SECOND REVISION

SIDEWINDER GUIDED MISSILE MARK 2 MODS 0 AND 1–14 AND TEST EQUIPMENT

DESCRIPTION, OPERATION, AND HANDLING

(U)

This publication supersedes NAVWEPS OP 2309 (First Revision) dated 1 November 1958

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SAFETY SUMMARY

Listed below is every WARNING contained in this ordnance pamphlet and the page on which the WARNING is located. All personnel involved in the handling, assembly, and testing of the SIDEWINDER 1 and 1A guided missiles must fully understand the WARNINGS and the procedure by which the hazard is to be reduced or eliminated.

All precautionary measures, specific and general, are summarized in chapter 5. Personnel should become thoroughly familiar with all aspects of safety of personnel and equipment prior to handling, assembly, and testing of the missile.

WARNINGS

Jettison target rocket before making an arrested landing, as landing forces can cause the heavier target rocket to leave the launcher. (Page 16)

It is particularly dangerous to expose the after end of the flare to an open flame or hot object. (Page 17)

Aircraft deceleration when landing with heavier target rocket can overcome detent restraint. Therefore, target rocket should be jettisoned before making an arrested landing. (Page 19)

Handle motors carefully at all times. Avoid jarring or dropping as a cracked propellant grain may cause motor blowup upon firing. Dropping the motor while it is in a horizontal position causes the grain to crack more readily than dropping while it is in a vertical position. Cracking also occurs more readily at low temperatures. It is imperative that, in transporting or handling the motor, care be exercised not to subject it to unnecessary jolts from dropping or sliding against a solid object. If an unpackaged motor has been dropped 18 inches or more, it shall not be used. Motors dropped less than 18 inches should be examined for external damage; if no damage is evident, the round may be considered safe to use. If a motor in a container is dropped 36 inches or more, it

should either be disposed of or returned to an ammunition depot. Do not tamper with or attempt to repair any parts of the motor. Damaged motors shall be disposed of in accordance with local directions. (Page 54)

The influence fuze is potentially dangerous ordnance material and should be handled with care. If the fuze has been dropped, it should be carefully examined for defects. Excessive scratches or abrasions in the vicinity of the window should be cause for rejection. Superficial scratches should not be cause for rejection. If no defect is found, the fuze may be used. A defective fuze, properly packaged and marked to indicate the nature of the defect, should be shipped to the appropriate ammunition depot. (Page 54)

The warhead is potentially dangerous ordnance material and should be treated in accordance with existing ordnance regulations. All safety precautions applicable to unfuzed bombs apply to unfuzed Mk 8 warheads. The high-explosive warhead is relatively insensitive to shock and will not normally detonate or explode when dropped 40 feet or more or when dropped from an aircraft on landing. However, like all high explosives, it should be treated with respect. Do not disassemble warheads or perform any alterations on them. (Page 55)

If a G&C section is dropped, resulting in damage to the dome and gyro, extreme care must be taken so that no escaped mercury-thallium mixture comes in contact with the skin tissue or clothing of personnel. This mixture is a fluid, silver in color, and is highly toxic. Should the skin be contacted, it must be washed thoroughly with soap and water. Should clothing be contaminated, it should be changed immediately and washed. Gloves must be worn in order to handle the damaged section safely. If the mixture gets inside the gloves, the hands and gloves must be washed thoroughly. No danger is involved if the section is dropped and no spillage or leakage is evident. (Page 55)

The contact fuze is potentially dangerous ordnance material and should be handled with care.

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All precautionary measures, specific and general, are summarized in chapter 5. Personnel should become thoroughly familiar with all aspects of safety of personnel and equipment prior to handling, assembly, and testing of the missile.

WARNINGS

Jettison target rocket before making an arrested landing, as landing forces can cause the heavier target rocket to leave the launcher. (Page 16)

It is particularly dangerous to expose the after end of the flare to an open flame or hot object. (Page 17)

Aircraft deceleration when landing with heavier target rocket can overcome detent restraint. Therefore, target rocket should be jettisoned before making an arrested landing. (Page 19)

Handle motors carefully at all times. Avoid jarring or dropping as a cracked propellant grain may cause motor blowup upon firing. Dropping the motor while it is in a horizontal position causes the grain to crack more readily than dropping while it is in a vertical position. Cracking also occurs more readily at low temperatures. It is imperative that, in transporting or handling the motor, care be exercised not to subject it to unnecessary jolts from dropping or sliding against a solid object. If an unpackaged motor has been dropped 18 inches or more, it shall not be used. Motors dropped less than 18 inches should be examined for external damage; if no damage is evident, the round may be considered safe to use. If a motor in a container is dropped 36 inches or more, it

The exercise warhead is a pyrotechnic item, and all precautions normally used for pyrotechnic signals should be observed. Any pyrotechnic material spilled from the head should be wetted down and swept up thoroughly for disposal. (Page 67)

The tracking flare contains a heat-sensitive pyrotechnic material. It should not be accidentally exposed to an open flame or a hot object. If the foil covering the holes at the after end of the flare or covering the end of the tube is torn, loose, or damaged, exposing the ignition holes, the flare shall not be used. If, after a flight, the foil around the ignition holes or covering the end of the tube is bulged or damaged, the flare shall not be used. Dispose of the damaged flare in accordance with local directives. (Page 68)

Do not use motors which have been damaged. A damaged motor tube may mean a cracked propellant grain, which may cause a motor blowup when the rocket is fired. Dispose of damaged rocket motors. Replace or repair damaged or bent fins. Observe standard safety precautions throughout the assembly and launcher loading operations. Only essential personnel may be in the vicinity of the assembly and loading operations. No smoking is permitted within 200 feet of rocket ammunition. (Page 68)

The tracking flares contain a pyrotechnic mixture and should not be exposed to open flames or hot objects. (Page 70)

Do not remove the shorting clip from the pigtail connector until it is necessary to plug the connector into the launcher receptacle just before takeoff. Before connecting pigtail to launcher receptacle, make certain that the master armament switch in the aircraft is in the OFF position and that the weapon selector switch is on SAFE. (Page 71)

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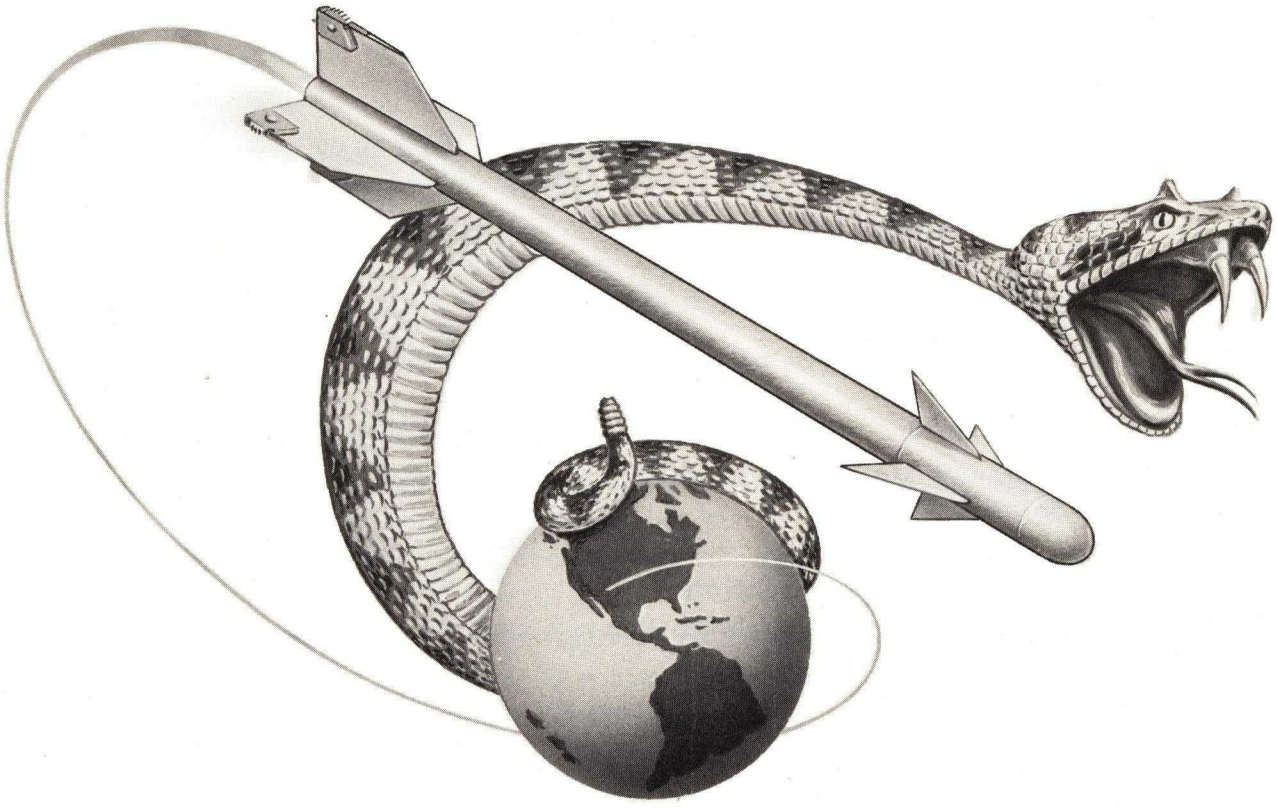


Chapter 1

INTRODUCTION

GENERAL

Ordnance Pamphlet 2309 (Second Revision) describes and provides instructions for the operating and handling of the SIDEWINDER 1 and 1A guided missiles and related test equipment. It is to be used by all personnel concerned with this weapon system. This Second Revision supersedes OP 2309 (First Revision), which shall be destroyed by burning.

INTRODUCTION TO SIDEWINDER

The SIDEWINDER guided missile (1 or 1A) is a supersonic air-to-air homing weapon employing passive infrared target detection, proportional-navigation guidance, and torque-balance control.

The missile is designed for launching from a rail launcher. The launcher contains a power supply, which furnishes standby power for the missile before firing, amplifies the missile signal for the pilot's earphones, and accomplishes the electrical functions necessary to fire the missile after the pilot pushes the firing button.

The SIDEWINDER 1 and 1A missiles are intended to be carried by high-speed fighter aircraft in attacks from a large portion of the after hemisphere, primarily against jet aircraft. Multiple-engine piston aircraft have been successfully attacked under ideal conditions.

No repair operation for any of the missile sections is performed aboard ship or at any supply depot or forward field area. The missile is designed as a simple, low-cost, reliable weapon without sacrifice of any functional performance requirements. Tactical sacrifices—in particular, restriction to fair-weather attacks from the tail cone—are inherent in the design.

MAJOR COMPONENTS

The SIDEWINDER missile is composed of five major sections: guidance and control (G&C), contact fuze, warhead (or exercise warhead), influence fuze, and rocket motor with wing assembly. In final assembly of the missile, four forward movable control fins on the G&C section are in line with the four rigid wings on the motor.

Each section is assigned a mark and mod number and, as functional or physical features of a section are modified, the mark and mod of that section is changed accordingly. The current mark and mod assignments of the five sections are as follows:

1. Guidance and Control Section Mk 1 Mods 0 through 14.

2. Contact Fuze Mk 304 Mods 0, , and 2.

3. Warhead Mk 8 Mods 0, 1, and . (Exercise Warhead Mk 2 Mod 0.)

4. Influence Fuze Mk 303 Mods 0, , 2, and 3.

5. Rocket Motor Mk 17 Mods 1 and with wings.

SIDEWINDER 1 AND 1A DESIGNATIONS

The SIDEWINDER 1 designation is assigned to assembled missiles containing the Mk 1 Mod 0 G&C section. The assembled SIDEWINDER 1 missile is identified as the SIDEWINDER Mk 2 Mod 0. This missile weighs approximately 158 pounds, is 110 inches long, and is 5 inches in diameter. The SIDEWINDER 1 (Mk 2 Mod 0) is restricted to pilot training.

The SIDEWINDER 1A designation is assigned to assembled missiles containing the Mk 1 Mods 1 through 14 G&C section. The assembled SIDEWINDER 1A missile is identified as the SIDEWINDER Mk 2 Mods 1 through 14. In other words, the mod number of the assembled missile is the same as the mod number of the G&C section. The SIDEWINDER 1A missile, shown in the Frontispiece, weighs approximately 160 pounds, is approximately 112 inches long, and is 5 inches in diameter.

COMPATIBILITY OF COMPONENTS FOR SIDEWINDER 1 AND 1A

MOTORS. Although the rocket motor Mk 15 has straight wings and normally is used with G&C Sections Mk 1 Mod 0, it is desired that this motor, when operationally feasible, be used on all missiles expended in training regardless of the mod number of the G&C section. The Mk 17 Mod 1 rocket motor has straight hinged-rolleron wings. The Mk 17 Mod 3 rocket motor has canted hinged-rolleron wings. Either a Mk 17 Mod 1 or 3 motor may be used with G&C Sections Mk 1 Mod 1 or later mods. The Mk 17 Mod 2 rocket motor is an inert rocket motor for captive flight only.

CONTACT FUZES. The Mk 304 Mod 0 contact fuze is not to be used with Mods 0 and 1 G&C sections with barium titanate crystals. Mods 1 and 2 contact fuzes shall be used with G&C sections that contain these crystals. The Mods 1 and 2 contact fuzes normally shall be used only with Mods 1–14 G&C sections.

Table 1 lists the compatibility of the various components.

GENERAL PRINCIPLES OF OPERATION

GENERAL. A brief description of the general principles of operation of the system and of the sections of the missile follows:

PREFIRING AND POSTFIRING SEQUENCE OF EVENTS. The following describes the sequence of events before and after missile firing.

After engine turn-up, aircraft generator power is furnished to the launcher power supply which provides 400-cycle, 115-volt AC current, 28-volt DC power, B+ heater, and filament power.

A missile signal is fed into the audio amplifier in the power supply.

TABLE 1. SIDEWINDER GUIDED MISSILE COMPONENT COMPATIBILITY

	G&C Section Mk 1 Mods		
	0	1	2–14
Rocket Motor Mk 15 *	X	X	
Rocket Motor Mk 17 Mods 1 and 3 **	X	X	X
Warhead Mk 8 Mods 0, 1, and 2	X	X	X
Exercise Warhead Mk 2 Mod 0	X	X	X
Contact Fuze Mk 304 Mod 0 ***	X	X	
Contact Fuze Mk 304 Mods 1 and 2	X	X	X
Influence Fuze Mk 303 Mods 0 and 1	X		
Influence Fuze Mk 303 Mod 2		X	X

* Mk 15 motor to be used for training.

** Mk 17 Mod 2 motors to be used for captive flight.

***Mk 304 Mod 0 contact fuze not to be used in G&C Section Mk 1 Mods 0 and 1 that have been modified to contain barium titanate crystals.

A gyro speed of 70 cycles per second will continue as long as the aircraft power is on, or until the missile is fired.

The simplified preflight check of the loaded missile, as described on page 64 of this pamphlet is performed. The master armament switch should be OFF for this test.

After takeoff, master armament switch is placed in the ARM position, station selector is set for station to be fired, and weapon selector is on SIDEWINDER or rockets position.

The SIDEWINDER is considered to be within range of the target if the pilot can see the target. The aircraft is considered to be within the firing envelope, if, in addition to the pilot hearing the audio signal, the firing aircraft can track the target with less than 1.6 g at 40,000 feet or above, or with less than 2 g below 40,000 feet. (For complete firing envelope, see OD 12663, SIDEWINDER 1A Performance Handbook.) Assuming all the foregoing flight conditions are met, the pilot will fire the missile, keeping the firing button depressed until the missile leaves the aircraft.

On missile firing, the following sequence of operations occurs:

Initial impulse fires the squib of the servo grain only. As the servo grain burns, gas pressure is built up and is distributed through a manifold to the turbogenerator and to the servo pistons within the drive cylinders.

When the turboalternator is rotating with sufficient velocity to generate sufficient power to operate the missile on internal supply, a relay in the launcher power supply is closed, and 28 volts of aircraft power is supplied through the relay to the two firing pins of the launcher. The time to effect this is 0.8 second, maximum. If the sequence is interrupted before the relay is closed, the servo grain will continue burning, but motor firing will not occur and the missile will not leave the launcher. Continued burning of the servo grain on the aircraft does not cause any safety in-flight hazard.

If the sequence described is uninterrupted the firing power is delivered

simultaneously to the firing squib of the rocket motor and to the thermal battery of influence fuze. The missile will then leave the launcher.

During missile acceleration, both fuzes are mechanically armed between 400–500 feet of the firing aircraft. The influence fuze is electrically armed approximately 2500 feet from the firing aircraft. Power to the contact fuze is furnished by the alternator of the G&C section. Power for the influence fuze is furnished by the thermal battery.

A disabling circuit prevents any turn signal from being sent to the steering servos for the first 0.5 second of flight. This prevents over control of the missile at relatively slow speeds.

At firing, the caging coil and motor drive coils are disconnected; the gyro is then free to precess to its limits in any direction necessary to track the target. The gyro coasts with no power during maximum flight time of the missile. Maximum burning time of the servo grain and, therefore, maximum guided flight of the missile is approximately 20 seconds. The warhead is exploded either on contact with the target, or, in the case of a near miss, by action of the influence fuze.

If the missile does not approach the target close enough for fuze action, a self-destruct sequence is initiated at the terminal end of guidance, and the warhead is exploded within approximately 23 seconds from time of launch.

GUIDANCE AND CONTROL SECTION MK 1 MODS 0–14. The G&C section comprises the forward end of the missile. The nose of the G&C section is a glass dome, and toward the rear of the section are mounted four steering fins, figure 1. An umbilical cord and connector extends from the rear skin area of the G&C section. Identification and modifications of the G&C section are given in Table 2. The length and weight of the G&C sections are as follows:

Section	Length, in.	Weight, lb
Mk 1 Mod 0	18	34
Mk 1 Mods 1–14	20	36

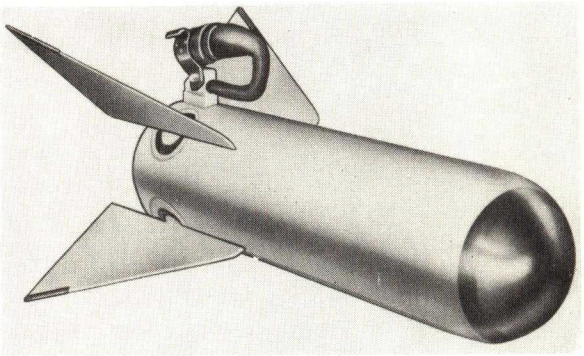


Figure 1. Guidance and Control Section.

The G&C section performs two primary operations. First, the missile optical system, which is a space-stabilized gyro, observes angular deviations between the gyro axis (also the optical axis) and the line of sight to the target. As the line of sight moves off the gyro axis, a signal is generated by the tracking loop which precesses the gyro axis toward the line of sight. Second, the signal generated by the tracking loop is used, by a phase detector, magnetic-amplifier, and pneumatic torque-balance servo combination, to deflect the fins so as to produce a missile-flight-line turning rate three to five times greater than the gyro-axis turning rate and in the same direction. By this means the missile is brought to an interception.

TABLE 2. IDENTIFICATION AND MODIFICATION CHARACTERISTICS OF SIDEWINDER G&C SECTION, MK 1

G&C Section Mk 1 Mod No.	Description of Modification
0	None
1	1. Servo actuation time, 21 seconds 2. Gyro seeker gimbal bearing replaced spherical-type bearing 3. Launch disabling of 0.5 second
2	1. Barium titanate crystals replaced fin contact strip
3	1. Filter in servo cylinders
4	1. Three parallel resistors removed from magnetic amplifier power supply for load regulation 2. A single load resistor added to servo
5	1. Dessicant dehydrator 2. Positive dome retention
6	1. Modified precession amplifier-preamplifier (6222 tube, plastic housing) 2. Current regulating transformer 3. Modified seeker head with new backplate to accept new preamplifier 4. Mercury-thallium damper
7	1. New cell specification 2. Modified precession amplifier 3. Rearrangement of components of magnetic amplifier 4. New improved fulcrum bearing (GE only)
8	1. Incorporation of new servo containing skin-type exhaust valve (Philco RP-30), resistive network in wiring harness replaced current limiting XMFR (GE RP-34) and heat limiter an integral part of manifold plate 2. Magnetic amplifier circuit changed to improve disabling time (GE RP-33) [Note: Concurrent with mod change, but no effect on mod in itself.]
9	1. Rehabilitation of the Mods 1 and 2 to include the following: a. New gimbal assembly (NOTS RP-12) b. Positive dome retention and dessicant c. NOTS XS-200 AC generator d. Rocker arms with fin fuze crystals (on Mod 1 only) e. Harness includes resistive network f. Soft cager and photoelectric cell and glass damper g. Filament rectifier change h. New silicone rubber boots i. Lower temperature thermostatic switch

G&C Section Mk 1 Mod 0 No.	Description of Modification
10	1. Rehabilitation of the Mod 3 to include the following: a. New gimbal assembly (NOTS RP-12) b. Positive dome retention and dessicant c. Piston pointer clips (Philco RP-29) d. NOTS XS-200 AC generator e. Harness modification includes resistive network f. Soft cager and photoelectric cell and glass damper g. Filament rectifier change h. New silicone rubber boots i. Lower temperature thermostatic switch
11	1. Rehabilitation of the Mods 4 and 5 to include the following: a. New gimbal assembly (NOTS RP-12) b. NOTS XS-200 AC generator c. Harness modification includes resistive network d. Piston pointer clips (Philco RP-29) e. Positive dome retention and dessicant on Mod 4 only f. Soft cager and photoelectric cell and glass damper g. Filament rectifier change h. New silicone rubber boots i. Lower temperature thermostatic switch
12	1. Rehabilitation of the Mod 6 or 7 with blade fulcrums in servo to include the following: a. New gimbal assembly (NOTS RP-12) b. NOTS XS-200 AC generator c. Resistive network replacing current limiting transformer d. Piston pointer clips (Philco RP-29) e. Soft cager and photoelectric cell f. Filament rectifier change g. New silicone rubber boots h. Lower temperature thermostatic switch
13	1. Rehabilitation of the Mod 6 or 7 with sleeve fulcrums in servo to include the same modifications as the Mod 12 above
14	1. Rehabilitation of the Mod 8 to include the following: a. New gimbal assembly (NOTS RP-12)

course in the manner of conventional proportional navigation.

Details of the Tracking Loop. The infrared radiation from a 4-degree solid-angle cone including the sky and target is imaged by the optical system upon a rotating reticle, figure 2. By referring to figure 3, it can be seen that the radiant energy is filtered as a visible light and then transmitted to the lead sulfide (PbS) cell, which is sensitive to infrared energy. The resistance of the PbS cell is changed by

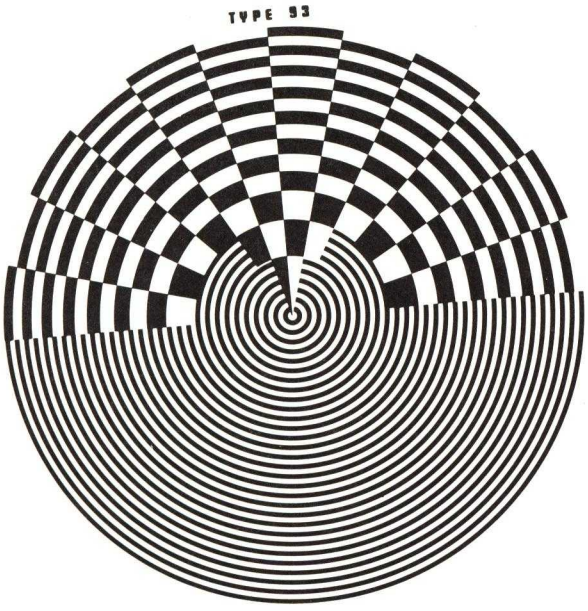


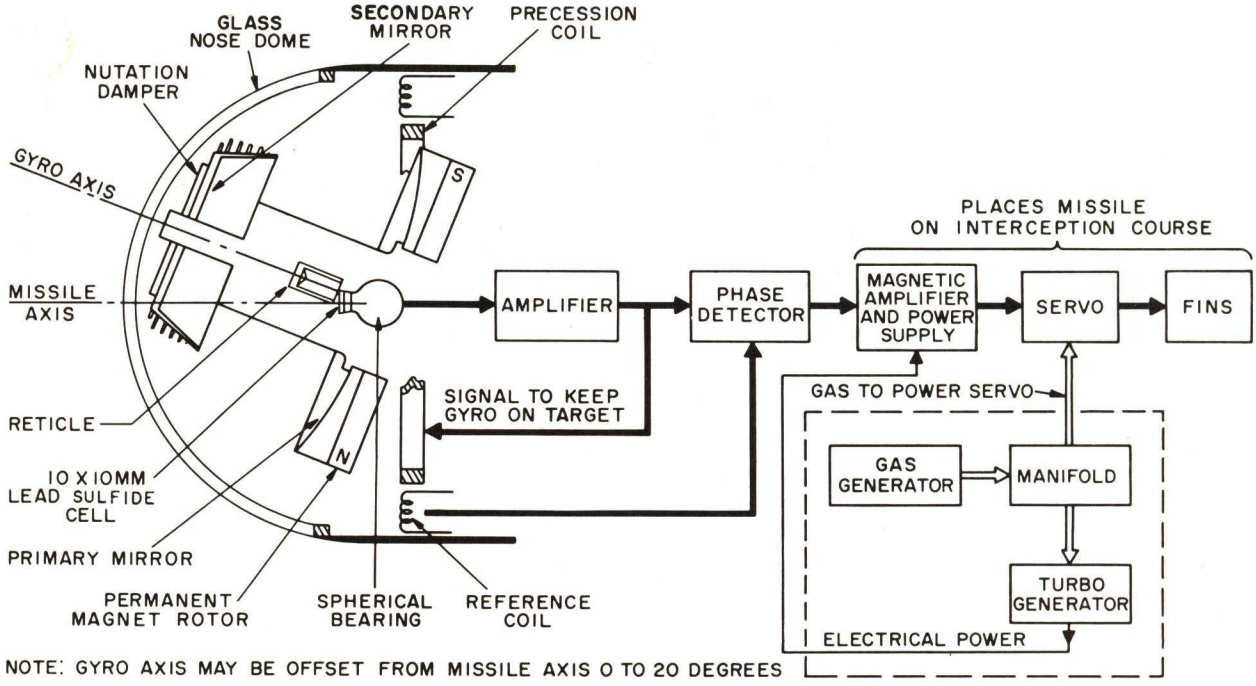
Figure 2. SIDEWINDER Reticle.

the total infrared flux falling upon the cell face, and the cell therefore generates an alternating signal voltage output proportional to the modulation of the total flux. The PbS cell responds to signal variation with about a 300-microsecond time constant. As a target appears in the field of view, the target has, in general, a different total radiation as compared to the radiation from the sky background which has been blocked by the target. Thus, as the target image pops in and out of the transparent slits, a pulse signal is generated by the cell because of the change in total infrared flux introduced by the contrast of the target. The pulse signal is amplified and fed directly to precession coils concentric with the missile axis. By proper angular orientation between the reticle and a magnet carried on the gyro motor, a phasing compensation is introduced so that the gyro axis is automatically precessed properly in the direction of the line of sight. This method of precession is independent of the missile coordinate system, and the gyro will track properly even if the missile rolls.

