CHAPTER 5

AIR-LAID MINES AND TORPEDOES

Since World War II, the U.S. Navy has developed sophisticated air-launched torpedoes and air-laid mines. These weapons incorporate components so sensitive that their operation is classified information. Therefore, the information in this TRAMAN on air-launched torpedoes and air-laid mines is limited. You will be referred to publications containing detailed information for the weapons discussed throughout the chapter.

MK 46 AND MK 50 TORPEDOES

LEARNING OBJECTIVE: *Identify the purpose and use of the Mk 46 and Mk 50 torpedoes. Recognize the torpedo configurations to include warshot and exercise and aircraft-launched torpedoes. Identify Otto Fuel II.*

The Mk 46 and Mods torpedo (fig. 5-1) is the primary weapon used in antisubmarine warfare (ASW).

MK 46 TORPEDO CONFIGURATIONS

The Mk 46 Mods torpedo can be assembled into one warshot (tactical) and three REXTORP

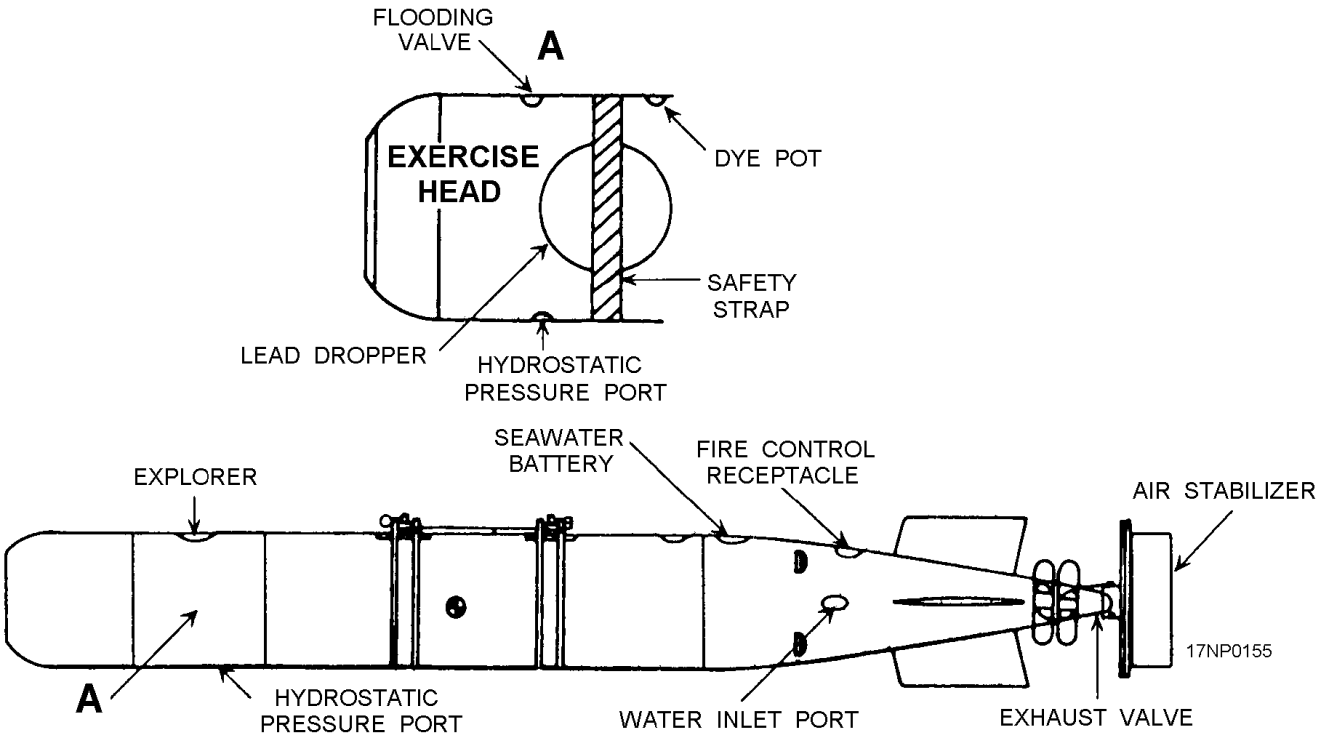


Figure 5-1.—Mk 46 torpedo.

(recoverable exercise torpedo) configurations (fig. 5-2).

Mk 46 Warshot Configuration

The warshot configuration of the Mk 46 and Mods torpedo consists of a nose section, warhead, control group, long fuel tank, and after body. A tactical warhead (contains explosives) is used in the warshot configuration.

Mk 46 Exercise Configuration

There are three versions of exercise torpedoes available for aircraft launching: (1) a torpedo with a short exercise head, extender section, and a short fuel tank; (2) a torpedo with a long exercise head and a short fuel tank; or (3) a torpedo with a long exercise head, instrumentation for tracking on 3D ranges, and a short fuel tank. All three configurations use Mk 85 and Mods exercise heads.

For detailed information concerning the component configuration of the Mk 46 and Mods torpedo, you should refer to *Mk 46 Torpedo/Mk 46 REXTORP Flight Accessories (Description, Operation, Installation, Removal, and Trajectory Data)*, NAVSEA SW512-AO-ASY-010.

Mk 50 Torpedo

The Mk 50 (fig. 5-3) is a lightweight, high-speed, antisubmarine torpedo that is compatible with all airborne ASW platforms. It has improved design features to ensure greater reliability and increased capabilities over previous torpedoes. The three major sections of the torpedo are nose, head, and after body. The nose contains the transmitter and receiver. The after body provides propulsion and control. The exercise head provides buoyancy for the torpedo. The warshot head contains an explosive charge. An orange nose and after body identify the exercise torpedo with a 6-inch blue strip around the circumference of the ballast assembly. For further information on the torpedoes, you should refer to *United States Ammunition Historical and Functional Data*, NAVSEA SW010-AB-GTP-010.

AIRCRAFT-LAUNCHED TORPEDO CONFIGURATIONS

To air-launch torpedoes, you will use launch accessory equipment. This equipment includes suspension bands to attach the torpedo to the aircraft and torpedo air stabilizers to ensure a predictable air trajectory and water entry. Torpedoes are configured and issued to the fleet depending on tactical or training requirements. As an Aviation Ordnanceman (AO), you are **not** responsible for the assembly of the torpedo at the organizational level. However, you **are** responsible for the installation of launch accessory equipment.

