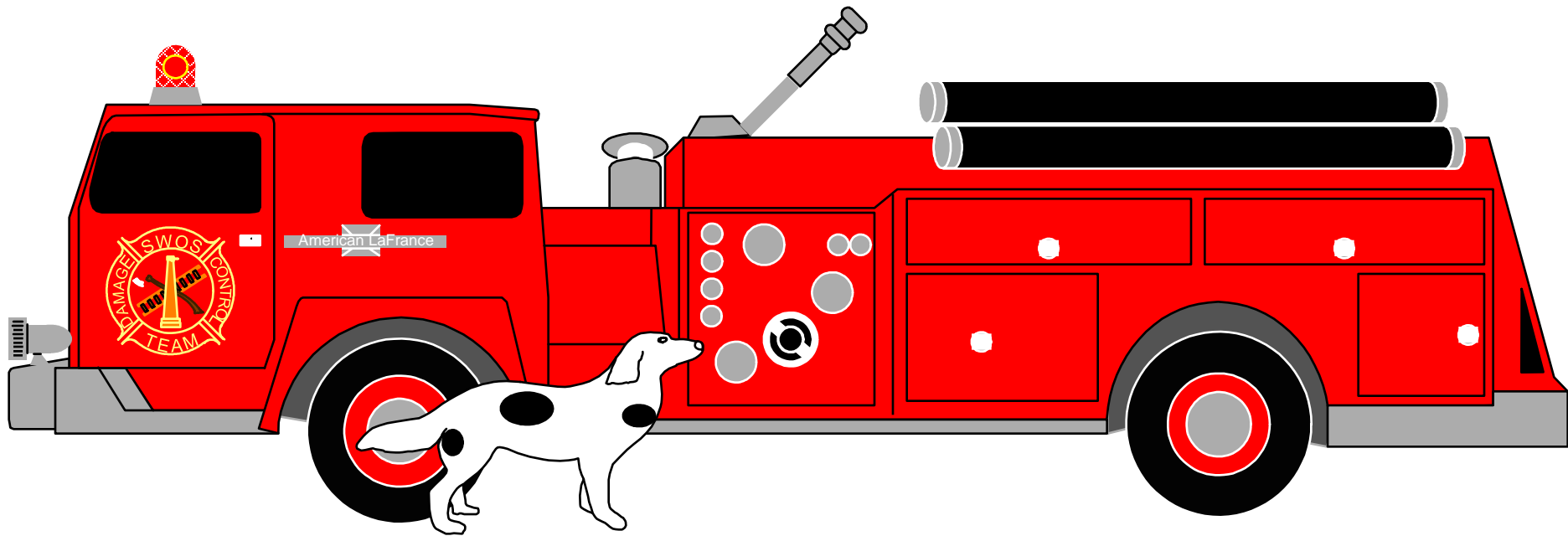


# Firemain



# ENABLING OBJECTIVES

- DESCRIBE the purpose, function, component parts, operating characteristics and maintenance requirements of the ship's firemain system
- DESCRIBE bi-metallic corrosion, its effect on seawater systems, and how to inspect for its presence

# ENABLING OBJECTIVES

- EXPLAIN how to isolate and bypass ruptures of the firemain system using the firemain damage control diagram

# WHAT IS THE PRIMARY FUNCTION OF THE FIREMAIN SYSTEM?



↑ TO SUPPLY  
SEAWATER  
TO FIGHT  
FIRES

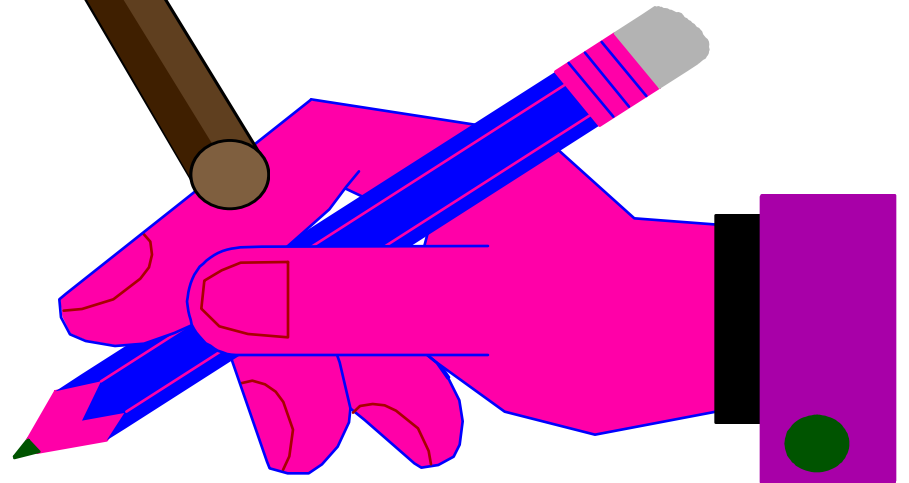
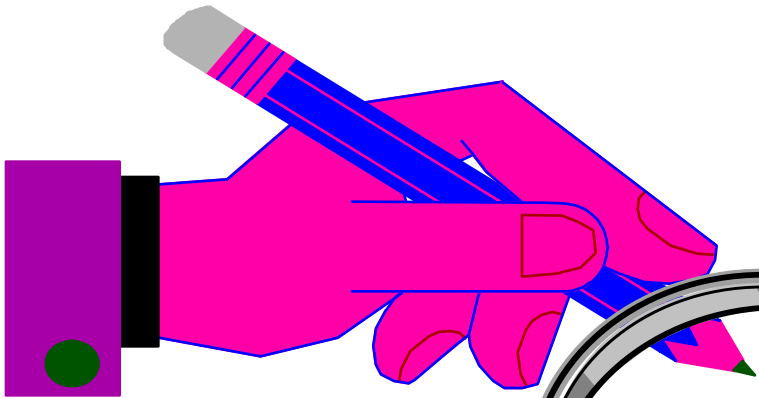
# FIREMAIN

- ***“NO INFORMATION IS OF GREATER IMPORTANCE TO THE DAMAGE CONTROL ORGANIZATION THAN A COMPLETE KNOWLEDGE OF THE SHIP’S FIREMAIN SYSTEM”***

**– NSTM 079 VOL 2**

**KNOW YOUR  
FIREMAIN  
SYSTEM**

**TRACE IT !!!**



# Firemain

- Firefighter should have a working knowledge of
  - Firemain piping
  - Firemain valves
  - Measures to be taken after battle damage to assure water service for firefighting

# **Firemain Systems**

- **Design Features**
- **Types**
- **Components**
- **Operation**
- **Maintenance**



