

# Surge and Interaction Damage

Loss prevention webinar – 25 July 2023



# Surge and interaction damage

## Speakers



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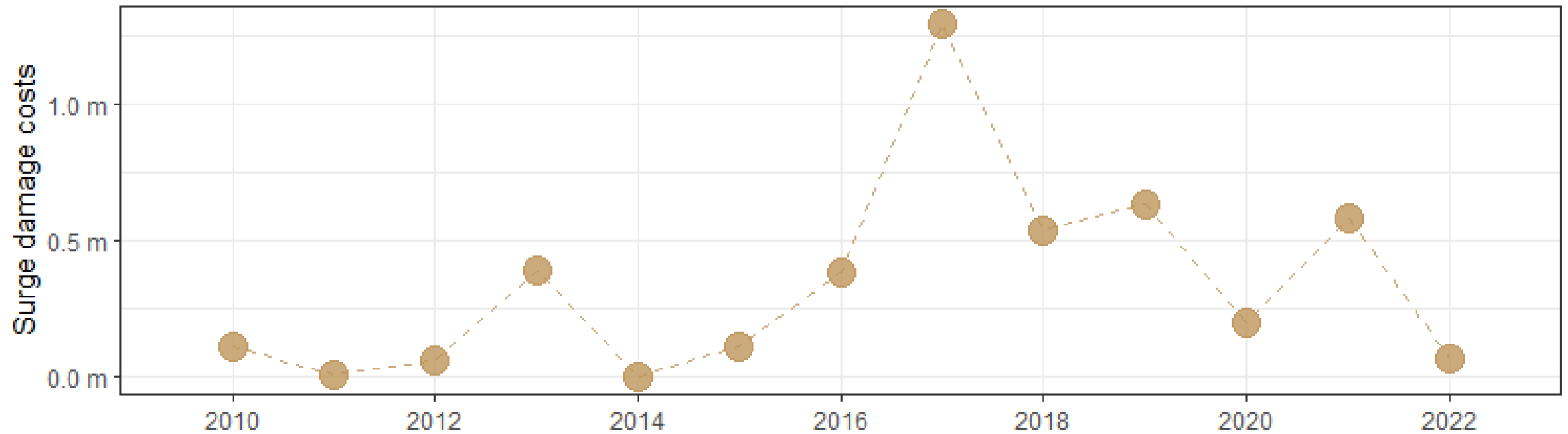


# Statistics



# Surge and interaction damage

## Statistics



Source: Britannia P&I Club



# Surge and interaction damage



- Most vessels will experience some form of hydrodynamic interaction with another vessel, especially when navigating in shallow water or narrow channel.

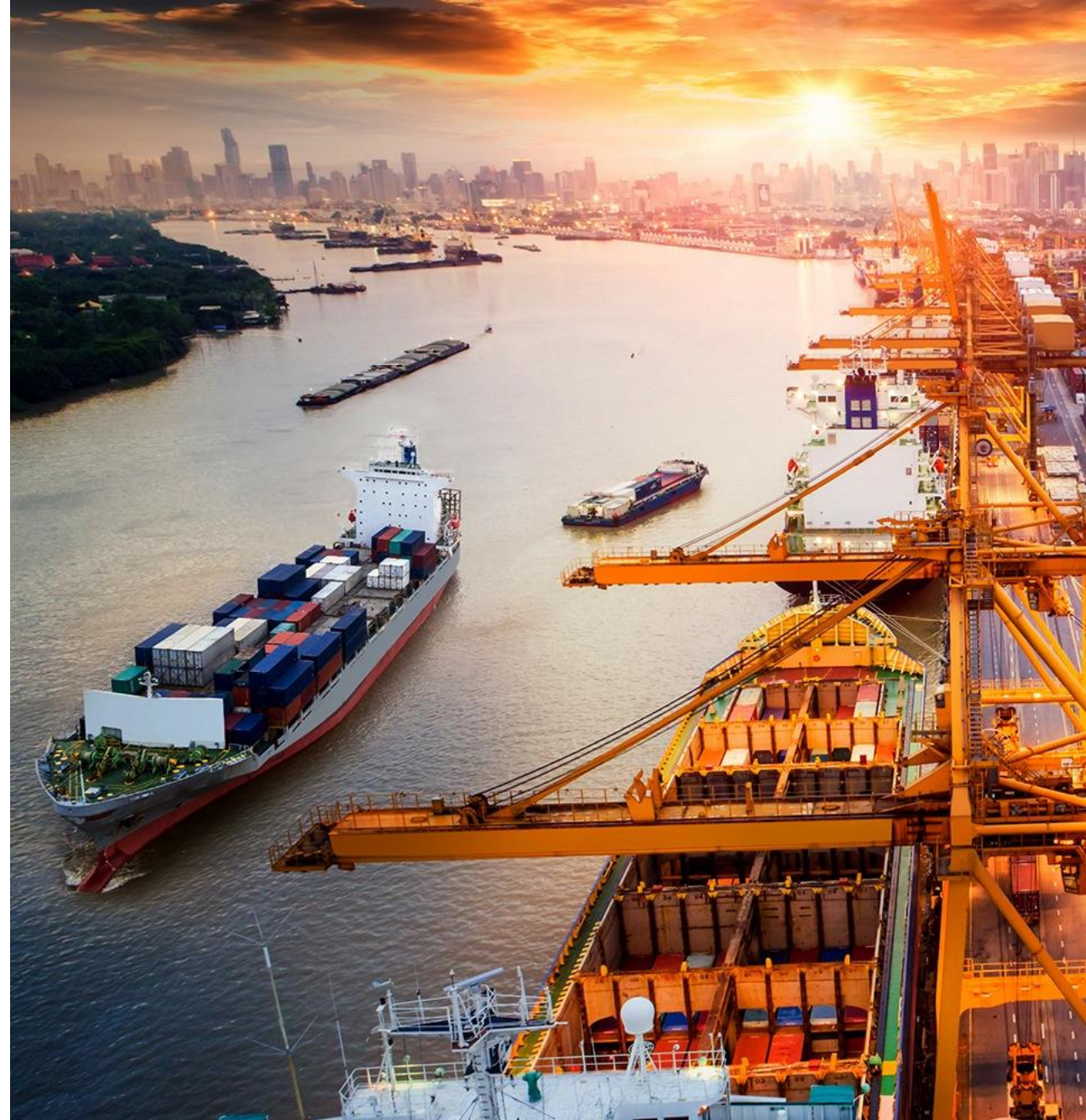


# Surge and interaction damage

When do they occur?

When a vessel is passing too closely or too fast to:

- Passing vessels
- Anchored vessels
- Moored vessels
- Fixed structures
- An obstruction
- Riverbank





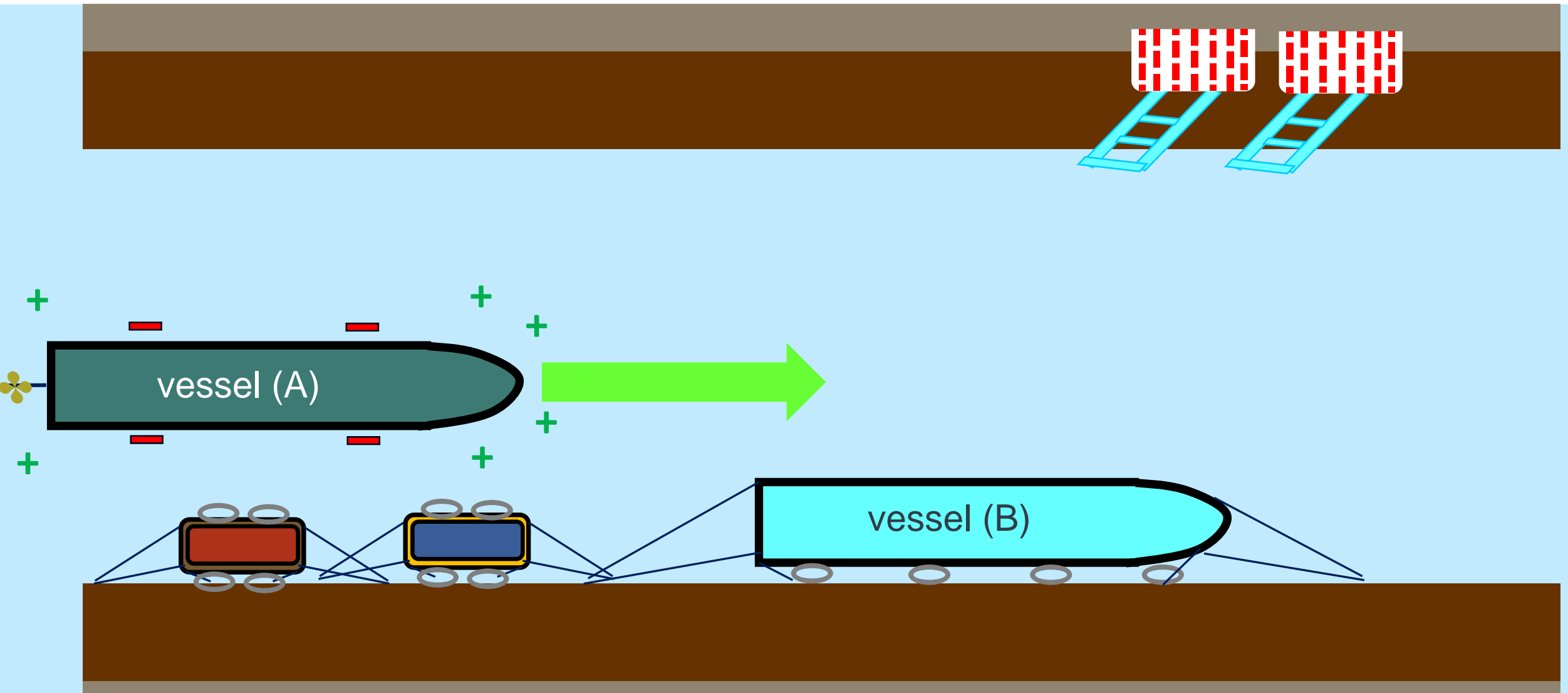
# Surge and interaction damage

## Hydrodynamic forces

- We understand when a vessel moves through the water, it sets the fluid into motion, creating hydrodynamic forces surrounding the vessel
- To put it simply, when a vessel moves through shallow waters, the water surrounding the underwater volume of the vessel (displacement) gets displaced and pushed ahead and/or to the sides of the vessel.

