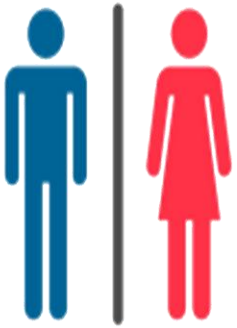
Registration Form Access

Course Title:
MCA ADV Fire Fighting

Course Title:
USCG ADV Fire Fighting

forms.office.com

Safety and Comfort First



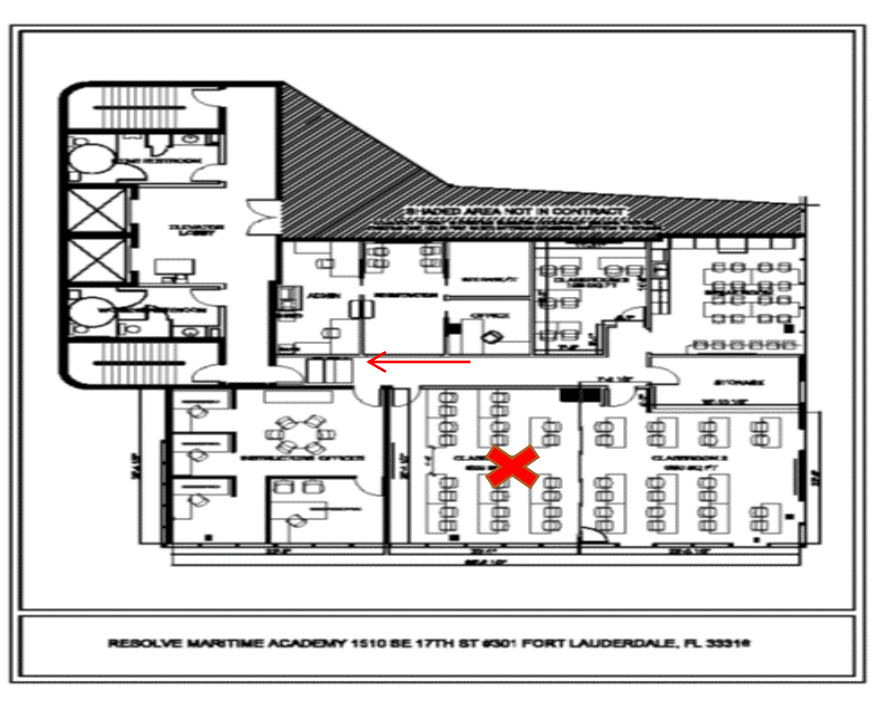
RMG-GUEST
res0lvemar1ne

off/silent during class

Important Facility Amenities

- Galley has coffee, water, ice and a snack machine and an HDTV
- Restroom Accessed by Code
  - Women's Restroom 1612#
  - Men's Restroom 1610#

Emergency Egress



Emergency Evacuation

X marks your class location

For ANY Emergency

- **Seek closest stairwell for Emergency Egress**
- **Activate Fire Alarm Pull Station at the door**
- **Descend Stairs**
- **Muster on Ground Floor under detached parking area**

Advanced Firefighting Presented by Resolve Maritime Academy

Self-Introductions

- Name
- Where you are from
- Maritime Experience
- Current Assignment
- Any Fire Fighting Experience

Course Philosophy

- Course developed to meet International Maritime Organization - Standards for Training Certification and Watchkeeping (STCW)
- Designed to provide a mix of classroom and practical exercise.
- Course format is informal – ask related questions at any time.

Completion Requirements

- Attend all scheduled training
- Classroom and Field Exercise Participation
- Minimum score of 70% on course evaluation
- Completion of a Course Critique

Course Goals

- Command and Control of fire-fighting operations aboard vessels.
- To organize and train fire parties.
- Provide hands on fire fighting training experience
- To inspect and service fire detection and extinguishing systems and equipment.
- To investigate and compile reports on incidents involving fire.
- Stress importance of realistic fire drills on board ship

Safety guidelines

- Emergency exits and procedures
- Safety briefs before the exercises
- Instructors will demonstrate exercises
- On-Site Instructor in full charge of field exercise
- Shirts and long pants or lightweight coveralls must be worn under bunker gear

Flag State Agencies Include

The Classification Societies

The Classification Societies and the Flag State agencies set construction standards for vessels. Currently there are over 50

ABS
(American Bureau of Shipping)

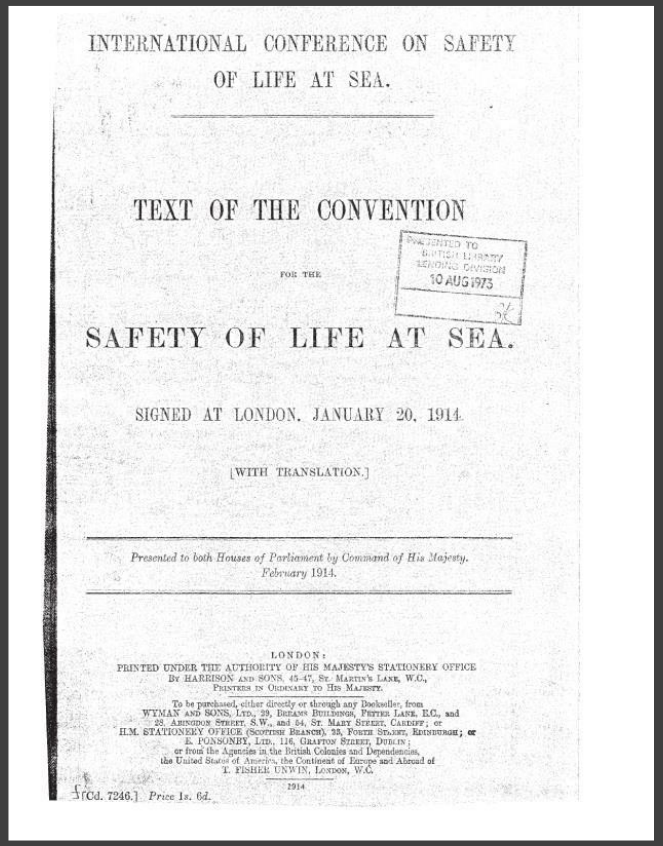
Lloyd's Register of Shipping

DNV
(Det Norske Veritas)

Minimum Standards

These minimum standards are largely based on past experiences and the availability of new technology.

- IMO- International Maritime Organization
- SOLAS- Safety of Life at Sea
- CFR- Code of Federal Regulations
- GMDSS – Global Maritime Distress & Safety System
- STCW
- International Safety Management Code
- MARPOL



INTERNATIONAL CONFERENCE ON SAFETY OF LIFE AT SEA.

TEXT OF THE CONVENTION

FOR THE

SAFETY OF LIFE AT SEA.

SIGNED AT LONDON, JANUARY 20, 1914.

[WITH TRANSLATION.]

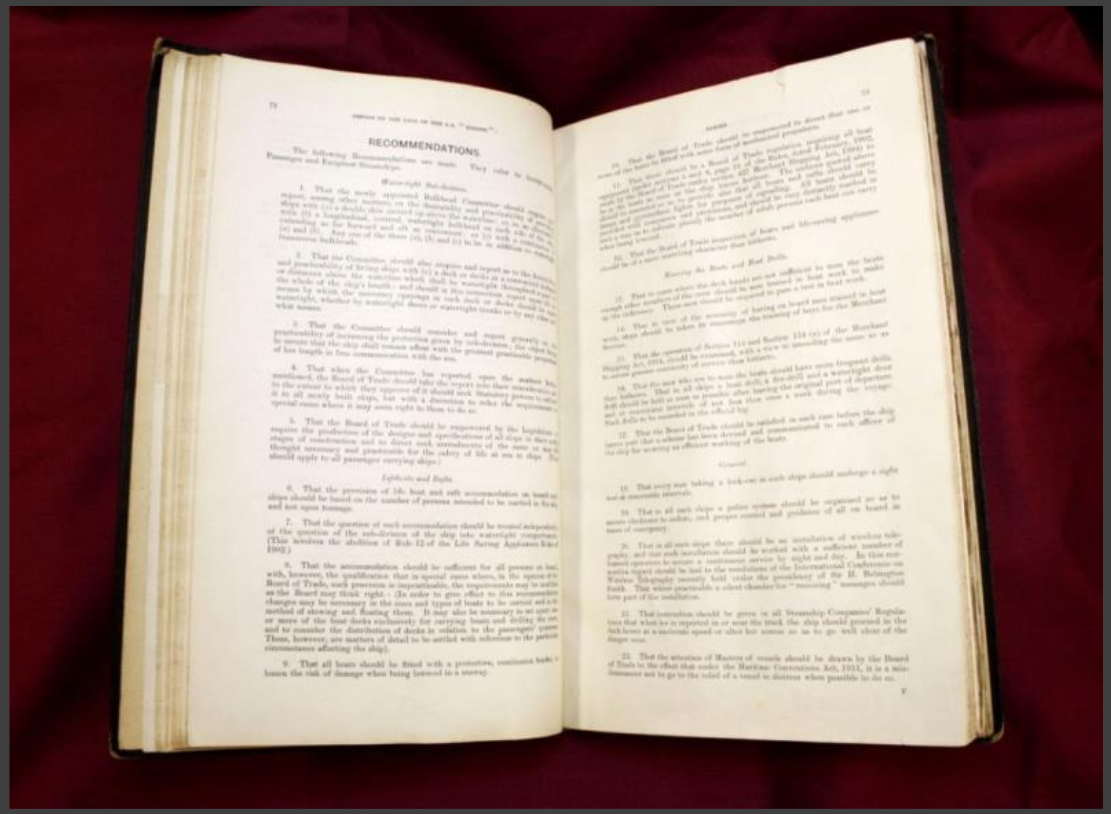
Presented to both Houses of Parliament by Command of His Majesty.
February 1914.

LONDON:
PRINTED UNDER THE AUTHORITY OF HIS MAJESTY'S STATIONERY OFFICE
BY HARRISON AND SONS, 45-47, ST. MARTIN'S LANE, W.C.,
PRINTERS IN ORDINARY TO HIS MAJESTY.

To be purchased, either directly or through any Bookseller, from
WYMAN AND SONS, LTD., 29, BREAMS BUILDINGS, FETTER LANE, E.C., and
28, ABINGDON STREET, S.W., and 54, ST. MARY STREET, CARDIFF; or
H.M. STATIONERY OFFICE (SCOTTISH BRANCH), 23, FORTH STREET, EDINBURGH; or
E. PONSONBY, LTD., 116, GRAFTON STREET, DUBLIN;
or from the Agencies in the British Colonies and Dependencies,
the United States of America, the Continent of Europe and Abroad of
T. FISHER UNWIN, LONDON, W.C.

1914

[Cd. 7246.] *Price* 1*s.* 6*d.*



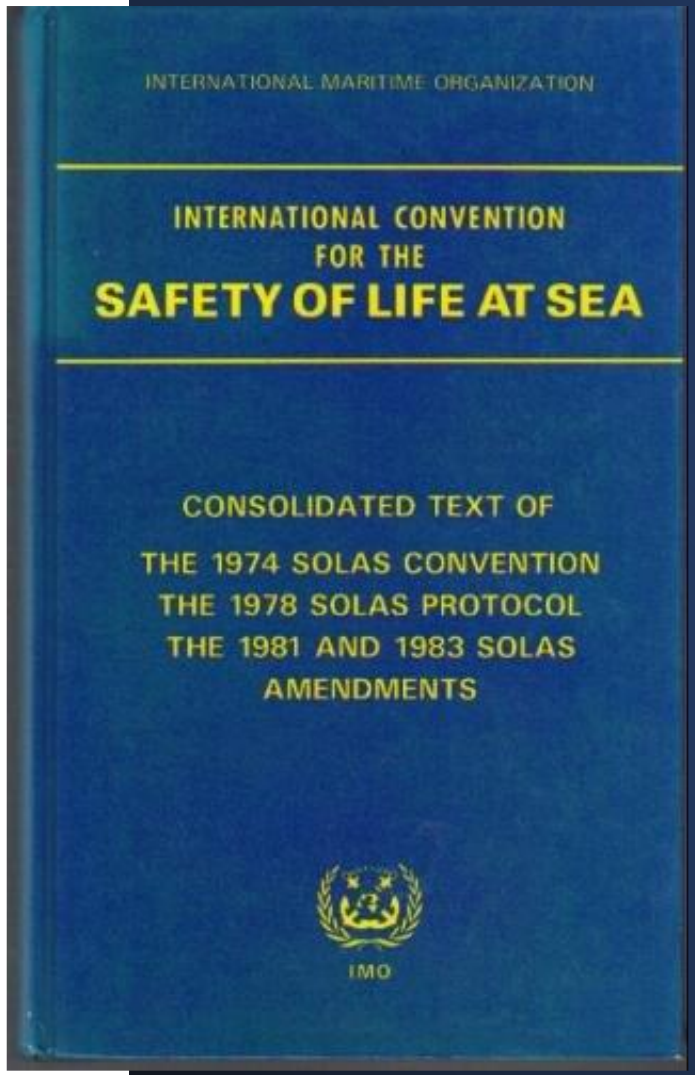
RECOMMENDATIONS

HISTORY OF SOLAS

- Sinking of the Titanic in 1912
- 1914 and 1929 SOLAS Conventions

FIRES ON SHIPS -RULES HISTORY OF SOLAS FIRE PROTECTION REQUIREMENTS

- 1974 SOLAS Convention
- Came into effect in 1980 -still in force today
- Separated the fire requirements into a
- Separate chapters:
- SOLAS chapter II (Construction)
- Fire protection
- Fire detection
- Fire extinction
- Further revised 1981 & 1983



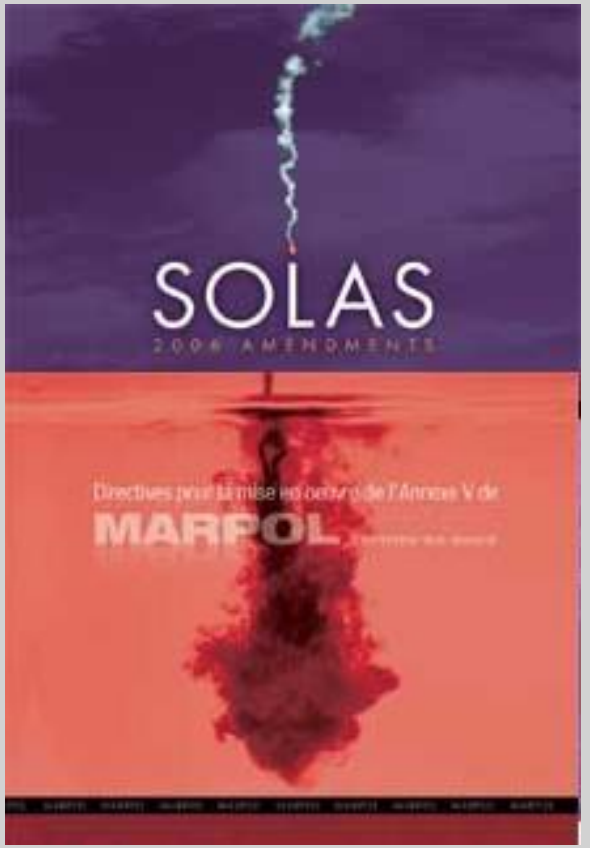
FIRES ON SHIPS
HISTORY OF SOLAS FIRE PROTECTION REQUIREMENTS

- 1990, a fire aboard the Scandinavian Star passenger ship left 158 persons dead.
- 1992 Fire Safety Amendments

SOLAS 74

SOLAS CONTENT:

- The SOLAS 1974 international maritime treaty comprises of 13 chapters and each chapter has its own set of regulations. The Following are the list of SOLAS all 13 chapters and the regulations they contain:



SOLAS 74

- The International Convention for the Safety of Life at Sea (SOLAS), 1974 describes the requirement for all merchant ship of any flag state to comply with the minimum safety norms laid down in the chapters which are as follows:

SOLAS 74

- **Chapter I – General Provisions:** Surveys and certification of all the safety items etc are included.
- **Chapter II-1 – Construction – Subdivision and stability, machinery and electrical installations:** Deals with watertight integrity of the ship, especially for passenger vessel.
- **Chapter II-2 – Fire protection, fire detection and fire extinction:** This chapter elaborates the means and measure for fire protection in accommodation, cargo spaces and engine room for the passenger, cargo and tanker ship.

SOLAS 74

- **Chapter III – Life-saving appliances and arrangements:** All the life-saving appliances and there use in different situations is described.
- **Chapter IV – Radio communications:** Includes requirements of GMDSS, SART, EPIRB etc for cargo and passenger vessel.
- **Chapter V – Safety of navigation:** This chapter deals with all the seagoing vessels of all sizes, from boats to VLCCs, and includes passage planning, navigation, distress signal etc.

SOLAS 74

- **Chapter VI – Carriage of Cargoes:** This chapter defines storage and securing of different types of cargo and containers, but does not include oil and gas cargo.
- **Chapter VII – Carriage of dangerous goods:** Defines the International Maritime Goods Code for storage and transportation of dangerous goods.
- **Chapter VIII – Nuclear ships:** The code of safety for a nuclear-propelled ship is stated in this chapter.

SOLAS-74

- **Chapter IX**-Management for the Safe Operation of Ships: The Chapter X – Safety measures for high-speed craft: safety code for the high-speed craft is explained.
- **Chapter XI-1&2** - Special measures to enhance maritime safety: Special and enhanced survey for safe operation, other operational requirements and ISPS code is briefed in this chapter.
- **Chapter XII** -Additional safety measures for bulk carriers: Includes safety requirement for above 150 meters length bulk carrier.
- **Chapter XIII** -Verification of Compliance
- **Chapter XIV** - Safety Measures for Ships Operating in Polar Waters

Vessel Types

Ships are Identified in accordance with S.O.L.A.S. 3 ways:

- Passenger
- Cargo
- Tankers

Ships Construction

Ships Construction

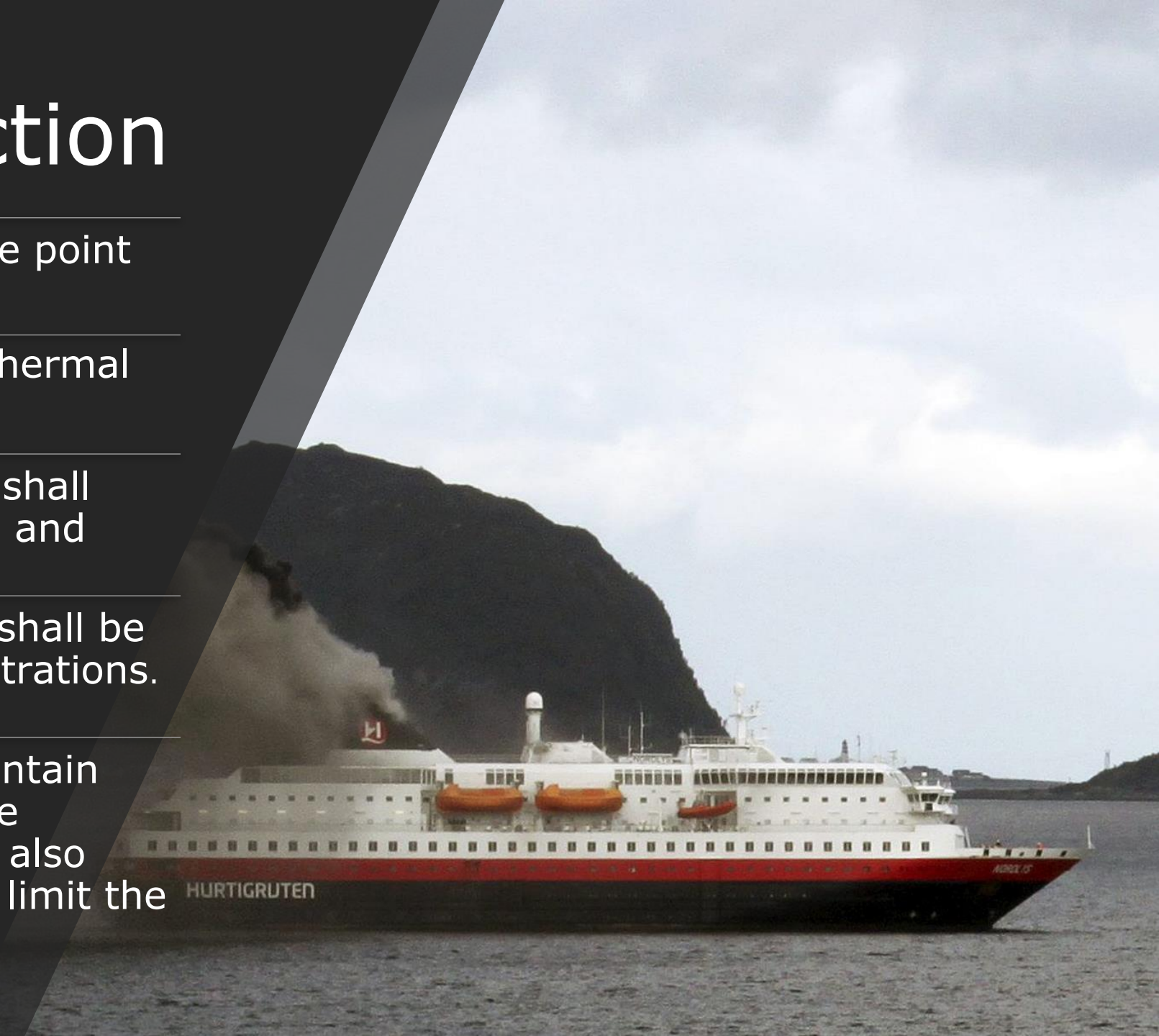
A fire is to be contained within the point of origin as follows:

The ship shall be subdivided by thermal and structural boundaries

Thermal insulation of boundaries shall consider the fire risk of the space and adjacent spaces

The fire integrity of the divisions shall be maintained at openings and penetrations.

A and B divisions are used to maintain thermal barriers depending on the associated risk. Fire dampers are also provided in ventilation ducting to limit the spread of heat and smoke.



Design Characteristics

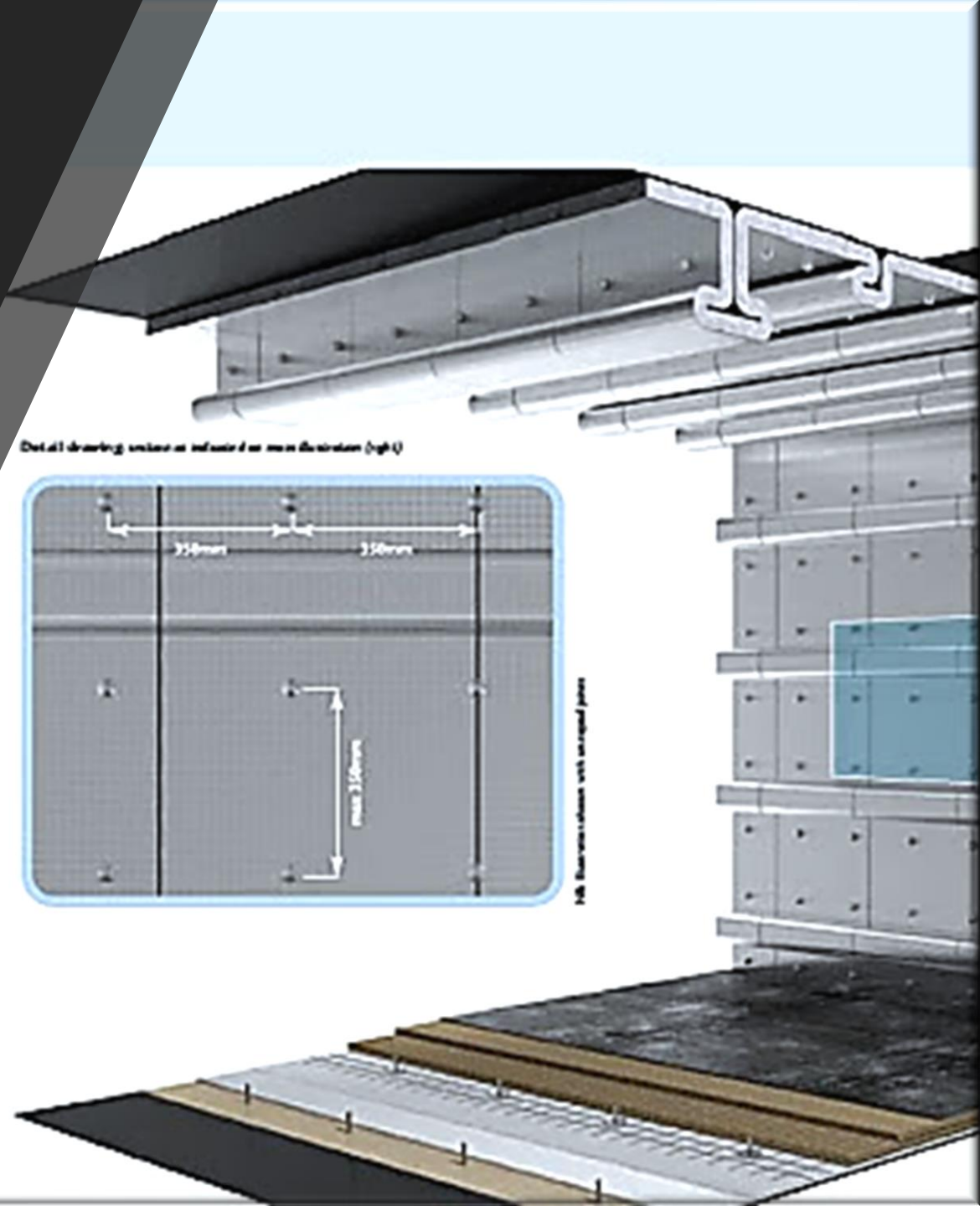
- Structural Fire Protection
- Restrictions on the use of combustible material
- Insulation of exhaust systems
- Means of egress / access
- Minimum stairway sizes

Design Characteristics

- Fire detection and alarm systems
- Fire main systems
- Fixed fire suppression systems
- Portable and semi portable extinguishers
- Approved machinery, equipment and installation

Class A Divisions: **Doors & Bulkheads**

- Material equivalent to 1/4” steel
- Limits transfer of radiant heat and smoke
- Can be insulated to limit transfer of conducted heat (A-60, A-30, A-15)
- Normally found on boundaries of Main Vertical Zones and around machinery and galley spaces



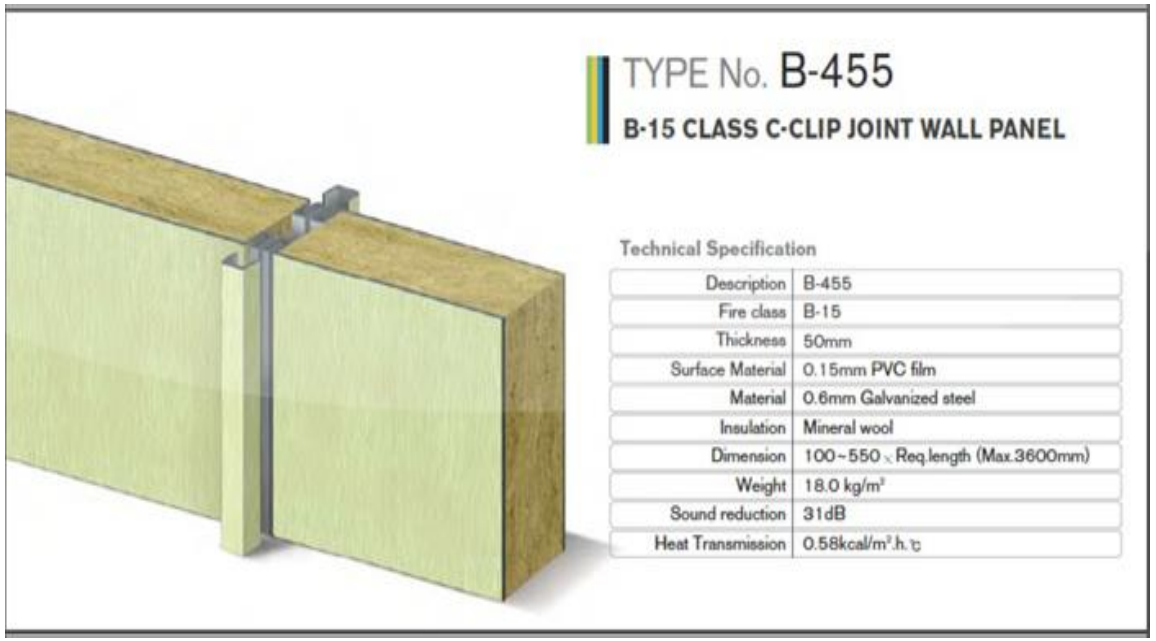
Class B Divisions: Doors & Bulkheads

Material equivalent to 1/8” steel (B-0)

Limits transfer of radiant heat and smoke

Can be insulated to limit transfer of conducted heat (B-30, B-15)

Normally found on boundaries within Main Vertical Zones and within compartments



Fire construction Bulkhead

Class C

- Fire resistant materials but unrated
- Reduces transfer of radiant heat
- Normally used as room dividers or bulkheads within staterooms
- Not required to go above dropped ceilings

Construction Materials

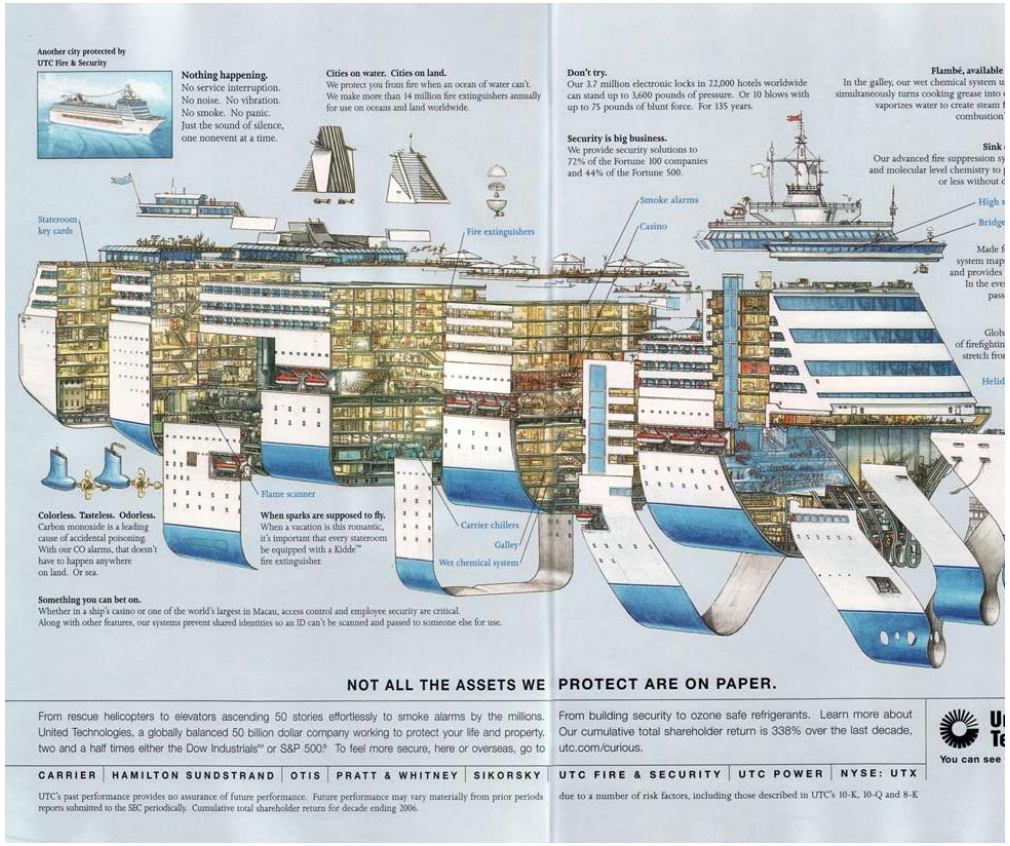
Steel: most common material used on commercial ships

Aluminum: in widespread use on yachts, high speed craft of all sizes, superstructures

Composite: Gaining in popularity as technology improves. Lifeboats are constructed of this material.

Passenger Vessels

- **Oasis of the Seas**



Cruise Ship Construction

Main Vertical Zones

Vertically divided subdivisions called **“<u>Zones</u>”**

These zones are typically evenly spaced the length of the vessel at 131 ft.

Zones utilize **Class A** rated bulkheads and doors for fire resistance.

Ships Construction

Passenger Ships

Class A Divisions

- In general, main vertical zones bounded by A Class divisions should not exceed 40 meters. A Class divisions are also used as boundaries protecting spaces that provide vertical access (stairways etc.), the boundaries of machinery spaces and those separating accommodation from cargo and service spaces and others.

Class B Division

- All corridor bulkheads, which are not required to be A Class, must be B Class.

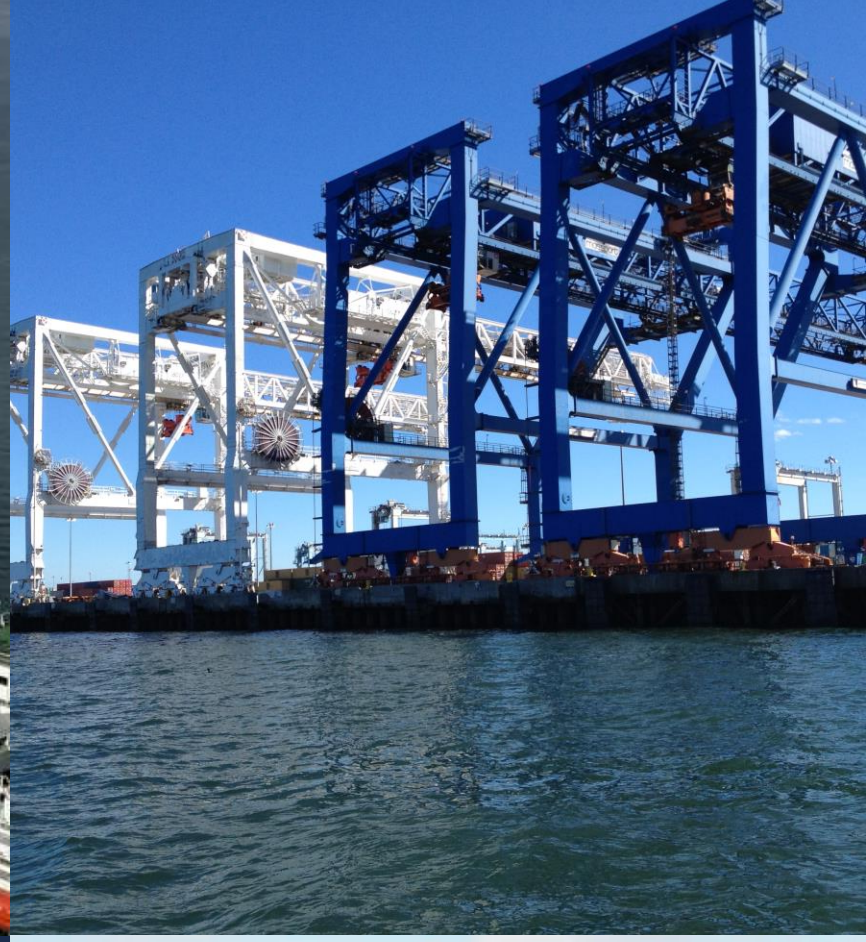
Class C Division

- Class C divisions are used for inter-cabin bulkheads and inter-sanitary accommodation must be constructed of approved non-combustible materials.

Carnival Ecstasy Fire July20, 1998

- Cutting and welding without proper precautions.
- Delay in discovery of the fire on the mooring deck.
- Avenue of fire spread through ventilation ducts containing lint and dust accumulations.

Main Vertical Fire Zone



Container Ships

RESOLVE ACADEMY

Ships Construction (cont)

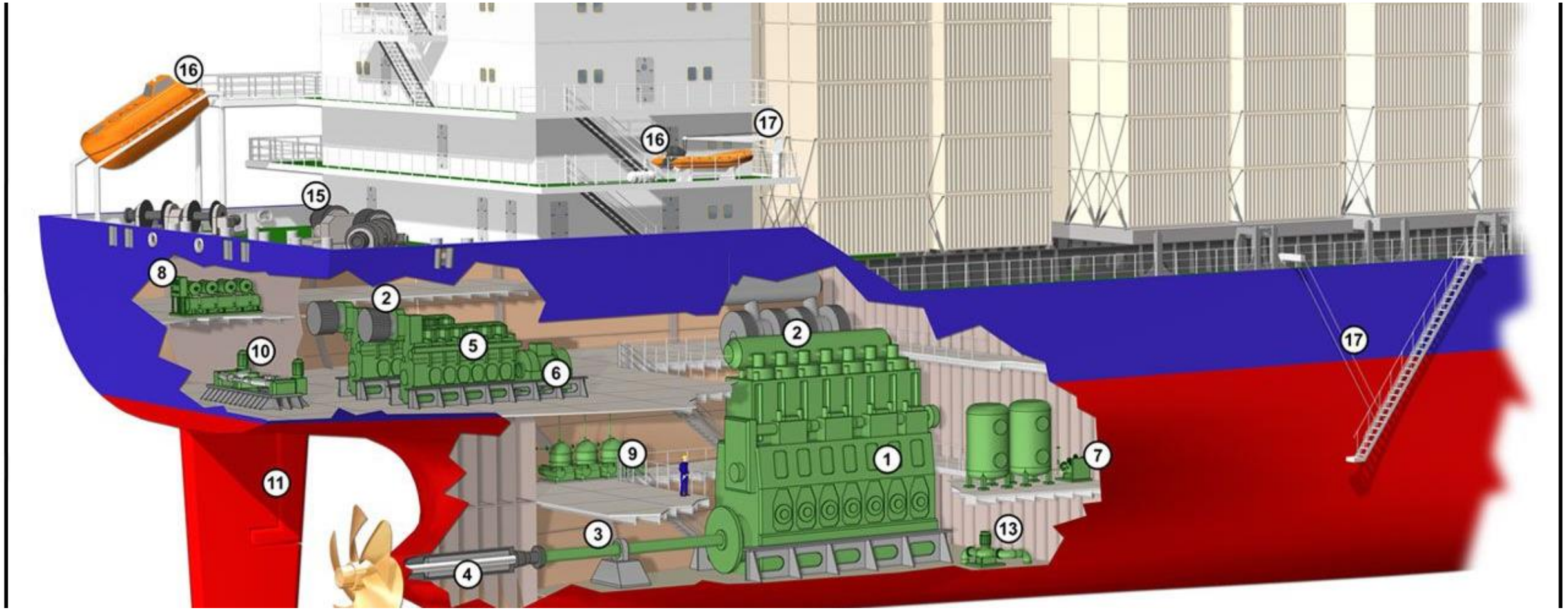
Container Ship

- The fire resistance will vary depending on the degree of fire detection or fix fire protection is provided. There are various methods in SOLAS to achieve the required protection, dependent on other measures.
- Where a fire detection, fire alarm system providing smoke detection, manually operated devices and call points in all corridors, stairways and escape routes within accommodation spaces.

Cut away view of a Container Ship

Container Ship…

- A ship that transports its cargo in truck-size containers that can be transferred from ship to train to truck without unloading and reloading the contents of the “container”.
- Container ships *now carry most of the seagoing non-bulk cargo.*

