ADVANCED FUZE & EXPLOSIVE ORDNANCE BULLETIN No. 4

1 MAY 1944

CONFIDENTIAL

This bulletin has been compiled by the combined staffs of the U.S. Navy Bomb Disposal School and the Advanced Fuze & Explosive Ordnance Course. It is to be used only by the graduates and those doing directly related work. While it is believed to be accurate, it is not to be considered an official publication.

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NOTICE

Effective with the 1 April 1944 issue, the AF & EO Bulletin has been standardized and all subsequent issues will be a 6 x 9 inch publication for which binders will be furnished to all graduates.

This change has been made for the following reasons:

1. The "U.S." section of the Bomb Disposal Intelligence Bulletin is to be eliminated and all Bomb Disposal personnel will receive the AF & EO Bulletin monthly. The Bulletin will fit into the binder currently being used by Bomb Disposal Officers for the Intelligence Bulletin.
2. The new size of the Bulletin will afford a considerable saving of paper and storage space and at the same time permit a greater volume of new material.

J. P. David

J. P. DAVID
Lieutenant, U.S.N.R.
Officer-in-Charge

BOMBS

T11 (M83) FRAGMENTATION BOMBS

WAFERS FOR T8 (M16) CLUSTER ADAPTER

As indicated in AF&EO Bulletin No. 3, the T11 (M83) fragmentation bombs may be carried in either the T7(M15) cluster adapter, 100 lb. size, which holds twenty-four fragmentation bombs, or in the T8(M16) cluster adapter, 500 lb. size, which contains ninety fragmentation bombs. The T7(M15) cluster adapter is shipped completely assembled as the M28 cluster, but the larger T8(M16) cluster adapter is not of sufficiently strong construction to permit its being shipped in a loaded condition. The T8(M16) cluster adapter must therefore be assembled by service personnel in the field.

To facilitate the shipment of the T11(M83) fragmentation bombs and their subsequent assembly in the T8(M16) cluster adapter, WAFERS, consisting of ten T11(M83) bombs strapped together, have been designed as shown in Fig. 1. Each T8(M16) cluster adapter accommodates nine of these wafers. The wafers are packed individually in boxes, and have the following dimensions and weights:

Length	19-13/16"
Width	18-1/4"
Height	6-25/32"
Weight (packed)	54.7 lbs.
Weight (unpacked)	30.85 lbs.

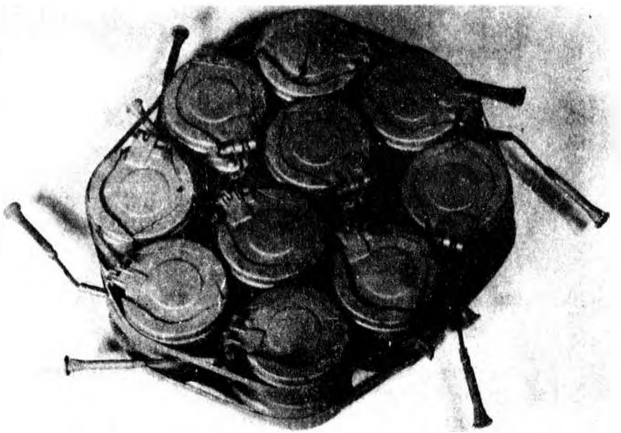

FIG. 1 WAFER OF TEN T 11 (M83) FRAGMENTATION BOMBS

T8(M16) CLUSTER ADAPTER

The Army has issued assembly instructions for the T8(M16) cluster adapter as follows:

Preparation of the Cluster for Use

A. Open Cluster Adapter
1. Place cluster adapter on suitable horizontal supports so that no weight will come on the tail fin.
2. Unscrew and remove the suspension lug guards.
3. Cut the wire on cup retainer located in the nose of the adapter. Remove cup retainer and remove wire.
4. Drive back the locking cup (See detail drawing Fig. 2). This may be accomplished by tapping lightly with any suitable tool. The top half of the cluster adapter may then be opened by prying with a screwdriver along the seam, a short distance back of the nose.
5. Thread a cord or light wire through the hole in the pull of the locking cup and pass the other end through the fuze opening from the inside so that the locking cup may be pulled into position when the cluster is closed.

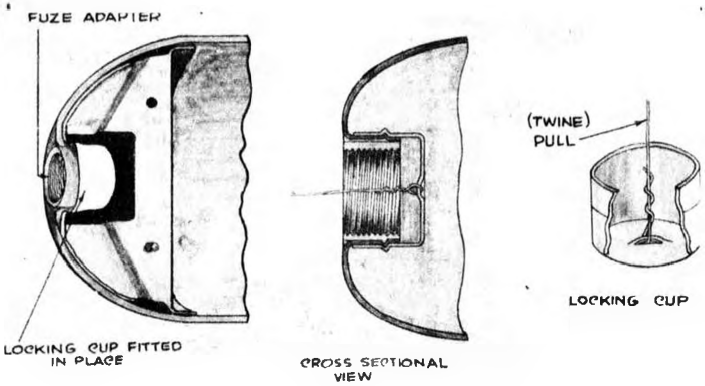

FIGURE 2
DETAILS OF LOCKING CUP

B. Load the Bombs in Cluster Adapter.
1. Open wafer packages. (Nine wafers of ten bombs each are required for one cluster. Each wafer contains bombs with only one type fuze.)
(a) Remove cover from wooden box of wafer package.
(b) Open metal liner.
(c) Clip straps on the upper plywood piece which secures the wafer and remove this plywood piece.
(d) Remove the wafer of ten bombs from the metal liner and also remove the twine and preserve for later use in loading (Paragraph C-1).

2. Place four wafers in the two center bays of the bottom half of the cluster adapters. CAUTION: Always handle wafer by cable assemblies or by the flat surface of the wafer. DO NOT HANDLE BY THE METAL STRAPPING SURROUNDING THE WAFER. (Note: This precaution must be observed so that the metal strap does not slip off accidentally and break up the wafer.)
3. If the cluster is to be suspended from the single suspension lug, remove the two suspension lugs located 14 inches apart and secure the longitudinal brace in place between the partitions for the single and double suspension lugs, using the screws taken from the two suspension lugs. Fasten the single suspension lug in place, using the machine screws provided with the lug. (The lug and screws are packed in the space forward of the first bulk-head of the cluster adapter.)
4. Place three wafers in the rear bay and two wafers in the front bay.

