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Engineer Technical Bulletin
No. 24

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Name Ericson Date 17 Oct

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ENGINEER HEADQUARTERS, FIFTH ARMY
A. P. O. #464, U. S. ARMY

1 October 1944

ENGINEER TECHNICAL BULLETIN NO. 24

I N D E X

I. MINES, BOOBY TRAPS AND DEMOLITIONS

1. Concrete "Wheelguard" Mine:

a. General: These mines are thought to be of unit or local manufacture as the concrete was still green. Four of these mines were found on a bend in the road between CAPRESE (R-3852) and PIEVE S. STEFANO (R-4155).

b. Description: The mine consists of a concrete block in the shape of a wheelguard commonly found on road bends, curves, etc. The concrete is cast around approximately three pounds of explosive. Access to the explosive is given by a rectangular hole in the front, to which is fitted the main igniter, and at the rear by a small round hole into which an anti-lifting pull igniter may be screwed. Dimensions are as shown in the sketch on page 2.

c. Tread Mechanism: The tread detonating mechanism consists of three pieces of 1½ inch x 1½ inch x 3 ft timber boards strapped together so that the two outside pieces are rigid and the inside is free to move up and down on a wooden pivot pin between them. A small wooden shear pin, the exact strength of which could not be ascertained, is inserted between the two outer members in such a position that the inner board when resting on it is about 1 inch above them.

d. Method of Laying: The concrete mine is set in the road verge to look like a wheel guide. A small trench is then dug from the mine at right angles to the road edge. The tread mechanism is laid and covered. The mine itself is covered to the main igniter hole. The anti-lifting igniter in the back of the mine is above ground level and is attached by wire to a peg.

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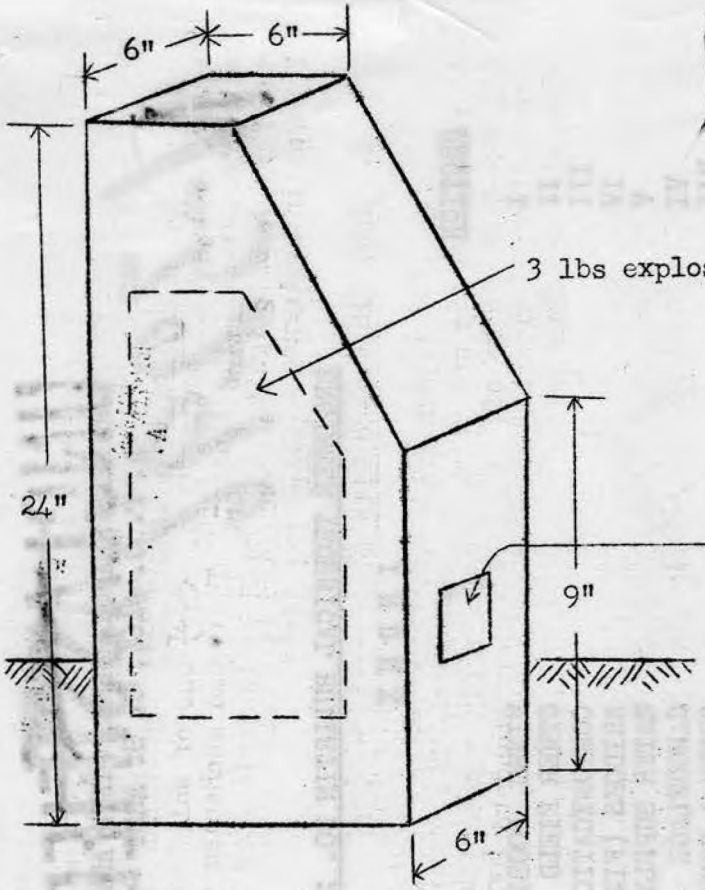
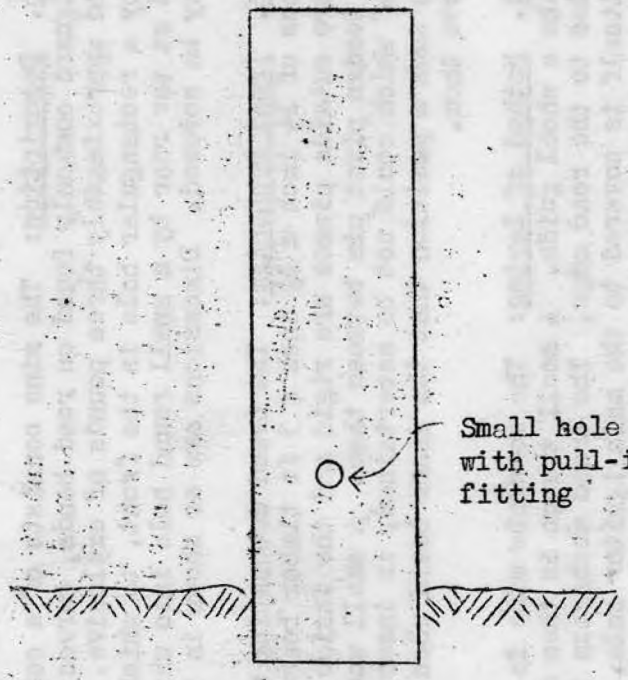
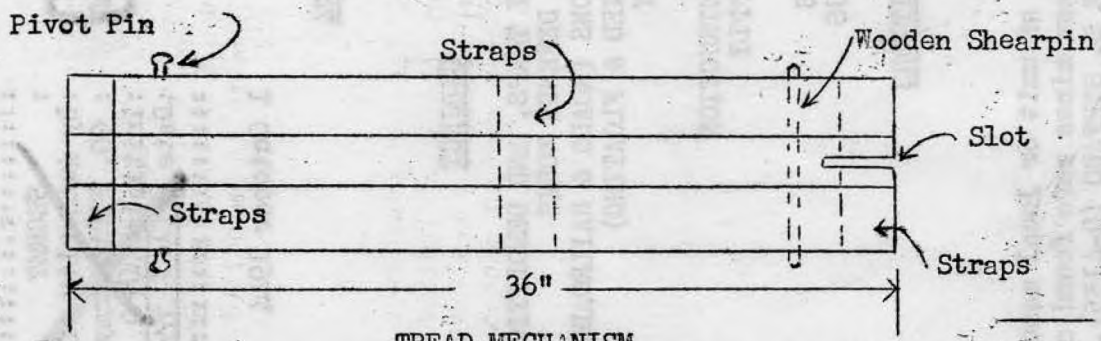
CONCRETE "WHEELGUARD" MINE

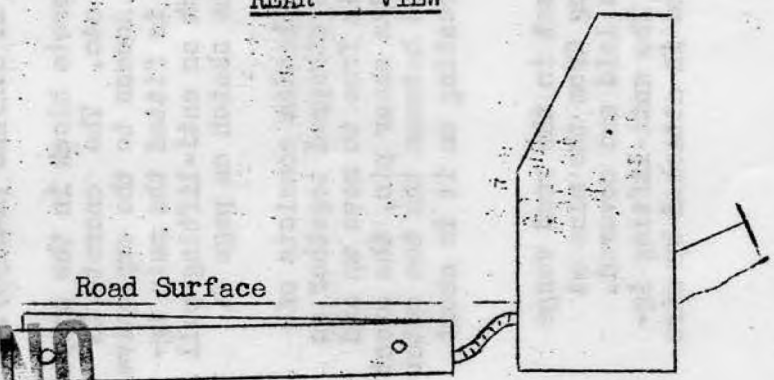




REAR VIEW



TREAD MECHANISM

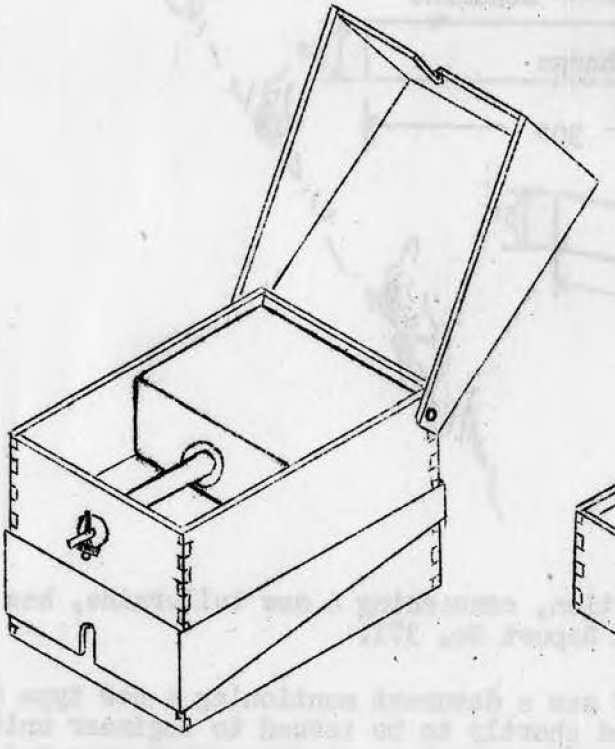


[redacted]

e. Method of Main Initiation: The mines found had either not been armed, or had been neutralized. Two, one of which killed a sheep, were fitted with the anti-lifting igniter. The tread mechanism could be used with either the DZ35 or ZZ42 igniter connected by instantaneous fuze to the mine. (Source: X Corps Intelligence Summary No. 398).

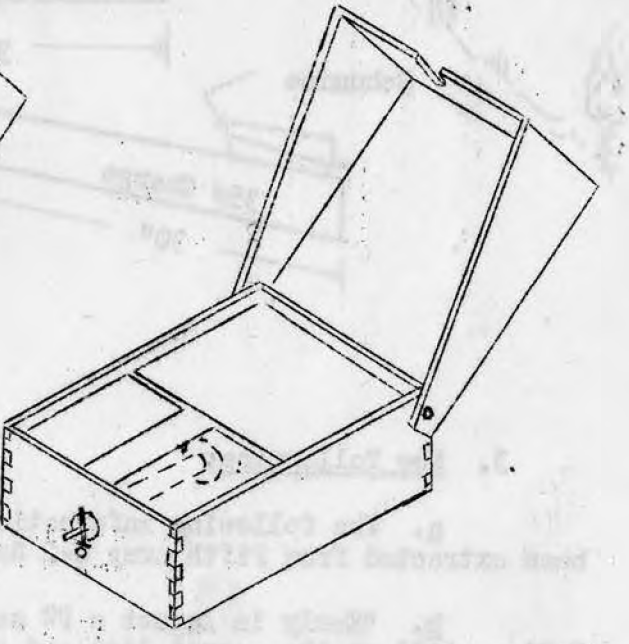
2. Schu Mines Used With Additional Charges:

a. The 1338th Engineer Combat Group reports finding schu mines laid in pairs, the top one being normal but the bottom mine having no igniter and two 200 gram blocks of explosive. In other cases, single schu mines were found with additional explosive (to the standard 200 gram charge) packed in alongside the ZZ42 igniter.



DOUBLE SCHU MINE

Top mine is standard Schu Mine
Bottom mine has no igniter, one 200 gram charge, and another 200 gram charge cut to fit.