# Design Features

## **Reliability:**

Resistant to Saltwater Corrosion

## **Redundancy:**

Multiple fire pumps

## **Optimum Sectionalization:**

Independent stations practical during battle

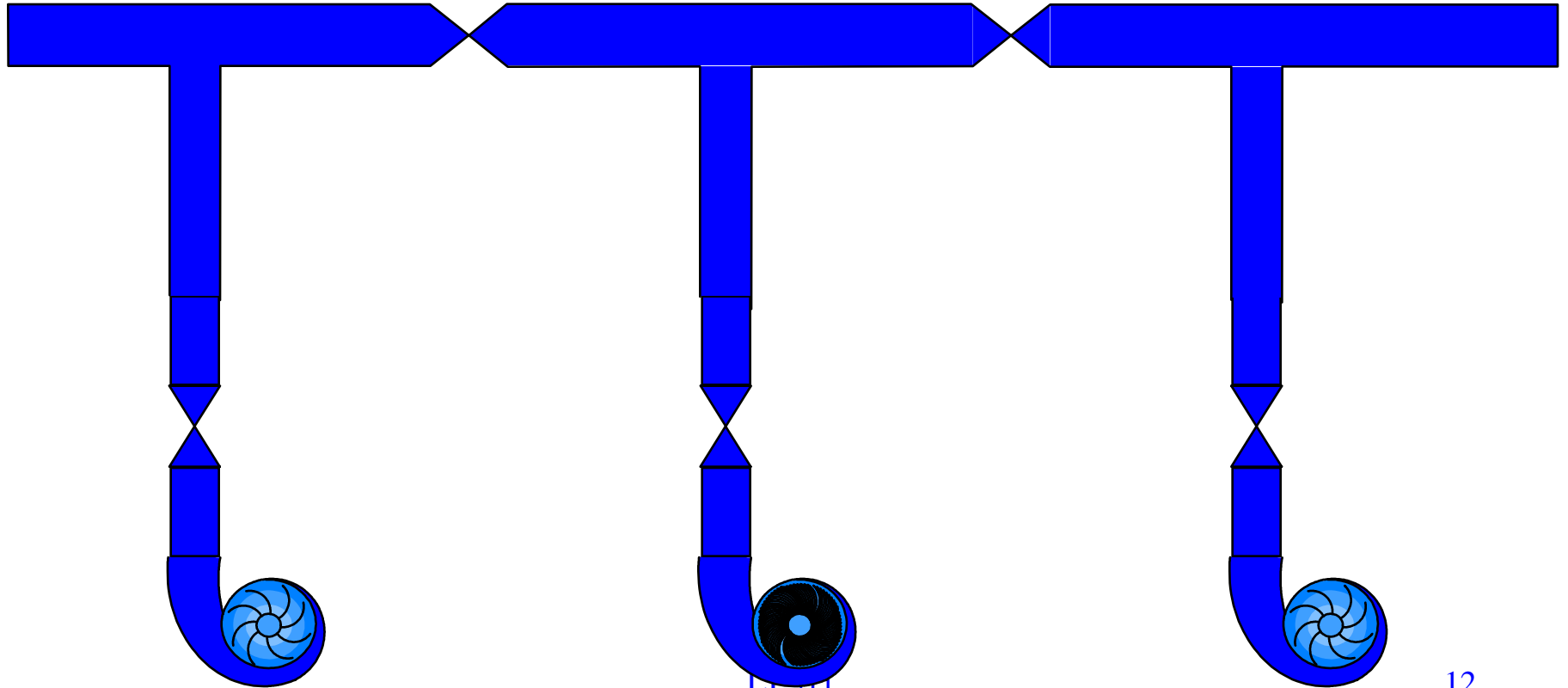
# System Types

- **Single Main**
- **Horizontal Loop**
- **Vertical Loop**
- **Composite**

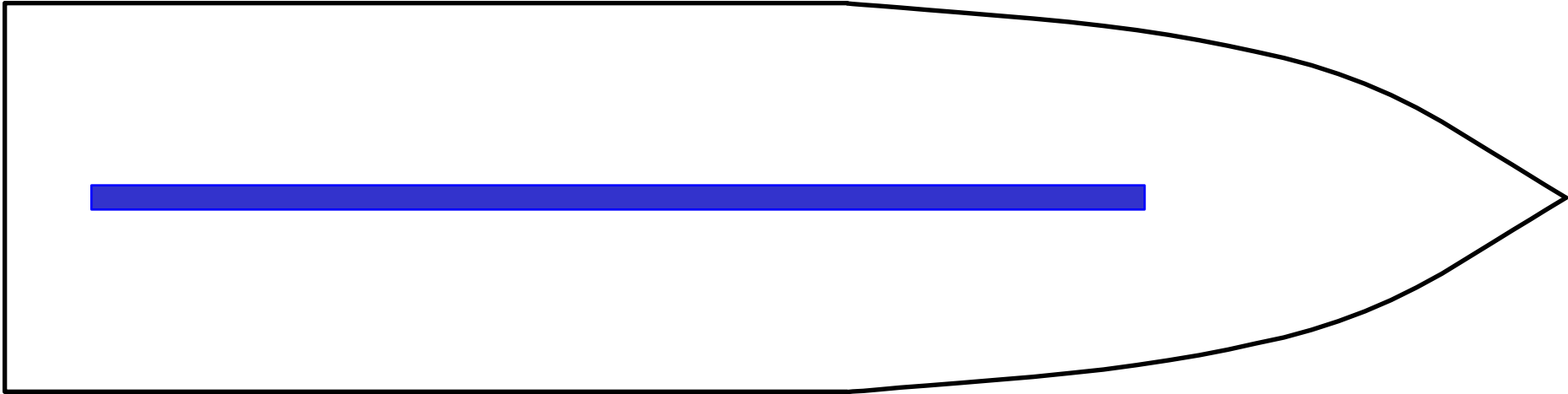
# Single Main

- Extends longitudinally near the centerline of ship
- Pumps discharge into risers
- Risers direct water into main
- Main supplies fireplugs & other services
- Usually found on FF's and DDG's