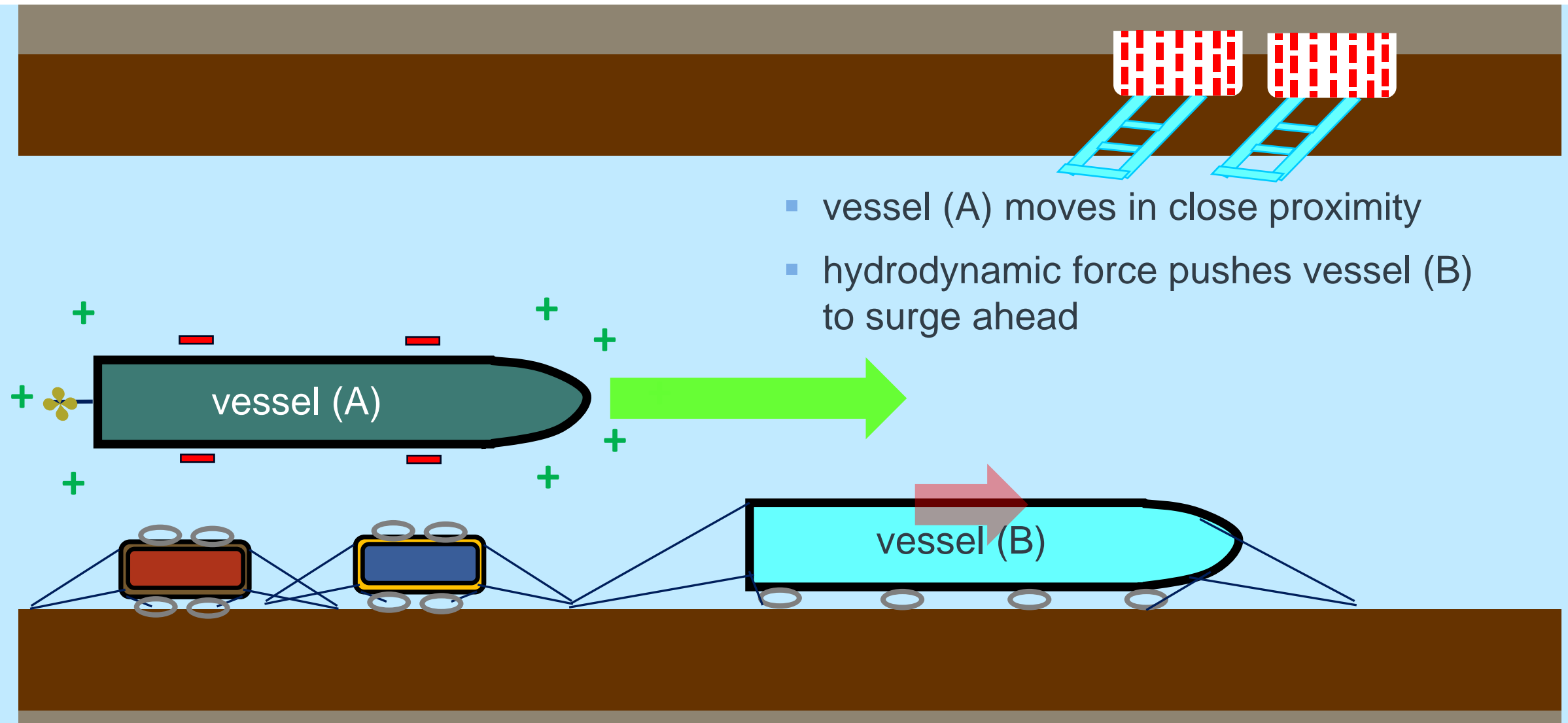


# Surge and interaction damage



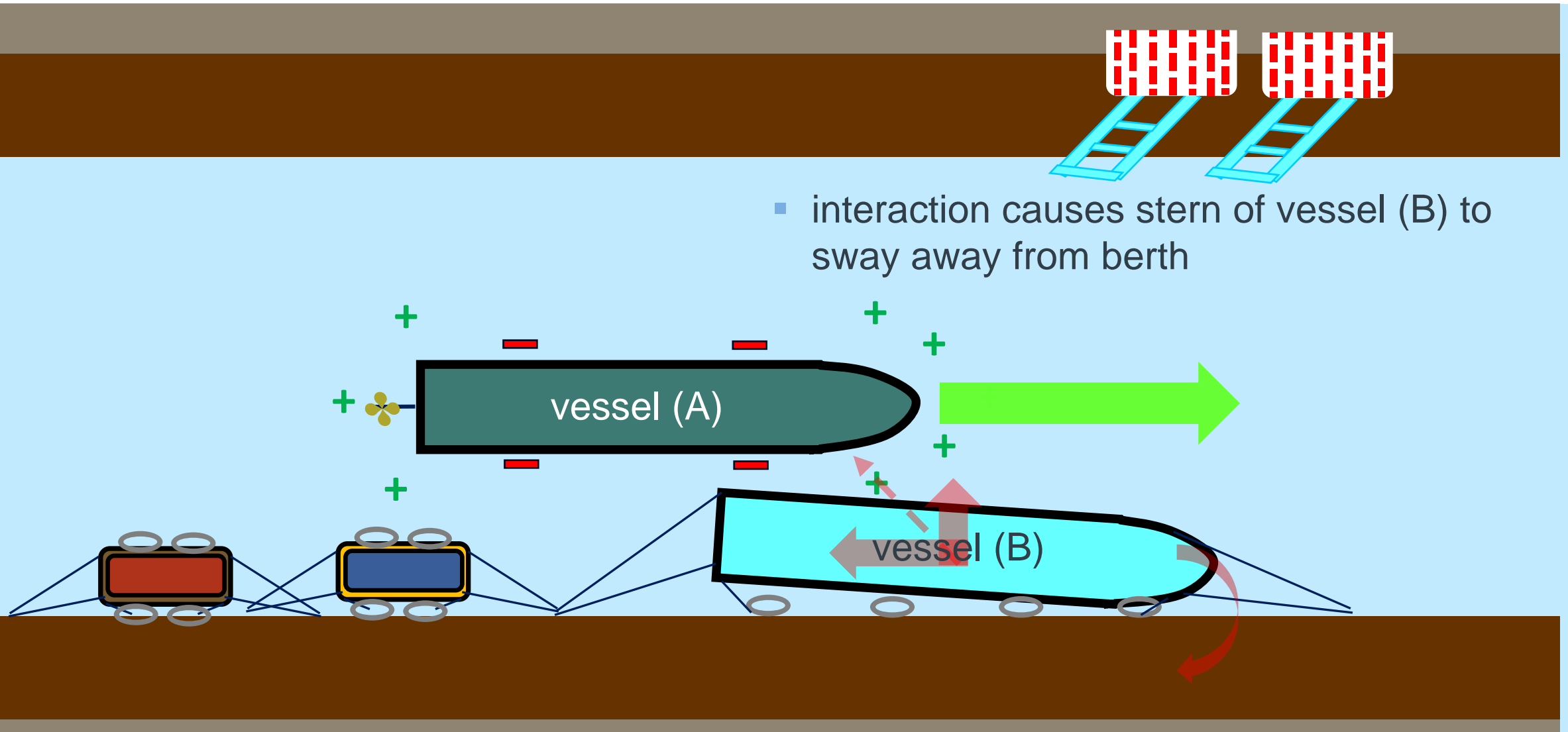


# Surge and interaction damage



# Surge and interaction damage

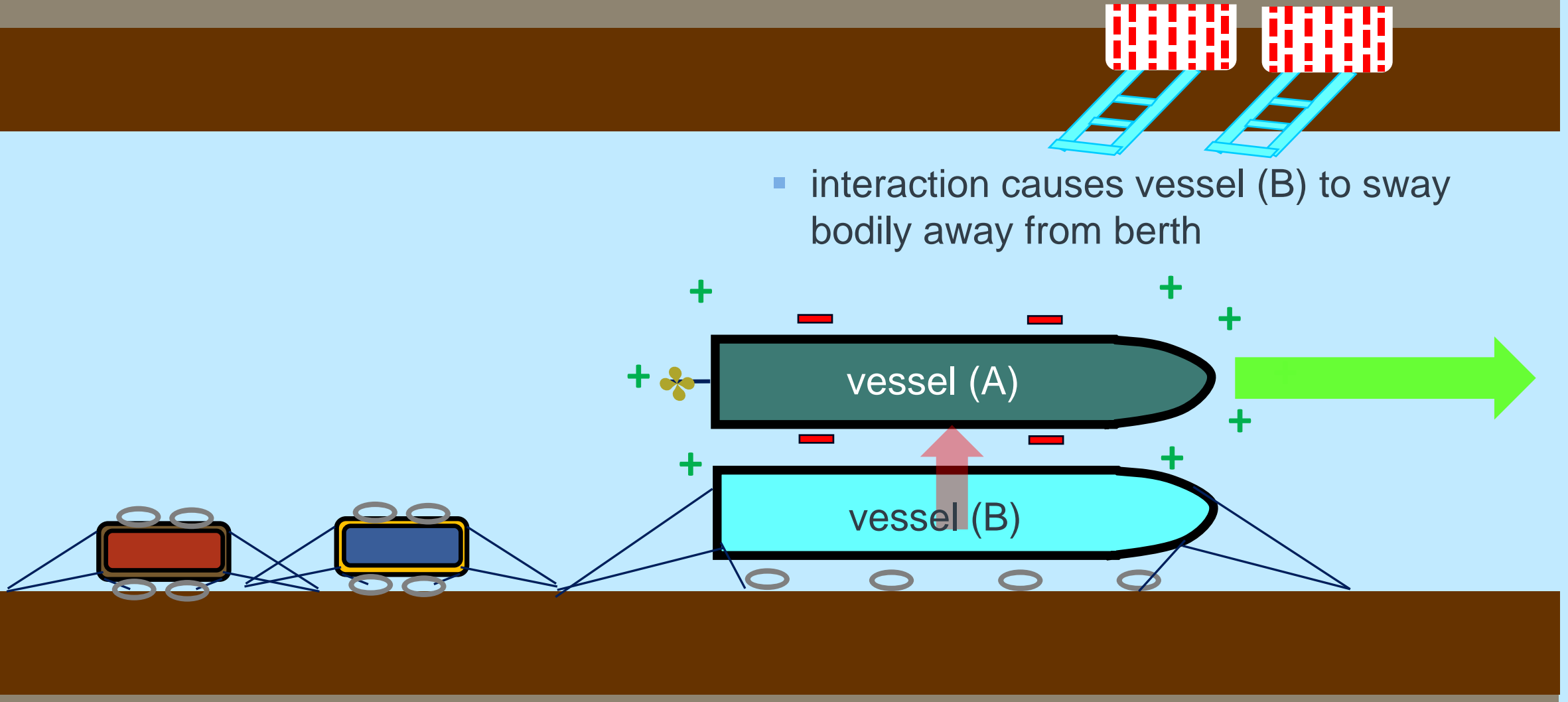
- interaction causes stern of vessel (B) to sway away from berth





