RECOGNITION OF GERMAN 1 KG. INCENDIARY BOMBS (Air Ministry Instruction No. 354, June 13, 1943).

The following information on German Incendiary bombs is based on a translation of a captured German technical document.

1. The standard 1 Kg. I.B. is now renamed B.1.E.

2. The 1 Kg. I.B. with steel nose is renamed B.1.3.E.

3. The standard 1 Kg. I.B. with explosive gaine in the tail is renamed B.1.E.Z. and the 1 Kg. I.B. with steel nose and explosive gaine in the tail is renamed B.1.3 EZ: in neither case will the fuze head any longer bear the marking 'A' in red and so the only external recognition marking will be the die stamped Z in letters 8 mm high.

4. It is emphasized that the only certain means of recognition is the removal of the tail unit to disclose the explosive gaine. (Supplements "Bombs & Fuzes" File No. 1321.1).

GERMAN (17)Be FUZE (Alusna, London, June 23, 1943).

Recovery of the (17)Be in North Africa has provided the following information. The markings L.Zt.Z.(17)Be are stencilled on the fuze shoulder in easily removable white paint. Die stamped on the fuze housing are the characters "bmv 1942e, 7d". The construction of the fuze is similar to that of the (17)A, but to accomplish the shorter time of operation the timing disc gearing has been changed and a less powerful mainspring incorporated. The adjacent plunger is not connected and is shorter internally than the "R" plunger. Delays from 5 to 133 minutes are obtainable.

GERMAN AB 250-2 CONTAINER FOR S.D. 1 KG. BOMBS (Air Ministry A.I. 2(g) Report No. 1085).

The following information is based on a report received from R.A.F. B.D. sources in N.W. Africa. Unfortunately the specimen was not wholly complete. First mention of this container was made in Intelligence Bulletin No. 48.

Bomb Data

Nationality - German.
Designation - AB 250 - 2 container for S.D. 1 Kg. Bombs.
Maximum body diameter - 14.7 inches.
Width of tail - 14.7 inches.
Overall length including fitting - 63.7 inches.
Method of suspension - Horizontal.
Contents - Carries 224 S.D. 1 Kg. Bombs.
Color and markings of tail or vanes - Khaki - two red stripes on cone.
Marterial and construction of body - Mild sheet steel.
Length of tail - 19.7 inches.
Span of tail vanes - 19.7 inches.
Thickness of casing - 0.08 inches.
Total weight - 215 Kg.
Color of nose and body - Khaki.
Marking of body - See diagram.
Material and construction of tail - Mild steel sheet welded.
Fuzing system - (79)A or (69)D.

Description

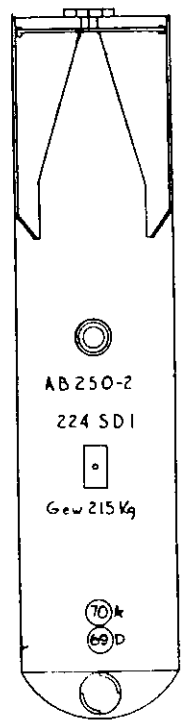
The container is constructed of mild steel and is divided along its longitudinal axis into two halves and hinged at the tail. The container is divided internally by two bulkheads into three compartments, a dome shaped nose compartment, a cylindrical central compartment, and a cone shaped tail compartment. Suspension of the container is horizontal. The sheet steel tail, formed of four fins braced by two bars riveted to opposite fins, is welded to both the central cylindrical and cone-shaped tail portions of the container.

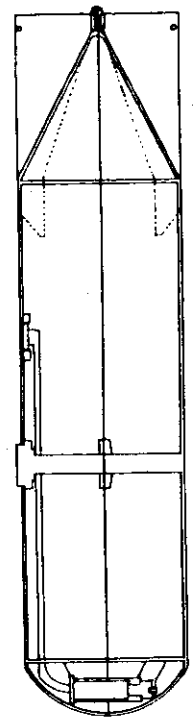
The nose compartment houses the fuze pocket welded to a bracket, which, in turn, is welded to the upper half of the container. The two halves of the container are presumably held together by a securing nut and a shear wire which passes through an anvil in the lower half of the fuze pocket (the anvil was not recovered). The fuze in the recovered container was (79)A; it is thought that the fuze (69)D, not yet encountered, is an alternative fitment.

The S.D. 1 Kg. bombs are houses in the central cylindrical compartment; no packing pieces (if any are used) have been found. Welded to the lower half at the point of balance of the loaded container is a stout metal transverse suspension strip provided with a metal plate tapped to take a suspension lug.

Functioning

On release of the container from the aircraft, a charge is imparted to the electric time fuze (79)A or (69)D via a charging adaptor, a cable, and a modified charging attachment which serve to bridge the abnormal distance between the charging arm head on the aircraft and the nose-located fuze. Thereafter it is thought the fuze functions and the container opens in a manner similar to the A.B. 23 S.D. 2 container.





LUCKY BAG

AXIS USE OF BOOBY TRAPS

A communication from Ensign Cope in Sicily states that the Axis is still using the French Box Mine, in addition to the Tellermine and B-4 Italian mine. Booby-trapped light sockets initiated by extraction of the bulb and a hand grenade with safety pin extracted, placed in the breech of a machine gun so that it would be set off when the cooking lever was pulled back, were among the anti-personnel devices uncovered.

EVACUATION DISTANCES

Lt.(jg) McMillan writes from Sicily as follows: "Sizeable fragments from both the 500 Kg. German bomb blown on the surface, and the 500 pounder (American), blown in an old crater, travelled over 1,000 yds. The evacuation tables for a surface bomb, according to Bomb Disposal Int. Bull. No. 45, issued July 2, 1943, permit traffic at 150 yds. The difference between these two sets of figures is reconcileable. Obviously the war has to go on, and traffic has to pass in many somewhat risky places. But it is felt that when a bomb is to be blown on the surface, the bomb disposal officer should tear up his evacuation table and evacuate all personnel, not adequately protected, for at least 1,000 yds."

In conjunction with this report, it is again emphasized that the distances prescribed in the B.D. Evacuation Tables are minimum figures for use under conditions where there is an attempt to prevent explosion of the bomb. If the explosion is a certainty, as where a bomb is blown in situ, all personnel should be evacuated as far as practicable, and what is more important, see adequate protection behind a wall, tree, etc.

JAPANESE

JAPANESE 30 KG. BOMB (New Japanese B.D. Information No. 12, 15 April, 1943).

Description

The general construction is identical with that of the standard Army 50 Kg. HE bomb (type 94). The body comprises a hollow steel tube into which a nose piece is screwed and to which a tail-cone is welded. The 4 tail fins are welded to the tail cone by spot welds, and are steadied by straps riveted to them. The tail fuze adapter is separate and welded to the tail cone. A normal Army type suspension lug is riveted to the bomb at the point of balance. Two pairs of grub screws at the nose and tail secure the fuzes, while a single grub screw locks the nose piece inside the body.

Dimensions

Overall length	- 2 ft. 9.25 in.	Total weight	- 30 Kg.
Diameter of body	- 5 7/8 in.	Weight of Filling	- 11.75 Kg.
Wall thickness	- 9/32 in.	Charge/Weight Ratio	- TNT/RDX 50/50
Length of body	- 2 ft. 4.12 in.	Color	- Black
Length of tail	- 1 ft. 1 1/4 in.	Markings	- Normal yellow and white bands.
Width of tail	- 8.25 in.		

Main Filling

The filling is made up of the normal 3 portions; nose, body, and tail. Each portion is separated by a circular cardboard disc. The explosive itself is 50% TNT and 50% RDX and is contained in cardboard cartons.

Fuzing

Nose - A-2(a)
Tail - B-1(a)
Nose fuzes A-2(b) or C-3(a) could also be fitted.

Use

This bomb is a normal GP Type and not anti-personnel.

JAPANESE BOTTLE GRENADE (BDO India - China, April 1943).

Bottle

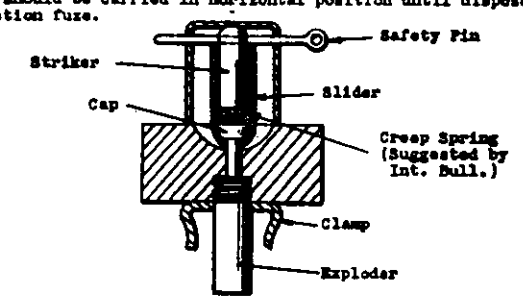
This fuze can be clamped on the neck of any bottle. The ones used by the Japs is 8" high. The bottle fits into a canvas bag which has straps to be carried on the belt.

Filling

One of these bottles is in possession of British Chemical Warfare in Calcutta. The filling is dark, thick liquid containing petrol, tar, and probably rubber. It has not been fully analyzed as yet.

Remarks

Care should be exercised if bottle found or fuze found alone with safety pin withdrawn. It should be carried in horizontal position until disposed of. This is an always action fuze.



GERMAN S.C. 250 BOMB

Use of Kopfring (Bomb Disposal Intelligence Bulletin No. 18, April 1943). A 250 Kg. S.C. bomb has been found in England having a kopfring. The kopfring is spot welded to 4-1" steel straps. These are secured to the bomb by a screwed plug which fits into the hole for the nose suspension eyebolt.

