

fire

'fī(-ə)r'

the shooting of guns or other weapons

fire

'fī(-ə)r'

to remove someone from their job

fire

'fī(-ə)r'

(material that is in) the state of burning that produces flames that send out heat and light, and might produce smoke

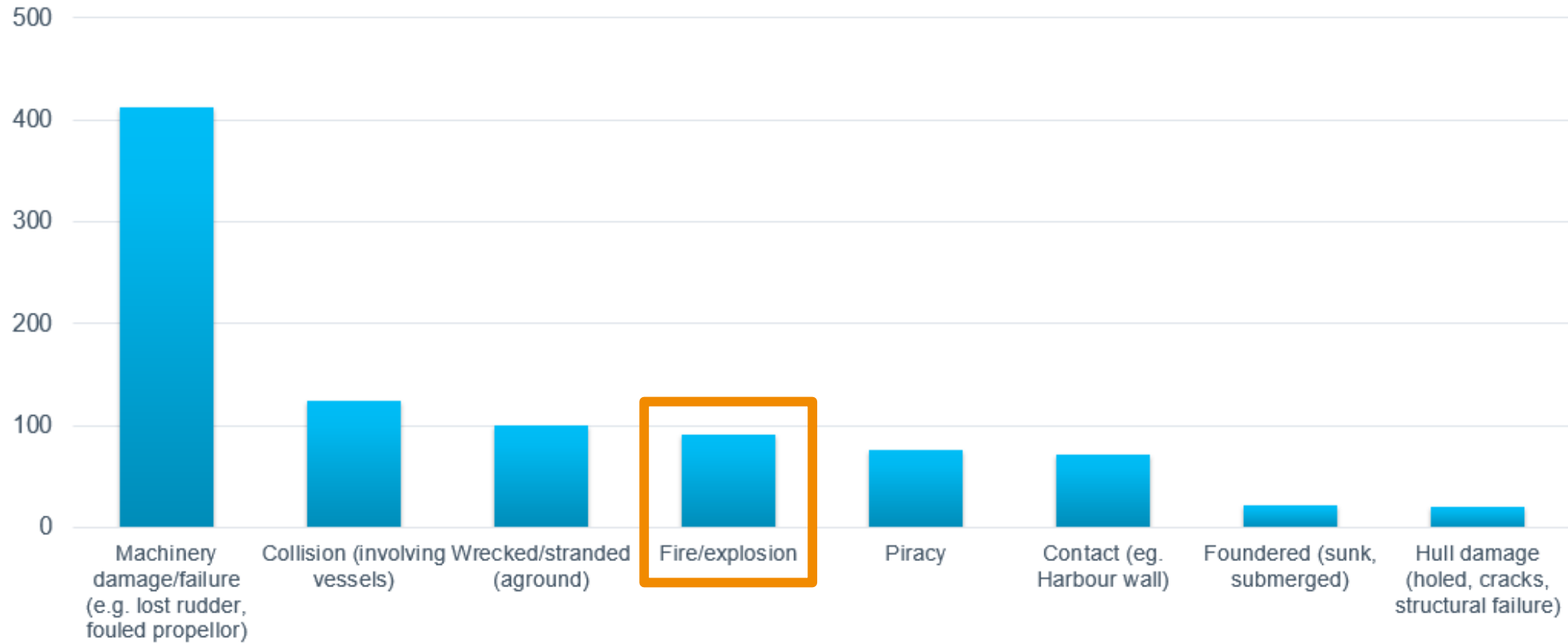
FIRE FEEDS ON NEGLIGENT DEEDS

Siddharth Mahajan
Loss Prevention Executive
20th June 2019



2019: THE YEAR OF CASUALTIES?