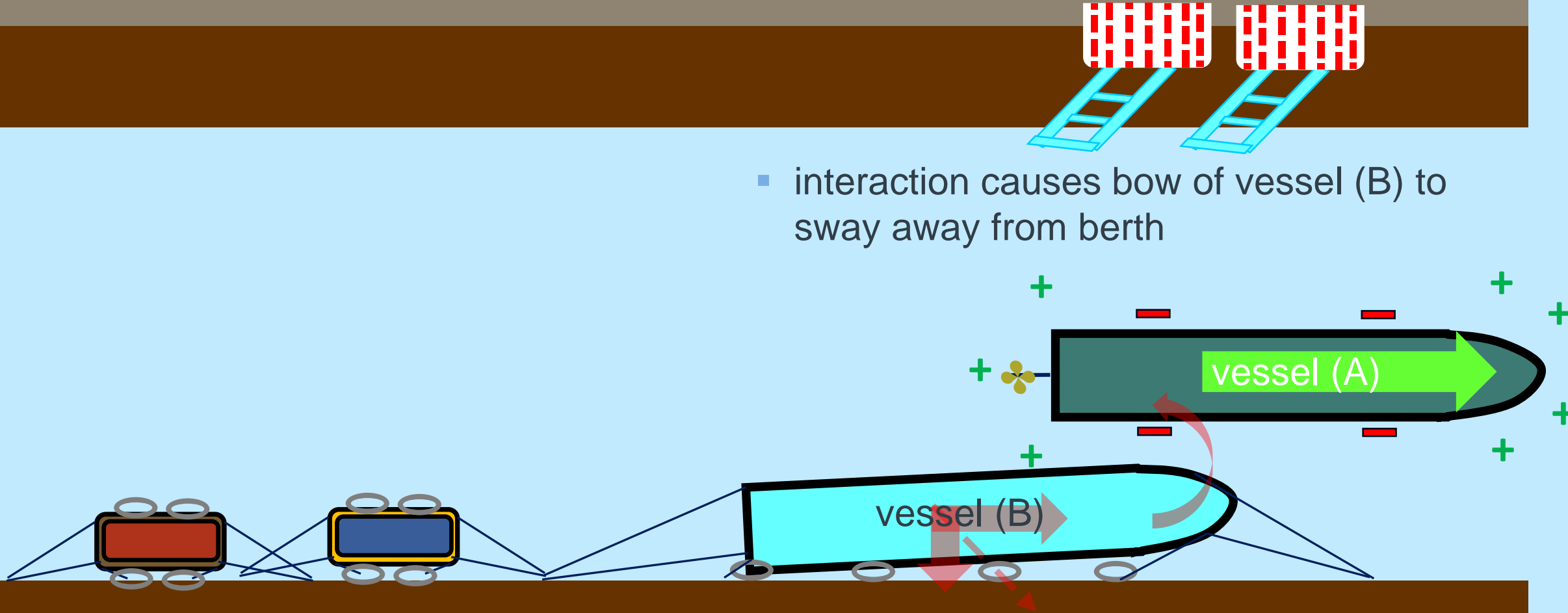
# Surge and interaction damage

- interaction causes vessel (B) to sway bodily away from berth



# Surge and interaction damage

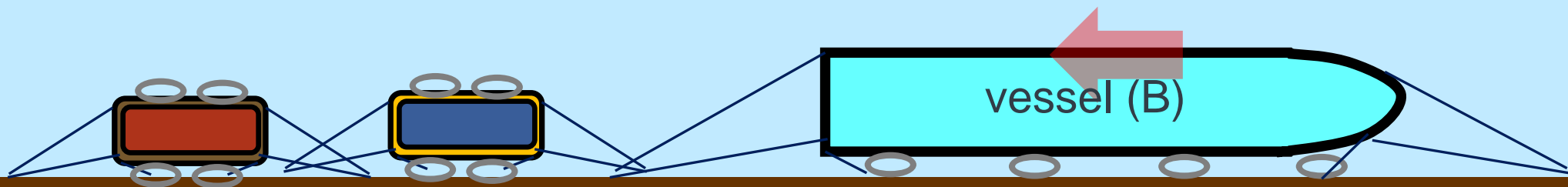
- interaction causes bow of vessel (B) to sway away from berth





# Surge and interaction damage

- interaction between both vessels causes unwanted surging for moored vessel (B)



# Surge and Interaction Damage

Simon Burnay, Waves Group



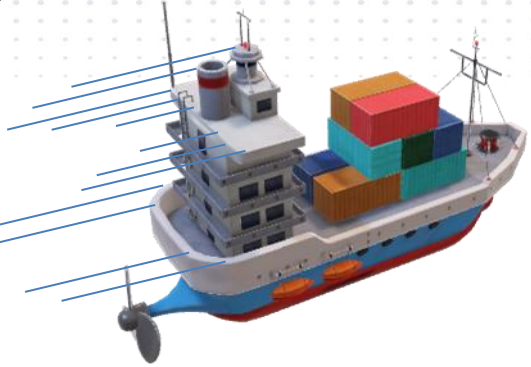


# What Affects Interaction?



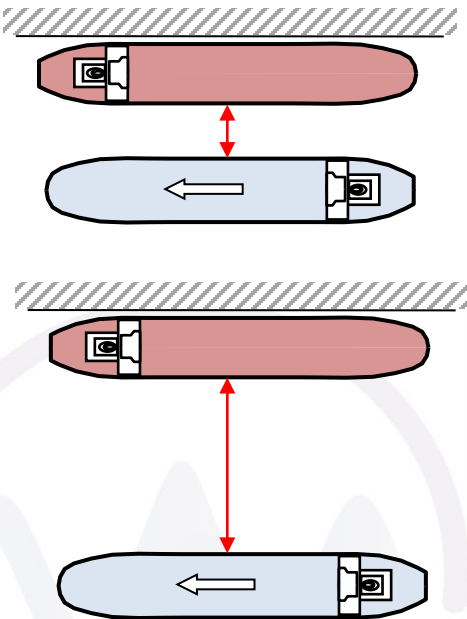


# Factors Affecting Interaction



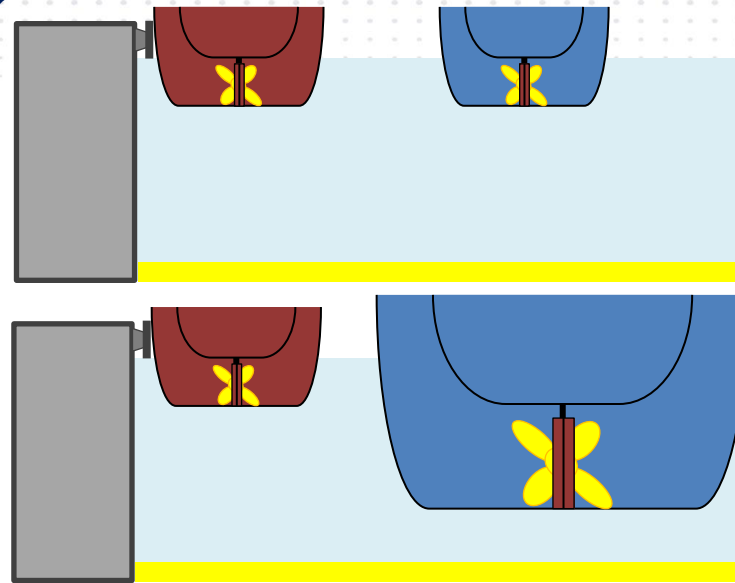
## Ship Speed

Interaction effect increases with speed squared!  
Relative speed!



## Passing Distance

Interaction force reduces with increased distance.  
Balance with speed.  
Both sides of vessel.  
Blockage.



## Displacement

Displacement of water.  
Displacement of both vessels.  
Big ship passing little ship = large effect.  
Blockage.

## Others

Currents – Speed through water, not over ground.

Water depth – Tides, squat, under-keel clearance – blockage.

Moored vessel – Properly moored – Lines / Winch brakes / tending?