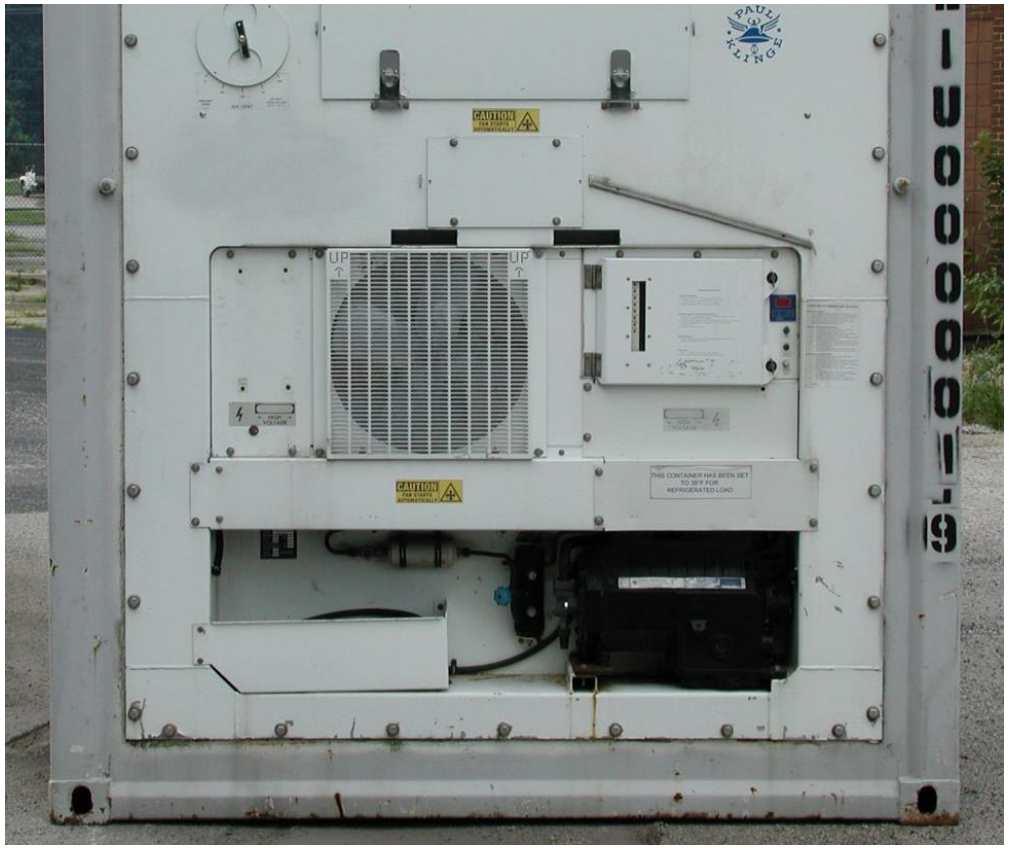


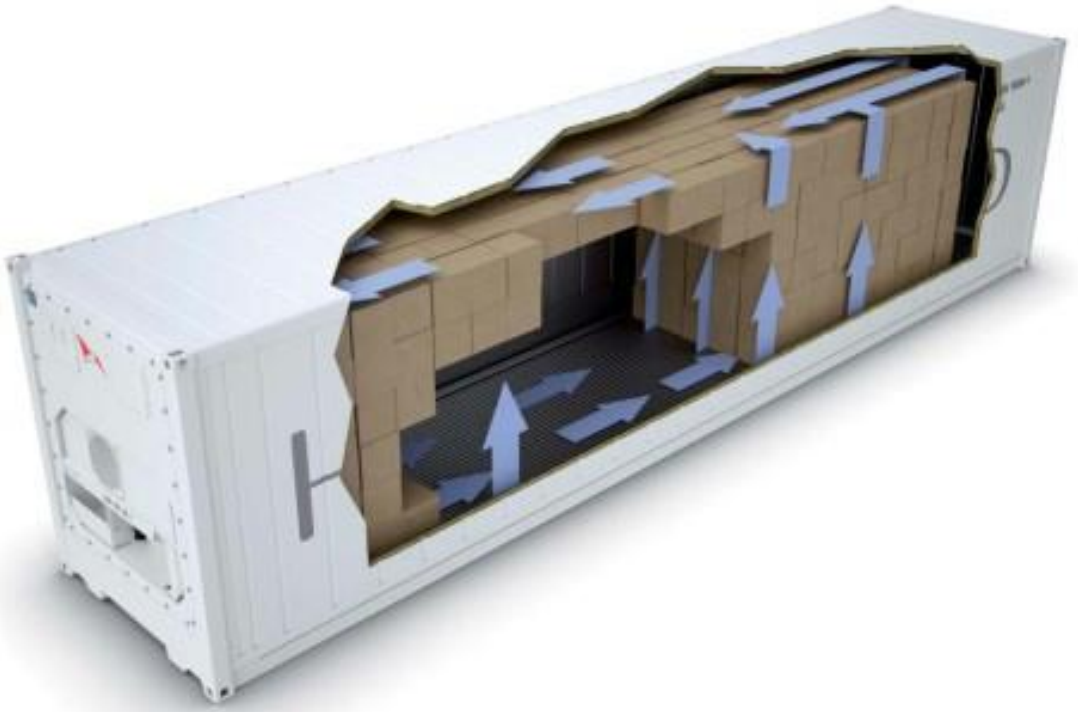
Container Ship | Engine Room

Containers

Greatest hazard:
Unknown contents

Reefer Containers

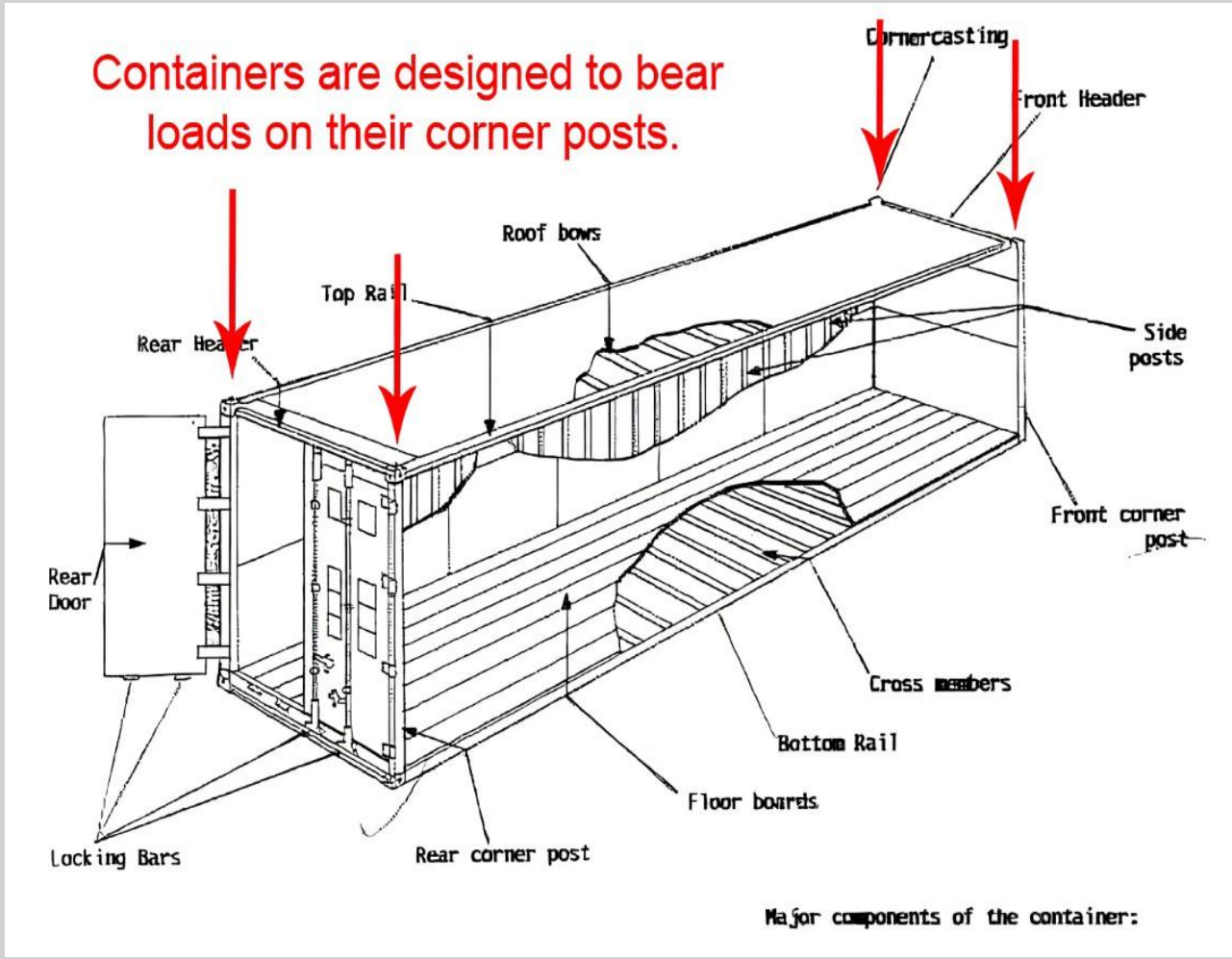




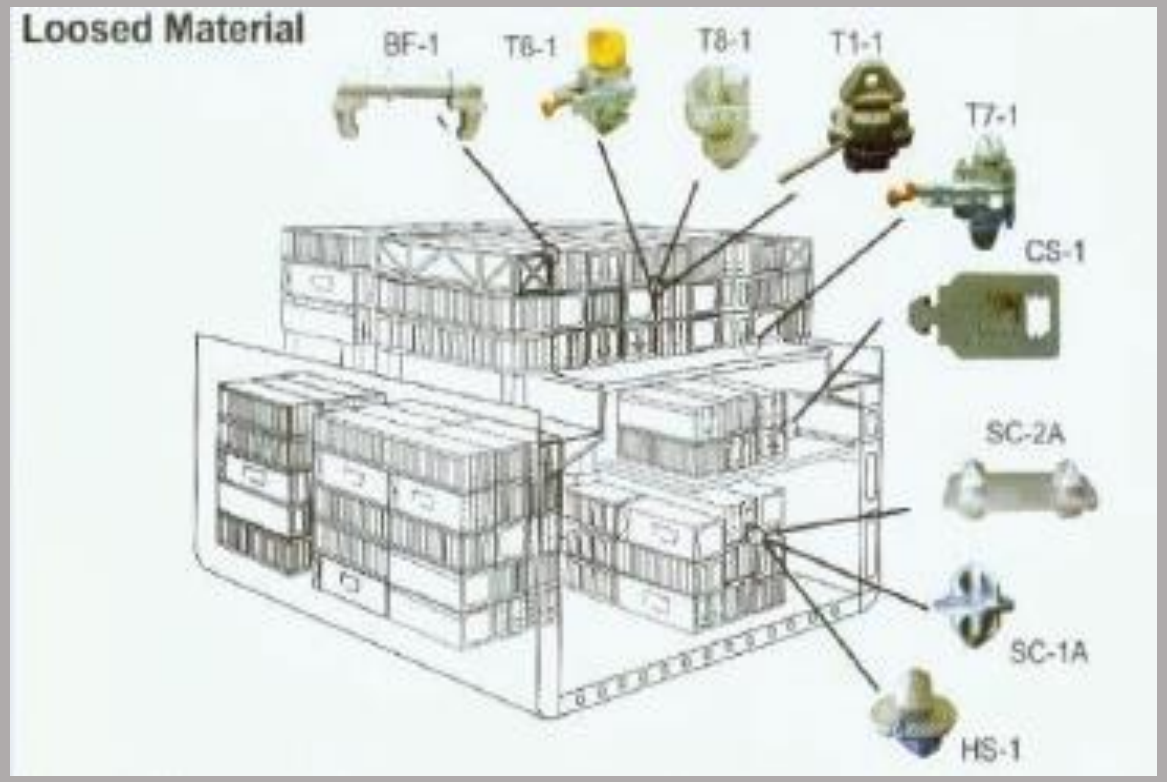
Strong Construction → Weak Box

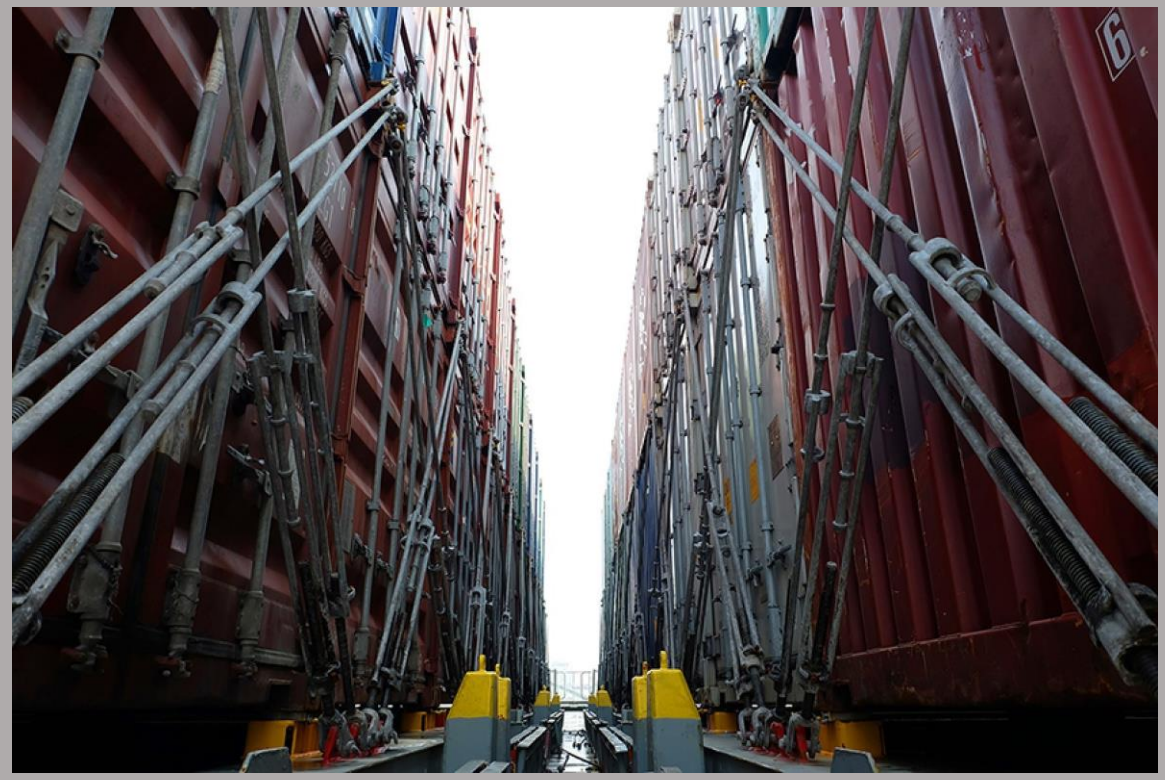
Shipping Container Dimensions

- 6 or 12+ m length
- Thickness of the steel sidewalls is 1.6 mm
- Thickness of the steel roof panel is 1.2 mm
- The floor is Plywood, Aluminum, or Steel
- The Corner Castings are engineered to carry the weight of the stack



Container Stabilization





Loading Containers with product

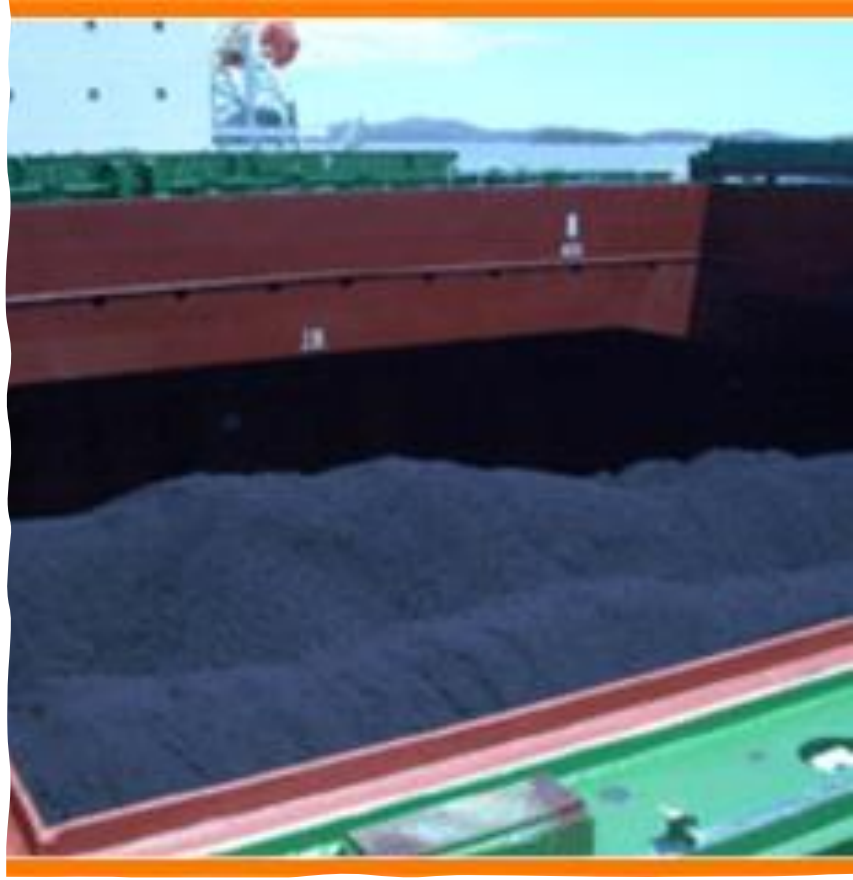
Bulk Carrier

RESOLVE ACADEMY

Bulk Carriers

Bulk Carriers

- The term BULK relates to trades where dry cargoes such as Iron ore, Grain, Coal, Alumina and Phosphate are carried in loose form, (i.e. the cargo is not packed).



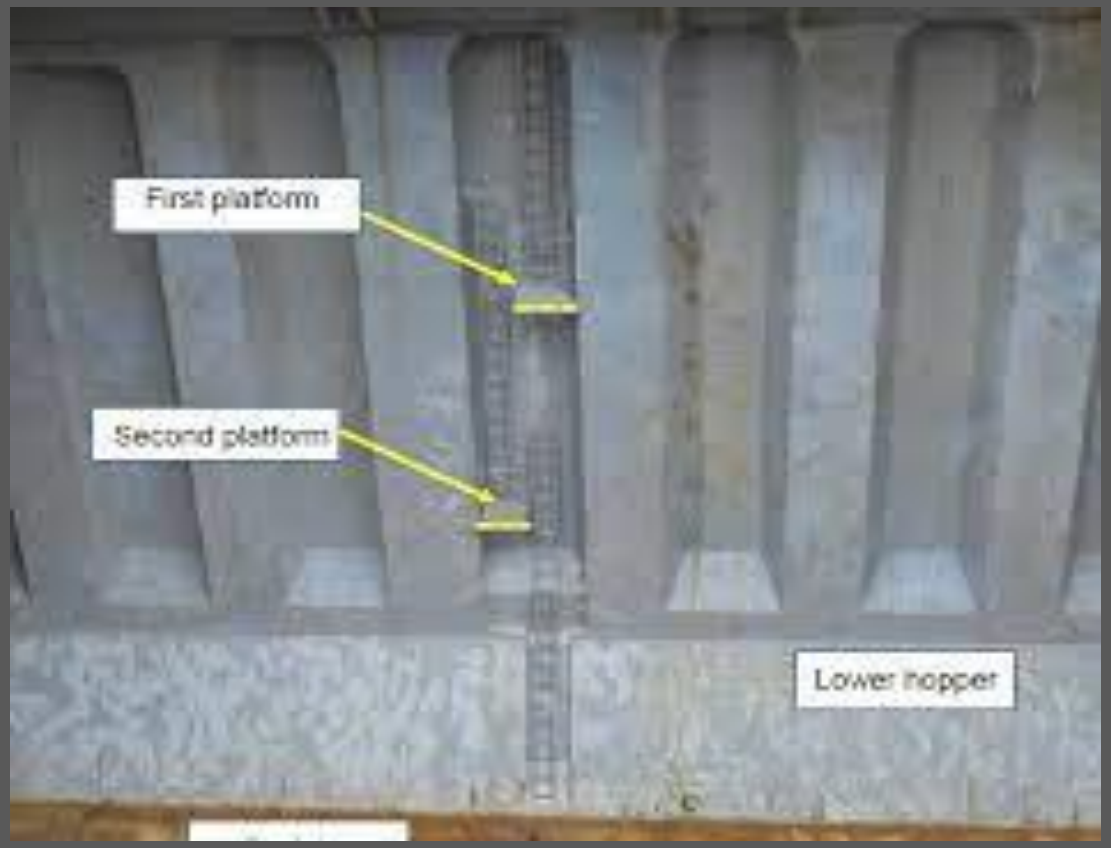
Bulk Vessels

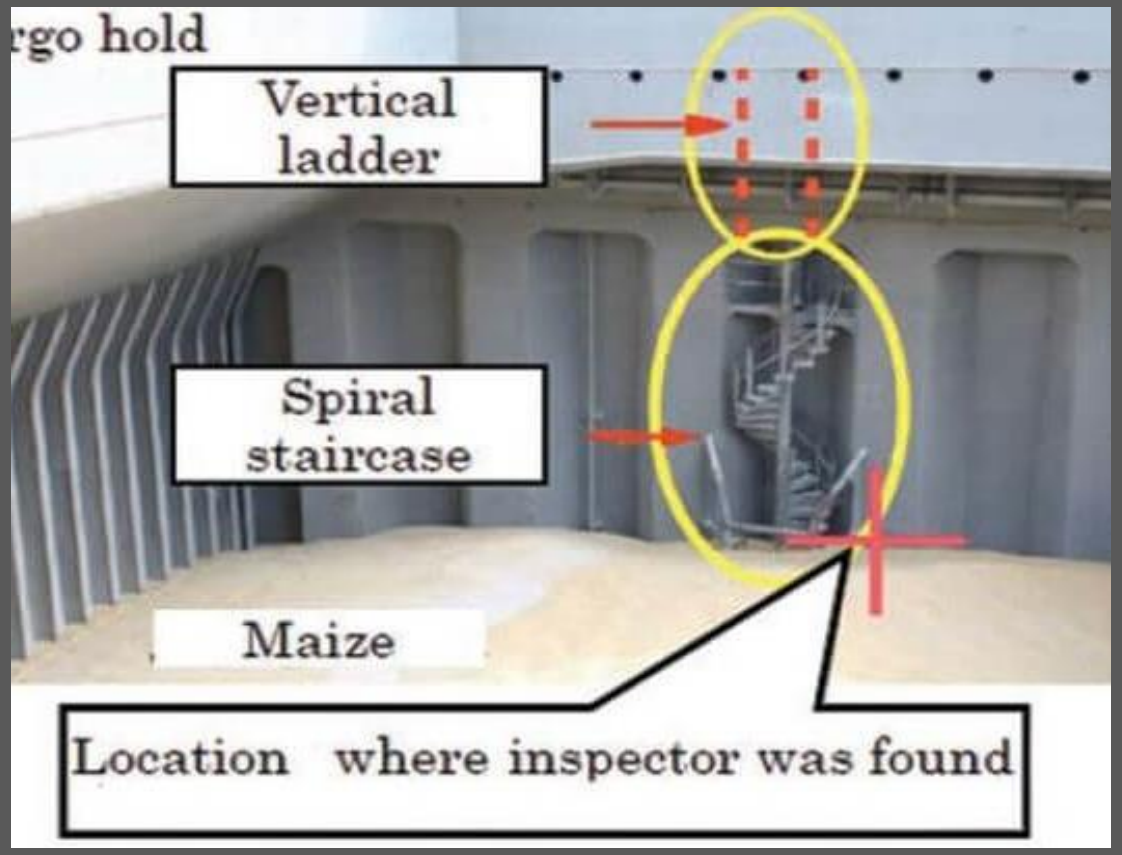
Bulk Vessels come in two types:

Gearless – meaning the ship doesn't have its own cranes and/or other cargo handling equipment.

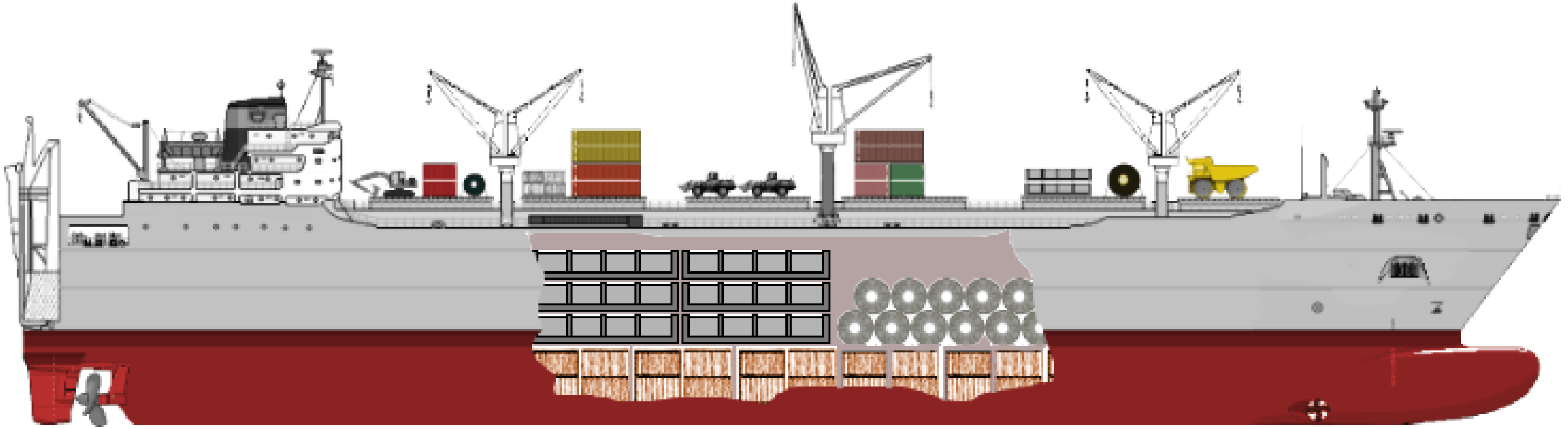
Geared – meaning the has its own cranes and/or other cargo handling equipment which means these ships can call at any suitable berth at the port for cargo operations.

Cargo Access





BREAK BULK



BREAK BULK

- The term BREAK BULK relates to trades where the cargoes are carried in unitized form such as palletized, bagged, strapped, bundled, drummed and crated like below and non unitized general cargo (vehicles, steel etc).

RESOLVE ACADEMY

Tanker Vessels

RESOLVE ACADEMY

Tankers

- A60 materials must be used for those areas of superstructure and deckhouses facing the cargo deck and for 3 meters aft on either side, engine casing, uptake and cargo pump rooms

RESOLVE ACADEMY

Tank Ship (Tankers)

Tanker ships are specialized vessels for carrying a large amount of liquid cargo. Tankers are further sub-divided into different types based on the cargo they carry-

Liquefied Gas Carriers: A gas carrier (or gas tanker) is designed to transport Liquid Petroleum Gas, Liquid Natural Gas or liquefied chemical gases in bulk.

Chemical and Product Carriers: A chemical tanker is a type of tanker ship designed to transport chemicals and different liquid products in bulk.

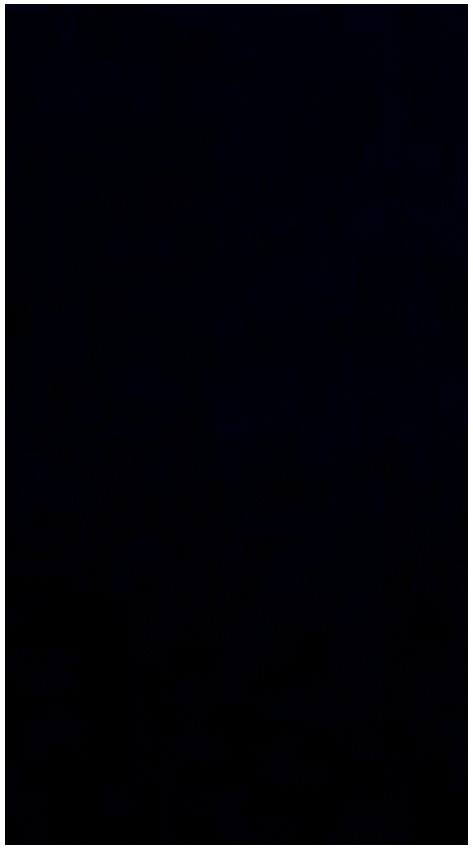
Oil Tankers: Oil tankers mainly carry crude oil and all of the by-products derived from Oil.

Other types of tankers: Some other types of tankers are juice tankers, wine tankers, Integrated tug/barge etc.

RESOLVE ACADEMY

Tanker

Tanker Video’s



RO-RO Vessels

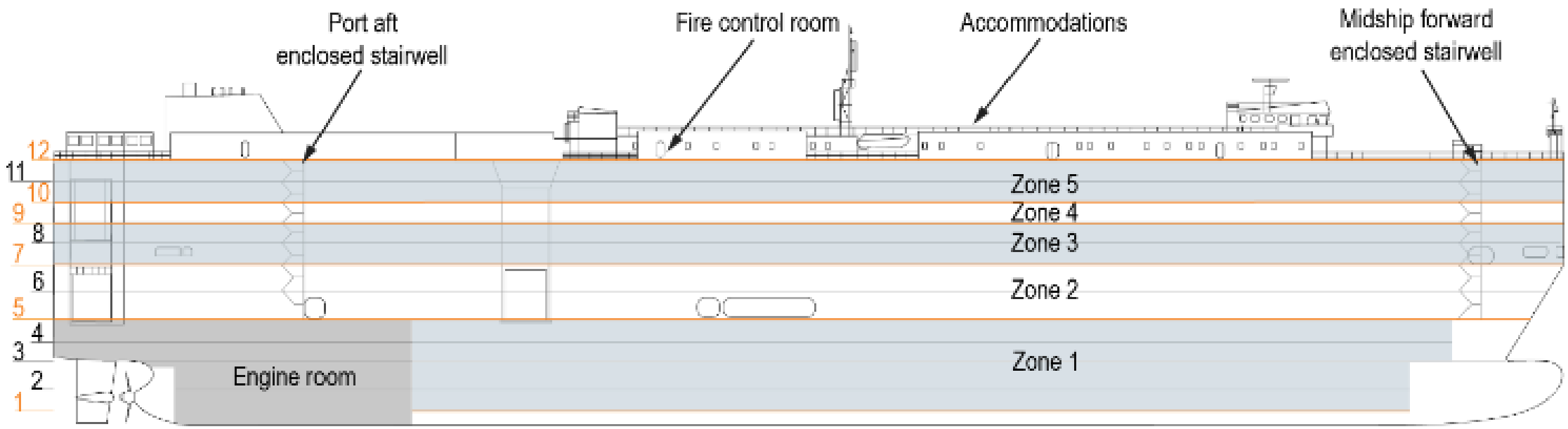
RESOLVE ACADEMY

64 major ship fires in the last 5 years. The past two years have mainly involved Car Carriers

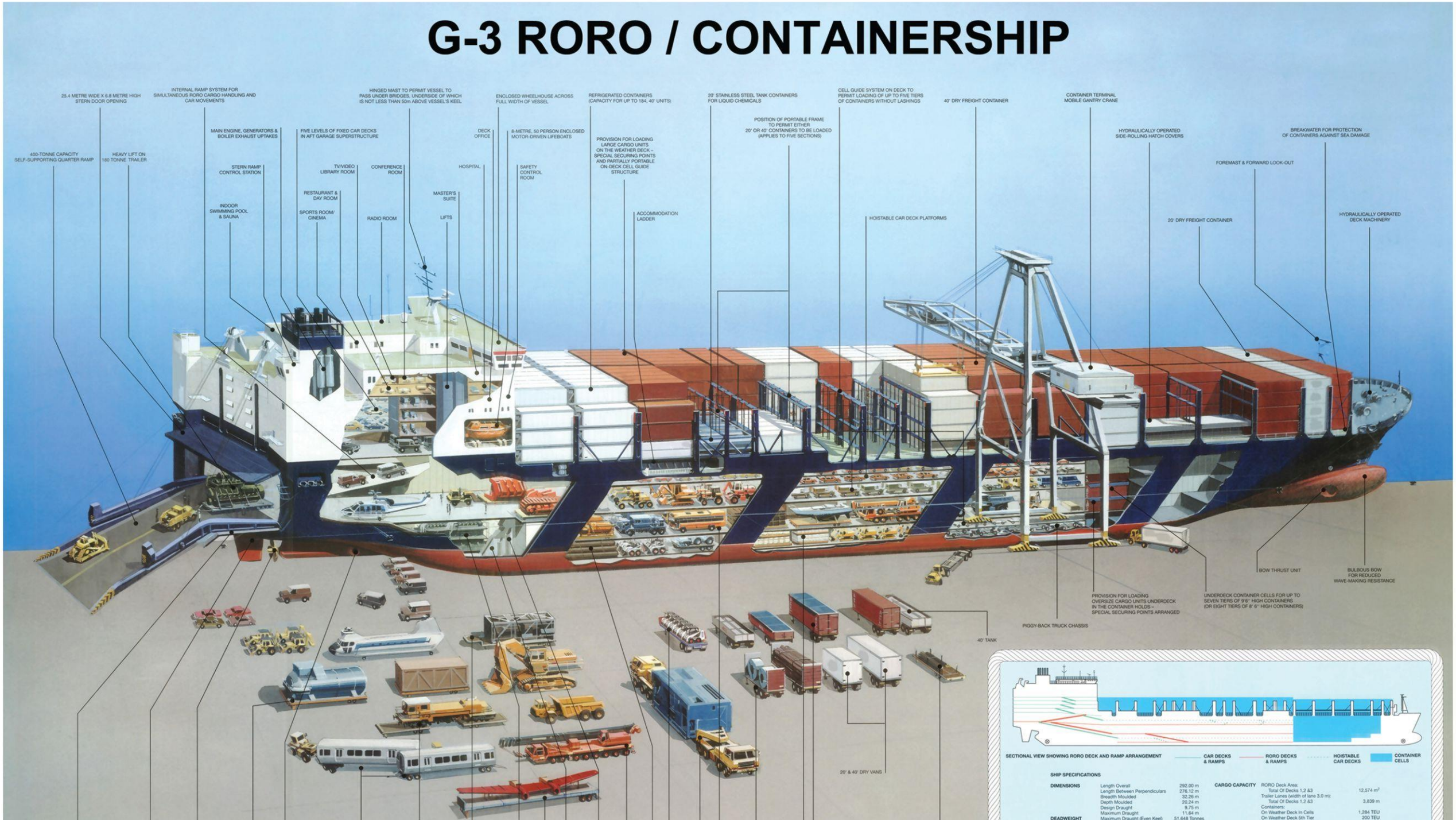
Roll-on Roll-off Ship

The Ro Ro is a purpose-built vessel for the transportation of different types of rolling cargo, such as private cars and trucks, heavy construction equipment, and other mobile heavy loads. The vessels are usually configured with 10-13 decks for the loading of different vehicle types; the axle loads varying between 1.2 tonnes to over 100 tonnes.

RESOLVE ACADEMY


Port aft
enclosed stairwell
Fire control room
Accommodations
Midship forward
enclosed stairwell
12
11
10
9
8
7
6
5
4
3
2
1
Zone 5
Zone 4
Zone 3
Zone 2
Zone 1
Engine room

G-3 RORO / CONTAINERSHIP



SECTIONAL VIEW SHOWING RORO DECK AND RAMP ARRANGEMENT — CAR DECKS & RAMPS — RORO DECKS & RAMPS — HOISTABLE CAR DECKS — CONTAINER CELLS

SHIP SPECIFICATIONS

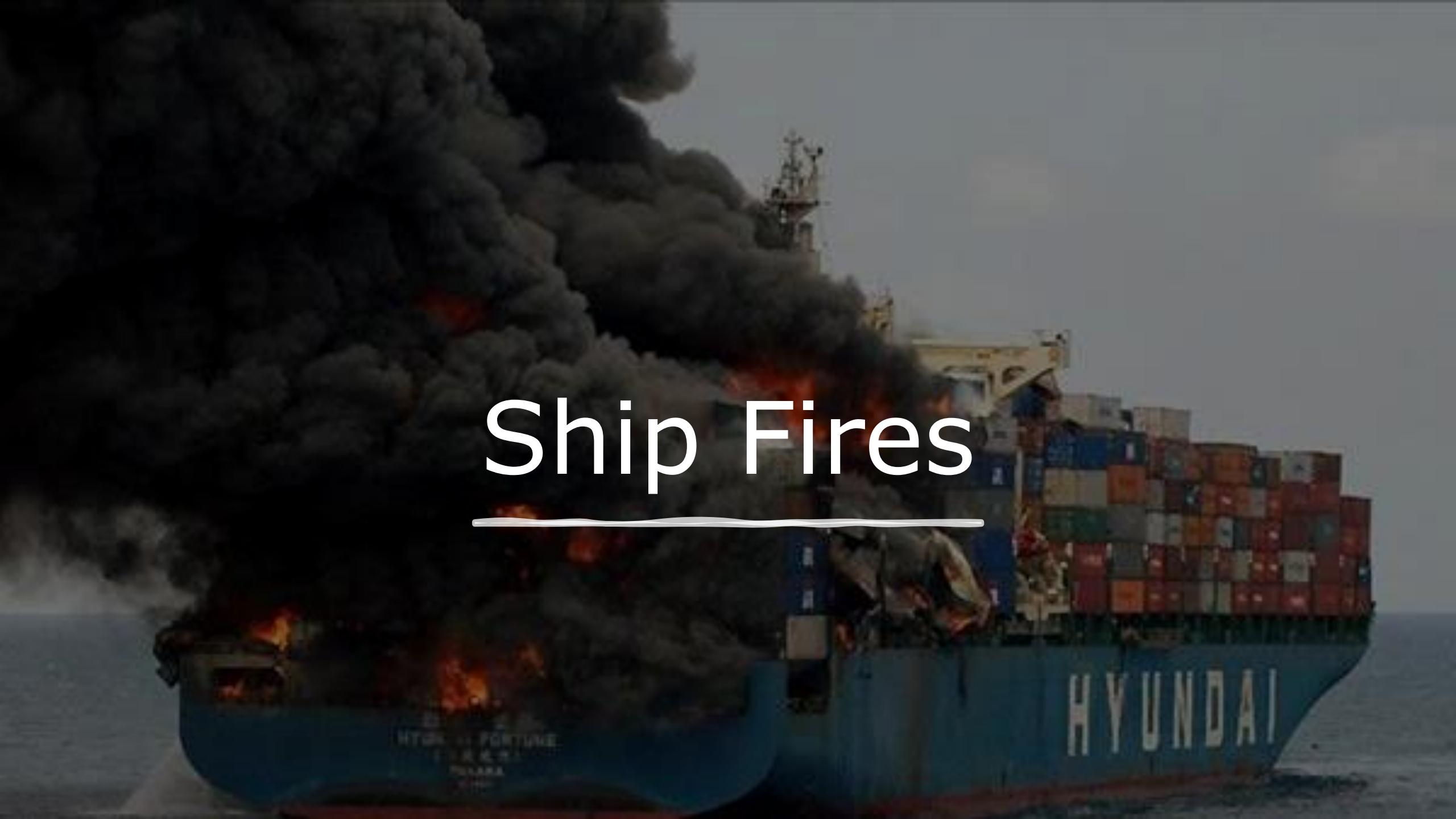
DIMENSIONS	Length Overall	292.00 m	**CARGO CAPACITY**	RORO Deck Area:	
	Length Between Perpendiculars	276.12 m		Total Of Decks 1,2 &3	12,574 m^2
	Breadth Moulded	32.26 m		Trailer Lanes (width of lane 3.0 m):	
	Depth Moulded	20.24 m		Total Of Decks 1,2 &3	3,839 m
	Design Draught	9.75 m		Containers:	
	Maximum Draught	11.64 m		On Weather Deck In Cells	1,284 TEU
	Maximum Draught (Even Keel)	51,648 Tonnes		On Weather Deck 5th Tier	200 TEU
DEADWEIGHT					

Barges

- Typically box shaped, flat deck vessels used for transporting cargo
- Virtually any cargo can be found onboard barges
- Usually do not have any fire suppression systems

Tugboats / Towboats

- Designed to move another vessel
- Many tugboats are equipped with monitors for firefighting
- Vessels have very large engines and engine rooms with a low freeboard



Ship Fires

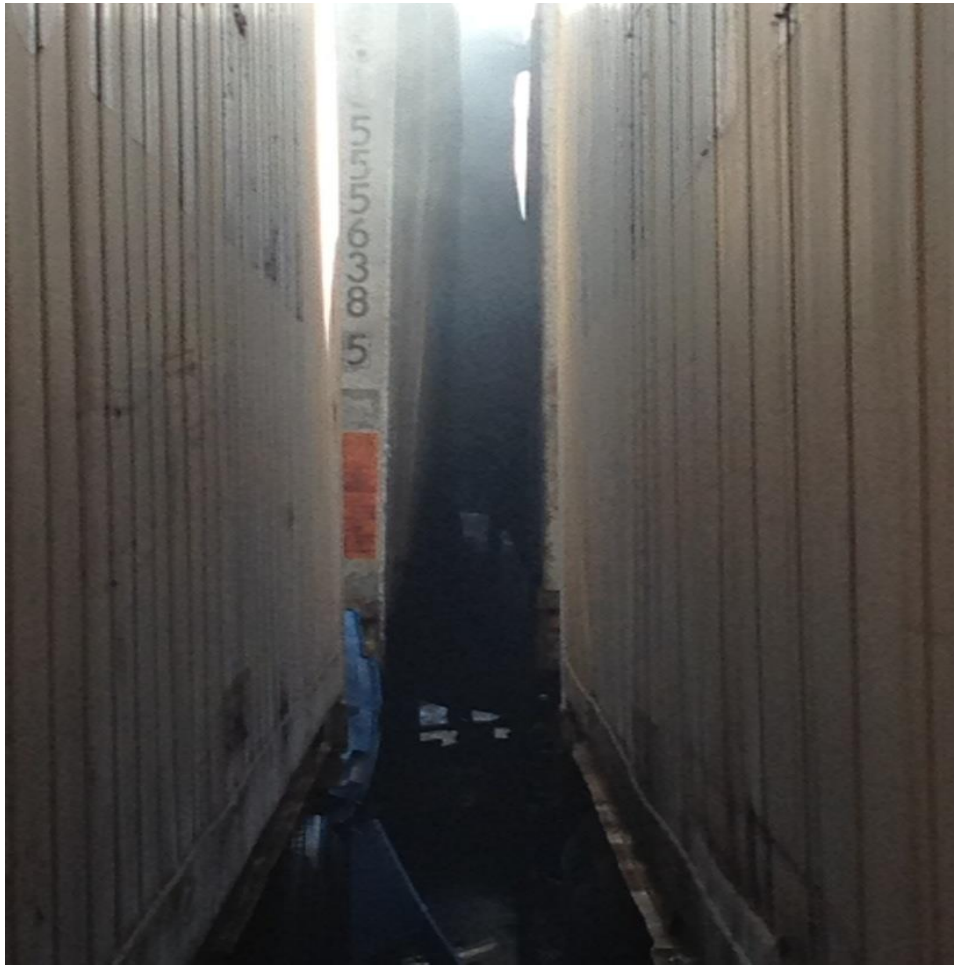
Not Ammonium Nitrate!

RESOLVE ACADEMY

Container Ship Fires

Cargo & Cargo Hazards

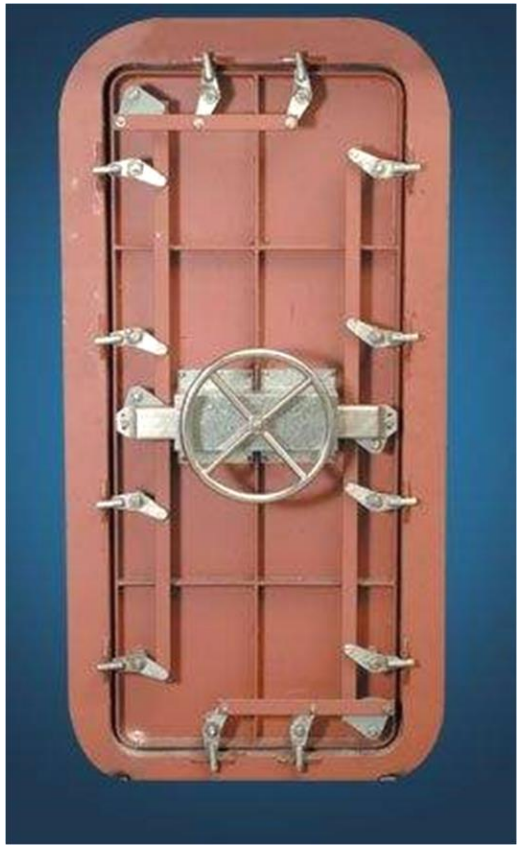
1 Ton Chlorine Cylinder/Access



Chlorine Gas

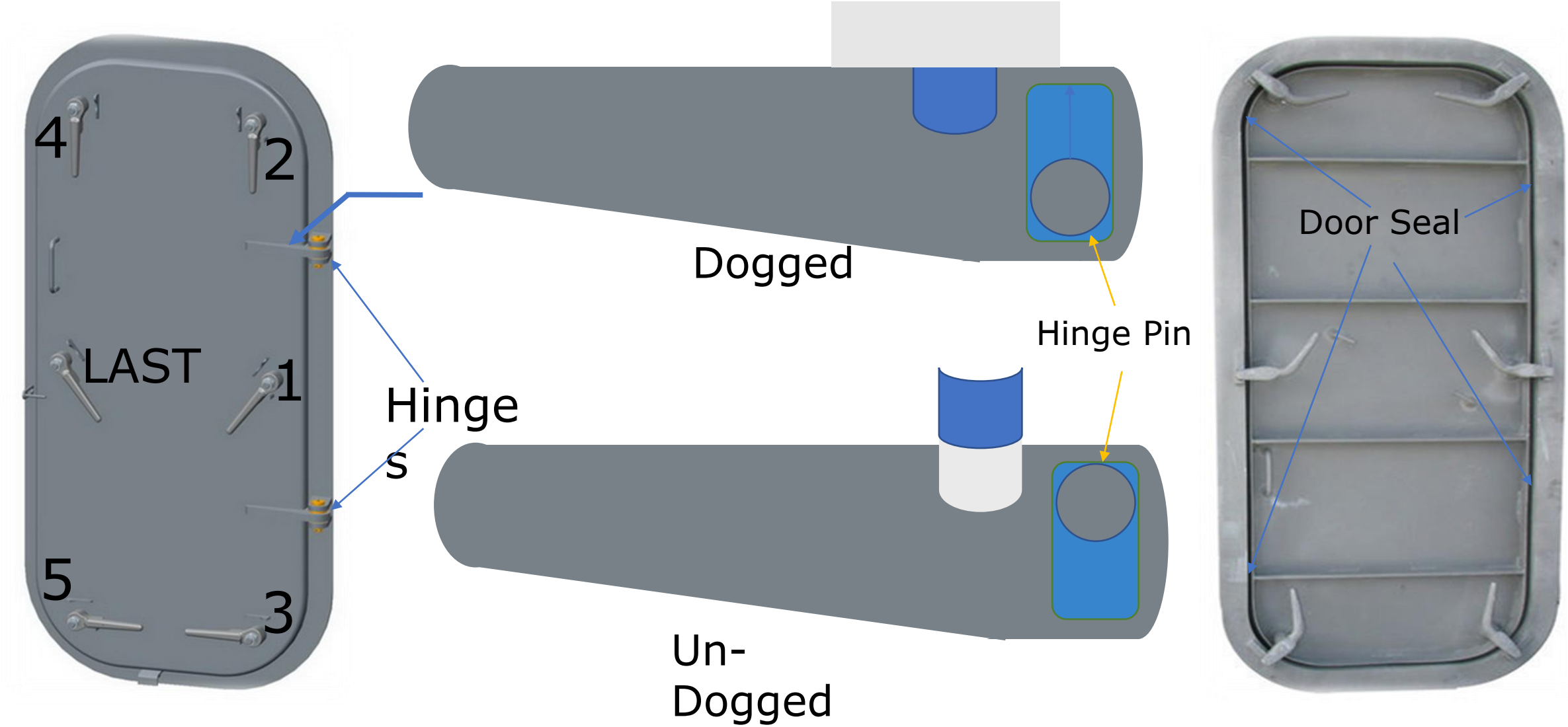

ZIM

Watertight doors



Watertight / Weathertight

6-Dog Weathertight Door



Watertight Doors

Watertight doors may not be passable, and an alternate route may need to be used

Class 1 door

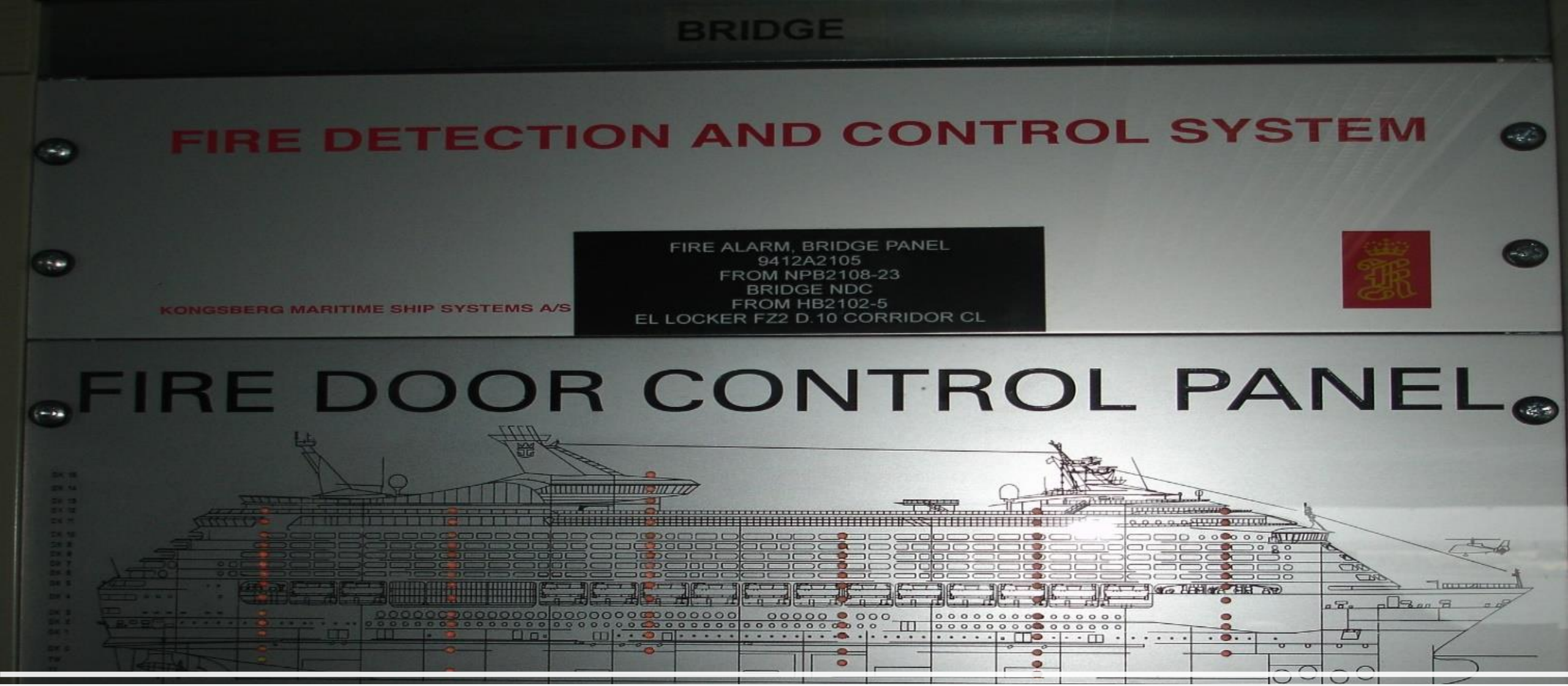
- Hinged door with locking mechanism

Class 2 door

- Sliding door with manual controls

Class 3 door

- Sliding door with hydraulic and manual pump operation
- Automatic closing upon fire alarm activation
- May be controlled from the bridge



