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# FM 5-23

DEPARTMENT OF THE ARMY FIELD MANUAL

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# FIELD DECOY INSTALLATIONS

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DEPARTMENT OF THE ARMY

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DEPARTMENT OF THE ARMY  
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## FIELD DECOY INSTALLATIONS

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\* This manual supersedes TB ENG 77, May 1945.

**PART ONE**  
**CHARACTERISTICS AND LOCATIONS OF DECOY**  
**INSTALLATIONS**

**CHAPTER 1**  
**INTRODUCTION**

---

**1. Purpose**

This manual provides a reference for officers at battalion level or lower who are responsible for planning and implementing visual deception phases of field operations and for training troops in the simulation of military activities and installations.

**2. Scope**

This manual covers the general principles of visual deception including the planning, implementation, operation, and maintenance of decoy installations. It furnishes the visual characteristics which identify various military installations and activities. It discusses the various considerations, such as the efficiency of opposing intelligence, the weather, and the terrain, which affect the extent to which these identifying characteristics must be reproduced in the production of a successful decoy. The equipment, tools, and methods by which decoy installations may be created are cataloged and explained. The use of flash devices, fires, and smoke screens in connection with decoy installations is discussed. No effort is made in this manual to explore the potentialities of deception in securing the element of surprise. In general, the manual is confined to methods of achieving visual deception.

**3. Definitions**

Terms which are important to a full understanding of this manual are given below.

*a. Camouflage.* A general term used to describe any measure the aim of which is to mislead by misrepresenting the existence or the true nature of any installation, equipment, or activity; a term used to describe the series of related concealment and deception measures which may form a part of the overall plan for the protection of installations, equipment, or activities.

*b. Concealment.* A particular term used to describe any activity the aim of which is to hide or disguise; the application of camouflage techniques with the aim of denying information as to the existence, nature, disposition, or intent of installations, equipment, or activities. Concealment offers protection from observation only; cover offers protection from gunfire.

*c. Deception.* A particular term used to describe any activity the aim of which is to draw attention; the use of any measure, the aim of which is to mislead by misrepresenting any installation, equipment, or activity.

*d. Decoy.* Dummy installation, equipment, or activity used to draw the attention of the enemy in order to keep the enemy from acting against the object or position it is intended to cover, or to provide him with information which will cause him to act to our advantage.

*e. Dummy.* An installation, object, or activity which reproduces a limited number of selected characteristics of the installation, object, or activity which it simulates. Dummy equipment normally reproduces visual or sonic characteristics. Dummy activity may reproduce appearance, sound, or timing.

*f. Fidelity.* The degree of accuracy to which a dummy reproduces the characteristics of the item it represents.

#### **4. Limitations of Visual Deception**

It is of primary importance to realize the limitations of visual deception. Deception unmasked by an enemy may well leave the contriver in a worse position for his effort. It must be kept in mind that where the enemy has available sources of intelligence other than visual or photographic, an effort to induce certain enemy conclusions by means of visual deception alone will be a failure. Conversely, other means of conveying erroneous intelligence will fail if, by means of a photograph or observer, the enemy may check the sham for accuracy and unmask it. The limitations of visual deception are, therefore, directly geared to the efficiency and methods of opposing intelligence agencies.

#### **5. Capabilities of Visual Deception**

The capability of visual deception is persuading the enemy that "seeing is believing," and that the "display" represents the true situation. A deception plan should be based on the assumption that the opposing intelligence agency is at least as effective as our own, and reduced in scope from this ideal as dictated by time, materials, and manpower available. The plan may include features designed to take advantage of known weaknesses and methods of operation of the opposing intelligence agency. A strong and efficient opponent may also furnish the very means by which he may be led to the incorrect estimate of the situation. If the opponent is known or suspected to rely on aerial photography or observers, ground agents, or even probing patrols, the stage may be set for visual deception.

## CHAPTER 2

### GENERAL PRINCIPLES

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#### Section I. PLANNING

##### 6. General

As the scope of this manual is limited to visual deception by means of decoy installations and simulator devices, no attempt is made to correlate this phase with other related phases of operations. The approval of a visual deception plan and its coordination with other measures and with the operations of other troops are the responsibility of the highest headquarters concerned. Nor does this manual do more than refer to the necessity of concealing, by camouflage or other means, the operation of troop units inconsistent with the visual deception plan.

##### 7. Development of the Plan

Development of a visual deception plan requires the same comprehensive thought that is required before issuing any important order. Accordingly, all phases of the standard estimate of the situation (FM 101-5) must be followed.

a. The mission of the visual deception must be thoroughly understood. It may be intended to deceive the enemy as to the true location of a parent target, to simulate the presence of an activity or installation that does not actually exist, or to give the impression of a larger activity or installation than is actually present. It must be kept in mind that the display must contain sufficient but not excessive visual indications, so that it will not arouse enemy suspicion. Also, all visible indications which refute the authenticity of the display must be removed or minimized.

b. The terrain in which the display is to be made, together with the customary characteristics of the surrounding friendly troops, must be considered. It is desirable that the planner equip himself with aerial photographs of adequate scale and with tactical maps of the area. If circumstances permit, he should familiarize himself by means of a personal reconnaissance. He should give particular attention to the cover and concealment naturally available, the roads and avenues of approach, and the proximity to the enemy, civilian observers, and friendly troops.

- (1) The extent of simulation detail in decoy installations is determined by the proximity of enemy observers and their ability to

take ground and aerial photographs. Weather conditions have a definite effect on the amount of detail needed. If poor visibility conditions are forecast for the period of the display, the detail may sometimes be reduced, but the display may have to be more extensive in order to be seen at all.

- (2) The more natural concealment there is in the area, the smaller will be the number of simulator devices needed to achieve the effect of real equipment. For instance, in arctic or desert terrain a high percentage of the actual military units will have to be simulated. In wooded or jungle terrain, little more than tracks and characteristic signs of occupancy are needed.
- (3) The natural cover of the area, in addition to providing concealment from enemy ground observers, will be important in that it might confuse enemy ground radar stations that may be checking for telltale absence of the proper reflectance. If cover is not available, proper radar reflectance must be provided for decoys (par. 21).
- (4) The roads and access routes must be considered with respect to whether they lend credence to the portrayed installation. A capable intelligence agency will undoubtedly reject a logistically improbable situation. Likewise, the tactical positioning of an installation must appear to be flawless to an observer.
- (5) The possibility of civilian observers should not be overlooked whether or not the installation is close to occupied towns or villages. These observers must either be prevented from effectively seeing the installation or, preferably, must have misleading information imparted to them. Advantages should be taken of shoulder patches, insignia, bumper markings, and the like to further the deception. Such identification is desirable not only for direct deception of observers but also for indirect disclosure by our own or allied troops who are not initiated to the proceeding. Uninitiated troops may innocently spread the news of the portrayed installation and the information may thus reach the enemy.
- (6) The planner must ordinarily imitate the tactics, camouflage methods, camouflage discipline, and living and housekeeping habits of friendly troops in the vicinity. Only if the unit simulated is known by the enemy to have other than the standard characteristics should a marked variation be permitted. Otherwise, deviation will immediately attract attention and mark the installation as different. In attempting to discover why the installation is different, the enemy may penetrate the deception.

c. It is essential that the planner familiarize himself as accurately as possible with the methods and personal peculiarities of the intelli-

gence agency which he is attempting to deceive. Chapter 3 summarizes the principal methods employed by intelligence agencies. These general methods must be supplemented in any given operation by specific information concerning the operations of the opposing enemy intelligence agency.

*d.* Having listed the various means by which the enemy secures evidence of our situation, the planner appraises the efficiency of each.

*e.* Possible deceptive measures to counter each of these enemy means are enumerated and appraised as to effectiveness. Analysis should include requirements for supplies, time, manpower, equipment, and probability of success of each of the countermeasures under consideration. The time and manpower required for installing the display must ultimately conform to the time required by a real organization to carry out the task being simulated. At this stage, familiarity with the various tables of organization and equipment is essential. Finally, the deception planner must so schedule his operation as to allow the enemy adequate but not excessive time to observe the display and to react thereto. If the display is set up too leisurely or left in evidence too long the chances of the enemy detecting its false nature are multiplied.

*f.* Basing it on this analysis, the planner devises a deception plan and transmits it to participating troops. It outlines what, where, when, and how to simulate. Minute features of installation simulation are not contained in this plan, but they should be furnished automatically and properly by the implementing troops.

*g.* Almost every kind of target may be simulated by a decoy. Decoys are normally either for daylight or night use, but may be combined if the situation requires it. Daylight decoys are usually less effective than night decoys because they can be recognized by enemy reconnaissance unless extraordinary care is taken to insure complete and realistic detail. Moreover, a great deal of material and labor is required to construct them and considerable personnel are needed to maintain and operate them.

*h.* The most important considerations in selecting a decoy site are—

- (1) Is the decoy intended for day or night operations, or both?
- (2) If the mission of the plan is to misrepresent the location of a parent target, is the location of the parent target such that a decoy may reasonably represent it without endangering other vital installations?
- (3) What is the probable direction of attack?

*i.* Both day and night decoys should be oriented on similar bearings and in the same general relation to prominent terrain features as their parent targets. When it is impossible to fulfill these two conditions, a



logical compromise must be made. Normally, decoys near towns and cities are located along the most probable line of attack, so they will be observed before the enemy reaches the parent target.

j. Minimum distances from decoys to other occupied positions cannot be prescribed, as the military situation will vary markedly. Care must be taken that decoys are not located so that bombing or strafing will endanger troops or other installations.

## **Section II. IMPLEMENTATION**

### **8. Responsibility**

The implementation of this display will ordinarily be conducted by camouflage or other special troops. It is important to conceal other troop units operating in the area, if their location or operations are inconsistent with the display. Normal camouflage procedures are followed in the concealment or disguise of the real troops (FM 5-20).

### **9. Factors Contributing to Realism**

a. The implementation of the display elements must be as realistic as possible in order to obtain the desired aerial identification. In order of importance, the factors which contribute to the aerial recognition of any military installation are—track and supply activity; the features associated with the installation; movement and life; and actual items of equipment. One of the most important elements to a convincing display is timing. The timing of all phases must conform to the timing of a genuine operation.

b. A decoy installation must avoid the appearance of being a decoy. It is so constructed that its disclosure to the enemy appears to be the result of defects in its camouflage.

c. Decoys intended to divert attention from real objects or installations are effective only when the real objects are completely concealed. A decoy must bear a convincing resemblance to the real object it simulates. If it is suspected as false, it will attract further attention to the area.

d. A decoy should be to the same scale as the installation it simulates. When the area available for a decoy is limited or when lack of materials, labor, or time make full-scale reproduction impossible, a scale three-quarters to one-half of full scale may be successful; however, alteration of the characteristic sizes of important objects must receive due consideration.

e. To deceive the enemy, a decoy simulating a large rear-area installation generally should be positioned to have approximately the same

relationship to nearby landmarks as the target itself. Landmarks are likely to be used as enemy reference points.

## **10. Camouflage**

The same camouflage technique or discipline which is maintained by surrounding troops should be followed in the display, even though it is poor. At times, it will be necessary to disregard good camouflage technique in order to assure that the display is revealed, being cautious that the breaches are not so obvious as to arouse suspicion.

## **11. Summary for Installations**

The following summarizes the points which must be considered by the commander of the troops responsible for the erection and maintenance of a display. These are points which the planner has also considered, and they will continue to be essential as long as the display plan is in force.

*a.* Consider and conform to characteristics of local friendly troops in regard to tactical locations, camouflage, camouflage discipline, and use of supply and traffic routes.

*b.* Utilize aerial photographs of reasonably large scale as well as available maps whenever possible during construction and maintenance of the display.

*c.* Install the display in accordance with the plan and utilize the participating troops to add to the deception by means of shoulder patches, insignia, and truck markings. Contact with uninitiated personnel, including adjoining United States or allied troops as well as local civilians, can be utilized to disseminate the desired information.

*d.* Continue to maintain the display to appear as an actual operating installation until directed to close display.

## **Section III. OPERATION AND MAINTENANCE**

### **12. Operation**

Decoy installations must appear to be actual operating concerns. To the enemy, they must appear to show normal indications of occupancy such as additional road improvement, maintenance, or construction, additional traffic patterns, blast marks, and spoil. Foot tracks should increase in number and visibility. Normal signs of human activity must also be evident. Men must be seen in the area, since simulated personnel are usually poor substitutes. Exposed laundry and bedding, smoke from fires, traffic of supply vehicles, and traffic to garbage pits all give a lived-in appearance. If a decoy installation is near a town, it will usually

be desirable to permit properly indoctrinated personnel to visit the town as frequently as do soldiers from real installations nearby.

### **13. Maintenance**

Most decoy installations require continual maintenance. The activities of the maintenance crew can usually be coordinated with activities which must be present at all installations. Simulator devices must be inspected periodically for loose wires, torn cloth, loose stakes, and fading paint. The effect of wind and rain on fabric and ropes must be corrected. Grass close to simulator devices must be kept trampled or trimmed.

## **CHAPTER 3**

### **ENEMY INTELLIGENCE**

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#### **Section I. AERIAL PHOTOGRAPHY AND OBSERVATION**

##### **14. General**

This section deals with the methods and equipment for interpretation of aerial photographs and aerial observation. Familiarity with this subject, covered in detail in TM 30-246, is a prerequisite to effective visual deception. All methods used by the aerial photograph interpreter or the aerial observer to secure information must be counted and, if possible, utilized in a deception plan to plant misinformation.

##### **15. Classes of Aerial Photographs**

There are two general classes of aerial photographs: oblique and vertical. Obliques portray a large area and show a close, large-scale view in the foreground, with a decreasing scale toward the background. Vertical photographs, in general, have a fixed scale over a limited area with very little distortion; they show a plan view of the terrain.

##### **16. Scale**

a. Vertical photographs with a scale determined by the local situation and enemy photographic equipment will be studied for signs of military activity. New roads, tracks, spoil, increased use of old roads, wire, and the like will first attract the attention of the interpreter to particular areas. A primary consideration in planning deception is the scale of the photographs which are likely to be available to the enemy.

b. It is impossible to specify the smallest scale at which an object can be identified. Columns of marching troops have been visible on a photograph of scale 1:20,000 and individual men have been identified on photographs of scale 1:10,000. Even with perfect photographic exposure, it is the contrast to the background or the shadow of an object which permits its identification. Without tracks or activity leading to it, a properly camouflaged combat installation is difficult to locate from the air. Figure 1 illustrates the landscape characteristics of common types of terrain.

c. As a rough guide to the planner, table I contains minimum measurable distances on photographs of various scales. These measurements apply to objects of maximum contrast with their background. In the event of slight contrast in color or texture between an object and its background, these measurements would be increased greatly.



① Agricultural and forest areas.



② Urban area.

*Figure 1. Landscape characteristics.*

## 17. Mission Sorties

a. In order to obtain exact information about a suspected area an enemy may send out a "mission sortie" in which an airplane covers the particular area flying very low, under 1,000 feet. The normal purpose of this type of reconnaissance is for personal observation and for taking oblique photographs such as figure 2.

*Table I. Relation of Scale to Distances and Sizes on Aerial Photographs*

Scale	Minimum measurable distance	Error in measurement	Smallest object recognizable by shape (maximum dimension in feet)
1/7,000	2' 4"	1' 2"	3
1/10,000	3' 4"	1' 8"	4
1/14,000	4' 8"	2' 4"	6
1/20,000	6' 8"	3' 4"	8
1/30,000	10' 0"	5' 0"	12



*Figure 2. Oblique photograph of infantry positions.*

b. Depending on the capabilities of enemy equipment, these photographs may produce only blurred close-range objects with increasing clarity to the background, or they may produce very good close-range vertical studies.

### **18. Photographic Strips**

Vertical aerial photographs are generally made in strips representing the line of flight of the airplane. Photographs are so timed as to permit substantial overlap of each exposure in the line of flight. When a single strip of photographs will not cover the area desired, parallel strips are flown. The photographs of a strip may be used for stereoscopic study or they may be matched and secured in place to form a mosaic. If the enemy is particularly interested in a certain area, he may take followup pinpoint photographs at various times to determine progressive changes in the area.

### **19. Interpretative Equipment**

In the study of photographs for intelligence purposes, a small portion of the photograph is viewed at one time. Suspected areas may be scrutinized under magnifying stereoscopes and illuminated magnifying glasses. Scales of the order of 1:100 inches or 1:1000 feet are attached to the glasses for use in estimating as accurately as possible the dimensions of installations and equipment, for comparison with the interpreter's knowledge of the equipment.

## **Section II. RADAR**

### **20. General Capabilities**

The deception planner should by no means overlook the possible use of radar detection equipment against his display. Since the range and capabilities of enemy radar equipment and techniques are subject to change, the planner must keep posted on the subject by whatever intelligence is available in the theater of operations.

### **21. Simulation of Radar Reflectance**

In the absence of definite information to the contrary, the deception planner should assume that airborne radar detection sets are in use and he must try to approximate the radar reflectance of genuine equipment in his installation. This situation is not true, however, if the terrain is such as to permit scanning of the deception operation by ground radar. It is safe to assume that in the case of such unfavorable topography, individual items above the size of a few sections of metallic bridge equipment or artillery could be detected, unless some provision is made to provide the necessary reflectance.

### **Section III. SOUND AND FLASH RANGING EQUIPMENT**

#### **22. General**

Other possible types of enemy detection equipment which must be considered when planning visual deception are sound ranging devices and flash spotting equipment. Briefly, each type operates on the triangulation principle to locate the sound of the discharge or the position of the flash.

#### **23. Sound Ranging Devices**

Sound ranging devices utilize a number of microphones, spread on a baseline or arc, which record comparatively the instant of discharge. When these data are corrected for temperature and for wind velocity and direction, a rather good location of the recorded explosion may be secured under favorable conditions. However, this equipment is seriously handicapped by its inability to select one particular point of discharge out of several. This permits the deception to be adequately protected by dummy discharges fired in salvo with other batteries or battalions.

#### **24. Flash Equipment**

Flash equipment is much more accurate than sound equipment and can be used to locate points of discharge within about 100 yards at a range of about 5,000 yards. Furthermore, flash equipment may utilize light filters for spectrophotometric analysis. These filters are capable of unmasking dummy flashes that do not correspond to actual flashes under spectrum analysis. Although the success of such analysis may or may not be probable, the risk that it might be used against the display of simulated flashes should be considered.

### **Section IV. GROUND OBSERVERS AND PATROLS**

#### **25. General**

Another potentiality which a deception plan should not overlook is the possibility of the enemy gaining information directly or indirectly from civilians located in or near the area, or traveling through it; from friendly troops not initiated into the deception but aware of it; or from the loose talk of troops participating in the deception. If properly controlled so that the enemy can receive only that information we want him to receive, such leaks or apparent leaks of information can be used to aid the deception; otherwise, they may lead to its failure and must be guarded against.

#### **26. Internal Security**

A final caution with respect to enemy intelligence methods must be added for all areas of operation where there is any possibility for an



enemy agent or patrol to penetrate the area. Enemy patrols must be excluded except to the extent intentionally permitted. The internal security measures taken to protect an area of display must be as nearly perfect as the situation permits. If the situation does not permit proper screening, the chances of failure of the deception normally warrant abandonment of the plan.

## CHAPTER 4

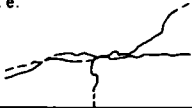

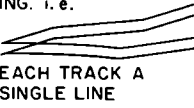
### TYPE INSTALLATIONS

#### Section I. GENERAL CHARACTERISTICS

##### 27. Tracks

a. A marking on the ground identifiable in an aerial photograph, peculiar to a certain piece of equipment or a certain type of field installation, is known as its "signature." Tracks are the most important and obvious part of the signature of a military installation. Military tracks have distinct features which differentiate them from civilian or peacetime activity. The principal characteristics of tracks usually found around military installations are furnished in table II.

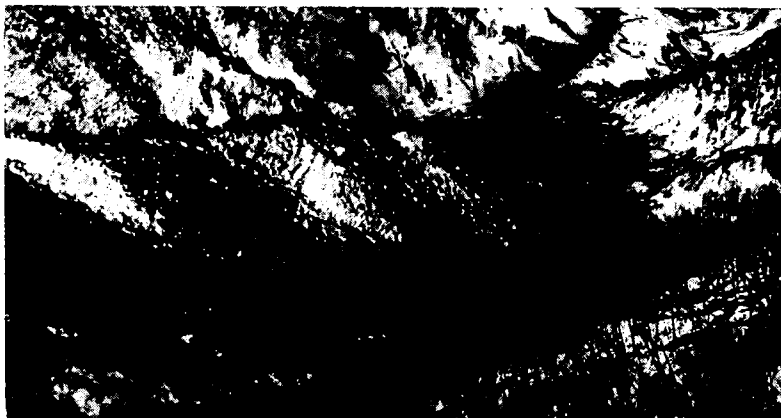
*Table II. Track Characteristics*

	TYPE OF TRACK		
	FOOT	WHEELED	CATERPILLAR
GENERAL APPEARANCE	NARROW WITH MANY FILAMENTS AND UNTRODDEN PATCHES. i.e. 	BROAD TRACK WHICH GRADUALLY COVERS AN AREA WITH A UNIFORM TONE.  EACH TRACK A SINGLE LINE	A NUMBER OF INDEPENDENT DOUBLE TRACKS CROSSING AND RECROSSING. i.e.  EACH TRACK A SINGLE LINE
STRAIGHTNESS	NEVER STRAIGHT.	STRAIGHT FOR SHORT DISTANCES.	WAVY BUT ALSO RUNS IN STRAIGHT STRETCHES.
BENDS AND TURNS	GOES AROUND SHARP BENDS AND ANGLES; NO SPECIAL MARK AT BENDS.	USUALLY AT LEAST A 20 FOOT RADIUS ON CURVES. CURVES EVEN.	MOST TURNS ANGULAR, CAN TURN AS SHARP AS 90°. U-TURNS CHARACTERIZED BY DEEP RUTS AT CURVE AND NOT AS EVEN AS WHEELED VEHICLE U-TURN.
HILLS	GOES STRAIGHT UP HILLS.	ZIG-ZAGS UP ALL BUT SLIGHT INCLINES.	MAY WIND UP A STEEP HILL - OTHERWISE GOES STRAIGHT UP.
CROSS COUNTRY	AVOIDS MINOR HUMPS AND DAMP SPOTS BUT GENERALLY NOT AFFECTED BY TERRAIN.	MUST HAVE GOOD GOING WITH EASY GRADES.	CANNOT GO OVER ROCK AND USUALLY FOLLOWS EASY GRADES IN EVEN TERRAIN.
NOTE: ALL TRACKS ARE IRREGULAR IN OUTLINE AND ARE MOST VISIBLE WHERE MANY TRACKS CONVERGE, SUCH AS AT GAPS IN WIRE OR MINE FIELDS OR TURN-OFFS INTO BIVOUAC AREAS.			

b. Tank tracks in flat, unwooded country appear as shown in figure 3 ③. Notice their wavy pattern with deep ruts at the turns. Typical truck tracks in similar terrain are shown in figure 3 ②. Notice the even turns and more or less straight patterns when compared to those of tanks. Figure 3 ① shows how footpaths appear on an aerial photo. Notice that they appear much narrower and fainter than vehicle tracks.

c. In simulating tracks around a decoy installation several methods may be used.

- (1) *Foot tracks.* The desired tracks should be made by actual foot traffic. Straw or hay may be scattered to give the effect of more extensive use. Tracks in a presumably occupied position must be constantly increased in intensity and width.

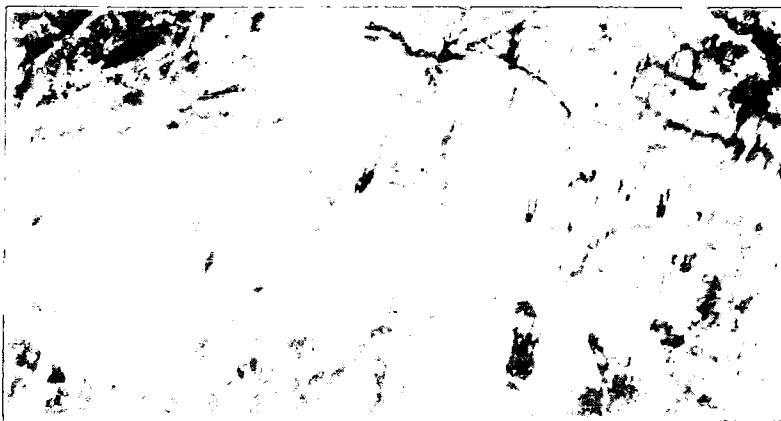


① Footpaths.



② Truck tracks.

*Figure 3. Aerial photographs of typical foot, wheeled vehicle, and tracked vehicle tracks.*



③ Tank tracks.

Figure 3—Continued.

- (2) *Wheeled tracks.* The best method of providing wheeled tracks is to run several vehicles through the area to create the illusion desired. Chains or logs may be dragged to create a more visible scarring on the ground.
- (3) *Tracked-vehicle tracks.* Only a tracked vehicle can make characteristic tracks of this type. For that reason it is desirable to utilize an actual vehicle to make the tracks. These tracks do not need to be renewed as frequently as the previous two types.

## 28. Associated Features

Associated features normally present at military installations are an essential part of any decoy installation.

*a. Spoil* is usually conspicuous near all dug positions. If, however, the camouflage discipline of surrounding troops includes disposal of spoil, the same practice must be followed with the simulated units. On the contrary, if spoil appears at normal dug positions it must be reproduced at decoy positions. The best way to produce the appearance of spoil is to spread the earth from a real excavation, although the excavation need not be as deep nor the spoil piled as high as in the genuine position. The trampling of the ground by working parties flattens vegetation and compacts the ground so that the general effect on all but bare rock or sand is to make the ground surrounding the emplacement appear lighter in tone than its surroundings.

*b. Shelters* such as dugouts or holes show as dark spots in a light area of tracks and trampling. Spoil is also present. Airing blankets and similar equipment may also be visible. Tenting or shacks are easily improvised locally.

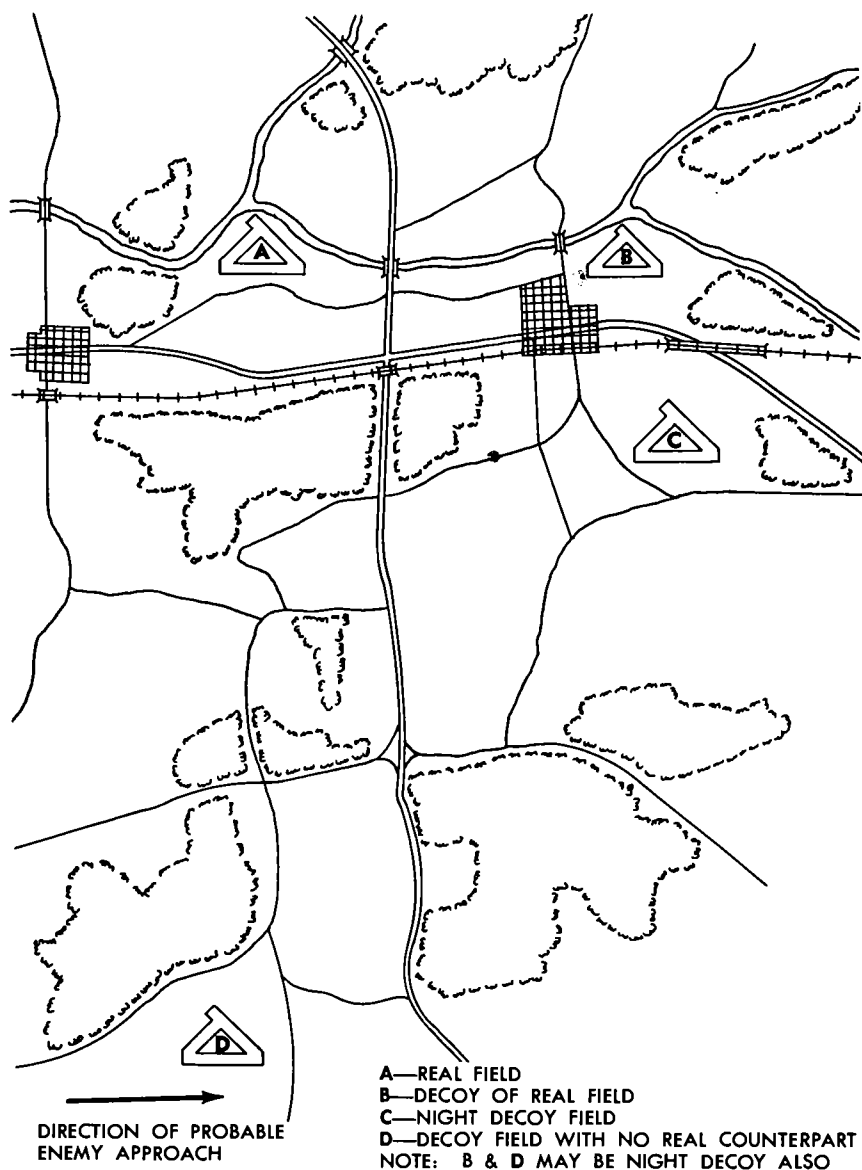


Figure 4. Positioning decoy airfields.

c. *Latrines* are an associated feature of every occupied site. They are usually disclosed by tracks converging and becoming more marked as time passes.

d. *Buried Cable* is frequently an adjunct of important headquarters and may also be associated with radar or other installations. It appears like a track, light in tone, and decreases slightly in visibility with time. It is usually straight with angular turns.

*e. Barbed Wire* is a feature of almost all infantry combat positions. The wire itself cannot be seen on aerial photographs, but its presence may be revealed by the tracks and trampling of the wiring party. After several days the location of the wire is disclosed by a faint gray line under the wire which gets darker and more pronounced as time passes because of the accumulation of untrampled vegetation (fig. 16). Gaps in the wire are often the means of disclosing its presence because of tracks which converge and diverge without apparent topographic reason.

*f. Minefields*, like wire, are best located on aerial photographs by the otherwise unexplainable convergence of tracks. Individual mines are unnoticeable. If a field is laid so that the refilled holes are in an identifiable line or area, the recurrence of the barely visible fill may be noticed.

## 29. Defects

Following is a representative list of the defects that most frequently cause a deception to fail. It will be noted that these are of general application and that any one of them may render worthless the otherwise most perfect decoy.

- a. Regularity of tracks.*
- b. Lack of litter associated with military occupation.*
- c. Flatness (no stereoscopic relief).*
- d. Failure to simulate any particular type of installation.*
- e. Absence of motor transportation and lack of movement.*
- f. No daily change in appearance.*
- g. Incorrect tactical positioning.*
- h. Unreasonable speed of buildup or removal.*
- i. Lack of real antiaircraft defense.*
- j. Failure to simulate a necessary component of a particular installation.*

## Section II. AIRFIELDS

### 30. Positioning Decoy Airfields

There are two distinct types of decoy airfields, day decoy fields and night decoy fields. The day decoy field consists of prepared runways, buildings, access roads, hut storage, and the auxiliary features. The night decoy field consists entirely of lights, and should not be visible during the day. Normally the day and night decoy fields are separate installations. The information in *a* through *d* below applies to both types of fields, while that in *e* and *f* applies only to day fields.

*a. Offset Distance.* The distance between the decoy airfield and its real counterpart should be from 4 to 8 miles. A decoy situated much more than 8 miles from the real airfield is likely to be regarded as an entirely separate airfield and cause enemy air attackers or observers to search further for the camouflaged real field.

b. *Operational Prerequisites.* Suitable terrain with adequate drainage must be secured for the decoy airfield.

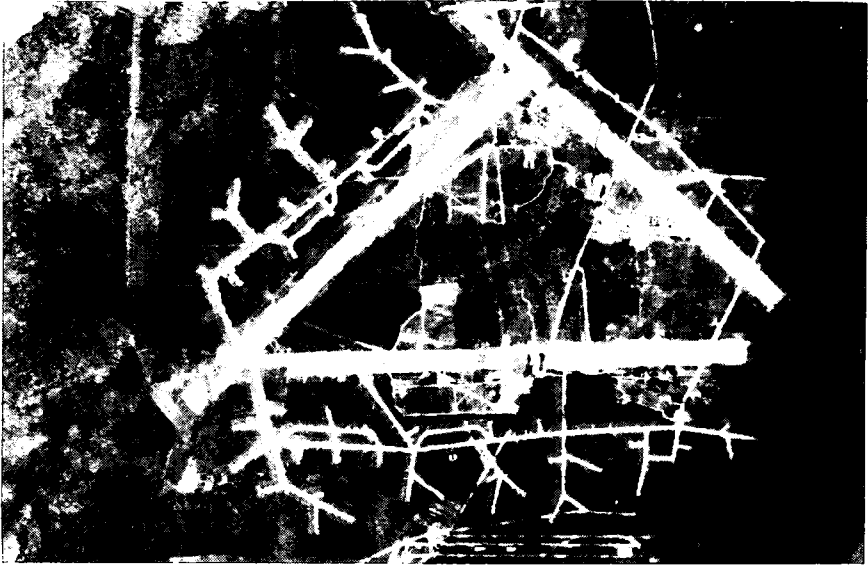
c. *Positioning Decoy in Relation to Landmarks.* As far as possible, a decoy airfield should be so situated that its relation to important landmarks and terrain features such as lakes, rivers, railroads, highways, wooded areas, and cultivated fields is similar to that of the real airfield (fig. 4). In some cases it may be practical to simulate some of these necessary landmarks, in dummy fashion, at the same time as the construction of the decoy airfield is progressing.

d. *Relation of Decoy to Probable Route of Enemy Approach.* A decoy airfield should generally be located in the path of the most likely approach an enemy would follow to the real field. The decoy will then be seen by enemy observers before they reach the real field. It is entirely possible, however, that in many cases this consideration in positioning may have to be foregone. The terrain, or existence of prominent landmarks, may indicate a much more desirable site in some other direction from the real field than that of probable enemy approach.



① Real airfield.

Figure 5. Comparison of real airfield and a decoy airfield that is too small, showing conspicuous difference in size. Taken from 13,750 feet.



② Decoy airfield.

Figure 5—Continued.

*e. Size of Decoy Airfield.* A day decoy field should be about the same size as the real field, or the standard size of similar known operational fields. This is important because enemy aerial photograph interpreters are to scale its actual size for comparison with their knowledge of the real field or their knowledge of our normal sized airfields. Substantial divergence in size, such as illustrated in figure 5, may cause the field to be suspect and probably identified upon further reconnaissance. Once the decoy is identified, air attackers will be briefed on how to avoid it.

*f. Aircraft Activity.* If the enemy is able to stand off some distance from the suspected airfield and observe it, a complete absence of air traffic would reveal the deception. If intelligence indicates that such a situation is probable, steps should be taken to give a minimum indication of air activity, possibly through the use of light planes which could operate off a rough strip.

### 31. Construction of Decoy Airfields

*a. Construction Estimates.* As a guide for the construction of a decoy airfield, estimates of man-hours and labor are given in table III. The estimates in table III would be less for a decoy field in barren or open areas, because in either less work would be necessary to outline or smooth off the runways. However, in barren terrain it is necessary to construct more dummy structures, equipment, and associated activities than in wooded terrain because of the lack of vegetation and natural concealment.



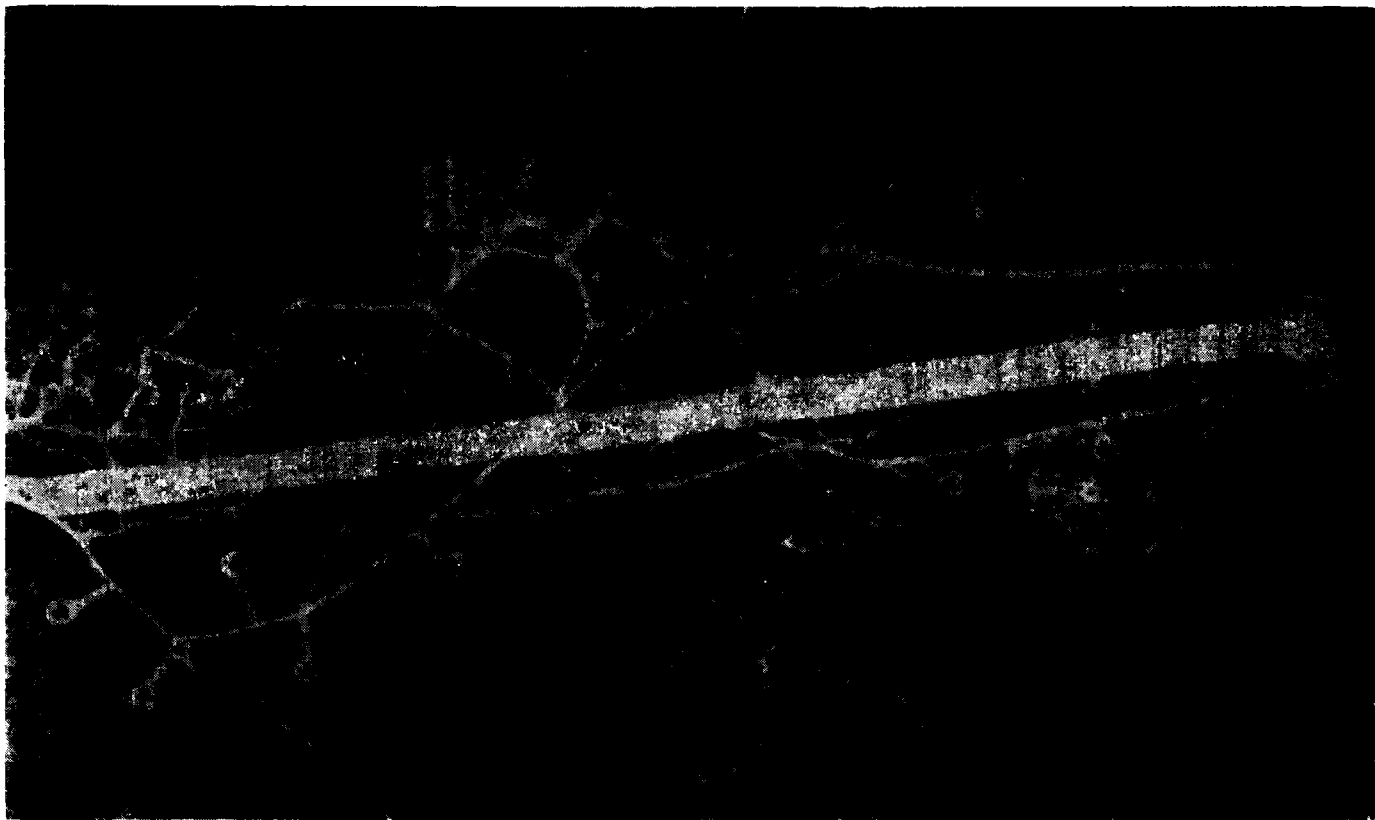
Table III. Construction Estimates for a Decoy Airfield in Partially Wooded Terrain

Type of work	Project	Area	Equip hours	Total man-hours	Size of work party	Work party hours
Grubbing.....	Runway (each) 3,650' x 225'.	(one runway) 51,000 sq ft*.	240*	1,600*	platoon	27*
Rough grad- ing and smoothing.	Runway (each) 3,650' x 225'.	(one runway) 812,200 sq ft*.	308*	382*	2 squads	27*
.....do.....	Railroad spur and road extensions. 3,090' x 35'.	108,150 sq ft	95	228	} platoon	25
.....do.....	Simulated road 2,850' x 35'.	100,000 sq ft	86	192		
Grubbing, rough grad- ing, and smoothing.	Runway extension 225' x 660' (ea.).	891,000 sq ft	120	160		
Decoy struc- tures of timber, wire, burlap.	Hanger 60' x 90'.	.....	715	.....	platoon	14
	Warehouse 72' x 150'.	.....	816	.....	platoon	16
	Storage house 44' x 112'.	.....	592	.....	platoon	24
	Shop building 92' x 124'.	.....	1,280	.....	platoon	24
	Control tower 14½ ft sq x 38' high.	.....	524	.....	squad	40
	Water tower 14½ ft diam x 40' high.	.....	810	.....	squad	30

\* Triple this number for the total on all three runways combined.

*b. Stages of Construction.* After the site for the decoy airfield is selected, construction is carried out in the following order:

- (1) *Runways, taxiways, and hardstands.* Since it is the runways, taxiways, and hardstands that make the decoy look like an airfield, they receive first priority in construction (fig. 6). A properly surveyed layout paying attention to sharp, clear straight lines of the prominent features is valuable. Usually, the layout can be constructed simultaneously by bulldozing and rough grading. A thin layer of crushed rock, sand, or gravel is sometimes an effective substitute for grading. A well-defined ditch will accentuate the outlines of taxiways, runways, and hardstands. For deceiving the air observer, the most important items in decoy airfield construction are the accentuation of these prominent features and any prominent structures, rather



*Figure 6. A decoy airfield, showing its prominent features.*

than detailed replicas of all features of the real installation (fig. 6). No more detail is necessary than that required to produce the effect of a camouflaged airport. Grade variations may be permitted and fine grading is never required.

- (2) *Access roads and service roads.* Roads leading to the airfield from main highways, and service roads connecting the hardstands with the bomb dump, gas storage, and main buildings, have close priority to the actual runways. These roads may be formed in the same manner as the runways and taxiways.

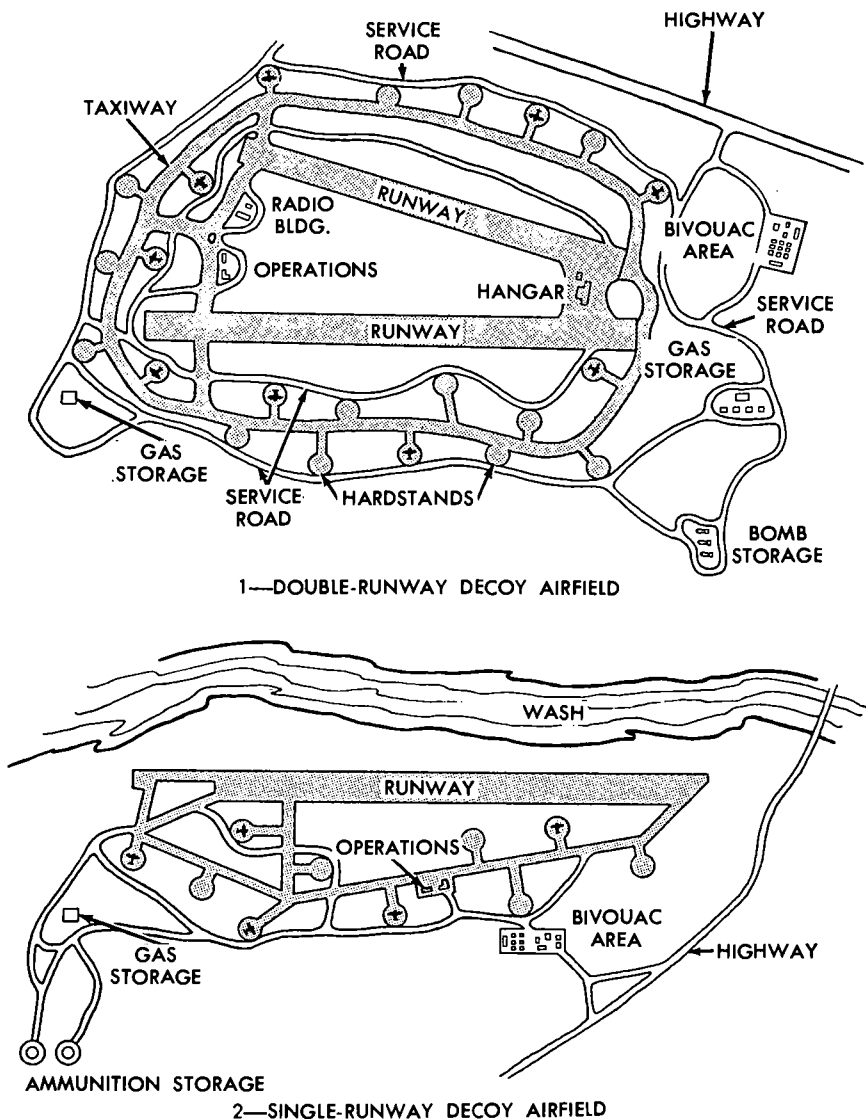


Figure 7. Sample double-runway and single-runway decoy airfield layouts.

- (3) *Gas storage and bomb dump.* These two facilities are important. The gasoline storage tanks may be simulated by a lumber framework covered with burlap or by suitable salvage material. Bomb storage pits may be indicated by semicircular parapets of earth pushed up by a bulldozer in a logical position along the service road. Information on making decoy equipment and supplies is given in part two of this manual.
- (4) *Control tower and buildings.* Control towers and other prominent structures associated with airfields are usually simulated in dummy form in the construction of decoy airfields in rear areas. However, in constructing a decoy of a forward airfield, these structures are seldom erected, since tents or trailers ordinarily serve as the operations centers at forward fields. For construction of dummy buildings, see paragraph 65. Figure 7 shows example of single and double runway decoy airfields.
- (5) *Camouflage.* A decoy airfield should receive the same camouflage treatment as used on the real field, such as simulated terrain patterns on runways and disruptive painting on buildings. Before doing this, it is advisable to study the real airfield by aerial observation and aerial photographs in order to determine the extent to which the decoy airfield should be camouflaged. The decoy should be camouflaged neither too well nor too little.

### Section III. ARTILLERY

#### 32. Antiaircraft Artillery

*a. Positioning.* Decoy antiaircraft positions, in accordance with the basic principle of all military simulation, must conform to the positioning characteristics of their real counterparts. In the combat zone, real antiaircraft artillery is located to protect bivouacs, troop concentrations, river crossings, heavy-gun positions, supply and administrative installations, routes of communication, and airfields. In the rear areas these weapons are located to protect airfields, mobilization centers, and installations such as industrial plants and manufacturing centers. Since antiaircraft weapons defending against air attack require primarily an unobstructed field of fire through 360°, they must be located in open positions, generally difficult to camouflage. The larger caliber artillery weapons are usually located 1,000 to 3,000 yards from the object or area defended and in a location where the guns can fire to a minimum elevation of 10° to 15°. This means that the batteries are generally located near the crests of hills, at the foot of gentle slopes, or in small orchards, low scrub growth, cornfields, and grain fields. A further requirement in positioning antiaircraft artillery is that the battery must be in the vicinity of a good road net. Figure 8 shows a 90-mm antiaircraft battery posi-

tioned by an abandoned race track and near a good road. Supplemental weapons such as .50 caliber anti-aircraft machine guns are generally positioned 50 to 200 yards from the larger caliber anti-aircraft guns which they are protecting.

*b. Signature.*

- (1) The 90-mm and 120-mm anti-aircraft artillery batteries consist of a firing unit of 4 guns, generally laid out in a rough square. A decoy position must include emplacements for the equipment shown in figure 9 and signs of associated activity.
- (2) Activity associated with an anti-aircraft artillery battery position would be indicated by equipment emplacements, a latrine, drums and power cables, possibly a tent, and tracks around the guns to and from the latrine, etc. Such signs of life must be duplicated at a decoy anti-aircraft artillery battery position.
- (3) Figure 9 shows a typical layout of the equipment and positions of an anti-aircraft artillery gun platoon in defense of a field artillery howitzer battery.

*c. Camouflage.*

- (1) Because the mission of anti-aircraft artillery batteries makes it necessary to emplace the guns in open areas, camouflage of the installation is difficult. In open areas the use of suitably garished camouflage net drape sets is highly desirable. If net drape sets are not available, camouflage is obtained by properly positioning each piece of equipment to blend in with surrounding ground features. In orchards, each gun and piece of equip-



*Figure 8. Good positioning of a 90-mm anti-aircraft artillery battery.*

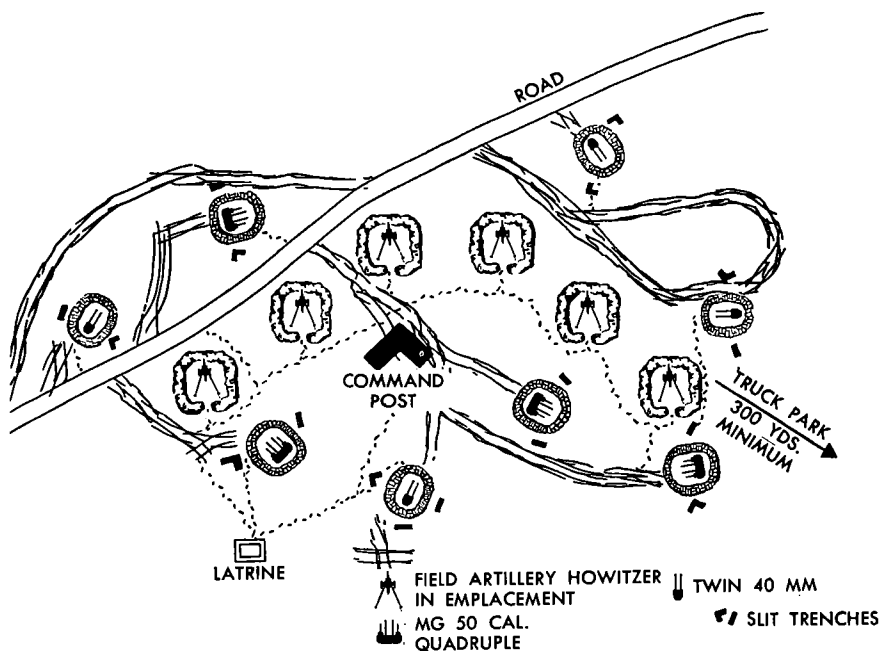


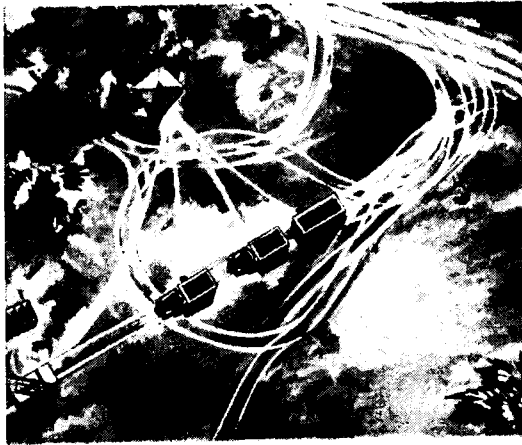
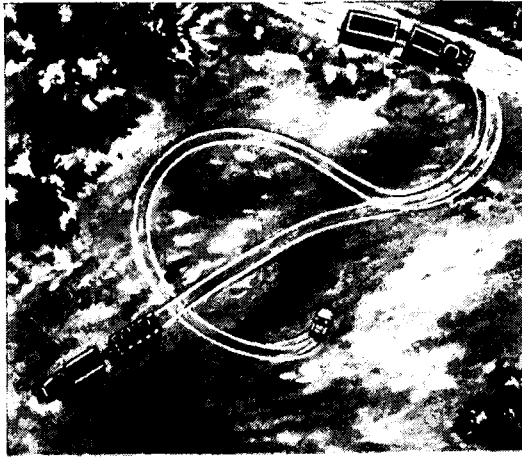
Figure 9. Signature of anti-aircraft artillery. Anti-aircraft gun platoon (SP) (40-mm) in defense of a field artillery howitzer battery.

ment may be placed where a tree has been removed; in hedge country, equipment may be placed in cleared spots in the hedge. Strict camouflage discipline is at all times a necessity.