# Single Main



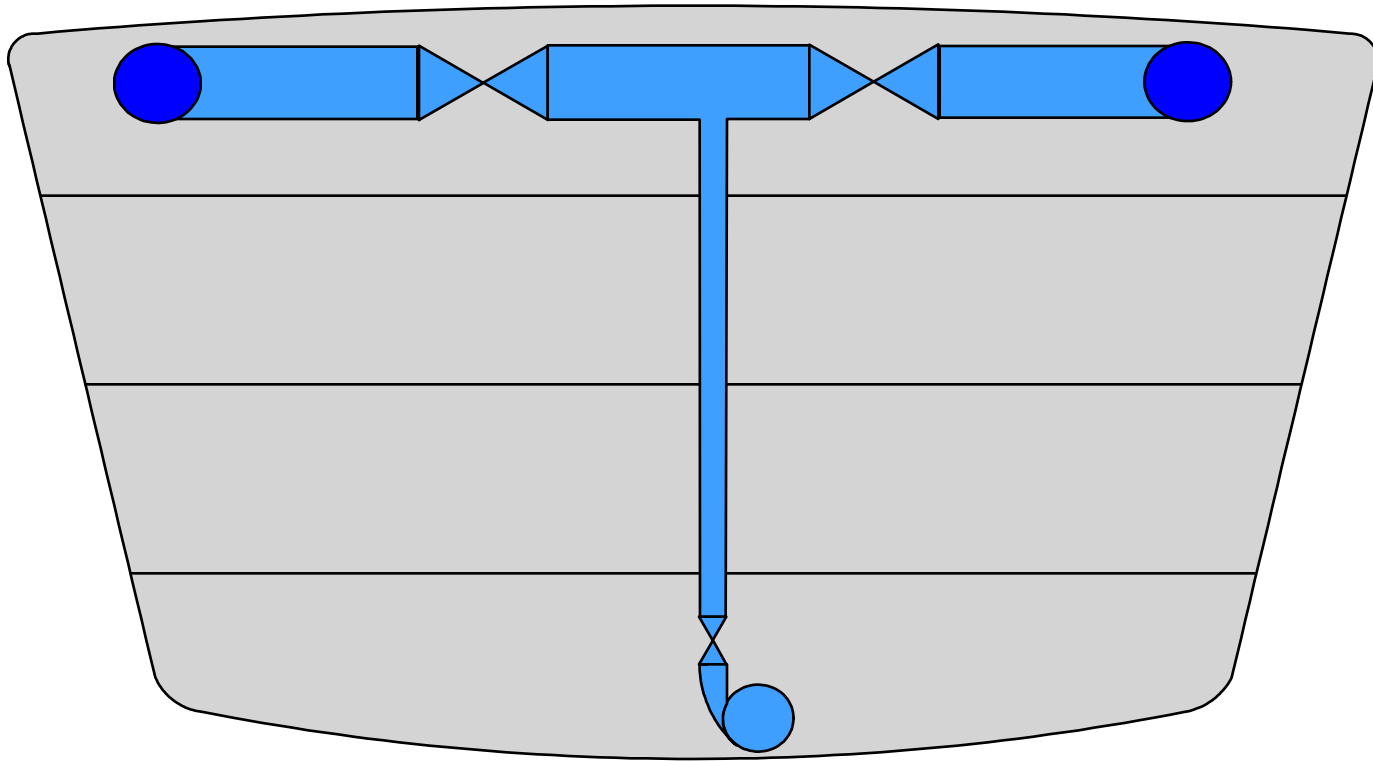
# Single Main



# HORIZONTAL LOOP

- 2 Single Mains on DC Deck
- Separated athwartship
  - Minimizes damage
  - Cross-connected to form series of horizontal loops
- Risers connected into Cross Connects
- Allows water into either or both loops
- Service Risers & Branches