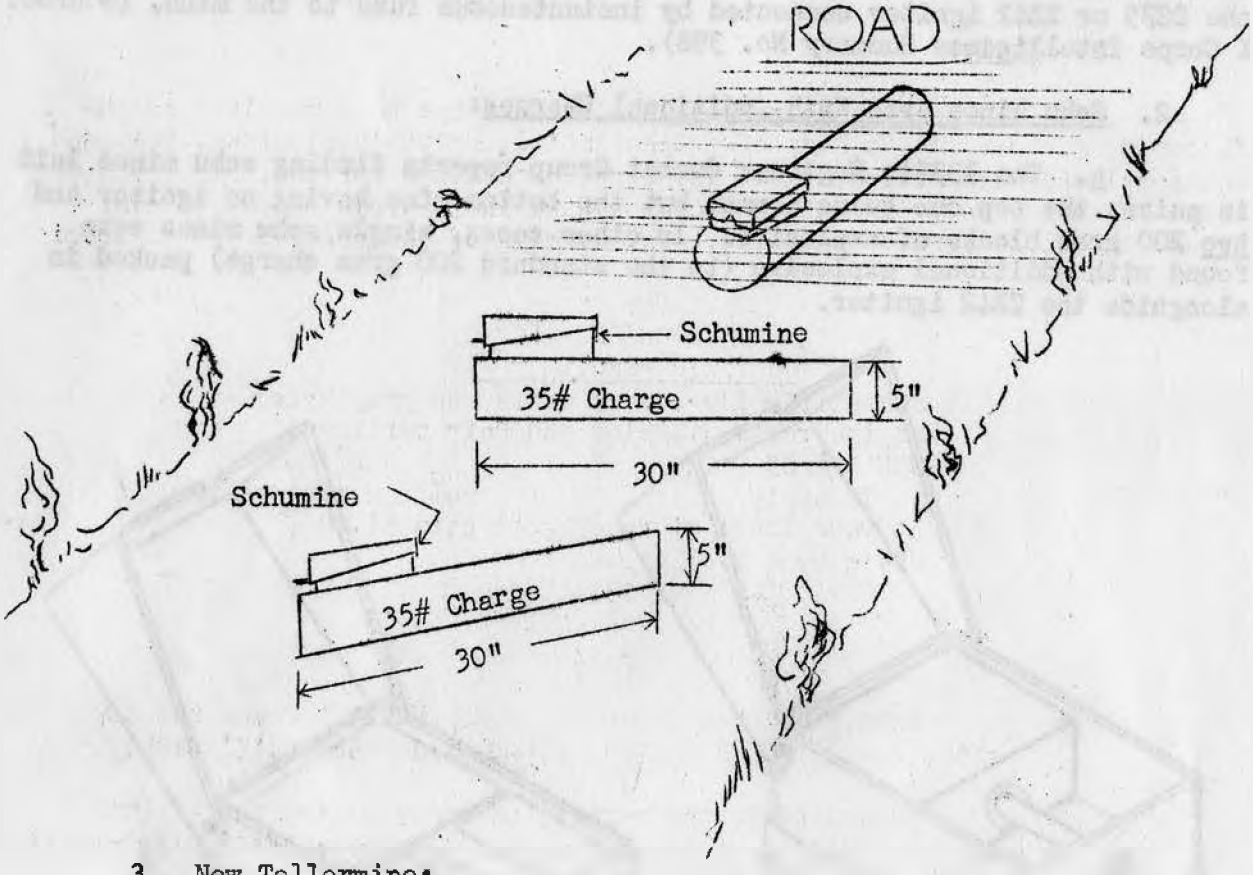


SINGLE SCHU MINE

With additional explosive placed along each side of ZZ 42 igniter

b. The following sketch illustrates how schu mines were found used with 35 pound charges, by the 109th Engineer Combat Bn, buried in a road in the vicinity of CORSICA (Q7297). One of these charges was blown in place, making a crater approximately 6 feet in diameter and 4 feet deep.

SCHU MINE AND PREPARED CHARGE LAID IN PATTERN ON ROAD AS FOUND



3. New Tellermine:

a. The following information, concerning a new tellermine, has been extracted from Fifth Army G-2 Report No. 371.

b. "Early in August a PW saw a document mentioning a new type of T-Mine still on the secret list and shortly to be issued to engineer units. This mine has the properties of T-Mine 42, but is distinguished by a red colored pressure plate. This explodes the mine when an attempt is made to screw it off. This pressure plate is also believed to be more susceptible to pressure than the old one. No other particulars are available. (Source: CSDIC No. 200 MU/DI/246).

4. Booby Traps: Brief particulars are given of some further types of booby traps encountered in N. France and Italy.

a. N. France:

(1) Three picric blocks filled with ZZ35 pull igniters were covered with stones and tension wires connected the igniters to a nearby hedge. Movement of the boughs caused the charge to detonate.

(2) A 30 second delay igniter has been reported fixed to mines, presumably directed against personnel who may lift such mines by use of a cable.

b. Italy:

(1) Moorish Hair Pencil: A report has been received on the following device. It is made of a light metal, probably aluminum, tube and hexagonal cap with milled edge. The name, directions for use, etc., are in white lettering on a black background. There is a purple band 2/5" wide around the closed end of the tube. The wording of the panel is as follows:

569
MOORISH
HAIR PENCIL
Scientifically covers white and grey hair
at the roots, temples and hair parting
NON GREASY HARMLESS
To apply moisten tip
At your local store or post paid $1.00
Mfg'd by E.F. LECHLER
569 West 181st Street
New York N.Y.
U.S.A.

Lettering on the cap is "E.F. LECHLER" round the top side, center "DARK BROWN", bottom side "569 W.181 st N.Y."

According to the report, on removing the cap of this tube, a child lost three fingers. (Source: AFHQ, G-2 Intelligence Notes No. 71)

5. T.Mi. Z.43 Igniter: Following is the answer to a query put to No. 1 Ops. Research Section (AAI) concerning whether or not it should be possible to determine if a T.Mi.Z.43 igniter is in a tellermine by tapping the pressure plate:

"We may conclude, therefore, that tapping the screw cap or pressure plate of suspect T.Mi.42s will reveal the presence of T.Mi.Z.43 igniters, and would suggest that this method be used until some other means is found to deal with the device. This method would, at any rate, provide a means of obtaining igniters for puspose of study. Under no circumstance, however, should this method be relied upon to reveal the presence of T.Mi.Z.43s in Type B Pilz Heads.

Should the igniter be applied to the Type A Pilz Head it may possibly be detected much more readily than in the case of the Type B. It is felt, however, that it is not likely that the new igniter will be met in the Type A head. Should there be sufficient spring pressure in the igniter to prevent ready spring depression there is every possibility the A head would become distorted."

6. Dummy Mines: One officer killed, and several other casualties, (16th Armd Engr Bn) was the result of being careless in lifting what proved to be a real mine from a field in which only dummy mines were being found.

7. Aerial Bombs Fitted with S.Mi.Z.35 Igniters:

a. These improvised mines (see following sketch) were found buried, and carefully concealed in the water bound macadam road surface between the demolished bridge at 006646 and TOSI 0165. Three were found in half a kilometer of road. There are believed to be other such mines in the vicinity of TOSI.

b. The mine consists of an Italian Aerial Bomb weighing about 100 lbs. An S.Mi.Z.35 Igniter is wedged in the fuse pocket cover and screwed in place of fuse. This igniter has a detonator fixed in its base underneath the flash cap by means of candle grease. The detonator is buried in the gain charge. When the igniter is fired the bomb is immediately exploded (no delay was provided in the examples found). To disarm unscrew fuse pocket cover, remove detonators. (Source: Chief Engineer, 13 Corps (Br)).

8. Interrogation of P.W.: The following information was furnished by a PW, and should be treated with reserve:

a. The normal form of Tellers now issued are the 42 and 43. The 42 is usually laid in fields and the 43 in roads. (This is largely born out in practice on this front).

b. He knew nothing of laying Tellers upside down and had NOT heard of its being practiced.

c. He stated that the TILT igniter Ki.Z.43 was available in this theater.

d. He had heard of the picric or mustard pot mine (A.200) but did not think they were in Italy.

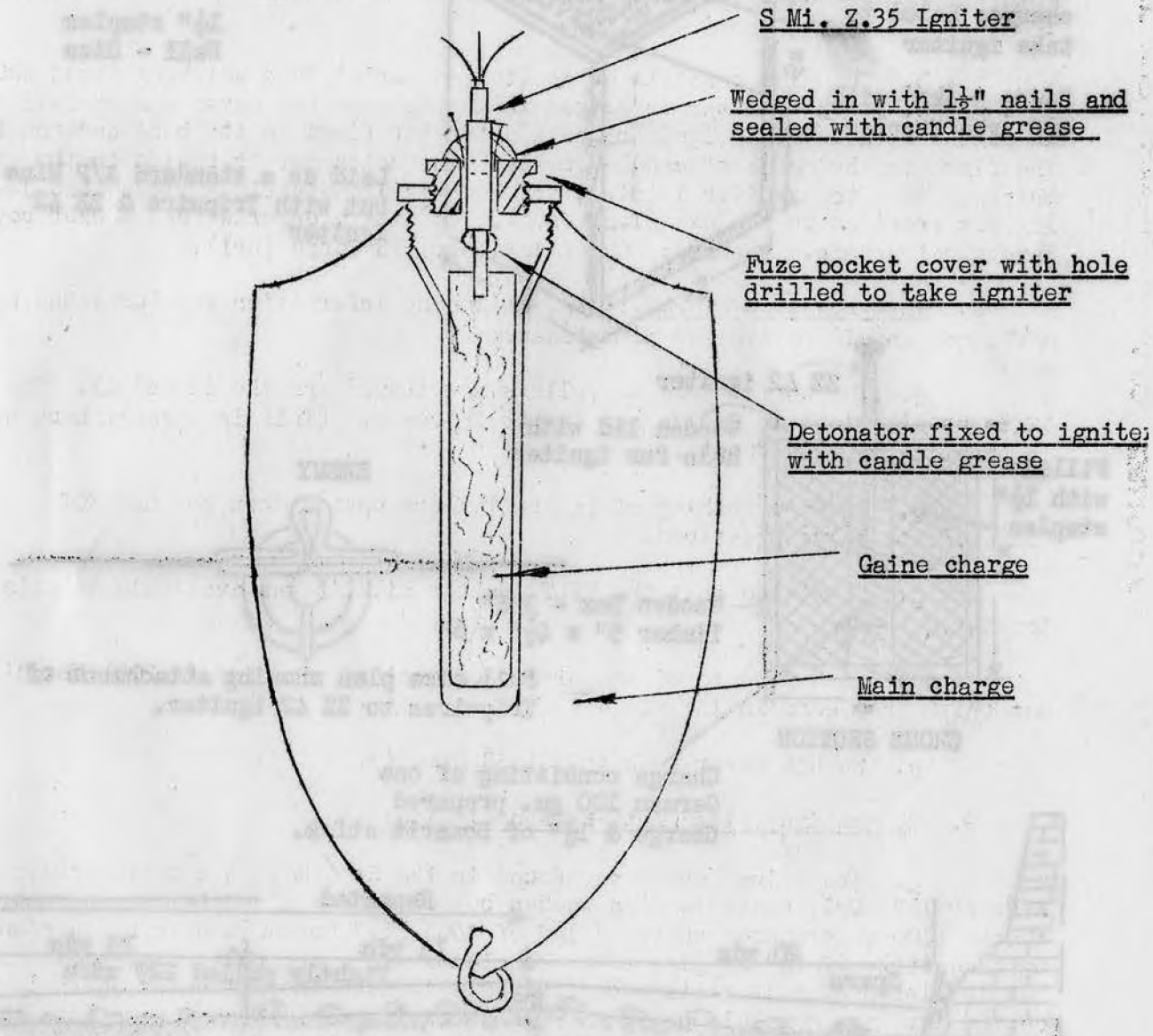
e. He has never seen the GLASS mine 43.

9. German Improvised Anti-Personnel Mine:

a. The "Mine" which was found in the R. ARNO, at a blown bridge near MONTEVARCHI, consists of a wooden box 6" x 5" x 4" containing a central charge (100 gm prepared charge / 1½" of "DONARIT" borehole charge) surrounded by a quantity of 1½" staples which completely fill the rest of the box. The box is closed by a lid with a central hole to take the detonator which is inserted into the borehole charge, and a ZZ 42 igniter, which screws into the threaded end of the charge. (See following sketch).