The physical characteristics, such as weight, length, etc., of the Mk 46 torpedo vary. These characteristics depend on the configuration of the

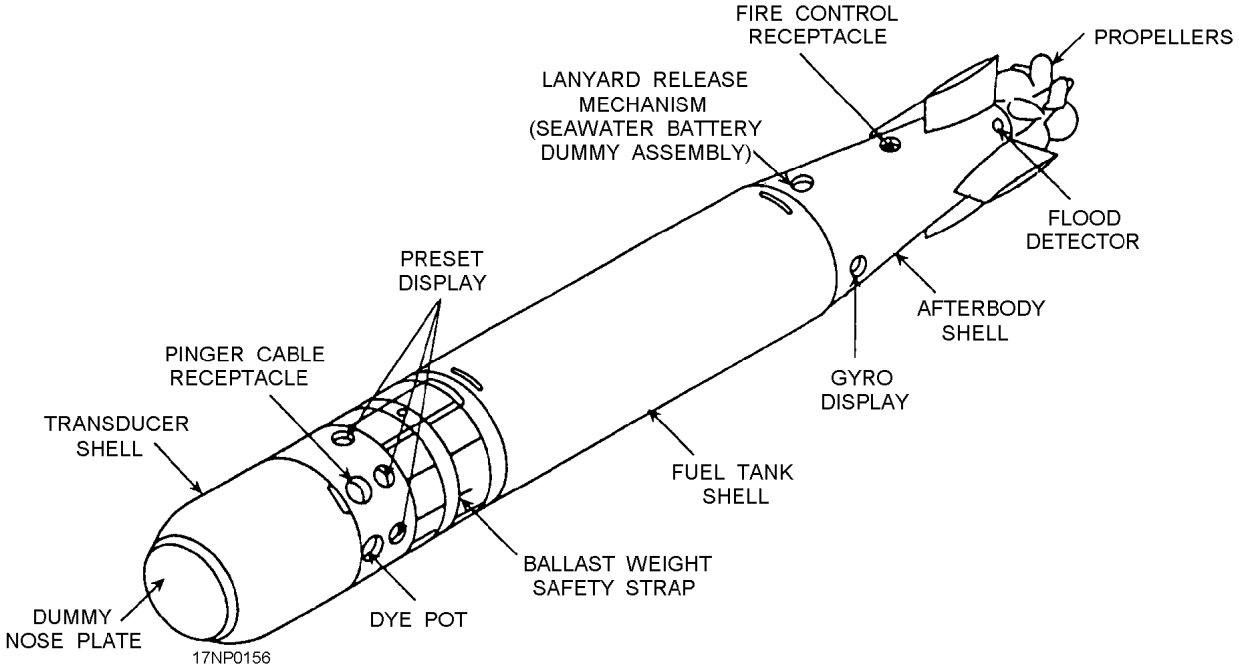


Figure 5-2.—Mk 46 recoverable exercise torpedo (REXTORP).

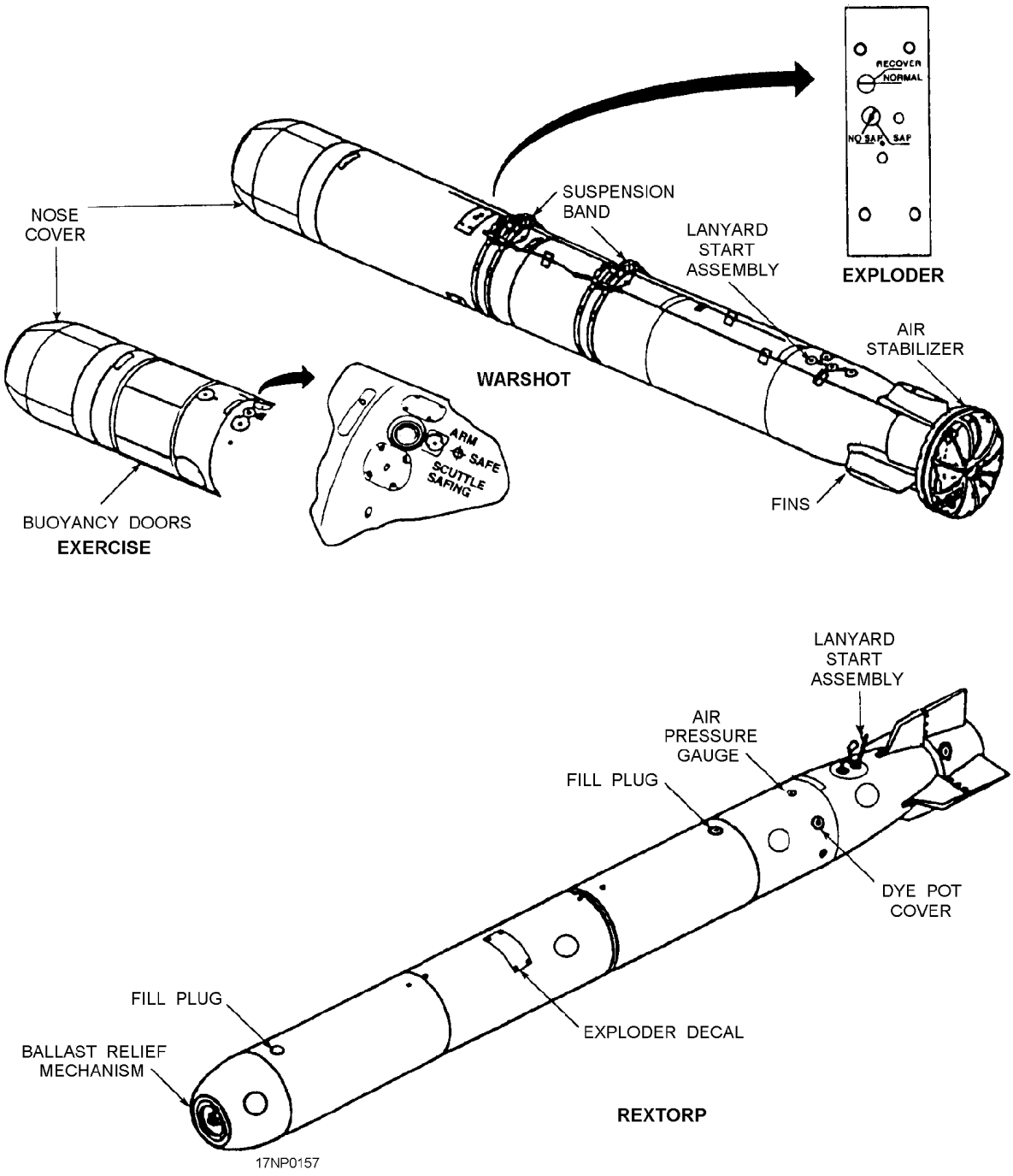


Figure 5-3.—Mk 50 torpedo configurations.

torpedo itself (warshot or exercise) and the configuration of the attached launch accessories. The Mk 46 torpedo is configured with aircraft-launch accessories for either helicopter or fixed-wing aircraft launching.

The basic items of accessory equipment used in launching torpedoes from fixed-wing aircraft and helicopters are the torpedo air stabilizer and suspension band assembly. The torpedo air stabilizer ensures a predictable air trajectory and water entry without torpedo structural damage. The air stabilizer reduces the descent speed of the torpedo relative to the speed of the launching aircraft. A static line or release lanyard deploys the parachute when the torpedo is dropped from the aircraft. The deployed parachute stabilizes the torpedo during descent to the water, slows the descent speed to an acceptable velocity for water entry, and assures the proper water entry angle. The Mk 28 Mod 2

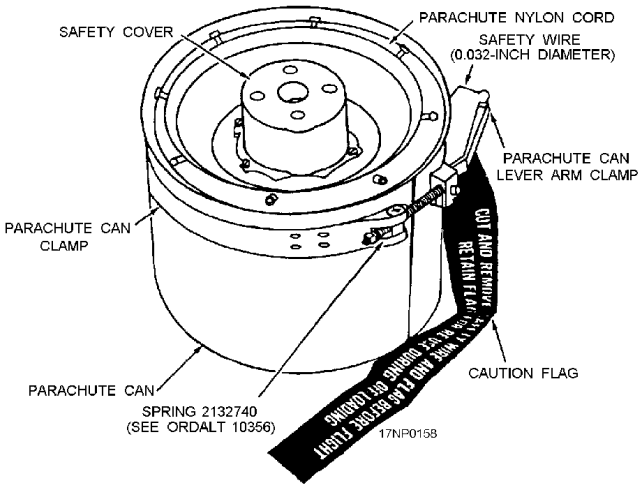


Figure 5-4.—Mk 28 Mod 2 torpedo air stabilizer.