C. Arrange Bombs in Cluster
1. Tie all wafers down firmly and separately with the twine provided, passing the twine over the bombs and outside of the bottom half of the cluster adapter. (Fig. 3)

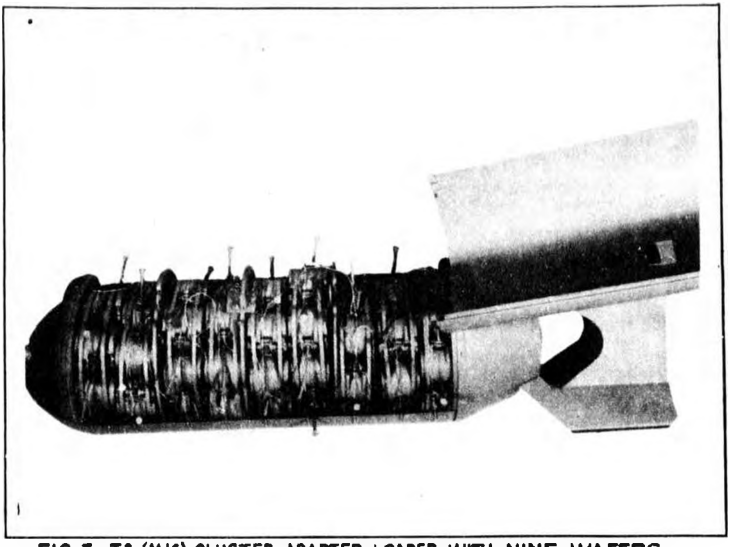

FIG. 3 T8 (M16) CLUSTER ADAPTER LOADED WITH NINE WAFERS T 11 (M85) FRAGMENTATION BOMBS

2. Cut and remove metal strapping from the bombs and settle the bombs in position by agitation of the separate groups so that no rigid parts of the bomb will interfere with closing of the cluster case.

D. Close Cluster
CAUTION: The following operation should be performed slowly and carefully as any wrong step may result in permitting the case assemblies (butterfly wings) to open: BEFORE CUTTING ANY STRINGS, BE SURE CLUSTER ADAPTER COVER WILL CLOSE.

1. Close the top half of the cluster adapter and pull locking cup back in the locked position using the hook and prying tool

provided for this purpose. When the locking cup has been pulled in place, it will seat itself as seen in detail sketch, Fig. 2. When closing the top half of the cluster be sure that the back corners of the top half of the cluster are seated under the rear flange and that the edge reinforcing strips of the cover are inside of the bottom half. Adjust the cable assemblies under the cover so that they will not rest across either of the partitions. If the flange along the sides of the cluster does not seat properly, it may be seated by tapping with a light hammer along the edge of the flange. The bottom surface of the locking cup should be a maximum 1-3/8 inches from the adapter nose when the locking cup is in the locked position. DO NOT exert sufficient force on the locking cup to distort it.

2. Cut and remove the twine with which the wafers have been tied. If the twine does not pull out easily, the pieces may be cut on both sides of the adapter at the seam and the upper portion left in the cluster.

E. Place the AN-M111A2 fuze in the nose of the adapter and carefully screw it in place. Before inserting the fuze, make sure that the locking cup pull has not been forced forward far enough so that the fuze will contact the locking cup when the fuze is screwed into position. To assure this, check to determine that the pull is below the adapter nose by a minimum of 27/32 inch (.844 inch).

F. Set the fuze to the desired time by loosening the thumb screw, rotating the body of the fuze until the desired number of seconds is indicated opposite the marker, then tightening the thumb screw.

G. Thread the free end of the arming wire through the front suspension lug and through the holes provided for it in the fuze.

H. Adjust the arming wire so that the arming plate is properly located for assembly to the bomb shackle.

I. Remove the safety cotter pin, striker stop and sealing wire.

J. Cluster is now ready to be installed on the bomb rack.

Removal

If not dropped, arming wire and fuze should be removed by reversing the order of procedure as outlined above. Stow the loaded cluster off the ground and under a tarpaulin. Stow for as short a period as possible, as this materiel, particularly the fuzes, is easily damaged by moisture.

Precautions

Under no circumstances should personnel attempt to disassemble the cluster or any of the bomb components. The cluster adapter when once loaded and closed must not be reopened.

Due to the great dispersion and drift when released, the cluster should be dropped from 2,000 to 5,000 feet with a time setting on the AN-M111A2 fuze, ranging from approximately five to eight seconds.

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T7 (M15) CLUSTER ADAPTER

The T7(M15) cluster adapter for twenty-four M83's has recently undergone minor changes as seen in Fig. 4. Although the external dimensions remain unchanged, an additional suspension lug has been added, located centrally between the two standard suspension lugs. This additional lug has been added for use in connection with British aircraft. Three metal bulkheads have increased the stability of the case and afford a sturdier means of suspension. The wooden bulk-heads formerly located in the nose and tail ends, have been replaced by metal ones. The metal bulk-head in the nose has a setting plug which fits into a corresponding hole in the other half of the case. This will facilitate closing the case and bring the two halves in proper alignment so that the pull locking cup may be secured more easily during assembly at the factory.

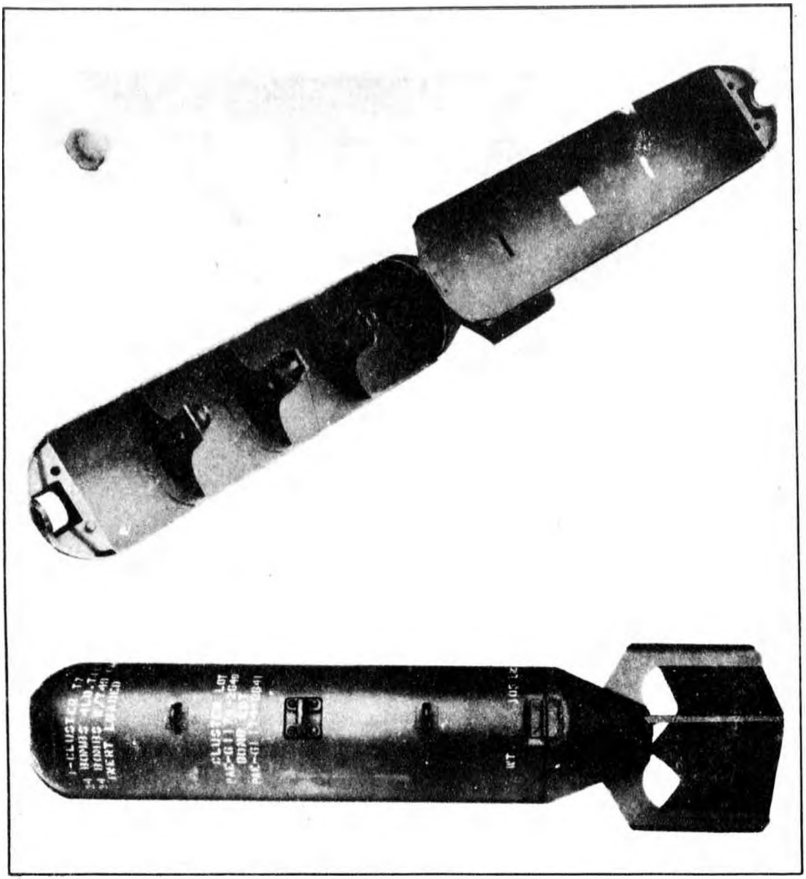

FIG. 4. MODIFIED T 7 (M15) CLUSTER ADAPTER

The T7(M15) adapter cluster is filled with twenty-four M83's at the loading plant and shipped to the field, one per case, as the M28 cluster. With each cluster, the Army will enclose instructions for handling as follows:

Preparation of the Cluster for Use

A. Assembly
1. Unscrew and remove the L-shaped pieces protecting the suspension lugs.
2. Cut wire on cup retainer located in the nose of the adapter. Remove cup retainer being careful not to push cup off the nose piece. Remove wire.
3. Place the AN-M111A2 fuze in the nose of the adapter and carefully screw it in place.
4. Thread the free end of the arming wire through the front suspension

lug and through the holes provided for it in the fuze.
5. Adjust the arming wire so that the loop is properly located for assembly to the bomb shackle.
6. Remove safety cotter pin, striker stop, and sealing wire.
7. The cluster is now ready to be installed in the plane.

B. Disassembly
If not dropped, the above steps should be reversed and the cluster returned to stowage. These clusters, when unpacked, should not be stowed in the open without a tarpaulin over them since moisture may damage the materiel.

Precautions:

The cluster is packed for use requiring only assembly of an AN-M111A2 fuze as described above. UNDER NO CIRCUMSTANCES WILL PERSONNEL ATTEMPT TO DISASSEMBLE THE CLUSTER OR ANY OF ITS BOMB COMPONENTS.

GENERAL DATA

The first 140,000 to 150,000 booster cups manufactured for the T11(M83) bomb fuzes were made of plastic material. Henceforth, these will be made of aluminum.

The Army has now decided upon a standard color scheme. The T11(M83) bombs will be olive drab overall with a half inch yellow enamel band painted around the folded butterfly wing assembly.

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AN-M81, 260 Lb. FRAGMENTATION BOMB

The M81, 260 lb. fragmentation bomb, (See pages 10 and 11 AF&EO Bulletin No. 1) has been adopted as AN standard. This bomb is similar in design to the AN-M41 20 lb. fragmentation bomb but it is not to be considered a substitute for the AN-M41 bombs clustered. The bomb will fit a 100 lb. station and is approximately the same size as a 100 lb. G.P. bomb.

Normal fuzing will be a combination of the AN-M103 with an instantaneous setting in the nose and the AN-M100A1 or AN-M100A2 in the tail with a non-delay M14 primer detonator.

Suspension is such that all services can use it.

Composition B[1] has been designated as the standard explosive for loading the AN-M81. Ednatol[2] and T.N.T. are first and second substitutes respectively. In loading the AN-M81, preference will be given to it over G.P. bombs that are to be loaded with Comp. B until the time when there will be sufficient Comp. B to meet all bomb requirements.

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[1] COMPOSITION B: Composition B, according to Army tests, has proven itself in some cases a better explosive than T.N.T. At present the Army is filling some of its large G.P. and fragmentation bombs with this explosive.

Composition B consists of either 60% R.D.X. and 40% T.N.T., or 59% R.D.X., 40% T.N.T. and 1% beeswax. Its pouring temperature is between 85 and 100°C. Its sensitivity lies between Picric Acid and T.N.T., requiring a thirty-inch fall with a 2 Kg. hammer to bring about detonation. Composition B remains stable in storage. On an equal weight basis it is 30% more powerful than T.N.T. and has a rate of detonation of about 7800 meters/second. As a bomb filler, it is poured and cast. Its color is pale yellow or cream. Specific gravity is approximately 1.62.

[2] EDNATOL: Ednatol is a relatively new explosive which may be seen more often in the future. It consists of 57% ethylene di-nitramine (also known as Edna or Halite) and 43% T.N.T. Its sensitivity to impact is equal to that of T.N.T. requiring a thirty-nine-inch fall with a 2 Kg. hammer in order to cause detonation. It is stable in storage and 22% more powerful than T.N.T. on an equal weight basis. Rate of detonation is 7460 meters/second. Melting point is approximately the same as T.N.T. - about 80.2°C. However, when melted, it does not turn to a liquid status, but remains in a pasty form. The explosive is light yellow or cream in color and is always cast. Its specific gravity is about 1.6.

As an indication of the effective damage which may be expected from the AN-M81 fragmentation bomb (T.N.T. loaded for this particular test), the following ratios have been computed using the AN-M41 20 lb. fragmentation bomb as a standard:

MILD STEEL PLATE	RATIO OF COMPARATIVE DAMAGE
1/8"	5
1/4"	8-1/2
3/8"	58

In comparing the AN-M81 and the AN-M41 bombs, on the basis of stowage space in standard aircraft it is necessary to compare a single AN-M81 bomb with a cluster AN-M14l of six AN-M41 bombs, as either fits into a 100 lb. station in a bomb rack. The computed ratios indicate that the AN-M81 bomb is only 84% as effective as the cluster when attacking 1/8" plate. If, however, the overlapping of the damage areas of the six AN-M41 bombs be considered, there probably would then be little difference in effectiveness. The computed ratios show that, when attacking 1/4" plate, the AN-M81 bomb is about 40% more effective than the cluster, and when attacking 3/8" plate, the AN-M81 is about ten times as effective as the cluster.

In attacking 1/2" mild steel, the AN-M81 and AN-M41 bombs are not comparable as no fragments from the AN-M41 will perforate such plate. On the other hand, at a distance of fifteen feet from an AN-M81 bomb, computations indicate that there should be about one fragment per four square feet, capable of perforating 1/2" mild steel.

In comparing the AN-M81 and AN-M41 bombs, on a weight basis, the single AN-M81 bomb would only be about 40% or 55% as effective as twelve AN-M41 bombs (the equivalent weight) when attacking 1/8" or 1/4" plate, respectively. However, in attacking 3/8" plate, the AN-M81 bomb would be four and a half times as effective on a weight basis as the AN-M41 bomb.

The foregoing tests and computations indicate that the AN-M81 bomb would be preferable for use against more resistant and concentrated targets, such as light armored motor vehicles, heavier airplane parts, PT boats, landing barges, etc. On the other hand, the AN-M41 bomb would be preferable in attacking more vulnerable targets, such as dispersed unprotected troops and light materiel targets.

