MASSACHUSETTS MARITIME ACADEMY

STCW FIREFIGHTING

BARNSTABLE COUNTY FIRE & RESCUE
TRAINING ACADEMY

OBJECTIVES

- Fire Chemistry
- Basic Fire Behavior
- Sources Of Ignition
- Classes Of Fire
- Fire Extinguishing Agents
- Fire Detection And Suppression Systems
- Fire Prevention Practices
- Shipboard Firefighting Organization And Practices

FIRE….

- What is fire?
- Why is it dangerous?
- How does it start?
- How does it move?

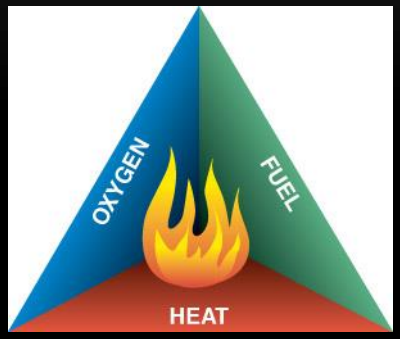
FIRE

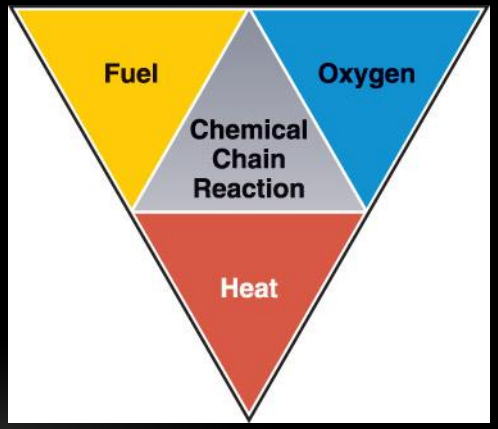
- Defined as:
  - “A rapid self-sustaining oxidation accompanied by heat and light of varying intensities.”

- What is Oxidation?
  - “The combination of a substance with Oxygen.”

CONDITIONS NEEDED FOR FIRE

- Three basic ingredients are required for combustion (Fire) :
  - Fuel
  - Oxygen
  - Heat
- Chemical chain reactions keep the fire burning.

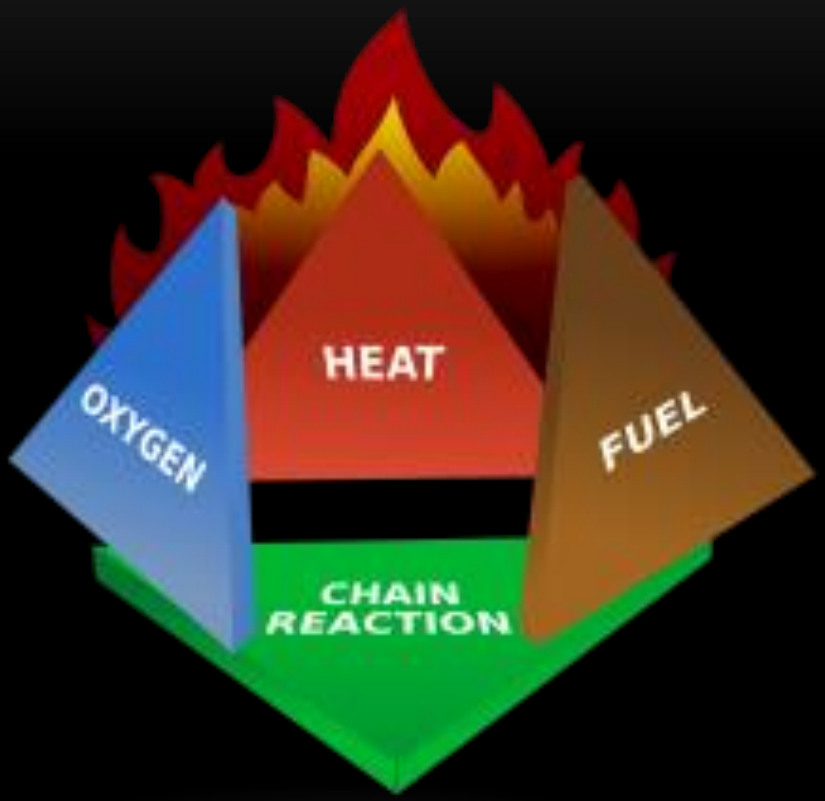




FIRE TRIANGLE *(YOUNGIE KNOWLEDGE)*

- Heat: Required To Break Down The Fuel Into Gases
- Fuel: The Material Being Oxidized
- Oxygen: The Material Required To Consume The Fuel

FIRE TETRAHEDRON



FUEL SOURCES

- Solids
- Liquids
- Gasses
- IMPORTANT to understand
  - VAPOR BURNS
  - Process is Called: Pyrolysis / Vaporization

FUEL

- Form of energy

- Energy released in the form of heat and light has been stored before it is burned

FUEL SOURCES

- PYROLYSIS

- Act of heating solid matter to a point that it begins to off gas a vapor
- Temperature has to be to the point that the solid matter can sustain the *pyrolysis* action
  - Decrease the temperature and fire can't continue

FUEL SOURCES

- VAPORIZATION

- Act of heating a liquid to the point that it begins to convert to a gas

- Can either be from heating the liquid directly or from exposure to atmosphere
  - Boiling Water
  - Dry Ice

FUEL SOURCES

- GAS

- Fuel source already in a gaseous state

- Usually contained in a device that allows gas to be released in a controlled manner

HEAT ENERGY

- In order for fire to occur the fuel source has to be acted on by some kind of heat energy

- What is heat energy?

- There are 4 kinds
  - Chemical
  - Electrical
  - Mechanical
  - Nuclear

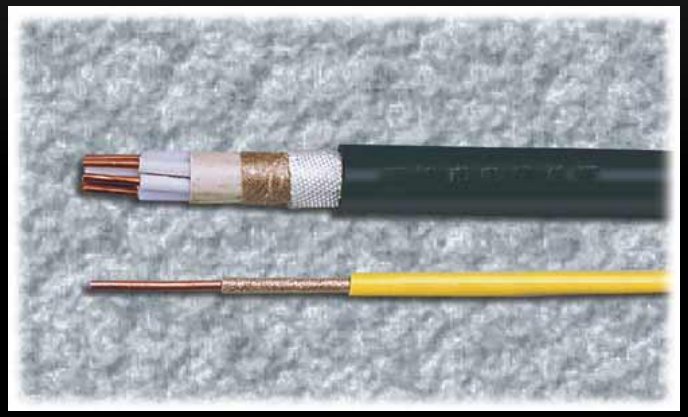
CHEMICAL HEAT ENERGY

- Caused from a chemical reaction

- Fires can be from:
  - Oily Rags
  - Resins
  - Lacquers / Varnishes

ELECTRICAL HEAT ENERGY

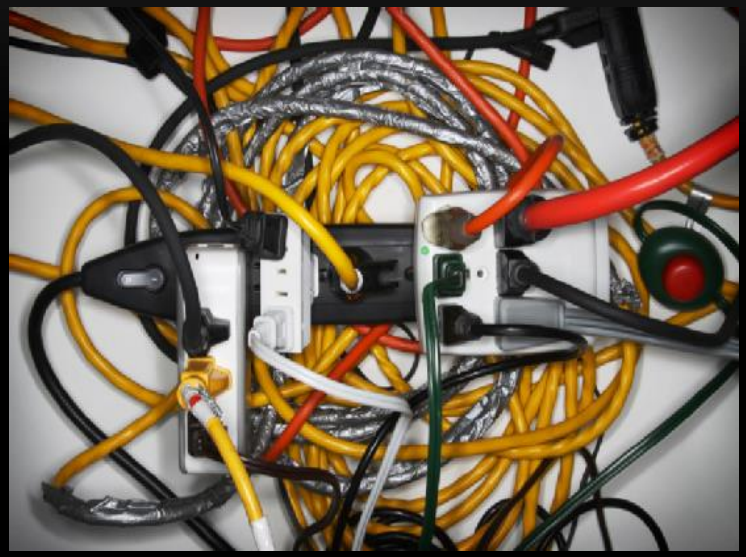
- Resistance Heating
  - Trying to push to much electrical current through to small a wire



- Current Leakage
  - Breaks in the insulation allowing the heat build up on the wire to ignite flammable material touching the wire

ELECTRICAL HEAT ENERGY

- Overload
- Arcing
- Static Electricity
  - Filling fuel

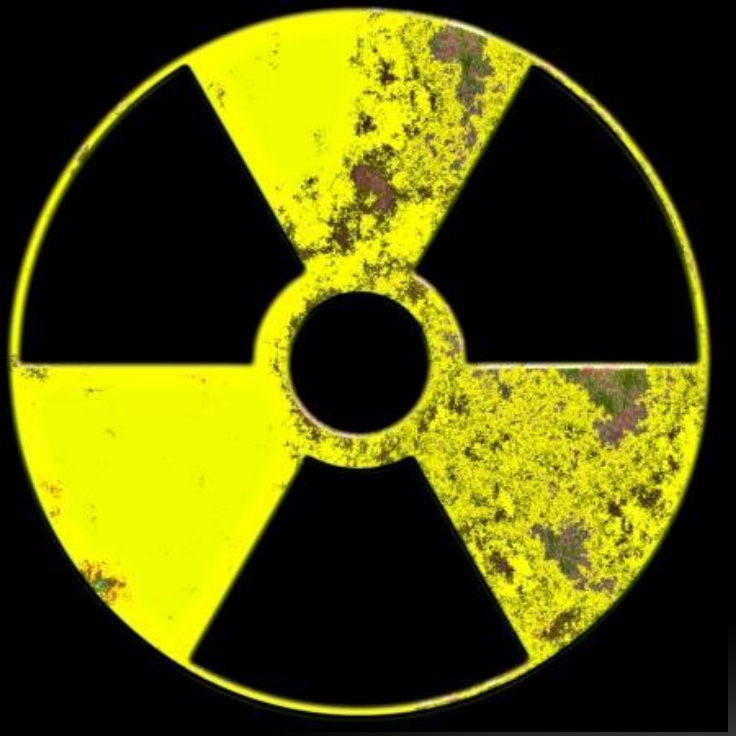


MECHANICAL HEAT ENERGY

- Heat of compression
  - Filling compressed gas / air cylinders to quickly
  - Diesel Engines

- Heat of friction between moving parts
  - Belts

NUCLEAR HEAT ENERGY



HEAT TRANSFER

- How does fire go from one point to another?
- Why is it important to understand these transfer methods?