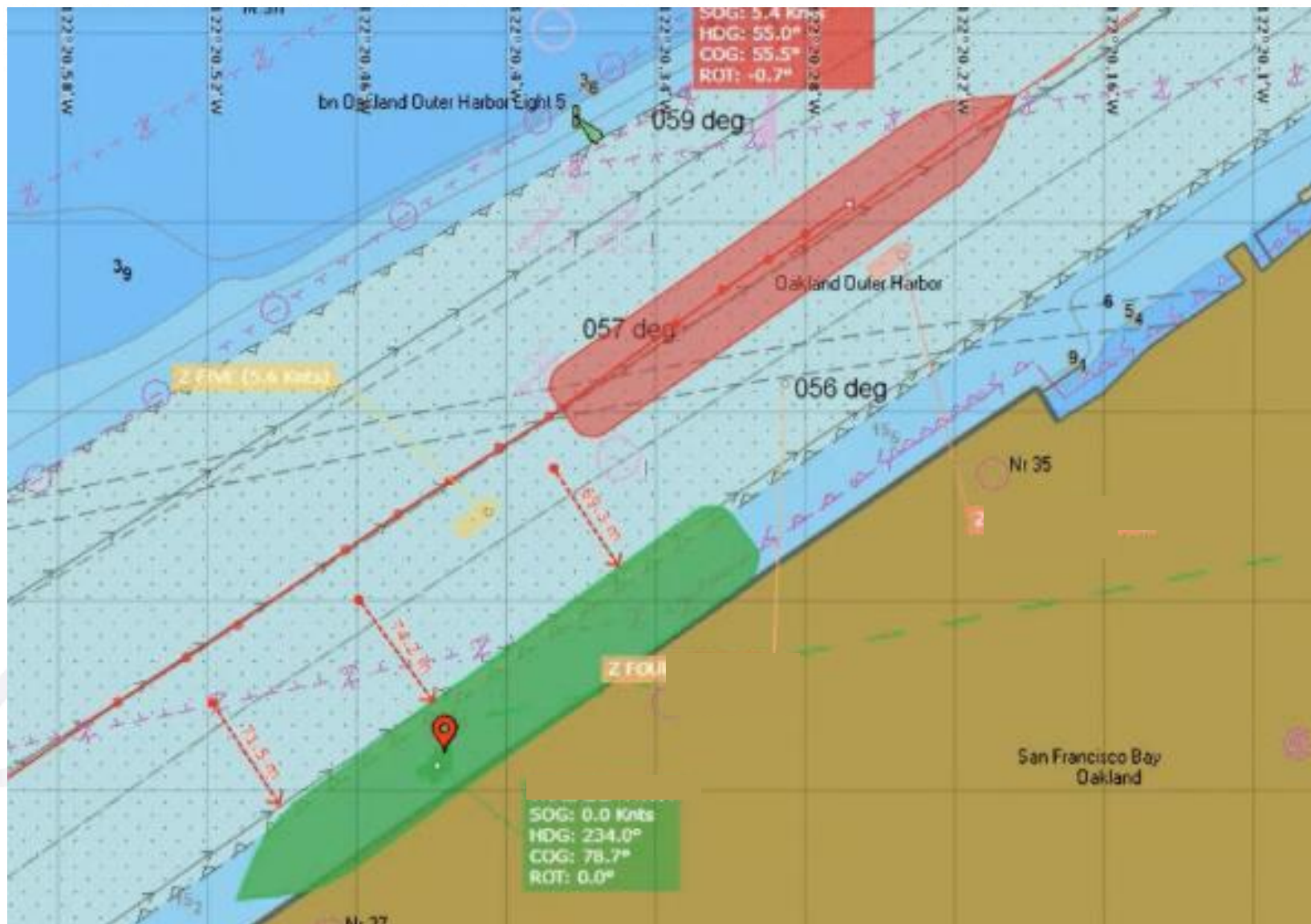


# Typical Case Examples





# Typical Case Examples - #1



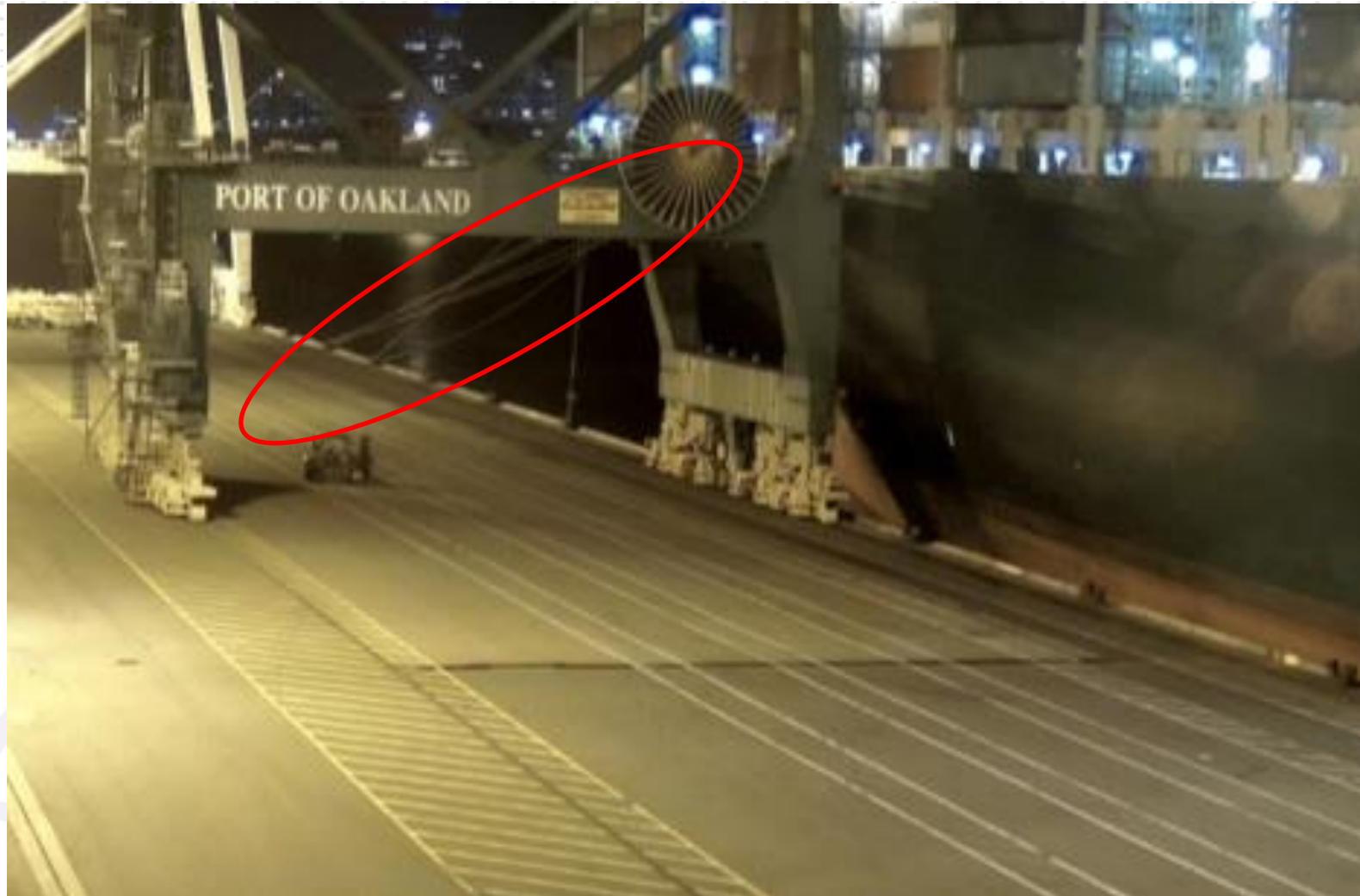
- Busy Container terminal.
- Passing vessel, beam to beam ~70m at ~5.5 knots.
- Moored vessel surges and contacts a gantry crane
- FFO damage claim + Business Interruption

Was this too close and/or too fast?

AIS analysis showed passing vessel followed typical track and speeds (marked on chart)



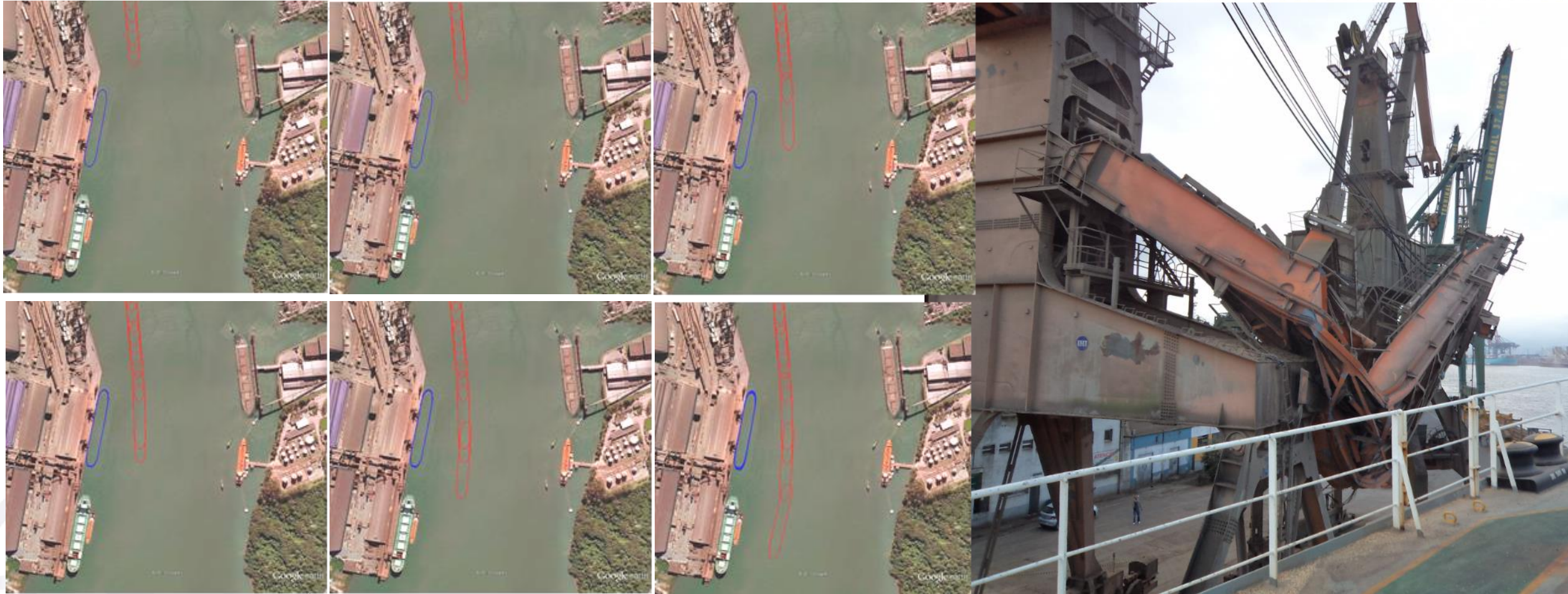
# Typical Case Examples – #1



- Improperly moored.
- Slack lines forward and aft led to excessive motion.
- Motion could not be restrained by remaining mooring lines.
- Vessel contacted gantry crane.