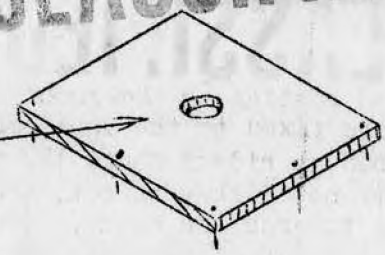
ITALIAN AERIAL BOMB WITH S. Mi. 35 IGNITER

NOT TO SCALE



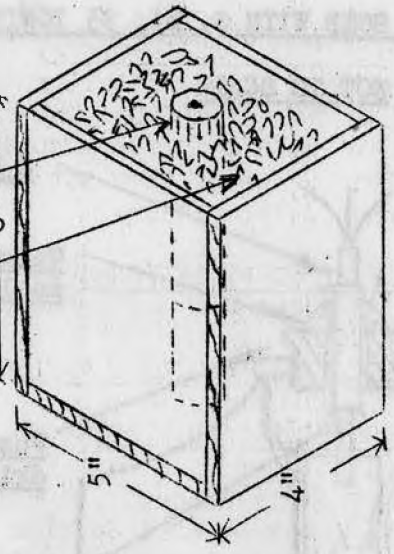
To DISARM: Unscrew Fuze pocket cover & remove detonator

IMPROVISED GERMAN A/P MINE



Roughly constructed Wooden box & Lid holed for igniter

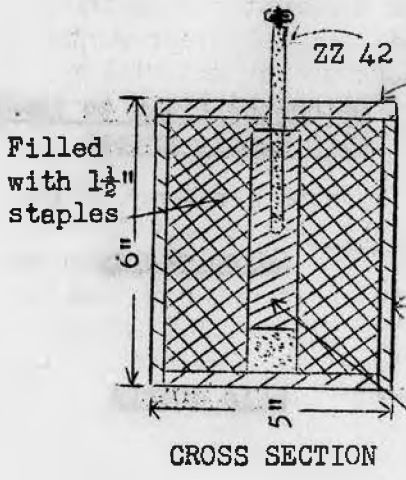
1½" staples Full - Size



Two or three Blocks of standard wrapped charges holed to take igniter

Space packed with 1½" iron staples

Laid as a standard A/P Mine but with Tripwire & ZZ 42 igniter

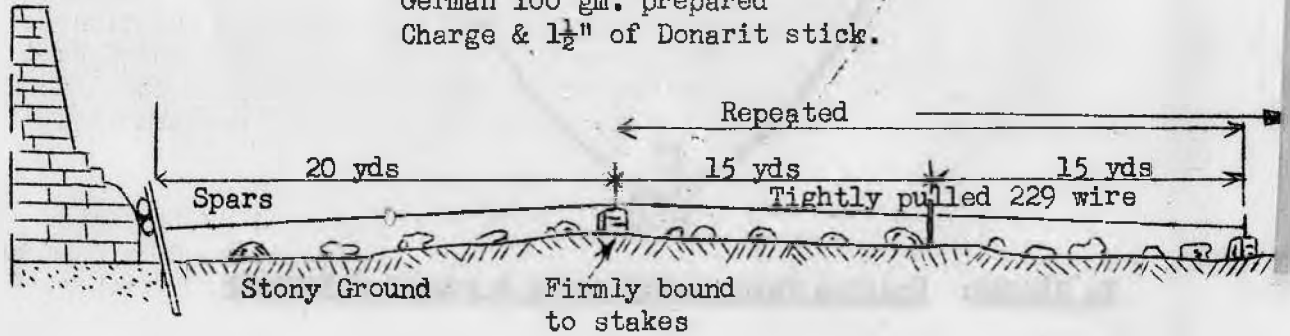


CROSS SECTION

Wooden Box - 3/8" Timber 5" x 4½" x 6"

Full size plan showing attachment of Tripwires to ZZ 42 igniter.

Charge consisting of one German 100 gm. prepared Charge & 1½" of Donarit stick.



General layout of A/P Mines in river bed found in R. ARNO at blown bridge near MONTEVARCHI.

b. The traps were found resting on the ground firmly attached to flat iron stakes. Trip wires were fixed to the igniters. The mines formed a continuous line in the river bed at ridges where the bottom was dry. The spacing was 30 yards. It will be noted that as set, the mines could be actuated only by a person moving towards the enemy. (Source: Eighth Army I.S. #9).

10. Sympathetic Detonation of No. 1 Tellermines: The 235th Engineer Combat Bn reports finding a minefield of No. 1 tellermines (T.Mi.35) laid in the streets of the coastal town of VIAREGGIO. The mines were spaced at about 5 paces and appeared to have been laid for a considerable time. In removing the mines, the explosion of one of them set off 23 other mines in the field, presumably by sympathetic detonation.

II. OTHER FIELD DEFENSE WORKS

Nothing

III. COMMUNICATIONS (ROADS & RAILROADS)

Nothing

IV. BRIDGES (FIXED AND FLOATING)

1. OMBRONE River Bridge: The six hundred and thirty foot bridge and fill, constructed by the 92nd Engineer General Service Regiment across the OMBRONE River on Route No. 1, is of interest in that it not only represented the largest semi-permanent type bridge construction work so far undertaken by the Fifth Army, but also because it presented problems not hitherto encountered.

a. Plan: Demolition of seven central spans by both air bombardment and enemy action resulted in a gap six hundred and thirty feet long. The original military bridge was a small, low-level bridge, and the 92nd Engineers were ordered to prepare plans for its replacement before high water should be expected. As finally approved by the Army Engineer, the plan called for the construction of a 330-ft, Class 40 two-way, Class 70 one-way, timber trestle, steel stringer bridge, and 300 feet of earth fill.

b. Details of Construction:

(1) Footings: The original masonry piers had been shattered down to water level, but below that point seemed suitable as foundation for the new timber trestles. The debris was removed, and a 24" reinforced concrete cap was poured, connected to the original masonry by 1" steel dowels, and containing foundation bolts for the timber sills. (See construction drawings.)

(2) Trestles. Each river trestle is composed of 14 posts built as a double bent and battened at the ends. The distance from base of concrete to top of cap is 40 inches. The upper cap is a 24" x 24" timber, which supports the three main girders.

(3) Girders. The center 270 feet is spanned by three continuous girders, formerly used as crane track at the PIOMBINO Steel Works. They are built-up members, approximately 62" deep. Cross bracing was used to add rigidity and decrease vibration. Standard 32' pre-fabricated girders were used on the two 30' end spans. The main members were launched as a continuous span from the south embankment, which had been left low to decrease the "jacking down distance". Bailey type rocking rollers as well as larger rollers found at PIOMBINO were used. A hand winch on the north abutment pulled the truss across, and a D-7 tractor, tied to the rear, acted as a brake when required. No particular trouble was encountered, although one rocking roller, set too high, was broken. Intermediate temporary piers, constructed from steel cubes, were used during launching to provide additional safety and to decrease the load on each roller.

(4) Decking. Two 3" layers of decking were carried on 12" I-beams, spaced on 24" centers. The curbs are 6" x 6", set 2" above the floor level, and the hand rails are carried by 4" angles welded to the floor beams.

(5) Miscellaneous. The height of the floor above low-water level is approximately 52 feet. It is estimated that the dead load of the bridge is approximately 2,000 lbs. per lineal foot. Concrete retaining walls contain the toe of the fill in the vicinity of the opening, and the slopes are rip-rapped to high-water level. After erection of the timber piers, a brick wall was erected to a height approximately two feet above the lower sill, and the inside filled with concrete. The main girders were hauled in 65-foot sections on 20-ton trailers. They were connected at the launching site by side plates and rivets. Inadequate methods of heating the rivets made this the slowest part of the job, and required approximately two weeks. The work order to begin construction was issued on 17 July, and the bridge was opened to traffic on 5 September (see photos on following pages). On 8 September, high water completely destroyed the small bridge previously used.

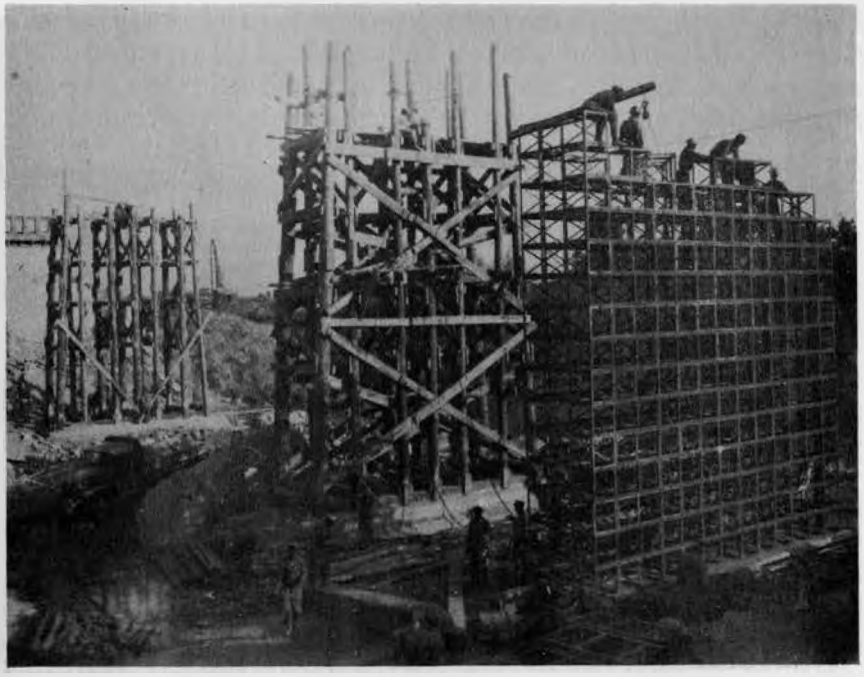
2. Bailey Bridge Across ARNO: A 410-foot, 3-span, Triple-Double, Class 40 Bailey Bridge was constructed across the ARNO River at Q774689. The bridge has 3 spans of the following lengths: 140 feet, 130 feet and 140 feet. The intermediate supports are the Bailey Crib type resting on the stone pier foundation. The piers of the original bridge were only slightly damaged when the bridge was demolished, and provided an excellent foundation and bearing surface for the Bailey Crib. The crib is of triple-triple construction, one bay high.

a. Construction Time: Construction time in man-hours for various items of the work are as follows:

Item	Man-Hours
Preparing existing stone piers for erection of Bailey Bridge Piers	242