# HORIZONTAL LOOP

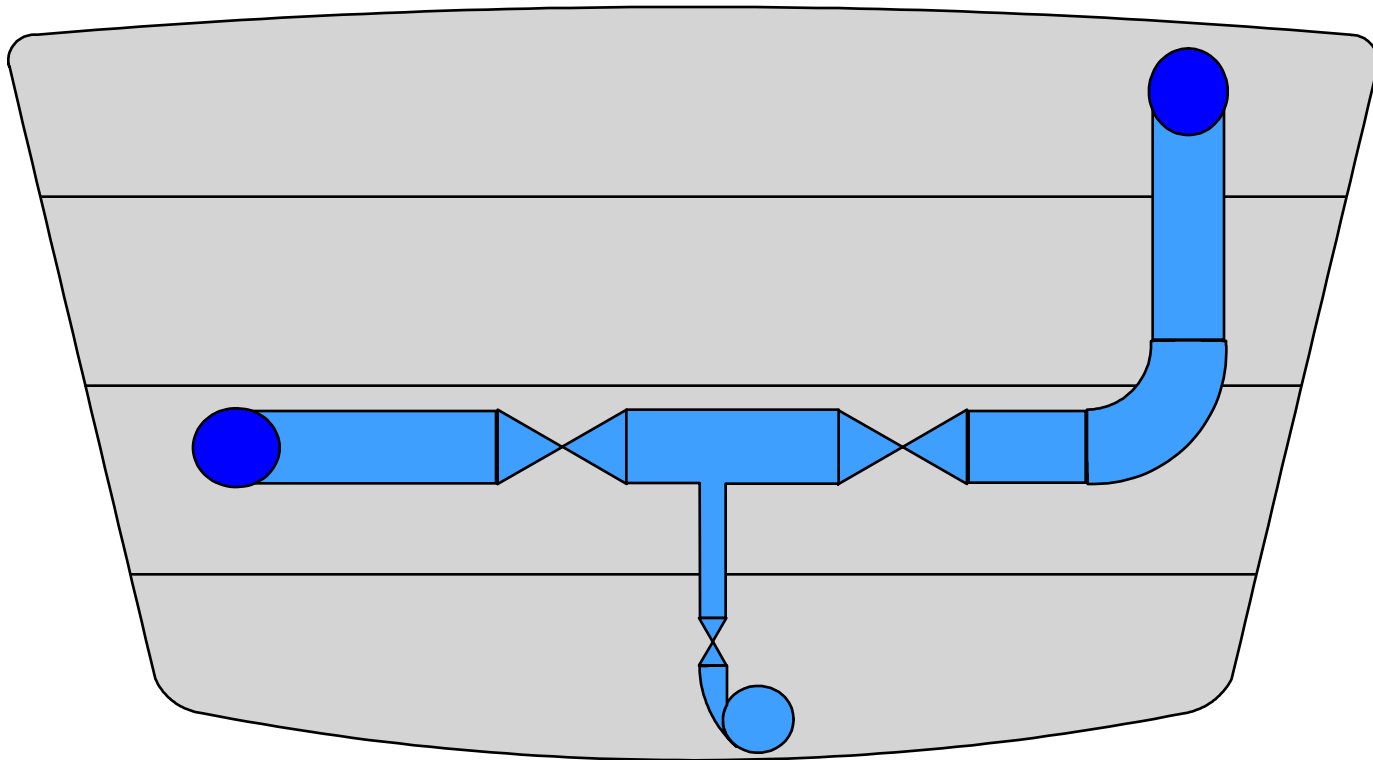


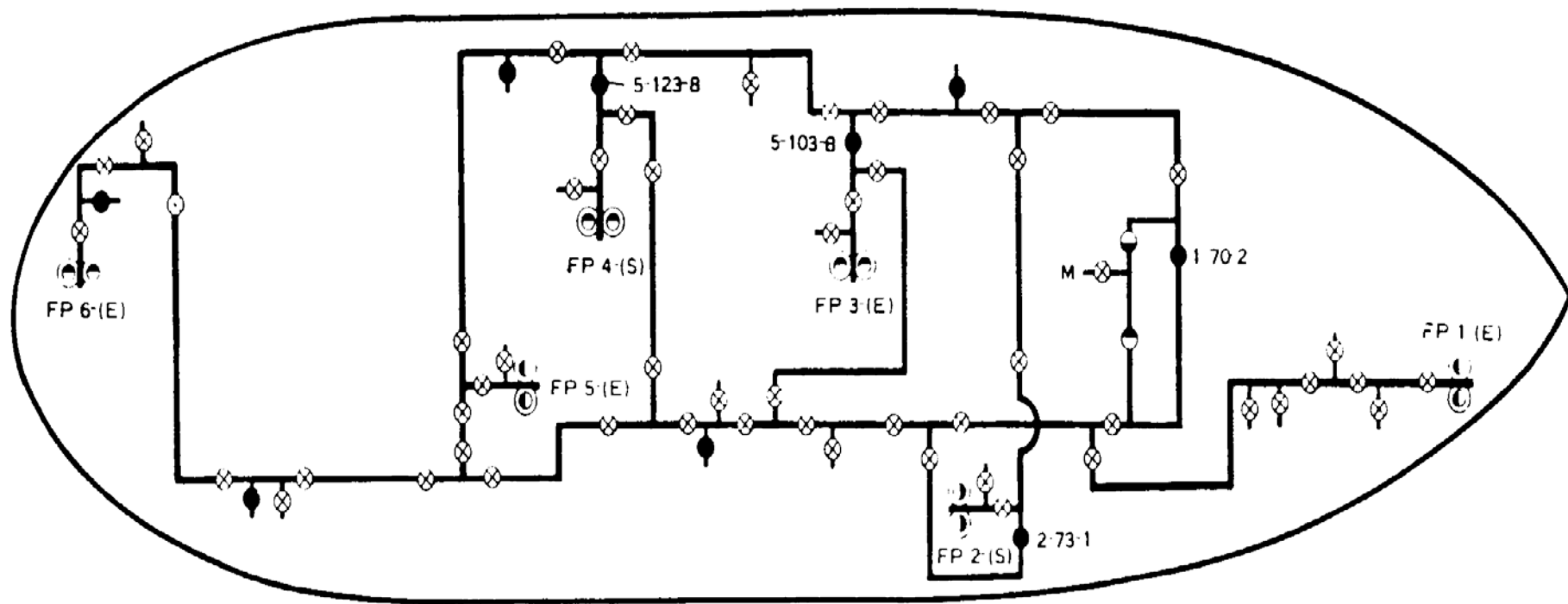
# VERTICAL LOOP

- 2 Single Mains
- Installed in oblique plane
- Separated vertically & athwartship
- Upper Main installed on DC deck
- Lower Main is low in ship
- Mains are cross-connected to form series of loops
- Risers discharge port/stbd into either main
- Service Risers led from Main



# VERTICAL LOOP



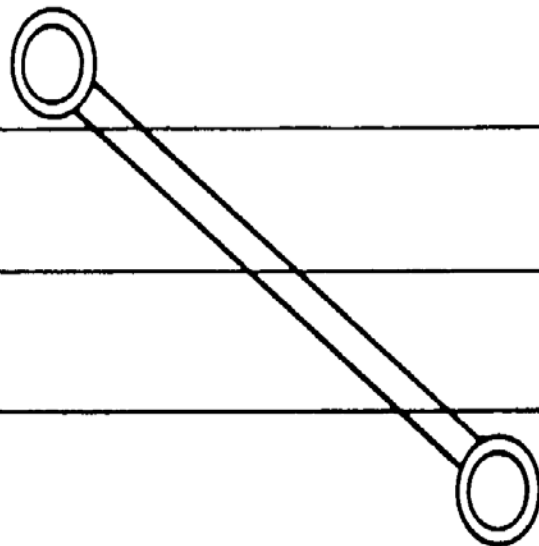


DC DECK  
(2ND DECK)

3RD DECK

4TH DECK

5TH DECK

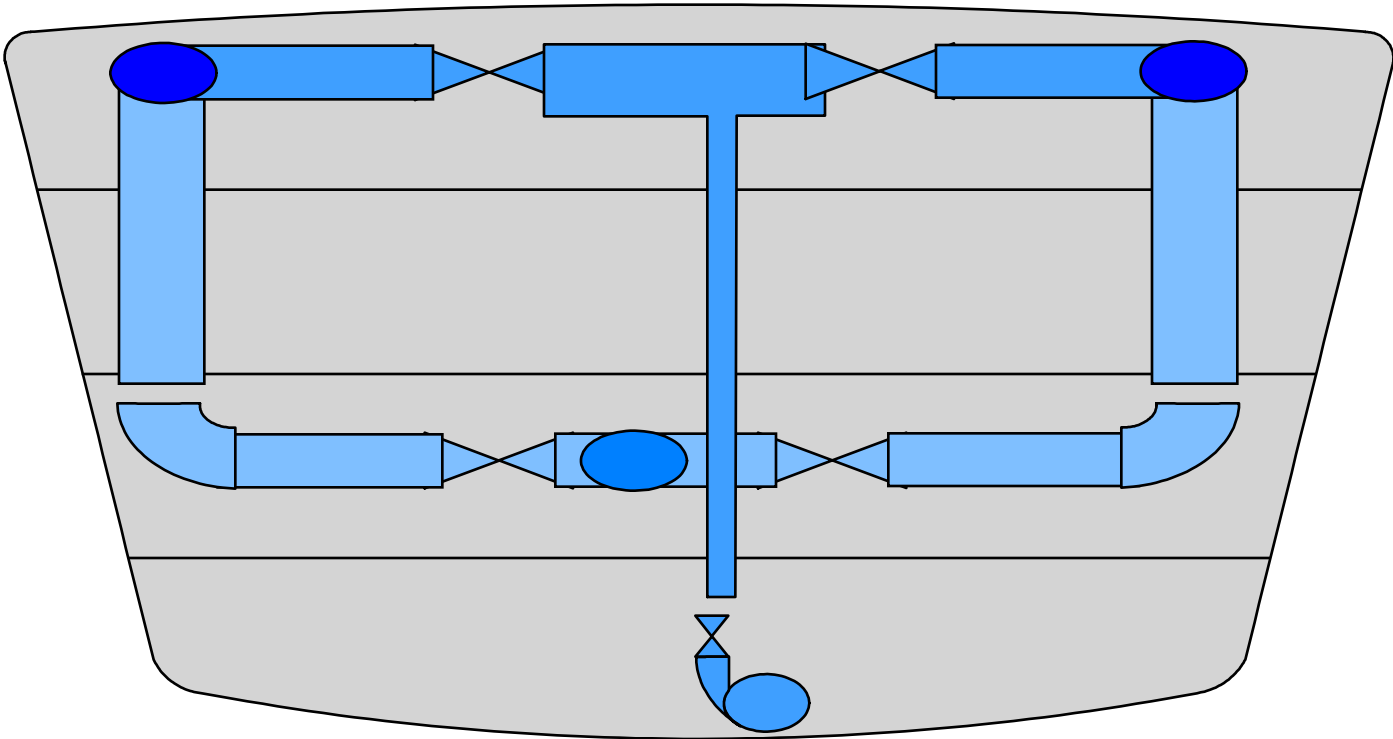


VERTICAL LOOP  
(END VIEW)