# Typical Case Examples - #2



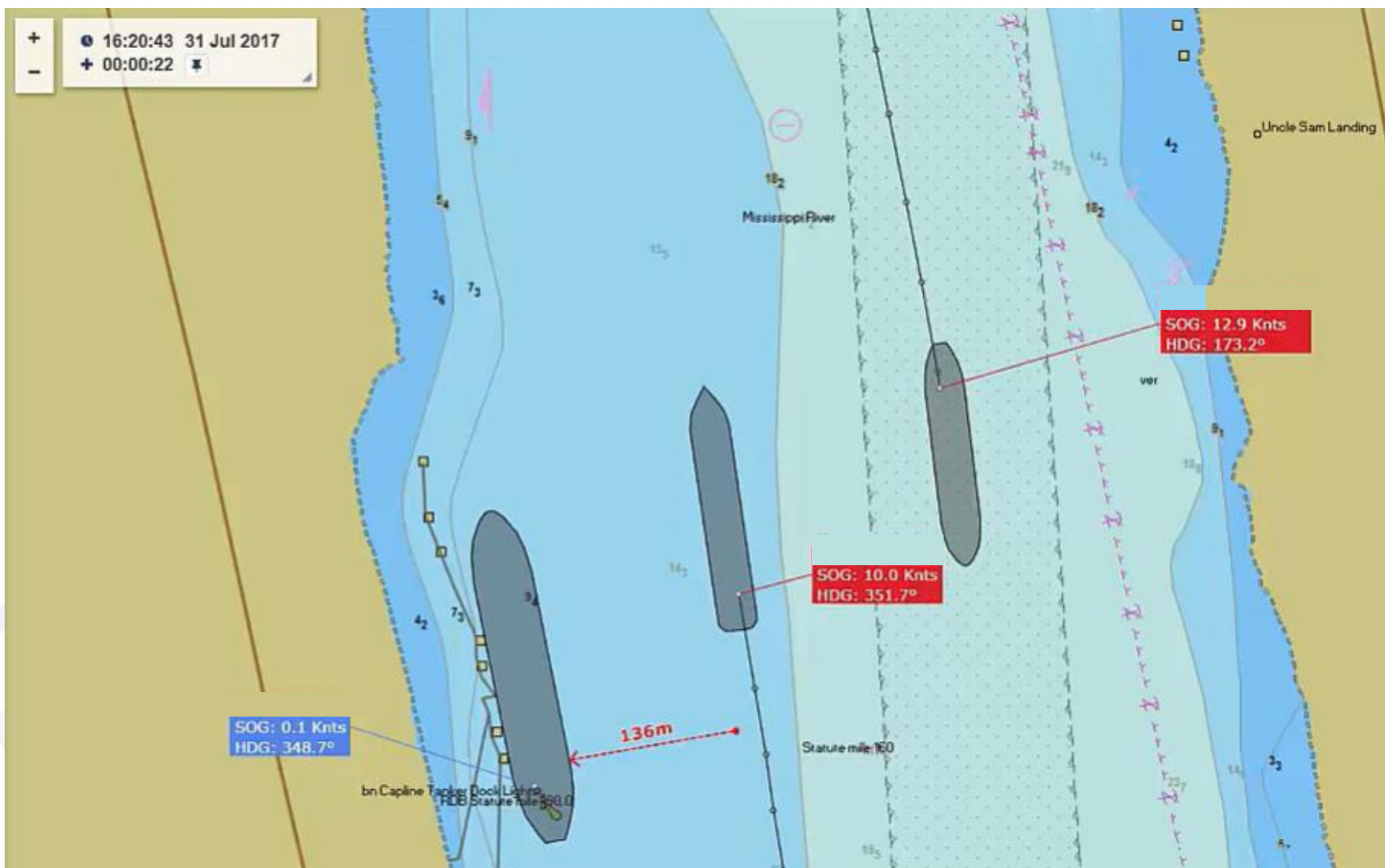


# Typical Case Examples - #2

- River terminals – bulk berths.
- Passing vessel alleged to pass too close and too fast.
- Moored vessel surged forwards during loading – extensive damage to ship-loader + large B.I. claim (tens of \$million).
- Despite ‘cutting the corner’ from channel centreline, **interaction forces due to passing vessel were low**.
- A properly moored vessel would have had no problems.
- **Moored vessel improperly moored and lines in poor condition.**
- **Moored vessel used main engine, which caused forward surge and contact with ship-loader.**



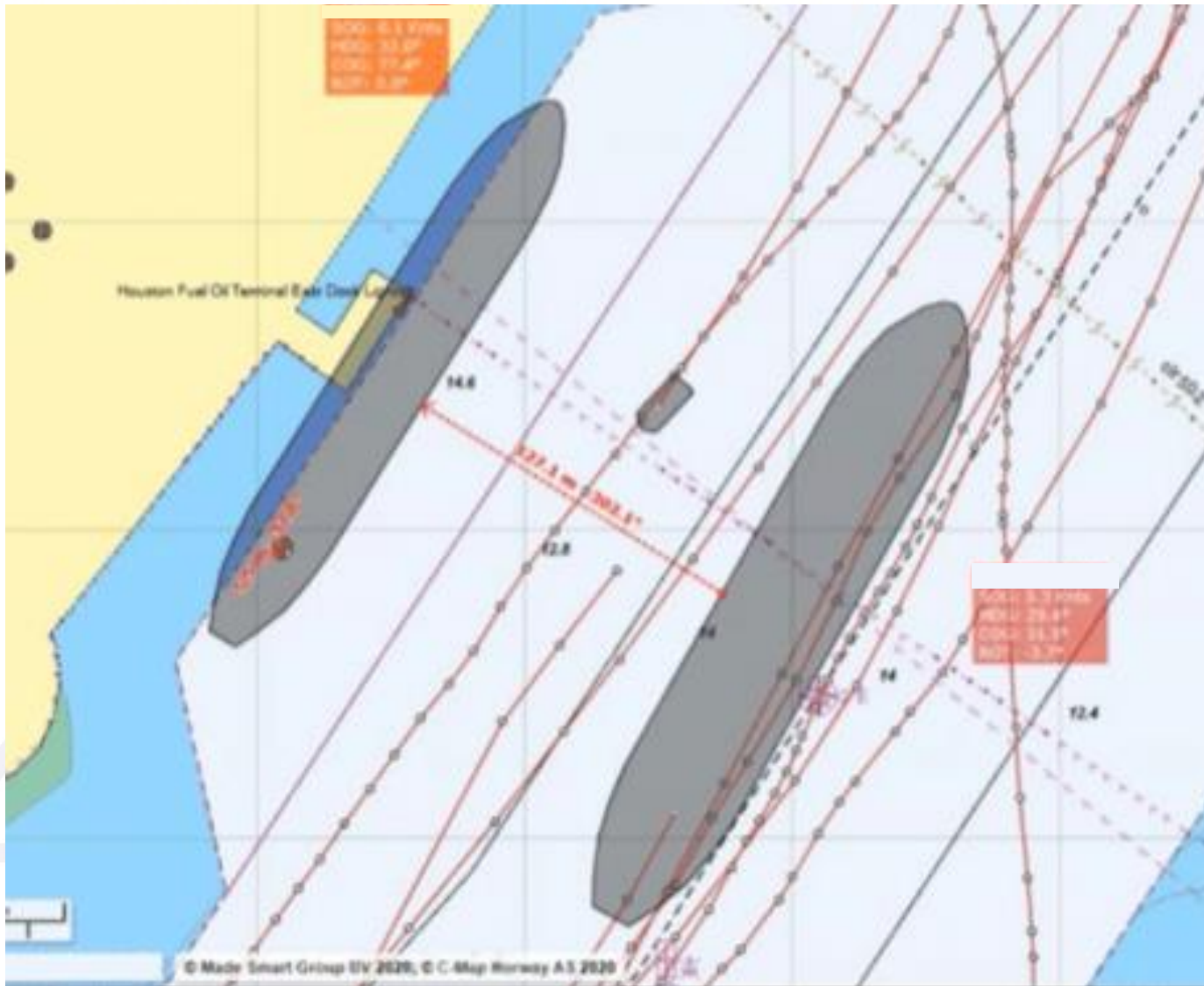




- Vessels passing each other in channel, opposite moored vessel.
- Interaction effect is additive!
- So, despite good passing distances, relatively high speeds created larger effect.

# Typical Case Examples - #4

- Large tanker passing moored vessel.
- Too close and too fast?
- Comparison with other port traffic (same vessel types) shows passing vessel on typical course and speed.
- Moored vessel improperly moored.





