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
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
Safe

Mooring

of

large ships

at

quay walls
Safe

Mooring

of

large ships

at

quay walls
PIANC WG186

Safe Mooring of large ships at quay walls


Picture: courtesy Hamburg Port Authority

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Safe Mooring of large ships at quay walls

https://www.aurecongroup.com/projects/resources/thai-oil-jetty-expansion
Safe Mooring of large ships at quay walls
Criteria for Acceptable Movement of Ships at Berths

Part of ‘safety’

Related to (un)loading operations

PIANC WG115
Criteria for Acceptable Movement of Ships at Berths

Part of ‘safety’

Related to (un)loading operations

Why is it relevant?

Passing vessel effects

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

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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
Why is it relevant?

Passing vessel effects (III)

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Why is it relevant?

Passing vessel effects – possible solutions

Photo: courtesy Antwerp Port Authority

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Why is it relevant?

Mooring in storm conditions


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

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

Photo: courtesy Rotterdam 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
Dynamic mooring analysis

\[ F = m \cdot \ddot{x} + b \cdot \dot{x} + c \cdot x \]
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
Dynamic mooring analysis

Project example: Renovation Europaterminal
THANK YOU