# COMPOSITE

- 2 or 3 service mains on DC deck
- Separated athwartship
- By-pass main installed at lower level near C/L
- Cross-connects installed alternately between service mains & by-pass main
- Risers discharge into cross-connects
- Service risers led from service main

# COMPOSITE



# SERVICES PROVIDED (PARASITIC SYSTEMS)

★ MAGAZINE  
SPRINKLING

🕒 CMWD

🕒 DECON  
SHOWERS

🕒 FLUSHING

🕒 BALLASTING

🕒 EMERGENCY  
ELECTRONIC  
COOLING WATER

🕒 EDUCTOR  
OPERATION

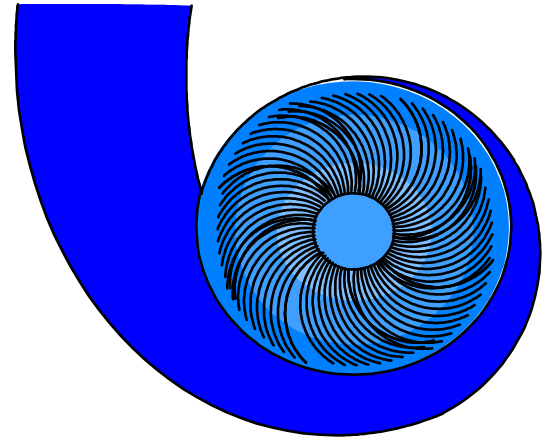
🕒 MISSILE BOOSTER  
SUPPRESSION  
SYSTEM

# Fire Pumps

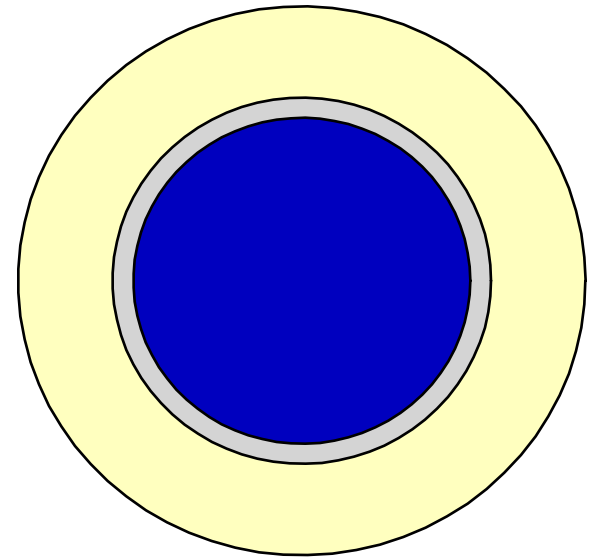
**Single Stage Centrifugal**

**Electric Motor**

**Capacity of 1000 GPM at  
150 psig**



# Piping



**4" to 12" diameter**

Depending on capacity requirements

**Cu-Ni construction**

Resistant to seawater corrosion

# VALVES

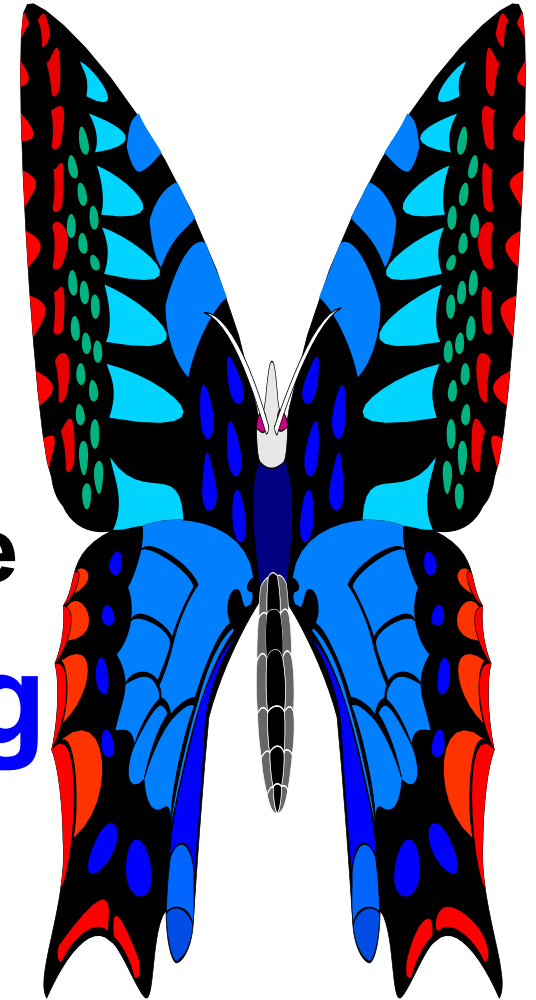
## Isolation

Gate (handwheel) or  
Globe

## Sectionalization

Butterfly - 1 motion handle

Pressure Reducing





# Fireplugs

## **Station Isolation Valve**

## **Marine strainer**

Removed upon receipt of vari-nozzles

## **Wye-gate**

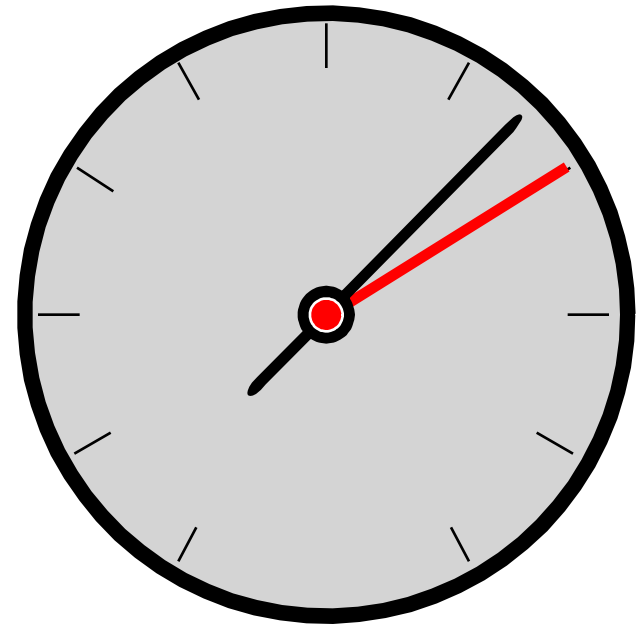
When required

## **Fire hose and nozzles**

Size, Capacity, and Quantity dependent on requirements

## **Spanner Wrenches (2)**

# Gauges



## Local

Fire Stations, Magazine Sprinkling,  
Flushing Stations

## Remote

D C Central, Repair Lockers,  
Main Control

# MARINE GROWTH

- Common cause of firemain malfunction
- Builds up in pipes, decreasing internal cross-section area
- Results in decreased supply of water
- Accumulates on valve seats, discs & stems
  - Prevents valve from seating
- Tropical waters