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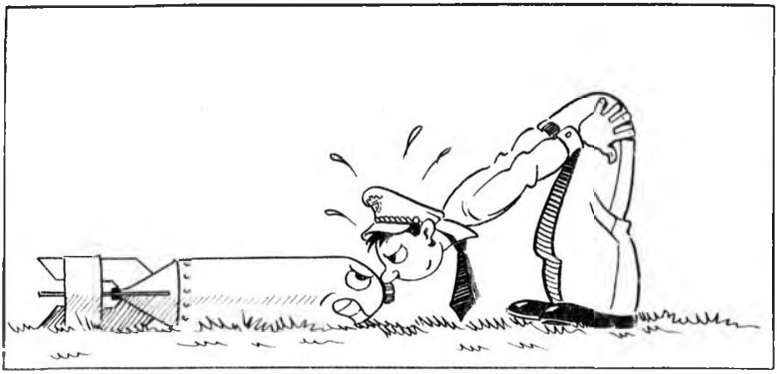
REFERENCE: Ordnance Committee Items 23073, 23273, and 22367.



"THE ETERNAL STRIFE"

FUZES

M132, M133, M134 TAIL (DELAY) FUZES

A preliminary discussion of these fuzes was made in AFFEO Bulletin No. 1, page 3 as the former T4l series. They are presented herein with more complete detail.

The M132 series fuzes, Fig. 5, have been designed with an average delay of ten minutes and an absolute minimum of five minutes. The five-minute minimum delay is incorporated to permit forward planes of large bomber formations to drop their bombs from low altitudes so that planes in the rear of the formation will not be damaged by blast or fragmentation. The M132 series fuzes are chemical action, similar in general principle to the M123 series and atmospheric temperature will have a direct bearing on the length of the delay. According to Army tests, the following delays were established at indicated temperatures:

Temperature	Length of Delay
122°F	6 min.
110°F	7.5 min.
85°F	15 min.
70°F	21 min.
55°F	30 min.
40°F	40 min.
32°F	45 min.
10°F	80 min.

The design of the M132 series fuzes has the following advantages over the M123:

1. The construction is such that set-forward forces resulting from nose impact of a bomb will not place any stress on the celluloid delay element, thus eliminating all possibility of instantaneous action from this cause.

2. The solvent is contained in a flexible copper bellows rather than a glass ampoule making the fuze safer for handling and stowage.

3. The fuze body does not project far beyond the adapter booster; hence, there is less chance of breakage upon severe multiple impacts.

The fuze is made in three sizes used in bombs with adapter boosters as indicated below:

FUZE	OVERALL LENGTH	BOMB USED IN	BOMB WEIGHT	ADAPTER BOOSTER
M132	9"57	AN-M30A1	100 lb.	M102A1
		AN-M57A1	250 lb.	M102A1
M133	12"57	AN-M64A1	500 lb.	M115A1
		(SAP) AN-M58A2	500 lb.	M102A1
M134	16"57	AN-M65A1	1000 lb.	M115A1
		(SAP) AN-M59A1	1000 lb.	M102A1
		AN-M66A1	2000 lb.	M115A1

At the present time no nose fuze is to be used with these tail fuzes.

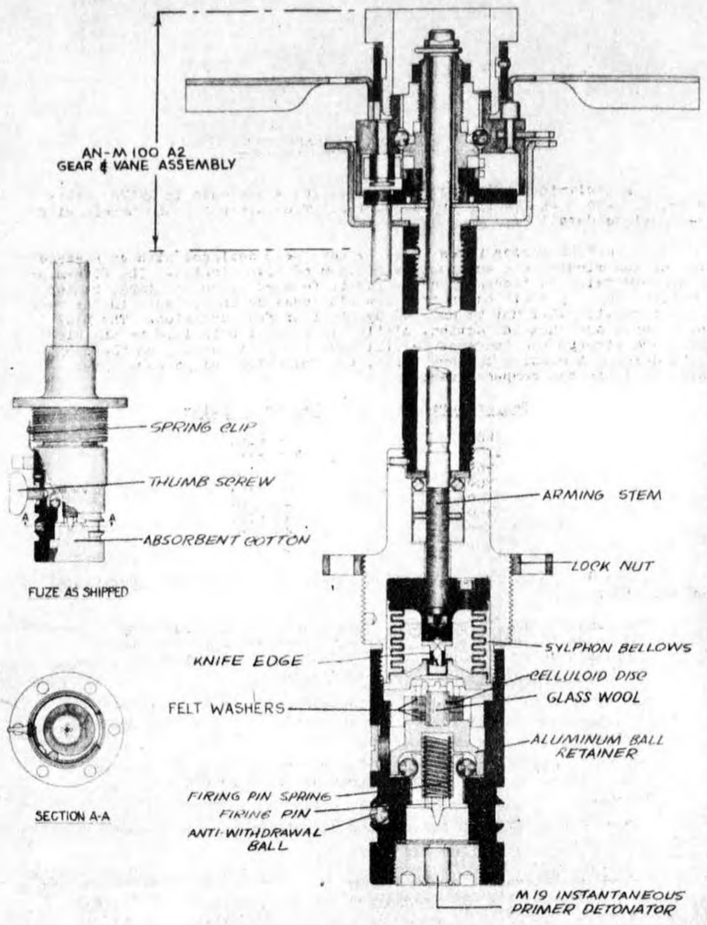


FIG. 5

TAIL, BOMB, FUZE

M132, M133, M134

DESCRIPTION:

When issued, the fuze has a metal spring band around the ball anti-withdrawal device (See detail section A-A, Fig. 5), a small thumb screw located in an enlarged hole in the fuze body to hold the aluminum ball retainer in place during shipment and a spring clip which engages a hole below the bomb mating threads of the fuze as seen in the detail sketch. The M19 primer detonator assembly, washer and disc are not assembled to the fuze when issued but are packed in the same container. The primer detonator cavity of the fuze is plugged with absorbent cotton. This cotton will indicate any leakage of the acetone solvent prior to fuzing by being stained red. If the cotton indicates solvent leakage, the fuze should be destroyed.

A lock nut is used to firmly secure the fuze to the bomb. The ball locking device is the same as that used on the M123 series. ANY ATTEMPT TO UNSCREW THE FUZE FROM THE BOMB ONCE IT HAS BEEN INSTALLED, WILL RESULT IN SEPARATION OF THE LOWER BODY FROM THE TOP PORTION CAUSING THE BOMB TO DETONATE.

The arming vane assembly is that of the AN-M100A2 series fuzes. The arming spindle is threaded into the top section of the sylphon bellows. Directly below the arming spindle is a knife edge which perforates the guilding metal disc to permit the acetone to escape. Around the celluloid plug, three felt washers are fitted which absorb the acetone and concentrate it on the celluloid plug as well as affording a seal to prevent leakage of the acetone.