HEAT TRANSFER

- Heat moves from point to point through 3 distinct methods
  - CONDUCTION
  - CONVECTION
  - RADIATION

- All 3 occur during a fire and influence both fire growth and fire spread

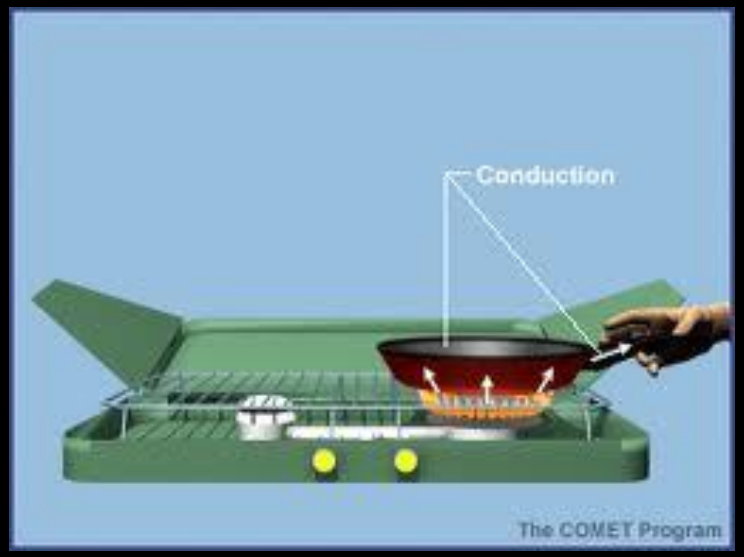
- It's imperative to understand how heat moves throughout a structure in order to anticipate where the fire will be in 5 minutes...NOT where it is now

HEAT TRANSFER

- CONDUCTION
  - Heating through Point to Point Contact

- Heat builds from once source and begins to transfer that heat to another object, heating it to it's ignition temperature

- Easiest to combat by removing flammable material from away heat source – or cooling heat source



HEAT TRANSFER

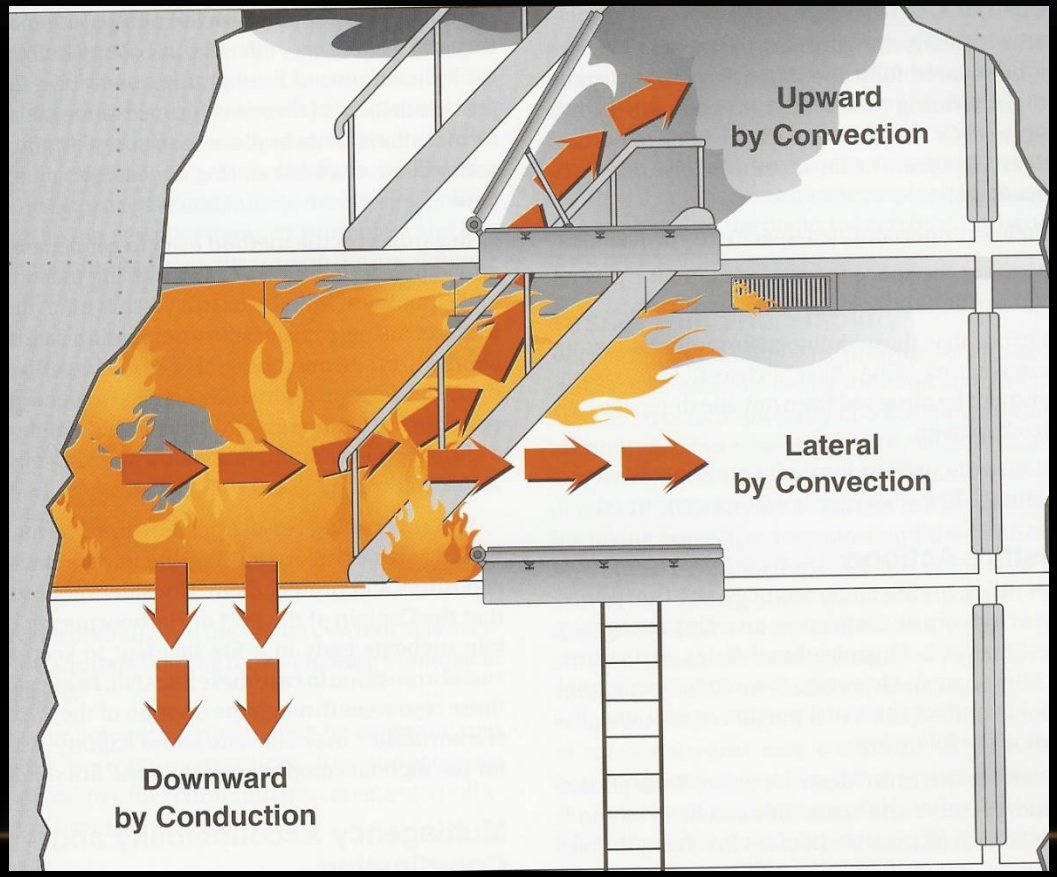
- CONVECTION

- Heat currents
  - Warm air rises – Cold air sinks
- Where there is smoke there is fire…
- Elevated ceiling temperatures

HEAT TRANSFER

- RADIATION
- Electromagnetic waves traveling in all directions
- Bring remote materials up to ignition temperature

FIRE SPREAD


Upward
by Convection
Lateral
by Convection
Downward
by Conduction

Compartment Above

Air Temperature
20 Minutes: 610°F (321°C)
10 Minutes: 390°F (199°C)
5 Minutes: 190°F (88°C)

Deck Temperature
20 Minutes: 1,520°F (827°C)
10 Minutes: 1,290°F (699°C)
5 Minutes: 890°F (477°C)

Metal Bulkheads and Decks

Air Temperature
20 Minutes: 180°F (82°C)
10 Minutes: 120°F (49°C)
5 Minutes: 90°F (32°C)

Bulkhead Temperature
20 Minutes: 970°F (521°C)
10 Minutes: 710°F (377°C)
5 Minutes: 390°F (199°C)

Adjacent Compartment	Fire Compartment	Adjacent Compartment

Fire Spread Through Metal Boundaries — Temperatures

STAGES OF FIRE

- Incipient / Ignition
- Growth / Free Burning
- Smoldering / Decay
- Flashover – During Free Burning
- Backdraft – During Decay

IGNITION STAGE

- This is where the fire begins
- The ignition source interacts with the fuel
- Fire is very small, easily extinguished
- Although easy…still dial 911/Sound the Alarm
  - Simple fires can get out of hand quickly

GROWTH STAGE

- Fire begins to consume oxygen and begins the pre-heating of surrounding fuel sources (conduction)
- Heat at ceiling level begins to grow and results in mushrooming effect at ceiling level.
  - Smoke begins to stretch outward across the ceiling and banking down the walls
- Fresh air begins to enter space to replace heated air by fire (convection)

STAGES OF FIRE

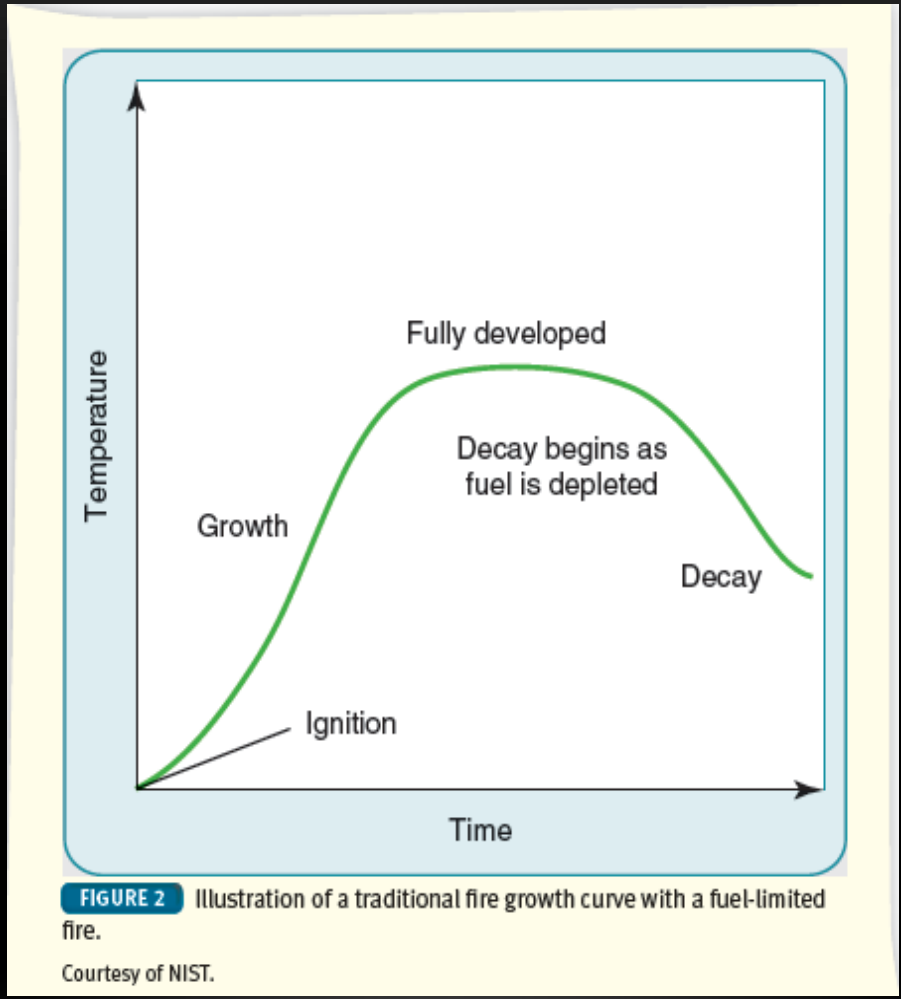


FIGURE 2 Illustration of a traditional fire growth curve with a fuel-limited fire.

Courtesy of NIST.