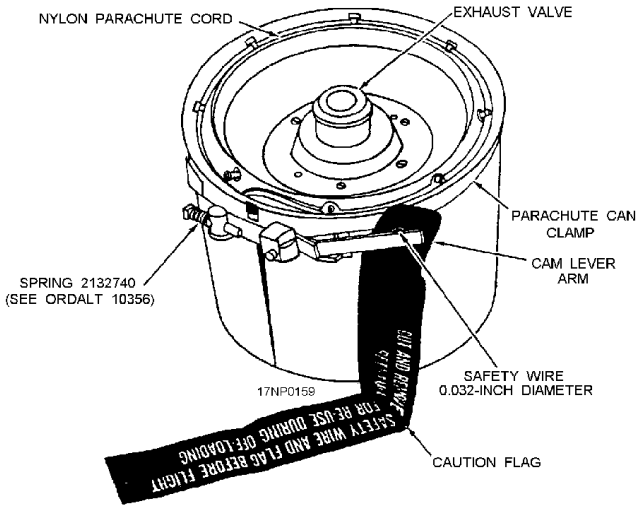


Figure 5-5.—Mk 28 Mod 3 torpedo air stabilizer.

(fig. 5-4) or the Mk 28 Mod 3 (fig. 5-5) air stabilizers are used on torpedoes configured for fixed-wing aircraft. The Mk 31 Mod 0 (fig. 5-6) or the Mk 31 Mod 1 (fig. 5-7) air stabilizers are used on torpedoes configured for helicopters.

Mk 78 Mod 0 or Mod 1 suspension bands (fig. 5-8) are used in pairs to suspend the torpedo from the bomb racks or shackles of the launching aircraft. The bands wrap around the torpedo and are secured by tension bolts. After the bands are installed, the torpedo is loaded aboard by engaging the suspension band lugs in the bomb racks or on the bomb shackles of the aircraft. The torpedo is loaded internally for fixed-wing aircraft launch and externally for helicopter launch. When the bomb rack/shackle hooks are released, the torpedo drops. Release wires unlatch the suspension bands, allowing them to break away from the torpedo as it is launched from the aircraft.

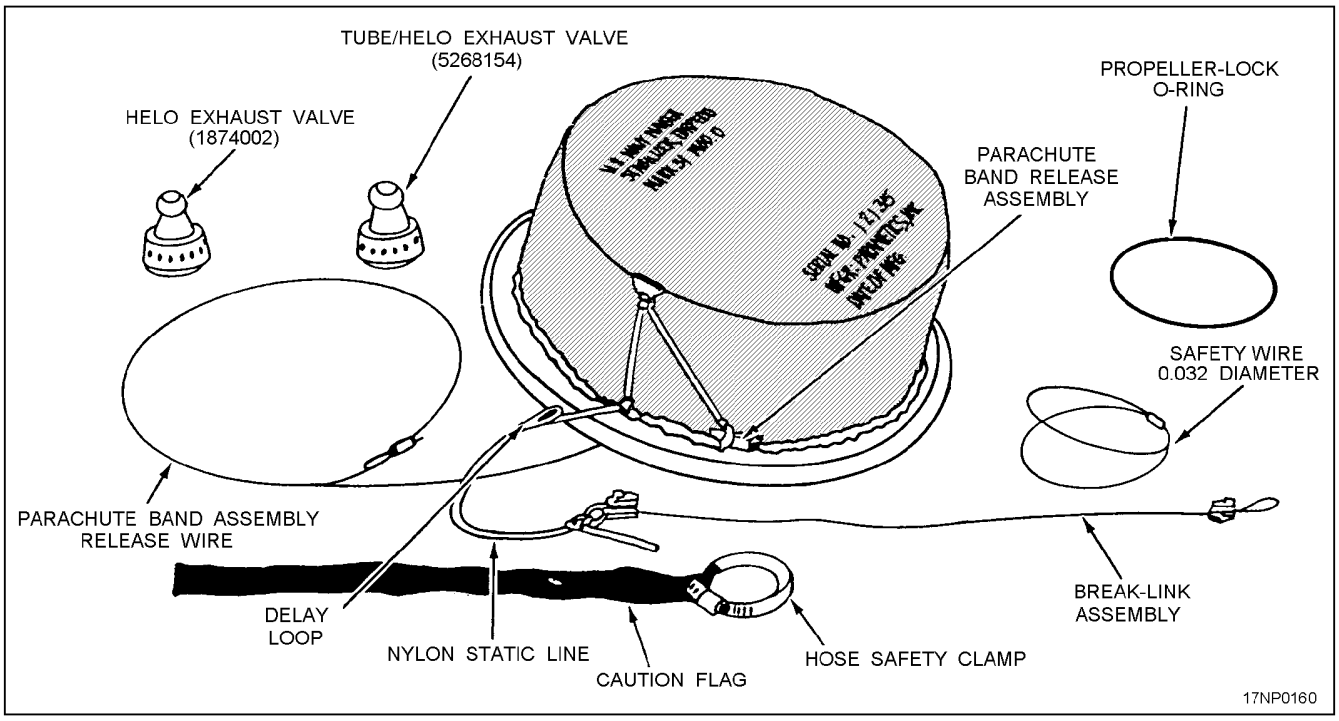


Figure 5-6.—Mk 31 Mod 0 torpedo air stabilizer.

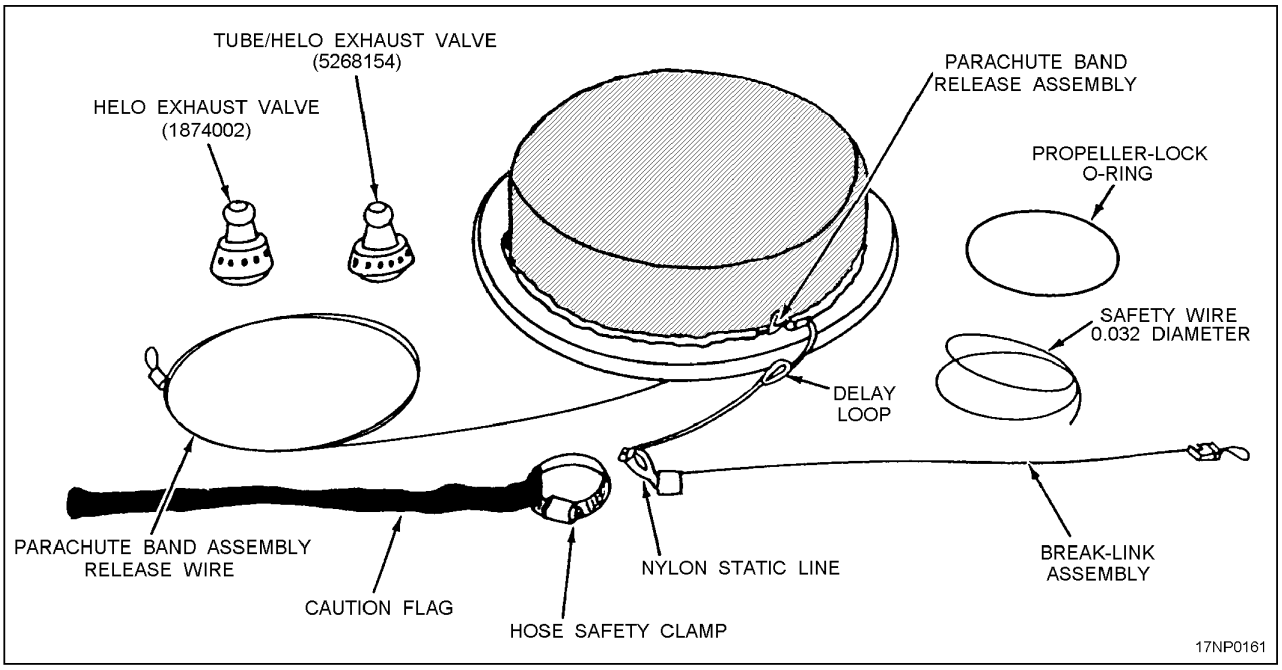


Figure 5-7.—Mk 31 Mod 1 torpedo air stabilizer.

