FIRE CONTROL WEAPONS

Lesson Topics

- Ammunition
- Basic Explosives Knowledge
- Weapons Security
- Ordnance Stowage
- Ordnance Handling

LEARNING OBJECTIVES

- Ammunition
  - Identify types of ballistics, propelling charges, inertial forces, fuses, and safety procedures.
  - Identify the components of basic projectiles, projectile types, and projectile functions.
  - Identify classifications and criteria of ammunition.
  - Identify pyrotechnic types, purposes, functions, and safety precautions.

LEARNING OBJECTIVES

- Basic Explosives Knowledge
  - Identify the definition, types, and uses of explosives for the Navy.
  - Identify the characteristics of explosives.
  - Identify the components and actions in both high and low explosives.
  - Identify the hazards and safety precautions associated with handling explosives and explosive materials.
  - Identify hazards, physical symptoms, and treatment of exposure to OTTO Fuel II.

LEARNING OBJECTIVES

- Weapons Security
  - Recognize the qualifications necessary for personnel assigned duties involving control and access to arms, ammunition, and explosives (AA&E).
  - Identify the security, issuing, and stowage requirements for small arms.
  - Identify the security and inspection measures for weapons magazines and the roles of those authorized to enter magazines.

LEARNING OBJECTIVES

- Ordnance Stowage
  - Identify the types of ordnance magazines and the types of ordnance they stow.
  - Identify magazine safety procedures and precautions, including the proper use of personal protective equipment (PPE).
  - Identify the safety features of a magazine.

LEARNING OBJECTIVES

Ordnance Handling

- Recall general ordnance handling safety precautions, personal protective equipment, and the hazards of electromagnetic radiation to ordnance (HERO) classification.
- Identify ordnance handling procedures and relevant safety regulations.
- Identify the four classifications of ordnance handling equipment and relevant safety regulations.
- Identify types of handling equipment

References

- NAVEDTRA 14324, Gunner's Mate Rate Manual
- NAVSEA OP 4, Ammunition and Explosives Safety Afloat
- NAVSEA OP 5, Ammunition and Explosives Safety Ashore
- NAVSEA OP 3347, U.S. Navy Ordnance Safety Precautions

Classroom Policy

AMMUNITION

ANY DESTRUCTIVE PROJECTILE THAT CAN EFFECTIVELY DAMAGE OR DESTROY A SELECTED TARGET

YOU MUST UNDERSTAND BALLISTICS, PROPELLANTS, FUSES AND AMMO SAFETY TO EFFECTIVELY CARRY OUT THIS MISSION!