FULLY DEVELOPED FIRE

- Entire contents of room are burning
- Temperature in room exceeds 1000^0 F
- Fire now begins to feed on structural members of room as well as begins to spread out of room into next space
- No viable victims are in a fully developed room fire

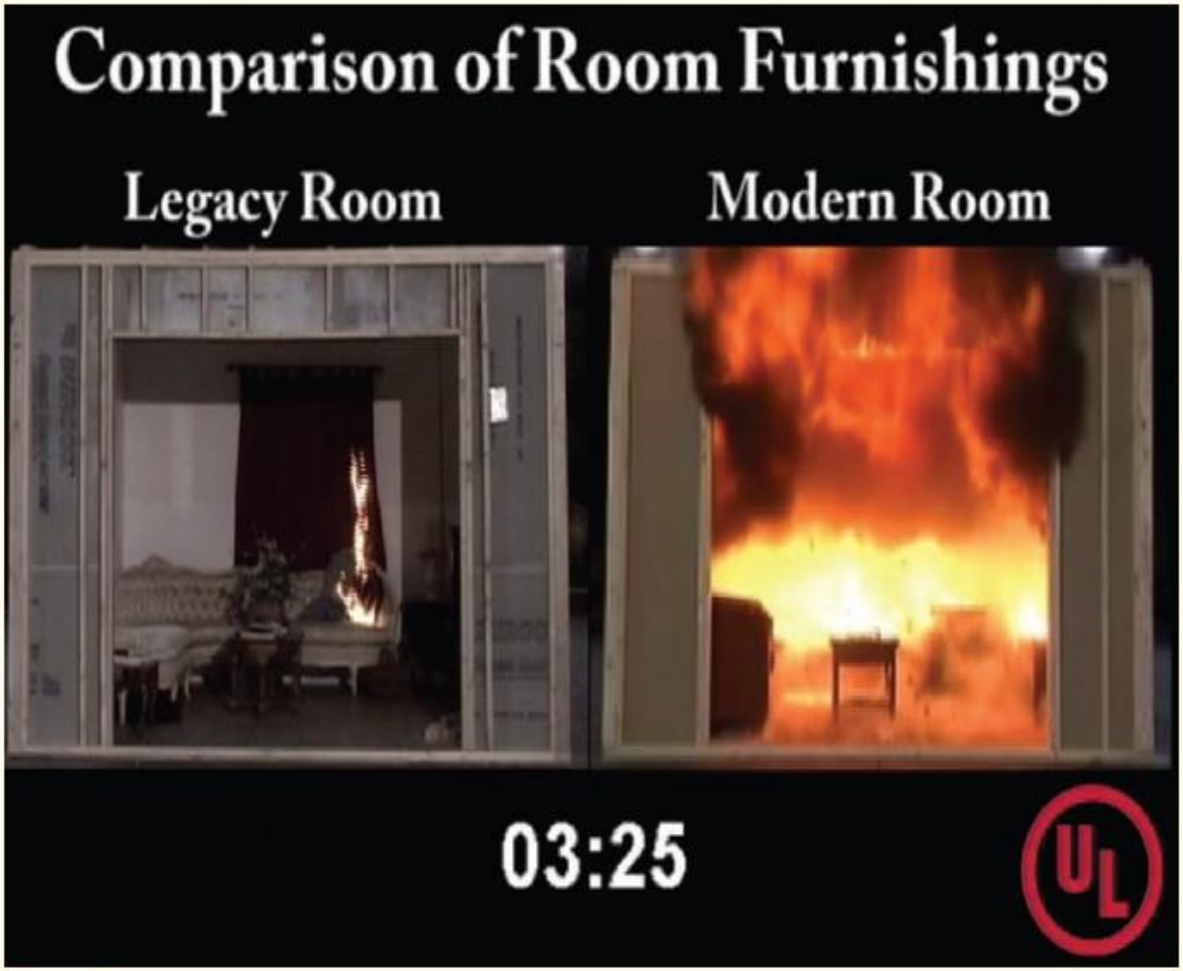


FIGURE 3 The legacy room with older furnishings has little flame showing 3 minutes and 25 seconds after ignition, while the modern room furnished with petroleum-based products has flashed over in the same time period.

Courtesy of UL.

PRE-FLASHOVER / FLASHOVER

- Intermediate period where all 3 forms of heat energy are acting on all flammable objects in a space

- Conditions at pre-flashover are:
  - Elevated temperatures
  - Thick black smoke
    - Almost boiling in appearance
  - Carbon dropping from smoke
  - Rollover in smoke level
  - Increasing fire noise

DECAY STAGE

- Fire has consumed either all of the Oxygen or Fuel in the space
- Fire can be easily extinguished by small hand lines
- Very real danger of condition called:
  - BACKDRAFT

BACKDRAFT

- Very dangerous condition that can occur at any point in the fire
  - Flashover can ONLY occur between growth and fully developed stage
- Fire has consumed all the available OXYGEN in the space
- Introduction of fresh air can cause a violent low yield explosion to occur

BACKDRAFT

- Most likely to occur in tight spaces
  - Sealed compartments
  - Small void spaces
  - Containers

BACKDRAFT

- Warning signs:
  - Elevated Temperatures
    - Handles burn hand through gloves
  - Blistering Paint
  - Smoke being forced out of small openings
  - Little or no visible flame
  - Heavy dark smoke conditions with limited ventilation

SPONTANEOUS COMBUSTION

- Heat is generated by a chemical reaction within a substance
- Continues rise to the point of ignition.
- Fire starts
- Prevention: Good housekeeping.
- Frequent Danger on Ships: Dirty rags soaked with incompatible chemicals that react with each other and start a fire.

CLASSES OF FIRE

- Fire can be separated into 5 distinct classes
- Each class has it's own special features
- Each class has it's own preferred method of extinguishment
  - Although there are other ways to extinguish the fire
- You must know each class of fire and the preferred method of extinguishment

CLASS A

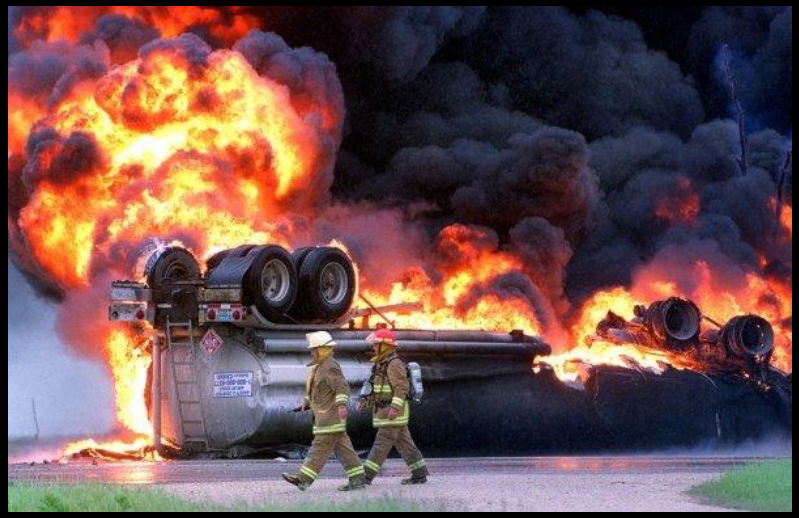
- Commonly referred to as Ordinary Combustibles
- Best extinguished with *WATER*
  - Can use deluxe extinguishing agents, but not always successful
- “If nature made it, it’s a Class A Fire”

CLASS A

- Ordinary Combustibles, wood, paper, wool; things that when burn leave an ash. The most common Class A extinguishing agent is water, which extinguishes a fire by absorbing the heat.

CLASS B

- Commonly referred to as a Flammable Liquid Fire
  - Can also be called a Flammable or Combustible Gas fire
- Best extinguished by FOAM
  - Also can be extinguished by BC or ABC extinguisher
- “If it’s a dead dinosaur, then it’s a Class B fire”



CLASS B

- Flammable and combustible liquids and gases, alcohol, gasoline, fuel oil; things that cannot be cooled by water to effect extinguishment. The best way to extinguish a fuel fire is to shit off the source. Extinguishing agents which may be used are dry chemical, carbon dioxide and foam.

CLASS C

- ***ENERGIZED*** Electrical Equipment
  - Very dangerous type of fire to attack

- **NO WATER!** For Obvious reasons

- Best Extinguished by *SECURING* the electrical supply
- If can't, use non-conducting agent:
  - CO_2 Extinguisher
  - BC Extinguisher

CLASS C

- Fires involving energized electrical equipment, conductors, or appliances. Non-conducting extinguishing agents must be used for protection of crew members.

CLASS D

- Combustible Metal Fires
- Anything that ends in IUM plus Zinc
- Very difficult to extinguish
- Best extinguished by specific powders designed to exclude O2 from metal

CLASS D

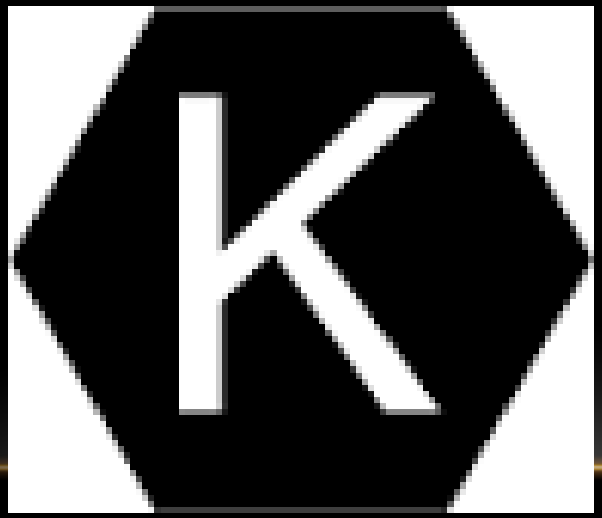
- Combustible metal fire requires special extinguishing agents. Common agents like water and dry chemical may react making the fire burn hotter and more violent. The spelling of most D-E materials indicate that the end with the letters IUM, such as magnesium or sodium.

CLASS K

- Labeled specifically for cooking oils
- Designed because of newer extinguishing agent
- Uses specific type of agent and delivery device
- *Technically it's a class B fire…*

CLASS K

- Is a rating given to wet chemical extinguishers used to extinguish fires in a kitchen setting. The chemical reacts with hot oils to form a foam and extinguish the fire. The foam turns into a soap through saponification.