- (2) Anti-aircraft artillery batteries are camouflaged chiefly against aerial observation. When protecting an industrial area or large installation which cannot be concealed, often no attempt is made to conceal the anti-aircraft artillery position, the theory being that the enemy will be cautious in bombing a heavily defended objective.

#### d. Decoy Anti-aircraft Artillery Positions.

- (1) Decoy anti-aircraft artillery positions may be simulated by digging a shallow pit of the correct diameter and shape for a particular caliber of gun, and piling the spoil around it as a parapet, or by forming a parapet of hay, straw, empty crates, oil barrels, or loose dirt on the ground around the decoy gun. Details of field-expedient construction of dummy guns are described in paragraph 67. For night simulation of an anti-aircraft artillery battery, flash simulators may be used (pars. 78 and 79).
- (2) A radar station is a necessary adjunct to most anti-aircraft artillery installations. Figure 10 shows the steps in the development of a radar station and the typical signature of such a position.



*Figure 10. Development of a radar station.*

- (3) A well-positioned and properly constructed decoy antiaircraft artillery position may provide a certain amount of protection to its apparently defended installation, by causing the enemy to fly at higher altitudes and thus make his bombing less accurate. Decoy installations of this nature were used by the Germans with good effect to protect supply and other installations at the time of the battle of Dunkirk. Decoy antiaircraft artillery positions are also effective in drawing the enemy away from real positions. To add further realism to decoy antiaircraft artillery positions, the proper number of gun registration rounds may be simulated by flash simulators, conforming to actual practice of real antiaircraft artillery guns. However, prearrangement for necessary air bursts should be made with some real battery.

### 33. Field Artillery

*a. Positioning.* The same care should be taken in positioning decoy field artillery positions to make them appear authentic, as in positioning any other type of decoy installations. Unlike antiaircraft artillery batteries which are nearly always positioned in the open to accomplish their mission, field artillery weapons are positioned under some type of cover or camouflage since their field of fire is much more limited in comparison with antiaircraft artillery. Field artillery guns may be located in villages, quarries, edges of woods, and on banks of lakes and rivers; in hedges, ditches, ravines, and orchards; and any other place where their fire mission can be accomplished from cover and concealment. A good road net is usually essential for the heavier class of towed artillery; however, self-propelled weapons can usually go where tanks and other tracked vehicles can maneuver.

*b. Signature.* Field artillery positions have a typical appearance which identifies them to the aerial photograph interpreter.

- (1) 105-mm and 155-mm howitzer battery positions may be identified by an irregular line of 6 guns generally emplaced in an inverted U (fig. 11), a star shape, or a staggered W-form. Each gun emplacement usually resembles a rough square or circle.
- (2) A 155-mm gun or 8-inch howitzer battery position shows 4 arrowhead shaped gun positions in an irregular line or rough square with all the associated tracks and related equipment sites, such as is shown in figure 12.
- (3) Figure 13 shows a typical signature of a 240-mm howitzer battery position. Notice that there are only 2 guns to this battery, distinguishing it from the emplacements for a 155-mm gun or 8-inch howitzer.



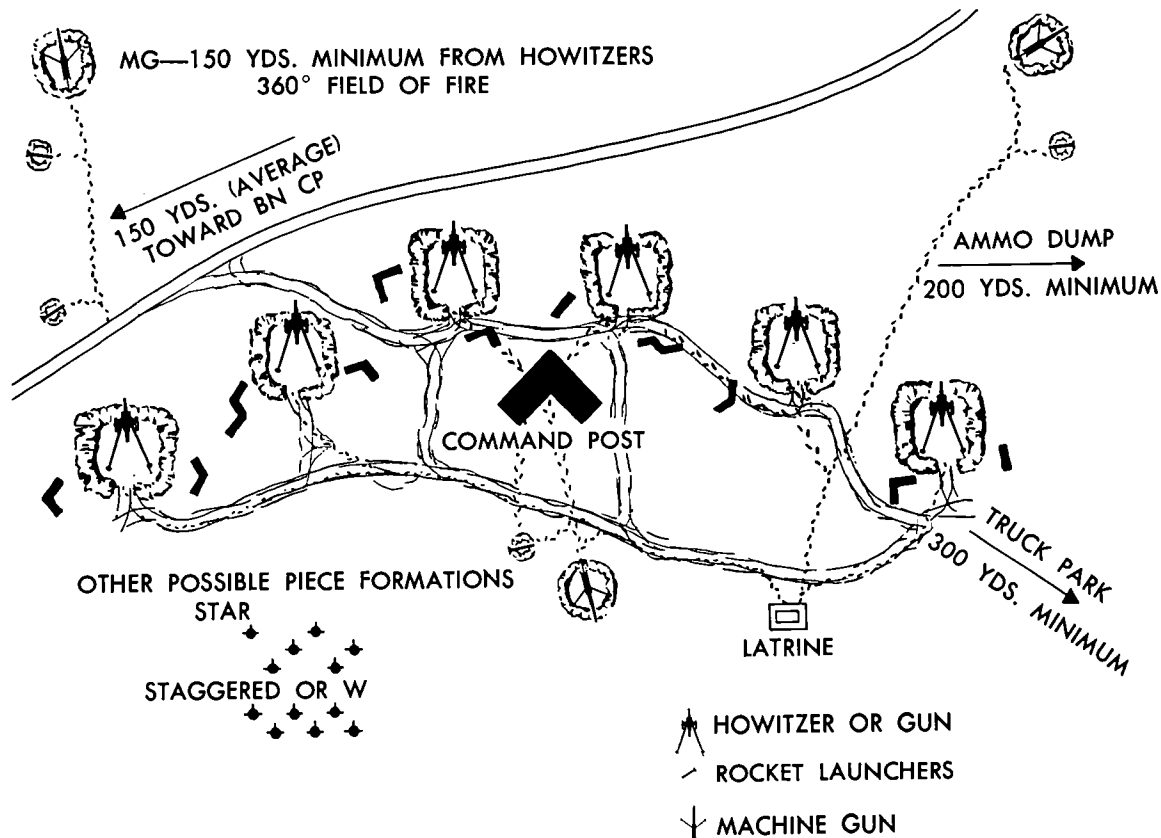


Figure 11. Signature of a 105-mm or 155-mm howitzer battery.

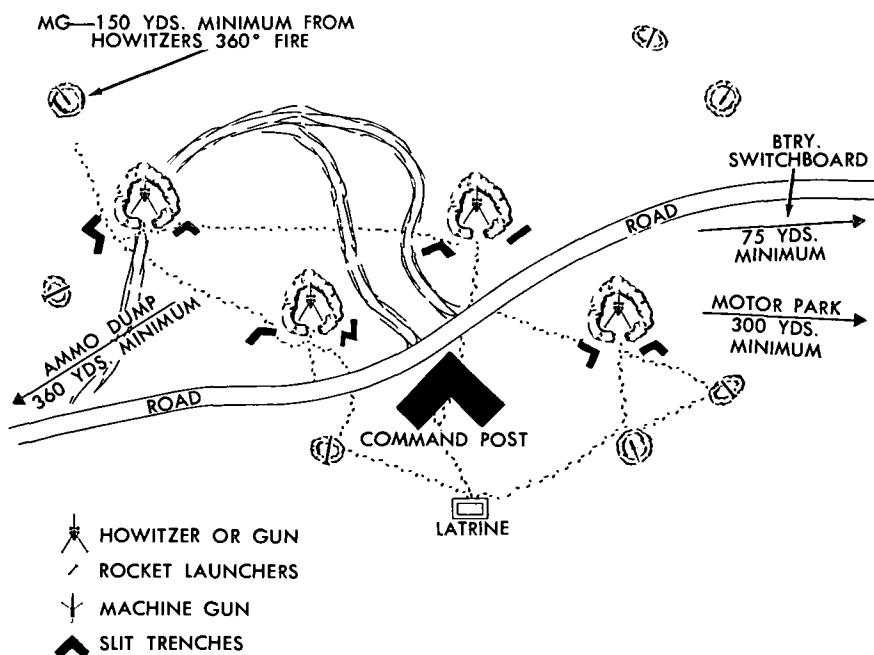


Figure 12. Signature of a 155-mm gun or 8-inch howitzer battery.

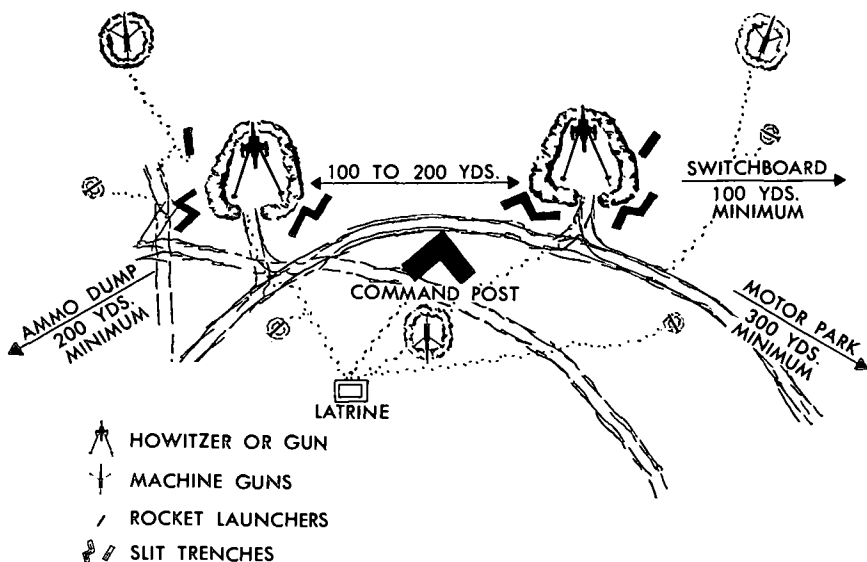


Figure 13. Signature of a 240-mm howitzer battery.

*c. Constructing Decoy Artillery Positions.*

- (1) Merely placing the dummy guns and supplementary equipment in such positions as shown in figures 12 and 13 is only part of the job of erecting a decoy position. Tracks must be made around the position as in a real battery emplacement, because it is the tracks that most often disclose the position to the aerial observer. Without tracks, a gun position looks fake; moreover, it would rarely be spotted if the guns were well-camouflaged. Furthermore, a decoy artillery position can be simulated perfectly without the use of simulated guns or equipment merely by making track and blast marks and by scattering debris, as shown in figure 14. Blast marks in front of each simulated gun position are very convincing. In snow-free ter-



*Figure 14. Field artillery battery simulated without the use of simulator devices.*

rain blast marks appear light to dark gray, while in snow-covered terrain they appear black. Flash simulators may be included with each simulated gun and used with the same regularity as the real guns they are simulating. For the field construction of simulated field artillery weapons, see paragraph 67b.

- (2) One of the best and simplest ways of simulating an artillery position is to place partially camouflaged simulated guns in vacated positions formerly occupied by real guns.

## **Section IV. BIVOUACS AND TROOP AND VEHICLE CONCENTRATIONS**

### **34. Bivouacs**

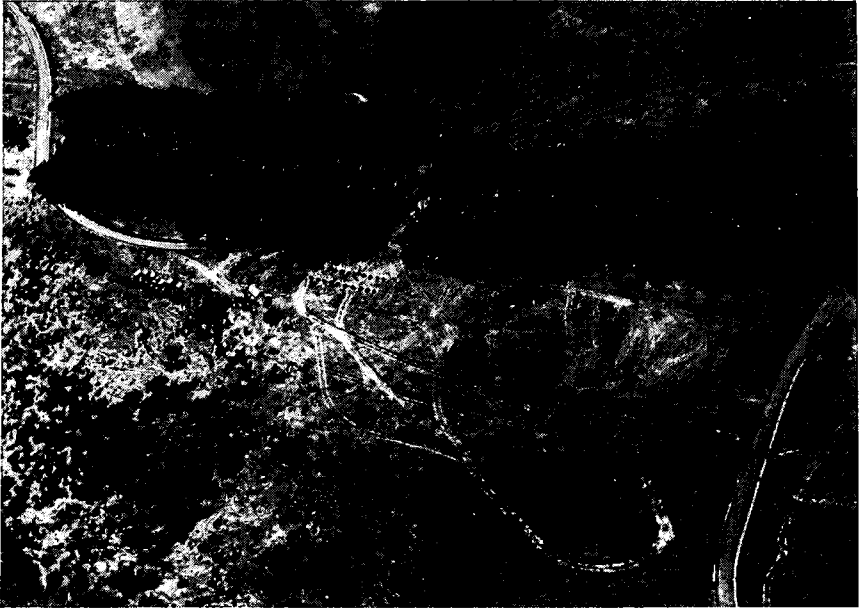
*a. General.* In simulating bivouacs of real units, it must be remembered that each arm or service creates a distinctive appearance which must be reproduced to make the decoy presentation convincing to the enemy air observer. The simulation of bivouacs is of particular importance in rear areas where reserves and fast-moving units are generally located. Enemy air reconnaissance is particularly careful in scrutinizing areas behind the front for indications of buildup in troops or equipment which would indicate probable attacks.

*b. Positioning.* Real bivouacs are generally located in areas that provide the best—

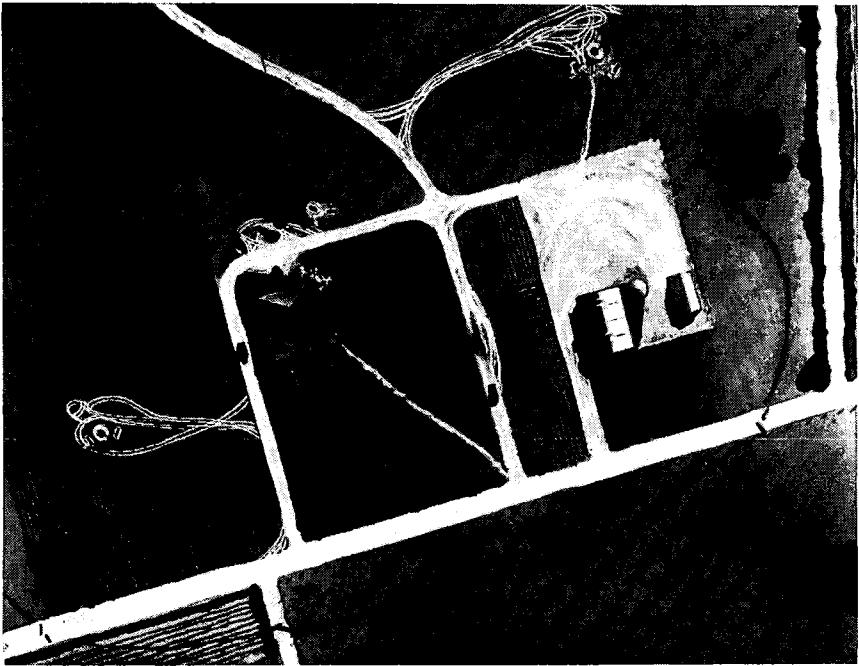
- (1) Concealment for personnel and equipment from aerial and ground observation.
- (2) Dispersion. Large forces should not be grouped in small, isolated woods.
- (3) Communications facilities (a good road net).
- (4) Protection from attack (in the vicinity of natural obstacles).
- (5) Water supply.

*c. Bivouac Signatures.*

- (1) From the air, the characteristics which most readily identify a bivouac are tracks, vehicles (the types and sizes of which will identify the unit), paths, trails, and trash and litter caused by poor camouflage discipline of personnel. Figure 15 shows an aerial view of a bivouac displaying signs of poor camouflage discipline which immediately reveal it to the aerial observer. Even a decoy bivouac area should rarely appear as obvious as the one in this illustration unless practice so requires.
- (2) Bivouacs are more difficult to conceal in snow-covered, barren, or desert areas than in other types of terrain, because tracks and trails are almost impossible to conceal or obliterate. Decoy bivouacs in this type of terrain can be realistically simulated



*Figure 15. Signature of a particularly obvious bivouac.*

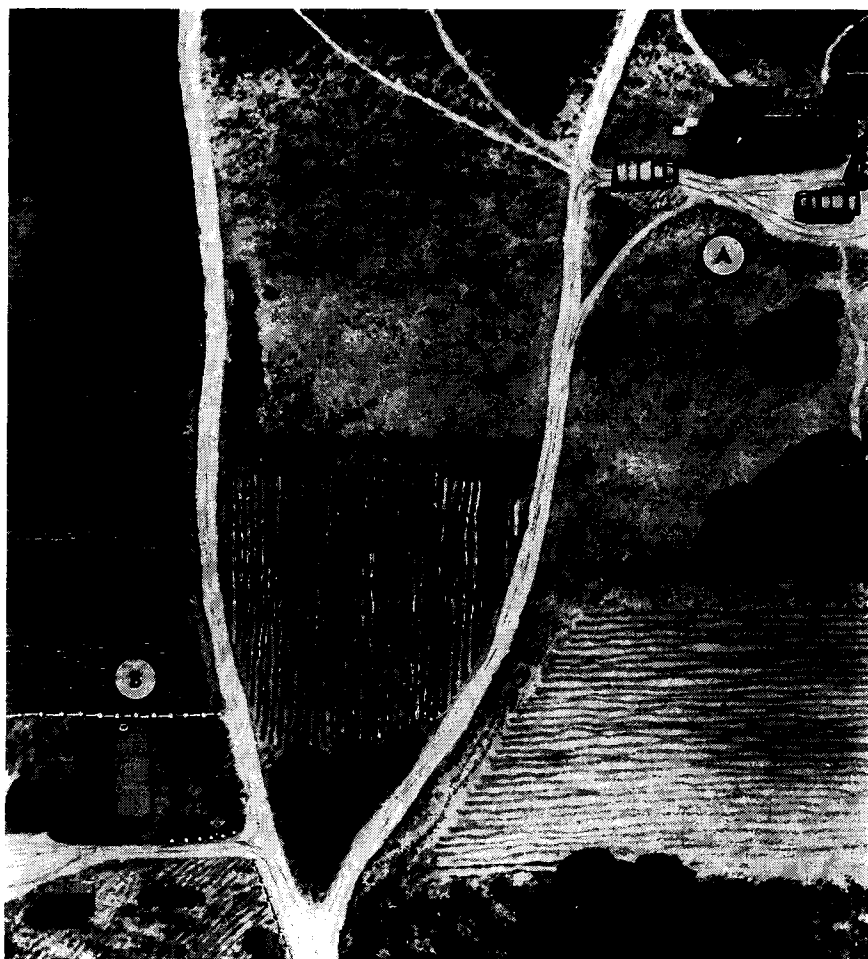


*Figure 16. Signature of a command post in a rural area.*

by making many additional tracks which do not lead to a real installation, or by digging shallow trenches and emplacements in the snow or sand and filling them with grass, leaves, brush, or other dark textured material. Brush piles with paths radiating from them resemble command posts or supply or ammunition dumps. A good way to make a decoy bivouac is to examine aerial photos of a representative real installation and then duplicate the track plan and some of the camouflaged objects in simulated fashion but in somewhat more conspicuous manner.

### 35. Command Posts

*a. Signature.* Some of the signs (fig. 16) which indicate to the observer the possible presence of a command post are:



A—Decoy command posts  
B—Real command posts

*Figure 17. A decoy command post (A) located near a real one (B).*

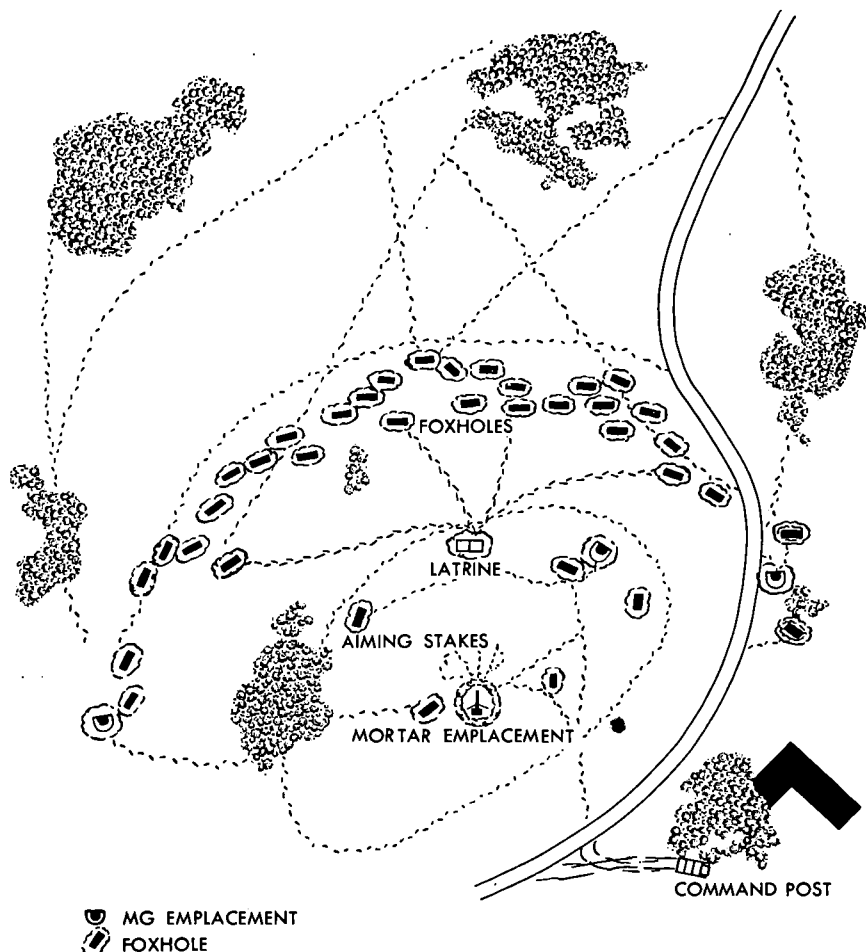


Figure 18. Typical signature of an infantry platoon in a defensive position.

- (1) Converging wire lines and vehicle tracks.
- (2) Concentration of vehicles.
- (3) Heavy traffic causing widened turn-ins.
- (4) New vehicle tracks to a position which could house a command post.
- (5) Protective wire, foxholes, and other barriers surrounding the installation.
- (6) Defensive weapon emplacements around the installation.

*b. Decoy Command Post.* When it is impossible to conceal from the air the fact that a command post is in a certain area, then a decoy command post may be constructed in the vicinity. In this instance it is obvious that the decoy must look more like the real thing than its genuine counterpart, in order to make construction of any decoy worth-

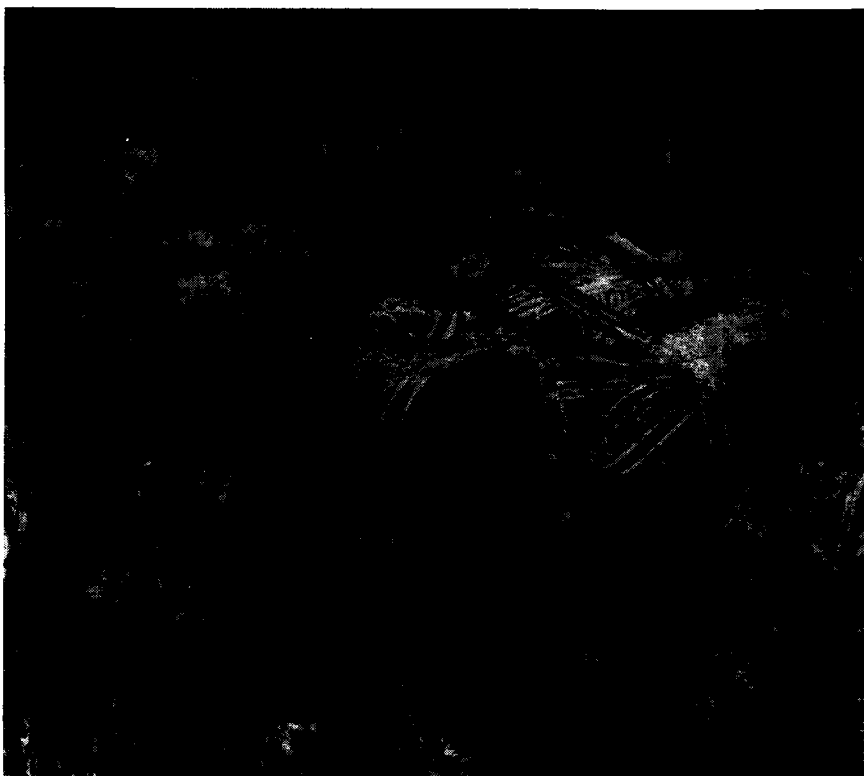
while. Disguise of the genuine to look like a decoy may be feasible. Certain characteristic signs of occupancy, as illustrated in figure 16, should be made at the decoy including cross-country tracks simulating those made by a wire-laying detail, smoke and occasional lights, a few poorly camouflaged tents, new tracks from day to day, and vehicles in the area as well as other signs of activity. Figure 17 shows a decoy command post installed in the vicinity of a real command post.

### **36. Troop Concentrations**

Various troop concentration points are generally identified by a certain collection of bivouac areas (par. 34), motor pools (par. 37), supply dumps (par. 42), or entrenchments (par. 39), with other associated activities such as are described in paragraph 28. Figure 18 illustrates the appearance of an infantry platoon in a defective position.

### **37. Truck Parks (Motor Pools)**

a. Around a motor pool or heavy equipment pool there are innumerable scars, tracks, slit trenches, and a continual shifting of equipment. In



*Figure 19. Signature of a former motor pool.*





*Figure 20. A decoy vehicle concentration in the desert (air view).*



*Figure 21. A decoy vehicle concentration in the desert (ground view).*

simulating these installations, all such characteristics must be faithfully presented. Other items that may be required for deceptive displays are refuse piles, mess tents, bivouacs, latrines, and command posts. Figure 19 shows an oblique view of a former motor pool. Notice the welter of tracks.

b. In desert or other barren terrain, motor pools or vehicle concentrations are best protected from enemy attacks by dispersion over a wide area such as is shown in figure 20. Here the value of decoys is most apparent because real vehicles and equipment are extremely difficult to conceal or camouflage. Decoy vehicle concentrations, such as the one in figure 20 which shows a decoy truck concentration in Egypt before the battle of El Alamein, are exceedingly valuable in drawing the enemy's attack, dispersing his effort, and confusing him as to our real strength. Notice in figure 21 that the decoy vehicles shown are also partially camouflaged with drapes and nets; notice the tracks and the personnel moving about to add realism.

### **38. Tank Concentrations**

Decoys of armored parks and bivouacs should follow the same general outline as described in paragraph 34. Distinctive type tracks made by tanks and other tracked vehicles both locate and identify the unit.

## **Section V. FIELD FORTIFICATIONS**

### **39. Emplacements and Intrenchments**

a. *General.* In simulating any dug-in type personnel or weapon emplacements, such as foxholes, trenches, and mortar or machinegun emplacements, the most satisfactory replicas are made by actually digging into the ground. However, it is not necessary to dig the replicas as deep as their real counterparts. A depth of at least one foot is usually sufficient to provide enough spoil for a parapet around the emplacement and to create the proper illusion of depth to the airman and aerial photo interpreter. A stronger illusion of depth may be obtained by partially filling the shallow emplacement with straw, brush, hay, or leaves. This breaks up the reflection of light from the bottom of the emplacement (fig. 22) and causes the emplacement to appear from the air to be much deeper than it actually is.

b. *Decoy Emplacements.*

(1) Figure 22 shows a decoy trench as it is being dug and as it

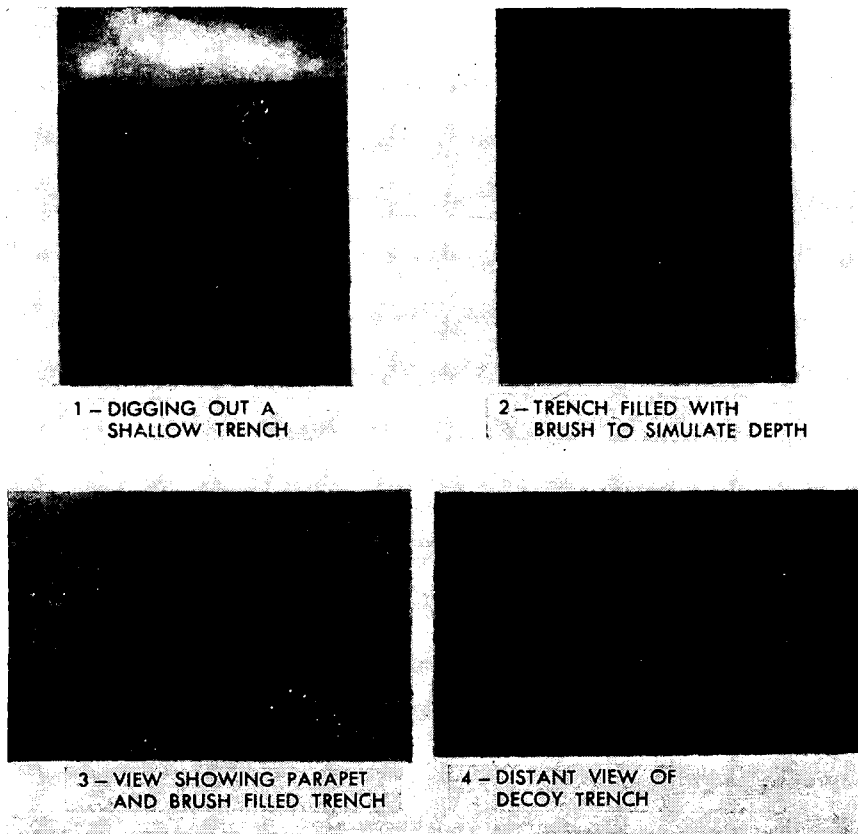


Figure 22. Decoy trenches.

appears close-up finished and filled with brush. Notice how the brush filling makes the completed decoy trench appear much darker than the unfilled trench.

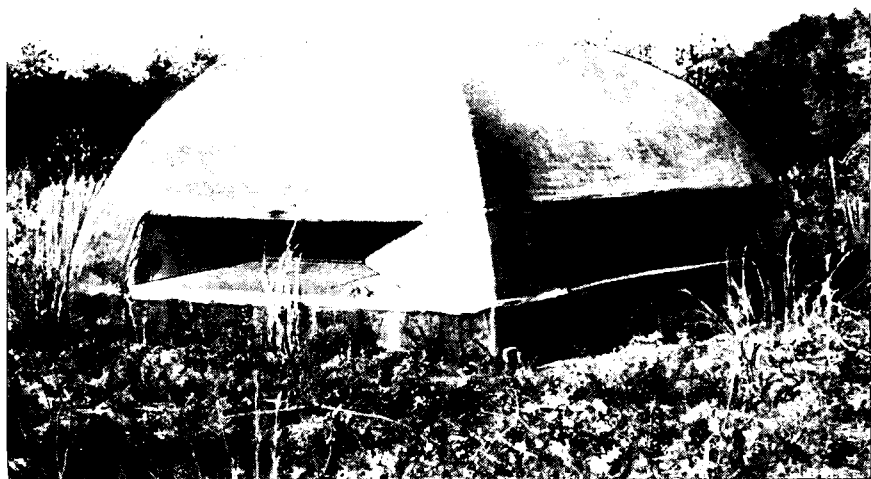
- (2) Simulated entrenchments or emplacements may also be made by painting burlap or cloth in the outline desired and then filling in the simulated excavated portion with waste oil, paint, or scraps of dark material. Figure 23 shows a decoy slit trench constructed in this manner next to a decoy gun emplacement. Note that the simulated parapet is formed by rolling under the edges of a large piece of burlap and creating the illusion of the mound of a parapet by piling sand under the burlap edges. The excavated portion of the slit trench is simulated in this figure by waste oil and dark-colored salvage scraps.

#### 40. Pillboxes

a. *Positioning.* Pillboxes are located to the most likely avenues of enemy approach; the enemy knows this and can accurately guess their



*Figure 23. Simulated slit trench by a simulated gun emplacement.*



*Figure 24. Decoy pillbox of wood covered with painted burlap.*

general location. However, if a pillbox is well-camouflaged, blended into its surroundings, or disguised as a rock, bush, house, or other object which will make it inconspicuous in its particular setting, the enemy is prevented from spotting it accurately. To further direct the enemy from the real pillbox, decoy pillboxes may be constructed and insufficiently camouflaged so that the enemy can spot them with little difficulty.

*b. Decoy Pillboxes.* Figure 24 shows a decoy pillbox constructed of wood, covered with burlap or osnaburg and sprayed with paint to resemble concrete. Sand and dirt may be sprinkled on the set paint to give it a concrete-like texture.

#### **41. Antitank Obstacles**

*a. Positioning.* Antitank obstacles are often located on reverse slopes,

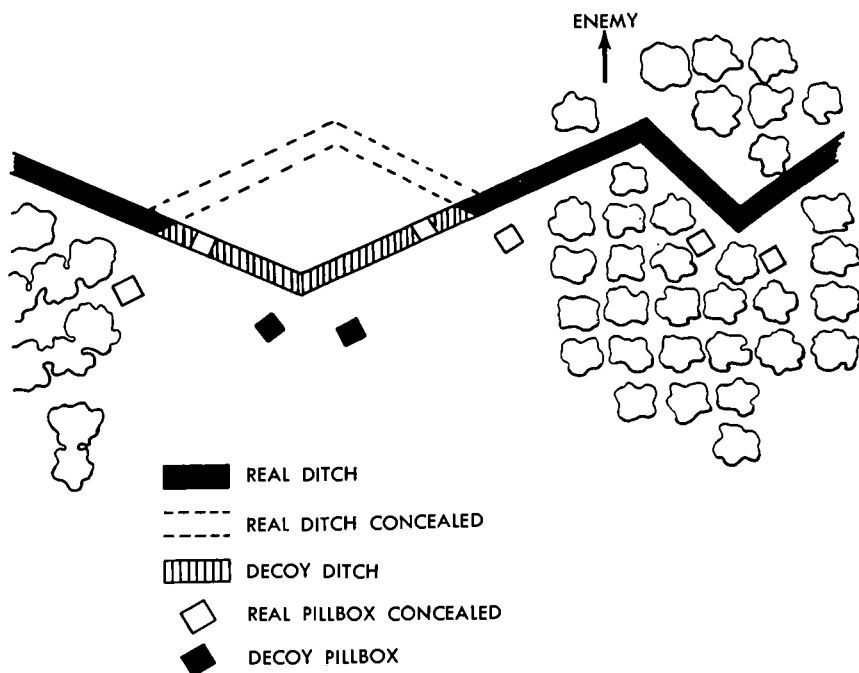


Figure 25. Layout of decoy and real antitank ditches and pillboxes.

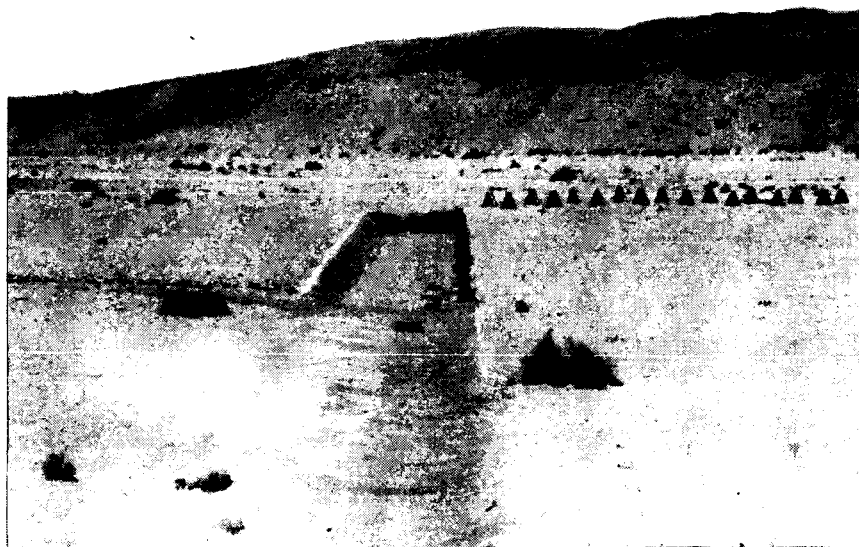


Figure 26. Decoy dragon's teeth and antitank ditch in conjunction with a real camouflaged antitank ditch.

# DUMMY PYRAMIDAL TANK OBSTACLE

## TYPE "A"

OSNABURG 130 SQ. FT. STANDARD

LUMBER 110 FT. 1 X 2

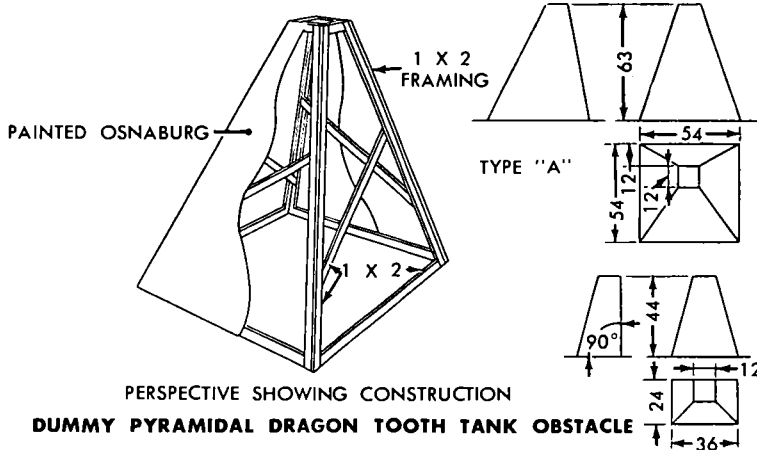
NAILS 1 LB. 6d

## TYPE "B"

OSNABURG 50 SQ. FT. STANDARD

LUMBER 80 FT. 1 X 2

NAILS 1 LB. 6d



NOTE: MOULD IS MADE FROM REAL TANK OBSTACLE OR THE EQUIVALENT; HALF DUMMIES, CAST FROM THIS MOULD, COMPOSED OF TWO LAYERS OF PLASTER, REINFORCED WITH BURLAP; THREE BANDS OF HEMP BINDING (AS INDICATED IN DRAWING) WITH ENDS LEFT LOOSE, FASTEN HALVES TOGETHER BY TYING; THREE STRIPS OF WOOD, SECURED TO WALL OF EACH HALF BY DABS OF PLASTER, SERVE TO REINFORCE STRUCTURE.

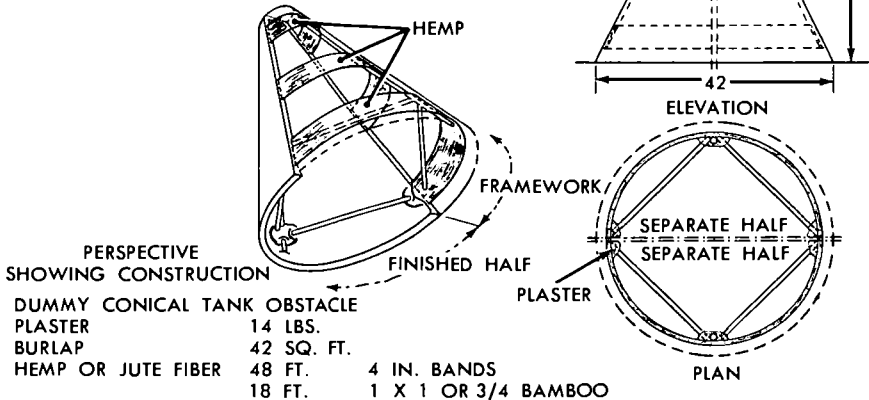


Figure 27. Details of construction of decoy dragon's teeth.

around curves, and in or behind natural screens to conceal them from the enemy and to gain surprise.

*b. Antitank Ditches.* Decoy antitank ditches are often effective in luring enemy tanks into real antitank ditches which are camouflaged. A decoy antitank ditch need be only about two feet deep to create the proper illusion of depth and may be constructed as described in paragraph 39. Figure 25 illustrates a deception scheme using real and decoy antitank ditches and pillboxes.

*c. Dragon's Teeth.*

- (1) Decoy dragon's teeth are effective in guiding the enemy into real traps. They may also be used in conjunction with real and decoy antitank ditches. Obstacles like dragon's teeth should not be simulated in areas not covered by antitank fire. Figure 26 shows a row of decoy dragon's teeth and a decoy antitank ditch. A camouflaged, real antitank ditch is in the foreground, covered with wire netting, cloth, and sand.
- (2) Decoy dragon's teeth may be constructed of wood, chicken wire, and a covering of plaster or painted burlap. Figure 27 shows details and bill of materials in constructing both conical and pyramidal dragon's teeth.

*d. Minefields.* A simulated minefield may be as effective an obstacle as a real field because the enemy must dig up each simulated mine to be sure it is not a live one. A decoy minefield is effective against aerial observation. A simple way to create a decoy minefield is to dig up the ground in a standard minefield pattern. Erecting a minefield marking fence is another simple, effective decoy. The characteristic zigzag pat-

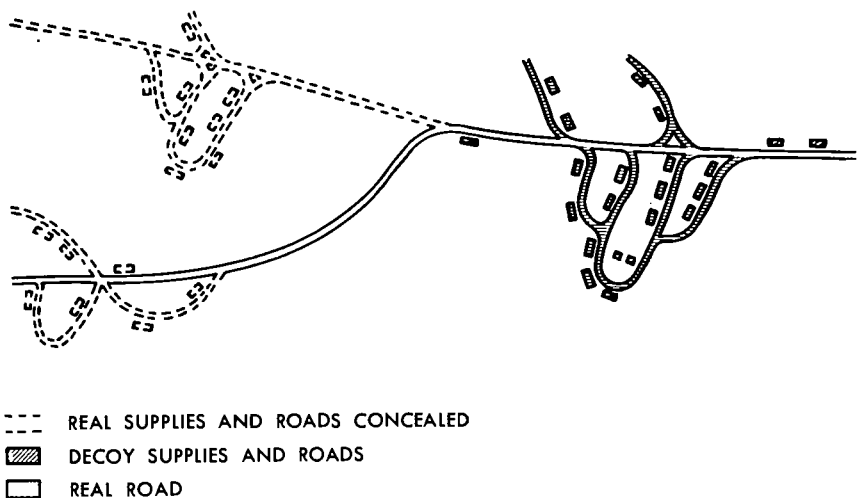


Figure 28. Positioning decoy supply points.

terns of gaps through minefields may serve as an effective decoy. Tracks of vehicles that twist and turn for short distances for no apparent reason and then continue on in a fairly straight line indicate to the enemy aerial observer the probability of a minefield gap. This track may be a false path through a real field or merely laid through unmined terrain. Tracks may be made by pushing a single rubber-tired wheel over soft ground through a real field or by driving vehicles through the site of a real field before the mines are laid.

## Section VI. SUPPLY AND REAR AREA INSTALLATIONS

### 42. Supply Dumps

a. *General.* Supply dumps and supply points vary in size and appear-



Figure 29. Signature of an engineer dump.



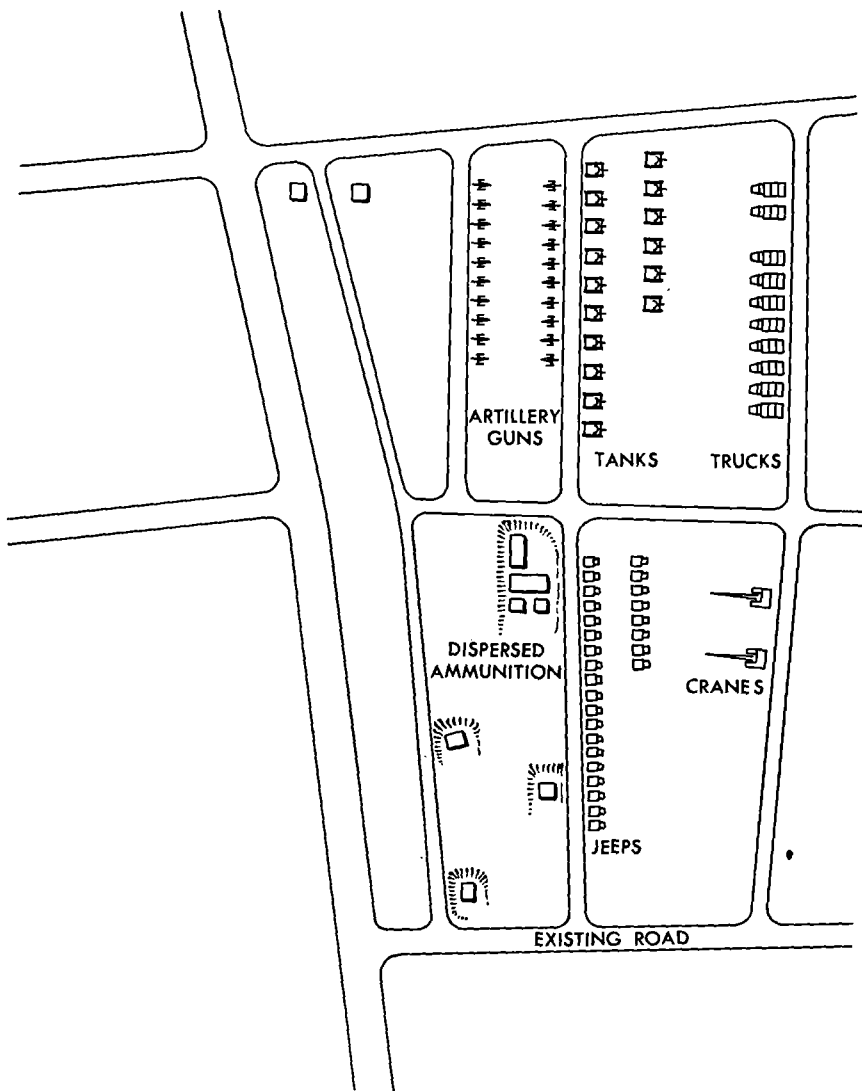


Figure 30. Signature of an ordnance dump.

ance, depending upon their particular function. They do, however, share the common characteristics of extensive tracking, activity, and location adjacent to transportation systems such as harbors, railroads, and road nets. Unless unusual measures are taken, they are usually apparent to even casual aerial observation.

*b. Positioning.* To properly position a decoy, consideration should be given to its location. It should be located near enough to appear to be the real installation and far enough away to allow for possible errors in

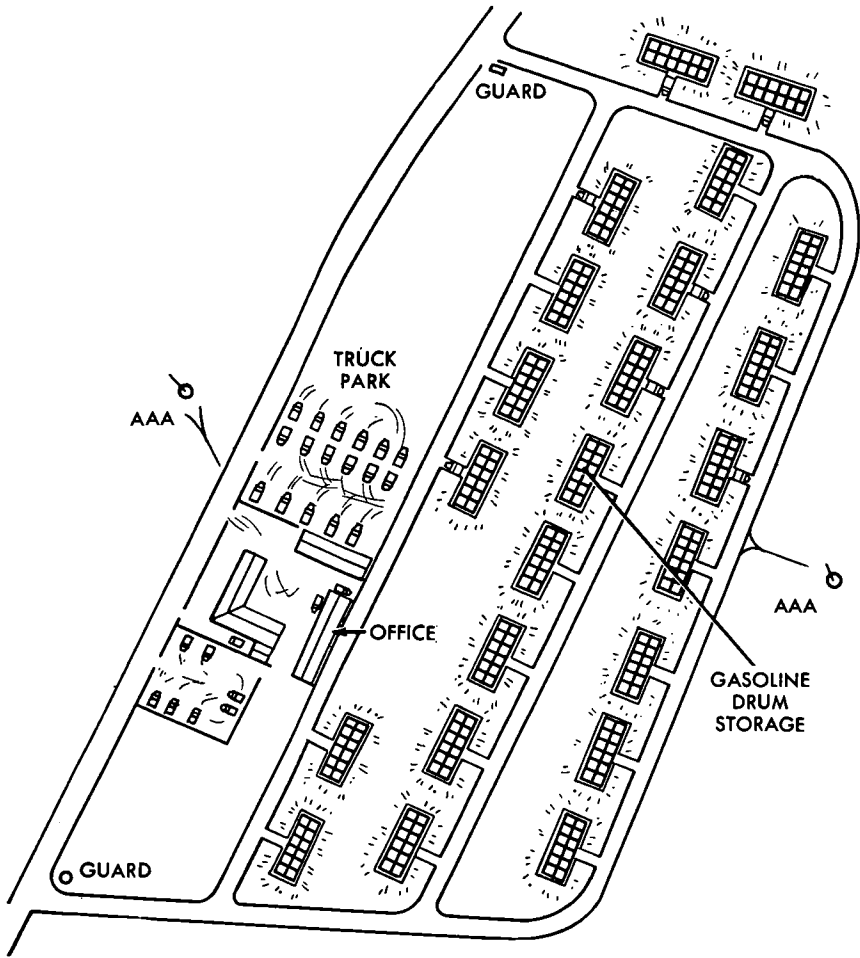
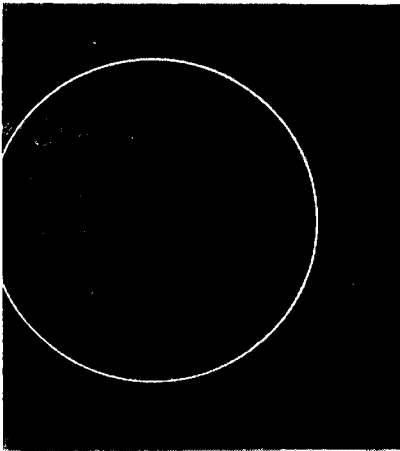


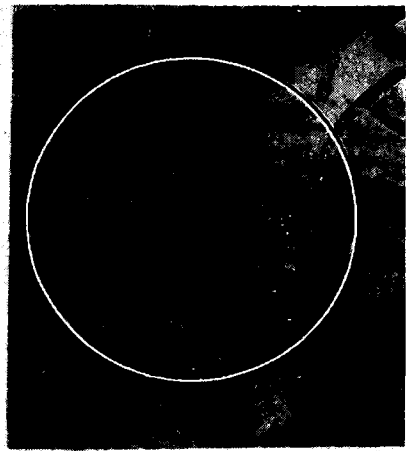
Figure 31. Signature of a gasoline dump.

marksmanship of any attacker. Prominent landmarks must be considered, and the decoy located in the same relation to them that the real installation would be. In some cases the landmarks may be simulated. Figure 28 shows the relationship of several decoy supply points to a real supply point.