OMBRONE BRIDGE

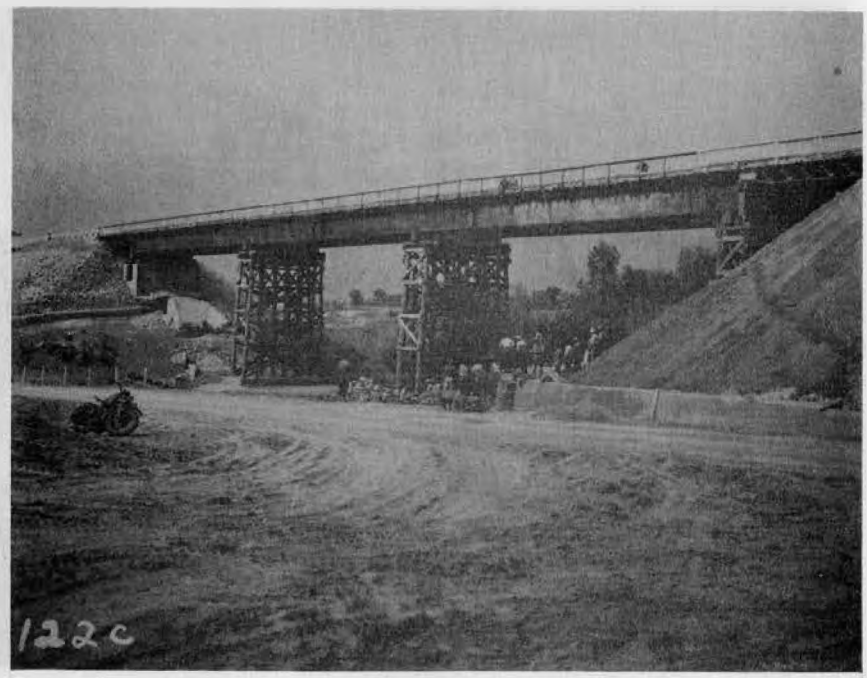
BEGINNING OF CONSTRUCTION
SHOWING DEMOLISHED BRIDGE



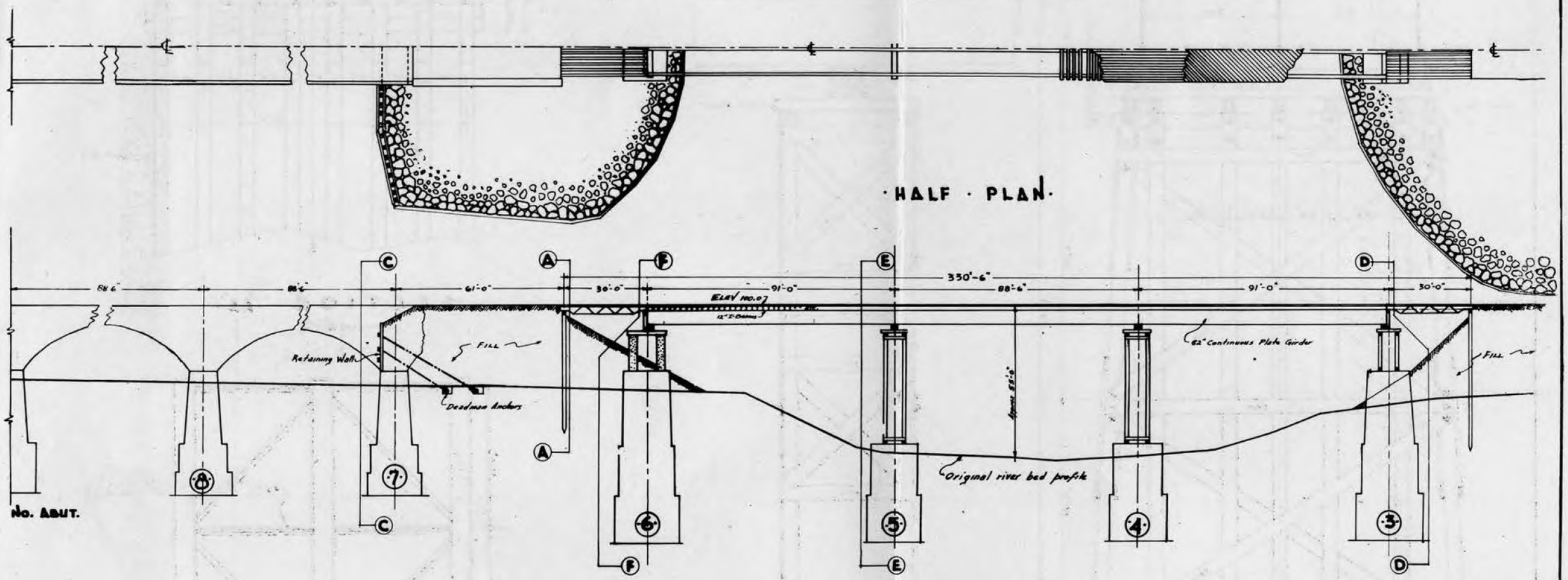
CONSTRUCTION OF TIMBER TRESTLE
AND TEMPORARY LAUNCHING PIER

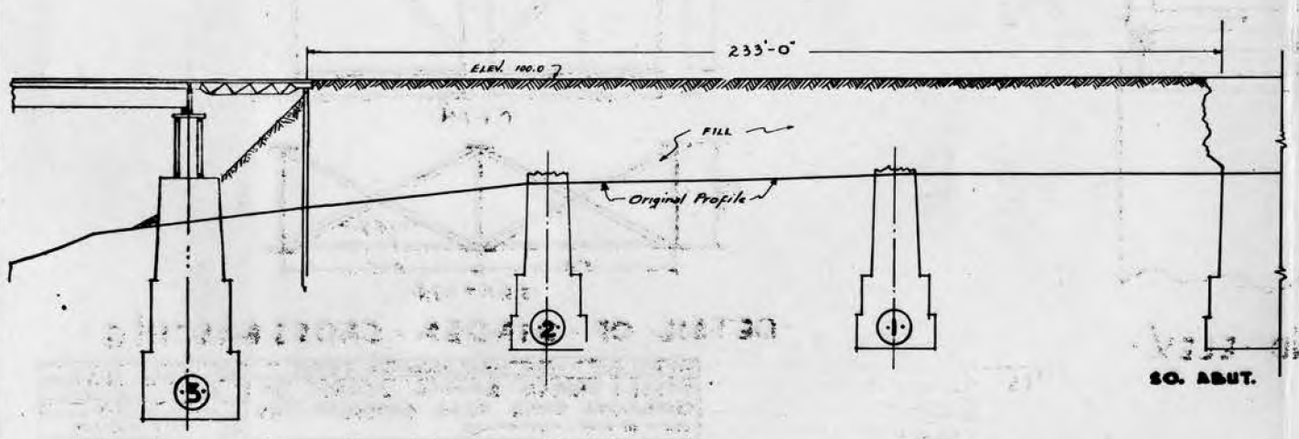
OMBRONE BRIDGE

COMPLETED BRIDGE
NORTH VIEW



COMPLETED BRIDGE
SOUTH VIEW





MAP REF: ITALY 1:100,000 SHT "124 | COORDINATES: E470825

STEEL & TIMBER BRIDGE ACROSS THE OMBRONE RIVER NEAR GROSSETO, ITALY

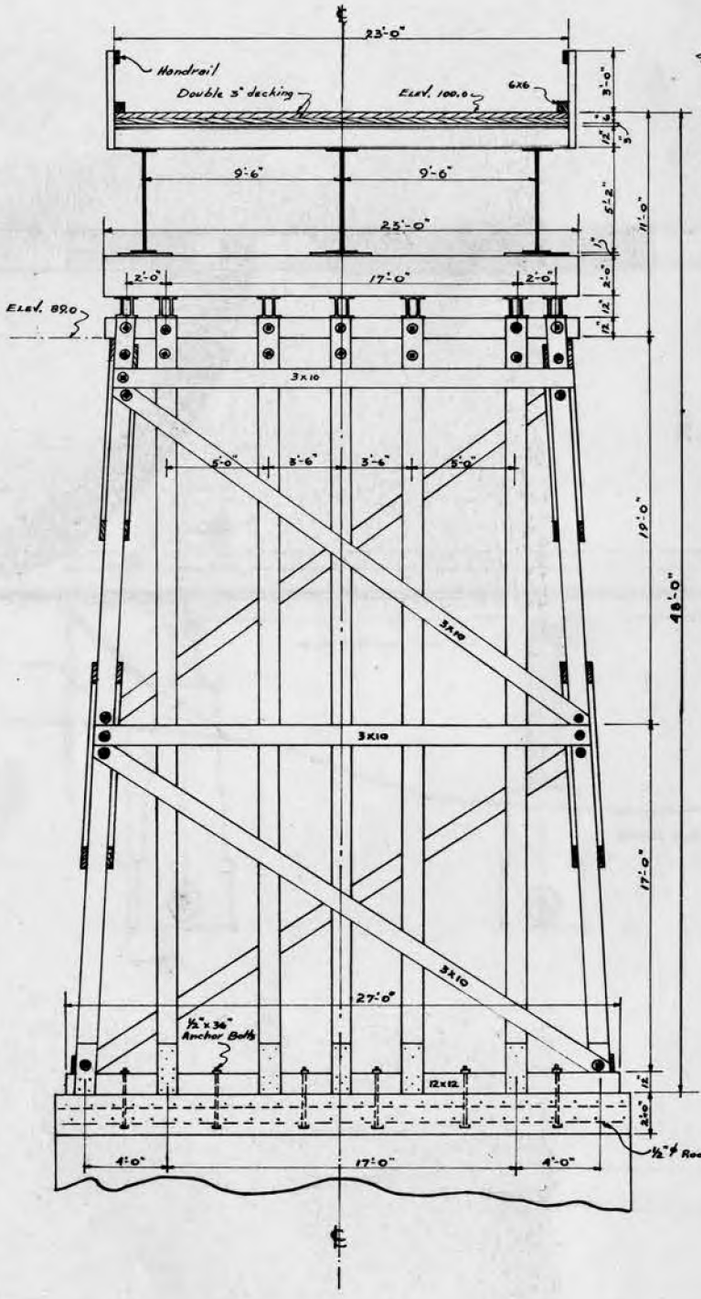
CLASS 40 2-way CLASS 70 1-way

GENERAL PLAN AND PROFILE

92nd ENGR. REGT.
· ENGINEER · SECTION ·

REVISED	DATE
24 June 44	16 June 44
	APPROVED

PROJECT No. 1264 | SHEET No. 1 - 4



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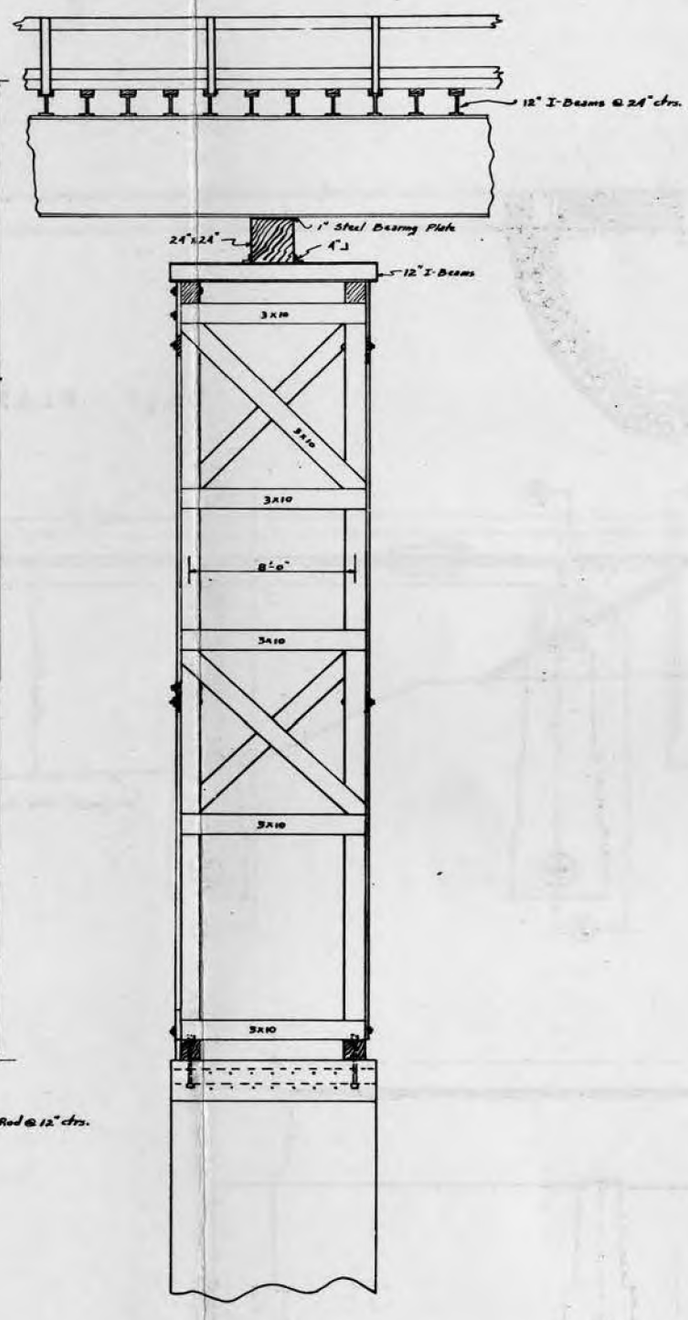

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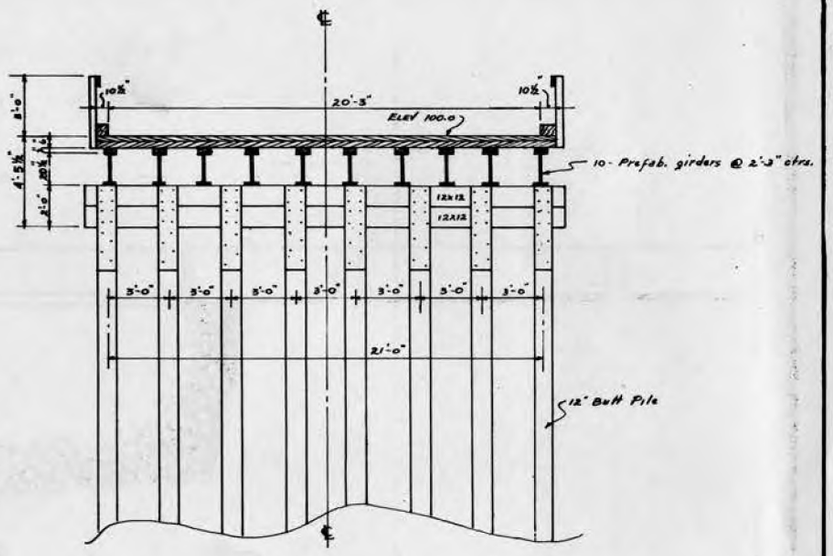

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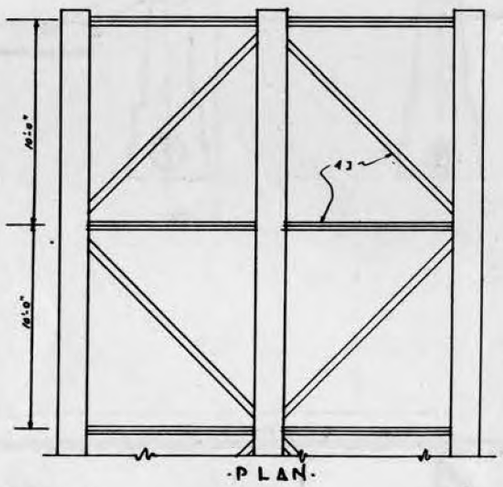
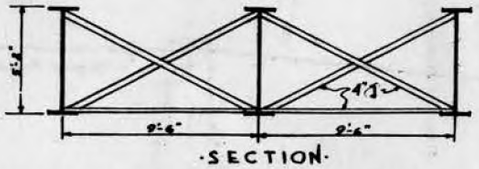