EXTINGUISHING METHODS

- 4 simple methods of extinguishing a fire

- REDUCING TEMPERATURE
  - Cool with water

- REMOVING FUEL
  - Securing the fuel supply

- EXCLUDING OXYGEN
  - Smothering with FOAM
  - Covering with a fire blanket

- INHIBITING CHEMICAL CHAIN REACTION
  - Dry Powder agents

INITIAL ACTIONS UPON FINDING A FIRE

- SOUND THE ALARM FIRST. ALWAYS.
  - Pullbox
  - Radio call
  - Phone call
  - Sound off verbally
  - Any available means of signaling

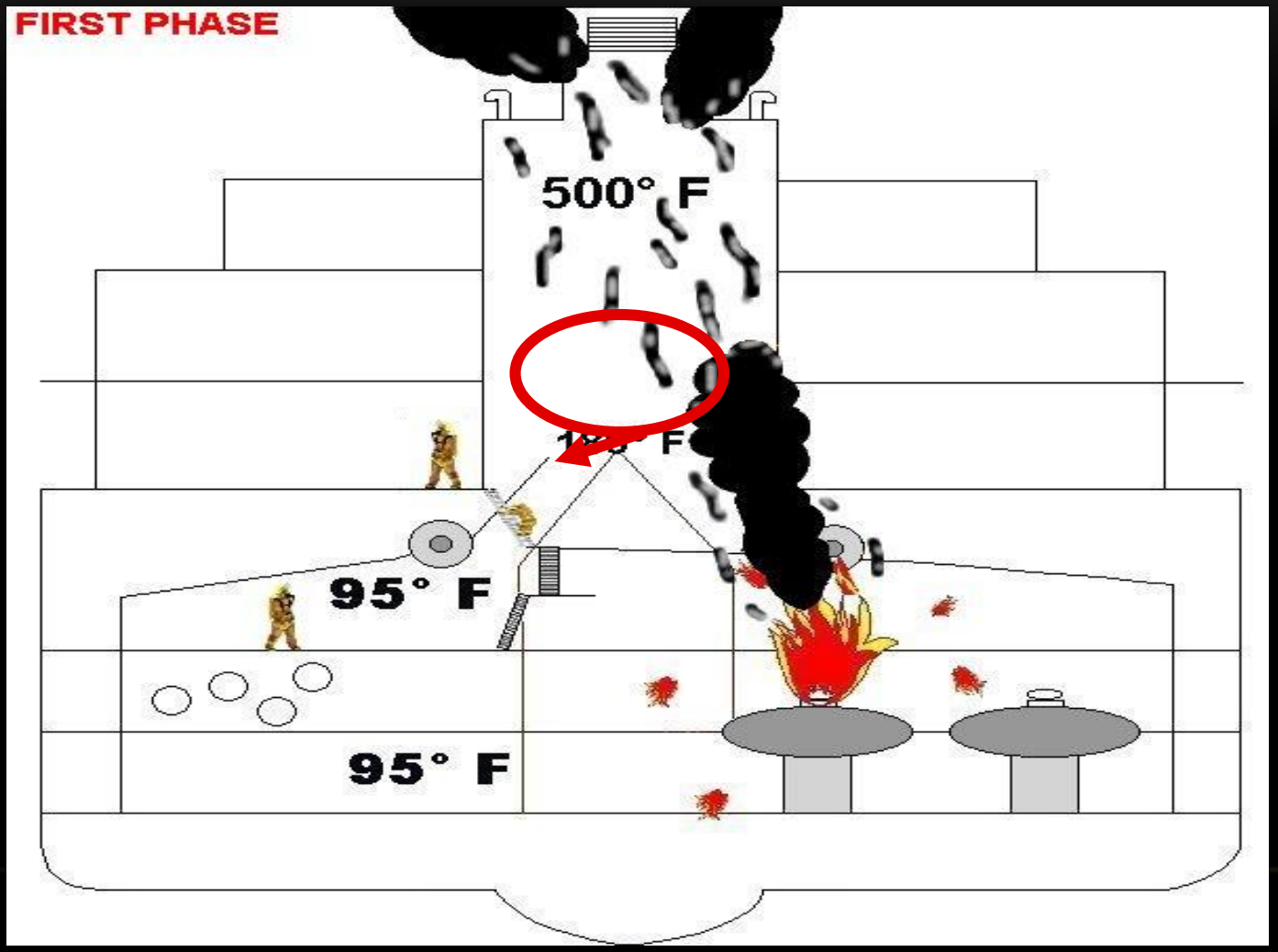
- Never attempt to put out a fire in a smoke-filled space without breathing apparatus and proper clothing.

(Continued)

WHAT DO YOU DO IF THERE IS A FIRE?

- ***Sound the alarm***
- Confine the fire if possible
- Report the fire or smoke condition and its location
- Attempt to extinguish the fire with proper firefighting equipment if available
  - IF you can safely do so
- **VICTIM INSIDE: Should you go in and get them?**

EXIT ENGINE ROOM FIRE BY LOWEST MEANS



ESCAPE TRUNK IS YOUR BEST OPTION

ESCAPING FROM SMOKE-FILLED SPACES

- Know the ship! Know exit points from any space before the alarm sounds.
- Know the alarms. Is there CO2 in the space you're in?
- Get low and move to exit.
- Engine room or other multi-deck spaces may have down-and-out escape route (Shaft Alley).

ALARM SIGNALS: WHISTLE & GENERAL ALARM

- **Fire & Emergency Signal**
  - *Continuous Sounding for not less than 10 seconds*
  - Followed by descriptive PA announcement (location, type of fire, etc)
  - Report to fire and emergency stations

- **Abandon Ship Signal**
  - *More than six short blasts followed by one long blast*
  - Followed by descriptive PA announcement (nearest point of land, etc)
  - Report to boat stations / abandon ship stations

EXTINGUISHERS

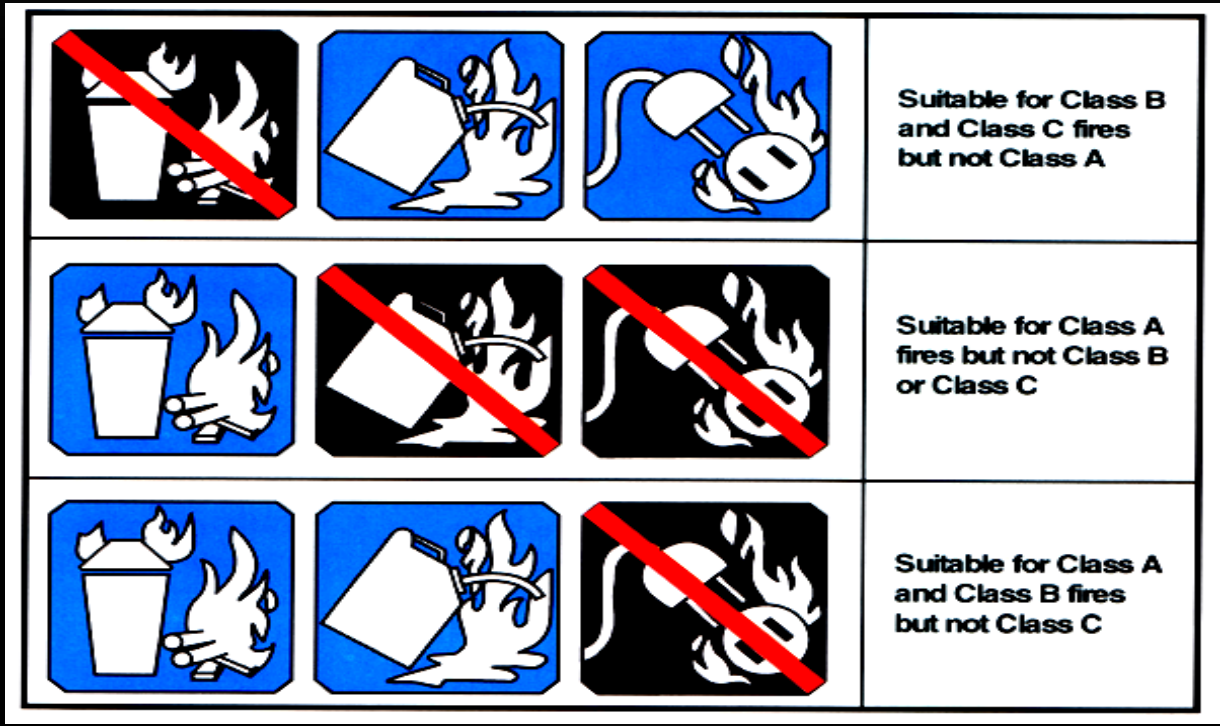
- Each style designed to extinguish a specific class of fire
  - Classes A - K
- Can have extinguishers rated for multiple classes
- For Class D fires, more commonly find a pail of product vs. an extinguisher.
  - Not just any powder agent; agent must be designed specifically for the fuel that's burning.
- All operate on principle of stored pressure and an extinguishing medium
- Basic Principle of Operation is
  - ***P-A-S-S***

PURPOSES OF FIRE EXTINGUISHERS

- Must know
  - Which fires require special extinguishing agents
  - What type of extinguisher to use
  - How to operate each type of extinguisher

INTERNATIONAL MARKINGS

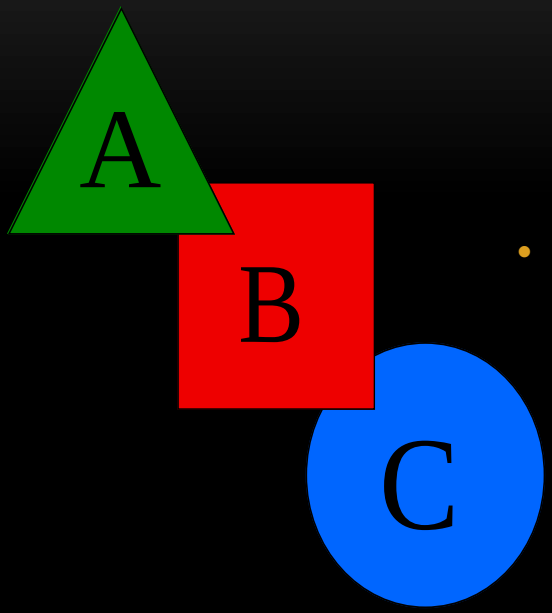
- Pictographs show which extinguisher should be used:



EXTINGUISHER LABELS

- Operation procedures are included on the label

LETTER CLASSIFICATION SYSTEM



- A, B, & C ratings can appear together on an extinguisher. If the symbol is not shown, the extinguisher is not good for that classification of fire. Class C will never be shown alone.