1 JANUARY 2019 – 31 MAY 19



Source: Lloyd's List Intelligence

AGENDA



Trends and
analysis

Fires
onboard

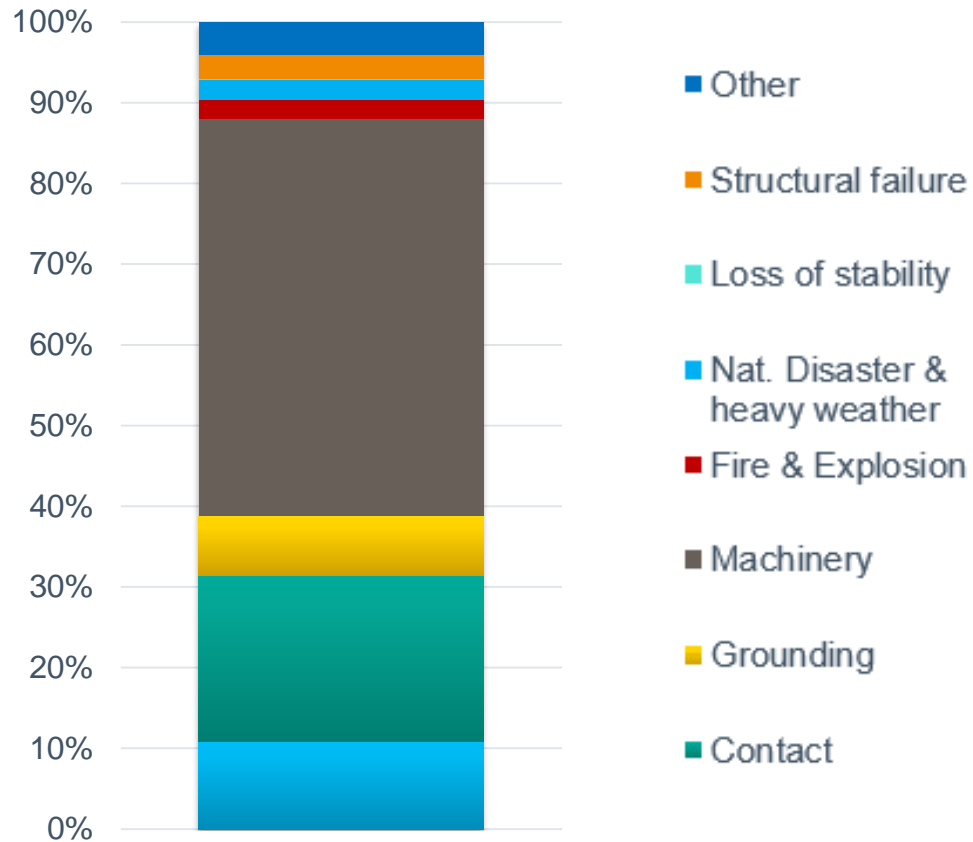
Post
extinguishing
concerns

TRENDS

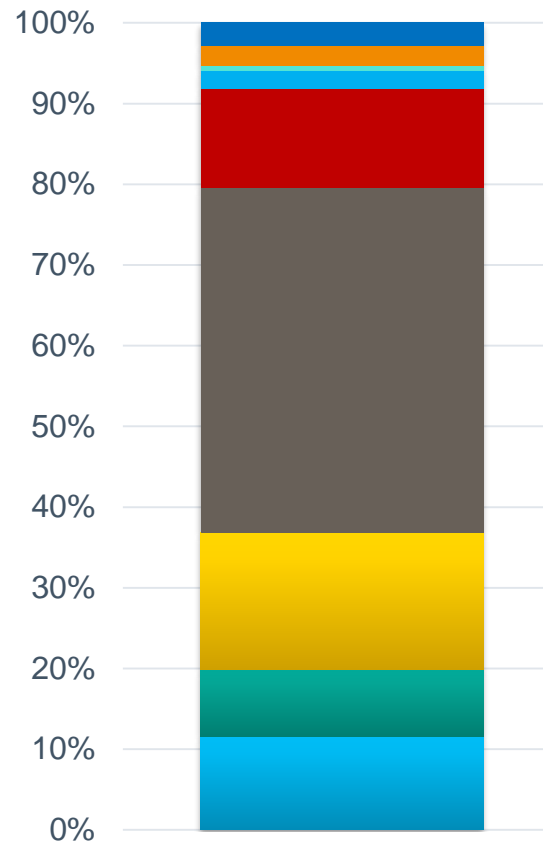


GARD CLAIMS – H&M

GARD DATA (2009 - 2018)



Count



Cost

Average cost:
\$2.6 m

Deaths:

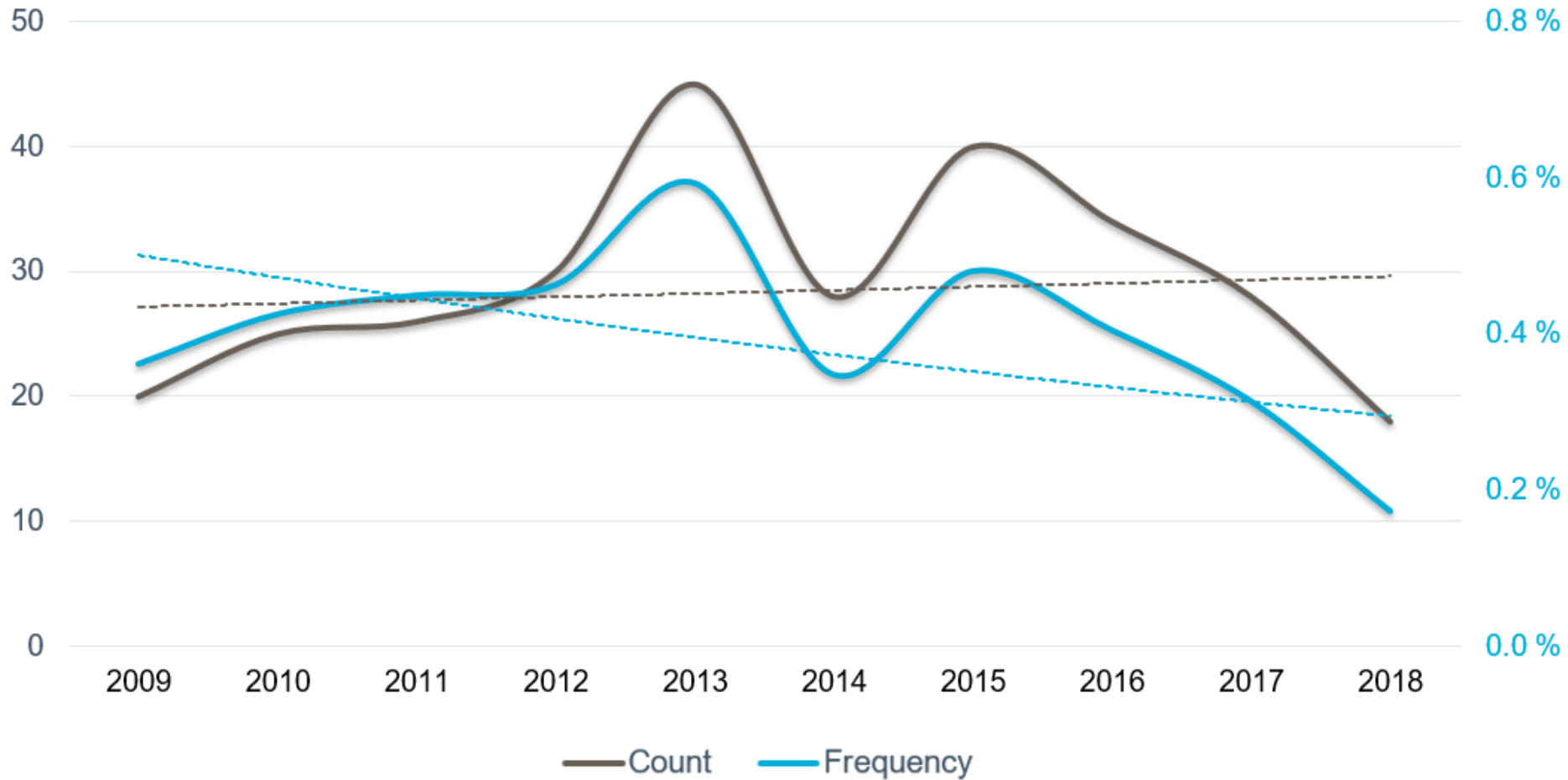
9

Injuries:

104

FIRE / EXPLOSION – COUNT AND FREQUENCY

GARD DATA (2009 – 2018)