BALLISTICS

INTERIOR BALLISTICS

THE SCIENCE OF HOW AMMUNITION MOVES INSIDE THE GUN

EXTERIOR BALLISTICS

THE SCIENCE OF HOW AMMUNITION MOVES ONCE THE PROJECTILE HAS LEFT THE GUN

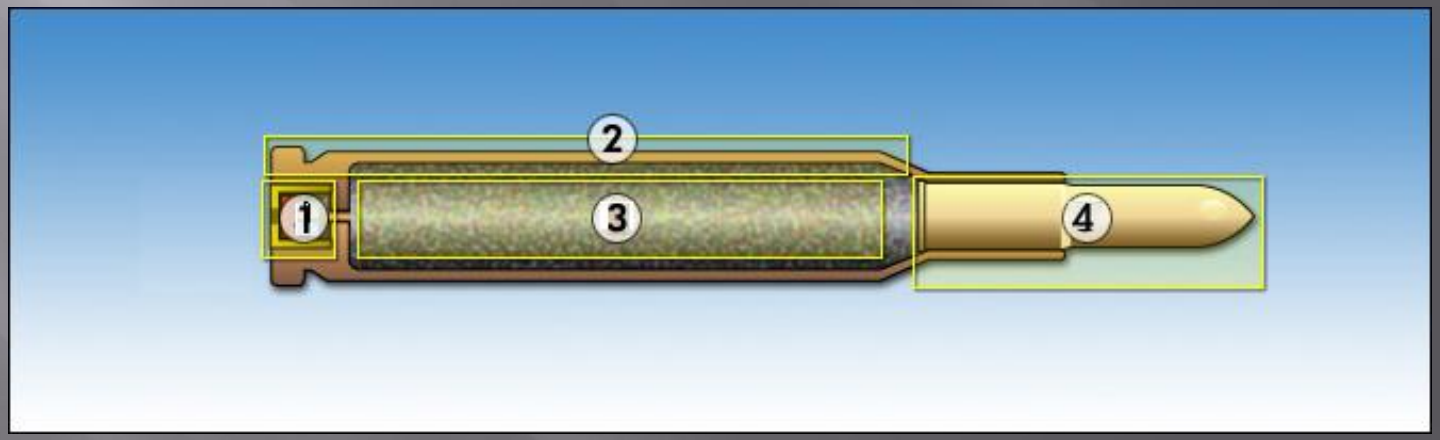
CHARGE COMPONENTS

PROPELLING CHARGE

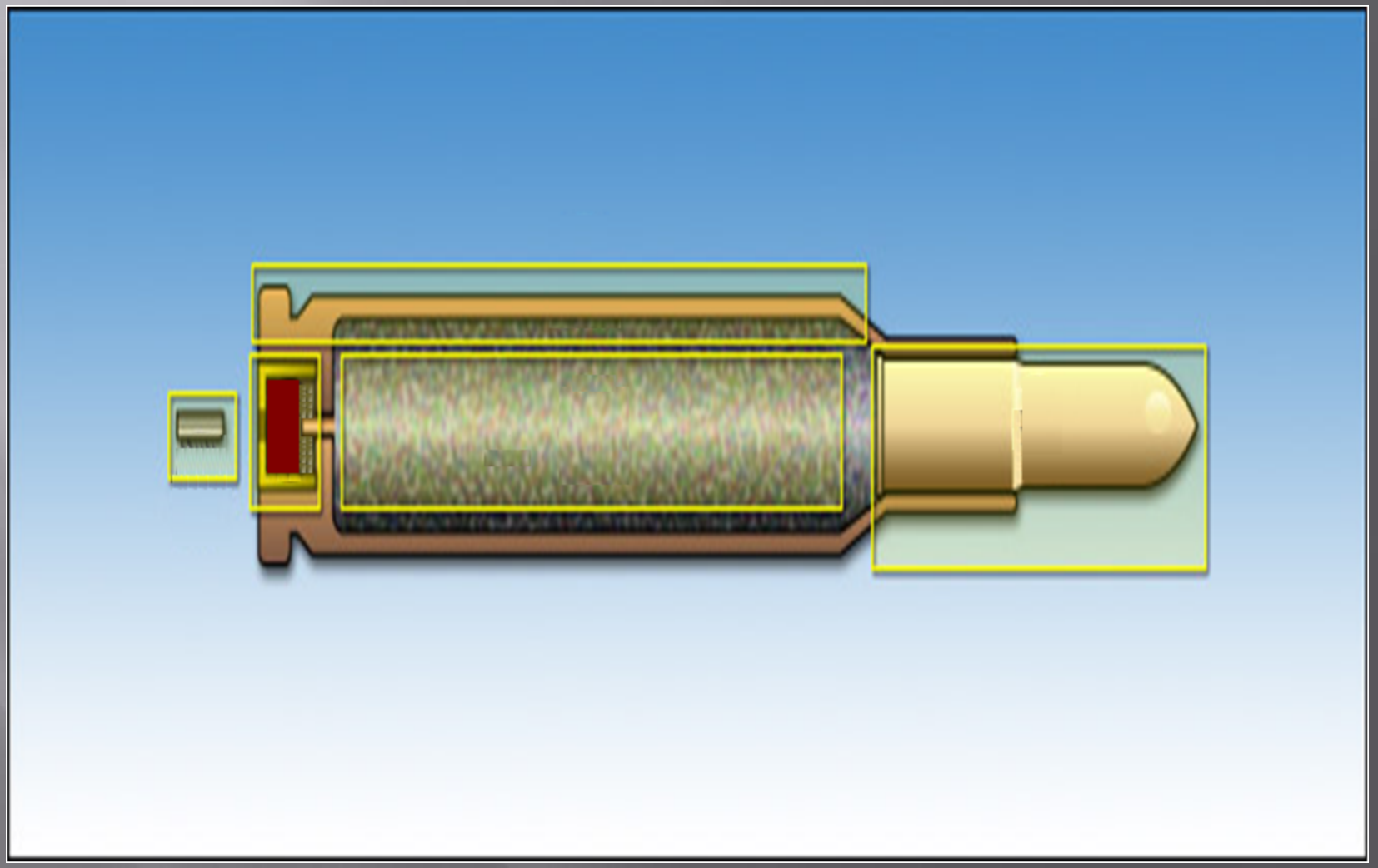
A mixture of explosives inside the cartridge case designed to shoot the projectile out of the barrel once it is ignited.