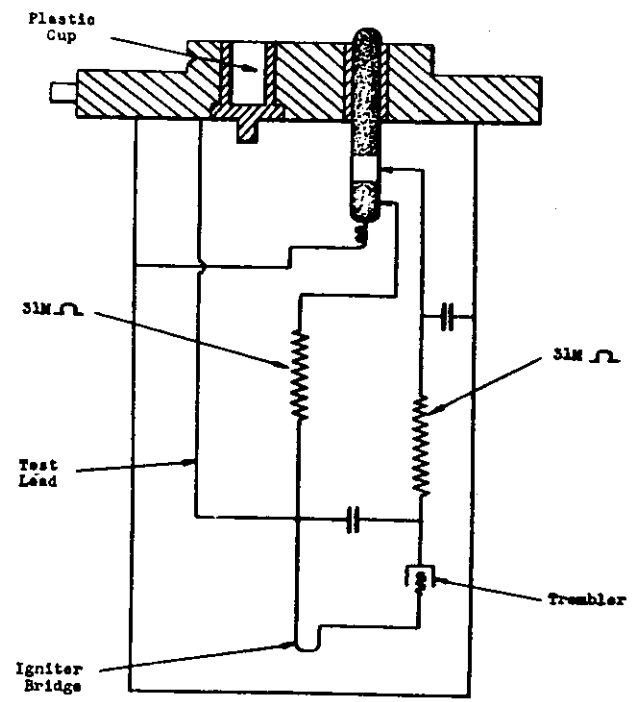
GERMAN FUZES - VARIATION OF (55) AND (25)B (S.R.8 England, June 11, 1943).

Examination has been made of a Rheinmetall Electric fuze with marking El AZ (55) embossed in a recessed panel on the fuze head, instead of being stamped. The additional markings were GB..40..4a. The fuze is identical in general characteristics with those marked in the usual way with (55). The measured delay was 8 seconds only, instead of the 14 seconds previously found for this type of fuze. Captured documents state that this fuze is to be used in bombs fitted with nose extension rods. Also examined was a Rheinmetall Electric fuze El.AZ 25B (no circle), with additional markings drs..42..12d. So far as could be ascertained this was identical with fuzes marked (25) (in circle) B.

GERMAN RHEINMETALL (45) FUZE

This fuze is similar in construction to the (55) except that the base is made of aluminum instead of plastic. The customary pressed black powder flash pellet is not fitted and the flash channel in the base is covered by a light copper disc. A plastic cup seals the adjacent plunger opening. The markings on the fuze shoulder are: El A.Z.(45), Rh.S.1940, 3c.

The single circuit incorporated in the (45) fuze provides only instantaneous action. The fuze can be discharged with all known dischargers. The (45) has never been found in a UXB and was probably the forerunner of the (55).



(45) FUZE

GERMAN "BRAND C.250A" PHOSPHORUS INCENDIARY (Military Intelligence Division W.D.G.S. May 6, 1943).

1. Several 250 Kg. phosphorus incendiary bombs have been recovered in the U.K. They have been of 2 types; Type I female base plate, Type II male base plate.

2. The following are the dimensions for this bomb.

a. Length of bomb including base plate, Type I - 46 3/8".
b. Length of bomb including base plate, Type II - 46 3/4".
c. Length of tail - 25.0".
d. Maximum diameter - 14.5".
e. Span of tail vanes - 20.0".
f. Overall length - 64.0".

3. The color of the bomb body is field grey except for the area under the tail unit which is left painted red. The tail unit itself is painted blue grey. Around the middle of the bomb runs a red band 1" wide above which is stenciled in black:- Brand C.250A.

4. In each bomb recovered a dummy fuze cap was fitted into the rear fuze pocket which was otherwise empty. This dummy cap was retained by a normal locking ring. In the forward fuze pocket was fitted a number 25-B fuze. Each fuze was fitted with a "bakelite" gaine around which was placed a picric acid exploder ring. Beneath the exploder ring was a picric pellet followed by one wood packing piece (14 cms. long) and one wood packing piece 2.2 cms long plus 3 cardboard discs, which together total 0.5 cm in length.

5. Filling (Ministry of Supply, Advisory Council on Scientific Research and Technical Development, A.C. 3965, BMB 264). Between the fuze pockets are 2 glass bottles of granular white phosphorus, held in place by a bundle of light wooden rods and 3 metal bands. This is the reported filling but is not detailed enough to be complete. Complete details will be printed when available.

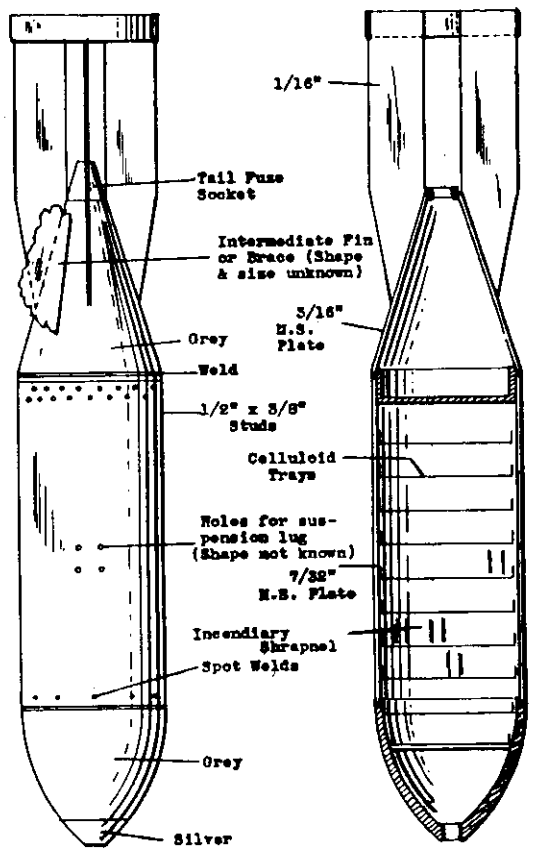
GERMAN MARKINGS INDICATIVE OF FILLERS (GHQ, Middle East Forces via Instructions to RAF, BD Units, June 22, 1943).

From examination of the marking on a large number of captured German bombs, it appears that there exists a code marking to indicate the nature of the high explosive filling. This is confirmed in captured German documents, but as no complete list has been found, the following table has been produced to explain the code as far as it is known. Single figures 1-9 indicate single substances, such as TNT, Picric Acid, etc. Mixtures are indicated by combinations of figures from 10 upwards. The attached table is obviously incomplete, and it is expected that amendments will be issued from time to time. It is becoming increasingly important that, wherever possible, all the markings on bombs should be recorded, so that knowledge of the filling is available to B.D. officers before disposal action is taken.

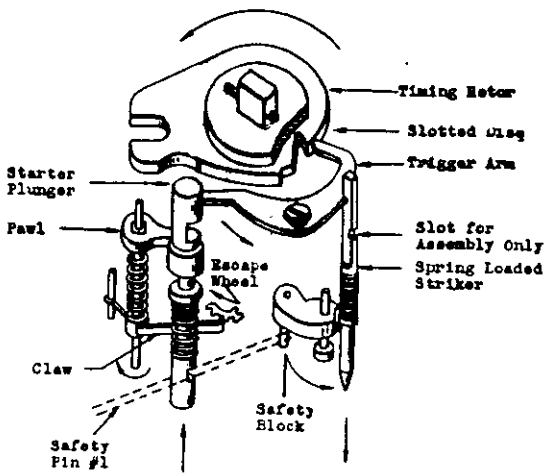
Key

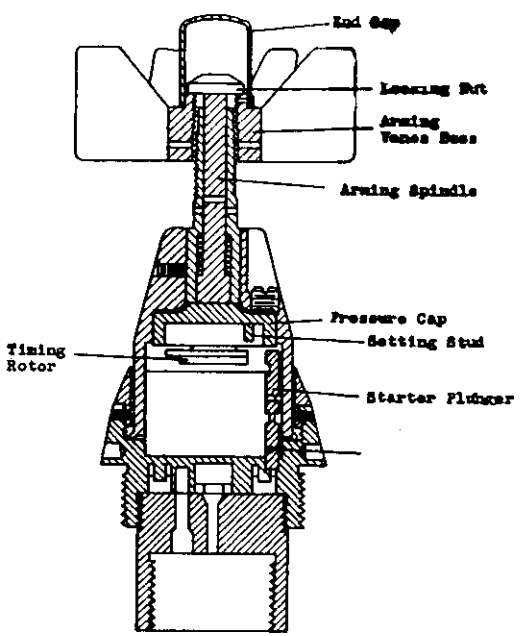
FpO2	- TNT	Np	- P.E.T.N.
Grf88	- Picric Acid	Np10	- P.E.T.N. plus 10% wax
Fp60/40	- 40-60 Amatol	Np40	- P.E.T.N. plus 40% wax
Fp50/50	- 50-50 Amatol	Np65	- P.E.T.N. plus 65% wax
Fp5	- TNT plus 5% Montan Wax	H	- R.D.X.
Fp10	- TNT plus 10% Montan Wax	H5	- R.D.X. plus 5% wax

INDEX FIGURE	NATURE OF FILLING	BOMBS IN WHICH USED
1	FpO2 (pressed)	
2	Grf88 Pressed (in wax paper)	
10	FpO2 plus Fp5 & Fp10	
13	Fp 60/40 poured	SD1, SD2, SD250, SD500, SC50, SC250, SC500, SC1000, SC1800.
13A	Fp 50/50	SC 250, SC 500.
14	FpO2 poured	SD1, SD2, SD50, SD250, SD500, SD1000, SD1400, SC10, SC50, SC250, SC500, SC1800, S Be 50.
16	FpO2(1) plus FpO2(14) Np	
32	Np10 (pressed, in waxpaper).	
36	Np 40	"
38	Np 65	"
52		SC 50
52A		SC 50, SD 500.



