# Presenting

# PIANC

The World Association for Waterborne Transport Infrastructure

***Presentation by***
***Stefaan Ides & Thibaut Van Zwijnsvoorde***

***at the occasion of***
***PIANC Belgium***

**2021/05/31 online**

# MarCom

**PIANC = The World Association for Waterborne Transport Infrastructure**

**MarCom = Maritime Navigation Commission**

**19 active countries**

**Belgian representatives : Koen Van Doorslaer and Filip Mortelmans**

*https://www.pianc.org/commissions-and-working-groups/maritime-navigation-commission*

# PIANC WG186

**Safe**

**Mooring**

of

**large ships**

at

**quay walls**

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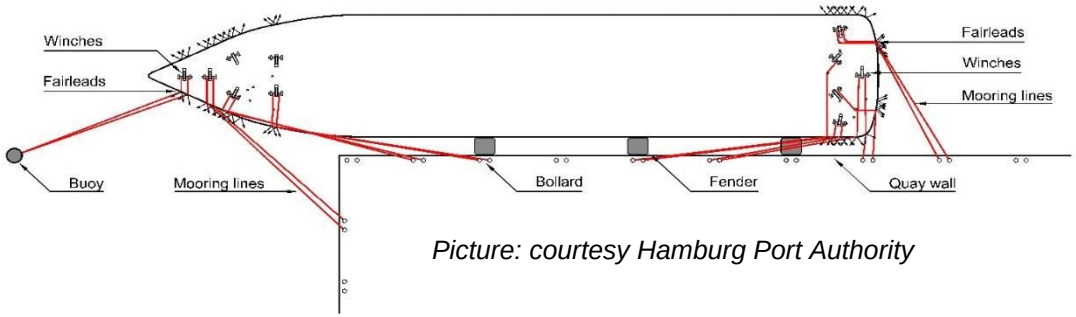
*https://splash247.com/suez-canal-blocked-by-stranded-evergreen-boxship/*




*Picture: courtesy Hamburg Port Authority*

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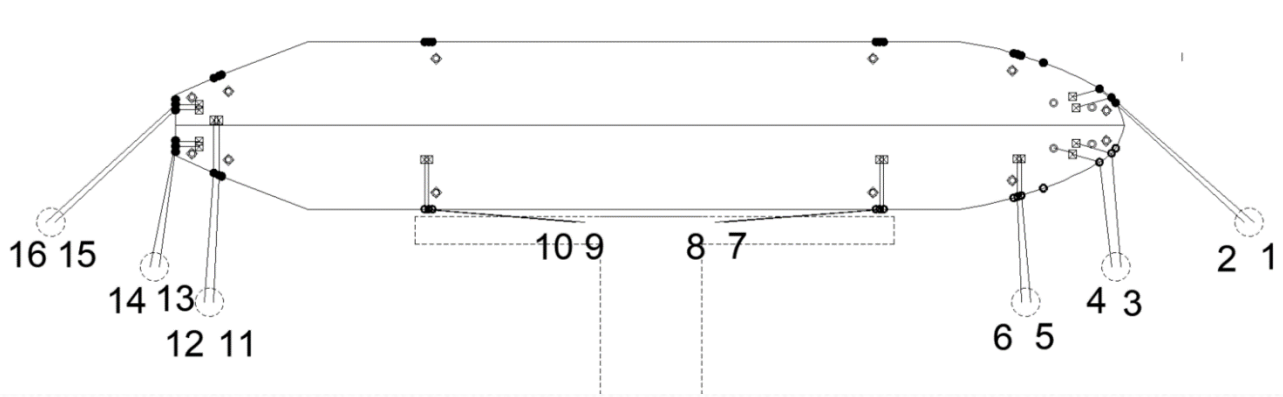