*Flush system every 3 months. Operate pumps at one end of the ship & open weather deck fire plugs on other end.*



*Flush with  
freshwater if  
possible*

**MARINE  
GROWTH**

# Firemain System

## Bimetallic Corrosion

- Dissimilar metals
- Pipe hangers/flanges - (Rubber spacer)
- Ferrous fasteners - flanges
- Use a magnet
- All seawater systems

# RUPTURED FIREMAIN

- **LOSS OF FIREMAIN PRESSURE**

- **FLOODED COMPARTMENTS**

- ↑ Must isolate damaged portions

- ↑ Restore pressure to intact system

- ↑ May be able to re-align segregation valves

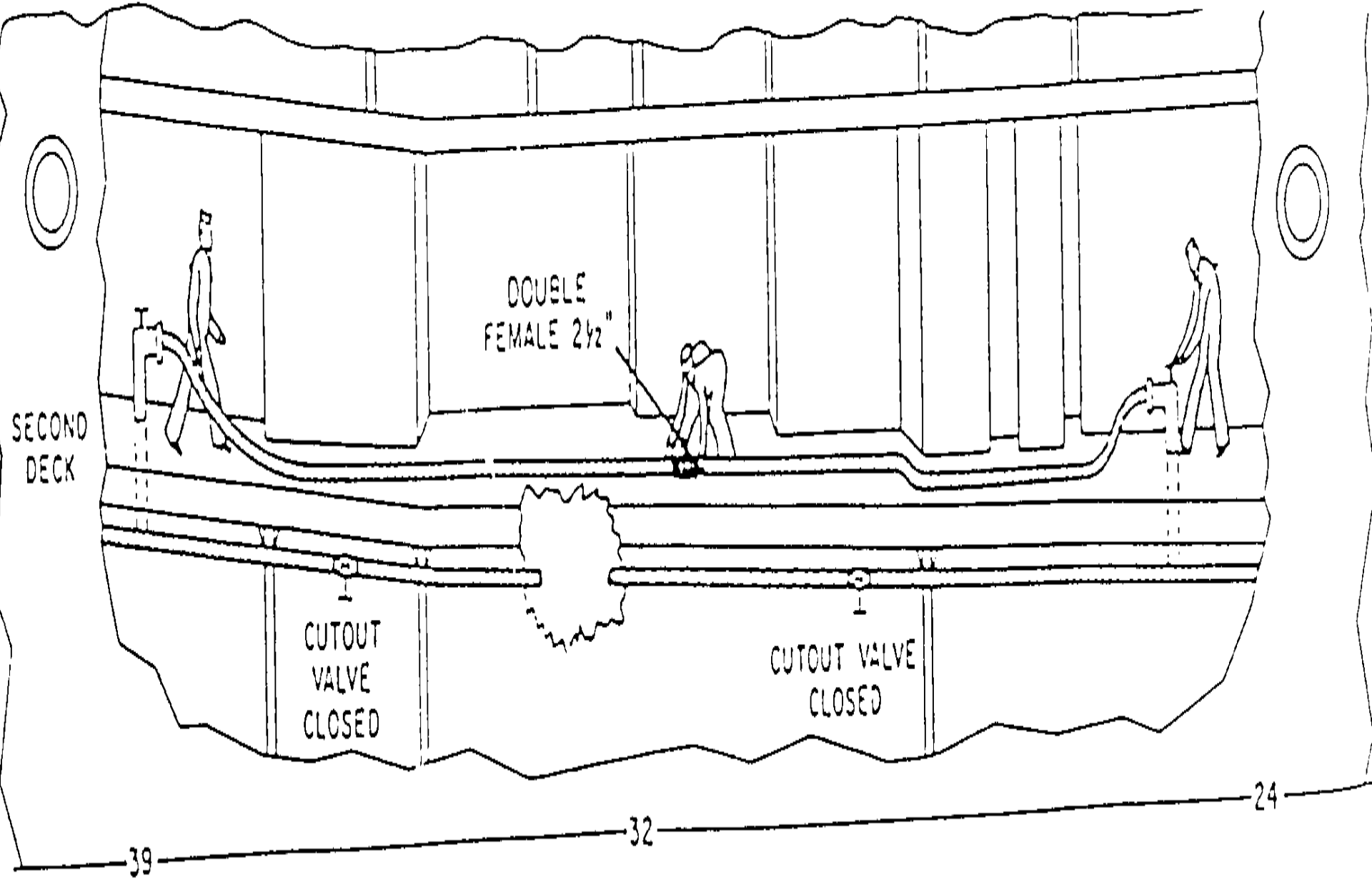
- ↑ May have to rig temporary jumper between fire hose stations or special jumper flanged connections