Fire Door Control Panel

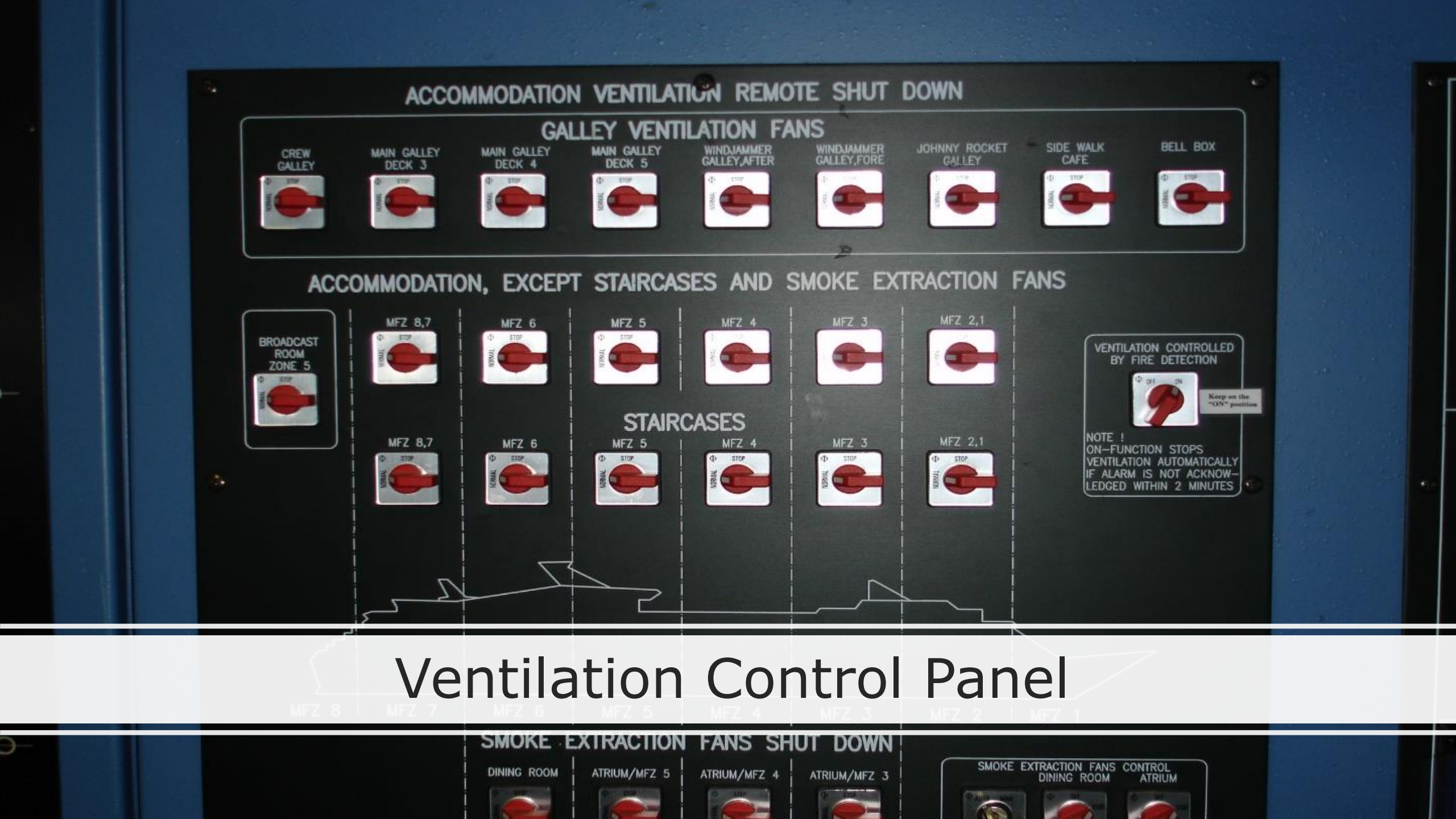
Fire screen door

Hose Port in Fire Screen Door

Vessel Construction

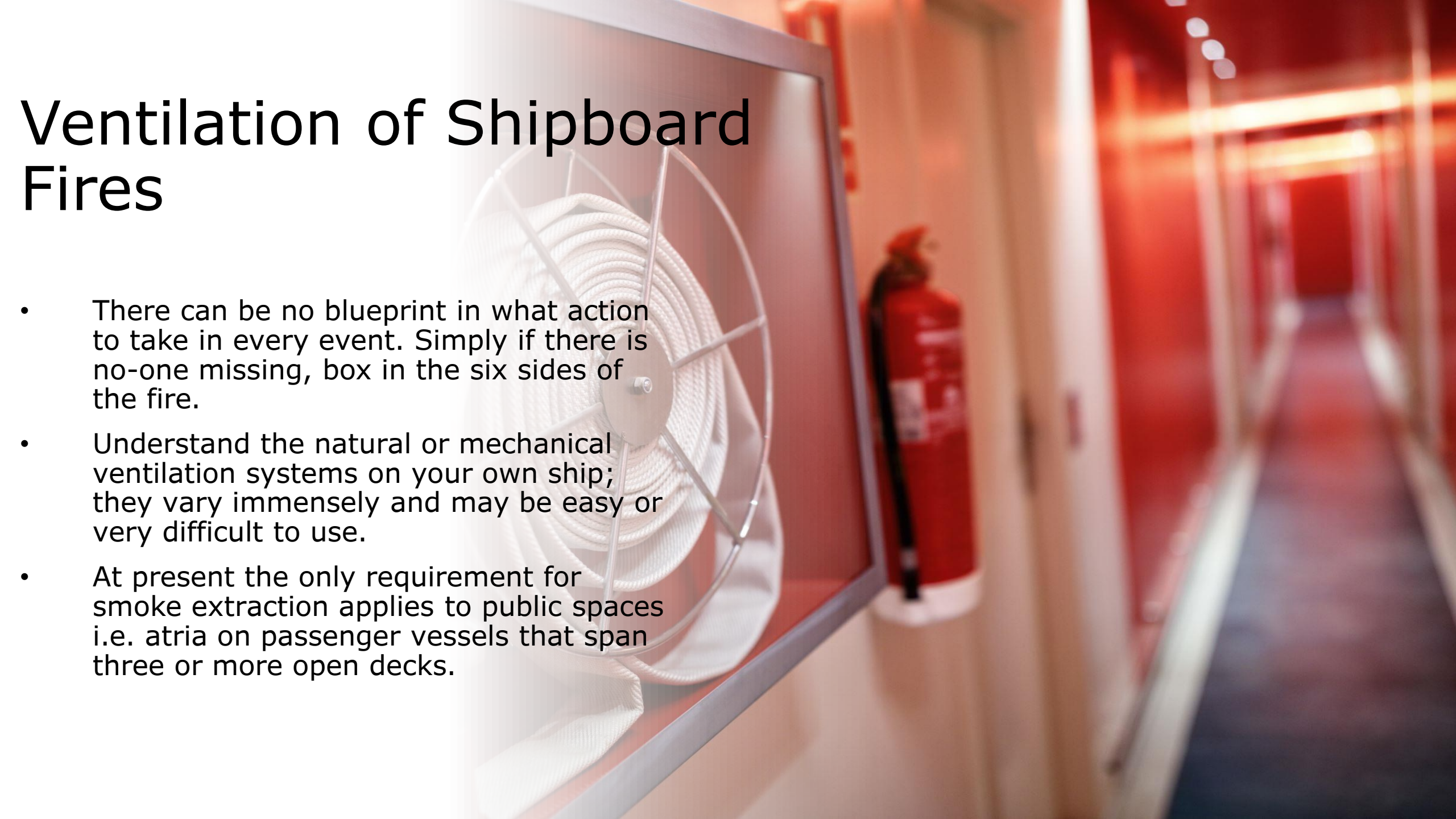
This is a fire station with a door number

- 5 = deck
- 4 = Fire Zone
- 01 = Stbd side
- Even numbers port, odd Stbd
- Other doors will have WT or FD

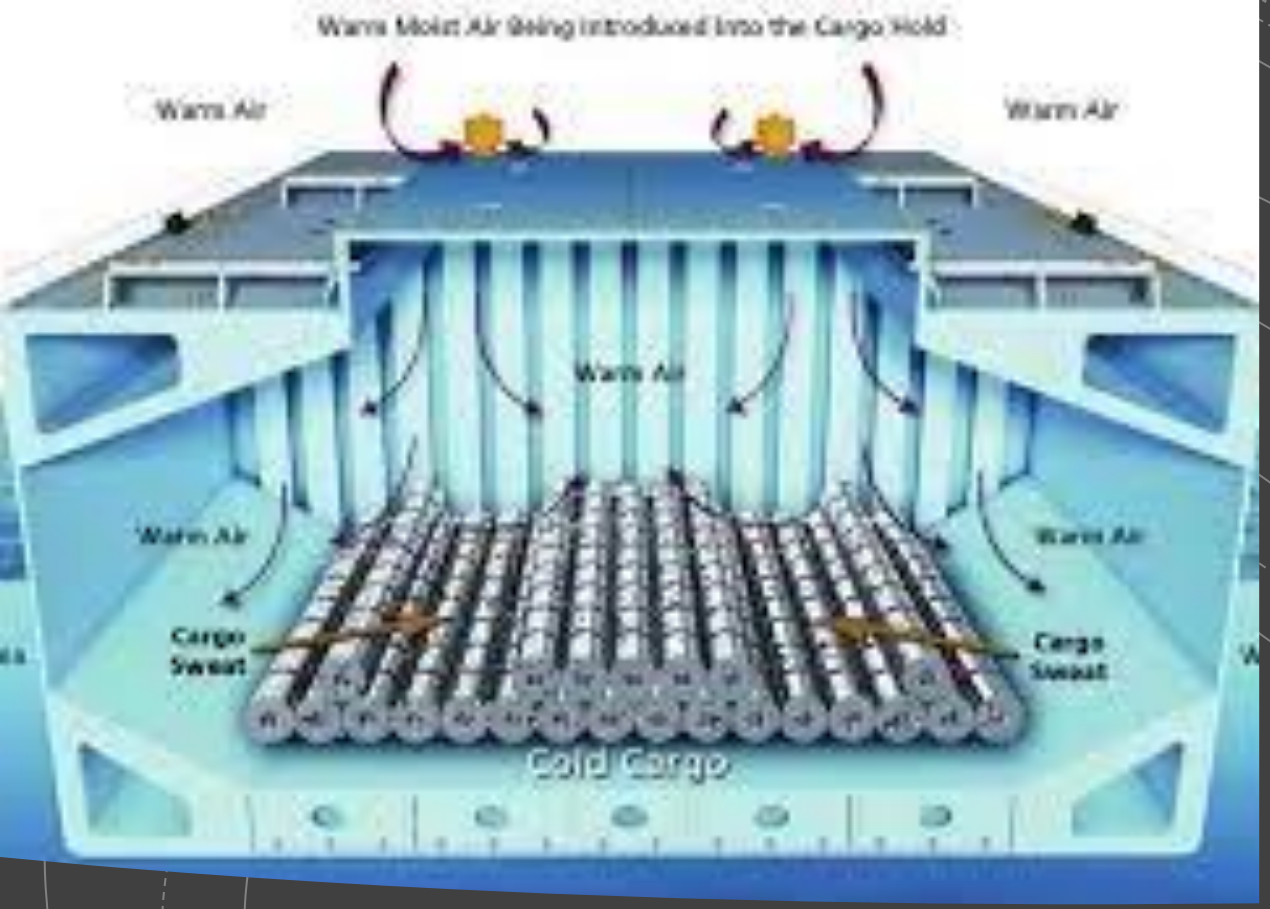


Ventilation Control Panel

Ventilation of Shipboard Fires



- There can be no blueprint in what action to take in every event. Simply if there is no-one missing, box in the six sides of the fire.
- Understand the natural or mechanical ventilation systems on your own ship; they vary immensely and may be easy or very difficult to use.
- At present the only requirement for smoke extraction applies to public spaces i.e. atria on passenger vessels that span three or more open decks.



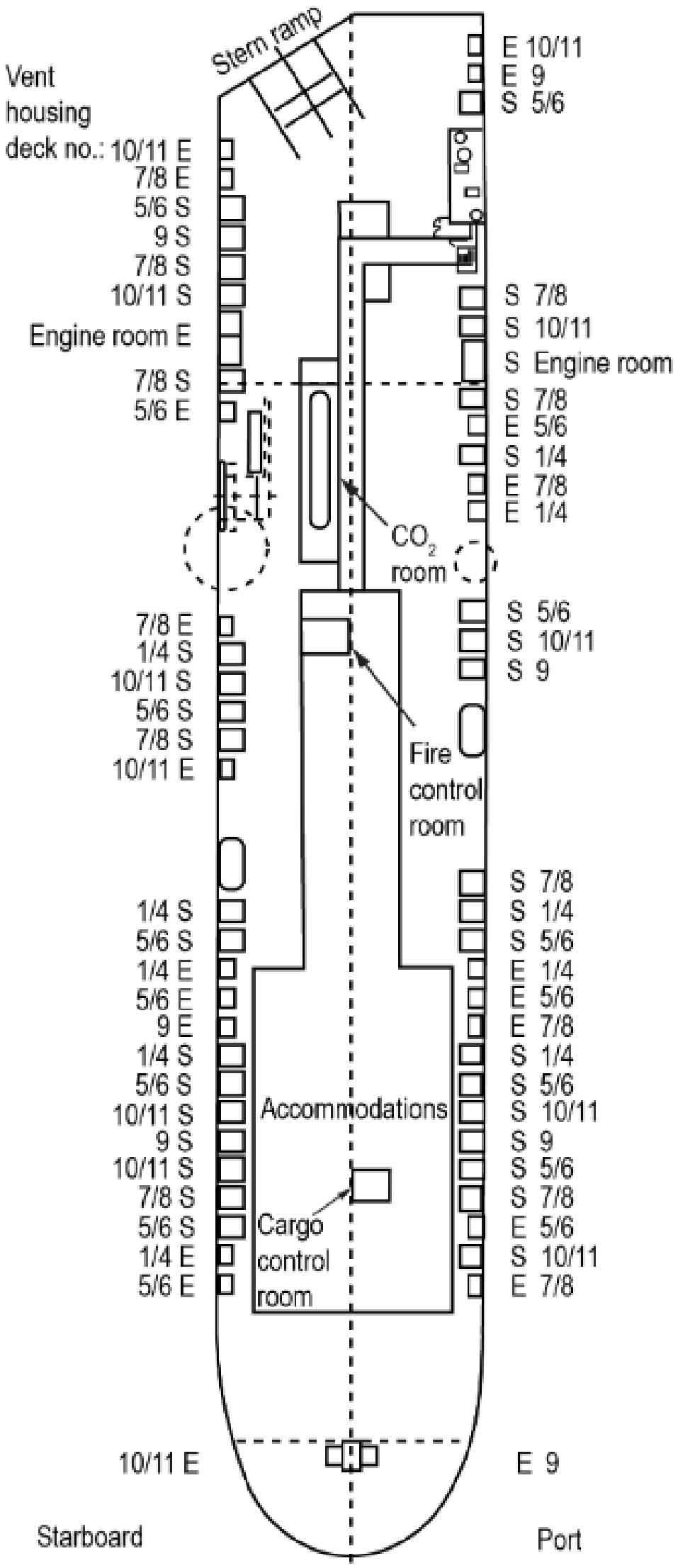
CARGO AND CARGO HOLD VENTILATION

Cargo Vessel

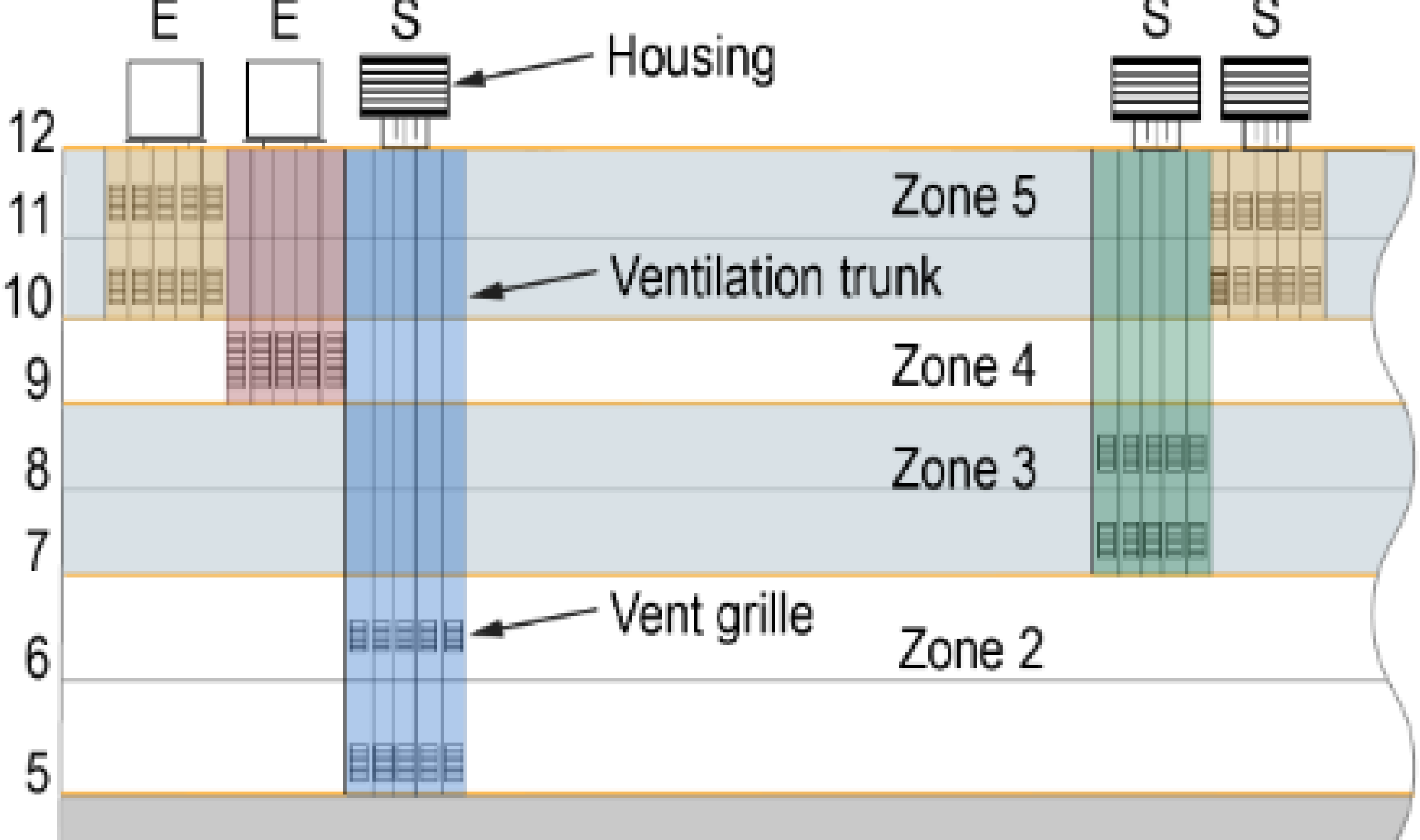
Ventilation-Manual/ Automatic

Container ship Ventilation

Ro/Ro Ship Ventilation


Stern ramp
Vent housing deck no.:
10/11 E
7/8 E
5/6 S
9 S
7/8 S
10/11 S
Engine room E
7/8 S
5/6 E
7/8 E
1/4 S
10/11 S
5/6 S
7/8 S
10/11 E
1/4 S
5/6 S
1/4 E
5/6 E
9 E
1/4 S
5/6 S
10/11 S
9 S
10/11 S
7/8 S
5/6 S
1/4 E
5/6 E
10/11 E
E 10/11
E 9
S 5/6
S 7/8
S 10/11
S Engine room
S 7/8
E 5/6
S 1/4
E 7/8
E 1/4
CO_2 room
S 5/6
S 10/11
S 9
Fire control room
S 7/8
S 1/4
S 5/6
E 1/4
E 5/6
E 7/8
S 1/4
S 5/6
S 10/11
S 9
S 5/6
S 7/8
E 5/6
S 10/11
E 7/8
Accommodations
Cargo control room
E 9
Starboard
Port


10/11
E
9
E
5/6
S
Vent housing deck no.:
Exhaust/Supply:
10/11
E
7/8
E
5/6
S
9
S
7/8
S
10/11
S
7/8
S
5/6
E


E
E
S
Housing
S
S
12
11
10
9
8
7
6
5
Zone 5
Ventilation trunk
Zone 4
Zone 3
Vent grille
Zone 2

Electrical Systems

- The crew must understand where the electrical cables are run through the ship.

- Regulation require that cable ways have fire stop's installed, even with a fire stop it is a weak point in the bulkhead

Electrical Systems

- A fire in a cable way can be very difficult to extinguish and even harder to get access too.

- The insulation produces toxic smoke, even in a light smoke condition

Electrical /Fire Stop

Propulsion

LNG

- Is the commonly selected fuel source for new foreign flagged construction
- The U.S. is slowly following this trend
- The USCG is expected to set the standards very soon

LNG Powered Vessels

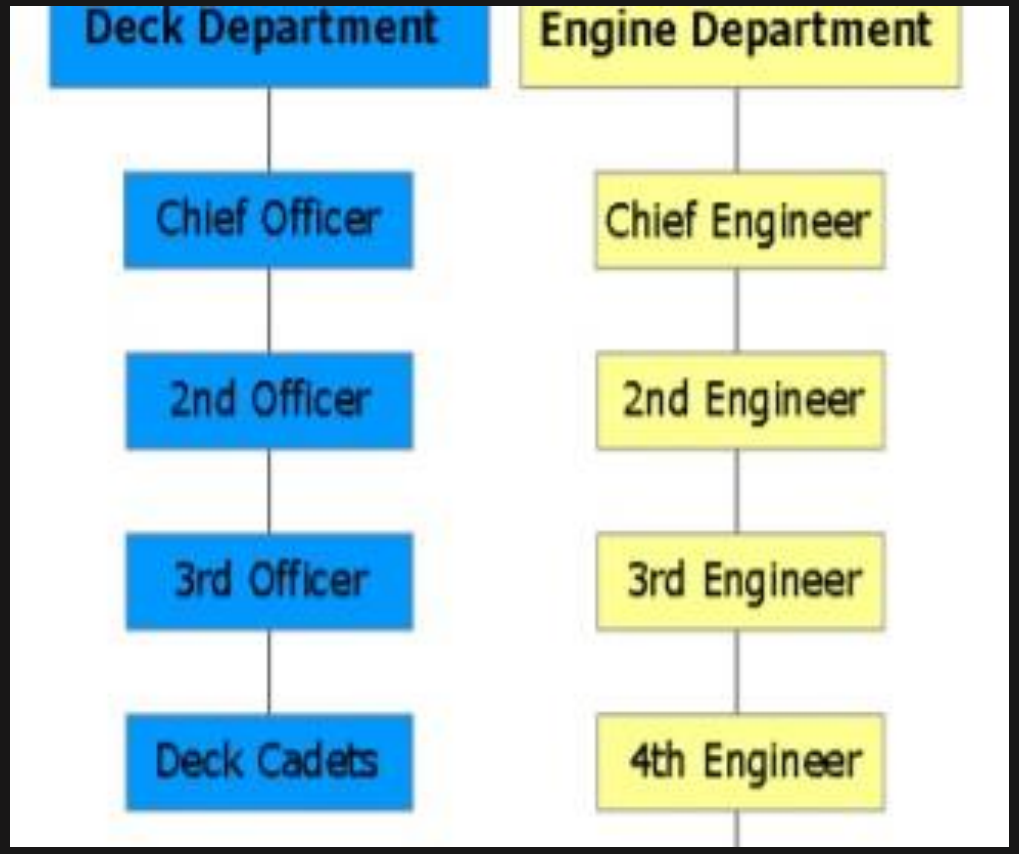

Q-LNG 4000

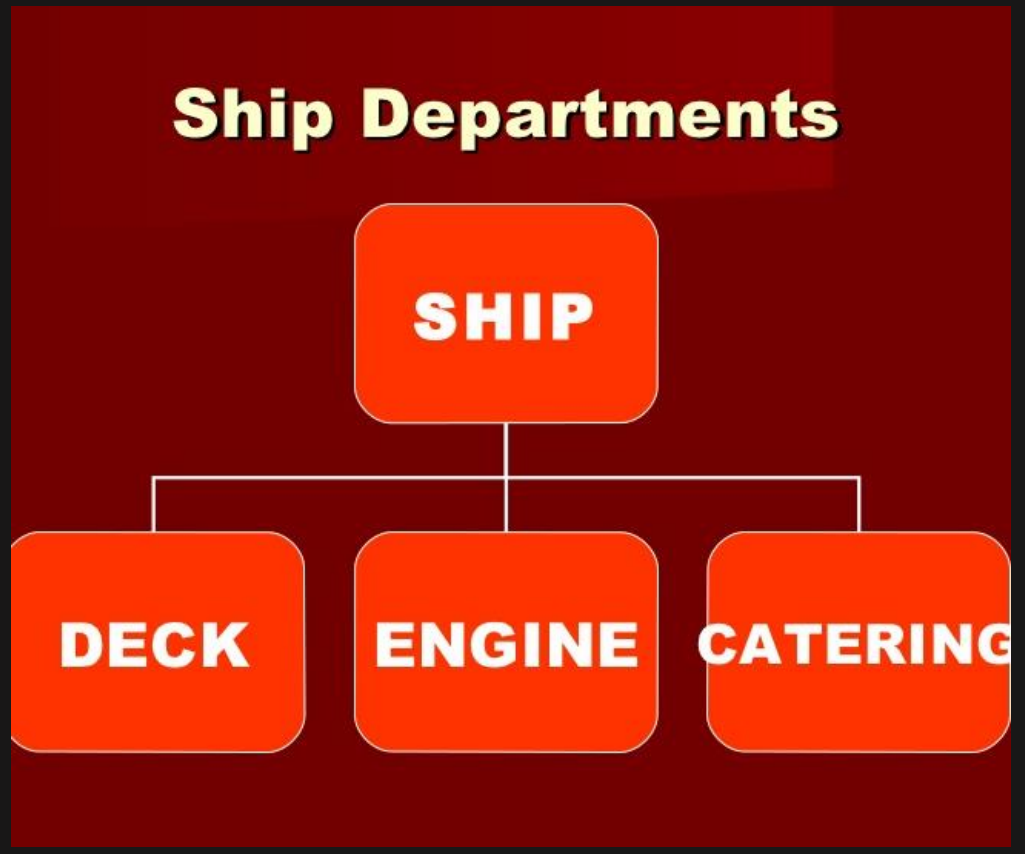
Shipboard Fire Fighting Organization

Shipboard Organization

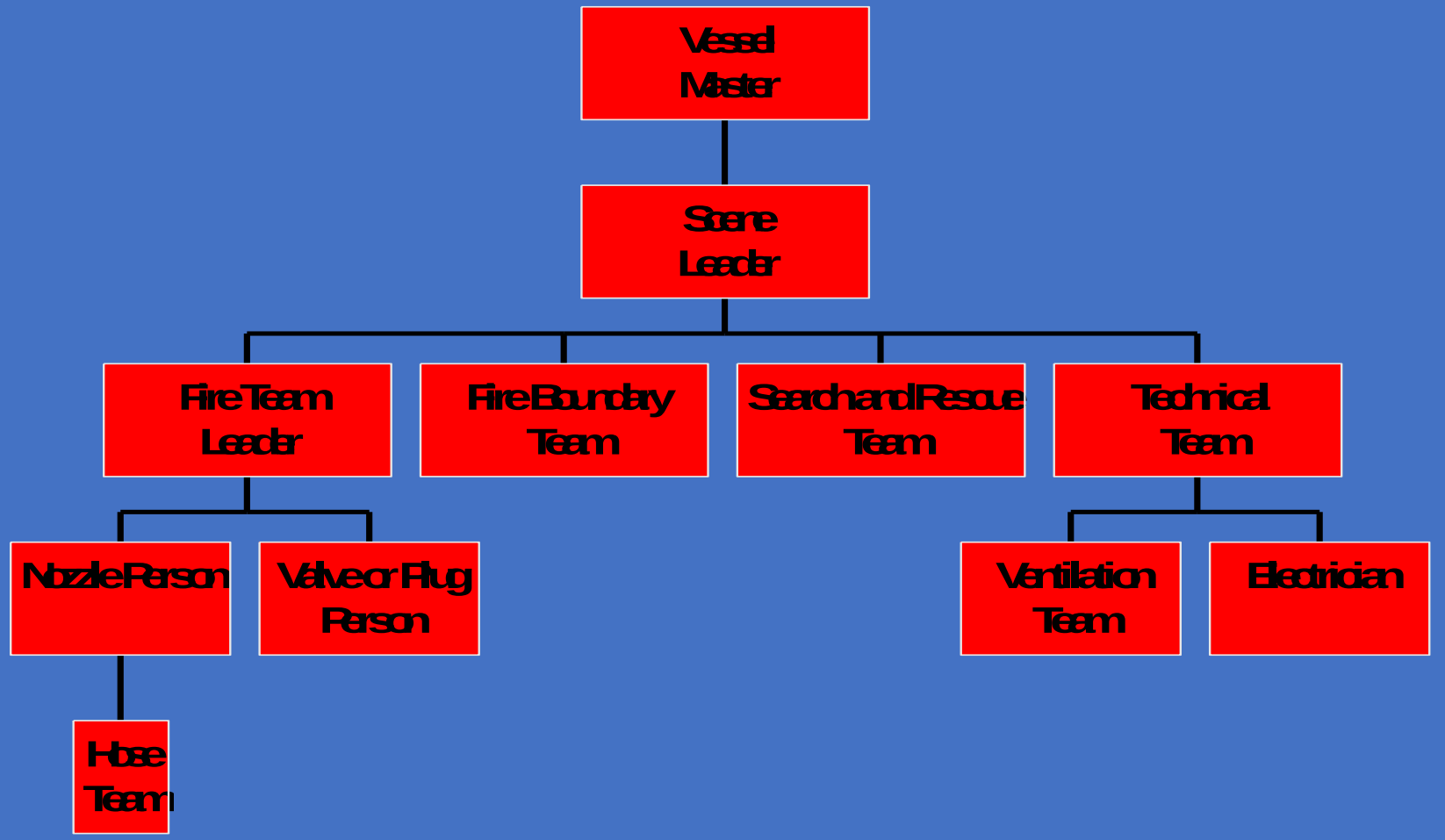
- The following is an introduction to each operational position and some of the considerations to be taken. Due regard should be taken to your company procedures on-board for emergency organization as this will vary from vessel to vessel.

Shipboard Organization





Fire Team Composition



Shipboard Organization (cont.)

Master/Officer in Charge

- Is the incident command for all emergencies.
- Manages incident from bridge
- Coordinate's efforts of shipboard fire fighting teams with the on-scene leader.
- Oversees operation & use of all shipboard fixed fire fighting systems and dewatering procedures
- Decides if & when to abandon ship

Size-Up

Performed by the On-Scene Leader

Used to develop the most effective and safe strategy to combat the fire

- Initial fire report
- Visual factors
- Smoke conditions
- Source of smoke
- Visible flame
- Visible flame impingement
- Initial actions taken

Size up is a continuous process

Shipboard Organization (cont.)

On Scene Leader (Officer in Charge on scene) Deck officer or Engine.

- Investigation & determines exact location of fire resulting in "Size-Up"
- Monitors actions & status of tactical units
- Monitors comms between all tactical units
- Keeps master informed

Shipboard Organization (cont.)

On Scene Leader

- The OSL position should be at or near to the scene of operations which should be a suitable safe position and a short travel distance from the incident.

- It is imperative that the OSL does not become engaged in operational activities during the event, this can cause a lack of focus and appreciation of the overall situation.

Fire Team Composition (cont)

Fire Team Leader Responsibility (2nd or 3rd Engineer & Deck Officers as available)

- Directs tactical activities of fire hose Team(s)
- Safety of fire team members under their command
- Reports status to Scene Leader
- Familiar with the pre-plan of the space
- Experienced with fire fighting methods

Fire Team Composition (cont)

Nozzleman

- Directs the fire stream and chooses the pattern required
- Crew member(s) to back-up nozzle person and relieve nozzle reaction force.
- In charge of the hose team if no fire team leader is present.

Hose Team

- Typically, crewmembers familiar with involved space
- Equipped with PPC & SCBA
- 1-2 people required for smaller hoses
- 3-4 people required for larger hoses

Fire Team Composition (cont)

Valve or Plug person

- Operates fire station control valve when ordered
- Tends hoses as needed

Search and Rescue Team

- Minimum two-person team
- Sweeps boundary areas for trapped personnel
- PPC & SCBA recommended if available

Fire Boundary team

- Establishes & maintains primary & secondary fire & smoke boundaries

Fire Team Composition (cont)

Technical Team

Ventilation Team

- Secures ventilation
- Secures openings to effected area
  - Fire dampers
  - Fire doors
  - Hatches

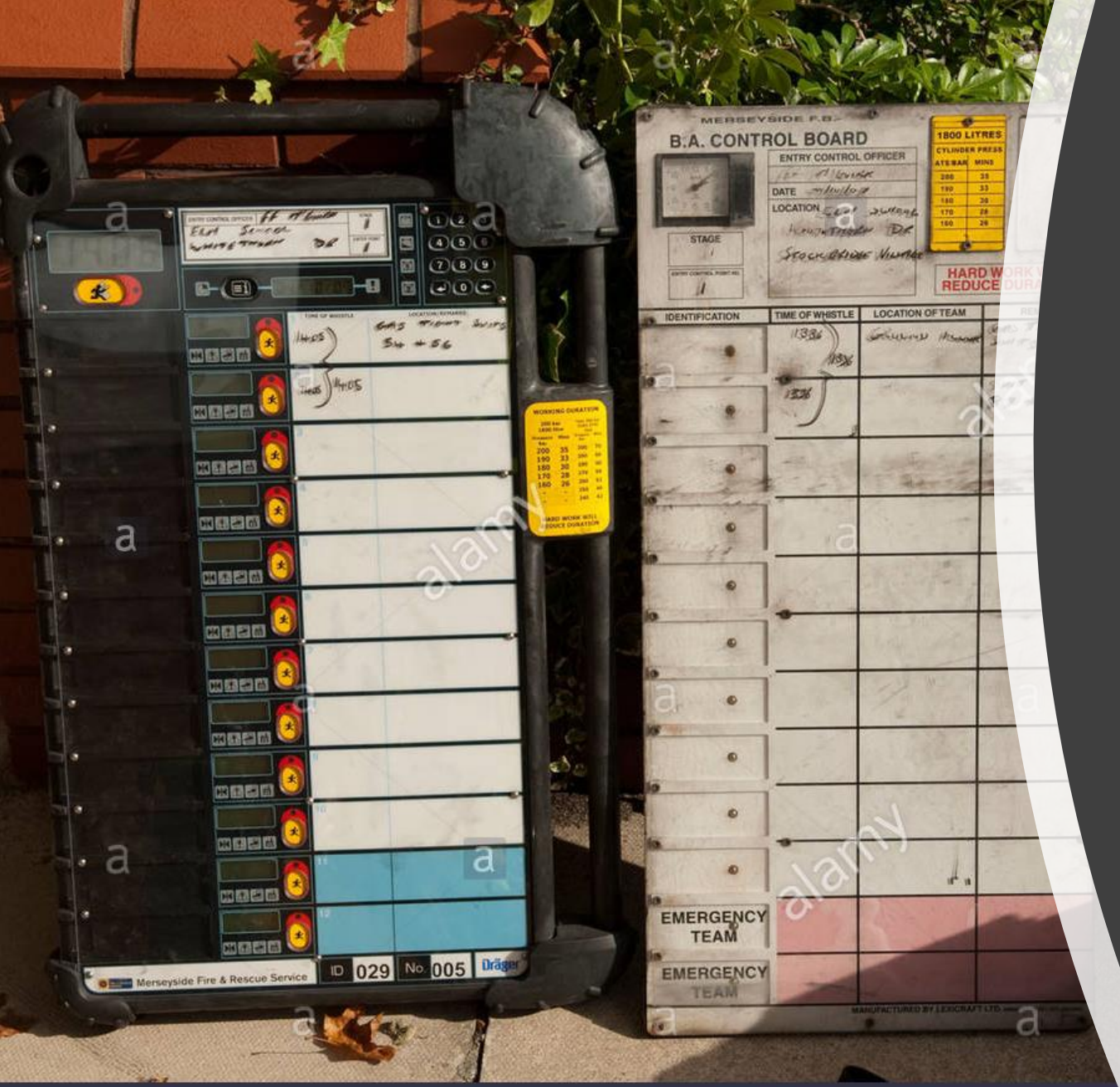
Electrician

- De-energizes circuits in involved area
- Rigs power cables for portable lights, tools or blowers

Fire Fighter Communications

- The IMO regulation (SOLAS regulation 10.10.4) requires all new ships from 1st July 2014 to equip their firefighting teams with at least two radios.
- Those two-way portable radiotelephone apparatus shall be of an explosion-proof type or intrinsically safe. Ships constructed before 1 July 2014 shall comply with the requirements of this paragraph not later than the first survey

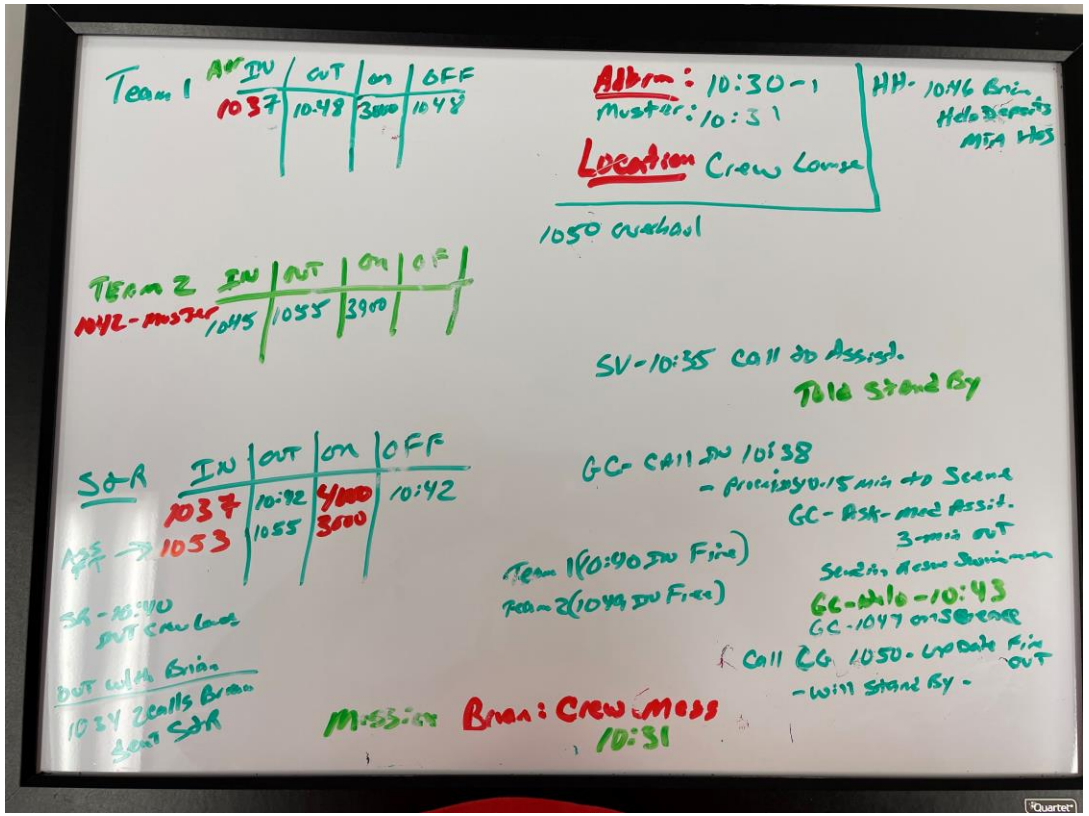
BA Control Board

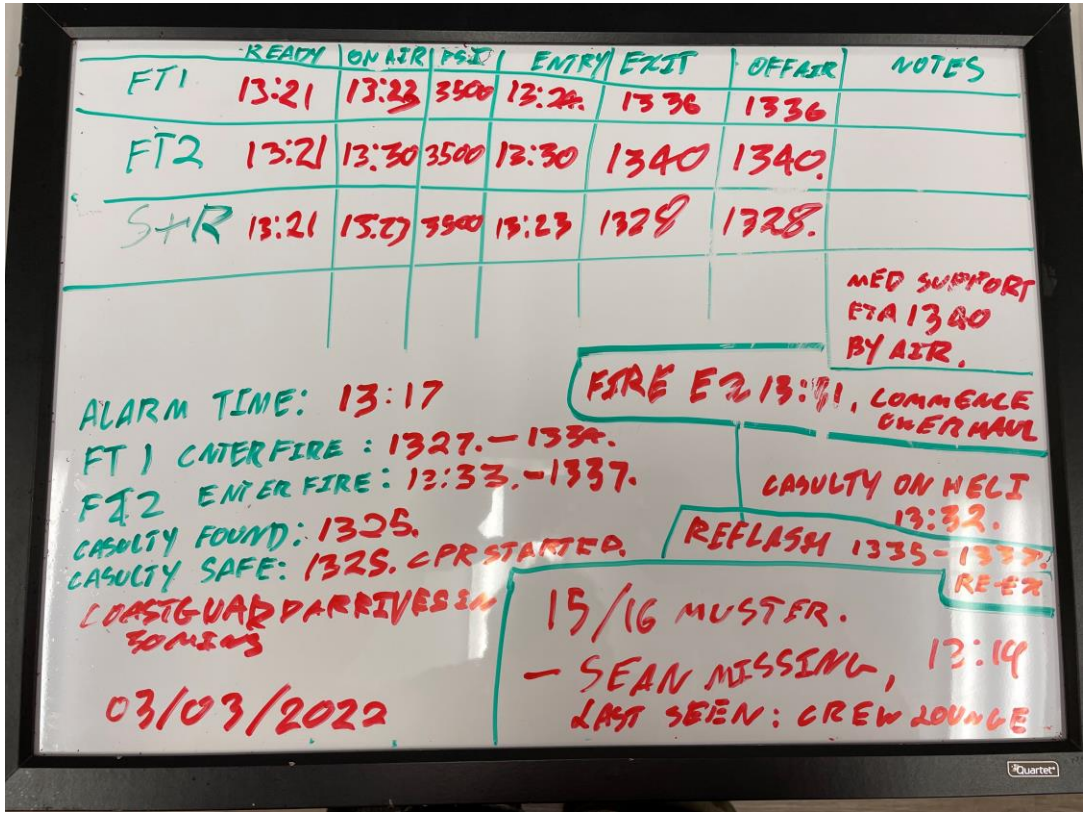


BA Controller

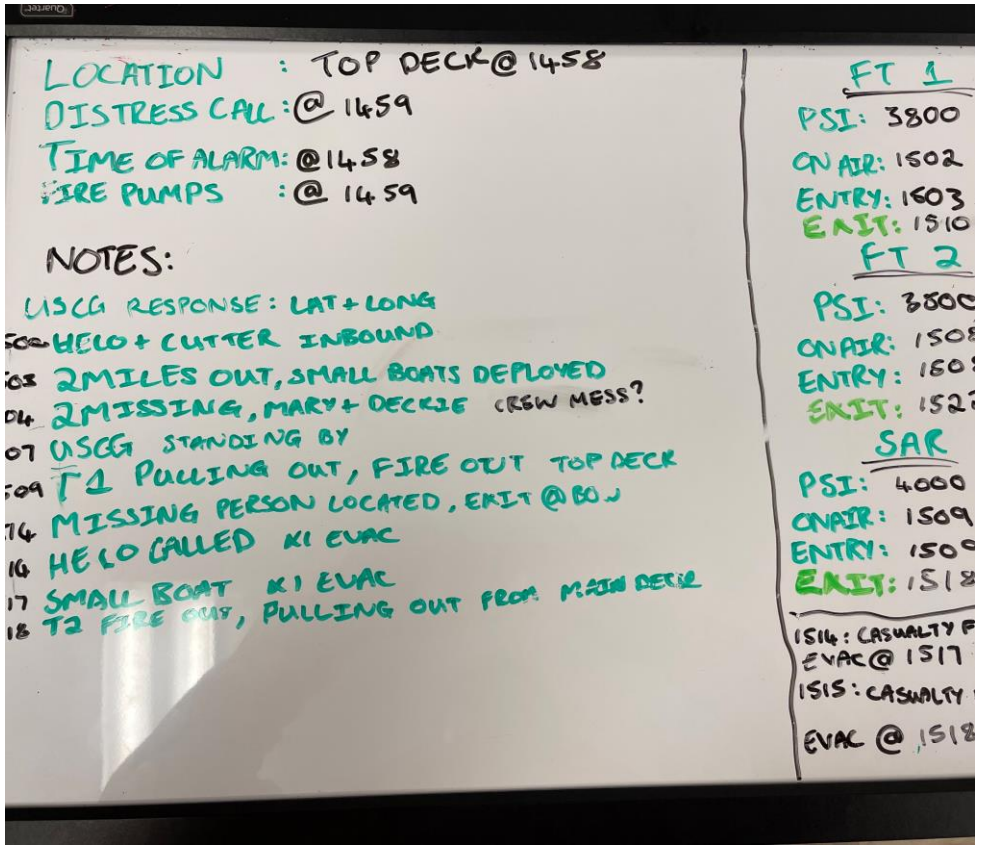
- Responsible for monitoring the air consumption of Fire Fighting teams.
- Gauge checks
- Two relief BA wearers are ready to enter and relieve or rescue five minutes before the whistle time of the first entry team.
- The BAC is essential, and they must be in clean air adjacent to every entry point.