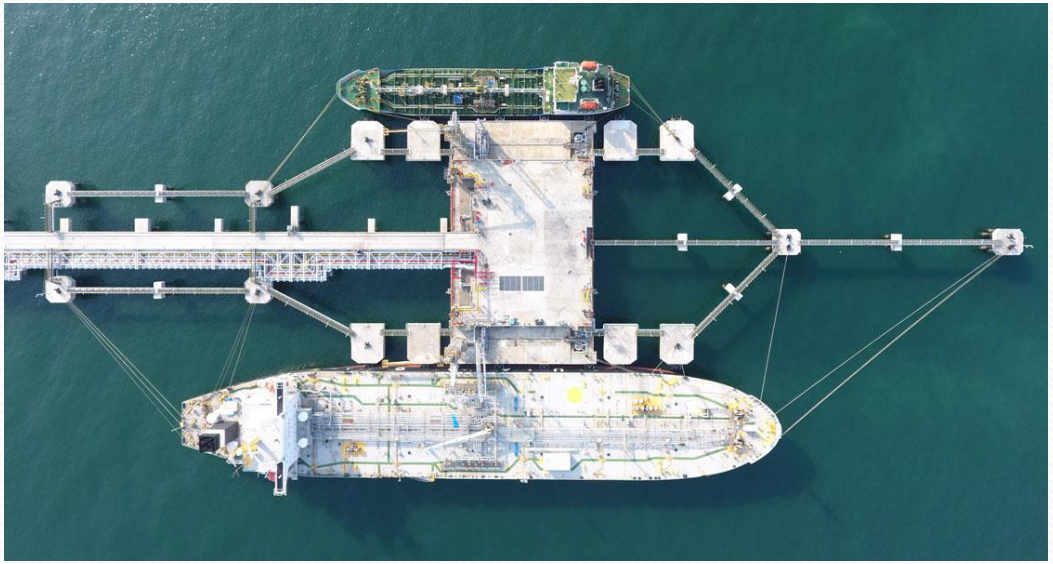

*https://www.aurecongroup.com/projects/resources/thai-oil-jetty-expansion*

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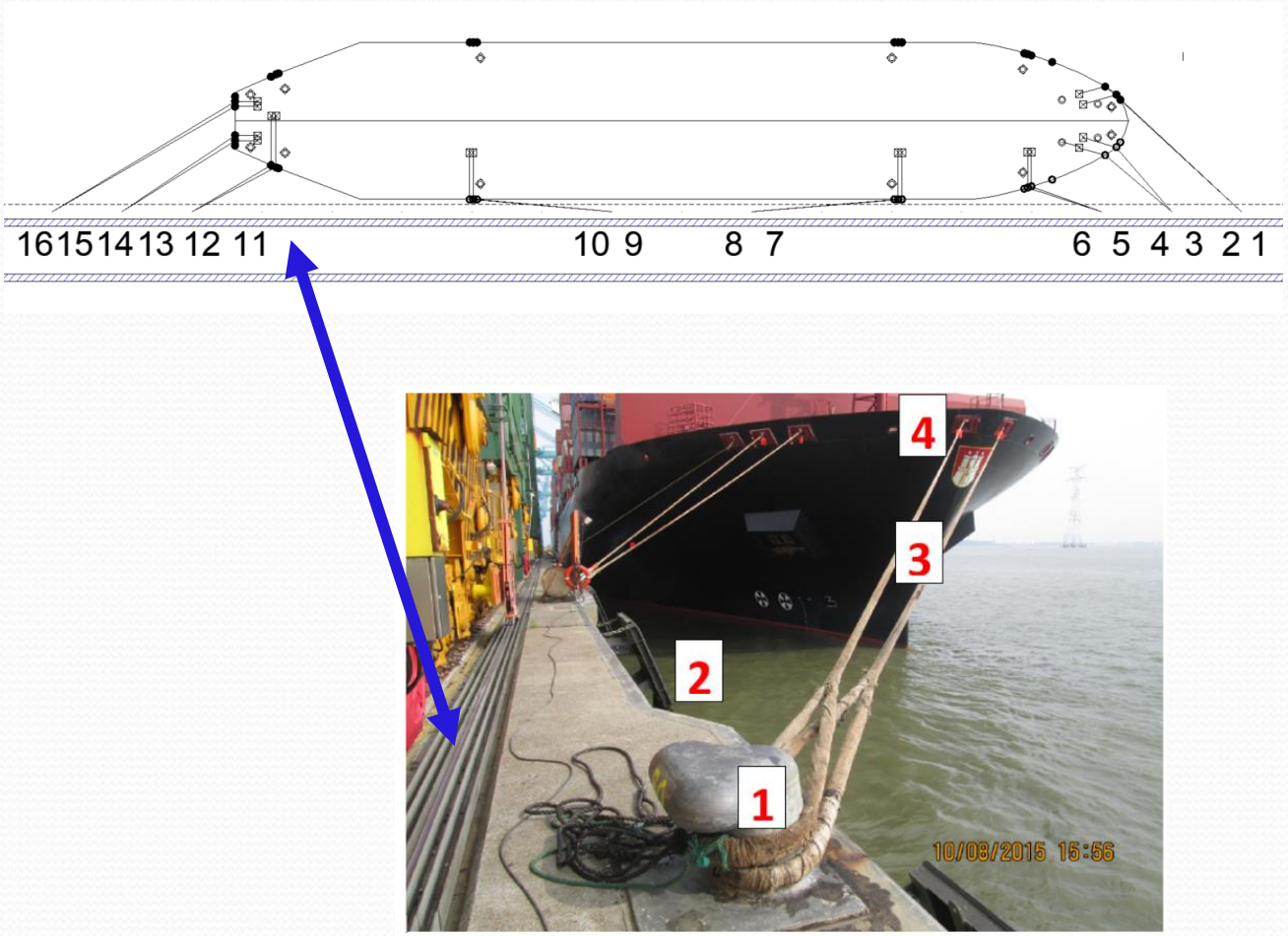


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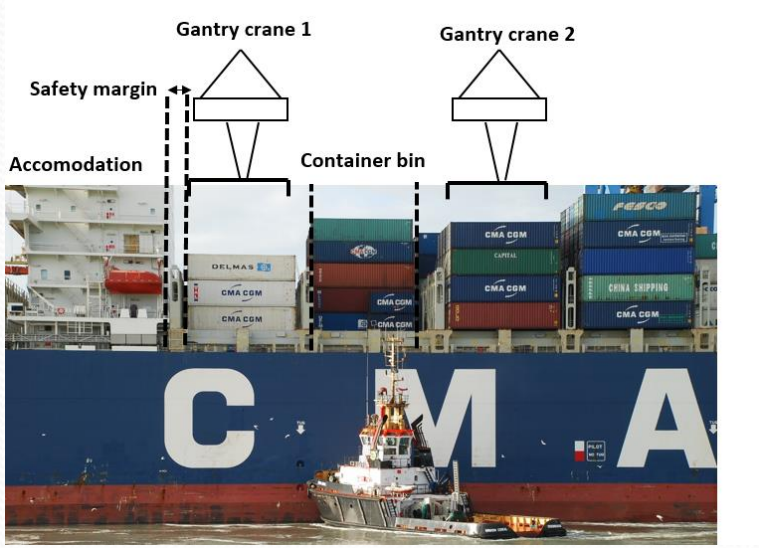
# PIANC WG212