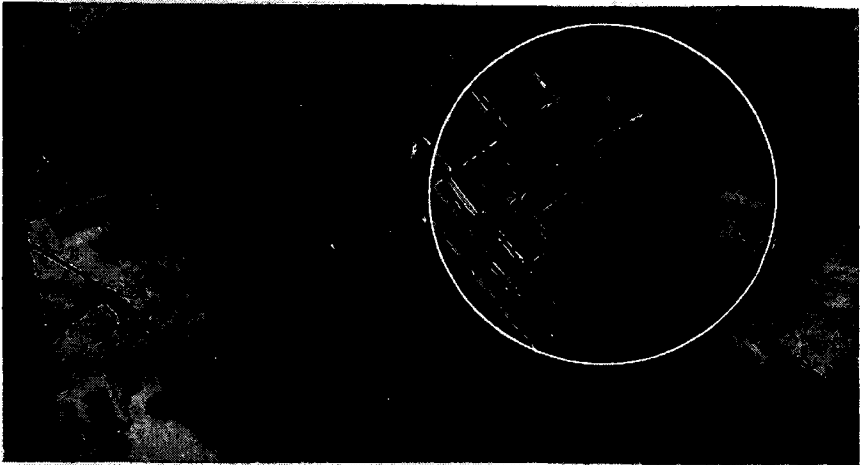
c. *Constructing Decoy.* The decoy must appear to have a convincing road net of the same pattern as the real installation. In addition, troops must be detailed to the decoy site to maintain the appearance of activity. New tracks, scars on the ground surface, movement of vehicles, and false supplies are essential characteristics for the decoy. If at all possible, it is desirable to route and control through the decoy all traffic to or from the



①—REAL OIL REFINERY BEFORE CAMOUFLAGING.



②—REAL OIL REFINERY AFTER CAMOUFLAGING.



③—DECOY OF THE REAL OIL REFINERY SHOWN IN ①

*Figure 32. Real oil refinery before and after camouflaging, and decoy of real refinery.*

real dump. If successful deception is essential, this measure will greatly enhance the decoy's chance of success. In the interest of making a convincing display it may be also desirable to locate incidental real installations, such as a salvage yard, adjacent to the decoy. In the latter case, the possibility of attack on the decoy by the enemy should be considered and appropriate protective measures taken. For night deception, certain types of night lighting, such as simulated building lights, showing through tent openings, and decoy fires, are very effective.

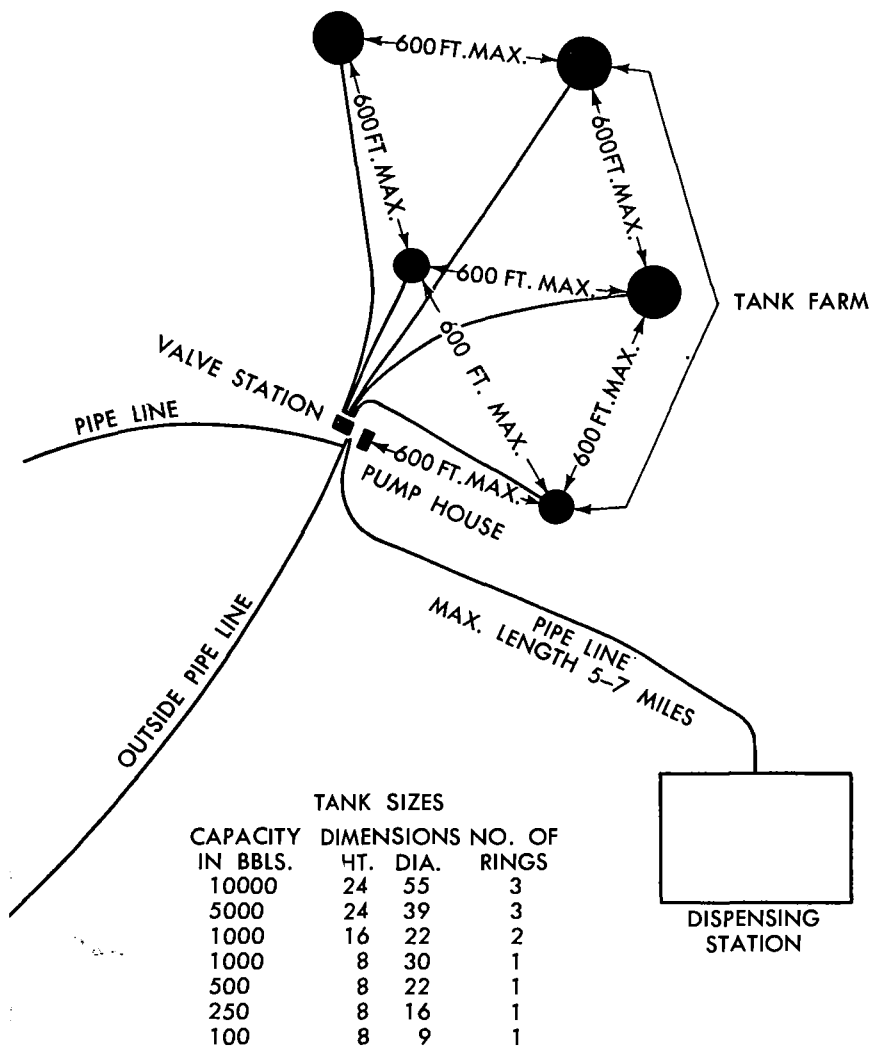
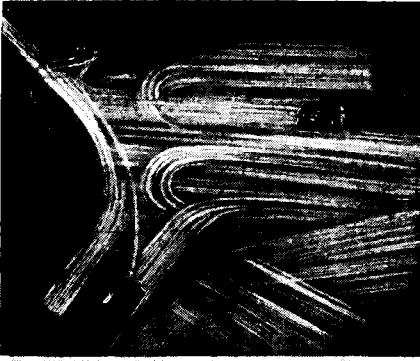


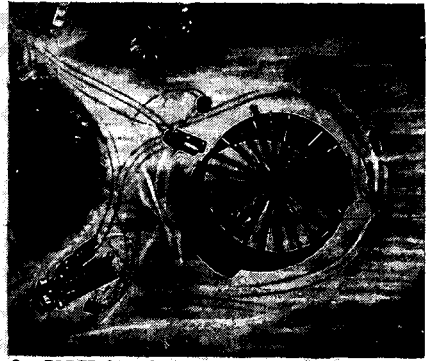
Figure 33. Tank farm layout.

d. *Signature of Dumps.* Each type of dump normally has its own distinctive signature.

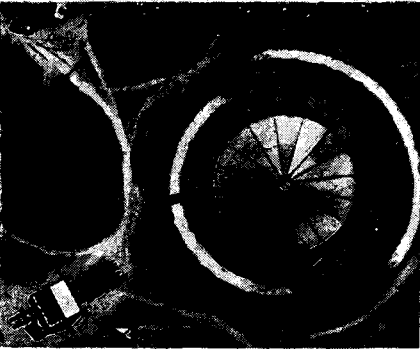
- (1) An engineer dump has the typical signature shown in figure 29. Note that it is typified by large stacks of material of various sizes and shapes, unlike gasoline or ordnance dumps which have stacks of supplies that are more uniform in size and shape.
- (2) An ordnance dump normally has a signature such as shown in figure 30.



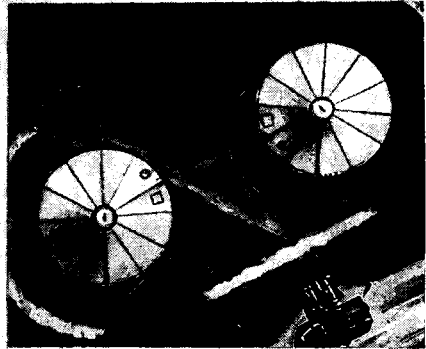
1 - BULLDOZERS LEVELING THE GROUND



2 - ERECTION OF THE TANK AND DISPENSING STATION



3 - COMPLETED 1000 GALLON TANK AND DISPENSING STATION



4 - DOUBLE 1000 GALLON TANK STORAGE AND DISPENSING STATION

*Figure 34. Steps in constructing a tank farm.*

- (3) Gasoline dumps consist of regular stacks of 5-gallon cans or 55-gallon drums, such as are shown in figure 31. Each stack should be separated by a distance of 150 feet, with 3 feet between separate piles in each stack.

#### **43. Oil Refineries and Tank Parks**

*a. Oil Refineries.* Oil refineries are so difficult to conceal that expenditures for camouflage and decoy construction are not generally justifiable. Night decoys of these installations (ch. 6) are, however, quite practicable. In positioning decoys of oil refineries it is very important to follow the same general layout and to place the decoy in surroundings similar to those at the real installation. A daytime simulation program is shown in



*Figure 35. Decoy tank farm and landmarks.*

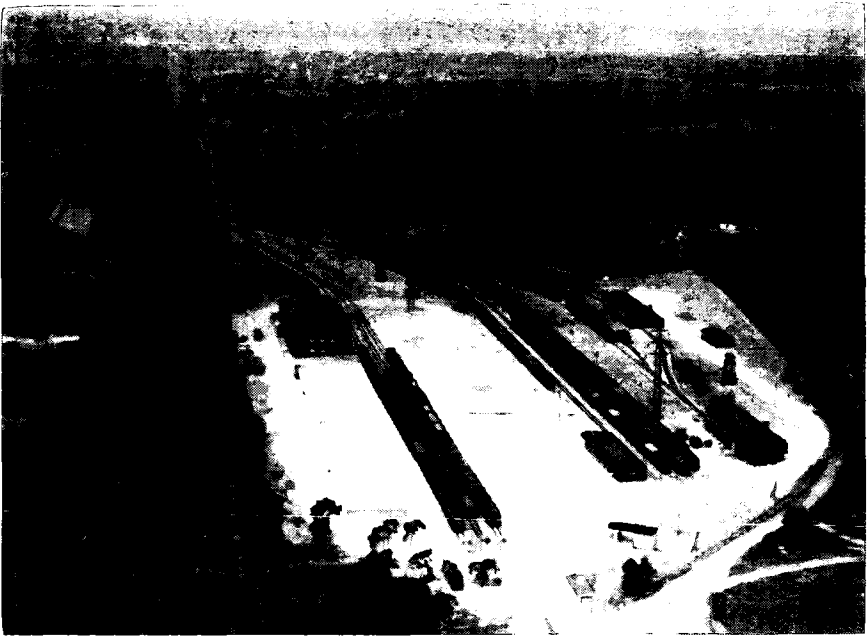
figure 32. Figure 32 ① shows a real oil refinery before being camouflaged; figure 32 ② shows the same oil plant after being camouflaged with netting. The camouflage netting should display a system of simulated roads, fields, and houses, which extend into the surrounding country. Figure 32 ③ shows the decoy of the real refinery. Note that the main features of the real installation are present in the decoy and that it is placed in a similar topographic setting. The decoy of a large installation should be



*Figure 36. Decoy tank farm with no real counterpart.*



*Figure 37. Signature of a railhead.*



*Figure 33. Railhead breakdown point.*

located about 5 to 10 miles from the real target, depending upon the type of terrain.

*b. Tank Farms.* Tank farms are often included in refineries but may be separate from refineries. In accordance with the general rule of possibility and justification of effort, if tank farms can be effectively camouflaged, decoys are quite worthwhile. A typical example of a tank-farm layout is shown in figure 33. Figure 34 shows steps in the construction of a double-tank storage and dispensing installation. The steps in construction and the prominent features of the installation must be duplicated at the decoy.

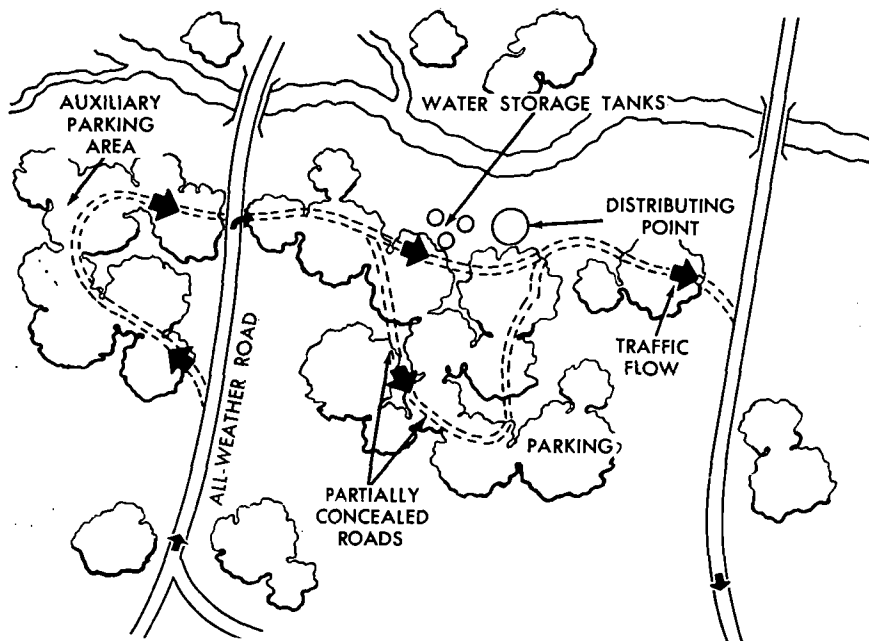
*c. Construction.* The construction of a decoy tank farm requires a great deal of effort and ingenuity if the area is subject to periodic observation by an enemy. Observation of a decoy under construction will obviously rob the decoy of its value. The camouflage of the real farm and erection of the decoy may proceed simultaneously only if enemy observation is improbable. If subject to periodic observation, the decoy should not be revealed until it is completed, interim camouflage being required, and the real farm should not be concealed before the decoy is revealed. Reduction of visibility of the real installation by dark paint and some camouflage may of course precede any activity. Figure 35





*Figure 39. Decoy town.*

depicts a decoy tank farm (A) on one side of a river and two decoy landmarks across the river which correspond to those at the real installation about 3 miles away. Notice that many of the decoy tanks are camouflaged with painted roofs and simulated roads to simulate a housing development. The decoy is camouflaged in the same manner as the real tank farm, but is more obvious. Formerly, a searchlight was near the church on the opposite side of the river from the real installation. At the decoy site a simulated church (B) has been built and the searchlight (C) has



*Figure 40. A water-point site.*

been moved from the real site to the decoy site. Decoys do not have to be related to any actual tank farm (fig. 36). Notice the simulated pipeline and the fire sites which may be lit to simulate burning tanks after an attack.

#### **44. Railheads**

a. Sidings for unloading supplies, a road net, and storage space are essential facilities for a railhead. Where possible, railheads are established in areas affording the best cover and concealment and may be supplemented by camouflage, antiaircraft, and other defensive measure. A railhead is shown in figure 37.

b. A railhead is usually associated with a bulk breakdown point, as shown in figure 38. Supplies are unloaded from railway cars onto trucks and carried to a dump. Since this is standard practice and known to the enemy, a decoy breakdown point or dump is essential in diverting enemy attacks. It should be more exposed and obvious than the real one.

#### **45. Towns**

In flat, barren country or in country with widely dispersed small set-

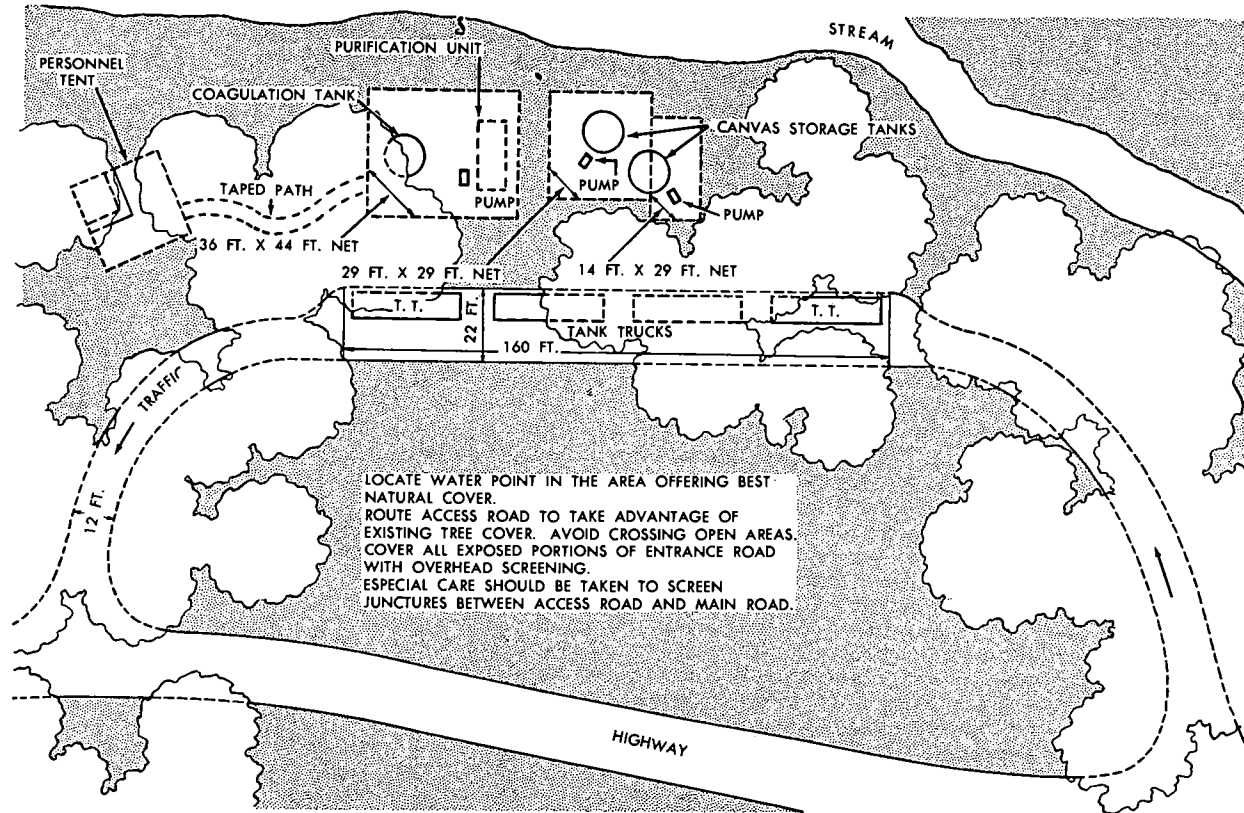


Figure 41. Details of a water-point layout.

lements, it may sometimes be desirable to construct a decoy of the more obvious features of an entire settlement. Such is the case in the construction of a decoy of an important installation located near a settlement. Figure 39 shows a decoy town.

#### **46. Water Points**

In addition to requiring a source of water, water points must be accessible from a main supply road, with a parking area for waiting vehicles. There must be adequate space for pumping, purification, loading, and storage facilities as well as for traffic passing the area (fig. 40). Details of a water-point layout are shown in figure 41. Water points are usually protected and concealed.

### **Section VII. NIGHT DECOY INSTALLATIONS**

#### **47. Types of Night Decoys**

*a. Common Characteristics.* All night decoys employ the same basic equipment: lights, fires, and pyrotechnics. This equipment is described in chapter 6. All have the common purpose of confusing the enemy and diverting him from vital targets to areas of little or no importance. The effectiveness of all night decoys is dependent upon the same factors: positioning, weather and visibility conditions, proper construction, proper operation and control, maintenance, and camouflage. These factors are discussed in the following paragraphs. A decoy may consist of a single or multiple installation, varying in size from a small simulated street light to a complicated installation composed of hundreds of firemaking and lighting devices which, when ignited, will simulate a burning supply depot, factory, airfield, town, or city.

*b. Types of Night Decoy in Installations.*

- (1) Type I civil decoys are those representative of breaches in blackout discipline in factories, warehouses, dock areas, freight yards, towns, or cities.
- (2) Type II airfield decoys are those representative of runway-marker lights, obstruction lights, wind indicators, and aircraft on the ground.
- (3) Field force decoys are those representative of blackout breaches of supply dumps, convoys, quarters, and shelters.

#### **48. Effectiveness of Night Decoys**

*a. World War II.* Night decoys were used extensively in World War II and were extremely valuable in drawing enemy bomber attacks at

night. Enemy airmen were captured whose operational maps showed night decoy installations, particularly night decoy airfields, as real targets.

*b. Factors of Effectiveness.*

- (1) *Air defense.* Aircraft flying over strange territory at night are strongly attracted by any light, and personnel are often willing to accept any reasonable semblance of the target as the genuine one. Effectiveness of decoys is proportional to the pressure under which the attack is made. If the air-defense is unable to stimulate speedy delivery, the change of successful deception is greatly diminished.
- (2) *Enemy bombardier.* The determining factor in the design of a night decoy is its appearance to the enemy bombardier. He must be able to reasonably identify the target either by vision or by radar and he must be persuaded that it is the target he is seeking.
- (3) *Parent target camouflage.* A decoy of a real target will be successful only if the parent target is successfully hidden. Since night decoys use light to attract the enemy, they are successful only when the surrounding territory is blacked out. All measures which make the parent target more difficult to locate than the decoy will increase the effectiveness of the deception. Fires started by bombing of the parent target must be extinguished as soon as possible. If a fire exists at the target as the result of the attack, further deception operations are not worthwhile against successive waves of attackers unless an equal or more convincing fire at the decoy is started which will have an equal or better chance of enticing followup attackers.

#### **49. Site Selection**

The success of a decoy installation will be largely influenced by the adequacy of the site. In the selection of a site the following features should be considered:

- a.* The site must be a plausible one. Locate the installation in an area where one would expect the target to be located.
- b.* The site should provide close similar reference points, discernible at night, to those surrounding the target. To the aerial observer, heavy forests, bodies of water, and open country are distinguishable from each other. Variations in grade up to 8 percent are not distinguishable.
- c.* The site should permit the decoy to be oriented in the same compass bearing as the target.
- d.* Where possible, it is desirable to choose a site located along the probable line of approach.

e. The site must provide an area sufficient for the light pattern on an adequate scale. As small as three-quarter scale will suffice if the full scale cannot be used.

f. The site should be within a reasonable distance of the target—close enough to be confused with it, but not so close that the area of poor bombing accuracy overlaps the target or other vital areas.

g. Wherever possible the decoy should be accessible to adequate roads and power lines.

h. If a night decoy only, the area should provide easy concealment of the existence of the decoy during daylight hours.

## 50. Construction

a. *Site Preparation.* In preparing the site for night decoy installations it is essential that indications of construction and changes in the appearance of the terrain be kept to a minimum. Normal activities such as farming and grazing should be continued where possible. These precautions not only serve to prevent the enemy from locating and mapping night decoy sites during the day, but also help to preserve local secrecy. The construction will be facilitated if the following procedure is followed:

- (1) Establish location of all devices, paying particular attention to location of service road and provisions for servicing the equipment.
- (2) Remove trees or brush which may constitute a fire hazard, taking care not to scar the landscape.
- (3) Cut weeds to minimize the spread of the fire, establishing an 8-foot band of bare earth, 20 to 30 feet in diameter, around each fire-making unit which may produce a fire hazard.

b. *Installation.* Paragraphs 75 through 77, on civil, airfield, and military night decoys contain information on typical installations. The following general information applies to all installations.

- (1) *Conventional symbols.* Certain conventional symbols have been standardized to indicate various types of night decoy devices on maps, drawings, and charts. These symbols as used in this manual are shown in figure 42.
- (2) *Lights.* Individual lights are arranged to create a pattern which is typical of the parent target. No two decoys should be identical, and standardized layouts should be avoided. The number of electrical circuits is cut down to a minimum to save cable, but two are essential; one for the main lighting (primary circuit) and one for the residual lights (secondary circuit). A standby power source should always be available.
- (3) *Control shelter.* The control shelter is located convenient to the decoy installation and contains the remote control switches

TYPE	SYMBOL	TYPE	SYMBOL
WIND INDICATOR		WAREHOUSE LIGHT	
OPEN DOOR		TURNING PLANE	
FURNACE GLOW		LOADING DOCK	
LOCOMOTIVE GLOW		BOILING OIL FIRE	
DUMMY WALL		OIL FED FIRE	
TROLLEY FLASH		FIRE BASKETS	
STREET LIGHT		GRID FIRE	
SKY LIGHT		SHELTER	
SKY LIGHT—TILTED		SIGNAL LIGHTS	
WINDOW LIGHT		DECOY INSTALLATIONS— USING LIGHTS	

#### AIRFIELD LIGHTING

TYPE	SYMBOL
ROTATING BEACON	
FLASHING BEACON	
MARKER LIGHT, CLEAR	
MARKER LIGHT, CLEAR-YELLOW	
MARKER LIGHT, GREEN-YELLOW	
OBSTACLE LIGHT, RED	

Figure 42. Conventional symbols peculiar to night decoys.

for the decoy lighting and fire devices. Adequate bombproofing for the type of attack expected is essential.

- (4) *Fire devices.* Care must be taken to insure adequate foundation under fire devices. Guy wires to both light and fire devices will be required. Cables and electrical connections must be made watertight and the devices protected from rain and snow.

*c. Materials.* The type and amount of equipment used in night decoys will depend upon the nature and scale of the target to be simulated, the

materials available, and the designer's ingenuity. The layouts and designs included in chapter 6 may be considered as typical. The materials used for construction and the fuel for operation may be greatly varied (pars. 73 and 74). In all instances the cheapest, least critical, and most readily obtainable materials that will serve the purpose should be used.

## 51. Operation

*a. Control.* In the operation of night decoys, provision must be made for territorial central control and for local control. The central control, which receives immediate information from all sources during an attack on the area, determines which decoy site should be fired and gives the order to the local controller concerned, who passes it on to the detachments in charge of the sites. In the event of a breakdown in communications, the local controller must have authority to act on his own initiative.

*b. Operating Personnel.* The number of men required to operate a night decoy varies with the size of the decoy. The smallest sites require 3 men and the large units about 20 men.

*c. Technique.* Successful operation of a night decoy will require on the part of the operator an understanding of the problem and considerable ingenuity. Variety and "life" are essential. These are obtained by varying the wattages of the lamps used, particularly in "bad blackout" effects, so that as a hostile aircraft approaches closer to a site, the lower-powered lighting comes within his range of vision. Furthermore, screens may be erected to obscure observation from certain directions, and "skylights" may be tilted at various angles so that as an aircraft circles a site the pattern of the decoy is always changing in a lifelike manner. Time switches may also be used to switch automatically on and off certain devices such as the "open door" light, thus introducing "life" without a prohibitive outlay in cable for separate circuits. The procedure of operating a night decoy may be subdivided into three parts as follows:

- (1) *After the order to light up has been received and before the enemy arrives.*
  - (a) Both primary and residual lights are turned on. The degree of brightness will depend upon weather conditions and will be included in the instructions from control.
  - (b) Special effects are operated intermittently, care being taken to avoid a stereotyped effect.
- (2) *After the enemy is near or has indicated interest in the field by circling or returning.*
  - (a) All primary lights are switched out. The secondary circuit may remain.



- (b) Special effects may be operated judiciously at intervals.
- (3) *After the first bombs have fallen.* Operator reports to control and lights fires as ordered by control. Any fires started by bombs on parent target must be extinguished as soon as possible.
- d. *Rules to Emphasize.*
- (1) Do not turn on the decoy lights while under enemy observation.
  - (2) Be sure to switch off primary lights when the enemy approaches.
  - (3) Do not switch lights on and off to attract attention.
  - (4) If enemy fails to bomb, do not switch primary lights back on until the enemy is well out of range.
  - (5) Do not light large fires until sure that the attack is a raid in force; do not set off decoy for a nuisance raider.
  - (6) Do not light fires later than 1 hour before dawn.
  - (7) Remove firing plugs during the daytime to prevent lightning from starting the fires.
  - (8) If electricity fails, use the stand-by generator.

## **52. Maintenance**

On a night decoy, maintenance will consist of the following:

- a. Rebuilding and refueling fire devices after a raid. Sufficient material should always be on hand to operate the decoy for three consecutive nights.
- b. Repairing damage after raids and eradicating bomb blast marks.
- c. Cleaning and checking generator.
- d. Checking all wires and contacts periodically.
- e. Lifting and re-laying wires if required by the use of the area.

## **53. Camouflage**

In desert or arctic terrain or in open country where night decoy installation may be discernible during the day, the camouflage of these decoys becomes important unless the decoy is also a day decoy. In any event the decoy lighting and fire devices will have to be concealed. Simple devices may be covered with a flattop or net. Those close to the ground may be covered with a drape. The more elaborate devices may be covered with dummy buildings or the installation may be made into a day-and-night decoy, in which case certain lighting equipment may remain exposed. Some simulator device night decoys in open terrain have also the advantage of greater nighttime deception, because decoy fire in a flat area may produce enough light to reveal the true nature of the site. If the decoy is not a dual purpose day-night decoy it will be necessary to refill and conceal bomb craters or damage in the area of the

night decoy. Indications of inexplicable attacks upon innocent country, evident during day reconnaissance, will immediately identify the site as a night decoy to the enemy observer.

#### **54. Nonuniformity and Visibility Requirements**

Standardization layouts for construction of decoys are not permissible, because no two decoys should contain any familiar pattern or regularity. Rather, the designer will have to employ the preceding devices in whatever construction the immediate problem requires. Night decoys should be checked and rechecked from the air by an experienced observer. Visibility conditions identical to those under which the enemy will observe the decoy should be chosen. The layout, background, dummy construction, and adjustments of light intensities should be checked under a number of different atmospheric conditions and at different altitudes. The following paragraphs deal with a few typical layouts of decoy installations.

### **Section VIII. SMOKE OPERATIONS**

#### **55. Functions**

Smoke has three functions in deception operations:

a. Smoke must be used in conjunction with decoys simulating those installations or situations that would normally produce smoke, such as factories and power plants, decoy damage, and campfires.

b. Light smoke must be used in conjunction with night decoys when the visibility and light conditions are such as to expose the decoy. In this situation, white smoke may be used to simulate ground haze or mist.

c. Smoke may be used to screen the site of any activity. Smoke may also be used to simulate activity without the aid of simulated construction. The nature of the decoy-screened activity may be disclosed, apparently unintentionally, by relating it to some other activity or display. This method of effective deception is well adapted to river-crossing preparation, beach assault concentration, assembly points, and any operation with which smoke is sometimes used. The ease, economy, and speed with which this type of visual decoy can be implemented are unequalled by other visual methods. Furthermore, if it is properly used and its radar characteristics are reproduced, this type of decoy is almost impossible to identify. The use of smoke has one serious limitation. Strong or rapidly changing winds make the use of smoke more difficult, in terms of the operating personnel and the amount of generating equipment required. For details of smoke-screening operations, see FM 3-50.

## 56. Smoke Generating

*a. Blanketing.* Smoke plumes from each generator drift downwind a considerable distance before merging with adjacent plumes to form a uniform blanket of smoke. Therefore, for best results, the distance between the near edge of the area to be concealed and the line of generators should be at least nine times the distance between generators. For example, if generators are placed 100 yards apart, they should be at least 900 yards upwind from the near edge of the area to be blanketed. If the source line of smoke is closer than this to the near edge of the area to be blanketed, the spacing between generators should be closer. In actual operation, local conditions may require markedly different spacing. The spacing suggested above may be used to initiate an operation, but should be checked and adjusted by aerial observation. In smoke-blanketing operations, the area actually blanketed should be larger than the crucial area being protected.

*b. Haze.* Spacings for producing smoke haze vary to such an extent that the generators must be adjusted for each operation by observation in the field.

*c. Curtain.* Proper placement and spacing of generators for producing curtains are determined by local conditions existing in the field.

## 57. Smoke Pots

*a. Blanketing.* Smoke pots are usually used in conjunction with smoke generators for reinforcing smoke blankets and for producing smoke while generators are warming up. If generators are not available, smoke pots can be used for producing smoke blankets. For smoke pots, as well as mechanical generators, the spacings required in each specific situation may vary markedly. To insure a uniform blanket over an area, the distance between the line of smoke pots and the near edge of the area to be blanketed should be at least nine times the space between the smoke pots. If it is necessary to place source lines of smoke closer to the near edge of the area, use smaller spacings. This spacing may be used to initiate an operation but should be checked and adjusted by aerial observation.

*b. Curtain.* Proper placement and spacing of smoke pots for producing curtains are determined by local conditions existing in the field.

# Section IX. DAMAGE

## 58. Decoy Damage

Simulated damage is an especially valuable and practical means of deception for installations which are impractical to conceal. Simulated damage that appears real may induce the enemy to stop or lessen the number and force of his attacks on what he is led to believe is a crippled

installation. Decoy damage may be used effectively on oil refineries, railroad sidings, hangars, power plants, bridges, wharves, warehouses, and other large installations.

### **59. Use of Decoy Damage**

Damage from bombs and fires is the usual type simulated. Simulated damage is prepared in advance; salvaged material and debris are neatly stacked to conform with existing patterns and are scattered immediately after an enemy attack to simulate bomb hits on the structure. Shallow holes may be dug or blasted to simulate bomb craters and sprayed with waste oil or black paint to appear deep; these are covered until the attack is in progress or until after the attack. During the attack, prepared charges and smoke pyrotechnics may be utilized and fires ignited, as described in chapters 6, 7, and 8. After an attack, the prepared damage is revealed. If deception of this kind is to be effective, speed is essential. Personnel should be trained and organized to follow a well-rehearsed drill in the event that the nature of the surrounding area is such that actual new bomb craters away from the installation may compromise the deception. Some provision may be required to conceal these real craters.

**PART TWO**

**DECOY EQUIPMENT, ITS CONSTRUCTION AND ERECTION**

**CHAPTER 5**

**FIELD EXPEDIENT DECOYS**

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**60. General**

When decoys are to be used in considerable numbers, and the plan for their display does not permit fabrication in place, it may be expedient to mass produce the components in the required quantities, and to transport them in unassembled or partially assembled form, completing the assembly at the display site. Such prefabrication will reduce the man-hours required, and will permit display of the greatest number of decoys in the selected area within a given period of time.

**61. Construction of Field Expedients**

*a. Types of Construction.* The basic materials for constructing field-expedient simulator devices are wood, wire, and burlap, all of which may be obtained from engineer depots. However, field-expedient simulator devices may also be constructed from any local or salvage material available and suitable for the job. Such material may include salvage tenting, empty crates and boxes stacked to resemble whatever the simulator device is to represent, and parts of wrecked items of equipment which may be partially camouflaged to resemble a camouflaged item of real equipment. Equipment or positions may also be simulated by digging shallow outlines in the ground or by painting either on cloth or on the ground. This latter method of simulating real equipment or positions is effective only as a temporary measure since the lack of height and perspective will be immediately apparent in stereophotographs or low-oblique photos.

*b. Construction Time Estimates.* Figure 43 shows a chart of the estimated number of man-hours required to construct three-dimensional simulator devices of the various items of equipment shown. The man-hours are classified as mass production, skilled, and unskilled labor. The time estimates will vary with the design of the simulator device and the kind of material used. The following paragraphs in this chapter detail the construction of various types of field expedient simulator devices.

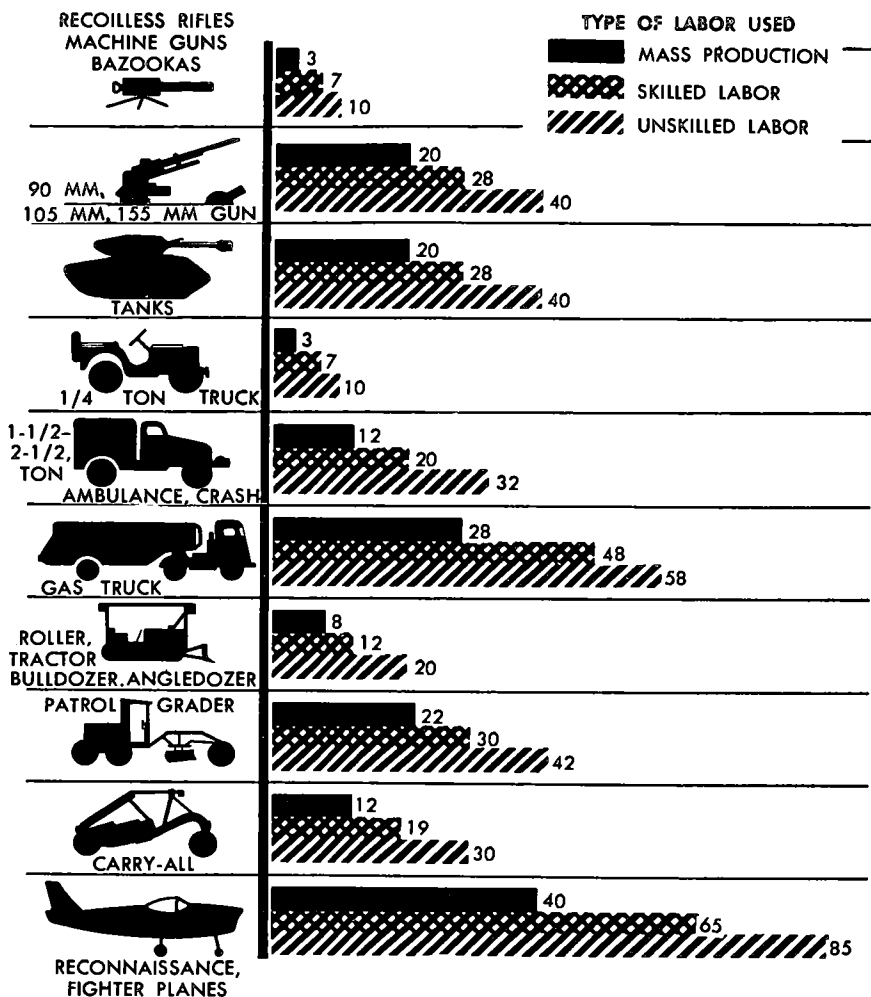


Figure 43. Man-hours required to construct three-dimensional field expedient simulator devices.

## 62. Aircraft

a. *General.* Liaison aircraft are primarily assigned to Army air sections. See appropriate organizational TOE.

b. *Construction of Aircraft Simulator Devices.* Aircraft simulator devices are divided into two classes. Class I simulator devices are simple, lightweight structures built in two dimensions only. They are effective only against high-altitude observation and may be identified as simulator devices on stereophotographs. Class II simulator devices are three-dimensional to represent the complete form of aircraft and are more effective against low-altitude observation. Both types should be colored to match real aircraft operating in the vicinity.

- (1) *Class I simulator devices.* An effective class I simulated airplane may be built in the field by sewing a full size cloth silhouette on an ungarnished twine net (fig. 44). Digging outlines of aircraft in the ground and painting the shapes of aircraft on the ground are other simple methods of constructing class I simulator devices. They are not very satisfactory because the simulator devices cannot be moved and are easily recognized as simulator devices in aerial photographs or stereopairs, but they do have some value in luring high-flying enemy aircraft during an enemy attack. These simulator devices could be prepared and covered with canvas or camouflage to prevent detection by enemy photoreconnaissance aircraft and exposed only when the site is under enemy air attack.

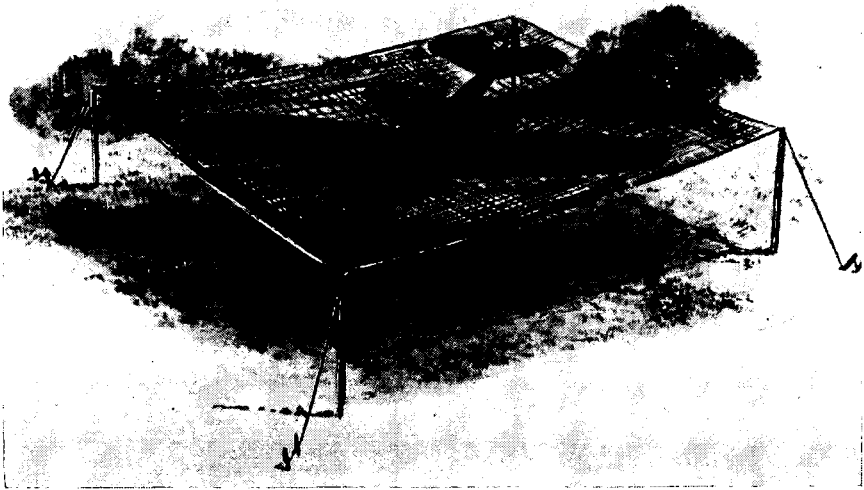
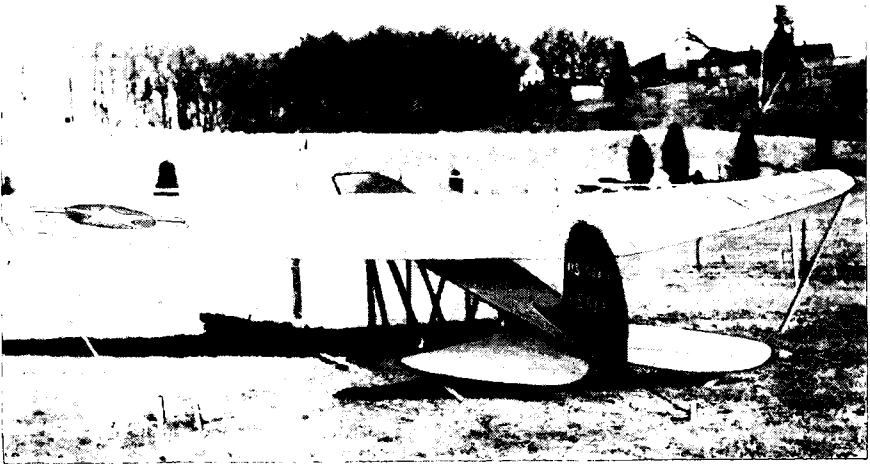


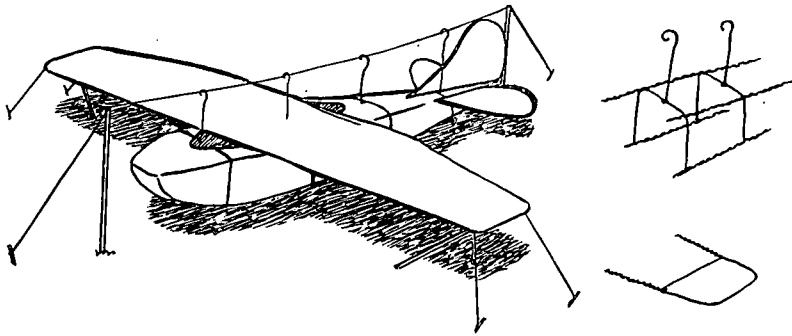
Figure 44. Class I simulated aircraft.

(2) *Class II simulator devices.*

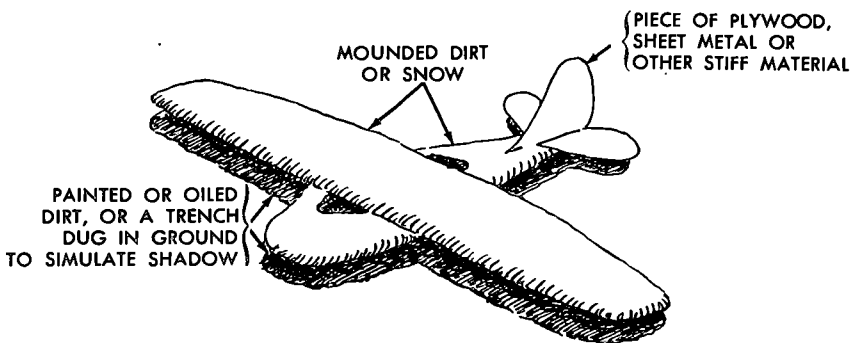
- (a) There are several types of class II aircraft simulator devices. One type, made of a framework of wire and wood and covered with painted burlap, shows only enough detail to represent true form and the characteristic shadow, such as shown in figure 45 ①. Figure 45 ② shows another type of class II airplane simulator device which is a little more detailed than that shown in figure 45 ①. The fuselage is a separate piece. Three strands of No. 10 wire are twisted together and shaped to form the cross-section braces; ropes are attached along the bottom and top edges to give support to the covering material. The fuselage is suspended on wire hooks from a wire extending the length of the airplane.



①



②



③

Figure 45. Types of class II simulated aircraft.



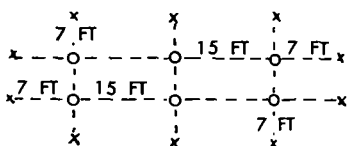


④

Figure 45—Continued.

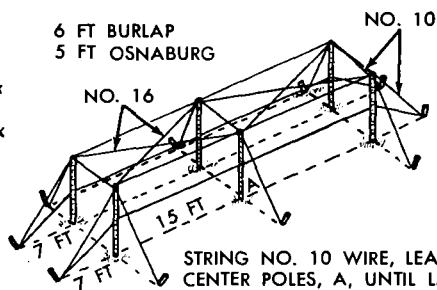
- (b) Snow, sand, or dirt may be used to make three-dimensional simulator devices by molding it into the correct size and shape and covering it with properly colored osnaburg or burlap (fig. 45 ③). Most of the snow or sand used for modeling should be excavated from the north side of the simulator device; this will serve to emphasize shadow. The rudder is made of some material rigid enough to stand by itself. One disadvantage of this type simulator is that it is not movable.
- (c) Wings, fuselage, and tail parts of damaged or wrecked planes may be placed projecting from under a tree, bush, clumps, or camouflage nets (fig. 45 ④) to suggest real aircraft partially camouflaged. Aircraft parts should be high enough to cause a realistic shadow. This is one of the simplest and most effective ways of simulating aircraft or other objects. This is the most practical type of device for simulating heavy bombers.

*c. Positioning Aircraft Simulator Devices.* The placement of aircraft simulator devices, and the associated activity, must conform to local airfield practice so that their presence and surroundings are convincing. Positions of simulator devices must be changed from day to day and signs of related activities, such as gasoline trucks beside them, are necessary. Simulated devices should be well located in relation to a taxiway and natural concealment. A thinly garnished net over the device reveals enough of the decoy aircraft to attract attention. A salvaged scrap wing may be placed so that it suggests a real aircraft under natural cover. The associated activities should include a simulated gasoline truck, vehicle and foot tracks, and a spur. Toned-down spurs and hardstands are simulated by clipping grass or removing turf.

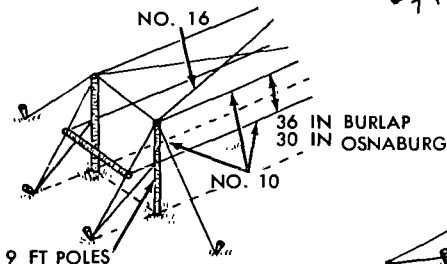


MARK OFF LOCATION OF POLES AND STAKES USING WIDTH OF COVERING MATERIAL TO JUDGE WIDTH OF PONTON. DRIVE ALL STAKES.

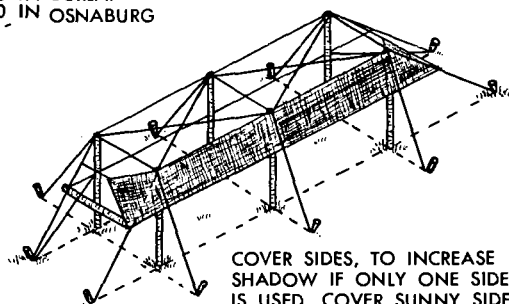
6 FT BURLAP  
5 FT OSNABURG



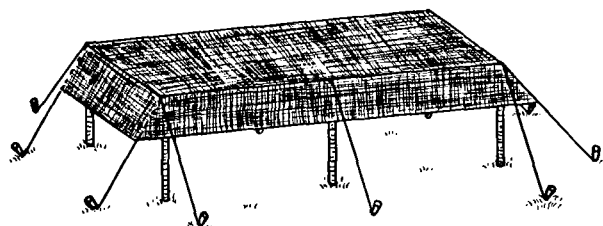
STRING NO. 10 WIRE, LEAVING CENTER POLES, A, UNTIL LAST. USE NO. 16 WIRE DIAGONALS.



9 FT POLES  
STAPLE POLE IN POSITION



REMARKS  
ERECTION TIME:  
6 MAN-HOURS



COMPLETED PONTON

NO.	LENGTH	MATERIALS	NO.	TOOLS
6	9 FT	POLES (SAWED ENDS)	2	PLIERS
2	6-1/2 FT	POLES (SMALL DIAMETER)	2	HAMMERS
10	2 FT	STAKES	1	CROSSCUT SAW
160 FT	36 IN	BURLAP	1	HANDAXE
160 FT	30 IN	OSNABURG (ALTERNATE)	1	MAUL
2	56 FT	NO. 10 WIRE	1	50 FT TAPE (OPTIONAL)
3	32 FT	NO. 10 WIRE ASSTD NAILS		
2	52 FT	NO. 10 WIRE & STAPLES		
		NO. 16 WIRE FOR DIAGONALS, SEWING BURLAP AND TYING		

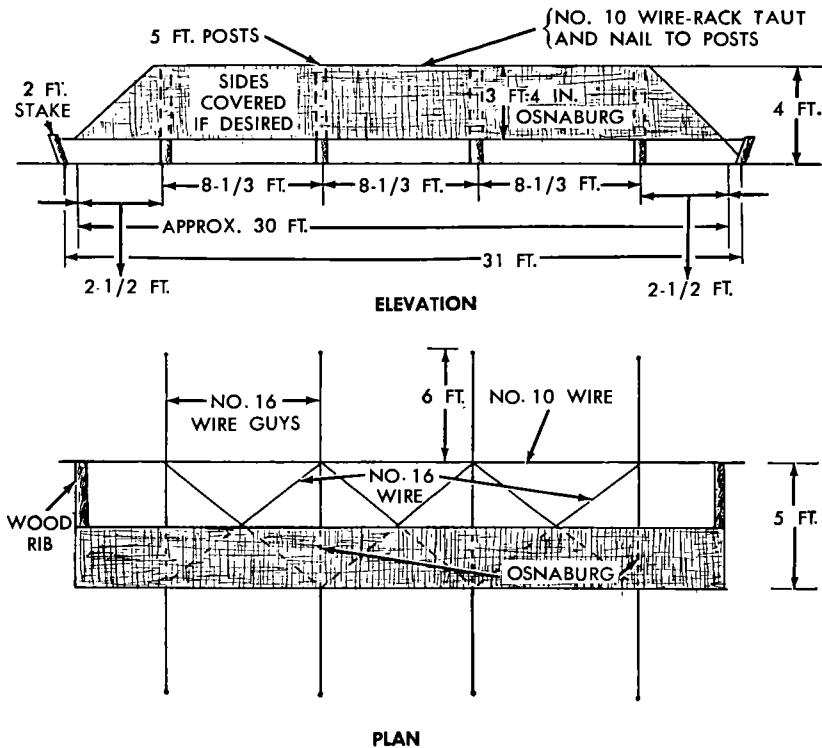
Figure 46. Simulated ponton boats, elevated.