JAPANESE 250 KG. INCENDIARY-SHRAPNEL





D-2(a) FUZE

GERMAN (50) FUZE WITH YELLOW HEAD (Inter-Services Mine and Missiles Committee, 12 August, 1943).

The circuit in this fuze is basically the same as that in the fuze El Z (50) without yellow head. The body of the fuze is painted green as is usual in 50 type fuzes. The following points of difference are noteworthy:-

1. The adjacent plunger is of a new type. The metal segments separated by the wider insulating segment are joined internally, and there is a permanent metallic contact from the lower metal segment to the ground side of the reservoir condensers.

2. The "ground" plates of the reservoir condensers only are "grounded" during charging of the fuze.

3. The capacities of the condensers and the values of the resistances differ from those in the fuze El Z (50).

The remote plunger acts as a booby trap as in all known types of 50 fuze. The reduction in the arming time is associated with the warning against using this fuze in low-level or dive bombing. This warning is indicated by the yellow head.

GERMAN (73)A FUZE (Inter-Services Mines and Missiles report No. 202, 20 August '43).

This fuze has the same external dimensions as the older type of fuze for the SD 1 bomb. It can be distinguished from the older type by the cannelure round the head of the fuze and by the stamping on the body

Internally the new fuze has a needle secured through a brass disc. Below the brass disc is a thin steel disc through which the needle passes. Both discs are pressed together and secured on a shoulder within the fuze head by the collar. This securing arrangement is common to both the pressure disc and the percussion cap and replaces the split ring and washer previously employed. There is no spring below the pressure disc, but the latter has six projections instead of three. As in the older type fuze there is a press-on transit cap.

GERMAN ELECTRIC El.A.Z. (55)A FUZES (Report of GHQ, MEF 29764/7/E).

As shown by the following drawings this fuze differs from the standard model mainly in the provision of an additional independent circuit with an external impact switch. This latter is located at the end of a steel rod which screws into the nose of the bomb. This rod normally screws into SD 50 Kg. bomb, but an adaptor is provided so that this same fitting can be used in SD 250 Kg. bombs.

Operation

The switch itself consists of 2 steel pressings (4) and (5) spot welded together. In the cavity between the 2 pressings is located the head of the screw (6) one face of which is corrugated to correspond with corrigations on the face (7) of the pressing (5). This enables the switch to be rotated when in place in the bomb, to coil the cable (8) around rod (2) and thus obviate the loose cable becoming damaged. The cable (8) consists of a single strand of insulated wire surrounded by several strands of fine wire covered by stout red insulation.

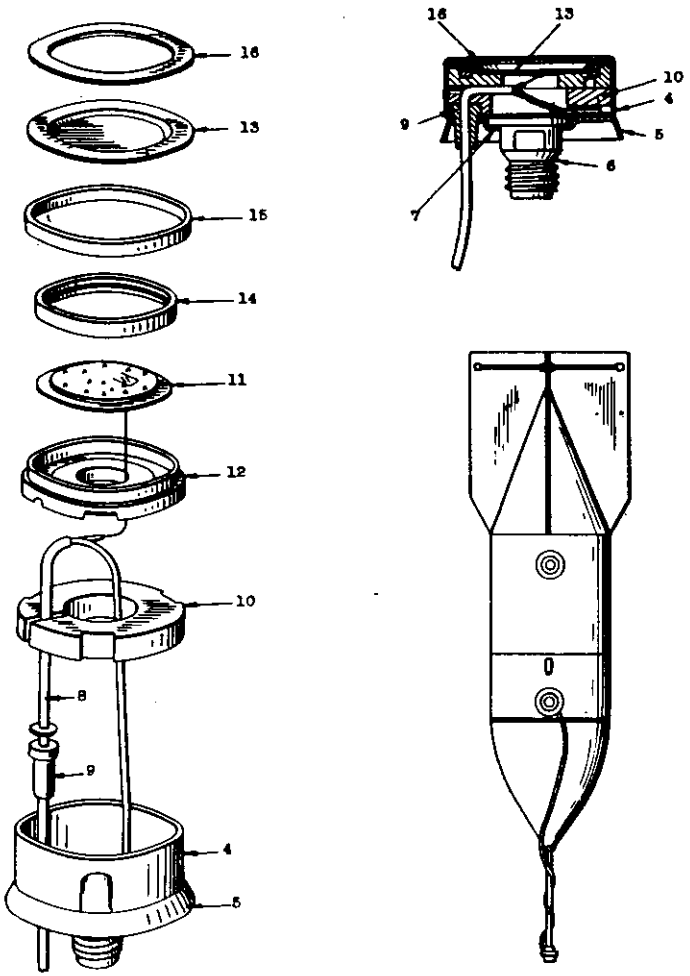
The cable passes into the switch through the rubber plug (9) the top surface of which is protected by a thin metal washer, and through the bakelite moulding (10). The outer wires are brazed to the body of the switch while the inner wire is soldered to a depressed flap in the thin metalic disk (11).

This latter rests on a bakelite moulding (12) and its surface is pressed to give a number of sharp pointed projections. Between this disk (11) and the surrounds the upper portion of the mouldings (12). The assembly is completed by the metal ring (16) which rests on the disc (13) and is held by the turned-in rim of the steel pressing (4). At the fuze, the cable passes out through the side of the head, and a slot is cut in the locating ring to allow for this. The cable is protected for 1 1/2" by means of a length of fine wire wound around it. The switch functions on impact by the outer disc (13) being pressed into contact with the inner disc (11), the projections on which give a good metalic contact. Good metal contact is maintained between disc (13) and the pressing (4) through the ring (16) by the compression of the rubber ring (15).

Handling

Contact between the inner wire and the outer wire of the cable, or between the inner wire and the bomb body, the extension rod or the switch body must be avoided since this completes the firing circuit. For the same reason the cable should not be cut.

2. Rod
4. Steel pressing
5. Steel pressing
6. Head of screw
7. Face of pressing
8. Cable
9. Rubber plug
10. Bakelite moulding
11. Inner metal disc
12. Bakelite moulding
13. Outer metal disc
14. Disc
15. Rubber ring
16. Metal ring



El. A.A. (55)A FUZE

JAPANESE SHORT DELAY CLOCKWORK TAIL FUZE, AERIAL BURST (MEIU No. 1, May 17, 1943. Ref. USNBD IB No. 43).

Nationality
Japanese.

Designation
D-2(a).

Bomb Used In
250 Kg. Incendiary shrapnel.

Description & Operation
The fuze as shown is in the armed position. Just prior to the departure of the aircraft, safety pin No. 1 is withdrawn. This safety pin passes through a slot in the bottom of the starter plunger securing it in the down position and also it pins the safety block under the spring loaded striker. Removal of safety pin No. 1 leaves the starter plunger held depressed by the arming pressure cap, and the safety block held under the striker only by its spring. On release from the bomb rack, safety pin No. 2 is withdrawn permitting the arming vanes to rotate in a counter-clockwise direction. The arming vanes are attached to an arming vane boss which rotates around a threaded bush and rises as the vanes spin. Near the end of its travel, the spinning boss comes in contact with the locking nut at the top of the extension from the pressure cap, raising the pressure cap upward. In the down, unarmed position, the pressure cap has served two functions:-

a. In conjunction with safety pin No. 1 it had held down the starting plunger.

b. A stud on the pressure cap fitted into a slot in the timing rotor so that turning of the pressure cap set the timing rotor which could not be moved by the clockwork until the stud had been removed.

Lifting the pressure cap frees the timing rotor and allows the spring loaded starter plunger to move upward. The starter plunger is slotted so that in its new position it permits the starter locking mechanism to rotate, removing the claw from the escape wheel, starting the clockwork, and locking the starter plunger via the pawl in the "up" position. Also, one end of the trigger arm is released so that the trigger arm may move when its other end comes in conjunction with the slot in the timing rotor. As the bomb rotates in a counter-clockwise direction the safety block is moved away from the striker by centrigugal action. This spring loaded block is incorporated as a precaution against initiation of the flash cap should the clock be accidentally started.

The striker is now held only by a knife edge on the trigger arm which fits into a slot in the striker. Since the striker is spring loaded it will tend to force the trigger arm against the slotted disc which is attached to the under side of the timing rotor. When the trigger arm and the slot in the disc come into conjunction as a result of the movement of the clockwork the trigger arm will be forced into the slot by the striker, releasing the striker which fires a primer cap, initiating the explosive train.

Winding the fuze may only be accomplished when the upper half of the fuze body is rotated until a 30 second setting is indicated. After winding, the fuze may be set for the desired timing. To ensure that the locating pin on the pressure cap is engaged in the slot provided in the timing rotor, remove the screw from the inspection hole provided in the side of the fuze body. Replace the screw after inspection.

JAPANESE 250 KG. INCENDIARY-SHRAPNEL BOMB (MEIU No. 1, May 17, 1943).

On April 12, 1943, the Japanese dropped new type incendiary-shrapnel bomb at Port Moresby, Papua, New Guinea. The bomb was fitted with a tail fuze to give an air burst at 200 to 500 ft. above the ground and with a direct acting nose fuze to operate in event the tail fuze failed to function.