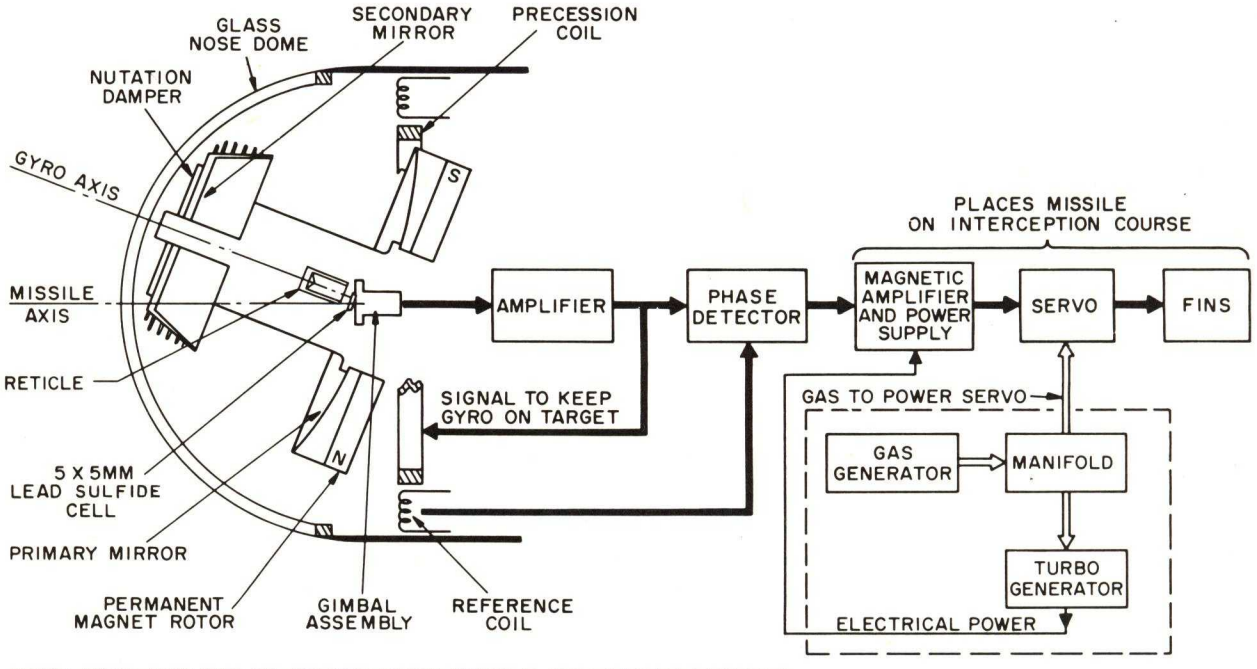
The gyro-optical system in the Mk 2 Mod 0 SIDEWINDER (which uses the Mk 1 Mod 0 G&C section) is characterized by an unconventional gimbal consisting of a single spherical bearing at the center of the gyro. Thus, the entire optical and gyro assembly rotates around its center of support. Also, the 10- x 10-mm PbS cell is mounted directly on the stationary central ball, avoiding the necessity for making flexible electrical connections through or around bearings or slip rings.

The gyro-optical system in the Mk 2 Mods 1–14 SIDEWINDER (which uses the Mk 1 Mods 1–14 G&C sections) is similar in most respects to the gyro-optical system used in the Mk 2 Mod 0 missile. However, a set of internal gimbals replaces the single spherical bearing, and the rotating optical assembly is supported by these gimbals. The gimbal system permits more positive mechanical decoupling of the gyro and optical assembly from the remainder of the missile. The PbS cell is mounted on the inner gimbal, which precesses with the optical elements, and is so positioned on the gimbal that the plane of the cell surface is always kept perpendicular to the optical axis. Because of this feature, the large 10- x 10-mm cell is not required, and a 5- x 5-mm cell is used. The leads from the cell extend through the center of the gimbal assembly. Since the inner gimbal and the cell do not spin with the rotor, no slip rings are necessary.

Details of the Missile Control Loop. Simplified tracking and control loops for the Mk 1 Mod 0 and Mk 1 Mods 1–14 are shown in figure 3. The target signal generated by the gyro tracking loop is fed from the electronic



MK I MOD 0



MK I MODS 1-14

Figure 3. Tracking and Control Loops, Simplified.

amplifier into two phase discriminators. Simultaneously, the rotating gyro magnet generates signals in the reference coils which are mixed, in the phase detectors, with the target signal. The resulting rectangular components of the target signal control the deflections of the two fin pairs. This result is achieved by pairs of push-pull magnetic amplifiers which control the currents in opposite pairs of solenoid valves of the servo. With this system, requirements for absolute roll-position control are eliminated from the missile, inasmuch as the reference coils roll rigidly together with the control fins.

The servo, figure 4, is powered by hot gas produced from a slow-burning, solid-propellant grain. The hot gas is fed into a manifold, which in turn supplies gas through four 0.019-inch metering orifices into four cylinders. Opposite fins are joined together by crossarms and are controlled by opposing pairs of pistons in the cylinders. The piston pairs operate differentially in a push-pull arrangement. Gas flow through the metering orifices is sonic and remains constant, regardless of the pressure within the cylinders. Gas is permitted to escape from each cylinder through an orifice covered by a cup valve. The outlet orifice and valve are located in the piston, which also houses a solenoid coil. The valve is acted upon by a magnetic control force which is generated by the signal currents flowing in the solenoid. The magnetic force closes the valve and holds it closed until the gas flowing into the cylinder raises the pressure enough to open the valve and exhaust the cylinder. At equilibrium, the valve permits as much gas to flow out of the cylinder as flows into the cylinder. If the pressure in the cylinder is too low, the valve closes and remains closed until the pressure rises to its equilibrium value; if the pressure is too high, the valve opens and remains open until the pressure falls to its equilibrium value. Because of the push-pull arrangement of the pistons and differential currents in the opposite pairs of solenoids, the torque exerted by the pistons on the fins becomes a linear function, within limits, of the differences in the currents through the solenoids.

The servo is a torque-balance system capable of exerting up to 800 inch-pounds of control torque. The difference in solenoid currents causes a pressure unbalance in the affected cylinders. The fins are then deflected in the airstream until the servo torque is balanced by the opposing aerodynamic forces.

In such a control system, automatic altitude compensation is incorporated into the control loop of the missile without requiring programmed electronic-gain changes in the amplifier or fin position control. Because of the elimination of the above two requirements, the problems of drift, gain calibration, and stability associated with DC amplifiers, pressure transducers, feedback control systems, etc., are not present in the torque-balance control system. Moreover, sensitivity of the control system to airframe elasticity is eliminated, since the fins naturally assume the angle relative to the airstream required to generate the called-for aerodynamic lift forces. Besides being highly reliable because of the small number of components required, this control system can be easily and cheaply manufactured in large numbers, by virtue of the relatively wide tolerances permissible on the various parts of the pneumatic servo as compared to the tolerances of

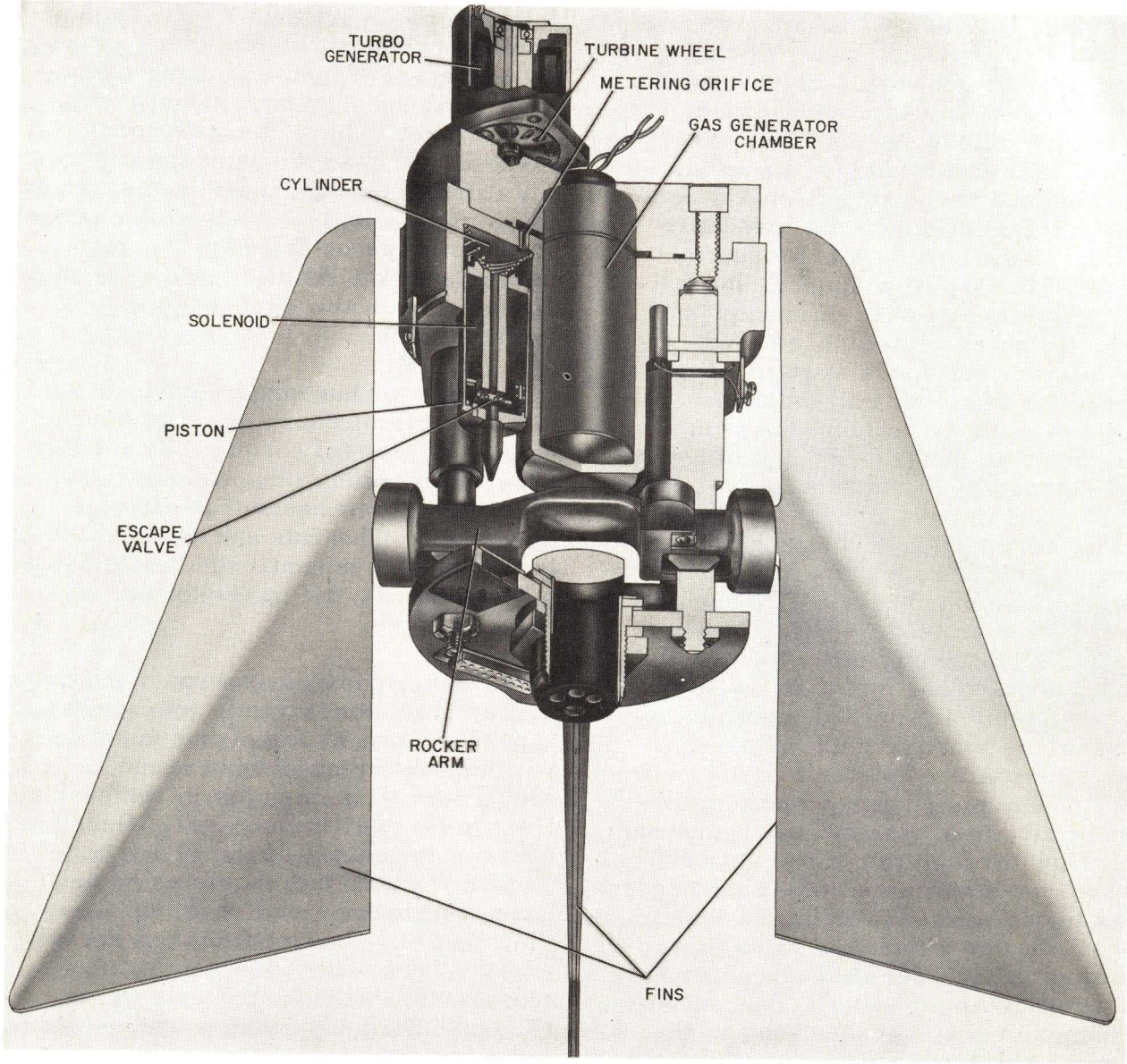


Figure 4. Pneumatic Control Servo and Turbogenerator.

corresponding components in a hydraulic servo.

Generator. The electrical generator, also shown in figure 4, is a small, efficient, high-frequency turbo-alternator driven by hot gas from the gas generator through the servo manifold. The voltage and frequency outputs of the generator are regulated by a passive-tuned regulating circuit. The high-frequency alternating generator power is used directly in the magnetic amplifier circuits and also is rectified to supply B+ and filament power for the electronic amplifier circuits. The generator supplies a total power of approximately 50 watts to the missile and has approximately 300 percent reserve capacity.

WARHEAD AND FUZE SYSTEM. A detailed explanation of the fuzing system will be found in the appropriate fuze ordnance pamphlet. A short description of the warhead and fuze system is given here.

Warhead. The section of the missile immediately aft of the G&C section is the warhead, figure 5. The

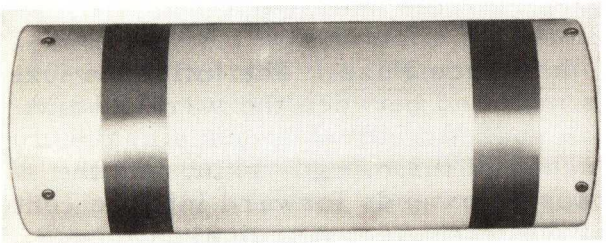


Figure 5. Warhead.

warhead is designated the Mk 8 Mods 0, 1, or 2. The 25-pound warhead consists of approximately 14 1/2 pounds of metal and 10 1/2 pounds of explosive. The explosive charge produces about 1300 high-velocity (6000 feet per second) fragments. The lethal radius of the warhead is about 30 feet. The fragments are capable of penetrating 3/8-inch steel plate at this radius. The warhead can be detonated by either the contact or influence fuze. The warhead is attached to the G&C section by four clamps secured with Allen-head screws. The Mk 2 Mod 0 exercise warhead is similar in weight and configuration to the Mk 8 warhead and may be used against drones and target rockets.

Contact Fuze. The contact fuze, figures 6 and 7, is mounted on the

Figure 6. Contact Fuze.

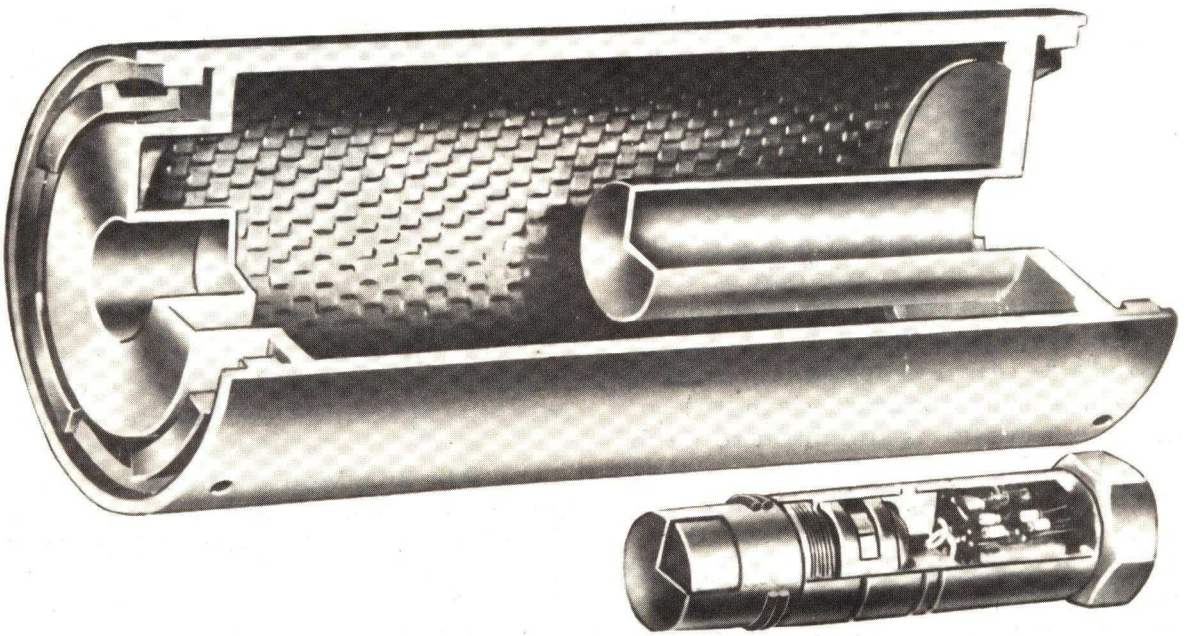


Figure 7. Warhead and Contact Fuze (With Booster), Cutaway.

rear of the G&C section, and the end containing the booster charge fits into the center of the warhead section. The SIDEWINDER Mk 2 Mod 0 missile employs a Mk 304 Mod 0 contact fuze together with the Mk 35 Mod 0 booster. The Mk 2 Mod 1 missile uses a Mk 304 Mods 1 or 2 contact fuze together with the booster previously mentioned. The Mod 2 contact fuze is similar in physical appearance to Mods 0 and 1, but it has a one-piece case design. Safety during handling and in use is assured by the incorporation of two different safety devices. The pyrotechnic firing train is interrupted by an escapement-type mechanism which can be armed only by a strong, prolonged acceleration. The contact fuze does not receive power until the turbogenerator within the missile has reached operating speed and until the safety short in the umbilical block has been broken by the missile launching.

Two methods have been devised for actuating the contact fuze. One method of actuation is by means of an insulated wire recessed in the outboard tip of each of the fins. These wires have a potential with respect to the fin body, and, upon striking a target, short to the fin body and cause instantaneous detonation of the warhead. This method of actuating the contact fuze has largely been replaced by a second, newer method. This second method of actuation (as used in the Mk 2 Mods 2—14 missiles) is by means of a piezoelectric (barium titanate) crystal. A crystal is mounted to each rocker arm of the G&C section. When the missile strikes the target, the shock to the rocker arms causes the crystal to generate a voltage. This voltage triggers the contact fuze, resulting in instantaneous detonation of the warhead.

In the case of the insulated wire method of fuze actuation, if any of the fuze wires are shorted to the fin body before the missile is fired, the fuze will arm mechanically, but contact with the target will not result in warhead detonation. In order to avoid loading a dud aboard the aircraft, the G&C section should be handled with care. The piezoelectric crystals, on the other hand, are not quite so delicate. However, reasonable care in handling should be exercised to ensure reliable operation.

Influence Fuze. The influence fuze is mounted between the warhead and the rocket motor. It occupies 3 1/10 inches of the missile skin, and the booster extends forward into the center of the warhead. A typical influence fuze is shown in figure 8.

Figure 8. Influence Fuze.

Four different influence fuzes are used in the SIDEWINDER 1 and 1A missile system. These are as follows:

1. Mk 303 Mod 0—used in conjunction with a Mk 34 Mod 0 booster, when installed on a Mk 2 Mod 0 (SIDEWINDER 1) missile.

2. Mk 303 Mod 1 (only small quantity produced)—used in conjunction with a Mk 34 Mod 1 booster, when installed on a Mk 2 Mod 0 (SIDEWINDER 1) missile.

3. Mk 303 Mod 2—used in conjunction with a Mk 34 Mod 1 booster, when installed on a Mk 2 Mods 1–14 (SIDEWINDER 1A) missile.

4. Mk 303 Mod 3—used in conjunction with a Mk 34 Mod 1 booster, when installed on a Mk 2 Mods 1–14 (SIDEWINDER 1A) missile.

The basic safety and arming devices of this fuze consist of a mechanically arming device, which arms between 400–500 feet from the firing aircraft and an electrically arming device, which arms approximately 2500 feet in front of the firing aircraft.

The power necessary to operate the influence fuze is supplied by a thermal battery internal to the fuze. The battery can supply no power until a firing pulse is transmitted from the aircraft launcher to the front lug button on the missile.

The influence fuze will be actuated if the missile fails to make a direct hit on the target but passes closer than 30 feet.

The warhead is attached to the fuze, during final assembly aboard ship, by four internal clamps (which are located in the after end of the warhead) secured with Allen-head screws. The after end of the influence fuze has an 8-pitch Acme male thread for closure to the rocket motor. Later fuzes contain a nylon locking strip inserted in a groove cut through the thread.

Neither fuze will mechanically arm if the missile misfires. Although the fuzes may be supplied with internal power, the basic mechanical safety and arming devices will prevent arming of the missile while it is on the aircraft. The internal power disappears at the expiration of the Mk 56 Mod 1 battery (in the Mk 303 fuze) after approximately 30 seconds. Fuzes involved in misfires should be so labeled, and returned to a depot.

ROCKET MOTOR. Just aft of the influence fuze is the rocket motor, the forward end of which has an 8-pitch Acme female thread for attachment to the influence fuze. The rocket motor (Mk 17 Mod 1) is shown in figure 9.

The rocket motor is approximately 75 inches long and provides a nominal impulse of 8440 pound-seconds with a 2.2-second burning time at 70°F. The motor tube has four wing-mounting channels, which are extruded integral with the tube. The four missile wings are clamped into these channels, each by means of five prestarted assembly screws, during the final missile assembly operation aboard ship. In addition, a firing button protector, BuWeps Dwg. No. 1555632, is installed, in final assembly, to protect the influence fuze and motor igniter from radio frequency (RF) energy.

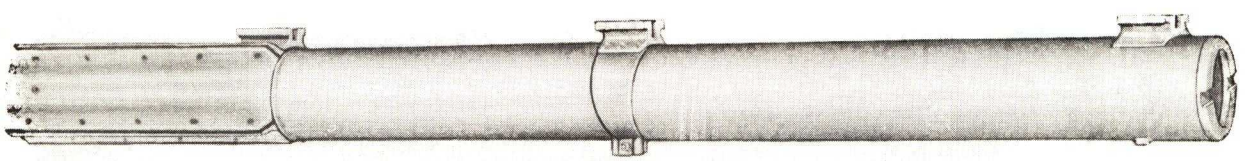


Figure 9. Rocket Motor Mk 17 Mod 1.

MISSILE PERFORMANCE

The missile performance under typical conditions is as follows:

Speed

Mk 2 Mod 0–14

The missile will be given an incremental speed of approximately Mach 1.5, depending upon the altitude, above that of the firing aircraft

Range

Mk 2 Mod 0

18,000 ft at 40,000-ft altitude at Mach 0.9 launch and Mach 0.9 target; 5000 ft at sea level at Mach 0.9 launch and Mach 0.9 target

Mk 2 Mods 1–14

28,000 ft at 50,000-ft altitude at Mach 1.2 launch and Mach 0.9 target; 6000 ft at sea level at Mach 1.2 launch and Mach 0.9 target

Maneuver Capability

Mk 2 Mod 0–14

2.7 g at 60,000 ft and missile speed of Mach 2.3; 4.2 g at 50,000 ft and missile speed of Mach 2.3; 10 g at sea level

Effective Control System

Time Constant: 0.25 sec (max)

Homing Principle: Passive infrared detection

Control: Torque balance

Guidance: Proportional navigation

Airframe Design: In-line cruciform

MISSILE PHYSICAL CHARACTERISTICS

Complete Missile:

Length: 109 1/2 in. (Mk 2 Mod 0)
111 1/2 in. (Mk 2 Mods 1–14)
Diameter of body: 5 in.
Fin span: 15 in.
Wing span: 22 in. (with rollerons)
Weight: 158 lb (Mk 2 Mod 0)
160 lb (Mk 2 Mods 1–14)

Guidance and Control Section:

Length: 18 in. (Mk 1 Mod 0)
20 in. (Mk 1 Mods 1–14)

Rocket Motor:

Mk 17 Mod 1 or Mod 3
Length: 74 7/8 in.
Diameter: Max., 7 in; min., 5 in.
Wing span: 22 in.
Weight (without wings): 75.3 lb

Wings:

Without Rollerons
Length: 21 in.
Width: 7 3/4 in.
Thickness: 1/4 in.
Weight: 13.2 lb (4 wings)

With Rollerons
Length: 21 in.
Width: 8 1/4 in.
Thickness: 7/8 in. (over rollerons)
Weight: 16.4 lb (4 wings)

GENERAL DESCRIPTION OF AUXILIARY SYSTEM COMPONENTS

CAPTIVE FLIGHT AND TRAINING MISSILE CONFIGURATIONS. Four types are available for captive flight and training and are described in the following paragraphs.

Type I Dummy Training Missile. The Type I dummy training missile is intended for use as a training dummy in missile assembly and handling drills, and for use as a captive dummy missile in aircraft missile performance tests. It consists of the following components:

1. Guidance and Control Section (Type I Dummy), consisting of the following features:

a. Plastic seeker head

b. Spring-loaded fins for "free-streaming" within aircraft local airflow.

c. Wiring harness with all connectors, but no wiring.

d. Weight and center of gravity approximating a live G&C section.

2. Influence fuze, inert only

3. Contact fuze, inert only

4. Warhead, inert only

5. Rocket motor, inert only, and wings

Type II Dummy Training Missile. The Type II dummy training missile is intended for use in the evaluation of aircraft–missile separation tests, and is designed for unguided firings. It consists of the following components.

1. Guidance and Control Section (Type II Dummy) consisting of the following features:

a. Gas generator grain assembly with dummy pistons.

b. Thermal time delay relay (replaces the turbogenerator of a live G&C section).

c. Special purpose wiring harness arranged to actuate the thermal time delay relay and the motor squib only.

d. Weight and center of gravity approximating a live G&C section.

2. Influence fuze, inert only

3. Contact fuze, inert only

4. Warhead, inert only

5. Rocket Motor, Mk 15 or Mk 17 (live), with wings

Type III Captive Flight Training Missile. The Type III captive flight training missile (weighted) is intended for use with captive flight tests and other training purposes where an active seeker assembly is required, but where the servo gas generator is not to be activated. It consists of the following components:

1. Guidance and Control Section (live), Mk 1 all mods, with a molded umbilical cable.

2. Influence fuze, inert only

3. Contact fuze, inert only

4. Warhead, inert only

5. Rocket motor, inert only

6. Wings (optional)

7. Umbilical servo by-pass adapter Federal Stock No. Z1420-676-4689.

Type IV Captive Flight Training Missile. The Type IV captive flight training missile (unweighted) was developed to satisfy training requirements at a lower unit cost than the Type III. The Type IV is provided as an alternate to the Type III, and both

are intended for captive flight tests and other training purposes where an active seeker assembly is required, but where the servo gas generator is not to be activated. It consists of the following components:

1. Guidance and Control Section (live), Mk 1 all mods, with a molded umbilical cable.

2. Unweighted adapter, BuWeps Dwg 1517438 (replaces influence fuze and warhead)

3. Unweighted motor, inert only (without wings)

4. Umbilical servo by-pass adapter, Federal Stock No. Z1420-676-4689.

EXERCISE WARHEAD. The SIDEWINDER 5.0-inch guided missile exercise warhead (Mk 2 Mod 0) is a cylinder 13 1/2 inches long (skin length on the missile) and weighs 25 1/2 pounds. When detonated, the exercise warhead produces a brilliant flash and a white smoke cloud.

The exercise warhead is fuzed at both ends. At the forward end, a well, 6 inches deep, is provided for the contact fuze which is mounted on the G&C section. At the after end, a shallow well is provided for the influence fuze booster. The exercise warhead is attached to the G&C section and to the influence fuze in the same manner as the warhead.

