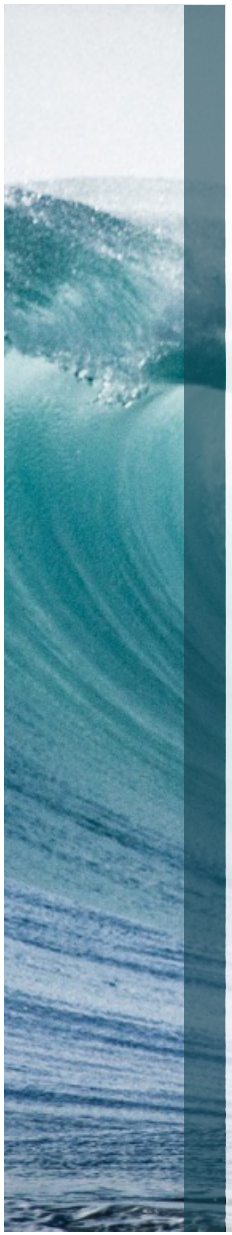
Concello da Coruña

SAIL TRAINING INTERNATIONAL CONFERENCE 2024

Incidents at Sea – That will never happen to me!

@tallshipsraces
@sailtrainingyouth
@thetallshipsraces

Sail Training International



MAIB

THE MARINE ACCIDENT INVESTIGATION BRANCH

Andrew Moll

MAIB
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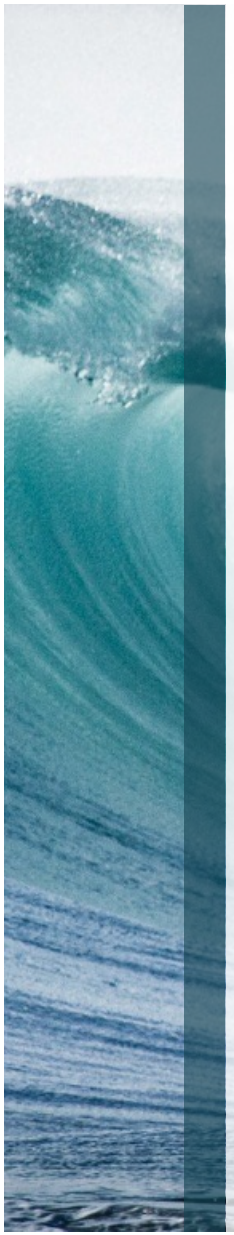

My aims today

- De-mystify the State accident investigation
- What to expect from us
- Thinking and acting safety (or, How to avoid meeting us!)

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The origins of the MAIB
Herald of Free Enterprise (6 March 1987)

In summing up at the end of his Formal Investigation, Lord Justice Sheen recommended separating accident investigators from regulators

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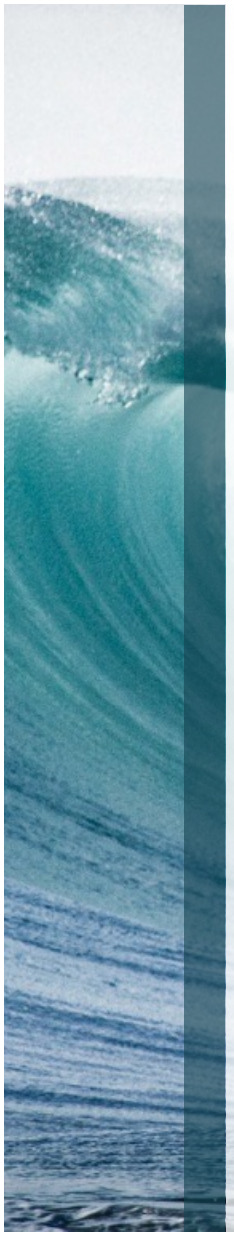

AIMS OF THE MAIB

- 1- To improve the safety of life at sea
- 2- To satisfy the public in general, and the maritime community in particular, that marine accidents are being properly investigated
- 3- To fulfil UK's international obligations to investigate marine accidents

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INTERNATIONAL OBLIGATIONS AND UK REGULATIONS

- UK complies with the:
  - International Maritime Organisation's (IMO) Casualty Investigation Code, and (currently)
  - EU Directive 2009/18/EC .
- National legislation (The Merchant Shipping (Accident Reporting and Investigation) Regulations 2012) give effect to these international obligations.
- Inspectors' powers are derived from the Merchant Shipping Act 1995

IMO Casualty Investigation Code

Res A.996(25) – wef 1 January 2010

- Applies to 'SOLAS convention' vessels (>500gt)
- Mandates investigation of all very serious marine casualties, which includes:
  - The loss of a vessel
  - Death, as a result of a marine accident
  - Serious marine pollution

IMO INTERNATIONAL MARITIME ORGANIZATION

EU Directive on Marine Casualty Investigation

Directive 2009/18/EC – wef 17 June 2011

- Safety investigations must be independent of criminal or other parallel investigations held to apportion liability or blame;
- Applies to all vessels, except:
  - State owned vessels on non-commercial service
  - Pleasure craft not engaged in trade unless carrying >12 passengers
  - Fishing vessels <15m
  - Inland waterways vessels

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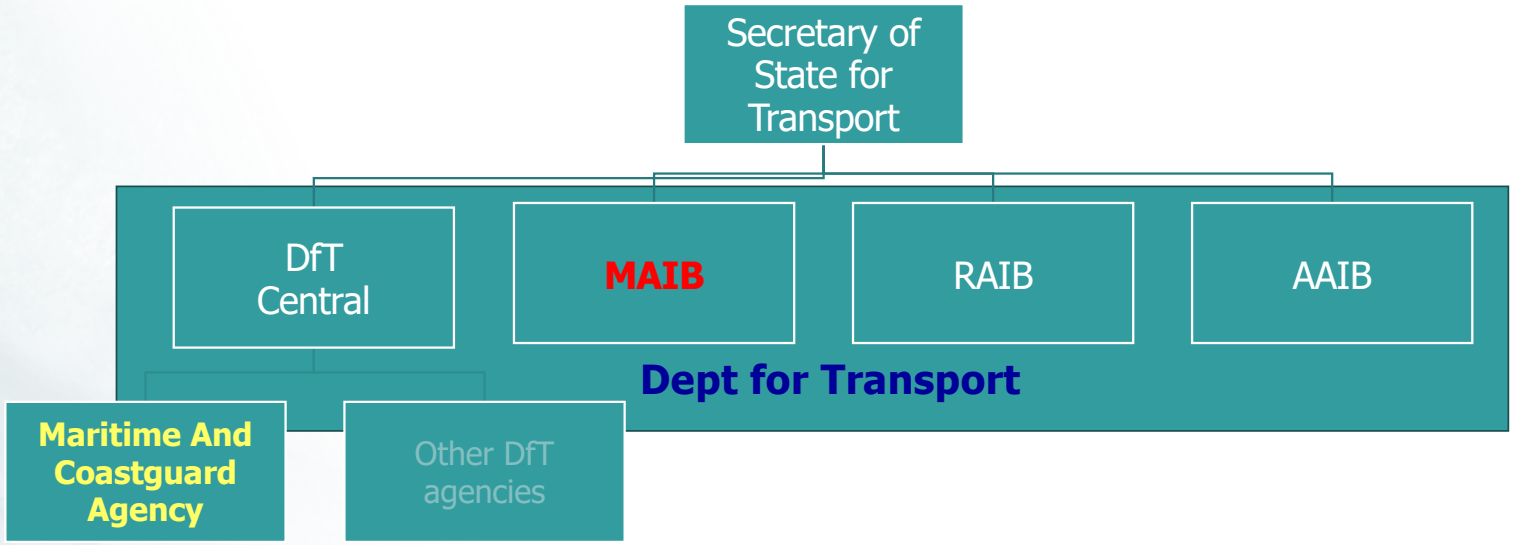
In the UK, the AIBs are part of, but are functionally independent from the Ministry



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What does MAIB investigate?

- UK flagged vessels anywhere in the world
- Any vessel in UK waters (12-mile limit)
  - Merchant ships of all sizes
  - Fishing vessels
  - Small commercial craft
  - Pleasure craft
  - Accidents to people
- About 1200 cases / year
- Around 20 full investigations

Sea Empress
16 Feb 1996

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What keeps me awake?

Herald of Free Enterprise (1987)
193 fatalities

Estonia (1994)
852 fatalities

As Salam Boccaccio 98 (2006)
c1400 fatalities

Costa Concordia (2012)
32 fatalities

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Ro-Ro vehicle deck fires, e.g. MV *Und Adriyatik* & MV *Lisco Gloria*