# Typical Case Examples - #5

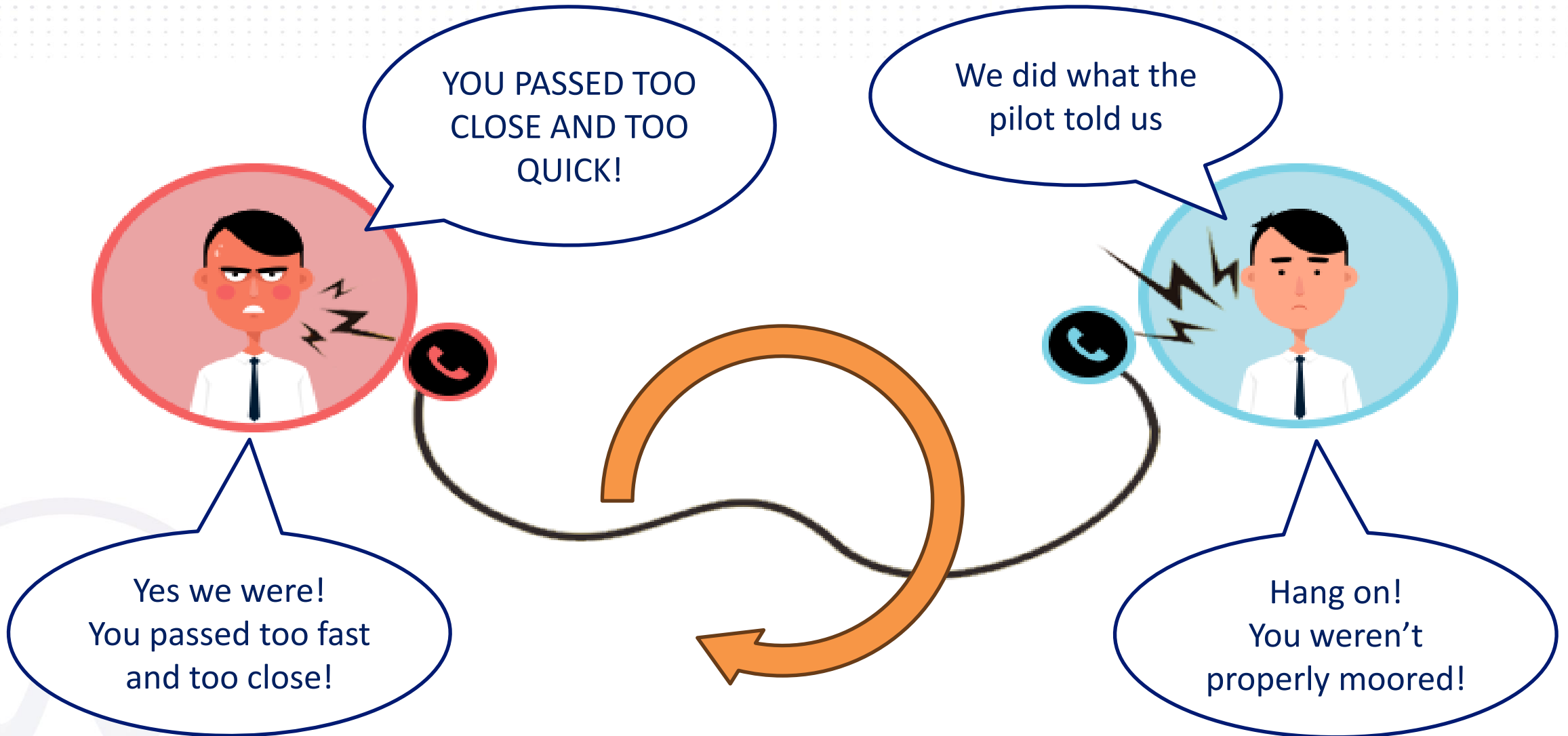


- Not just parallel headings.
- Vessel moored in basin perpendicular to main channel.
- Large vessel in channel causes interaction to moored vessel.
- Breakaway – gangway and loading arm damages.
- Mooring lines (wire) rendered.

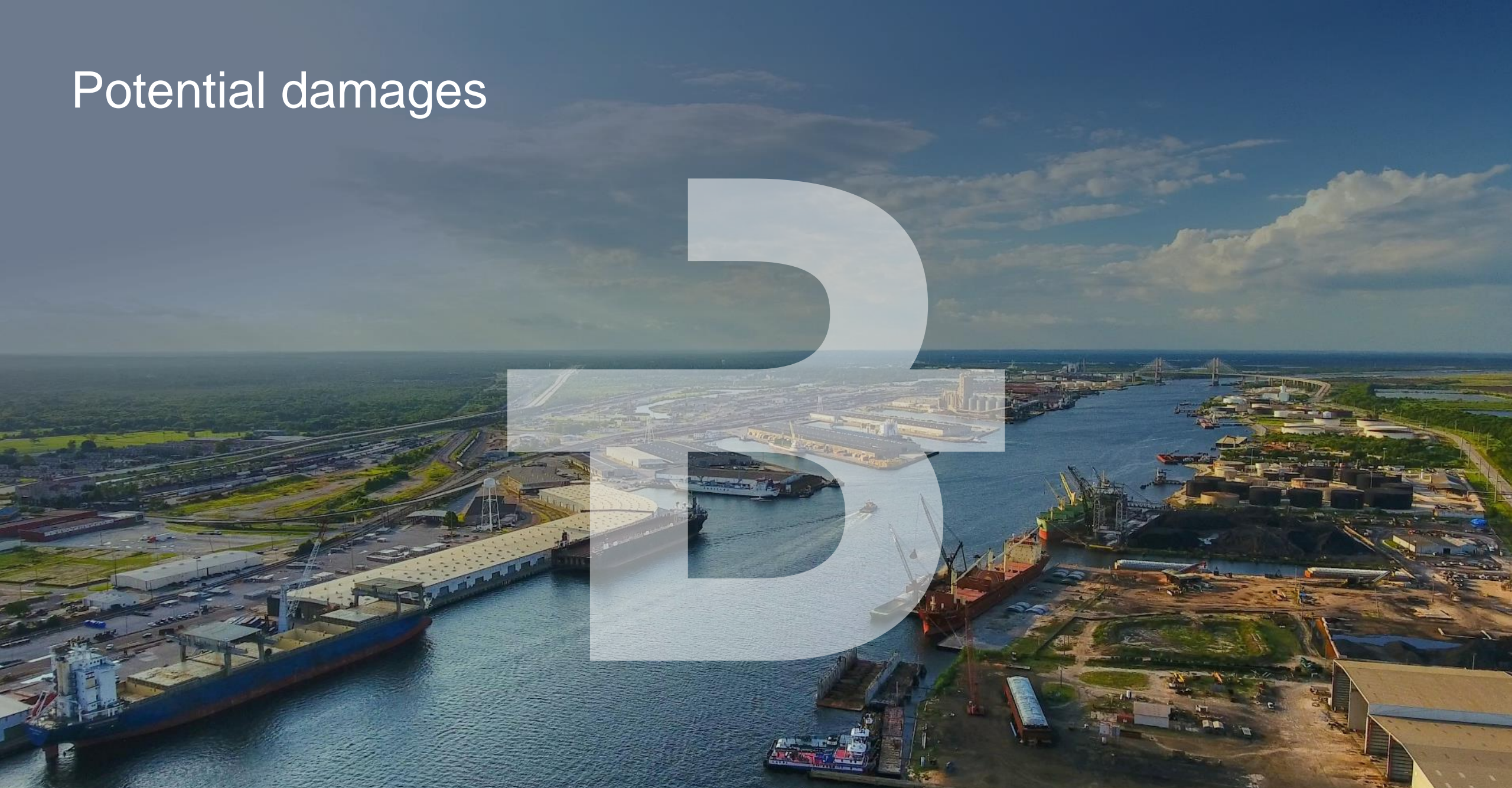
If properly set, mooring lines should render before they fail!