- *Class D extinguishers are always listed separately and only carry the D rating.*

CLASS A

- Referred to as a Stored Pressure Water Extinguisher
- Usually 2 ½ gallons of water
- Pressurized to 100 psi by compressed air or inert gas (nitrogen)
- Enough to extinguish small fire or keep fire contained to area of origin

CLASS B

- Specific to Flammable Liquid Fires
- Designed to operate with FOAM
  - Tell by Nozzle design
- Not common in general
- More common in specific industry settings

CLASS BC / ABC

- Unique combination of extinguishing agents
- Referred to as either BC or ABC extinguishers
- OR…Multipurpose Extinguisher
- Discharges same as a Class A
  - EXCEPT medium is a fine powder vs. stream of water

CLASS C

- Usually a CO2 extinguisher
  - Can also be a Halon or Halon Derivative type extinguisher
  - Halon extinguisher VERY similar to a multi-purpose extinguisher in construction

- A non-conducting medium which excludes the oxygen from the fire

- Danger associated with a CO2 extinguisher is??
  - Suffocation
  - Electrical Shock

NO GAUGE…filled by weight

CLASS D

- Very different extinguisher style and color
  - Common to have in pail form as well
- Designed to exclude oxygen from metal – thus extinguishes the fire

CLASS K

- Specifically used in commercial kitchens
  - Close to stoves and fryolators
- Agent is a foam derivative used to blanket the burning material
- Comes out of nozzle under low pressure so doesn't cause over filling of container or splatter of burning product

CARTRIDGE & STORED PRESSURE

- The two types of dry-chemical extinguishers

EXTINGUISHER CONSTRUCTION

Basic construction for Classes:

A
ABC
BC
D
K

EXTINGUISHER CONSTRUCTION

Basic construction for a cartridge operated Dry Chemical extinguisher or Multipurpose Extinguisher

EXTINGUISHER OPERATION

- Very simple to remember
  - After you have verified extinguisher operates
- **P** – Pull the Pin
- **A** – Aim at the base of the fire
- **S** – Squeeze the handle
- **S** – Sweep aggressively back and forth at the base of the fire until extinguished


James Walker
Cruise Ship
FIRE
NEWS TONIGHT WOR
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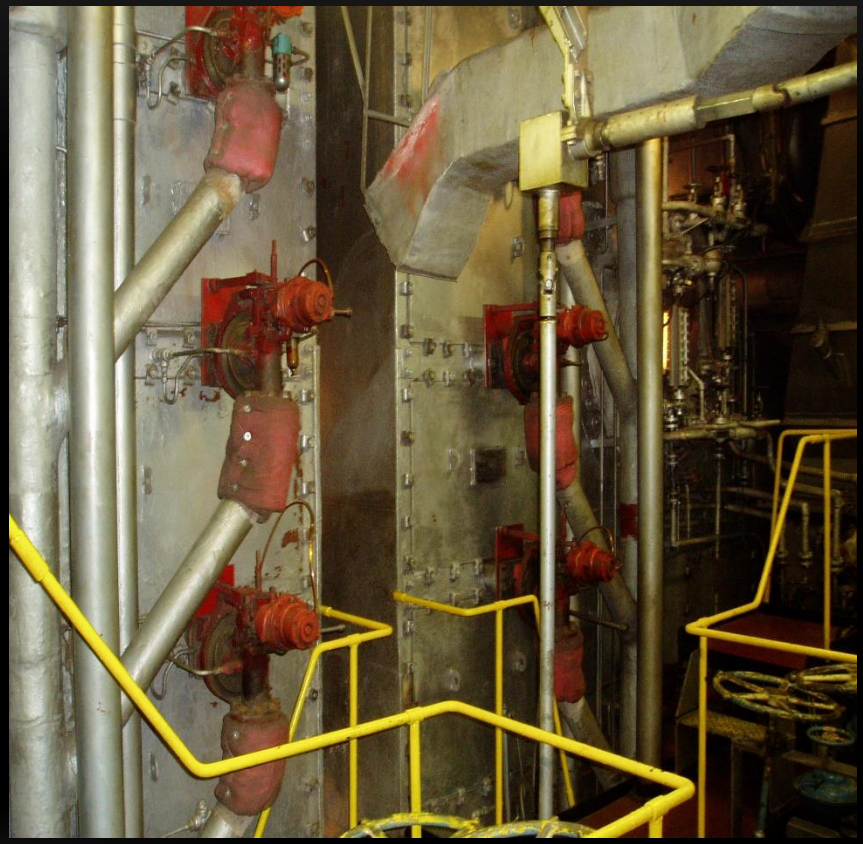
SHIP BOARD FIREFIGHTING CAPABILITIES

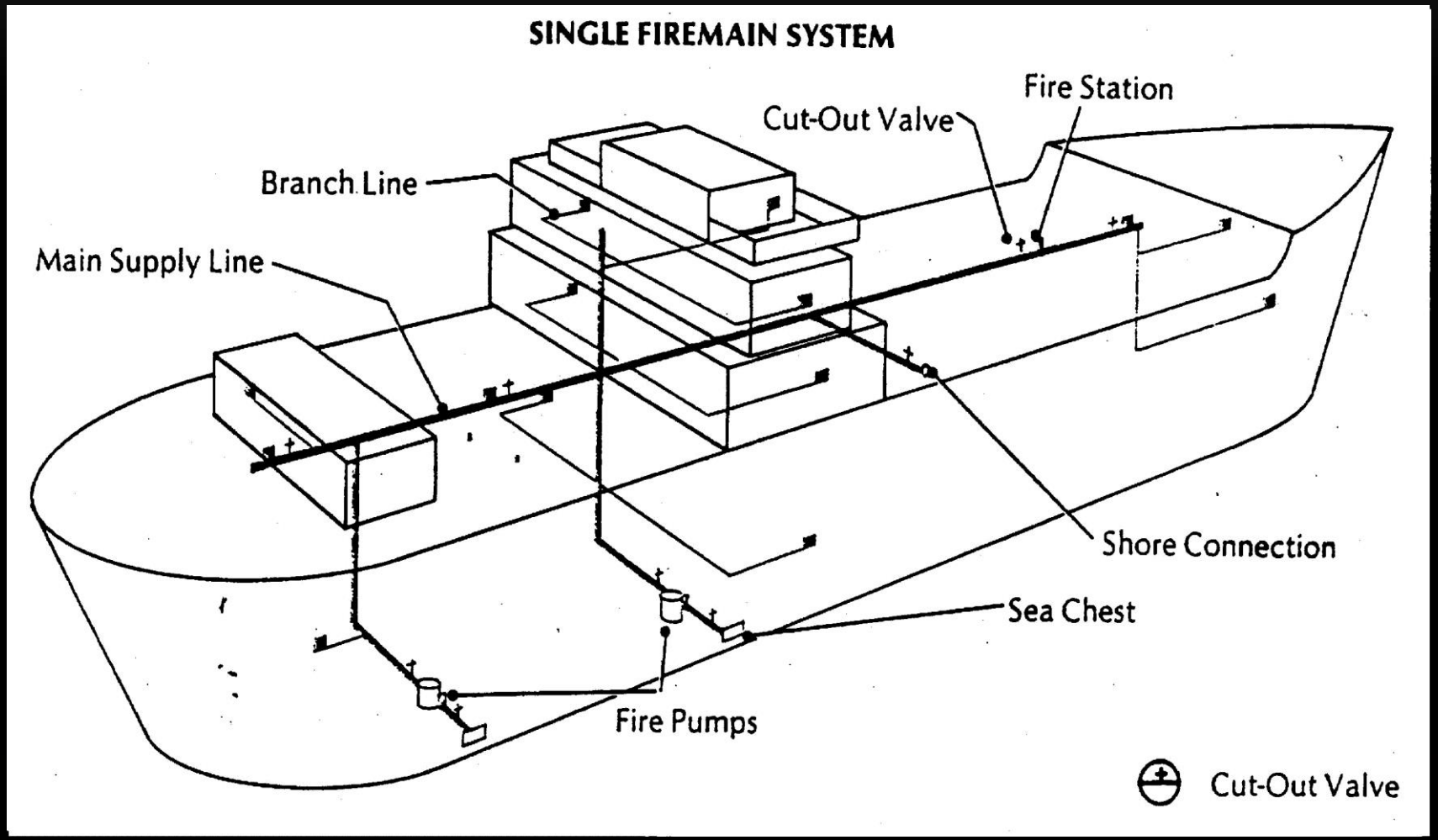
- Damage Control Lockers
- Fixed Fire Suppression
- Fire Stations
  - 1 ½” Interior
  - 2 ½” Exterior

VESSEL SYSTEMS

- Fuel Oil
- Lube Oil
- Propulsion/Steam
- Hydraulic
- Cooling/Refrigeration
- Electrical
- Water/Wastewater
- Cargo Handling
- Fire Suppression



FIRE MAIN SYSTEM



FIRE HOSE

- Fire hose developed to provide firefighters the needed fire stream necessary to extinguish a fire of any size

- Fire hose is constructed of a rubber inner lining surrounded by a protective jacket

- The protective jacket can be constructed of several kinds of materials:
  - Canvas
  - Cotton
  - Synthetic

FIRE HOSE

- Fire hose onboard ships:

- Supply hose:
  - 4 inches diameter.