## Criteria for Acceptable Movement of Ships at Berths

Part of ‘safety’

Related to (un)loading operations




*PIANC WG115*

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# PIANC WG212

## Criteria for Acceptable Movement of Ships at Berths

Part of ‘safety’

Related to (un)loading operations

*https://www.rivieramm.com/news-content-hub/news-content-hub/new-guidelines-on-marine-loading-arms-57427*

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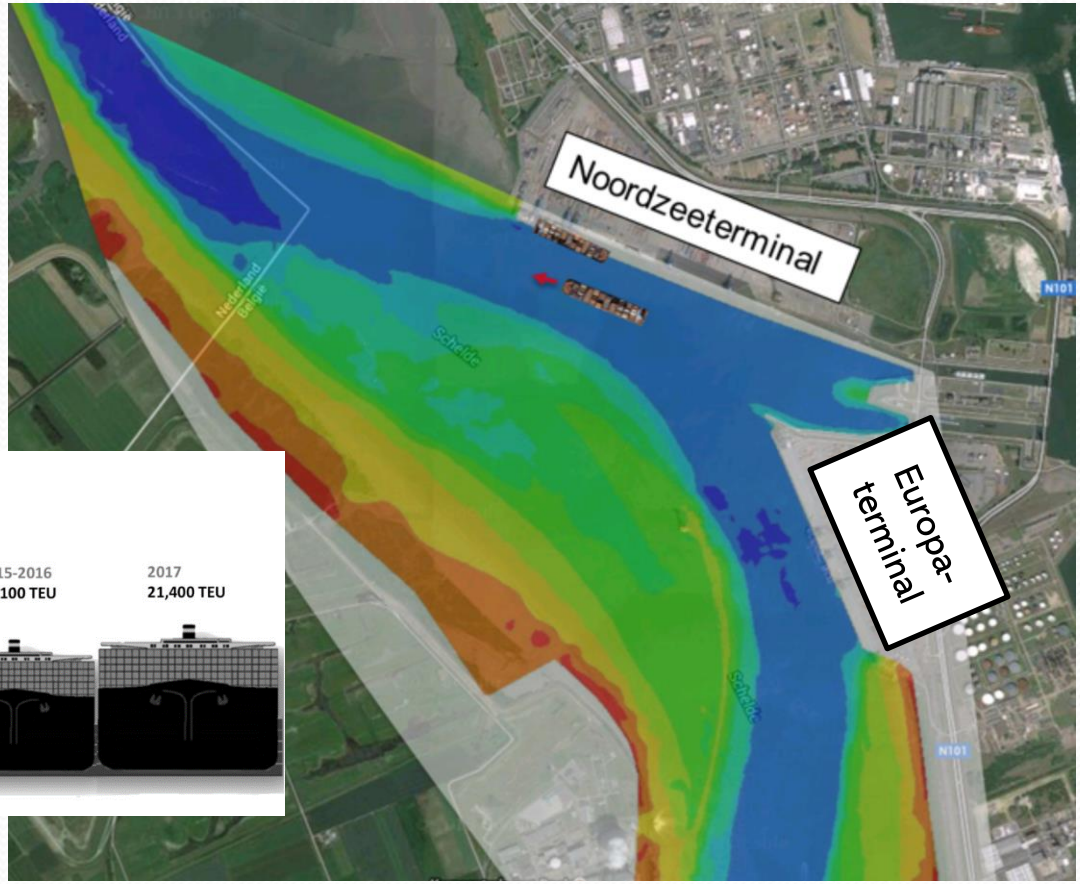
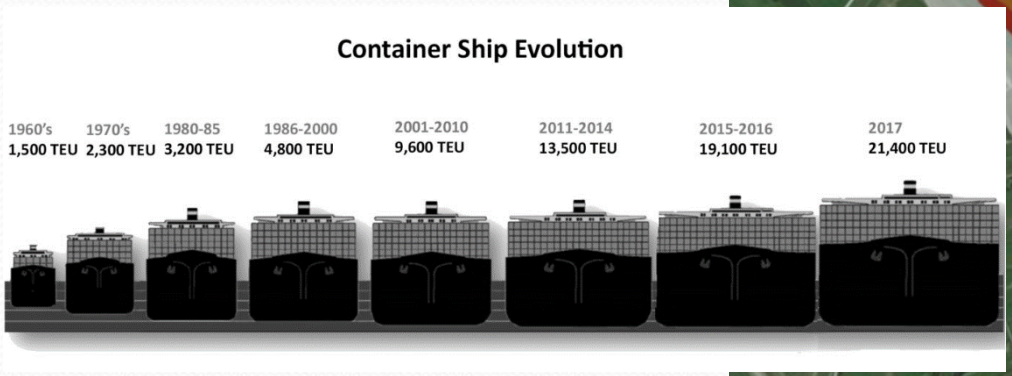
# Why is it relevant?