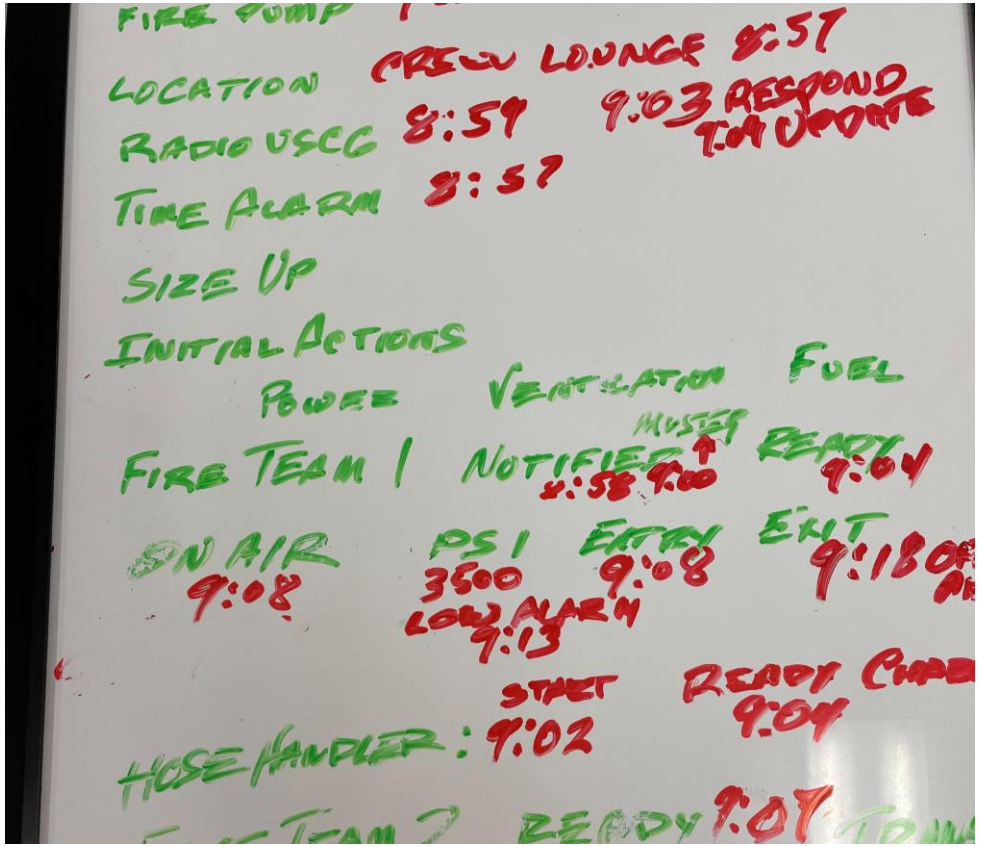
Control Boards





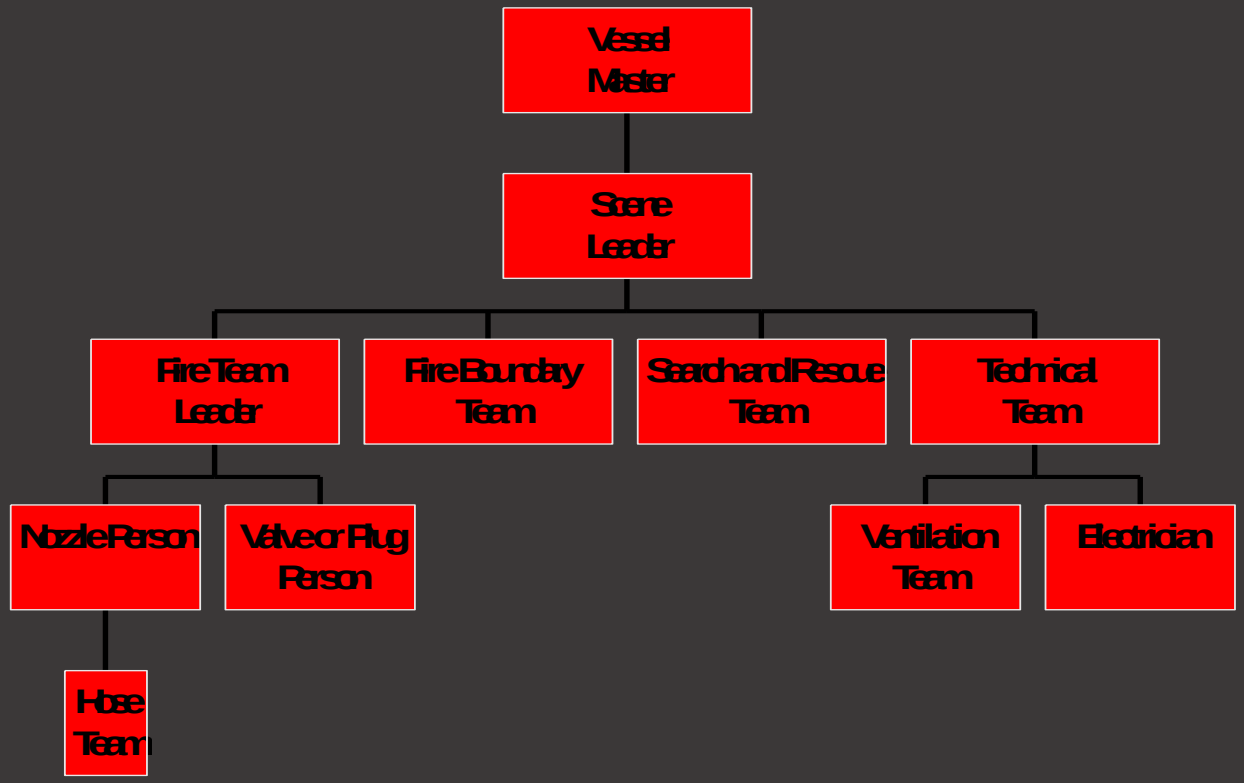
Control Boards



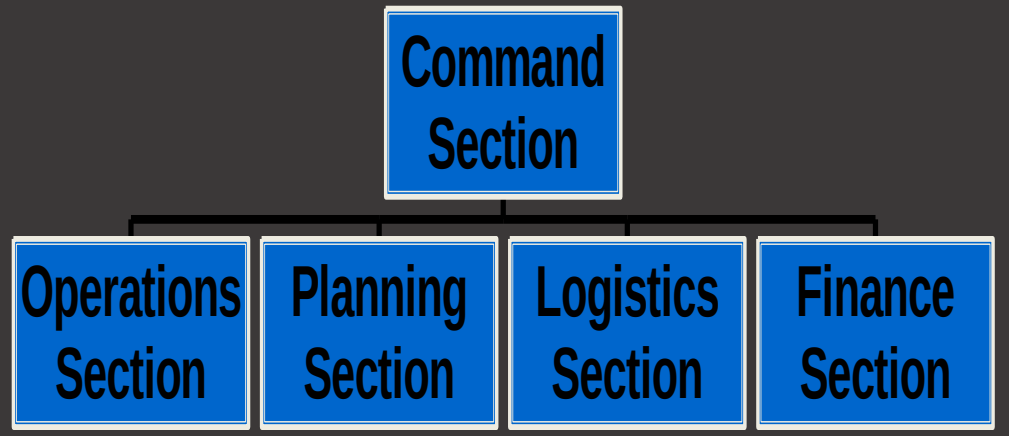


Your Ship, Who is Responding

Incident Command System

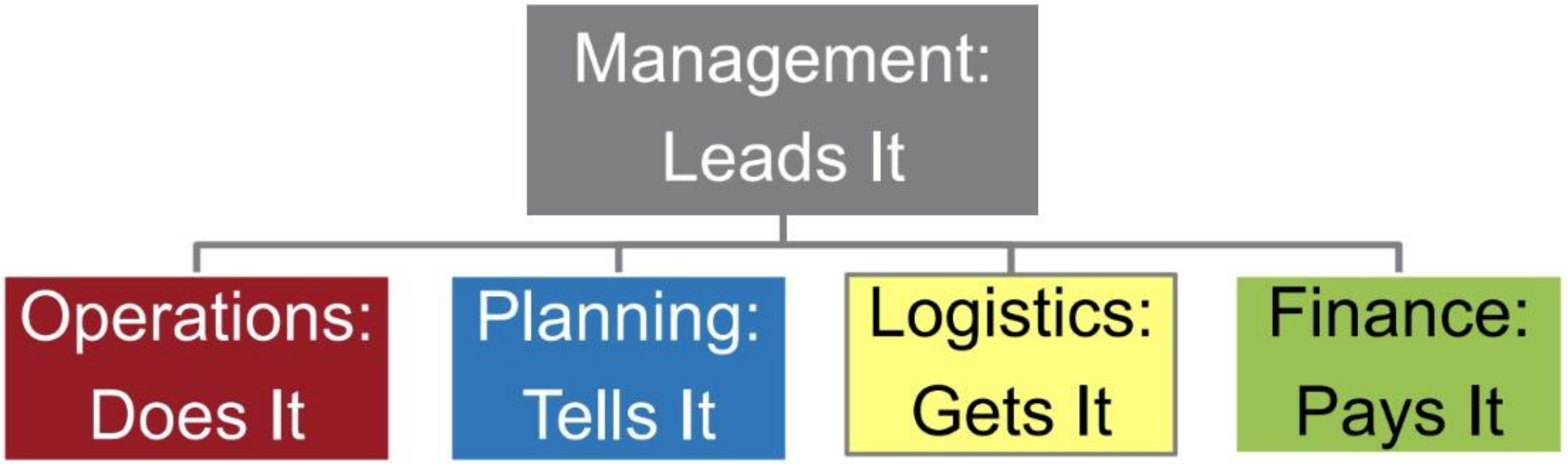


ICS Organization and Structure



Incident Command System

To put it simply:



Incident Management

- Marine Incidents will demand a huge commitment of manpower and resources
- Management of both is needed to be successful in the mitigation of these incidents
- Contributing factors can include the vessel configuration, nature of work, incident location, exposures, environmental concerns and more

Incident Command System

- The structure of the incident command system can be established and expanded depending on the nature of the incident
- The Incident Command System or ICS, is currently in widespread use worldwide
- System consists of procedures for controlling personnel, facilities, equipment and communications

Incident Command System (cont)

Command Section

- Overall command & management of incident
- Develops strategic goals for the emergency
- Located away from immediate area of the emergency
- Staff positions include
  - Safety Officer
  - Liaison Officer
  - Public Information Officer

Incident Command System (cont)

Operations Section

- Manages operations directly applicable to primary mission
- Directs tactical operations to meet strategic goals developed by command
- Operations section is divided into branches & may be further divided into groups or divisions
- Groups assign teams particular tasks

Unified Command System

Established for a large, multiple agency response to an emergency

Consists of representatives from each agencies responsible for that emergency

Unified Command System(cont)

Other ICS sections typically have representatives from different agencies

- Operations may have personnel from the fire department as well as ship’s crew
- Planning, Logistics and Finance may have representatives from all agencies

Unified Command System(cont)

Command section of a Unified Command System for major ship fire in port could consist of :

- Vessel Master
- Fire Chief
- U.S. Coast Guard Marine Safety Office
- Port Authority Director
- Tug operator
- Harbor Pilot

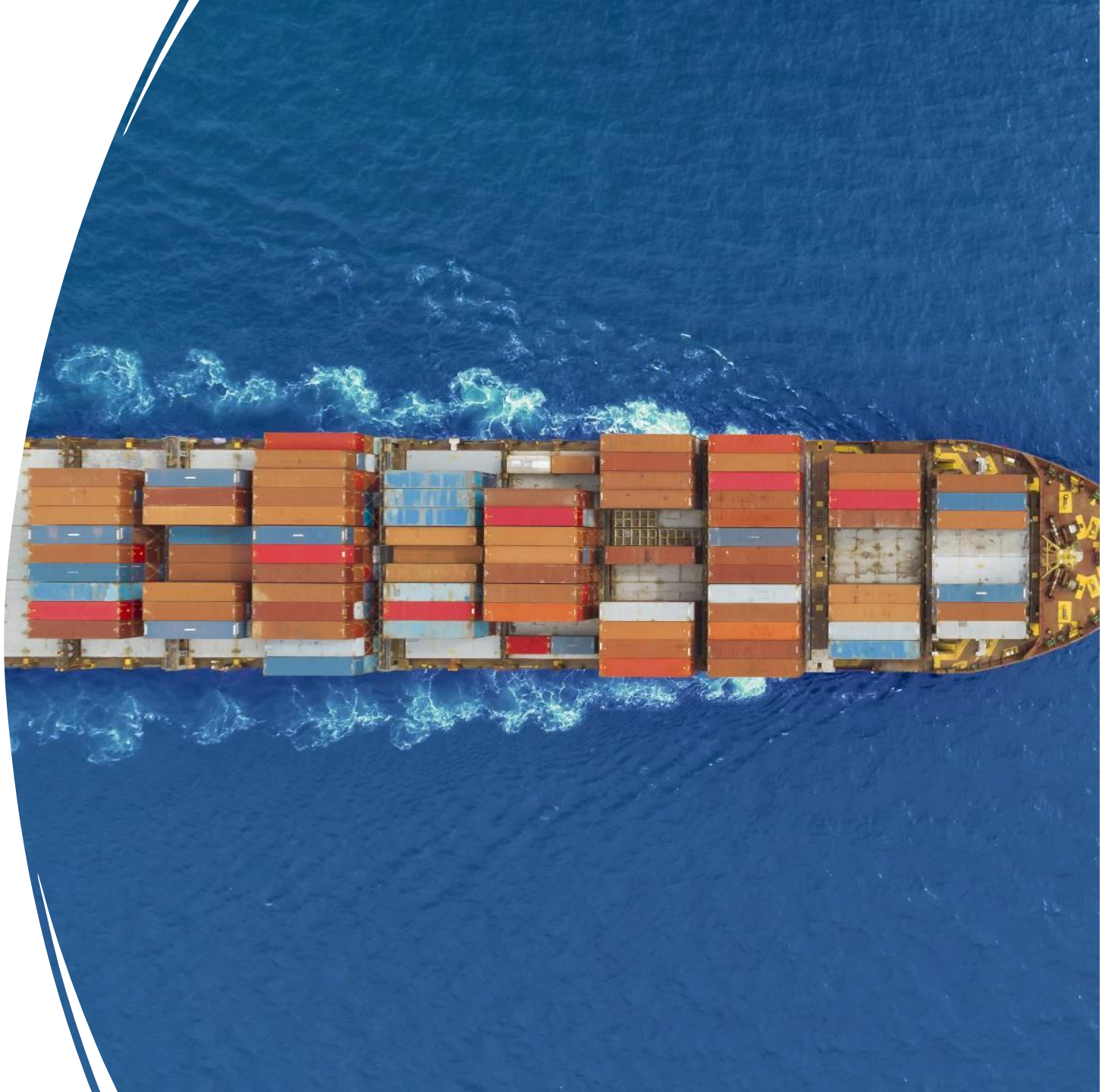
USCG

Legal Responsibility of the US Coast Guard:

- Waterway Safety Act of 1972
- Policy / Regulations
- Captain of the Port
- Resources /Equipment & Supplies
- Personnel
- Contingency Plan

Marine Firefighting

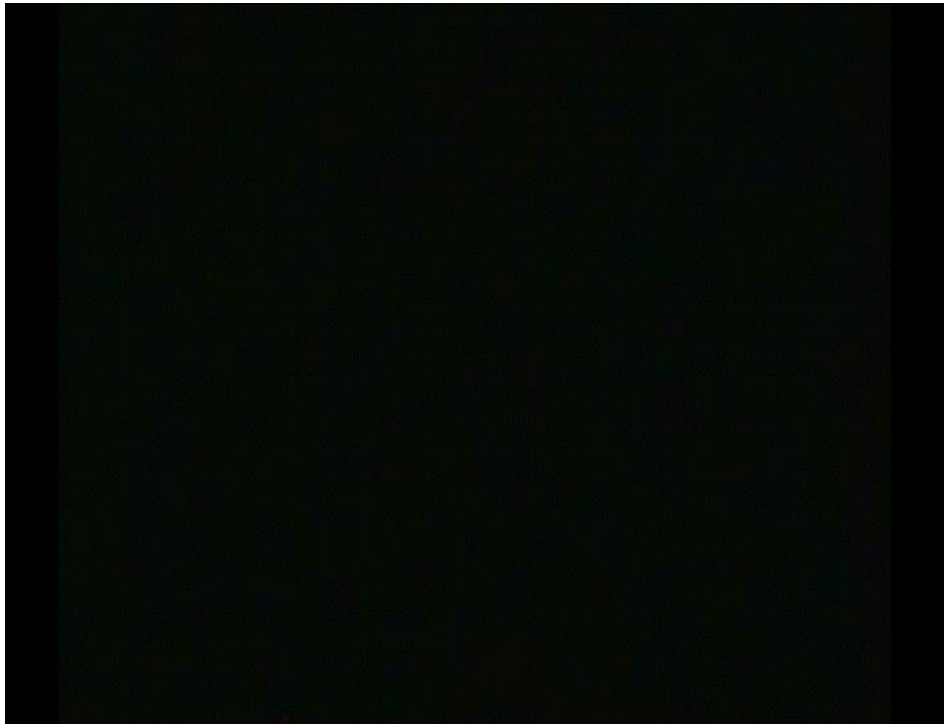
Shipboard firefighting



Strategies & Tactics

Fire Control

- *There is no one correct method of fighting a shipboard fire*
- *Success or failure depends on the skill of the personnel involved in the initial attack*
- *A well-trained team, with proper equipment, can contain most fires in their early stages*
- *Drills & Training = A well-trained team*
- *Marine Fires and Initial Response*



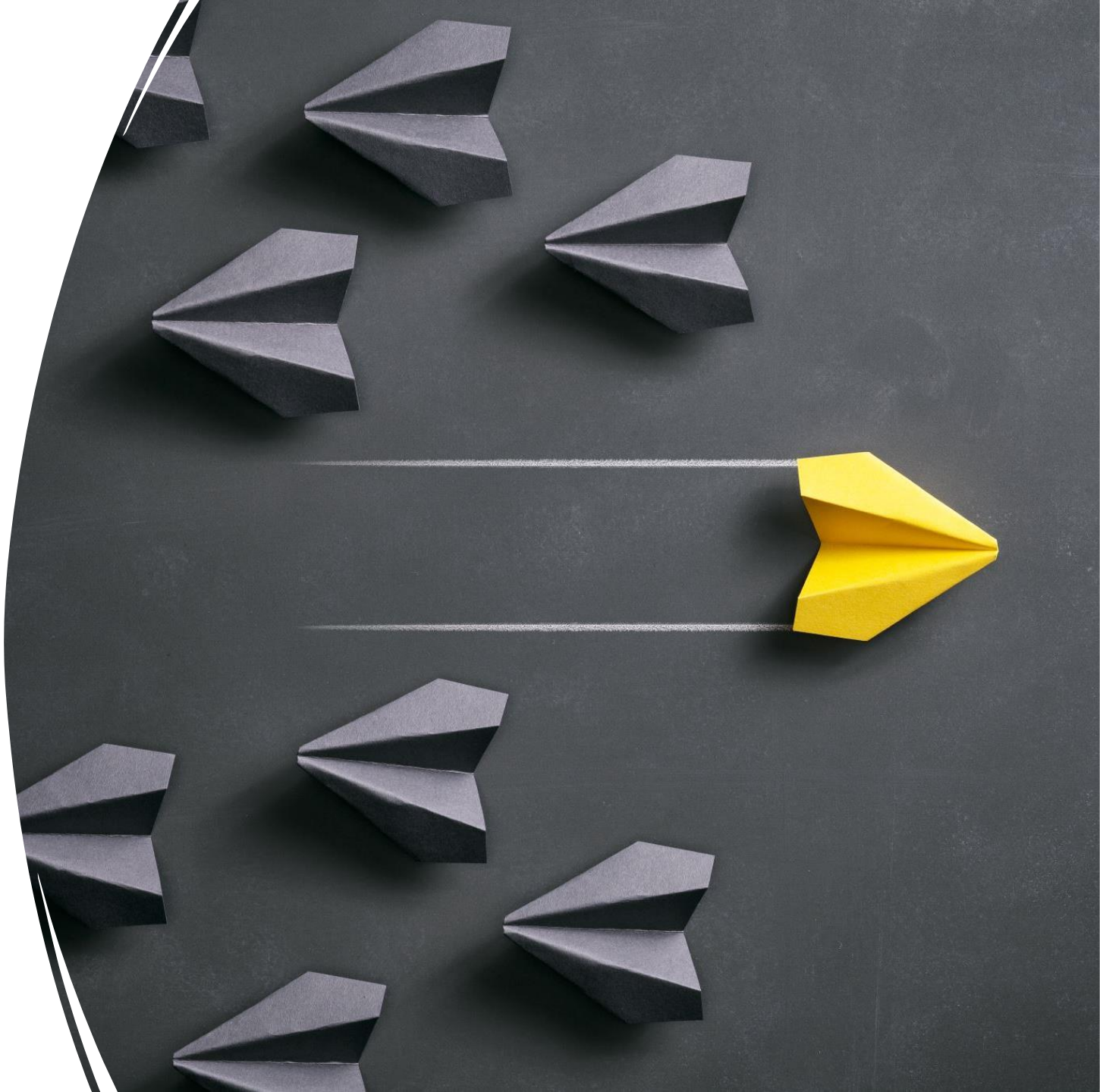
Fire Attack Mode

OFFENSIVE:

- An offensive mode involves taking direct action to mitigate the problem. This means an aggressive interior attack.

DEFENSIVE:

- The defensive mode is chosen to isolate or stabilize and incident to ensure it does not extend or get any worse. Stop the loss!



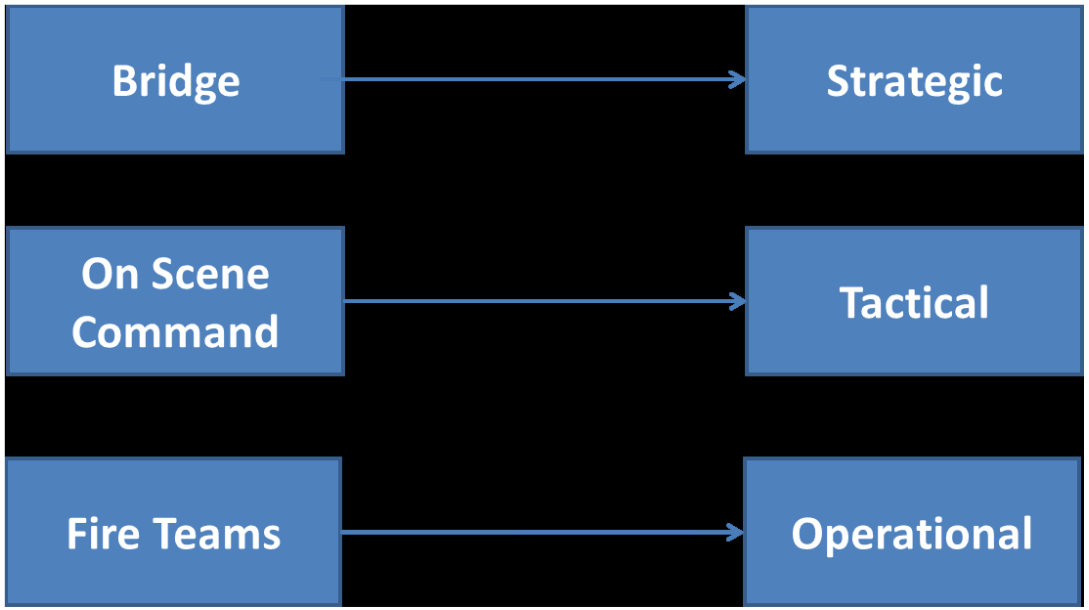
Fire Fighting Strategies

Strategy - An overall plan for incident attack and control.

Tactics - Specific tasks and duties to be completed in order to meet overall strategy.

Operational - Implementation of the strategy and tactics as decided utilizing safe operational procedures.

Command & Control



Command and control can be broken down into three areas on-board alongside relevant levels of responsibility in the incident.

Strategies & Planning

Based on the facts at hand

- Quickly survey & analyze the situation
- Weigh various factors
- Decide course of action (Strategy)
- Apply basic principles (Tactics)
- Formulate plan of action (Attack Plan)
- Exercise command

General Strategic Planning

Three R’s

Review

- Fire is a dynamic event always changing.

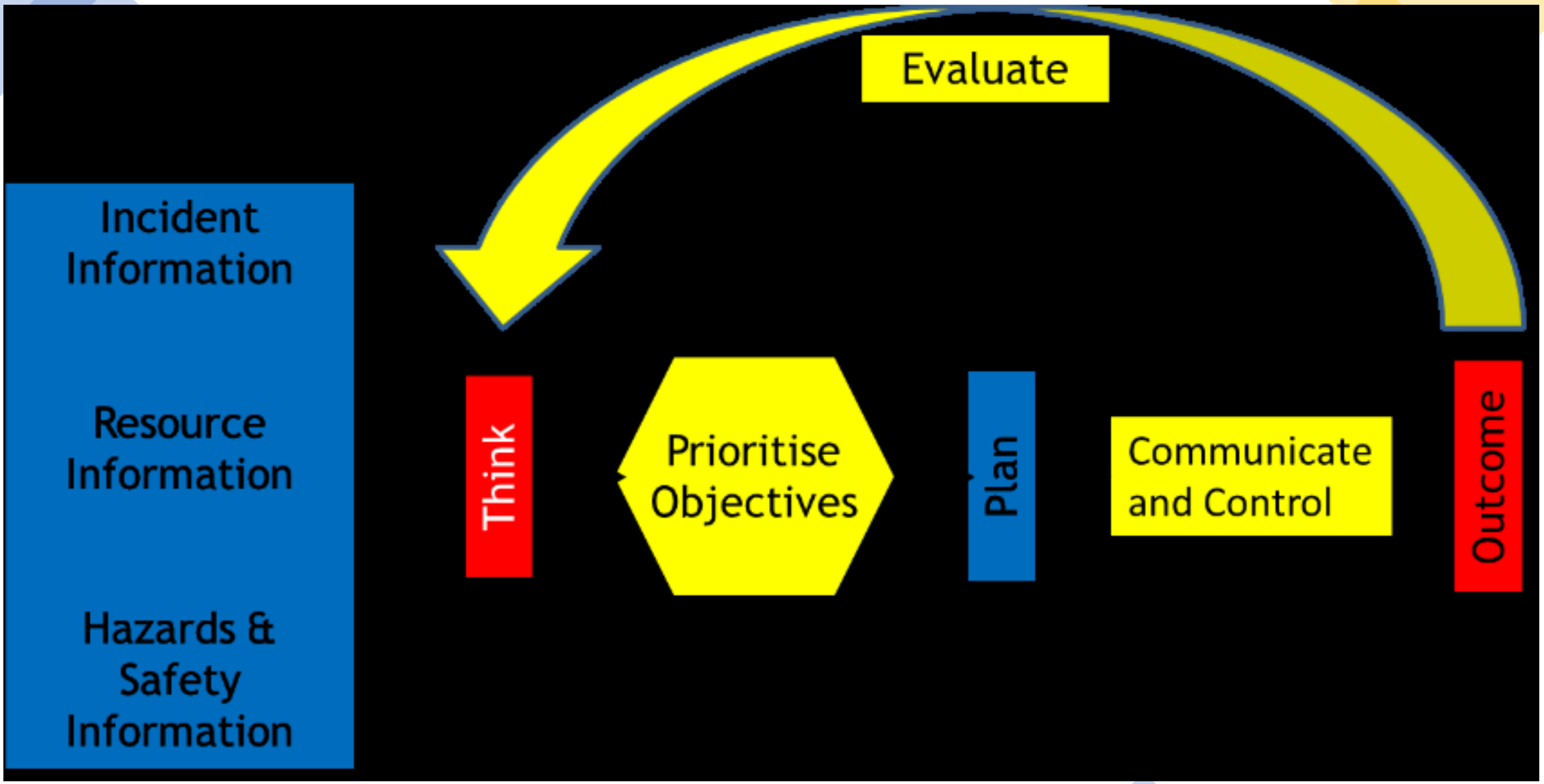
Reevaluate

- Suppression efforts need constant evaluation.

Revise

- Revise resources, strategy & tactics as required.

Size up is a continuous process


Evaluate
Incident Information
Resource Information
Hazards & Safety Information
Think
Prioritise Objectives
Plan
Communicate and Control
Outcome

Communications

Internal

- Establish ASAP between Bridge, Forward Control & Staging
- Telephone
- Portable handheld radios – Primary choice due to mobility & non relance on ships power.
- Messenger

External

- Name, location, situation, support needed.

Fire Tactics

Firefighting Objectives

RECEO

- Rescue
- Exposure Protection
- Contain / Control
- Extinguish
- Overhaul

- Ventilation

Firefighting Tactics

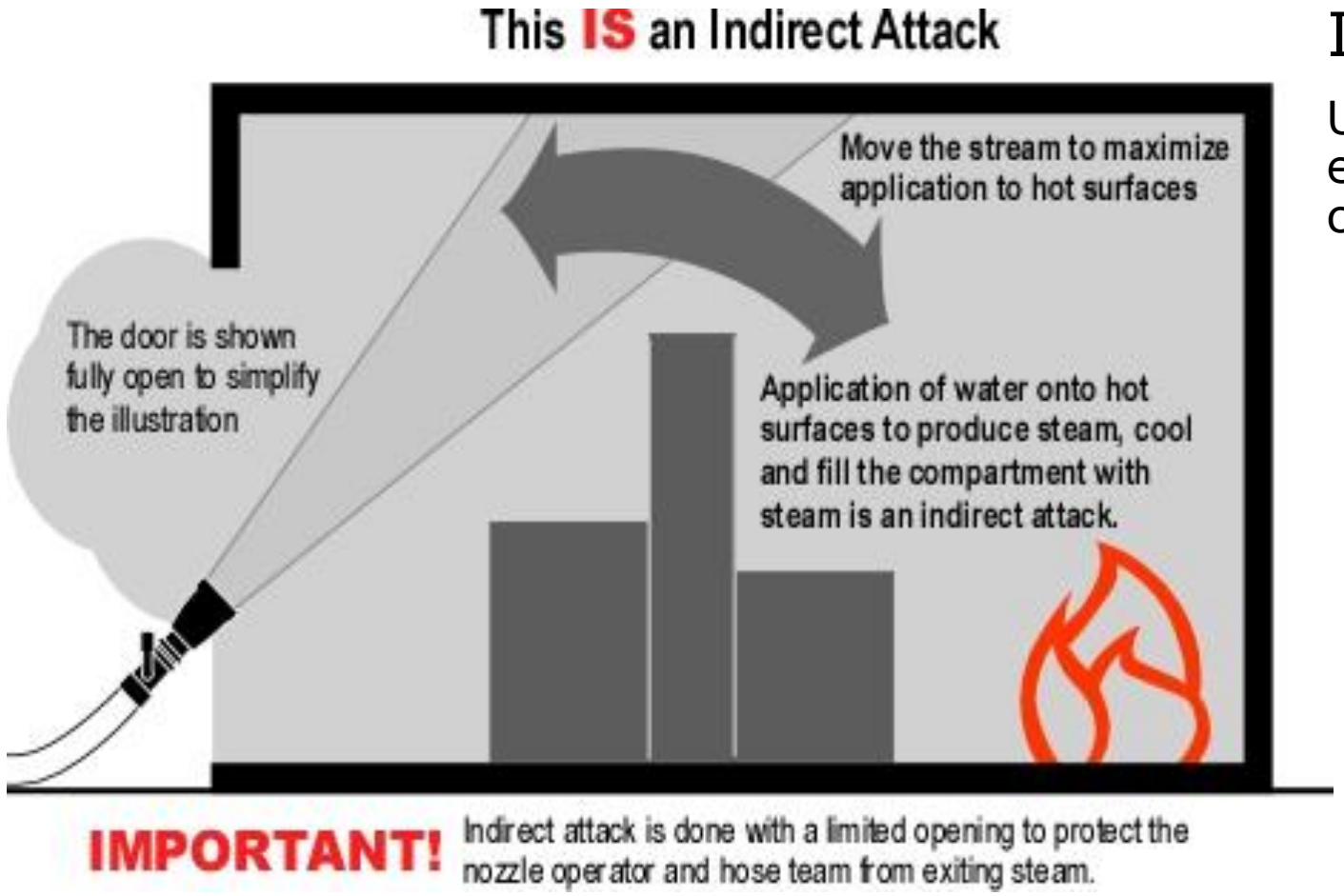
Fire Extinguishment

- Direct Attack
- In Direct Attack
- Combination

Fire Fighting Tactics

- **Direct Attack**
- Use on incipient or free burning fires
  - Power Cone (30° Fog Pattern) to attack base of fire
  - Solid Stream to penetrate
  - Work the hose nozzle using sweeping motion

Fire Fighting Tactics



Indirect attack

Use when unable to advance due to excessive heat or potential flashover conditions

- Direct short burst (3-5 sec.) of solid stream toward overhead of compartment
- Water flashes to steam smothering fire
- 1 cubic foot of water produces 1700 cubic feet of steam
- Creation of steam requires vast amounts of heat reducing compartment temperatures

Fire Fighting Tactics

Water Discipline

- Minimizes water damage
- Maintains vessel stability
  - One gallon of water weighs 8.6 pounds
  - 12’ x 12’ space with 6” water on deck is 2.24 tons
  - At flow rate of 100 gpm, occurs in about 5 minutes

Too much water disturbs thermal balance creates too much steam reducing visibility.

Creates severe heat conditions in lower portions of compartment hindering or injuring fire fighters

Firefighting Objectives

Overhaul

- Final phase of fire fighting
- Turn over debris
- Extinguish hot spots
- Cool & ventilate space
- SCBA & PPC must be worn during overhaul

Post Fire Considerations

- Reflash Watch
- Sprinkler Deactivation
- Commence Fire Investigation
- Debrief Fire Teams

Fire Fighting Tactics

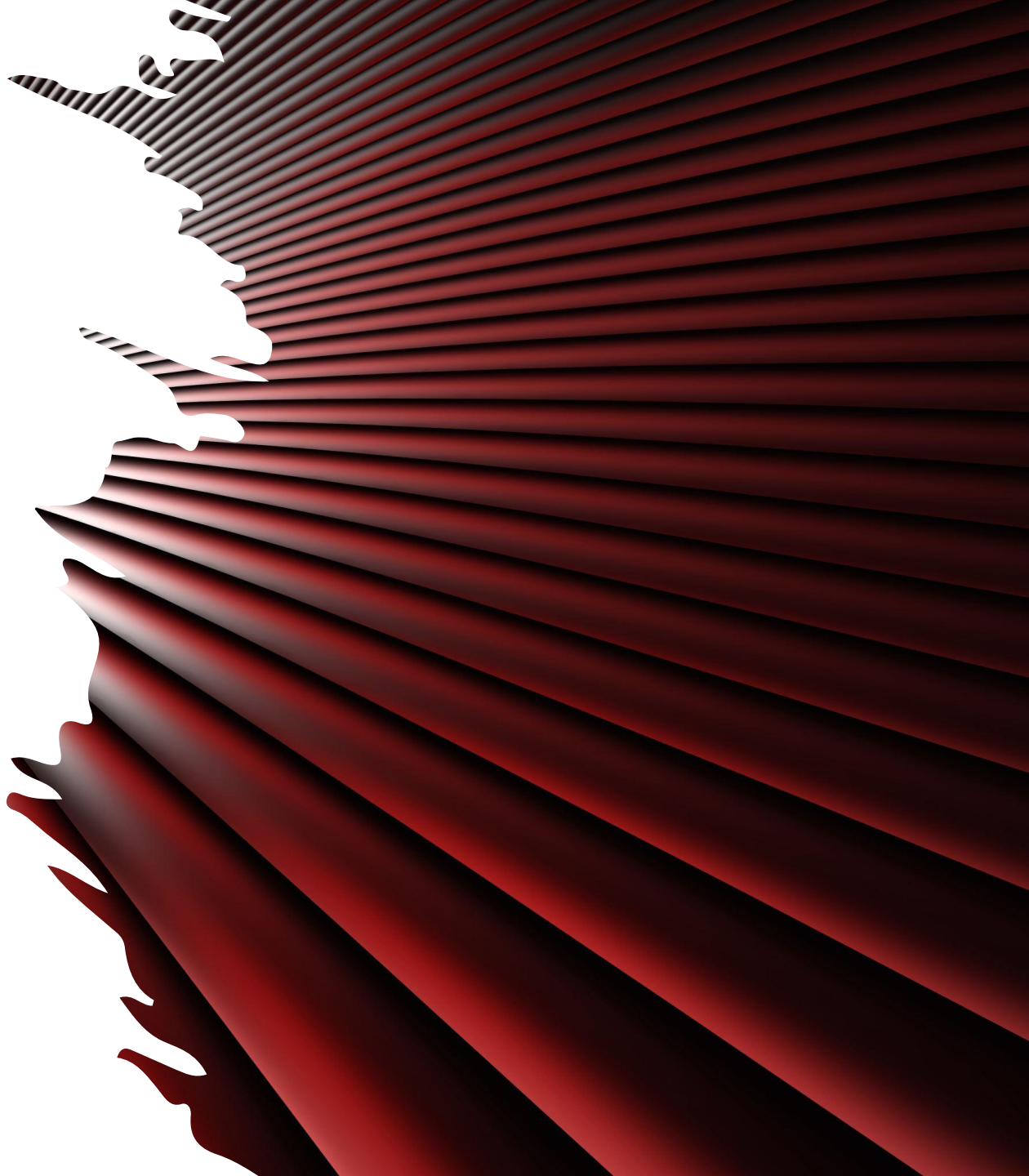
Use of Ventilation

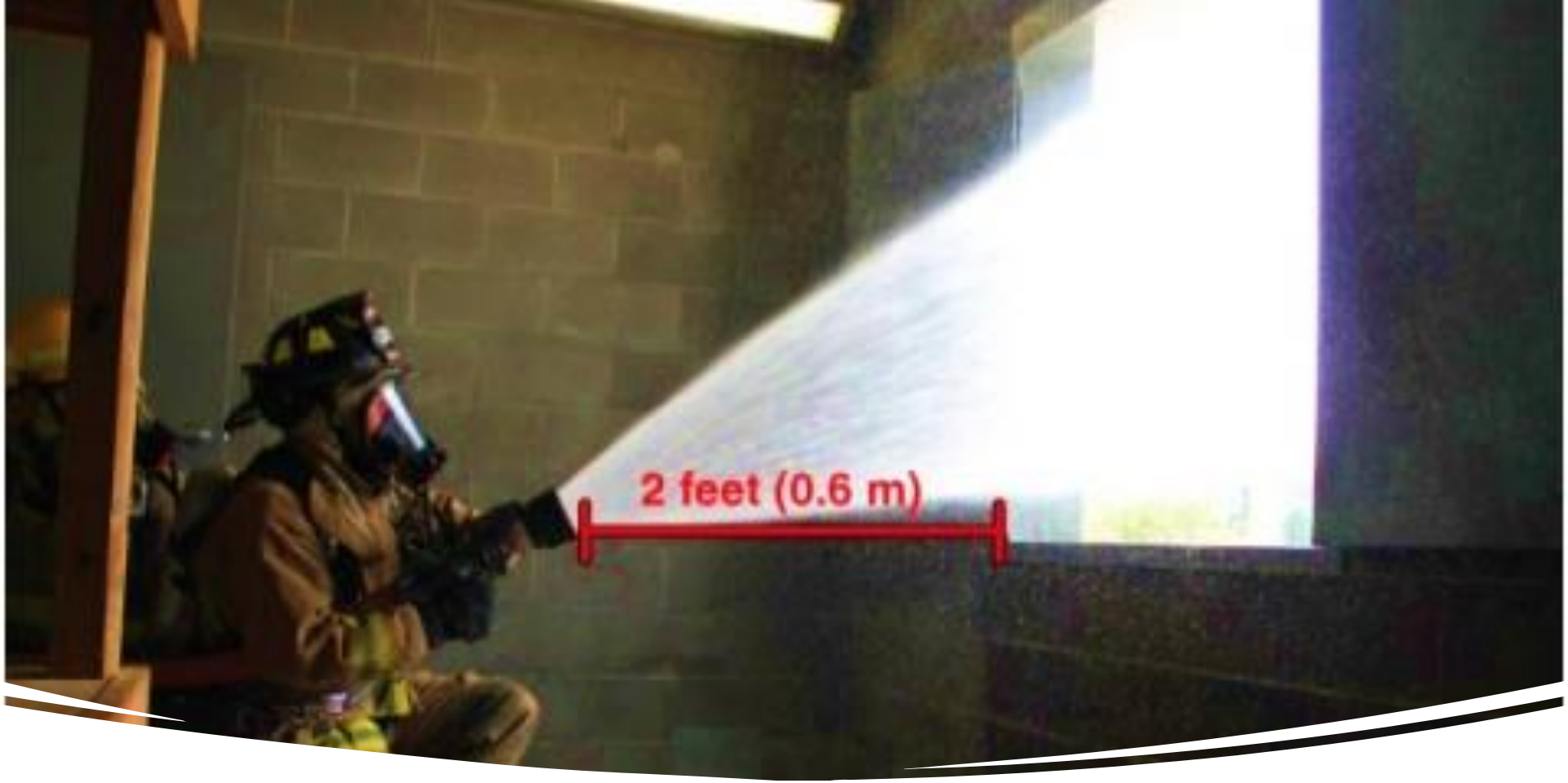
Horizontal ventilation normally required

- Use high velocity fog aimed out opening to exterior

Mechanical ventilation

- Can be effective with fire attack
- Can improve conditions in fire area
- Must be coordinated to prevent fire spread
- Attack lines must be ready before ventilating





Hydraulic/ Assisted Ventilation

Direct a fog pattern out any nearby opening. Smoke and heat are pulled from the fire area by the venturi airflow created by the fog pattern.