# Typical Case Examples



# Potential damages

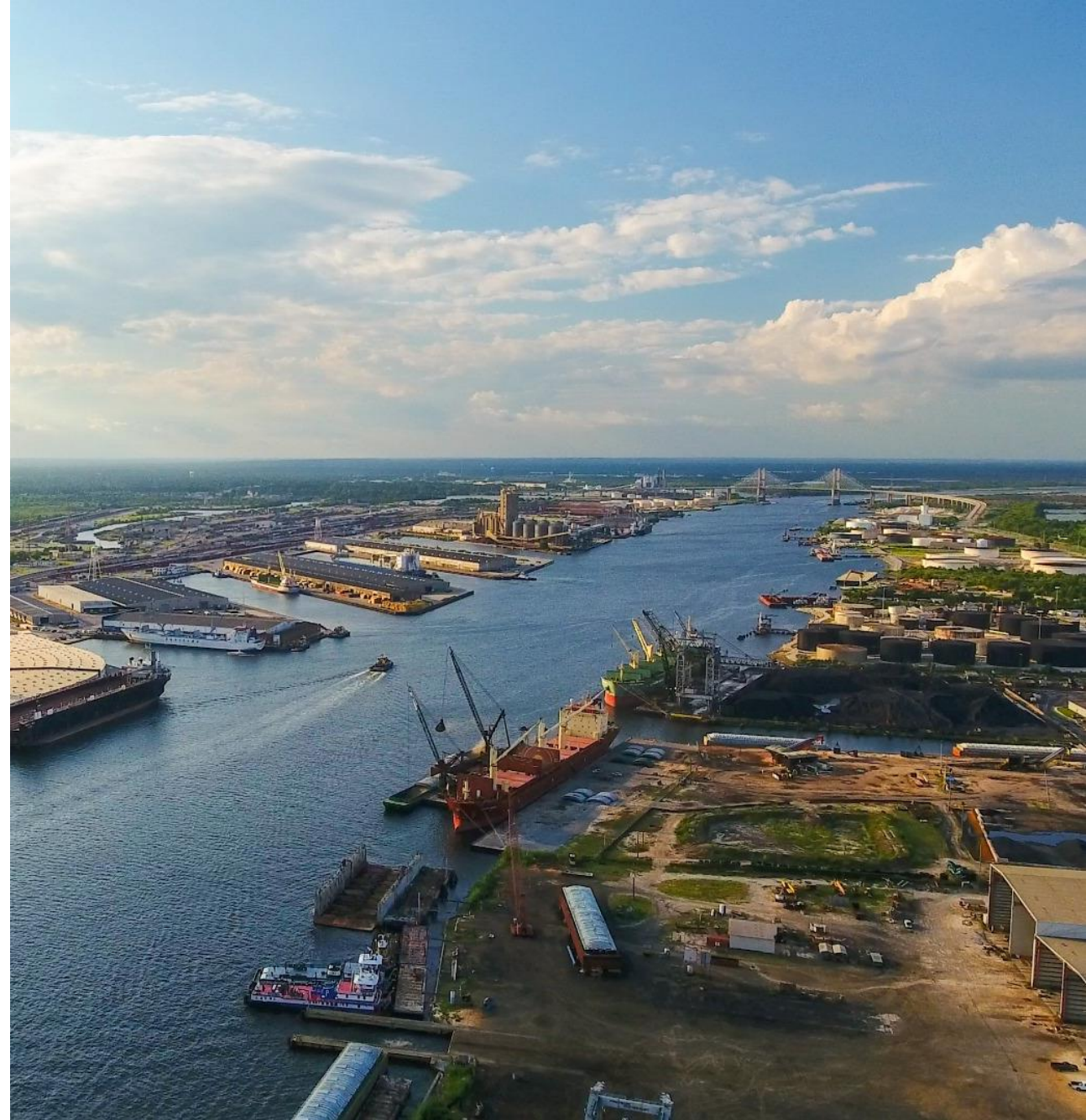




# Surge and interaction damage

## Potential damages

- Gangway / accommodation ladder
- Mooring lines
- Cargo hoses / loading arms
- Fenders / dolphin
- Contact damages
- Personal injury





# Effective prevention





# Surge and interaction damage

## Preventive measures – moored vessels

- Extra mooring ropes
- Types of mooring ropes used
- Mooring ropes tended to regularly
- Positioning of the gangway
- Weather (wind, swell, current) or heavy weather
- Main engine maneuverability
- Call for tugboats





# Surge and interaction damage

## Preventive measures – passing vessels

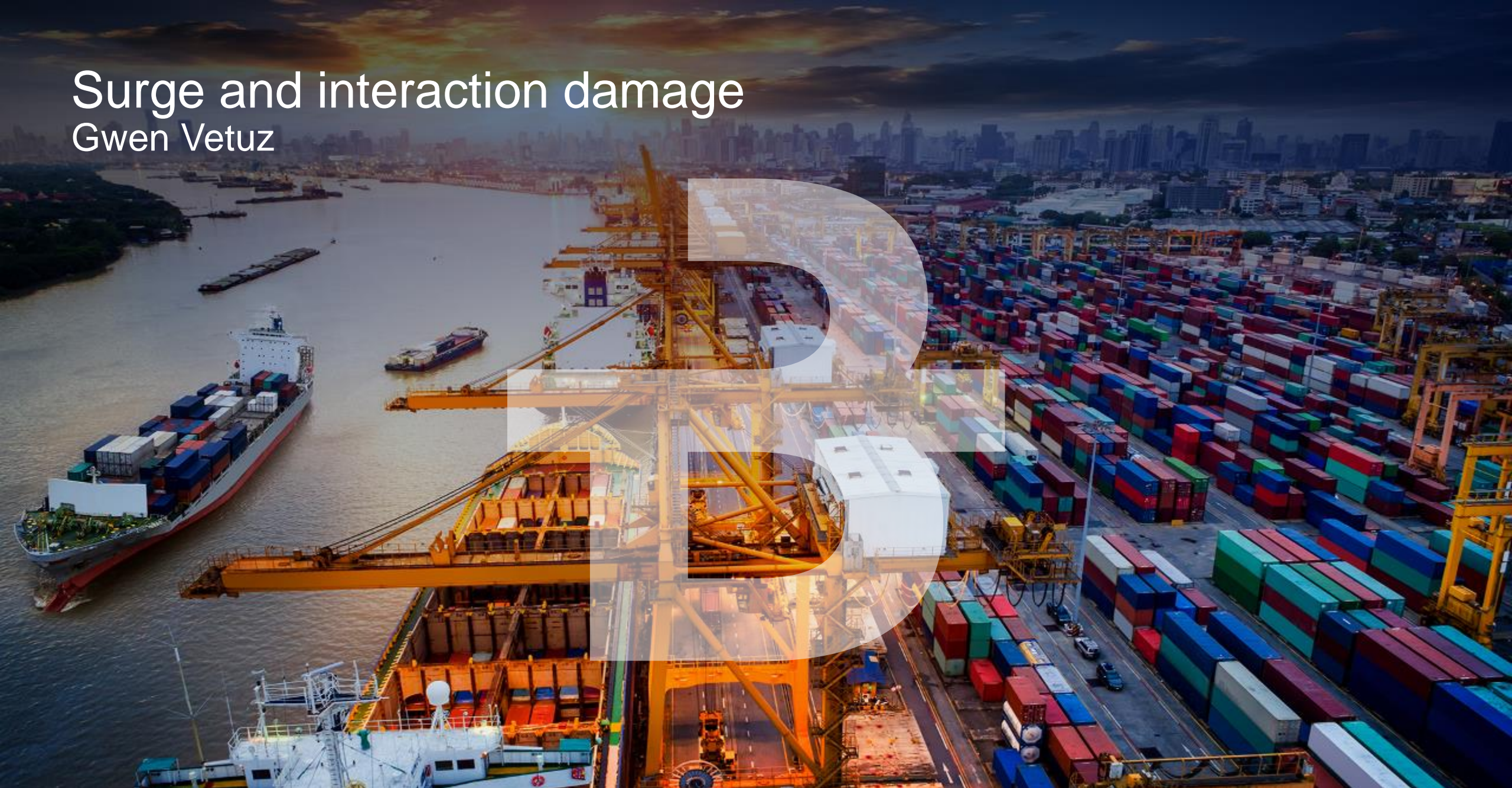
- Reduced speed
- Within speed limit
- Increase CPA
- Understand effects of shallow water and drafts





# Surge and interaction damage

Gwen Vetuz



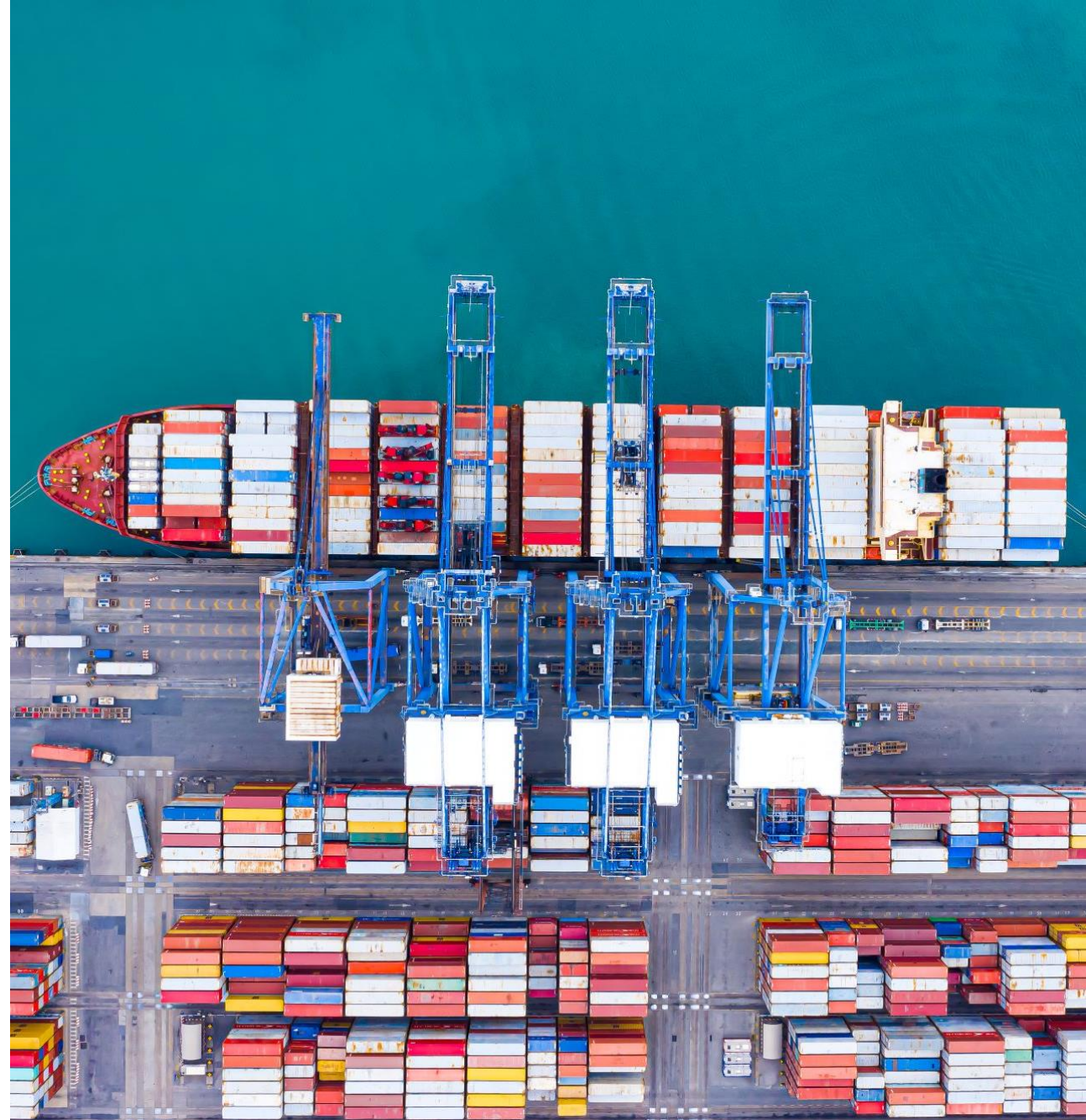


# Potential Third-Party Liabilities arising from surge and interaction damage

- Property Damage [Rule 19(10)]
- Non-contact damage to Ships [Rule 19(11)]
- Pollution [Rule 19(12)]
- Fines [Rule 19(19)]
- Personal Injury/ Loss of Life [Rule 19(4)]