## Passing vessel effects

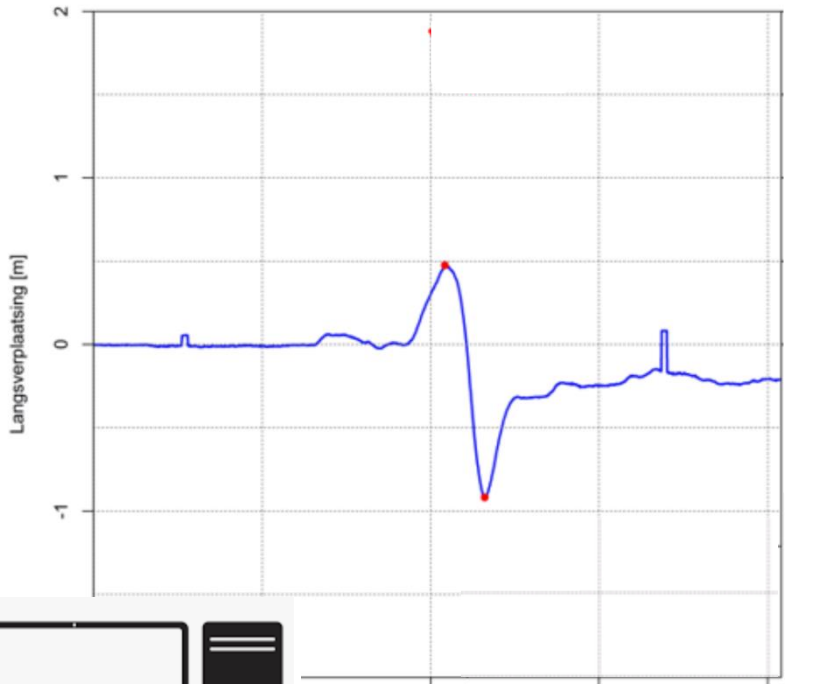



*https://unioceanlines.com/largest-container-ship-race/*

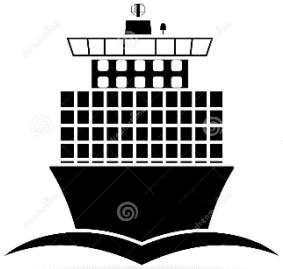
# Why is it relevant?

## Passing vessel effects (II)





Moored vessel: 24 000 TEU



LOA: 400m
B: 61m
D: 14,5m

Passing vessel: 13 000 TEU

LOA: 366m
B: 48m
D: 13,4m
S: 12,6kn

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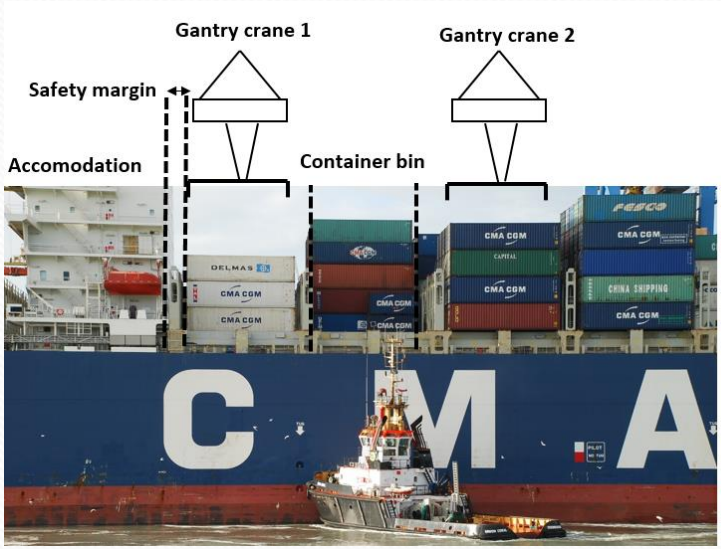
# Why is it relevant?