·PLAN·



·SECTION·

·DETAIL·OF·GIRDER·CROSS·BRACING·

MAP REF: ITALY 1:100,000 SHT°128 COORDINATE: E 650625

STEEL & TIMBER BRIDGE ACROSS THE OMBRONE RIVER NEAR GROSSETO, ITALY
CLASS 40 2-way : CLASS 70 1-way

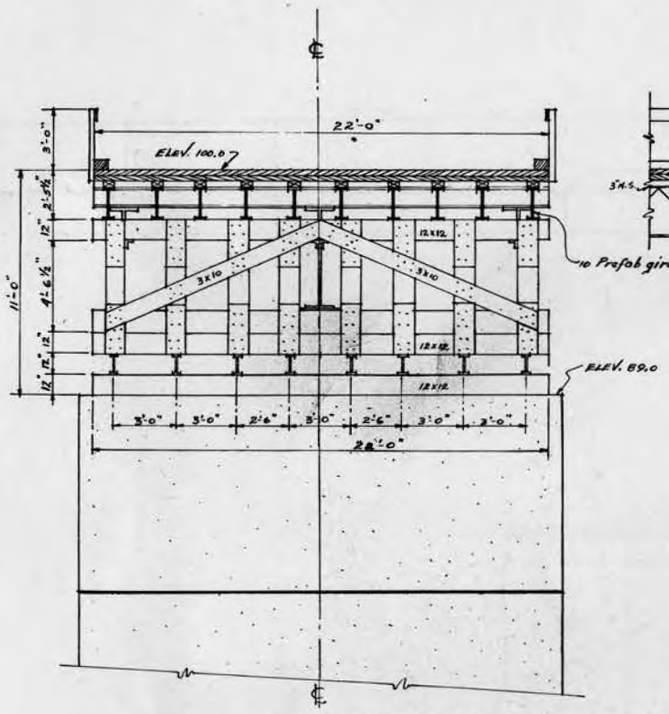
·DETAILS·OF·TIMBER·BENTS·
& GIRDER·CROSS·BRACING·

92nd ENGR. REGT. (Gp)
ENGINEER SECTION

REVISED	DATE
24-7-44	16 JULY 44
	APPROVED

PROJECT No. 1264

SHEET No. 2 of 4



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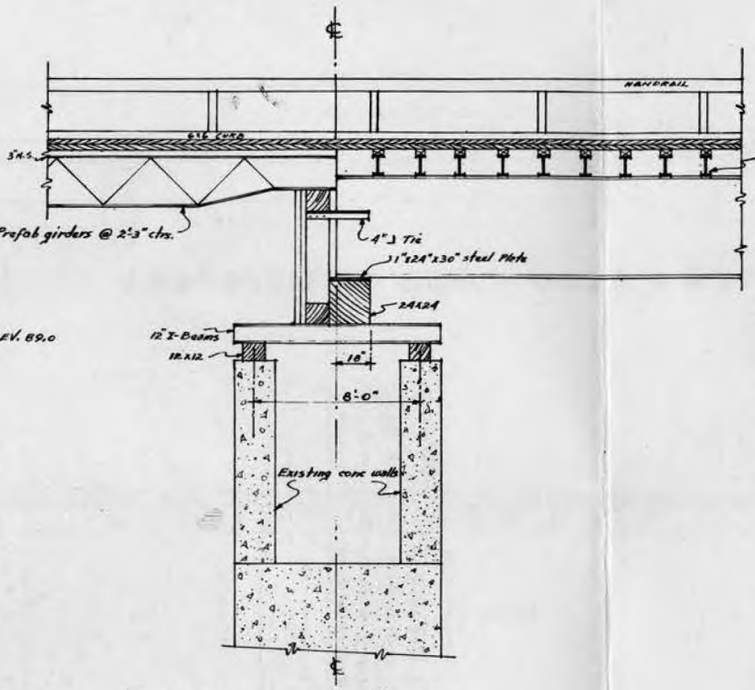

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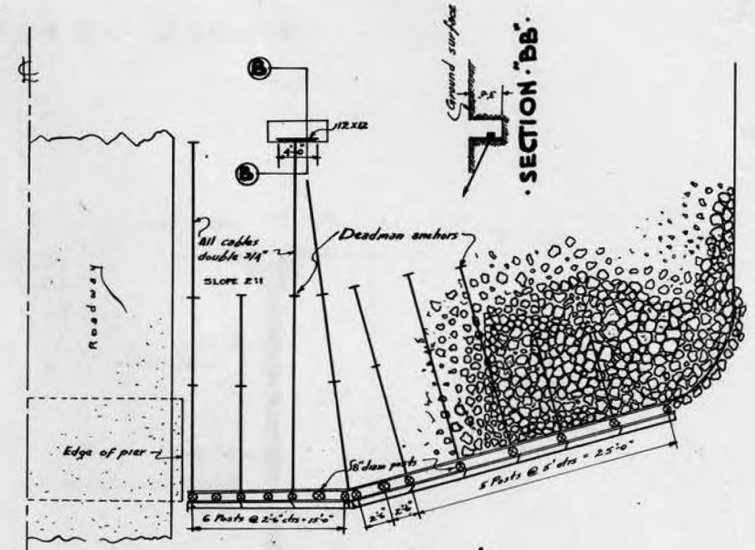
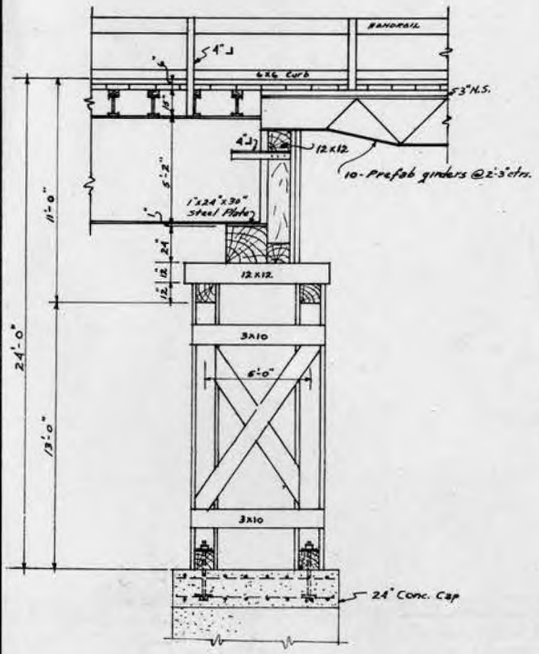


·PLAN·



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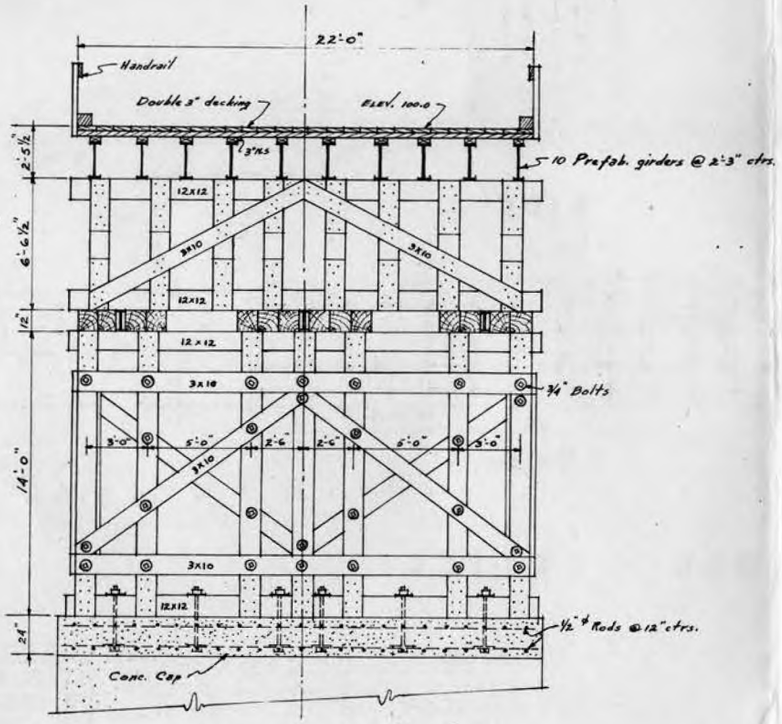

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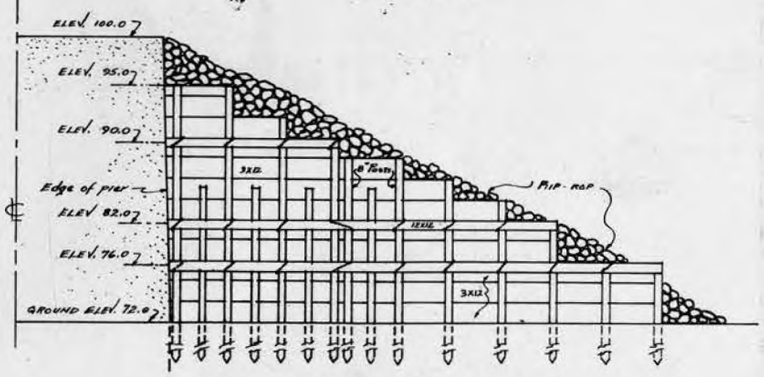

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MAP REF: ITALY 1:100,000 SHT 126 COORDINATE E 680628

STEEL & TIMBER BRIDGE ACROSS THE OMBRONE RIVER NEAR GROSSETO, ITALY

CLASS 40 2-WAY CLASS 70 1-WAY

DETAILS OF TIMBER BENTS & ABUTMENT RETAINING WALL

92ND ENGR. REGT. (HD)

ENGINEER SECTION

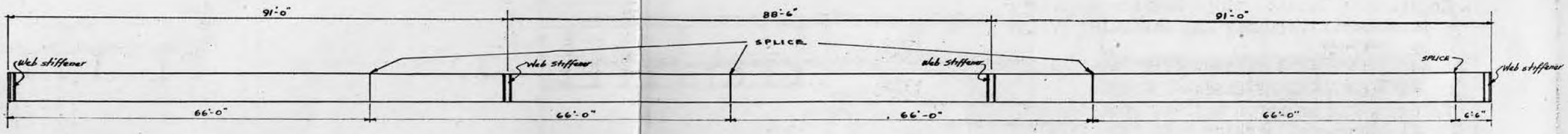
REVISED — 24-7-44

DATE 16 July 44

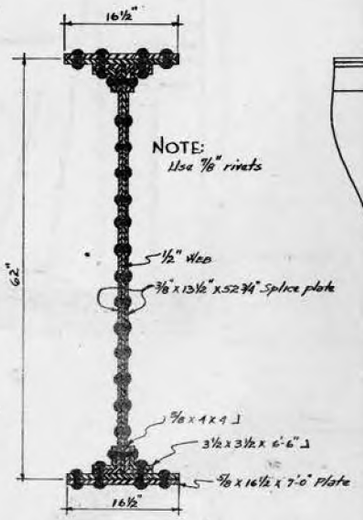
APPROVED

PROJECT NO. 1264

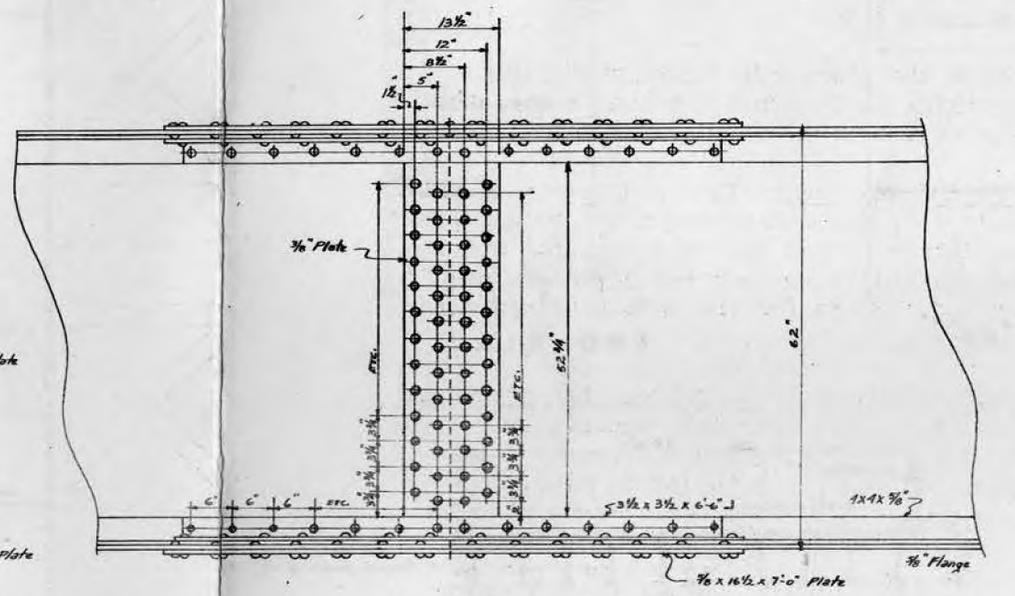
SHEET NO. 3 OF 4



· GIRDER · SPLICES · AND · WEB · STIFFENERS ·



· SECTION ·



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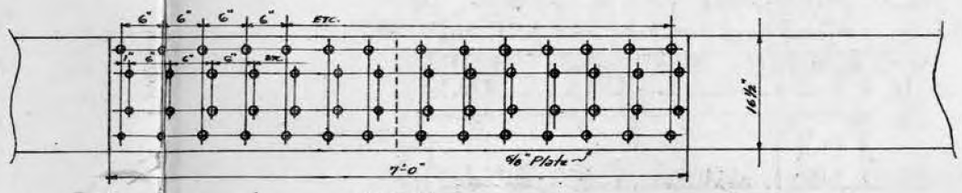