- Attack hose:
  - From ½ inch to 2 ½ inch in size

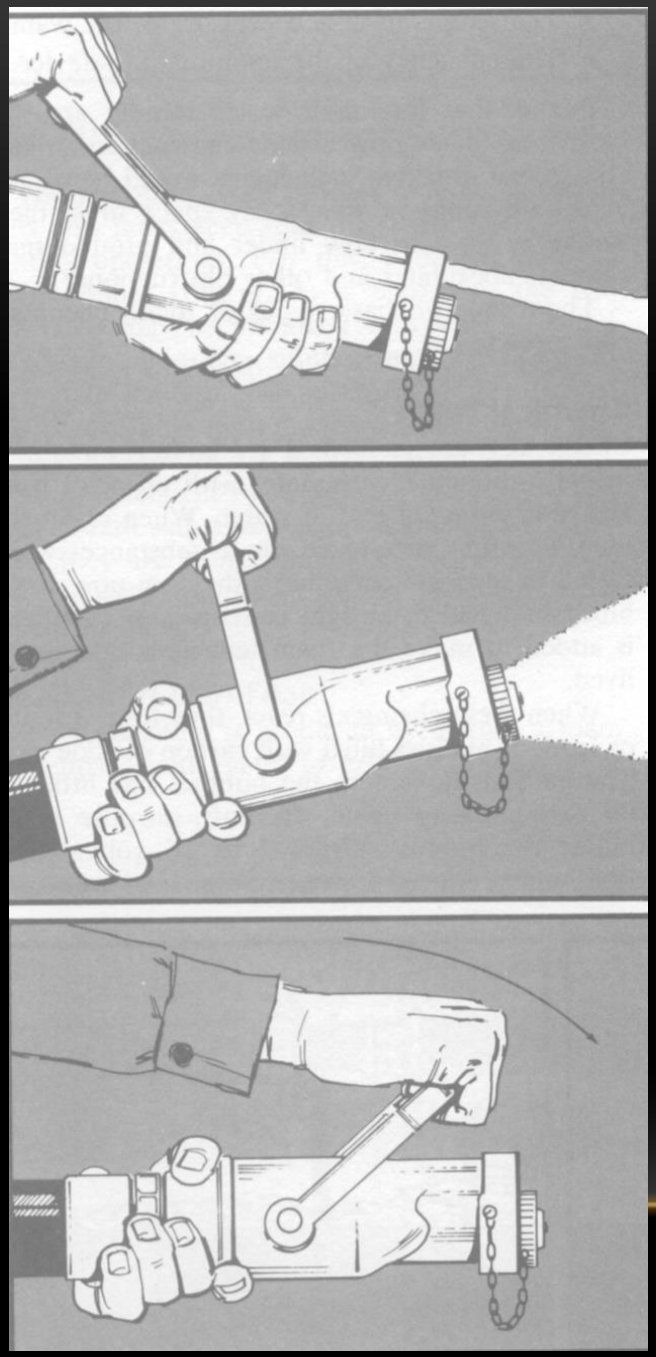
NOZZLES

- NOZZLES
- Water is applied to the fire through two types of nozzles,

- Combination (Fog)
  - Variable pattern tip causes stream pattern to be adjusted from 90 º fog to straight stream
  - Fog pattern designed to enhance heat absorption in the room on fire
- Smooth Bore
  - Straight stream designed for penetration into a fire room or for distance to the fire

SHIPBOARD FIRE STATION

MARITIME NOZZLE - *ALL PURPOSE* NOZZLE



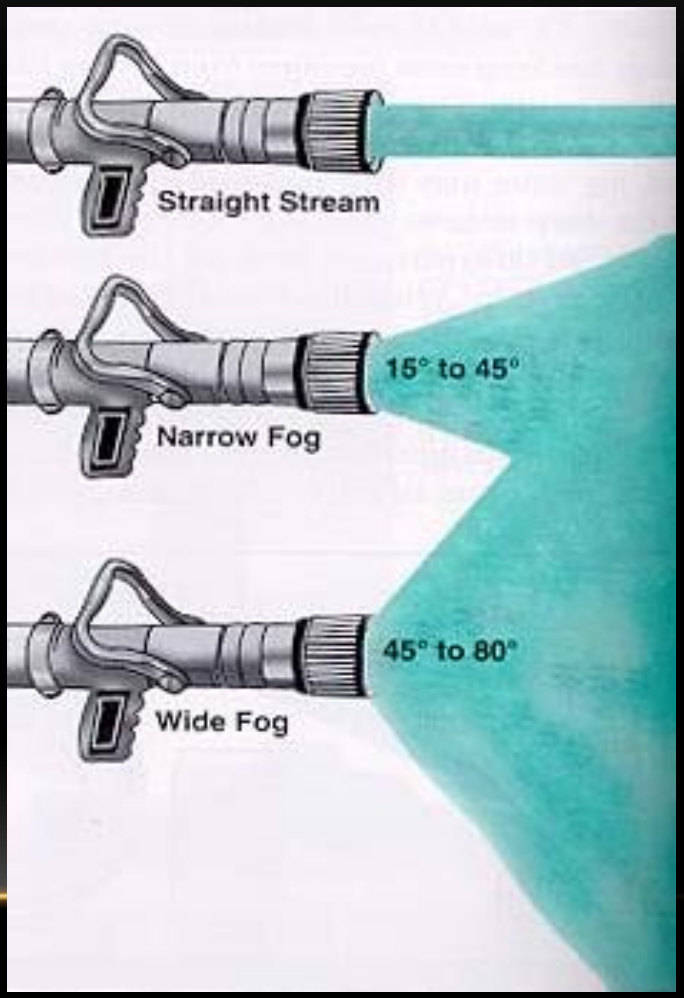
NOZZLE OPERATING POSITIONS

- Bale all the way back.
  - Straight Stream.
    - Provides reach and penetration.
- Bale Halfway back
  - Fog Stream
    - Provides spray for indirect attack
- Bale all the way forward
  - Shut off position

VARI-NOZZLE

Two Bail Positions
"Open" "Closed"

"Right to Tight"
Straight Stream
"Left to Loose"
High Velocity Fog
Low Velocity Fog

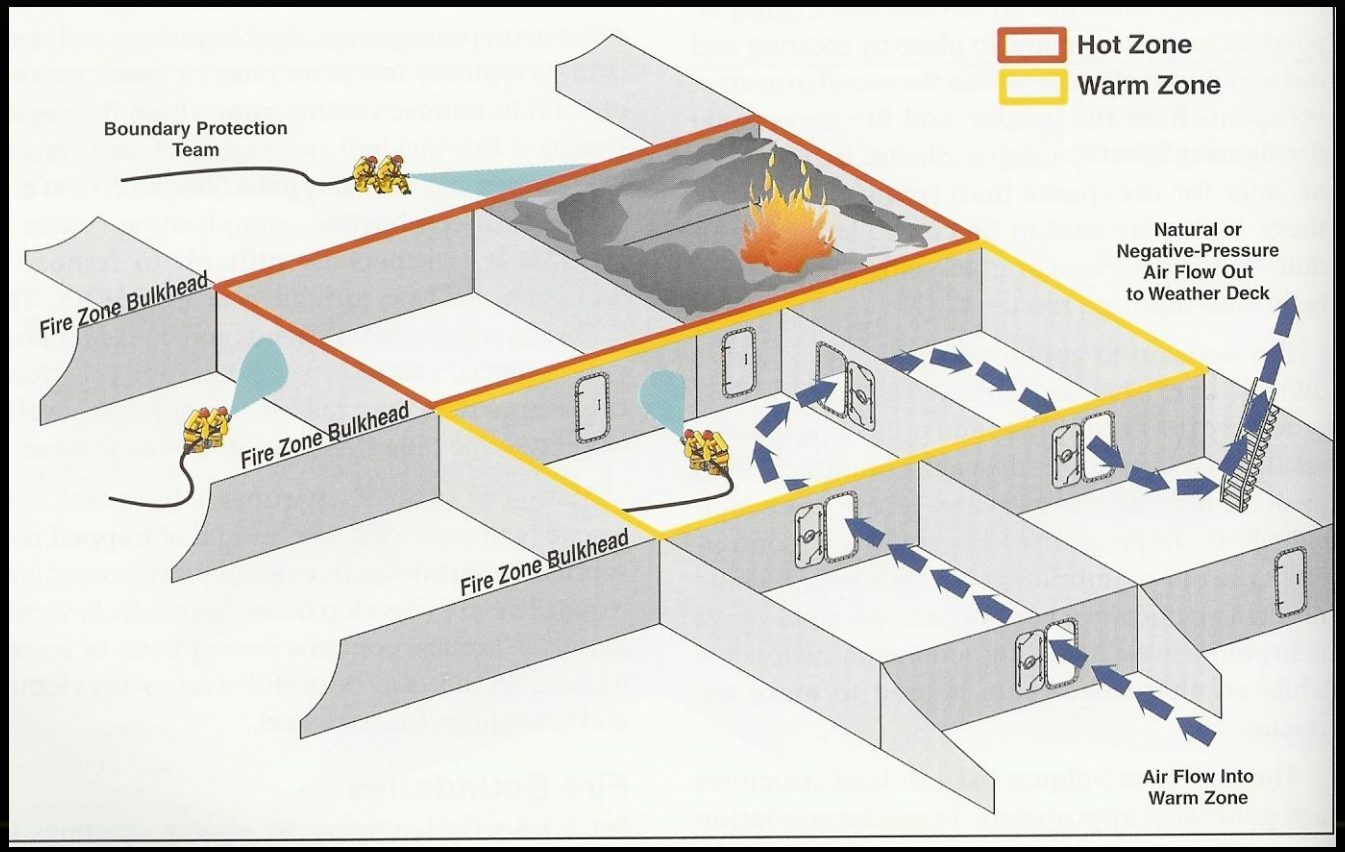


- Foam from buckets or storage tanks is entrained in firefighting water in a specially rigged fire hose.
- The resulting product is foam agent squiring out of the fire hose that can be directed to fight the fire.
- Foam agent is applied to create a floating layer on pooled oil or other flammable liquids to interrupt the fire triangle by creating a barrier between the air in the space and the flammable liquid.
- Foam is often applied by using a straight stream.
- The stream is directed at objects NEAR the fire so that it bounces off into a spray pattern that does not disturb the foam layer – disturbing the foam layer may cause the fire to reflash (start again).

FIREFIGHTING AGENT: FOAM

- Strategy
  - Type of Vessel
    - Container
    - Passenger
    - Tanker
  - Location/Class/Size of FIre
- Tactics
  - Direct Attack
  - Indirect Attack
  - Fixed Suppression Systems
  - Boundary Cooling