## Passing vessel effects (III)

*PIANC WG115*



# Why is it relevant?

## Passing vessel effects – possible solutions

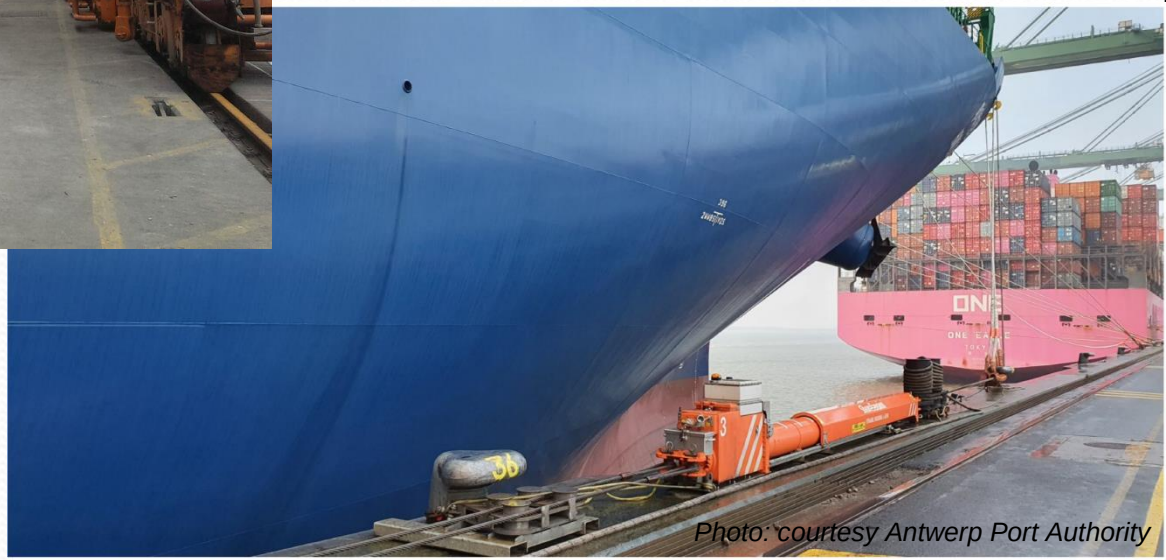
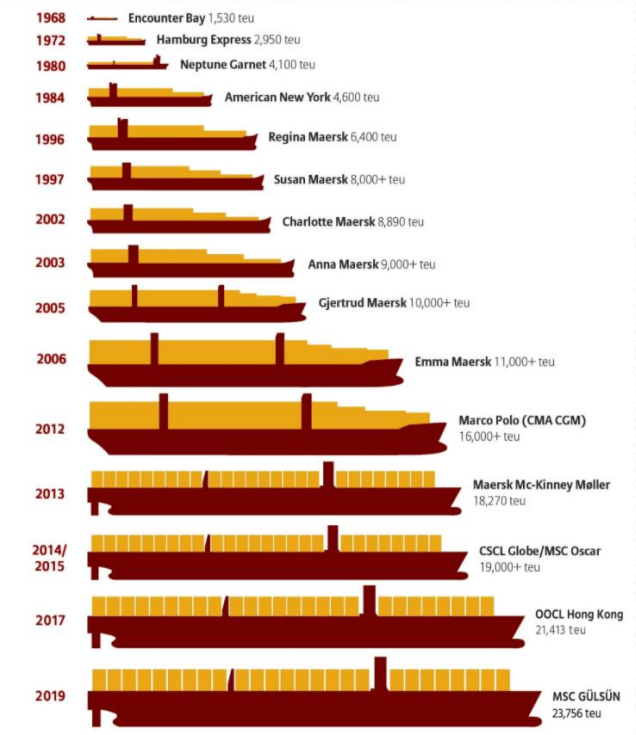




*Photo: courtesy Antwerp Port Authority*

# Why is it relevant?

## Mooring in storm conditions




*https://www.shippingandfreightresource.com/port-congestion-causes-and-impact-on-global-trade/*

*https://www.futureland.nl/bezoek*

# Why is it relevant?

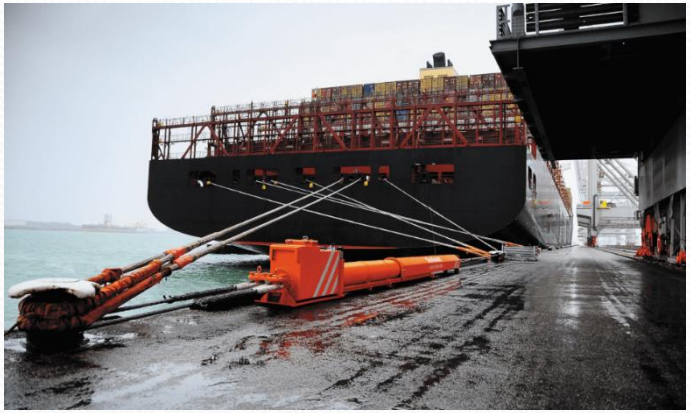
## Mooring in storm conditions (II)

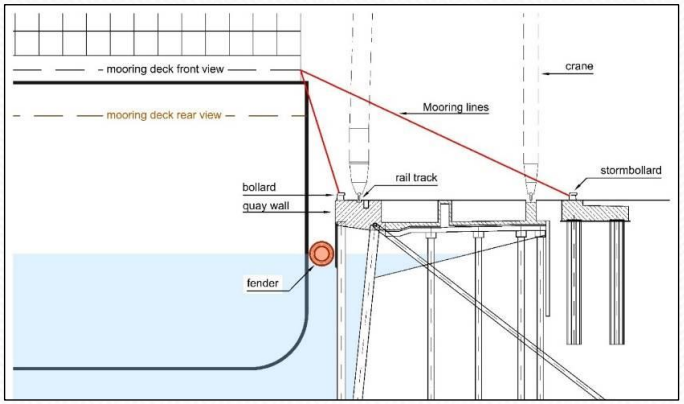
*Photo: courtesy Antwerp Port Authority*