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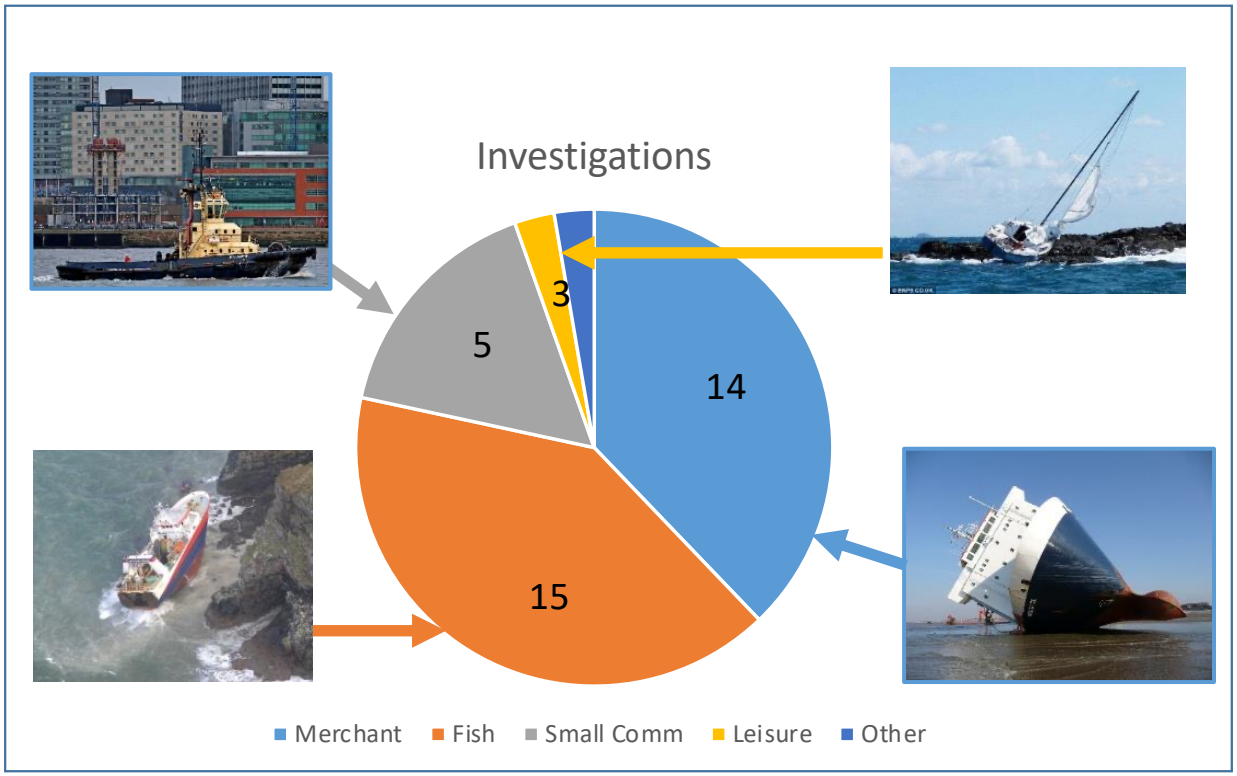
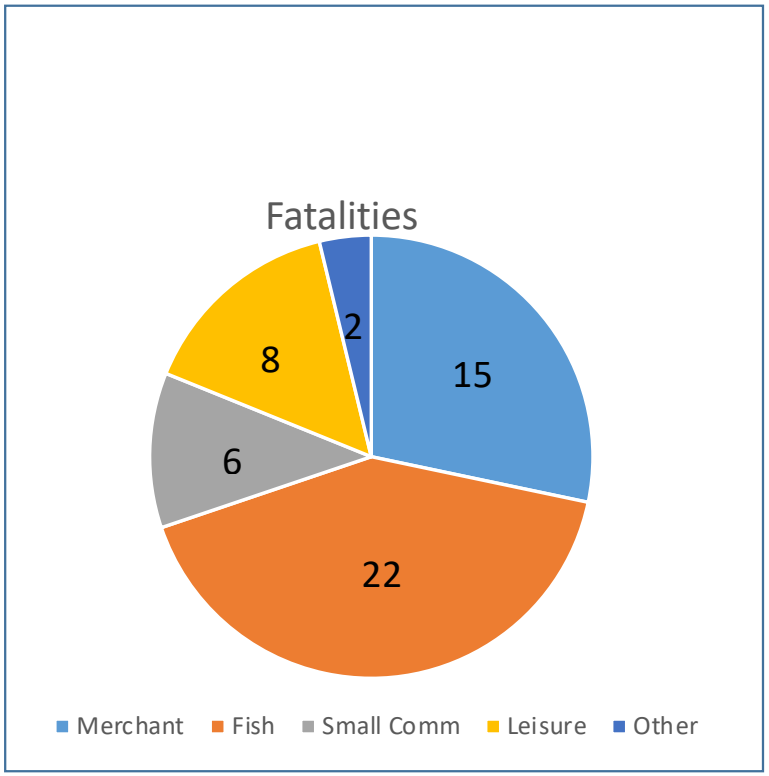
What keeps us busy……
Current Investigations @ 10/10/24

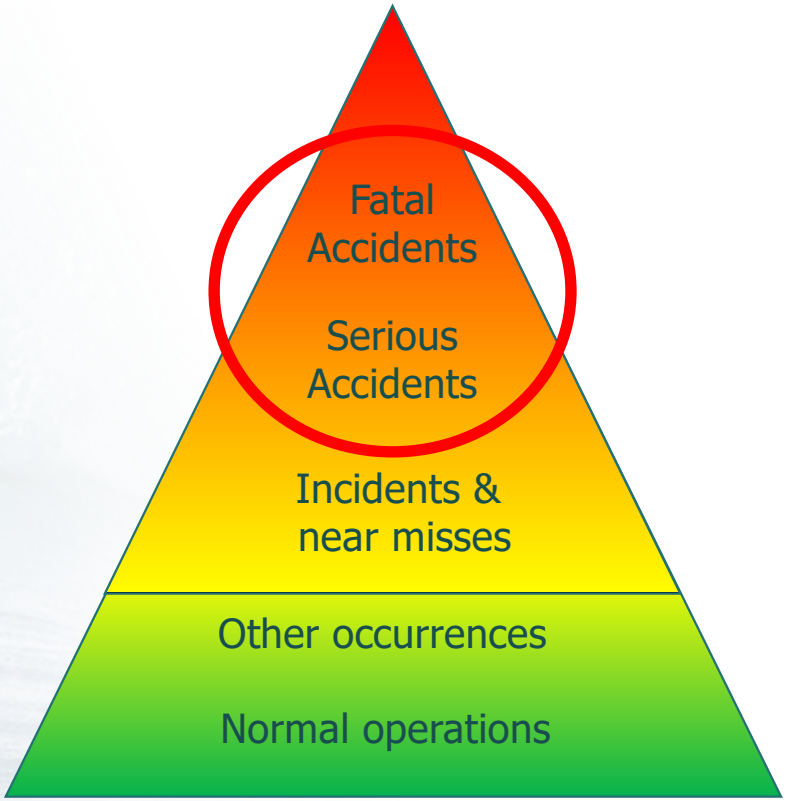
38 Investigations



53 Fatalities



What do we investigate?



Who else in investigating?

- Police
- Regulators (MCA)
- Harbour authorities
- Insurers / Loss adjusters
- Manufacturers
- Operators
- Owners

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Maria Asumpta, off Padstow on 30 May 1995, resulting in 3 deaths

Grounding and sinking of *Astrid* near Kinsale, County Cork on 24 July 2013

Knock down and foundering of *Concordia,* 300 nm southeast of Rio de Janeiro, Brazil, on 17 Feb 2010

STC *Amicitia* mast failure 21 August 2016, resulting in 3 deaths

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Pelican of London - Fall from gangway resulting in a single fatality at Sharpness Docks, on 2 October 2023

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Components of an Accident

- There is usually some pre-existing weakness in the system of work or equipment that creates a safety vulnerability.
- There will be a trigger event that tips the scales to create the accident.
- A finally, how the event is handled can often determine the severity of the outcome.

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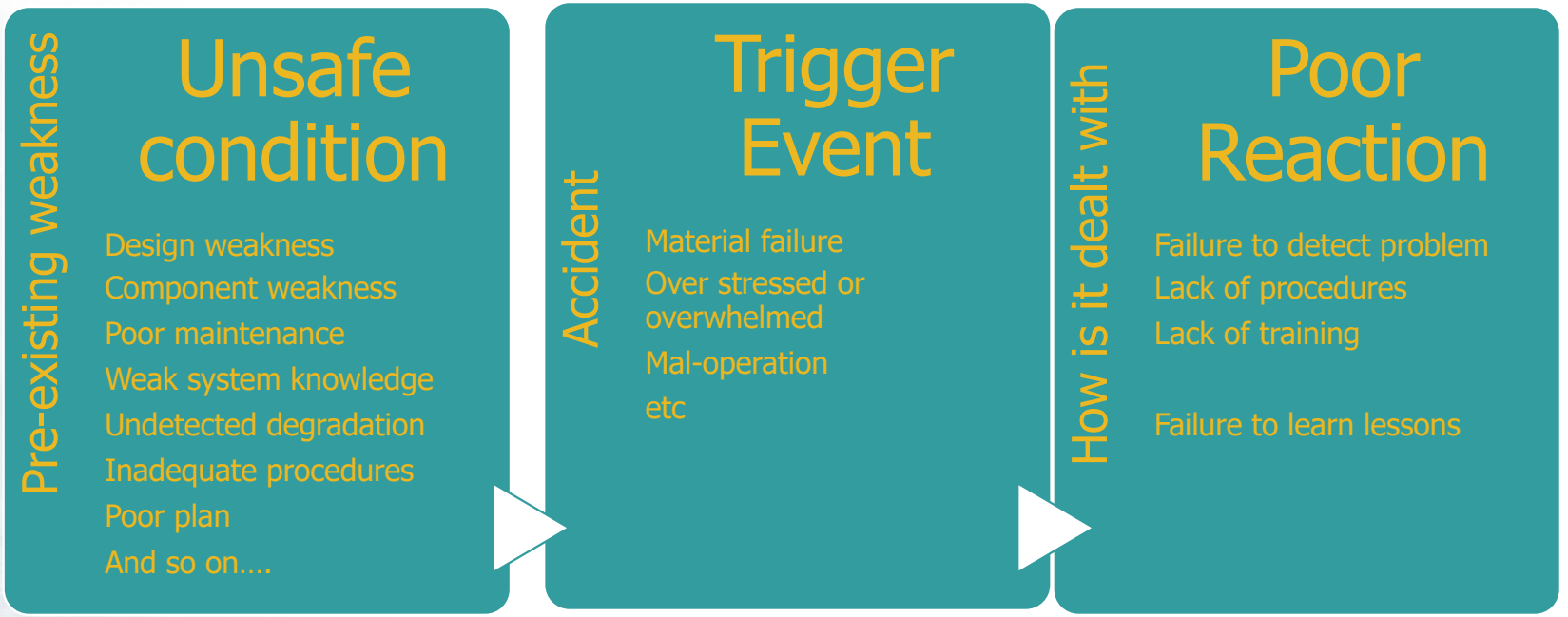
Components of an Accident



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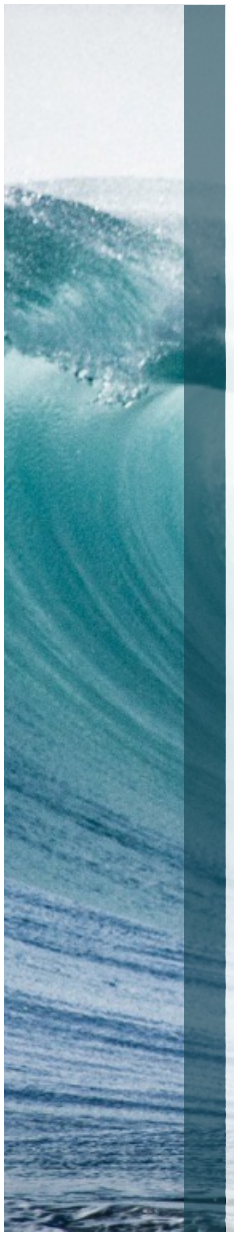

Obvious hazards:

- Slips trips or falls.
- Fall or washed overboard.
- Fall from height (stowing sails or conducting maintenance).
- Working under a suspended load (main yard, gaff etc).
- Working in the line of recoil.
- Clothing caught in a capstan or warping drum.