- ↑ Bypasses damaged section

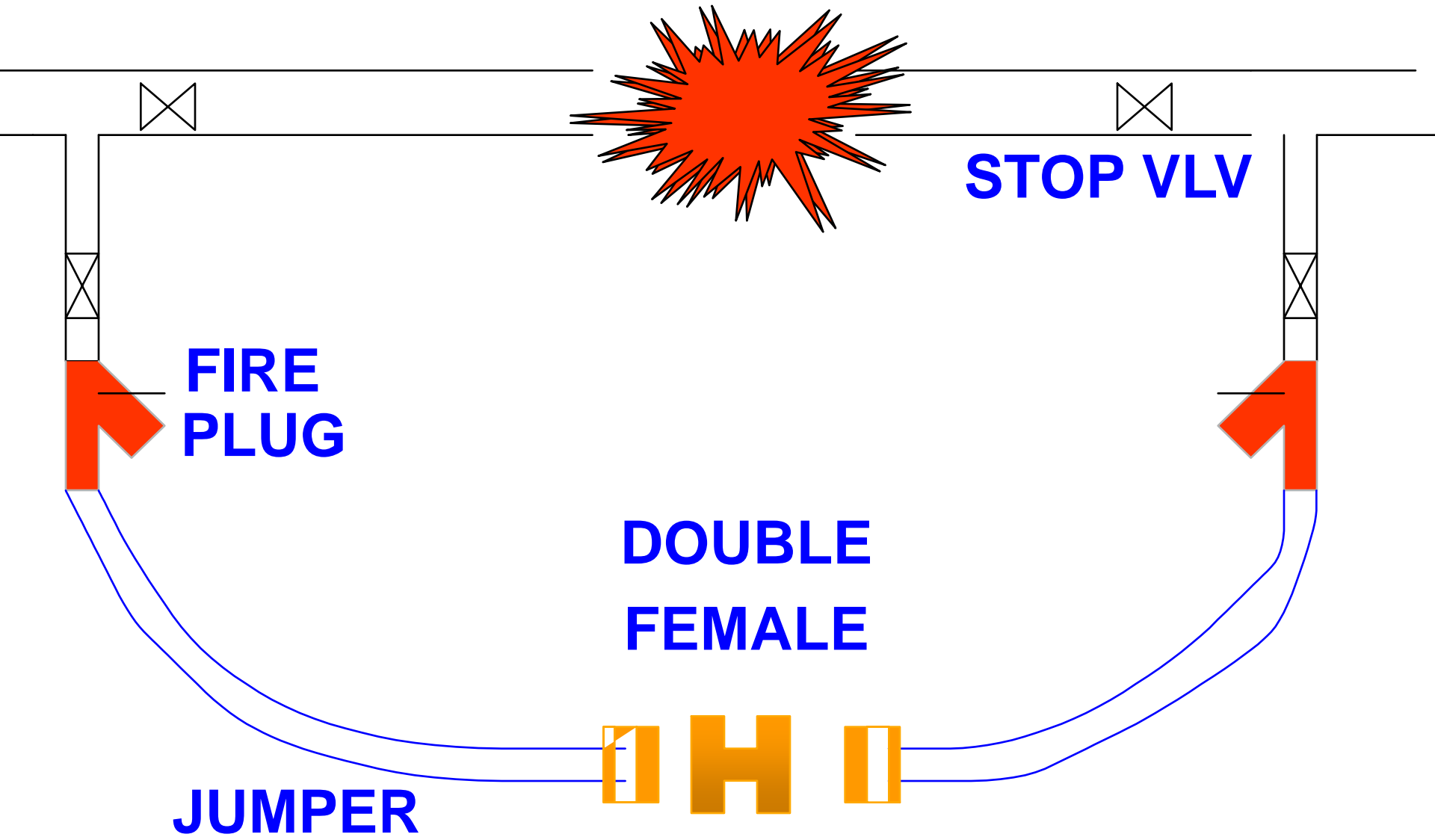
# PROCEDURES

- ☰ Secure isolation valves at either end of rupture
- ☰ Remove wye-gates from required fireplugs
- ☰ Attach 2-1/2 in. hose to each fireplug
- ☰ Connect 2 lengths of hose using a 2-1/2 inch double female coupling
- ☰ Open fireplugs

# PROVIDING TEMPORARY FIREMAIN BY USING HOSE AND DOUBLE FEMALE COUPLING







**FIRE  
PLUG**

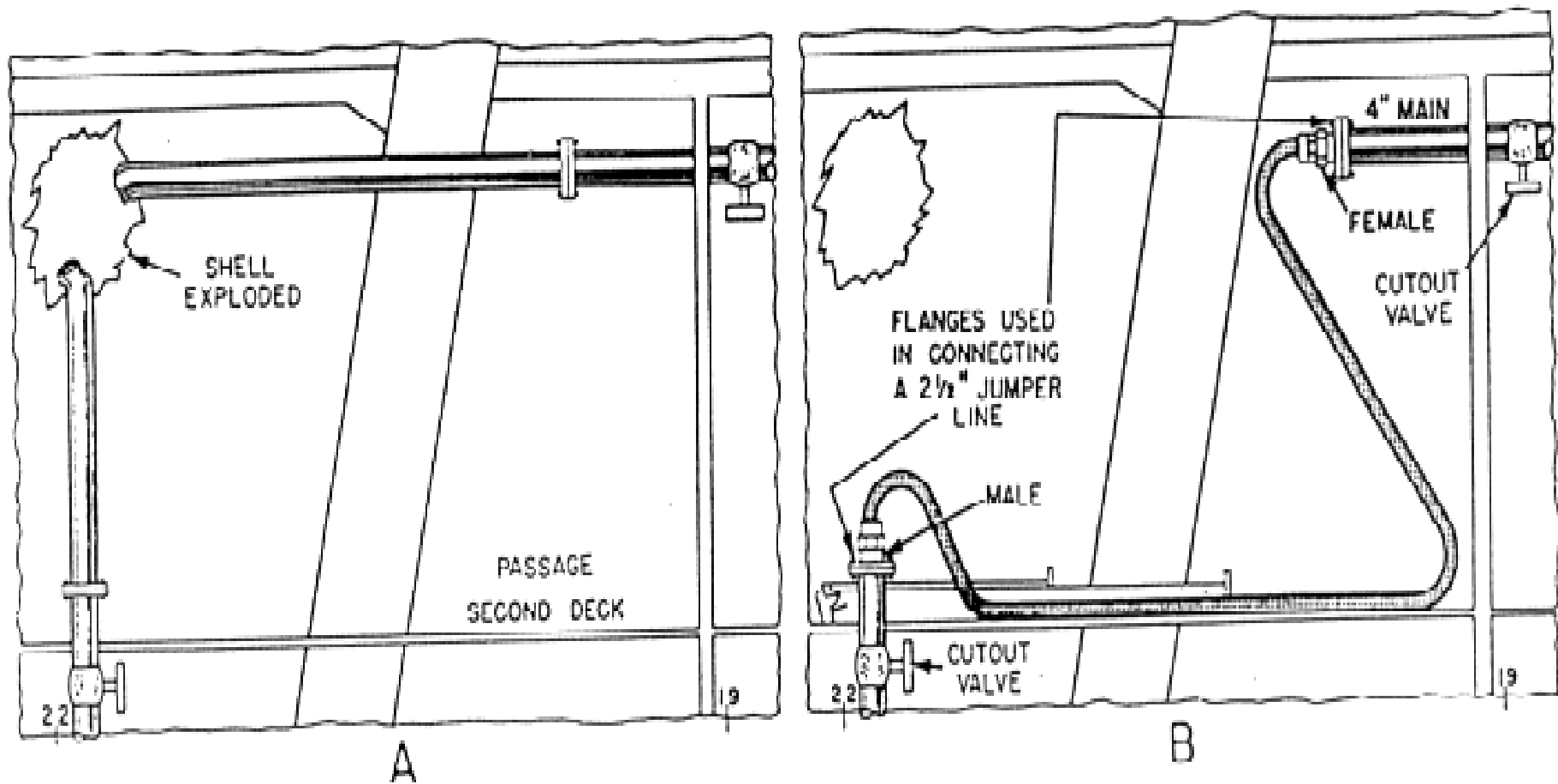
**STOP VLV**

**DOUBLE  
FEMALE**

**JUMPER**

# PROCEDURES - Rigging jumpers between firemain flanges

- ☐ Secure isolation valves nearest rupture
- ☐ Remove ruptured section of firemain at flanged joints
- ☐ Bolt on adapters at flanges
  - ☐ 1 male and 1 female
- ☐ Connect length of 2-1/2 inch hose
- ☐ Open isolation valves
- ☐ Use trigate