The data to follow was obtained from the RAEBDU at Port Moresby, by the U.S. Navy BD officer in that area. The information, while not complete, will be helpful in identifying subject bomb.

Data
Nationality - Japanese.
Information Date - April 1943.
Size - 250 Kg.
Type - Incendiary-shrapnel.
Target - Parked aircraft, gasoline and ammunition dumps, thickly populated areas in military camps and civilian installations.
Fuze - Nose A-3(a); Tail D-2(a) clockwork mechanism.

Overall length - 5 ft. 9 in.
Length of body - 3 ft. 3 in.
Diameter of body - 12 in.
Thickness of wall - 7/32 in.
Material of wall - Mild steel plate.
Construction of body - A cast steel nose is fastened on the steel body by a continuous weld and 12 spot welds. A ring or insert is fastened to the tail cone with a continuous weld. This is held by two rows of set-screws (a total of 40).
Type of suspension - Horizontal.
Construction of suspension lug - The suspension lug was missing from the bomb recovered, but presence of rivet holes indicates that lug was riveted to the body.
Length of tail - 2 ft. 6 in.
Material of tail - 3/16 in. sheet steel cone; 1/16 in. sheet steel fins.
Construction of tail - 4 vanes welded to tail cone and braced with box-type struts. There are 4 subsidiary or intermediate fins which are located between the regular tail fins.
Type of filling - The main filling consists of 10 layers of incendiary-shrapnel, each layer being separated by a celluloid tray.

a. The shrapnel consists of approximately 750 pieces of pipe 1 1/8" in external diameter and 2 3/4" long.
b. The incendiary filling for this shrapnel is probably a mixture of rubber, phosphorous and electron.
c. The 10 trays of incendiary-shrapnel are held in position by a tap and bottom cover plate each of which consists of a 3/16" mild steel plate containing 25 - 13/16" holes.

Weight of filling - 300 lbs.
Total weight of bomb - 500 lbs. (Approx.)

Remarks
The tail fuze consists of a clockwork mechanism which is fitted into a fuze socket secured to the apex of the tail cone. The tail fuze is supposedly designed to opperate 100 to 200ft. above the ground. This tail fuze, the D-2(a), requires for its operation that the bomb be rotated by the action of the subsidiary or intermediate fins mentioned above.

JAPANESE B-1(b) SHORT DELAY TAIL (MEIU No. 1, June 30, 1943).

In a raid on Darwin, June 20, 1943, bombs dropped in a low level attack were fitted with a new type short delay tail fuze which has been designated the B-1(b). The nose fuze pockets of these bombs were filled with a composition plug.

Fuze Data
Nationality - Japanese.
Designation - B-1(b).
Classification - Mechanical tail impact fuze.
Bomb used in - 50 Kg. General Purpose H.E
Color - Natural Brass.
Overall length - 2 3/16 in. (less booster).
Overall width - 1 9/16 in.
Material of construction - Creep spring, firing pin and lock washer are of steel; remainder is brass.
Position & method of fixing fuze in bomb - This fuze is screwed into the apex of the cone of the tail by means of a spanner wrench and is secured by a grub screw in the tail cone.
Fuze found with - None, composition plug in nose
Explosive train - The primer flash cap ignites the delay train which after burning its length ignites the black powder relay. The relay sets off the detonator which activates the picric acid booster.
Arming time - 8 revolutions of the arming vanes.

Description
The fuze consists of a brass upper and lower body. The striker spindle is fitted into the tapered part of the upper body and is threaded at the upper end to receive the arming vanes and boss and at the lower end to receive the steel striker point. A small stud engages into one of 3 grooves in the striker body and prevents it from rotating when the arming vanes are unscrewed. Two small studs, one on the body and one on the vane,boss, prevent the vanes from jamming too hard against the body. A brass delay train ring is fitted between the upper and lower body and provides the delay for this fuze. A creep spring is fitted between the striker spindle and the lower fuze body. This fuze does not have a shear wire. Into the lower fuze body is screwed the primer flash cap container and the upper portion of the detonator container. The delay train ring is positioned by a locating pin which lines up the flash holes in the lower fuze body and the ring. The main booster screws onto the lower fuze body and the ring. The main booster screws onto the lower fuze body and houses a ring and a stick of picric acid. There are 6 spanner holes equally spaced around the lower fuze body.

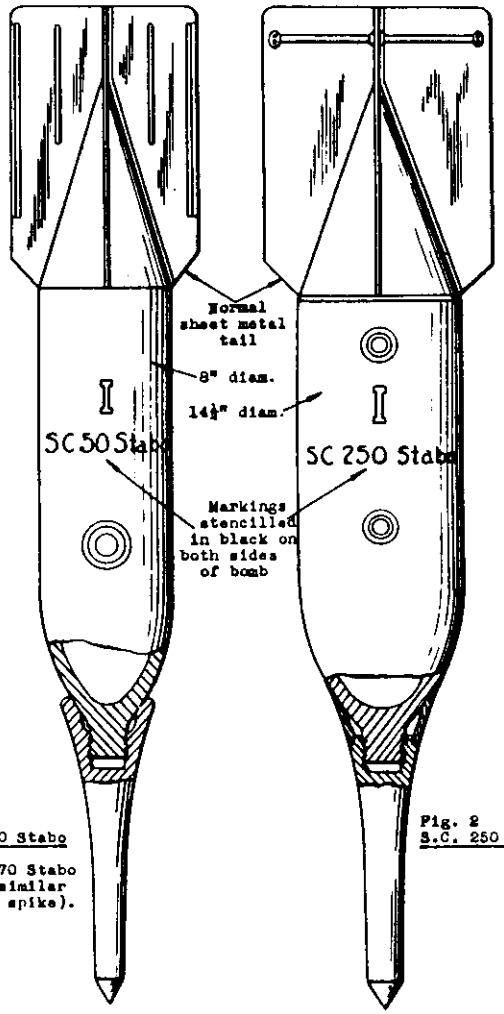


Fig. 1
S.C. 50 Stabo

(S.D. 70 Stabo has a similar nose & spike).

Fig. 2
S.C. 250 Stabo

GERMAN 2 KG. A/P BUTTERFLY (B.D. Int. Bulletin No. 18, April 1943).

A captured German document refers to the use of a rack for these bombs which will carry 24 bombs, and which are intended for use in low level attack. If no AB 23 containers are found after at attack in which these bombs were dropped an attempt should be made to account for the bombs in multiples of 24 before an area can be declared clear.

release of 100 m with a speed of flight of 450 mph must be maintained. Successful results can also be obtained in g liding flight at an angle of at least 15° with a height of release of 50m. The minimum height of release diminishes with the diminishing speed of flight. This also depends, however, on the nature of the target. If the ground is hard or frozen the minimum height of release must be greater or the speed reduced.

Fuzes

The following fuzes are used:- Stabo 50 & 70 Fuzes (50), (55), (57).
Stabo 250 Fuzes (17)A, (50), (55), (57).
(Fuze (57) may not be used in low level attack, as it has an anti-rupture device which endangers the aircraft if the bomb hits railway lines etc.).

The fitting of the fuze (55) with any of the other fuzes mentioned in the stabo 250 is senseless and therefor forbidden. A good comination is a long delay fuze (17)A or (57) with the anti-handling fuze (50).

Suspension

Stabo 50 and 70 can at present be carried only externally. They can be loaded in any horizontal carrier for 50 Kg. bombs, similarly the stabo 250 can be suspended from any horizontal slip for 250 Kg. bombs. A further TACL will give a list of the number of stabos 50, 70 and 250 to be carried in various aircraft types.

Structure and Markings

The spike is of steel. Dimensions of the spike and weight of the whole bomb are as follows:-

BOMB	SPIKE LENGTH	SPIKE DIAMETER	WEIGHT OF BOMB
Stabo 50	470 mm	45 mm	62 Kg. (Approx.)
Stabo 70	470 mm	45 mm	77 Kg. (Approx.)
Stabo 250	700 mm	75 mm	282 Kg. (Approx.)

When used in the packing case the spike is separated from the bomb. It is screwed on to the threaded lug on the nose of the bomb. In the case of the Stabo 250, the so called pressure piece is first placed on the nose of the bomb and the actual spike screwed in. This presses the pressure piece against the nose of the bomb and simultaneously rests against it. The spike for the 50 and 70 are in one piece.

The appropriate markings:- S.C. 50 Stabo
S.C. 70 Stabo
S.C. 250 Stabo
are stencilled on the bomb casing on two opposite sides in black characters 40 mm high. The distinguishing colors on the tail are as follows:-
Stabo 50 & 250 - Yellow
Stabo 70 - Red (Note that this is a S.C. bomb).

The spike bomb No. 500 referred to in Memorandum No. 1900-41 of 11.6.41 and TACL Ser. No. 547/41 has not yet been placed in service. (Berlin, 30 October, 1942).

GERMAN BOMBS - USE OF NOSE EXTENSION ROD (DINORT RODS), for SD 70, SD 250, and SD 500 (Translation of captured German document No. F90/42; Berlin, October 1942).

Definition

The Dinort rods are screwed into the nose screws of the suspension eyes of the SD 50, SD 250 and SD 500 bombs. Their object is to make sure the bomb detonates before its nose penetrates the ground.

Construction

The Dinort rod 70 consists of a rod 600 mm in length and 55 mm in diameter. The other end of the rod is threaded to screw into the nose of the SD 50 or SD 70. (One end having a plate which is 120 mm in diameter. The Dinort rods 250 and 500 consist of a rod 375 mm in length. The diameter of the plate is 240 mm for the SD 250 and 320 mm for the SD 500A. The other end of the rod has a pot shaped support to rest against the nose of the bomb.