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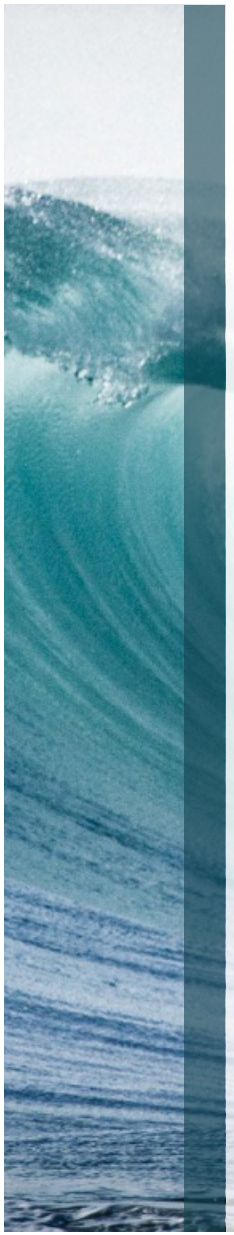

Less obvious hazards:

- Watertight integrity (*Concordia*)
- Fuel quality (*Maria Assumpta*)
- Engine room hot spots

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Ro-Ro Ferry Stena Europe

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Seat of the fire

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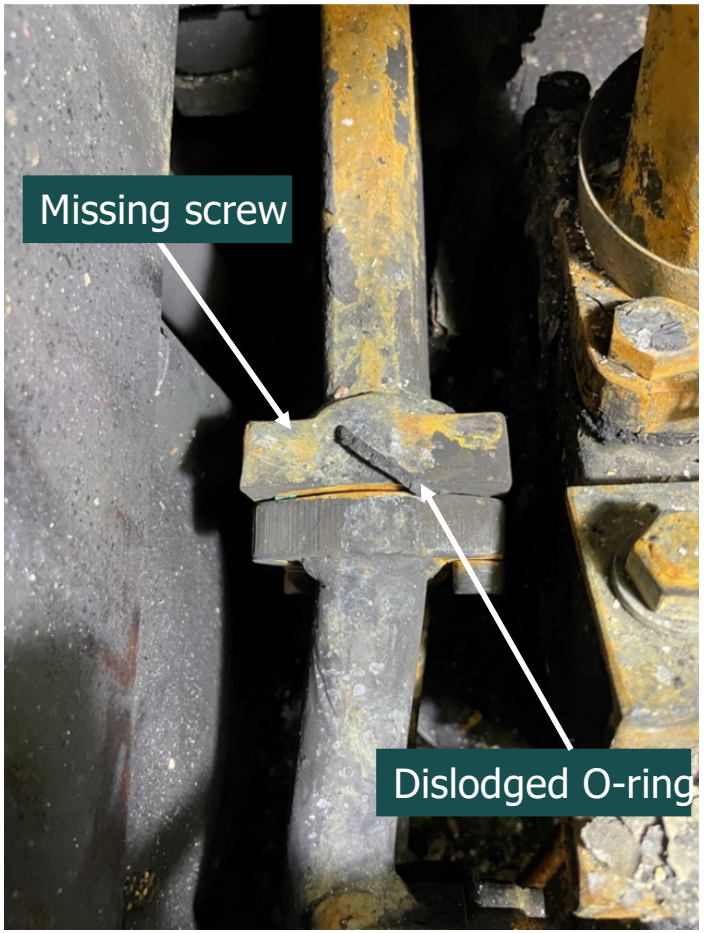
Failed fuel system joint, which allowed fuel under pressure to escape.

A manufacturer's modification that replaced 2-bolt couplings with 4-bolt couplings had not been implemented.



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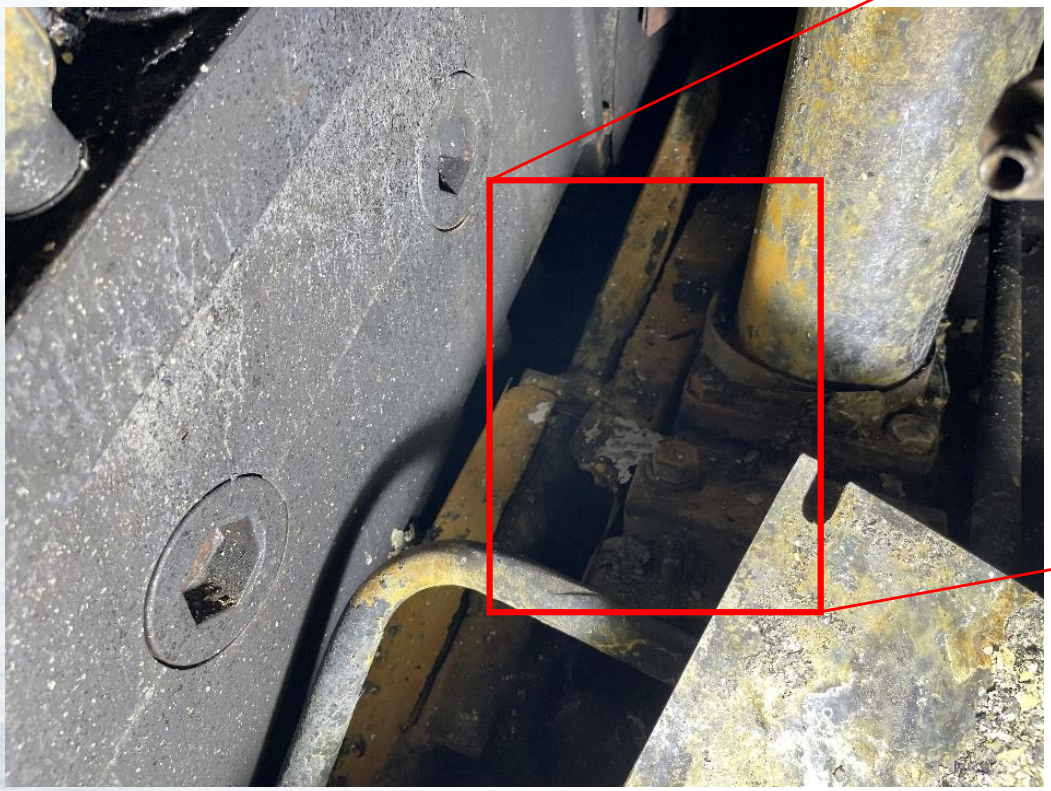
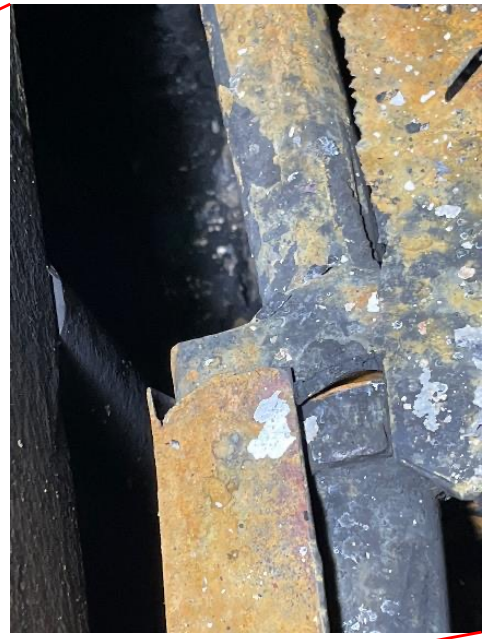
Incomplete shielding with exposed fuel pipe flange connection





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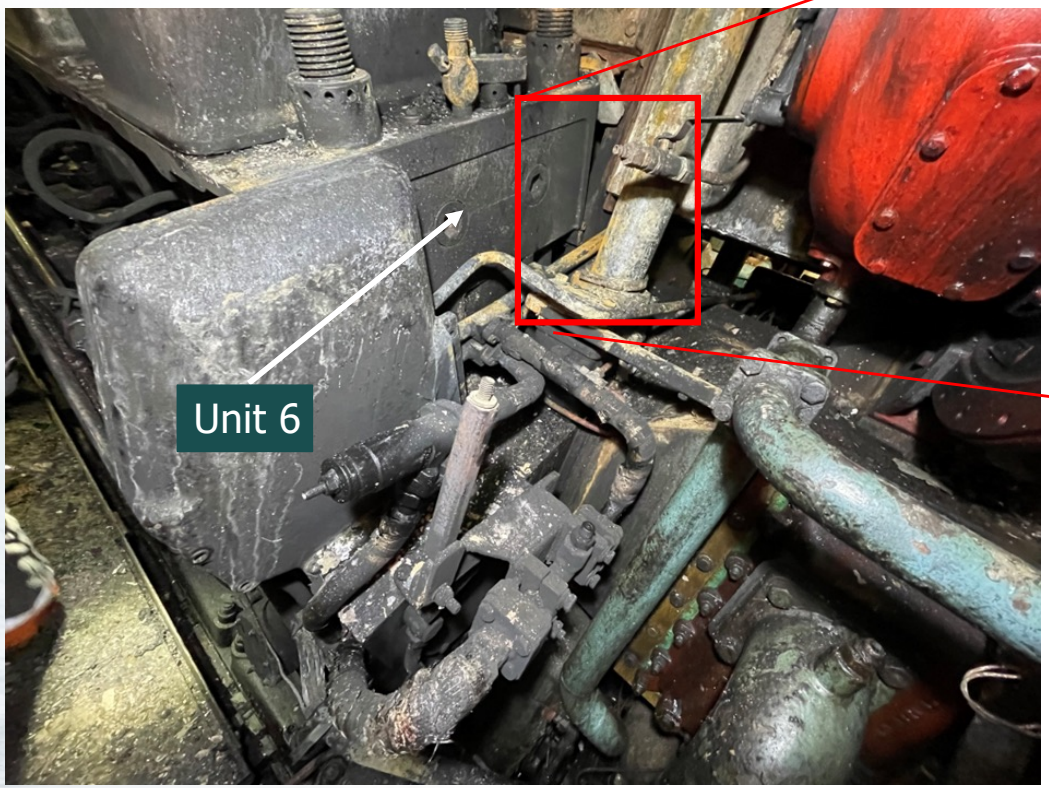
Displaced exhaust insulation



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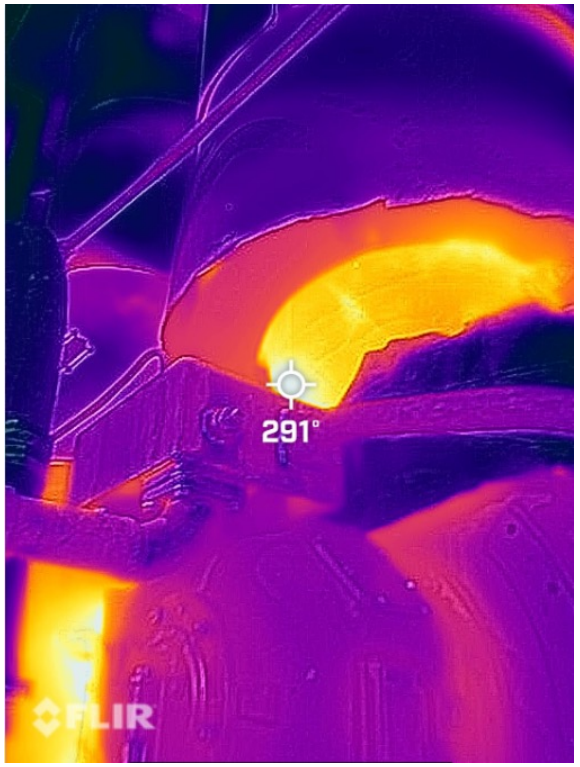
Photograph of main engine B bank turbocharger and uptake.
Thermal image showing hotspot of 291ºC behind seemingly intact lagging.