COMPONENTS OF AMMO

1. Primer.
2. Brass Cartridge.
3. Propellant charge.
4. Projectile.



CHARGE PROCESS



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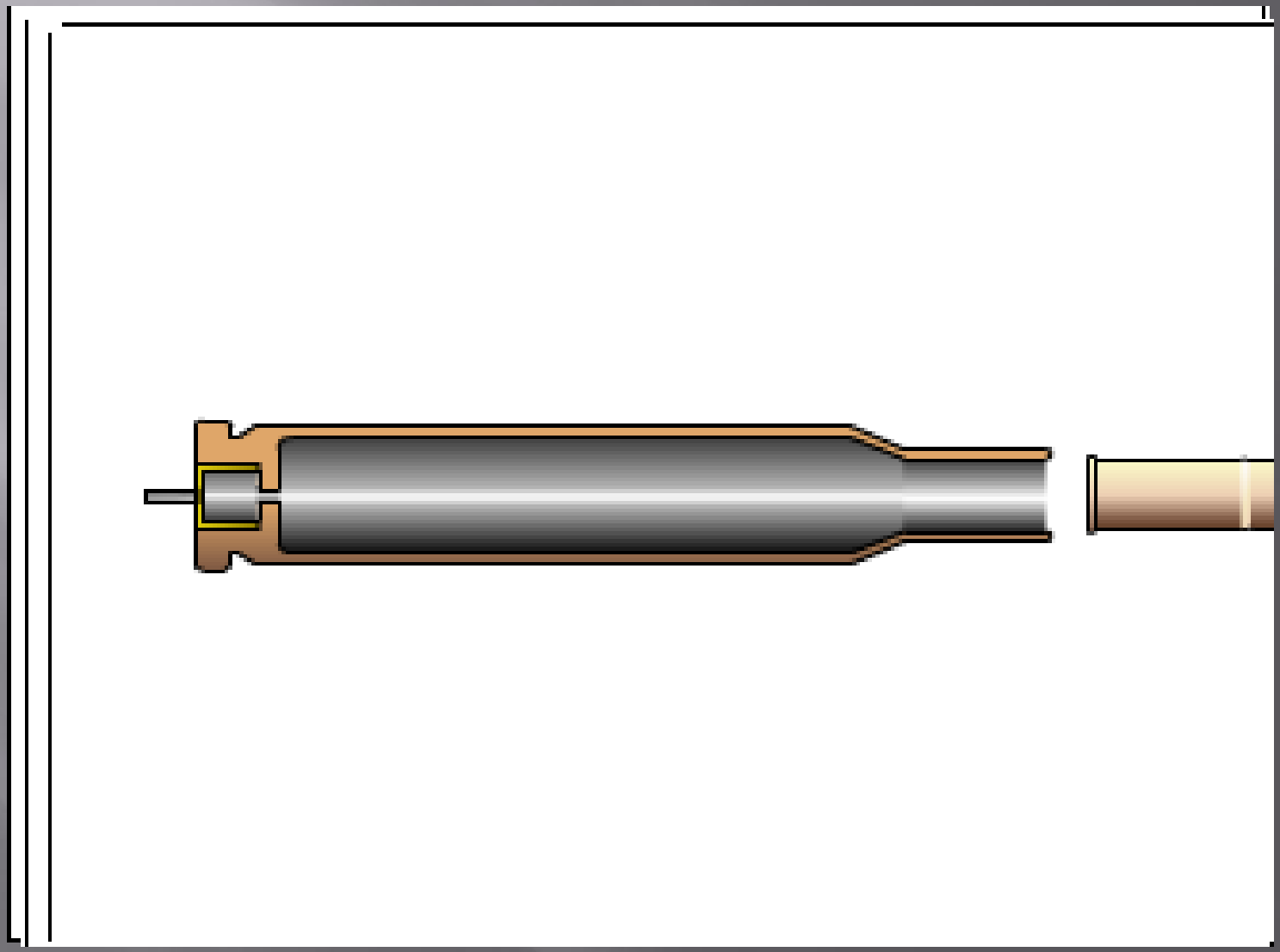
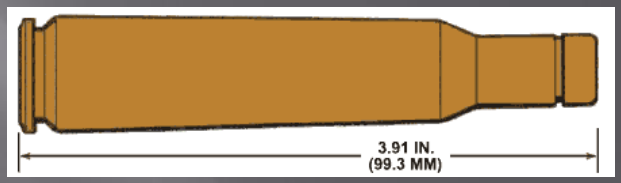