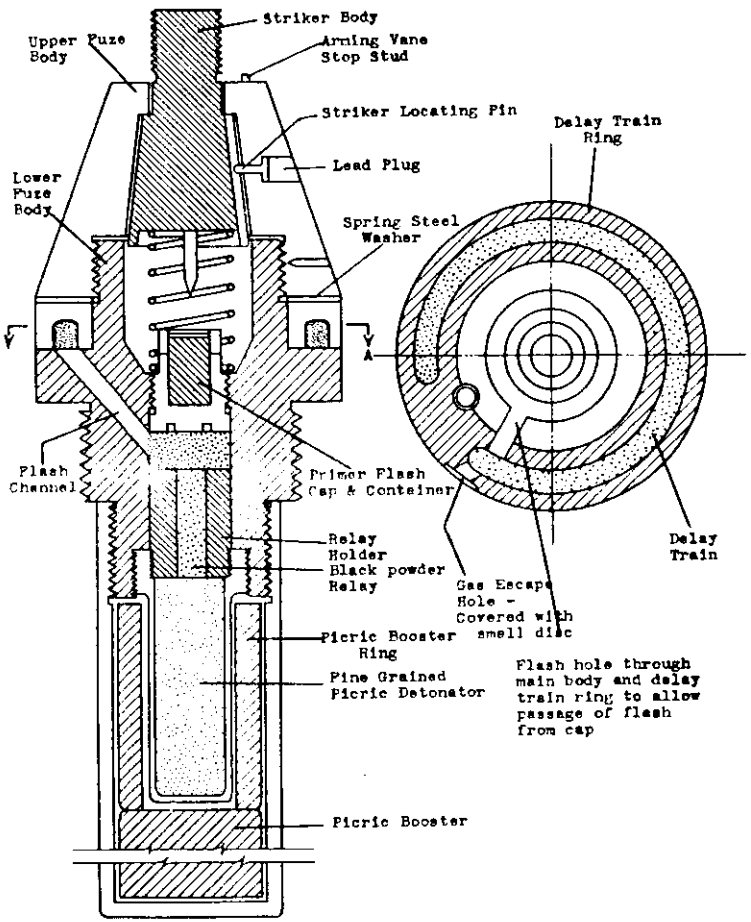
Markings

The Dinort rods are marked as follows:- Din St. 50, Din St. 250, Din St. 500. These markings are painted on the plate in white characters 16 mm high.

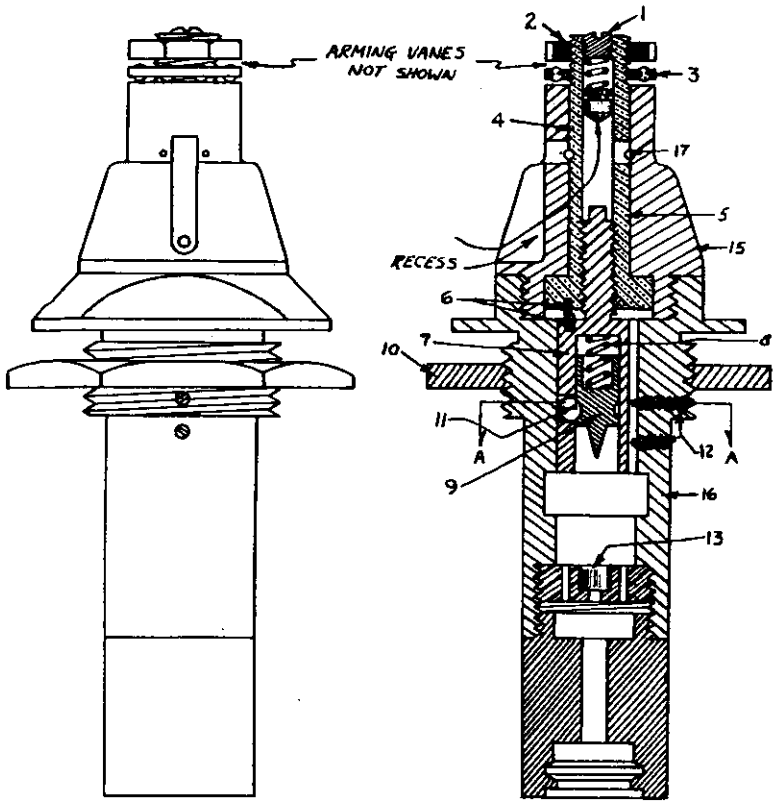
A spring steel washer between the upper fuze body and the delay train ring prevents same from unscrewing. There are two equally spaced spanner holes in the upper body. The arming vanes are prevented from rotating by a U shaped arming wire which fits through the arming vanes and into the body.

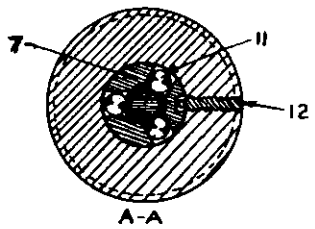
Operation

On release from the bomb carrier the U shaped wire with withdrawn from the vanes. The arming vane rotates 11 times and falls clear. On impact the striker spinel moves in against the creep spring forcing the firing pin against the primer cap.



B - 1(b) FUZE





JAPANESE NOSE FUZE, D-3(a).

forward cylinder is filled with calcium chloride. A tube running through the center of the forward cylinder allows the sea water to enter, and controls its flow to the calcium chloride. The generated acetylene is collected in a chamber just behind the forward cylinder and passes to a burner in the tail. A small chamber in the aft cylinder contains calcium phosphate and has a tube leading from the tail to it and one from it leading to the burner. The sea water enters the tube leading from the tail and reacts with the phosphate giving phosphereted hydrogen. This passes through the second tube to the burner and ignites on contact with the air, igniting the acetylene generated by the calcium carbide. The operation may be started by the pilot pulling a rubber bung in the sea water tubes.

ATTACK (55) A GERMAN FUZE (GHQ, MEF 29764/7/E).

In discharging this fuze avoid all interference with the pressure switch and discharge the fuze using the LFD in the usual manner. Since the capacity of this fuze for liquid is greater than in most fuzes, the LFD should be filled up a second time, and applied until approximately 40 cc of liquid has entered the fuze. Now that the electrical circuit of this fuze is known the two-pin plug may be used only in an emergency.

BOMBS - GERMAN PC 1400 KG. (Captured German Document No. 91/42, Berlin, January 14, 1942).

Structure and Markings
The diameter is 552 mm (22" approx.), the length 2836 mm (111.5" approx.). The bomb is made of tempered material with a hardened nose, which ensures good penetration. The light metal tail has a ring at the end, of the same diameter as the bomb. The marking PC 1400 is stencilled in characters 40 mm high on the 2 opposite sides of the casing. Distinguishing marking on tail cone - blue. Weight 1400 plus or minus 55 Kg. Explosive charge 300 Kg.

Use
The PC 1400 is suitable for use in diving flight against reinforced targets.

Fuze
For use against land and sea targets the bomb is fitted with fuze (28)A, or sometimes fuze (35). The fuze is provided with an extension cap II, which must in all circumstances remain on the fuze, so that the charging head has the prescribed safety distance.

Suspension
The PC 1400 is suspended by means of a suspension lug. The trunnions which are used only for release from the JU 87 are attached to a suspension lug. In the JU 88 the bomb is used without the trunnion band.

GERMAN P.C. 1000 (Captured German Document No. 90/42, Berlin, 14 January, 1942).

Structure and Markings
The diameter is 500 mm (19.5" approx.), the length 2100 mm (82.5" approx.). It is made of tempered material, with a hardened nose. The tail is of light metal with a ring at the end, of the same diameter as the bomb. The markings are stencilled in characters 40 mm high on 2 opposite sides of the bomb. Weight 1000 plus or minus 50 Kg. Explosive weight 160 Kg.

Fuze
Same as PC 1400.

Suspension
It is supported by means of an eye or log, the eye or lug when not used being kept in a pocket in the tail. When used in the JU 87 a trunnion band is used.

GERMAN "STABO" 50, 70, and 250 Kg.(Translation of captured German documents No. 810/42).

Definition
The spike bombs (stabo) 50, 70, and 250 are bombs of quality class I with a threaded lug forged to the nose, to which a spike is screwed.

Use
Spike bombs 50, 70, and 250 are used in low level attacks, in particular against railway lines and country roads. The spike sticks into the target and prevents the bomb from bouncing. To ensure accuracy of aim a minimum height of

ITALIAN

BOMBS - ITALIAN 70 KG. (Bomb Disposal Int. Bulletin No. 18, April 1943).

This bomb consists of a cylindrical body to which is welded the hemispherical nose and tapered tail cone. Four tail fins, without struts or strengthening bands are welded to the tail cone. The bomb body is painted grey and the nose red, marking being stenciled on in white. The bomb is filled from the nose end and the filling plug is adapted to take the nose fuze. There is no provision for a tail fuze. No example of the fuze has yet been recovered.

ITALIAN BOMB CONTAINER (D.U.B.D., July 1943).

General Description

This is a metal container holding eight columns of anti-personnel or incendiary bombs. A small clockwork unit on the tail causes a drogue to open after the preset number of seconds, and this in turn causes the ejection of the bombs. There is no explosive material in the container apart from that in the bomb.