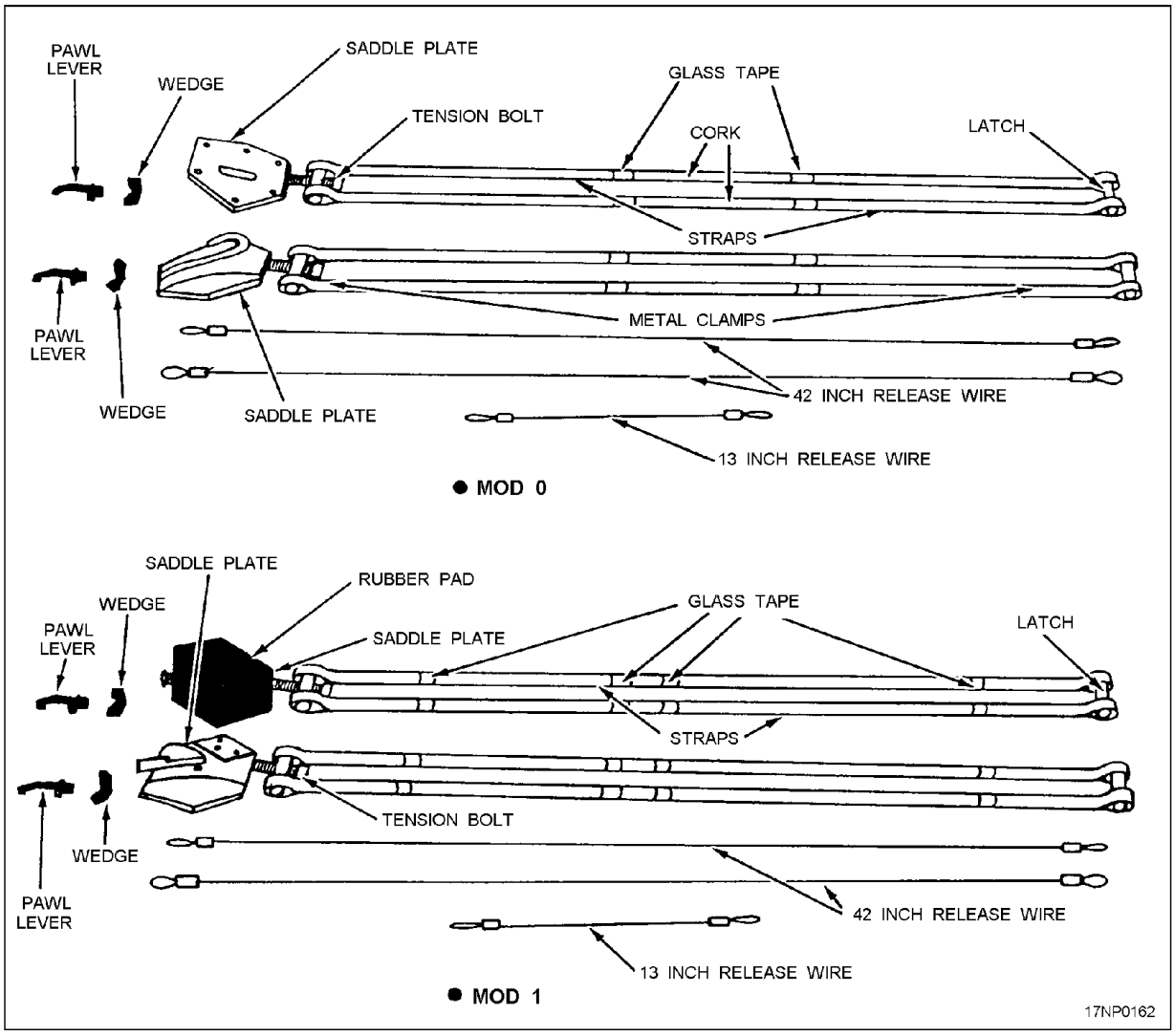


Figure 5-8.—Mk 78 Mod 0 and Mod 1 suspension band assemblies.

For detailed information concerning aircraft launch accessories, you should refer to the *U.S. Navy Aircraft Torpedoes Accessories and Trajectory Data and Quality Assurance Test and Inspection Plan for Installation of Torpedo Mk 46 Launch Accessories*, NAVSEA SW512-AO-ASY-010.

OTTO FUEL II

Otto Fuel II is the propellant for the propulsion system of the Mk 46 (all Mods) torpedo. Otto Fuel II is first sprayed under pressure into a combustion chamber where it is ignited. The exhaust gases from the burning fuel are used to drive the torpedo engine. The major advantage of this system is the short turnaround time required for exercise weapons.

Otto Fuel II is a stable, liquid monopropellant composed of a nitrate ester in solution with a desensitizing agent and a stabilizer. It is a bright red, free-flowing, oily liquid that is heavier than water. (**NOTE**: When in a thin layer, such as a spill, stain, or leak, Otto Fuel II is a yellow-orange color.) Otto Fuel II is noncorrosive. It has an extremely low vapor pressure, minimizing explosive and toxic hazards. Otto Fuel II can detonate, but the conditions and stimulus required are so extreme that it is considered a nonexplosive. The propellant has a high flash point and other safety characteristics. It is classified as a low fire hazard material.

The ingredient of medical concern in Otto Fuel II is the nitrated ester. Nitrated esters are known for their acute effects on the human body. Symptoms of exposure to Otto Fuel II include the following:

- Headache
- Dizziness
- Drop in blood pressure
- Nasal congestion

NOTE: Depending upon the sensitivity of the individual, a temporary symptom-free tolerance may develop during the remainder of the working period. After exposure to a vapor-free environment, the first contact with Otto Fuel II vapors often causes these symptoms to recur.

A stowage space is specifically designated for each type of torpedo stowed aboard a combat ship. When handling Otto Fuel II, at least two crewmembers should handle the fuel. All personnel must know the general characteristics of Otto Fuel II, the safety precautions for handling the fuel, and protective equipment required. To avoid hazardous situations when handling Otto Fuel II, personnel should be well trained and supervised. For further information concerning Otto Fuel II, you should refer to *Otto Fuel II Safety, Storage, and Handling Instructions*, NAVSEA S6340-AA-MMA-010.

REVIEW NUMBER 1

Q1. What is the primary weapon used for antisubmarine warfare?

Q2. List the Mk 46 configurations.

Q3. When the Mk 46 is used in the exercise configuration, what exercise head is used?

Q4. After launch, what equipment stabilizes the torpedo during its descent into the water?

Q5. List the air stabilizers used for (a) fixed-wing and (b) rotary-wing aircraft.

Q6. Torpedoes are suspended from bomb racks or shackles by Mk 78 Mod 0 or Mod 1 suspension bands. How do the suspension bands release when the torpedo is launched?