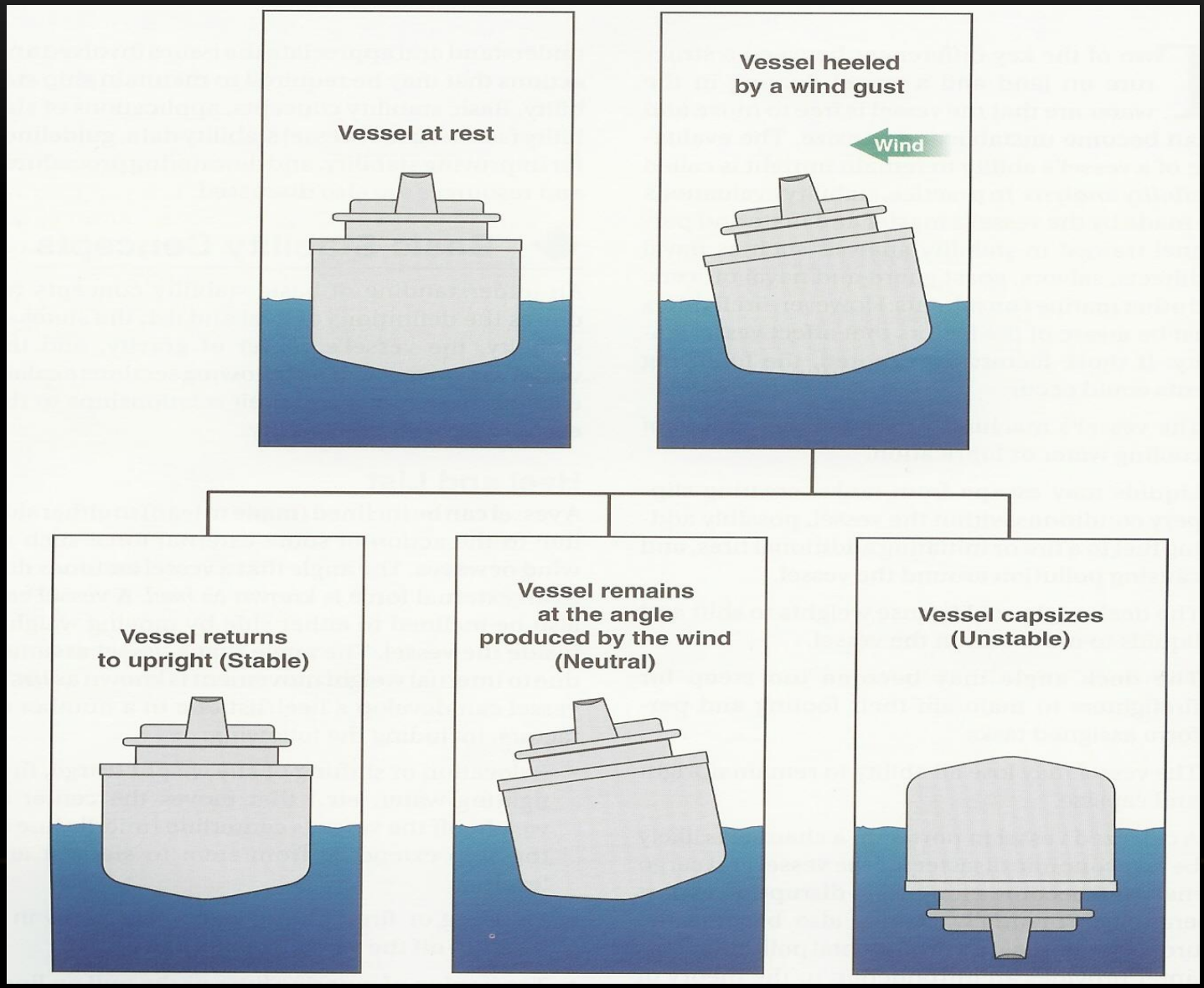
BOUNDARY COOLING



FUEL SHUT OFFS

- Multiple Locations

VESSEL STABILITY

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EXCLUSIVE
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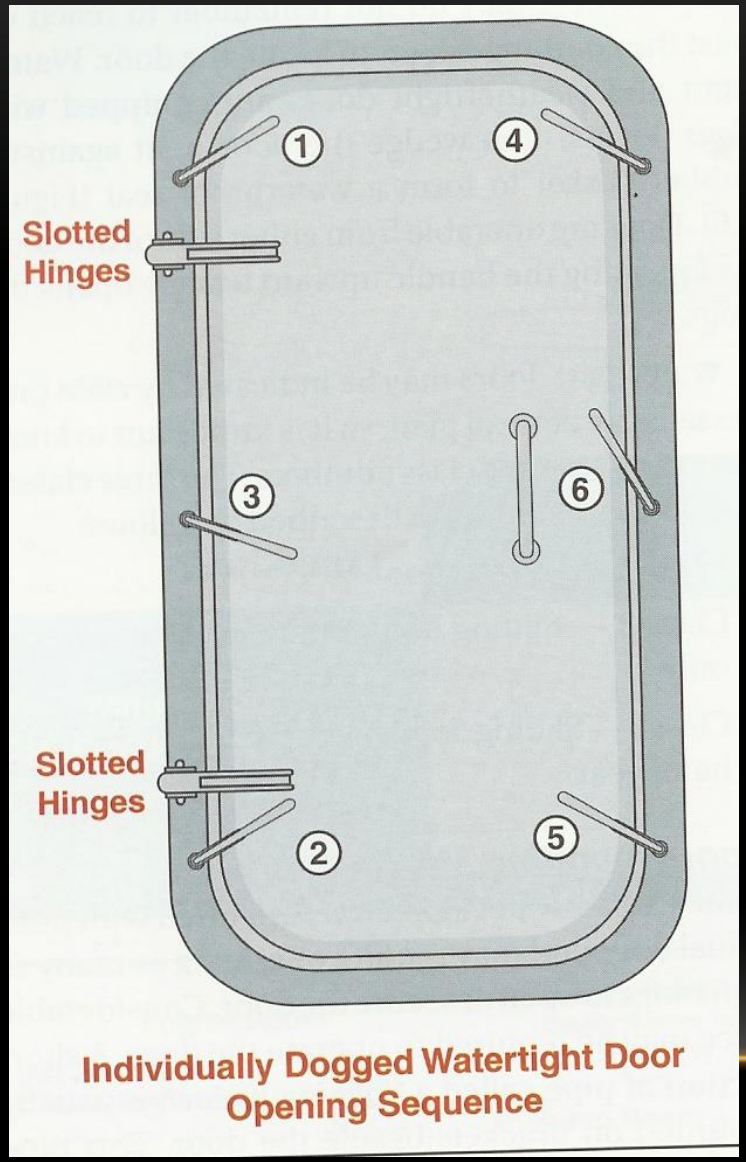
WATER TIGHT HATCH



CLASS 3 WATER TIGHT DOOR

CLASS 3 WATER TIGHT DOOR

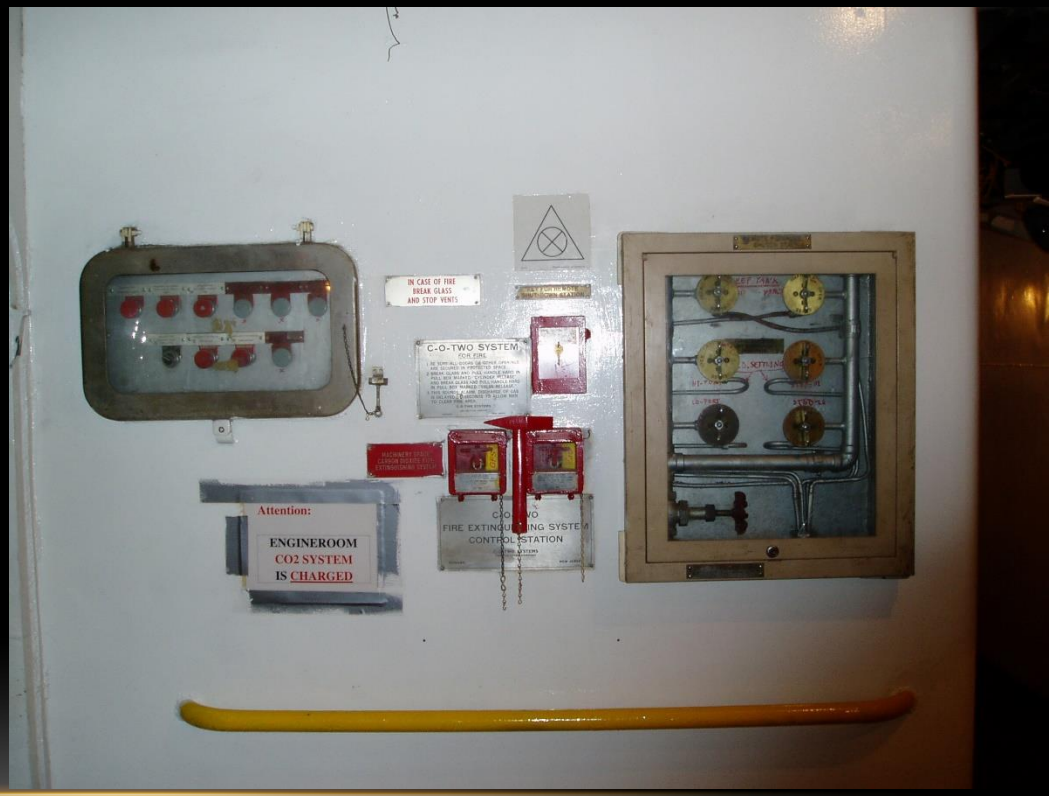
FIRE DETECTION

Bridge

Quarterdeck

FIXED FIRE SUPPRESSION SYSTEMS

- CO_2 Flooding System
  - Engine Room
  - Paint Lockers
  - Haz-Mat Storage Spaces



CO_2 EXTINGUISHING SYSTEM

FIRE HAZARDS, IGNITION AND PREVENTION

- Smoking
- Spontaneous Ignition
- Faulty Electrical Equipment
- Construction
- Cargo Stowage
- Galley
- Fuel Transfer
- Welding
- Shipyard Work
- Collisions

BIGGEST REASON:
HUMAN ERROR

FIRE PREVENTION

- RESPONSIBILITY

- Effective Program – 3 E's
  - Engineering
  - Education
    - Escape Routes are a must T.S. Bay State..
  - Enforcement

- When does this begin and stop?
  - USCG requires weekly fire & boat drills
  - Fire and Boat drill upon leaving port

PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Turnout Gear
  - Protective Envelope
  - Helmet
  - Hood
  - Jacket
  - Pants
  - Boots
  - Eye/Ear Protection
- SCBA

SELF CONTAINED BREATHING APPARATUS

- Commonly referred to as SCBA

- Originally designed in the early 70's through collaboration between Boston, Chicago, Los Angles City Fire Departments and NASA
  - Simple harness assemblies
  - Steel bottles

- Newer units are now composite bottles with lightweight harnesses

SELF CONTAINED BREATHING APPARATUS

- Why do we wear them?

- IDLH Environment
  - IMMEDIATELY DANGEROUS TO LIFE or HEALTH

  - A condition "*that poses a threat of exposure to containments when that exposure is likely to cause death or immediate or delayed permanent adverse health effects or prevent escape from such an environment".*

  - Does an IDLH environment have to occur in a fire?