TARGET ROCKET. The rocket used as a target for SIDEWINDER is made up from Target Rocket Kit Mk 23 Mod 0 and HVAR Rocket Motor Mk 10 Mods 6 and 7. The kit contains a weighted rocket head, a center hanger, and a fin assembly. The assembled target rocket is designated as Target Rocket Mk 26 Mod 0. The rocket is approximately 73 inches long and weighs 215 pounds. The distance between centers of the launching lugs is the same as for SIDEWINDER to enable the target rocket to fit into the launcher. Clamps are provided on the fin assembly for the attachment of four tracking flares to the rear of the target rocket. The assembled target rocket is shown in figure 10.

WARNING

Jettison target rocket before making an arrested landing, as landing forces can cause the heavier target rocket to leave the launcher.

TRACKING FLARE. The Tracking Flare Mk 21 Mod 0 consists of an

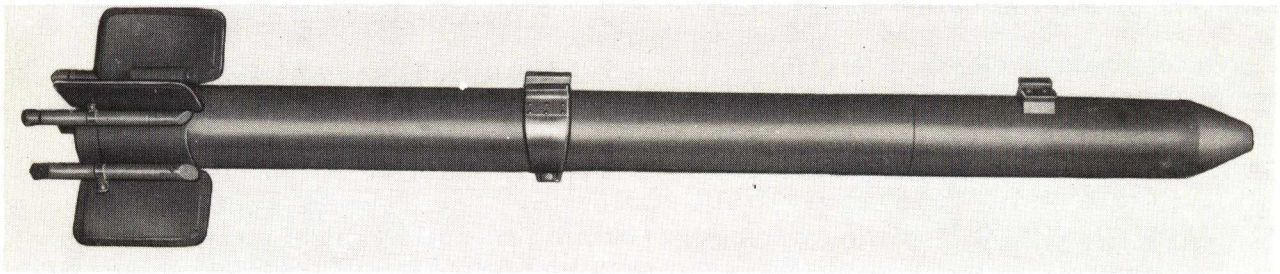


Figure 10. Target Rocket Mk 26 Mod 0.

aluminum tube and stud and measures 10 inches long by 1 inch in diameter. The tube is filled with approximately 100 grams of a pyrotechnic mixture in the forward end and approximately 10 grams of ignition mixture in the after end. Eight ignition holes, 3/16 inch in diameter, are drilled around the after end of the flare. The after end of the flare is sealed with a plastic cap, and the ignition holes are covered with aluminum foil tape. The whole after end of the flare is coated with a purple lacquer. Figure 10 shows tracking flares installed on a target rocket.

The tracking flare was designed to facilitate the tracking of rockets and missiles throughout their trajectory. It is difficult or impossible to track a rocket or missile without the benefit of a flare or tracer which continues to burn after the motor burns out. The flare burns with a hot, bright flame that consumes the tube as the pyrotechnic mixture burns the length of the tube and allows the rocket or missile to be easily seen or readily photographed. The flare also emits light energy in the infrared region, which makes it particularly adaptable for attachment to large rockets for infrared seeker missiles such as SIDEWINDER.

The ignition mixture in the after end of the flare is very sensitive to heat in order to ensure reliable ignition.

WARNING

It is particularly dangerous to expose the after end of the flare to an open flame or hot object.

The flares are ignited by the burning exhaust of the rocket motor. The flame from the rocket motor impinges on the flare that extends approximately 5 inches behind the rocket fins into the rocket blast. The heat from the rocket exhaust melts the aluminum foil and ignites the ignition compound, which in turn ignites the pyrotechnic mixture. The mixture will burn for approximately 25 seconds.

TARGET FLARE. The Target Flare Mk 33 Mod 0, which will ultimately replace the Tracking Flare Mk 21 Mod 0, is similar to the tracking flare but is of an improved design. The case is of steel rather than aluminum, and the after end of the flare has three ignition slots, each 1/4 inch wide by 1 inch long, instead of eight ignition holes in the Mk 21 tracking flare.

The physical dimensions and the method of installation of both flares are identical.

The ignition mixture of the Target Flare Mk 33 will burn for approximately 60 seconds.

NONPROPULSION ATTACHMENT. A nonpropulsion attachment (NPA), figure 11, is available. The NPA is affixed, by means of a bayonet-type connector, to the nozzle end of the rocket motor in the ready-service stowage area.

NOTE: It is recommended that the NPA be removed immediately after the missile is loaded on the aircraft launcher; at the discretion of the local Command, it may be removed before loading on the launcher.

Figure 11. Nonpropulsion Attachment.

PYLON AND LAUNCHER. SIDEWINDER is launched from an Aero 3A guided missile launcher, which is attached to the aircraft by means of an Aero 3A guided missile launcher pylon. The pylon and launcher are shown in figure 12.

Physical characteristics of both launcher and pylon are as follows:

	Launcher	Pylon
Length	84.2 in.	49.7 in.
Height	4.9 in.	12.5 in. (untrimmed)
Width	2.6 in.	2.5 in.
Weight	50.0 lb (with self-contained power supply)	30.0 lb

The launcher carries the missile by means of the three missile lugs which slide in the launcher rail. The missile is loaded onto the launcher by inserting the missile into the launcher rail so that the three lugs pass through the three slots in the rail, and pushing the missile forward 3 inches until the front lug rests between two fingers of the restraining detent. It is also necessary to attach the umbilical block hook of the launcher to the umbilical block of the missile and to connect the missile umbilical cable plug to the receptacle inside the launcher nose cap. The restraining detent, under ordinary conditions, prevents missile movement in the longitudinal direction. A heavy spring pushes down on the front of the detent block, so that a forward

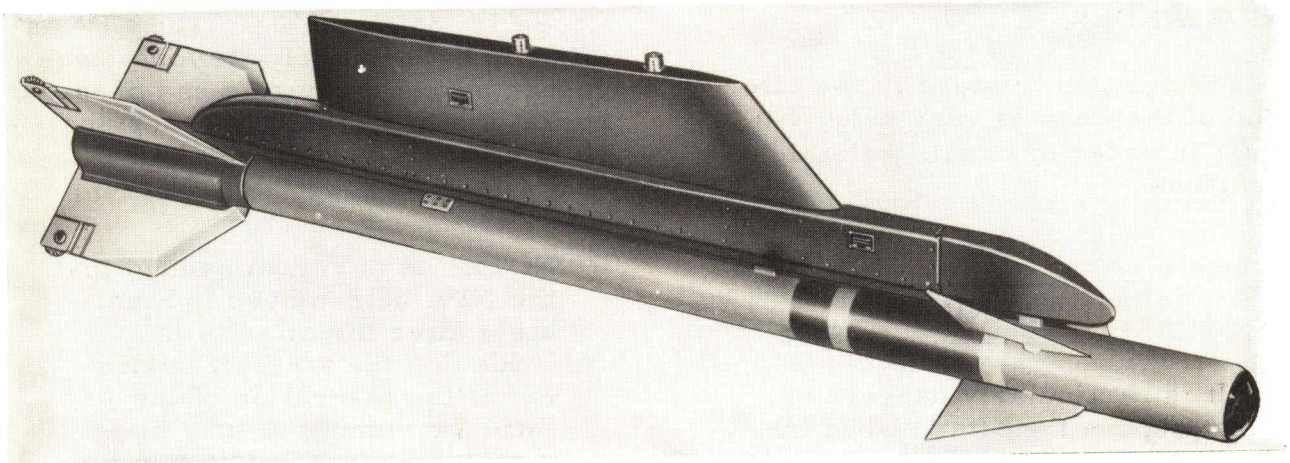


Figure 12. Typical Pylon and Rail Launcher With Mk 2 Mod 1 Missile.

force of 1500 pounds (minimum) is required to override the detent and release the missile. The 20 to 25 g missile acceleration occurring in normal firing and in jettisoning easily overrides the detent, but the aircraft deceleration caused by arrested and barrier landings is not sufficient to release the missile. Between the two fingers of the detent are two spring-loaded striker points which engage electrical contact buttons on the rocket motor when the missile is on the launcher. The front contact button connects to the influence fuze, and the rear contact button connects to the missile motor squib.

WARNING

Aircraft deceleration, when landing with heavier target rocket, can overcome detent restraint. Therefore, target rockets should be jettisoned before making an arrested landing.

The missile is restrained from swaying or vibrating while on the launcher by means of spring-loaded snubber cams adjacent to the front and rear lugs. These snubbers very tightly wedge the missile lugs against the rail. The forward motion of the missile at firing automatically releases the snubbers; the raising of the rear detent when unloading a round also automatically releases the snubbers. Missiles are unloaded by using a 3/8-inch Allen wrench to rotate a cam in the launcher, which raises the rear detent. The missile can then be unloaded through the loading slots in the launcher rail.

An electronic power supply (Aero 3A) for the missile is located inside the launcher, between the two pylon attach points. It weighs approximately 12 pounds. The unit is encapsulated in a plastic material and is nonrepairable. The launcher power supply furnishes both standby and firing power to the missile and provides amplification of the missile signal. It receives 400-cps, 115-volt power and 28-volt DC power from the aircraft, and furnishes B+ power, heater power, filament power, and firing power to the missile. It also amplifies the missile signal for the pilot's earphones by means of a two-tube, push-pull class A audio amplifier. Four relays in the power supply, used in firing and jettisoning the missile, provide safety in the form of multiple openings in the firing circuits.

The Aero 3A launcher should have an unloading stirrup installed in accordance with Aircraft Armament Change No. 200. The stirrup prevents shearing of the umbilical block during missile unloading.

A launcher dust-cap protector should be placed on the power supply receptacle whenever a launcher is removed from an aircraft. (Refer to Armament Material Bulletin No. 274.)

The LAU-7/A launcher, designed primarily for SIDEWINDER 1C, can be used to launch SIDEWINDER 1A missiles. However, an electrical adapter, Federal Stock No. VM5935-885-9397 M 558, is required to adapt the launcher electrically to the missile.

Chapter 2

DEPOT FACILITY

DEPOT HANDLING FACILITIES

The following paragraphs give some typical background information on the handling and stowage of missile components at the shorebase installation. It is to be pointed out, however, that some variation will exist between various depots and, in all cases, local regulations governing operation of each particular depot are to be followed at all times.

Logs or records of incoming and outgoing shipments and results of any necessary tests should be kept in accordance with standard procedures established at the depot. The stowage plans should allow grouping so that outgoing shipments may be made from the earliest received incoming shipments, thus ensuring that the stock is kept up to date.

INCOMING AND OUTGOING SHIPMENTS. Typical depot handling facilities for incoming and outgoing shipments of missile components are shown in figure 13. This diagram shows the routing and storage of the various components in a typical shorebase installation. For example, incoming shipments of explosives are received at the transfer depot and from there go directly to the magazine for storage. Outgoing shipments of explosives proceed from the magazine to either the transfer depot or to the pier.

FLEET RETURN. Figure 14 shows typical depot handling facilities for fleet return of defective and surplus missile components, as well as for return of reusable containers. For example, inert missile components are returned to the pier. The inert components are removed from the pier for inert segregation and are then placed in the appropriate storage facility. Items in need of repair are reconditioned in the shop before being stored.

HANDLING AND STOWAGE OF INCOMING MISSILE COMPONENTS

GUIDANCE AND CONTROL SECTIONS. One G&C section is packaged to a container. Guidance and control sections shall be tested for proper operation upon receipt, subsequent to stowing, and once every year thereafter. Desiccant should be regenerated and each section properly resealed in its container after testing, and the containers repalletized according to the requirements of the stowage plan. (A method which works well is to pack six containers to a single Mk 7 Mod 0 steel pallet.)

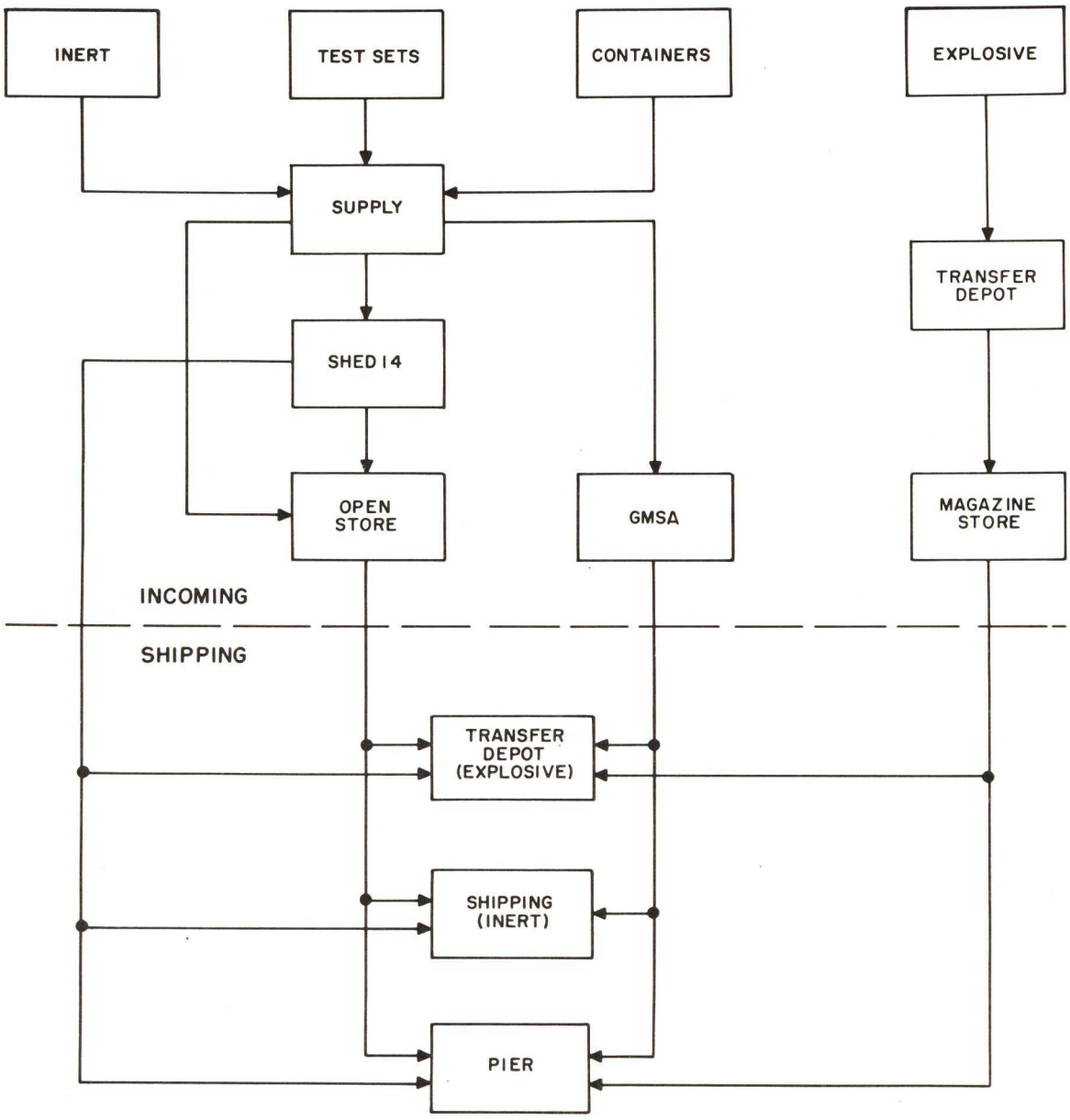


Figure 13. Routing and Storage of SIDEWINDER Components at the Depot.

When long-term storage is necessary, it is recommended that G&C sections be stored at temperatures between -65 and 100°F. For temperatures above 100°F, limited storage is permissible provided that the storage times do not exceed those listed in table 3. If the maximum storage time for a specific temperature shown in the table is exceeded, the G&C sections are not to be used.

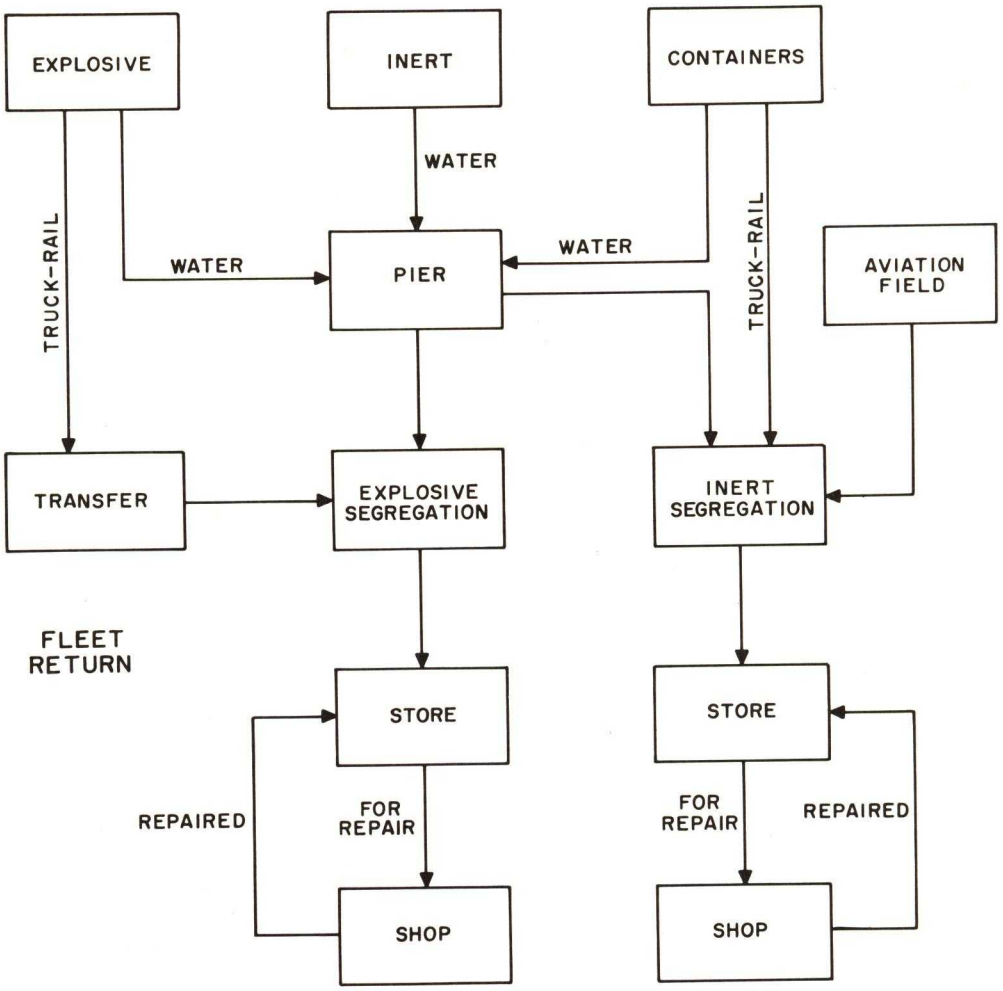


Figure 14. Fleet Return of SIDEWINDER Components to the Depot.

TABLE 3. MAXIMUM ALLOWABLE STORAGE TEMPERATURES AND TIMES FOR GUIDANCE AND CONTROL SECTION

Storage Temperature	Maximum Storage Time (Cumulative)
120 to 130°F	8 hours
100 to 120°F	500 hours
-65 to 100°F	Continuous

WARHEADS, CONTACT FUZES, INFLUENCE FUZES, AND FUZE BOOSTERS. Warheads, contact fuzes, influence fuzes, and fuze boosters shall be given magazine stowage in accordance with rules governing the shorebase establishment. Warheads should be inspected for the presence of exudate, which should be removed in accordance with standard operating procedure. Warheads with explosive in the fuze cavity should be disposed of. Clamps

should be fully retracted. There is no limit to the maximum humidity for continuous storage of these items when stored in their containers. Typical stowage is in ground level earth-covered magazines, with maximum allowable capacity of 143,000 pounds of all types of explosives (except fuzes) in each magazine area. Typical stowage of fuzes allows a maximum of 50,000 fuzes of each type, with a total of 150,000 fuzes per magazine area.

Warheads are packaged two to a container, and these in turn are palletized (usually 45 containers to a Mk 7 Mod 0 steel pallet). Warheads may be stored at temperatures up to, but not in excess of, 130°F. If the warheads should attain temperatures of 130°F or greater, they must be thoroughly reinspected at the depot.

Contact fuzes are packaged 20 fuzes to a metal container (an outer container holding five inner containers of four fuzes each) and nine containers on a Mk 7 Mod 0 steel pallet. Contact fuzes may be stored continuously at temperatures between -65 and 160°F. There is no limit on ready-service storage or flight hours for the contact fuze.

Influence fuzes and boosters are supplied separately and mated at the depot. Typical packaging is four fuzes (with boosters) to a metal container, with 15 containers banded on a Mk 7 Mod 0 steel pallet. Influence fuzes may be stored continuously at temperatures between -65 and 130°F. For temperatures above 130°F, limited storage is permissible provided that the storage times do not exceed those specified in table 4. If the maximum storage time for a specific temperature shown in the table is exceeded, the fuzes are not to be used but should be forwarded, together with the fuze log card, to Commanding Officer, Naval Ammunition Depot, Crane, Indiana, Attention: Quality Evaluation Laboratory.

Influence fuzes may be stored inside or outside their containers and may be maintained in storage for one year. At the end of the ready-service period the influence fuzes shall be returned to the depot. A note should be made on the log card stating the amount of flight time and storage time to which the fuze has been exposed.

TABLE 4. MAXIMUM ALLOWABLE STORAGE TEMPERATURES AND TIMES FOR INFLUENCE FUZES

Fuzes with serial numbers above EK 7843.

Storage Temperature	Maximum Storage Time (Cumulative)
145 to 160°F	8 hours
130 to 145°F	500 hours
-65 to 130°F	Continuous

Fuzes with serial numbers below EK 7843 and other serial numbers.

Storage Temperature	Maximum Storage Time (Cumulative)
120 to 130°F	8 hours
100 to 120°F	500 hours
-65 to 100°F	Continuous

Readying Fuze for Storage. When fuzes and boosters are received separately, the mating of boosters to fuzes at the depot is as follows:

Mating Boosters to Contact Fuzes. The jig and necessary tools (with the exception of the 3-way wrench) for mating boosters to contact fuzes are shown in figure 15. The contact fuze and booster are first screwed together hand-tight, and then clamped in the jig as shown in figure 16. Before

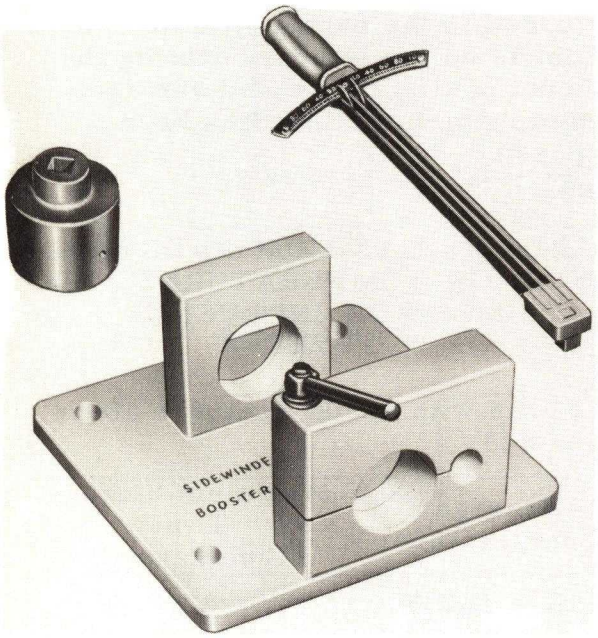


Figure 15. Jig and Tools for Mating Boosters to Contact Fuzes.

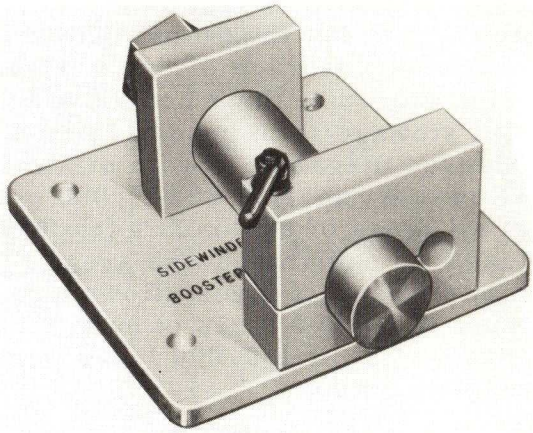


Figure 16. Contact Fuze and Booster Assembly Placed in Jig.

installing the booster, be certain that the spacer is properly torqued to 20 ± 2 inch-pounds in the booster well. The adapter assembly is placed over the end of the booster and secured to the booster by tightening the Allen-head clamp screw as shown in figure 17. The booster is tightened to the fuze body, with the torque wrench, to a torque of 100 ± 10 inch-pounds, figure 18, after which the adapter assembly is removed and the complete fuze and booster assembly is taken from the jig.

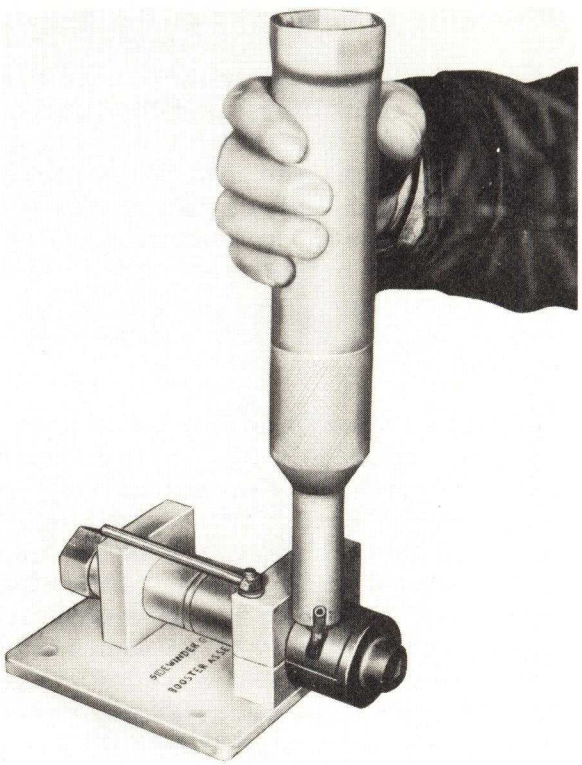


Figure 17. Clamping the Adapter Assembly to the Booster.