· TOP ·

· DETAIL · OF · GIRDER · SPLICE ·

MAP REF: ITALY 1:100,000 SHT # 128 | COORDINATE: E 650625

· STEEL · & · TIMBER · BRIDGE · ACROSS · THE · OMBRONE · RIVER · NEAR · GROSSETO, ITALY
CLASS 40 2-WAY : CLASS 70 1-WAY

· LOCATION · & · DETAILS · OF · GIRDER · SPLICES · & · WEB · STIFFENERS ·

92nd ENGR. REGT.
ENGR. REP. SECTION

REVISED: 24-7-44
DATE: 16 July 1944
APPROVED:

PROJECT No. 1264
SHEET No. 4 OF 4

Erection of Bailey Bridge Piers and preparation of approaches, and unloading bridge from trucks	1088
Construction of 1st story (triple-single) and launching of bridge	1330
Erecting 2nd story on bridge, breaking continuous span, jacking down onto base plates, and laying traffic strip	1260
Total erection time	3920
Hauling bridge from dump to site of work	936
Total	4856

It is believed that the preparation of the piers could have been accomplished more expeditiously if the working parties had not been restricted by other working parties at the site of the work.

b. Preparation of Stone Pier Foundation: The stone piers of the original bridge at the site were only slightly damaged when the bridge was demolished. There was considerable debris around and on top of the piers. Portions of the pier were shattered and the loose rock was dislodged and the top surface of the pier was leveled. Seats for the crib bearings were niched into the rock surface and seated in concrete.

c. Erection of Bailey Bridge Piers and Preparation of Approaches: A considerable problem developed in getting the material, especially panels, out to, and upon the prepared stone pier. This was overcome by stringing the winch cable of a truck to a pole near the stone pier. On this cable was strung a snatch block and line. The material was put out to the pier on this improvised cableway. The material was lowered to the pier by slackening of the winch cable. The snatch block was brought back to the shore by the line attached thereto. The tops of the Bailey Cribs were finished off with the standard crib cap sill over which was placed a deck of 8" x 8" timber. The base plates were secured to this deck. The approaches were not much of a problem. These approaches were cut into the bank, and the bridge was launched at such a level as to allow the ramp approaches to the bridge to be practically horizontal. This eliminated the usual steep ramp approaches to the bridge.

d. Construction of First Story and Launching of the Bridge: It was considered best to launch the bridge initially as a triple-single bridge and add the top story later. The reasons for pursuing this type of construction were: (1) the launching weight of the bridge was less; (2) less "nose" was required to launch this type of bridge; (3) two working parties could work adding the upper story after the bridge had been pushed across, thus speeding up the work. A great amount of attention was paid to the placing and leveling of the plain rollers and the rocking rollers on both the shore and the piers. All were set in place and leveled with a surveyor's level. No shifting or other difficulties were en-

countered in launching the bridge. The winch on a four-ton truck with cable attached to bridge by a bridle was used to pull the bridge across the stream.

e. Erection of Second Story and Breaking Continuous Span: Two erection crews were employed to speed up the erection of the second story after the bridge was launched. Only the usual problems of taking out the sag of the bridge and bringing the chords together were experienced. Two methods were used to disconnect the continuous span over the piers (one method on each pier):

(1) The top pin of the outside truss at each disconnect point was left out. Other top pins at this point were taken out during the launching just before the disconnect point of the bridge was over the center line of the pier. (The pins are removed when the stress in the top chord is neutral. This can be determined visually by noting the point of change of deflection from positive to negative.) The bottom pins were then easily removed when the disconnect point was over the center line of the pier.

(2) The bridge was launched so that the disconnect point was over the center of the pier. The shore end of the bridge was then jacked up to an elevation that would relieve the negative stress in the top chord over the pier. Thus, the shore end of the bridge was lifted between four and five feet. The top pins were then removed and the bridge jacked down to the original level and the bottom pins removed.

The first method was considered more favorable because it was accomplished much faster.

f. Deck Connection Between Spans: A gap of approximately five feet was left over the piers between the end posts of the end spans and the center span. Standard plain and button stringers were cut to necessary length to fill the gap and chess were laid in the normal manner on these "short" stringers.

g. Footwalk: A standard one-way footwalk was constructed on the downstream side of the bridge.

h. Hauling of Bridge Material to Site of Work: All material was hauled to the site of the work by organizational transportation. There was a total of seventy-eight truck loads of material hauled to the site from the bridge dump, a total distance of 45 miles round trip. The bridge was hauled on three different days in convoys of twenty-six trucks each. Material was hauled in the following order:

10 trucks of Bailey Crib material
2 accessories loads
7 panel loads
7 deck loads
12 panel loads

FIGURE 1

Bridge site at Q-774689 on Arno River. Bridge referred to in this report was constructed on the left of the partially completed bridge shown in this photograph.

FIGURE 2

Preparing stone piers for Bailey Cribs.

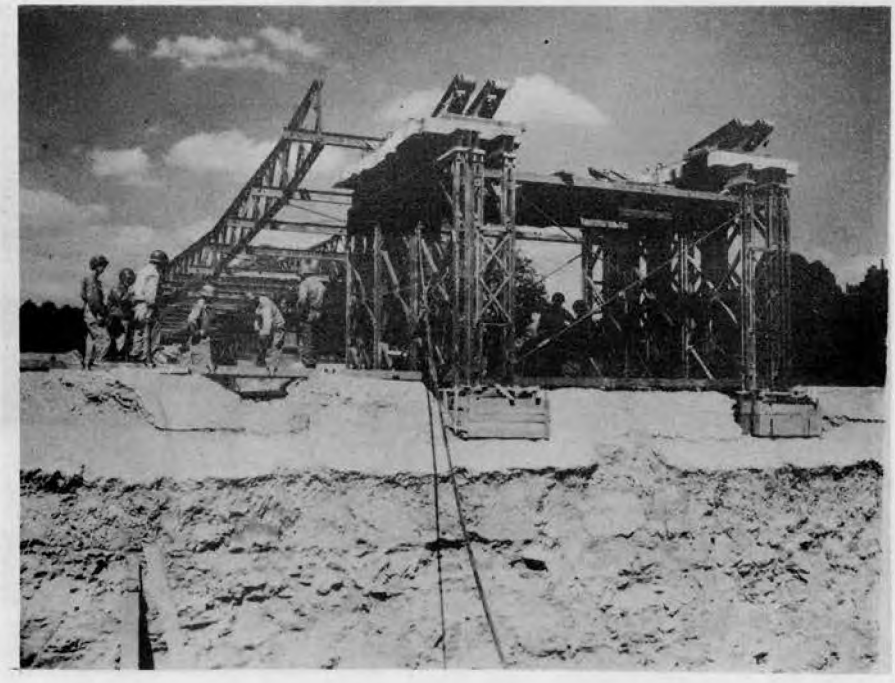


FIGURE 3

Niching stone piers for Bailey Crib seats

FIGURE 4

Bridge launched across stream over completed piers and cribs. Note that decking is proceeding from both ends of the bridge.

FIGURE 5

Top storey being added to first span of bridge.

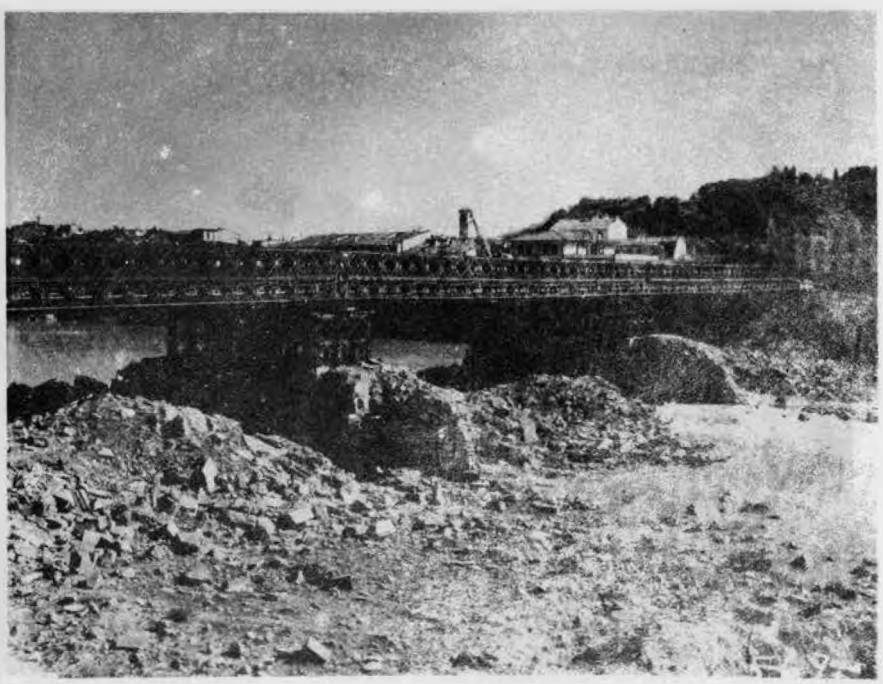


FIGURE 6

Completed bridge looking from North bank of Arno River

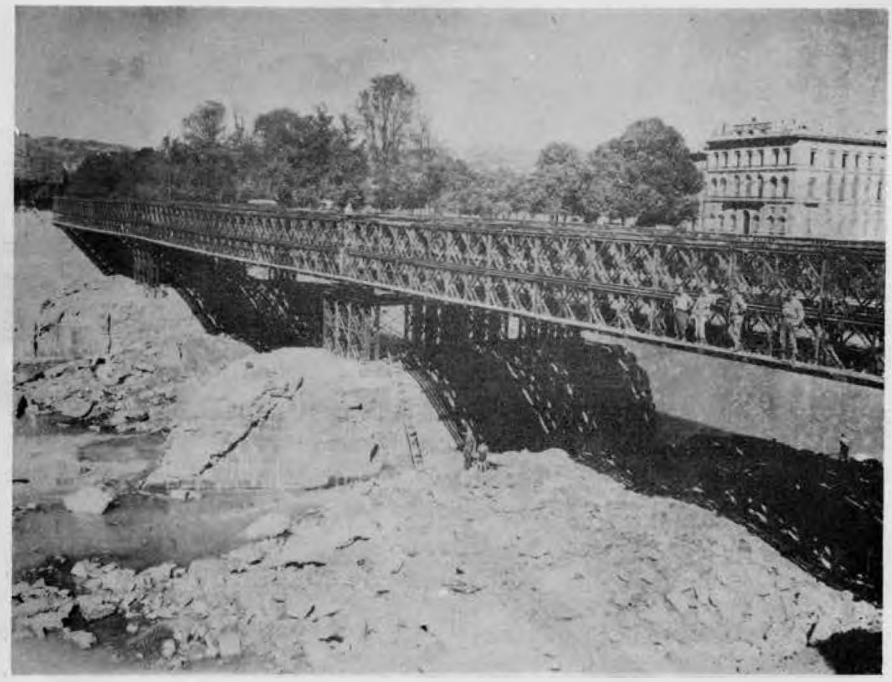


FIGURE 7

Completed bridge looking from South side of Arno

FIGURE 8

Completed bridge showing South approach.

14 deck loads
24 panel loads
2 ramp loads
78 2 ½-ton truck loads

All material was stacked at the site of the work and no part of the bridge was constructed direct from the trucks. Panels for the top story of one span and half of the deck loads were unloaded on the far shore to allow work to progress from each end of the bridge. Pictures of the bridge during construction begin on the next page. There will be noted a second partially completed bridge in these pictures. This bridge is being constructed by British troops. Pier construction of both bridges is the same.

V. WATER SUPPLY

1. Interesting filtration occurs at FLORENCE where triple stage filter beds offer a method for handling the ARNO River as a surface supply for the city. The plant, of French design, was constructed in 1916 and utilizes rapid sand filtration with compressed air for backwashing in the initial phase of sand purification. Two remaining sets of slow sand beds then are available depending on the degree of effluent required.

