Index

- The project
- The tender procedure
- Issues during construction
Brammen terminal

- Fabrication of slabs in Brazil by Thyssen Krupp Steel
- International tender for import location of slabs by TKS
- JV PoR with Steinweg Handelsveen won tender
- 500 m deep sea quay wall
- Inland transport (Germany, Ruhr) by barge or rail
- D&C tender, large freedom for contractors, low price, crucial time schedule
Many brammen
Location of the works
Preparation phase

- severe time pressure & financial advantage: D&C
- Start specifications and open European tender procedure: June 2007
- Target: five competent contractors
- Mid September 2007 the four contractors obtained specifications
Time line

- Start preparations: June 2007
- Start prequalification: June 2007
- Start design contractors: September 2007
- Bids: 23 January 2008
- Negotiations: 22 Feb/21 March 2008
- Contract signing: 8 April 2008
- Delivery to client: 1 April 2009
Specifications

- Tender manual,
- Conceptual D&C contract,
- (Technical) terms of reference,
- Geotechnical (CPT’s, SMTP’s, triax, etc) and environmental survey. Both on land and water,
- Inventory of the minimum required permits
- Historical analyses (historic reclamation works, existing infrastructure, possibility of wrecks and not exploded ammunition)
- No reference design was made.
- No system Engineering
### Technical terms of reference

- **Nautical length**: 500 m
- **Guaranteed bottom level**: NAP -16.65 m
- **Construction depth**: NAP -18.65 m
- **Deck level**: NAP + 5.00 m
- **Terrain loads**: first 20 m 40 kN/m², then 150 kN/m²
- **Dredging volume**: 500,000 m³
- **Bollards**: single, 1500 kN each 17.5 m
- **Crane loads**: 2177 kN/m²
- **Maximum construction time**: 1 year
- **Eastern end extendable without hinder or loss of investment**
- **Western end extendable with hinder and loss of investment**
Tender phase

- two individual meetings
- 6 bids
- Technical examination by RPW
  - Does the offer meet the specifications in the terms of reference ?!?!
  - Is the design sufficient (expert judgment) ?!?!?
  - Are there unacceptable risks?
  - Are there unidentified risks?
  - Are there any incorrect issues?
  - Are there specific positive or negative aspects?
13 AANVULLING TOT +5.00
19 VERWIJDEREN BRONBEMALING
15 UITTREKKEN DAMWAND
16 BAGGEREN TOT -17.40
ONTWERPVARIAANT COMBIWAND - VARIANT I, SNEDE 1

NEW WATERLINE

N.A.P. +0.000

DRAINAGEKOFFER
HART KOFFER DP -0.700

LEEuwANKERS Ø 101.6/23 MW450
L = 46.75 m H.O.H. 1500 mm

VERDPAAL Ø 610/660 H.O.H. 3000

P.P.N. -34.000

CA. 1675

SECTION 1 Ø 1420/16 mm
D7 01 + 2.604 [S240]
-7.000

SECTION 2 Ø 1420/20 mm
D7 01 + 2.604 [S240]

SECTION 3 Ø 1420/16 mm
D7 01 + 2.604 [S240]

+2.000

825

-2.000

-2000

-18500

-18500

-16250

-16650

-2000

-1000

-2000

-5000

+5000

-1500

+1500

-23000

P.P.N. -35.000
Parallel with the technical check by Rotterdam Public Works, the Port of Rotterdam judged the bids on 3 other aspects.

- Project management plan
- Maintenance and residual risks.
- Contribution Corporate to social responsibility targets Port of Rotterdam

Points with a similar interval
### Final score

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F = Ballast Nedam = € 25,385,000.
E = F but with diaphragm (€ >25% )
Design specifications

- Combi wall 1420-16/20 mm (L= 33m) PU18 (L= 21 m), anodes
- SI anchor 101.6 – 28mm (1 each 1.9 m, L=45 m, 35° and 40°), 2500 kN
- FSC Azobe
- Relatively high placed relief floor
- Vibro piles 610 en 740 mm (center distance 3560 mm)
Delay due to breeding sea gulls
Groundwater dewatering permit

- 7 months
- D&C: responsibility of the contractor, design and dewatering plan are related
- Construction time one year
- PoR obtained the dewatering permit parallel with the design
- Permit granted end of March
- The soil did not act as predicted
- Permit appeared to be too tight for D&C flexibility
Group dynamics by SI anchors?

- 1.9m interval
- 35° and 40° reduces risk
- SI = flexible system
- SAAF. In hollow, rod
- Check location and interval (>7x diameter)
Drilling SI anchors on Brammen
Driving MV piles on Euromax
Economies of scale

- Strong learning effect
- High efficiency at end of construction process
- Euromax 500 m in one year and 1400 m in next year
- Long quay walls (> 1km) will be cheaper m$^1$
Delivery to the client  1-9-2009
Lessons learned

- technical specs didn’t meet internal quality criteria
- endless freedom in design of the main structure
- quay furniture should be described in detail
- furniture is minor investment, but determines maintainability
- maintenance is always done by the Port of Rotterdam.
- Bad experience with DCM contracts due to frequent damage by ship collision
- separate contracted maintenance cheaper (economy of scale)
- DCM, at least 20 years
- Current practice: lowest LCC
The exception
Conclusions

- Focus on low LCC, not on low contract price
- Prescribe proven details in detail
- Combi wall cheaper than diaphragm wall (2008)
- Breading birds can delay projects for many months
- Obtaining a dewatering permit by the principal in a D&C contract should be avoided
- If measured, group dynamics can be excluded as a risk and SI anchors can be used on heavy quay walls
- The longer the quay wall, the lower the price per m³ due to optimized processes in the construction pit
- Use System Engineering in D&C contracts
Questions?