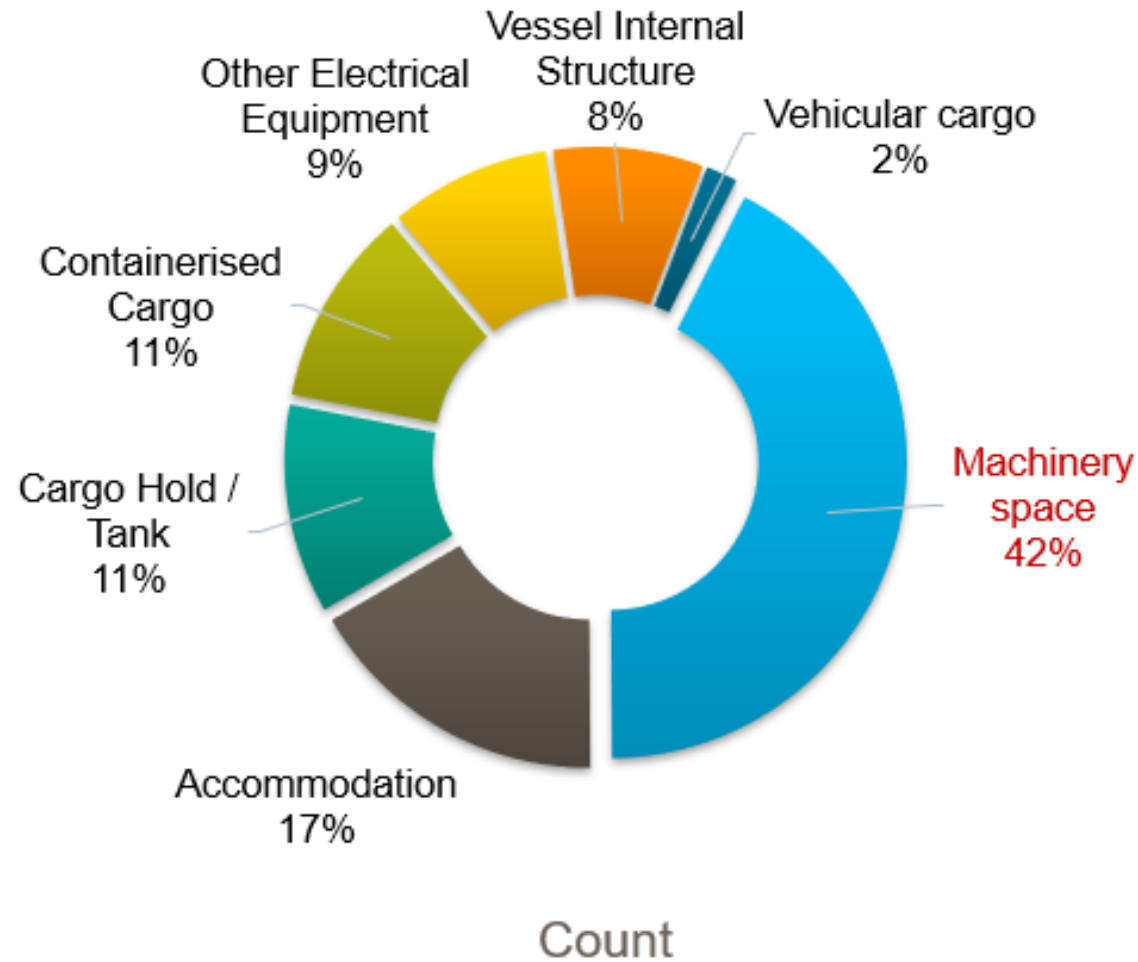


Average freq:

0.4%

FIRE / EXPLOSION – BY LOCATION (TOP 7)

GARD DATA (2009 - 2018)



MACHINERY SPACE FIRES

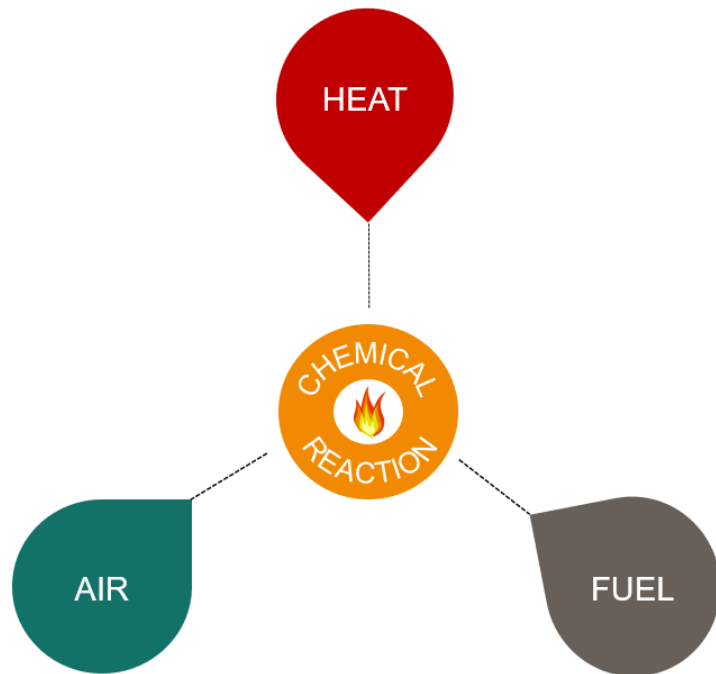


THE BASICS

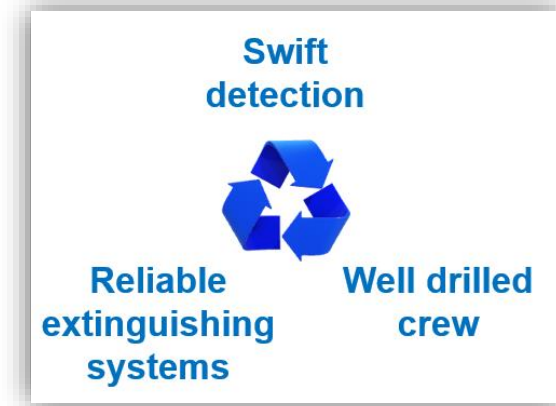
AFF – STCW 2010



The fire tetrahedron



- Extinguishing a fire:
 - Cutting fuel supply (e.g. quick closing valves)
 - Removing/reducing oxygen (e.g. CO2 and foam)
 - Does NOT work for oxidizing substances
 - Eliminating heat (e.g. water)
 - Breaking the chain reaction (e.g. dry chemical powder)



MACHINERY SPACES – A FIRE PRONE AREA?

- Characteristics of an Engine Room:
 - Limited openings
 - Restricted access
 - Not much compartmentation
 - Confusing walkways
 - Many obstructions
- High risk of fire – as **ALL sides** of fire triangle **co-exist** closely and in abundance.



Unless fire is restricted in its initial stages – it can go **out of control** very fast