For best results cover 75% or more of the opening with the fog pattern

Vessel Fire Control Plans

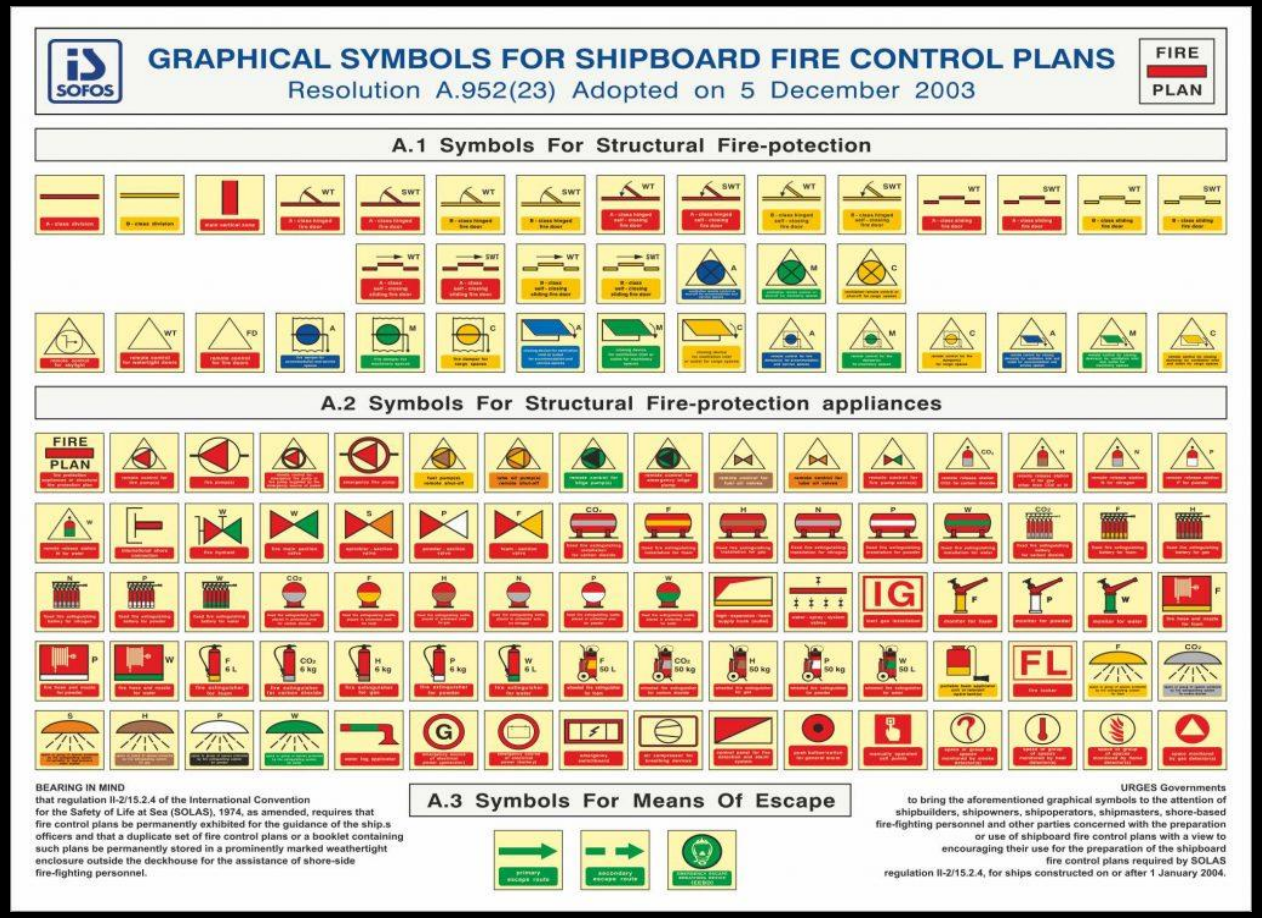
- SOLAS- CH-II requirements Permanently exhibited on Bridge
- Duplicates must be stored outside the deckhouse in waterproof containers at the gangway
- Must be kept up to date

Fire Control Plans

SOLAS - Ship general arrangement and emergency equipment and systems:

- Main Vertical Zones
- Class A Divisions
- Class B Divisions
- Fire Detection Systems
- Fire Alarms
- Sprinkler Systems
- Fire Extinguishing Appliances

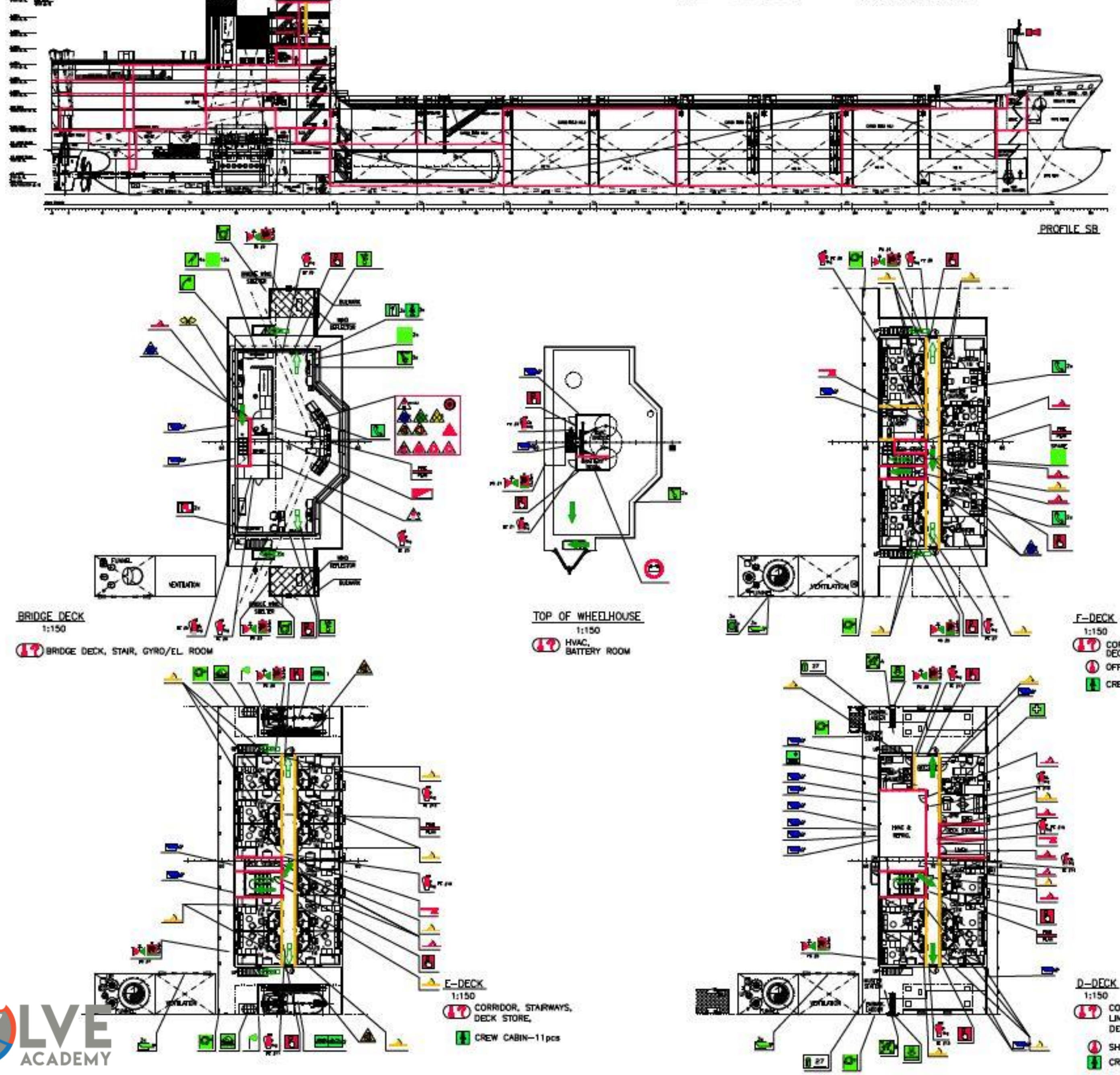
Fire Control Symbols



FIRE & SAFETY PLAN

EL COQUI

IMO: 9721968
CALL SIGNAL: WDJ4838



SYM.	TOT.	DESCRIPTION
	4	LINE-THROWING APPLIANCE (4 SEPARATE UNITS)
	1	PYROTECHNIC SET- 12 RED HAND FLARES, 2 SMOKE SIGNALS 12 ROCKET-STAR SIGNAL
	2	RADAR TRANSPONDERS
	3	TWO-WAY VHF RADIOTELEPHONE APPARATUS
	2	EPIRB
	12	ROCKET PARACHUTE FLARES
	6	EMERGENCY TELEPHONE
	2	EMERGENCY LIGHT FOR LIFERAFTS AND MUSTER STATION
	X	PRIMARY ESCAPE ROUTE
	X	SECONDARY ESCAPE ROUTE
	4	FIRE & SAFETY PLAN
	11	DOOR-FIRECLASS A W/SELF-CLOSING
	26	DOOR-FIRECLASS B
	1	SIGNAL FLAG (KIT)
	1	AIR HORN
	2	DOOR-FIRECLASS B W/SELF-CLOSING

FIREMAN'S EQUIPMENT

PERSONAL EQUIPMENT :
- Fire Protective Suit (suit, gloves and tight-fitting goggles)
- Boots of rubber
- Fireman's Helmet
- Safety Lamp
- Light Fireman's Axe (w/non-conductive handle) w/cover and fireman's belt

SELF-CONTAI. COMPRES. AIR BREATHING APPARATUS (1200L/30min.)
LIFELINE (30m)
TWO-WAY VHF RADIOTELEPHONE APPARATUS

FIRE BULKHEADS INTEGRITY

- A-CLASS
- B-CLASS

APPROVED
SEE LETTER Date: 2018-06-22

SYM.	TOT.	DESCRIPTION
	9	FIRE HYDRANT
	9	FIRE HOSE(15.24m) WITH COMBINED JET AND FOG NOZZLE
	13	MANUALLY OPERATED CALL POINTS
	1	PUSH BUTTON/SWITCH FOR GENERAL ALARM
	1	CONTROL PANEL FOR FIRE DETECTION AND ALARM SYSTEM
	19	MULTI DETECTOR
	2	HEAT DETECTOR
	5	CO_2 EXTINGUISHER 6 kg. PORTABLE
	12	POWDER EXTINGUISHER 9 kg. PORTABLE
	3	FIRE AXE
	1	REMOTE CONTROL FOR FIRE DAMPERS ACCOMMODATION & SERVICE SPACE
	1	REMOTE RELEASE STATION WATERMIST SYSTEM
	1	REMOTE RELEASE STATION CO2 SYSTEM
	18	CLOSING OF VENT OPENINGS FOR ACCOMMODATION
	9	CLOSING OF VENT OPENINGS FOR MACHINERY SPACES
	3	FIRE DAMPERS FOR MACHINERY SPACES
	4	REMOTE CONTROL OF VENTILATOR FANS FOR ACCOMMODATION
	1	REMOTE CONTROL OF VENTILATOR FANS FOR MACHINERY SPACES
	1	REMOTE CONTROL OF VENTILATOR FANS CARGO SPACES
	3	FUEL OIL PUMP REMOTE SHUT-OFF
	1	LUBE OIL PUMP REMOTE SHUT-OFF
	1	EMERGENCY STOP OF MAIN ENGINE AND AUXILIARY ENGINES
	1	REMOTE CONTROL FOR FIRE PUMP
	1	REMOTE CONTROL FOR EMERGENCY FIRE PUMP
	1	REMOTE CONTROL FOR WATER SPRAY PUMP
	1	REMOTE CONTROL FOR WATERMIST PUMP
	1	EMERGENCY BATTERY FOR RADIO/INTERNAL COMMUNICATION
	1	FIRE LOCKER WITH FIREMAN'S EQUIPMENT (CUPBOARD)
	3	EMERGENCY ESCAPE BREATHING DEVICE (Incl. spare 1pcs)
	2	MUSTER STATION
	1	LIFE BOAT/RESCUE BOAT (TOTALLY ENCLOSED) 30/6 MEN
	1	LIFE BOAT (TOTALLY ENCLOSED)
	2	INFLATABLE LIFE RAFT 30 MEN
	6	LIFEBUOY WITH LIGHT
	2	LIFEBUOY WITH LIGHT AND SMOKE
	2	BOX WITH LIFE JACKETS (27)
	3	LIFE JACKETS
	30	SURVIVAL SUIT
	2	EMBARKATION LADDER
	1	MEDICAL LOCKER
	1	STROKES LITTER

NOTE:
ALL NORMALLY MANNED SPACES AND OPEN DECKS HAVE SPEAKERS AND ALARM DEVICES FOR THE FIRE & LIFEBOAT ALARM SYSTEM

ISSUED

PRINCIPAL PARTICULARS:

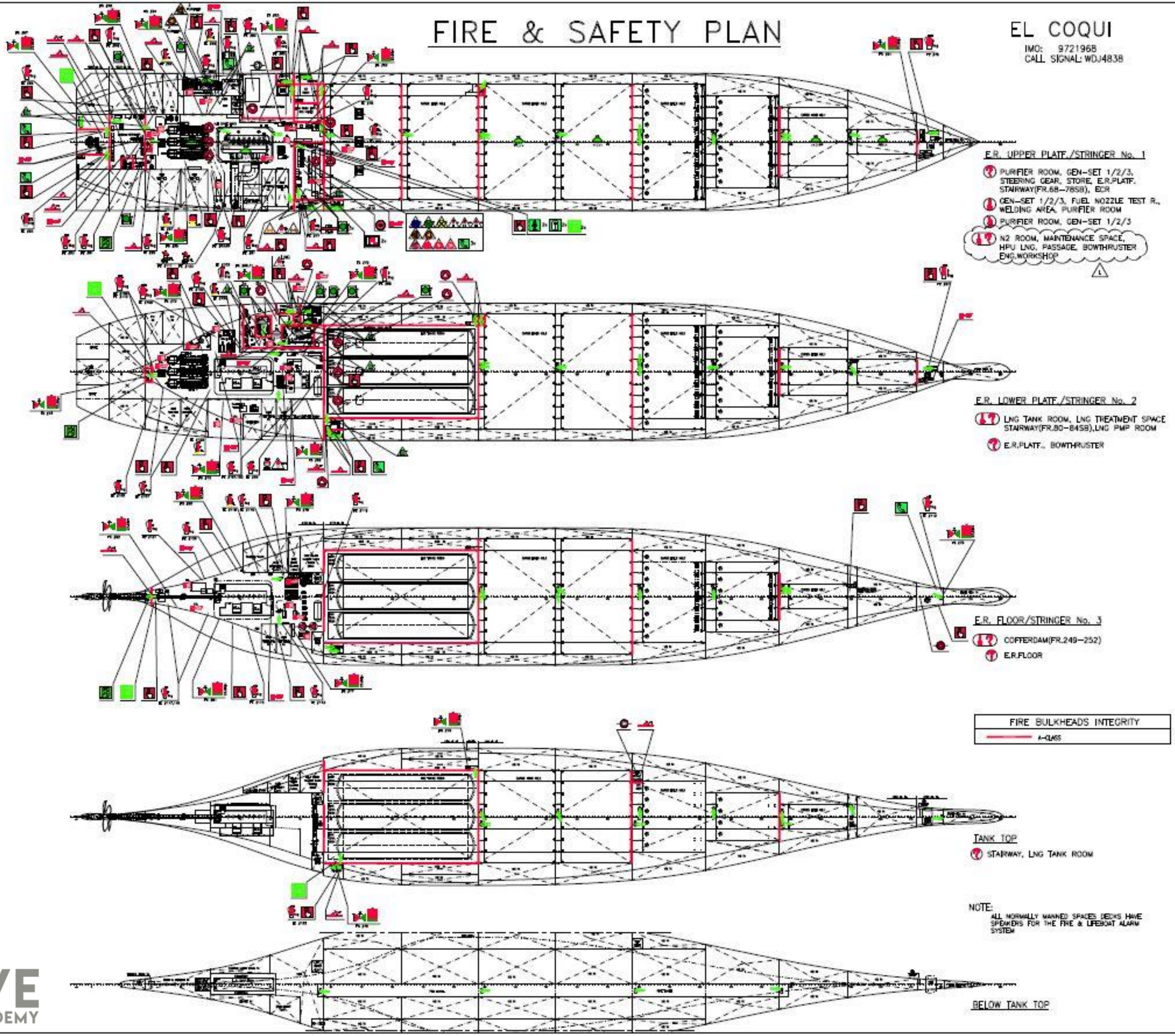
LENGTH OVER ALL:	219.50 m
LENGTH BETW. PERP.:	208.80 m
BREADTH MOULDED:	32.24 m
DEPTH MOULDED TO MAIN DECK:	18.00 m
DRAFT DESIGN:	9.50 m
DRAFT SCANTLING:	10.00
TOTALS:	27 PERSONS
DEADWEIGHT AT 10.00 m DRAFT, EVEN KEEL APPROX.:	26,500 t

CLASS NOTATION:
DNV +1A1, General Cargo Carrier, CONTAINER, RO-RO, GAS FUELLED, NAUTICUS (Newbuilding), DG-P, BIS, TMON, BWM-T, E0, NAUT-OC, CLEAN

VT Halter Marine
CROWLEY MARITIME
FIRE & SAFETY PLAN
AS-BUILT

FIRE & SAFETY PLAN

EL COQUI
IMO: 9721968
CALL SIGNAL: WDJ4838



NOTE:
ALL NORMALLY MANNED SPACES DECKS HAVE SPEAKERS FOR THE FIRE & LIFEBOAT ALARM SYSTEM

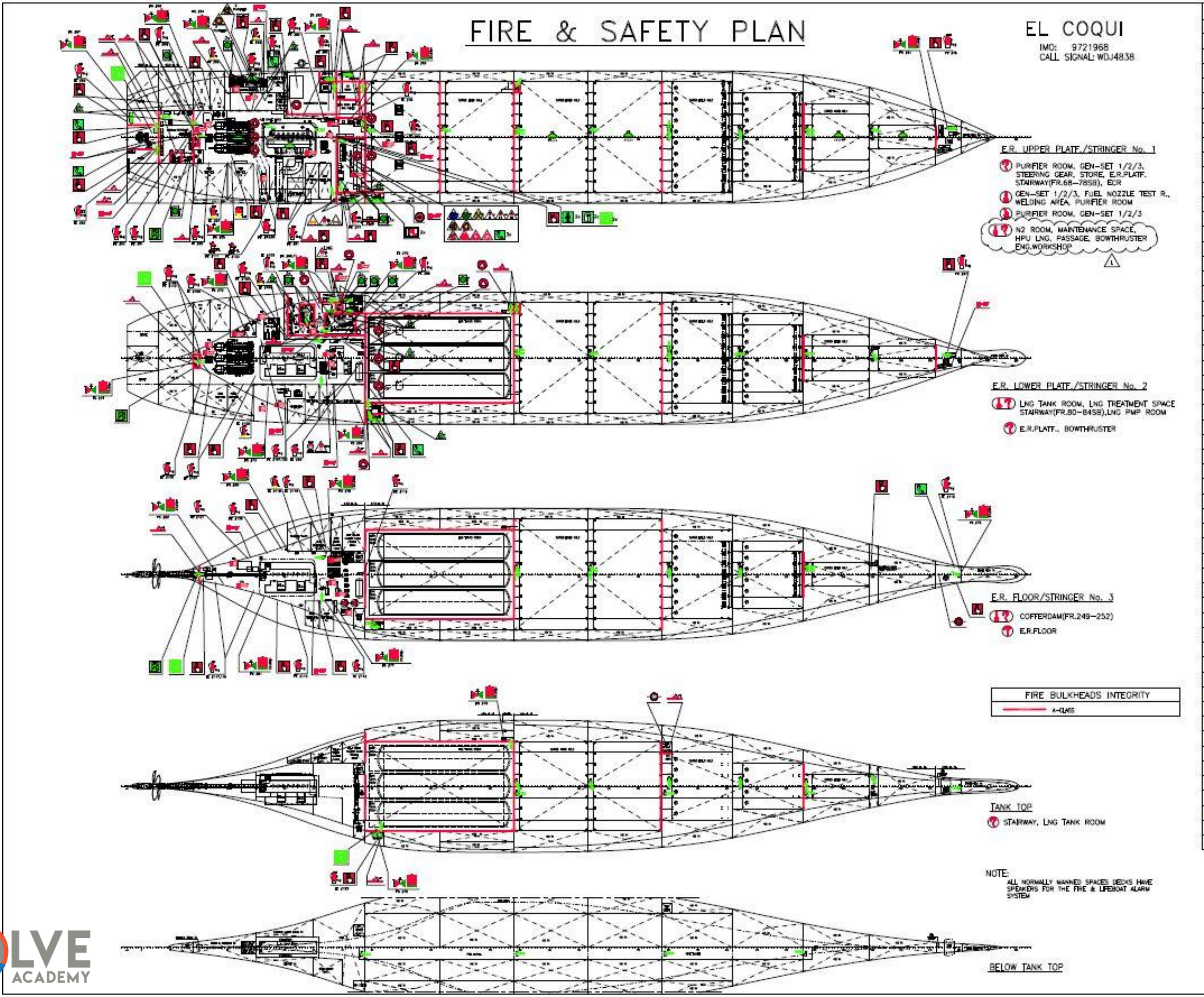
SYM.	TOT.	DESCRIPTION
	2	FIRE/BILGE PUMP 110 m³h /8,80 bar
	1	EMERGENCY FIRE PUMP 75 m³h /8,82 bar
	1	WATER SPRAY PUMP 250 m³h /8,35 bar
	1	WATERMIST PUMP 23,6 m³h /51,7 bar
	22	FIRE HYDRANT
	22	FIRE HOSE(22.88m) WITH COMBINED JET AND FOG NOZZLE
	12	FIRE ALARM HORN (SIGNALING COLUMN)
	15	CO_2 ALARM HORN
	12	CO_2 SIREN
	38	MANUALLY OPERATED CALL POINTS
	1	PUSH BUTTON/SWITCH FOR GENERAL ALARM
	4	HEAT DETECTOR
	13	SMOKE DETECTOR
	11	MULTI DETECTOR
	3	FLAME DETECTOR
	25	GAS DETECTOR
	5	CO_2 EXTINGUISHER 6 kg. PORTABLE
	33	POWDER EXTINGUISHER 9 kg. PORTABLE
	6	FOAM EXTINGUISHER 9 L
	1	PORTABLE FOAM APPLICATOR UNIT
	1	TRANSPORTABLE FOAM EXTINGUISHER 135 L
	1	FIXED (LOCAL) CO2 FIRE EXTINGUISHING BOTTLE
	1	REMOTE RELEASE WATER DECK WASH SYSTEM
	1	REMOTE RELEASE WATERMIST SYSTEM
	1	REMOTE RELEASE WATER SPRAY SYSTEM
	2	REMOTE RELEASE STATION CO2 SYSTEM
	1	REMOTE RELEASE STATION CO2 (LOCAL) SYSTEM
	4	SPACE PROTECTED BY WATER SPRAY EXTINGUISHING SYSTEM
	3	SPACE PROTECTED BY WATERMIST EXTINGUISHING SYSTEM
	5	SPACE PROTECTED BY CO2 EXTINGUISHING SYSTEM
	1	SPACE PROTECTED BY CO2 (LOCAL) EXTINGUISHING SYSTEM
	15	FIRE DAMPERS FOR MACHINERY SPACES
	13	REMOTE CONTROL FOR FIRE DAMPERS MACHINERY SPACES
	1	REMOTE CONTROL OF VENTILATOR FANS FOR ACCOMMODATION
	1	REMOTE CONTROL OF VENTILATOR FANS FOR MACH. AREAS
	1	REMOTE CONTROL OF VENTILATOR FANS CARGO AREA
	3	FUEL OIL PUMP REMOTE SHUT-OFF
	3	LUBE OIL PUMP REMOTE SHUT-OFF
	1	REMOTE CONTROL FOR FUEL OIL VALVES
	1	REMOTE CONTROL FOR FIRE PUMP
	1	REMOTE CONTROL FOR EMERGENCY FIRE PUMP
	1	REMOTE CONTROL FOR WATER SPRAY PUMP
	1	REMOTE CONTROL FOR WATERMIST PUMP
	6	EMERGENCY ESCAPE BREATHING DEVICE
	2	LIFE JACKETS
	2	SURVIVAL SUIT
	8	EMERGENCY TELEPHONE
	3	EMERGENCY EXIT/EMERGENCY ASCENT
	X	PRIMARY ESCAPE ROUTE
	X	SECONDARY ESCAPE ROUTE
	1	FIRE & SAFETY PLAN
	6	WATERTIGHT DOOR-FIRECLASS A W/SELF-CLOSING
	26	DOOR-FIRECLASS A W/SELF-CLOSING
	1	REMOTE CONTROL FOR LUBE OIL VALVES
	1	TRANSPORTABLE FOAM EXTINGUISHER 45 L
	2	FIRE LOCKER WITH FIREMAN'S EQUIPMENT

VT Halter Marine
CROWLEY MARITIME
FIRE & SAFETY PLAN
B135/B136
811-0013

FIRE & SAFETY PLAN

EL COQUI

IMO: 9721968
CALL SIGNAL: WDJ4838



SYM.	TOT.	DESCRIPTION
	2	FIRE/BILGE PUMP 110 m³ h /8,80 bar
	1	EMERGENCY FIRE PUMP 75 m³ h /8,82 bar
	1	WATER SPRAY PUMP 250 m³ h /8,55 bar
	1	WATERMIST PUMP 23,6 m³ h /51,7 bar
	22	FIRE HYDRANT
	22	FIRE HOSE(22.86m) WITH COMBINED JET AND FOG NOZZLE
	12	FIRE ALARM HORN (SIGNALING COLUMN)
	15	CO_2 ALARM HORN
	12	CO_2 SIREN
	38	MANUALLY OPERATED CALL POINTS
	1	PUSH BUTTON/SWITCH FOR GENERAL ALARM
	4	HEAT DETECTOR
	13	SMOKE DETECTOR
	11	MULTI DETECTOR
	3	FLAME DETECTOR
	25	GAS DETECTOR
	5	CO_2 EXTINGUISHER 6 kg. PORTABLE
	33	POWDER EXTINGUISHER 9 kg. PORTABLE
	6	FOAM EXTINGUISHER 9 L
	1	PORTABLE FOAM APPLICATOR UNIT
	1	TRANSPORTABLE FOAM EXTINGUISHER 135 L
	1	FIXED (LOCAL) CO2 FIRE EXTINGUISHING BOTTLE
	1	REMOTE RELEASE WATER DECK WASH SYSTEM
	1	REMOTE RELEASE WATERMIST SYSTEM
	1	REMOTE RELEASE WATER SPRAY SYSTEM
	2	REMOTE RELEASE STATION CO2 SYSTEM
	1	REMOTE RELEASE STATION CO2 (LOCAL) SYSTEM
	4	SPACE PROTECTED BY WATER SPRAY EXTINGUISHING SYSTEM
	3	SPACE PROTECTED BY WATERMIST EXTINGUISHING SYSTEM
	5	SPACE PROTECTED BY CO2 EXTINGUISHING SYSTEM
	1	SPACE PROTECTED BY CO2 (LOCAL) EXTINGUISHING SYSTEM
	15	FIRE DAMPERS FOR MACHINERY SPACES
	13	REMOTE CONTROL FOR FIRE DAMPERS MACHINERY SPACES
	1	REMOTE CONTROL OF VENTILATOR FANS FOR ACCOMMODATION
	1	REMOTE CONTROL OF VENTILATOR FANS FOR MACH. AREAS
	1	REMOTE CONTROL OF VENTILATOR FANS CARGO AREA
	3	FUEL OIL PUMP REMOTE SHUT-OFF
	3	LUBE OIL PUMP REMOTE SHUT-OFF
	1	REMOTE CONTROL FOR FUEL OIL VALVES
	1	REMOTE CONTROL FOR FIRE PUMP
	1	REMOTE CONTROL FOR EMERGENCY FIRE PUMP
	1	REMOTE CONTROL FOR WATER SPRAY PUMP
	1	REMOTE CONTROL FOR WATERMIST PUMP
	6	EMERGENCY ESCAPE BREATHING DEVICE
	2	LIFE JACKETS
	2	SURVIVAL SUIT
	8	EMERGENCY TELEPHONE
	3	EMERGENCY EXIT/EMERGENCY ASCENT
	X	PRIMARY ESCAPE ROUTE
	X	SECONDARY ESCAPE ROUTE
	1	FIRE & SAFETY PLAN
	6	WATERTIGHT DOOR-FIRECLASS A W/SELF-CLOSING
	26	DOOR-FIRECLASS A W/SELF-CLOSING
	1	REMOTE CONTROL FOR LUBE OIL VALVES
	1	TRANSPORTABLE FOAM EXTINGUISHER 45 L
	2	FIRE LOCKER WITH FIREMAN'S EQUIPMENT

VT Halter Marine

CROWLEY MARITIME

FIRE & SAFETY PLAN

1:200

811

B135/B136

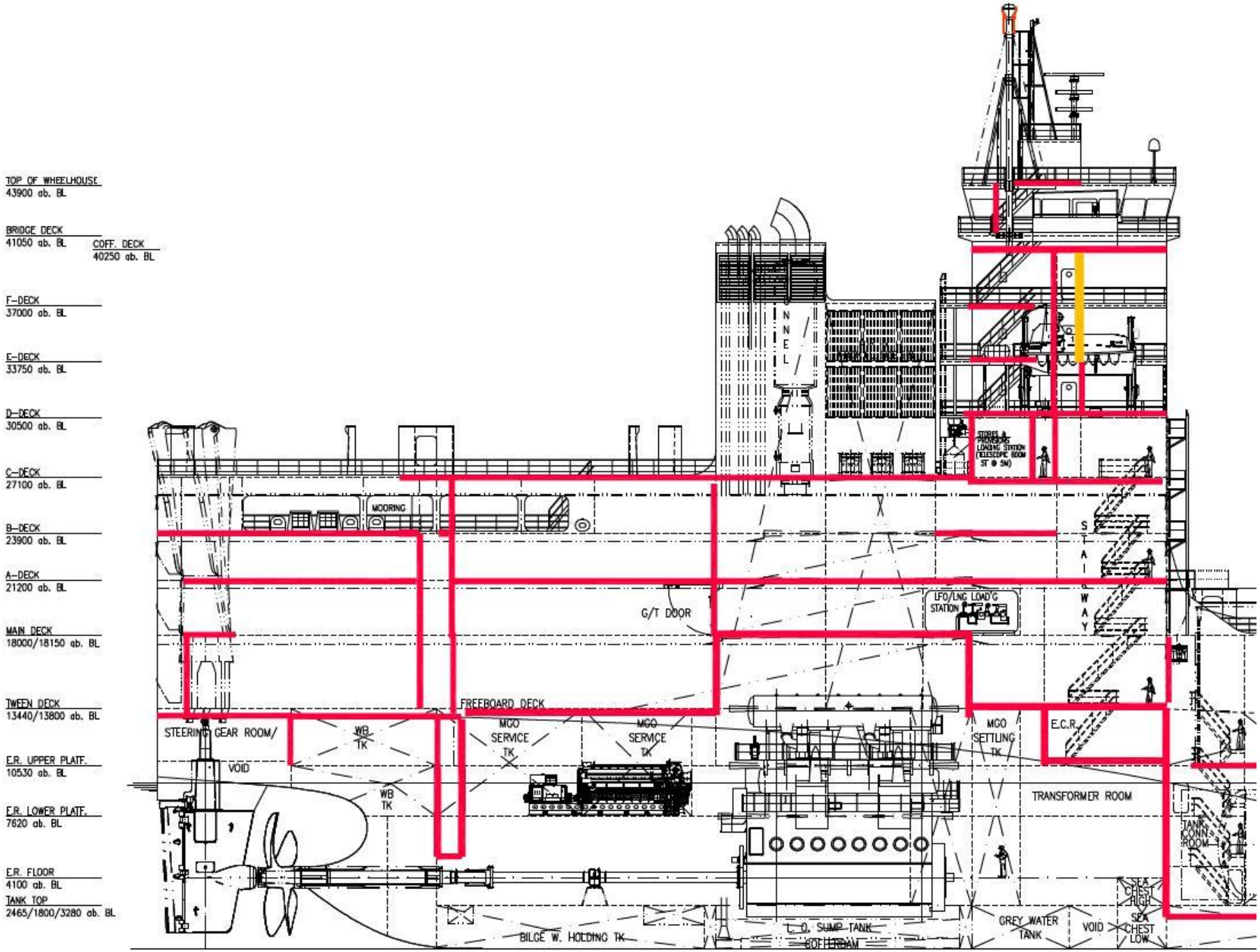
FA-811-0013

50103

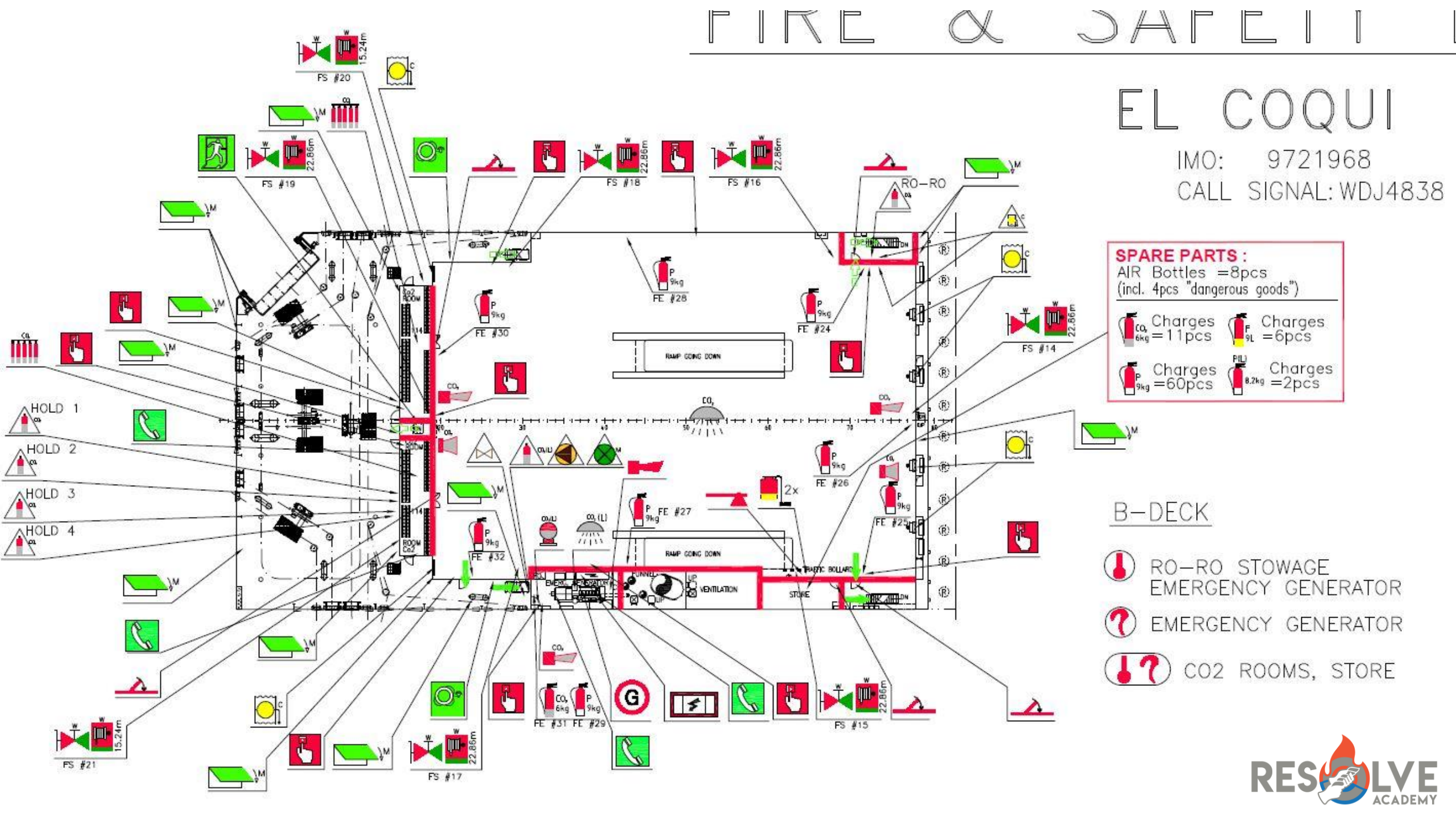
L

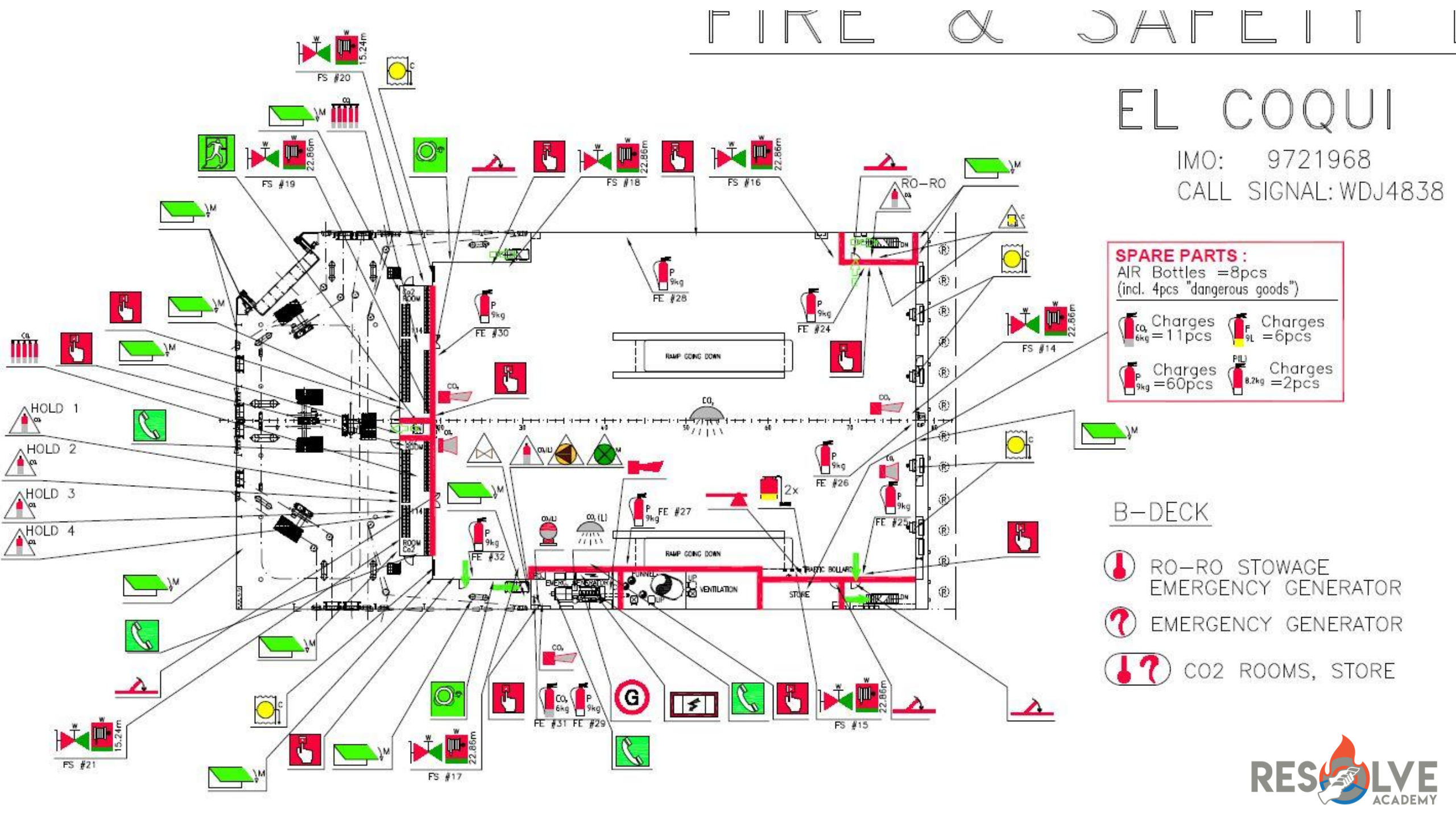
WÄRTSILÄ

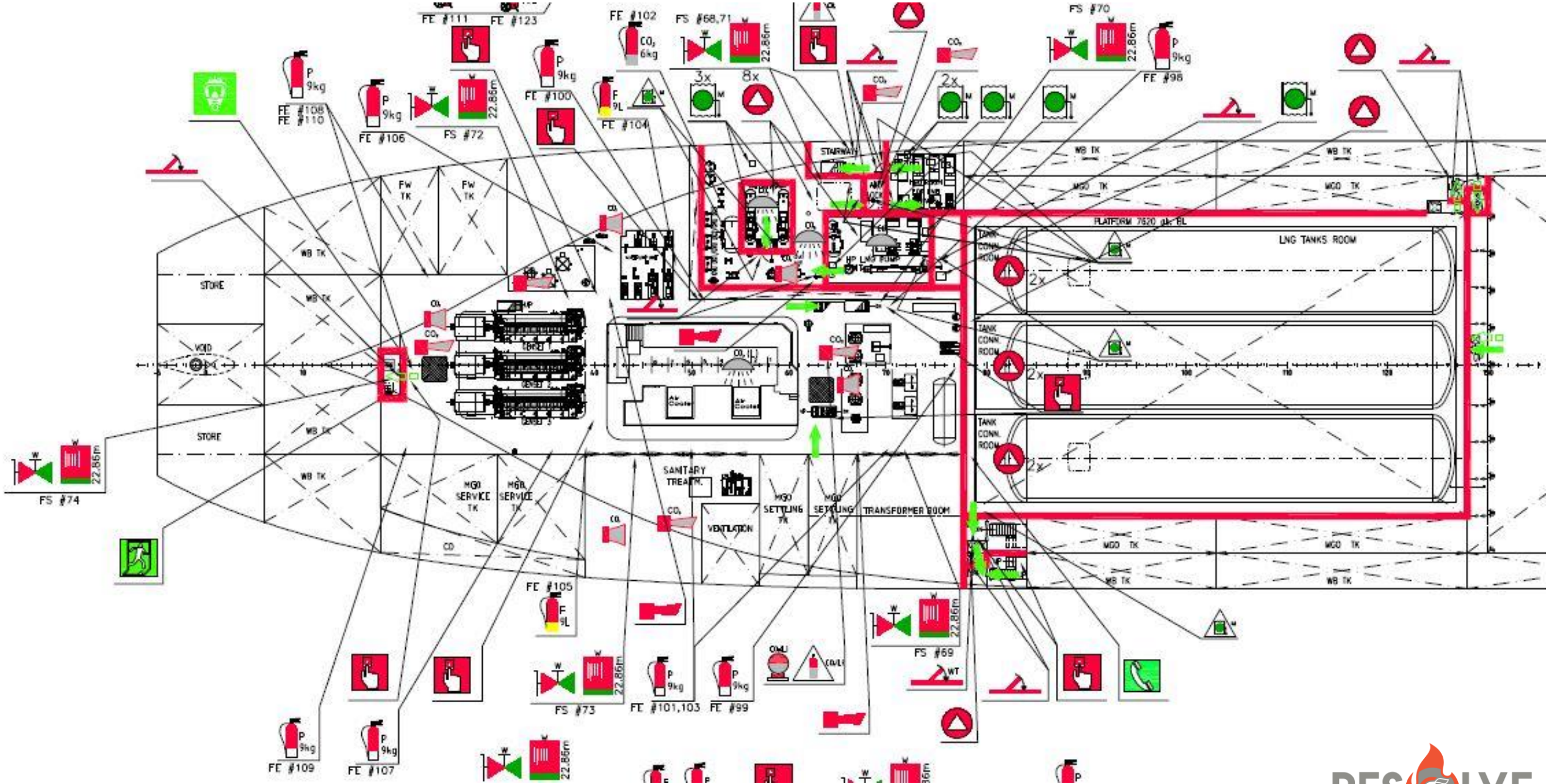
RESOLVE ACADEMY



RESOLVE ACADEMY


FIRE & SAFETY
EL COQUI
IMO: 9721968
CALL SIGNAL: WDJ4838
SPARE PARTS :
AIR Bottles =8pcs
(incl. 4pcs "dangerous goods")
CO2 6kg Charges =11pcs
F 9L Charges =6pcs
P 9kg Charges =60pcs
P(L) 8.2kg Charges =2pcs
B-DECK
RO-RO STOWAGE
EMERGENCY GENERATOR
EMERGENCY GENERATOR
CO2 ROOMS, STORE
FS #20
FS #19
FS #18
FS #16
FS #14
FS #15
FS #17
FS #21
FE #28
FE #30
FE #24
FE #26
FE #25
FE #27
FE #32
FE #31
FE #29
RO-RO
RAMP GOING DOWN
RAMP GOING DOWN
TUNNEL
VENTILATION
STORE
TRAFFIC BOLLARD
HOLD 1
HOLD 2
HOLD 3
HOLD 4
CO2 ROOM
ROOM CO2
2x
15.24m
22.86m


FIRE & SAFETY
EL COQUI
IMO: 9721968
CALL SIGNAL: WDJ4838
SPARE PARTS :
AIR Bottles =8pcs
(incl. 4pcs "dangerous goods")
CO2 6kg Charges =11pcs
F 9L Charges =6pcs
P 9kg Charges =60pcs
P(L) 8.2kg Charges =2pcs
B-DECK
RO-RO STOWAGE
EMERGENCY GENERATOR
EMERGENCY GENERATOR
CO2 ROOMS, STORE
FS #20
FS #19
FS #18
FS #16
FS #14
FS #15
FS #17
FS #21
FE #28
FE #30
FE #24
FE #26
FE #25
FE #27
FE #32
FE #31
FE #29
RO-RO
RAMP GOING DOWN
RAMP GOING DOWN
TUNNEL
VENTILATION
STORE
TRAFFIC BOLLARD
HOLD 1
HOLD 2
HOLD 3
HOLD 4
CO2 ROOM
ROOM CO2
2x
15.24m
22.86m


FE #111
FE #123
FE #102
CO2 6kg
FS #68,71
22.86m
FS #70
FE #98
FE #108
FE #110
FE #106
FS #72
FE #100
FE #104
3x
8x
2x
STAIRWAY
FW TK
WB TK
MGO TK
PLATFORM 7620 µk. BL
LNG TANKS ROOM
TANK CONN. ROOM
STORE
VOID
HP LNG PUMP
SANITARY TREATM.
MGO SERVICE TK
MGO SETTLING TK
VENTILATION
TRANSFORMER ROOM
FS #74
FE #105
FS #69
FS #73
FE #101,103
FE #99
FE #109
FE #107

SYM.	TOT.	DESCRIPTION
	4	LINE-THROWING APPLIANCE (4 SEPARATE UNITS)
	1	PYROTECHNIC SET- 12 RED HAND FLARES, 2 SMOKE SIGNALS 12 ROCKET-STAR SIGNAL
	2	RADAR TRANSPONDERS
	3	TWO-WAY VHF RADIOTELEPHONE APPARATUS
	2	EPIRB
	12	ROCKET PARACHUTE FLARES
	6	EMERGENCY TELEPHONE
	2	EMERGENCY LIGHT FOR LIFERAFTS AND MUSTER STATION
	X	PRIMARY ESCAPE ROUTE
	X	SECONDARY ESCAPE ROUTE
	4	FIRE & SAFETY PLAN
	11	DOOR-FIRECLASS A W/SELF-CLOSING
	26	DOOR-FIRECLASS B
	1	SIGNAL FLAG (KIT)
	1	AIR HORN
	2	DOOR-FIRECLASS B W/SELF-CLOSING

SYM.	TOT.	DESCRIPTION
	9	FIRE HYDRANT
	9	FIRE HOSE(15.24m) WITH COMBINED JET AND FOG NOZZLE
	13	MANUALLY OPERATED CALL POINTS
	1	PUSH BUTTOM/SWITCH FOR GENERAL ALARM
	1	CONTROL PANEL FOR FIRE DETECTION AND ALARM SYSTEM
	19	MULTI DETECTOR
	2	HEAT DETECTOR
	5	CO_2 EXTINGUISHER 6 kg, PORTABLE
	12	POWDER EXTINGUISHER 9 kg, PORTABLE
	3	FIRE AXE
	1	REMOTE CONTROL FOR FIRE DAMPERS ACCOMMODATION & SERVICE SPACE
	1	REMOTE RELEASE STATION WATERMIST SYSTEM
	1	REMOTE RELEASE STATION CO2 SYSTEM
	18	CLOSING OF VENT OPENINGS FOR ACCOMMODATION
	9	CLOSING OF VENT OPENINGS FOR MACHINERY SPACES
	3	FIRE DAMPERS FOR MACHINERY SPACES

FL

FIREMAN'S EQUIPMENT

PERSONAL EQUIPMENT :

Fire Protective Suit (suit, gloves and tight-fitting goggles)
Boots of rubber
Fireman's Helmet
Safety Lamp
Light Fireman's Axe (w/non-conductive handle)
w/cover and fireman's belt

SELF-CONTAI. COMPRES. AIR BREATHING APPARATUS (1200L/30min.)