OPERATION:

When the bomb is dropped, the arming wire is withdrawn, freeing the vanes which then rotate. The rotation of the vanes via the gear reduction system turns the arming spindle. As the arming spindle rotates, the bellows are compressed a sufficient distance to permit the knife edge to perforate the guilding metal disc. Thus, the acetone in the bellows is free to flow through the channels in the knife edge onto the celluloid plug. The three felt washers absorb excess acetone and concentrate it on the plug. As the celluloid plug is dissolved after a minimum of five minutes, the compressed firing pin spring thrusts the aluminum ball retainer upwards, freeing the balls holding the firing pin in place. The firing pin spring, being a two-way action spring, is then in a position to force the firing pin down onto the M19 primer detonator.

ASSEMBLY OF FUZE IN BOMB

1. CAUTION: Before assembling a fuze, remove the absorbent cotton from the primer detonator cavity and be sure that no solvent has leaked onto the cotton. If the cotton indicates leakage by being red, destroy the fuze.

2. Remove the thumb screw from the fuze body. Insert in its place the small flat washer and small flat cap screw shipped separately in fuze container. Tighten screw.

3. Insert primer detonator closing disc (aluminum or copper) into the detonator end of the fuze.

4. Insert sealing washer (lead) over the disc.

5. Screw primer detonator in place. In doing this, support the fuze body so as to prevent relative rotation of parts. Tighten primer detonator securely with PIN wrench.

6. Remove spring band which is fitted around the ball anti-withdrawal device. Ball should move freely in its groove.

7. Remove spring clip from fuze body. At this point be careful not to allow the fuze body to rotate about the bomb mating threads.

8. If the fuze lock nut is not on the bomb mating threads, assemble it to these threads and screw it as far as possible toward the vane end of the fuze.

9. Screw any standard tail fuze, except a long delay type, into the fuze cavity of the adapter booster to make sure that the threads are not crossed or otherwise damaged. Remove this fuze. Screw the desired M132 series fuze in by hand as far as possible, then tighten the lock nut with the L wrench supplied.

10. Thread the longer end of the arming wire assembly through the rear suspension lug and the nearer pair of eyelets on the fuze. Should the nearer pair of eyelets be occupied by the safety pin and sealing wire, place a second pin through the eyelets diametrically opposite, before removing original safety pin.

11. Cut sealing wire and remove safety pin, complying with instructions on the tag.

12. Thread the end of the arming wire through the appropriate eyelet in the arming vane assembly. At the same time slip the vane over the end of the fuze so that the slots in the hub fit over the heads of the two eyelet pins.

13. Screw the vane nut on threaded end of the bearing cup, handtight.

14. Adjust the arming wire to protrude beyond the arming vane from 2 to 3 inches.

15. Slip the safety clip over the end of the arming wire until it just touches the face of the vane. The fuze is now completely assembled in the bomb.

ARMING DISTANCES

The Army has recently conducted tests in order to determine correct arming distances of the M132 series fuzes with the following results:

ARMING DISTANCE IN FEET OF AIR TRAVEL

FUZE	BOMB SIZE					Maximum revolution of vanes to arm - 84
	100 lb.	250 lb.	500 lb.	1000 lb.	2000 lb.	
M132	300	320				
M133			370			
M134				300	460	

EQUIPMENT ISSUED WITH FUZES:

Twenty-five fuzes are packed in one box. Sufficient quantities of primer detonators, discs and their washers, small flat cap screws, small flat washers and vane assemblies are packed with each box of fuzes. In addition, an L wrench is issued to tighten the fuze lock nut which is located on the bomb mating threads of the fuze and a PIN wrench is furnished to tighten the primer detonator in place.

In each box of fuzes, two thermometers are included. One is designed to indicate temperatures of 150°F. Should the fuzes have been subjected to temperatures as high as 150°F., they are still usable, but the Army recommends that they be released from high altitudes only.

The other thermometer will register a temperature of 170°F. Fuzes which have been subjected to 170°F., or in excess of that reading, should be destroyed.

STOWAGE OF FUZED BOMBS:

Bombs which have been fuzed with the M132 series fuze and which have not been dropped* must be stowed in a shaded area under special guard

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* Editor's Note: To date, no official instructions to jettison bombs fuzed with M132 series fuzes have been brought to the School's attention. However, it is recommended that such bombs if not dropped on the target, be jettisoned.

whose duty it is to prevent removal of the fuzes from bombs. If stowage temperatures approach 140°F., the bombs should be cooled by pouring water over the roof of the stowage house or over the bombs.

SAFETY PRECAUTIONS

Although not as sensitive as the M123 series, the M132 series fuzes are potentially dangerous and too much stress cannot be placed on the observance of safety precautions at all times. To repeat, for emphasis:

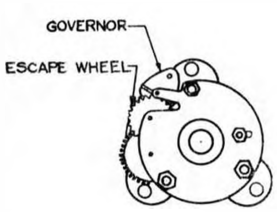
ONCE THE FUZE HAS BEEN SCREWED INTO THE ADAPTER BOOSTER OF THE BOMB IT MUST NOT BE REMOVED FOR IN SO DOING DETONATION OF THE BOMB IS CERTAIN TO TAKE PLACE FOR TWO REASONS: (1) THE BALL ANTI-WITHDRAWAL DEVICE PREVENTS UNSCREWING OF THE FUZE AND (2) IF AN ATTEMPT IS MADE TO FORCE REMOVAL, THE LOWER BODY OF THE FUZE WILL UNSCREW FROM THE UPPER PORTION RENDERING THE STRIKER FREE TO STRIKE THE PRIMER DETONATOR CAUSING DETONATION OF THE BOMB.

AN-M120A1 NOSE FUZE

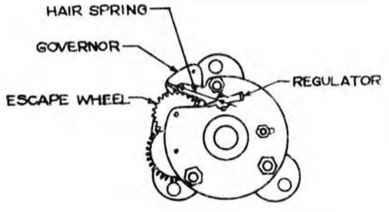
The new adaptation of the AN-M120 nose fuze has been designated AN-M120A1. The AN-M120A1 is designed for use in the nose of the AN-M40 23 lb. para-frag bomb as was the AN-M120. With the modified fuze, attacks may be made at lower levels because the arming time has been reduced from 2.5 seconds (+ or - .25 seconds) to 1.90 seconds (+ or - .15 seconds).

In order to correctly adjust the arming time to 1.9 (+ or - .15 seconds), a regulator has been added to the top of the clockwork mechanism as seen in Fig. 7. A hair spring has been staked to the shaft of the governor and as the governor oscillates, the hair spring oscillates with it, the distance being limited to the amount of free space between the two studs on the regulator. Should the time delay of the clock work mechanism be inaccurate, the error can be compensated for by adjusting the regulator. This operation is done at the factory and is not required of service personnel.

The external appearance of the AN-M120A1 remains the same as the AN-M120.