Oil fires

Electrical fires

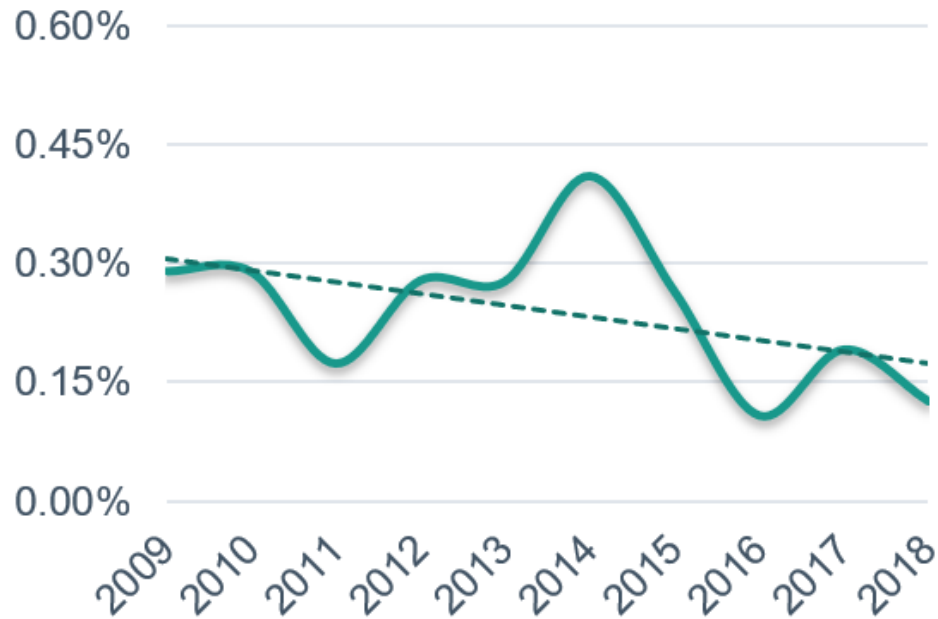
Gaseous fires

Solid fuel fires

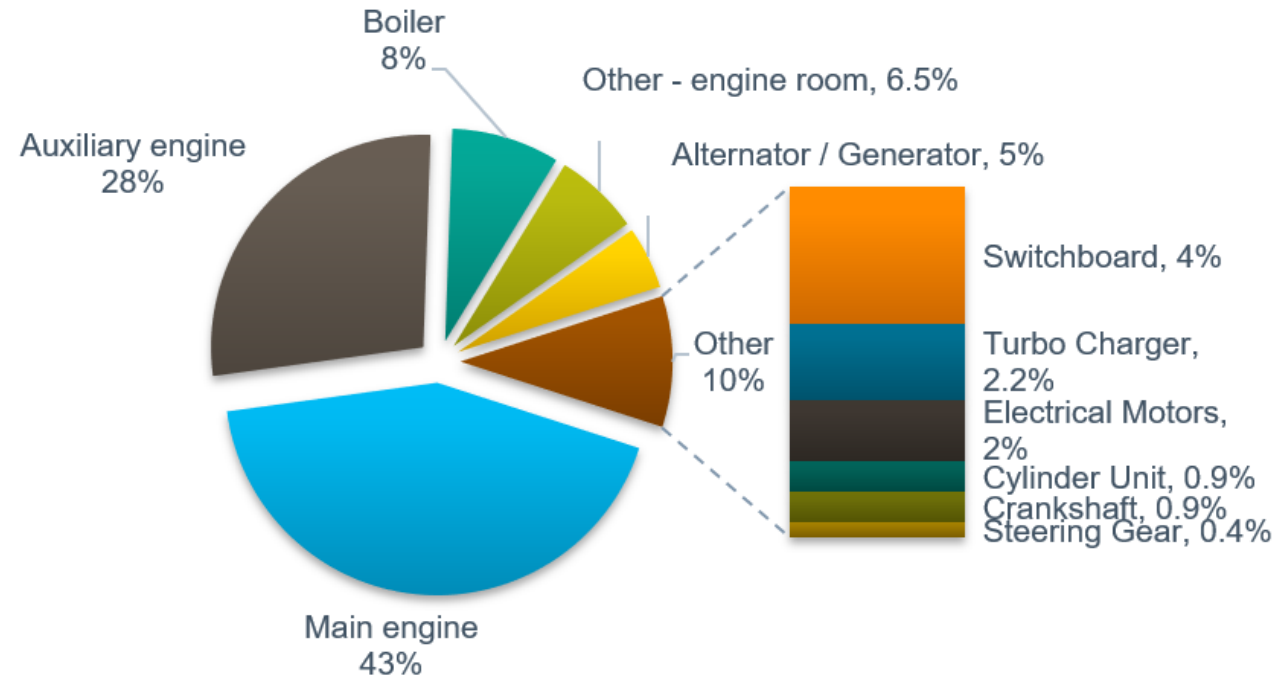
Soot & scavenge fires

Incinerator & boiler fires

MACHINERY FIRES – BY EQ. AND FREQUENCY



Frequency

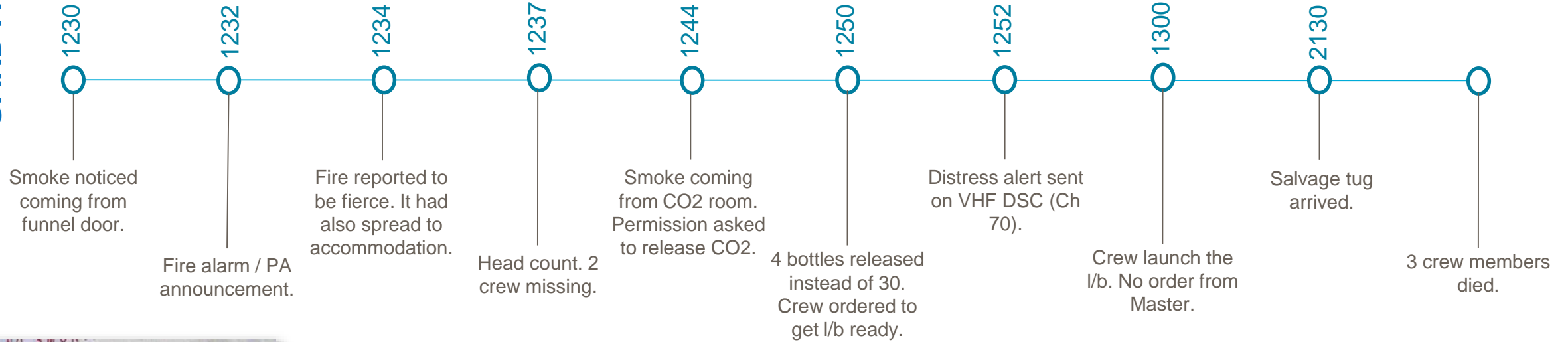


By machinery

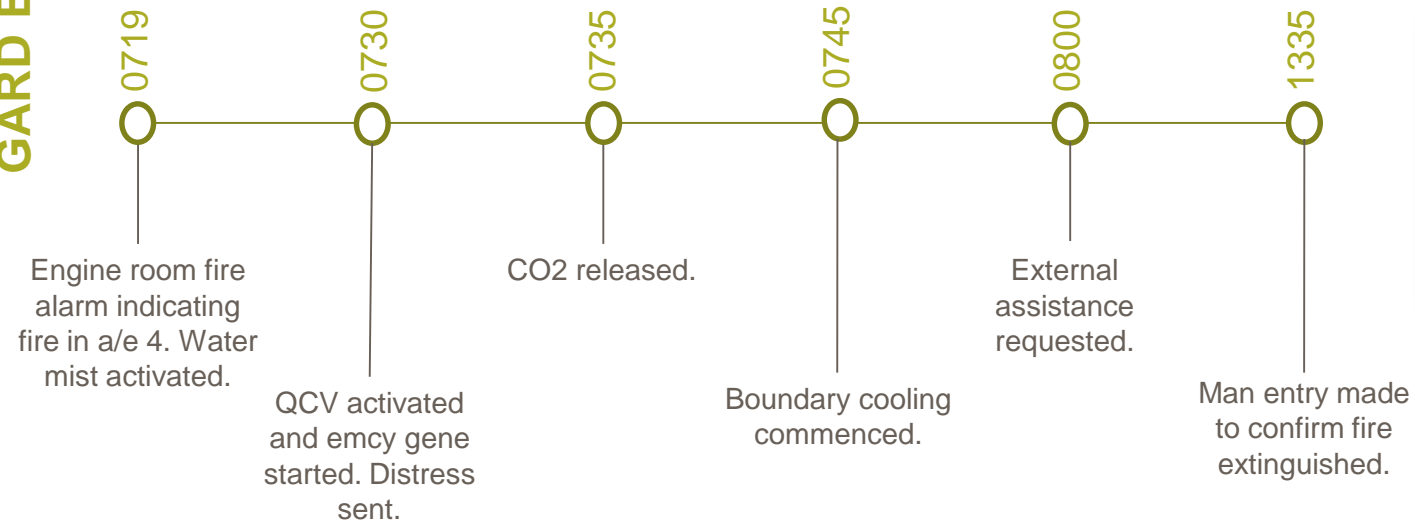
ENGINE ROOM FIRE - A TALE OF TWO TEAMS



GARD A



GARD B



WHAT WENT WRONG?

TIME IS OF THE ESSENCE



No timely detection

- Oil mist detector did not function.
- Fire alarm in engine room did not activate.

** Vessel had a PSC deficiency in relation to fire detection system 3 months prior to the accident.*

Delayed / inadequate initial response