Data

Length (overall) - 5 ft. 6 in.
Length of body - 2 ft. 8 1/2 in.
Diameter - 11 in.
Weight (empty) - 23 Kg.
[illegible] - 40-2F or 2 Mtr. or 11 or 24-4A.R. (Thermos Bomb) or 20-21.

The body is cylindrical in form and is of welded sheet steel. It contains eight longitudinal tubes which are welded to the after closing plate and the forward closing plate; holes in the latter leave the forward ends of the tubes open. A flap which is hinged to this plate partly closes these holes. The container is held closed by a ball locking, the adjustment of which can be observed through the inspection hole. The forward end of the bomb is closed by an aluminum cap held on by three spring clips. Rivetted to the inside of this cap is a plate.

Ejection springs are fitted in the after ends of the tubes. Suspension is either horizontal or vertical by a rod on the aft end.

The tail cone, carrying four fins, is fitted by screws to the body. A corrugated ring strut strengthens the tail fins. Below the drum and situated between each pair of adjacent fins is a drogue of pressed steel. Each of these is pivotted on a thin steel rod attached to the edges of adjacent fins. Each drogue is connected to its neighbor by a fabric web fixed to the sides of the drogues by rivets. A fabric covered elastic strip attached to each case at one end to the drogue and at the other end to the drum tends to pull each drogue open. The range of movement of each drogue is limited by the length of a flexible wire cable fixed to the tail cone. Before dropping, these drogues are prevented from opening by a cord or wire which encircles them and passes through a cutter device which is operated by clockwork and is attached to one of the drogues. This clockwork is prevented from running by a safety pin. To the underside of this particular drogue is attached an additional cable which runs through a hole in the tail cone, between the main body and inner tubes, and terminates in a bolt, the withdrawal of which releases the ball locking device. A transit safety pin prevents withdrawal of the bolt.

Functioning

On loading into the aircraft, the transit safety pin is withdrawn. On release from the aircraft, the safety pin in the clockwork is withdrawn. After the preset time, which varies between 0 and 20 seconds, the clockwork functions a cutter which severs the restraining wire and so allows the drogues to open. This causes the bolt to be withdrawn. The springs eject the bombs by forcing open the flap which in turn throws off the cap by pressing on the plate within the cap.

GERMAN

GERMAN FLAM FLOAT "LUX.N." (GHQ, MEF 29764/3/E, April 1943).

This equipment is intended to indicate the position of airmen making forced landing at sea. It is made of sheet steel and painted yellow with the stencilling "Lux.N" on the body. The body of the float is made up of 2 hollow cylinders welded together. Four stabelizing fins are welded to the second cylinder. The

JAPANESE D-3(a) NOSE FUZE FOR PARACHUTE FLARE (A.L.F. in S.W. Pacific Area).

The fuze examined was recovered in good condition from an exploded paracnute flare dropped at MORESBY on 13 May, 1943. Height of release was estimated at 20,000 ft. and the flare burned for about 5 minutes.

Description

1. The FUZE BODY is constructed of brass in two portions (15) and (16), which screw together. A DELAY TRAIN HOLDER screws into the lower port on (16).

2. The ARMING MECHANISM is constructed of a brass arming bush (5) (operated by arming vanes), into which is screwed the spindle of the arming sleeve (7). The arming bush (5) has a groove (17) into which a locking pin engages. (This prevents vertical movement of the bush, but leaves it free to rotate). The arming sleeve (7) has a keyway cut in its side, which is engaged by two screw pins (12). (This permits vertical movement of the sleeve, but prevents it from rotating). The arming sleeve (7) houses a spring loaded striker (9) which is retained in position by three steel balls (11) located in holes provided in the arming sleeve. When in the "safe" position, the steel balls project into the arming sleeve, and are positioned in a groove provided in the spring loaded striker (9), thus preventing downward movement of the latter. The spindle of the arming sleeve (7) is screwed with a left hand thread (40 t.p.i.). Stop studs (6) are provided on both the arming sleeve (7) and the arming bush (5) to prevent the bush and sleeve becoming jammed together and consequently failing to rotate.

3. The SPRING LOADED STRIKER (9) is hollowed out at the rear end to house two helical springs (8) (one inside the other).

4. A DETONATING CAP (13) is contained in a plug which screws into the lower portion (16) of the fuze body.

5. The DELAY TRAIN HOLDER is of shape and size as shown on drawings. Details of explosive constituents are not available, but are assumed to include a flash build-up overlaying a central pyrotechnic train, as indicated on accompanying drawings.

6. ARMING VANES were not recovered, hence no details other than their position can be given in the drawings.

7. The SAFETY PIN was not recovered, but it is assumed that this would be an L-shaped member designed to fit into recess in the fuze body (15) and arming bush (5) shown on attached drawing. The function of the safety pin is to lock together the above mentioned fuze components, thus preventing rotation of the arming bush and arming vanes. The top face of the safety pin is probably slightly hollowed out to receive the spring loaded pin (4) which secures the safety pin against falling out during handling.

Operation

1. Upon withdrawal of safety pin, the arming vanes and arming bush (5) rotate in a clockwise direction, causing the arming sleeve (7) to move downwards until the three balls (11) coincide with the recess (8A) provided in the lower half (16) of fuze body.

2. The pressure of the spring loaded striker (9) upon the three balls causes them to move outwards into the recess (8A).

3. Thus the striker (9) is released and drives down into the detonating cap (13), which ignites the flash powder. This fires the delay train which in turn initiates the charge that propels the candle and attached parachute from the container.

DISTINCTIONS BETWEEN JAPANESE ARMY AND NAVY BOMBS AND FUZES.

The following distinctions between Japanese Army and Navy Bombs and Fuzes were arrived at through the combined efforts of the U.S. Navy Bomb Disposal Officers at Bombay, India, and the Royal Engineer Bomb Disposal Officers at Kirkee, India.

Area in Which Dropped

1. Jap Navy bombs and fuzes are being dropped exclusively in the southwest Pacific and Alaskan theaters of operation. (One Jap Army C-3(a) was found in the former area).

2. Jap Army bombs and fuzes are being used on the China and Burma fronts, where no Navy bombs and fuzes have been found to date.

Arsenal In Which Made

1. The Navy type bomb fuzes are made in the arsenal at Kuio which is shown by the following marking on all fuzes 

2. The Army type fuzes are made in three different arsenals:

Tokio  Osaka  Nagoya  The abbreviated

characters given above are used on all of the Army type fuzes. The full marking for the arsenals are as follows: Tokio  Osaka  Nagoya 

Markings

1. Navy - The emperor mark  appears at the left of the date line on Navy type fuzes. Most of the Navy fuzes also have an anchor mark on them.

2. Army - The emperor mark  appears at the right of the date line on Army type fuzes. Crossed guns  and a five pointed star ★ are often found on Army type fuzes. The former usually accompanies the Osaka marking and the latter the Tokyo marking.

Bomb Body Construction

1. Navy - The nose cap is attached to Navy type H.E. bombs by screws, rivets, or spot welding.

2. Army - In the case of the Army type H.E. bomb the nose cap is screwed onto the body and the tail cone is welded onto the body. The 15 Kg. bomb is an exception to this in that the tail cone is screwed onto the bomb body. The nose cap is held on the 50 Kg. phosphorous bomb by dowel pins. This is also true of the 50 Kg. gas bomb.

Color

1. The Navy H.E. G.P. bombs are usually bluish grey or olive drab and sometimes have a longitudinal red stripe along the nose cap and body, which never occurs in the case of the Army bombs. The tail struts are sometimes painted green on Navy bombs. They also sometimes have a blue band around the body.

2. The Army H.E. G.P. bombs are painted black with a yellow and a white band around the body (the yellow is forward of the white which is just forward of the suspension lug). They also have a red band around the nose fuze pocket. (The phosphorous bomb is an exception to this color rule).

Suspension

1. The Navy type bombs use a rounded suspension lug which is rigidly fastened to the bomb body.

2. The Army type bombs have a squared U-bolt suspension lug which is pin-hinged to a plate riveted to the bomb body.

Fillings

1. The filling of the Navy type bombs are cast in two sections.

2. The Army bombs are filled in three sections (tail cone, body, and nose cap) with cast picric, and each section is wrapped in a waxed cardboard container. The 30 Kg. Jap Army type bomb is an exception to this since it is filled with TNT and RDX.

Fuzing

1. The Navy fuzes have solid vanes and sometimes use safety pins. The diameter of the screw-threads of these fuzes is much larger than for Army fuzes.

2. The Army fuzes have holes in the vanes and never use safety pins.

Gaines

1. Navy fuzes always take the long finger-type gaines. If any delay is incorporated in the bomb, it is found in the gaine.

2. Army type fuzes employ three different types of short gaines similar to the French gaines. If there is any delay in the action of the bomb it is incorporated in the fuze.

Tail Construction

1. The tail fins on the Navy bombs usually come up to about the center of the tail cone, and the forward end of the fin is usually cut sharp.

2. The tail fins on the Army bombs usually come up to the very forward part of the tail cone and are rounded at the forward end.