CHARGE TYPES

REDUCED CHARGE
contain less than the standard amount of powder.

SALUTING CHARGE
used when rendering honors

CLEARING CHARGE
used to clear a round that is jammed in the gun



SERVICE CHARGE
used in actual firing of the weapon during combat. They are full charges.

INERTIA

SET BACK

CREEP

ANGULAR ACCELERATION

IMPACT

CENTRIFUGAL FORCE

FUZE TYPES

MECHANICAL TIME FUZE

VARIABLE TIME FUZE

PERCUSSION FUZE

AUXILIARY FUZE

COMBINATION FUZE

AMMUNITION SAFETY

- Do not handle roughly
- New personnel must not work alone
- Handle minimum amount of explosives required
- Personnel must be properly briefed and understand their role
- Comply with all rules and operating procedures
- Report all conditions that appear unsafe or conflict with safety rule
- SAFETY IS EVERYONE'S RESPONSIBLIITY!!!!!!!

AMMUNITION COMPONENTS

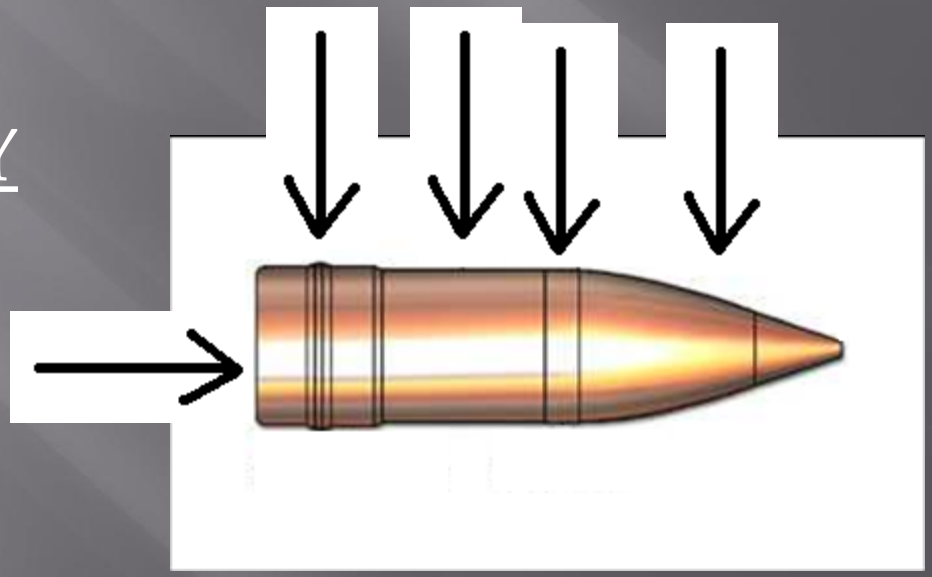
BASE

Bourrelet

ROTATING BAND

Ogive

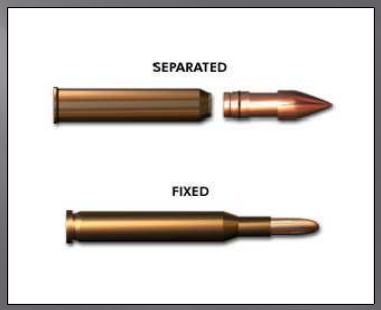
BODY



AMMUNITON CLASSIFICATION

GUN SIZE

ASSEMBLY CONFIGURATION



PURPOSE AND CONSTRUCTION

SERVICE USE

PYROTECHNICS

Categorized as ammo because they share many similar characteristics:

1. Burn with intense heat

2. Often fired from a standard gun

3. Require many of the same safety precautions

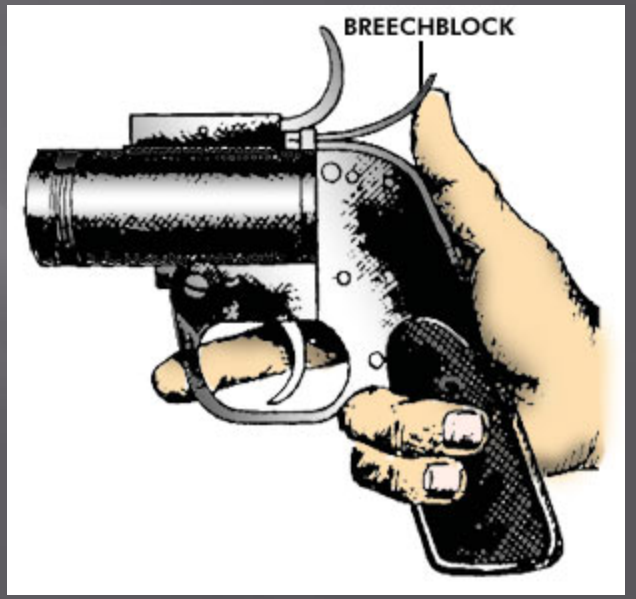
PYROTECHNICS IN USE

PYROTECHNICS

- Marking
  - Marine Marker
    - Used as reference marks on the ocean's surface
      - Man overboard
      - Navigation Drills
      - Search and Rescue
    - Burn Time of 40 to 60 min
    - Activate with seawater.
    - MK 58
      - Primary marine location marker
    - MK 6

PYROTECHNICS

- Illumination
  - Can be seen during the day and night.
  - Colors are green, red, or yellow
  - Are fired by a M-8 pyro pistol.
  - Produce a star pattern



- Signaling
  - Used in distress

PYROTECHNICS

Safety and Stowage

- Every effort should be made to maintain stowage temp at *not more than 100 degrees.*

- PYRO PISTOLS do not have a positive safety mechanism!!

BASIC EXPLOSIVE KNOWLEDGE

PROPERTIES OF EXPLOSIVES

Stability

Length of time it can be kept without deterioration

Loading Properties

Munitions requirements for the explosive

Ignition Temperature

Range of temp explosive will ignite or detonate

Sensitivity

Amount of energy required to initiate detonation or explosion

HIGH AND LOW EXPLOSIVES

HIGH

- Decompose extremely fast, almost instantaneously
- Explosive train contains a detonator, booster and main charge

LOW

- Usually solid combustible materials that decompose rapidly but do not detonate
- Explosive train contains a primer, igniter and propellant

Explosive Safety

Publications

- NAVSEA OP 4 for Ammunition Afloat
- NAVSEA OP 5 for Ammunition Ashore
- NAVSEA OP 3347 for USN Ordnance Safety Precautions

Precautions

- Ensure electrical switches, circuit breakers, and similar devices are closed at all times when explosive materials are in the vicinity.
- Always use artificial light
- No Smoking
- Keep handling to minimum and only qualified personnel.
- Only qualified Explosive Ordnance Disposal (EOD) personnel may handle unidentified ordnance.

OTTO FUEL II

is an extremely dangerous stable, non-corrosive, liquid monopropellant used to propel torpedoes

Physical Symptoms of exposure:

- -Nasal congestion
- -Headache
- -Dizziness
- -Nausea
- -Decreased blood pressure
- -Labored breathing

WEAPONS SECURITY

Sailors are screened YEARLY or when circumstances indicate a review would be prudent.

Their record is maintained 6 months after their assignment.

Small Arms Security

- Small arms are categorized as anything hand-held and smaller than 20MM
- Ammunition and Weapons theft by rebellious groups and individuals require a stricter control of access, security, and stowage.

- Armory
  - Designated stowage area for small arms.
  - Personnel must be designated in writing by the Commanding Officer for entrance and must be posted inside.
- Stowage
  - Small arms and ammo may be stowed together only for security and response personnel.

MAGAZINE SECURITY

A magazine is a designated stowage facility for ammunition, ordnance and explosives.