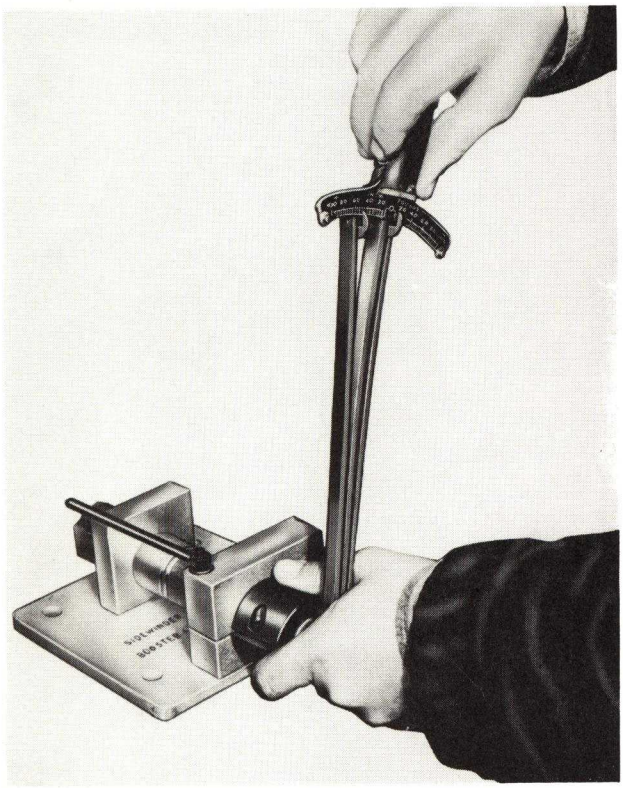


Figure 18. Securing the Booster to the Contact Fuze.

Mating Boosters to Influence Fuzes. The jig and necessary tools (with the exception of the 3-way wrench) for mating boosters to influence fuzes are shown in figure 19. The influence fuze and booster are first screwed together, hand-tight. Proper seating depth of the booster is then checked by means of the clearance gage, as shown in figure 20. The gage must pass freely over the booster as it is slid over the lip of the fuze. The fuze and booster assembly is placed in the tightening jig, figure 21. (The locking pin on the side of the jig is pulled outward as the fuze assembly is inserted in the jig, after which the pin is released to engage one of the four spanner-wrench holes in the fuze body.) The adapter assembly is placed over the end of the booster and tightened in place with the 3-way wrench. The booster is tightened to the fuze body, with the torque wrench, to a torque of 100 inch-pounds, figure 22, and the adapter assembly is then removed and

Figure 19. Jigs and Tools for Mating Boosters to Influence Fuzes.

TABLE 5. MAXIMUM ALLOWABLE STORAGE TEMPERATURES AND TIMES FOR ROCKET MOTORS

Storage Temperature	Maximum Storage Time (Cumulative)
130 to 150°F	8 hours
120 to 130°F	100 hours
110 to 120°F	500 hours
-65 to 110°F	Continuous

WINGS (WITH ROLLERONS). Wings with rollerons are given inert stowage and are packaged 16 wings to each metal (Mk 2 Mod 0) container. The containers are palletized, 15 containers on a Mk 7 Mod 0 steel pallet. There are no humidity or storage temperature restrictions.

HANDLING AND STOWAGE OF AUXILIARY MISSILE COMPONENTS

EXERCISE WARHEADS AND TRACKING FLARES. Exercise warheads and tracking flares shall be given pyrotechnic magazine stowage in accordance with rules governing the shorebase establishment. There is no limit to the maximum humidity for continuous storage of these items when in sealed storage containers. Typical stowage is in isolated buildings with a fire-hazard limit of 500,000 pounds of pyrotechnics.

Exercise warheads (dummy warheads equipped with smoke puff and flash marker devices) are hermetically sealed units and are packaged two to a box. The boxes in turn are palletized (usually 45 boxes on a Mk 7 Mod 0 steel pallet). Exercise Warheads Mk 2 Mod 0 may be stored at temperatures up to, but not in excess of, 185°F.

Tracking flares are packaged in hermetically sealed metal containers, 56 flares to a container. The flares should not be stored out of these containers for long periods at relative humidities above 60 percent. Tracking flares may be stored at temperatures up to, but not in excess of, 165°F.

TARGET-ROCKET MOTORS. Mk 10 Mods 6 and 7 HVAR rocket motors are subject to the same handling and stowage considerations as the regular SIDEWINDER rocket motors. Mk 10 Mods 6 and 7 rocket motors are packaged one each to a container, and the containers are palletized (usually 30 containers on a Mk 7 Mod 0 steel pallet).

TARGET-ROCKET KITS AND NONPROPULSION ATTACHMENTS. Target rocket kits and NPAs are given inert stowage at the shorebase establishment.

Each target-rocket kit consists of an inert rocket head, a center hanger assembly, a fin assembly, a firing plug, and associated hardware packed in a single wooden box. The boxes are palletized (usually 12 boxes on a Mk 2 steel pallet).

HANDLING AND STOWAGE OF TEST EQUIPMENT

The AN/ASM-11 guided missile launcher test set is given inert stowage in a covered warehouse. There are no humidity or storage temperature restrictions when these items are stored in their original packing for limited periods of time.

HANDLING AND STOWAGE OF ACCESSORY EQUIPMENT

ASSEMBLY EQUIPMENT, ALIGNMENT JIGS, AND TOOLS. SIDEWINDER assembly jigs are stripped and banded separately. Production of assembly jigs has been discontinued and future issues will be the assembly stand. One alignment jig and one complete set of SIDEWINDER assembly tools are to be used with each assembly jig. The set of tools consists of two pneumatic screwdrivers and two 3-way wrenches. Additional tools are shipped separately to comply with fleet requests for replacements and spares. Included among these are end-closure tools (for decanning G&C sections) and launcher cocking tools.

The assembly stand consists of three main parts: two end pieces and a center piece. An alignment jig, a tie-down assembly, and a deck socket are provided with the assembly stand. No pneumatic tools are furnished with the assembly stand, but are issued separately. Assembly equipment and tools are given inert storage in accordance with shorebase facilities.

HANDLING EQUIPMENT. Aero 12B bomb skids, Aero 8B, 8C, and 9B adapters, and Aero 30A kits (vibration isolation units) are given inert storage in accordance with existing facilities at the depot. There are no temperature or humidity restrictions on the storage of these items.

DEPOT RECORDS

INVENTORY CONTROL. Inventory records should be maintained in accordance with standard procedures established at the depot. It is important that outgoing shipments be made from the earliest received incoming shipments at all times so that the stock is always kept up to date. Therefore, the inventory records should not only reflect the total quantities involved but should also indicate shipping and receiving dates, lot identification, and storage location.

GUIDANCE AND CONTROL SECTION RECORDS. A service log, figure 23, is packed with each G&C section. This log bears the serial number of the G&C section and must be stored with the section at all times. Space is provided on both the front and back of this card to enter data on each test and inspection. If the G&C section is rejected at any time, the reason for rejection must be stated in the remarks column of the log. In such a case, the log is to be returned in the container with the defective section to the location designated by existing regulations. Completed log cards on expended missiles are to be forwarded to Commanding Officer (Code 65) U. S. Naval Ordnance Laboratory, Corona, California.

Guided missile servicing activities of the issuing depot will make entries on the Guided Missile Service Record, NAVWEPS Form 8800/2(7-60), figure 24. These records will reflect the test results established by the field test set (pen recorder). (BuWeps 8800.1 FQQA-4 of 8 July 1960 gives instructions on the use of this form.)

ADDITIONAL RECORDS. Additional records may be kept, as required, to log various data.

ORDNANCE RECORDS. Ordnance records are maintained by the Waterfront and Storage Division of the depot for both inventory control and inspection purposes.

SIDEWINDER GUIDANCE AND CONTROL UNIT SERVICE LOG

(Print or type all entries)

1. FACTORY ACCEPTANCE RECORD — CLASSIFICATION

G & C Unit Serial No.	Manufacturer	Date of Acceptance	Operating Time at Acceptance (Hrs. and Tenths)

Functional Deviations and Waivers at Acceptance

11. FIELD SERVICE RECORD

INSTRUCTIONS

1. Enter data of each inspection or operation of the Unit.
2. Insert pen recordings of each test in the Service Log Envelope.
3. Upon rejection of the unit, place this Service Log and the Test Records in the shipping container with the Unit.
4. Upon expenditure of the missile, forward this Service Log and Test Records within 15 days to: COMMANDING OFFICER (CODE 65), U.S. NAVAL ORDNANCE LABORATORY, CORONA, CALIFORNIA.

TEST DATE	REPORTING ACTIVITY	TEST SET TYPE	RESULTS (CHECK ONE)		REMARKS (NOTE REASONS FOR REJECTS)
			ACCEPT	REJECT	

Figure 23. Guidance and Control Section Service Log.

GUIDED MISSILE SERVICE RECORD
NAVWEPS FORM 8800/2 (7-60)

(Please print)

REPORT SYMBOL BUWEPS 8800-2

None (Sample only)

MAIL ORIGINAL TO
Commanding Officer (Code 60)
U.S. Naval Ordnance Laboratory
Corona, California

1. ORIGINATING ACTIVITY: NAND/SEAL BEACH

2. MISSILE OR ASSBY. (Name, Configuration and/or S/N): SIDEWINDER G&C MK1

3. TEST SET (Type, S/N and Calibration date): PEN RECORDER #30 1-15-60

4. DATE MO DAY YR	5. OPERATION	6. ITEM (Identification) NAME, STOCK NO. AND SERIAL NO.	7. OP TIME (Minutes) EXTERNAL POWER	7. OP TIME (Minutes) INTERNAL POWER	8. TEST RESULTS (Check √ one) GO	NO GO ITEM	NO GO T.E.	NO GO PERS	NO GO OTHER	9. DETAILS AND/OR REMARKS TYPE OF FAILURE, LIGHT INDICATIONS, METER READING, ADJUSTMENTS, DESCRIPTION OF DAMAGE, REFERENCES, DISPOSITION, ETC.	
01-16-60	D	P-12345			✓						
01-16-60	B	G-2345				✓				PHASE DETECTOR	RETEST
01-16-60	B	G-2345				✓				PHASE DETECTOR	TOQEL
01-17-60	A	G-3456						✓		UMBILICAL NOT SECURED	RETEST
01-17-60	A	G-3456			✓						
01-18-60	E	G-9550			✓					PLACED IN STOCK	
01-19-60	D	P-18992				✓				GYRO CAGING TIME	RETEST
01-19-60	D	P-18992			✓						RETEST
01-19-60	D	P-18992				✓				GYRO CAGING TIME	TOQEL
01-20-60	D	P-19270					✓			RUPTURED AIR HOSE	RETEST
01-20-60	D	P-19270			✓					PLACED IN STOCK	
01-20-60	E	G-5678							✓	POWER FAILURE	RETEST
01-20-60	E	G-5678			✓					PLACED IN STOCK	

Figure 24. Guided Missile Service Record.

MAGAZINE STOWAGE RECORDS. All magazine-stored components are logged in and out, using the standard Magazine Card, NAVORD Form 421, as shown in figure 25, and whatever additional procedures that are set up by the local authority.

INERT STOWAGE RECORDS. Inert items are logged in and out of storage in accordance with existing local regulations.

MAGAZINE CARD
MISCELLANEOUS AMMUNITION AND COMPONENTS
NAVORD FORM 421 (REV. 6-44)

MAGAZINE .....

DESCRIPTION	MARK	MOD.	LOT NO.	YEAR	

DATE		RECEIVED FROM OR ISSUED TO	RECEIVED	ISSUED	BALANCE	DATE		RECEIVED FROM OR ISSUED TO	RECEIVED	ISSUED	BALANCE

Buff—Unobligated stock only. Green—Reserved stock only. Red—Unserviceable stock only.

Figure 25. Magazine Card.

Chapter 3

SHIPBOARD FACILITY

GENERAL

This chapter contains a summary of plans formulated for the handling, stowage, assembly, and use of SIDEWINDER 1 and 1A missiles aboard aircraft carriers. Safe-handling considerations are listed in chapter 5.

Present plans stipulate the following:

1. The SIDEWINDER 1 or 1A shall be stowed and assembled on an aircraft carrier equipped with SIDEWINDER-carrying aircraft.

2. Normally, each aircraft shall be equipped with Aero 3A launchers to enable it to carry up to four SIDEWINDER missiles.

3. Ready stowage of completely assembled missiles will be necessary to meet any immediate requirements for missiles while missile supply chains are being manned, and to provide storage for any unexpended missiles returned from aircraft.

4. Typical after spaces allotted for missile component stowage and assembly are shown in figure 38.

5. Typical figures for stowage of missile components and ready-service missiles for an aircraft carrier are given in table 6.

TABLE 6. TYPICAL FIGURES FOR STOWAGE

Section	Stowage Compartment	Quantity* (Approx.)
G&C section	G&C Stowage	450 to 900
Warhead	Magazine	450 to 900
Contact fuze (including booster)	Magazine	450 to 900
Influence fuze (including booster)	Magazine	450 to 900
Motor Mk 17 Mods 1 and 3	Magazine	450 to 900
Wings (sets)	G&C Stowage or inert	450 to 900
Ready-service missiles	Ready-service Magazine	20 to 32

*Figures above 450 indicate multiple missile stowage areas.

NOTE: The quantities listed in the table are only typical; actual quantities will depend upon ordnance equipment lists generated by appropriate authority for each carrier.

TABLE 7. TYPICAL STOWAGE DATA

Item	Stowage Compartment*	Quantity
Training missiles	Inert stowage	Per allowance list
Flares (parasite type)	Pyrotechnic	23 containers (56 flares each)
Target rocket motors Mk 10 Mods 6 and 7	Magazine	50
Target rocket kits	Inert stowage	50
Handling equipment:		
Aero 12B bomb skids	Ready-service compartment	4
	Inert stowage	20
Aero 8B adapter	Inert stowage	5
Aero 8C adapter	Ready-service compartment	10
Aero 9B adapter	Inert stowage	9
Aero 30A kits (vibration isolation units)	Ready-service compartment	4 sets
	Inert stowage	6 sets
Assembly jig or stand	Assembly	2 to 4
Assembly tools:		
Pneumatic screwdriver	Assembly	2 per assembly jig or stand and 4 (spares)
3-way tool	Assembly	2 per assembly jig or stand and 4 (spares)
Alignment jig	Assembly	1 per assembly jig or stand and 2 (spares)
Launchers	Squadron	Squadron allowance
Pylons	Squadron	Squadron allowance
AN/ASM-11 guided missile launcher test set	Lockers (main deck)	
Miscellaneous:		
End-closure clamp tool	G&C stowage compartment	6
Launcher safety pin	Squadron	Squadron allowance
Launcher cocking tool (3/8-in. Allen wrench)	Squadron	
Exercise warheads	Pyrotechnic	50
NPAs	Ready-service compartment	20

*Quantities will vary with individual aircraft carriers and allowance lists.

6. Typical figures for stowage of SIDEWINDER system auxiliary equipment are given in table 7.

7. Guidance and control sections assembled on ready-service missiles may be kept in storage a maximum of one year. (See page 23 for fuze ready-stowage limits.)

8. Influence fuzes stored outside their containers may be maintained in ready service for one year or 100 flight hours, whichever occurs first. At the end of the ready-service period, the influence fuze shall be returned to the depot. A note should be made on the log card stating the amount of flight time and storage time to which the fuze has been exposed.

9. Mk 10 Mods 6 and 7 rocket otors are to be stowed on the first atform along with an equal number target-rocket kits. These target ckets shall be made up to furnish actice targets for SIDEWINDER.

10. Inert components (as speci-d by the allowance list) are to be owed aboard ship to be used as aining missiles. Training shall in-ude handling, assembling, loading aircraft, and pilot training when aded on aircraft launchers and own against simulated targets. A mmy G&C section shall be used th each training missile for train-g in assembly, handling, and load-g. On captive flight missiles for ot training inert motors should be ed with live G&C sections used in njunction with SIDEWINDER um-ical servo by-pass adapter, Fed-al Stock No. Z-1420-676-4689. is adapter should be used only ter the Aero 3A launcher has been odified in accordance with Arma-ent Material Change No. 246. ert motors must be installed for ptive flights. THESE MISSILES RE FOR TRAINING ONLY AND ANNOT BE LAUNCHED.

11. Inert storage for spare unchers and pylons shall be ailable aboard ship. These spares ll be brought aboard by squadrons d used in the event of damage to, or alfunction of, equipment installed on rcraft.

12. Missile assembly equipment d tools shall be utilized to aid in oviding delivery of fully assembled issiles to the flight deck at a rate nsistent with requirements.

13. Handling equipment shall con-st of standard bomb skids and apters. Bomb skids intended for fully assembled missiles must be fitted with Aero 30A kits (vibration isolation units).

14. Tracking flares of the parasite type, for use on missiles and target rockets, respectively, will be required and shall be given pyrotechnic stowage aboard ship. These flares are ignited by the exhaust of the missile or target-rocket motor.

15. SIDEWINDER exercise warheads for use on live missiles during practice shall also be given pyrotechnic stowage. These are equipped with pyrotechnic indicators that are activated by regular influence or contact fuze boosters.

16. Federal specifications, stock, or BuWeps drawing numbers for equipment tools and accessory items are listed in table 8.

MISSILE FACILITIES ABOARD SHIP

Missile facilities aboard ship consist of the handling equipment (including bomb skids with adapters, assembly equipment, and tools), the test equipment, and spaces on the aircraft carrier that are allotted to missile and equipment stowage and to operational procedures essential to readying the missiles for launching. These facilities and the manpower requirements are discussed in the following paragraphs.

HANDLING EQUIPMENT. Equipment to be used for the handling of SIDEWINDER 1 and 1A missiles and components aboard ship will consist of standard Aero 12B bomb skids, some of which will be equipped with Aero 8C adapters, and some with Aero 9B adapters. The skids and

TABLE 8. SIDEWINDER 1A TOOLS AND ACCESSORY ITEMS

Item	Dwg. No.	Federal Stock No.	Navy Stock No.	Federal Specification No.
Assembly Stand		AX 1450-773-8192		
Dome Cover	1516424			
Influence Fuze Cover	1516501			
NPA		1336-658-3249		
Umbilical Servo By-Pass Adapter		Z-1420-676-4689		
Test Set, AN/ASM-11		R-4935-633-5311 MANN		
Electrical Adapter for LAU-7/A Launcher		VM-5935-885-937 M 558		
End Closure Tool		Z-1450-69-6355		
Three-Way Tool		Z-1450-563-0207		
Driver Assembly (Allen Wrench Insert for Three-Way Tool)		Z-1450-610-3761		
O Rings				
G&C Section		Z-5330-835-6115		
Contact Fuze		KZ1-5330-291-4887		
Influence Fuze (preferred)			12Z-9024-7	
Influence Fuze (alternate)		KZ1-5330-194-3739		
Greases				
DC-11, for lubricating Fuze O-Rings		WK-9150-616-9212		
Bearing, for motor tube threads				
1-lb can		WK-9150-184-9159		MIL-G-16908
5-lb can		WK-9150-235-5542		MIL-G-16908

adapters to be used for stowing ready-service missiles and for transporting other fully assembled missiles to the flight deck will be equipped with Aero 30A kits (vibration isolation units) and long handles.

Figure 26 shows the Aero 12B bomb skid equipped with the Aero 9B package adapter.

Figure 27 shows a close-up of the vibration isolation units (Aero 30A kit) mounted on the Aero 12B bomb skid. Figure 28 shows an early version of the Aero 8C adapter for use with the Aero 12B bomb skid.

Figure 29 shows an early version Aero 8C adapter mounted on an Aero 12B bomb skid which is equipped with the vibration isolation unit, and it can be used for carrying motors only. An Aero 8B adapter can also be employed for carrying motors. Figure 30 shows the Aero 12B bomb skid equipped with vibration isolation unit, long handles, and Aero 8C adapter with individual clamping devices.

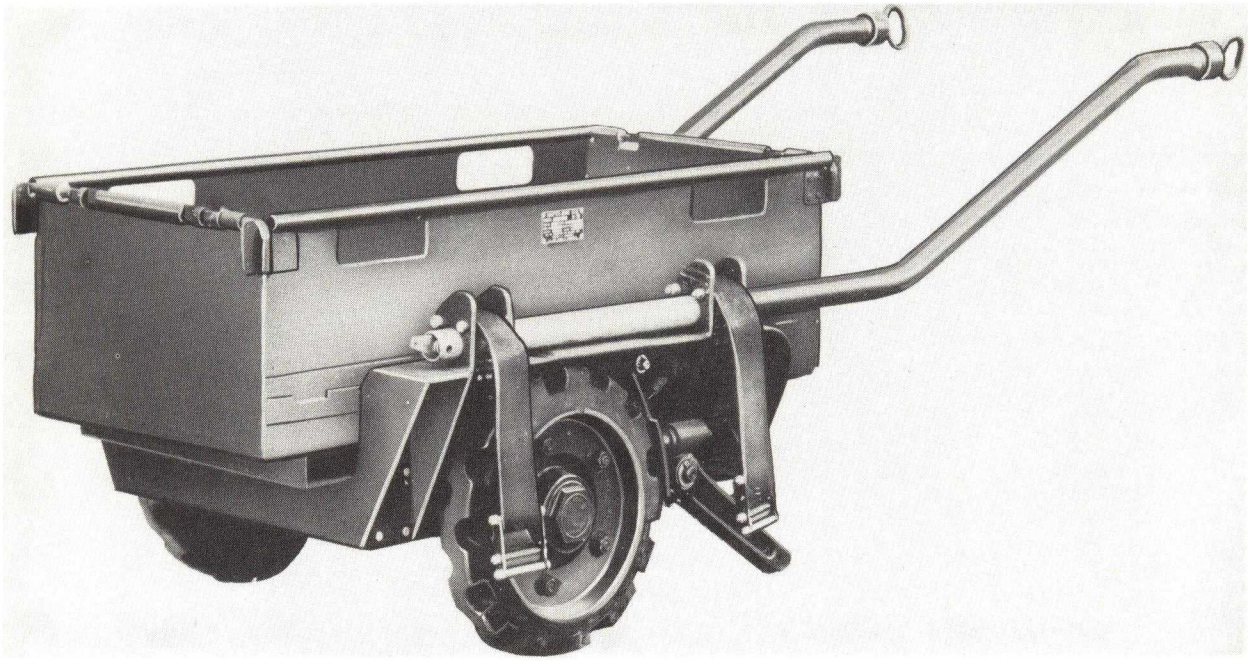


Figure 26. Aero 12B Bomb Skid With Aero 9B Package Adapter.

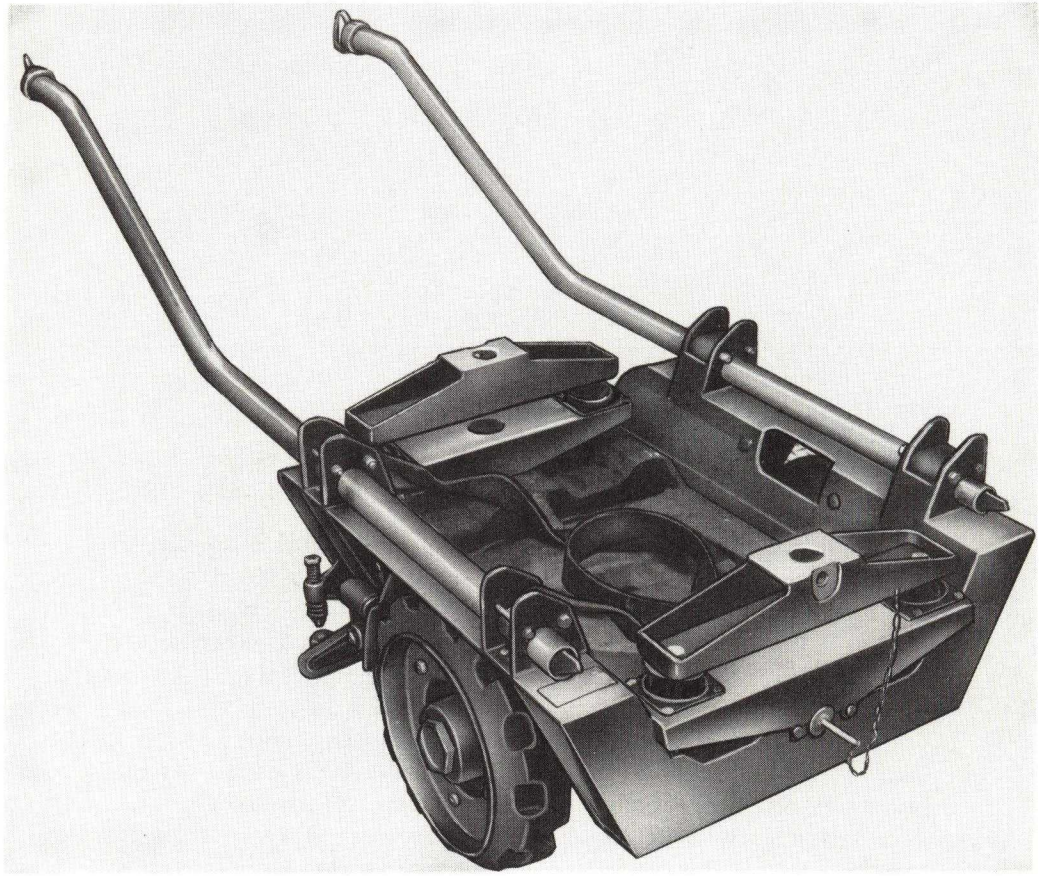


Figure 27. Vibration Isolation Unit Mounted to Aero 12B Bomb Skid.

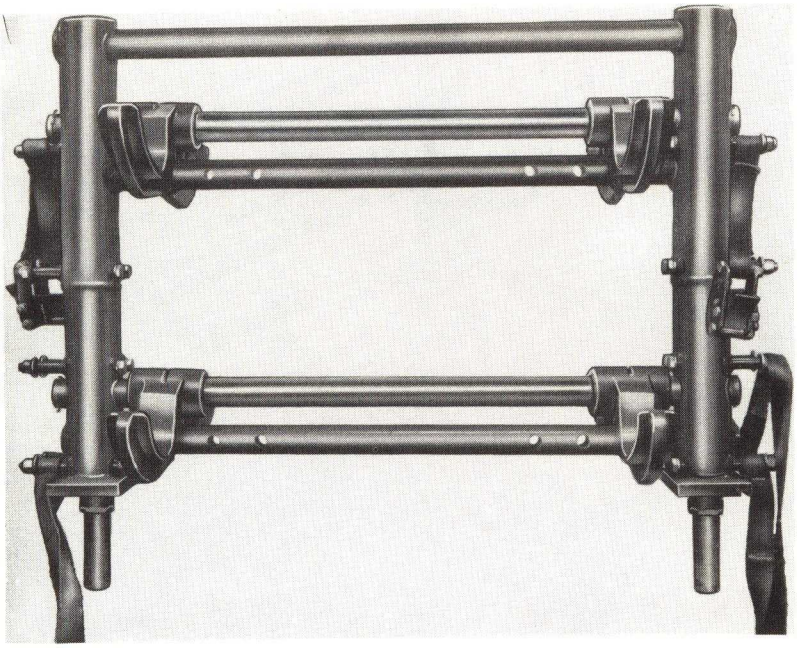


Figure 28. Aero 8C Adapter.

