Risk Management
Top 5 risks PUMA

1. Breakdown E-crane
2. Contractual interpretation between Client and Contractor
3. Damage of underlayers of Hard Sea Defence during storm conditions
4. Damage of temporary protection of Hard Sea Defence during storm conditions
5. Dredging of contaminated soil at Maasvlakte 1
Top 5 Opportunity’s PUMA

1. Design Change into Reef Breakwater with cobble beach
2. Improvement of Human development
3. Use of broken concrete
4. Encourage Knowledge sharing
5. Close cooperation with Client for Handing over work
Quantitative risk analyses

- Based upon risk register
- All risks and uncertainties are implemented (negative and positive!)
- Use of Monte Carlo simulation model
- Outcome: total sum of the risk exposure
- Prediction of future performance against key objectives
- Sensitivity of risks is made clear
Risk management Lessons Learned

Implementation in practice

• Also contractual, communication and organisation risks, not only technical risks
• Risk Management stimulates pro-active measures
• Opportunity & Risk Workshops
• Frequent communication about risks and opportunities is necessary to keep it alive
• Task forces of engineer, preparation and superintendent
• ‘Online’ Risk file