## PROVIDING TEMPORARY FIREMAIN SERVICE BY USING FLANGES AND A FIRE HOSE

# INSPECTION AREAS

- PIPING
- STRAINERS
- INSULATION
- REMOTE OPERATORS (MANUAL, ELECTRICAL, HYDRAULIC)
- VALVES
- LABELING
- HANGERS
- PUMPS
- CONTROLLERS
- GAUGES
- JOINTS (WELDED & MECHANICAL)

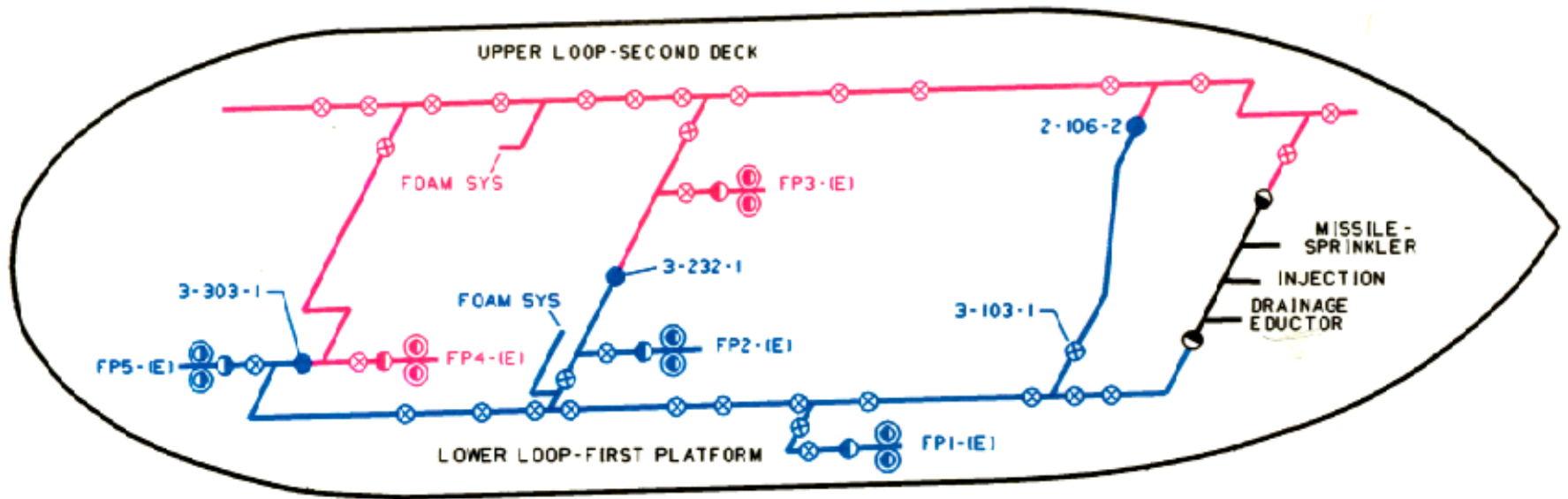
# DC DIAGRAM

- FIREMAIN, SPRINKLER, FOAM & WASHDOWN SYSTEMS
  - Shows cutout valves
  - Location of all fireplugs
  - CMWD valves
  - Sprinkler groups
  - Foam system valves

# DC BOOK SECTION IIe

- Fire pumps
  - How many, what type, location
  - Start/stop locations
- Type of firemain
- Zebra valves
- Fire stations
- Magazine Sprinkler groups

# FIREMAIN SEGREGATION - Condition ZEBRA



— ALL PUMPS AVAILABLE FOR OPERATION OF THE MK13 GMLS, SPRINKLER SYSTEM, BOOSTER SUPPRESSION & DRAINAGE EDUCTORS

— LOWER LOOP - FP1-(E), FP2-(E), & FP5-(E)

— UPPER LOOP - FP3-(E), & FP4-(E)

THE FIREMAIN LOOP IS SEGREGATED INTO TWO SECTIONS. IN CONDITION "ZEBRA" AS INDICATED ABOVE. TO ESTABLISH CONDITION "ZEBRA" FROM CONDITION "X-RAY" OR "YOKE", THE FOLLOWING THREE "ZEBRA" VALVES ARE CLOSED.

VALVE NO.	LOCATION	REMOTE CONTROL
2-106-2	2-100-4-L	2-292-01-C
3-232-1	5-212-0-E	2-292-01-C
3-303-1	5-292-0-E	2-292-01-C
3-103-1	3-100-1-L	

# **MOB-D-20-SF**

## **ISOLATING & PATCHING DAMAGED PIPING**

- Train repair parties to isolate a damaged section of the firemain or other piping & make emergency repairs
- Pipe patching kit
- Firemain chart available & used to identify all systems affected



# LESSON 3.11 SUMMARY

- ▶ Design features
- ▶ Types of systems
- ▶ Parasitic systems
- ▶ Fire pumps
- ▶ Additional equipment
- ▶ Required maintenance
- ▶ Bimetallic corrosion

# QUESTION #1

- WHAT ARE THE FOUR TYPES OF FIREMAIN SYSTEMS?

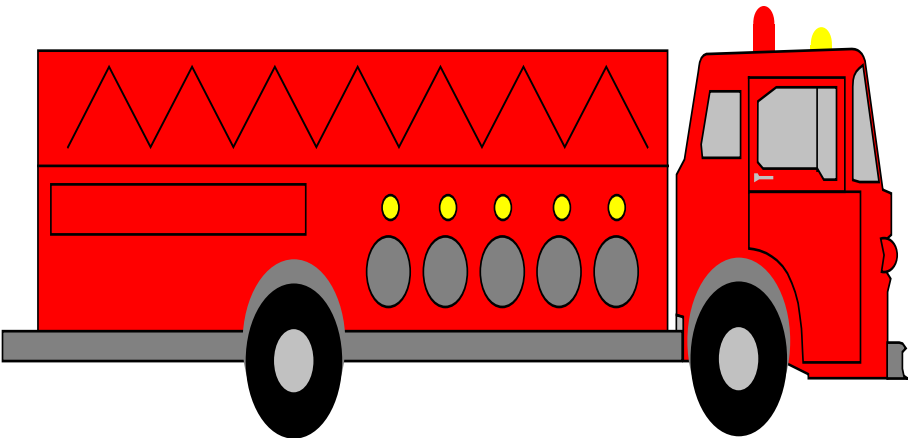


# ANSWER



- SINGLE MAIN
- HORIZONTAL LOOP
- VERTICAL LOOP
- COMPOSITE

# QUESTION #2



- NAME SOME OF THE SERVICES PROVIDED BY THE FIREMAIN SYSTEM.

# ANSWER

- **CMWD**
- **FLUSHING**
- **MAGAZINE  
SPRINKLING**
- **BALLASTING**
- **EMERGENCY  
ELECTRONIC  
COOLING**
- **DECON STATION**
- **EDUCTOR  
OPERATION**