A fully loaded Aero 12B bomb skid carries four SIDEWINDER missiles, is approximately 118 1/2 inches long, including long handles, and weighs approximately 800 pounds. The skid with short handles and loaded with motors only is 90 1/2 inches long and weighs 712 pounds. The skid with short handles and the Aero 9B adapter is 74 1/2 inches long and weighs 183 pounds empty. The bomb skid without any accessories is 26 inches wide.

Table 9 lists typical requirements for bomb skids, adapters, and Aero 30A kits for moving the various SIDEWINDER components from their stowage compartments to the assembly area. In addition, it lists requirements for handling equipment for ready-service and other fully assembled missiles.

Assembly equipment must be provided for shipboard assembly of the various SIDEWINDER components into the complete missile. The assembly jig, shown in figure 31, is fabricated from hollow, square aluminum structural members, and has facilities for clamping the various SIDEWINDER components during missile assembly. Spring-loaded anchors are provided to secure the jig to the deck when in use. The jig is 83 inches long, 37 3/4 inches wide, and 44 1/4 inches high when set up for use. The total weight is 160 pounds. The assembly stand, figure 32, which is of a simpler and lighter design and will replace the assembly jig, allows the missile motor to be clamped in position and the remaining components assembled to it. An alignment jig, figure 33, is used with either the assembly jig or the stand to align the missile umbilical block with the hangers. The assembly equipment can be stowed on the bulkhead in the compartment used for SIDEWINDER assembly.

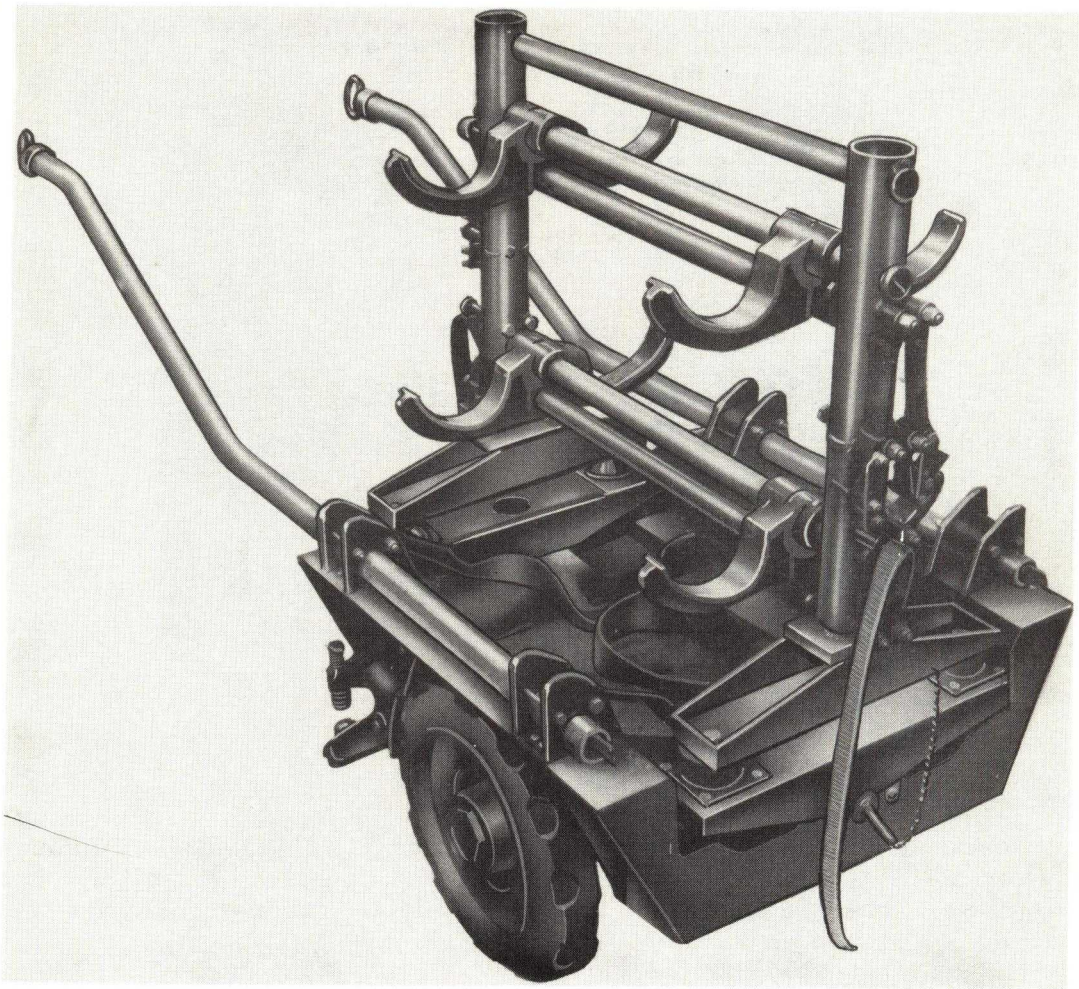


Figure 29. Aero 12B Bomb Skid With Vibration Isolation Unit, Short Handles, and Aero 8C Adapter.

In a typical initial shipment, two pneumatic screwdrivers, and two 3-way wrenches should be received with each assembly jig. The tools are not issued with the assembly stand, however, and must be ordered or are issued separately. These tools are described in the following paragraphs.

Several types of pneumatic screwdrivers may be used for assembly of the SIDEWINDER. Two of these are the ARO, figure 34, and the THOR. The ARO pneumatic screwdriver, Model No. 7265B, is a pistol-grip tool with adjustable clutch and reversible drive. This tool requires 100-psi air pressure, and operates at 275 rpm. The THOR pneumatic screwdriver, Model No. 7611, is also a pistol-grip tool with adjustable clutch and reversible drive. The THOR also requires 100-psi air pressure, but operates at 300 rpm. An additional feature of the THOR tool is an adjustable air flow control which permits fine adjustments in torque. The air flow control is operated by a knurled knob located just be-

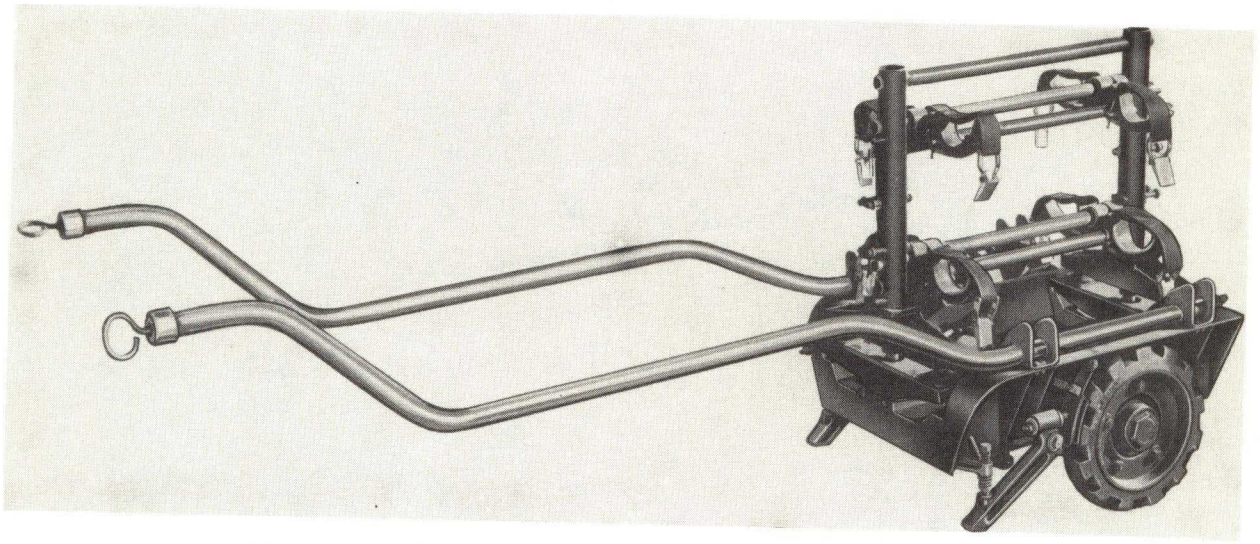


Figure 30. Aero 12B Bomb Skid With Vibration Isolation Unit, Long Handles, and Aero 8C Adapter.

TABLE 9. HANDLING EQUIPMENT REQUIREMENTS

SIDEWINDER Components	Aero 12B Bomb Skids	Aero 8C Adapter	Aero 9B Adapter	Handles		Aero 30A Kit (Vibration Isolation Units)
				Short	Long	
G&C sections*						
Warheads contact fuzes, and influence fuzes	1 Loading in stowage area		1	1		
	2 In assembly area		2	2		
	2 In transit between assembly area and stowage area		2	2		
Motors	1 Loading in motor stowage compartment	1		1		
	2 In assembly area	2		2		
	2 In transit between assembly area and motor stowage compartment	2		2		
Wings	1 At elevator hoist		1	1		
	2 In assembly area		2	2		
	1 In transit between assembly area and hoist		1	1		
Ready-service missiles	1 In ready-service compartment	1			1 set	1 set
	4 In ready-service compartment	4 (on brackets)			4 sets	4 sets
Assembled missiles (from assembly area to flight deck)	2 In assembly area	2			2 sets	2 sets
	3 In transit to or from flight deck	3			3 sets	3 sets
Totals	24	15	9	14 sets	10 sets	10 sets

*Hand carried to assembly area

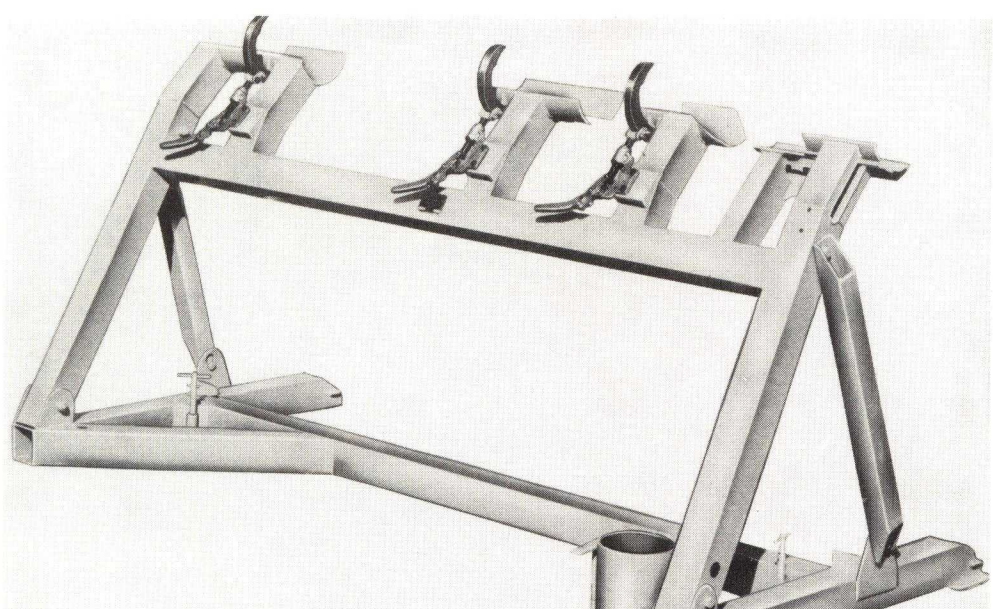


Figure 31. SIDEWINDER Assembly Jig Set Up for Use.

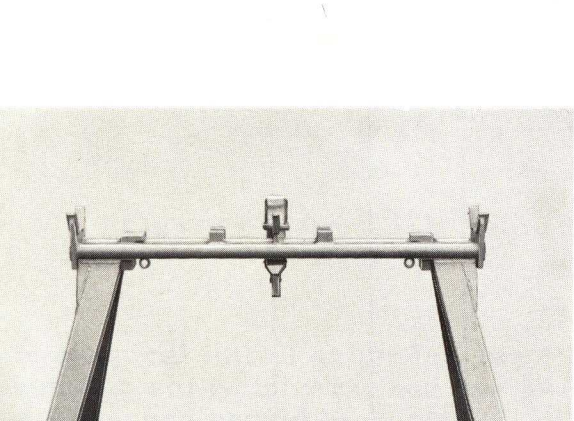


Figure 32. SIDEWINDER Assembly Stand Set Up for Use. (Tie-down not shown.)

low the handle of the tool. Each tool is about 10 inches long and weighs approximately 3 pounds.

The hexagonal bit for use in the pneumatic screwdrivers has a 1/4-inch hexagonal shaft at one end which fits into the screwdriver. The other

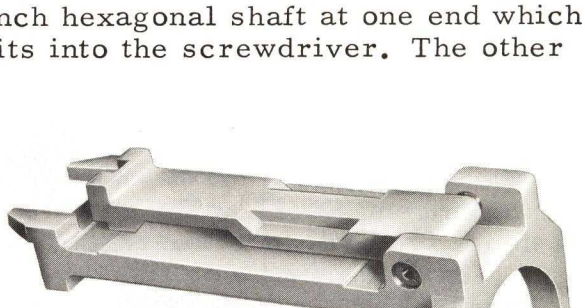


Figure 33. Alignment Jig.

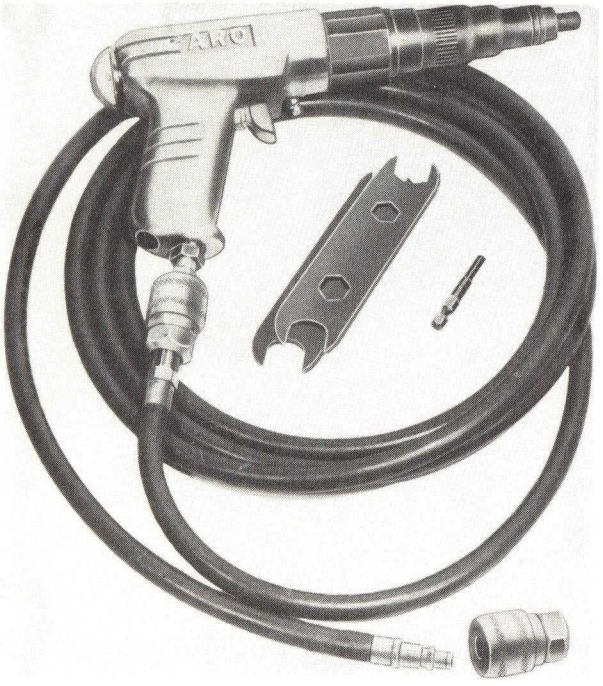


Figure 34. Pneumatic Screwdriver.

end of the bit is a 5/32-inch (across flats) hexagonal shaft which fits the head recesses of the wing screws, warhead screws, and the nitrogen inlet plug of the G&C section. A worn bit may be replaced by first pulling out the worn bit with pliers and then inserting the new bit.

The 3-way assembly wrench combines a spanner on the side, a 1 1/2-inch (across flats) hexagonal recess at one end, and a replaceable and reversible hexagonal 5/32-inch (across flats) key insert at the other end, figure 35. The 5/32-inch hexagonal bits are brazed into each end of a holder which has a retaining ball to hold the device and a pin to prevent rotation when using the tool. To reverse the bits in the 3-way tool, it is only necessary to pull out the bit holder and replace it with the used end in. When both ends of the bit are

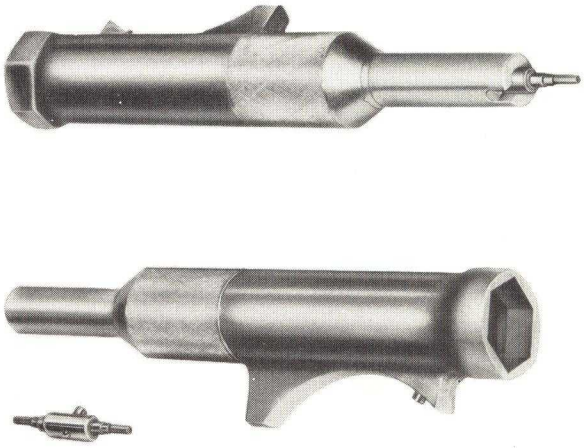


Figure 35. Three-Way Wrench With Driver Assembly.

worn, replace with a new part (Driver Assembly, Federal Stock No. Z-1450-610-3761).

The end-closure clamp tool is provided for turning the pressure relief valve and for loosening the end-closure clamps on the G&C section containers. This tool, shown in figure 36, is essentially an extension for the handles of the clamps and is a screwdriver at the other end. In use, the tool slips over the handles to provide additional leverage. The tool is approximately 13 inches long, weighs 1/4 pound, and is fabricated from 12-gage steel.

As part of the squadron equipment, launcher tools (table 7) will be required on the flight deck when loading SIDEWINDER missiles aboard aircraft.

Figure 36. End-Closure Clamp Tool.

TEST EQUIPMENT. The squadron equipment required for testing the SIDEWINDER launcher is discussed in the following section.

AN/ASM-11 Guided Missile Launcher Test Set Check. Launchers, which carry and launch SIDEWINDER 1 and 1A missiles, can be tested for safe operability by the AN/ASM-11 guided missile launcher test set, figure 37. The test set provides a go-no-go determination that the power supplied to the SIDEWINDER missile, both standby and firing, is within voltage tolerances, that the missile firing sequence is operating satisfactorily, and that the firing circuits are safe. In addition, it may be used to show that the aircraft-launcher circuits are operational and that the jettison circuits function satisfactorily.

NOTE: The AN/ASM-20 test set, being developed for the SIDEWINDER 1C system and intended for use with the LAU-7/A (SIDEWINDER 1C) launcher, can also be used to check the Aero 3A launcher.

The AN/ASM-11 test equipment is contained within a waterproof and shock resistant carrying case; total weight of the set is 25 pounds including the carrying case. The front panel of the test set is equipped with two handles that afford crash protection as well as a handhold in moving the unit from one launcher station to another. The front panel display consists of a pilot light, an indicator meter, a 20-position selector switch, and an electrical connector.

A special purpose electrical cable assembly is furnished as part of the test set. The cable assembly provides

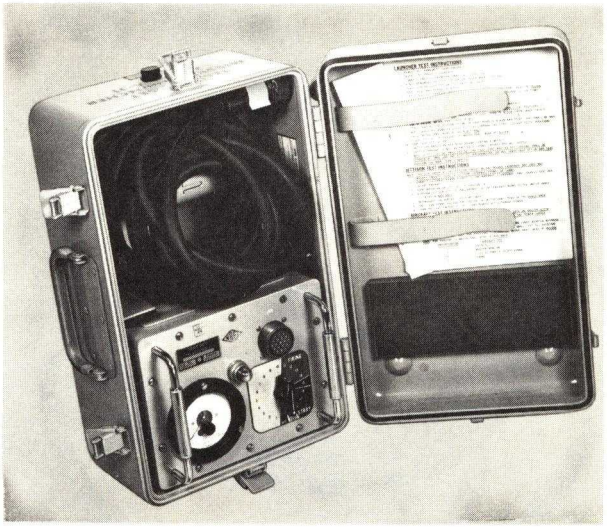


Figure 37. Guided Missile Launcher Test Set AN/ASM-11.

the required electrical connections between the test set and the missile launcher or aircraft circuits being tested.

An adapter connector is furnished, the purpose of which is to adapt the test set cable assembly to the aircraft circuits when the launcher has been removed from the aircraft and disconnected from the aircraft circuitry.

As launcher tools, two hexagonal wrenches, sizes 7/32 and 3/8 inches, are furnished for raising the detent and for opening the nose cover.

CAUTION

Before performing test of launcher operation, remove, or verify that all ordnance has been removed (both internal and external), from the aircraft, and install the launcher safety pin.

NOTE: When the test set is energized, do not leave the selector switch in any numbered switch position for more than 5 minutes.

SPACES. Figure 38 shows a typical after installation aboard an aircraft carrier, including assembly and ready-service stowage areas. It should be remembered that variations exist from one carrier to another, and the actual arrangement of space facilities depends upon the particular carrier in question.

Stowage Areas. Stowage areas are listed in tables 6 and 7. Typical stowage of G&C sections is shown in figure 39.

Assembly Area. It is recommended that the assembly area be centrally located near the stowage areas. A typical assembly area setup is shown in figure 40. The assembly stands when not in use may be collapsed and stowed on the bulkheads or overheads. Figure 41 shows another view of the typical assembly area. Here, the bomb elevator may be seen in the right background, and the magazine stowage area may be seen through the open door in the left background.

Ready-Missile Stowage. An area shall be provided, adjacent to an ammunition elevator, for the stowage of ready-service missiles. While the number of ready-service missiles to be stowed may vary from one carrier to another, typical ready-service stowage provides for 20 completely assembled missiles. Typical stowage facilities for these missiles are as follows: Four ready-service missiles shall be stowed on an Aero 12B bomb skid which is equipped with an Aero 8C adapter, long handles, and an Aero 30A vibration isolation unit. Eight missiles shall be stowed on each of two bulkheads, on brackets equipped with vibration isolation units and designed to hold Aero 8C adapters with missiles. The adapters with missiles shall be lifted onto the brackets by means of a hoist in the ready-service compartment. Three bomb skids equipped with Aero 30A kits shall be stowed at the after end of the compartment, for use in moving ready-service missiles to the flight deck in an expeditious manner. An additional bomb skid equipped with an Aero 30A kit shall be stowed near the ready-service compartment. Figure 42 shows typical ready-service stowage of SIDEWINDER Mk 2 Mod 0 missiles loaded on an Aero 8C adapter and stowed on bulkhead mounting brackets. The missiles are stowed with NPAs and protective dome and fuze covers in place. This necessitates leaving the cager rods in the shipping position (in the case of SIDEWINDER 1A missiles) until the NPAs are removed. In the case shown, the chain hoist is used to remove the loaded Aero 8C adapters from the bomb skids and to place them into special stowage brackets on the bulkheads. The ammunition elevator door may be seen to the right of the missiles, in the photograph.

MANPOWER. In some cases, a crew of 51 men, including a CPO supervisor, will be required to assemble and supply SIDEWINDER missiles at the rate of one missile per minute. Variations in the number of men assigned to any given operation may be made at the discretion of the local command and will vary drastically with the class of carrier and the type of installation. Breakdown of the manpower requirements is given in table 10.

Figure 39. Typical Shipboard G&C Section Stowage Area.

HANDLING FROM RECEIPT ABOARD SHIP TO STOWAGE

GENERAL. Missile components, auxiliary tools, and equipment shall, in general, be loaded aboard the aircraft carrier in accordance with standard Navy procedure. They will then be taken below decks, where they will be stowed.

Figure 43 is a block diagram showing missile component flow aboard ship. Missile components brought aboard ship are taken directly to the breakdown area to be unpackaged or stowed below in their containers. Twenty missiles are assembled for ready-service use if this is an initial shipment. In such a case, the assembly of the ready-service missiles should be accomplished as soon as practicable after receipt of components. If the shipment is merely a replenishment, assembly of ready-service missiles will not be necessary.

MISSILE COMPONENTS. In general, loading of missile components aboard ship will be done in accordance with standard Navy procedures. The following paragraphs describe the procedure to be followed in moving the missile components, upon receipt, to their stowage areas. Bomb skids

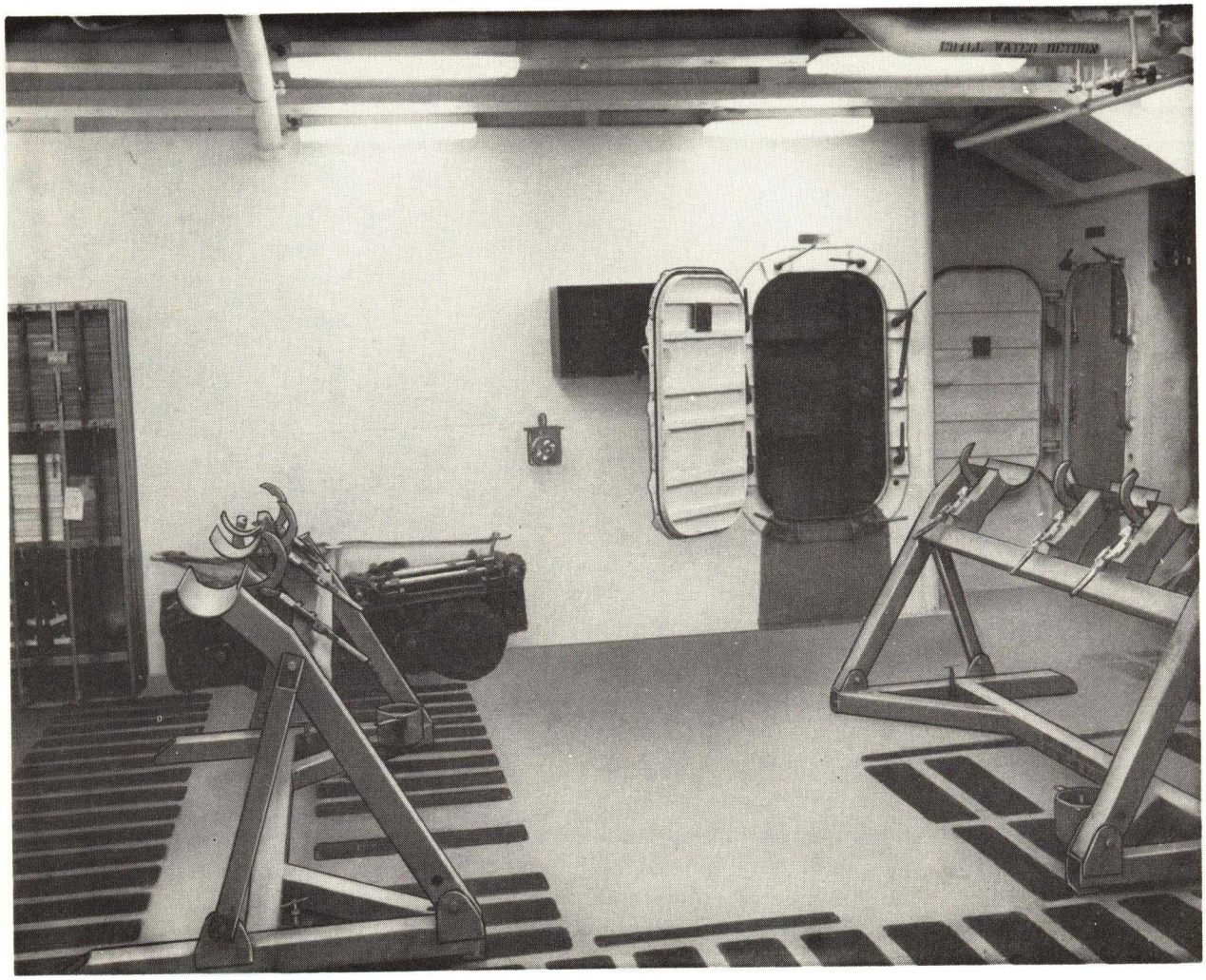


Figure 40. Typical Shipboard SIDEWINDER Assembly Area in CVA-59 Class.

and adapters are used to facilitate this operation.