Q7. What propellant is used in the propulsion system of the Mk 46 torpedo?

Q8. Because Otto Fuel II has a high flash point, low vapor pressure, and is noncorrosive, it is classified as _____.

Q9. List the symptoms you might exhibit if you were exposed to Otto Fuel II.

Q10. For safety reasons, how many crewmembers should be present when handling Otto Fuel II?

AIRCRAFT-LAID MINES

LEARNING OBJECTIVE: *Identify aircraft-laid mines and recognize their classifications. Describe aircraft-laid mine components and identify operational aircraft mines.*

Naval mines are used in offensive or defensive mining operations. The primary objective is to effectively defend or control vital straits, port approaches, convoy anchorage's, and seaward coastal barriers.

Aircraft mine delivery is the principal method of making large-scale mining attacks on enemy coastal and port areas. Aircraft-laid mines are usually carried and dropped in the same way as bombs, but they have

different ballistic flight paths. Air-laid mines usually require parachutes that are released from the mine on water entry.

CLASSIFICATIONS

Mines are classified by intended use, method of delivery, position assumed when laid method of actuation, or weight. Mines classified by their intended use are further classified as service, exercise (recoverable), and training mines. Service mines are fully explosive-loaded mines assembled with service components for use in wartime. Exercise (recoverable) and training mines are inert loaded to service weight. They have many uses, such as assembly and laying in fleet exercises. After exercise completion, they are recovered, analyzed, and overhauled for reuse. When assembled, exercise and/or training mines may contain minor explosive components.

Mines classified by method of delivery are submarine-laid, surface-laid, or air-laid. The classification depends on the laying vehicle.

Mines classified by the position they take in the water after being laid are moored or bottom mines. Bottom mines rest on the bottom of the sea. Their effective depth is controlled by the amount of charge they contain relative to the depth of the area in which they are planted. Their design includes sufficient negative buoyancy to provide good stability on the bottom of the sea.

Moored mines are buoyant mines. They are connected by cable to an anchor resting on the bottom (fig. 5-9). There are two important considerations in laying moored mines—stability and moored depth. An anchor achieves mine stability with sufficient negative buoyancy to retain the mine in its position (without moving) on the bottom of the sea.

Mines are classified by the methods used to activate them. Methods of activation are contact and influence, or a combination of both methods. Influence-actuated mines are the only mines used tactically in an air-laid operation. Influence-actuated mines are further classified as magnetic, acoustic, or pressure mines. These classifications are generally combined to

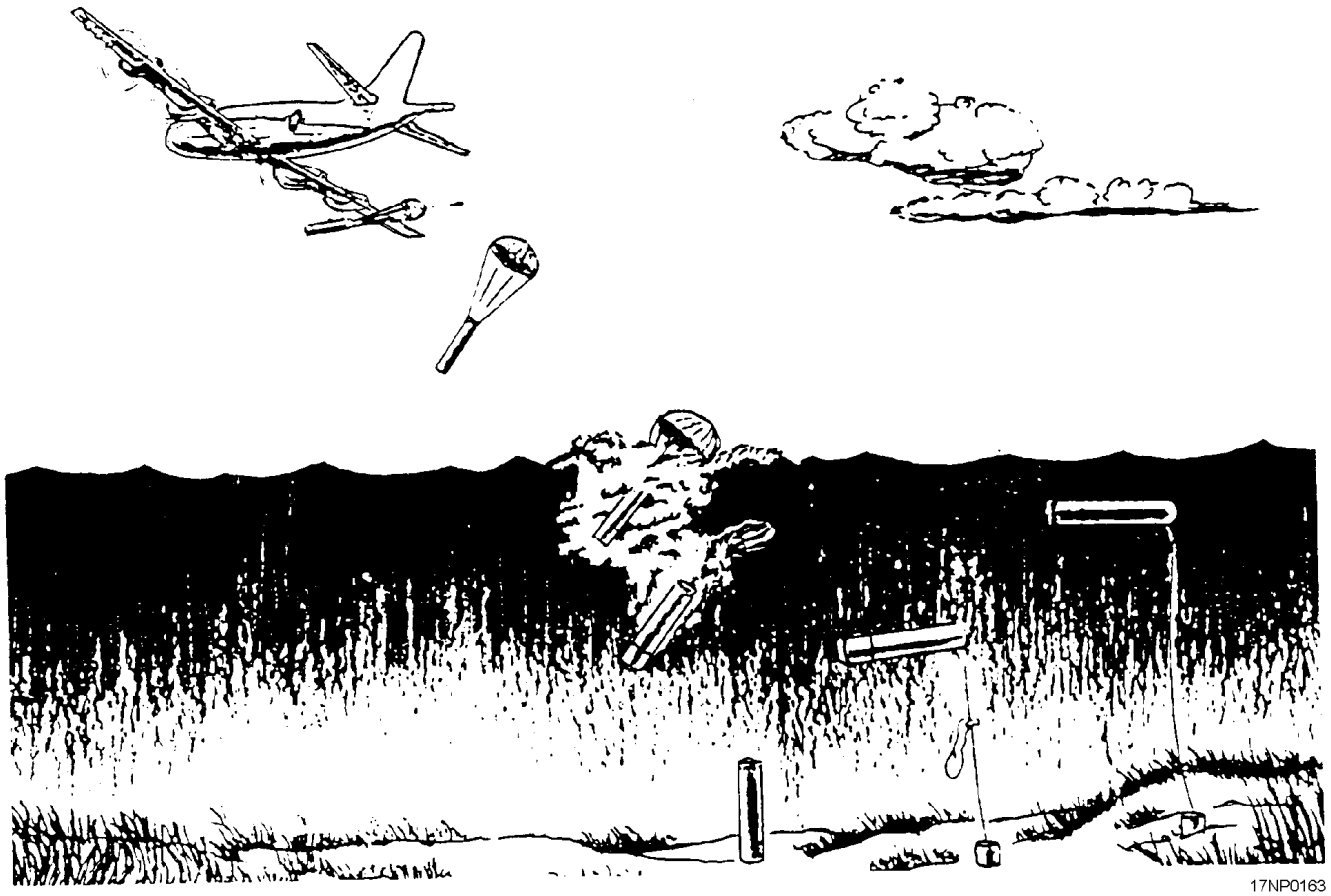


Figure 5-9.—Aerial mine delivery sequence of moored mines.

describe a given mine; for example, an air-laid, pressure-fired, bottom mine or an air-laid, magnetic-fired, moored mine. Table 5-1 provides a list of the air-laid mines currently in use.

REVIEW NUMBER 2

Q1. Mines classified by their intended use are classified as _____.

Q2. What mines are fully loaded with explosives and designated for use in wartime?

Q3. What mines is classified by the position they take in the water after being laid?

Q4. The effective depth of a bottom mine is controlled by _____.

Q5. Moored mines are stabilized by what means?

Q6. List the classifications of influence-actuated mines.

MINE COMPONENTS

The components used in a mine vary, depending on the type of mine and its specific use. In addition to the mine case and explosive system, mine components provide mine arming, target sensing, actuation, laying control, countermeasure resistance, firing power, and sterilization. Exercise components are used in exercise (recoverable) mines.

REVIEW NUMBER 1 ANSWERS

A1. The Mk 46 torpedo is the primary weapon used for antisubmarine warfare.

A2. The Mk 46 configurations include warshot and exercise.

A3. When the Mk 46 is used in the exercise configuration, the Mk 85 and Mods exercise head is used.