*Photo: courtesy Rotterdam Port Authority*

# Why is it relevant?

## Mooring in storm conditions – possible solutions





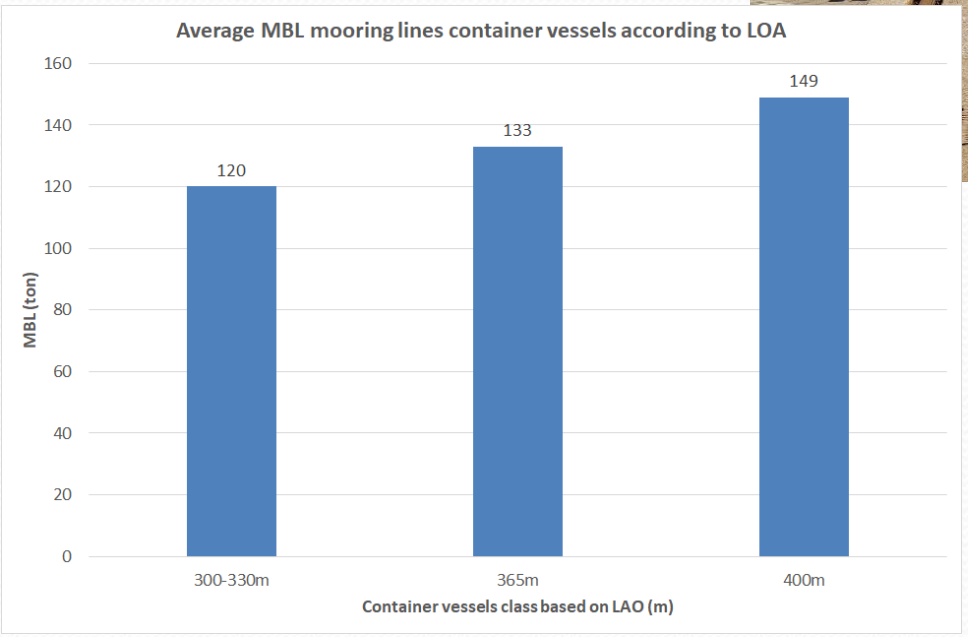

*Picture: courtesy Hamburg Port Authority*

*Photo: courtesy Rotterdam Port Authority*

# Why is it relevant?

## Overloading bollards

*Photo: courtesy Rotterdam Port Authority*




*Graph based on data from Antwerp Port Authority & Hamburg Port Authority*

# Why is it relevant?

## Overloading bollards – possible solutions

**SWL = f(# lines, MBL lines, brake load winch)**

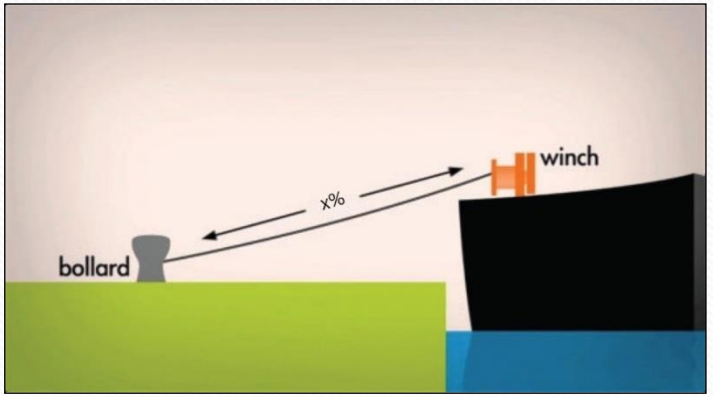




*Photo: courtesy Bollard Proof*

# Dynamic mooring analysis

**Why?**

Design of a new terminal

Safety of terminal operations

New design ship

**What?**

DMA = time-domain simulation of moored ship behaviour

Vlugmoor = UGent in-house DMA package



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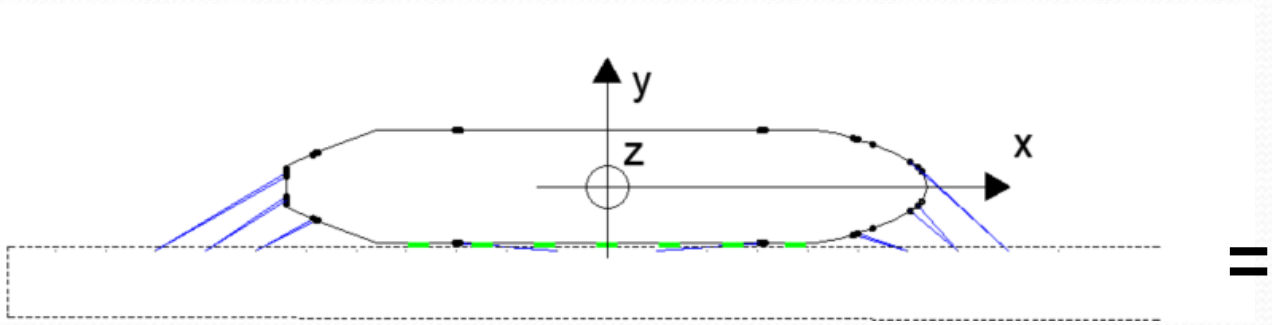
# Dynamic mooring analysis

$$F = m \cdot \ddot{x} + b \cdot \dot{x} + c \cdot x$$

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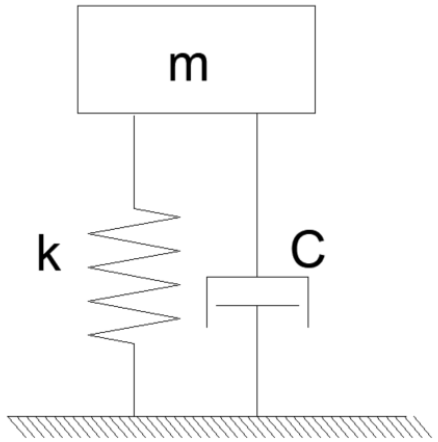