AN-M120 FUZE CLOCKWORK
FIG. 6



AN-M120A1 FUZE CLOCKWORK
FIG. 7

STRIKER
TO SHOWERS
TO START PLACE COIN IN SLOT
OIL VALVE
TIME SETTING
PRESSURE CONTROL
BIRTH CONTROL
EMERGENCY BRAKE
DANCING EVERY NIGHT
BARGAIN BASEMENT
NOSE DROPS

MISCELLANEOUS

4.5 BARRAGE ROCKET LAUNCHERS

In response to a recent suggestion, sketches of various types of 4.5 BR Launchers are presented here (Figs. 8, 9, 10 and 11). A brief description of the launchers shown will be found on page 32 of AF&EO Bulletin No. 3.

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CERTIFICATES OF SAFETY

(REF BUORD CIRC LTR X4-44)

1. Many items of United States, allied, or enemy ordnance, picked up in action areas, contain explosive components which are not revealed by inexpert inspection, and which, if not detected and removed, may present serious hazards for long periods.

2. No ordnance item which may still contain explosive components, should be investigated in any manner, or disassembled, by unqualified personnel. No item of the class described in paragraph 1 should be so handled, unless there is attached to it a Certificate of Safety, signed by a qualified member of an Explosive Investigation Laboratory, or of a Mine or Bomb Disposal Unit.

3. Printed Certificates of Safety, in the form of tags, are being issued to all Explosive Investigation Laboratories, and to the Mine and Bomb Disposal Units. These certificates state that the item in question is entirely free from any form of explosive or pyrotechnic compound. Consequently, it may be manipulated or disassembled without danger of detonation or burning.

4. If no printed Certificate of Safety is available, a qualified disposal expert should attach the following statement, over his signature and date, to any item of ordnance which he certifies to be free of explosive:

"This ordnance contains no explosive."

Signature _____ Date _____

Unit _____

- - - - - -

MARKING OF BOMBS LOADED WITH COMPOSITION B

Under the present system of marking, handling in the various theaters of war frequently erased the markings and personnel were unable to determine whether the bombs were loaded with TNT and Amatol or Comp. B. Since the tactical uses of bombs loaded with these fillings differ, a method of marking has been devised to permit various types of fillings to be distinguished. While bombs filled with TNT and Amatol, will remain unmarked, Comp. B can be identified by -

> "Two peripheral yellow stripes one inch in width and located two inches between centers will be painted at the nose end of the bomb and two such stripes will be painted at the tail end of the bomb and the words "Comp. B" will be stenciled with black stencil paint in two places on each of the two stripes nearest

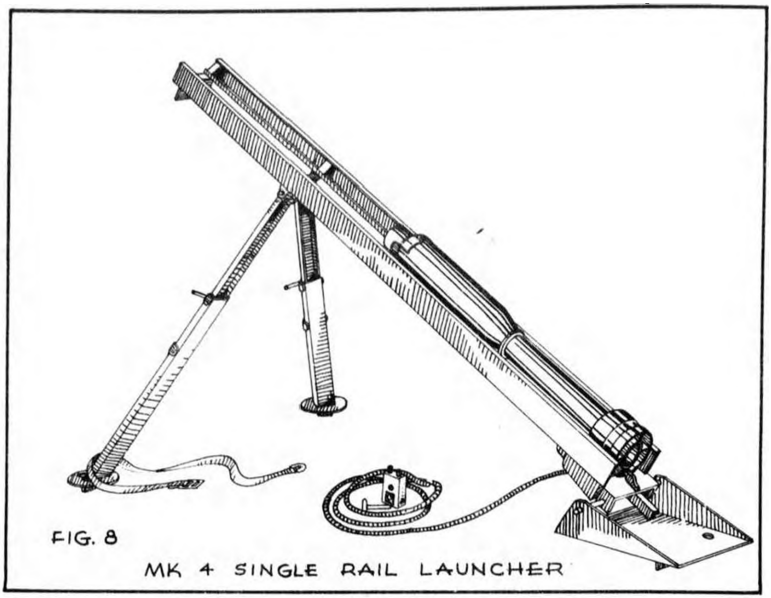

FIG. 8

MK 4 SINGLE RAIL LAUNCHER

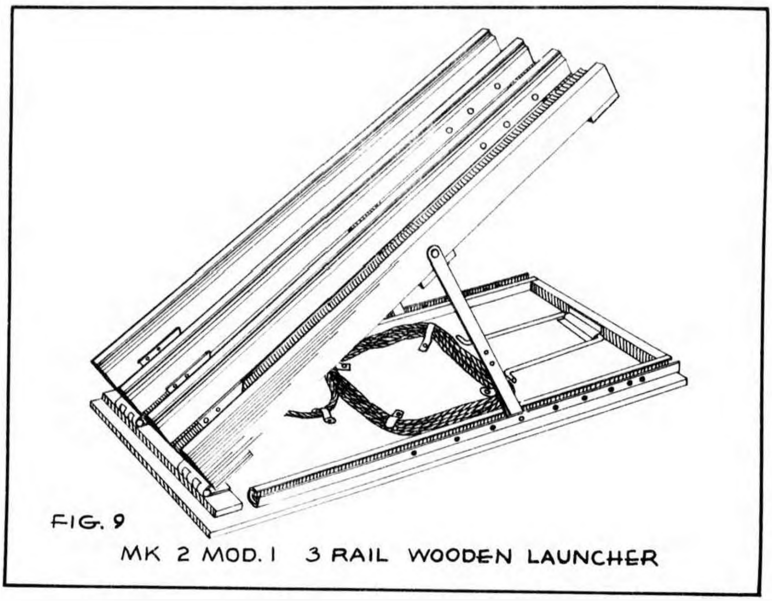

FIG. 9

MK 2 MOD. 1 3 RAIL WOODEN LAUNCHER

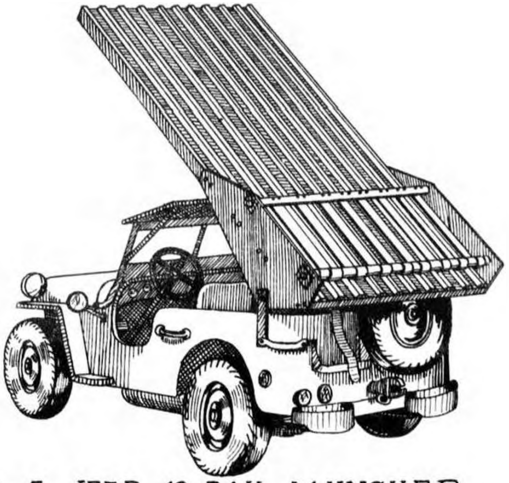

FIG. 10

Mk. 5 JEEP 10 RAIL LAUNCHER

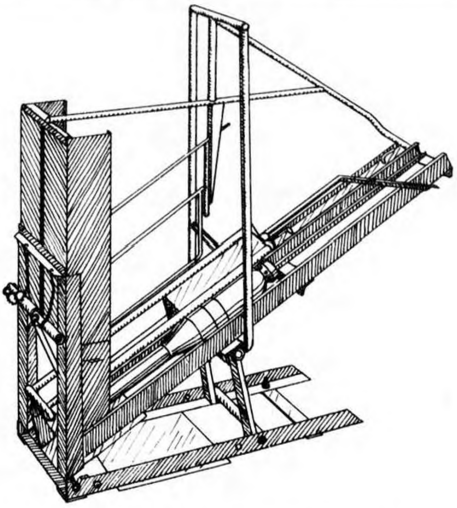

FIG. 11

Mk. 7 12 ROUND AUTOMIC LAUNCHER

the center of the bomb."