Missile components (in their containers and palletized) shall be loaded aboard the aircraft carrier and moved to the designated breakdown area adjacent to the elevators on the hangar deck, figure 44. The components shall be struck down from the pallets at the breakdown area, and some of the components will be "decanned," before transporting them to their respective stowage areas. Typical handling of the individual components follows:

Guidance and Control Sections. Guidance and control sections are to be hand-carried in their containers to the G&C section stowage compartment.

Warheads. Warheads are to be removed from their metal shipping containers and transported from the breakdown area to the magazine on

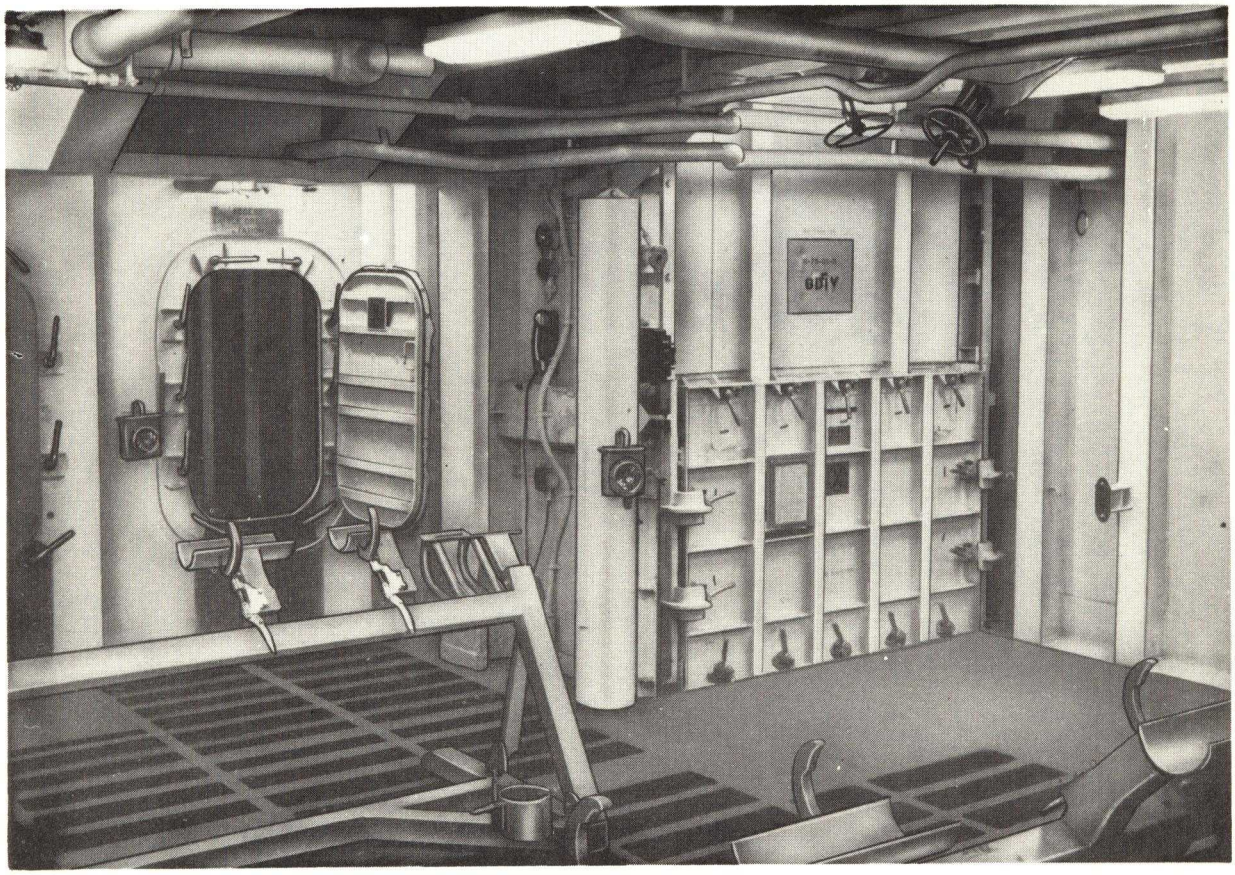


Figure 41. Typical Shipboard SIDEWINDER Assembly Area in CVA-59 Class. (Bomb elevator at the right.)

Aero 12B bomb skids equipped with Aero 9B package adapters.

Fuzes. Contact fuzes and influence fuzes (both with boosters mated) are to be left in their metal shipping containers and transported from the breakdown area to the magazine on Aero 12B bomb skids equipped with Aero 9B package adapters. Contact fuzes are stowed in inner containers. Influence fuzes are stowed in outer shipping containers.

Rocket Motors. Rocket motors are to be removed from their metal shipping containers and transported, four at a time, from the breakdown area to the magazine on Aero 12B bomb skids equipped with Aero 8C adapters.

Wing (With Rollerons). Wings are to be left in their metal shipping containers and transported from the breakdown area to the stowage area on Aero 12B bomb skids equipped with Aero 9B package adapters. The wings are to be stowed in special racks in the assembly area.

Miscellaneous. Tracking flares are to be left in their metal shipping containers and transported from the breakdown area to the magazine on Aero 12B bomb skids equipped with Aero 9B package adapters. Exer-

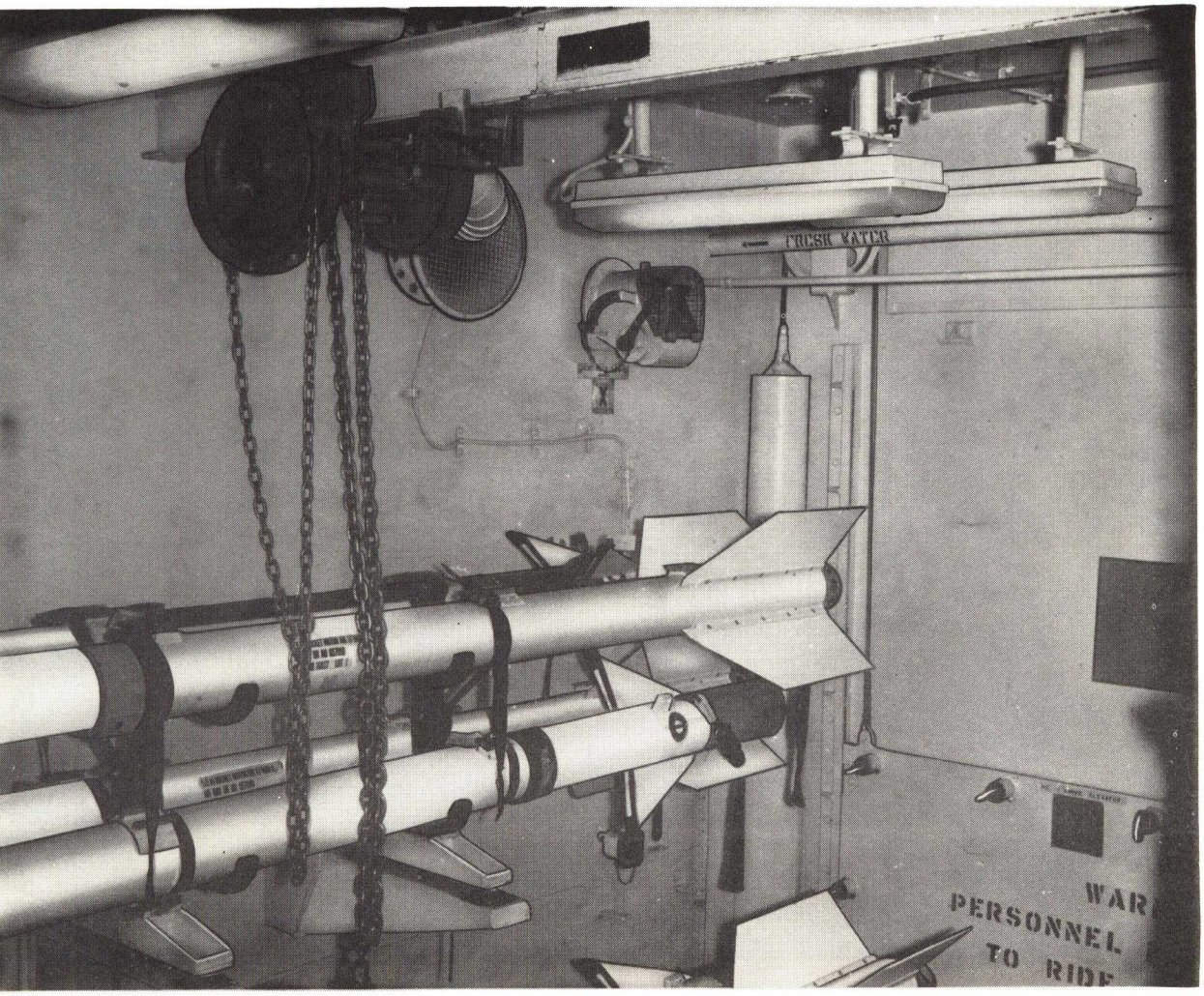


Figure 42. Typical Ready-Service Stowage.

ise warheads are to be removed rom their metal (warhead) shipping ontainers and transported from the reakdown area to the magazine on Aero 12B bomb skids equipped with Aero 9B package adapters. Non-ropulsion attachments and compo-ents for exercise missiles are to be emoved from their shipping contain-rs and transported to their respec-ive stowage areas in the same man-er as for "live" components.

SQUADRON EQUIPMENT. The complement of squadron test equipment consists of AN/ASM-11 launcher test sets, launchers, and pylons in accordance with squadron allowance lists.

HANDLING EQUIPMENT. Included in the complement of handling equipment already aboard are the following items for SIDEWINDER:

24 Aero 12B bomb skids
15 Aero 8C adapters
9 Aero 9B adapters
10 Aero 30A vibration isolation units
10 sets of long handles
14 sets of short handles

Four Aero 12B bomb skids with long handles, five Aero 8C adapters, and five sets of Aero 30A kits shall be used in the ready-service missile compartment as previously described. The remainder shall be stowed in other stowage compartments.

ASSEMBLY EQUIPMENT. Two assembly jigs or stands with alignment jigs and tools are used. These shall be uncrated and moved to the assembly compartment. The assembly equipment and tool sets shall be stowed on the bulkhead as provided for in the assembly compartment. One stand and a set of tools shall be set up as soon as is practicable for assembly of the ready-service missiles.

TABLE 10. MANPOWER REQUIREMENTS

Operation	No. Men Required	Total
Assembly	3 to 5 per assembly team 1 CPO supervisor	6 to 10
Supply and breakout	G&C sections, 16 Motors, 8 Warheads, fuzes, and wings, 12	36
Assembled missiles	Assembly area to elevator, 4	4

ASSEMBLY AREA

FACILITIES. The area to be utilized for assembly of SIDEWINDER missiles shall have facilities for securing the assembly equipment to the deck. Air pressure at 100 psi shall be supplied near the assembly equipment locations, and the airline shall be equipped with quick-attach fittings for use of the pneumatic screwdrivers.

ASSEMBLY EQUIPMENT. If assembly jigs are used, they are set up for use by placing them on the deck in such a position that the clamps on the jigs can be secured in the holes provided in the deck plate. The channel member of the jig is lifted, the supporting leg at each end is swung down, and the bolt heads are fitted into the slots in the flanged portion at each end. The jigs are then ready for use.

The assembly stand is set up by placing the tongue of the leg of the stand into the slot in the center section. The leg is swung outward until the joint is engaged securely. The setscrews are then tightened, and the assembly stand is secured to the deck by use of tie-downs and deck sockets.

ASSEMBLY TOOLS. Tools required for assembly of the SIDEWINDER missile are listed in table 11.

HANDLING EQUIPMENT. Assembly area handling equipment (as previously set forth in table 9) consists of eight Aero 12B bomb skids. Two of these will be equipped with Aero 8C adapters and short handles; two with Aero 8C adapters, long handles, and

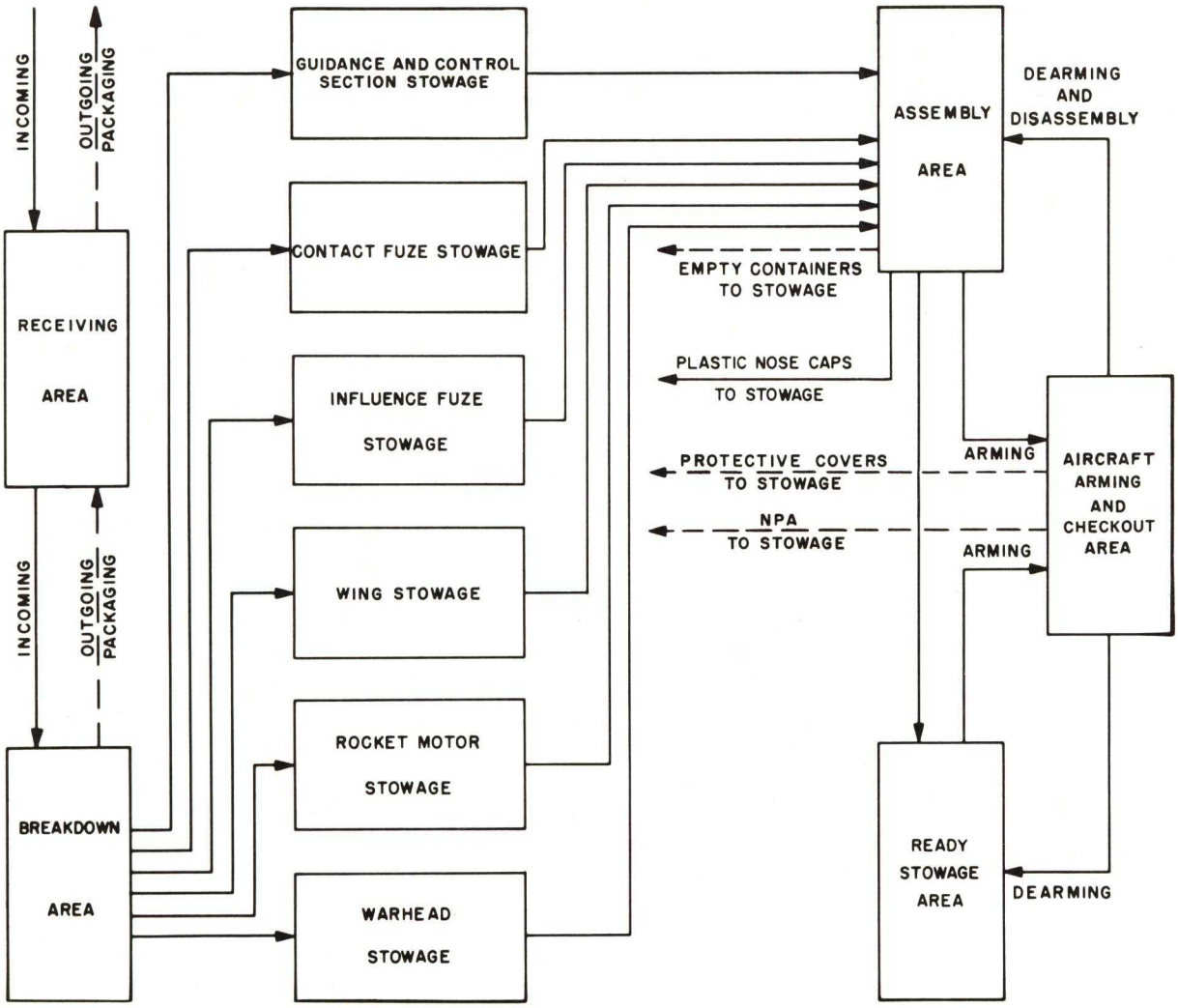


Figure 43. Shipboard Flow of SIDEWINDER Components, Block Diagram.

Aero 30A kits; and four with Aero 9B package adapters. The two Aero 12B/8C units with long handles and Aero 30A kits will be used for transporting assembled missiles to the ready-service compartment. The two Aero 12B/8C units with short handles will be used for hauling rocket motors to the assembly area. The four Aero 12B/9B units will be used for hauling wings, warheads, and fuzes to the assembly area. No handling equipment is specified for G&C sections, as these will be hand-carried to the assembly area.

OFF-LOADING FROM SHIP

Off-loading of SIDEWINDER missile components and auxiliary tools and equipment shall take place in accordance with standard Navy procedures. In general, the handling pro-

TABLE 11. ASSEMBLY TOOLS

Tool	Uses	No. Required	Spares	Total
Pneumatic screwdriver	Securing wings in channels Securing warhead to influence fuze Securing G&C section to warhead	2 per assembly team	100%	8
3-way tool	Assembling influence fuze to motor Assembling contact fuze to G&C section	2 per assembly team	100%	8
Alignment jig	Aligning umbilical block with centerband lug	1 per assembly team	100%	4

dures for off-loading of SIDE-
INDER components are approxi-
ately the reverse of the handling
ocedures previously specified for
-loading.

MISSILE COMPONENTS. The
ssile components shall be trans-
rted from the stowage areas to the
eakdown area previously used for
-loading (area adjacent to the ele-
tors on the hangar deck), by means
Aero 12B bomb skids and adapters.
cessary reusable containers for
ese components shall be brought
om container stowage to the break-
wn area. The missile components
all be repackaged in their original
ntainers and palletized at the break-
wn area, preparatory to actual off-
ading from the ship.

AUXILIARY MISSILE COMPO-
ENTS. Auxiliary missile compo-
nts scheduled for off-loading are to
handled in the same manner as the
gular live SIDEWINDER components.
e components and any necessary re-
able containers are transported to
breakdown area, using Aero 12B
mb skids and adapters. The auxil-
y components are then repackaged
d palletized at the breakdown area,
preparatory to actual off-loading from the ship.

REUSABLE CONTAINERS. Reusable containers from expended missile components shall be transported to the breakdown area (using Aero 12B bomb skids and Aero 9B package adapters), where they will be palletized, preparatory to off-loading from the ship.

RECORDS

Shipboard records shall be kept in accordance with established Navy practices. These should reflect the shipboard receipt, return, and expenditure of SIDEWINDER missile components for inventory control purposes. In addition, surveillance record forms distributed by NOL (Corona) should be obtained and utilized.

The Guidance and Control Unit Service Log (shown in figure 23), which is packed with each G&C section, must be kept with the unit at all times. Completed log cards on expended G&C sections are to be forwarded to Commanding Officer (Code 65) U. S. Naval Ordnance Laboratory, Corona, California.

Chapter 4

READY FOR USE

BREAKOUT (SUPPLY CHAIN)

READY-SERVICE MISSILES. According to the typical plan for ready-service stowage outlined in chapter 3, the four ready-service missiles that are stowed on the Aero 12B bomb skid in the ready-service stowage compartment may be immediately moved to the flight deck. The remaining Aero 8C adapters with missiles may then be lifted from the bulkheads, by chain hoist, and placed upon the waiting bomb skids for subsequent movement to the flight deck via the elevator.

MISSILE COMPONENT FLOW TO ASSEMBLY AREA. Missile components are moved from stowage to the assembly area by component supply teams. The number of members required for these teams will vary to suit conditions, but for the typical case set forth in this ordnance pamphlet, 18 team members are required to break out and supply components for each assembly team (this was shown in table 10 of the preceding chapter).

Both packaged and unpackaged components are transported to the assembly area by means of standard bomb skids and adapters (or hand-carried if the assembly area is centrally and adjacently located with respect to the stowage areas). The packaged components are "decanned" at the assembly area in accordance with the immediate requirements. The supply rate to the assembly area will be determined as needs are made apparent in the assembly area.

The foregoing movement and unpackaging of components is to be accomplished while the ready-service missiles are being loaded on the aircraft, and while the assembly equipment is being set up and the assembly tools laid out.

The compatibility of the various components of the SIDEWINDER 1 or 1A is shown in table 1, chapter 1.

MISSILE ASSEMBLY

The procedures for the assembly of missile components of SIDEWINDER 1 and 1A are given in the following paragraphs. Table 12 lists the sequence of steps for team members. Figure 47 illustrates these procedures. A three-member team is required for missile assembly. The assembly operations described below will allow two teams, each using an assembly stand, to set the missile components up in the assembly compartment, form supply chains using a sufficient number of bomb skids, and assemble 60 missiles in less than 1 hour

1. Place the rocket motor on the assembly stand. Position the motor in the central supporting section of the stand with launching lugs up.

WARNING

Handle motors carefully at all times. Avoid jarring or dropping as a cracked propellant grain may cause motor blowup upon firing. Dropping the motor while it is in a horizontal position causes the grain to crack more readily than dropping while it is in a vertical position. Cracking also occurs more readily at low temperatures. It is imperative that, in transporting or handling the motor, care be exercised not to subject it to unnecessary jolts from dropping or sliding against a solid object. If an unpackaged motor has been dropped 18 inches or more, it shall not be used. Motors dropped less than 18 inches should be examined for external damage; if no damage is evident, the round may be considered safe to use. If a motor in a container is dropped 36 inches or more, it should either be disposed of or returned to an ammunition depot. Do not tamper with or attempt to repair any parts of the motor. Damaged motors shall be disposed of in accordance with local directives.

2. Simultaneously with Step 1, ubricate the O-ring of the NPA with Federal Stock No. KZ1-5330-197-9576 grease; then secure the NPA to he rocket motor.

NOTE: The NPA will remain in place until the assembled missile is loaded aboard the aircraft, and the rolleron cager rods must be left in their shipping position as long as the NPA is on the rocket motor. The cager rods are not adjusted to missile firing position until after the missile is loaded aboard the aircraft and the NPA is finally removed.

3. Position the wings in the channels at the after end of the motor.

4. Secure the wings in the channels by tightening the channel screws, using pneumatic screwdrivers fitted with Allen-head bits.

5. Remove the rocket motor thread protector and lubricate the motor tube threads with MIL-G-16908 bearing grease.

WARNING

The influence fuze is potentially dangerous ordnance material and should be handled with care. If the fuze has been dropped, it should be carefully examined for defects. Excessive scratches or abrasions in the vicinity of the window should be cause for rejection of the influence fuze. Superficial scratches should not be cause for rejection. If no defect is found, the fuze may be used. A defective fuze, properly packaged and marked to indicate the nature of the defect, should be shipped to the appropriate ammunition depot.

CAUTION

O-rings for influence fuzes should never be used more than once. Be certain that a new O-ring is in place on the

influence fuze, and that the motor-tube threads are properly lubricated before assembling the influence fuze to the rocket motor. The proper place for the O-ring is in the groove at the after end of the fuze. It should not be placed in the thread relief groove forward of the threads.

6. Check the influence fuze to see that an O-ring and a nylon locking strip, applicable only to fuzes with slots cut in 8-pitch Acme threads, have been assembled to the fuze. Assemble and secure the influence fuze to the forward end of the motor. Tighten the fuze securely with the 3-way wrench.

NOTE: The Navy stock number for the preferred O-ring to be used with the influence fuze is 12Z-9024-7. Alternate O-rings, Federal Stock No. KZ1-5330-194-3739, may be used. O-rings should be lubricated with DC-11 grease (Federal Stock No. WK-9150-616-9212).

WARNING

The warhead is potentially dangerous ordnance material and should be treated in accordance with existing ordnance regulations. All safety precautions applicable to unfuzed bombs apply to unfuzed Mk 8 warheads. The high-explosive warhead is relatively insensitive to shock and will not normally detonate or explode when dropped 40 feet or more or when dropped from an aircraft on landing. However, like all high explosives, it should be treated with respect. Do not disassemble warheads or perform any alterations on them.

7. Mate and secure the warhead to the influence fuze, by starting the four warhead clamp screws with the 3-way wrench, and tightening the screws with the pneumatic screwdriver.

WARNING

If a G&C section is dropped, resulting in damage to the dome and gyro, extreme care must be taken so that no escaped mercury-thallium mixture comes in contact with the skin tissue or clothing of personnel. This mixture is a fluid, silver in color, and is highly toxic. Should the skin be contacted, it must be washed thoroughly with soap and water. Should clothing be contaminated, it should be changed immediately and washed. Gloves must be worn in order to handle the damaged section safely. If the mixture gets inside the gloves, the hands and gloves must be washed thoroughly. No danger is involved if the section is dropped and no spillage or leakage is evident.

8. Check the O-ring at the after end of the G&C section to make certain that it is in place and is not mutilated. Replace the O-ring (Dwg. No. 1522566-1), Federal Stock No. Z-5330-835-6115, if necessary. Also, verify the presence of two O-rings (KZ1-5330-291-4887) on the booster body of the contact fuze.

NOTE: Do not use grease on the G&C O-ring.

WARNING

The contact fuze is potentially dangerous ordnance material and should be handled with care. If the fuze has been dropped it should be carefully examined for defects. Any dent in the housing or any damage to the electrical plug is cause for rejection. If no defect is found, the fuze may be used. A defective fuze, properly packaged and marked to indicate the nature of the defect, shall be shipped to the appropriate ammunition depot.

9. Mate and secure the contact fuze to the after end of the G&C section using the large hexagonal socket of the 3-way wrench.

NOTE: It is recommended that the umbilical cable be secured to the body of the G&C section at all times except when in use or when testing. It is further recommended that the umbilical clips used for packing be saved and reused when a G&C section is returned to its container.

10. Mate the G&C section and fuze assembly to the warhead.

11. Place the alignment jig on the missile and rotate the G&C section until the slot of the alignment jig mates with the umbilical block. Secure the G&C section to the warhead by starting the four warhead clamp screws with the 3-way wrench and tightening them with the pneumatic screwdriver. Make sure that the protective cover for the influence fuze, figure 45, and the nose cover for the dome of the G&C section, figure 46, are in place.

12. Remove the completely assembled missile from the assembly stand and place it on an Aero 12B bomb skid equipped with an Aero 8C adapter and an Aero 30A kit for subsequent transportation to the flight deck. At the flight deck, the missile is loaded on the aircraft by the squadron personnel.

The above assembly procedures are depicted in figure 47.

Figure 45. Protective Cover for Influence Fuze.