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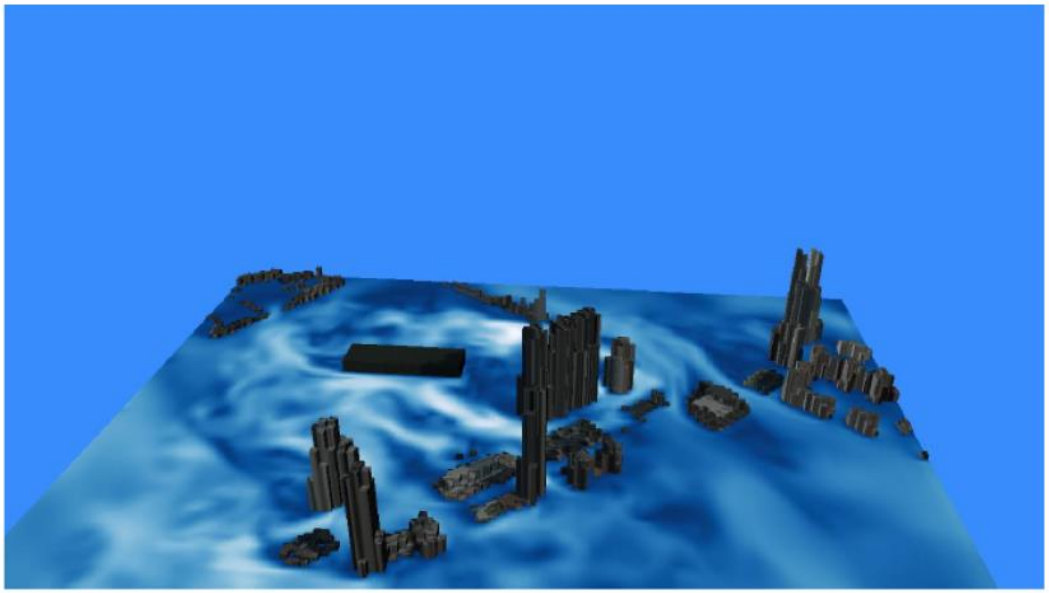
# Dynamic mooring analysis

$$F = m \cdot \ddot{x} + b \cdot \dot{x} + c \cdot x$$

wind
waves
passing ship
…



*From JIP Windlass newsletter*

# Dynamic mooring analysis

$$F = m \cdot \ddot{x} + b \cdot \dot{x} + c \cdot x$$

wind
waves
passing ship
…

mass
added mass

damping

# Dynamic mooring analysis

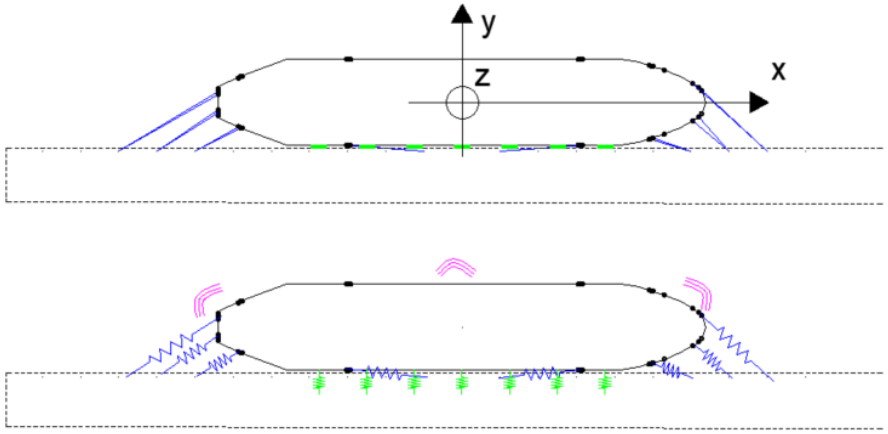
$$F = m \cdot \ddot{x} + b \cdot \dot{x} + c \cdot x$$