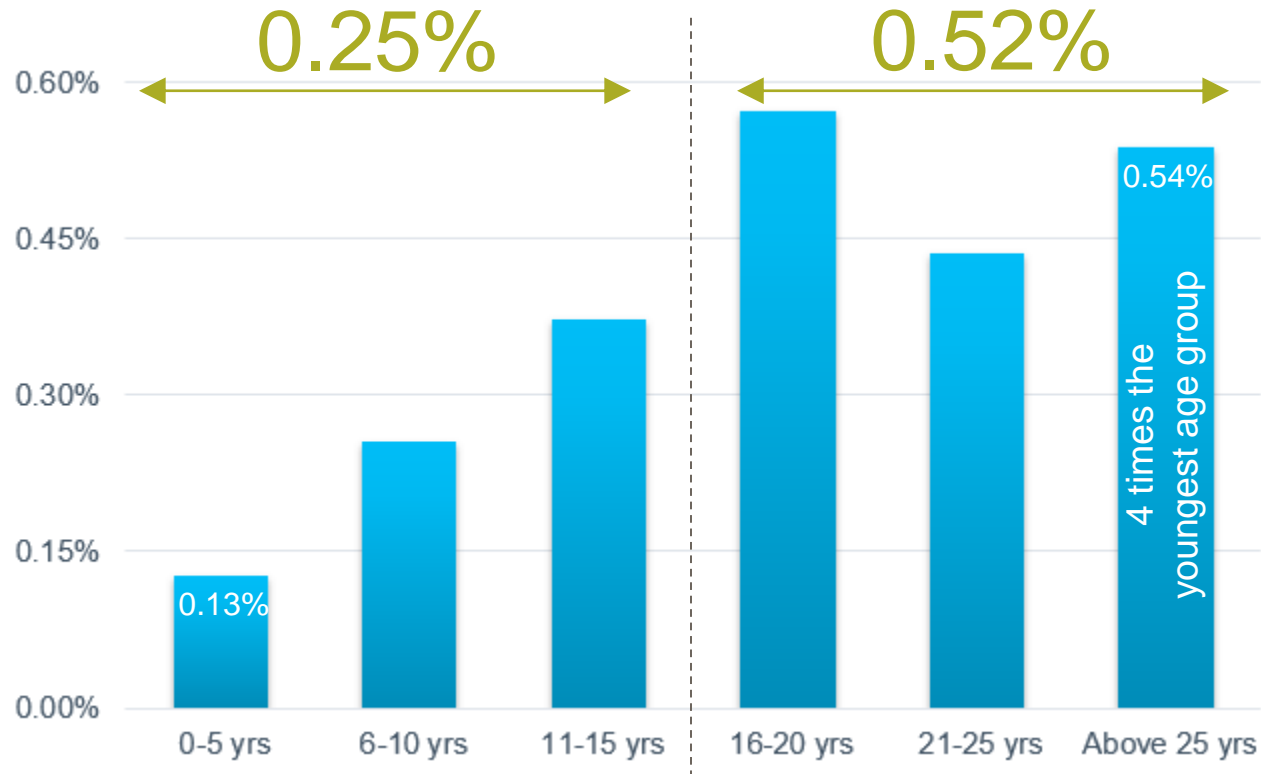
- Engine room fire door not closed.
- Emergency fire pump stopped after one hour of operation.
- Remote for quick closing valves malfunctioned.
- External assistance could not arrive on time.

Non-performance of crisis team

- Muster not done quickly
- CO2 system release improper
- Distress sent very late
- Decision to abandon ship taken by crew themselves
- *“The crew admitted that fire drills had not been carried out for several months.”*

ARE OLDER VESSELS MORE PRONE TO FIRES?

FIRE FREQUENCY AS A FUNCTION OF SHIP'S AGE



10 year average frequency – by age group

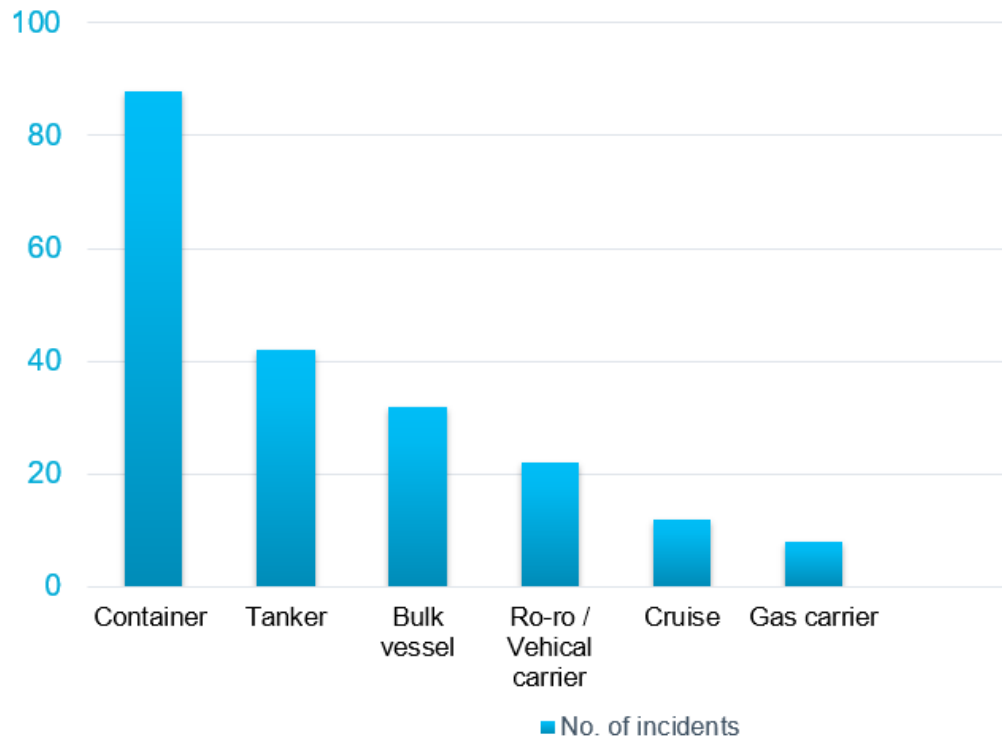
Report of the 2012 Concentrated Inspection Campaign (CIC) on Fire Safety Systems