Mags are opened for:

-Inspection

-Ventilating

-Testing

-Work

Commanding Officer

is the custodian of all magazine keys

Weapons Officer

ensures spaces are locked after work is done.

Duty Weapons Officer

assumes the weapons officer role during their absence

Assigned Personnel may perform:

Fleet sentencing, maintenance, ordnance handling/stowage, watch standing, weapons issue

MAGAZINE INSPECTION

- Inspected at regular intervals IAW OPNAVINST 5530.13C
- Verify that stowed ammunition has not been affected

Temperature monitoring

Record all temperatures 100degrees and over in RED

Thermometers have 3 needles:

- high temp
- low temp
- current temp.

Record high and low temp and initial.

MAGAZINE TYPES

Primary Magazine

Generally located below main deck, and contain enough ammo for peacetime operation

Ready Service Mag

Located conveniently to the weapon they serve

Missile Magazine

Have missile handling equipment

Lockers

House special types of ammo such as detonators, pyrotechnics, and chemicals and are located on weather decks

Chemical Magazine

Hold lethal or incapacitating ammunition. Not normally onboard ships unless authorized by NAVAL SEA SYSTEMS COMMAND or higher

ORDNANCE CLASSIFICATION

CLASS A

- Chemical, mass detonating, warheads, torpedoes, black powder

CLASS B

- Rapid combustion, rockets without projectiles, fireworks, starter cartridges for jets

CLASS C

- Devices that contain both Class A and B explosives, electric squibs, explosive bolts, common fireworks, small arms

Magazine Safety

- Temperature Control
  - Once a magazine containing gas generators, propelling charges, or fixed ammunition reaches 110 degrees, certain actions must be taken to preserve the explosives.
- No flammable liquids should be located adjacent to magazines

MAGAZINE IDENTIFICATION

"**EMPTY**" sign is posted when a magazines contents have been removed

"**AMMUNITION FAR SIDE**" signs are installed on bulkheads, decks and overheads surrounding magazines and are placed 5 feet above the deck, 12 feet apart and are placed for maximum visibility

Magazine Safety Features

- Magazines are equipped with several safety features, like environmental control, a sprinkler system, and early warning alarms. The proper operation and maintenance of these systems is crucial to the safety of magazines and ordnance.
- Ventilation
  - Important in every magazine because most magazines are located below decks, where there is limited access to outside air.

MAGAZINE ALARMS

Sprinkling alarm (FH)

FH Circuit indicates the sprinkler system has been activated

Flooding alarm (FD)

FD circuit indicates that there is flooding after approximately 2 inches of water on deck

High Temp alarm (F)

F circuit indicates magazine temperature has reached 105 degrees. Installed in overhead and cover 250 square feet

Inspection Procedures

- Basic Inspections
  - Magazines and magazine areas are inspected to verify that stowed ammunition has not been affected by environmental control loss, handling damage, ship's movement, severe weather, or other factors
- The necessary requirements and inspection criteria are outlined in the standard operating procedures (SOP) document for magazine inspection.
- Maintain a high standard of cleanliness and order to prevent fires

ORDNANCE HANDLING SAFETY

- Personal Protective Equipment (PPE)
  - Establishes a “last line of defense” to hazard

HERO

HAZARDS OF ELECTROMAGNETIC RADIATION TO ORDNANCE

Prevents accidental ignition of explosives devices due to radio frequency electromagnetic fields

- **HERO Safe -** ordnance is protected
- **HERO Susceptible -** Ordnance can be affected by RF energy
- **HERO Unreliable** - Ordnance has been exposed to RF
- **HERO Unsafe-** Ordnance is not safe in HERO environment

ORDNANCE HANDLING SAFETY

Regulations

- Competition and Horseplay are **Prohibited**
- Do not drop, bump, hit or strike ordnance with handling gear
- Keep personnel to a minimum
- 2 person minimum to transfer ammo
- Do not leave ammo unattended unless secured
- Do not move armed or damaged ammo
- Do not use **Bale Hooks**
- Never use Cargo nets alone to handle ammo
- Personnel shall be assigned to guide ammo through scuttles
- A certified supervisor shall be present prior to handling
- Pre-Brief shall be conducted prior
- Handling shall be kept to a minimum
- Only properly maintained OHE shall be used
- Completely engage all suspension lugs or ordnance handling points