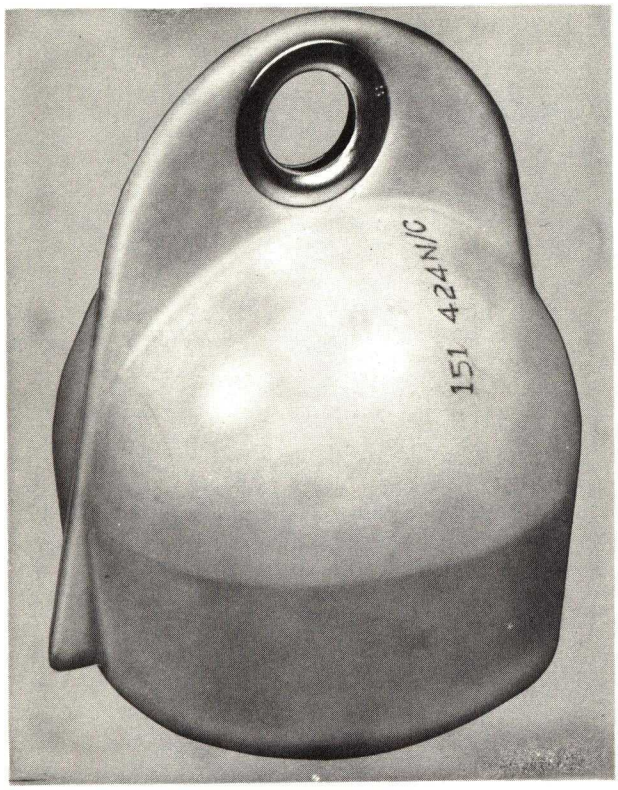


Figure 46. Protective Cover for Nose of G&C Section.

FIRING BUTTON PROTECTOR

The following paragraphs cover procedures to be followed for the installation of a protective device on SIDEWINDER 1A Mk 15 and Mk 17 live motors. The device is designed to protect the influence fuze and motor igniter from radio frequency (RF) energy.

This device is needed when a missile is loaded onto an aircraft that is in close proximity to operating radio and radar transmitters. As the missile is loaded onto the launcher, the rear launcher detent can contact the firing buttons of the motor, which may result in delivering dangerous levels of RF current to the influence fuze and motor igniter.

DESCRIPTION. The new device is of plastic and fits over the firing buttons. The part is attached with a screw provided and should be on live, assembled missiles at all times. Its purpose is to act as an insulator between the firing button and the detent. The plastic protector shall be installed on the missile at the end of a normal missile assembly. It will remain on the missile throughout all handling and loading operations after assembly.

The use of this device makes it necessary to remove the shorting clip from the motor at the time of missile assembly. This is done to allow the plastic protector to fit over the firing buttons. The missile in the assembled condition will be stored without a shorting clip.

COMPONENTS. The following components are listed:

1. Firing button protector, BuWeps Dwg. No. 1555632

2. Number 6-32 NC X 7/16-long Screw Mach RH Stl

REFERENCE. NAVAER 11-75-A-504-Aero 3A Missile Launcher and Pylon Assemblies.

INSTALLATION PROCEDURE. After the missile has been assembled and while it is still on the assembly stand, proceed as follows:

1. Remove the shorting clip from the motor and install the plastic protector with the screw supplied. Figure 48 shows the firing button protector in place.

TABLE 12. SEQUENCE OF ASSEMBLY PROCEDURES

Step No.	Team Member No. 1	Team Member No. 2	Team Member No. 3
1	Place rocket motor on assembly stand. Position the motor with lugs up.		
2		Lubricate the O-ring of the NPA with silicone grease and secure it to the rocket motor.	
3	Position wings in wing channels at the after end of the motor.		
4	Secure the wings in wing channels by tightening the channel screws, using pneumatic screwdrivers fitted with Allen-head bits.		
5			Remove rocket motor thread protector and lubricate motor threads.
6	Check influence fuze to see that O-ring and nylon locking strip have been assembled to fuze. Assemble and secure influence fuze to forward end of motor. Tighten the fuze securely with a 3-way wrench.		
7	Note: Either Team Member No. 1 or 2 assists No. 3.		Mate and secure the warhead to influence fuze by starting the four warhead clamp screws with 3-way wrench and tightening with pneumatic screwdriver.
8			Check O-ring at after end of G&C section to make sure it has never been used. Replace, if necessary. Verify presence of two O-rings on booster body of contact fuze.
9			Mate and secure contact fuze to after end of G&C section using hexagonal-socket of 3-way wrench.
10	Mate G&C section to warhead.		
11	Align (center) umbilical block of G&C section radially with respect to missile launching lugs. Secure G&C section to warhead by starting the four warhead clamp screws with 3-way wrench and tightening with pneumatic screwdriver.		
12	Remove assembled missile from assembly stand and place on Aero 12B bomb skid equipped with Aero 8C adapter and an Aero 30A kit for transportation to flight deck.		

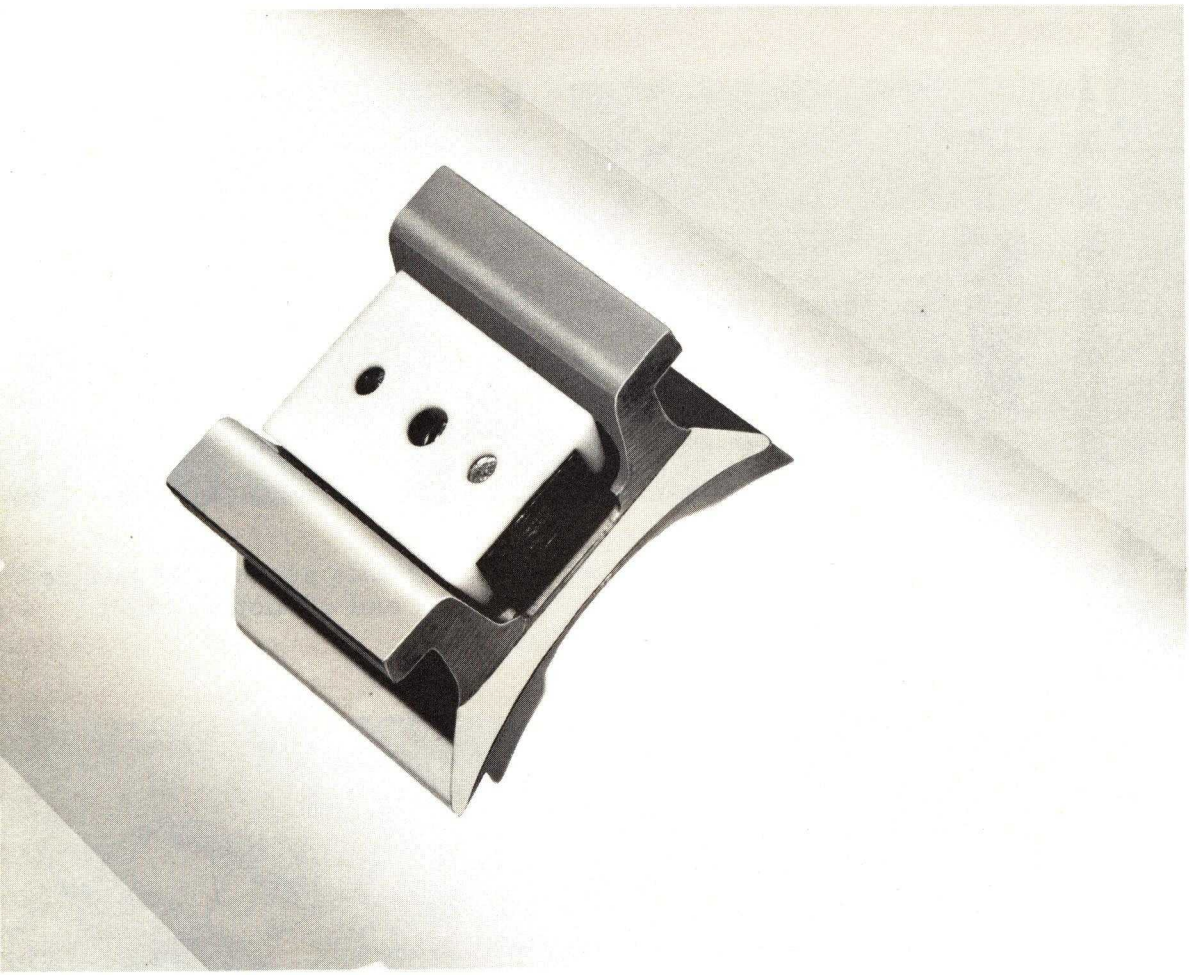


Figure 48. Firing Button Protector in Place.

CAUTION

The screw head must be below the motor firing buttons. This is to ensure that during firing there is no damage to the launcher and that the missile leaves the launcher properly.

2. The missile is now ready to be ken to ready-service stowage or to e flight deck.

3. Load the missile onto the uncher as described on page 65 of this ordnance pamphlet. During loading, the plastic protector will drag on the detent. For this reason, the loading crew will find that in some cases more force than normal is required to slide the missile forward on the launcher.

CAUTION

Always raise the launcher detent to its maximum height before sliding the missile forward.

4. If the missile is not launched and requires disassembly, remove the plastic protector and place the shorting clip on the motor.

CAUTION

When the missile is removed from the launcher, the plastic protector may be torn. If the missile is being returned to ready service, or will be reused on another aircraft, replace the protector with a new one. If the missile is being returned for disassembly and stowage, replace the protector with the shorting clip. This operation should not be performed in an area near operating radar or radio transmitters, such as the flight deck.

ON-DECK CHECKOUT PROCEDURES

The provisions for the on-deck (preflight) checkouts are as follows.

LAUNCHER. The Guided Missile Launcher Test Set AN/ASM-11 is provided for checking all launcher functions to ensure proper operation of the launcher. Instructions for using the AN/ASM-11 test set to perform a test of the launcher are as follows:

CAUTION

Visually check for evidence of failure of both forward snubber cams of Aero 3A guided missile launchers before loading missiles and target rockets. Return Aero 3A launchers with cracked or broken snubber cams to an overhaul and repair facility (O and R) for repair.

1. Insert the lug handle in the launcher; connect P 103 to the launcher umbilical; and connect P 102 to the test set connector J 101, figure 49.

2. Place aircraft armament selector switch in the SIDEWINDER position.

3. Place aircraft station selector switch in position of station to be tested.

4. Apply auxiliary power to the aircraft.

5. Observe the knife-edge pointer on the test set meter dial; be sure that it is on the extreme left edge of the BLACK area. If this is not true, refer to NAVWEPS 16-30ASM-11-1 for calibration instructions.

6. Attach connector of the cable assembly to the front panel of the test set.

WARNING

Before proceeding, remove or verify that all ordnance (both internal and external) has been removed from the aircraft, and install the launcher safety pin.

7. Raise the launcher detent with the required hexagonal wrench furnished with the test set; insert the lug handle into its position on the launcher rail. (The arrow on the lug handle should point forward.)

Figure 49. Launcher Test Set AN/ASM-11 Connected to Launcher.

8. Using the required hexagonal wrench (also furnished with the launcher) raise the launcher nose cover and connect the cable assembly to the launcher connector, figure 50.

9. Energize the aircraft circuitry by use of the auxiliary power unit.

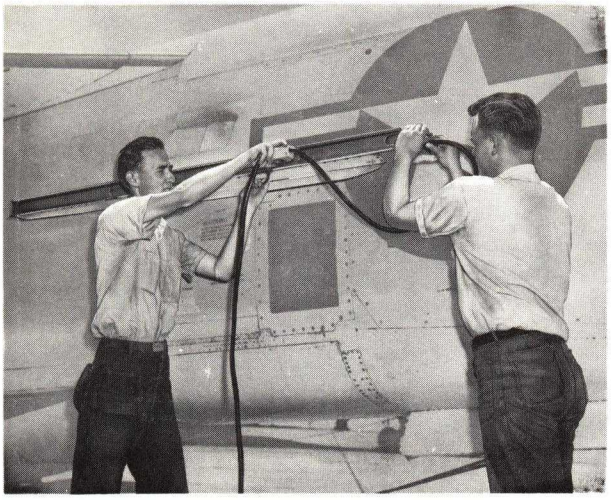


Figure 50. Lug Handle Inserted and Cable Assembly Connected to Launcher.

10. Starting with Test Position 1, turn the switch knob through the first 10 positions, stopping at Position 10. The knife-edge pointer on the meter dial should be in the YELLOW for each of the 10 positions, figure 51.

NOTE: Do not leave test set in any test position for more than 5 minutes.

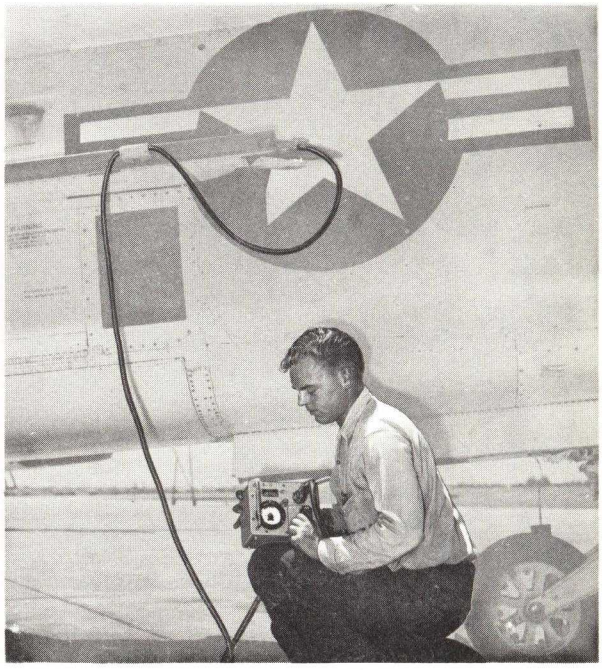


Figure 51. Launcher Test Set Connected and Ready for Launcher Checkout.

11. With the switch knob on Position 10, a 400-cycle tone should be heard in the pilot's earphone. If the tone is not heard, be sure that the proper cockpit switches are turned on and that the volume is turned up.

12. Turn on the master armament and safety override switches.

13. Depress the firing switch and hold it down for Steps 14 and 15, which follow.

14. Turn the switch knob through Positions 11, 12, and 13. If the launcher circuits are functioning properly, the knife-edge pointer will be in the RED portion of the dial.

15. Turn the switch knob to Position 14. The knife-edge pointer should read in the BLACK portion of the dial. Pull the safety pin from the launcher, and the pointer should be in the RED portion.

16. Release the firing switch, and turn off the master armament switch.

17. Turn the switch knob to Position 15. The knife-edge pointer will read ZERO (BLACK area), and the pilot light will go out.

18. With the safety pin removed from the launcher, turn the switch knob through Positions 16, 17, and 18. The knife-edge pointer should read in the BLACK area for these three positions.

19. Turn the switch knob to Position 19. The knife-edge pointer should read in the YELLOW area.

20. Turn the switch knob to the OFF position and reinsert the launcher safety pin.

LAUNCHER JETTISON. This is a test that is performed on the SIDEWINDER launcher jettison circuitry and does not confirm any circuits related to the external stores or tanks.

WARNING

Although the following jettison test is a test for the SIDEWINDER circuits only, other aircraft jettison circuits may be energized during this test. Therefore, reaffirm that all ordnance (both internal and external) and other external stores have been removed from the aircraft.

1. Energize the aircraft circuitry.

2. Turn the test set switch knob to Position 14.

3. Perform the jettison procedure prescribed for the type of aircraft being tested. The knife-edge pointer should be in the RED area.

4. De-energize the jettison circuit.

5. Turn the switch knob through Positions 16, 17, and 18. The knife-edge pointer should be in the BLACK area for all three positions.

6. Turn off, or remove, power and disconnect the test set.

AIRCRAFT CIRCUITRY. The preceding section has discussed the checkout of the SIDEWINDER launcher. In addition to tests on the launcher, the AN/ASM-11 test set is also designed to provide a test of the aircraft circuitry. This test cannot be made on an aircraft that does not have a connector MS 3106A-20-27S at or near the launcher station. The following test is to be made on aircraft when NO missile launchers are on the aircraft.

1. Connect P 102 of the cable assembly to J 101 of the test set.

2. Connect P 105 of the adapter to connector MS 3106A-20-27S located in or on the aircraft wing or fuselage, or at the bottom of the launcher pylon.

3. Connect P 103 on the cable assembly to P 104 of the adapter.

4. Energize the aircraft circuitry by using an auxiliary power unit.

5. Turn on the master armament and safety override switches.

6. Turn the switch knob to Positions 2, 3, and 10. The knife-edge pointer should read in the YELLOW area for all three positions, and a 400-cycle tone should be heard in the pilot's earphones.

7. Turn the switch knob to Position 12.

8. Depress the firing switch. The knife-edge indicator should read in the RED area.

9. Turn off the power and disconnect the test set.

NEGATIVE TEST RESULTS. Should the test set at any time indicate that the aircraft or launcher circuit being tested is not functioning properly, eliminate all minor causes of the negative results before labeling the aircraft, launcher, or the test set as defective. The following information should serve as a guide to establish the point of existing trouble.

1. Check the test set selector switch to be sure that it is on the correct position.

2. Check the connector at J 101 and all other connections to be sure that they are correct and electrically secure.

3. Check the auxiliary power unit for proper output.

4. Check the position of the switches in the aircraft.

5. If the trouble still exists, connect the test set to another launcher or aircraft circuit. If the same failure appears, obtain a new test set and check the troubled position again. Should the condition remain, change back to the original test set; label the aircraft circuit or launcher as defective; and mark for repair.

6. Should the test set prove to be out of order, mark the test set for repairs.

MISSILE. No systematic missile checkout associated with the assembly operations is required but a preflight testing of the missile is required. The missile G&C section is to be surveillance-tested once every year in the stowage area and the ready-service G&C section is to be replaced by previously checked out sections once every month.

Simplified Checkout and Testing Procedures. A simplified method for checkout and preflight testing of the missile is given in BUWEPS INST 08811.1 of 21 March 1960. The instruction restricts the use of the Mk 341 Mod 0 test set and the field test set (pen recorder). An analysis of test results revealed that approximately the same degree of missile performance will be obtained from the simplified test procedures described below.

Part 1. Before missile assembly, examine the umbilical block for evidence of partial shearing or breakaway. Examine the dome for cracks or excessive pitting. Look through the dome window for evidence of loose parts, foreign matter, or condensed moisture inside the seeker head. Move both sets of guidance fins by hand to ensure that they move freely. Spin the rollerons on the motor wings by hand to ensure that they spin freely.

CAUTION

Any unsatisfactory condition revealed by the above inspection is cause for rejection of the unit.

Part 2. Check operability of the launcher with the AN/ASM-11 launcher test set. Load the assembled missile on the launcher and apply power through the aircraft circuits. Inspect to see that the gyro in the seeker is rotating. If the gyro does not rotate, check the missile umbilical connector to see that it is fully engaged in the launcher. Also, check the fuzes and switches in the aircraft. If the gyro still fails to rotate, attempt to start the gyro by moving any magnetic object, such as a bar magnet or a steel tool, back and forth in the vicinity of the head-coil assembly. If the foregoing attempt fails to start the gyro rotating, reject the unit.

With the missile loaded on the launcher and with the gyro rotating, check pilot's tone by passing a portable infrared source in front of the seeker head at a distance of about 15 feet. This should result in an audible signal in the pilot's headphone.

NOTE: A standard 2-cell flashlight is a suitable infrared source.

CAUTION

If pilot's headphone is functioning and no audible signal is heard in response to the infrared source, reject the unit.

MISSILE DELIVERY TO AND LOADING ABOARD AIRCRAFT

When loaded with assembled missiles, the bomb skid is moved to the aircraft on the flight deck, via the bomb elevator, where three-man teams mount missiles on the launchers.

LOADING MISSILE ON LAUNCHER. The procedure for loading a missile on the launcher is as follows:

WARNING

Make sure that firing system cannot be energized during launcher loading operations. Never stand behind or directly in front of a missile that is being loaded onto a launcher. When a launcher is loaded and ready for firing, all unnecessary personnel should be at least 25 feet away from the flank of the launcher, and should stay away from behind the launcher. The loaded launcher is considered dangerous within 200 feet aft. When practicable, the aircraft with loaded launchers should be pointed away from personnel and installations. With the exception of

final signal tone, no electrical tests are to be conducted while the missile is on the launcher. The safety pin should not be removed from the launcher until the last practical moment.

NOTE: The NPA should be removed at the time that the missile is placed on the launcher and the cager rods extended. The protective covers for the G&C section and influence fuze may be removed before the aircraft moves forward to the catapult.

1. Make certain that the aircraft ttery and master arm switches are the OFF position, and that the uncher safety pin is in place, fige 52.

2. Remove the shorting clip from e contact button assembly on the issile.

3. To load the missile onto the uncher, first bring the missile into

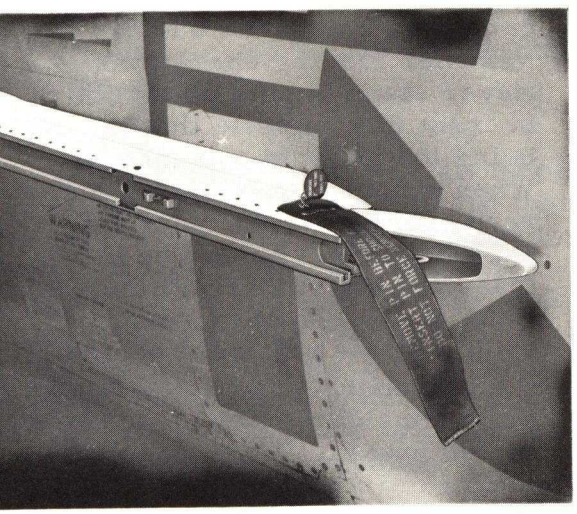


Figure 52. Launcher on Aircraft With Safety Pin in Place.

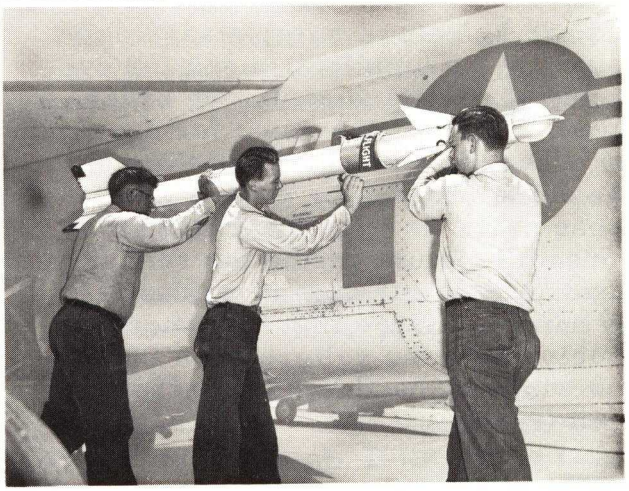


Figure 53. SIDEWINDER 1A Missile Being Loaded Aboard Aircraft.

position just outside the three loading slots, move the missile to engage it in the slots, raise the after lug of the detent by rotating it with the 3/8-inch hexagonal wrench, and then push the missile forward until the forward lug engages the detent, about 3 inches. Remove the wrench from the launcher. Figure 53 shows a missile being loaded aboard aircraft.

CAUTION

Be certain to raise the detent so as to clear the contact buttons of the missile. Failure to do so when Firing Button Protector, BuWeps Dwg. No. 1555632, is not in place can actuate the thermal battery by arcing, thereby disabling the influence fuze (see page 57 for description and use of the firing button protector).

4. Unlatch the front cover on the launcher, and connect the umbilical cord and umbilical disconnect mechanism. Relatch and SECURE COVER.

5. Make certain that snubber cams are in locked position.

6. Make certain that protective covers for G&C section and influence fuze, NPA, and the launcher safety pin are removed before aircraft take-off. Figure 54 shows the missile on the aircraft with protective cover and safety pin in place.

NOTE: The protective covers may be removed before the aircraft moves forward to the catapult. The NPA, however, can be removed at the time that the missile is placed on the launcher.

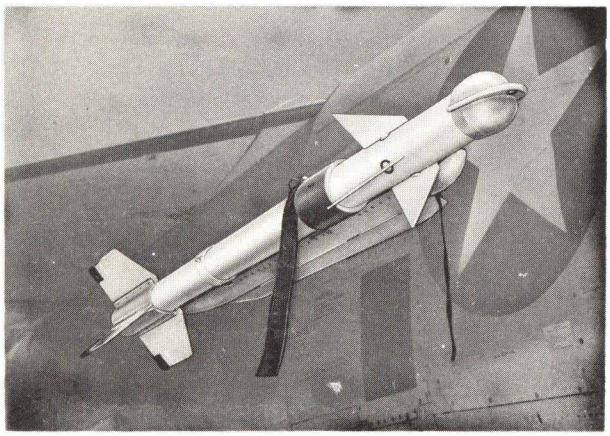


Figure 54. SIDEWINDER 1A Missile Aboard Aircraft With Protective Covers and Safety Pin in Place.

WARNING

Failure to remove the NPA will cause critical aircraft damage if the missile is fired.

UNLOADING MISSILE FROM LAUNCHER. The procedure for unloading a missile from the launcher is as follows:

WARNING

Make sure that firing system cannot be energized during launcher unloading operations. Never stand behind or directly in front of a missile that is being unloaded from a launcher. The safety pin is to be reinstalled as soon as possible after the aircraft lands.

NOTE: The NPA should be installed at the time that the missile is removed from the launcher, and the protective covers for the G&C section and the influence fuze should be placed on the missile.

Normal Live Missiles. If it is necessary to unload the launcher, the reverse of the loading procedure above is followed.

NOTE: Before attempting to remove the missile, make certain that the launcher safety pin is in place and that the battery and master arm switches have been placed in the OFF position; this precludes any possibility that the firing circuit may be energized during the unloading routine.

1. Raise the detent, using the launcher tool, to allow the missile to be moved backward to the loading slots.

2. Make certain that the protective nose cover and the influence fuze cover are replaced BEFORE removing the missile from the launcher.

3. If the firing button protector ee page 57) is not being used, re- ace the shorting clip over the con- ct button assembly as soon as the issile is removed from the launcher.

4. Use great care to ensure that e plastic strip on the influence fuze not touched, scratched, or marred any way. If any foreign matter is served on the plastic strip, clean e strip with a dry, soft, clean cloth lens tissue.

NOTE: It is recommended that the umbilical cable be secured to the body of the G&C section at all times except when in use or when testing. It is further recommended that the umbilical clips used for packing be saved and reused when a G&C section is returned to its container.

Captive-Flight and Training Mis- les. Captive-flight and training issiles are unloaded from the uncher in the same manner as nor- al unfired SIDEWINDER missiles.

Misfired or Hang-Fire Missiles. misfired missile is one in which an tempt has been made to fire the mis- le, but for some reason the motor d not ignite. Examples of a misfire e (a) defective motor, (b) defective uncher, (c) improper loading of issile, or (d) pilot error. A hang- re missile is one which has been red and the motor has ignited, but d not leave the launcher.