Reference: Ordnance Committee Item No. 22220

M117 ADAPTER BOOSTER

The M117 Adapter Booster, Fig. 12, has been designed by the Army to accommodate small, Army nose fuzes with a 1"5 thread diameter in standard Army fuze seat liners having a thread diameter of 2"0.

Use of this adapter booster affords a wider selection of possible bomb fuzes as tactical uses may dictate. The AN-M120A1 Fuze as seen in Fig. 13 is used simply for purposes of illustration and is not to be taken as a recommendation for its use in G.P. Bombs.

SEPARATE PACKING OF BOMB FUZES AND ARMING WIRE ASSEMBLIES

The Army Ordnance Committee has approved the following recommendations in connection with shipment of fuzes and arming wire assemblies which were formerly shipped in the tail crate:

"That no bomb fuzes for AN standard bombs shall be shipped in the same container with the bomb, with the exception of incendiary fragmentation or any other bombs which are shipped fuzed; and that no such bomb fuzes shall be shipped in the fin crate. Metallic or non-inflammable containers for fuzes will be provided as early as practicable.

"That no arming wires shall be shipped in the fin crate but shall be shipped separately in a water-proof container; and that a metallic or non-inflammable container be made available as early as practicable."

Reference: Ordnance Committee Item No. 23071

M16A1 PRIMER DETONATOR

The M16 primer detonators used in the minimum altitude bombing fuzes, namely the M112 series and the M115 series, have been modified slightly and will be designated M16A1.

It was found in some instances of severe impact, that the combined weight of the plunger and firing pin assembly hitting the M16 primer detonator would produce either erratic burning or failure of the delay train. The shoulder of the M16A1 has been modified as seen in Fig. 14, and is designed to give added strength and to insure that only the firing pin will strike the primer.

To accommodate the new primer detonator, only the M112 series fuzes had to be changed slightly to allow passage of the shoulder on the M16A1 into the fuze body. Fuzes incorporating this change will be designated M112A1, M113A1 and M114A1.

The M16 and M16A1 will fit only those fuzes as indicated below:

M16 PRIMER DETONATOR	M16A1 PRIMER DETONATOR
M112, M112A1	M112A1
M113, M113A1	M113A1
M114, M114A1	M114A1
M115	M115
M116	M116
M117	M117

While the M16 primer detonator was made with two delays, namely 4 to 5 seconds and 8 to 11 seconds, the new M16A1 primer detonator is being made with a 4 to 5 second delay and a new 8 to 15 second delay. The 8 to 15 second delay element consists of a barium chromate powder in place of the lead chromate silicon mixture used in the M16 primer detonator.

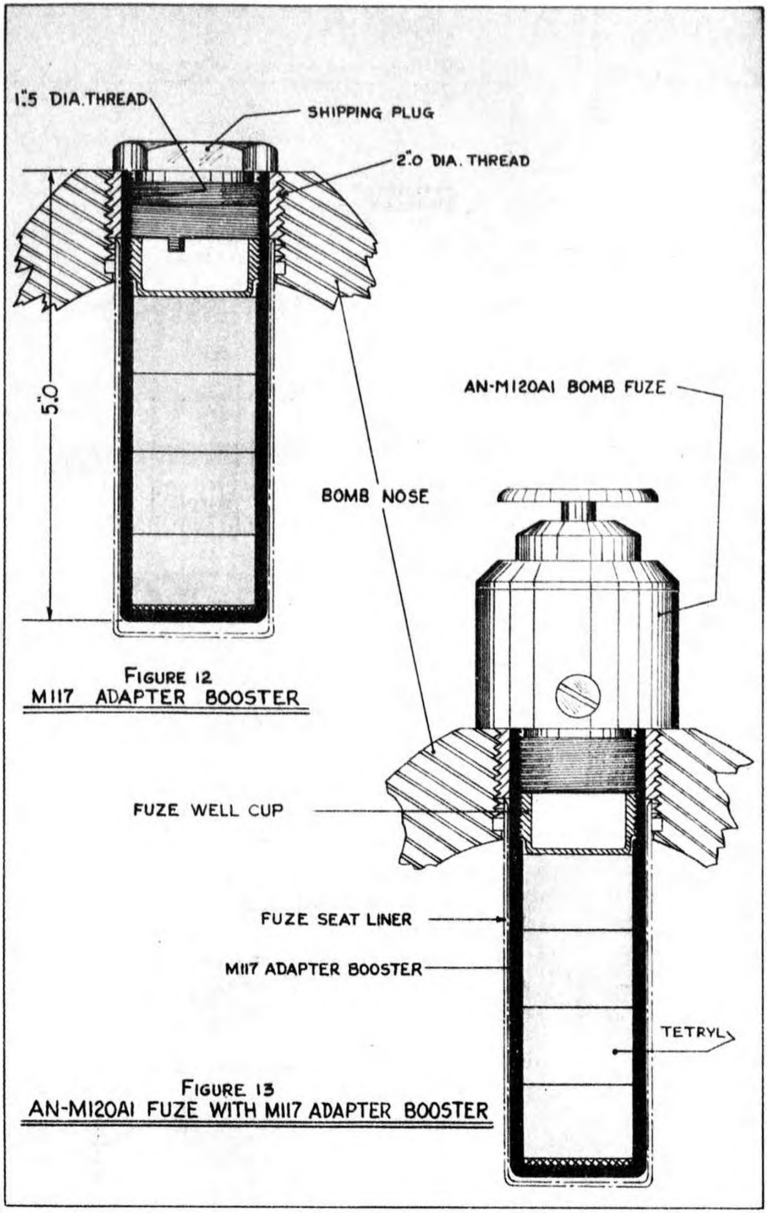

FIGURE 12
M117 ADAPTER BOOSTER

FIGURE 13
AN-M120A1 FUZE WITH M117 ADAPTER BOOSTER

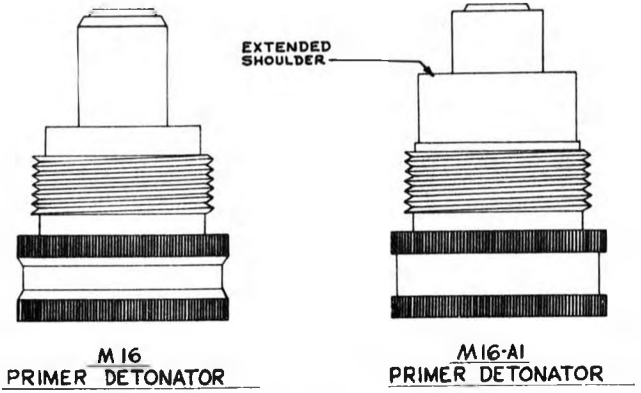

FIGURE 14

Although there is still a considerable quantity of M16 primer detonators in the field with the 6 to 11 second delay, this item is no longer being manufactured.