LIFELINE (30m)

TWO-WAY VHF RADIOTELEPHONE APPARATUS

FIRE BULKHEADS INTEGRITY

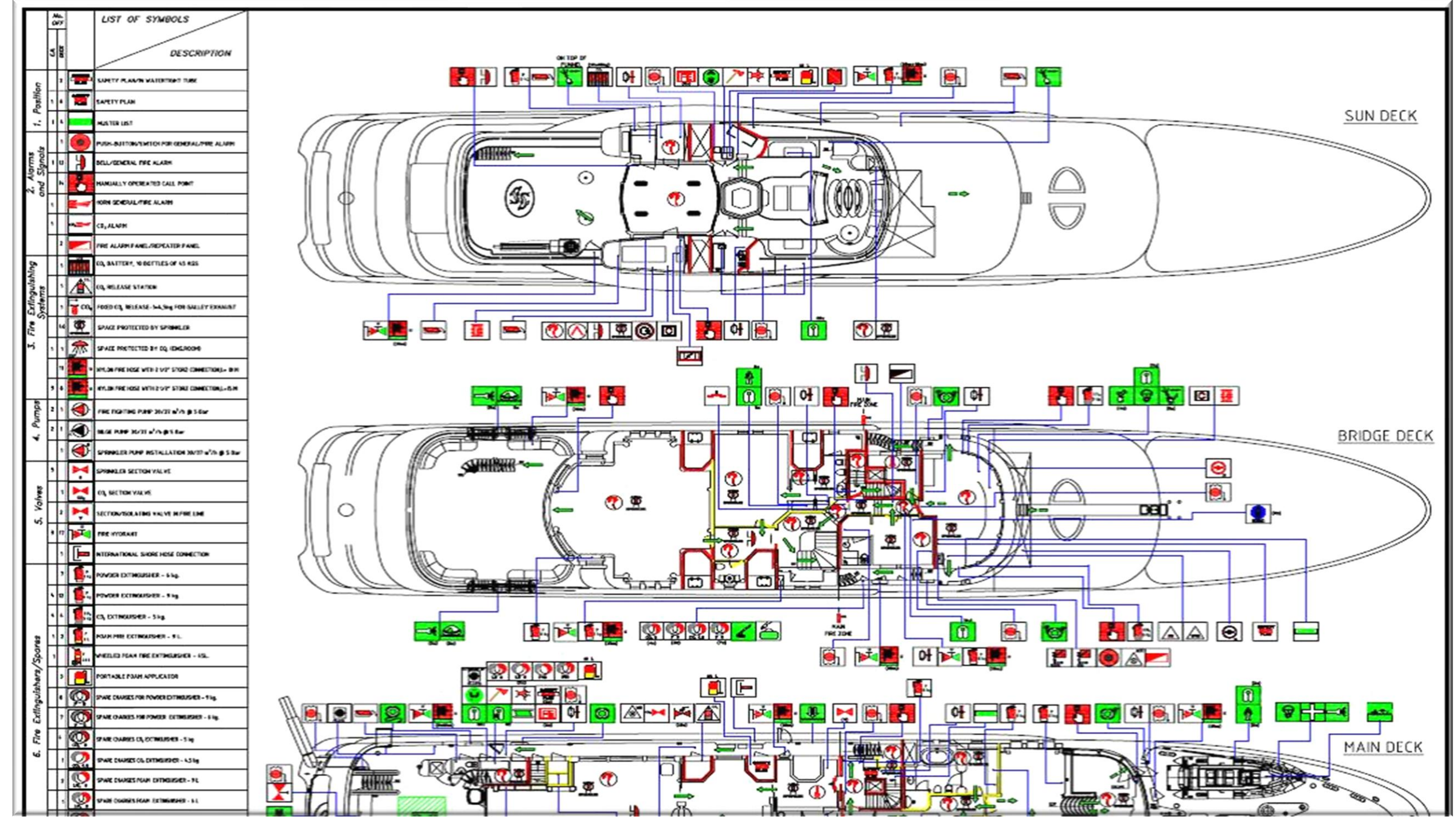
A-CLASS

B-CLASS

APPROVED
SOLAS Ch. II-2 Reg. 10/15.2.4/19.3.6 & 7/20.6.2, SOLAS Ch. III and USCG ACP Rev. 11
SEE LETTER Date: 2018-06-22

	4	REMOTE CONTROL OF VENTILATOR FANS FOR ACCOMMODATION
	1	REMOTE CONTROL OF VENTILATOR FANS FOR MACHINERY SPACES
	1	REMOTE CONTROL OF VENTILATOR FANS CARGO SPACES
	3	FUEL OIL PUMP REMOTE SHUT-OFF
	1	LUBE OIL PUMP REMOTE SHUT-OFF
	1	EMERGENCY STOP OF MAIN ENGINE AND AUXILIARY ENGINES
	1	REMOTE CONTROL FOR FIRE PUMP
	1	REMOTE CONTROL FOR EMERGENCY FIRE PUMP
	1	REMOTE CONTROL FOR WATER SPRAY PUMP
	1	REMOTE CONTROL FOR WATERMIST PUMP
	1	EMERGENCY BATTERY FOR RADIO/INTERNAL COMMUNICATION
FL	1	FIRE LOCKER WITH FIREMAN'S EQUIPMENT (CUPBOARD)
	3	EMERGENCY ESCAPE BREATHING DEVICE (incl. spare 1pcs)
	2	MUSTER STATION
	1	LIFE BOAT/RESCUE BOAT (TOTALLY ENCLOSED) 30/6 MEN
	1	LIFE BOAT (TOTALLY ENCLOSED)
	2	INFLATABLE LIFE RAFT 30 MEN
	6	LIFEBUOY WITH LIGHT
	2	LIFEBUOY WITH LIGHT AND SMOKE
27	2	BOX WITH LIFE JACKETS (27)
	3	LIFE JACKETS
	30	SURVIVAL SUIT
	2	EMBARKATION LADDER
	1	MEDICAL LOCKER
	1	STROKES LITTER

IRWAY,
MEETING ROOM


LIST OF SYMBOLS
DESCRIPTION
1. Position
2. Alarms and Signals
3. Fire Extinguishing Systems
4. Pumps
5. Valves
6. Fire Extinguishers/Spares
SAFETY PLAN/IN WATERTIGHT TUBE
SAFETY PLAN
MUSTER LIST
PUSH-BUTTON/SWITCH FOR GENERAL/FIRE ALARM
BELL/GENERAL FIRE ALARM
MANUALLY OPERATED CALL POINT
HORN GENERAL/FIRE ALARM
CO2 ALARM
FIRE ALARM PANEL/REPEATER PANEL
CO2 BATTERY, 10 BOTTLES OF 45 KGS
CO2 RELEASE STATION
FIXED CO2 RELEASE - 54,5kg FOR GALLEY EXHAUST
SPACE PROTECTED BY SPRINKLER
SPACE PROTECTED BY CO2 (ENGINROOM)
NYLON FIRE HOSE WITH 2 1/2" STORZ CONNECTION L= 20 M
NYLON FIRE HOSE WITH 2 1/2" STORZ CONNECTION L= 15 M
FIRE FIGHTING PUMP 30/20 m³/h @ 5 Bar
BILGE PUMP 30/20 m³/h @ 5 Bar
SPRINKLER PUMP INSTALLATION 30/20 m³/h @ 5 Bar
SPRINKLER SECTION VALVE
CO2 SECTION VALVE
SECTION/ISOLATING VALVE IN FIRE LINE
FIRE HYDRANT
INTERNATIONAL SHORE HOSE CONNECTION
POWDER EXTINGUISHER - 6 kg.
POWDER EXTINGUISHER - 9 kg
CO2 EXTINGUISHER - 5 kg.
FOAM FIRE EXTINGUISHER - 9 L.
WHEELED FOAM FIRE EXTINGUISHER - 45L.
PORTABLE FOAM APPLICATOR
SPARE CHARGES FOR POWDER EXTINGUISHER - 9 kg.
SPARE CHARGES FOR POWDER EXTINGUISHER - 6 kg.
SPARE CHARGES CO2 EXTINGUISHER - 5 kg
SPARE CHARGES CO2 EXTINGUISHER - 4,5 kg
SPARE CHARGES FOAM EXTINGUISHER - 9 L
SPARE CHARGES FOAM EXTINGUISHER - 45 L
SUN DECK
BRIDGE DECK
MAIN DECK

Pre-Fire Planning

Pre-Fire Planning

Preplan Format

- Static information on one side & concise
- Diagram should be on reverse side

Vessel arrangement considerations

Similarity of space & function

- Assemble spaces of similar function & lump together in one preplan
- Example - cabins on same electrical circuit or air conditioning zone

Pre-Fire Planning(cont)

Classification of hazard areas

- Normal spaces - Living spaces
- Functional spaces - Normal working areas
- High Hazard Area - Combustibles, Flammables & potential ignition sources

Paths of Extension

- Identify potential avenues of fire spread
- Develop methods to cut off or control

Pre-Fire Planning(cont)

Mission Review

- Consider most hazardous condition
- Consider least hazardous condition
- Base preplans on worst case scenario

Material Resource

- Equipment locations
- Primary & secondary access to equipment

Pre-Fire Planning(cont)

Manpower Resource

Manpower levels

- Full staffing
- Relief crews

Crew Knowledge & Experience

- Crew Training
- Level of training

Pre-Fire Planning(cont)

Stability

- Consider high probability areas where large volume of water may be utilized
- Effect of large water volumes in fully loaded & ballast or light conditions

Additional considerations

- Counter flooding
- Drainage over side
- Pumped over side
- Drainage to bilges

Pre-Fire Planning(cont)

Evaluation

- Use preplan during drills
- Test the plans
- Request feedback from fire teams
- Test the plans with normal port of call shoreside fire fighters

Review

- Review plans on annual basis
- Update as required

Pre – Fire Planning

Fire Hazard Areas

Each space has its own unique Hazard, areas include:

Machinery Space, causes including:

- Combustible liquids leaking through faulty or damaged connections
- Oil-soaked insulation
- Hot surfaces, e.g. exhaust pipes, engine parts overheating, close proximity to oil lines

Fire Hazard Areas (cont)

Machinery Spaces:

Containment Methods include:

- Watertight Doors, Hatches & Scuttles

Detection Methods include:

- Smoke & Rate of Rise Heat Detectors

Fire Hazard Areas (cont)

Machinery Spaces:

Fire Systems include:

- Fixed Systems such as :
  - Water/High Fog
  - Foam
  - CO2

Portable Fire Extinguishers:

- Large Semi-portable or Mobile Extinguishers including Foam, CO2 or Dry Chemical

Fire Hazard Areas (cont)

ACCOMADATION SPACES, causes including:

- Combustible materials
- Matches and cigarette smoking, including careless disposal of burning cigarettes or ash
- Defective and overloaded electrical systems

Fire Hazard Areas (cont)

Accommodations

Containment Methods include:

- Fire Doors & Dampers
- Use of Fire-Retardant Materials in construction
- Fire Retardant Furnishings

Detection Methods include:

- Smoke Detectors
- Heat Detectors
- Fire Patrols

Fire Hazard Areas (cont)

Accommodations

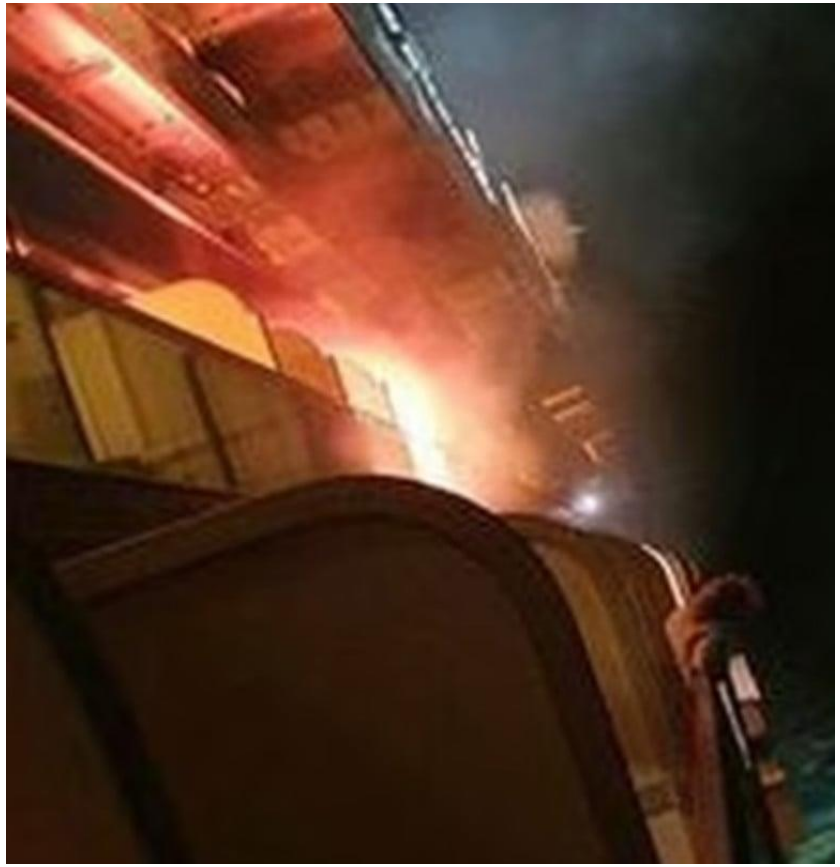
Fire Appliances include:

Portable Extinguishers such as:

- Pressurized Water
- Dry Chemical
- CO2

Fix Systems:

- Sprinkler Systems
- Fixed Fire Stations with hoses & nozzles



Fire Hazard Areas (cont)

GALLEY SPACES, causes including:

- Overheating of combustible liquids and fats
- defective electrical connections
- Greasy flues

Fire Hazard Areas (cont)

Galley Spaces:

Containment Methods include:

- Fire Doors & Dampers
- Fire Blankets
- Deep Fat Fryer Covers

Detection Methods include:

- Heat Detectors

Fire Hazard Areas (cont)

Galley Spaces

Fire Appliances include:

- Portable Extinguishers (K)

Fix Systems:

- Sprinkler Systems
- Galley Range Suppression Systems

Commercial Laundry

Commercial Laundry

Fire Hazard Areas (cont)

Cargo holds and containers causes including:

- Cargoes liable to self-heating and spontaneous combustion (coal, copra), bulk cargoes liable to emit flammable gas (coal, direct reduced iron)
- Loss of integrity of packages containing explosive, flammable or reactive substances - collection of oily materials as a result of insufficient cleaning and of leakage from tanks

Fire Hazard Areas (cont)

Cargo / Containers:

Containment Methods include:

- Hatch Covers & Hull Structure
- Use of Fire Dampers
- Remote control of extinguishing media

Detection Methods include:

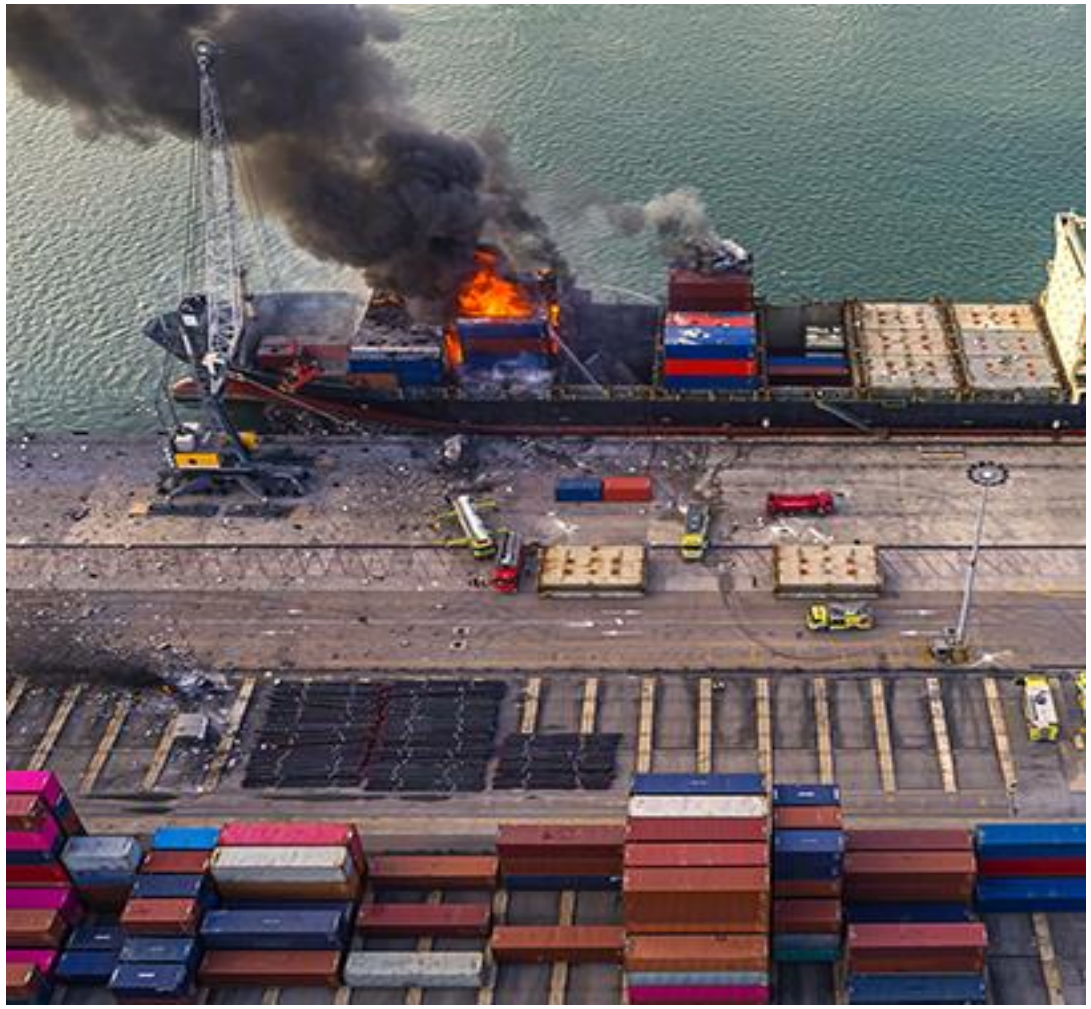
- Smoke Detectors
- Temperature Probes

Fire Hazard Areas (cont)

Cargo / Containers:

Fire Appliances include:

- Fixed Systems- water spray, high expansion foam and carbon dioxide
- Portable- water, foam, powder and carbon dioxide
- Mobile – Foam-making equipment



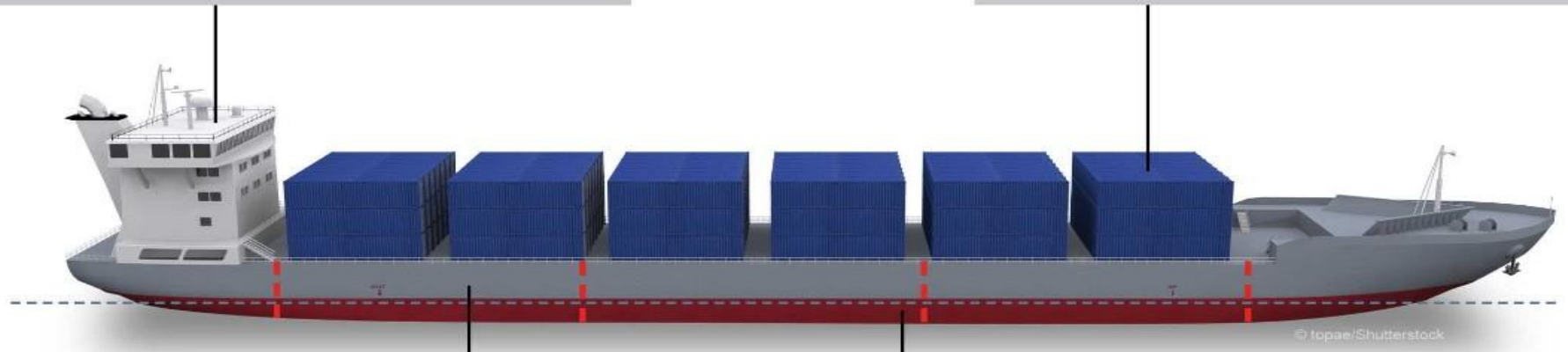
CONTAINER CARRIER FIRE FIGHTING GUIDE

CONTAINER CARRIER HOUSE, CCH

- Ventilation
- Air Monitoring
- Assembly Space
- Water Spray
- Essential Equipment
- Structural Fire Protection of Bulkheads

FIRE-FIGHTING ON-DECK CONTAINER, FOC

- Portable Monitors
- Water-mist Lance
- Additional Hydrants
- Additional Breathing Apparatus

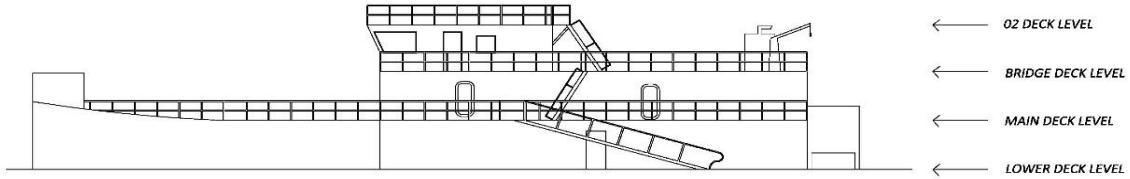


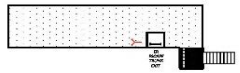
CARGO HOLD FLOODING, CHF

- Single Hold Flooding
- Water Level Indication
- Dewatering Arrangements
- Prevention of Progressive Flooding
- Stability
- Rapid Response Enrollment

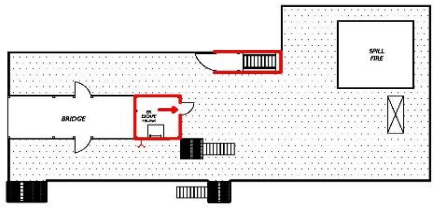
FIRE PROTECTION BELOW DECK, FBC

- Fire Control System
- Container Hold Openings
- Fire Detection
- Fire-extinguishing
- Structural Fire Protection of Spaces Adjacent to Container Bays
- Radios
- Thermal Imaging
- Water Mist Lances

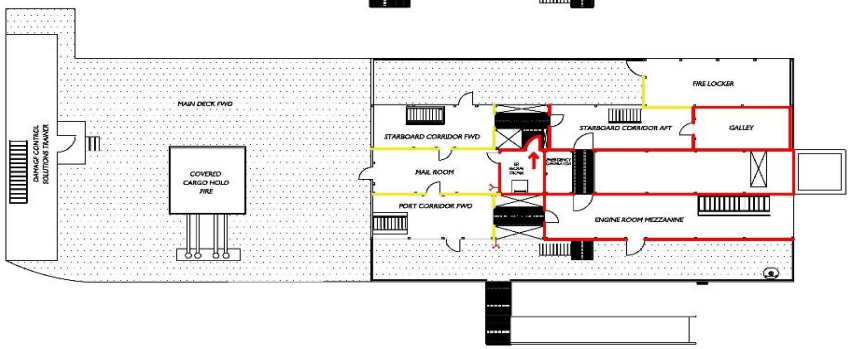




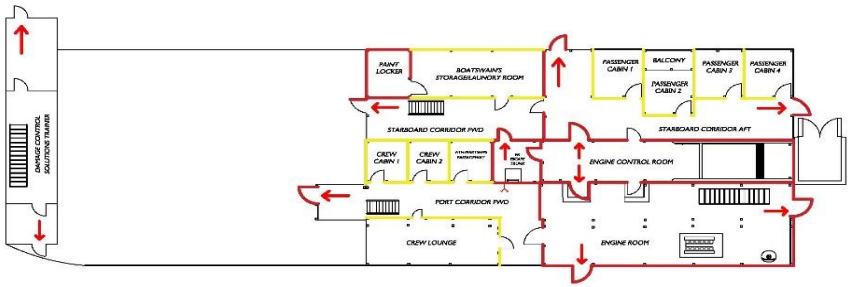
02 Deck Level



Bridge Deck Level

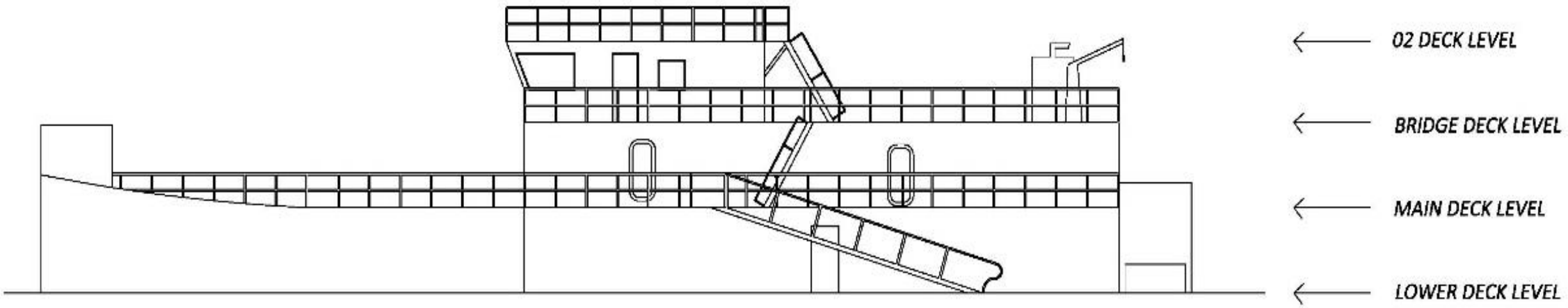


Main Deck Level

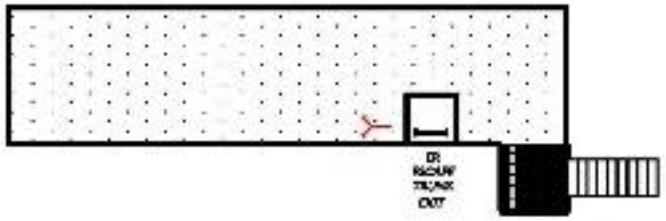


Lower Deck Level

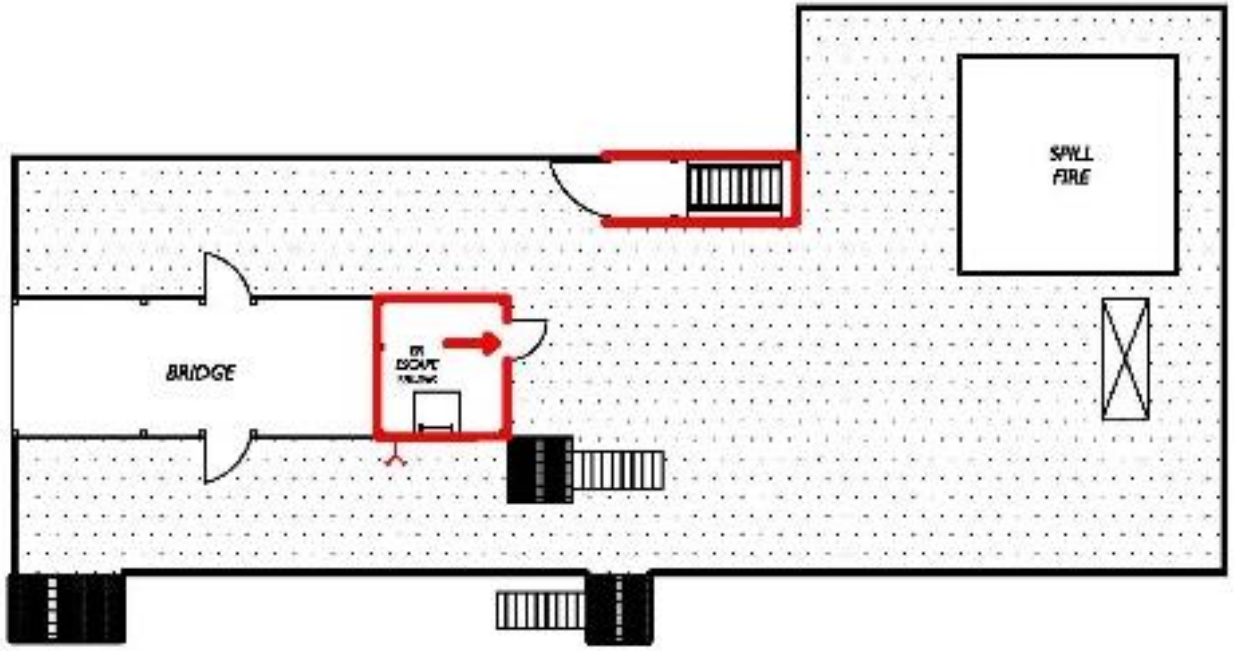
FIRE CONTROL PLAN



FIRE CONTROL PLAN



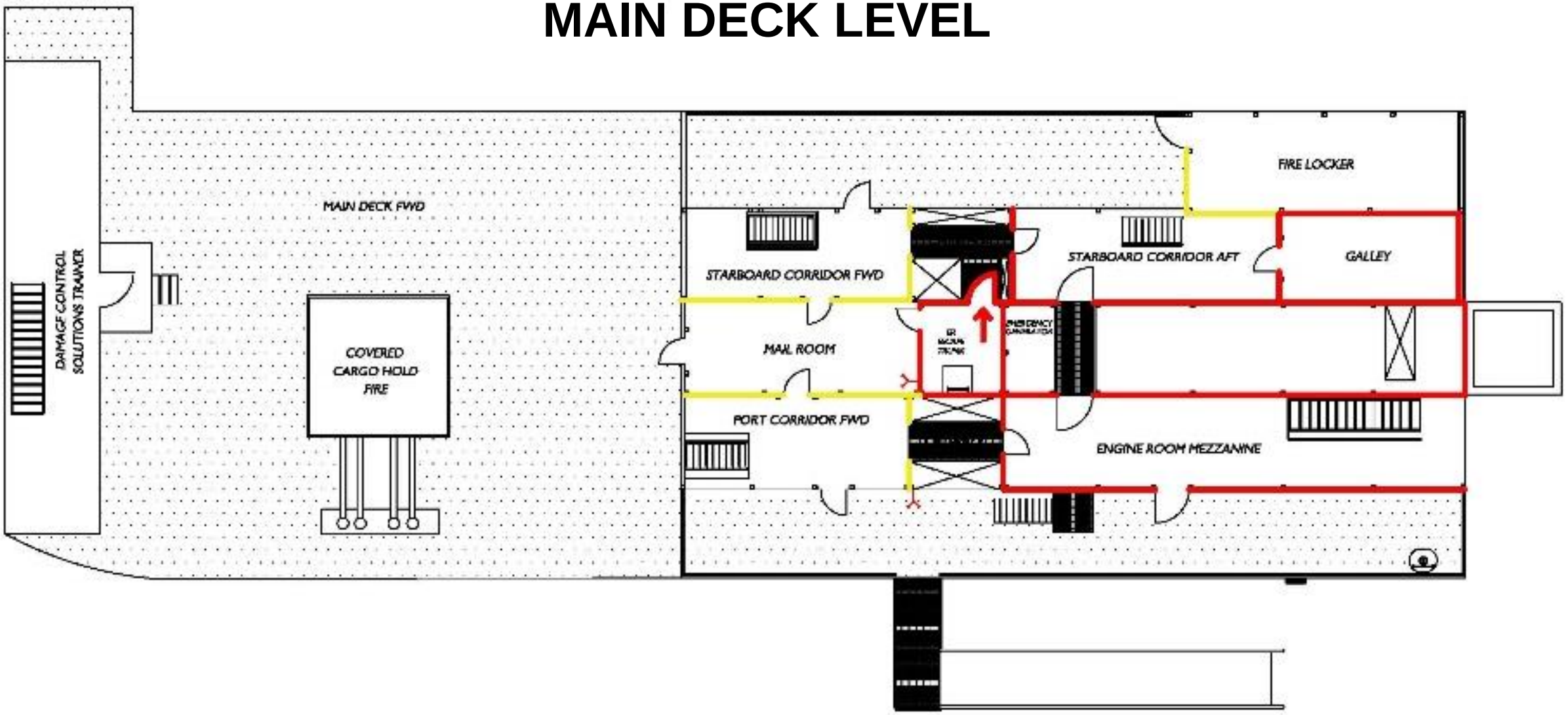
02 Deck Level



Bridge Deck Level

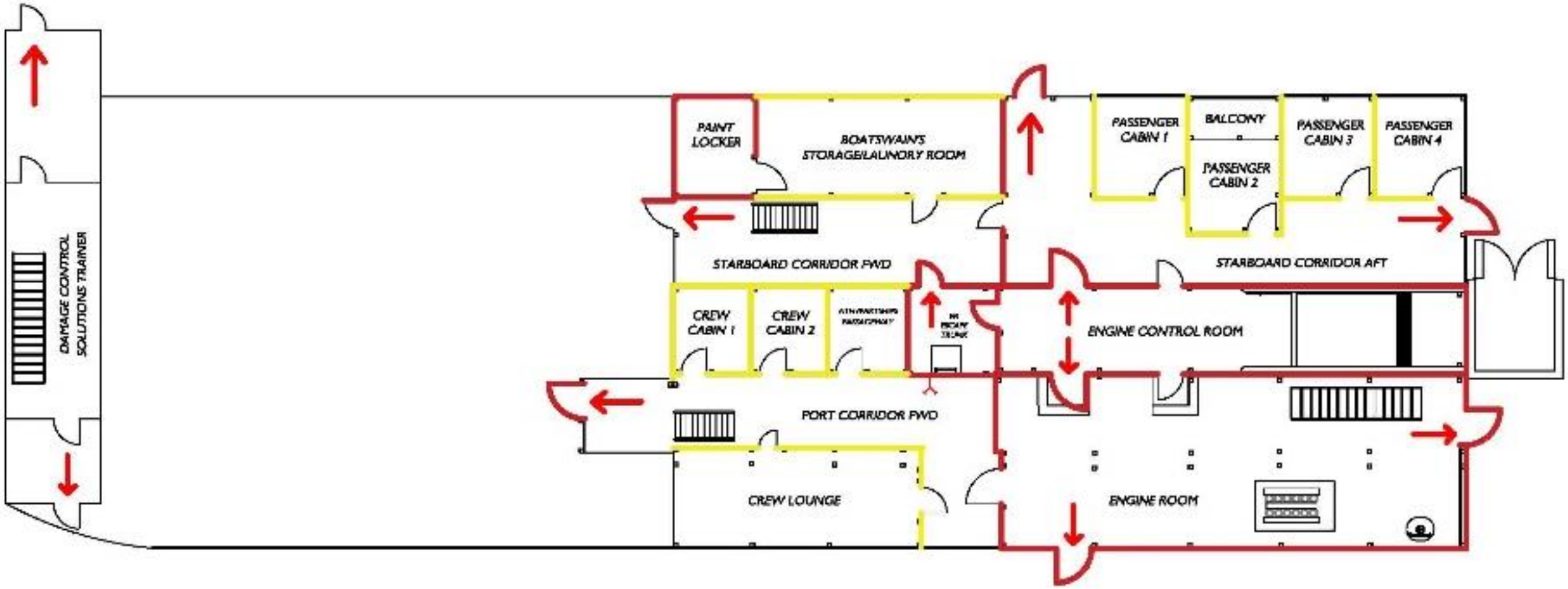
FIRE CONTROL PLAN

MAIN DECK LEVEL



FIRE CONTROL PLAN

LOWER DECK LEVEL



Field Day Preparations

Gray Manatee Shipboard Fire Fighting Facility
3305 S.E. 19th Avenue Ft. Lauderdale, FL 33316

- Picture I.D. required to enter Port Everglades

Dress Code:

- Long pants, shirt w/sleeves, close toed shoes, socks

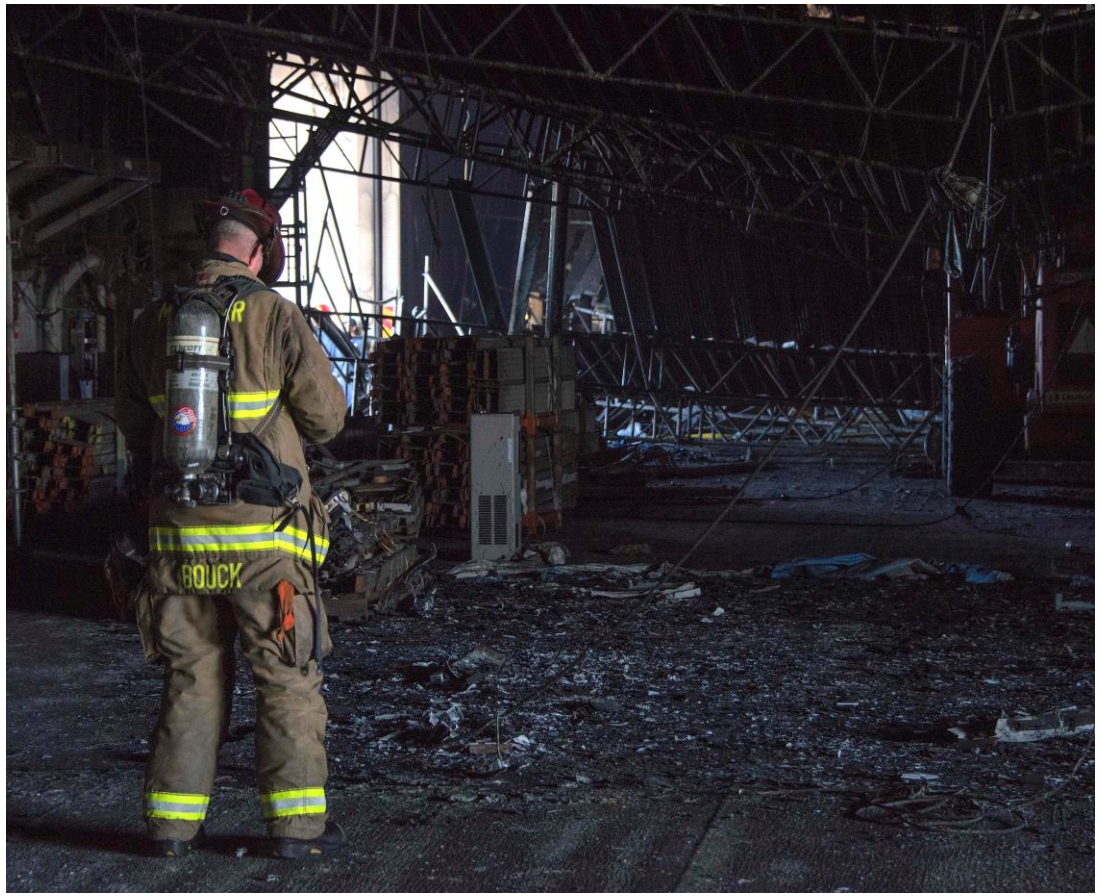
- Hydrate prior to arrival. Cold water & Gatorade provided
- Refrigerator & snack/soda machine on site)
- You will be given 1-hour for lunch. You will be inside Port Everglades. The closest “fast food” is approximately 15 minutes each way.

Fire Investigation

Personnel Safety

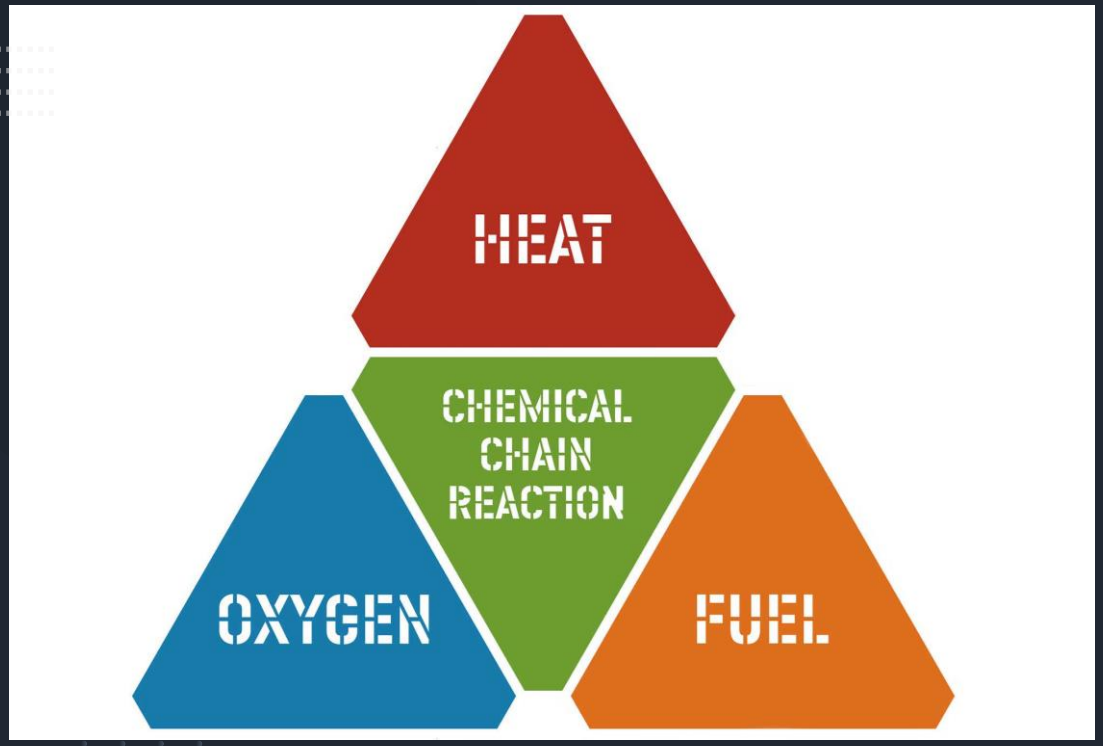
Ensure Fire Extinguishment and Overhaul is complete before starting investigation by:

- Testing air quality and record findings
- Be aware of possible hidden structural damage
- Wear PPE to prevent injury or evidence contamination
- Limit access and maintain custody



Investigations

A fire investigation requires knowledge of chemistry of fire:



Class of Fire	Type of Fire	Type of Extinguisher	Extinguisher Identification	Symbol
A	Ordinary combustibles: wood, paper, rubber, fabrics, and many plastics	Water, Dry Powder, Halon	A	
B	Flammable Liquids and Gases: gasoline, oils, paint, lacquer, and tar	Carbon Dioxide, Dry Powder Halon	B	
C	Fires involving Live Electrical Equipment	Carbon Dioxide, Dry Powder Halon	C	
D	Combustible Metals or Combustible Metal Alloys	Special Agents	D	No Picture Symbol D
K	Fires in Cooking Appliances that involve Combustible Cooking Media: Vegetable or Animal Oils and Fats		K	

4 types of fire cause classifications

Accidental

Natural

Intentional

Undetermined

Investigations

Requires Observations: “if it doesn’t look right, it isn’t”

Investigations are based on:

- Facts & Evidence
- “Not based on opinion”
- Firefighters
- Can you recall information when you are under heavy stress?

Documentation

- Pictures
- All Log Books
- Statements from all involved
- Any type of sketches
- Any audio recordings from bridge/ Video/cell phones etc.
- Anything that could be part of the case

Documentation

Cell phone pictures

Cell phones are often used to take pictures, due to the ease of access and quality of picture.

- It captures the time stamp with date and time and some phones even location
- Save pictures in a secure folder as soon as possible

Documentation

- Records
- Logbooks are legal documents (46 CFR 78.37)
- Statements
- Can be electronic, but preference is handwritten due to the integrity of the statement
- Watch logs can be subpoenaed
- Any drawings or pictures

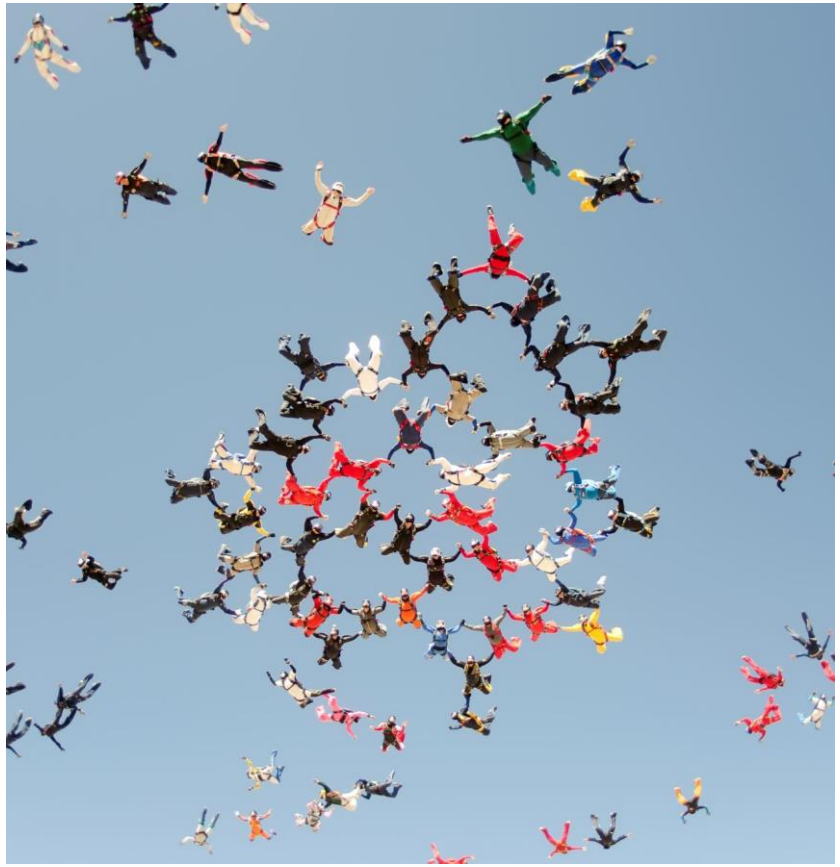
Documentation

Logbook Entries Should include:

- How the fire was discovered
- Time at which the fire alarm was sounded
- Initial action taken
- Time on air for fire team
- Any casualties
- When the fire was extinguished
- Any personnel casualties

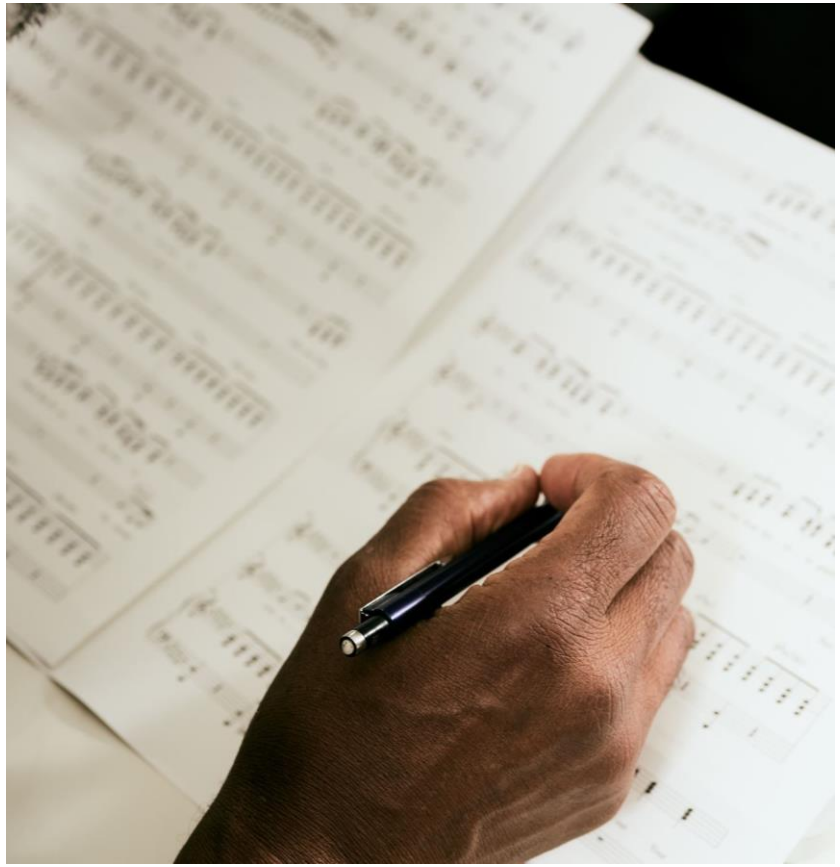
Official Documentation

- US flag vessels or vessels and personnel who fall under US jurisdiction can find guidance on investigating and reporting in NVIC 05-17
- US Flag vessels will fill out CG-2692
- Red Ensign Vessels will fill out ARF (Accident Report Form)



Written Statements

- Written statements should be as detailed as possible while catching a bird's eye view of the scenario.
- A statement should be written in first person view and only on what as experienced by the author of that statement.
- Handwritten is usually the most preferred as it cuts down on any inadvertent changes
- What did you See, Hear or smell



Written Statements

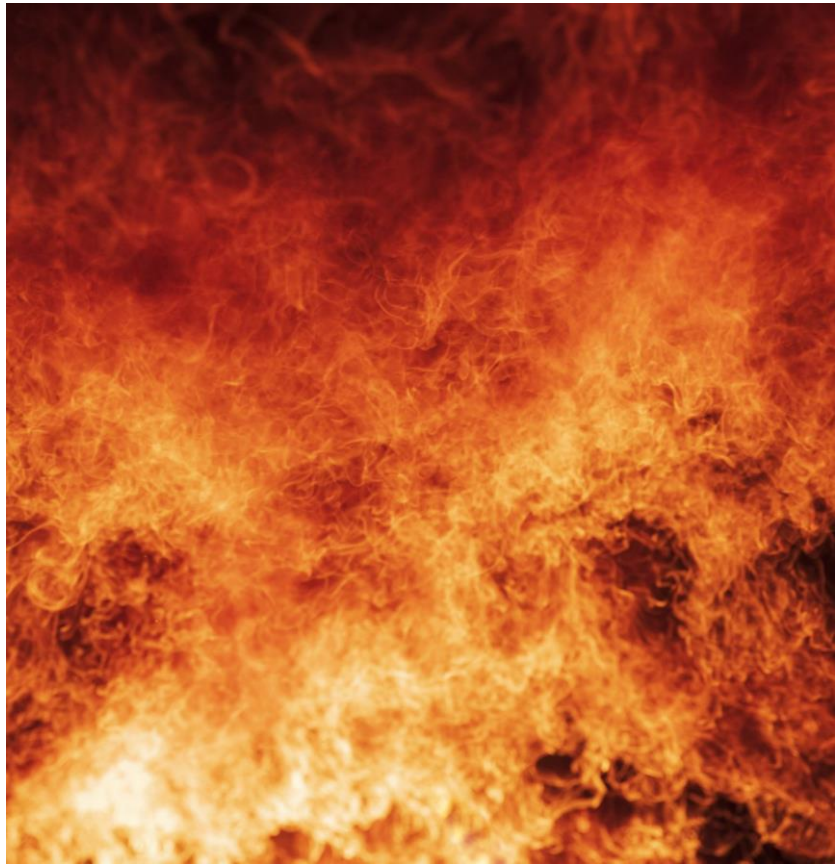
Written statement pitfalls

- Do not write in the third person
- Avoid writing about things you weren’t involved with
- Avoid speculating or giving your opinion
- Do not be vague, be detailed

Locating the source

The first clues as to the “cause and origin” is determined by the initial on scene observations. Some of those observations will be:

- Where the flames are most intense
- The color of the flames and smoke
- The sounds emitted from the fire
- The rate at which the fire spreads
- The amount of smoke
- The structural damage



Collecting Evidence

- Take precautions to prevent contamination.
- Document the location of evidence using written notes, sketches, photographs, photo and video logs, the evidence recovery log, evidence tags and container labels.
- Collect evidence in any areas where the fire originated (such as the first fuel ignited and ignition source) in cases where the fire is not accidental.
- Place evidence in labeled containers for transportation and preservation. Liquid evidence collected for laboratory identification must be immediately placed in clean, unused, vapor tight containers (e.g., clean, unused paint cans; glass jars.