63. Pontons and Landing Craft

a. General. Simulated pontons and landing craft are practicable. Deception applied to a craft larger than a landing ship, utility (LSU), is best limited to building simulated deckhouses, funnels, and other superstructure on the actual craft to change its appearance.

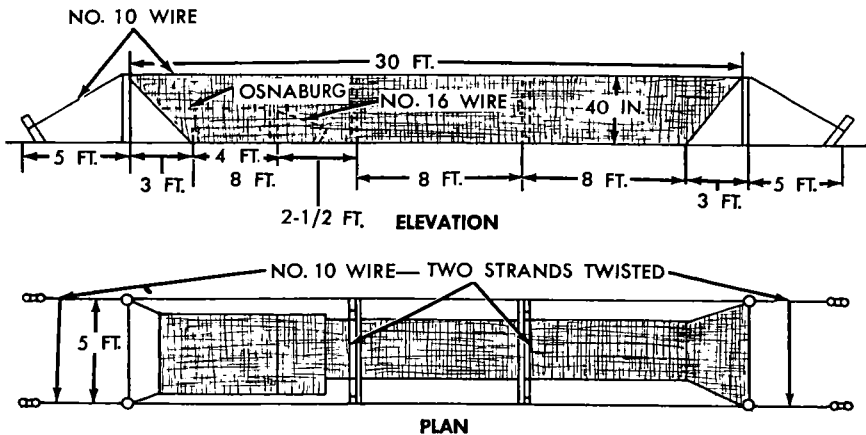
b. Simulator Device Pontons.

- (1) Simulated pontons for land-display purposes are made of wire, wood, and osnaburg or burlap. For details of construction, see paragraph 64d. Figure 46 shows a simulated inverted ponton. Bill of materials, tools, and erection time are included. Figure 47 gives the plans, bill of materials, and tools for erecting an inverted ponton boat simulator device. Figure 48 shows the



MATERIALS		TOOLS	
NO.			
65 FT.	40 IN. OSNABURG—BOTTOM	3	MAULS
65 FT.	40 IN. OSNABURG—SIDES	1	AXE
150 FT.	NO. 10 WIRE	1	HANDAXE
150 FT.	NO. 16 WIRE	2	HAMMERS
8	5 FT. POSTS	2	PR. PLIERS
12	2 FT. STAKES	1	50 FT. TAPE
2	1 IN. DIA. X 5 FT. LONG, STAKES		
	ASSORTED NAILS AND STAPLES		

Figure 47. Simulated ponton boat, inverted.



NOTES: 5 FT. STAKES DRIVEN IN 20 IN.—REMAINING 40 IN. FOR HEIGHT OF BOAT. REMOVE GRASS AND SHRUBS FROM BOTTOM OF BOAT. TRAMP GROUND TO ACCOMPLISH PURPOSE OF REFLECTING LIGHT TO IMITATE PONTON BOTTOM.

NO.	MATERIALS	TOOLS
8	5 FT. POLES OR 2 X 4 STAKES	3 MAULS
12	3 FT. POLES OR 2 X 4 STAKES	1 HANDAXE
100 FT	NO. 10 WIRE	1 AXE
75 FT	NO. 16 WIRE	2 HAMMERS
85 FT	OSNABURG 40 IN. WIDE	2 PR. PLIERS
	NAILS AND STAPLES	1 50 FT. TAPE

Figure 48. Simulated ponton boat, upright.

plans and bill of materials for erecting an upright ponton boat simulator device.

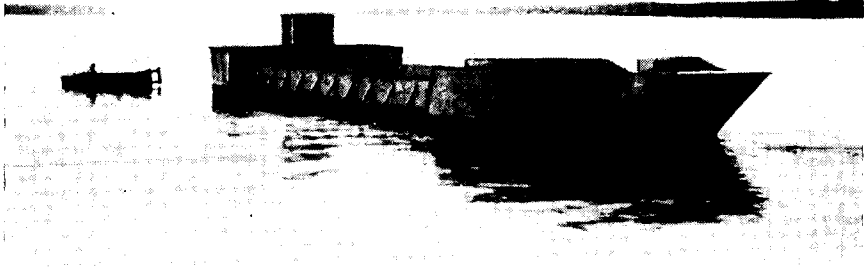
- (2) Decoy pontoons that will float require two 55-gallon drums to provide the flotation.

c. *Simulated LSU.*

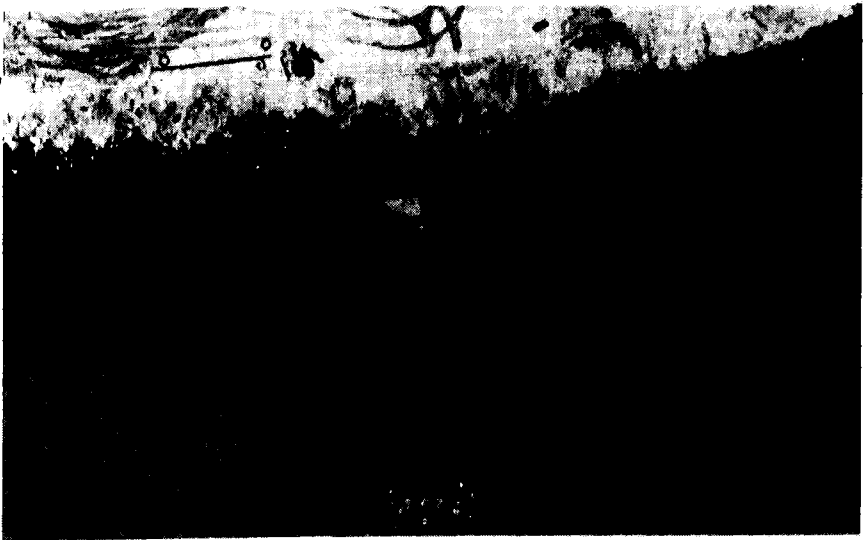
- (1) The simulated LSU shown in figure 49 can be constructed by a platoon of trained engineer troops in 1 day. This design is sufficiently durable for prolonged exposure to the elements in reasonably sheltered anchorages and requires little maintenance. This simulated device is suitable for use in simulating amphibious operations where the bow can be nosed up on the beach of a harbor or inlet or can be tied up to a simulated pier.
- (2) The bill of materials for constructing this simulator is as follows:

(a) *Substructure:*

Forty-nine 55-gallon drums  
 1,750 linear feet of 2- by 4-inch lumber  
 400 feet of No. 10 wire



**1—THREE-QUARTER VIEW**



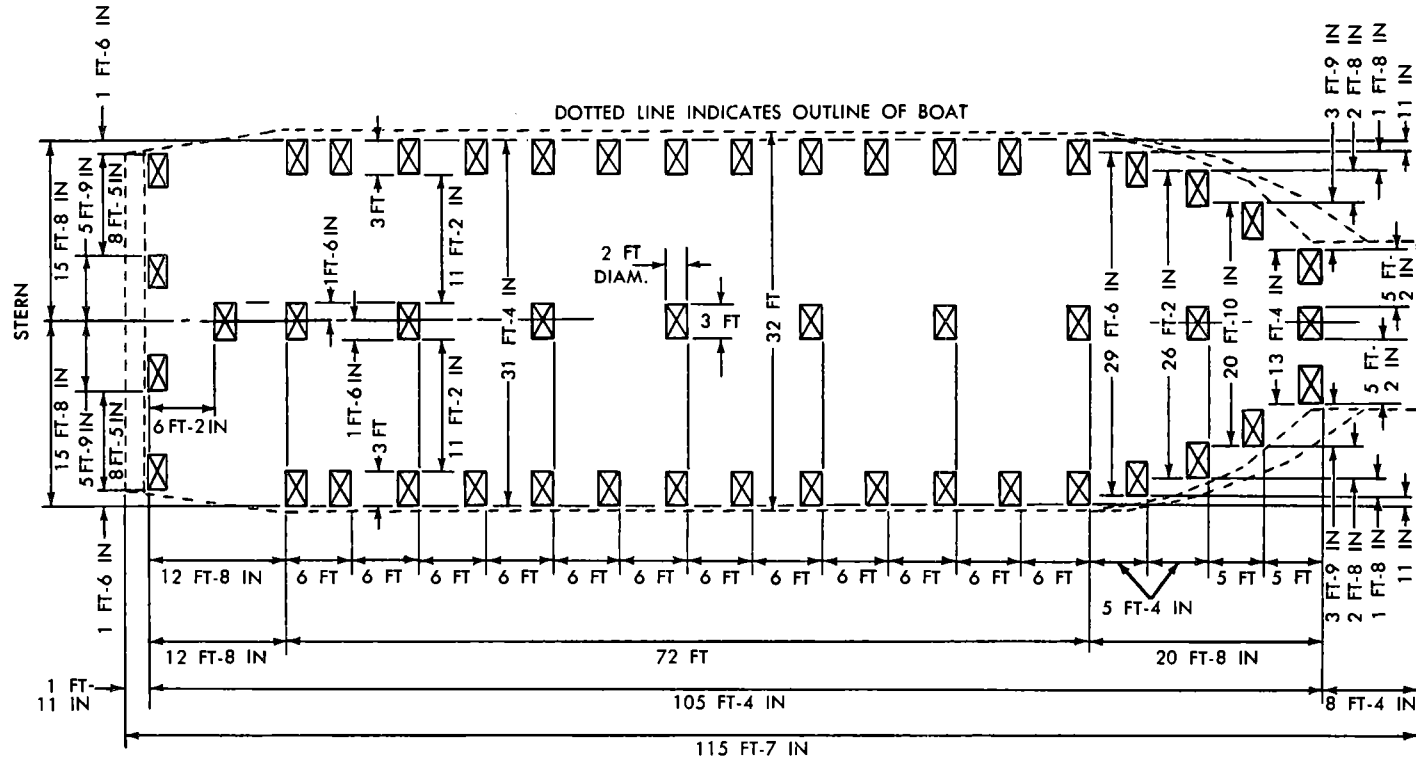
**2—TOP VIEW FROM 3,000 FEET**

*Figure 49. Simulated LSU.*

*(b) Superstructure:*

- 1,300 linear feet of 2- by 4-inch lumber
- 400 linear feet of 1- by 6-inch lumber
- 8,000 square feet of osnaburg
- 140 gallons of oleoresinous paint

- (3) Figure 50 shows the details of the oil-drum flotation system layout for the LSU.
- (4) Figure 51 gives the plans and details of construction at deck level.



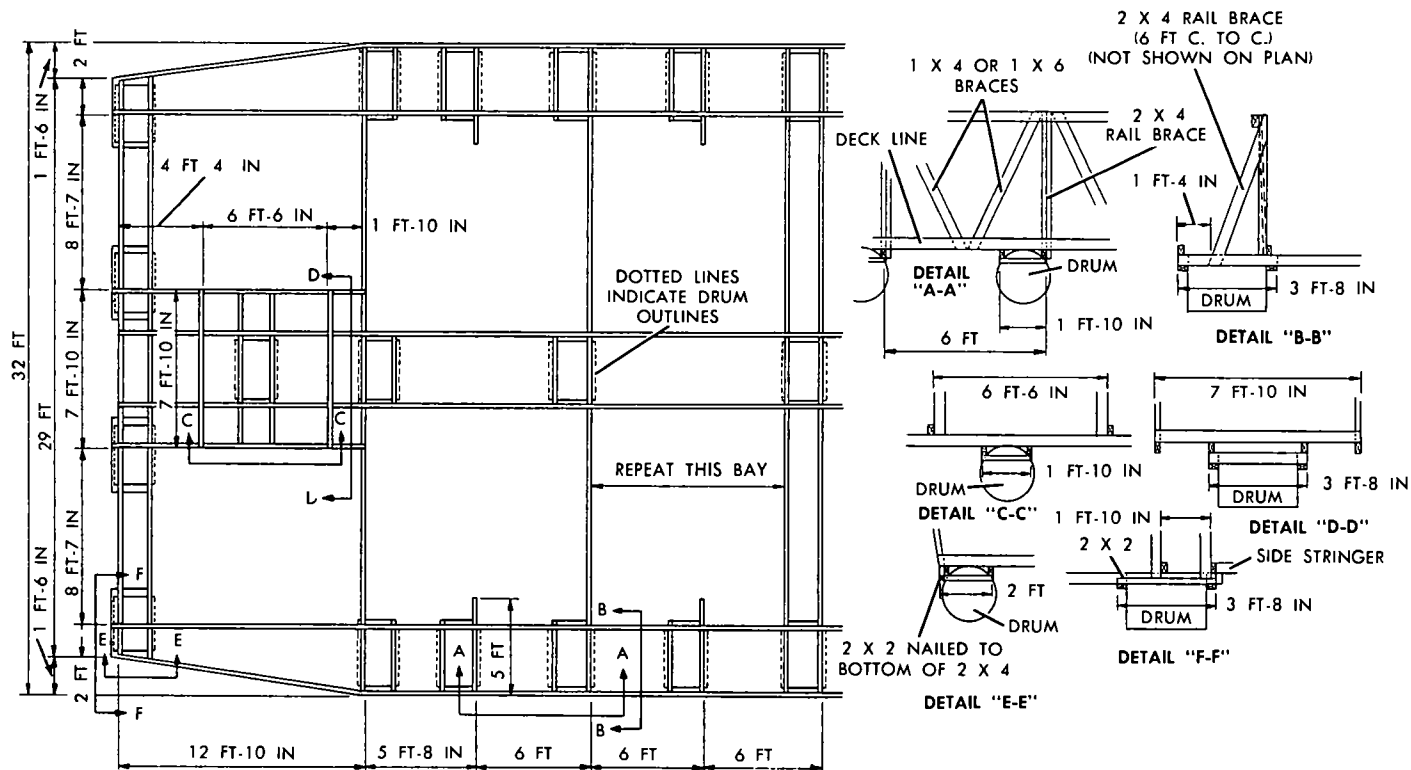
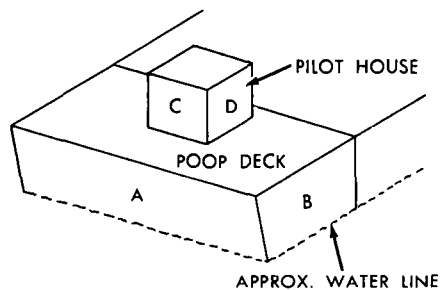


Figure 51. Plan and details of construction at deck level.



DIAGRAMMATIC SKETCH  
SHOWING ELEVATIONS  
NO SCALE

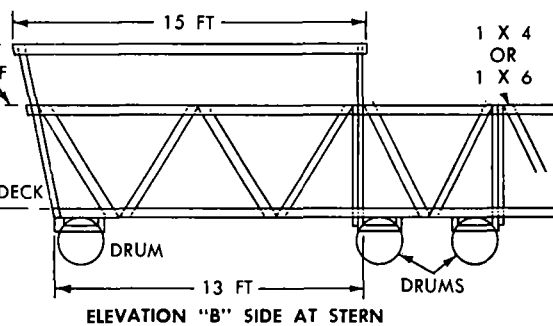
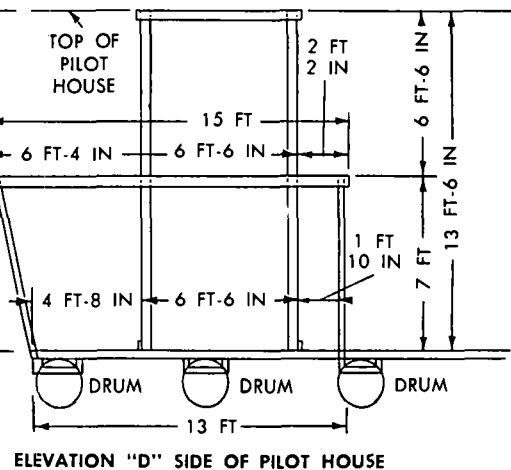
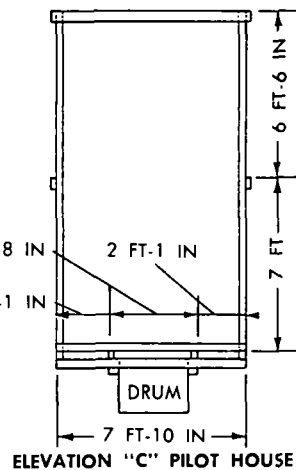
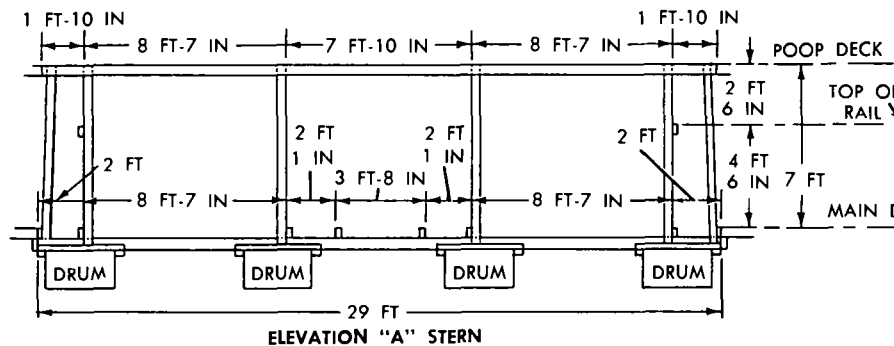


Figure 62. Details of stern superstructure.



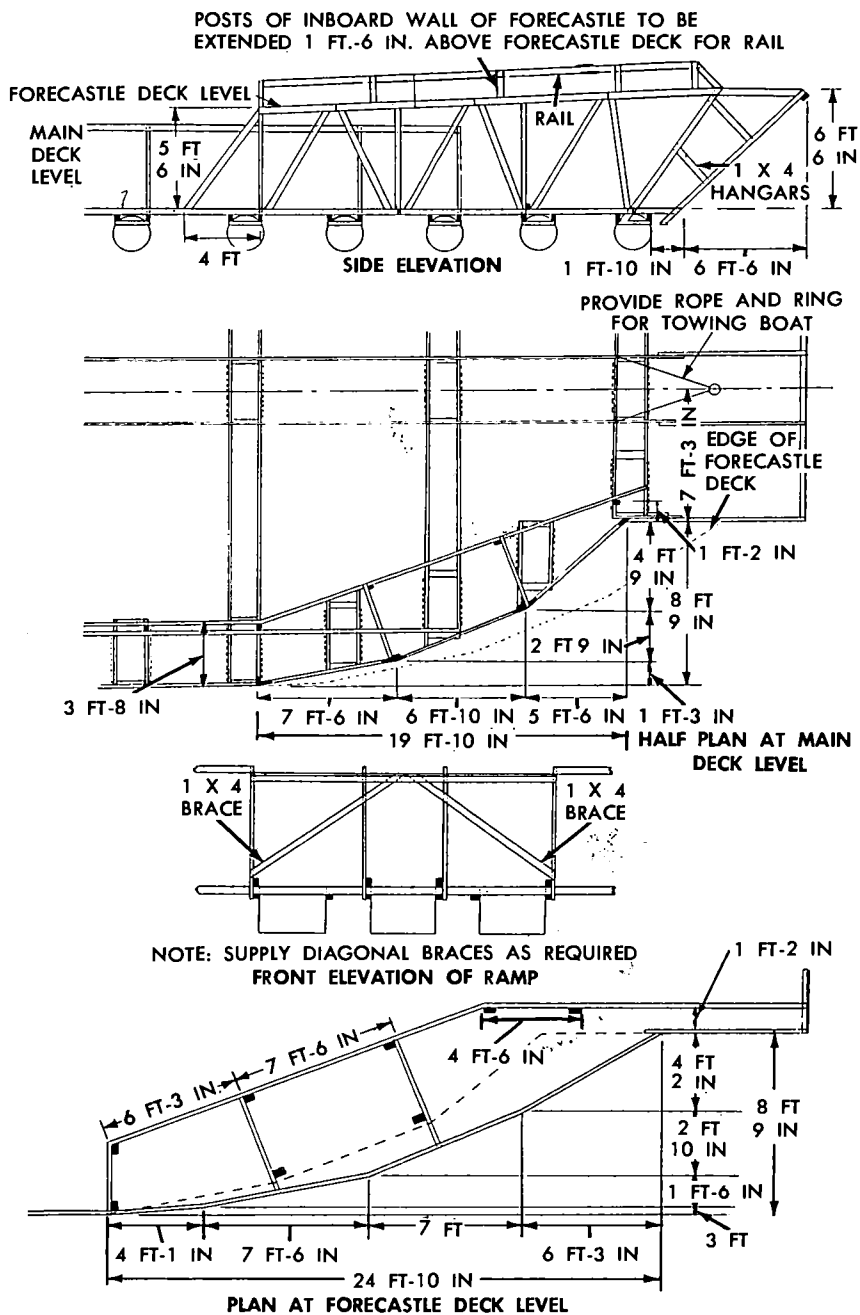
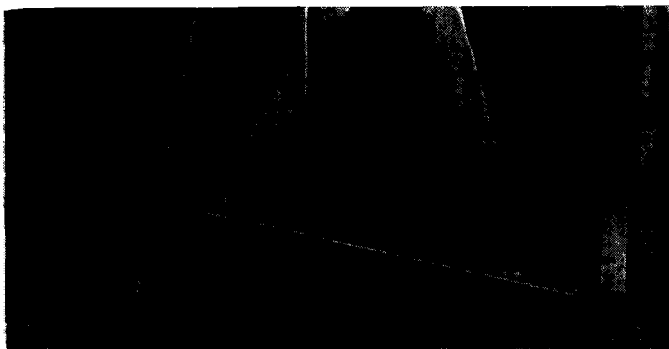


Figure 53. Details of bow superstructure.



1—DETAIL OF 55-GAL. DRUM IN CRADLE. ONE PIECE OF ROPE IS NECESSARY FOR SECURING BARREL AND SAVING IT FROM SINKING SHOULD IT DEVELOP A LEAK.



2—DETAIL OF FLOTATION SYSTEM AT CENTER LINE OF CRAFT. NOTE DIAGONALS OF NO. 10 WIRE.



3—CENTER FLOTATION SYSTEM. IT IS ADVISABLE TO LEAVE A CAT-WALK DOWN THE CENTER FOR ADJUSTING OF CARGO EFFECTS AND PAINTING DURING LATTER PART OF CONSTRUCTION.

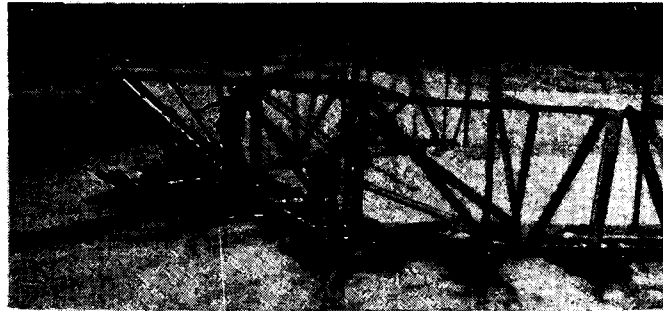


4—DETAIL OF SIDE RAIL.

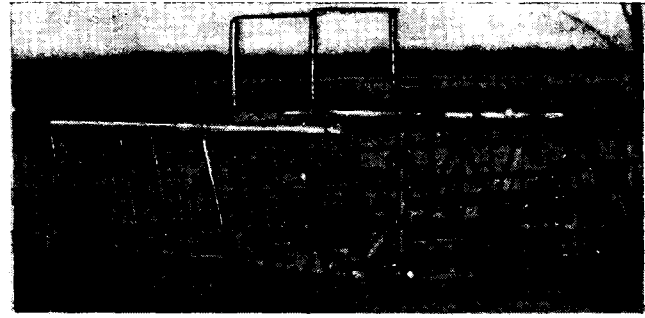
Figure 54. Construction details for simulated LSU.



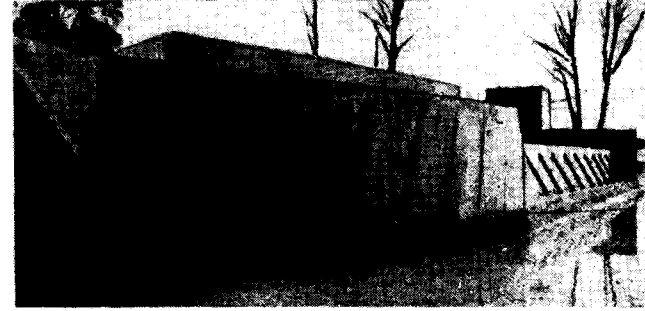
5—SIDE RAILING DETAIL ON FLOTATION SYSTEM. TEMPORARY WOOD DIAGONAL BRACING MAY BE NECESSARY DURING THE ASSEMBLY.



7—BOW FRAMING. CLOTH COVERING WAS APPLIED TO THE STERN SECTION FIRST, THE MAIN DECK SECOND, THEN THE SIDE RAILS AND LAST THE BOW. ATTENTION IS CALLED TO THE BOW FRAMING MEMBERS.



6—STERN FRAMING. THE STERN SUPERSTRUCTURE WAS ERECTED BEFORE WORK COMMENCED ON THE BOW, AND CLOTH COVERING APPLIED TO THE WHEEL HOUSE WHILE IT WAS CLOSE TO SHORE AND EASY TO REACH.



8—PORT BOW. UNEVEN PAINT APPLICATION WHICH MAY APPEAR ON THE FABRIC COVERING IS AN ADVANTAGE. NOTE THE WEATHERED LOOK TO THE SIDE OF THE BOW.

Figure 54—Continued.

- (5) Figure 52 shows the details of construction of the stern superstructure and figure 53 shows details for the bow of the simulated LSU.
- (6) Figure 54 shows photographic details of steps in construction of the simulated LSU.

#### 64. Floating Bridges

a. *General.* Simulated floating bridges may be practicable and effective when simulated at river-crossing points. Care must be taken to make the decoy look authentic by tracks leading to both abutments of the simulated bridge.

b. *Footbridges.* An easily constructed simulated footbridge is shown in figure 55. This bridge is made of scrap lumber, wire, and nails, with grass or brush laid over the center section to resemble the pathway. Instead of grass, osnaburg may be rolled across the simulated floats to resemble a pathway and nailed down to the framework.

c. *Simplified Ponton Bridge.*

- (1) One type of simulated ponton bridge is shown in figure 56. This bridge can be constructed by 12 men in about 8 hours. This particular simulated bridge is effective against aerial visual observation above 5,000 feet, but aerial photographs would show its falseness, particularly because of the open pontons.

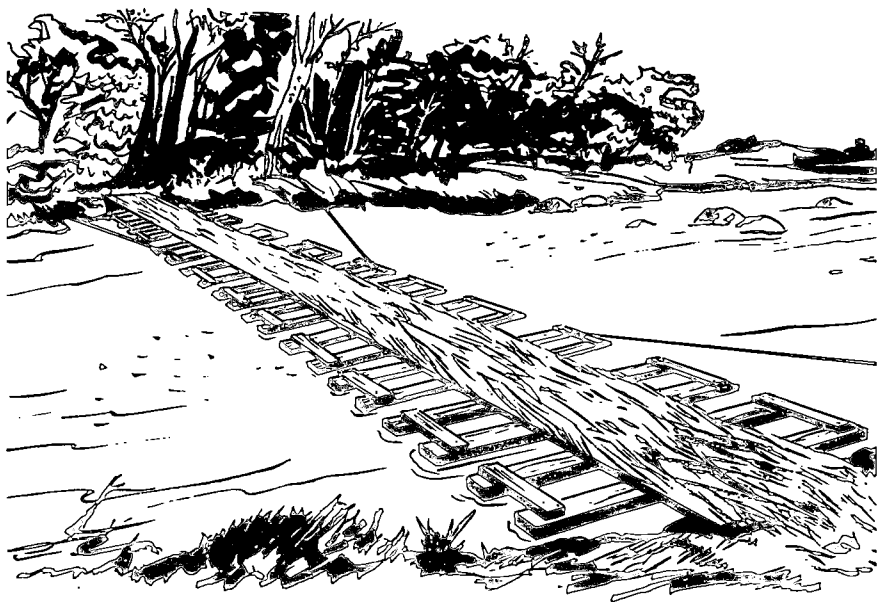
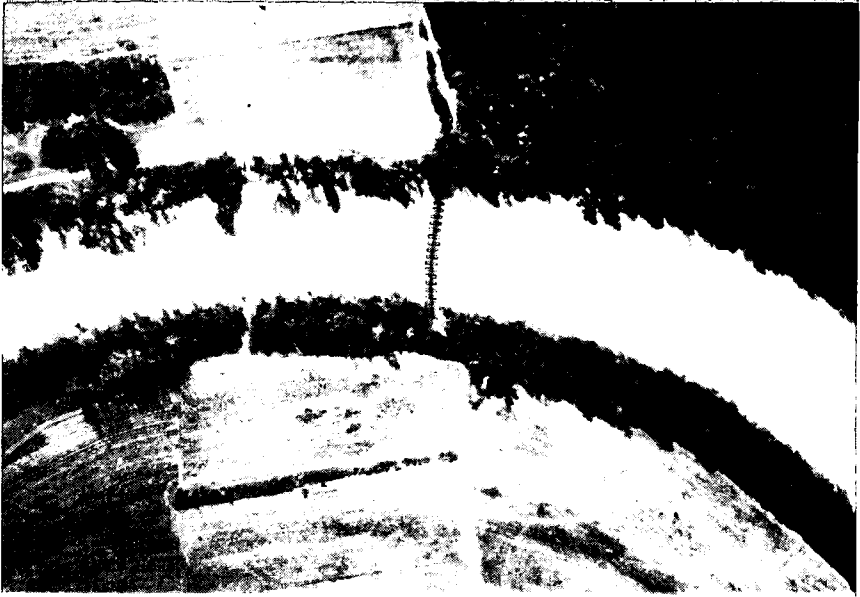


Figure 55. Simulated footbridge.



1—AERIAL VIEW AT 5,000 FEET



2—GROUND VIEW

*Figure 56. Two views of a simple ponton bridge simulator.*

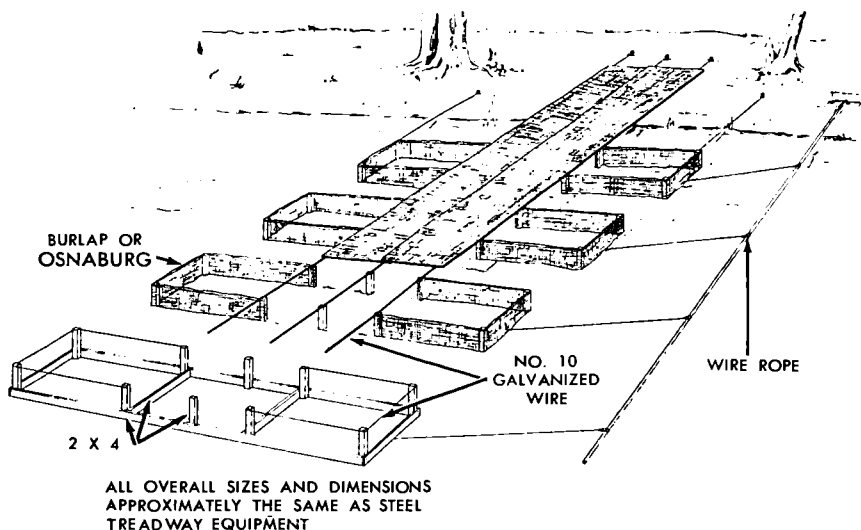


Figure 57. Construction details for a simple ponton bridge simulator.

- (2) Figure 57 shows details and plans for erecting another simulated ponton bridge. The floats are made separately and are hooked by guylines to the upstream mooring cable. Then the three wire strands are laid across the floats; osnaburg or burlap is rolled across and fastened to the floats.

*d. Elaborate Ponton Bridge.* A more realistic and stronger simulated ponton bridge is shown in figure 58. Compare the aerial and ground views of this simulated bridge with those of the simulated bridge shown in figure 56. This simulator is generally effective against aerial photographic observation down to 5,000 feet and aerial visual observation down to 3,000 feet. Because of the oil drum floats, the simulated pontons for this bridge are easily maneuvered in the water. Furthermore, the drums offer less damming action and resistance to the stream flow than the floats used for the more simplified bridge shown in figure 56.

*e. Methods of Erection of Elaborate Bridge Simulator.*

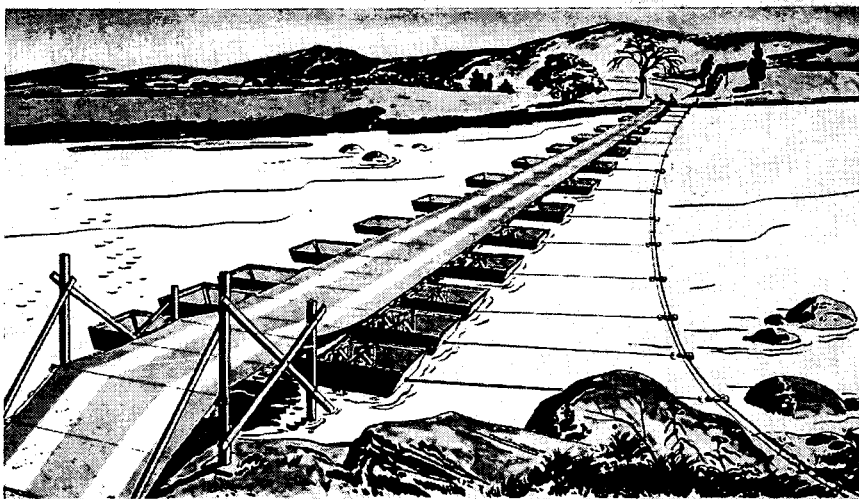
- (1) The construction area should be at a sheltered and concealed site separated from the erection point. Vehicular transport of field-fabricated pontons should be kept to a minimum.
- (2) Individual pontons and bridge floor panels should be launched and rigged by being pushed out from the shore along the final alignment of the bridge, the upstream mooring cable having first been rigged and firmly anchored. The launching and assembly crew in the stream at the water's edge will total 15 to 16 men. Eight men are required to carry and place each ponton; 4 men for each road panel. The wire lashings are made

by 2 men on each side of the bridge. Where the span is more than 400 feet long, it is necessary to launch and assemble pontoons in units of 2 to 4 and tow them into place.

- (3) An alternate launching method for relatively short spans and moderate currents is to assemble the bridge parallel with the bank and then swing it into place. This method is not as easy or quick as the method in (2) above.



1—AERIAL VIEW (A) DECOY BRIDGE (B) REAL BRIDGE UNDER CONSTRUCTION



2—GROUND VIEW

*Figure 58. Two views of an elaborate ponton bridge simulator.*

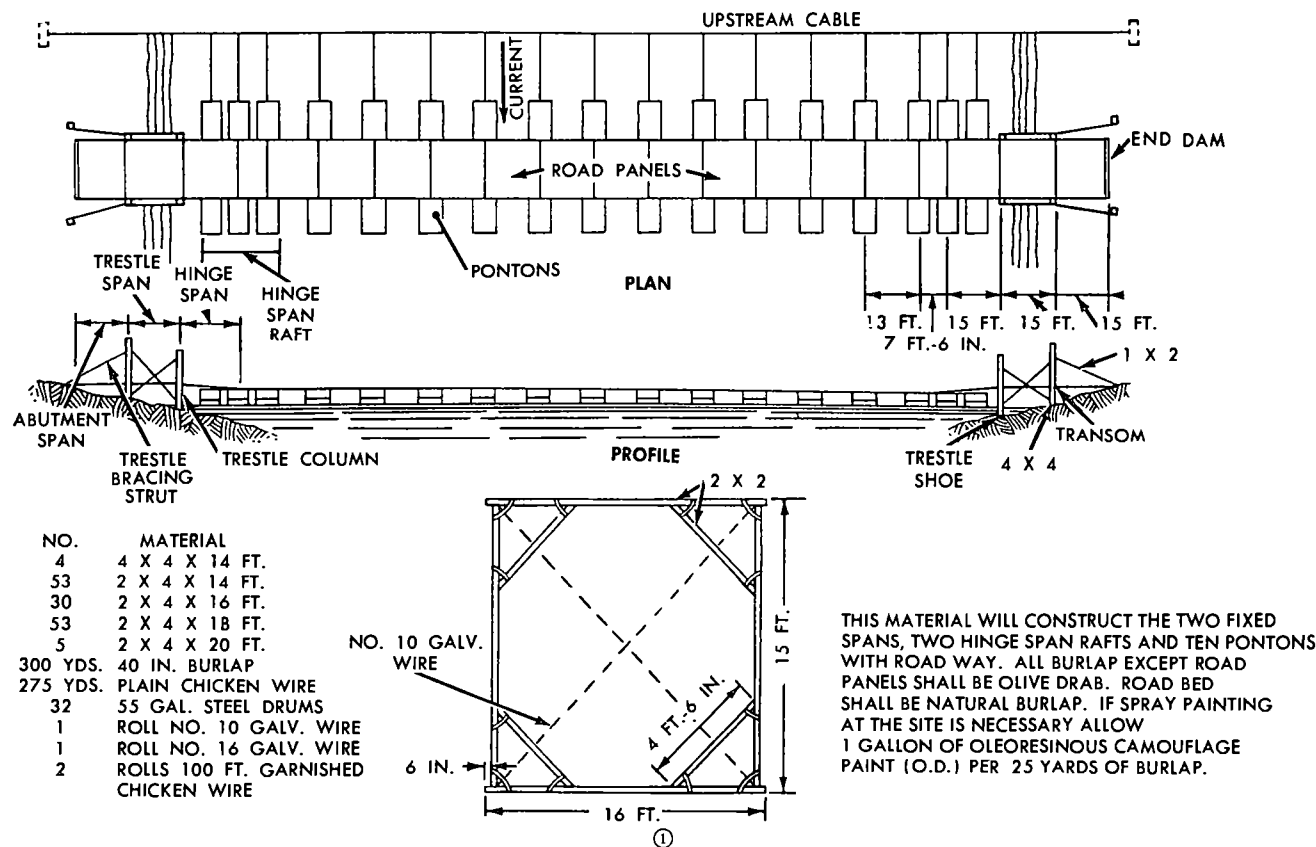


Figure 59. Details of construction of drum-float ponton bridge simulator.



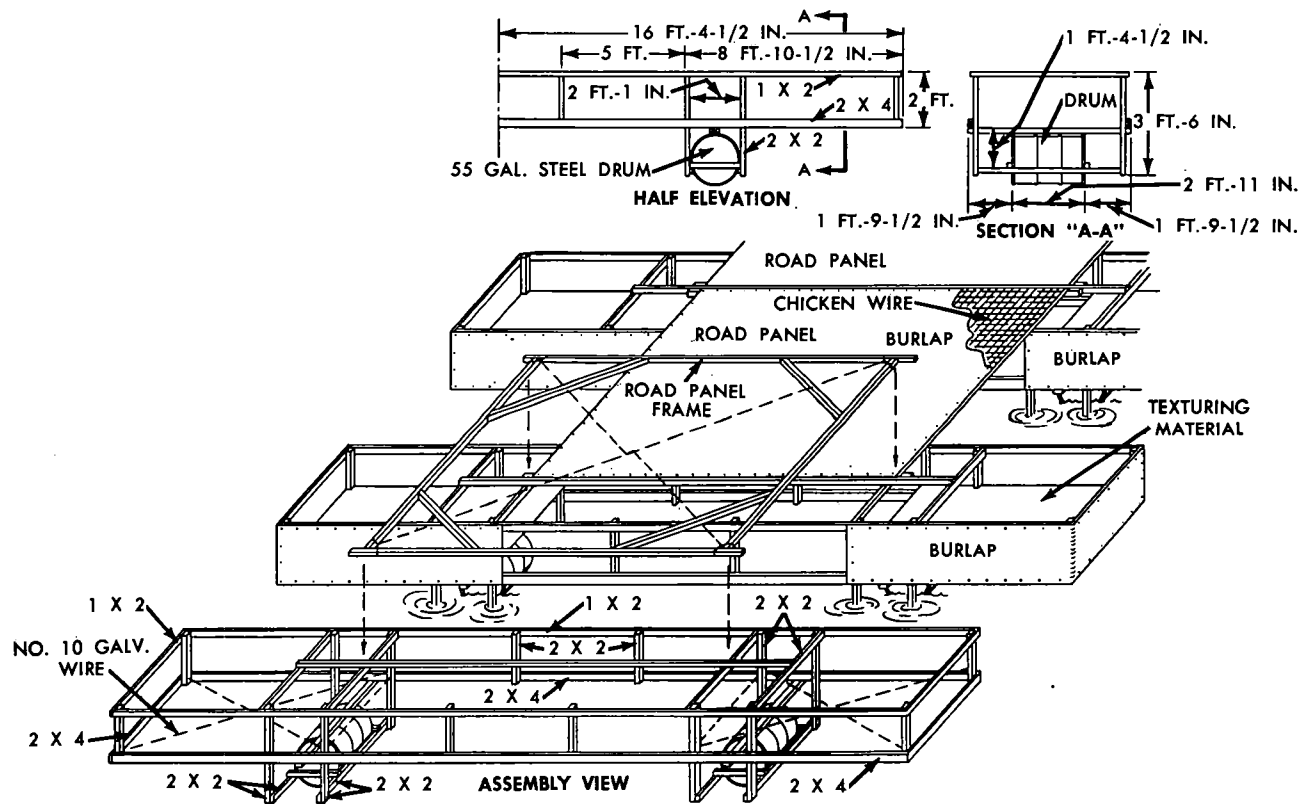


Figure 59—Continued.

- (4) Boats are required for rigging the anchor cable, towing, straightening the pontoons, and mooring the bridge to the anchor cable. Where current is reasonably strong, a heavy-duty utility boat is required. Two storm boats with outboard motors are also necessary and one or two skiffs are desirable as auxiliary craft.
- (5) Figure 59 contains the information needed for an engineer unit to construct and erect this floating bridge. Bills of materials for a typical simulated bridge unit are contained in the drawing. The drawing of the shore pontoons requires no further explanation. The materials used are usually available in engineer dumps. With the exception of the auxiliary launching craft, the bridge can be constructed with engineer combat battalion TOE equipment.

*f. Development of Decoy Bridge Site.* Figure 60 illustrates the development of a decoy bridge and figure 61 shows the development of decoy bridge sites in several types of terrain.

## **65. Buildings**

*a. Houses.* The construction of simulated houses is frequently practicable.

- (1) *Two-dimensional building.* Figure 62 shows the plans and color scheme for simulating a building by painting on burlap or other cloth material, and an aerial view showing the effectiveness of this simulator device from an altitude of 3,000 feet.
- (2) *Three-dimensional house.* Figure 63 shows a ground view of a three-dimensional simulated house constructed of a frame of lumber covered with garnished chicken wire. The roof frame is elevated above the ground at least 4 to 5 feet so that a real shadow is cast. Painted canvas or osnaburg is nailed to the frame around the base of the roof supports to give the appearance of sides when seen from the air.
- (3) *Simulated house for concealing aircraft.* Figure 64 shows a simulated house suitable for concealing fighter or reconnaissance aircraft. The side of the building most often in shadow is left uncovered for entry and exit of the aircraft. The framework for this building may be made entirely of lumber or saplings. No. 10 wire is used to reinforce the sides and roof. The roof and the walls may be covered with any available material.
- (4) *Simulated shack with rolling roof.* The type of simulated building shown in figure 65 with a sliding roof is suitable for camouflaging antiaircraft gun positions. It is easily constructed of 2- by 4-inch lumber, chicken wire, No. 10 wire, and osnaburg.

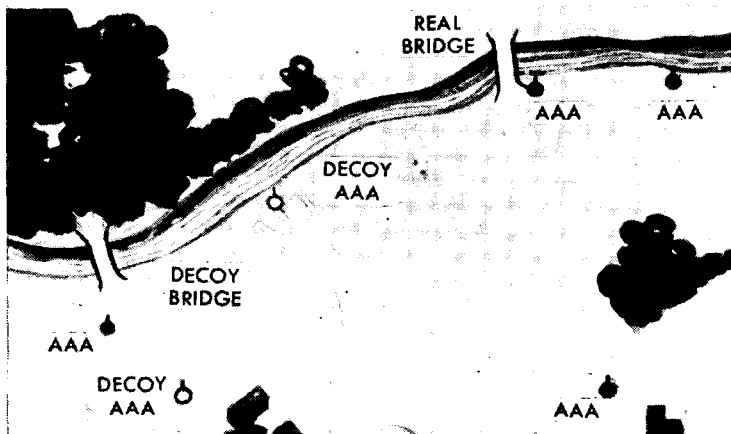
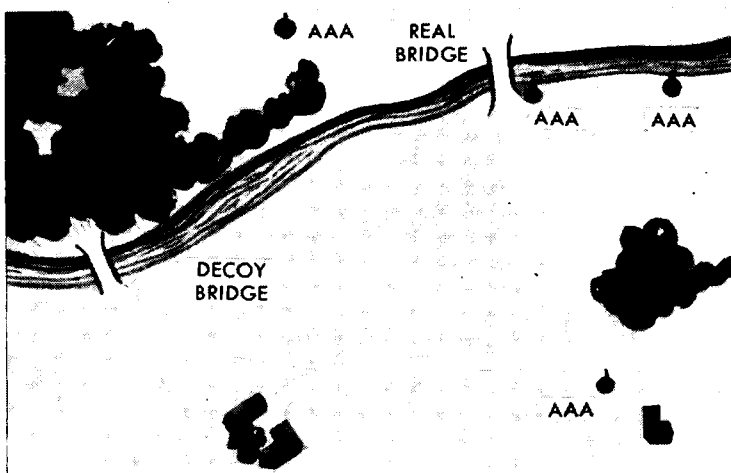
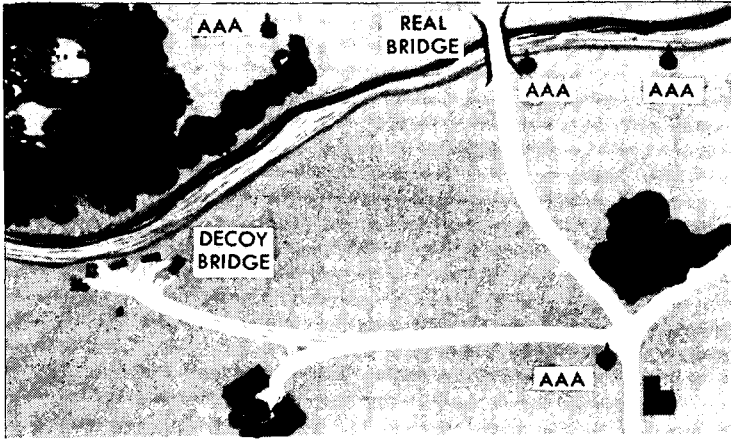


Figure 60. Development of a decoy bridge.

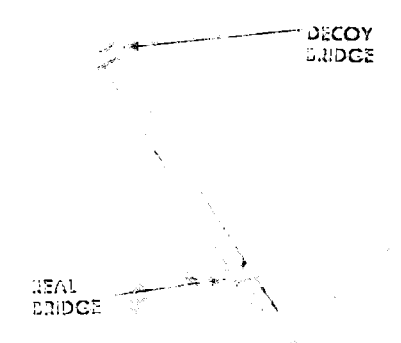
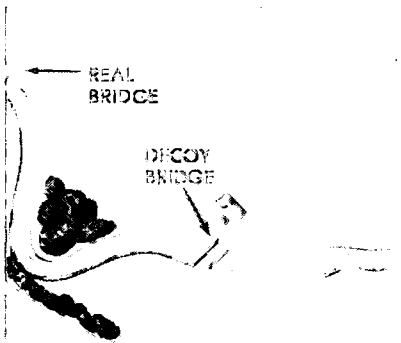
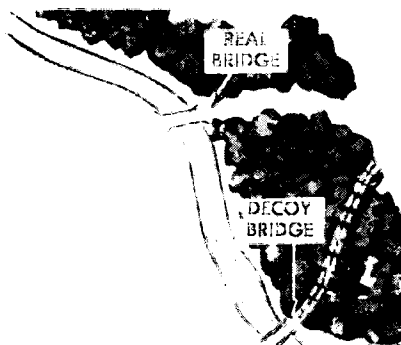
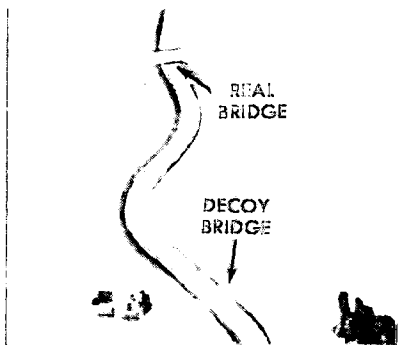
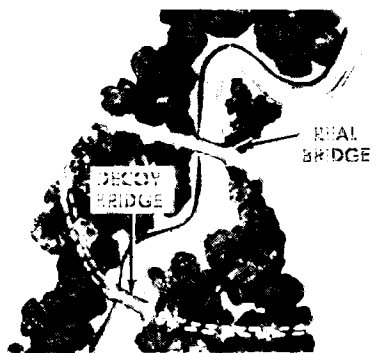
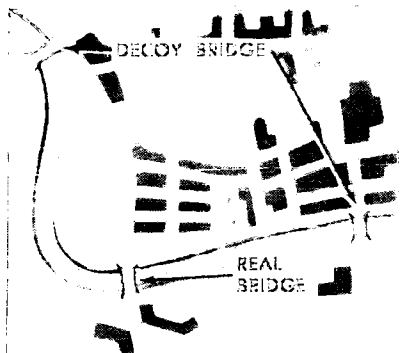
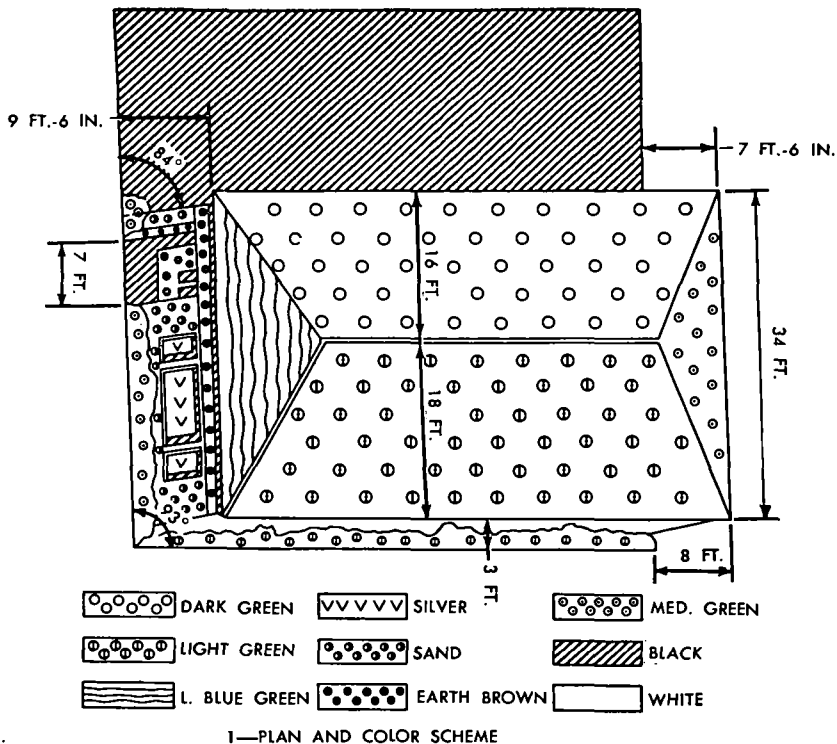


Figure 61. Positioning of decoy bridges.