Both the M16 and M16A1 primer detonators will have the length of the delay stamped on them. When procuring these primer detonators, it should be specified which delay is desired.

Reference: Ordnance Committee Item Nos. 22510, 22689.

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IDENTIFICATION OF CHEMICAL MUNITIONS

(BuOrd Circ. Ltr. A128-43)

To insure immediate identification of projectiles, rocket bodies, bombs, smoke pots and floats, etc., containing a chemical warfare agent as the filler (or part of the filler), these munitions are being marked with solid colored bands to indicate the presence of and type of chemical agent. The chemical warfare symbol of the chemical agent is also being marked on the munition.

The filler indicator bands and the type filler they indicate are:

NUMBER AND COLOR OF BANDS	TYPE AGENT
2 half-inch green bands a half inch apart	Persistent Casualty
1 half-inch green band	Non-persistent Casualty
1 half-inch red band	Harassing
1 half-inch yellow band	Smoke
1 half-inch purple band	Incendiary

The indicator bands and chemical warfare symbols of the more common chemical agents are as follows:

AGENT	SYMBOL	INDICATOR BANDS
Mustard	H	2 green
Lewisite	L	2 green
Mustard plus Lewisite	HL	2 green
Nitrogen Mustard	HN	2 green
Ethyldichlorarsine	ED	2 green
Chloropicrin	PS	2 green
Diphosgene	DP	2 green
Phosgene	CG	1 green
Cyanogenchloride	CC	1 green
Chlorine	CL	1 green
Hydrocyanic Acid	AC	1 green
Chloracetophenone	CN	1 red
Chloracetophenone Solution	CNS	1 red
Chloracetophenone Trng. Solution	CNB	1 red
Brombenzylcyanide	BBC	1 red
Adamsite	DM	1 red
Diphenylchlorarsine	DA	1 red
Diphenylcyanarsine	DC	1 red
White Phosphorus	WP	1 yellow
Titanium Tetrachloride	FM	1 yellow
Sulfurtrioxide plus chlorosulfonic acid	FS	1 yellow
Hexachlorethane type mixtures	HC	1 yellow
Thermite	TH	1 purple

To avoid any confusion between bombs filled with smoke and bombs filled with high explosives, smoke bombs will be painted gray (H.E. bombs are painted olive drab). In addition, all chemical bombs should have the words "gas", "smoke", or "incendiary" painted on them along with the connected symbol (such as HC-SMOKE).

Exceptions to the above are the FS smoke generators and spray tanks and the FM generators which will not have the indicator bands painted on them.

A considerable supply of chemical munitions, especially smoke pots and floats, and bombs, had been issued before it was decided to use the indicator bands and chemical warfare symbols. These munitions should have the correct symbol and, when practicable, the correct indicator band(s) painted on them.

* * * * * * *

MAILING ADDRESSES

With the first issue of the AF&EO Bulletin, an address card was included for purposes of keeping the School informed of the best mailing address for each addressee. Changes in the mailing list have been made in accordance with the cards returned.

In view of the fact that a considerable number of officers are in a mobile status, delivery of future issues of the Bulletin can be made most expeditiously be keeping the School informed of any changes and corrections in addresses.

* * * * *

"FROM THE FIELD...."

With this issue, the Bulletin will contain a section titled "FROM THE FIELD". This section is to include reports from graduates of both the Bomb Disposal as well as the Advanced Fuze & Explosive Ordnance Schools who are presently in the field engaged in ordnance activities. It is expected that such reports will have a great deal of interest value to both your classmates and other graduates who will benefit from your experiences. Letters and reports of this kind should be addressed to:

OFFICER-IN-CHARGE
U.S.N. BOMB DISPOSAL SCHOOL
AMERICAN UNIVERSITY
MASS. & NEBR. AVENUES
WASHINGTON 16, D.C.

All contributions will be welcomed. So, let's hear from all of you!

Report from Ens. R. E. Crandall, Officer-in-Charge, Mobile Bomb & Fuze Instruction Unit No. 3, South Pacific:

"....With respect to the aircraft rockets in this area, there are several points I would like to bring to your attention. So far, the rockets as used by the TBF's and SBD's have had only fair success, mainly due to the fact that no delay fuzes have been available. When the rockets have been used against merchant shipping, barges, and gun emplacements, the Mark 148 has been detonating the rocket before it has had a chance to penetrate. Therefore, there is a great need for the Mark 146 base fuze with a short delay.

"The Mark 4 T-slot launcher has been another source of difficulty. TBF's and SBD's equipped with these launchers have been unable to keep up with the rest of the planes in the striking force because of the increased drag on the airplane. Upon the advice of Dr. Fowler, of the California Institute of Technology, we are having the squadrons equipped with Mark 4 T-slot launchers cut off about twenty inches from the forward end to reduce drag.

"Although this procedure reduces the drag to some extent, it doesn't overcome the basic difficulty and the result is that everyone wants the zero-length launchers as soon as possible."

(Ed. Note: The Zero-length launcher is designed for use on fighter planes where the drag of 7.5 ft. rails makes the Mark 4 launcher impractical. The launcher consists of two bolts for each round fastened to the underside of the wing. The lug bands of the rocket are supported by the bolts. The tail travel distance of a rocket on the Zero-length launcher is actually about 1½0. This type of launcher is still undergoing further tests on fighter planes. It is hoped to reduce the drag of the launchers to 1 knot at 200 knots (indicated air speed. With the next issue of the Bulletin, it is expected that sufficient information on the Zero-length launcher will be available to present the complete story on it.)

AF&EO OR B.D. OFFICER?

Word has come in from the field that several officers trained in the Advanced Fuze & Explosive Ordnance School have claimed to be qualified Bomb Disposal Officers. This procedure can have serious complications as AF&EO Officers are not instructed in the methods of rendering enemy or allied ordnance safe and only to a limited degree are they taught the attack for U. S. Ordnance. It is recommended that any misconception that may exist in this respect be corrected immediately.