# Property damage

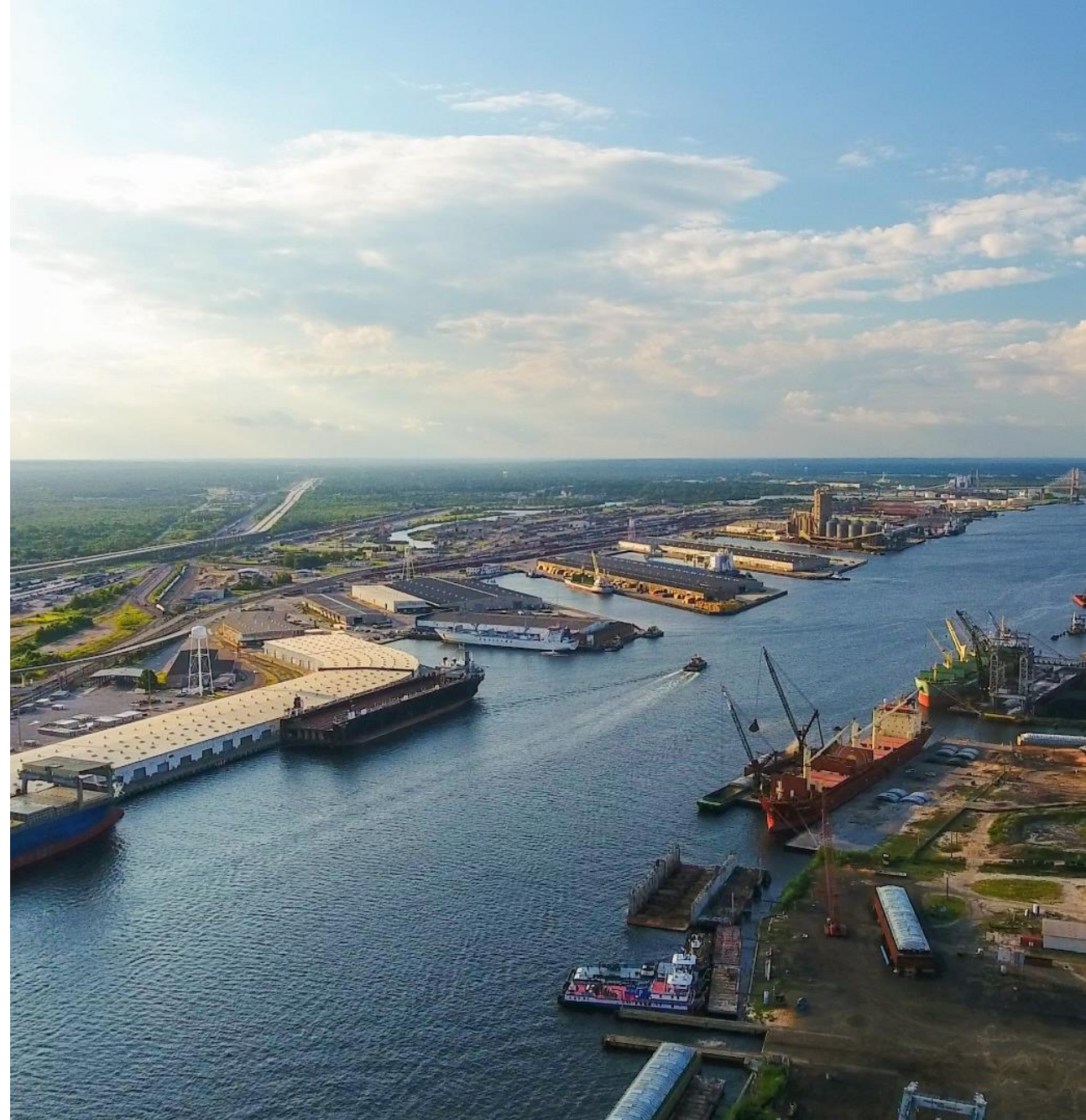
- Infrastructure of Ports/Terminals/Marina
- Damage to shore structures
- Cranes
- Loading/discharge equipment
- Berths/fenders/dolphins
- Cargo hoses part/loading arms damaged (ship side or shore side)
- Damage to shoreline, protective seawalls





# Non-contact damage to ships

- Anchored or Moored vessels
- Hull damage
- Equipment (e.g. accommodation ladder, gangway, mooring lines)
- Swamping of non-powered vessels



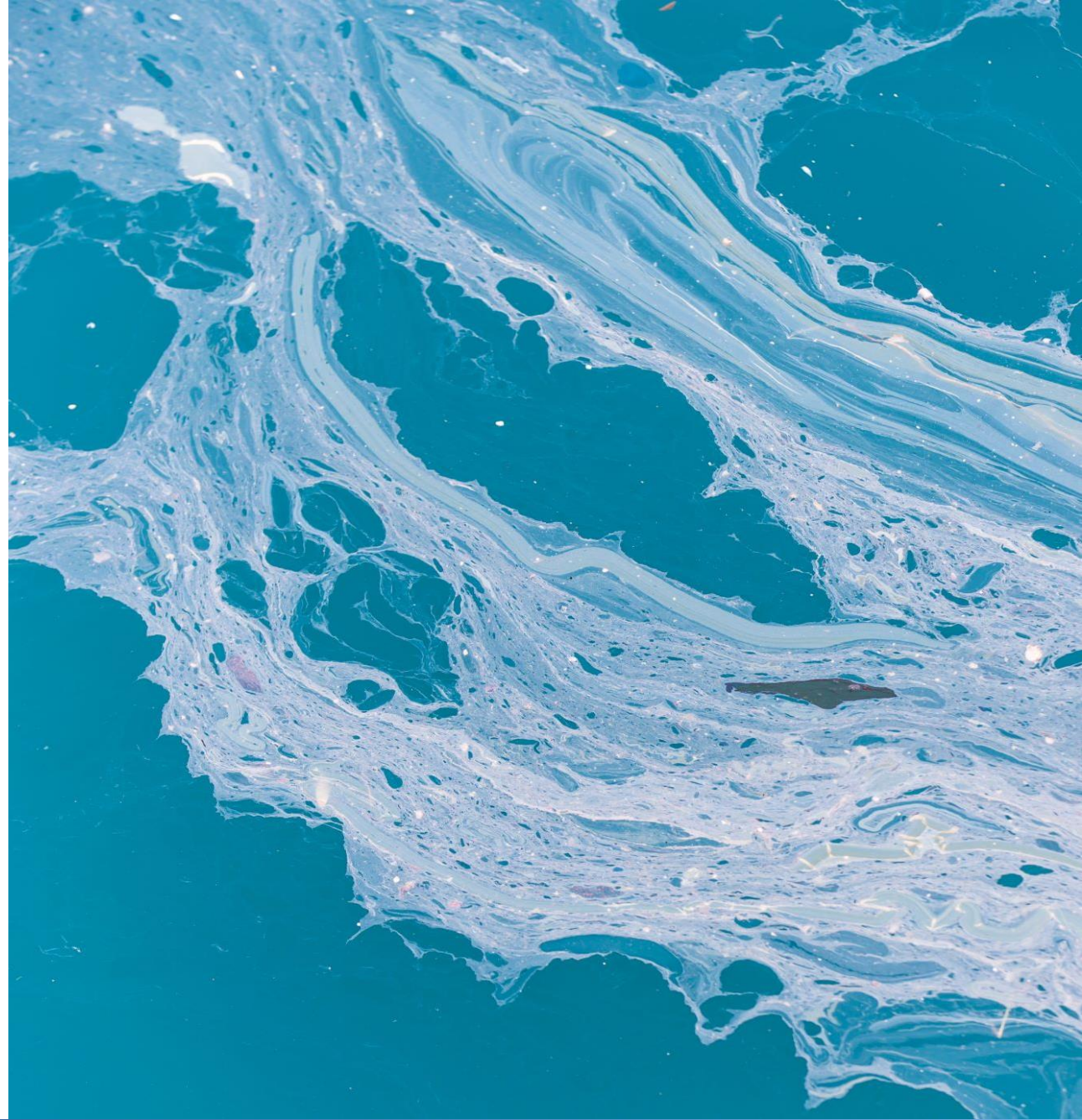
# Marina





# Other loss/damage

- Cargo damage
  - Cargo being loaded/discharged
  - Cargo in a yard (e.g. containers or bulk)
- Pollution
- Fines/ Penalties
  - From local authorities
- Personal injury



# What to do if the Vessel is accused?

- Often Vessel unaware that anything amiss – passing vessels
- Notified after the event
- Investigate
- Save all evidence
- AIS, VDR / ECDIS data backup
- CCTV recordings
- Parted mooring ropes – tagged and sealed
- Seek assistance from Club/Local Correspondents/Lawyers



# Factors to consider if accused Vessel is responsible

- Speed
- Distance from damage/ casualty
- Compliance with local regulations (e.g. was Vessel passing on correct side of the channel?)
- Compliance with applicable speed restrictions or minimum passing distance
- Responsibility of other Vessel (if any)

# Factors to consider if accused Vessel is responsible



- Pilots
  - Master's Responsibility for Safety and Navigation of Vessel
  - Liability: Negligence under Local law
  - Limitation of Liability



# Conclusion

Practical tips on what to do when a vessel is faced with a claim

- Preserve evidence
- Notify Club
- Instruct local correspondents/local lawyers
- Investigate facts
- Determination on Liability and Claim Quantum
- Check if any possibility of Recovery
- Loss prevention – learning points for fleet

# Q&A

For more information: [lossprevention@tindallriley.com](mailto:lossprevention@tindallriley.com)





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