Collecting Evidence

- Label each container so that it is uniquely identified. Labeling may include the name of the investigator, date and time of collection, case number, sample number, description and location of recovery.
- Collect and preserve suitable comparison samples but recognize that such samples may be unavailable.
- Package evidence in accordance with their laboratories' policies and procedures.
- Recognize the presence of other physical evidence, such as bloodstains, shoe prints, latent prints and trace evidence, and use proper preservation and collection methods or seek qualified assistance.

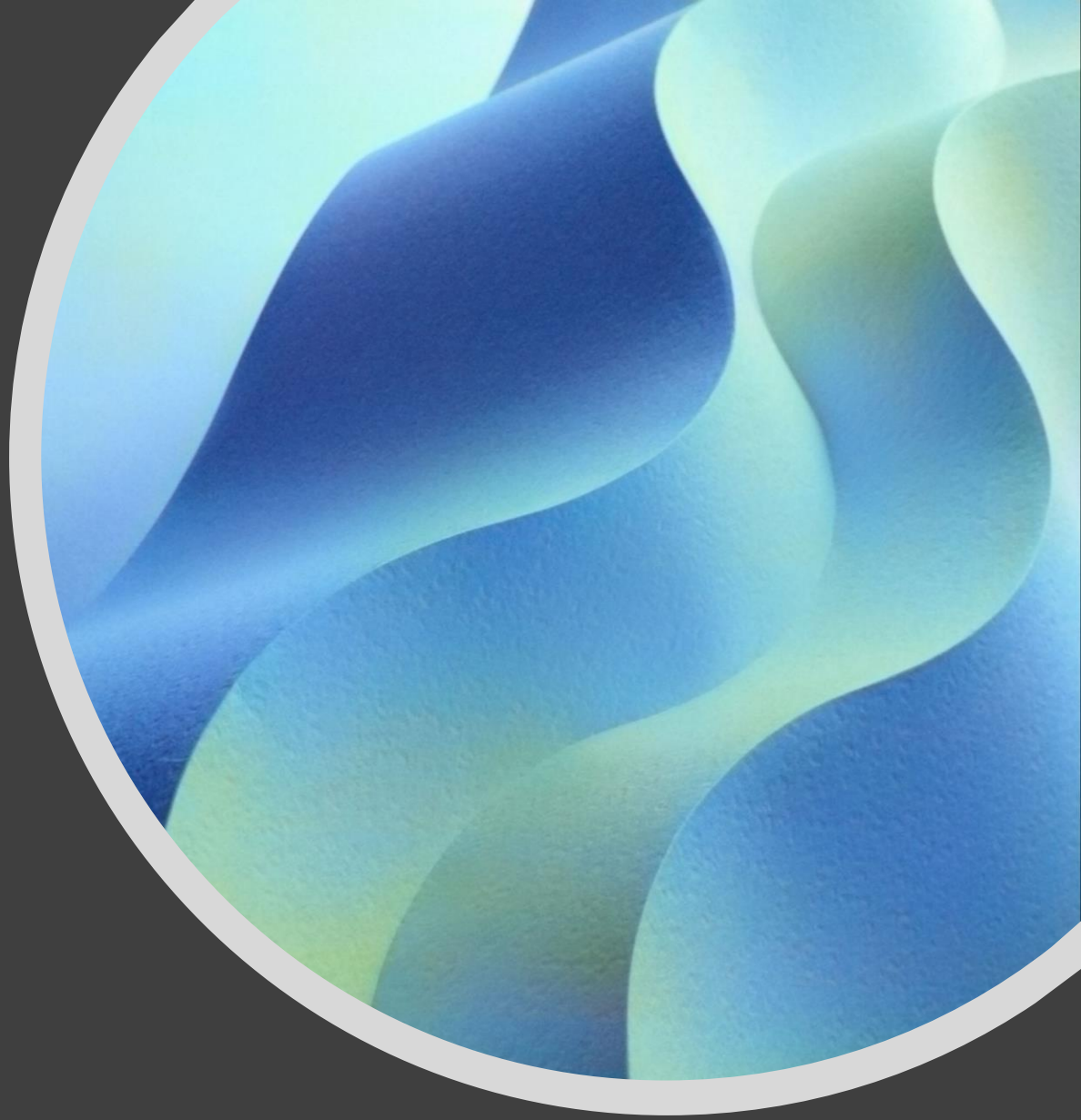
Basic Evidence Kit

- Barrier tape.
- Clean, unused evidence containers (e.g., cans, glass jars, nylon or polyester bags).
- Compass.
- Decontamination equipment (e.g., buckets, pans, detergent).
- Evidence tags, labels, and tape.
- Gloves (disposable gloves and work gloves).
- Handtools (e.g., hammers, screwdrivers, knives, crowbars).
- Lights (e.g., flashlights, spotlights).
- Marker cones or flags.
- Personal protective equipment.
- Photographic equipment.
- Rakes, brooms, spades, etc.
- Tape measures.
- Writing equipment (e.g., notebooks, pens, pencils, permanent markers).

Crew Training & Fire Fighting Drills

STCW Code requires all crewmembers to be given instruction on emergency procedures, responsibilities and trained in the use of the ship’s fire appliances and equipment

SOLAS Ch 3/Reg 19 and MGN 71 gives guidance on Musters, drills, on-board training and instructions to be carried out onboard:



Muster List

Clear instructions must be provided on the vessel that detail the actions each person on board should follow in the event of an emergency. SOLAS Chapter III, Reg.8 and 37

Assignments must include:

- Abandon Ship
- Man Overboard
- Fire Parties
- Accountability of passengers and
- Crew
- Medical

Muster List (Larger Vessels) **Name of Fishing Vessel:**

Crew Member	Stage 1 Muster at muster station with warm clothing and lifejacket securely fastened	Stage 2 Form work parties to save the ship and attend to casualties	Stage 3 Abandon ship on verbal order of the skipper
	Muster Point	**Emergency Parties**	**Abandon Ship**
Skipper	**Muster point 1. Wheel House** Don lifejacket. Inform Coastguard by radio.	**Maintain communications with Coastguards.**	Issue Verbal command Broadcast Mayday. **Deploy EPIRB and portable VHF.** Ensure all crew has embarked to life rafts. **Take charge of liferaft No 1.**
Mate	**Muster point 1. Wheel House** Don lifejacket Account for all crew.	**Take charge of emergency parties.**	Broadcast to crew, **abandon ship to life rafts** **Deploy first aid kit, flares, SART and take charge of liferaft No 2.**
Bunk 3	**Muster point 2. Boat Deck** Don lifejacket. Ready life rafts for deployment.	**Under mates direction undertake first aid duties.**	Deploy life raft to lee side of vessel, secure painter. **Abandon ship to liferaft 1.**
Bunk 4	**Muster point 2. Boat Deck** Don lifejacket. Ready life rafts for deployment.	**Under mates direction.**	Deploy life raft to lee side of vessel, secure painter. **Abandon ship to liferaft 2.**
Bunk 5	**Muster point 3. Fish Room Hatch** Don lifejacket Await further orders.	**Under mates direction.**	**Abandon ship to liferaft 1.**
Bunk 6	**Muster point 3. Fish Room Hatch** Don lifejacket Await further orders.	**Under mates direction.**	**Abandon ship to liferaft 2.**

Muster List

General Emergency Alarm

- International Standard for General Emergency Alarm
- Seven or more short blasts followed by one long blast on ship’s whistle and general alarm system
- Must have an emergency power source
- Must be operable from the bridge

Crew Member Training (cont)

*Training for **all** crewmembers must include:*

- *What to do in the event of a fire or smoke detector activation.*
- *What to do if fire or abandon ship alarm sounds*
- *How to sound fire alarm*
- *Location and use of Portable Extinguishers*
- *Action during a medical emergency*
- *Passenger safety briefing*
- *Basics of fire prevention on ships*

Crew Member Training (cont)

- Training for crewmembers assigned to fire fighting duties must include:
  - Location and use of Portable Extinguishers
  - Location and use of Mobile Extinguishers
  - Location and use of Fixed Fire Extinguishing Appliances and Systems
  - Location and use of Fire Fighter Outfits
  - Location and use of Fire Control Plans

Crew Member Training (cont)

- All training must:
  - Be realistic but safe
  - Practice personal safety
  - Include machinery space mock fires
  - Include accommodation space mock fires
  - Include cargo spaces and systems

Crew Member Training (cont)

- All fire party training must include:
  - Instruction on job responsibilities
  - Other member job responsibilities
  - Proficiency exercises

Crew Member Drills

DRILLS

- Sound the alarm and crew muster at their emergency station.
- Provision must be made for alternative muster points where fire or smoke makes it impossible to assemble.
- The regular ritual of mechanically performing these duties will contain little training benefit, therefore drills must be as realistic as possible.

Crew Member Drills (cont)

- Fire and emergency pumps started.
- Hoses should be laid out and where practicable, water should be played through them first with the machinery space pump and secondly with the emergency pump with the isolation valve closed.
- Instruction and discharge of extinguishers
- Closing of openings and operation of remote controls

Crew Member Drills (cont)

- Exercises in BA and other emergency appliances
- Examination of appliances not used at that drill
- At least one extinguisher let off by a different member of crew
- Instruction in fire prevention and other emergency subjects

Crew Member Drills (cont)

A different officer devises a scenario for each drill, either:

- The exercise is performed in slow Motion
- Time with full instruction.
- Proper emergency response.

Crew Member Drills (cont)

- It is excellent practice in drills to occasionally take the leader out of the emergency structure so the second in command can have an opportunity in taking on this difficult task.

Crew Member Drills (cont)

- The drill must be followed by a full debrief as there will always be mistakes and misunderstandings.
- Never surprise your crew with a drill, always give some forewarning even if it is not too precise. Where a public address system is installed, a message must be prefaced “This is a drill”.

Fire Patrols

Fire patrol member training includes:

- Instruction on ship arrangement
- Manually operated call points
- Fixed Detection and Alarm Systems
- Communication Systems
- Portable Fire Extinguishers
- Fire Hydrants, Hoses and Nozzles
- Passenger vessels - 22:00–07:00

Liaison with Shore Based Firefighters

- Approximately 65 percent of all fires occur in Port.
- This liaison is vital when a ship is in Port for any length of time and especially when the ship's company is depleted by shore leave.
- The owners of a ship have a legal right to control access to their ship, and to decide what assistance the ship may require. They may also dispense with assistance already accepted, for any reason, but in doing so may incur legal liability.

Liaison with Shore Based Fire-fighters (cont)

In the event of a fire on board your vessel, a fire officer will require a briefing and ask you some of the following questions. This First one being.

Is there anyone missing?

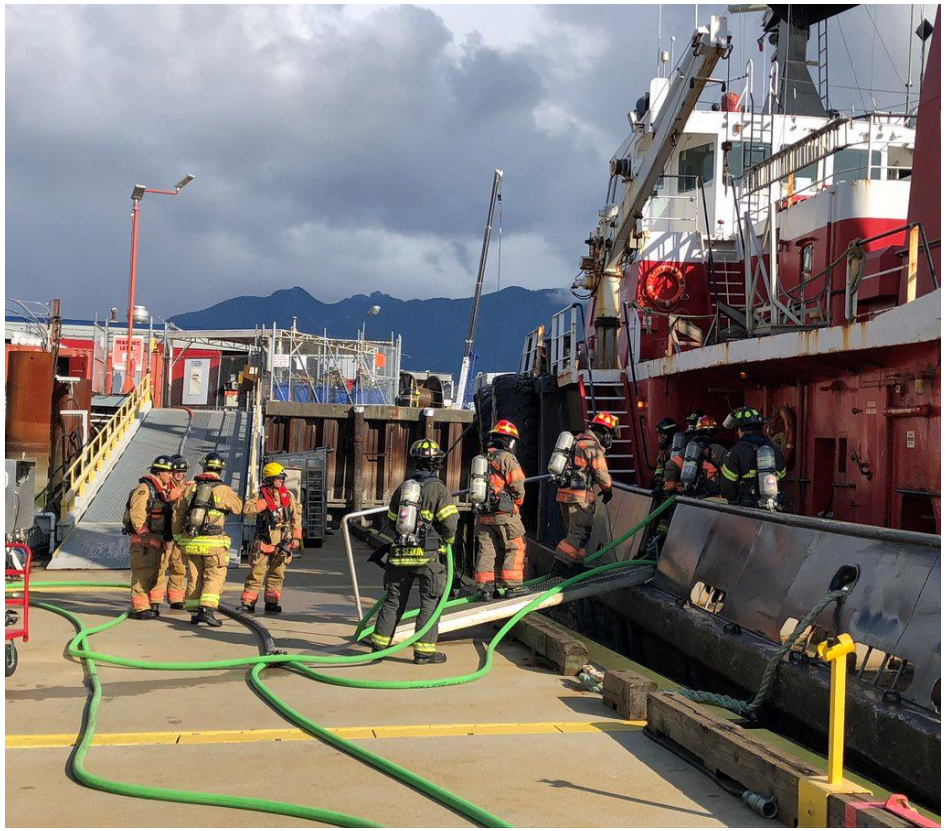
Liaison with Shore Based Fire-fighters (cont)

Additional questions that may be asked:

- Where is the fire?
- What sort of fire is it?
- Is there any danger of electricity in the compartment? (i.e. high voltage)
- How long has the fire been burning?
- How did the fire start?
- What has been or is being done about it?

Liaison with Shore Based Firefighters (cont)

- What is the state of the fire main?
- What is the state of the fire party?
- How much water has been pumped into the ship?
- How critical is stability at present?
- How many access points are there?
- Are there dangerous goods on board?



Liaison with Shore Based Firefighters (cont)

- Accountability! Control entry and exit of the vessel
- Treat all shipboard fire incidents like a hazardous material or technical rescue call **slow and methodical**

Liaison with Shore Based Firefighters

- Avoid mooring areas.
- Use crew members for guidance.
- Use your own equipment.
- 800 radio system may not work!

Liaison with Shore Based Firefighters (cont)

The following indicates areas for consideration for ships crews alongside.

- How emergency services are summoned (VHF, telephone)?
- Invite fire crews aboard to familiarize themselves with the layout and other peculiarities of the ship
- Arrange training exercises with the Fire Brigade and ship's crew working together

Liaison with Shore Based Firefighters (cont)

Additional considerations will be:

- Learn how the local Brigade works and what its plans are for a ship fire
- Always have a fire wallet available containing stability data, fire plans, ventilation& bilge plans, cargo manifest
- Does the port have a local disaster plan? If so obtain a copy and determine what support can be expected from Port Authorities

Liaison with Shore Based Fire-fighters (cont)

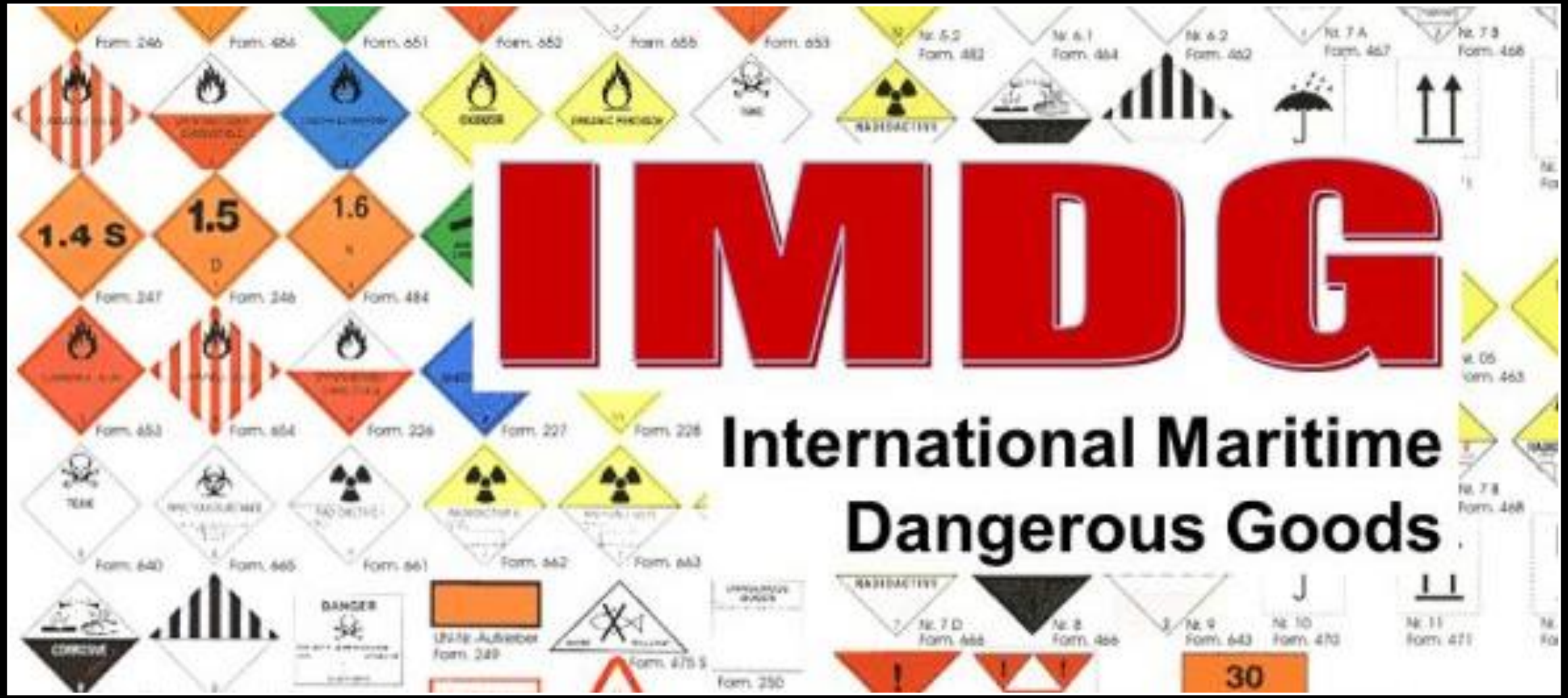
Additional considerations will be:

- Are Brigade hose couplings compatible with the ship’s fire main?
- Ensure pier sides are always clear, allowing access for emergency vehicles
- Always arrange to have a responsible officer to meet the Brigade at the top of the gangway

Liaison with Shore Based Firefighters (cont)

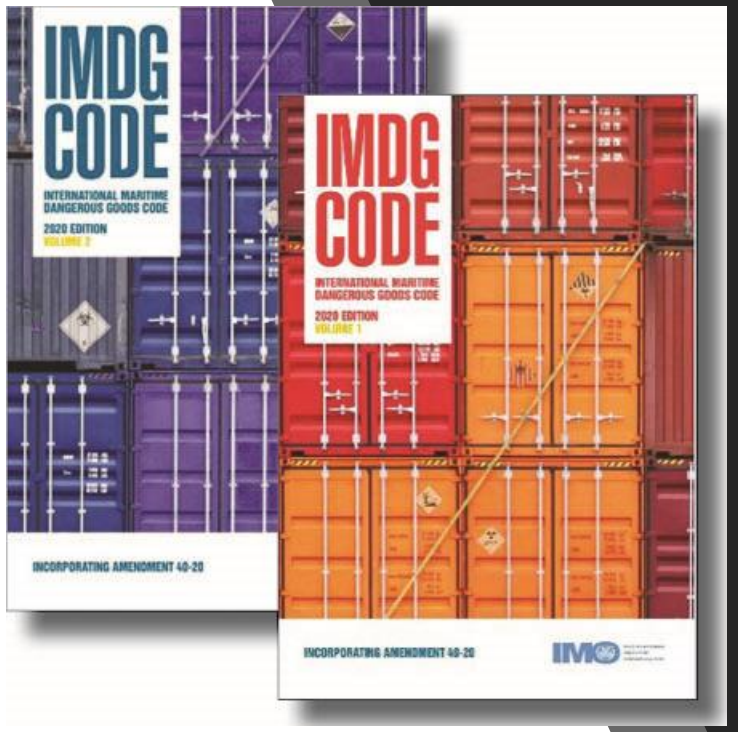
Additional considerations will be:

- What arrangements are there for extra foam supplies?
- What arrangements are there for obtaining additional supplies of carbon dioxide: bulk supplies, cylinders
- What arrangements are there to make available, fire tugs/boats if ship is anchored offshore



IMDG CODE

IMDG CODE



- IMDG Code or International Maritime Dangerous Goods Code is accepted as an international guideline to the safe transportation or shipment of dangerous goods or hazardous materials by water on vessel.

- The code is intended to protect crew members and to prevent marine pollution in the safe transportation of hazardous materials by vessel. It is recommended to governments for adoption or for use as the basis for national regulations.

DANGEROUS GOODS CLASSES

CLASS 1 Explosives eg. TNT		**CLASS 4.3** Dangerous when wet eg. Calcium Carbide	
CLASS 2.1 Flammable Gases eg. Acetylene		**CLASS 5.1** Oxidising Substances eg. Silver Nitrate	
CLASS 2.2 Non-Flammable Non-Toxic Gases eg. Nitrogen		**CLASS 5.2** Organic Peroxides eg. Methyl Ethyl Ketone Peroxide	
CLASS 2.3 Toxic Gases eg. Chlorine		**CLASS 6** Toxic Substances eg. Sodium Cyanide	
CLASS 3 Flammable Liquids eg. Petrol		**CLASS 7** Radioactive Substances eg. Uranium	
CLASS 4.1 Flammable Solids eg. Sulfur		**CLASS 8** Corrosive Substances eg. Hydrochloric Acid	
CLASS 4.2 Spontaneously Combustible Substances eg. Zinc Dust		**CLASS 9** Miscellaneous eg. Asbestos	

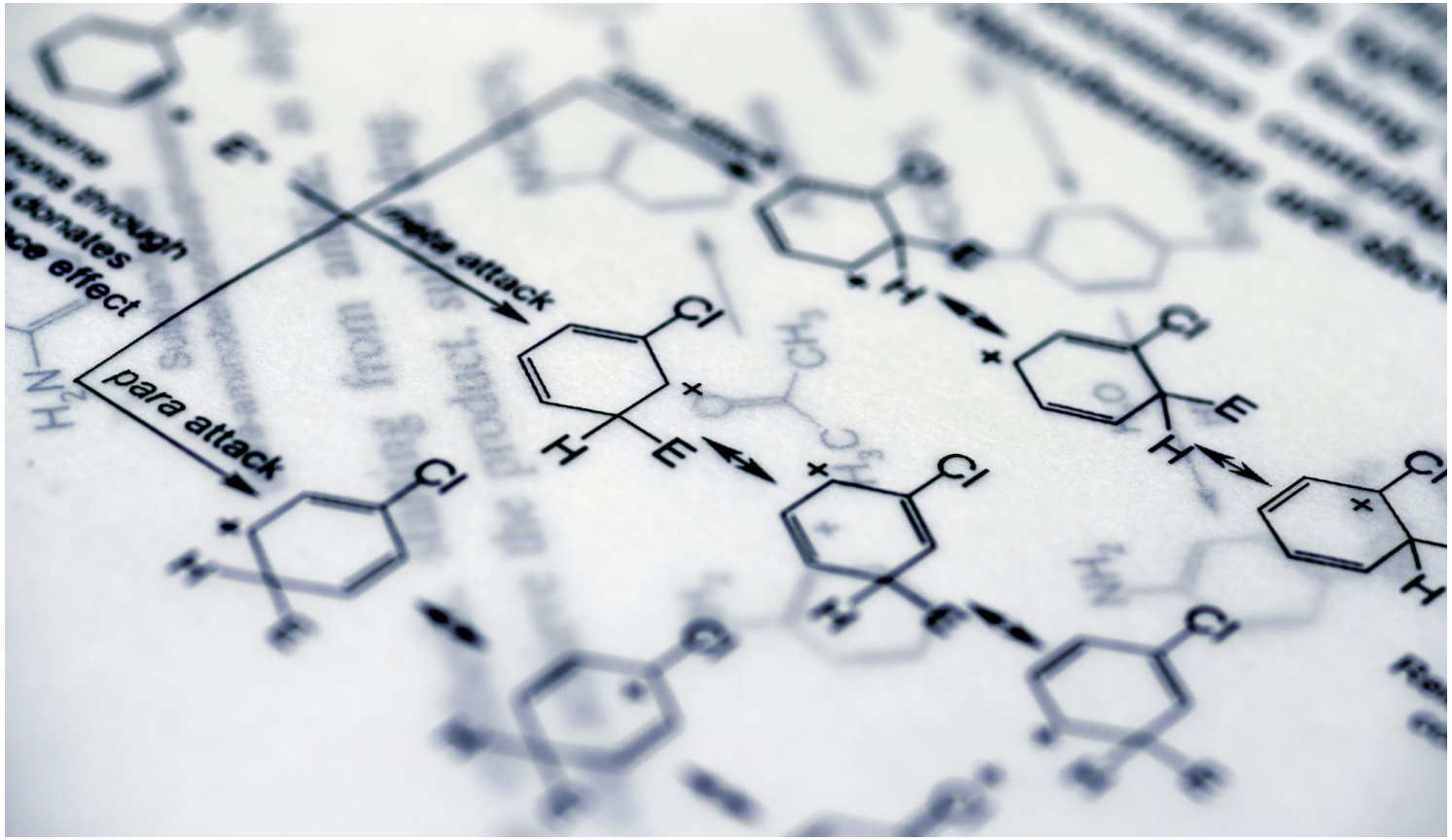
DANGEROUS GOODS PACKING GROUPS

PACKING GROUP I	GREAT DANGER
PACKING GROUP II	MEDIUM DANGER
PACKING GROUP III	MINOR DANGER

IMDG

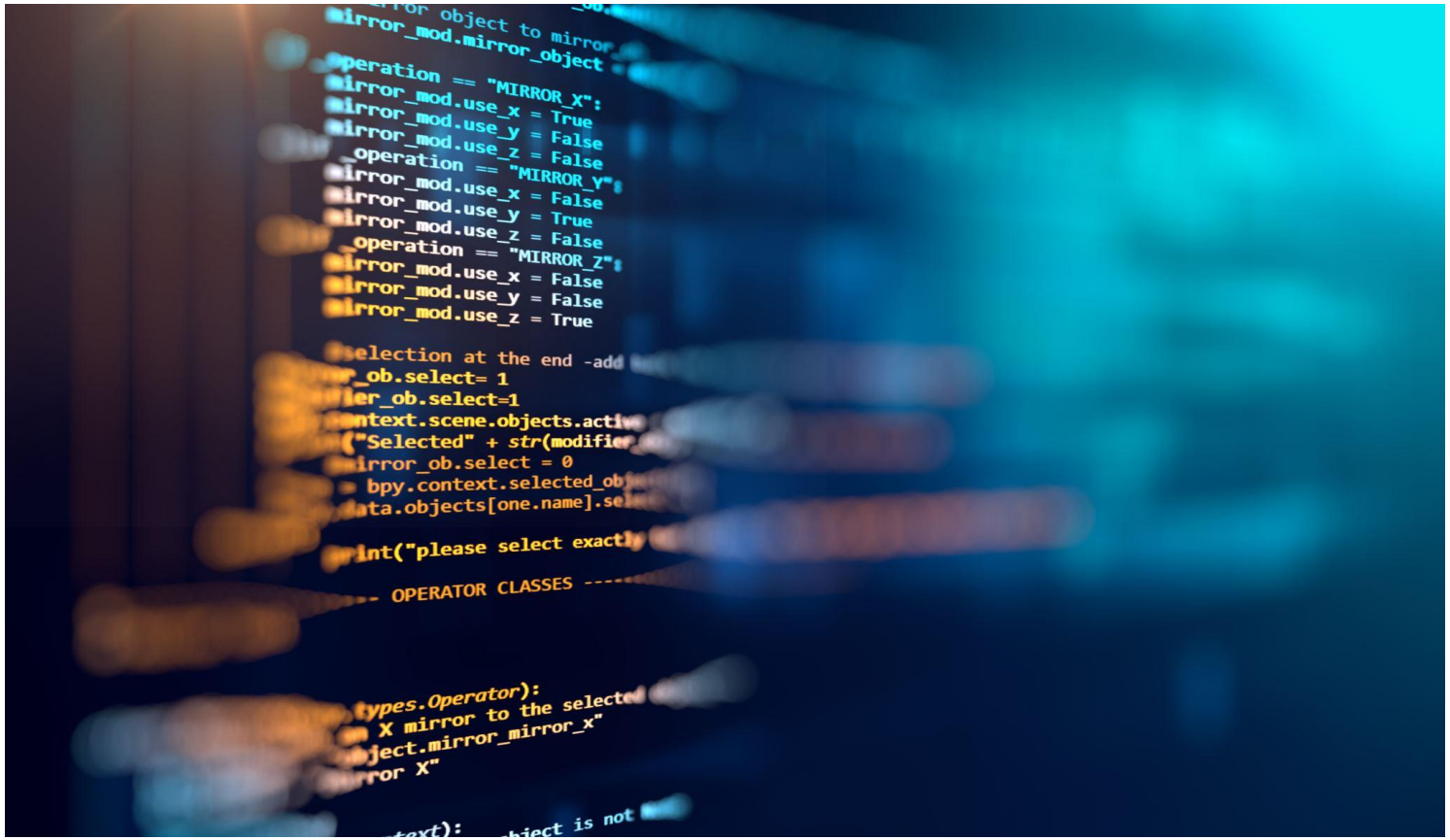
- **Classification in the IMDG Code is as follows**
- **ERG - Emergency Response Guidebook**

IMDG CODE



- The IMDG code consists of two volumes and one supplement.
- Volume 1 contains sections on:
- General provisions, definitions, training
- Classification
- Packing and tank provisions
- Consignment procedures
- Construction and testing of packaging
- Transport operations

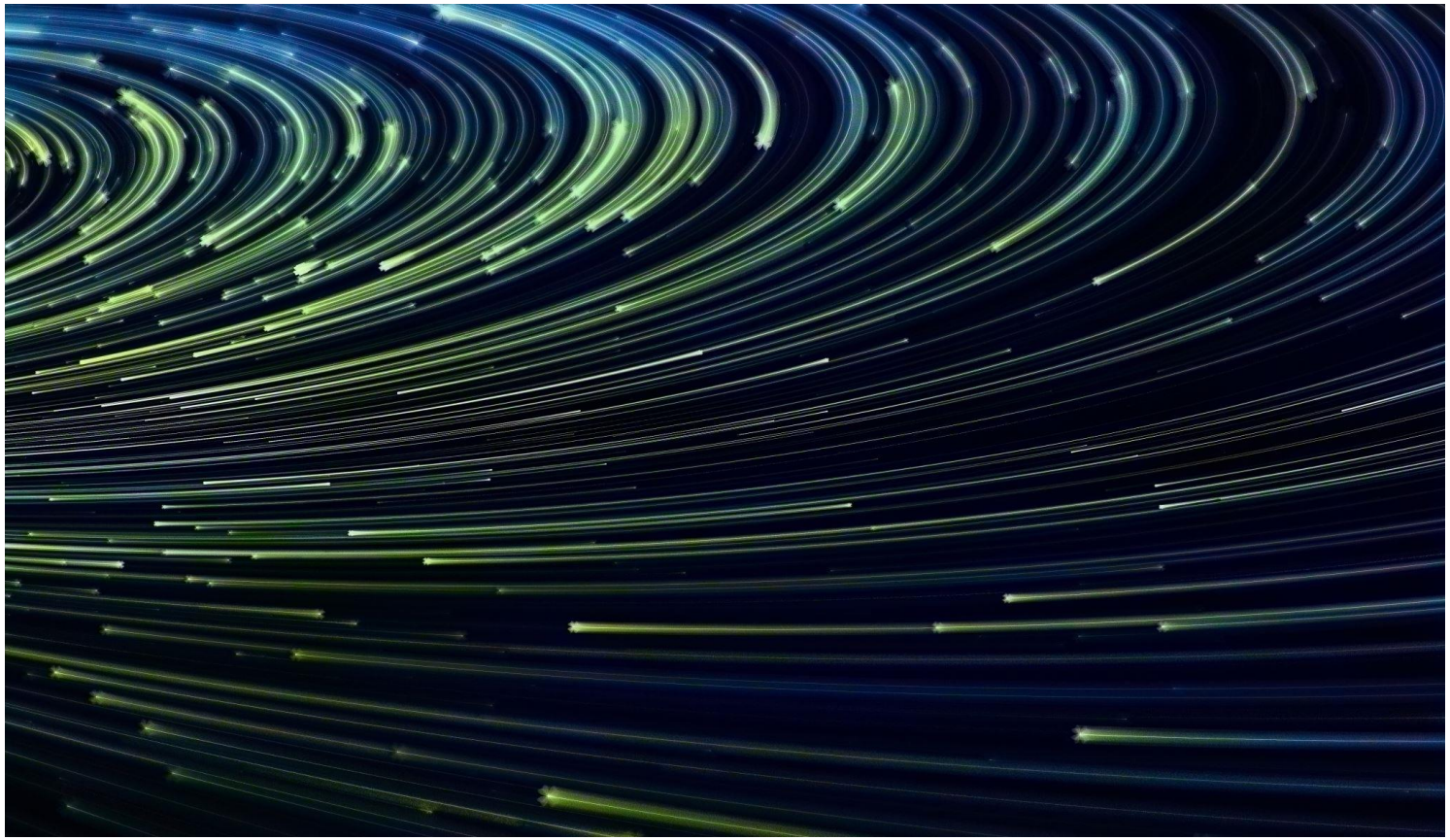
IMDG CODE



Volume 2 contains:

- Dangerous Goods List, presented in tabular format
- limited quantities exceptions
- The Index
- Appendices

IMDG CODE



The Supplement contains the following texts related to the IMDG Code:

- EMS Guide
- Medical First Aid Guide
- Reporting Procedures
- Packing Cargo Transport Units
- Safe Use of Pesticides
- INF Code

IMDG CODE

- The Emergency Schedules Guide (ESG) contains guidance on Emergency Response Procedures for Ships Carrying Dangerous Goods including the ESG to be followed in case of incidents involving dangerous substances, materials or articles, or harmful substances (marine pollutants),
- The Emergency Schedules for FIRE contains specific guidance for ten groups of dangerous goods and gives general guidelines for dealing with fires onboard
- The fire-fighting procedures within the ESG SCHEDULES are different for "on deck" and "under deck" stowage. For specific ship types (hatch less container ships) or cargo holds (open vehicle decks of ferries), these two procedures must be assigned specifically to the individual ship.

IMDG CODE

Dangerous Goods

The International Maritime Dangerous Goods Code (IMDG) gives specific details on the carriage of Dangerous Goods in packaged form, solid or bulk. In short safe carriage can be achieved by:

- Good packaging
- Correct marking, labelling and placarding
- Appropriate segregation
- Complete documentation

Cargo Transport Units

- Many incidents in transport are caused by poor practices in the packing of CTU's. CTU's are Cargo Transport Units. Examples of poor practices:
  - • inadequate securing of the cargo
    • overloading
    • incorrect declaration of contents

- The CTU Code is a joint publication of the International Maritime Organization (IMO), the International Labor Organization (ILO) and the United Nations Economic Commission for Europe (UNECE). The Code addresses these concerns through a global code of practice for the handling and packing of shipping containers for transportation by sea and land.

Cargo Transport Units

Shipper's information

Recipient's information

Airport of destination

HAZMAT name, classification, packaging information

Emergency contact information

SHIPPER'S DECLARATION FOR DANGEROUS GOODS

Shipper: TRAFFIC MANAGEMENT FLIGHT
5236 CHASE ST
WRIGHT PATTERSON AFB, OH 45433-5501
PHONE NUMBER: (793)257-4409 DSN:787-4409

Air Waybill No.
Page 1 of 1 Pages
Shipper's Reference Number (optional)
FB230001809002XXX

Consignee: FB 5612
435 ABW LRS
RAMSTEIN AB, GERMANY

Person Responsible for Shipment:
Two completed and signed copies of this Declaration must be handed to the operator.

WARNING
Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties.

TRANSPORT DETAILS
This shipment is within the limitations prescribed for: (delete non-applicable)
PASSENGER AIRCRAFT XXXX CARGO AIRCRAFT ONLY
Airport of Departure: DOV DOVER AFB, DE

Airport of Destination: RAMSTEIN AB, GERMANY
Shipment Type (delete non-applicable): NON-RADIOACTIVE XXXXX

NATURE AND QUANTITY OF DANGEROUS GOODS

Dangerous Goods Identification: UN or ID No.	Proper Shipping Name	Class or Division (Subsidiary Risk)	Packing Group	Quantity and Type of Packing	Packing Instruction	Authorization
UN0321	Cartridges for Weapons	1.2.1E	II	1 Wooden pallet X 221.467 KG NEW	A5.12	

Additional Handling Information
Emergency Telephone Number (703) 697-0218/0219

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to the applicable international and national governmental regulations. I declare that all of the applicable air transport requirements have been met.

Name/Title of Signatory: George Jones
Transportation Officer
Place and Date: WP AFB, OH 45433 3 Jan 2011
Signature (see warning above)

Source: TRANSCOM.

IMDG CODE

- The IMDG Code specifically states that it does not apply to ship’s stores and equipment, however many dangerous or potentially dangerous chemicals are carried.
- These will vary according to the type of ship. If ship’s stores are stowing dangerous goods according to the IMDG Code this would show that all precautions had been taken in the event of an accident.

IMDG Code

Segregation

The following table shows the general provisions of segregation between the various classes of dangerous goods.

Class	1.1 1.2 1.5	1.3 1.6	1.4	2.1	2.2	2.3	3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7	8	9
Explosives 1.1, 1.2, 1.5	*	*	*	4	2	2	4	4	4	4	4	4	2	4	2	4	X
Explosives 1.3, 1.6	*	*	*	4	2	2	4	3	3	4	4	4	2	4	2	2	X
Explosives 1.4	*	*	*	2	1	1	2	2	2	2	2	2	X	4	2	2	X
Flammable gases 2.1	4	4	2	X	X	X	2	1	2	X	2	2	X	4	2	2	X
Non- toxic, non- flammable gases 2.2	2	2	1	X	X	X	2	1	2	X	1	X	X	2	1	X	X
Toxic gases 2.3	2	2	1	X	X	X	2	X	2	X	X	2	X	2	1	X	X
Flammable liquids 3	4	4	2	2	1	2	X	X	2	1	2	2	X	3	2	X	X
Flammable solids (including self-Reactive substance and solid 4.1 Desensitized explosion)	4	3	2	1	X	X	X	X	1	X	1	2	X	3	2	1	X
Substances liable to Spontaneous combustion 4.2	4	3	2	2	1	2	2	1	X	1	2	2	1	3	2	1	X
Substances which, in contact 4.3 With water, emit flammable gases	4	4	2	X	X	X	1	X	1	X	2	2	X	2	2	1	X
Oxidizing substances (agents) 5.1	4	4	2	2	X	X	2	1	2	2	X	2	1	3	1	2	X
Organic peroxides 5.2	4	4	2	2	1	2	2	2	2	2	2	X	1	3	2	2	X
Toxic substances 6.1	2	2	X	X	X	X	X	X	1	X	1	1	X	1	X	X	X
Infectious substances 6.2	4	4	4	4	2	2	3	3	3	2	3	3	1	X	3	3	X
Radioactive material 7	2	2	2	2	1	1	2	2	2	2	1	2	X	3	X	2	X

- The segregation table provided in IMDG Code 7.2.4 (see below) identifies general requirements for separation between hazard classes and divisions.

IMDG Code

Class		1.1 1.2 1.5	1.3 1.6	1.4	2.1	2.2	2.3	3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7	8	9
Explosives	1.1 /1.2 /1.5	*	*	*	4	2	2	4	4	4	4	4	4	2	4	2	4	X
Explosives	1.3 / 1.6	*	*	*	4	2	2	4	3	3	4	4	4	2	4	2	2	X
Explosives	1.4	*	*	*	2	1	1	2	2	2	2	2	2	X	4	2	2	X
Flammable gases	2.1	4	4	2	X	X	X	2	1	2	2	2	2	X	4	2	1	X
Non-toxic, non-flammable gases	2.2	2	2	1	X	X	X	1	X	1	X	X	1	X	2	1	X	X
Toxic gases	2.3	2	2	1	X	X	X	2	X	2	X	X	2	X	2	1	X	X
Flammable liquids	3	4	4	2	2	1	2	X	X	2	2	2	2	X	3	2	X	X
Flammable solids**	4.1	4	3	2	1	X	X	X	X	1	X	1	2	X	3	2	1	X
Substances liable to spontaneous combustion	4.2	4	3	2	2	1	2	2	1	X	1	2	2	1	3	2	1	X
with water, emit flammable gases	4.3	4	4	2	2	X	X	2	X	1	X	2	2	X	2	2	1	X
Oxidizing substances (agents)	5.1	4	4	2	2	X	X	2	1	2	2	X	2	1	3	1	2	X
Organic peroxides	5.2	4	4	2	2	1	2	2	2	2	2	2	X	1	3	2	2	X
Toxic substances	6.1	2	2	X	X	X	X	X	X	1	X	1	1	X	1	X	X	X
Infectious substances	6.2	4	4	4	4	2	2	3	3	3	2	3	3	1	X	3	3	X
Radioactive material	7	2	2	2	2	1	1	2	2	2	2	1	2	X	3	X	2	X
Corrosive substances	8	4	2	2	1	X	X	X	1	1	1	2	2	X	3	2	X	X
Miscellaneous dangerous substances and articles	9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Numbers and symbols relate to the following terms as defined in this chapter:

X - Segregation, if any, is shown in the Dangerous Goods List

1 - "Away from".

2 - "Separated from".

3 - "Separated by a complete compartment or hold from".

4 - "Separated longitudinally by an intervening complete compartment or hold from".

* See IMDG Code 7.2.7.2

** - Including self-reactive substances and desensitized explosives.

The numbers in the segregation table represent:

1. away from
2. separated from
3. separated by a complete compartment or hold
4. separated longitudinally by an intervening complete compartment or hold

- X Consult the Dangerous Goods List (DGL) to identify any specific segregation provisions

Inspection and servicing Fire Equipment

Inspect, Service & Operate Firefighting Equipment

- All firefighting equipment should have an inspection and maintenance cycle
- Some fire equipment can be inspected and serviced by the crew
- Some equipment must be inspected and serviced by a outside company

Inspect, Service & Operate Firefighting Equipment

Competent Person

- Carries out the work on-board under direct supervision of a senior officer holding an advanced firefighting certificate (experienced person holding a Merchant Shipping STCW II/2 or III/2 certificate of competency and an Advanced Fire Fighting certificate).
- All work should be carried out as part of a planned maintenance system with all necessary procedures, work instructions, manuals, tools, spares and calibrated test equipment readily available; or
- An accredited service agent

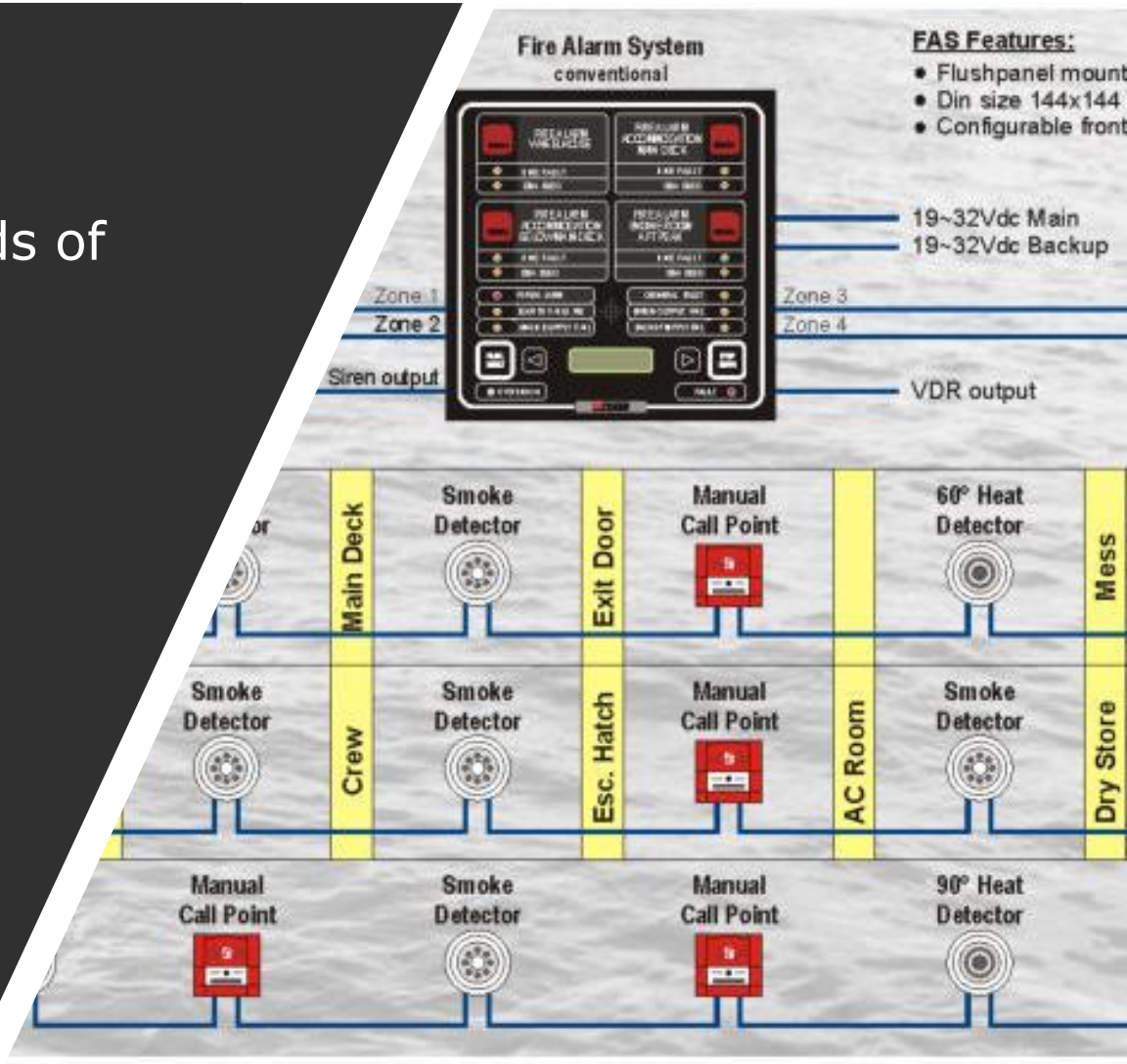
Fire Detection Systems

Fire Alarm Control Panel

- Brain of the system
- Located on the bridge
- Make the system operational within 30 seconds of main power failure

Possible Automatic Functions:

- A/C Shutdown
- Close Fire Doors & Vent Dampers
- Operate certain ventilation systems
- Override Elevators
- Activate fixed systems
- Shutdown Engines & Machinery



Inspect, Service & Operate Firefighting Equipment

Weekly testing and inspections

- **Fixed fire detection and alarm systems**
- verify all fire detection and fire alarm control panel indicators are functional by operating the lamp/indicator test switch.