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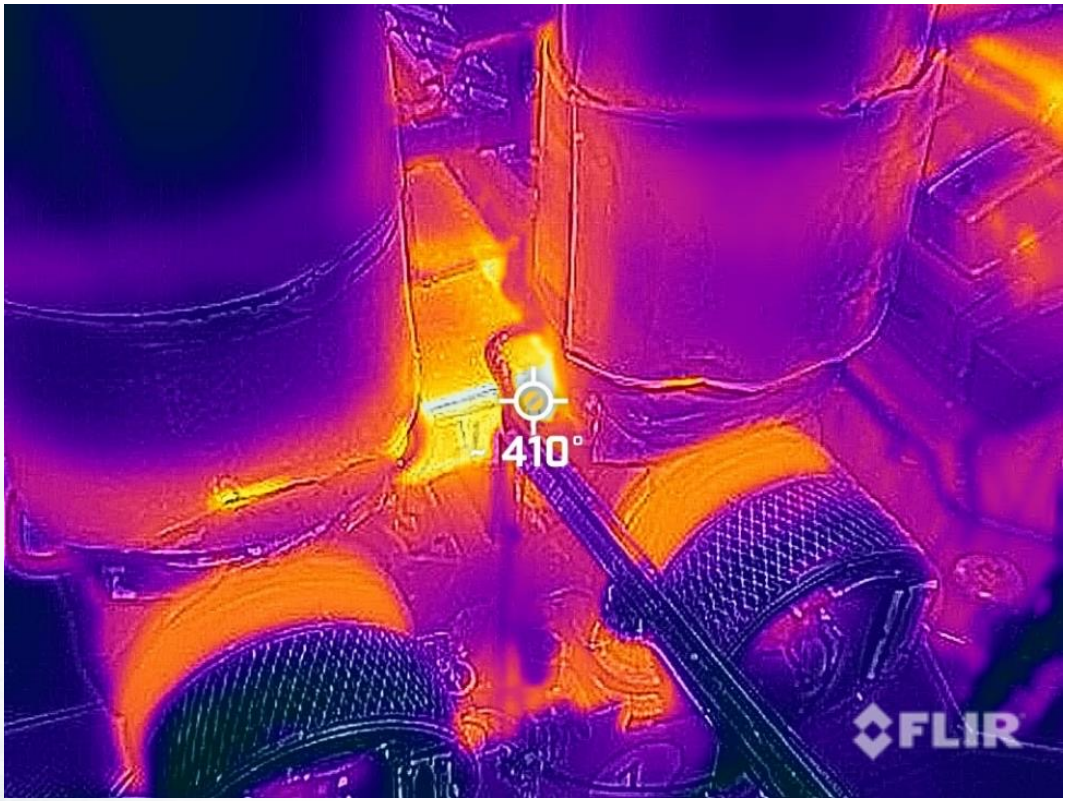
Thermal image of the front of main engine one, showing a previously unidentified exposed hot surface of 410ºC.



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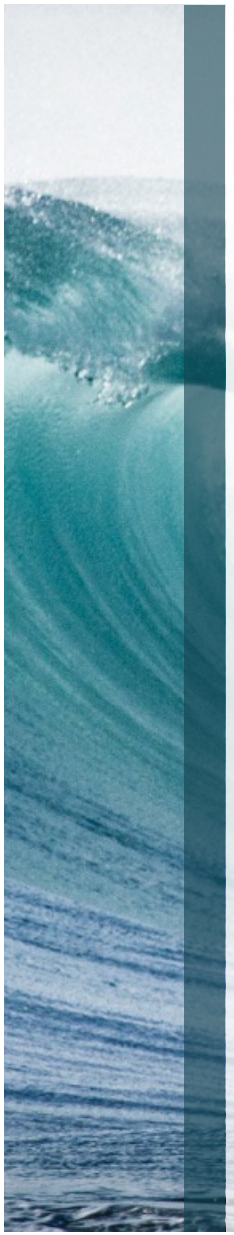

MSC.1/Circ.1321 "Prevention of fires in ER"

- Solid fuel pipes adequately secured against vibration.
- Spray shields / anti-splash tape for flanged / screwed joints.
- Flexible hoses should be as short as possible, only fitted where necessary to accommodate movement between piping and machinery, recorded and actively monitored.
- High temperature surfaces (>220^{o}C) insulated (lagged).
- Filters and strainers should be as far as possible from hot surfaces and sources on ignition.
- And so on……

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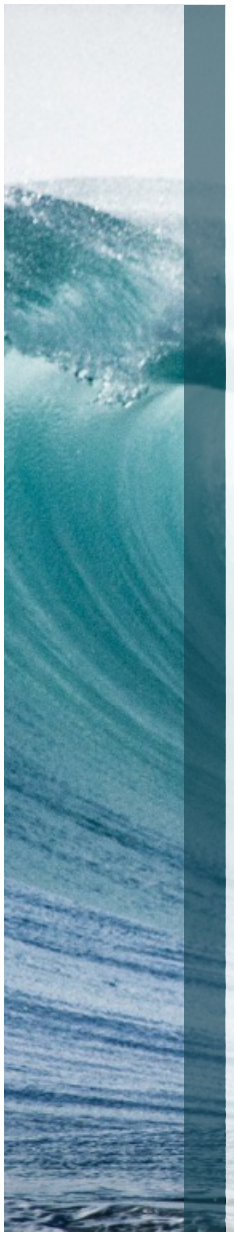

Efficiency – Thoroughness Trade-off (ETTO)

"Demands for productivity reduce thoroughness while demands for safety reduce efficiency."

Erik Hollnagel

- Safety Vs Risk:
  - The Trade-off seems like a good idea at the time, and for as long as things are going right.
  - Eventually, luck runs out and something goes wrong. With hindsight, it is often obvious where such trade-off were made.

It can take a conscious effort to make a safe decision.

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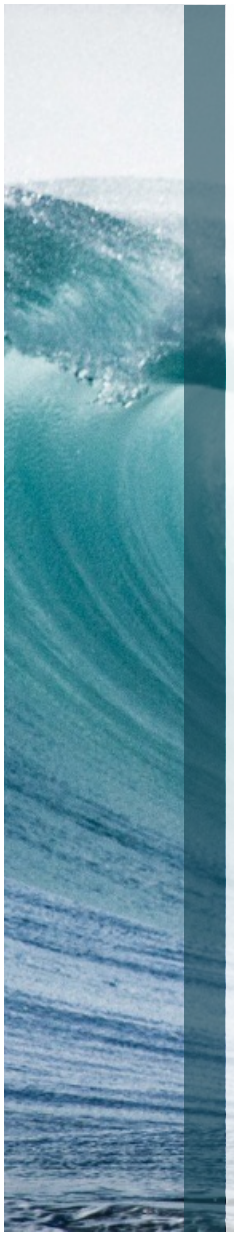

ABC of avoiding accidents

A. Do we have a plan?	**A**nticipation
B. Are we following the plan?	**B**ehaviour
C. What happens if things go wrong?	**C**ontingency

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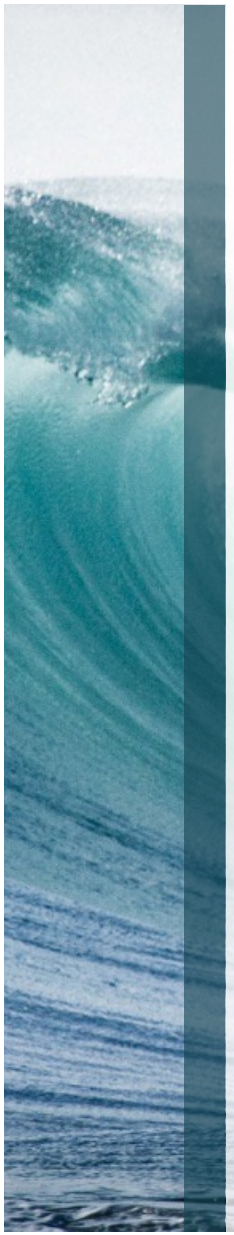

Anticipation = Precautionary thought

Planning is an unnatural process; it is much more fun to do something. And the nicest thing about not planning is that failure comes as a complete surprise rather than being preceded by a period of worry and depression.

Sir John Harvey Jones

Industrialist

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MY *Channel Queen* – grounding and foundering during a Round-the-Island swim-support voyage on 20 July 2023.

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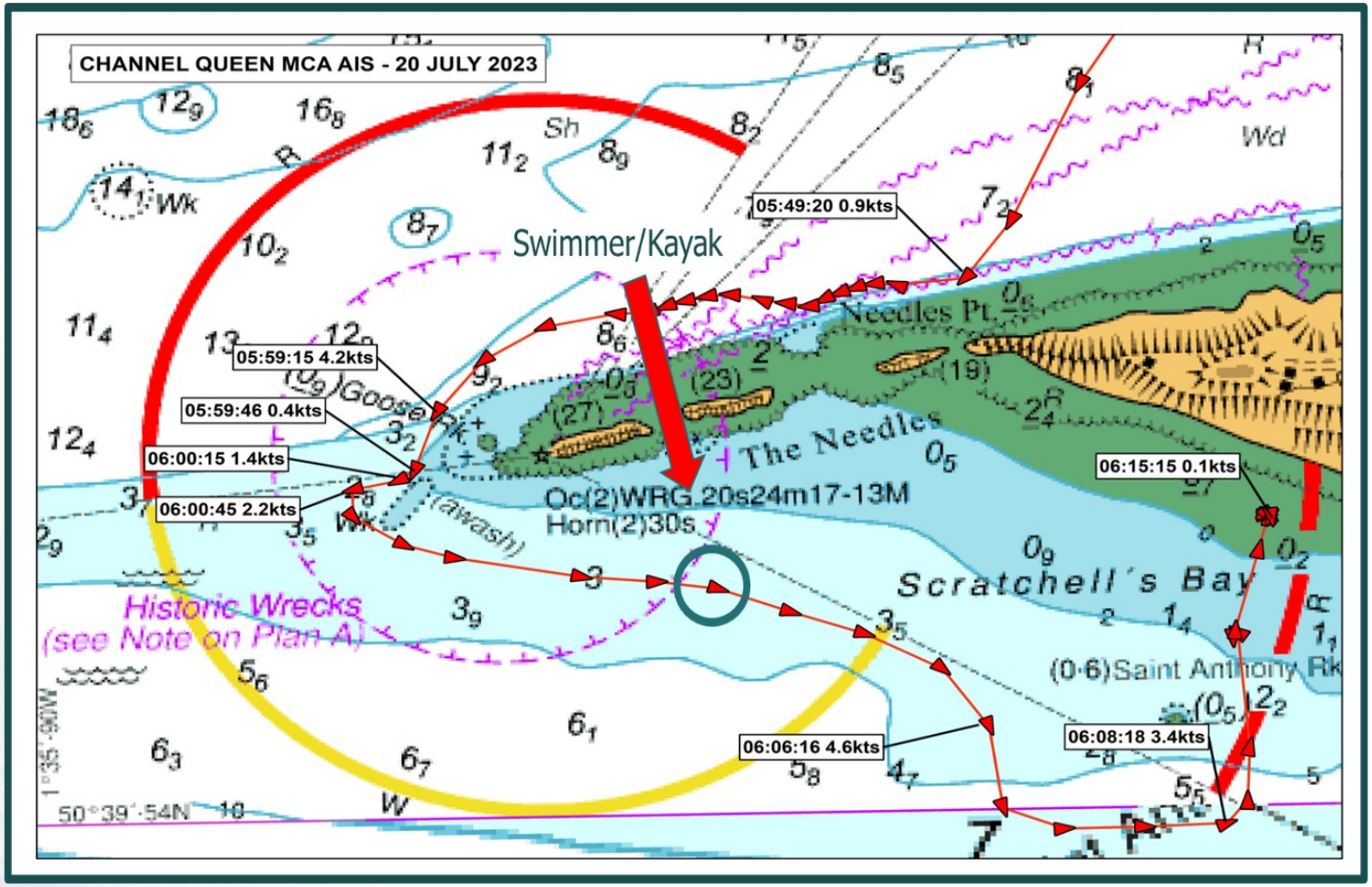