For both types of malfunctions, the llowing procedures are to be fol- wed:

1. After the aircraft has landed, e launcher safety pin shall be in- erted into the launcher as soon as possible, and the aircraft moved to a safe position.

2. In case of a misfired missile, a waiting period of at least 10 minutes from the time that the firing button was last depressed is desirable before unloading the missile from the launcher.

3. The missile is then unloaded from the launcher in accordance with standard unloading procedures.

4. The missile is moved to the assembly area where it is disassembled, and the components are inspected and segregated as follows:

a. Visually inspect the G&C section for evidence of firing of the gas generator. Any slight discoloration, smoky in color, in the vicinity of the exhaust ports (ordinarily covered by tape) or in the area adjacent to the fin axes is an indication of firing of the gas generator grain.

A G&C section with no malfunction is returned to its container and is stowed in the appropriate stowage compartment for reuse. If the G&C section is defective, it is returned to the appropriate ammunition depot with appropriate entries on the Guided Missile Service Record NAVWEPS Form 8800/2 (7-60).

b. The contact fuze is reusable, and no further checks are required. It is returned to the appropriate stowage compartment.

c. The warhead is also reusable, and it is returned to the appropriate stowage compartment.

d. The influence fuze shall be properly marked and packaged and returned to the appropriate ammuni-

tion depot. (In a misfire the battery may be de-activated and the fuze may be a dud.)

e. The motor is not to be inspected for possible malfunction. It is not reusable and should be disposed of in accordance with local instructions.

CAUTION

In the event of a hang-fire, particular attention must be directed to the possibility of a launcher malfunction. Visually check for evidence of failure of both forward snubber cams of the Aero 3A launcher. Return Aero 3A launchers with cracked or broken forward snubber cams to an overhaul and repair (O and R) facility.

f. The launcher shall be checked by referring to NAVAER 11-75A-504, Handbook of Operations and Service Instructions. If malfunctions are found, corrections shall be made in accordance with the instructions in the handbook, or the launcher should be returned to the nearest O and R facility for repair.

Unexpended Missiles. When an aircraft returns with unexpended missiles, these are to be unloaded from the launchers in accordance with the procedures given in this ordnance pamphlet. The returned missiles are then usually moved to the ready-service compartments for stowage. However, if there are more unexpended missiles than required to complete the ready-service quota (typically, 20), the extra missiles are disassembled and the components are stowed in proper compartments. These missiles shall be transported from the flight deck to the assembly area, where they will be placed on the assembly stands and disassembled in the reverse order of assembly procedures given earlier. The components shall be systematically moved to their respective stowage compartments, and those components originally stowed in containers shall be returned to their containers before stowing.

ASSEMBLY OF EXERCISE WARHEAD AND TRACKING FLARES

EXERCISE WARHEAD. The Mk 2 Mod 0 exercise warhead is used in place of the regular high-explosive warhead on missiles intended for target practice. Exercise missiles are assembled in the same way as live SIDEWINDER missiles.

WARNING

The exercise warhead is a pyrotechnic item, and all precautions normally used for pyrotechnic signals shall be observed. Any pyrotechnic material spilled from the head should be wetted down and swept up thoroughly for disposal.

CAUTION

In the event of accidental dropping, the exercise warhead may be used unless enough damage is sustained to prevent assembly to the other components of the missile or to render the head unsuitable in some other way.

NOTE: Exercise warheads that fail to mate because of ovality

or out-of-tolerance in the mating diameter should be scrapped, as machining of loaded exercise heads is not permissible.

TRACKING FLARES. The tracking flare, as packaged, includes a 1/4-inch socket-head cap screw. The cap screw holds the flare to the rocket nozzle. The channel ring has four tapped holes, which fit the cap screws.

WARNING

The tracking flare contains a heat-sensitive pyrotechnic material. It should not be accidentally exposed to an open flame or a hot object. If the foil covering the holes at the after end of the flare or covering the end of the tube is torn, loose, or damaged, exposing the ignition holes, the flare shall not be used. If, after a flight, the foil around the ignition holes or covering the end of the tube is bulged or damaged, the flare shall not be used. Dispose of the damaged flare in accordance with local directives.

Each flare is held in proper position by the single cap screw which fits through the flare and into the channel ring or motor body.

Assembly of the flare to the target rocket is discussed in more detail in the following section.

ASSEMBLY OF TARGET ROCKET (MK 26 MOD 0) USING TARGET ROCKET KIT MK 23 MOD 0 AND 5"/0 ROCKET MOTOR MK 10 MOD 6 OR 7

NAVORD Instruction 8042.16 of 15 August 1958 has been issued on proper assembly and handling of the target kit for pilot training. The instructions are summarized in the following paragraphs.

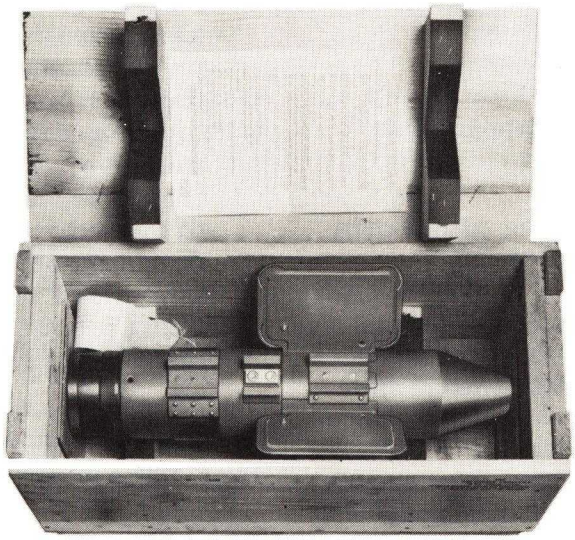
TOOLS REQUIRED TO ASSEMBLE TARGET ROCKET MK 26 MOD 0. The tools required are as follows:

1. One assembly stand
2. One 5-inch spanner wrench or strap wrench
3. One each 5/32-inch and 3/16-inch Allen wrenches
4. One 3/8-inch open-end wrench
5. One each 7/16-, 1/2-, and 9/16-inch socket wrenches with ratchet handle
6. One screwdriver

ASSEMBLY OF TARGET ROCKET. Target Rocket Kit Mk 23 Mod 0 and assembled Target Rocket Mk 26 Mod 0 are shown in figure 55. To assemble the target rocket, proceed as follows:

WARNING

Do not use motors which have been damaged. A damaged motor tube may mean a cracked propellant grain, which may cause a motor blowup when the rocket is fired. Dispose of damaged rocket motors. Replace or repair damaged or bent fins. Observe standard safety precautions throughout the assembly and launcher loading operations. Only essential personnel may be in the vicinity of the assembly and loading operations. No smoking



(a)

(b)

(c)

Figure 55. Target Rocket. (a) Target Rocket Kit Mk 23 Mod 0 as packaged; (b) Mk 23 Mod 0 kit parts removed from packing case; (c) completely assembled Target Rocket Mk 26 Mod 0.

is permitted within 200 feet of rocket ordnance.

1. Remove the three lug bands from the motor.

2. Remove the shipping plug from the forward end of the motor.

3. Slip the fin assembly onto the motor with hanger forward and slide it aft until it stops against the nozzle ring.

4. Screw the head (with the center band on it) to the motor and tighten with a spanner or strap wrench.

5. Slide the center hanger band back about 3 feet.

6. Using a straightedge about 5 feet long, align the after hanger by rotating the fin assembly until the side of the hanger touches the straightedge, which is held along the corresponding side of the forward hanger. Tighten the fin sleeve on the motor making sure the fin sleeve butts against the nozzle ring.

7. Locate the center hanger so that the distance between the front edge of the center hanger and the front edge of the forward hanger is 30 1/16 inches. Align the center hanger until it touches the straightedge, which is held against the sides of the forward and after hangers.

8. Check the height of the center hanger by placing the straightedge on the top surfaces of the forward and after hangers. The center hanger can be raised or lowered by tightening or loosening the setscrew in the top of the hanger. Tighten the center band after vertical alignment is secured.

NOTE: A condition may exist as a result of a bow in the tube in which the center hanger is too high, making it impossible to get perfect vertical alignment between the three hangers. However, allowance has been provided in the dimensions of the launcher rail for a small amount of vertical misalignment (about 1/16 inch) between the hangers.

FLARE ATTACHMENT. Attach four flares, one at a time, as follows:

WARNING

The tracking flare contains a pyrotechnic mixture and should not be exposed to open flames or hot objects.

1. Insert the flare through the flare clamp on the fin.

2. Attach the forward end of the flare to the fin with a 1/4-inch cap screw through the flare stud and the matching hole in the fin. The cap screws and nuts are in the mailing bag found in the target rocket kit box.

3. Secure the after end of the flare by tightening the flare clamp.

LAUNCHER PREPARATION. In order to fire the target rocket from the Aero 3A launcher, the special firing plug must be inserted in the umbilical plug receptacle in the forward fairing of the launcher. The firing plug is in the mailing bag found in the target rocket kit box.

LAUNCHER LOADING. Proceed as follows:

1. Lift up the round so that the three suspension lugs fit into the corresponding slots in the launcher rail. Then push the round forward until the detent falls into place to hold the front lug in position.

WARNING

Do not remove the shorting clip from the pigtail connector until it is necessary to plug the connector into the launcher receptacle just before takeoff. Before connecting pigtail to launcher receptacle, make certain that the master armament switch in the aircraft is in the OFF position and that the weapon selector switch is on SAFE.

2. Perform stray voltage check of launcher before plugging in electrical connector of HVAR (see NAVORD Instruction 8042.16).

3. Remove the shorting clip from the pigtail electrical connector.

4. Plug the pigtail electrical connector into the HVAR firing receptacle on the after end of the launcher.

CAUTION

Make certain that slack in pigtail wire is taken up and secured to launcher to prevent possible loss of electrical continuity due to whipping of the wire by the airstream.

NOTE: Since the specifications for the launcher require only a minimum detent force of 1500 pounds, the target rocket shall be jettisoned before making an arrested landing. The target rocket weighs 215 pounds, so that a decelerating force of 7 g may cause the target rocket to come off the launcher on landing.

RECORDS

Records should be maintained which reflect inventory and control of ready-service missiles, defective components taken from misfired missiles, exercise (training) missiles and their components, and accessory equipment. In addition, records should be kept of captive flights and associated missile performance data, and the number of hours that live G&C sections have been used as captives.

READY-SERVICE MISSILES. Records reflecting inventory, inspection, test, and captive-flight operating time of ready-service missiles are to be kept. (See page 23 for captive flight limitations on fuzes.) The SIDEWINDER Captive Flight/Firing Report Form (NAVORD Form 2867) is shown in figure 55. The essential data observed during flight are to be entered by the pilot.

GUIDANCE AND CONTROL SECTIONS. Deficiency reports pertaining to the G&C section will be made on either the Guided Missile Service Record, NAVWEPS Form 8800/2 (7-60) or on the SIDEWINDER Captive Flight/Firing Report Form mentioned above.

Firing Units. Firing Units will only use the Guided Missile Service Record (NAVWEPS Form 8800/2) to report deficiencies noted during the Part 1 of the simplified checkout and testing procedure before missile assembly (discussed on page 65 of this ord-

SIDEWINDER CAPTIVE FLIGHT/FIRING REPORT
NAVORD FORM 2867 (New 2-59)

REPORT BUORD 8811-1

CONFIDENTIAL
(When filled in)

DATE:

MAIL TO: COMMANDING OFFICER, NAVAL ORDNANCE LABORATORY (CODE 65), CORONA, CALIF.

1. SHIP OR STATION		2. SQUADRON NO.
3. AIRCRAFT TYPE	BU. NO.	4. LAUNCHER TYPE _____ POSITION _____
5. GUIDANCE AND CONTROL SER. NO.	6. INFLUENCE FUZE SER. NO.	7. CONTACT FUZE SER. NO.
8. WARHEAD SER. NO. ☐ LIVE ☐ EXERCISE		9. CAPTIVE FLIGHT TIME HOURS

FIRING RESULTS

10. AIRCRAFT ALTITUDE AND SPEED
_____ FT. MACH NO. _____

11. AIRCRAFT ATTITUDE AT FIRING
☐ LEVEL ☐ DIVE ☐ CLIMB ☐ TURN

12. ANGLE OFF TARGET TAIL
(Tail-on = 0°) _____ DEG.

13. TARGET *(Check flares, if used)*
TYPE _____ ☐ FLARES

14. TARGET SLANT RANGE
_____ FT. ☐ RADAR ☐ EST.

15. TARGET ALTITUDE AND SPEED
_____ FT. MACH NO. _____

16. TARGET BACKGROUND

17. ANGLE OF SUN FROM TARGET
_____ DEG. ☐ OVER 90°

18. SIGNAL TONE STRENGTH
☐ NORMAL ☐ SEE REMARKS

19. LAUNCHER ACTION/DELAY
☐ NORMAL ☐ SEE REMARKS

20. MISSILE PERFORMANCE
☐ NORMAL ☐ SEE REMARKS

21. CONTACT HIT/MISS DISTANCE
☐ HIT _____ FT. DIRECTION _____

22. FUZE/WARHEAD ACTION
☐ NORMAL ☐ SELF-DESTR. ☐ NONE

23. TARGET DAMAGE
☐ TOTAL ☐ PARTIAL ☐ NONE

24. REMARKS *(Weather, target maneuvers, unsatisfactory & explanatory info, etc.)*

_____
(Pilot)

F-41623

CONFIDENTIAL
(When filled in)

Figure 56. Flight Record Form.

nance pamphlet). Figure 57 shows entries made by the Firing Unit with deficiencies noted in the no-go column. Inspections that reveal no deficiencies shall not be recorded.

Any G&C section deficiencies noted after the missile has been assembled shall be entered on the SIDEWINDER Captive Flight/Firing Report Form 2867, figure 56. Each completed Form 2867 with no failures indicated denotes that the missile has passed the second part of the simplified procedure.

It is intended that these two reports constitute all deficiency reports on the G&C section and that these reports will be sent to the U. S. Naval Ordnance Laboratory, Corona, for analysis. This system of reporting failures is devised to hasten the flow of information pertinent to G&C section failures and to improve the overall reliability of the missile.

MISFIRED SIDEWINDER MISSILES. In the case of a misfired missile or a defective fuze, forward the influence fuze and fuze log card, both properly packaged, to the appropriate ammunition depot. Indicate that the fuze was involved in a misfire. Possible fuze defects are (1) a cracked, scratched,

GUIDED MISSILE SERVICE RECORD
NAVWEPS FORM 8800/2 (7-60)

(Please print)

REPORT SYMBOL BUWEPS 8800-2

MAIL ORIGINAL TO
Commanding Officer (Code 60)
U.S. Naval Ordnance Laboratory
Corona, California

SECURITY CLASSIFICATION: None (Sample only)

1. ORIGINATING ACTIVITY: USS NEVERSAIL CVA XX

2. MISSILE OR ASSBY. (Name, Configuration and/or S/N): SIDEWINDER G&C MK 1

3. TEST SET (Type, S/N and Calibration date): SIMPLIFIED

4. DATE (MO DAY YR)	5. OPERATION	6. ITEM (Identification) NAME, STOCK NO. AND SERIAL NO.	7. OP TIME (Minutes) EXTERNAL POWER	7. OP TIME (Minutes) INTERNAL POWER	8. TEST RESULTS (Check √ one) GO	8. NO GO ITEM	8. NO GO T.E.	8. NO GO PERS	8. NO GO OTHER	9. DETAILS AND/OR REMARKS TYPE OF FAILURE, LIGHT INDICATIONS, METER READING, ADJUSTMENTS, DESCRIPTION OF DAMAGE, REFERENCES, DISPOSITION, ETC.
06-14-60		P- 3456				✓				BENT FINS.
06-15-60		P- 4567				✓				BROKEN UMBILICAL
06-15-60		G- 9110				✓				CRACKED DOME
06-16-60		G- 5678				✓				DAMAGED CONTACT FUZE RECEPTACLE
06-19-60		P- 3579				✓				LOCKED FINS

Figure 57. Guided Missile Service Record, With Entries Made by Firing Unit.

or cloudy plastic strip (the plastic strip should be transparent); and (2) damaged or defective screw threads. Discard the rocket motor in accordance with local instructions. Return warhead and contact fuze to stowage for later use.

ACCESSORY EQUIPMENT. Tools, test equipment, and various accessories such as target rockets and training components, NPAs, etc., shall be logged in and out of stowage areas in accordance with standard practices adopted at the local level.

Chapter 5

SAFETY PRECAUTIONS

INTRODUCTION

There are numerous safety precautions which must be disseminated to personnel concerned with the handling and stowage (whether shorebase or shipboard) of the SIDEWINDER 1 and 1A missiles and each of the missile components. This chapter of the ordnance pamphlet lists the general precautions concerned with the complete missile, and also the pertinent precautions concerned with each component of the missile.

GENERAL MISSILE PRECAUTIONS

Observe latest restrictions for handling, loading, or parking of loaded aircraft in the presence of electromagnetic energy from ship's transmitters.

Make sure that the firing system cannot be energized during launcher loading and unloading operations. Keep well away from the front and rear of the missiles when loaded on launchers.

If the assembled missile is to be held in ready stowage, make certain the NPA is used.

When the missile is not on the launcher, be sure that either the shorting clip or, preferably, the firing button protector is in position on the contact buttons.

Do not smoke within 200 feet of ordnance.

MISSILE COMPONENT PRECAUTIONS

GUIDANCE AND CONTROL SECTION. If a G&C section is dropped, resulting in damage to the dome and gyro, extreme care must be taken so that no escaped mercury-thallium mixture comes in contact with skin tissue or clothing of personnel. This mixture is fluid, silver in color, and is highly toxic. If the fluid contacts the skin, wash the skin thoroughly with soap and water. If clothing is contaminated, change and wash clothing immediately. Gloves must be worn in order to handle the damaged component safely. If the mixture gets inside gloves, the hands and gloves must be washed thoroughly.

No danger is involved if the section is dropped and no spillage or leakage is evident.

O-rings that are included in the G&C section container should be used in the groove at the after end of the G&C section that butts against the forward end of the warhead. These O-rings are not the correct size for the influence fuze and should never be used on the fuzes.

FUZES. The Mk 303 and 304 fuzes were designed to ensure the safety of personnel responsible for their handling. Accidental or unintentional rough treatment will not cause the fuzes to become hazardous to handling personnel. The fuzes do, however, contain delicate mechanisms and electronic circuitry and their reliability may be reduced by careless handling. Failure of any element of the fuzes as a result of careless handling will prevent the accomplishment of the fuzing purposes. It is emphasized therefore that the fuzes must not be mishandled or dropped.

It is recommended that the following drop and handling criteria be used for judging the serviceability of the subject fuzes.

Mk 303 and Mk 304 Fuzes, All Mods, Bare or in Inner Containers. A fuze dropped from a height of 3 feet or less shall be considered serviceable, unless evidence of damage to the fuze is readily apparent.

NOTE: Evidence of damage is flattened or deformed edges, dents, scratches, or gouges in the metal housing; rattles due to loosened components within the housing; or, in the influence fuze, excessive abrasions, gouges, or a puncture of the Kel-F window strip.

A fuze dropped from a height in excess of 3 feet shall be considered unserviceable.

Any discernible evidence of damage to a fuze noted during fuze breakout or missile assembly shall be cause for rejecting the fuze as unserviceable.

Mk 303 and Mk 304 Fuzes, All Mods, in Outer Shipping Containers. A fuze dropped from a height of 5 feet or less while packed in the inner and outer container shall be considered serviceable, unless evidence of damage to the fuze is readily apparent when the fuzes are unpackaged.

A fuze dropped from a height in excess of 5 feet while packed in the inner and outer container shall be considered unserviceable.

Mk 304 fuzes found unserviceable, as a result of a drop or damage, shall be disposed of in accordance with existing regulations for disposal of explosive ordnance. Mk 303 fuzes found unserviceable shall be returned to a navy depot for inspection. If on inspection at the navy depot the Mk 303 fuze is found operable, the fuze will be tagged with a brief description of the visible damage and a statement that the fuze is serviceable in the conditions indicated. The fuze will then be returned to the using agency.

WARHEAD. The warhead is potentially dangerous ordnance material and should be treated in accordance with existing ordnance regulations.

The high-explosive warhead is relatively insensitive to shock and will not normally detonate or explode when dropped 40 feet or more or when dropped from an aircraft on landing. However, like all high explosives, it should be treated with respect.

Unfuzed warheads may be stored as either gun-projectile ammunition or bomb ammunition.

All safety precautions applicable to unfuzed bombs apply to unfuzed Mk 8 warheads.

Do not disassemble warheads or perform any alterations on them.

ROCKET MOTOR. The rocket motor is potentially dangerous ordnance material, and should be treated in accordance with existing ordnance regulations.

In accordance with regulations set up for handling rocket motors, the following precautions shall apply:

Storage conditions which apply to smokeless powder also apply to rocket motors.

Do not store the motor when it will be subjected to unduly high temperatures for extended periods.

Do not store motors with or near radio or radar apparatus, or adjacent to electric panels or live wires.

Do not fire rocket motors when the propellant temperature is outside the safe-firing temperature limits specified on the motor tube. Firing under such conditions may result in a motor blowup. If the motor has been exposed for more than one hour to temperatures outside these limits, maintain it within safe temperature limits for six hours.

Handle motors carefully at all times. Avoid jarring or dropping, as a cracked propellant grain may cause motor blowup upon firing. Drops of the motor in a horizontal position cause the grain to crack more readily than drops while the motor is in a vertical position. Cracking also occurs more readily at low temperatures. It is imperative that in transporting, moving, or handling the motor, care must be exercised not to subject it to unnecessary jolts from dropping or sliding against a solid object. If a motor has been dropped 18 inches or more, it shall not be used, and should be disposed of. Motors dropped less than 18 inches should be examined for external damage. If no damage is evident, the rounds may be considered safe to use.

Do not tamper with or attempt to repair any part of the motor. If the motor is damaged or defective, remove the other components and discard the motor.

Use all standard safety precautions for rocket motors.

NONPROPULSION ATTACHMENT. The NPA is to be used when the rocket motor is assembled with other missile components. It is recommended that the NPA be removed at the time that the missile is placed on the launcher.

AUXILIARY COMPONENT PRECAUTIONS

TARGET ROCKET. The rocket motor is nonpropulsive in the event of accidental ignition when the head is removed. Never store the target rocket in the assembled condition.

Never remove the electrical connector shorting clip until the rocket is loaded on the aircraft launcher. Plug the electrical connector into the HVAR pigtail receptacle after stray voltage check and just before takeoff.

Before loading the target rocket, examine the motor tube and fins

for any damage. A bent fin will cause erratic rocket flight. A damaged motor tube may mean a cracked propellant grain, which may cause a motor blowup if the rocket is fired. Dispose of damaged rocket motors. Repair or replace a damaged or bent fin assembly.

Observe standard safety precautions throughout the assembly and loading operations. Only essential personnel may be in the vicinity of assembly and loading operations.

TRACKING FLARE. The tracking flare contains a heat-sensitive pyrotechnic mixture. It should be treated as a pyrotechnic and should not be exposed to an open flame or a hot object.

If, after a flight, the foil around the ignition holes or covering the end of the tube is bulged or damaged, the flare shall not be used. Likewise, if the foil covering the holes at the after end of the flare or covering the end of the tube is torn, loose, or damaged, exposing the ignition holes, the flare shall not be used. Dispose of the damaged flare in accordance with local directives.

EXERCISE WARHEAD. SIDEWINDER exercise warheads to be used on missiles during practice should be handled as a pyrotechnic item and shall also be given pyrotechnic stowage. Any pyrotechnic spilled from the head should be wetted down and swept up thoroughly for disposal. All precautions normally used for pyrotechnic signals should be observed.

AERO 3A LAUNCHERS. Remove all ordnance from aircraft while performing launcher checkout.

CAUTION

Visually check for evidence of failure of both forward snubber cams of Aero 3A guided missile launchers, before loading missiles and target rockets. Return Aero 3A launchers with cracked or broken snubber cams to an overhaul and repair facility (O and R) for repair.

Do not install a missile or target rocket on launcher without first making a stray-voltage check.

Before loading or unloading missiles, make sure that the following conditions prevail.

1. Aircraft power must be OFF.
2. Aircraft must be electrically grounded.
3. Launcher safety pin must be in launcher when loading or unloading missiles.
4. Master armament switch must be in the OFF position.
5. Weapon selector must be on SAFE.

After loading, make certain detent latch is securely latched, snubbers are engaged, all electrical plugs are securely fastened in place, umbilical-block hook is locked in umbilical block, and nose cap is latched.

MISFIRED AND PHYSICALLY DAMAGED SIDEWINDER MISSILES

HANDLING AND DISPOSITION INSTRUCTIONS FOR MISFIRED SIDEWINDER MISSILES. These instructions are as follows:

1. If jettison fails, or if the pilot elects to return with a misfired SIDEWINDER missile, the following precautionary measures must be taken prior to landing:

a. Weapon selector switch is placed in SAFE position.

b. When flight operations permit, a wait of at least 10 minutes from the time that the firing button was last depressed is desirable.

2. After an aircraft has landed with a misfired SIDEWINDER missile, the launcher safety pin shall be inserted in the launcher immediately and the aircraft spotted in a safe position.

3. After the waiting period of at least 10 minutes has elapsed, the missile is unloaded from the launcher in accordance with the standard unloading procedures (e.g., Aero 3A Launcher and Pylon Assemblies Handbook NAVAER 11-75A-504, Handbook—Operation and Service Instructions).

4. The missile is disassembled in accordance with this OP 2309, and the individual missile components are checked and disposed of as set forth here.

HANDLING PROCEDURES FOR PHYSICALLY DAMAGED SIDEWINDER MISSILE COMPONENTS. Handling procedures are as follows:

Motors. Make a visual inspection of each motor before assembly and subsequent to disassembly. Reject and dispose of motors with deep scratches, dented tube walls, or damage which prevents assembly with other components.

Warheads. Inspect, visually, each warhead before assembly and after disassembly. Give particular attention to the ends, cavities, and outer walls. Reject for any damage which prevents assembly with other parts.

In every case where the outer wall is damaged sufficiently to expose the explosive, throw the warhead overboard immediately if at sea. Ashore, the damaged warhead shall be properly segregated and the services of Explosive Ordnance Disposal Personnel obtained immediately.

Fuzes. Inspect, visually, each fuze before assembly and after disassembly. Reject for any damage which prevents assembly with other components, paying special attention to threads and walls of fuzes and boosters. Inspect the clear plastic strip on the fuze for any visible damage, such as cracks, chips, abrasions, or other surface imperfections. Should excessive damage exist, reject the fuze, and return it to a depot. Note on the log card the cause of rejection.