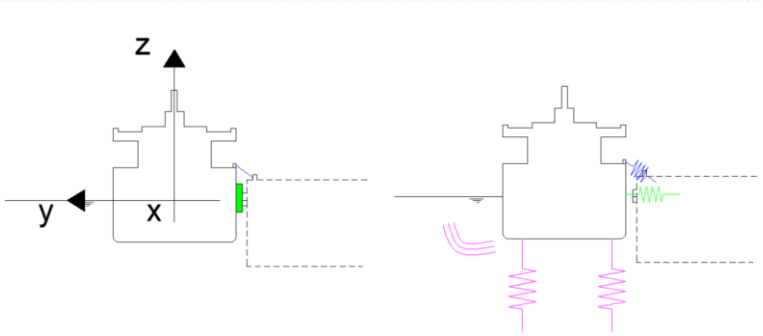
wind
waves
passing ship
…

mass
added mass

damping

water
mooring line
fenders

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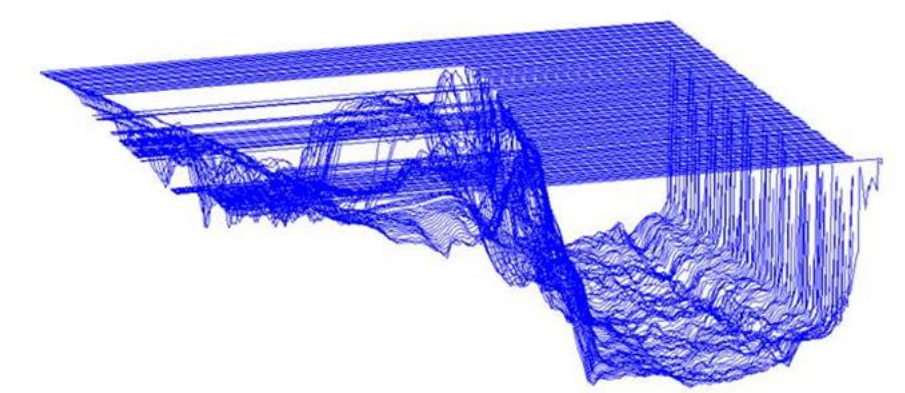
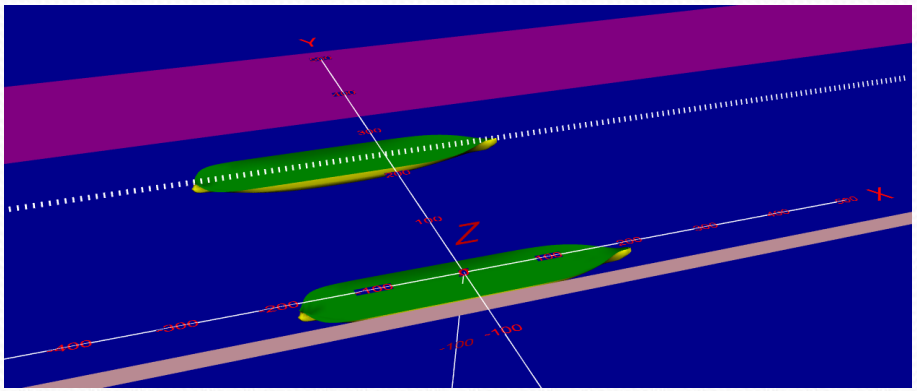
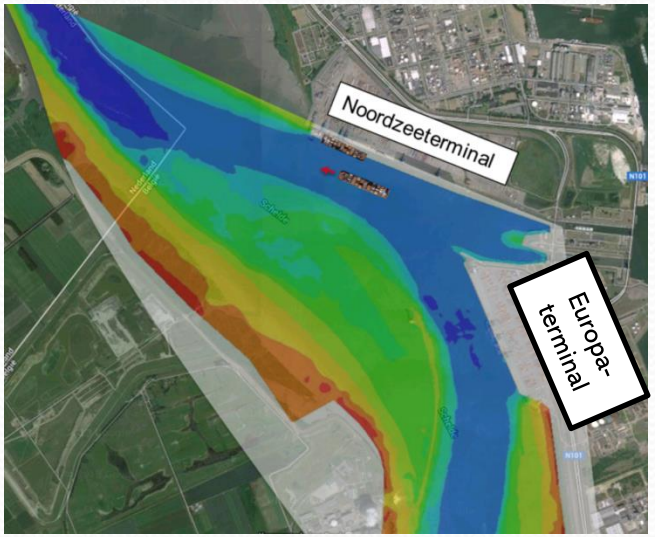
# Dynamic mooring analysis

## Project example : Renovation Europaterminal







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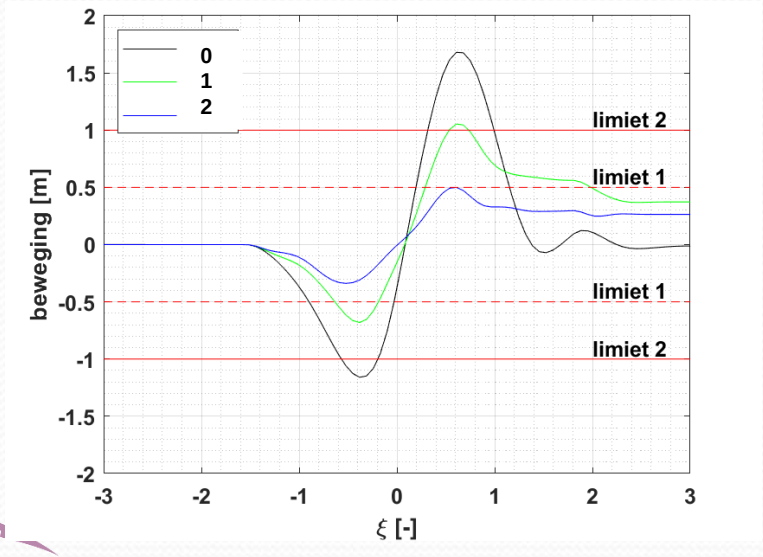


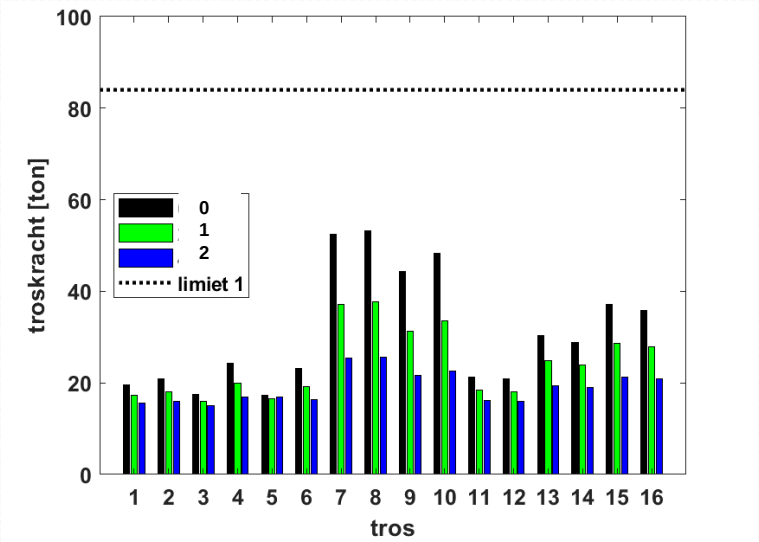


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# *THANK YOU*

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