2—AERIAL VIEW FROM 3,000 FEET

Figure 62. Two-dimensional simulated house made by painting on a cloth background.

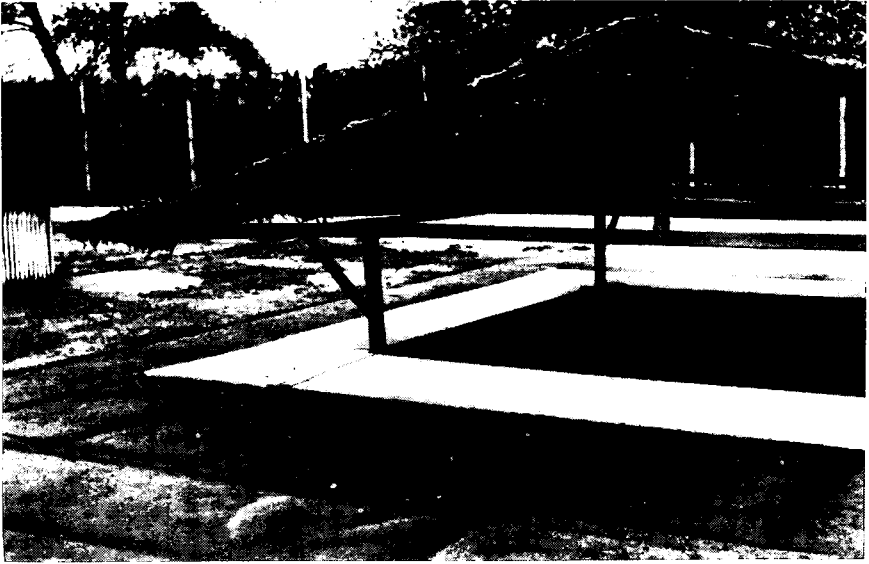


Figure 63. Three-dimensional simulated house.

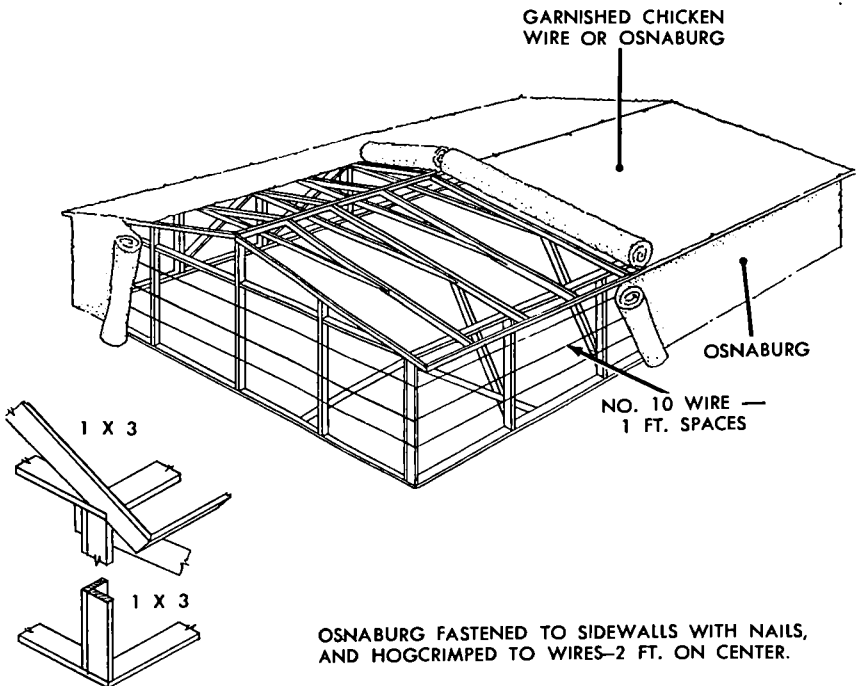


Figure 64. Simulated house for concealing aircraft.

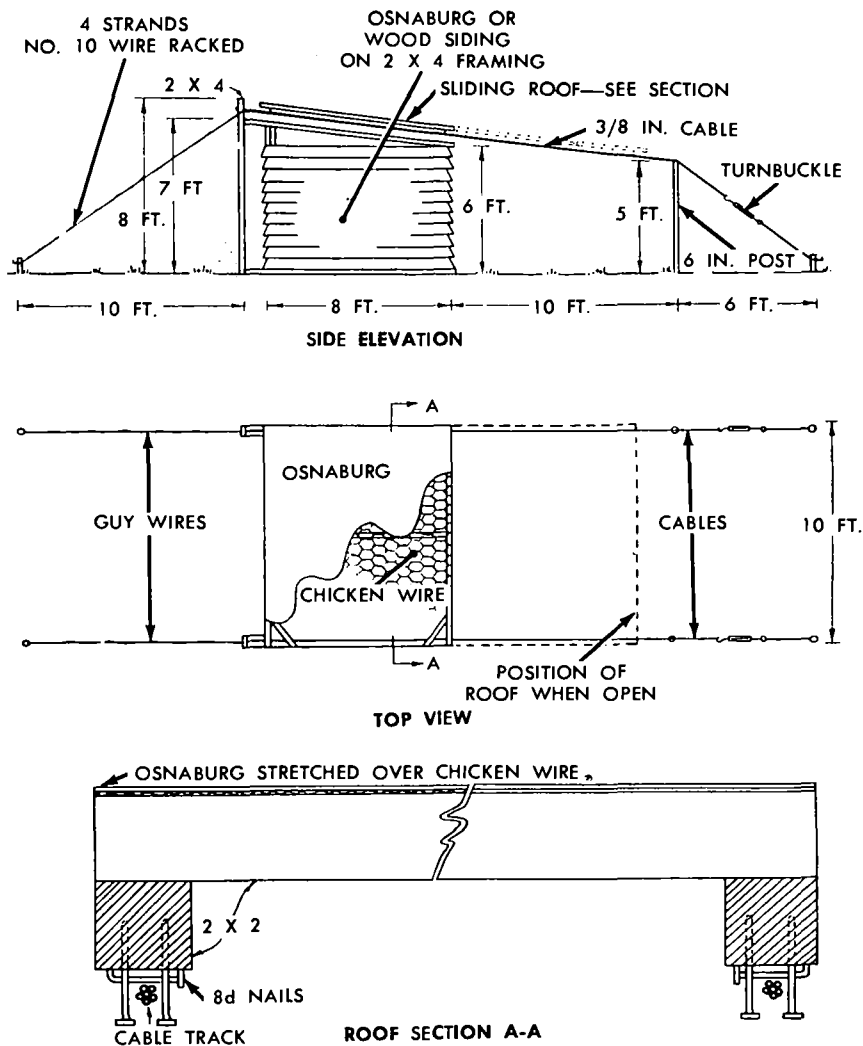


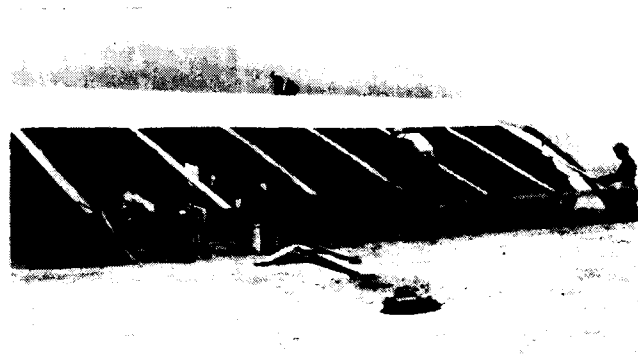
Figure 65. Simulated shack with rolling roof.

#### b. Warehouses.

- (1) Simulated warehouse buildings are practicable both in drawing enemy attacks and in reducing high-priority targets to lower priority targets. They are particularly practicable in barren country where all types of military activity are difficult or impossible to conceal. Figure 66 shows types of simulated warehouses and a simulated warehouse concealing a messhall. These simulated warehouses consist of cut or uncut lumber framework covered with painted osnaburg or burlap.



1—DUMMY TYPE OF WAREHOUSE



2—DUMMY CONVENTIONAL TYPE WAREHOUSE



3—DUMMY WAREHOUSE CONCEALING MESSHALL

Figure 66. Types of simulated warehouses.



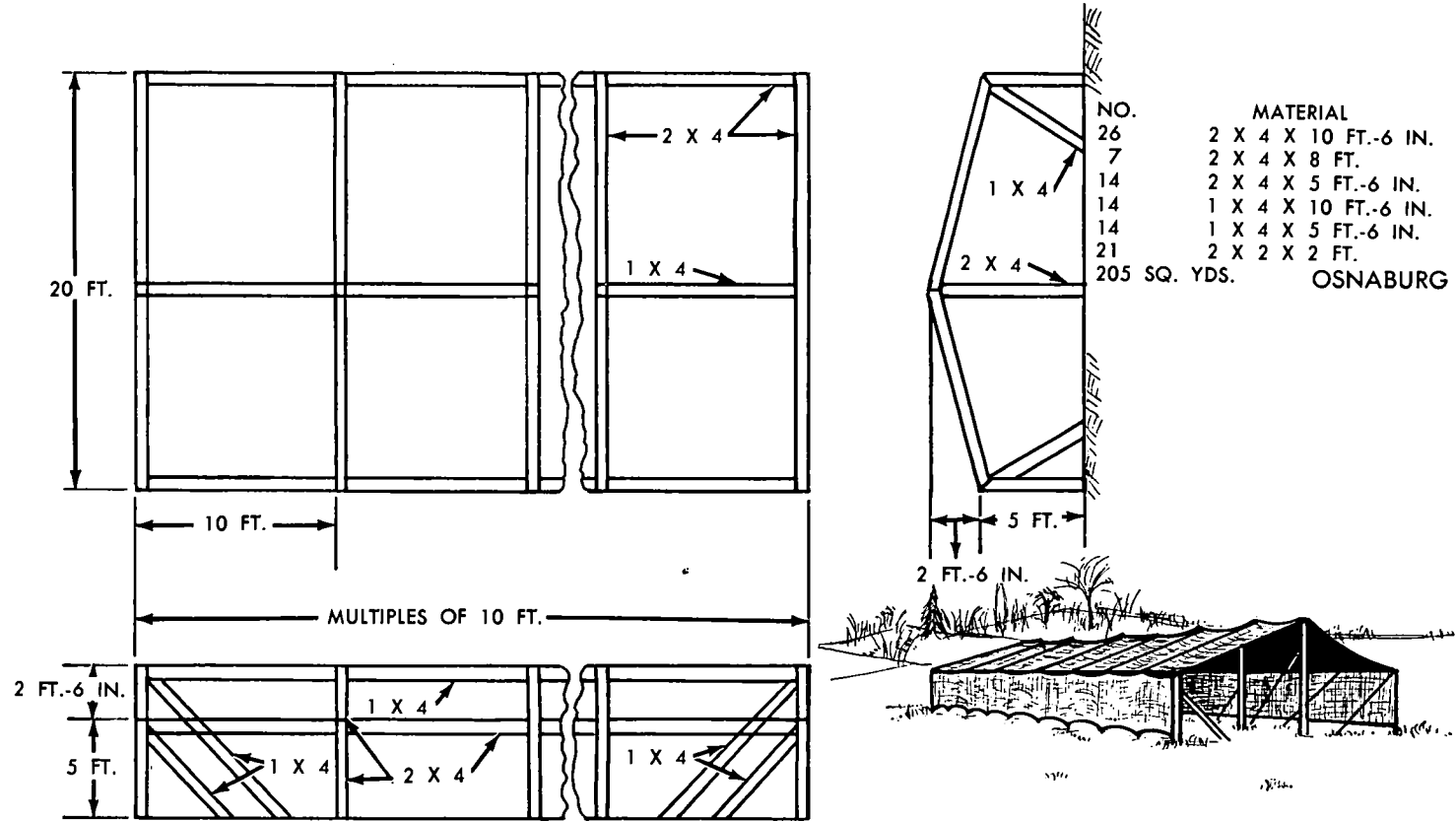


Figure 67. Three-dimensional simulated building.

- (2) Figure 67 gives details and bill of materials for constructing a simulated building which would serve as a simulated warehouse, garage, or other typical building on an airfield or other military installation.

*c. Tents.*

- (1) The plans and bill of materials for constructing a simulated shelter tent are shown in figure 68, for a simulated kitchen fly in figure 69, and for a pyramidal tent in figure 70.
- (2) Two pyramidal tents may be camouflaged by constructing a framework over them to resemble a shed, as shown in figure 71.

## 66. Decoy Damage Simulation

*a. Simulating Damage to Buildings.* Figure 72 shows the steps in revealing simulated damage to a building before, during, and after an

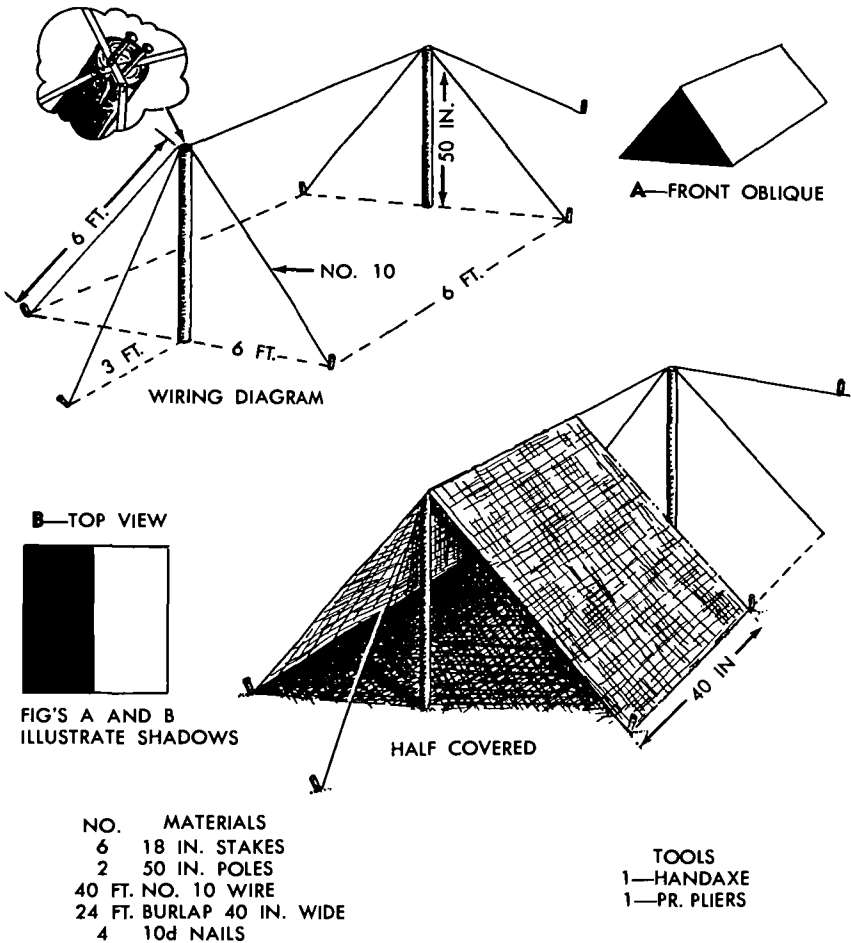


Figure 68. Simulated shelter tent.

enemy air attack. Notice in figure 72 step 1 that salvaged material and prepared decoy damage are neatly stacked to appear as part of the wall. Figure 72 step 2 shows how, during the attack, large pieces of painted cloth are draped over the walls to simulate bomb damage, salvaged material is strewn about, and smoke pots have been started. Figure 72 step 3 shows that during the night the "damage" is made more lasting by painting simulated bomb holes in buildings and making holes in the ground to replace pieces of painted cloth.

b. *Simulating Damage to Bridge.* The same procedure described above may be followed on bridges. Figure 73 ① shows a bridge with false damage prepared in readiness for enemy attack. Part of the side railing has been removed to stack debris and salvaged material. This material

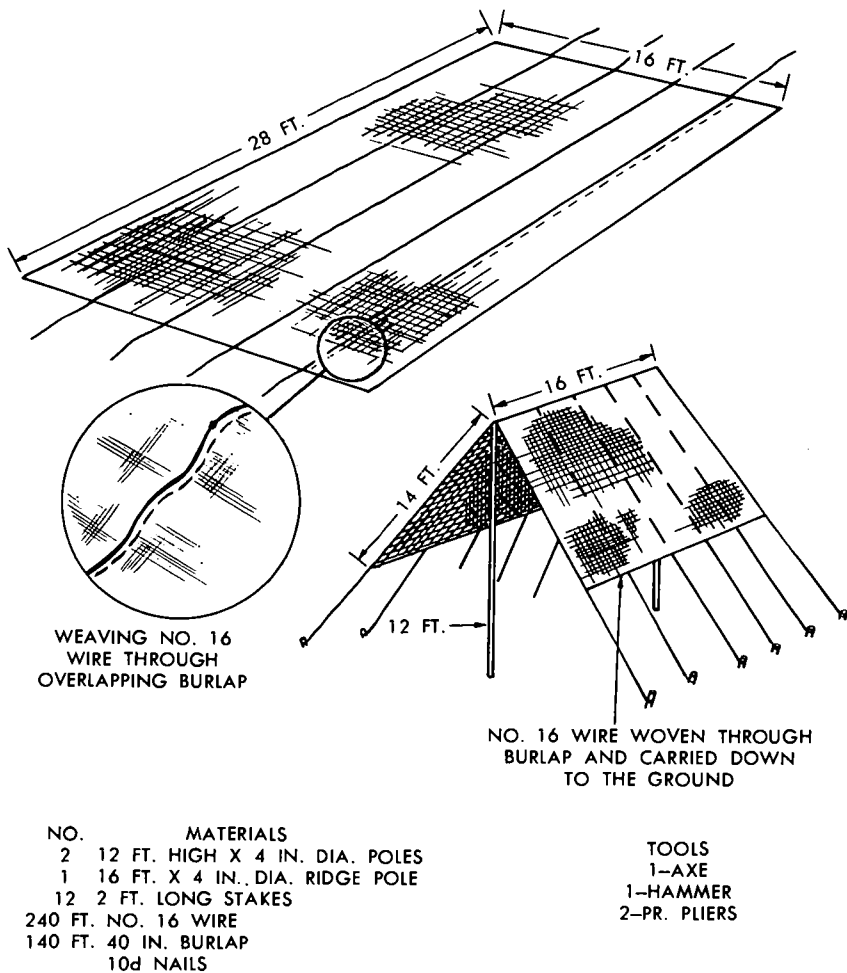
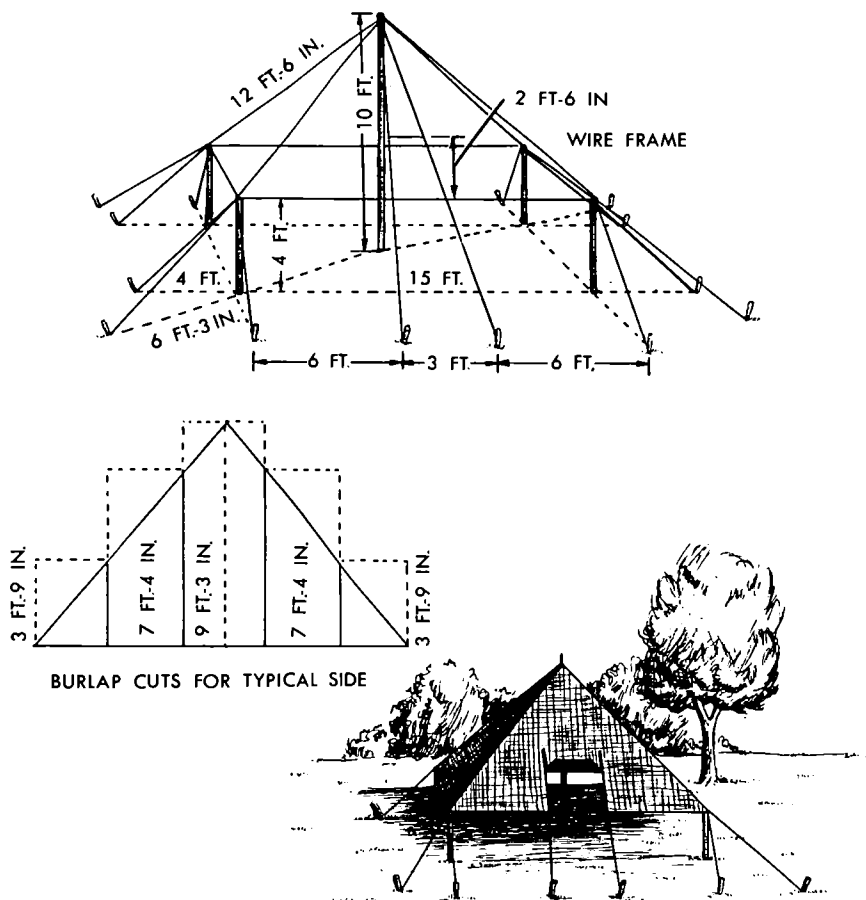


Figure 69. Simulated kitchen fly.



NO.	MATERIALS
2	40 FT. NO. 10 WIRES-DIAGONALS
1	40 FT. NO. 10 WIRE-DOOR FR.
4	25 FT. NO. 10 WIRE-SIDES
	NO 16 WIRE FOR TYING AND SEWING
8	4 FT.-40 IN. OSNABURG
8	8 FT.-40 IN. OSNABURG
4	10 FT.-40 IN. OSNABURG
14	2 FT. STAKES OR POLES
1	10 FT. STAKES-4 IN. DIA.
4	5 FT. STAKES OR POLES

#### FINISHED VIEW

TOOLS
3-MAULS
1-CROSSCUT SAW
1-HANDAXE
2-AXES
2-PR PLIERS
2-HAMMERS
NAILS & STAPLES

REMARKS: PLACE IN SUCH A POSITION THAT MAXIMUM LIGHT STRIKES TENT. DOORWAY SHOULD BE LEFT VISIBLE. A POSSIBLE ASSET TO DECEPTION WOULD BE DUMMY LAUNDRY AND TRACKS. ERECTION OF TENTS NEXT TO WOODS COULD ELIMINATE PART OF STRUCTURE.

Figure 70. Simulated pyramidal tent.

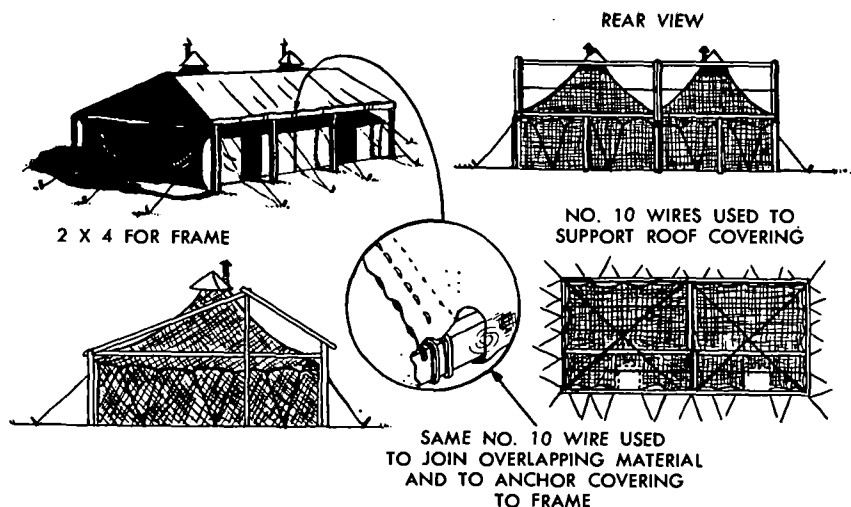


Figure 71. Two pyramidal tents camouflaged as a shed.

may also be neatly stacked along the side railing before use. Another device for simulating damage, shown in figure 73 ②, is to prepare an overhead framework of wire or cable on which debris is spread after an attack. For this type of deception to be convincing, it must appear that an alternate river crossing has been or is being prepared. Approaches to this decoy must be well worn on both banks.

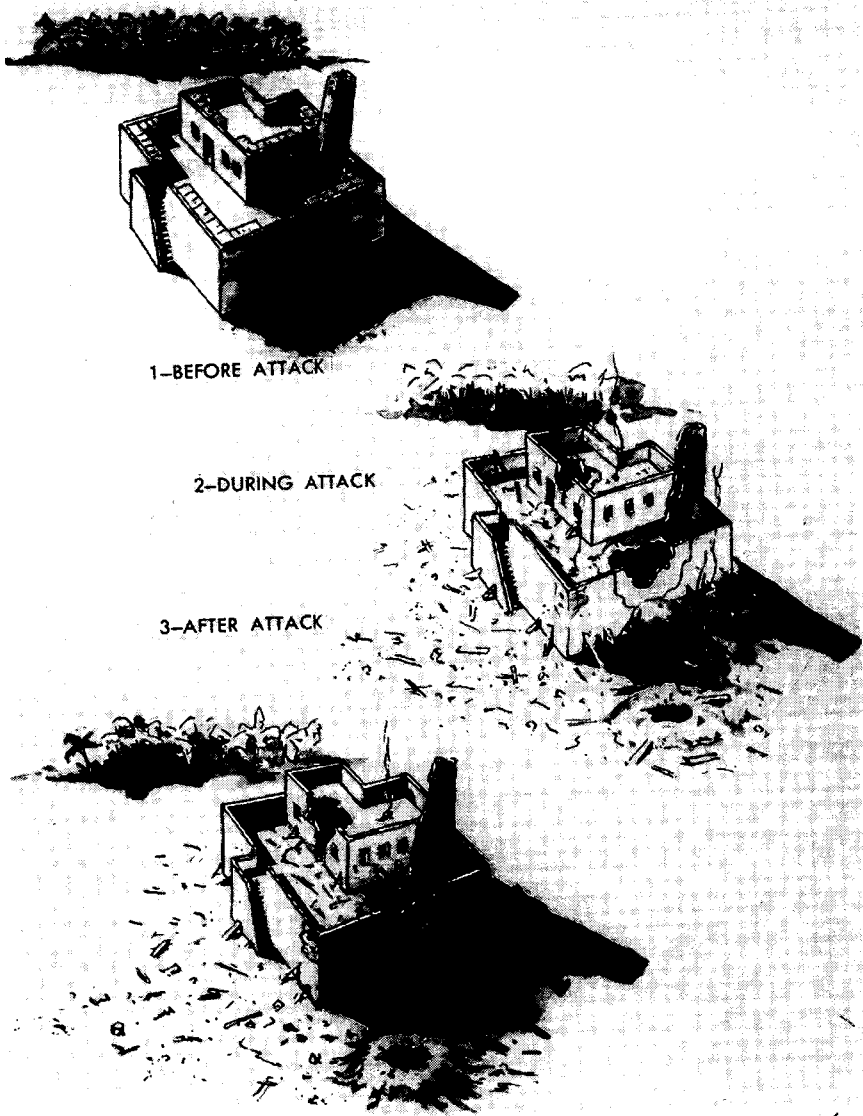
## 67. Guns

### a. Antiaircraft.

- (1) Simulated antiaircraft guns may be constructed of such local or scrap material as logs, tin cans, wire, burlap, and scrap metal. Figure 74 shows a simulated gun erected in a shellhole which has been improved to resemble an emplacement. Figure 75 shows a simulated gun in a simulated emplacement which is made of wire netting and painted cloth over a wood-and-wire framework. Figure 76 illustrates a simulated gun made entirely from salvaged cans.
- (2) Figure 77 gives the plans and bill of materials for erecting a simulated antiaircraft gun.

b. *Field Artillery.* Field artillery pieces may be simulated in the same general manner as described for antiaircraft guns. Figure 78 gives the plans and materials for constructing a simulated 105-mm howitzer. Other field artillery weapons may be constructed similarly.

c. *Machine Guns.* Machine guns can be simulated in the same general way as described for antiaircraft guns.



*Figure 72. Steps in simulating damage to a building.*

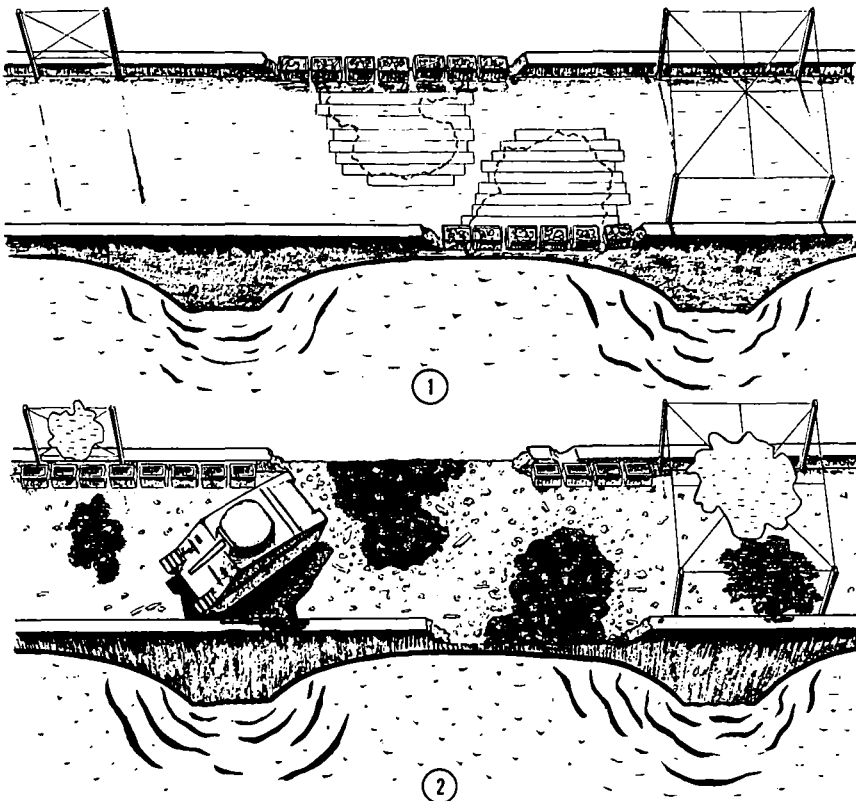


Figure 73. Decoy damage on a bridge.



Figure 74. Decoy erected in shell hole.



*Figure 75. Simulated gun in simulated emplacement.*



*Figure 76. Simulated gun made entirely of tin cans.*

## **68. Piers, Barges, and Mooring Buoys**

*a. General.* Simulated piers may be constructed in a manner similar to that described for LSU simulators (par. 63c). A typical simulated pier and barge with dummy crane are shown in figure 79.

*b. Details of Construction.* The plans and bill of materials for constructing a simulated pier are shown in figure 80. Notice that the simulated barge in figure 79 is constructed from four sections of the simulated pier.



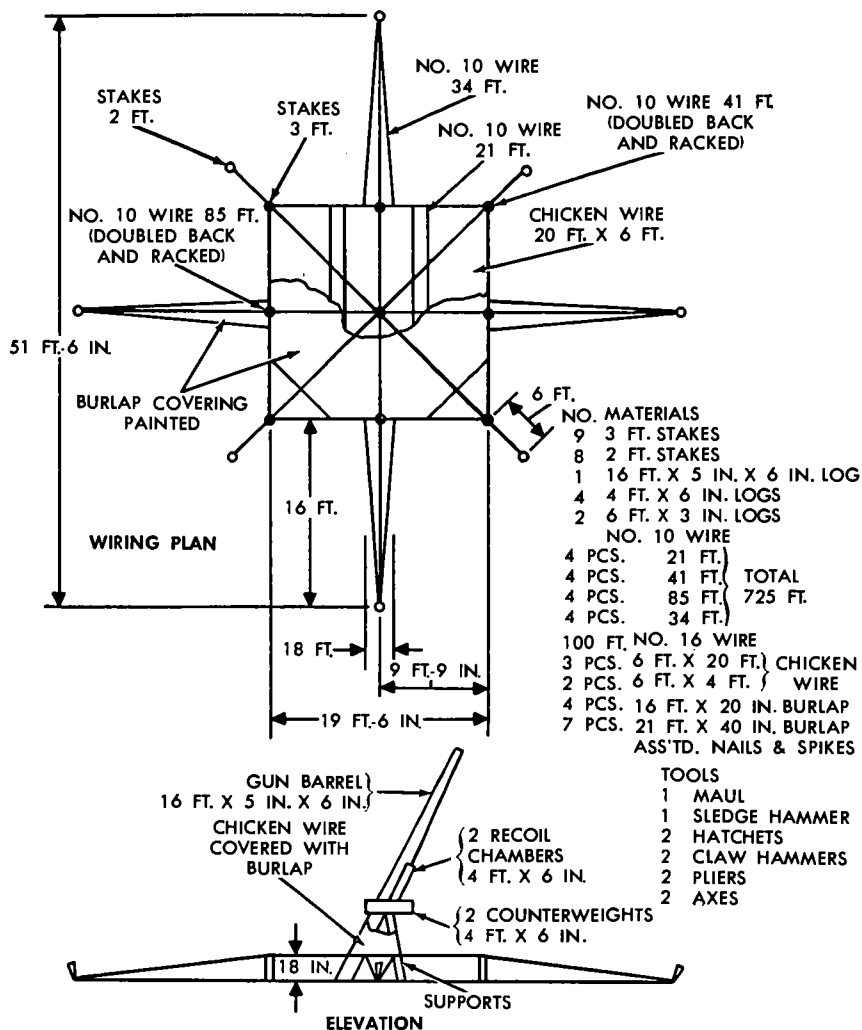


Figure 77. Plans and bill of materials for a simulated anti-aircraft gun.

c. *Mooring Buoy.* A mooring buoy is an essential part of an overall decoy dock site. The plans for constructing a simulated mooring buoy are given in figure 81.

d. *Pile Pier and Ponton Pier.* Figure 82 shows the general layout of a small base including a simulated pile pier, ponton pier, landing craft, assault boats, barge, road, trucks, and stacks of supplies near simulated warehouses.

## 69. Railroad Tracks

False railway lines may be used with simulated rear-area installations and railway artillery. Simulated rails may be constructed of various

This diagram shows the elevation view of the log skidder assembly. Key dimensions and components include:

- Overall Width:** 11 FT.
- Overall Height:** 12 FT.-2 IN.
- Log Diameter:** 6 IN.
- Log Length:** 8 IN. LOG
- Skidder Arm Length:** 3 FT.-3 IN.
- Skidder Arm Width:** 3 FT.
- Skidder Arm Height:** 6 FT.-9 IN.
- Skidder Arm Material:** BURLAP
- Labels:** (B) and (D) are circled labels pointing to specific parts of the assembly.

Side elevation drawing showing dimensions: 5 FT.-6 IN., 8 FT., 8 FT., 1 FT., 1 FT.-6 IN., 10 IN., and 11 FT.-10 IN.

SHING

LOGS

2 FT. 4 IN.

4 FT. 9 IN.

2 IN.

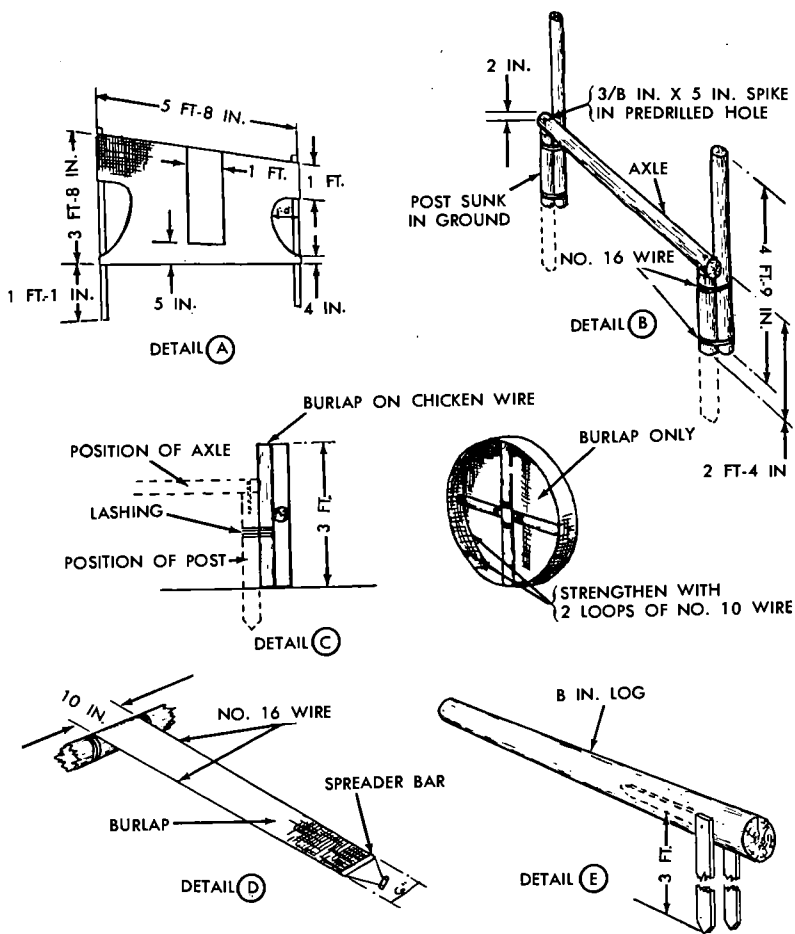
(C)

NO. 16 WIRE

A perspective view of the lashing assembly. It shows two wooden blocks, labeled 'X 2 BLOCKS', being held together by three horizontal lashing rods. A circular burlap pad is positioned between the blocks. A drift pin is used to secure the lashing rods. The entire assembly is shown from a side-on perspective.

①

*Figure 78. Plans for constructing a simulated 105-mm howitzer.*



NO.	MATERIALS
2	1 IN. X 2 IN. X 2 IN. WOOD BLOCKS
10	FT. 6 IN. WIDE CHICKEN WIRE
35	FT. 40 IN. WIDE BURLAP
50	FT. NO. 10 WIRE
70	FT. NO. 16 WIRE
4	DRIFT BOLTS
1/4	LB. Bd NAILS
2	6 IN. X 1 IN. X 2 IN. SPREADER BARS

NO.	MATERIALS
1	8 FT. X 8 IN. DIAM. LOG
1	8 FT. X 6 IN. DIAM. LOG
1	5 FT.-6 IN. X 6 IN. DIAM. LOG
1	5 FT.-9 IN. X 4 IN. DIAM. POLE (AXLE)
2	5 FT.-6 IN. X 3 IN. DIAM. POSTS (SHIELD)
4	3 FT. X 2 IN. DIAM. POLES (WHEELS)
2	3 FT. X 1 IN. X 3 IN. STAKES
2	3 FT. X 3 IN. DIAM. STAKES

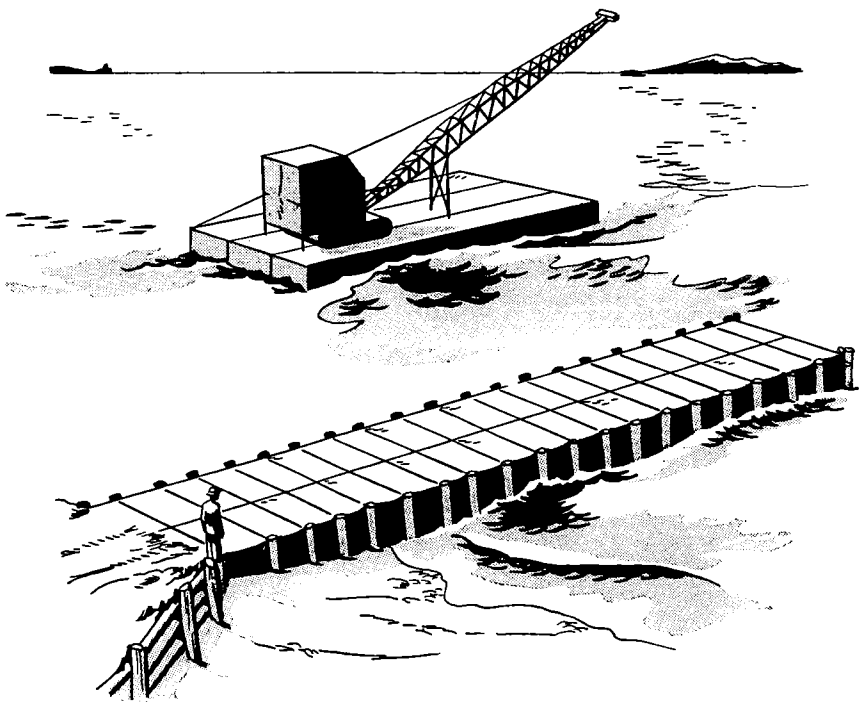
②

Figure 78—Continued.

materials as shown in figure 83. Ties may be simulated by ground painting or by lengths of scrap tin, lumber, or cardboard. If sufficient real rails are available, these may be laid end to end without joining on simulated ties. Figure 83 ① shows simulated rails of 2- x 4-lumber coated with aluminum paint on top and laid on painted ties. Figure 83 ② depicts simulated rails and ties fashioned from cans flattened and reshaped.

## 70. Trains

a. Simulated trains are constructed to add realism to a decoy rail-head, such as is described in detail in paragraph 44. The simulated train shown in figure 84 is constructed by erecting a framework of lumber and wire, covering it with burlap, osnaburg, or salvaged tenting, and then spraying it in appropriate colors. Simulated trains should not be too permanent. Lack of normal movement or shifting of cars will quickly arouse suspicion.



*Figure 79. Simulated pier and barge.*

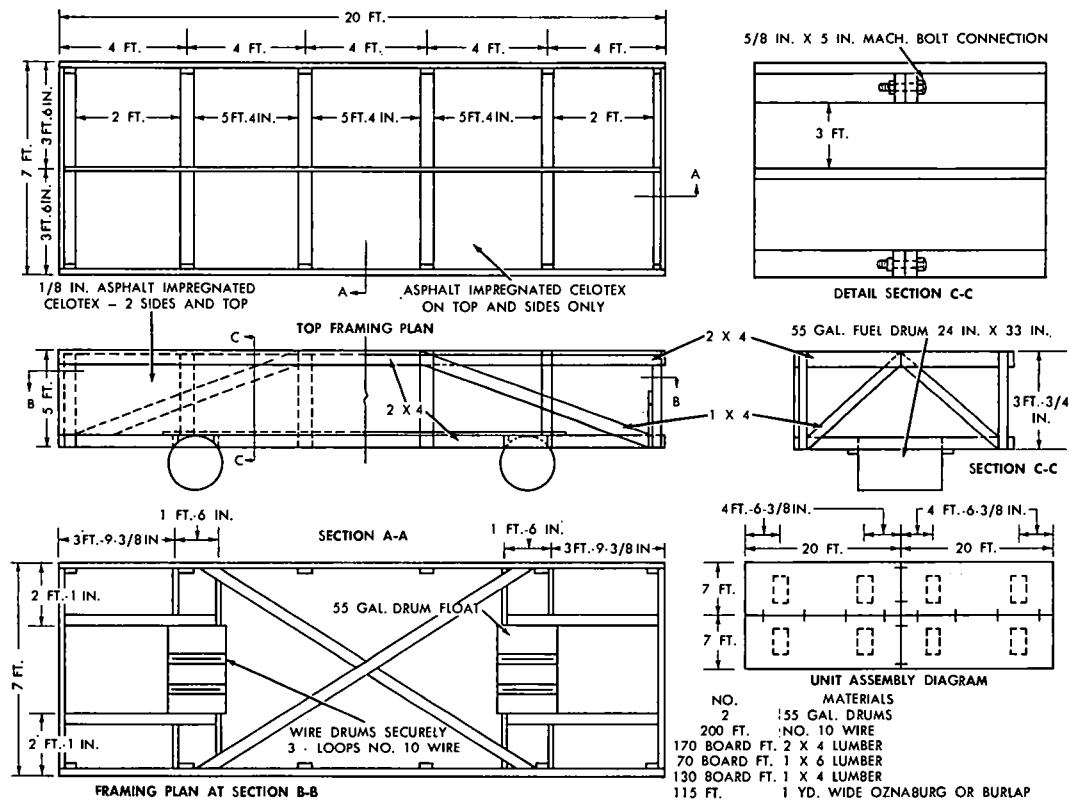


Figure 80. Plans for constructing a simulated pier and barge.

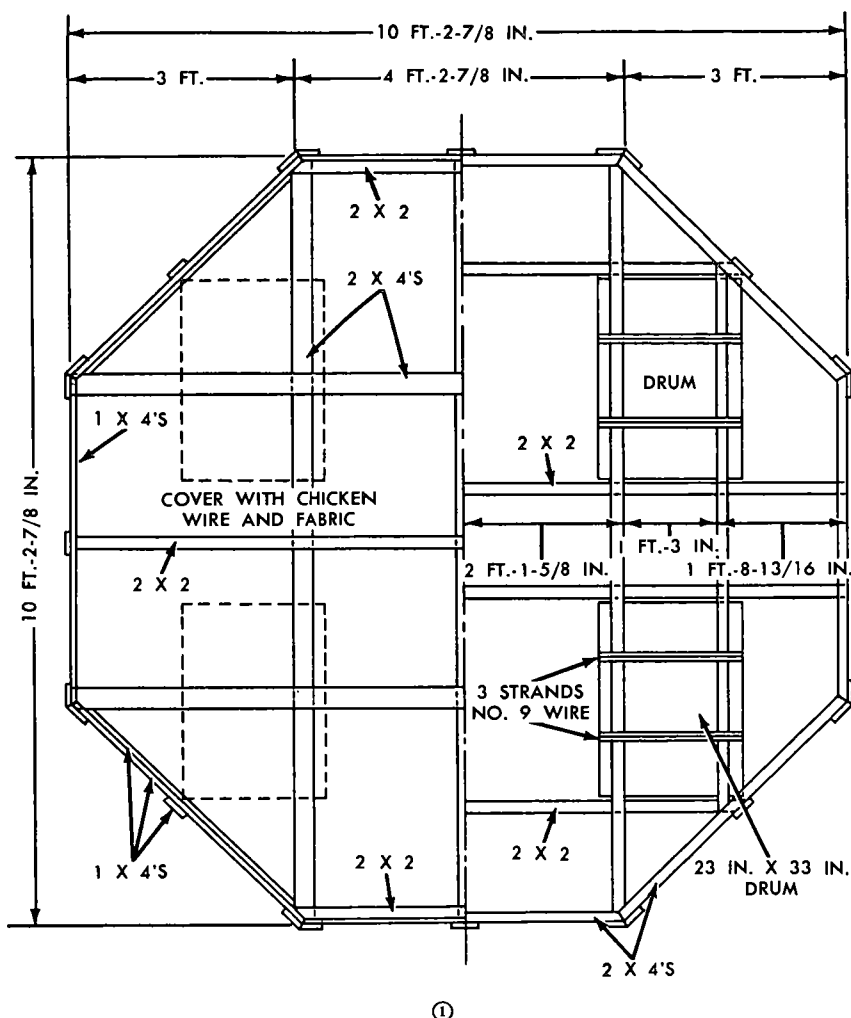


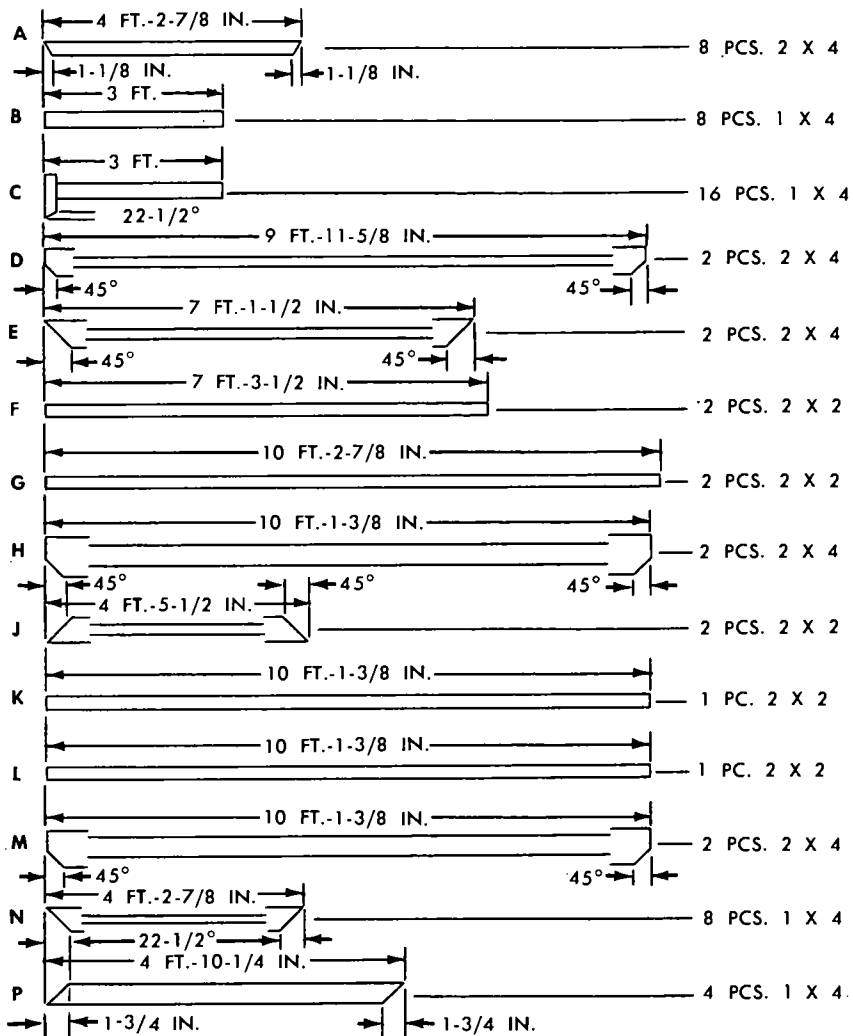
Figure 81. Plans for constructing a simulated mooring buoy.

b. For constructing a simulated train, approximate dimensions and views of current American rolling stock are shown in figure 85. All rolling stock is three feet from the rails to the bed of the car.

c. European rolling stock averages about 10 percent less in length and width but is about the same height as American rolling stock. This gives the European equipment its characteristic appearance.