TABLE OF STANDARD BRITISH BOMBS

NAME	CONSTRUCTION	NOSE FUZE OR PISTOL	TAIL FUZE OR PISTOL	FILLING	L.F.	REMARKS
20# P.	Streamlined, Cast or Forged Steel Horiz. suspension.	34-P 38-P 45-P	None	T.N.T. 80/20 Amatol	22%	Scatter plates are put under nose pistol in order to scatter the bombs when dropped in clusters. Diameters of them are 3" and 4".
Parachute	Same	33-P	None	Same	22%	Wire from parachute attached to safety pin in nose pistol.
40# G.P.	Same	34-P 38-P 45-P	None	Same	22%	Scatter plates used - Diameter 4 & 5"
G.P. 250-500# Mk. 4 1000# Mk I, IV 1900# Mk I, II 4000# Mk I, II	Streamlined - Cast or forged steel. Horizontal Suspension Clip on tail. 2 fuze pockets	27-P (except 42-P (1000 & 1900 Mk 2 & 3. 845-P with D-38 det.	28-P 30-P 37-P	Amatol Amatex	32%	1000# & 1900# Mk.1 has nose plug. 1000# & 1900# Mk.2 & 4 has welded in nose plug so no nose fuze. 4000# has a side fuze pocket.(Mk I only)
G.P.250 & 500# Mk V	Same except it has a central tube.	None	17-P L.D.	Amatol Amatex	32%	Used with long delay pistol only.
M.C. 500# Mk I - IV 1000# Mk I	Parallel sides. Looks like U.S.G.P.	27-P 42-P 44-P 845-P	28-P 30-P 37-P	Amatol Amatex TNT	50%	1000# Fitted with transit rings. 2 suspension lugs on one side for US planes and one lug on other side for British.
A.S. 250# & 500# Mk III	Pointed nose threaded to take a nose adaptor. Streamlined. Tail secured by one bolt.	32-F	None	TNT Baratol 10/90	55%	
AS 100, 250 & 500 lb. Mk IV	Flat nose.Streamlined. Clip on tail.	None	30-P	TNT	55%	
A.S. 100# Mk. V	Tail unit secured by 4 bolts	858-P	30-P	Torpex	55%	Vanes on 858 can't rotate until it hits water. No.30 pistol has 3 sec. delay det. (Gray ring).
SAP Mk. III - 250 & 500#	Streamlined - steel casting or foring. Locking ring to hold tail on	None	30-P	TNT	20%	Bung sticks out to which tail is secured. Fuze fits in this bung.
SAP Mk IV 250 & 500	Same as Mk III	Used by F.A.A.				Clip on tail
SAP Mk.V 250 & 500	Clip on tail	None	30-P 28-P	TNT	20%	Uses 30-P for sea targets. Uses 28-P for land targets.
AP 2000# Mk.I & II	Heavy wall-narrow & parallel sides. Tail held on by locking ring	None	37-P	Shellite	8%	
H.C. 2000# Mk. 3	Looks like a hot-water heater,3/8" plate.Cylindrical tail. Parachute unlikely.	Three 27-P or 42-P.	None	Amatex	75%	
HC 4000 Mk.1-4 8000 Mk 1 & 2	Resembles big gas tanks.	Three 27-P or 42-P	None	Amatex	75%	8000# bomb is two 4000# sections held together by steel girders.
500# AS Mk. I	Fabricated 1/8" plate.Light welded const. Tail & nose cap light, break up.	None	862-P	Minol-2	80%	Hydrostatic - variable depth setting fuze. Details are forthcoming
AS 35# Mk I, II	Conical nose. Shaped charge.	868 DA Perc.type fuze.	None	RDX TNT 60/40	50%	868 fuze fires on impact with submarine.

8. When the fuze is taken out it must be placed immediately in CO2 paste from the 6th container. Keeping the fuze thus frozen is extremely important as it will warm up much faster when it is out of the bomb and may become sufficiently warm to detonate the booster.

9. Remove the fuze and bomb to a suitable disposal area.

BRITISH

BOMBS - BRITISH LC 30 lb. MK I AND IN (Admendment List No. 2 to S.D. 35, Vol. ', March 1945, Air Ministry Manual of Chemical Warfare).

Description
Overall length - 32.76 inches
Diameter - 5.0 inches
Weight - 30 lbs.

The bomb consists of a steel tubular body to which is welded a steel tail plate and a steel nose plate, a tail and a nose fairing. Into the nose plate screws the fuze and into the base plate a filling plug. The tail consists of a tinplated cone, the apex of which is surrounded by a cylindrical tail vane connected to the tail cone by vane supports. The body is varnished, unless otherwise stated, to prevent corrosion by the filling.

Color and Markings
The bomb body, the tail, and the nose fairing are painted grey. Near the nose of the bomb is a painted band, 3" wide, colored according to the nature of the charge contained in the bomb. If the bomb is fuzed a red band, 1/2" wide, will be painted on the nose. The markings are stencilled in black and give the charging code letters and numbers, the type and mark of the bomb, the date of charging, the monogram of the firm or station that charged the bomb, the design number of the method of charging, the filled lot number, and the letters FZD if the bomb is fuzed.

Fuzing
No. 38 MK I.

Targets
This bomb is mainly used against buildings and will penetrate reinforced concrete of a thickness of up to about 4".

BRITISH INCENDIARY BOMBS.

BOMB	MEANS OF INITIATION	FILLING	MARKINGS
4# Mk. I to IV	Striker unit built on tail of bomb	Thermite and Magnesium body	Mk. I to III, IV, & V 2" bright red band on nose
4# X Mk. I & II	Same	Same but has a C.E. pellet in nose	Same as Mk. IV & MK. V but has 3/4" red band above 2" band. Delay 2 or 4 minutes marked on bomb.
30# Mk. I	No.38 Mk II N.D. Nose fuze.	5% rubber in benzol.	Dull red body with 2 bright red rings around body.
30# Mk II, III, IIm, & IIIm.	No.846 Mk I or IA. Nose fuze.	Same except it has white phosphorous in nose 1# Phos. in nose	Same plug another red band around body. FZD stenciled on bomb denotes bomb is fuzed.
45# Mk. I	Nose	Rubber & benzol solution plus phosphorous sequi sulphide.	Dull red body & a red band on nose.
250# Mk. I	No.36 Mk II ND Nose Fuze	Rubber & bensol solution	Same
4000# GEL	No.27 Nose Pistol with inst. det. & 7" ext. rod.	P.X. incendiary filling and phosphorous	Same

Summary of Bombs and Fuzes
A breakdown follows for bombs and fuzes:

FUZES

Army	Doubtful	Navy
A-2(a)	A-5(a)	A-1(a)
A-2(b)		A-1(b)
A-2(c)		A-3(a)
A-4(a)		A-3(b)
B-1(a)		B-2(a)
B-1(b)		B-2(b)
B-4(a)		B-3(a)
		B-5(a)
		B-5(b)
C-3(a)		C-1(a)
		C-2(a)
D-1(a)	D-3(a)	D-2(a)

Bombs

15 Kg.	1 Kg. Inc	1/3 Kg. A.A.
30 Kg.		1 Kg. A.A.
60 Kg. Inc.		70 Kg. Inc.
50 Kg. Gas		Flares and
50 Kg. H.E.		fl. lights
100 Kg. H.E.		Sea marker
250 Kg. H.E.		60 Kg. Inc.
		60 Kg. H.E.
		63 Kg. H.E.
		250 Kg. H.E.
		250 Kg. SAP
		800 Kg. A.P.

APPENDIX

DELAY TIMES OF (57) FUZE

The following data must be taken into account in attacking the (57) fuze. These delays from time of charging till time of firing were determined by testing various fuzes under as nearly accurate conditions as possible. All fuzes were tested at a temperature of 80°F. The tests were conducted by Lieut.(jg) R. E. Haubold. There has been a report from other sources that delay time may be as high as twelve (12) hours. However, this has not been verified, and in view of the results of Lieutenant Haubold's tests, it seems likely that the upper time limit will run slightly over nine hours at 80°F. Any considerable lowering of temperature would increase the time considerable.

Delay times were:

Test	#1	3	hours 00	minutes
"	#2	4	" 00	"
"	#3	4	" 15	"
"	#4	4	" 15	"
"	#5	4	" 45	"
"	#6	5	" 00	"
"	#7	5	" 15	"
"	#8	5	" 30	"
"	#9	5	" 45	"
"	#10	5	" 45	"
"	#11	6	" 00	"
"	#12	6	" 15	"
"	#13	6	" 30	"
"	#14	6	" 45	"
"	#15	7	" 00	"
"	#16	7	" 15	"
"	#17	7	" 15	"
"	#18	7	" 30	"
"	#19	8	" 00	"
"	#20	8	" 15	"
"	#21	9	" 15	"

Position of thefuze had no noticeable effect on delay time.

In nine of the fuzes the striker was resting on the inertia block and was not held by the soluble disc. These fuzes fired on impact. Therefore, when these fuzes are used some may fire on impact.

It is thought that there will be very few cases of fuzes that will be complete duds, i.e., the (57) may be expected to fire one way or another if it is properly armed.

INFORMATION - NAVY MK 223 (From report of EDO, Unalaska Sub Seafor, April 1943).

"Special trouble has been encountered several times in case of the Mk 223 fuze. The small nut at the top of the larger gear of the upper gear train is of necessity usually only finger tight to allow proper rotation of vanes. During flight of plane, this nut is unscrewed by vibration and gears are freed. Hence fuze may become armed without rotation of arming vanes. This has been the case on several occasions and planes returned with an armed Mk 223 fuze in bomb. It is suggested that by very slight alterations, this condition can be remedied."

ATTACK - U.S. NAVY *ADM 1, ANTI-DISTURBANCE FUZE.

Equipment Required

1. Six carbon dioxide, 15 lb. size, fire extinguishers. (Note: The 15 lbs. refers to the weight of the CO_2 charge in the extinguisher).