A4. After launch, the air stabilizer stabilizes the torpedo during its descent into the water.

A5. Fixed-wing aircraft use Mk 28 Mod 2 or Mod 3 air stabilizers, and rotary-wing aircraft use Mk 31 Mod 1 air stabilizers.

A6. Torpedoes are suspended from bomb racks or shackles by Mk 78 Mod 0 or Mod 1 suspension bands. As torpedoes are launched from the aircraft, release wires unlatch the suspension bands, letting them break away from the aircraft.

A7. Otto Fuel II is the propellant used in the propulsion system of the Mk 46 torpedo.

A8. Because Otto Fuel II has a high flash point, low vapor pressure, and is noncorrosive, it is classified as a low fire hazard material.

A9. If you were exposed to Otto Fuel II, you might exhibit the following symptoms: headache, dizziness, blood pressure drop, and/or nasal congestion.

Table 5-1.—Air-laid Mines Currently in Use

MINE DESIGNATION	WEIGHT CLASS	TYPES OF ACTUATION	POSITION IN WATER	RETARDED
Mk 55	1000 lb	Influence	Bottom	Parachute
Mk 62	500 lb	Influence	Bottom	Fin
Mk 63	1000 lb	Influence	Bottom	Parachute
Mk 64	2000 lb	Influence	Bottom	Parachute
Mk 65	2000 lb	Influence	Bottom	Parachute

A10. For safety reasons, at least two crewmembers should be present when handling Otto Fuel II.

Mine Case

The mine case is the main element of the mine. It contains or carries all other components. The mine case is normally made of sheet steel, but aluminum, spun glass, or various plastics are used in some types of mine cases. The case is watertight and strong to resist water pressure. Mine case openings are carefully sealed with suitable gaskets.

Explosive Components

The explosive system of a mine includes the main charge, the booster, the initiating system, and auxiliary explosive devices.

MAIN CHARGE.—The main charge is the mine's payload. It is a high explosive cast directly into the mine case, or into an explosive section attached to the mine case when the mine is assembled. The amount of explosives used in air-laid mines ranges from 160 pounds to 1,300 pounds. Types of explosives used include Comp B, TNT, H6, or HBX mixtures. The HBX mixtures are commonly used explosives.

BOOSTER.—The booster varies from a few ounces to several pounds of explosive. Generally, the smaller boosters contain tetryl, and the larger boosters contain granular grade A TNT. The intermediate size booster contains Comp B. In some cases, the booster consists of a subbooster. The booster is housed in a brass, terneplate, plastic, or fiber container. When assembled in the mine case, the booster is in intimate contact with the main charge explosive.

INITIATING SYSTEM.—An electric primer in an explosive fitting is used to set off a flash detonator. This initiates the leads to the booster or subbooster, causing the mine to detonate. Explosive fittings may contain a primer or a detonator, depending on their design function.

AUXILIARY EXPLOSIVE DEVICES.— Auxiliary devices are usually small explosives that blow or open a hole in the mine case to sink it. A small explosive device, such as the explosive driver, is used during the mine planting or operating sequence. For example, it is used to close or open electrical switches, unlock mechanical linkages, open gas bottles, and jam cables from further pay out. Other types of auxiliary explosive devices are used to cut cables and to release pyrotechnic signals from exercise and training mines.

Arming Components

An arming device (fig. 5-10) is a combination of a hydrostatic switch piston and an explosive aligning

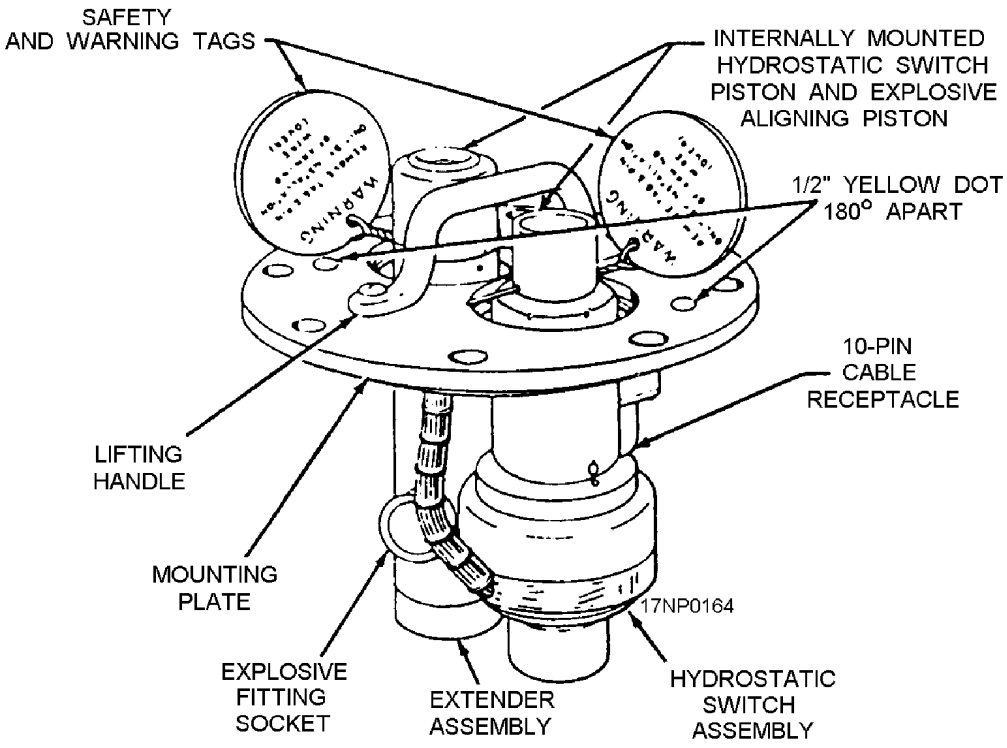


Figure 5-10.—Arming device.

piston. They are internally mounted in a single assembly. The hydrostatic piston acts to open and close electrical switches. The explosive piston aligns the explosive train when the hydrostatic piston and the explosive piston are forced in by water pressure after the mine is laid. These pistons are held in the retracted or safe position by safety pins during ground handling. The safety pins are replaced by arming wire assemblies after the mines are loaded aboard the aircraft.

After planting, a clock-delay mechanism prevents firing until the mine has been submerged for a predetermined period of time. A switch in the detonator circuit of the mine controls the firing mechanism. This switch remains open until the clock-delay device has run its predetermined time. This time could vary from 8 minutes to 10 days, depending upon the type of clock installed. Sometimes another clock is also used to sterilize the mine after a preselected period of armed life.

Firing Components

Firing components include elements that detect the target, analyze target information, and act to fire the mine. In simple systems, a single device does these functions. However, in most systems, these functions are performed by two or more components.

The types of firing mechanisms used in mines vary widely in appearance and configuration. In older mines, the firing mechanism might be a circuit arrangement. In newer mines, the firing mechanism might be a color-coded rectangular box.

Since influence-actuated mechanisms are the only type of firing mechanisms currently used in aircraft mines, they are discussed in the following paragraphs. Influence-actuated firing mechanisms may be subdivided into three general categories—acoustic, pressure, and magnetic.

ACOUSTIC.—An acoustic mine is fired by the initiation of an enclosed microphone. The microphone picks up the sound waves generated by a nearby ship's rotating screws or other operating machinery. These mines are equipped with an anticountermine device that prevents detonation of the mine from explosions set off during minesweeping operations.