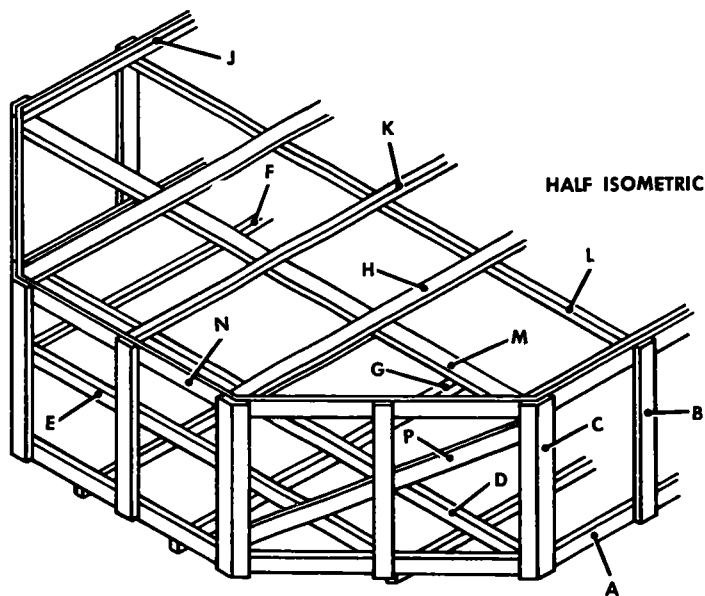
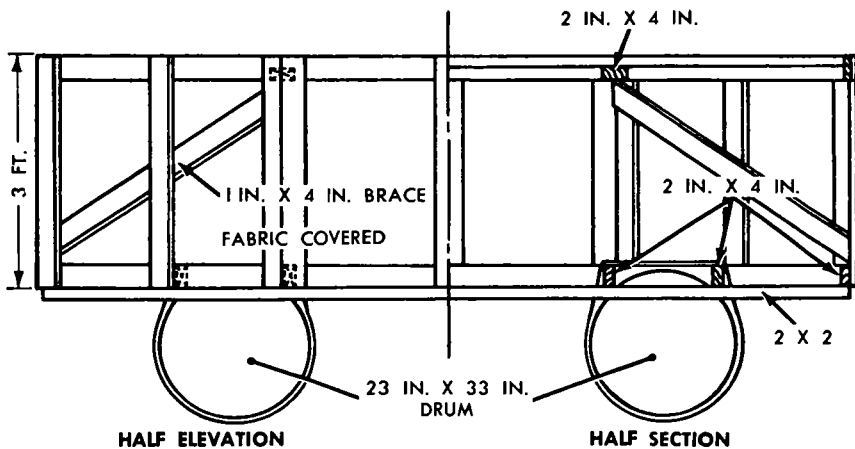
d. In constructing a simulated train it is important to take into consideration the geographical area and the types of real trains operating in the area in which the simulator device is to be erected.

# CUTTING LIST OF PIECES FOR MOORING BUOY



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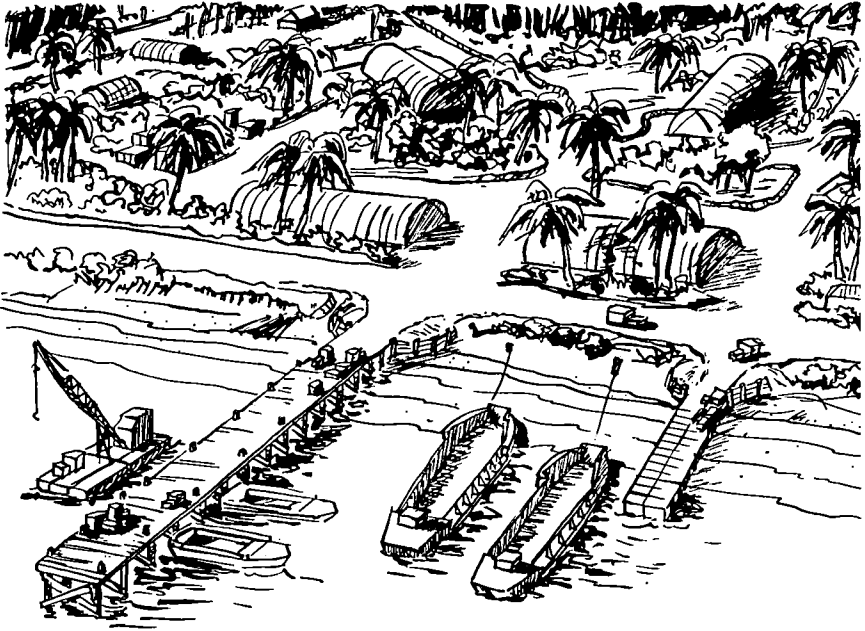
Figure 81—Continued.



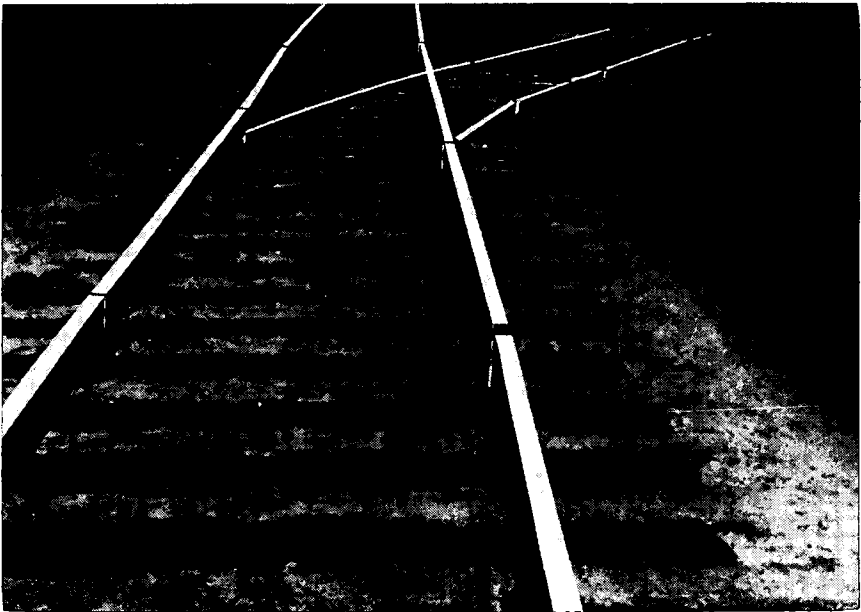
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Figure 81—Continued.



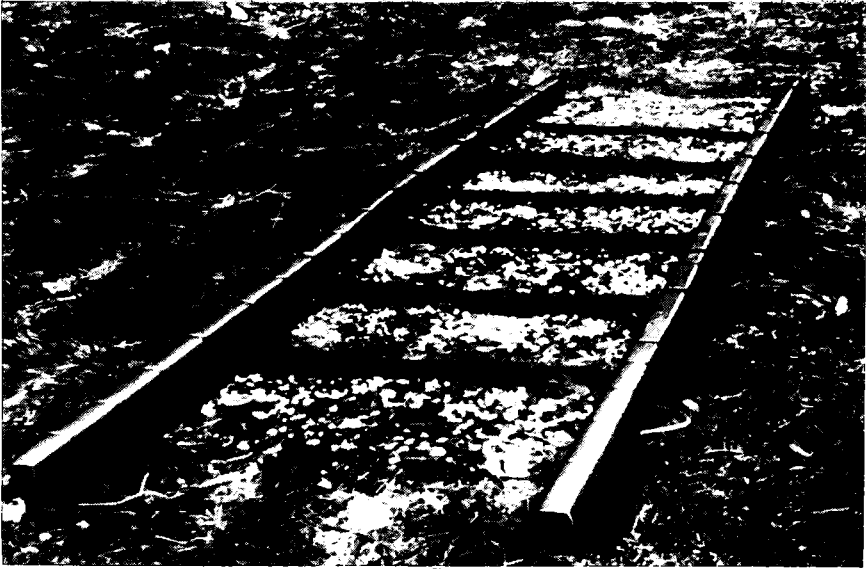


*Figure 82. Decoy supply base.*



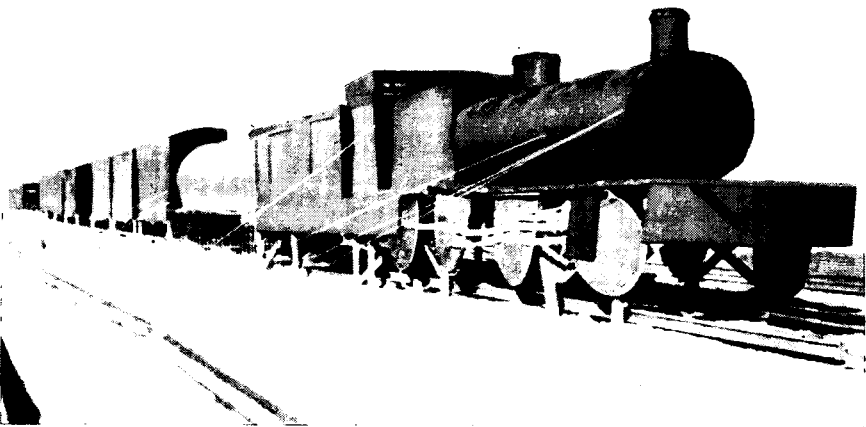
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*Figure 83. Simulated railroad tracks.*



②

*Figure 83—Continued.*



*Figure 84. Simulated train at a decoy railhead.*

## **71. Vehicles**

*a. General.* Simulated vehicles, such as tanks and trucks of all types, are among the most important items in a simulation scheme. To indicate normal military activity, considerable numbers of simulated vehicles are frequently necessary. For this reason, and because periodic movement of the position of each vehicle is essential, simulated vehicles must be light in weight, simple in construction, and easily transportable. Preferably, they should be collapsible so that a maximum number may

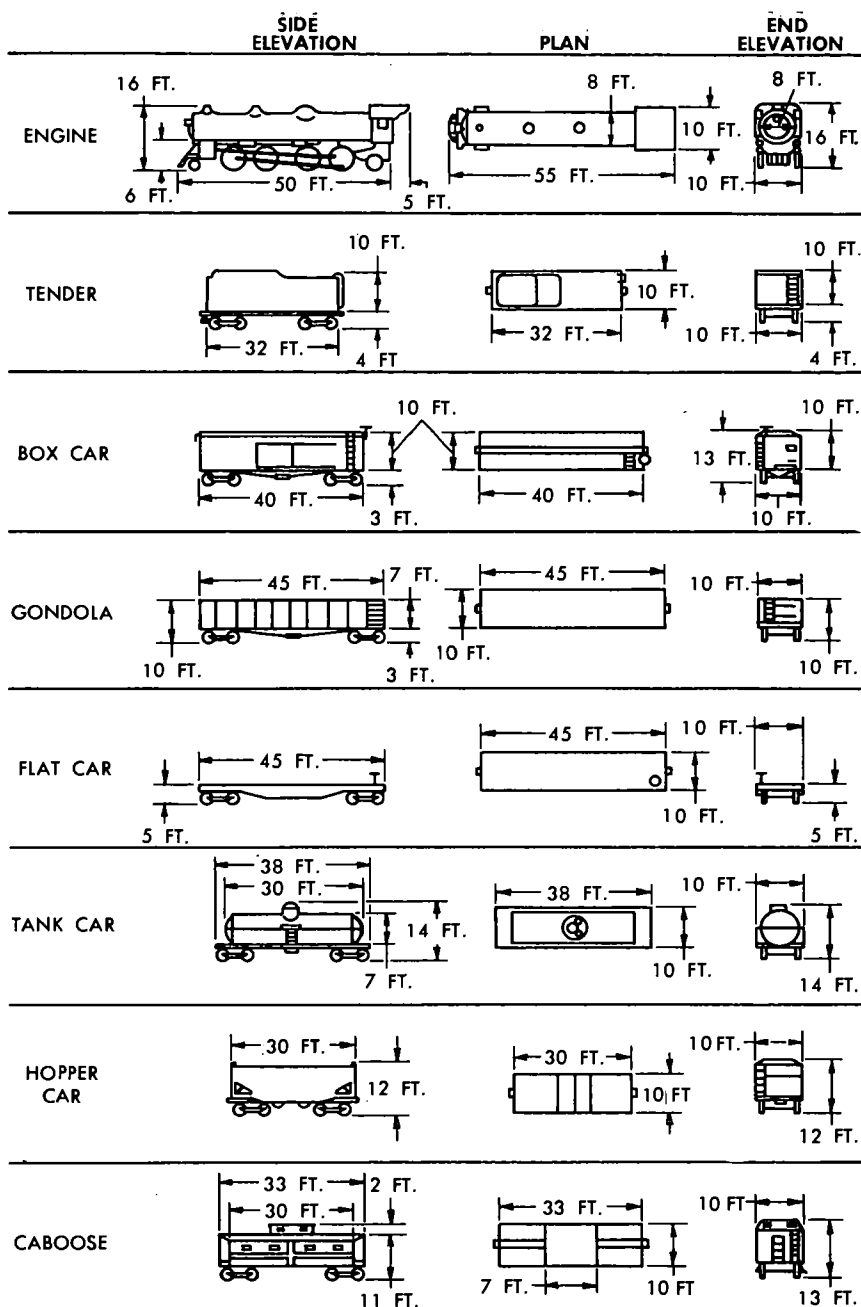
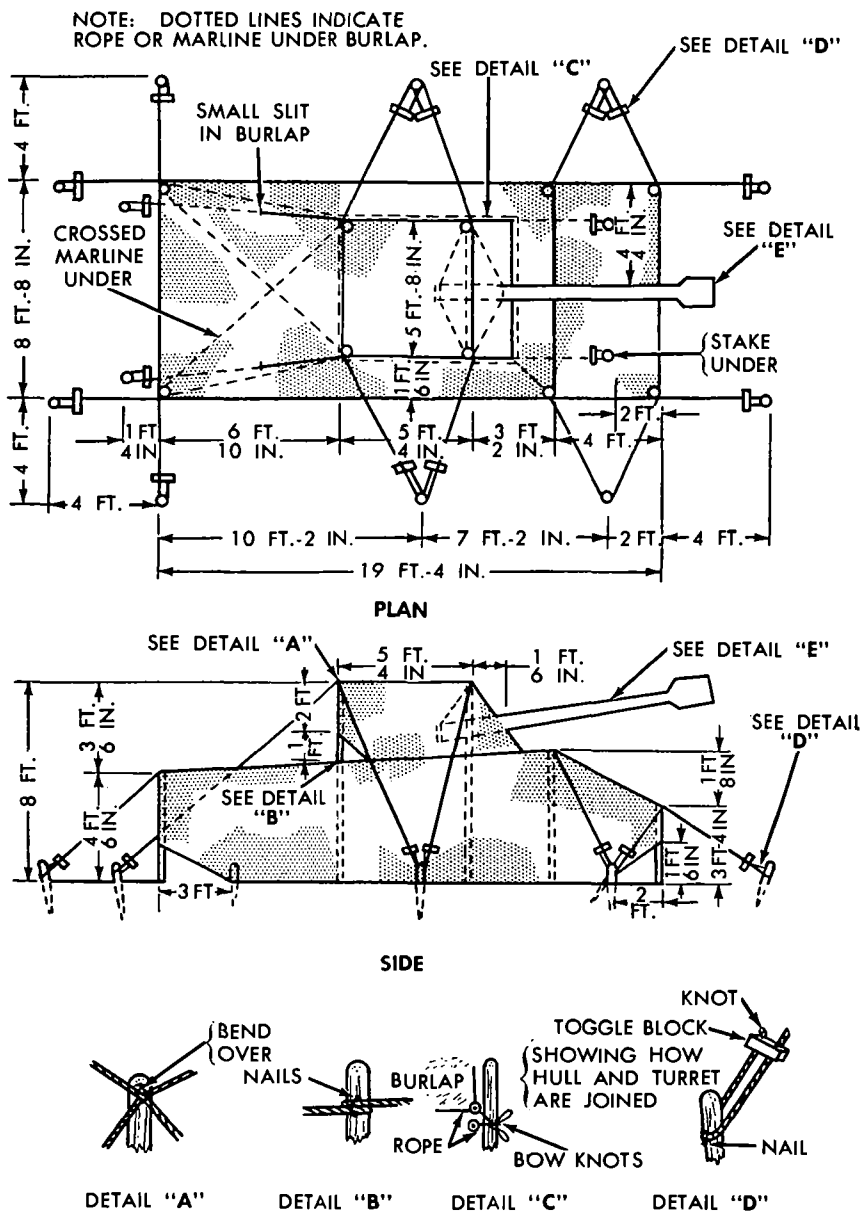
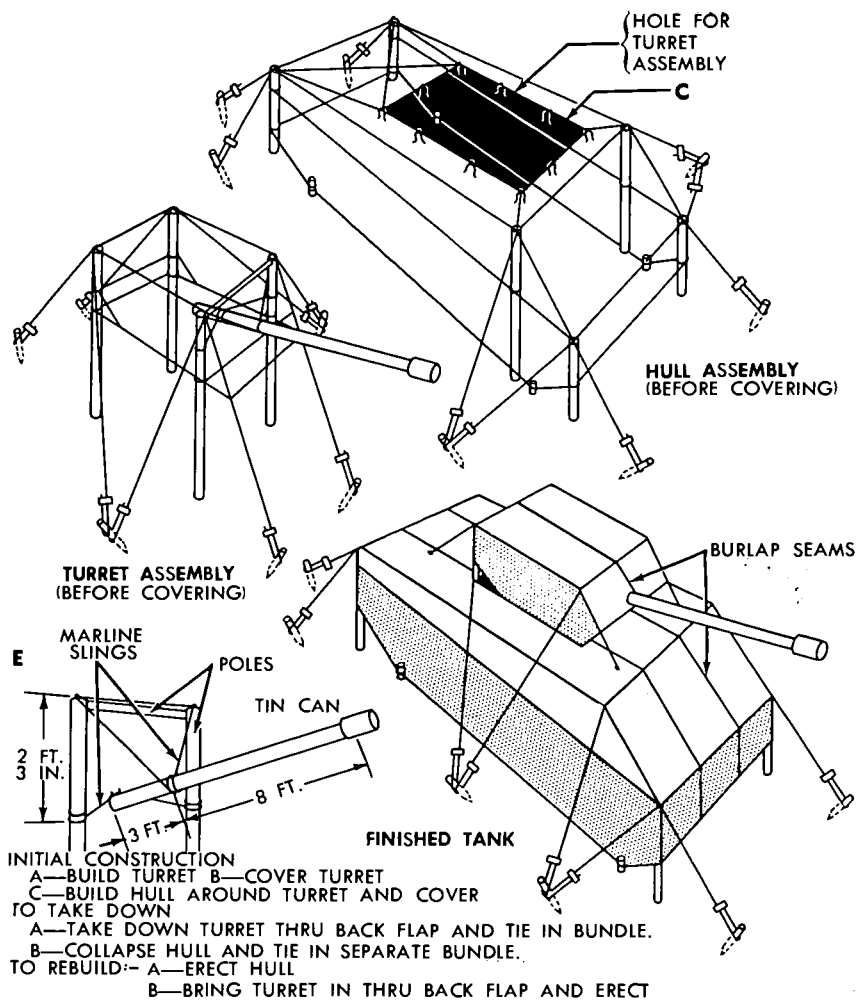


Figure 85. Dimensions of American rolling stock.



①

Figure 86. Plans and materials for constructing a simulated tank.



NO.	MATERIAL
1	6 FT. X 3 IN. DIAM. WOOD POLE (BARREL)
4	8 FT. X 3 IN. DIAM. WOOD POLE SUPPORT
2	5 FT.-6 IN. X 3 IN. DIAM. WOOD POLE SUPPORT
2	4 FT.-6 IN. X 3 IN. DIAM. WOOD POLE SUPPORT
2	3 FT.-4 IN. X 3 IN. DIAM. WOOD POLE SUPPORT
1	36 FT. X 44 FT. SHRIMP NET FOR DRAPING
18	6 IN. - 2 IN. X 2 IN. TOGGLE BLOCKS - 3/4 IN. HOLES
2	6 IN. - 2 IN. X 2 IN. TOGGLE BLOCKS - 3/8 IN. HOLES
1	5 FT. X 2 IN. SPREADER BAR
14	2 FT. X 3 IN. DIAM. STAKES
6	1 FT. X 2 IN. DIAM. PEGS
180	FT. 40 IN. WIDE BURLAP
350	FT. 3/8 IN. ROPE
200	FT. NO. 16 WIRE
150	FT. MARLINE
1/2	LB. 8 d NAILS

(2)

Figure 86—Continued.

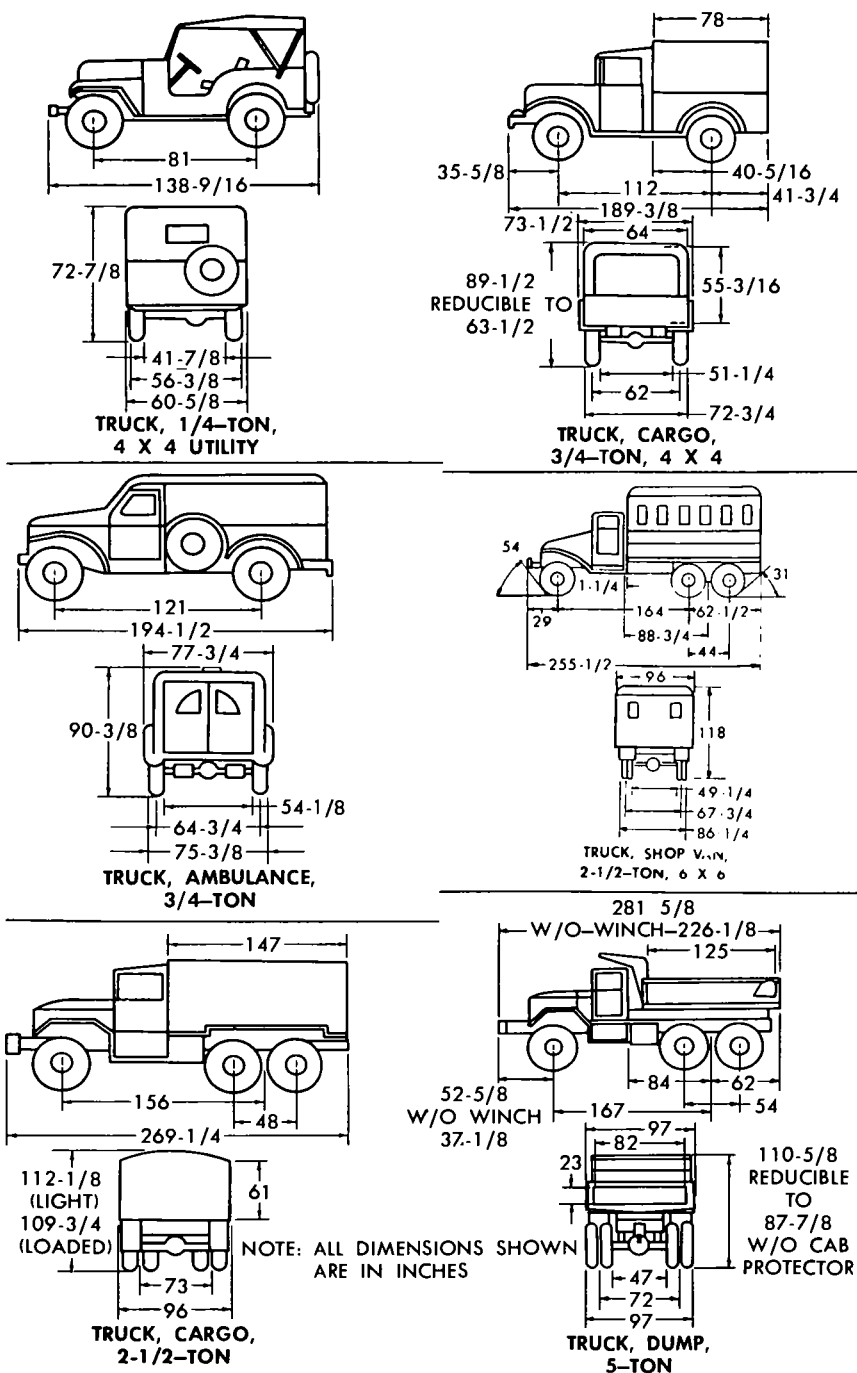
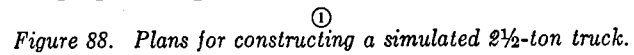
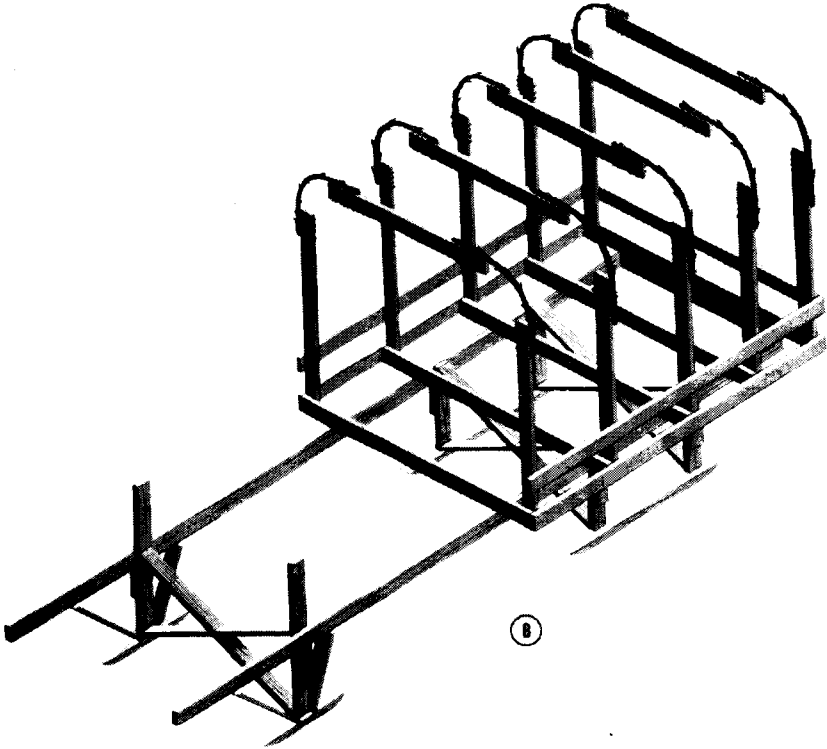
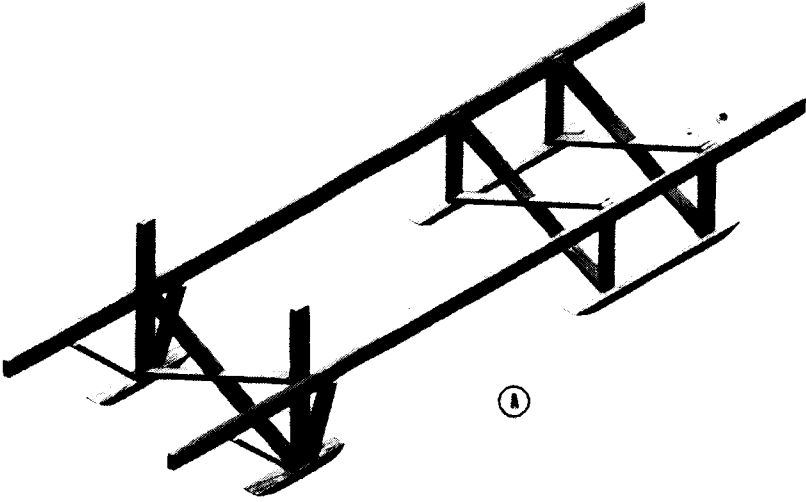


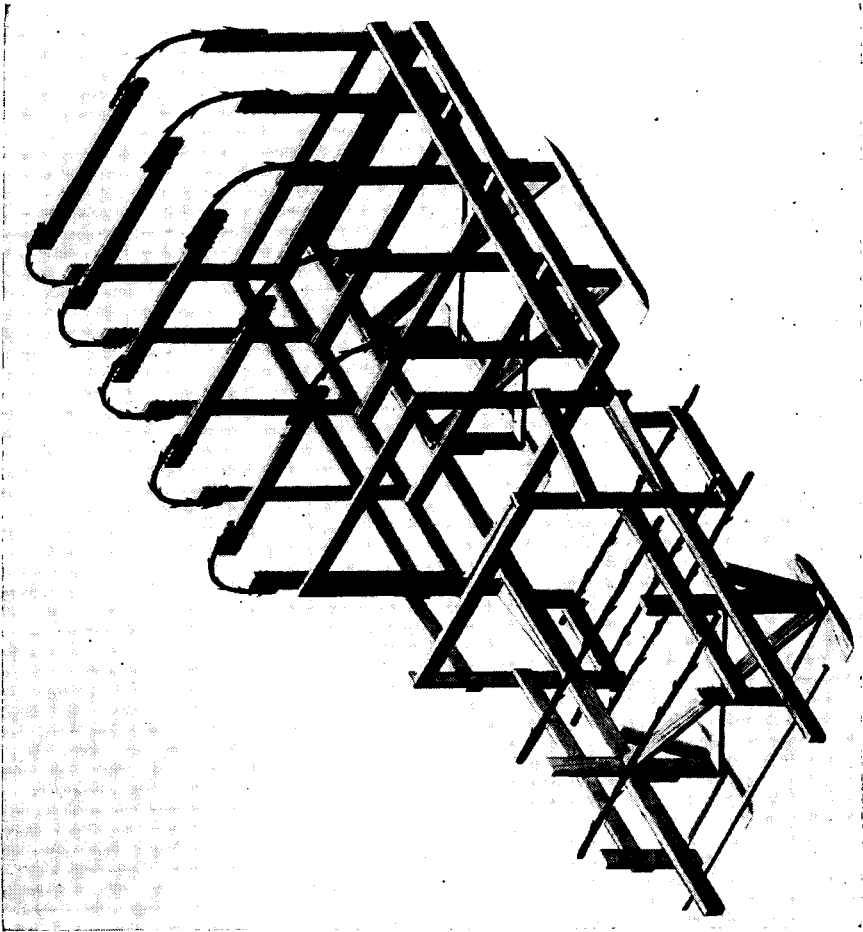
Figure 87. Views and dimensions of U. S. Army vehicles.





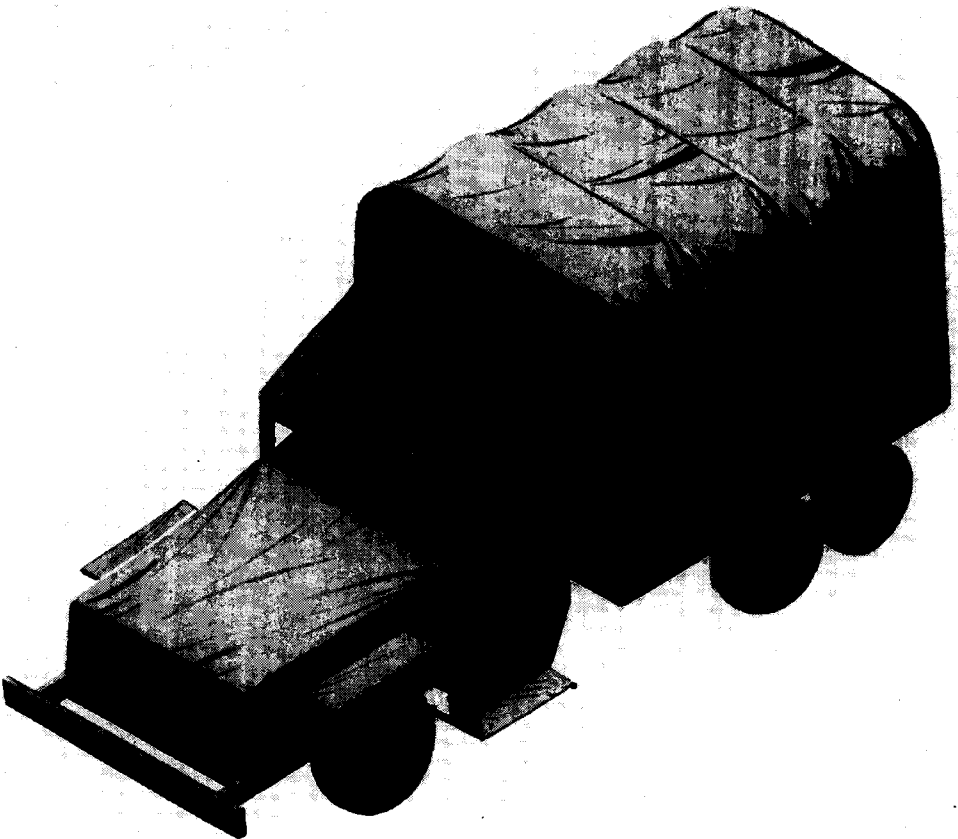
②  
Figure 88—Continued.





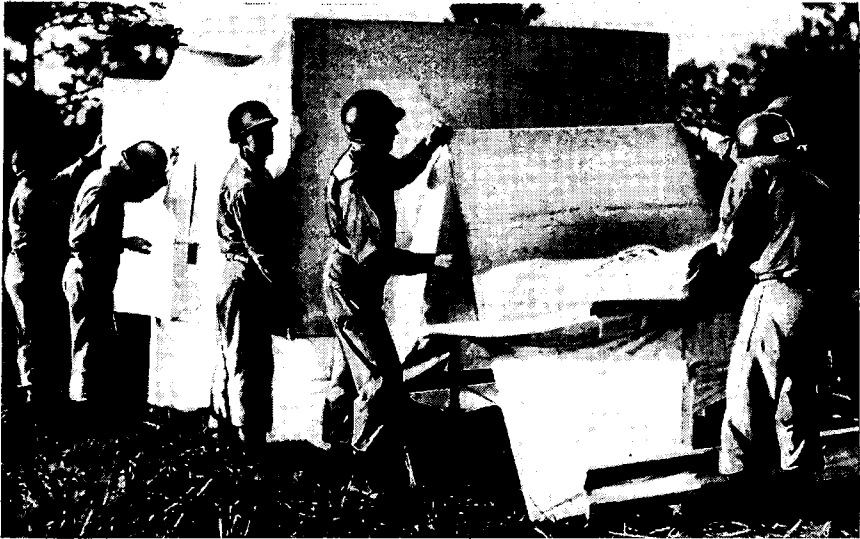
③

*Figure 88—Continued.*



④

*Figure 88—Continued.*



*Figure 89. Unfolding and erecting a simulated truck.*

be carried in one truck to the erection site. Collapsible simulator devices need more maintenance, such as tightening of ropes and guylines, than the rigid type and must be collapsed in order to be moved to a new position. However, they are easier to construct, use less material, and are more easily transported.

*b. Tanks.* An easily constructed, lightweight simulated tank can be made from marline twine or rope and supports of 2- x 2-lumber or saplings covered with burlap or osnaburg. Figure 86 shows the steps and the bill of materials in constructing such a simulated tank.

*c. Trucks.*

- (1) *Dimension of standard trucks.* Figure 87 gives views and dimensions of the standard U. S. Army wheeled vehicles and is suitable as a guide for constructing simulated trucks.
- (2) *Method of construction.*
  - (a) Vehicles shown in figure 87 may be constructed in the manner illustrated for the 2½-ton truck in figure 88.
  - (b) Figure 89 shows a step in unfolding and erecting a simulated truck prior to spray-painting it.
- (3) *Simulated ¼-ton truck.* Figure 90 gives the plans and bill of materials for constructing a simulated ¼-ton truck.
- (4) *Simulated ambulance.* Figure 91 shows a simulated ambulance constructed in the same manner as described in figures 87 through 90.

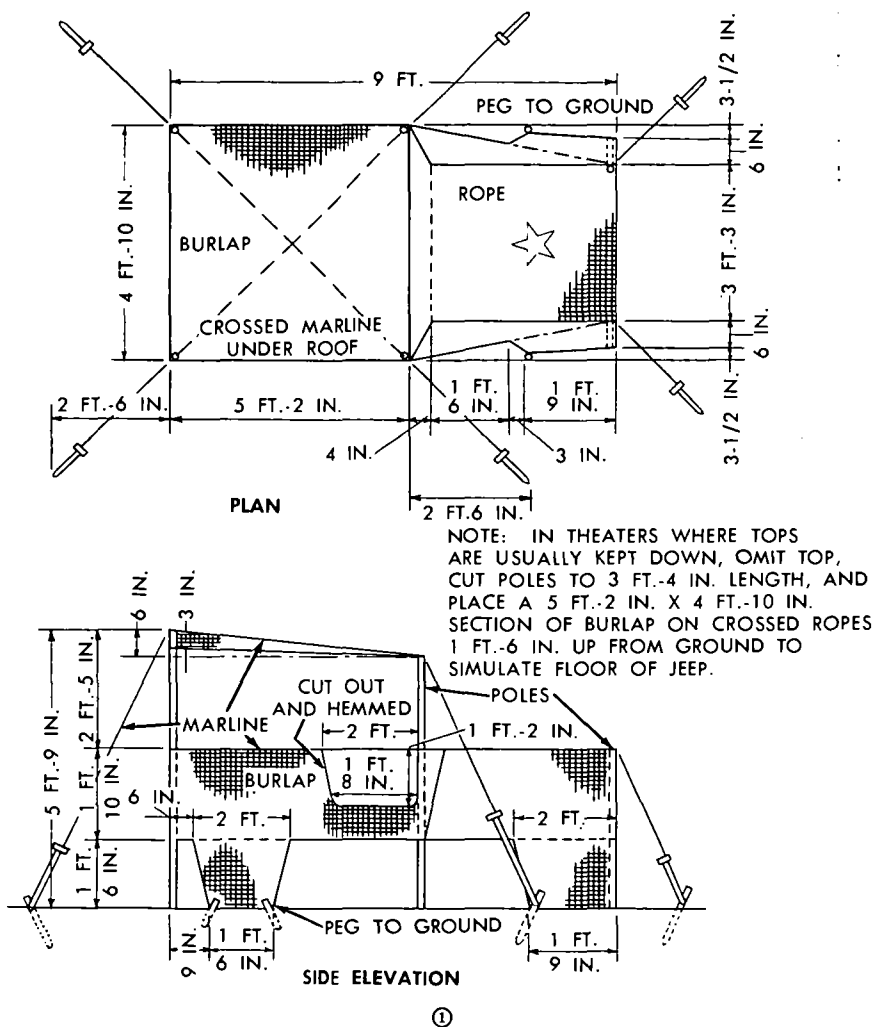
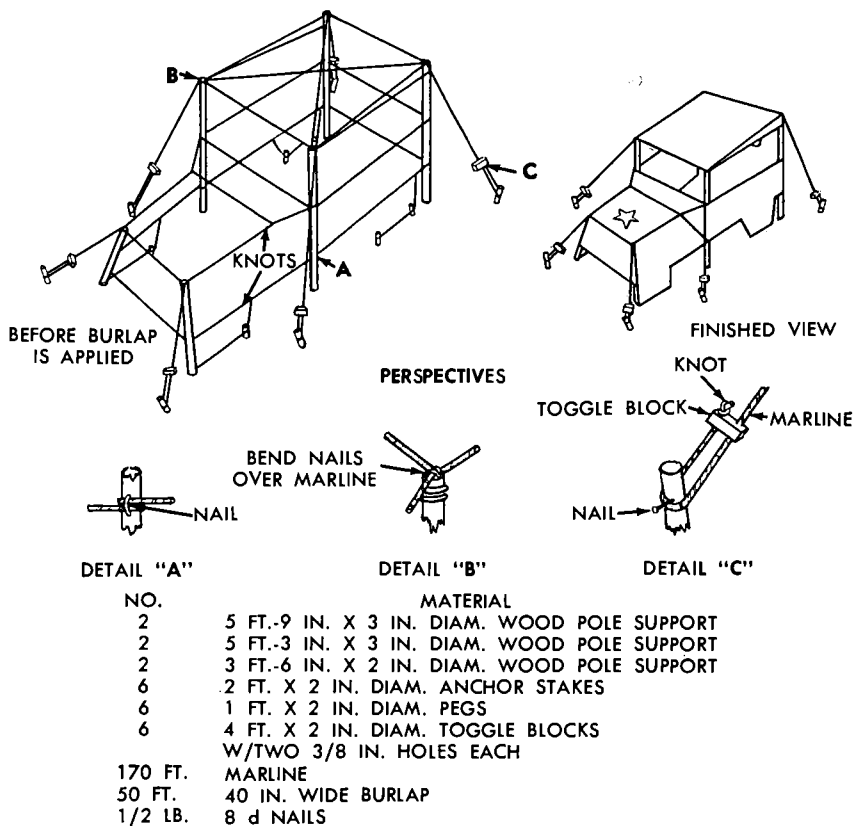
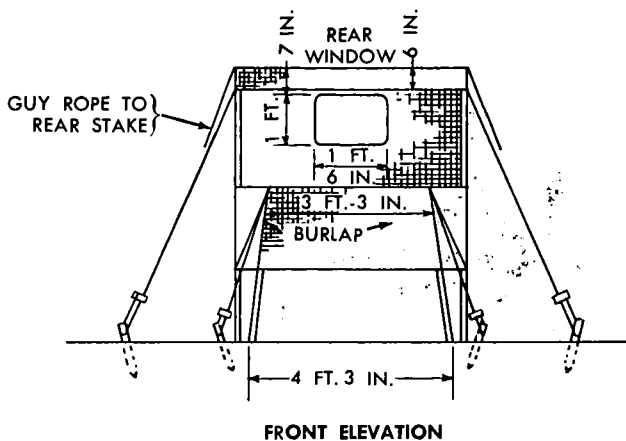


Figure 90. Plans and materials for constructing a simulated  $\frac{1}{4}$ -ton truck.



②

Figure 90—Continued.



Figure 91. Simulated ambulance being erected.



Figure 92. Simulated truck convoy.

- (5) *Simulated convoys.* Figure 92 shows a convoy of trucks, built in accordance with the plans described in this paragraph, set up along a dirt road to resemble a unit at halt on a road march.
- (6) *Expedient simulated vehicles.* Figure 93 illustrates a simulated truck made by utilizing parts of a wrecked truck.
- (7) *Use of scrap material.* Figure 94 shows simulated trucks made from scrap material. The chief objection to this type of construction is that such simulator devices are difficult to move.

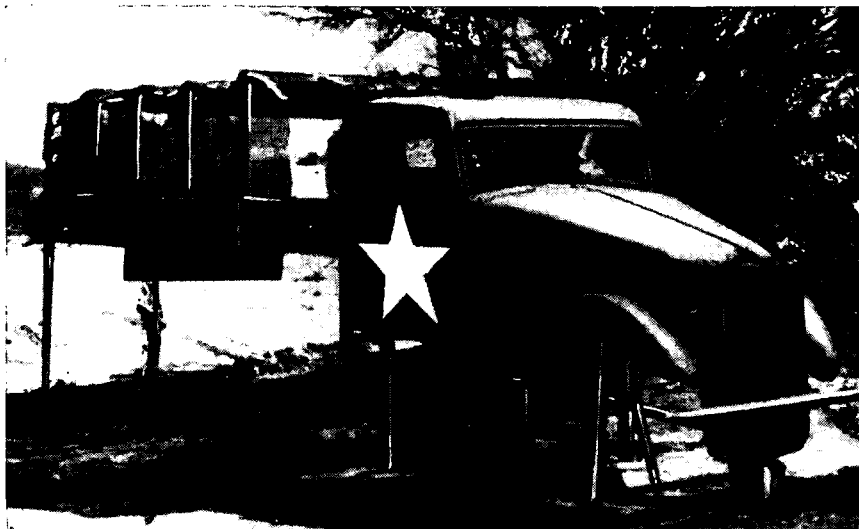


Figure 93. Simulated trucks made from salvaged parts of a real vehicle.

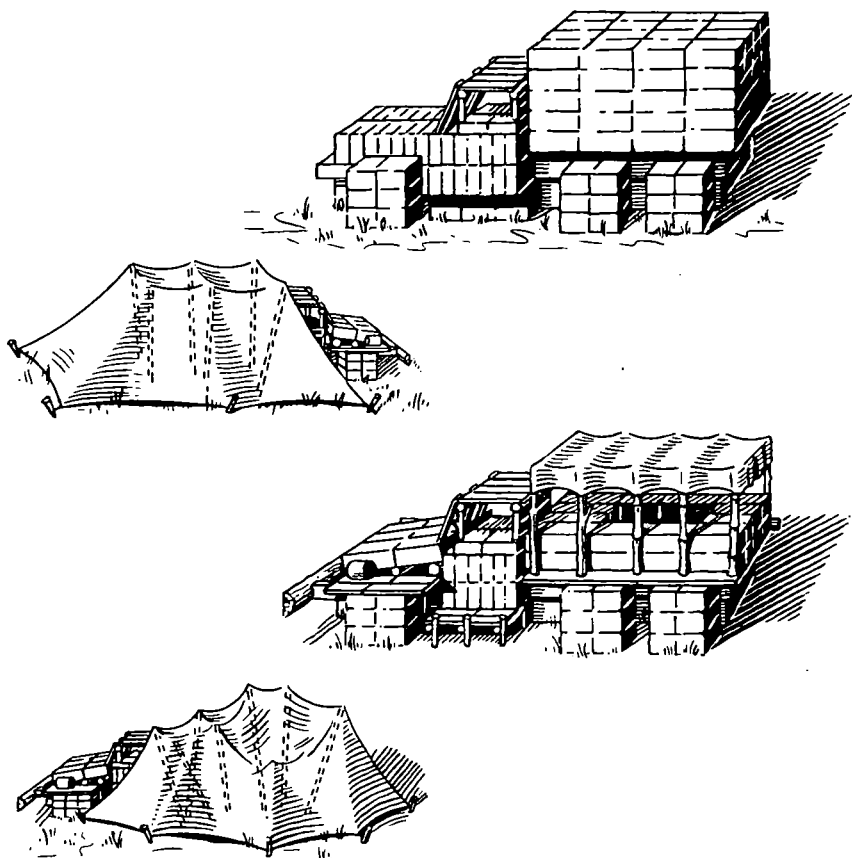


Figure 94. Simulated trucks made from scrap material.

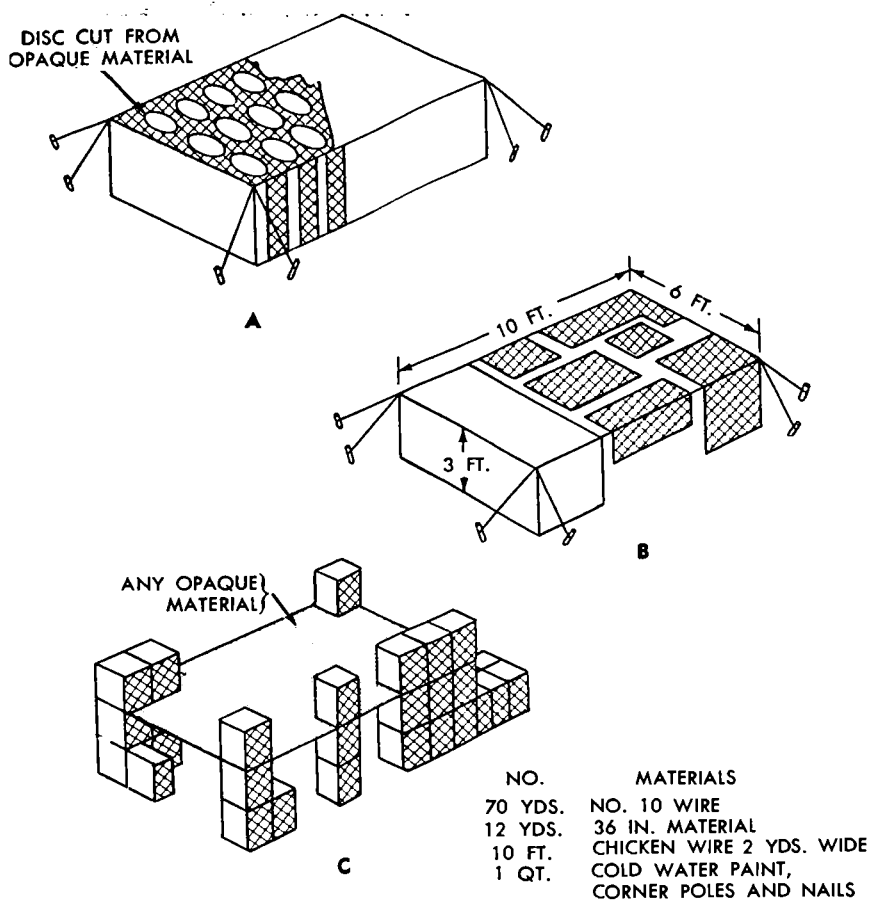


Figure 95. Dimensions and bill of materials for a simulated stack of supplies.