Monthly testing and inspections

- **Fixed fire detection and alarm systems**
- test a sample of detectors and manual call points so that all devices have been tested within five years. For very large systems the sample size should be determined by the Ship Registry.

Inspect, Service & Operate Firefighting Equipment

Annual testing and inspections

- **Fixed fire detection and fire alarm systems**
- test all fire detection systems and fire detection systems used to automatically release fire-extinguishing systems for proper operation, as appropriate;
- visually inspect all accessible detectors for evidence of tampering obstruction, etc., so that all detectors are inspected within one year; and
- test emergency power supply switchover.

CO2 Fix Systems

Fixed gas fire-extinguishing systems

Weekly testing and inspections

- verify all fixed fire-extinguishing system control panel indicators are functional by operating the lamp/indicator test switch
- verify all control/section valves are in the correct position.

Monthly testing and inspections

- verify containers/cylinders fitted with pressure gauges are in the proper range and the installation free from leakage.

Fixed gas fire-extinguishing systems

Annual testing and inspections

- visually inspect all accessible components for proper condition;
- externally examine all high-pressure cylinders for evidence of damage or corrosion;
- check the hydrostatic test date of all storage containers;
- functionally test all fixed system audible and visual alarms;
- verify all control/section valves are in the correct position;
- check the connections of all pilot release piping and tubing for tightness;
- examine all flexible hoses in accordance with manufacturer’s recommendations;
- test all fuel shut-off controls connected to fire-protection systems for proper operation;

Fixed gas fire-extinguishing systems

Annual testing and inspections

- Test all fuel shut-off controls connected to fire-protection systems for proper operation
- If cylinders are installed inside the protected space, verify the integrity of the double release lines inside the protected space, and check low pressure or circuit integrity monitors on release cabinet, as applicable
- Bottle Hydro - 12/ 10

Fixed gas fire-extinguishing systems

Two-year testing and inspections

- All high-pressure extinguishing agents' cylinders and pilot cylinders must be weighed. or have their contents verified by other reliable means to confirm that the available charge in each is above 95% of the nominal charge. Cylinders containing less than95% of the nominal charge should be refilled
- Blow dry compressed air or nitrogen through the discharge piping or otherwise confirm the pipe work and nozzles are clear of any obstructions. This may require the removal of nozzles, if applicable.

Fixed gas fire-extinguishing systems

Ten-year service

- Perform a hydrostatic test and internal examination of 10% of the system’s extinguishing agent and pilot cylinders.
- If one or more cylinders fail, a total of 50%of the onboard cylinders should be tested. If further cylinders fail, all cylinders should be tested;
- Flexible hoses should be replaced at the intervals recommended by the manufacturerand not exceeding every 10 years

Fixed gas fire-extinguishing systems

Table 8.1
Minimum Percentages of Carbon Dioxide Needed to Extinguish Fires in Various Materials

Material	Carbon Dioxide (Percent)
Most flammable liquids	34
Most combustible materials	65
Dry electrical wiring insulation	50
Small electrical machines Wire enclosures (under 2,000 cubic feet [57 m^2])	50
Record (bulk paper) storage Ducts	65
Fur storage vaults Dust collectors	75
Acetylene	66
Coal or Natural Gas Benzene	37
Gasoline Butane Kerosene	34
Quench and lube oils	34
Hydrogen	78

For more information, see *Fire Protection Handbook*, 18th edition, National Fire Protection Association, 1997.

Water mist, water spray and sprinkler systems

- **Weekly testing and inspections**
  - verify all control panel indicators and alarms are functional;
  - visually inspect pump unit and its fittings; and
  - check the pump unit valve positions, if valves are not locked, as applicable.

Water mist, water spray and sprinkler systems

Monthly testing and inspections

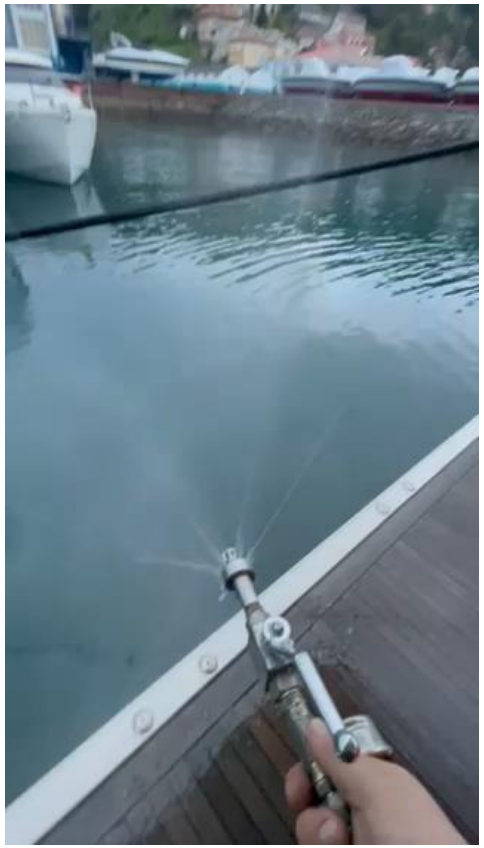
- verify all control, pump unit and section valves are in the proper open or closed position
- verify sprinkler pressure tanks or other means have correct levels of water
- test automatic starting arrangements on all system pumps so designed
- verify all standby pressure and air/gas pressure gauges are within the proper pressure ranges
- test a selected sample of system section valves for flow and proper initiation of alarms.

Water mist, water spray and sprinkler systems

Annual testing and inspections

- verify proper operation of all water mist, water-spray and sprinkler systems using the test valves for each section;
- visually inspect all accessible components for proper condition;
- externally examine all high-pressure cylinders for evidence of damage or corrosion;
- check the hydrostatic test date of all high-pressure cylinders;
- functionally test all fixed system audible and visual alarms;
- flow test all pumps for proper pressure and capacity;
- test all antifreeze systems for adequate freeze protection;

Water High Fog /Foam



Water mist, water spray and sprinkler systems

- **Annual testing and inspections**
- test all system cross connections to other sources of water supply for proper operation;
- verify all pump relief valves, if provided, are properly set;
- examine all filters/strainers to verify they are free of debris and contamination;
- verify all control/section valves are in the correct position;
- blow dry compressed air or nitrogen through the discharge piping of dry pipe systems, or otherwise confirm the pipework and nozzles are clear of any obstructions. This may require the removal of nozzles, if applicable;

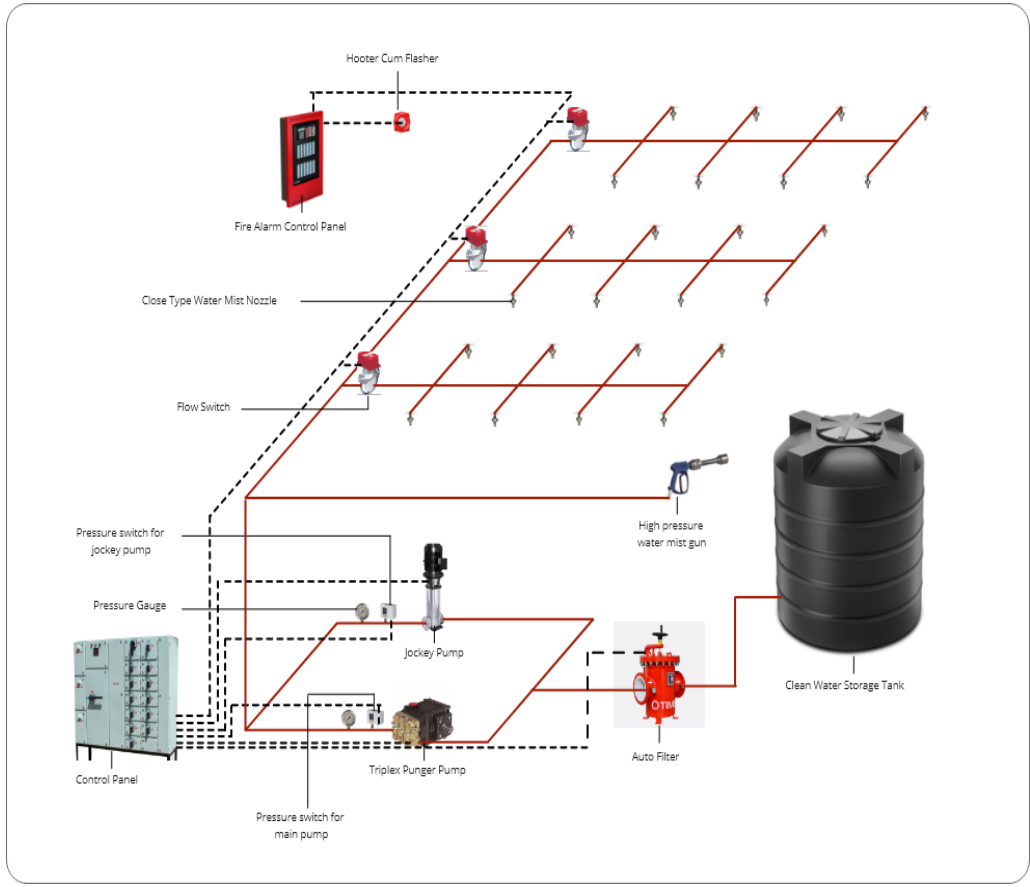
Water mist, water spray and sprinkler systems

- **Annual testing and inspections**
- test emergency power supply switchover, where applicable;
- visually inspect all sprinklers focusing in areas where sprinklers are subject to aggressive atmosphere (like saunas, spas, kitchen areas) and subject to physical(like luggage handling areas, gyms, playrooms, etc.) so that all sprinklers are inspected within one year. Sprinklers with obvious external damage, including paint must be replaced;
- check for any changes that may affect the system such as obstructions by ventilation ducts, pipes, etc.;
- test a minimum of one section in each open head water mist system by flowing water through the nozzles. The sections tested should be chosen so that all sections are tested within a five-year period; and
- test automatic and automatic water mist nozzles in accordance with the flow chart included in MSC.1/Circ. 1516.

Water mist, water spray and sprinkler systems

Five-year service

- Water mist, water spray and sprinkler systems
- flush all ro-ro deluge system piping with water, drain and purge with air;
- perform internal inspection of all control/section valves; and
- check condition of any batteries or renew in accordance with manufacturer's recommendations.



Water mist, water spray and sprinkler systems

Ten-year service

- Systems should be inspected and tested by a **competent person** as per the manufacturer's instructions, and as a minimum should include the following;

- Perform a hydrostatic test and internal examination for gas and water pressure cylinders according to EN 1968:2002.

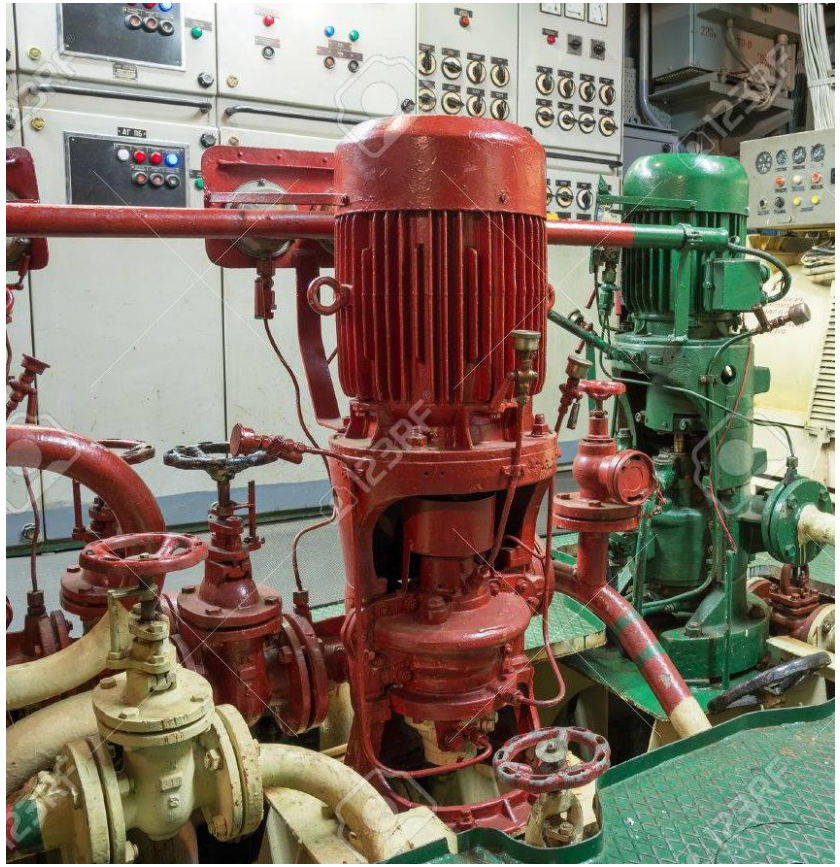
Fire Mains, Fire Pumps, Hydrants, Hoses and Nozzles

Monthly testing and inspections

- verify all fire hydrants, hose and nozzles are in place, properly arranged and are in serviceable condition;
- operate all fire pumps to confirm that they continue to supply adequate pressure;
- emergency fire pump fuel supply adequate, and heating system in satisfactory condition, if applicable.

Quarterly testing and inspections

- verify international shore connection(s) is in serviceable condition.



Fire Mains, Fire Pumps, Hydrants, Hoses and Nozzles

Annual testing and inspections

- flow test all fire pumps for proper pressure and capacity. Test emergency fire pump with isolation valves closed
- test all hydrant valves for proper operation
- pressure test a sample of fire hoses at the maximum fire main pressure, so that all fire hoses are tested within five years;
- verify all fire pump relief valves, if provided, are properly set;
- confirm nozzle size/type correct, maintained and working.

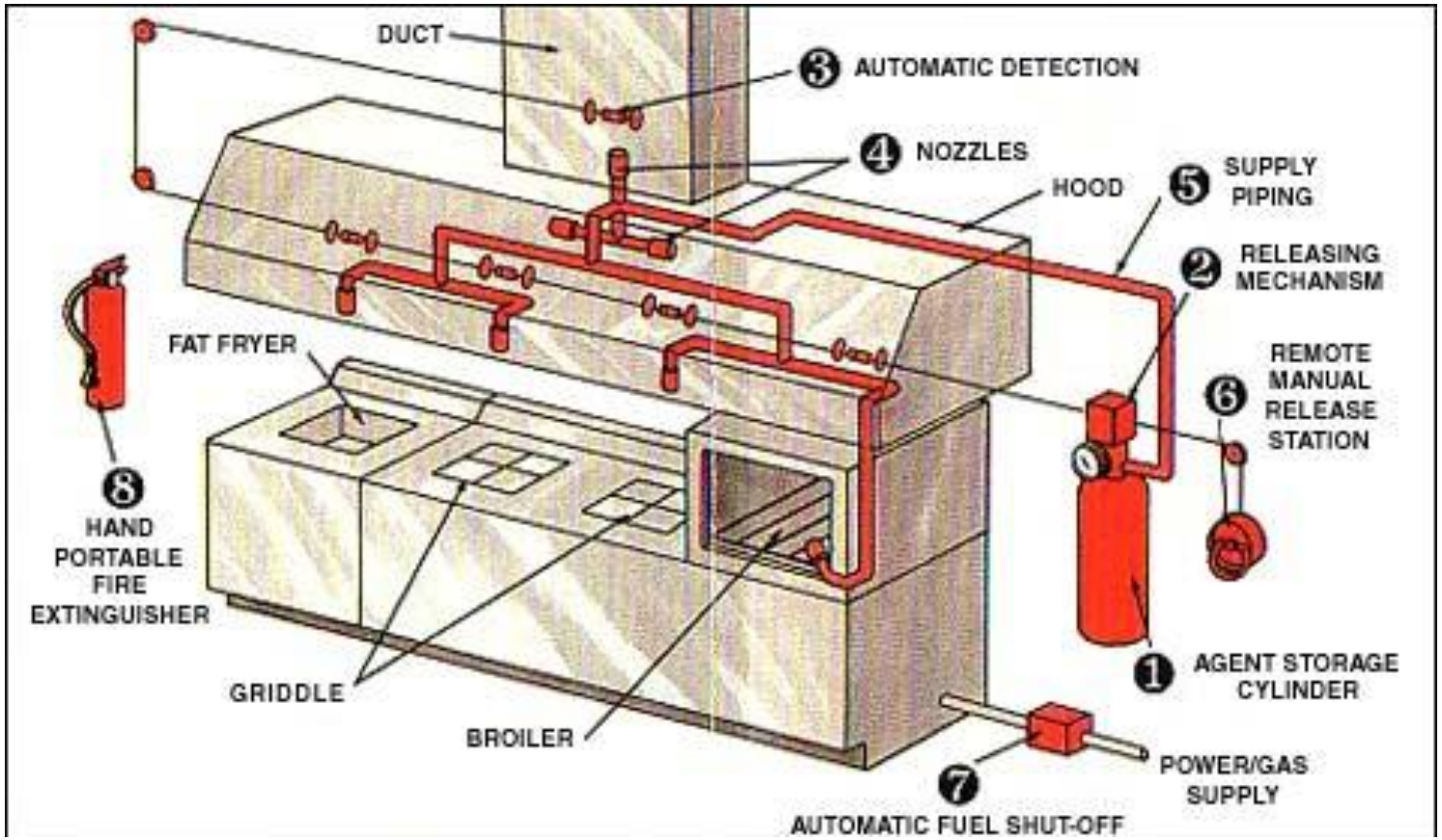
Fire Hose

NFPA 1962: Standard for the Care of fire hose appliances.

- Fire hose tested Annually.
- Inspected monthly or after every use.
- Inspect all hose for dirt in couplings, missing gaskets, damaged threads

Nozzles

- Used to shape fire stream and direct water onto the fire
- Can be bail operated or twist type



Galley Systems

Galley inspection:

Galley and deep fat cooking fire-extinguishing systems:

- Replace Fusible link every 6 months
- Clean Filters
- Check Cylinders
- Clean Nozzles

Fire Fighting Foam Concentrate

Hydrocarbon & Polar Solvent

Flammable Liquids are typically one of two types:

Hydrocarbons:

- Gasoline
- Diesel Fuel
- Oil (Bunkers)

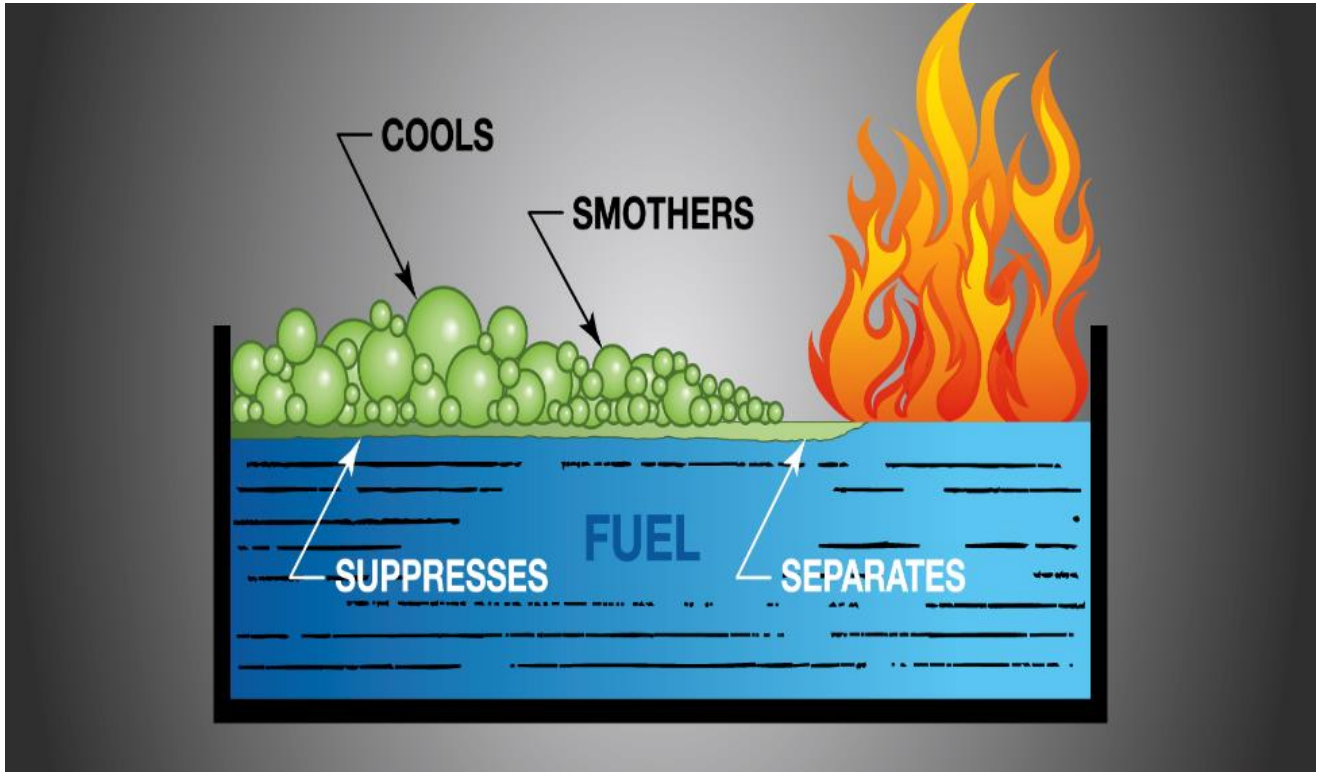
Polar solvents:

- Alcohol
- Acetone
- Ethanol

Class A Foam Concentrate

- Improves effectiveness by reducing the surface tension of water thereby allowing penetration through Class **A** materials.

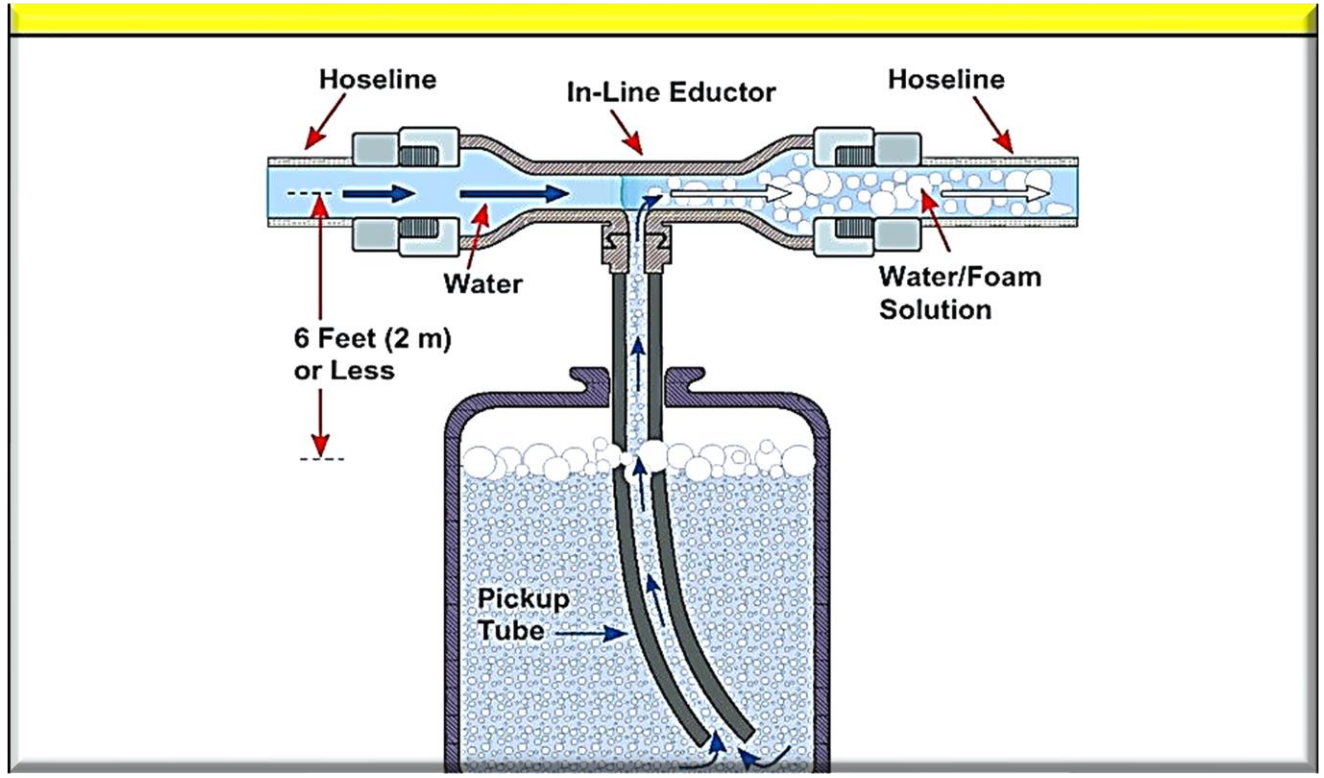
Fire Fighting Foams



- Foam is lighter than the burning liquid, so it floats across the fuels surface.

- What are the 3 extinguishing actions of foam?
  - Cooling
  - Smothering
  - Separating

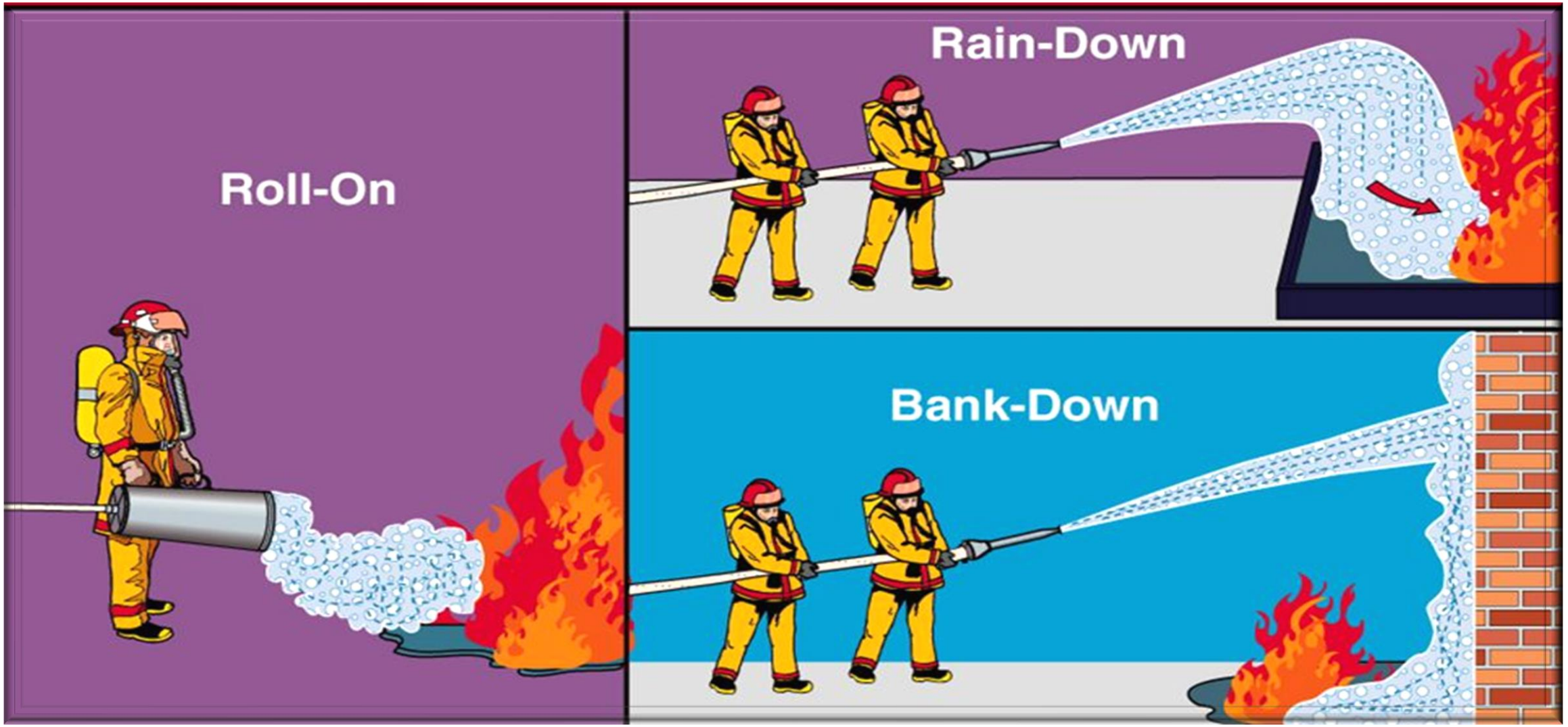
Proportioning



Foam Proportioner:

- The device that introduces foam concentrate into the water stream at a metered rate.

Application Method



Foam Equipment

Monthly:

- Verify all portable foam applicators are in place, properly arranged, and are in proper condition.

Quarterly testing and inspections

- Verify the proper quantity of foam concentrate is provided in the foam system storage tank.

Annual testing and inspections

- Verify all portable foam applicators are set to the correct proportioning ratio for the foam concentrate supplied and the equipment is in proper order
- Verify all portable containers or portable tanks containing foam concentrate remain factory sealed, and the manufacturer's recommended service life interval has not been exceeded.

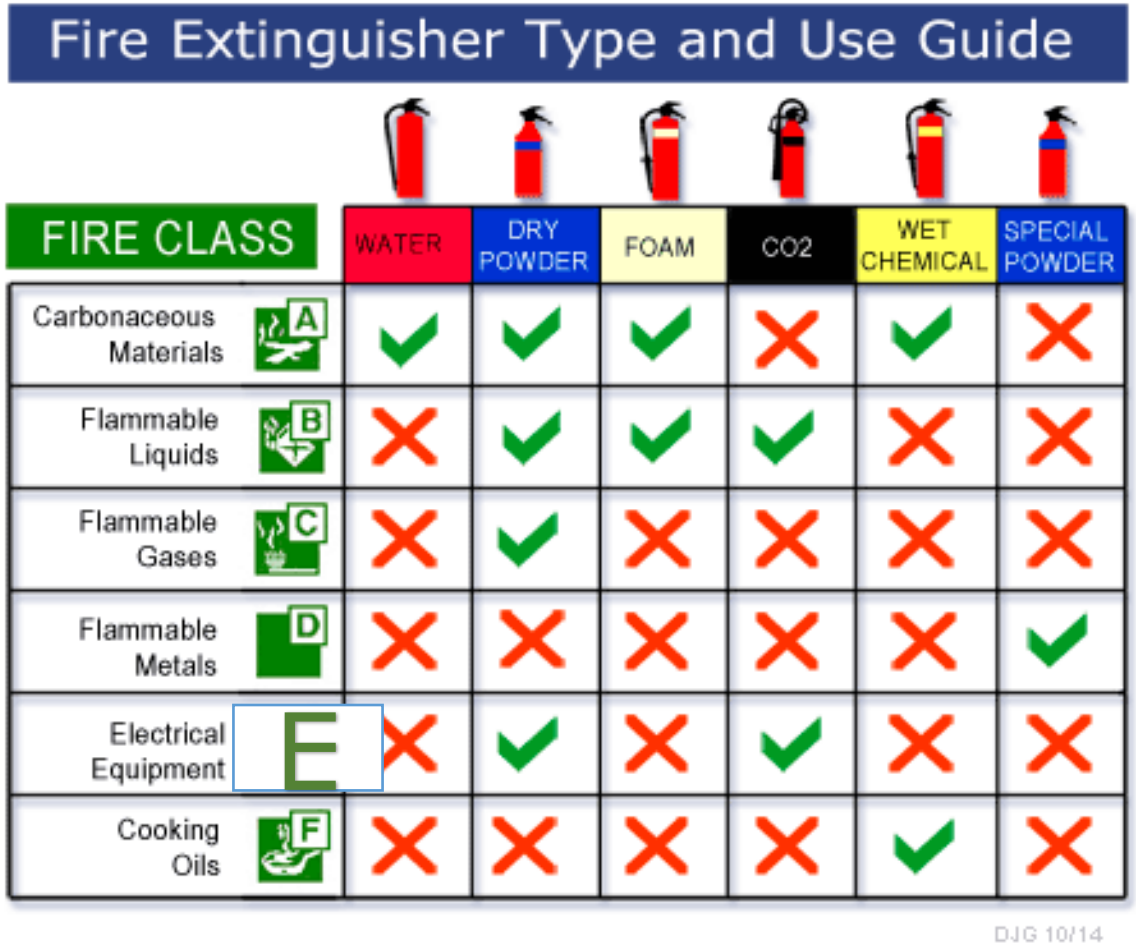
Portable Fire Extinguishers

Fire Ext Classifications: US/Canada (ANSI & UL711/ULC-S508) vs. EU/UK (EN3-7/BS 5306-3 & BS 5423)

Portable fire extinguishers are classified by the type of fires they are designed to extinguish. There are five basic classifications of fuel and extinguishers, and extinguishers are labeled with either letter-shaped or pictorial symbols that indicate what types of fires they are intended for.

A		Ordinary Combustibles	Wood, Paper, Cloth, Etc.
B		Flammable Liquids	Grease, Oil, Paint, Solvents
C		Live Electrical Equipment	Electrical Panel, Motor, Wiring, Etc.
D		Combustible Metal	Magnesium, Aluminum, Etc.
K		Commercial Cooking Equipment	Cooking Oils, Animal Fats, Vegetable Oils

Classifications of Fires and Extinguishers



Fire Ext Servicing: US/Canada (ANSI & UL711/ULC-S508) vs. EU/UK (EN3-7/BS 5306-3 & BS 5423)

NFPA 10 - Table 8.3.1: Hydrostatic Test & Maintenance Intervals for Extinguishers (US / Canada)		
Extinguisher Type	Internal Examination (Years)	Hydro Test Intervals (Years)
Stored Water pressure, Water Mist, Loaded Stream, and/or Antifreeze	1	5
Wetting Agent	1	5
AFFF (Aquaeous Film-Forming Foam)	3	5
FFFP (Film-Forming Fluoroprotein Foam)	3	5
Dry Chemical with Stainless Steel Shells	5	5
Carbon Dioxide	5	5
Wet Chemical	5	5
Dry Chemical: Stored-Pressure with Mild Steel Shells, Brazed Brass Shells or Aluminum Shells	6	12
Dry Chemical: Cartridge or Cylinder Operated with Mild Steel Shells	1	12
Halogenated Agents	6	12
Dry Powder: Stored Pressure, Cartridge or Cylinder Operated with Mild Steel Shells	6	12
Non-Rechargable Fire Extinguishers	None	Remove from Service at 12 Years

Fire Ext Servicing: US/Canada (ANSI & UL711/ULC-S508) vs. EU/UK (EN3-7/BS 5306-3 & BS 5423)

BS 5306-3 - Table 6: Maintenance Intervals for Extinguishers (EU / UK)

Extinguisher Type	Basic Service (Years)	Hydro Test Intervals (Years)
Stored Water pressure, Water Mist, Loaded Stream, and/or Antifreeze	1	5
Wetting Agent	1	5
AFFF (Aquaeous Film-Forming Foam)	1	5
FFFP (Film-Forming Fluoroprotein Foam)	1	5
Dry Chemical with Stainless Steel Shells	1	5
Carbon Dioxide	1	10
Wet Chemical	1	5
Dry Chemical: Stored-Pressure with Mild Steel Shells, Brazed Brass Shells or Aluminum Shells	1	10
Dry Chemical: Cartridge or Cylinder Operated with Mild Steel Shells	1	5
Halogenated Agents	1	10
Dry Powder: Stored Pressure, Cartridge or Cylinder Operated with Mild Steel Shells	1	5
Non-Rechargable Fire Extinguishers	1	Remove from Service at 10 Years

Portable Fire Extinguishers

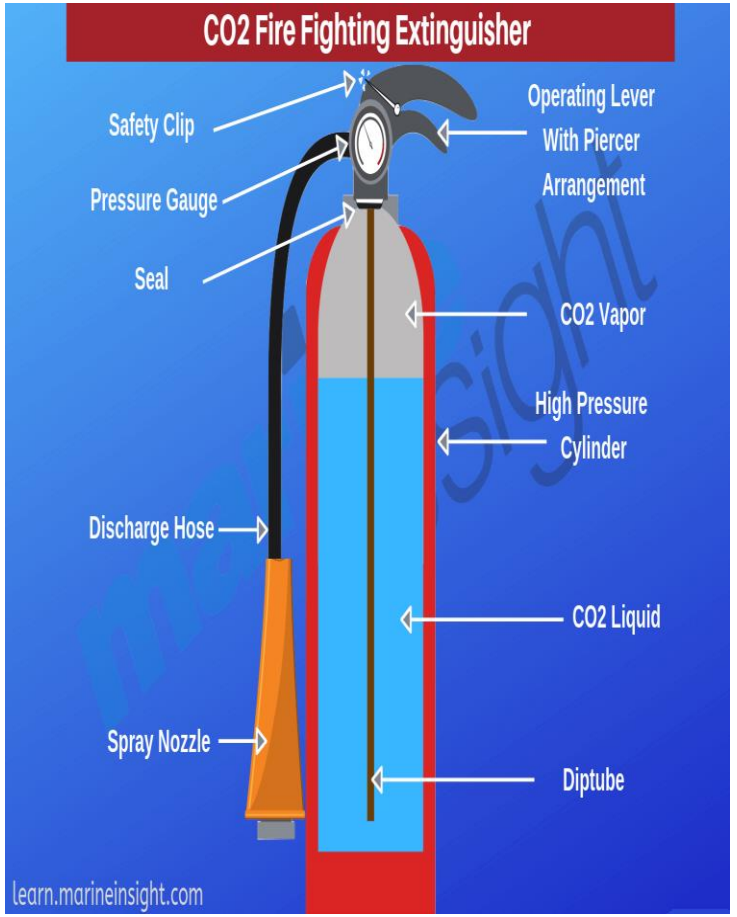
NFPA-10. Fire Extinguishers - Inspection and Servicing:

Monthly Inspections

- Invert dry chemical types to loosen powder.
- Ensure seals not punctured on cartridge type dry chemical extinguishers.

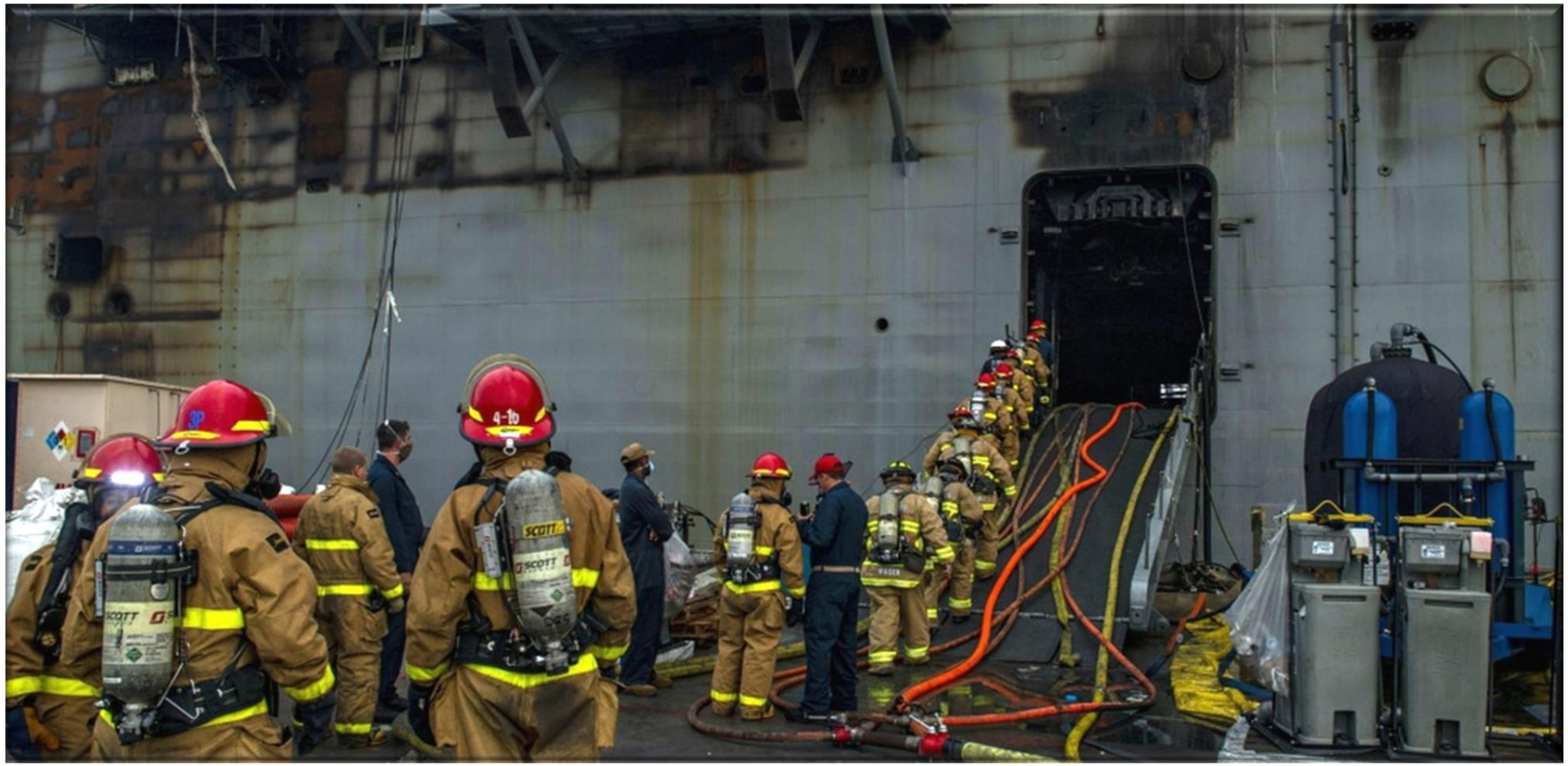
Fire Extinguishers require annual inspection from licenses company

- Cylinders must be hydrostatically tested.
  - 5 years for CO2, water & foam stored pressure type
  - 12 years for cartridge type Dry Chemical



Mobile Apparatus

Personal Protective Firefighting Gear



Personal Protective Equipment (PPE)

- **NFPA-1851**- Standard for the selection, maintenance and inspection of firefighting gear.
- **Fire-fighters outfits- Monthly**
  - Verify lockers providing storage for fire-fighting equipment contain their full inventory and equipment is in serviceable condition.
  - PPC must be replaced every 10 years

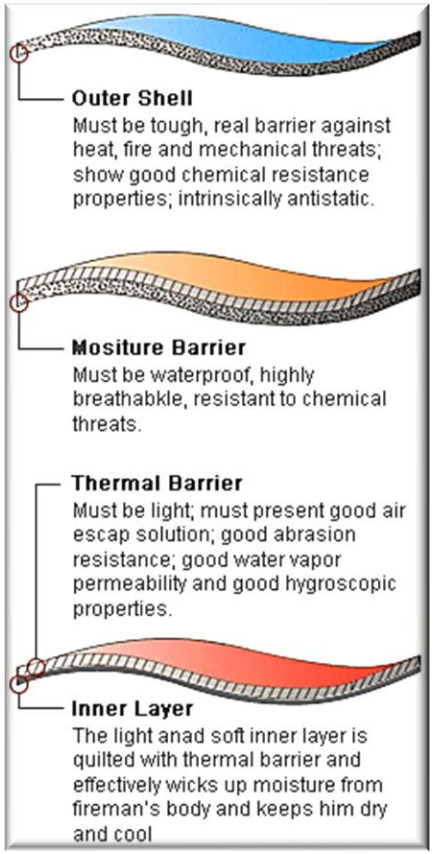
Personal Protective Equipment (PPE)

Bunker Gear/Turn-Out Gear

- Protective equipment designed to provide protection for those engaged in interior firefighting operations

Designed with 3 primary layers:

- Outer Shell
- Moisture Barrier
- Thermal Barrier with Inner liner



Personal Protective Equipment (PPE)

Items on the checklist include such things as:

- Rips
- Tears
- Cuts
- Missing hardware/closures
- Discoloration
- Hook and loop functionality

Self Contained Breathing Apparatus

NFPA 1852. S.C.B.A.

Positive Pressure

- Offers greater protection with slightly increased pressure in facepiece
- There are 3 main parts to the SCBA.
    - Backpack and harness assembly
    - Bottle
    - Mask

S.C.B.A. Components

Backpack and harness assembly

- Includes straps, buckles and cylinder bracket
- Distributes weight of the cylinder & pack
- Includes high-pressure hose & low-pressure alarm
- Low pressure alarm sounds when the pressure reaches one third of the capacity of the cylinder

S.C.B.A. Components

Air cylinder (Bottle)

- Includes cylinder, valve & pressure gauge
- Stores high pressure air (2216p.s.i. - 4500p.s.i.)
- Available in 60, 45, 30 & 15 minute

Hydrostatic testing, 3 years for composite and 5 for steel.

S.C.B.A. Components
Mask / Face Piece

Emergency Escape Breathing Apparatus

Emergency Escape Breathing Apparatus

Breathing apparatus:

Weekly:

- Examine all breathing apparatus and EEBD cylinder gauges to confirm they are in the correct pressure range.

Annual Inspections:

- Check breathing apparatus air recharging systems, if fitted, for air quality.
- Check all breathing apparatus face masks and air demand valves are in serviceable condition.
- Check EEBDs according to maker's instructions.


SUPERYACHT TIMES