VI. CAMOUFLAGE

1. German Dummy Tanks: Eighth Army camouflage officers have reported the finding of eight dummy Mark VI German tanks (non-mobile) near the River MELFA. The dummies were apparently fabricated from local materials; the bodies being scrap lumber covered with tar paper. The turrets were of plywood, and guns were simulated with telegraph poles; stiff cardboard being used for the muzzle brake and gun jackets. These tanks were realistic enough to draw considerable allied shell fire. (Source: AFHQ Camouflage Bulletin No. 6)

2. Camouflage Painting of Vehicles and Guns:

a. Fifth Army Operations Memorandum No. 21, dated 13 September 1944, directs that Fifth Army vehicles and guns will be painted lusterless olive drab, except when special permission is granted to pattern paint. The general consensus of opinion among camouflage officers is that pattern painting is of dubious value, and is only helpful under special circumstances. British vehicles in Italy have also discarded the use of pattern painting, adopting the U.S. lusterless olive drab.

b. Continued studies by camouflage officers of enemy methods of pattern painting bear out the general ineffectiveness of such painting to conceal installations. Aerial photographs and air observation of large scale painting projects, such as the Solvay Plant S. of LIVORNO, the petroleum installation at LIVORNO, the Gas Holders at FLORENCE, and other in-

stallations bear out the contention of field camouflage officers that such painting merely tends to make the structures more conspicuous as military targets. The painting, however, does tone down the structures when dark colors are used.

3. Underwater Bridges: Aerial photographs taken 24 July 1944 disclosed the existence of an underwater bridge across the ARNO River at Q816677 (East end of FLORENCE). The bridge was destroyed during August. Investigation of the site indicated that the bridge was apparently a timber decked structure, supported on rails with uprights of 4" angle iron. The bridge was used by foot troops and light military traffic. The decking was at times covered by six inches to a foot of water, depending upon the height of the river. The reason for bridge being underwater is unknown. The two most logical reasons are:

a. Protection from low level fighter bombers.

b. The river rose higher than expected and covered the bridge.

4. Sommerfeld Mats for Tank Camouflage: The mat rods were spot welded to the tank hull at approximately 18-inch intervals and at the rod ends. On the tank turret and gun shield, iron brackets, consisting of the bent ends of mat rods, were welded and a wire strung to form a network. Waterproof tape was used to secure a wire mesh on the gun barrel since welding is impossible. After the wire is attached, a standard camouflage pattern is painted on the tank and natural foliage is placed in the wire foundation. (Source: Engineer Intelligence Memorandum, No. 25, First United States Army)

VII. GENERAL CONSTRUCTION

Nothing

VIII. ENGINEER SUPPLY

Nothing

IX. EQUIPMENT

Nothing

X. PUBLICATIONS

1. Below is a list of recent acquisitions to the Engineer Headquarters Library. These documents are available on a loan basis to all engineer units in Fifth Army for a period not to exceed five days. Only one copy of each is available and prompt return of borrowed documents is necessary in order that all interested parties may benefit from available information. Requests for items should be accompanied by the document title, number and/or date.

a. Engineer Board Reports: Date

Development of Firing Device, Release Type, T-5	17 Feb 1944
No. 840 German Map Reading Light	17 July 1944
No. 842 Equipment for the Passage of Enemy Minefields	15 July 1944

XI. MISCELLANEOUS

1. Expedient Means for Projecting Detonating Cord Cable:

a. Recent tests have shown that a 13-strand cable of detonating cord will clear a path four feet wide through Schu-mines buried flush with the ground surface or laid on top of the ground. Described herein is a method of preparing and launching approximately 200 feet of this cable over a minefield. The component parts required to make up the equipment are available in all theaters where Schu-mines are likely to be encountered. They are as follows:

(1) 2795 feet of detonating cord.
(2) 300 feet of twine or tracing tape.
(3) 15 feet of 3/4-inch manila rope.
(4) 27 inches of safety fuse.
(5) 2 M-2 fuse lighters.
(6) 2 Corps of Engineers non-electric blasting caps.
(7) Propellant powder from 44 caliber .30 cartridges.
(8) 1 base ejection smoke shell, M-84, as used in the 105 Howitzer.

b. The cable consists of 13 strands of detonating cord 215 feet long. This length makes a practicable one-man load of 43 pounds and allows a margin of safety over the 200 feet to be cleared. In making up the cable the strands are held by several men as shown in Figures 1 and 2 and wrapped or seized with twine, tracing tape, or friction tape.

c. The projectile of the 105 mm, M-84, base ejection smoke shell is used as the launching device. To prepare the shell for this purpose the base plate, which has a left hand thread, is removed by inserting the point of a bayonet in one of the two holes in the plate and striking the end of the hilt sharply with the heel of the hand (Figure 3). The smoke containers and the small bag of M-3 powder are removed. The fuse is deactivated by opening the two side jets with a bayonet point and igniting the powder train inside by flame from the spit of a piece of safety fuse. One inch of dirt is then tamped in the nose of the shell to seal off the hole leading to the fuse. The propellant consists of approximately 150 grams of powder removed from 44 caliber .30 rifle cartridges. This powder is wrapped in a piece of osnaburg cloth or similar material and placed in the shell on top of the tamped earth. A Corps of Engineers non-electric blasting cap with 12 inches of safety fuse and fuse lighter attached is

placed in the powder and the remaining space in the shell filled with tightly tamped moist earth. Care should be taken that no loose gravel is used in the tamping or the blast from the open end of the shell will be toward friendly troops.

d. A 15-foot length of 3/4-inch manila rope is used to attach the projectile to the detonating cord cable. This rope is first tied on the projectile by means of a cats paw and four half-hitches as shown in Figure 4. The detonating cord cable is coiled in a uniform figure eight. It is suggested that a template as shown in Figure 5 be used to assure uniformity. A Corps of Engineers non-electric blasting cap with 15 inches of time fuse and fuse lighter attached is taped to the bottom end of the coiled cable. The entire assembly is a two-man load, one man carrying the projectile with rope attached and the other carrying the coiled cable. A third man goes in front to find the way and to assist and relieve the other bearers from time to time. He carries a block of wood or ammunition case or some similar item to serve as a launching prop for the projectile. An empty 1000-foot detonating cord spool has proved convenient for this purpose but may not be available in the field.

e. Upon arrival at the edge of the minefield the explosive cable is placed as shown in Figure 6. The projectile is propped up at an angle of about 30 degrees and pointed in the desired direction as shown in Figure 7. It is placed three feet to the side and even with the coiled cable at right angle to the long axis of the figure eight. The side of the projectile on which the four knots in the attaching rope have been tied should face the coiled cable. The end of the rope is then attached to the top end of the explosive cable. This is done by first taking an 18-inch bight on the cable, then typing a double sheet bend with the 3/4-inch rope six inches from the loop in the cable. Follow with a half-hitch six inches further toward the running end of the bight on the cable. Tie the rope to the remaining six inches of the bight with about two feet of tracing tape or friction tape (see Figure 8). The fuse lighters on both the projectile and the cable are then pulled and the working party retires approximately 100 feet to the rear and takes the prone position with helmets toward the projectile. The projectile is propelled about 200 feet by the blast and drags the cable after it (see Figure 9). After nine seconds, the cable will be detonated. Care should be taken not to cut the fuse on the detonating cord cable too short and allow the cable to be detonated before it is in place.

f. A path approximately 200 feet long and 4 feet wide is cleared of Schu-mines by the explosion (see Figure 10). "S" Mines are not set off unless they are directly under the cable. However, the path is clearly marked and grass or camouflage is removed allowing the "S" Mines to be more readily seen. Trip wires are either cut or exposed by the blast. "S" Mines wired with heavy wire will usually be set off.

g. This operation may be repeated by additional crews clearing 200-foot paths each time. Should the rear end of an explosive cable be

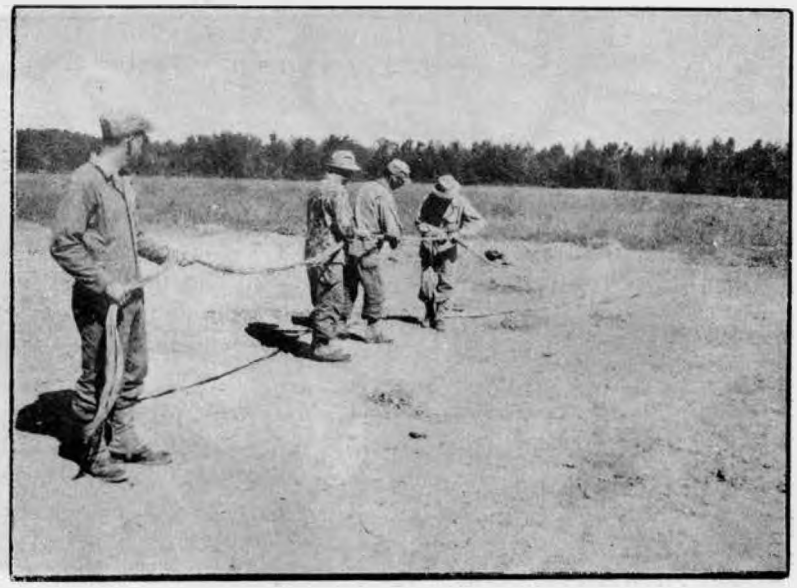


FIG. 1. Men tying and taping 215 foot length of 13 strand detonating cord.

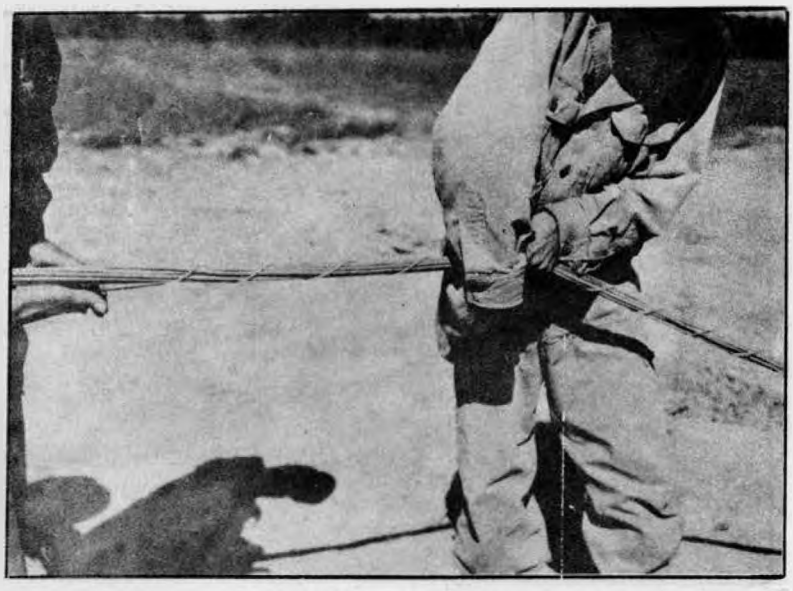
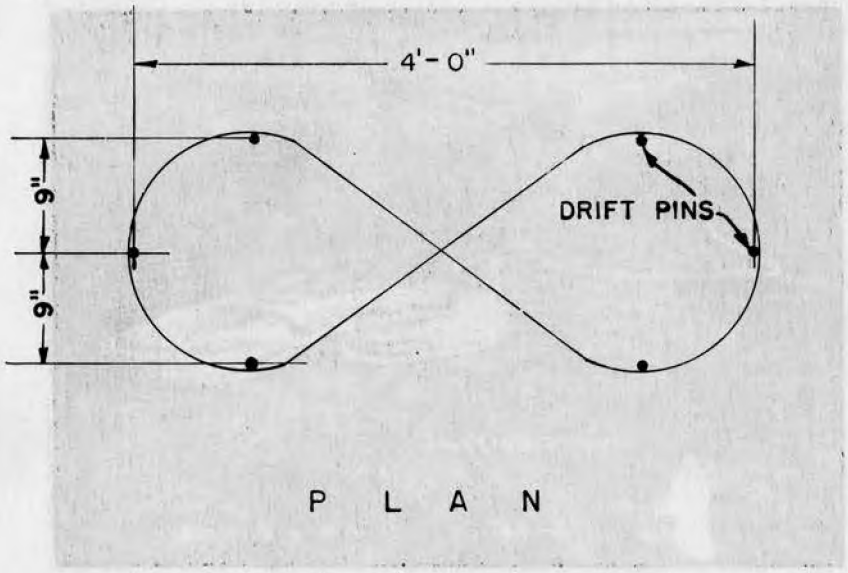


FIG. 2. Closeup of men preparing 13 strand rope of detonating cord. Man on left wrapping twine around the 13 strands of detonating cord; man on right making two turns around detonating cord with friction tape. Friction tape is applied about every 10 feet.

FIG. 3. Inserting point of bayonet into base plate in 105 mm. semifixed B.E. shell for removal. Thread is left handed.

FIG. 4. Shell mounted for launching with cats paw and four half hitches.