## 72. Miscellaneous

*a. General.* This paragraph describes a few of the numerous items which must necessarily appear in and around decoy installations to make them appear realistic. FM 5-22 contains complete lists of materials and manufacturing processes for making more elaborate types of decoys such as plaster molds for simulated rocks, walls, and obstacles, and elaborate false trees, houses, and other items.

### *b. Fuel Containers.*

- (1) Oil storage or supply dumps may be simulated by using standard camouflage materials as illustrated in figure 95. The base of the simulated stack of supplies is a flattop frame over which chicken wire or camouflage netting is stretched. Material of any type is cut into the patterns indicated and fastened to the net frame, then painted suitable colors.



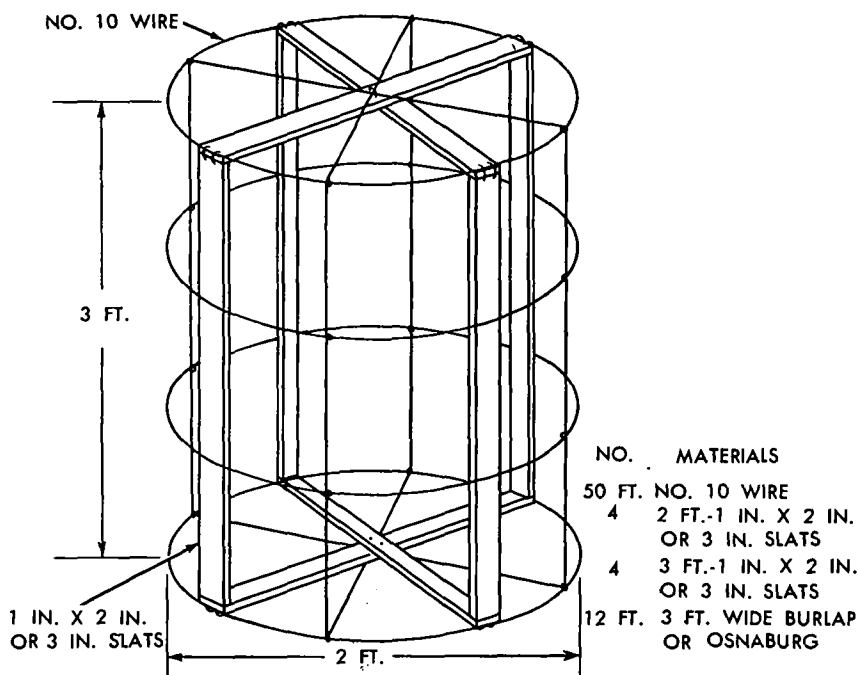


Figure 96. Simulated oil drums.

- (2) Figure 96 gives the plan and materials for constructing simulated oil drums out of wire, lumber, and cloth.

*c. Trees and Bushes.* There are many ways in which trees and bushes may be simulated, using either natural or artificial materials. Natural materials such as leaves, grass, or hay may be used to cover a chicken-wire framework. Foliage must be replaced periodically to blend with the surroundings. Faded material may sometimes be sprayed with paint to obtain the desired color. Figure 97 shows several ways of simulating trees and bushes. Special instructions for each type shown in figure 97 are as follows:

A—Reinforce the outer edge of the panels. Use No. 10 wire for panels up to 4 feet in diameter; stiffen larger sizes with additional wire, branches, or other material. Panels may be any shape. Add guy wires as required.

B—Use cut sapling or large branches as skeleton and garnish with available natural or artificial material.

C—Erect a frame of stakes and guy it into position with No. 10 wire. Garnish with natural or artificial material. Fast-growing vines may be grown for cover.

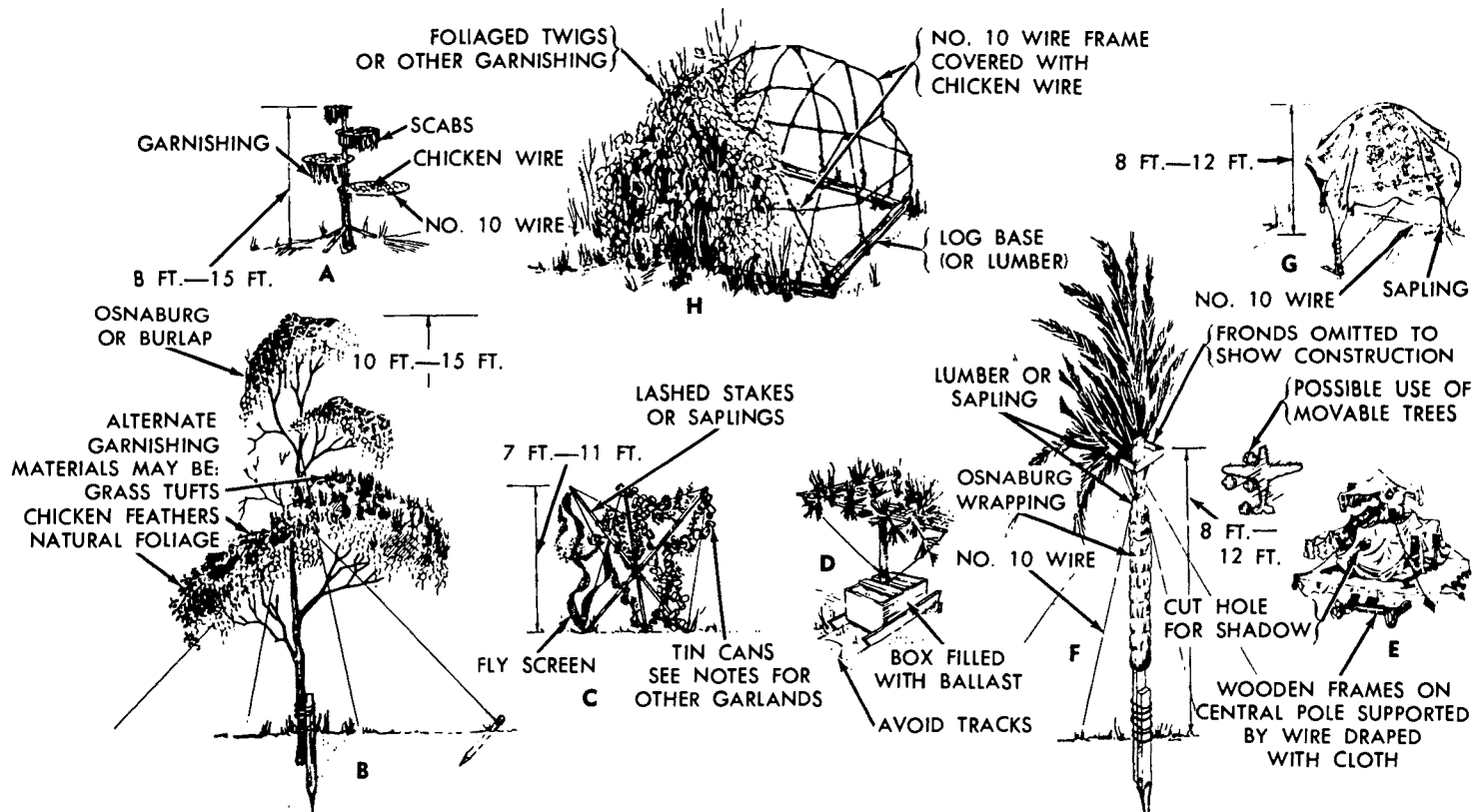


Figure 97. Simulated trees and bushes.

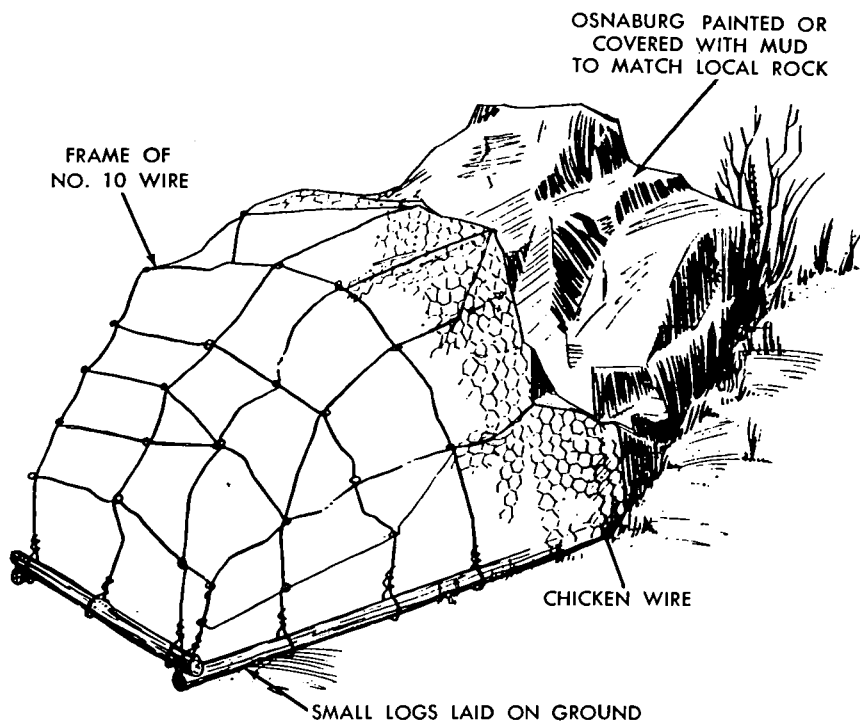


Figure 98. Simulated rock.

D and E—These types may be used in any situation where mobility is required.

F—Construct the frame and secure branches in place with No. 16 wire before erecting the tree.

G—Bent saplings or stakes form the skeleton for this type. Cover may be net or drape.

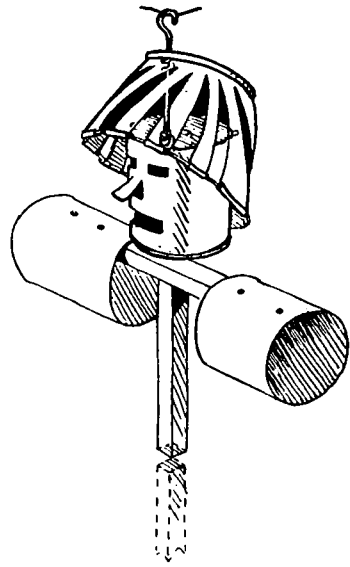
H—This simulated bush may be used as cover for a dugout, small supply dump, or similar position. Any garnishing material available may be used.

*d. Rocks.* Figure 98 shows a simulated rock which may be constructed of No. 10 wire, chicken wire, and osnaburg or burlap. The size, shape, and color of the rock should conform to real rocks in the vicinity. Moulding plaster, papier-mâché, or other suitable materials may be substituted for those shown. This type of dummy is excellent for camouflaging small-gun positions, emplacements, and small stacks of supplies.

*e. Personnel.* Simulated personnel are extremely poor substitutes for the living personnel usually moving about the installations. They may



BODY



DETAIL OF HEAD  
AND SHOULDERS

*Figure 99. Simulated soldiers.*

sometimes be utilized, however, to augment the effect of real troops connected with the display. Figure 99 shows one method of constructing dummy personnel. Simulated figures should be posed in natural positions. Helmets and shoulders can be made of tin cans; body framework of cut lumber, nailed together to support the shoulders and body. Cans at the hips give shape to the body. Salvaged fatigues or other uniforms can be used for the clothing. The clothing can be stuffed with leaves or grass to give shape.

## CHAPTER 6

### NIGHT DECOYS

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#### Section I. NIGHT DECOY DEVICES

#### 73. Lights

a. *Classes.* The two classes of lighting for night decoys are:

- (1) *Main or primary.* These lights simulate lighting which occurs in blackout areas and which is normally switched off upon receipt of the alert signal. Examples are—the factory exterior light, lighted windows, signal lights, dock or freight yard lights, and the flash from an electric welder.
- (2) *Residual or secondary.* Residual lighting represents lighting which cannot be extinguished immediately on receipt of a warning, such as the glow from a furnace or coke oven, or lighting caused by faulty blackout. Examples of this type of lighting are—poorly blacked-out skylight, truck convoy (movement of a convoy under blackout conditions is comparatively imperceptible when compared to speed of air attack), simulated trolley flash, and a simulated furnace, coke oven, or locomotive glow.

b. *Types.* Following are descriptions and illustrations of the most common types of lights seen at night and identifiable from the air. Decoy lights to simulate buildings may be made in various ways, depending upon the material available. Essentially, they are individual light boxes of small size. When arranged in patterns, they appear to the airman as buildings carelessly blacked out. The three principal types are windows, doors, and skylights. They may be permanently located if they can be concealed during the day; otherwise they must be portable or mobile, and placed under concealment before dawn. It may be necessary to construct decoy buildings to contain the lights when simulating large factories or warehouses since such large structures are usually discernible at night from the air.

(1) *Windows:*

- (a) A simple type of decoy lighted window to simulate that of a small building or house is shown in figure 100.
- (b) Figure 101 shows a decoy lighted skylight for a large building, factory or warehouse.

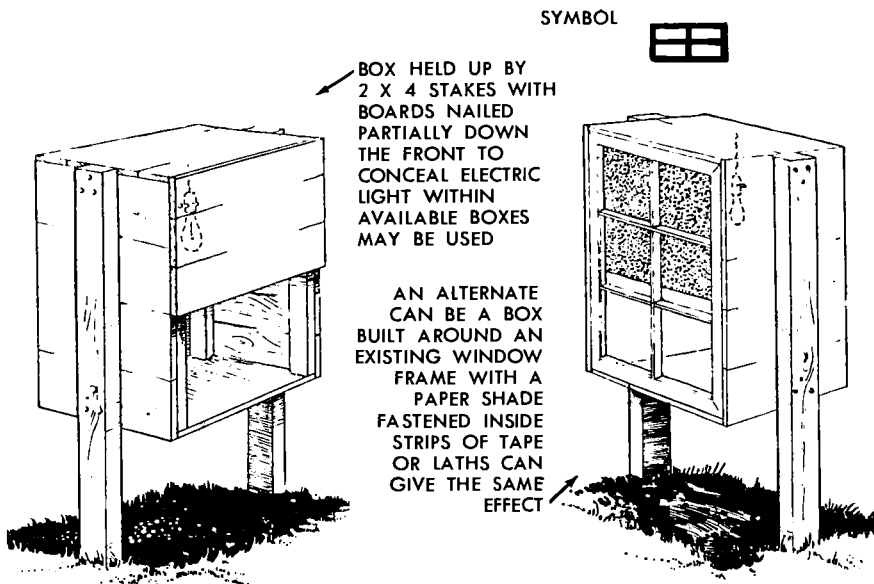


Figure 100. Simple type of simulated lighted window.

- (2) *Doors.* Two types of decoy lights seen through open doors are shown in figures 102 and 103.
- (3) *Skylight.* A poorly blacked out skylight may be simulated in several ways. The type shown in figure 104 is adjustable to various angles so that it will be visible from only certain sides.
- (4) *Furnace glow.* Furnace glow decoys, such as shown in figure 105, may be used in banks or series to create the effect of factory furnaces or coke ovens. These devices should be separately controlled and equipped with a rheostat so that the glow may be made to vary.
- (5) *Turning-aircraft light.* The plans for constructing a light to simulate the headlight of an aircraft turning onto or off the runway are shown in figure 106.
- (6) *Gliding aircraft.* The gliding aircraft device simulates the lights of an aircraft gliding in for a landing. One type consists of a car or truck on which is mounted a crossbar to simulate a wing, equipped with landing lights. The car travels along the runway strip at high speed. The driver is protected only by a splinterproof cab. Another type of device consists of a rocket-powered box with a crossbar carrying wing lights, which travels at high speed down a slanting pair of parallel wires. It may be started by remote control. Power is supplied to the wing lights through the wires which form the track.

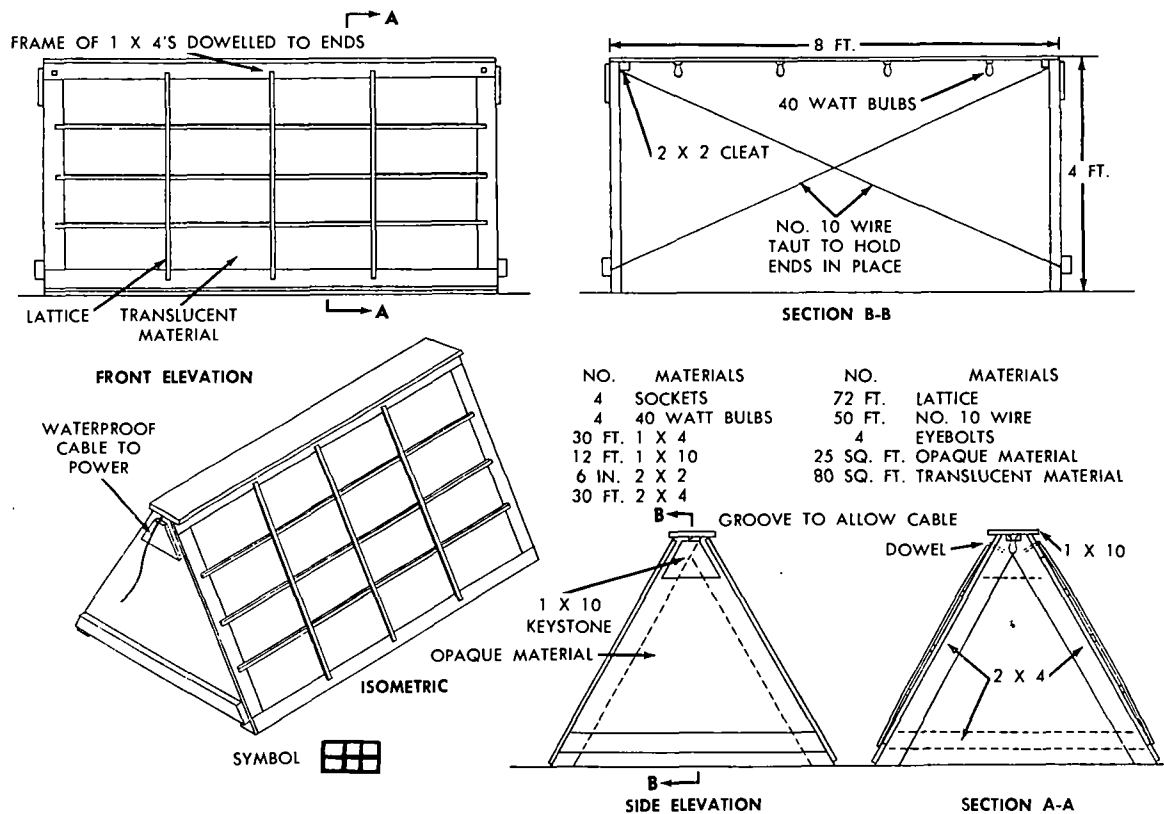


Figure 101. Warehouse decoy lighted skylight.

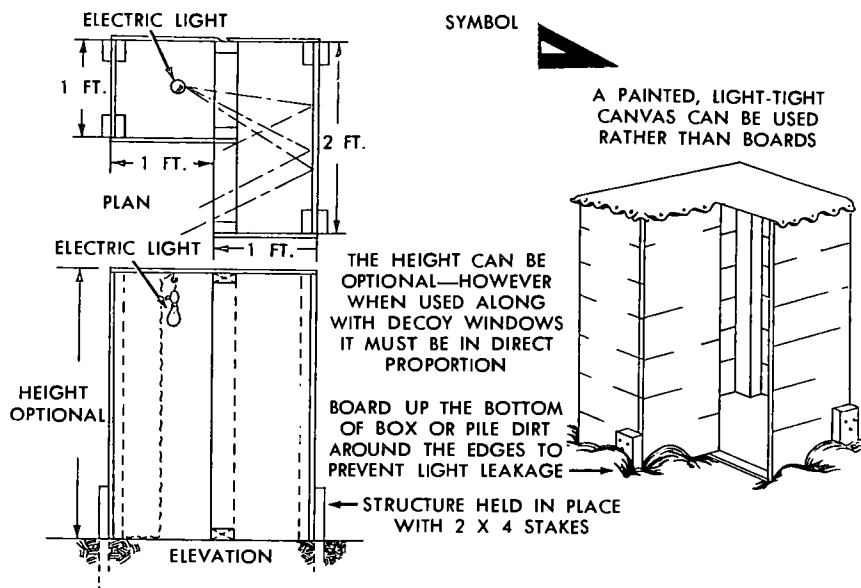


Figure 102. Open-door decoy light, type 1.

- (7) *Decoy convoy.* The appearance of a parked convoy may be simulated by using shielded lights, hand flashlights, or lights wired to a central control. The lights are spaced along a road so as to show a small area. The presence of one light might not be noticeable but a pattern of faint lights will be. As the enemy approaches, most of these lights are turned off.

#### 74. Fires

Decoy fires are lit at night to divert the attention of enemy bombers from real installations. They should be designed to attract successive waves of enemy bombers and therefore must consist of two types of fire-producing units. There should be a type of device which can be ignited without delay when the first wave of bombers strikes. This type of device is needed to burn for a short period while the other type of device, capable of sustaining decoy fires for several hours, is being ignited. The latter type of device usually takes from 10 to 15 minutes to reach its full capacity. It is necessary for a complete decoy installation to be capable of producing fires of 6 to 7 hours duration, and the number of devices installed should be sufficient to provide this. The shape and kind of fire produced should bear a close visual relationship to the probable behavior of the real installation if it caught fire. To do this successfully requires the control of the shape and type of fire.



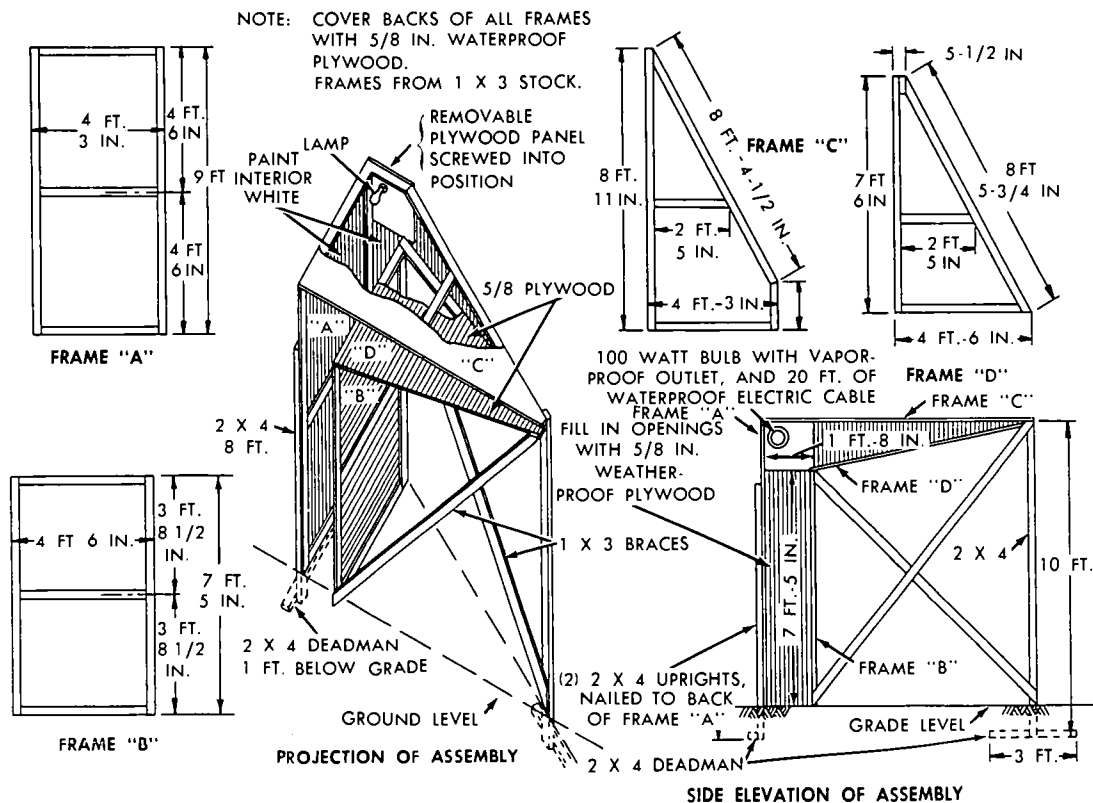


Figure 103. Open-door decoy light, type II.

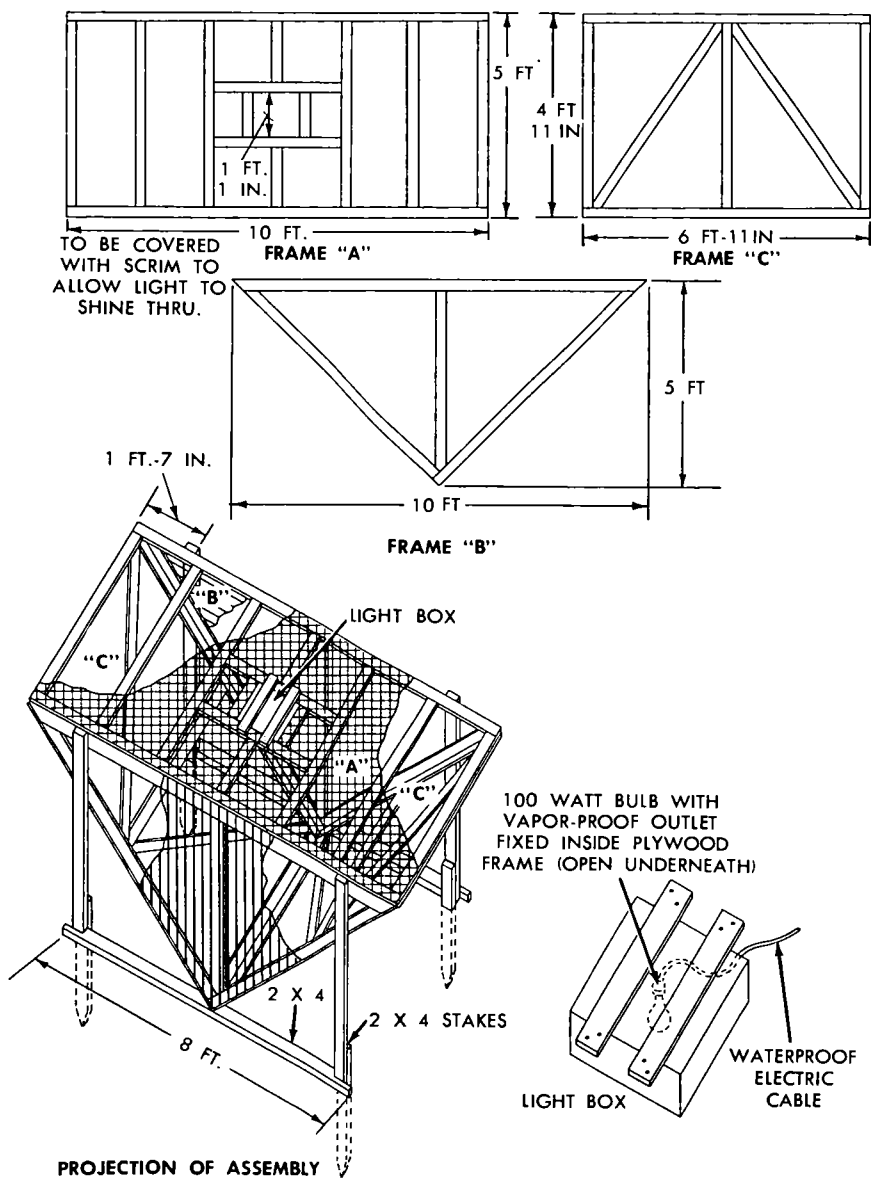


Figure 104. Simulated skylight.

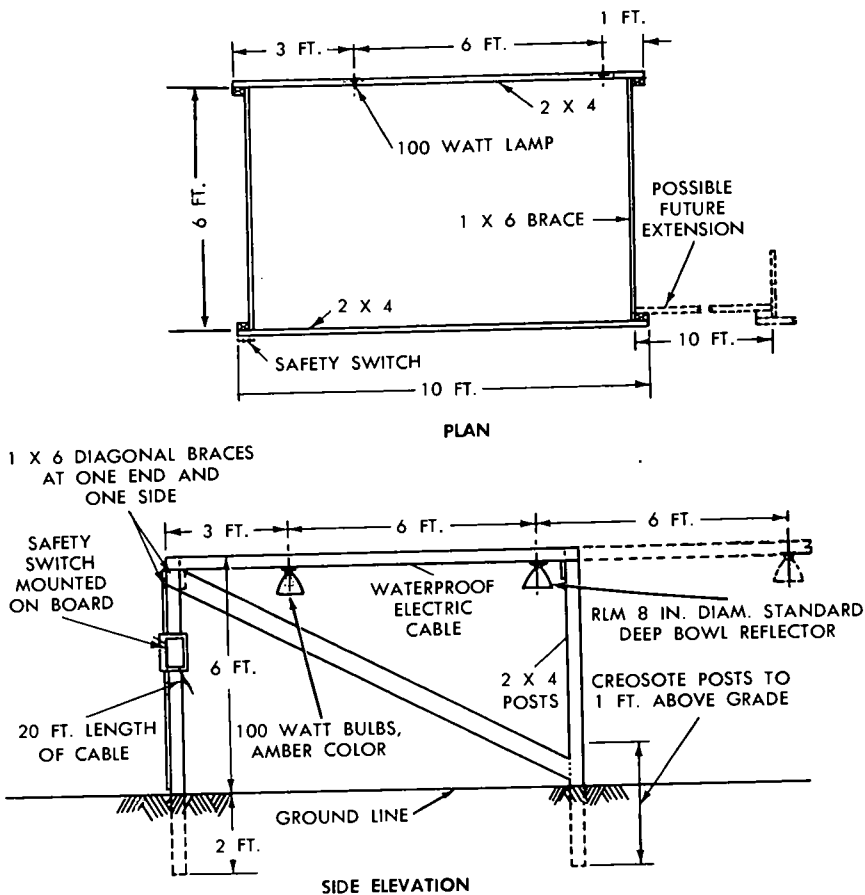


Figure 105. Decoy furnace glow.

*a. Shape of Fire.* The shape of a fire can be controlled by containing the flames within a fireproof form, by using oil-filled ditches, or by constructing the size and shape of the decoy target so that it simulates the general area of the real objective.

*b. Type of Fire.* Depending upon the character of the real objective, decoy fires should give off varying quantities and colors of smoke and flame. To simulate such conditions, various methods are used. A surface fire to simulate a burning oil dump or gas truck is made of any available containers laid side by side. These containers are filled with oil and interconnected with wicks. The fire is ignited by a flare bag or canister and may be operated by remote or manual control. The whole setup is covered with burlap or osnaburg which prevents the containers from filling with sand or dirt during heavy winds. If sprayed with oil, this cover also will act as a wick (fig. 107). Certain types of decoy

3/4 IN. X 10 IN. BOLT, 2 NUTS  
AND 4 WASHERS. 5 IN. X 1 IN.  
REVOLVING PIPE HANDLE.

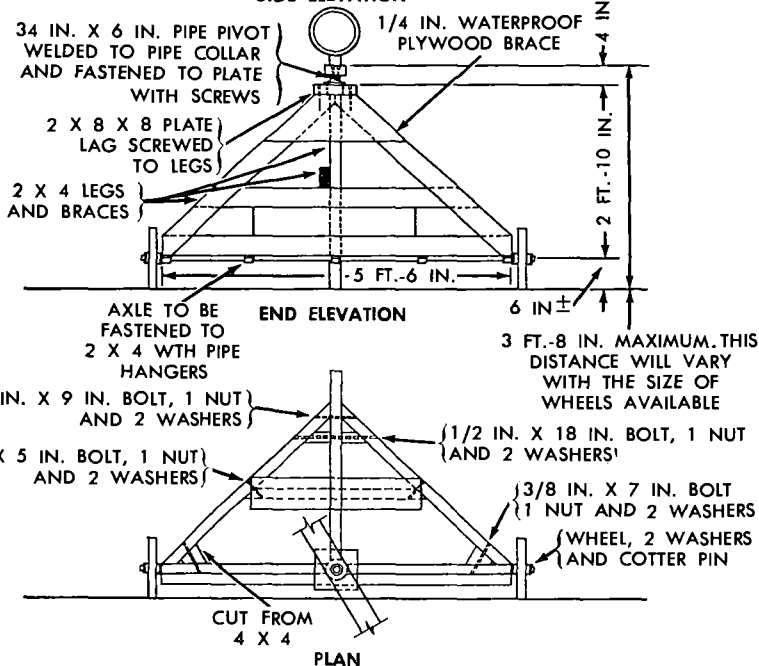
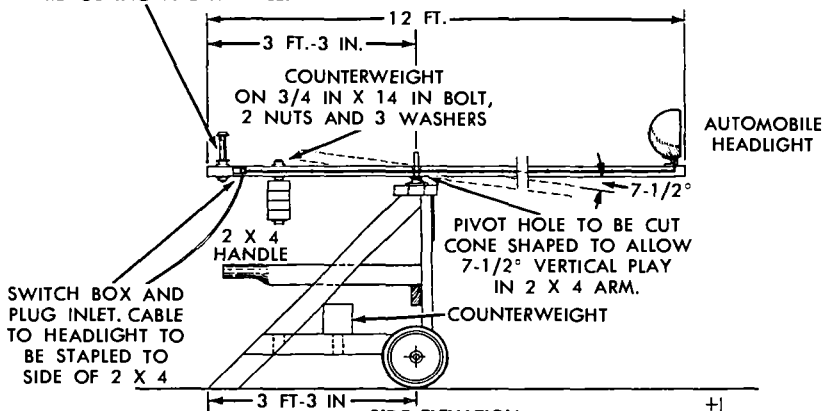
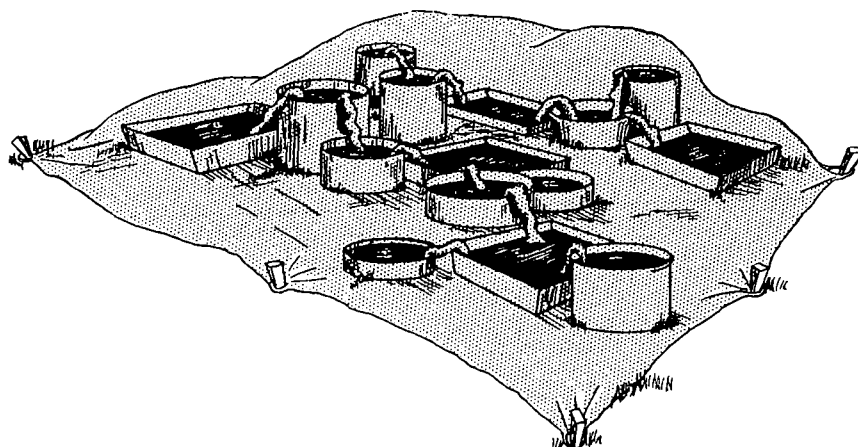


Figure 106. Simulated turning-aircraft light.



OSNABURG DRAPE FOR  
DAYLIGHT CONCEALMENT

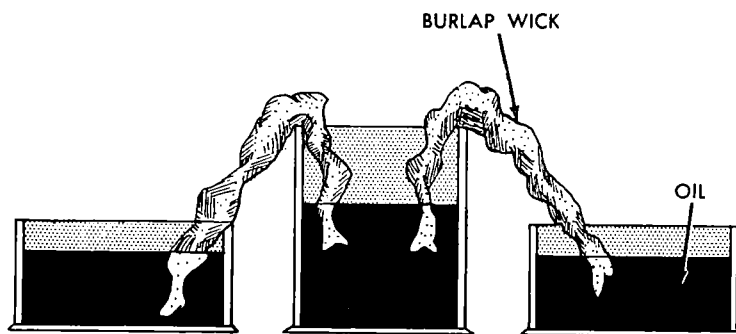


Figure 107. A type of decoy fire device.

fires may require the simulation of explosions. This can be accomplished by means of Very signal lights, flamethrowers, ground flares, star shells, smoke mortar shells, hand grenades, and colored smokes.

c. *Typical Installation.* Figure 108 shows a typical decoy fire installation, the types of fires, and the plan of firing. Each separate fire site is wired for remote control operation.

d. *Ignition Devices.* The Chemical Corps has incendiary and smoke grenades available. See FM 3-5. Field expedient ignition devices may be fabricated as shown in figure 109.

- (1) *Flare bag.* The flare bag consists of a bag containing an electric squib surrounded by cordite, black powder, or the powder of a crushed flare cartridge of a Very pistol. The bag is made of

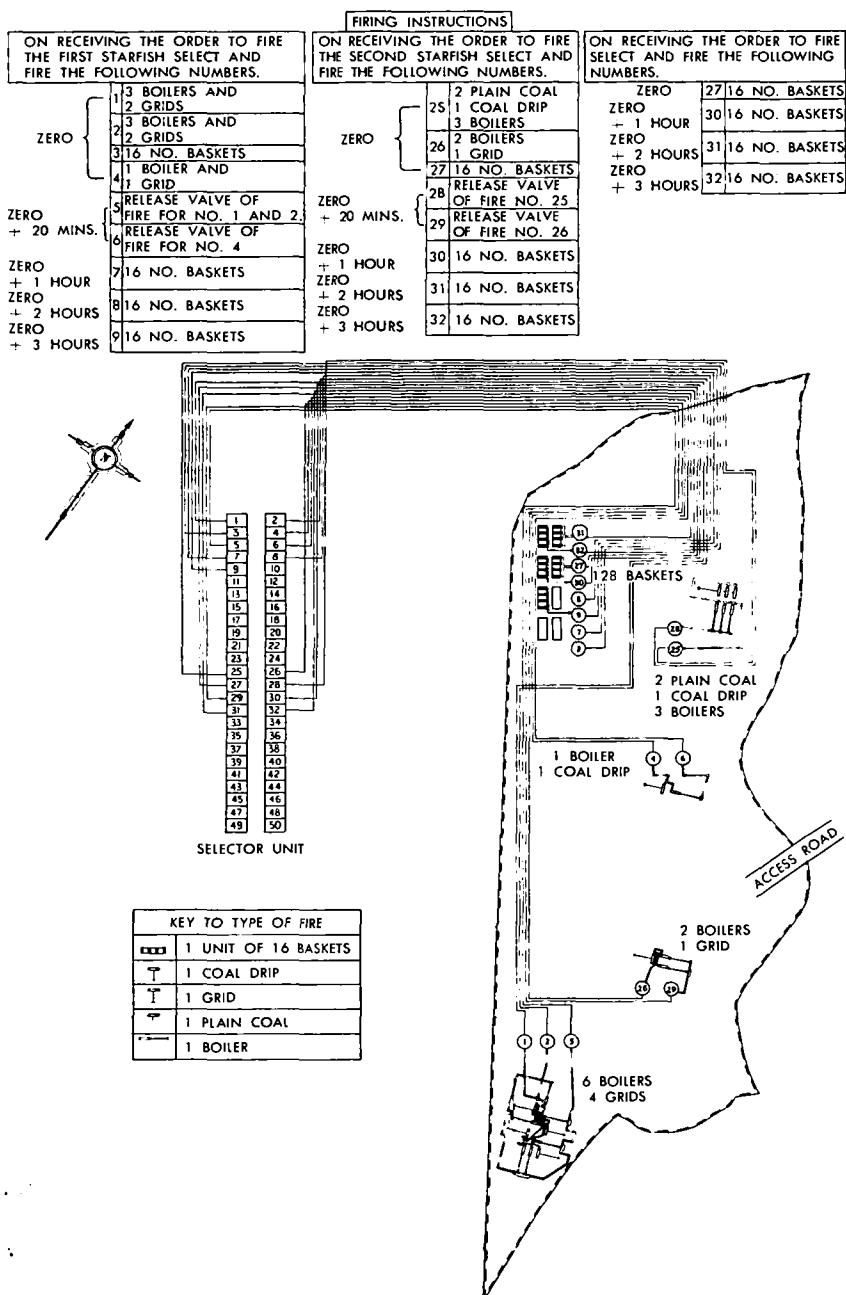


Figure 108. Typical decoy fire installation.

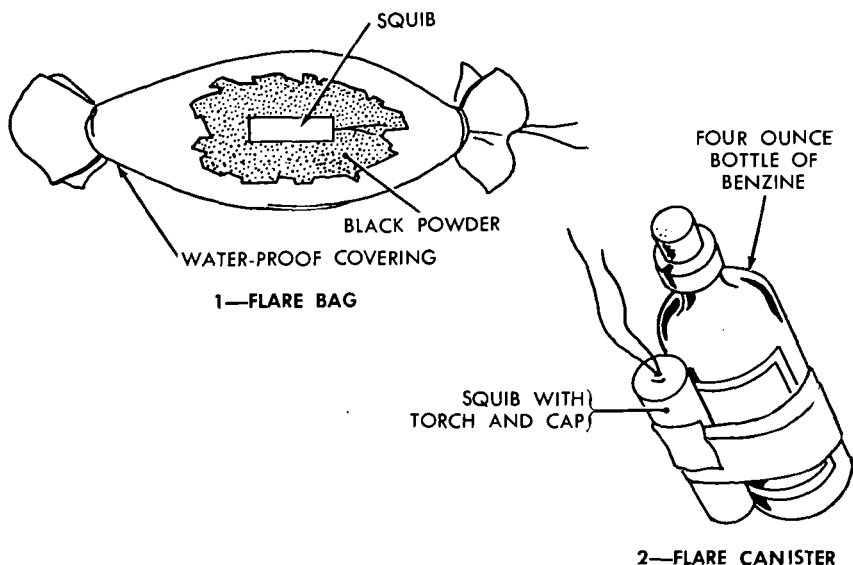


Figure 109. Flare bag and canister ignition devices.

waterproof material, such as salvaged raincoat or gas caps fabric, which is tightly bound at each end.

(2) *Flare canister.*

(a) The flare canister provides a positive ignition device for igniting fuel oil. The canister is composed of the following:

1. Electric squib with lead wires or a "quick-match fuse" for manual operation.
2. Self-oxidizing pyrotechnic torch (magnesium).
3. Dynamite cap.
4. Delayed fuse between torch and dynamite cap.
5. Four-ounce glass bottle containing 3 ounces of benzine, gasoline, or similar material.

(b) Upon contact the squib fires the magnesium flare, igniting the delayed dynamite cap which shatters the bottle of benzine and spreads the flaming liquid over the oil.

e. *Types of Fire Devices.*

- (1) *Fire basket.* The simplest form of fire device is the fire basket which is an oil drum or box filled with waste inflammable material saturated with creosote and elevated to provide a strong draft. The baskets are fired by remote control. They can be fired in a series or simultaneously, depending upon the effect desired. Care must be taken to keep the container dry and

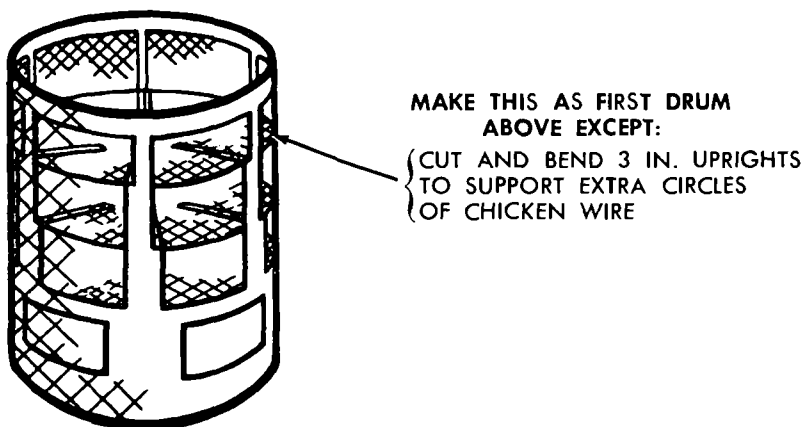
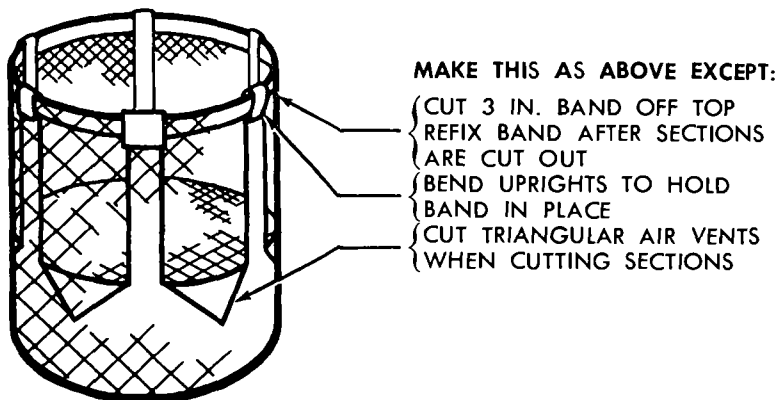
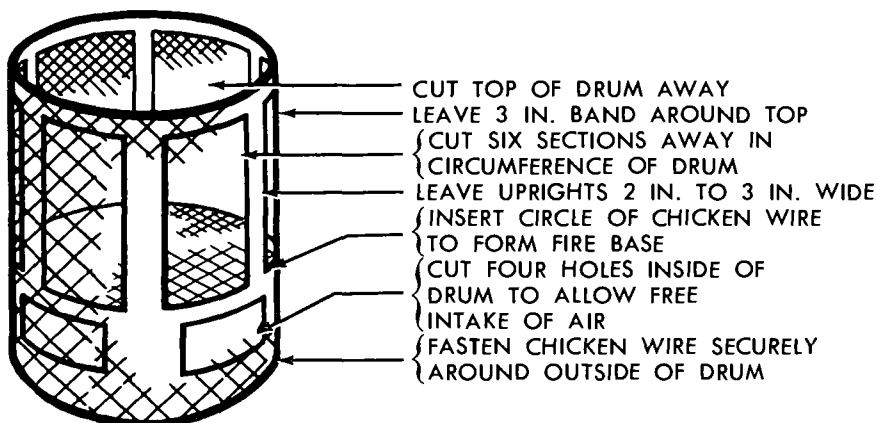


Figure 110. Fire baskets made from oil drums.



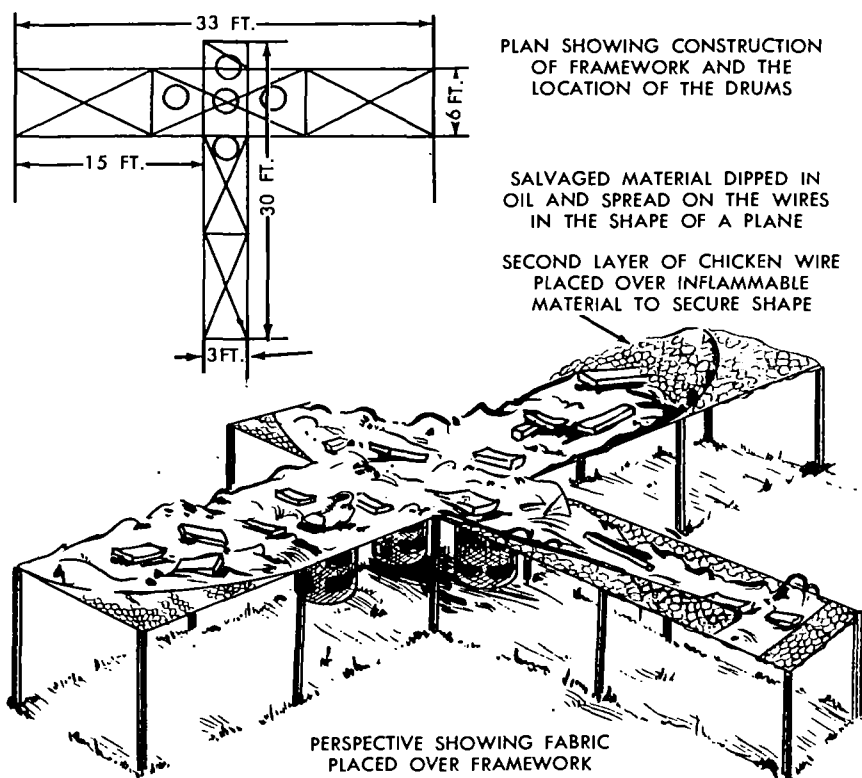
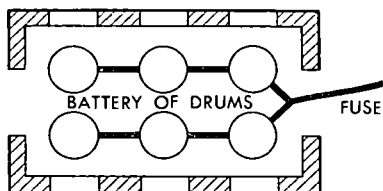
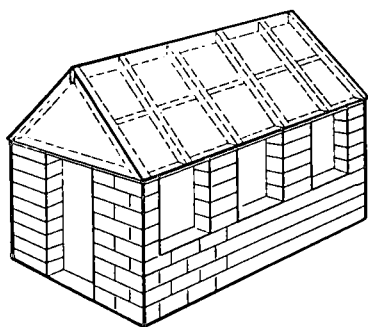


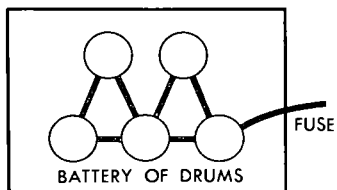
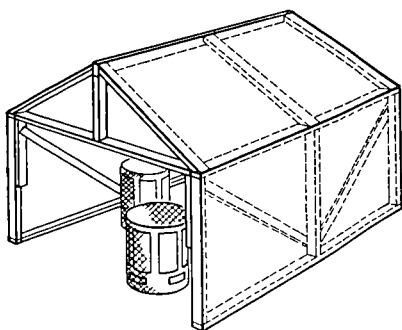
Figure 111. Burning plane decoy fire.

ready for immediate ignition. The types shown in figure 110 are typical. Other waste materials or containers may be substituted for those shown. Some of the uses of fire baskets are shown in figure 111 and 112.

- (a) *Burning aircraft.* Figure 111 shows a device to simulate a burning aircraft. It is made of wire netting raised on stakes over five fire baskets. The shape of the aircraft is outlined on top of the wire netting with cotton waste or salvaged fabric saturated with oil. The decoy is fired by a flare or canister attached to the wire net. Four incendiary bombs, six Very lights, and six reconnaissance flares are inserted along the fuselage. Two sealed gas tins are placed on the wings. Small pieces of scrap aluminum will furnish the white glow associated with burning aircraft.
- (b) *Burning house.* Figure 112 shows three suggestions for using basket fires to fire a decoy house or building.



