Polder Container Terminal
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Content

- Inspiration
- Port construction
- Polder terminal
- Container terminal operations
- Polder quay structure
- Water management
- Conclusions
- Comments and questions
2009

- Interview
  *What goes wrong on a container terminal when it floods?*

- Container terminal project
  *To be located on a tidal mudflat in Asia*
Modern port construction

- Few on-shore locations left
- Off-shore developments
- Land reclamation (MV2 +5m CD)
- Large volumes of good quality fill
- Dredging, transport and placing cost (€3-5/m³)
- Environmental impact of dredging
- Soil settlement
- Soil improvement
Polder terminal

- Container terminal
- Tidal mudflat along a river
- Tens of meters of soft mud
- Large volumes of fill required
- Expensive soil improvement required

Why not a polder terminal?
Polder terminal

- Suvamabhumi International Airport (Bangkok)
- Cost of raising by 2.5m (32 km\(^2\))
- Settlement problems (20m soft clay)
- Polder plan (De Weger 1993)
Terminal operations

Conventional terminal
- Quay, apron and yard all on same level
- No problems with horizontal transport

Polder terminal
- Quay on higher level than yard
- Operations - horizontal transport?
- Polder terminal quay structure?
Terminal operations

First generation automated container terminal

Photo ECT
Terminal operations

Second generation automated container terminal (Euromax and Altenwerder)
Terminal operations

Polder terminal waterside operations
Quay wall dike structure

- Conventional structures
- L.s. wall is anchor wall
- Combi wall is seepage screen
Quay wall dike structure

Landside view
Polder terminal layout
Water management

Water collection and storage

- Rain and seepage water
- Polder water fresh or brackish
- Underground drains for seepage water collection
- Storm water drains for rain water collection
- Gravel beds and/or surface water (5%-10%) for storage
- Water level fluctuations (no agriculture, no historic buildings)
- Wetland development inside the port
- Fish or algae farming
Water management

Water collection and storage
Water management

Water discharge
- Discharge sluice
- Electric pumping station
- Use only wind generated power
- Water level fluctuations allowed
Water management

Water discharge
Conclusions

Polder terminal
- Requires less fill material
- Less environmental impact through dredging
- Nature may be included in terminal
- Less settlement of yard area
- Less visual impact of yard
- Compatible with modern container terminal layout
- Existing construction techniques
- More adaptable to sea level rising
- Comments
- Questions