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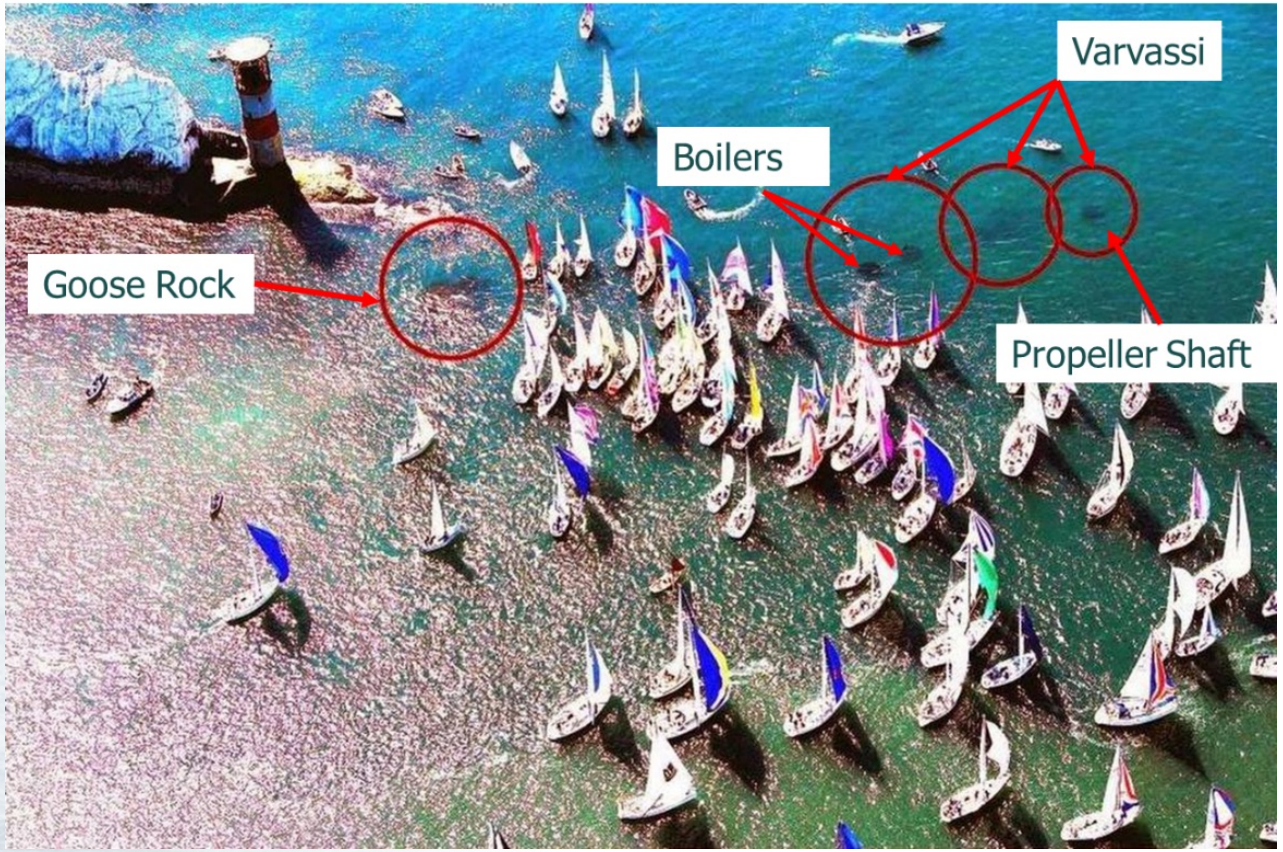
Annual Round-the-Island yacht race



Threading the Varvassi wreck

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Channel Queen abandonment

Safety Issues:

Crew fatigue
Passage planning
Watchkeeping competence
Distraction
Insufficient crew numbers

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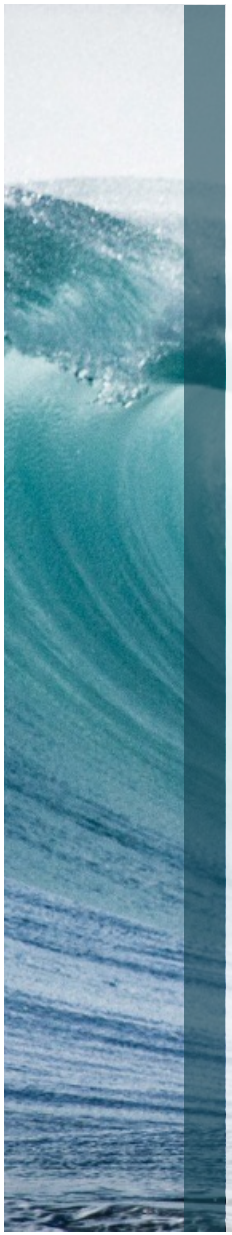

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Behaviours, too often can be triggers…..

How safe are you when no-one else is watching?

Do you only act safely when the 'punters' are around?

Do you practice what you preach?

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Humans do not make good monitors

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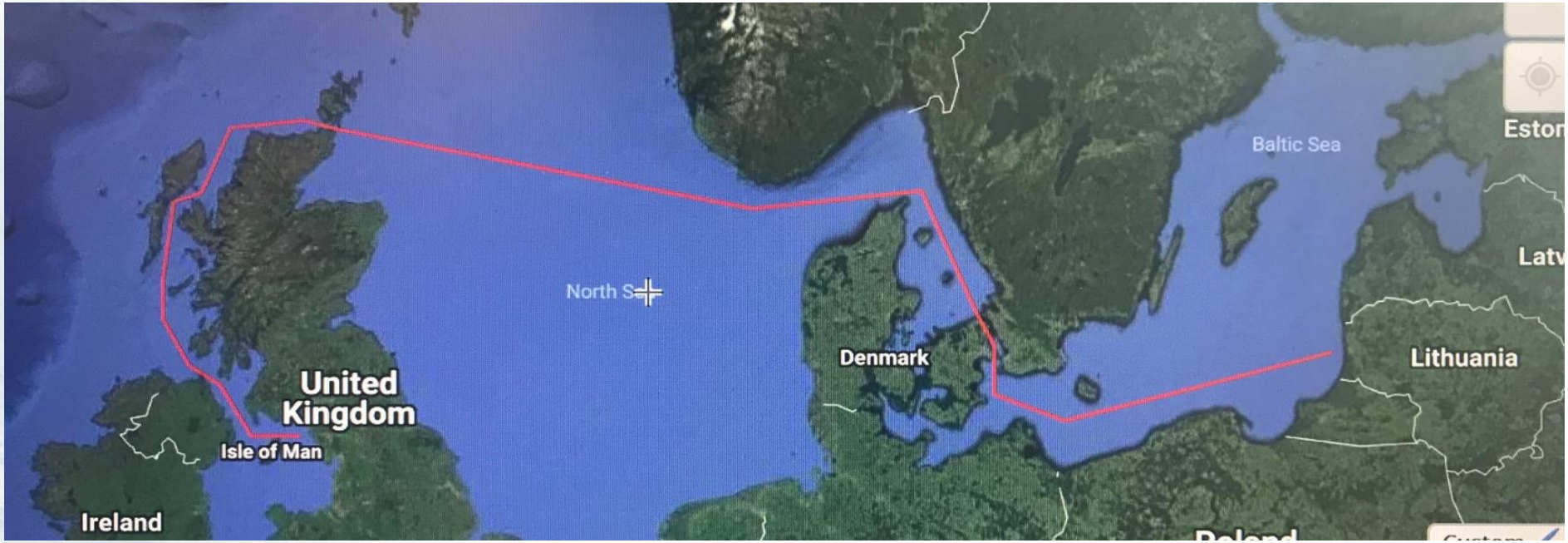
Grounding of MV Priscilla approaching Pentland Firth on 18 July 2018 (MAIB Report 12/2019)

- Spot market – mixed general cargoes – Grain / steel / animal feed / fertilizer etc
- Carrying a cargo of 3300t fertilizer from Klaipeda, Lithuania to Siloth, UK



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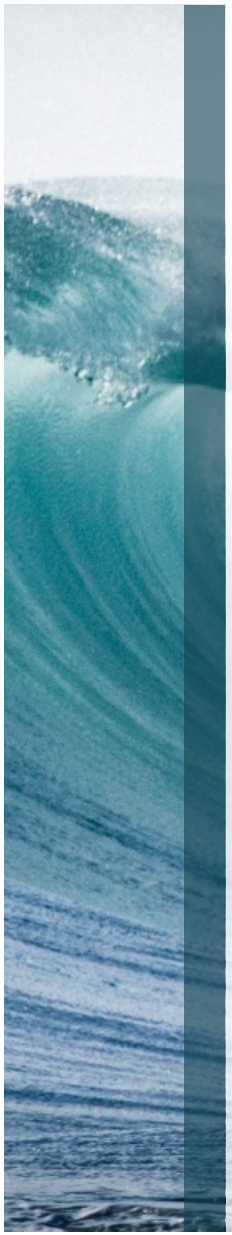