ORDNANCE INSPECTIONS

Ordnance inspections are conducted during

Receipt - To ensure ammo is safe upon reception

Routine - Contribute to long-term reliability of ordnance

Transfer- Prior to transferring ammo to another command to ensure ammo is safe

Handling Equipment Classifications

- Materials Handling Equipment (MHE)
  - Forklifts, pallet trucks, and platform trucks
- Weight Handling Equipment (WHE)
  - Cranes, Hoists, and cargo booms
- Ordnance Handling Equipment (OHE)
  - Specially designed mechanical equipment used for assembling, disassembling, handling, transporting, lifting, positioning, rotating, or containing conventional weapons, ammunition, explosives, and related components.
  - Adapters, beams, carriers, dollies, and handlift trucks
- Weapons Support Equipment (WSE)
  - Primary function is to support explosive ordnance components
  - Strongbacks, weapon skids, and maintenance stands.

HANDLING EQUIPMENT

ELEVATORS AND CONVEYORS

Elevators move items vertically, Conveyors move items from one operating building to another

HOIST

Lift ammo manually, electrically and pneumatically powered

ADAPTERS

provide support surface to secure ammo

BARS

Carry, lift and haul weapons

BEAMS

H, I or T types lift ammo

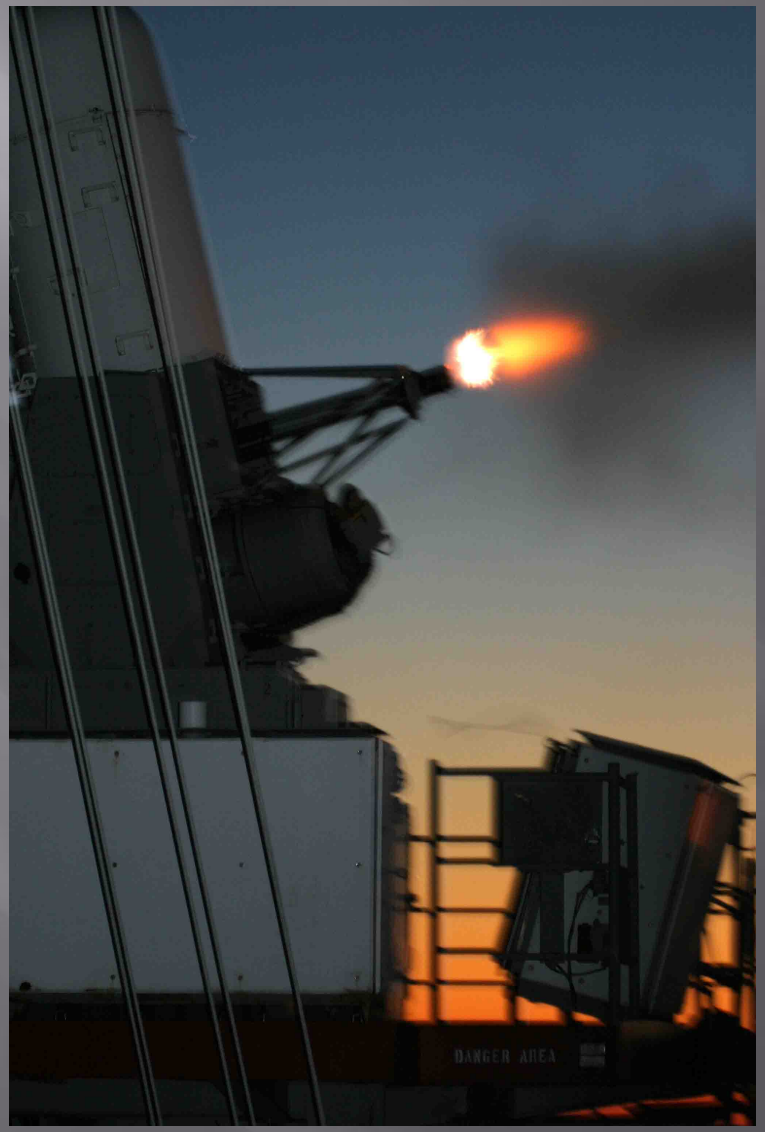
SLINGS:

Lifting devices to move bulk ammunition such as pallets

TRUCKS:

Fork Lift, Pallet or hand lift used to move ammo

QUESTIONS?



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