PRESSURE.—The pressure mine firing mechanism is actuated by a decrease in water pressure immediately surrounding the mine. Normally, this occurs only when a large ship passes over it. The pressure mine firing mechanism is used in conjunction with a magnetic-influence mechanism. The combination of these two mechanisms makes effective minesweeping operations nearly impossible.

MAGNETIC TYPE.—Magnetic mines are induction mines actuated by changes in the earth's magnetic field. Their actuation depends primarily on the rate at which the field changes rather than the amount of change. A change in the magnetic field induces an electromagnetic field in the winding of a coil. This electromagnetic field and the resulting current are proportional to the rate of change of the magnetic field. When the magnetic field increases to a predetermined level, a relay actuates and closes the firing circuit.

REVIEW NUMBER 2 ANSWERS

A1. Mines classified by their intended use are classified as service, exercise (recoverable), and training mines.

A2. Service mines are fully loaded with explosives and designated for use in wartime.

A3. Moored or bottom mines are classified by the position they take in the water after being laid.

A4. The effective depth of a bottom mine is controlled by the amount of charge contained in the mine relative to the depth to which the mine is planted.

A5. A cable connected to an anchor resting on the ocean floor stabilizes moored mines.

A6. Influence-actuated mines are classified as magnetic, acoustic, and pressure.

Parachute Packs

Some mines laid from aircraft use parachutes to prevent them from building up too much speed before entering the water. The parachute reduces the impact velocity and protects the mine components from damage. The use of parachute packs permits the mines to be released from an aircraft at high altitudes, which may be required when ports or sea passages are heavily armed.

The parachute pack currently used is the delayed-opening type. In this type of parachute pack, a control mechanism is used to open the parachute at some point in the air trajectory of the mine. A typical delayed-opening parachute pack contains a drogue-type parachute, release gear, and a control device. The

parachute release gear consists of a metal ring that attaches the parachute to the mine during air travel. It is released from the mine upon water impact by inertia weights, wipe-off plates, or hydrostatic mechanisms. The control device opens the parachute during the mine's descent. An adjustable fixed-delay device usually controls it. Since firing an explosive fitting deploys the parachute, parachute pack control devices contain explosive components.

REVIEW NUMBER 3

Q1. What element of a mine carries all other components?

Q2. List the explosive components of a mine.

Q3. What amount of explosives is used in air-laid mines?

Q4. After a mine is planted, what device prevents the mine from firing until it has been submerged for a predetermined time?

Q5. What is the range of the delay time in planted air-laid mines?

Q6. List the influence-actuated firing mechanisms.

Q7. What type of mine is detonated by the sound waves generated by nearby ships' rotating screws?

Q8. What force actuates the pressure mine?

Q9. What actuates the magnetic type of mine?

OPERATIONAL AIRCRAFT MINES

Air-laid mines currently in operational use are discussed briefly in the following paragraphs.

Mk 55 Mine

The Mk 55 service mine and the Mk 55 exercise mine (fig. 5-11) are air-laid bottom mines. Each mine is fitted with a nose fairing and box fins for drop stability. Each is suspended from the aircraft by two suspension lugs spaced 30 inches apart. Both mines use a parapak designed to slow descent and reduce impact when the mine enters the water. A control unit, activated by a single arming wire, opens the parapak. Each mine is equipped with an arming device and a double arming wire used on the extender and hydrostatic switch. The Mk 55 mine is equipped with a firing system that is responsive, either singly or in combination, to the acoustic, magnetic, and/or pressure influence of a

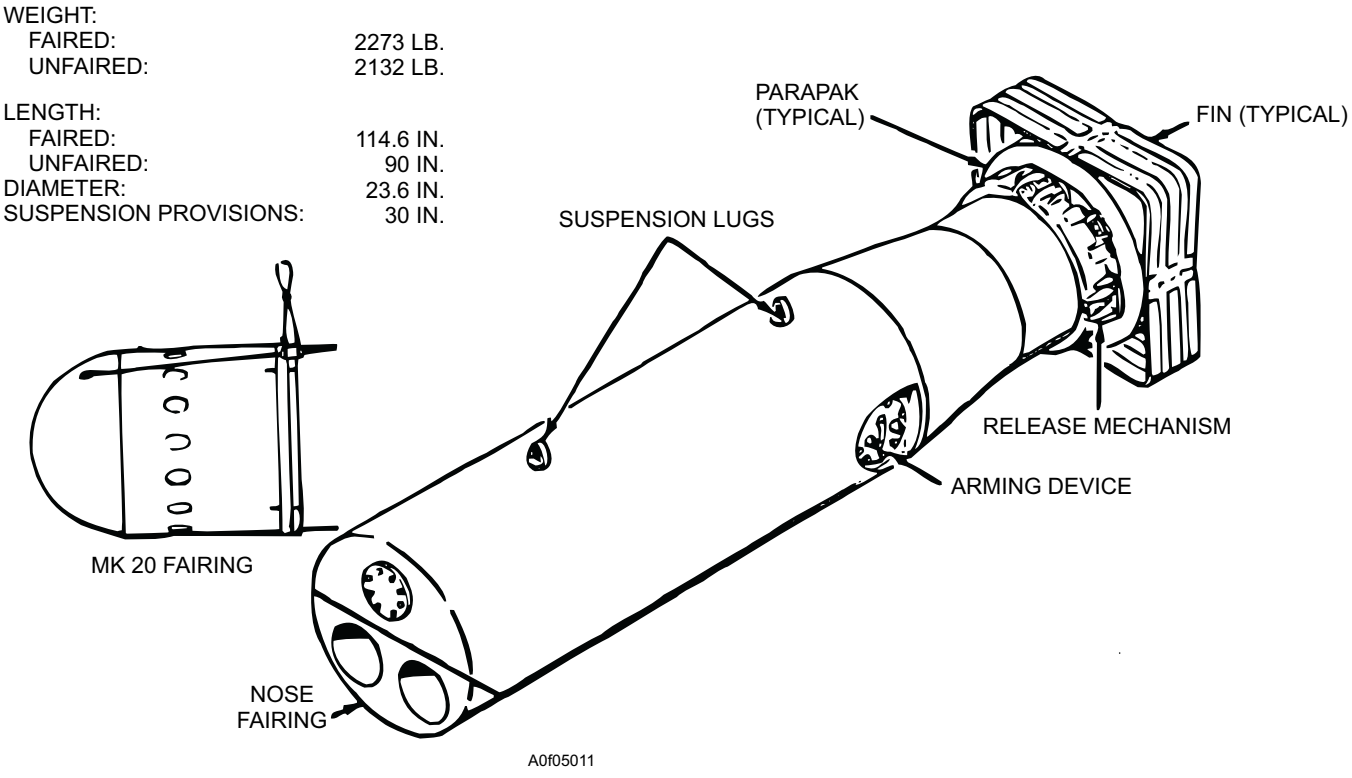


Figure 5-11.—Mk 55 service and Mk 55 exercise mine.

passing ship. The Mk 55 exercise mine is an inert service mine equipped with exercise components.

REVIEW NUMBER 3 ANSWERS

A1. The mine case contains or carries all other components.

A2. The explosive components of a mine include the main charge, booster, initiating system, and auxiliary explosive devices.

A3. Between 160 and 1,300 pounds of explosives are used in air-laid mines.

A4. After a mine is planted, a clock-delay mechanism prevents the mine from firing until it has been submerged for a predetermined time.

A5. The range of the delay time in planted air-laid mines is from 8 minutes to 10 days.

A6. Influence-actuated firing mechanisms include acoustic, pressure, and magnetic.