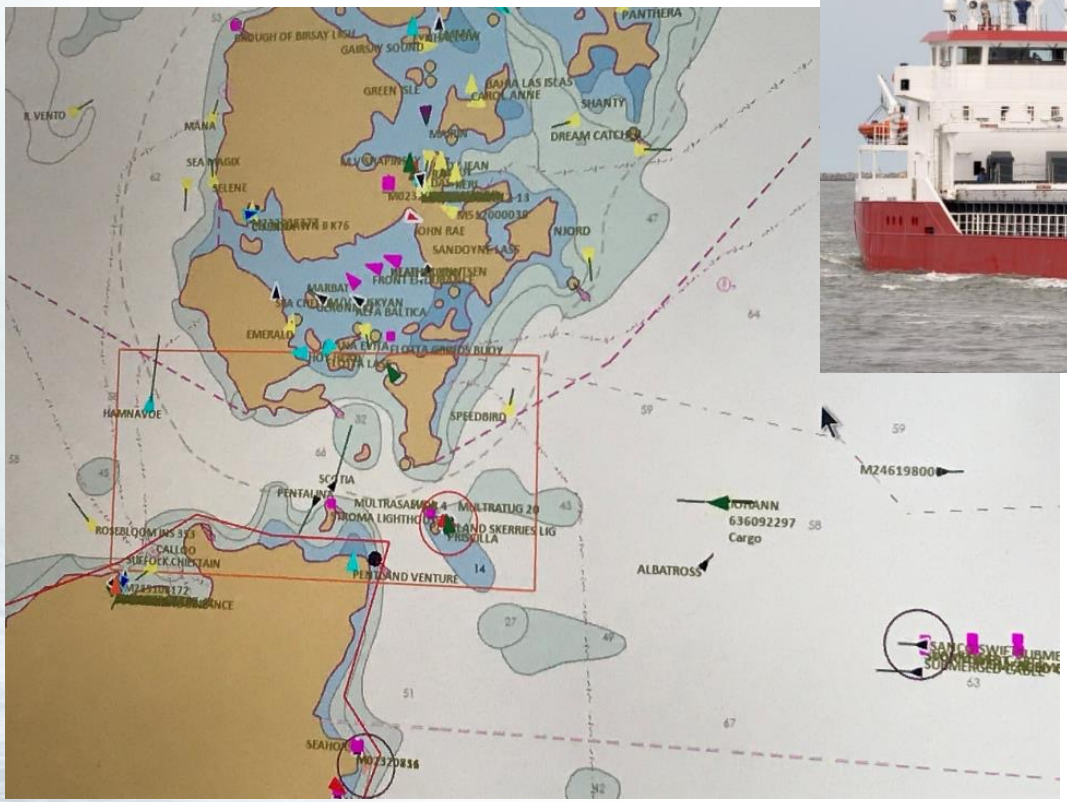

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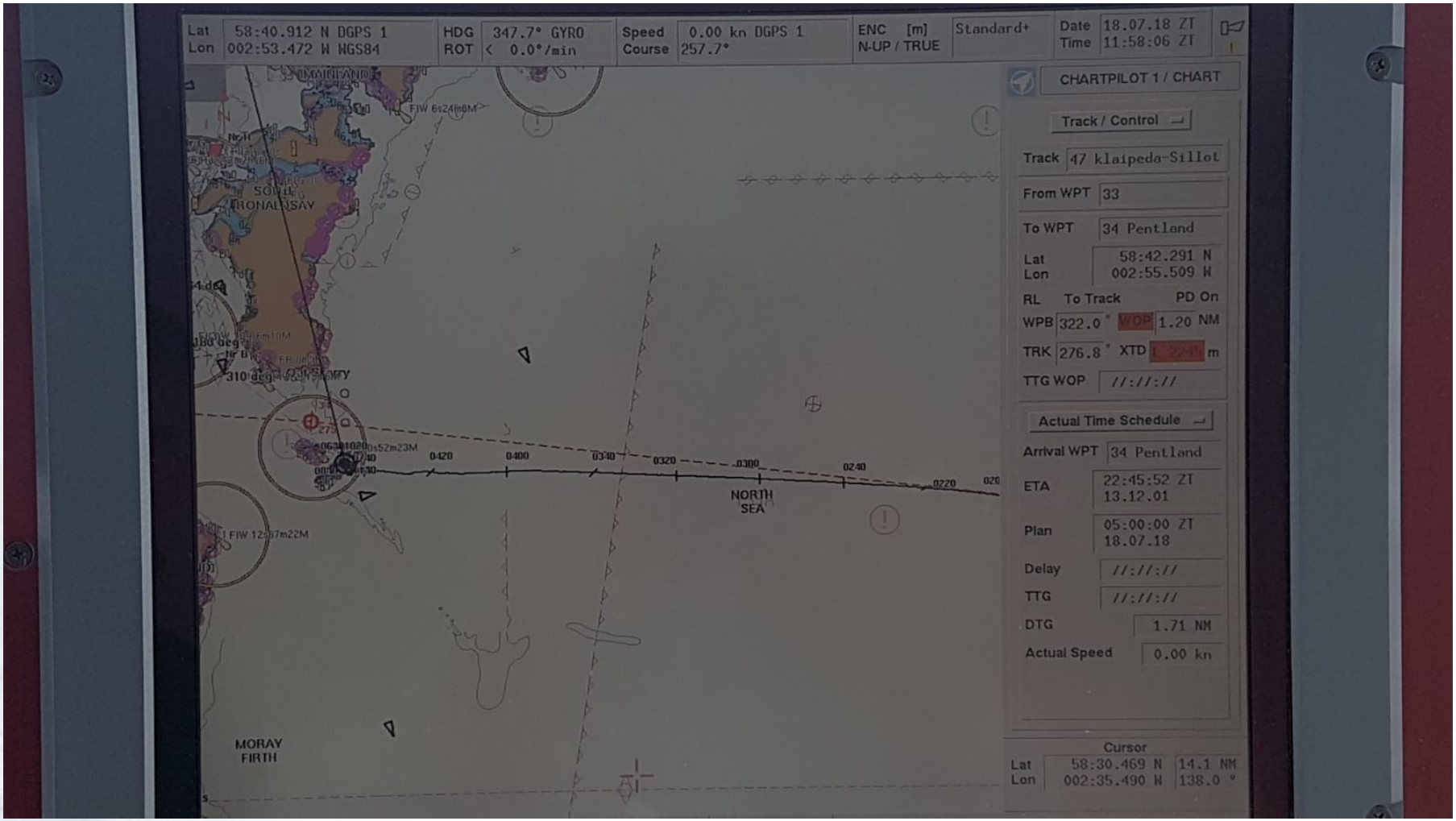

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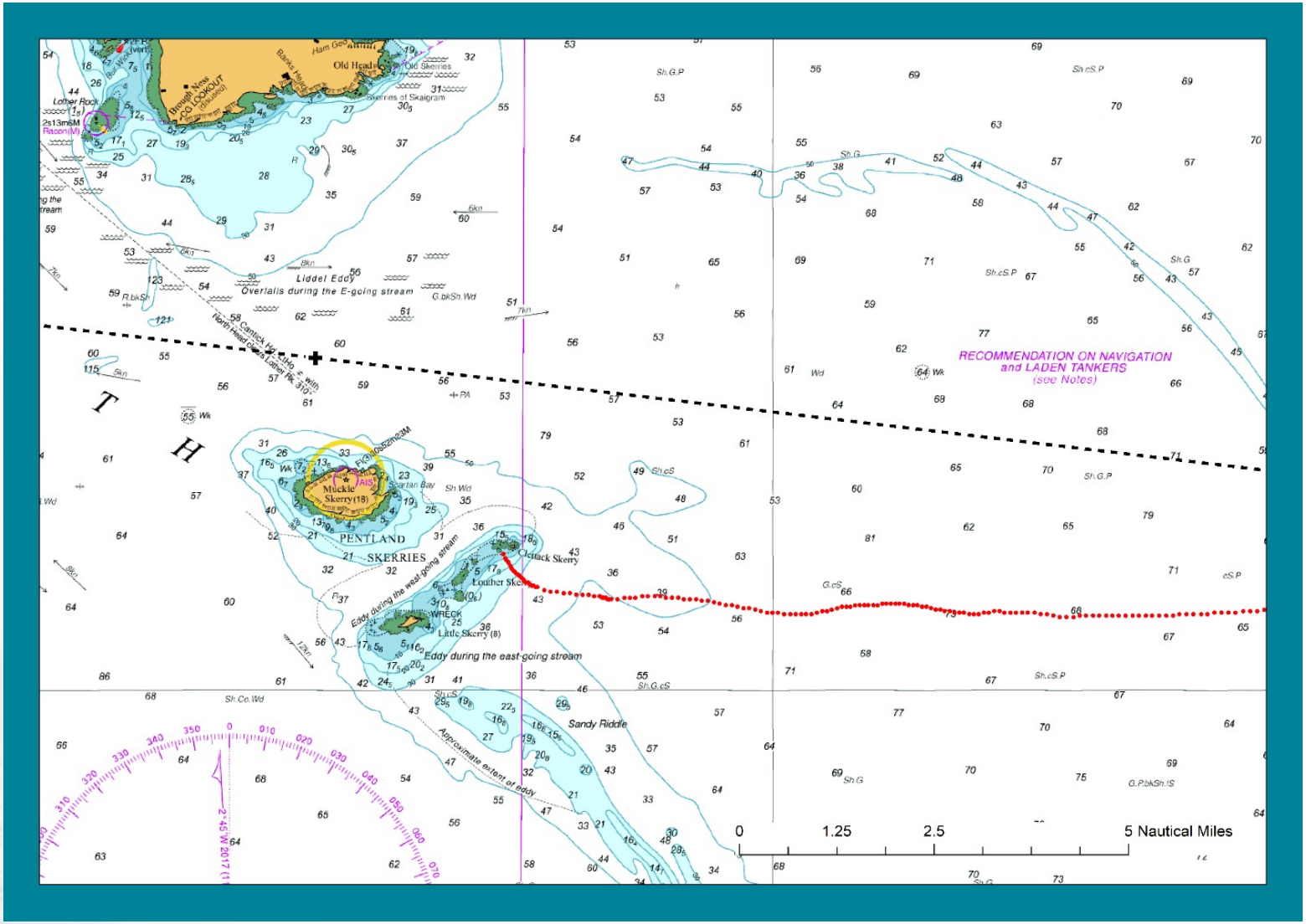

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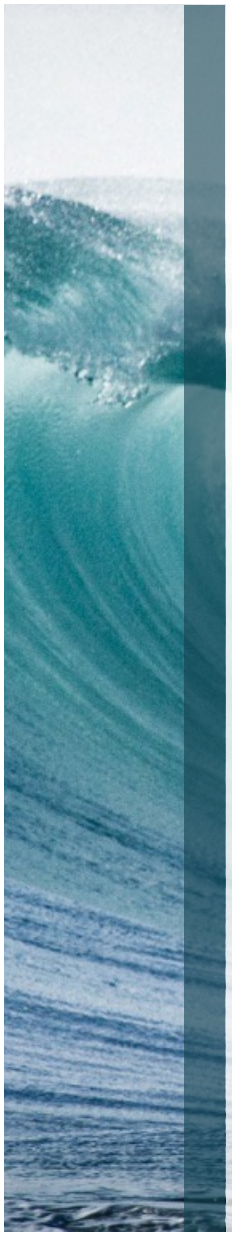