TYPES OF RESPIRATORY HAZARDS

- Oxygen Deficiency
- Elevated Temperatures
- Smoke
- Toxic Atmospheres

Oxygen & Combustion

21% In Atmosphere

At 18% Fire begins to decrease in intensity, but is still burning

At 14% Fire smolders but is not out

IDLH ATMOSPHERE – DECREASED OXYGEN

- Need 21% O2 in air to breath normally (without exertion)

- Air and Fire behave somewhat the same
  - At 21% both do great

- At 19% and lower people begin to act “funny”
  - Fire begins to decrease in size

- At 16% and Less people cease to be … Alive
  - Fire has decreased to point that it is smoldering..but not out

REDUCED OXYGEN

- 21% Normal conditions
- 17% Some muscle impairment, increased rate of breathing
- 12% Dizzy, headache, rapid fatigue
- 9% Unconsciousness
- 6% Death within a few minutes

IDLH ATMOSPHERE – CARBON MONOXIDE

- Colorless and Odorless Gas
- Present in all fires
- Deadly to humans
  - Bonds with hemoglobin 1000x more than oxygen
- Very high flammability range
  - 12 – 74%

IDLH ATMOSPHERE – HYDROGEN CHLORIDE

- Colorless to yellow gas
- Causes respiratory tract swelling
  - Suffocation
- Caused by burning of:
  - Telephone Cables
  - Electrical Cables
  - PVC's
  - Plastics

IDLH ATMOSPHERE – HYDROGEN CYANIDE

- Colorless to pale blue gas
- Bitter almond smell

- Causes heart failure & death
  - Heart can not move blood and therefore it backs up
  - Recent discovery for FF's having heart attacks after fires

- Caused from burning
  - Rubber
  - Polyurethane
  - Wool / Paper
  - Nylon
  - Synthetics

IDLH ATMOSPHERE - PHOSGENE

- Colorless gas with musty hay odor
- Forms Hydrochloric Acid in the lungs
- Eye and Skin Irritant
- Found in burning and off gassing of Refrigerants

IDLH ATMOSPHERE - AMMONIA

- Colorless gas or liquid

- Pungent suffocating odor
- Causes Pulmonary Edema
  - Fluid build up in the lungs
- Found in:
  - Refrigerants
  - Cleaning products
  - Fertilizer

IDLH ATMOSPHERE - CHLORINE

- Greenish to yellow gas

- Causes Pulmonary Edema
- Burns to eyes, nose and mouth

- Found in burning and non-burning:
  - Rubber
  - Pool chemicals
  - Cleaning products
  - Synthetic textiles
  - Heated plastics, PVC's

When in doubt…wear an SCBA

SCBA

- Units allow firefighters to penetrate deeper into IDLH environments while breathing clean air

- Limited by
  - Physical conditioning
    - Need some kind of fitness level to have proper length of “air time”
  - Physical features
    - Influences mask seal – no beards!
  - Psychological restrictions
    - Confined space – claustrophobia

SCBA

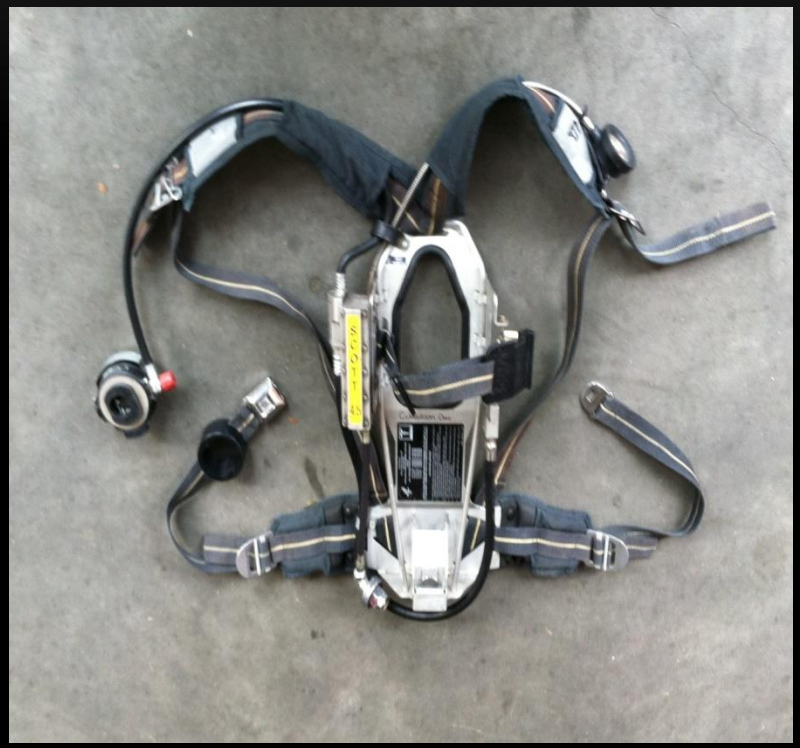
- Units build around 2 main bottle styles
  - 2216 (aka: 2.2)
  - 4500 (aka: 4.5)

- Each unit basically has approximately “30 minutes of working time”
  - Reality is approximately 12-15 min.
  - Unless you are experienced and comfortable with the unit
  - There is NO UNLIMITED amount of air in the bottle…once you’re out of air…you’re out!

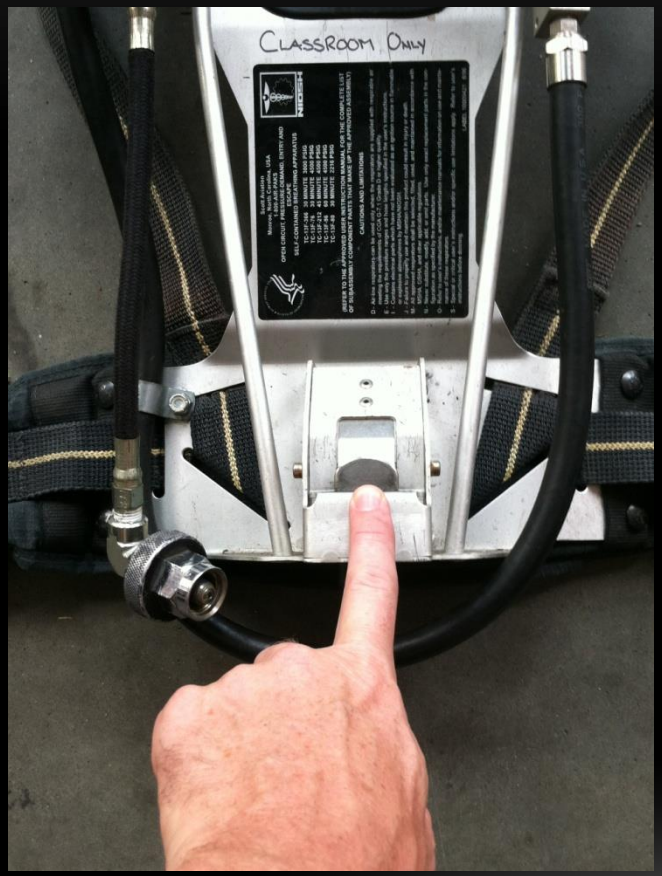
- SCBA assemblies have 3 main components
  - Harness / Bottle / Face Piece

SCBA - HARNESS

- Very similar to design and use as a backpack
  - Shoulder straps and waist straps
- On left side is the High Pressure Regulator
- On left side, attached through the strap is the Low Pressure Regulator
- On the right side is the Bottle Valve
- On the right side attached to the right shoulder strap is the remote pressure gauge



SCBA - HARNESS



- Back plate assembly
- Designed to cradle the bottle with a retention strap located near shoulders
- Clip as shown is the ONLY part which attaches the bottle to the harness
  - Bottle has small metal tab which makes connection into the clip

SCBA – HIGH PRESSURE REGULATOR

- Takes pressure form Bottle and drops it down to roughly 100 psi
  - Located on left side of harness assembly
- Constructed to handle either 2216 or 4500 psi. Can not mix bottles
- Has 2 hoses.
  - 1 goes over left shoulder to 2nd stage regulator
  - 1 goes to remote gauge

SCBA – 2ND STAGE REGULATOR

- Designed to drop pressure from 100 psi to just above atmospheric
- Positive pressure unit
- Has a “Vibra-Alert” feature to warn when getting to approximately ¼ volume of bottle
  - 1000 psi – 2.2
  - 1500 psi – 4.5
  - Roughly 5 minutes regardless

SCBA – 2ND STAGE REGULATOR

- Works though a diaphragm located just behind silver (or black) cover
- Has 3 features on the unit to facilitate operation
  - Don / Doff Switch
  - Emergency By-Pass
  - Face Piece Latch

Don / Doff Switch

Emergency By-Pass

Face Piece Latch

SCBA – REMOTE GAUGE

- Designed to give basic reading of available air in bottle
- Not exact reading – can be off by as much as 100 psi
- Can be integrated with PASS Device
- If reading is drastically different between gauge and bottle – take entire unit OOS
  - Can't determine which is right…

SCBA – BOTTLE

- Constructed of aluminum cylinder wrapped in carbon fiber
- Has remote gage on both sides of bottle
  - Gauge must read the same…
- Has attachment point for respective harness
  - ONLY 4.5 will fit into a 4.5 harness
  - 2.2 *can* fit into a 4.5 so be careful
- Bottle pressure is listed in two places if you're not certain what you have

SCBA – BOTTLE VALVE

- Designed to accept the high pressure line from the harness assembly
- Has the bottle ON / OFF valve located to the right side of the bottle
  - Valve designed to open easily & close difficult
- Has 2 gauges on either side of the bottle
  - Each gauge should read the same…if not the bottle is OOS

Tab which clips into the harness

SCBA – FACE PIECE

- Made of high strength plastic
- Designed to allow 2nd stage regulator to connect into face piece with a secure fit
- FIRST item to fail in high heat environment
- Need to have a tight seal, must be air tight to operate properly

OVER THE HEAD METHOD

DONNING FACE PIECE

- Hood before coat
- Spread harness
- Position chin in chin cup
- Slide harness up and over
- Pull bottom straps back to tighten: not out
- Tighten temple straps
- Check seal for leaks
- Pull hood into place

FIRE PREVENTION

- Inspections
- Preventative Maintenance & Repair
  - Who bears this responsibility?
- Housekeeping
- Fire watch
  - Fire Patrols
  - *Constant Vigilance* when moving between spaces

FINAL THOUGHTS

- USCG is NOT tasked to provide Maritime Fire Fighting
  - Local FD's or "Any Vessel At Sea"
- If you sail long enough you will have a fire at sea
- Remember these lessons and future classes
- YOU are the FIRE DEPARTMENT once you leave the pier

STATIONS

- **SCBA**
- **EXTINGUISHERS**
- **HOSE HANDLING**

QUESTIONS ?

This Week and The Next Three Years