Paris MoU result (4014 inspections):

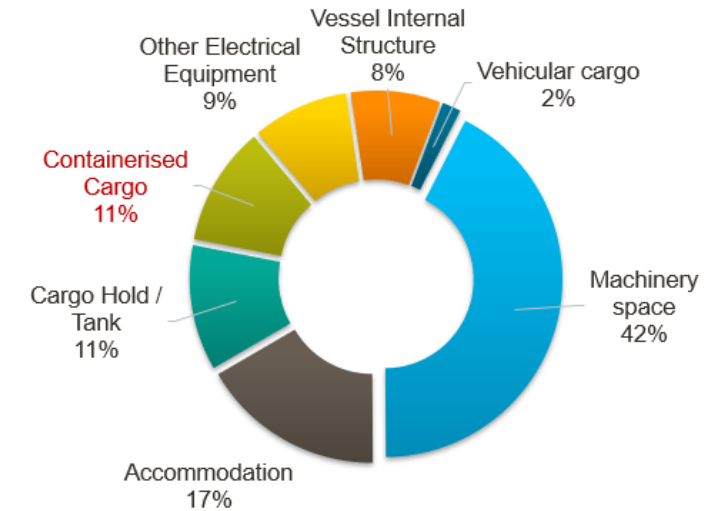
- Most favorable: < 6 yrs
- Least favorable: > 30 yrs

WHICH SHIP TYPE HAS MOST FIRES?

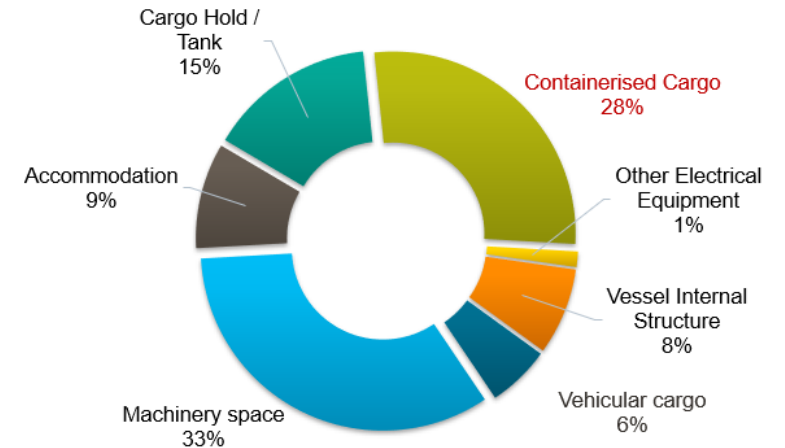
GARD DATA (2009 – 2018)



COUNT



COST



CONTAINER SHIP FIRES



CONTAINER FIRES ASKING FOR ATTENTION

GARD DATA



43

1996 <i>TWO</i>	1997 <i>TWO</i>	1998 <i>THREE</i>	2001 <i>ONE</i>
2004 <i>ONE</i>	2006 <i>TWO</i>	2010 <i>ONE</i>	2012 <i>TWO</i>
2013 <i>FOUR</i>	2015 <i>SEVEN</i>	2016 <i>FIVE</i>	2017 <i>SIX</i>
2018 <i>THREE</i>	2019 (Jan-May) <i>FOUR</i>		

COSTS
(incurred by Gard)