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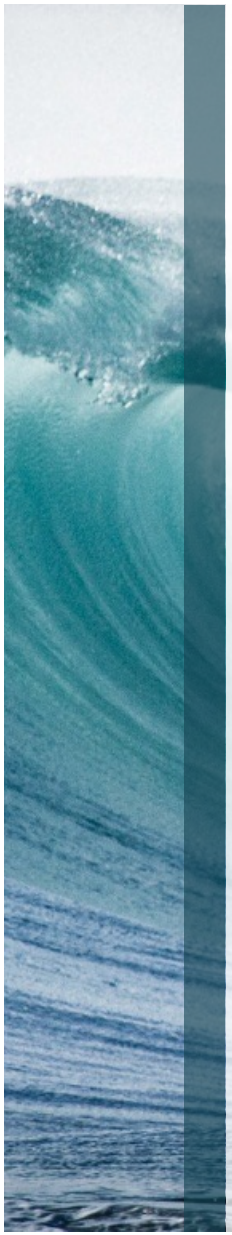

Smartphone Use in the US

Generation	Average Daily Screen Time	Proportion Who Feel Addicted
Gen Z	6 hours and 5 minutes	56%
Millennial	4 hours and 36 minutes	48%
Gen x	4 hours and 9 minutes	44%
Baby Boomer	3 hours and 31 minutes	29%

https://explodingtopics.com/blog/smartphone-usage-stats

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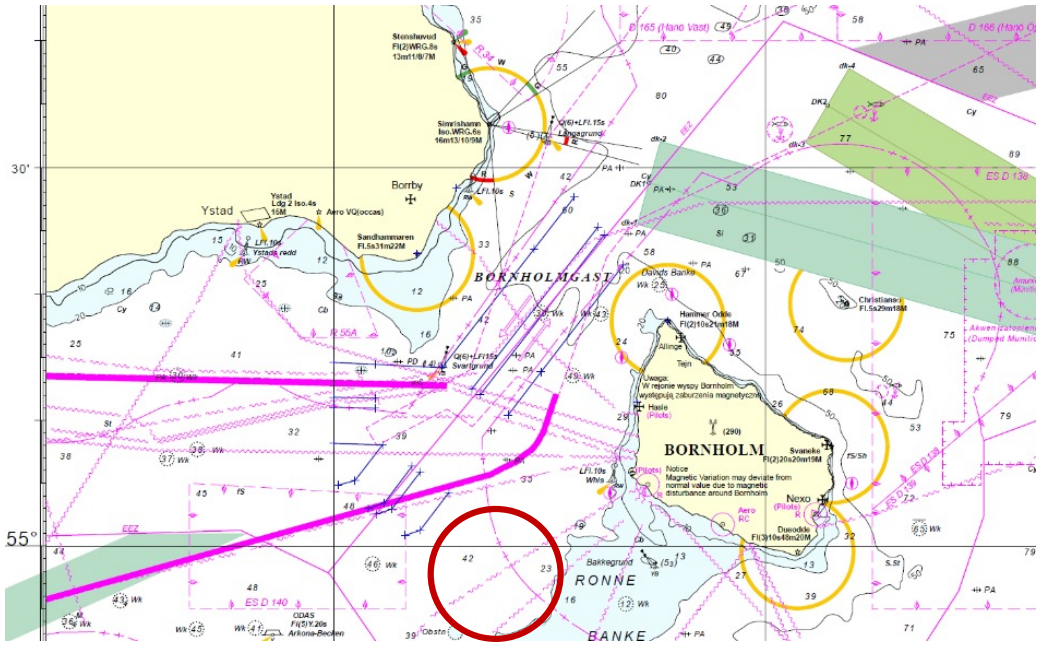
Double fatality on the split-hopper barge *Karin Hoej* following collision with general cargo vessel *Scot Carrier in the* Bornholmsgat TSS, Sweden, on 13 December 2021



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Karin Hoj, inverted.

Safety Issues:

- Altering course without checking
- Inadequate lookout
- Alcohol consumption
- Lone watchkeeper
- Self-distraction

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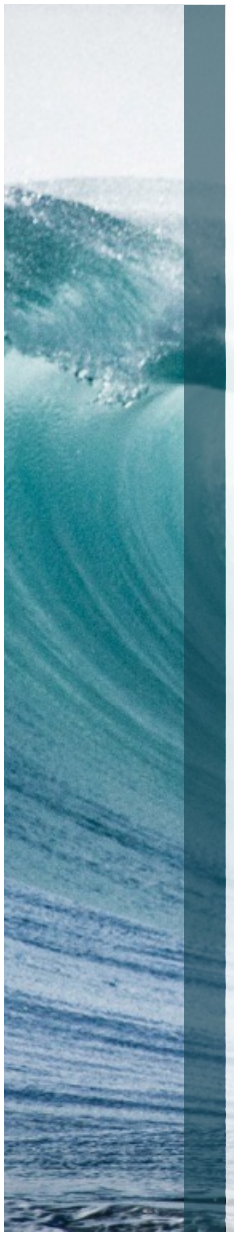

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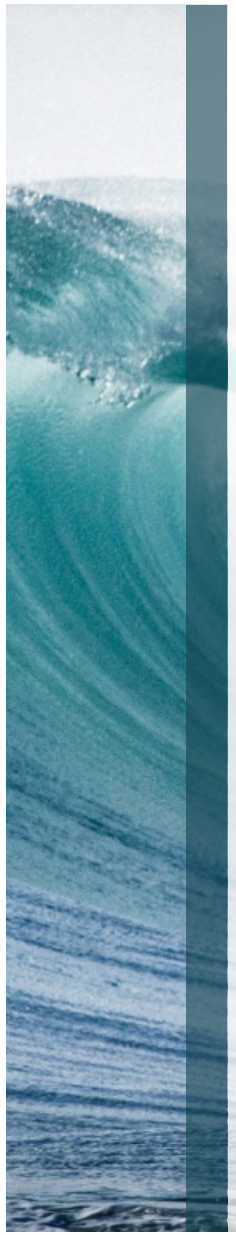

Contingency

Once an accident has happened, it is not what happened, it is how you deal with it that matters

How you react can determine the severity of the outcome

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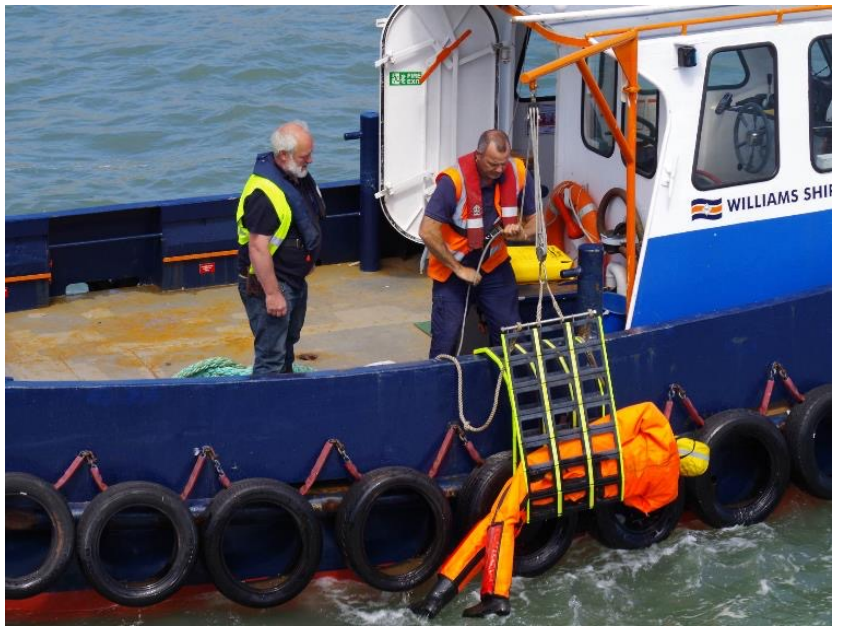
Which recovery method would you chose?

www.alamy.com - H6AEX5



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Berge Mawson – IMO 9738868

Triple fatality on board the Isle of Man flagged vessel

22/06/2022 – Indonesia

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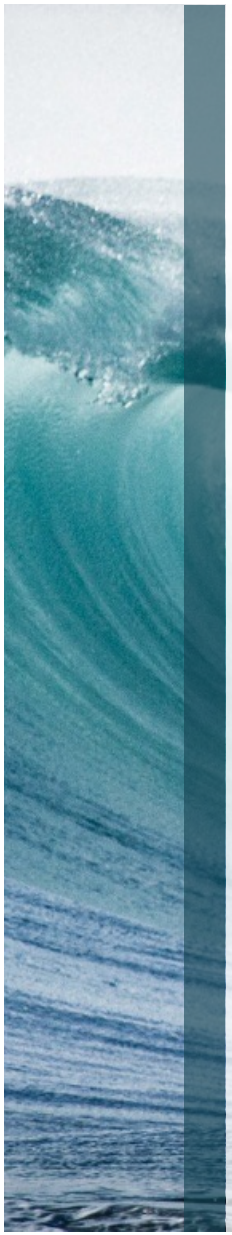

Any miner will tell you that coal is nasty stuff:

Coal can produce methane, carbon dioxide and carbon monoxide, all of which may lead to a depletion of oxygen.