A7. Acoustic mines are detonated by the sound waves generated by nearby ships' rotating screws.

A8. A decrease in the water pressure immediately surrounding the mine actuates the pressure mine.

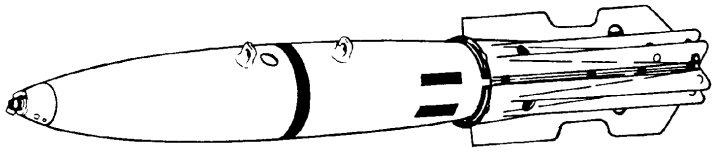
A9. A change in the earth's magnetic field actuates the magnetic type of mine.

Mk 62, 63, and 64 Quickstrike Mines

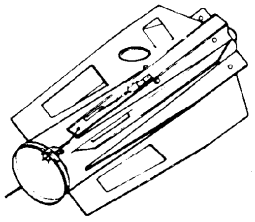
The Mk 62, 63, and 64 (fig. 5-12) mines are air-laid, all modular, influence-actuated bottom mines.

PHYSICAL CHARACTERISTICS:

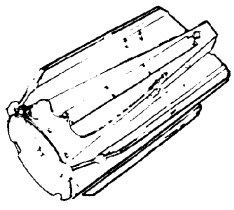
	MK 62 MINE	MK 63 MINE	MK 64 MINE
MK 15	565 LBS.	N/A	N/A
BSU-86	571 LBS.	N/A	N/A
MAU-91	N/A	1105 LBS.	N/A
MK 11	N/A	N/A	1990 LBS.
MK 12	N/A	1016 LBS.	N/A
DIMENSIONS: DIAMETER:	11 IN.	14 IN.	18 IN.
SUSPENSION PROVISIONS:	14 IN.	14 IN.	30 IN.



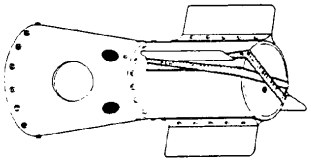
MK 62 MINE (TYPICAL) W/MK 15 FIN ASSEMBLY



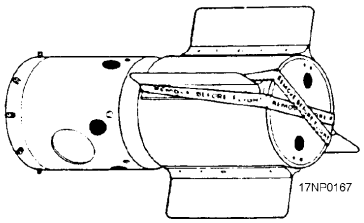
BSU-86 FIN ASSEMBLY
MK 62 MINE



MAU-91 FIN ASSEMBLY
MK 63 MINE



MK 11 TAIL SECTION
MK 64 MINE



MK 12 TAIL SECTION
MK 63 MINE

Figure 5-12.—Mk 62, 63, and 64 quickstrike mines.

They are used against submarines and surface targets. The mines are upgraded by installation of the Mk 130 conversion kit, Mk 130 battery, and flight gear.

Mk 65 Quickstrike Mine

The Mk 65 quickstrike mine (fig. 5-13) is a 2,000 pound, air-laid, all modular, influence-actuated, bottom mine. The Mk 65 is used against submarines and surface targets. The Mk 65 consists of a Mk 65 mine case, a Mk 45 safety device arming group with a Mk 2 arming device, a Mk 57 target detecting device and a Mk 7 tail assembly.

REVIEW NUMBER 4

Q1. What components are used on the Mk 55 mine for drop stability?

Q2. What is the suspension of the Mk 55 mine?

SAFETY PRECAUTIONS

LEARNING OBJECTIVE: *Recognize the safety precautions for handling mines and torpedoes.*

Handling mines is a specialized job. If you aren't qualified, don't disassemble the mines or their components. You should follow the same safety precautions for mines as you follow when handling bombs.

To conform to safety and ammunition stowage requirements, mines are normally received aboard ship in assembly configurations C or D. Aviation Ordnancemen are not required to assemble mines, but they are required to be qualified and certified in mine handling and aircraft loading procedures.

A Mobile Mine Assembly Group (MOMAG), composed of personnel from the Mineman rate, is responsible for the proper assembly of all mines. It is the responsibility of the mine planting activity to notify the MOMAGs of scheduled mine operations and the exact dates their assistance will be required.

When a mine is jettisoned safe, the wires remain in the clock starter and booster extender. This prevents them from operating after the mine submerges. However, when the mine strikes the water, the arming wires may pull free. Hydrostatic pressure or countermining shock can cause the wires to shear. Also, after a mine is submerged for a long period, the wires can corrode and break. No mine is jettisoned safe in water that is less than 800 feet (243.8 meters) deep with positive assurance that it isn't a hazard. Depths greater than 800 feet will crush or flood the mine case, making the mine inoperative.

When handling mines during preflight operations, follow the same general handling techniques you use for bombs or torpedoes.

REVIEW NUMBER 5

Q1. In what configuration are mines normally received aboard ship?

Q2. The assembly of mines is the responsibility of _____.

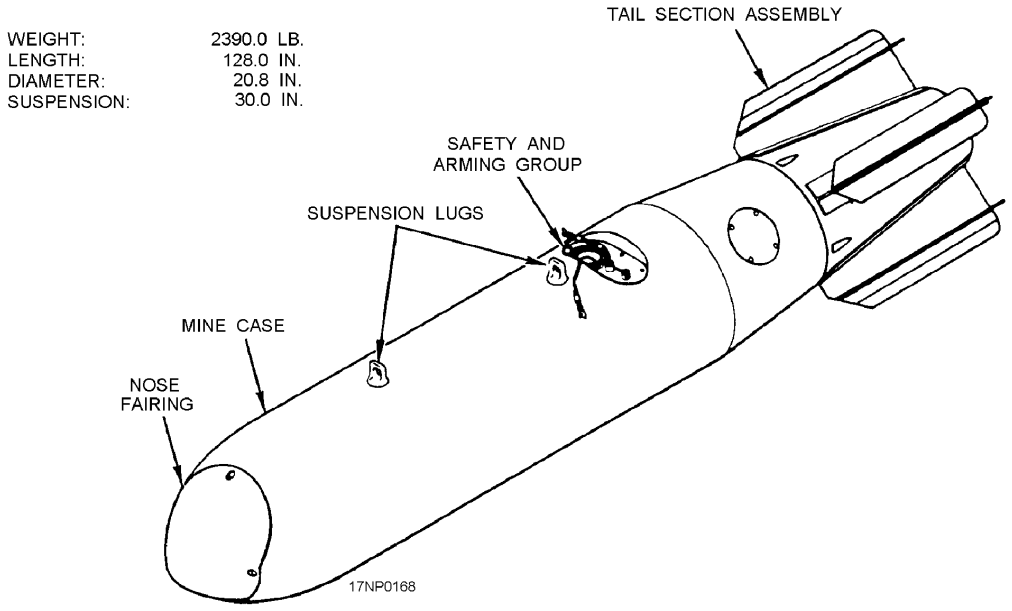


Figure 5-13.—Mk 65 quickstrike mine.

Q3. To what minimum depth must a mine be jettisoned to be considered jettison safe and not constitute a hazard?

REVIEW NUMBER 4 ANSWERS

A1. A nose fairing and box fins are used on the Mk 55 mine for drop stability.

A2. The Mk 55 mine is equipped with suspension lugs 30 inches apart.

REVIEW NUMBER 5 ANSWERS

A1. Normally, mines are received aboard ship in configurations C and D.

A2. The assembly of mines is the responsibility of a mobile mine assembly group (MOMAG).

A3. A mine must be jettisoned to a minimum depth of 800 feet (243.8 meters) to be considered jettison safe and not constitute a hazard.