2. One container to hold CO_2 on bomb. Any device that will hold the CO_2 in contact with the bomb will do.

3. One gallon of methyl alcohol (if methyl alcohol is unavailable, anti-freeze alcohol will work successfully).

4. One pillow case or flour sack.

5. One large Stilson wrench.

6. One bucket or container of similar size.

7. One small garden trowel.

8. Two or three pairs of leather gloves.

Source of Supply

Each operating unit must procure its own equipment.

Procedure

1. Prepare the bomb for action by clearing a space for the CO_2 container. This must be large enough to provide easy access to the fuze for removal after freeing.

2. Lag the bomb with wet earth, sand bags, etc. Shade should be provided for the bomb if it is in the sun.

3. Anchor the container to the bomb with any means available. If the bomb is vertical with the nose down, the container can be held in place by wedges.

4. Hold a pillow case, flour sack or equivalent over the CO_2 fire extinguisher nozzle. Open the valve as wide as possible. Powdered CO_2 will collect in the sack; this should then be placed in the bucket and approximately 1 pint of methyl alcohol added to make a paste of the CO_2. The escaping gas from the fire extinguisher may create enough electricity to give a mild shock to the person holding the sack to the nozzle. Do not use the fire extinguisher in the bomb excavation as the CO_2 gas is heavier than air and will collect in the bottom and may make breathing difficult if not impossible at the bomb. This gas is not poisonous but will cause suffocation if admitted to the lungs in a sufficient quantity.

5. Place the CO_2 paste in the container with the trowel and gently shove it up against the fuze and bomb nose using the fingers and thumbs. Three pairs of gloves used alternately will protect the fingers from the extreme cold of the CO_2. It is extremely important that intimate contact between the CO_2 and fuze and bomb nose be maintained at all times! Therefore, the CO_2 paste in the container of the bomb must be worked constantly to maintain intimate contact.

6. Add CO_2 (mixed with alcohol) when necessary to keep the container fully packed. Use up the contents of five 15 lb. fire extinguishers. This should require about 40 to 60 minutes over an air temperature range of 60°F to 100°F.

7. When the last of the fifth extinguisher has been used, continue to force the CO_2 around the fuze for 2 minutes. At the end of the two minutes, remove the fuze with a large Stillson wrench. This must be done with as little delay as possible; if it requires more than 10 minutes after the CO_2 container is removed from the bomb, the fuze must be refrozen using the contents of 2 additional 15 lb. fire extinguishers. If the fuze is allowed to warm up before refreezing the entire procedure from steps 1 to 8 must be repeated.

* ADM 1 is the American adaptation of the British 845 (See Intelligence Bulletin No. 32, March 19, 1943).

Methods of Detonating Plastic Explosive:-

1. Two No. 6 detonators taped side by side with the electric leads at the same end.

2. Standard No. 8 detonators may be expected to detonate plastic explosive. Use of two of this type taped side by side is recommended.

3. Primacord, when a knot is tied in the primacord and this knot is well surrounded by plastic explosive.

NOTE: Detonators should be inserted at least 1/2 inch but not over 1 inch in the plastic explosive for best results.

Sensitivity of Plastic Explosive - Whether in the plastic state or when made brittle by cold, composition "C" is insensitive to ordinary shock, even to hits from small arms fire. However, long exposure at temperatures above 110° will soften and then evaporate the oily compounds which make it plastic. It then becomes flaky and the particles separate. In this state it becomes dangerously sensitive and should be handled with care, since it may be detonated by small arms fire or sudden shock. Composition "C" should be stored in a cool place.

M-123, M-124 AND M-125 TAIL FUZES.

OPERATION

The firing pin in this fuze, which is spring loaded downward, is supported by a celluloid ring. Seated above the firing pin and held in place by a rubber washer and retainer above is an ampoule containing a solvent. The ampoule is located directly beneath the vane stem.

Rotation of the vane causes the stem to be screwed down against the ampoule, breaking it and freeing the solvent. The solvent gradually dissolves and softens the celluloid ring and when sufficiently soft the striker spring forces the striker free and impells it into the detonator cap, initiating detonation. Varying concentrations of solvents gives the various delays.

Anti-withdrawing operation - On an attempt to unscrew the fuze at any time after insertion in the bomb, the steel ball in the body extension will jam in the adapter booster. The fuze body will then unscrew from the body extension, freeing the firing pin sleeve which is spring loaded downward. The sleeve and firing pin will then be driven forward and fire the detonator, initiating detonation.

MISCELLANEOUS DATA

Type - Arming vane with mechanical delay.
Use - Any of the AN Standard G.P. and S.A.P. bombs. M-123 is used for 100 and 250 lb. bombs, M-124 for 500 lb. bombs, and M-125 for 1,000 and 2,000 lb. bombs.
Arming Time - 80 to 100 feet of air travel along the trajectory.
Delay - Long delays of 1, 2, 6, 12, 24, 36, 72, and 144 hours.
Overall Length - M-123 - 9.63 inches
M-124 - 12.63 inches
M-125 - 16.63 inches

PRECAUTIONS

1. Fuze must not be unscrewed during or after assembly to bomb.
2. Fuze must be stowed in a cool place. It should never be subjected to a temperature exceeding 120°F.
3. Unexpended bombs should be jettisoned before landing.
4. In assembling the detonator, care should be taken to avoid damage to the locking ball in its groove.

EXPLOSIVE TRAIN

None in fuze.

PERTINENT FACTS

1. Provision has been made to seal the fuze against entrance of water while bomb is at rest under ground.
2. In order to protect the long delay time fuze from tampering by the enemy, the sensitive, anti-disturbance fuze (T-30) should be used in the nose.
3. In each shipping box there are two vials containing powder which solidifies at temperatures above 120°F. Follow directions in the shipping box in regard to use and disposition of these fuzes if higher temperatures are experienced.

UNITED STATES

SHAPED CHARGES - USE IN DISPOSAL OF BOMBS AND MINES (E.I.L. Report No. 8).

Experiments have been conducted by the Explosives Investigation Laboratory to determine the effectiveness of the shaped charges utilizing the "Munroe Effect" in the disposal of bombs and mines under difficult conditions through such intervening media as mud, sand, or air. Cylindrically shaped Plastic explosive (Composition "C") was used in all the tests with a mild steel liner fitted into the conical cavity in the base of the charge. Generally the following conclusions were drawn:-

1. Best results were obtained when the height of the body of the charge was from 2 1/2 to 3 times the diameter of the charge.

2. The hollow conical-liners were made of mild steel and functioned best when the thickness of the liner was 3% of the base diameter of the liner and substantially uniform in thickness (no bulky seams).

3. The most effective apex angle for the follow conical-liners of these charges was found to be about 80°.

4. The stand-off distance, or the height at which the charge is detonated above the target, was found to be quite important in determining the effectiveness of the charge. Taking the base diameter of the charge and liner as the unit of measurement, best results were obtained when the stand-off distance was between 1 and 2 diameters.

5. Confinement of the shaped-charge does not increase the penetrating power of the charge other than slightly enlarging the hole cut.

The specific charge found to be most effective in obtaining the desired result of partial detonation of mines and bombs through intervening media met the following specifications:-

Weight of charge	- 3 lbs.
Diameter of charge	- 3 inches
Height of charge	- 8 1/2 inches
Apex angle of cone	- 80°
Thickness of cone	- 0.0937 inches
Material of cone	- Mild steel

A more uniform charge was obtained when the plastic explosive was added 1/2 lb. at a time. To further obtain uniformity a cardboard mailing tube suitably treated for protection from moisture and incorporating a sleeve to give a stand-off distance may be used as a container for the charge. Partial detonation of mines and bombs was obtained with the above specified charge when the force of the charge was not aimed at a booster. This partial detonation resulted in opening or demolishing the container of the charge and making it easy to dispose of the remainder by burning. When the boosters were directly hit by the force of the shaped charge there was complete detonation of the main charge.

Allied experiments may be briefly summarized as follows:-

1. A standard 1/2 lb. pressed TNT demolition block placed endwise on the case of a MK. VII mine adjacent to the portion containing 300 lb. of TNT caused a low order detonation of the TNT.

2. A 1/4 lb. cylinder of plastic explosive similarly placed caused a high order detonation.

3. The U.S. Army Anti-Tank rocket and the 10 lb. U.S. Army M-1 shaped demolition charge proved to be effective in detonating a bomb through intervening media.

4. Shaped charges of plastic explosive formed on hollow conical-liners that are in production for the Ordnance Division of the U.S. Army were tried. The advantage of these liners is that they are a production item and readily available. The disadvantage is that they project a steel slug so heavy as to cause complete detonation of the main charge.

It must be remembered that the experiments considered in this report were concerned with TNT loaded ordnance. Many of the high explosives now being used in foreign ordnance are more sensitive than cast TNT, and more complete detonation must be expected under similar treatment.

Experiments are now in progress which from early reports indicate that by proper selection of the shaped-charge used, partial detonation may be obtained from the more sensitive explosives.

TABLE OF CONTENTS

DIAGRAMS

S.I.O.O.

CONFIDENTIAL

U. S. NAVY BOMB DISPOSAL

INTELLIGENCE SUMMARY

BULLETINS 41–50

NOVEMBER 1, 1943

Issued by the U. S. Navy Bomb Disposal School,
Potomac River, Naval Command, Washington, D.C.
for retention and use by Bomb Disposal
Personnel.