Mines gases were called 'damps' (from the German word *Dampf*, meaning vapour)

Fire damp	- Methane (CH_4) highly explosive in air if the proportion is 5% - 15%
Black damp	- Flame will not burn, usually due to an excess of Carbon Dioxide (CO_2).
Stink damp	- Hydrogen Sulphide (H_2S), which creates a strong smell of rotting eggs.
White damp	- Toxic atmosphere created by Carbon Monoxide (CO), which can be fatal in concentrations of 0.1%

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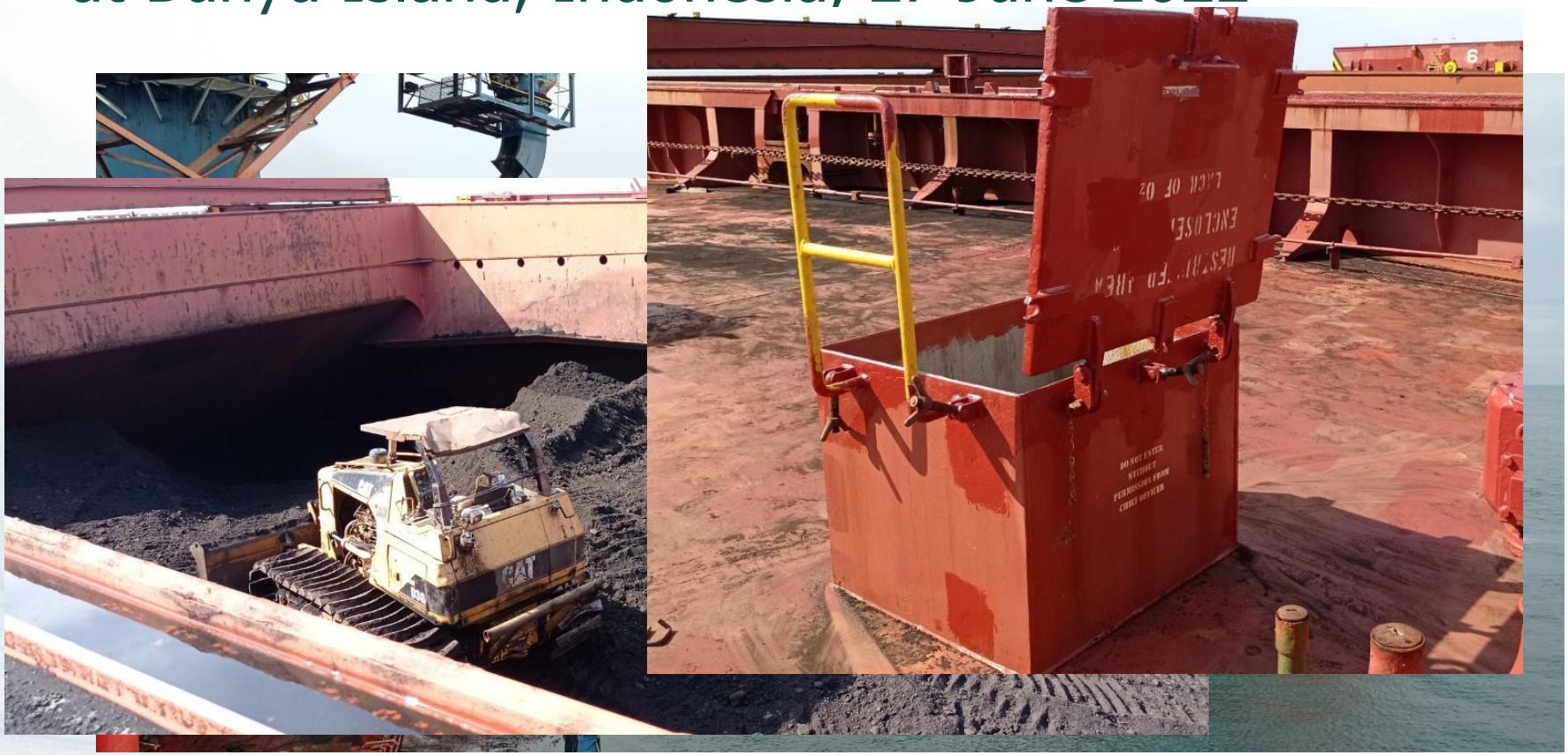
MV *Berge Mawson:* Triple fatal accident during loading at Bunyu Island, Indonesia, 27 June 2022



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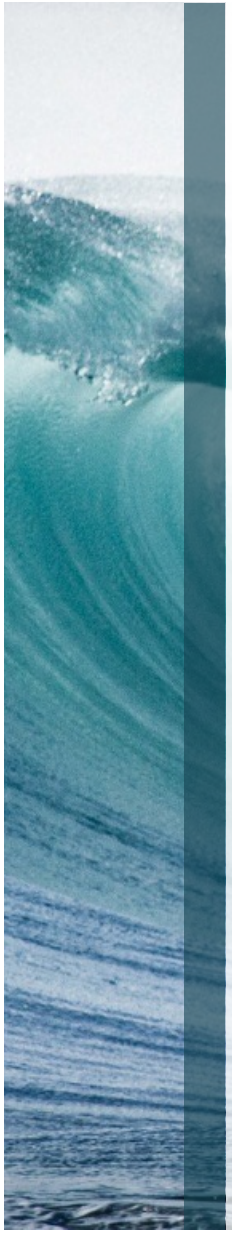
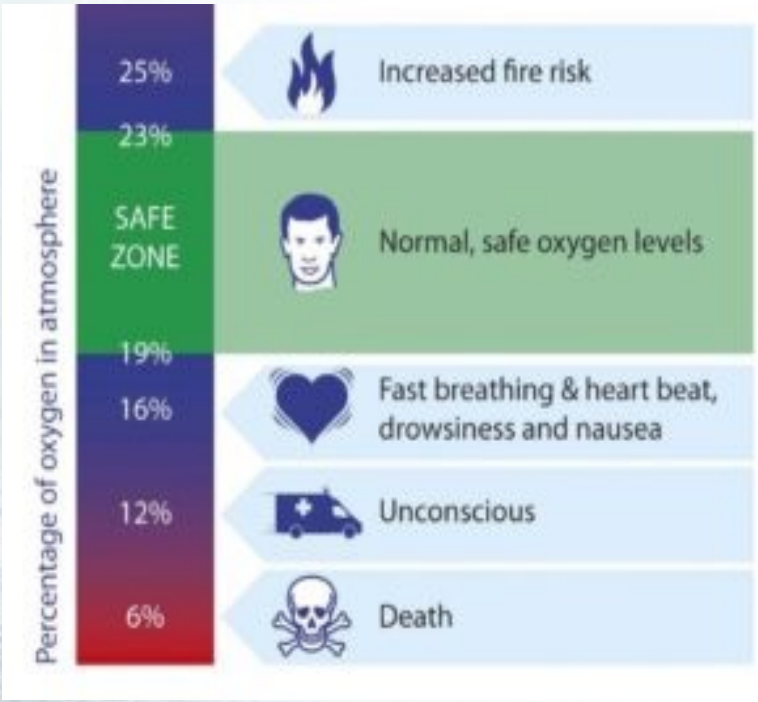


Atmosphere #8 Cargo Hold Forward Access:

- LEL 36%
- Oxygen 0.9%
- CO 1247ppm
- H2S 3.1 ppm

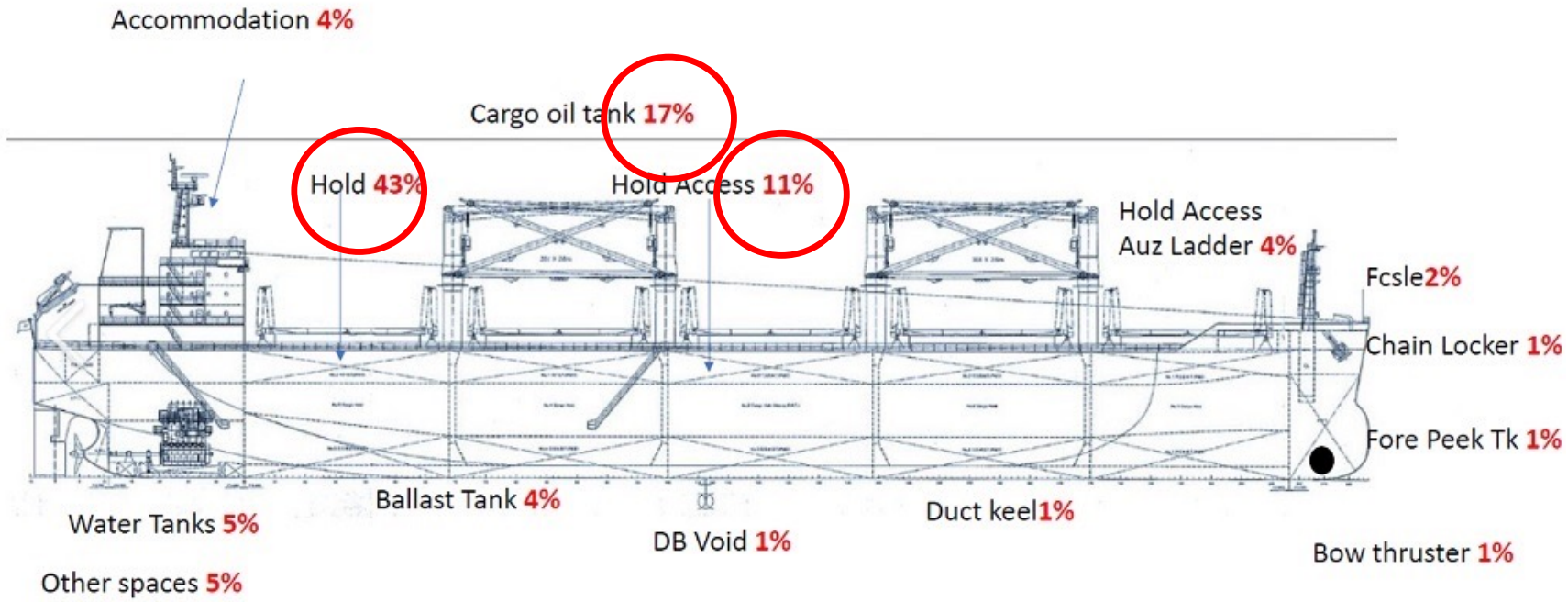


CARBON MONOXIDE LEVELS CHART

0 ppm	**Recommended Safe Level**	
6 ppm	WHO 24 Hour Average	
9 ppm	ASHRA 8 Hour Average EPA 8 hour 8 Hour Average NAAQS 8 Hour Average WHO 8 Hour Average	**Physical Symptoms** physical symptoms may include headache, fatique, dizziness and/or nausia.
25 ppm	ACGIH 8 Hour Average	
30 ppm	WHO 1 Hour Average	
35 ppm	NIOSH 8 Hour Average NAAQS 1 Hour Average	Physical symptoms after 6-8 hours.
50 ppm	OSHA 8 hour Average (PEL)	
30-69 ppm	UL 30 Day Alarm	
87 ppm	WHO 15 Minute Average	
70-149 ppm	UL 1-4 Hour Alarm	
200 ppm	NIOSH 15 minute STEL	Physical symptoms after 2-3 hours.
150-399 ppm	UL 10-50 Minute Alarm	Physical symptoms in 1-2 hours. Life threatening 3 hours.
400+ ppm	UL 4 Minute Alarm	Physical symptoms in 45 minutes. Unconscious in 2 hours. Fatal in 2-3 hours.
800 ppm		Physical symptoms in 20 minutes. Fatal within 1 hour.
1,600 ppm		Physical symptoms in 5-10 minutes. Fatal within 25-30 minutes.
3,200 ppm		Physical symptoms in 1-2 minutes. Fatal within 10-15 minutes.
6.400 ppm		
12,800 ppm		Fatal within 1-3 minutes.

Confined space fatalities, all ship types 1996 – 1 Dec 2023

Source - Intermanager



Two points stand out:

- **Cargo and cargo spaces account for 71% of fatalities (43 + 17 + 11)**
- **Cargo spaces are much more frequently accessed.**

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Emergency Drills & Safety Equipment

Safety Equipment: Is not needed, **until its needed**

Do you know how to use it?

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Two more thoughts to take away….

Compound risk (*before taking the next step down, look back at the flight of steps you have already descended*)

If you know something, what are you doing about it?

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Thank you

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