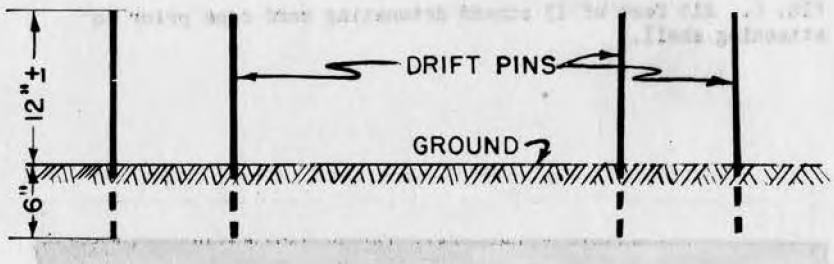


Fig. 5. – Template for preparing detonating cord, fig 8.

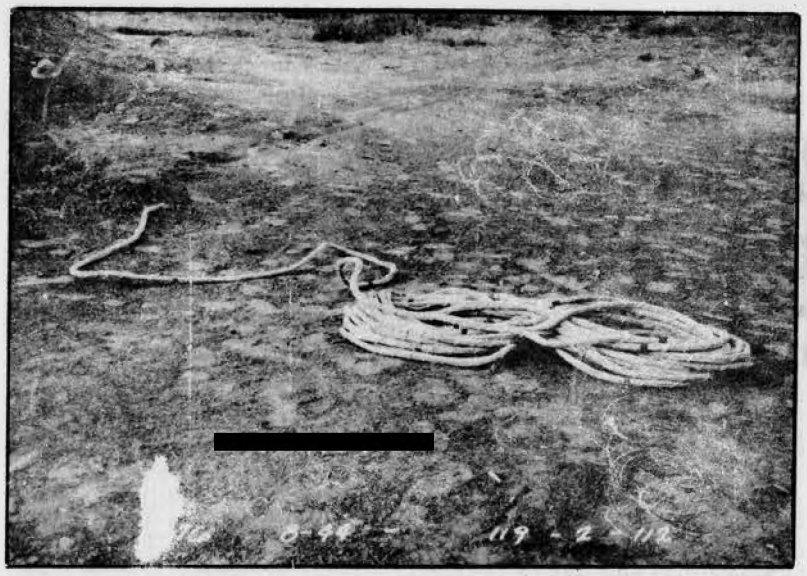


FIG. 6. 215 feet of 13 strand detonating cord rope prior to attaching shell.

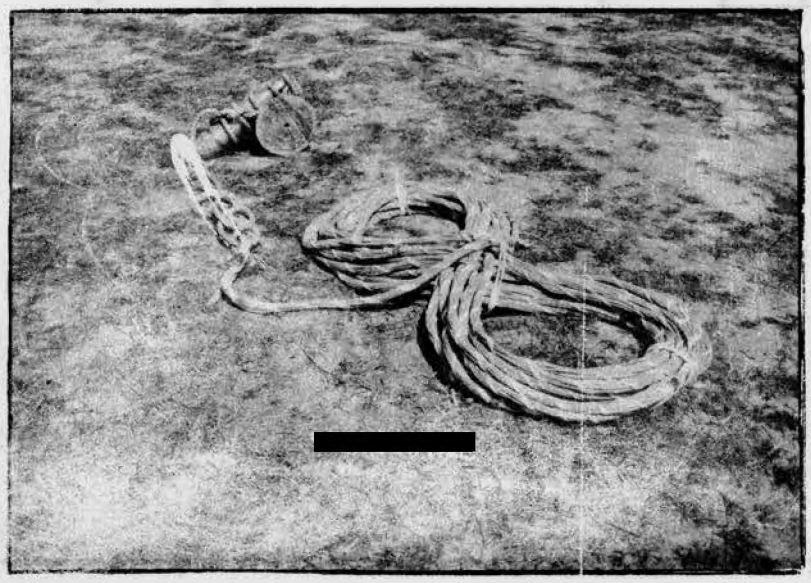


FIG. 7. Shell or launcher attached to 13 strand detonating cord rope preparatory to firing.

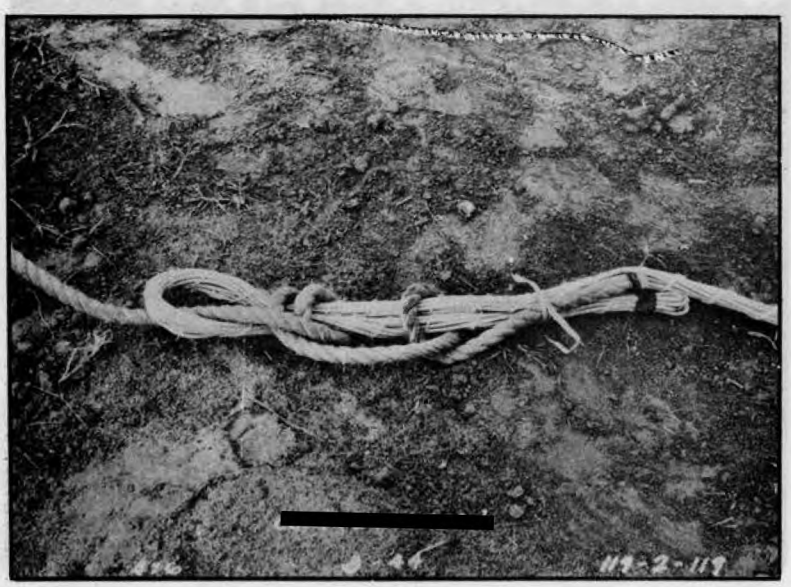


FIG. 8. 3/4 inch rope attached to 13 strands of detonating cord with double sheet bend, half hitch and seizing.

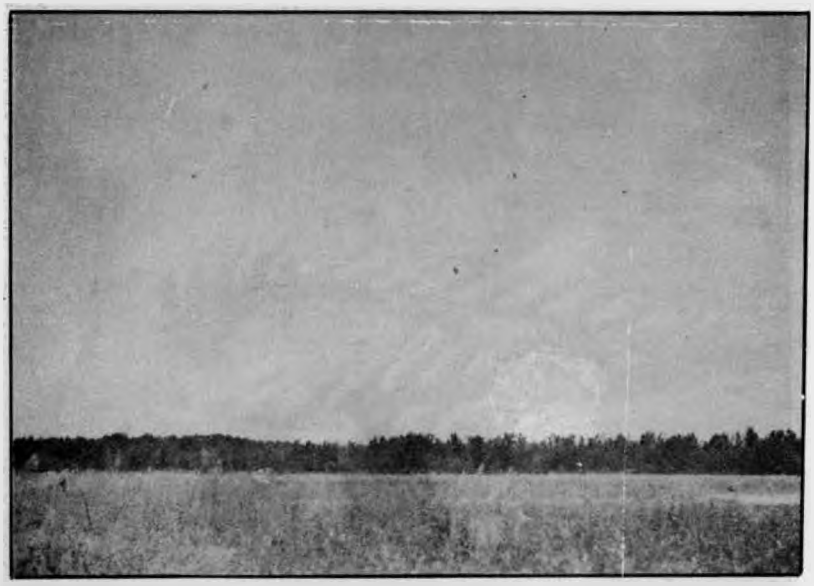


FIG. 9. Shell going through air pulling 215 feet of 13 strand detonating cord.

FIG. 10. Cleared path after 13 strands of detonating cord has been detonated in Schu mine field.

FIG. 11. First step in preparing a cats paw.

FIG. 12. Second step in preparing a cats paw.

FIG. 13. Completed cats paw.

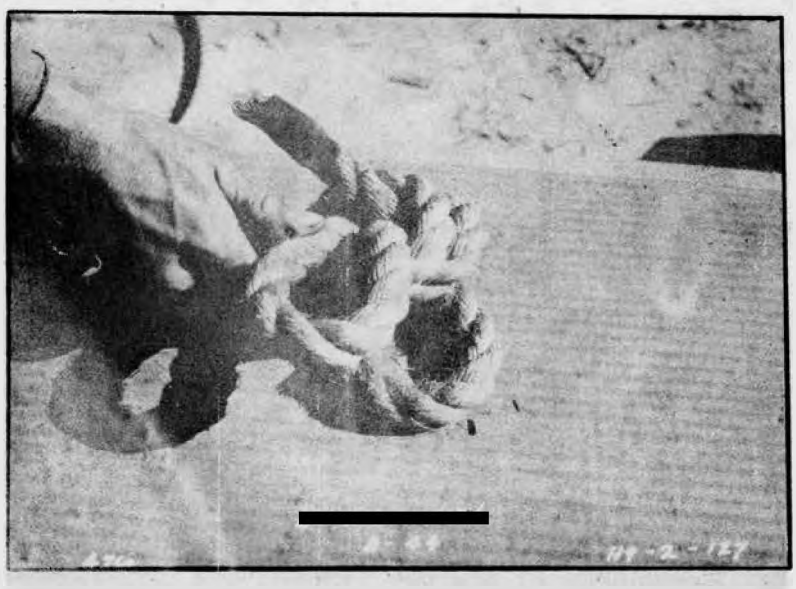


FIG. 14. Cats paw ready to be placed on shell nose.

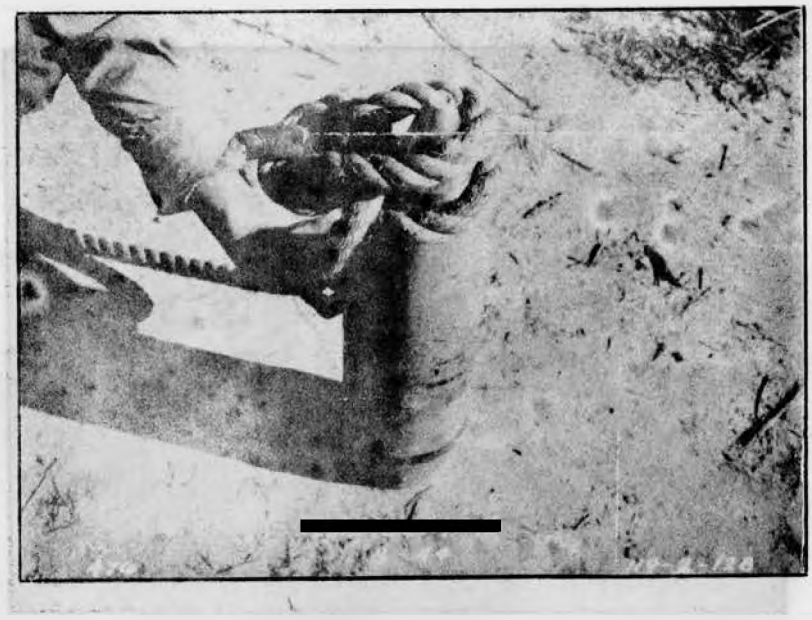


FIG. 15. Cats paw in place on nose of shell. Four half hitches on body of shell completes tie.

carried too far forward by the projectile, the space between the 200-foot paths must be cleared of mines by hand or by firing an additional short length of explosive cable.

h. Special Precautions:

(1) In making the cats paw for the nose of the shell, make the diameter of the loops small enough to fit tightly on the fuse of the shell. If the loops are larger, it is possible that the shell will slip through the loops when it is launched (Figures 11, 12, 13, 14 and 15). No trouble will be encountered if the loops are made to fit the fuse of the shell tightly.

(2) If the rope is tied to the shell beforehand and it is to be transported some distance before using, it is recommended that the 3/4-inch rope be held in place by tracing tape tied in clove hitches about the cats paw and the half hitches.

(3) The charge should not exceed that recommended. If the powder from as many as 70 cartridges of .30 caliber rifle ammunition or over is used, the projectile is likely to burst. (Source: Memorandum Report of the Technical Staff of the Engineer Board, dated 29 August 1944)..

i. Trial by 39th Engineers: After a week's trial of the above mentioned device, the 39th Engineers has the following to add to the original report:

(1) If a sloping, launching trench is dug to the proper angle, much better direction can be obtained. By placing the face of a flat rock or board at right angles to the axis of the projectile and at its open end, to act as the breech on a gun, a much greater force in launching was obtained.

(2) Experiments showed that the angle of projectile for greatest distance of projection was 40 degrees from horizontal.

(3) Normal deflection was found to be as much as fifteen feet in a 200-foot length of cable, from the line of sight.

(4) Lengths of projection were found to vary between 164 feet and 218 feet, the variance due probably to the non-uniformity of earth tamping and launching angle.

(5) The propellant charge as described in the Engineer Board Memorandum Report was found to be ideal.

(6) Other uses for this method of launching were tried with the result that a 3/4" rope could be launched to a height of 80 feet, and a telephone wire can be projected across a 300-foot gap.

(7) Results of the experiments show that this method of launching a detonating cable 200 feet long into a minefield is effective and feasible in this theater with the equipment readily available.

NOTE: Any description of only enemy equipment or methods, contained in this bulletin, or in any previous edition of the Fifth Army Engineer Technical Bulletin, may be extracted and reproduced with the classification of "RESTRICTED".

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