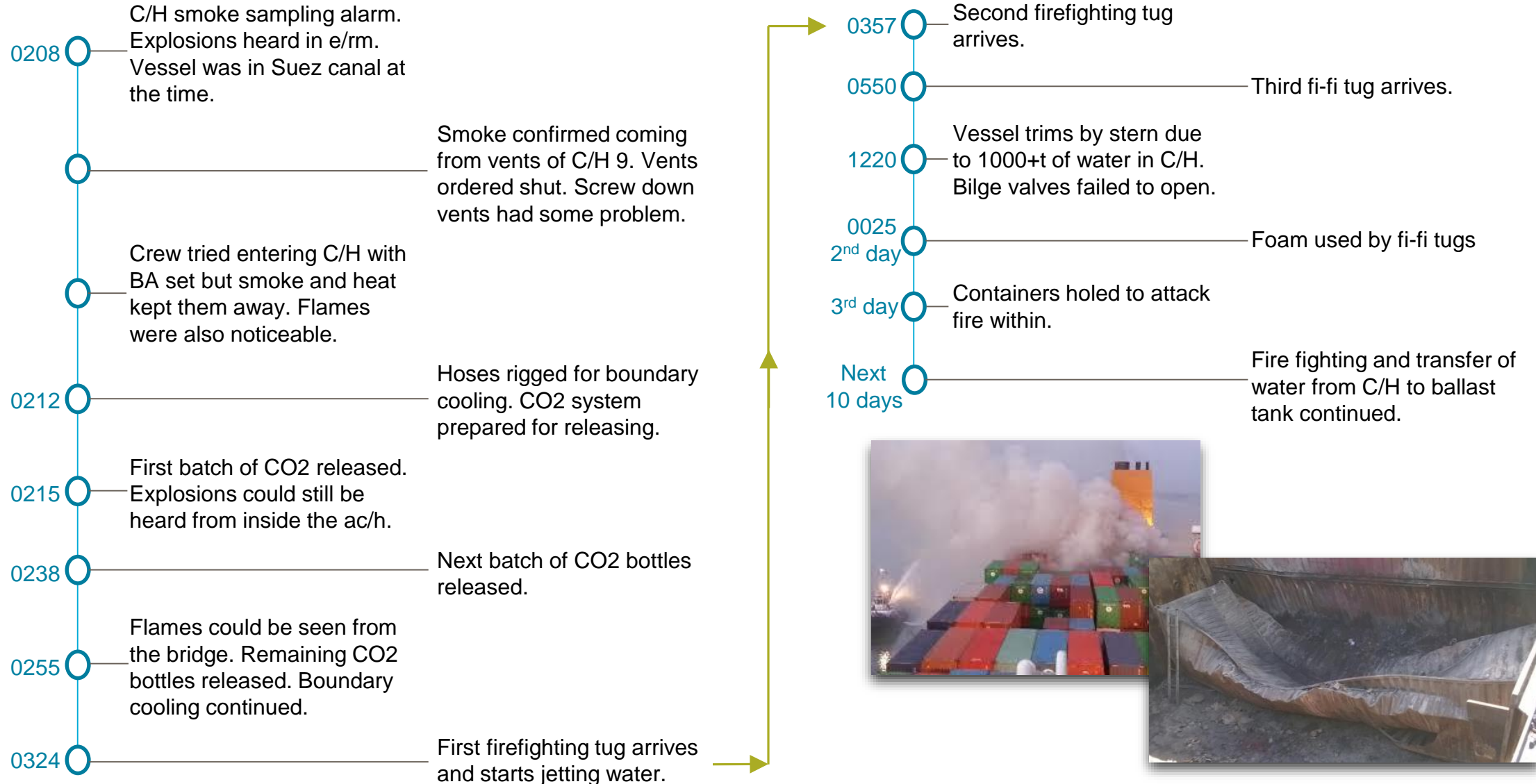
2001 – 2015: **\$30m**

2016 – 2018: **\$47m**

2019 – so far: **\$50m**

CONTAINER FIRES – HARD TO DOUSE

CASE STUDY – GARD CONTAINER



CONTAINER FIRES – HARD TO DOUSE

Fire initiation

- Crew interaction not necessary.
- **MISDECLARATION**

Fire detection

- Is cargo hold smoke sampling the most efficient way?

Fire fighting

- Are crew capable of tackling such fires?
- Shore assistance crucial?



VIDEO: KMT C feeder rocked by explosion and fire

South Korean-owned containership engulfed in smoke, over 100 people admitted to hospital.



Further explosions rock fire-ravaged boxship

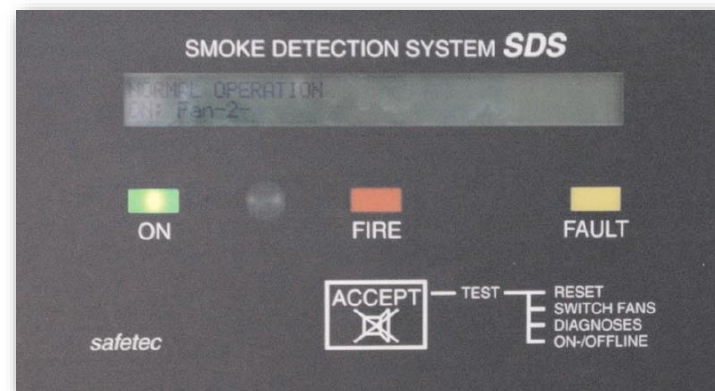
TradeWinds

The Global Shipping News Source

IUMI calls for boost to boxship firefighting capabilities

FIRE DETECTION – SLOW AND INADEQUATE

- Under deck fire: **Smoke extraction system**
 - Delays (what if ventilation fans are on...?)
 - May not allow storage of historical data or data may be overwritten
 - No indication of:
 - Density of smoke
 - Cargo hold temperature
- On deck fire: Officer on bridge or crew on deck



FIRE FIGHTING – INEFFECTIVE

Onboard

Mobile

- Unable to access hold
- Dragging pressurized hoses in C/H is a herculean task
- Leaks in fire main
- No redundancy in hold water drenching system
- Difficulty in drilling holes in containers

Fixed

CO2

- Leaks from gap between hatch covers / open vents
- Cannot penetrate the container wall
- Not effective for all fires
 - Smoldering fires and cargoes which evolve oxygen
- Technical problems

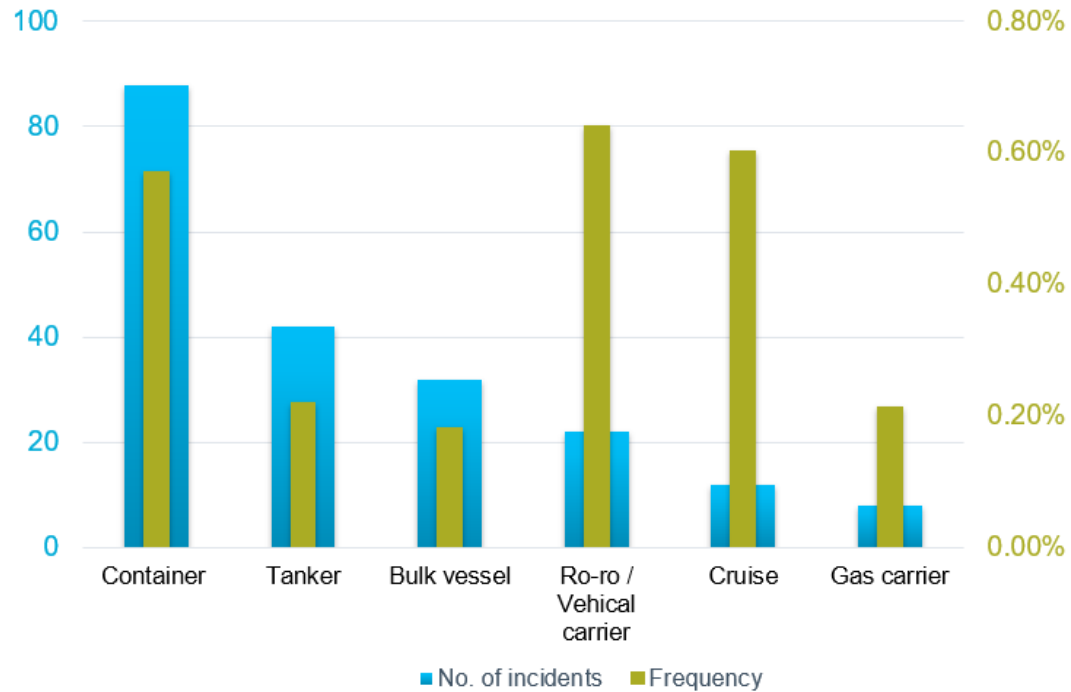
Shore assistance

- Vital for extinguishing container fires
- Might not be available within a short time



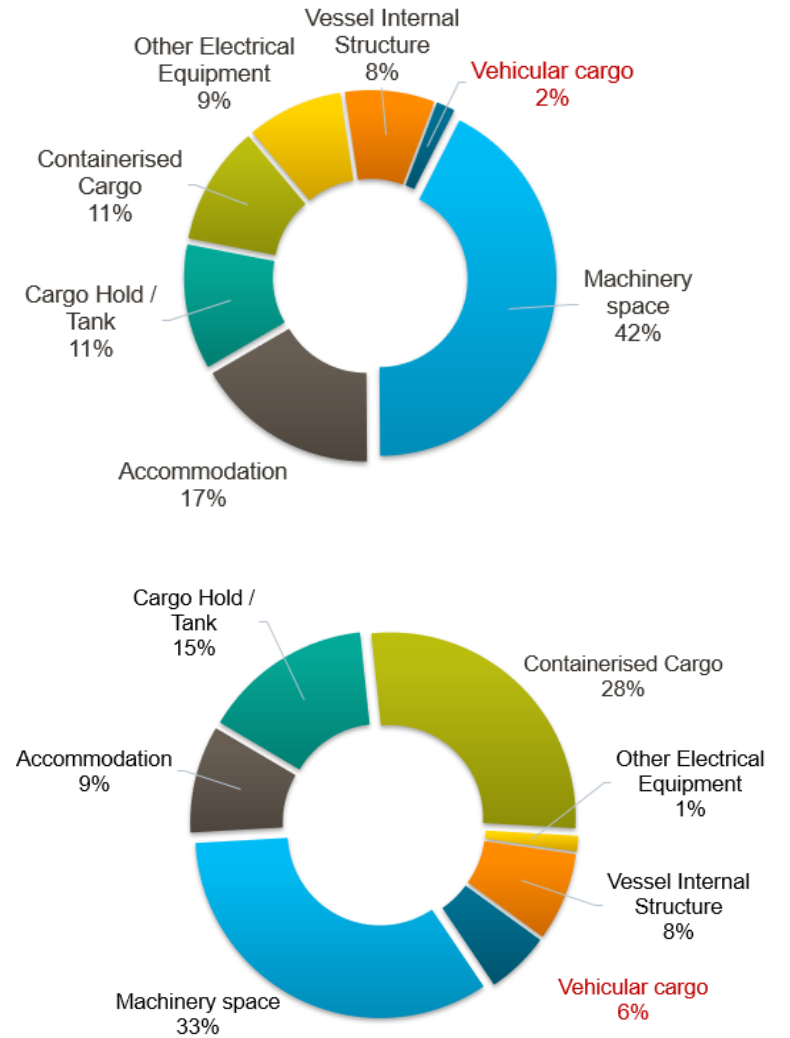
WHICH SHIP TYPE IS MOST PRONE TO FIRES?

GARD DATA (2009 – 2018)



COUNT

COST



RO-RO / CAR CARRIER FIRES



RO-RO FIRE SAFETY HIGH ON IMO AGENDA

INDUSTRY WIDE OCCURENCE



2005 <i>TWO</i>	2007 <i>TWO</i>	2008 <i>THREE</i>	2009 <i>THREE</i>
2010 <i>FOUR</i>	2012 <i>FOUR</i>	2013 <i>SEVEN</i>	2014 <i>FOUR</i>
2015 <i>FIVE</i>	2016 <i>TWO</i>	2017 <i>TWO</i>	2018 <i>FIVE</i>

43

Source: DNV-GL and Lloyd's List Intelligence

FOCUS AREAS FOR RO-RO FIRES

Early detection

Rapid spread of fire

Late response

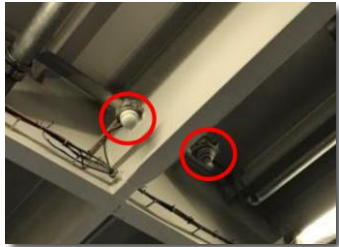


FIRE DETECTION

EARLY DETECTION IS THE KEY



Early detection failure



SYSTEM FAILURE

PEOPLE FAILURE

Internal failure

External failure

Fire patrol

Bridge monitoring

- Contaminated or damaged detector heads

- Seat of fire close to vents
- High airflow
- Poor positioning
- Fire inside vehicle
- Rapid fire development

- No fire patrol
- Low frequency
- Accessibility problems
- Lack of training / experience
- Lack of suitable equipment
- Low motivation

- Treated as a fault alarm?
- Ignored due to workload

RAPID SPREAD OF FIRE

FLOATING CAR PARKS



6 minutes



21 minutes



27 minutes

Tight stowage

- Side to side : 100 mm
- Bumper to bumper: 300 mm

Air flow

- Open decks and semi-closed decks
- 6-10 air changes/hr in closed cargo spaces

LATE RESPONSE

- Underestimating the situation
- Technical problems
- **Reluctance among crew to activate the water drenching / other fixed fire fighting system:**
 - **No or lack of decision mandate**
 - **Unfamiliarity with system**
 - **Fear of adverse consequences**

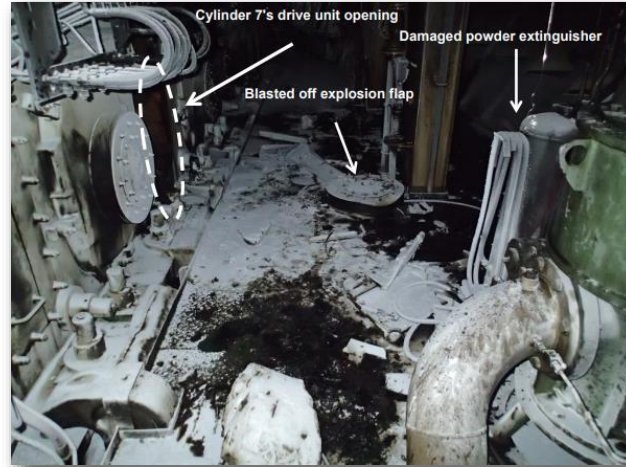
**REACTION TIME –
WATER SPRAY FOR RO-RO DECKS**



FIRE EXTINGUISHED NOW WHAT?



FIRE EXTINGUISHED. NOW WHAT?



FIRE EXTINGUISHED. NOW WHAT?

ACT FAST - ACT RIGHT



Questions about fire – how, why...?

Fire experts.

They will help -

- Establish origin, cause, and reasons for spread
- Determine how materials behaved
- Assess effectiveness of vessel's fire safety systems



Why did the connection fail?

Corrosion & soot contamination

Fire reaction products are carried by air and water, leading to atmospheric corrosion, soot contamination and chloride corrosion



Chloride affected corrosion in auxiliary engine turbocharger.

Where to go?

Authorities will have their own concerns.

Is sufficient yard space available?

Are there waste disposal facilities?

No place of refuge for stricken ship

10 Aug 2012 | NEWS

Written by

[Patrick Hagen](#)

[Craig Eason](#)

[MSC Flamirina managers slam port state reluctance to help](#)



KEY TAKEAWAYS



CONCLUSION – are there any blazing CONNECTIONS?

FIRE IS DANGEROUS FOR CREW, ENVIRONMENT AND PROPERTY



Early detection is the key

Proper maintenance and testing

Use of technology (e.g. CCTVs has proven useful)

Strong case for early activation of fixed FFS

Redistribute responsibilities to reduce decision making time

Conduct realistic drills

Involve Gard and experts early

Vast expertise and experience in handling casualties

THANK YOU

WWW.GARD.NO

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