USE MUD BRICKS OR CANS FILLED WITH SAND FOR WALL STRUCTURE. MAKE ROOF SUPPORTS OF WOOD SLATS OR METAL. COVER WITH FABRIC.



USE TIMBER OR METAL FRAMEWORK FOR WHOLE BUILDING. ROOF AND SIDES TO BE CLOTH STRETCHED TAUT.

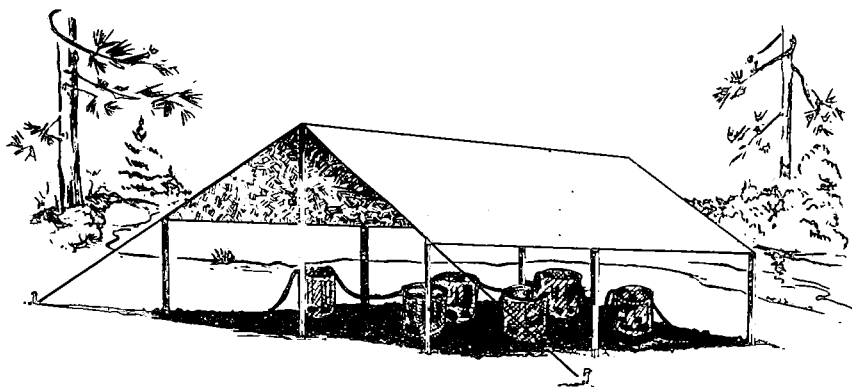


Figure 112. Burning building decoy fire.

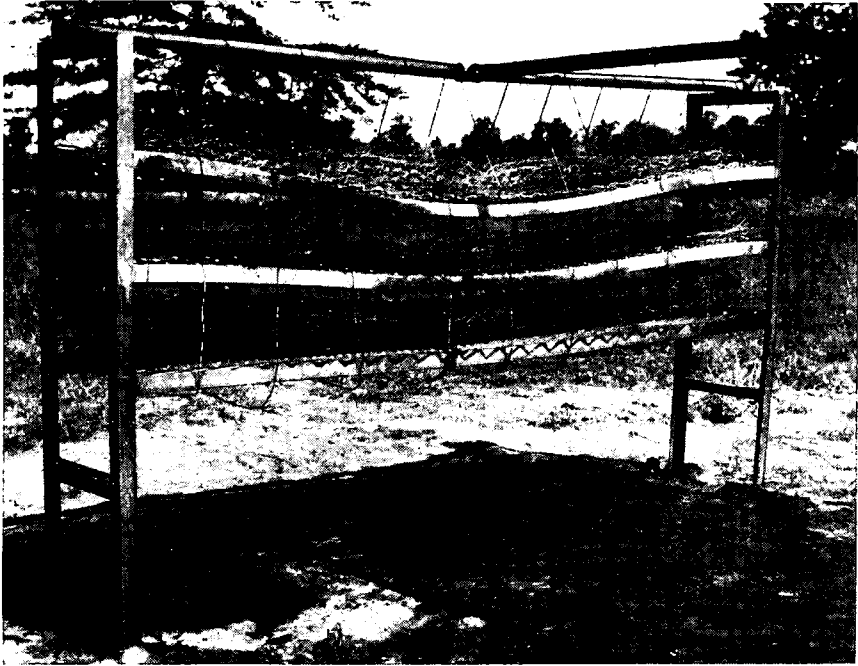


Figure 113. Grid oil-fire device.

- (2) *Grid fire (oil drip fire).* The grid fire (oil drip fire) (figs. 113 and 114) which is intended to simulate a burning wall, consists of several rolls of chicken wire (12-inch diameter) placed in an iron frame to form a vertical wall. The rolls are filled with oil-soaked combustible material and an attachment is provided to drip oil into them. A squib, fuse, and flare-bag arrangement provides ignition by remote control. The grid fire flares up 5 minutes after being ignited. It burns brightly, producing flames 10 to 15 feet high. Oil dripping on the hot chicken wire continues to ignite after the other material has completely burned, and the device continues to operate as long as the oil supply lasts.
- (3) *Oil-fed fire.* The purpose of the oil-fed fire (figs. 115 and 116) is to provide a continuous flickering fire which will burn for 8 to 12 hours. The oil-fed fire consists of a metal grid filled with coal under which are placed flare cans of coal oil. An oil drip arrangement keeps the fire burning brightly. The flare cans provide large flares of varying intensity. The oil-fed fire produces flames approximately 6 to 10 feet high.
- (4) *Boiling-oil fire.* The boiling-oil fire (fig. 117) consists of a trough for burning coal, over which is placed a shallow pan.

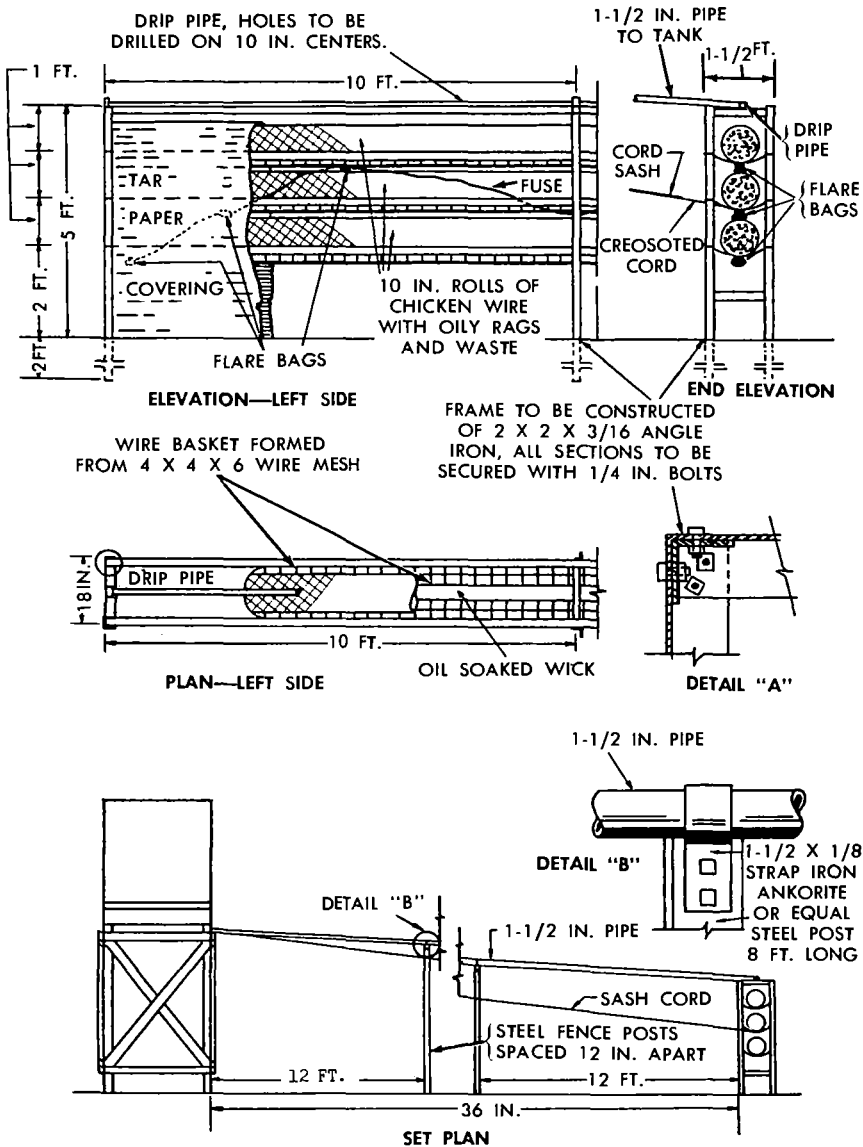


Figure 114. Plans for constructing a grid oil-fire device.

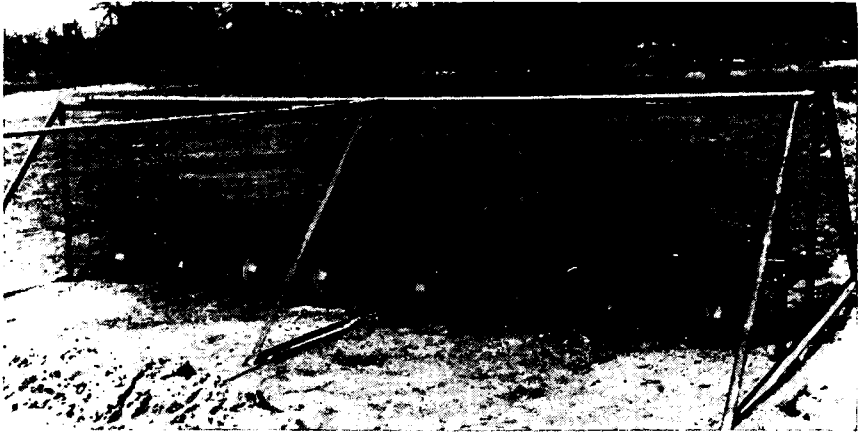
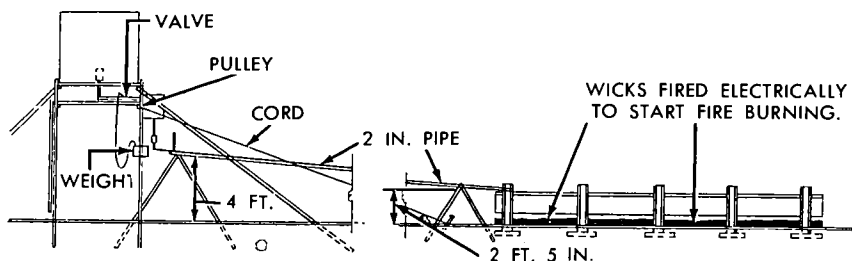


Figure 115. Oil-fed fire device.

After the pan has been heated by the coal fire, oil and water are alternately discharged into it, causing large bursts of smoke, flame, and steam. The purpose of this fire is to create the effect of supplies burning and exploding. The explosions are produced by discharging water on the heated oil. It is intended for use in areas where prolonged air raids are expected. Specifically, it serves (when used in quantity) to simulate a large fire, such as might be started early in a raid, and which then acts as a target for subsequent waves of bombers. The trough takes 20 minutes to heat up, during which time fire baskets, oil-fed fire, and other devices may be used to create the desired illusion. The boiling-oil fire produces flames up to 40 feet high when oil and water are discharged into the trough.

- (5) *Field expedient boiling-oil fire.* The field expedient boiling-oil fire (fig. 118) consists of a shallow ditch containing a grate mounted on bricks, 6 inches above the ground. Over the grate a section of light bar-and-rod steel landing mat is suspended on stakes. Halves of 55-gallon oil drums are placed on the mat. These are filled with oil and a fire ignited beneath them. When the oil has been sufficiently heated to burn, water is discharged into it to produce flashes. This installation was designed as a practical expedient to be built in the field from available materials. A dirt parapet should be erected along one long side of the ditch to keep too much draft from the fire.
- (6) *Bomb flash.* Simulated explosions can be made with flamethrowers arranged either singly or in a group to be fired remotely. See FM 3-5 for various types of mobile and portable flamethrowers. Remote firing devices can be improvised by the use of solenoids.



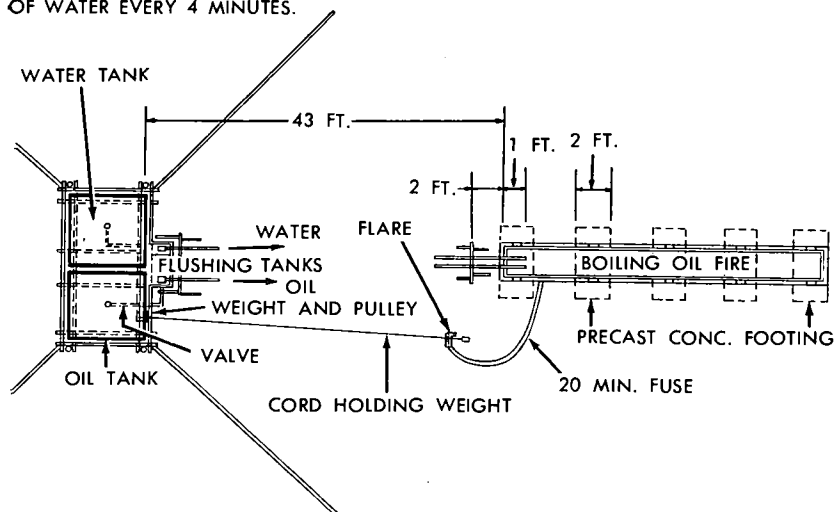


FLARE BURNS STRING, WHICH DROPS WEIGHT, OPENING VALVE WHICH STARTS A CONTINUOUS FLOW OF OIL INTO FLUSHING TANK. FLUSHING TANK HAS A VALVE, THAT EMPTIES THE FLUSHING TANK AFTER THE OIL REACHES THE REQUIRED LEVEL.

THE OIL FLUSHING TANK HAS A FLOAT THAT CONTROLS FLOW OF WATER FROM WATER FLUSHING TANK SO THAT THE REQUIRED AMOUNT OF WATER PASSES THRU WHILE THE OIL FLUSHING TANK IS REFILLING. WATER FLUSHING TANK HAS FLOAT VALVE TO PREVENT OVERFLOW.

WATER TANK HAS A WEIGHT AND VALVE THAT IS RELEASED AFTER OIL FLUSHING TANK HAS EMPTIED 5 TIMES WHICH SHOULD TAKE ABOUT 20 MINUTES.

PROPER FLOW IS 6 GALS. OF OIL FOLLOWED BY 2 GALS. OF WATER EVERY 4 MINUTES.

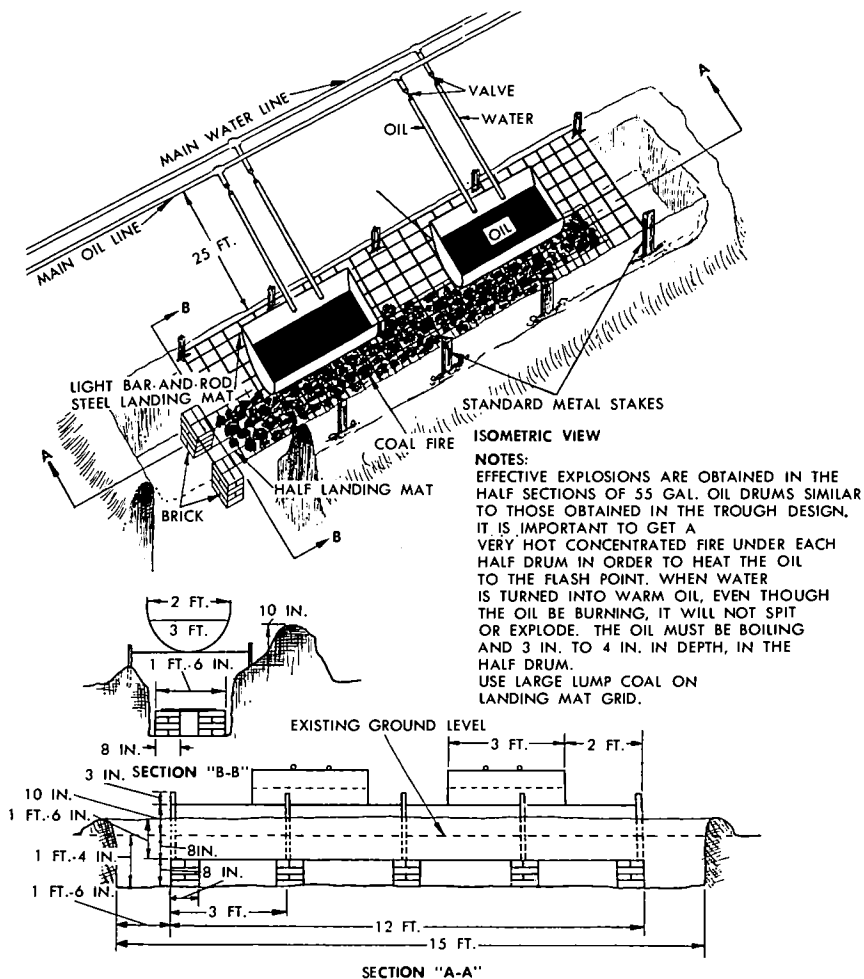


(1)

Figure 117. Plans for boiling-oil fire device.







## Section II. NIGHT DECOY INSTALLATIONS

### 75. Civilian Installation Decoys

a. Figure 119 illustrates a night decoy of a factory. This decoy may be employed alone or in conjunction with the other elements to simulate a town or city.

b. Figure 120 gives a layout simulating a dock and freight yard area with the types of devices used.

### 76. Airfield Installation Decoys

a. An example of a night decoy airfield layout is shown in figure 121.

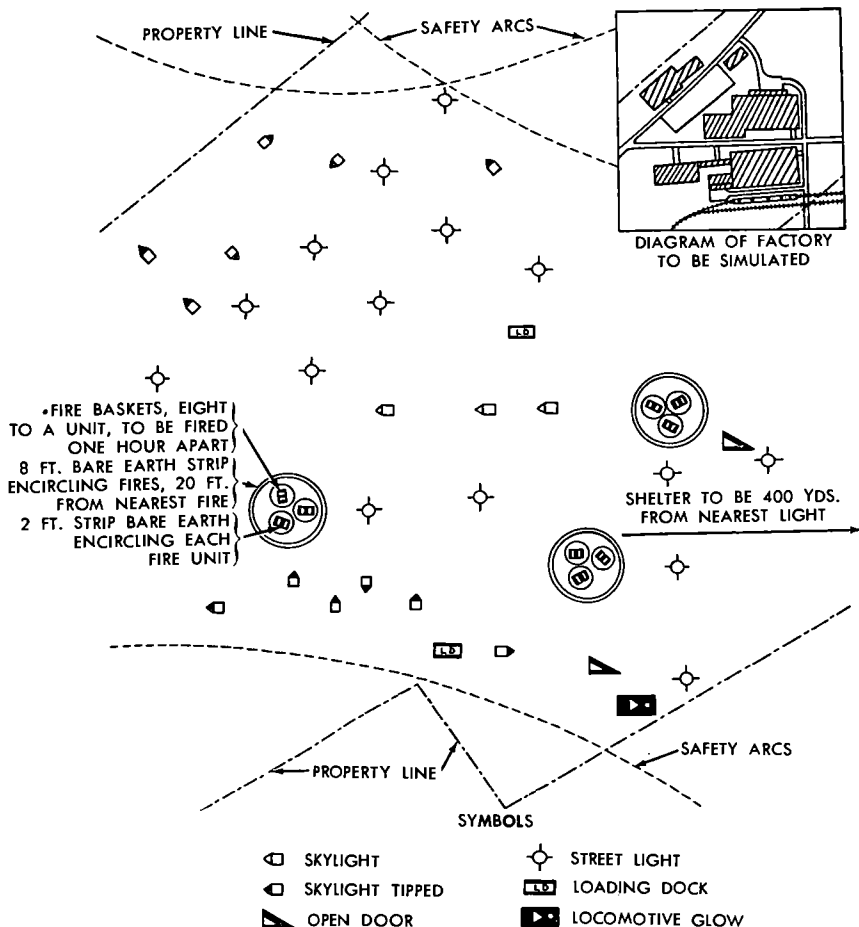


Figure 119. Night decoy of a factory site.

b. If the use of flares by hostile aircraft is anticipated, figures 122 and 123 demonstrate the necessity of some dummy construction to indicate runways and major installations.

c. If the use of flares by hostile aircraft is uncommon, day and night decoys should not be superimposed because identification of day decoys is easier and occurs more frequently than identification of night decoys. Unless night decoys are revealed by flare they are almost impossible to identify, and if the day decoy is identified it automatically compromises the night decoy which otherwise might continue to operate effectively.

## 77. Military Installation Decoys

Night decoys of field force installations may not be represented in any one typical installation. Rather, the extent and frequency of

breaches in blackout discipline will vary according to the state of training of friendly troops and the alertness of the enemy to capitalize on such breaches. Rear-area installations may be simulated in the same manner as suggested for civilian installations. Convoys may be simulated as described in paragraph 71.

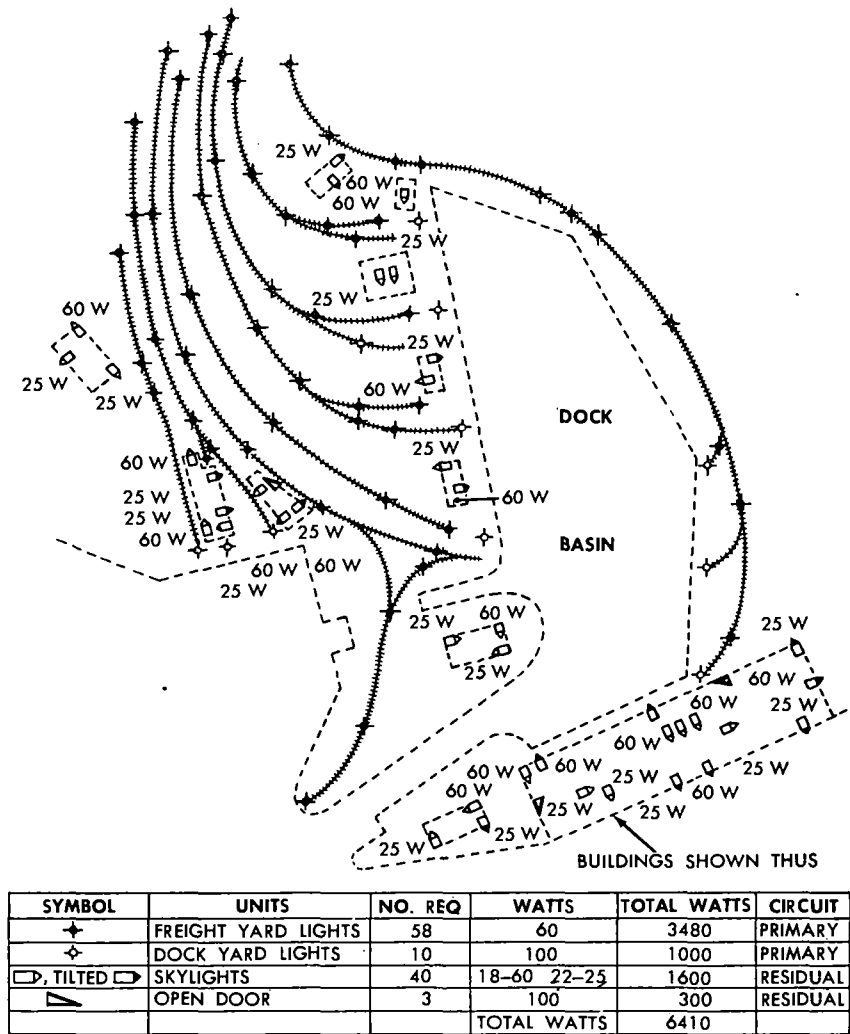


Figure 120. Night decoy of a dock and freight yard.

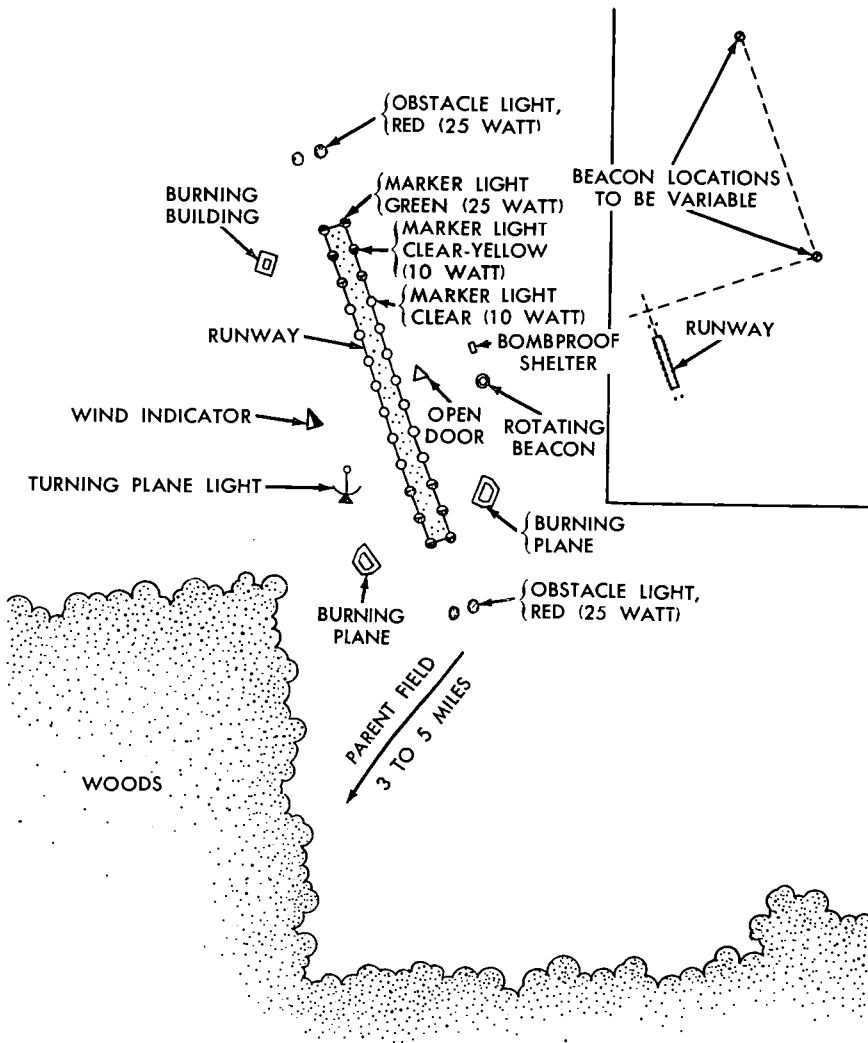
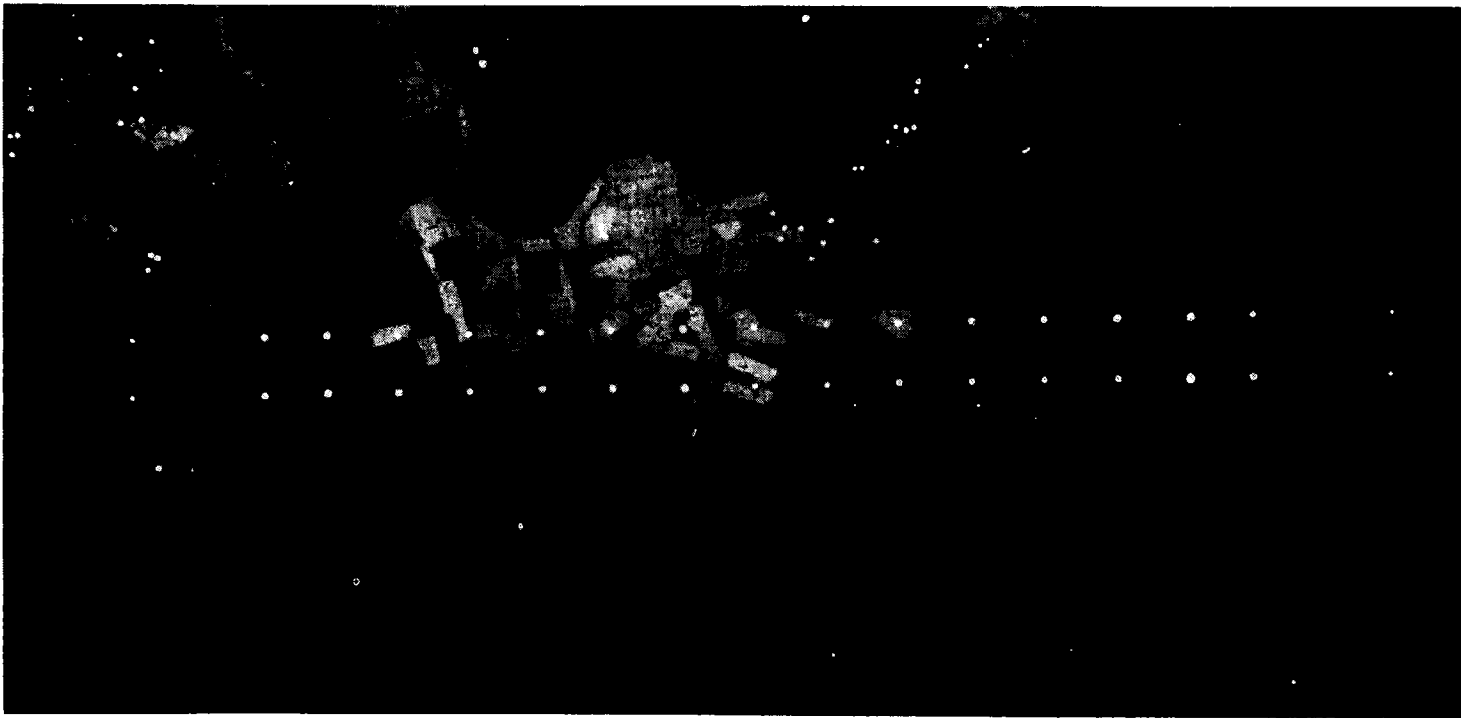
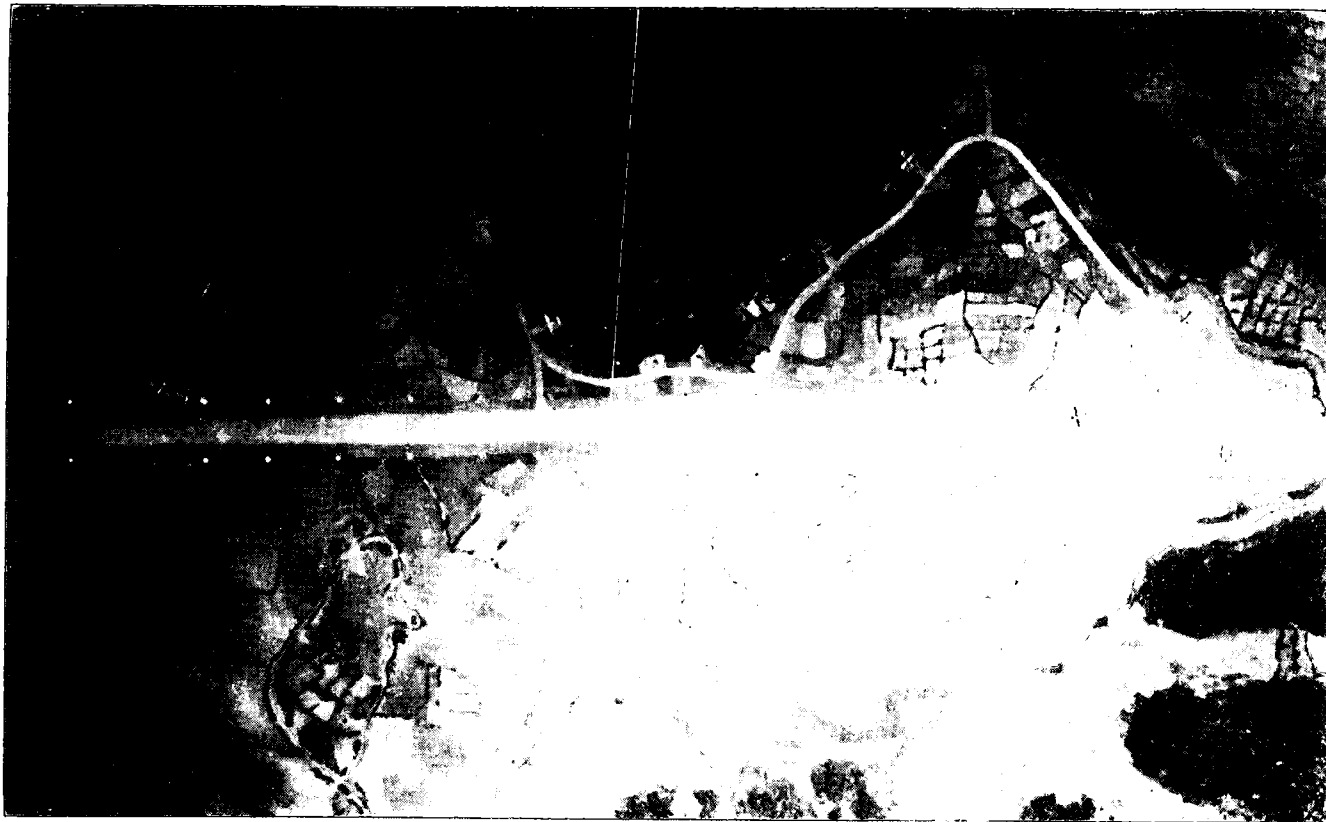


Figure 121. Lighting system of night decoy airfield.



*Figure 122. Night (only) decoy airfield by flare.*



*Figure 123. Night and day decoy airfield by flare.*

## CHAPTER 7

### FLASH SIMULATORS

---

#### 78. General

False gun-flashes may be used in either protective or deceptive decoys. If the devices throw the proper amount and color of smoke, they are effective both by day and by night. They may be utilized to simulate antiaircraft guns and field artillery. A cardinal prerequisite to using a simulated flash equipment is to provide real weapon support so timed as to produce real shells in some target area at the same instant such shells should be arriving from the decoy pieces. Without this touch of realism it is hard to visualize a situation in which decoy gunflashes would long be effective. Decoy gunflashes may be used in conjunction with a day decoy position, or by themselves at night to induce counter-battery, or in conjunction with a night decoy airfield. If they are realistic in appearance and properly coordinated with real weapons they are effective in adding very convincing reality to any decoy position.

#### 79. Flash Simulator Devices

a. *Prefabricated Devices.* Although no standardized devices are commonly in supply channels, several satisfactory types, both American and British, have been manufactured. If they are needed, requisitions may be filed through the theater engineer. The normal time lag between a requisition and the delivery of special equipment of this nature is such that any unit contemplating a deception mission should maintain a supply equivalent to the needs of at least one operation.

b. *Field Expedient Devices.* Figure 124 illustrates one method of making a field expedient gunflash simulator and a firing circuit for numerous simulators. The simulator consists of a No. 2½ can containing a cardboard disk on top of 4 to 6 ounces of either black gun or blasting powder depending upon the caliber piece being simulated. The charge is set off by an electric cap. Three dry cell batteries furnish the current for the firing circuit. Figure 125 illustrates three methods.

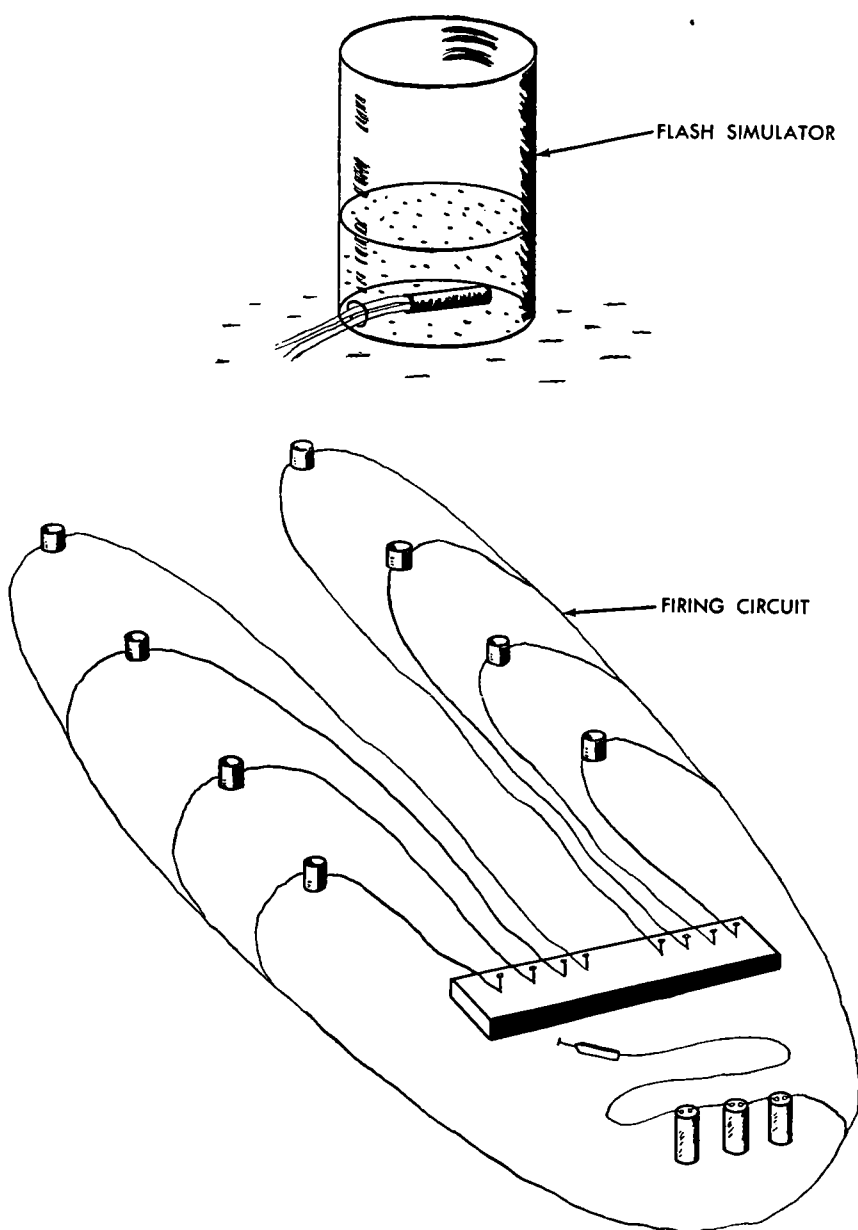
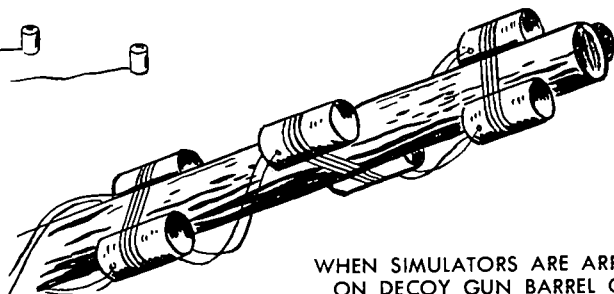
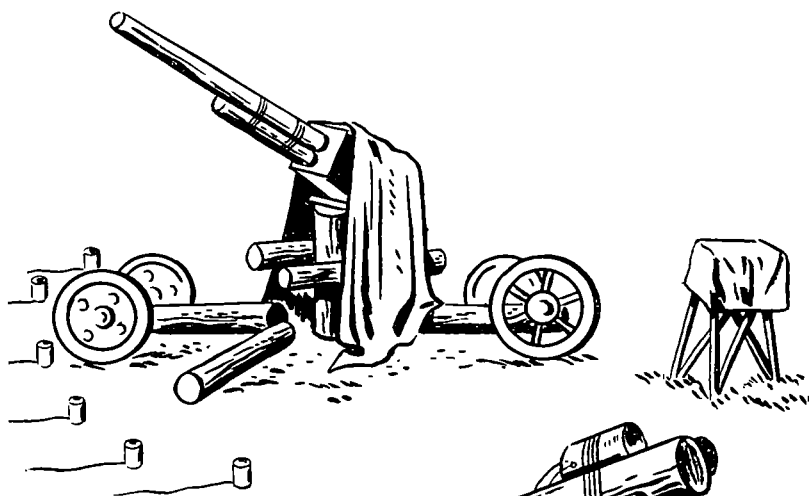
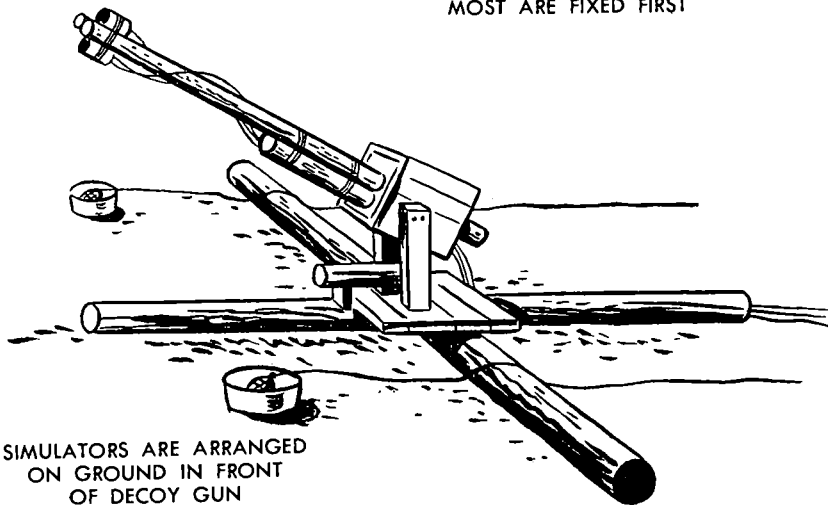


Figure 124. Field expedient gun flash simulator and firing circuit.





WHEN SIMULATORS ARE ARRANGED  
ON DECOY GUN BARREL OUTER  
MOST ARE FIXED FIRST



SIMULATORS ARE ARRANGED  
ON GROUND IN FRONT  
OF DECOY GUN

*Figure 125. Simulators mounted on decoy gun.*

## CHAPTER 8

### SMOKE PRODUCING EQUIPMENT

---

#### **80. Mechanical Smoke Generators**

Chemical Corps has the following standard devices for producing quantities of white smoke (FM 3-5).

*a.* Mechanical smoke generator M1 is a heavy-duty, trailer-mounted device capable of delivering large quantities of white smoke for 8 to 12 hours if equipped with auxiliary fog oil supply.

*b.* Mechanical smoke generator M2A1 is a portable device, TOE equipment with chemical smoke generator companies, capable of delivering substantial quantities of smoke for about 1 hour.

#### **81. Smoke Pots**

*a.* HC smoke pot M1, weighing 15 pounds, burns about 8 minutes.

*b.* Miniature smoke pot M1, weighing about 2 pounds, burns about 3 minutes.

*c.* HC 30-pound smoke pot M5, burns about 15 minutes.

*d.* HC floating smoke pot M4A1, for use in river or beach operations, weighs about 38 pounds and burns about 15 minutes.

## APPENDIX I

### REFERENCES

---

SR 320-5-1	Dictionary of United States Army Terms.
SR 320-50-1	Authorized Abbreviations.
DA Pam 108-1	Index of Army Motion Pictures, Television Recordings and Filmstrips.
DA Pam 310-series	Military Publications Indexes.
DA Pam 310-5	Index of Graphic Training Aids and Devices.
FM 3-5	Tactics and Technique of Chemical, Biological, and Radiological Warfare.
FM 3-50	Chemical Smoke Generator Battalion and Chemical Smoke Generator Company.
FM 5-20-series	Camouflage series.
FM 5-22	Camouflage Materials.
FM 21-5	Military Training.
FM 21-6	Techniques of Military Instruction.
FM 21-30	Military Symbols.
FM 101-5	Staff Officers' Field Manual: Staff Organization and Procedure.
TM 30-246	Tactical Interpretation of Air Photos.

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[AG 618.33 (17 Jul 1956)]

By Order of *Wilber M. Brucker*, Secretary of the Army:

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*NG*: State AG (6); units—same as Active Army.

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For explanation of abbreviations used, see SR 320-50-1.

## FIELD MANUAL

## FIELD DECOY INSTALLATIONS

FM 5-23  
CHANGE  
No. 1

HEADQUARTERS,  
DEPARTMENT OF THE ARMY  
Washington 25, D. C., 30 November 1960

FM 5-23, 3 October 1956, is changed as follows:

## CHAPTER 9

## PNEUMATIC DECOY TARGETS

(ADDED)

**82. Description**

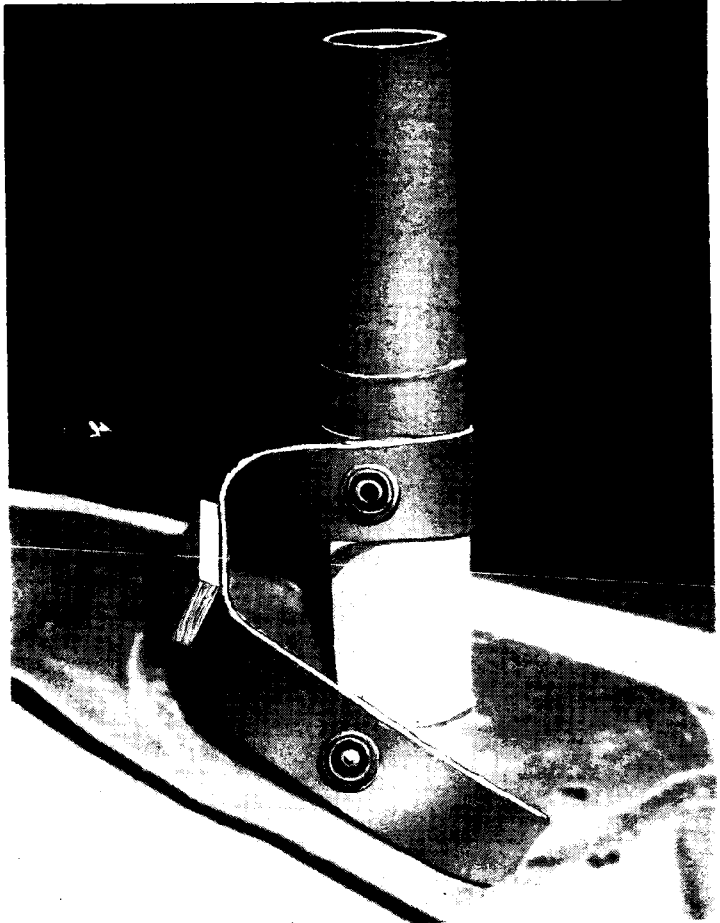
a. Pneumatic decoy targets, referred to in the following paragraphs simply as "targets," are prefabricated, three-dimensional, pneumatic simulation devices. They are intended to be displayed with partial camouflage, so as to simulate military vehicles, tanks, guns, and other standard equipment to unaided visual observation at 1,500 feet and beyond.

b. The targets are constructed of 4-, 6-, and 8-inch air-retaining tubing made of three-ply neoprene coated cotton fabric, each ply separated by a neoprene film. The tubes are tailored and connected to form the general contours of the particular item to be simulated. The resulting framework is covered with a light-weight neoprene-coated fabric which is cemented to the framework to form the finished outer surface of the target.

c. The inflation and deflation valves are of the rubber football type (fig. 126). The stem of the valve consists of 1-inch rubber tubing, 7 inches long, which is attached by cementing its flanged base directly to the air-retaining tube. A valve strap with a snap fastener is secured to the valve for clamping in a closed position. The inflation valves are painted white at the tip and the deflation valves are painted white at the base.

d. The targets are designed to withstand some external loading such as camouflage materials, but damage will result if they are subjected to heavy weights.

e. The targets are not designed for operation at subzero tem-



Open

*Figure 126. Football type rubber valve.*



Closed

*Figure 126—Continued.*

peratures, but can be employed during all other normal climatic variations.

f. At list of the targets including pertinent logistical information is given in table IV. Actual weights and cubages may vary slightly in some instances. The erection and deflation times are approximate and are based on daylight operation, using a 60 CFM air compressor.

### **83. Mounting**

a. The packaged target should be unloaded close to the desired position. Sharp stones, fallen limbs, and any other objects which might puncture the target should be removed. The case is then unlaced and the target unrolled and spread on the ground (fig. 127).

Table IV. Logistical Data

Nomenclature	Stock no.	Erection time	Deflation time	Crated weight	Uncrated weight	Crated bulk	Uncrated bulk
		(man-minutes)	(man-minutes)	(pounds)	(pounds)	(cubic feet)	(cubic feet)
Decoy target, gun antiaircraft; self-propelled, 40-mm.	1080-571-6463	15	14	625	429	51.2	43.5
Decoy target, gun; field artillery, towed, 155-mm.	1080-570-6517	8	4	406	271	35.7	30
Decoy target, howitzer; light, towed, 105-mm.	1080-570-6519	3	5	147	93	14.7	12
Decoy target, howitzer; medium, towed, 155-mm.	1080-570-6520	6	5	240	150	25.5	20
Decoy target, howitzer; self-propelled, 105-mm.	1080-571-6462	19	23	743	482	65	58
Decoy target, tank; combat, full-tracked, medium, 76-mm gun, M41.	1080-536-4587	18	18	812	450	94	80.5
Decoy target, tractor; full-tracked, high-speed, M5.	1080-570-6530	13	15	447	300	39.5	32.5
Decoy target, tractor; full-tracked, high-speed, M8A1.	1080-570-6532	20	18	698	466	59.5	51.5
Decoy target, truck; cargo, 2½-ton, 6x6, M34.	1080-570-6524	16	18	567	351	56	48
Decoy target, truck; wrecker, medium, 5-ton, 6x6, M62, w/winch, W/E.	1080-570-6525	28	25	767	470	77	66
*Decoy target, tank, 90-mm.	1080-570-6526	22	26	799	520	72	62
*Decoy target, vehicle, utility, armored.	1080-570-6529	12	16	610	395	60	48

\* Nonstandard items. Only a limited quantity procured. Not available for further issue.



*Figure 127. Decoy target, truck; wrecker, 5-ton, 6x6, M62, w/winch, W/E spread prior to inflation.*



b. All *deflation* valves are closed.

c. The main structure is inflated first, beginning with the lower portions, and proceeding upward. Wheels, tracks, air mattress chambers, and other inflatable surface features are inflated last. Although no exact order of inflating the various systems need be followed, the general rule of inflating first the internal supporting structure, and then the surface features, should always be applied. This procedure results in the most rapid spreading and raising of the target with the least stress on the structure, and contributes to efficient operation by reducing the mounting time and maintenance.

d. The pressures used in the different size tubes vary from 1½ psi to 3 psi. Four-inch tubing is inflated to 3 psi, 6-inch to 2 psi, and 8-inch to 1½ psi. The large wheels are inflated to 1 psi and the air mattress chambers to 2 psi. (A pneumatic float low-pressure air gage, Federal stock No. 5420-506-4316, for reading pressures up to 10 psi is available.) Experience enables an operator to determine the proper pressure by the "feel" of the tubes. They should be firm but not hard. Proper inflation allows the target to support its own weight, with the exception of long extended surface features such as gun barrels (*e* below). Inflation is accomplished with a power-driven rotary air compressor, 60 CFM. Care must be taken that the tubes and surface features are not overinflated. In this connection, caution should be exercised when inflating the air mattress chamber and spare tire on the 5-ton medium wrecker simulator (fig. 137). Both features are inflated through 4-inch tubes leading to the valve. This appears as though 4-inch tubing were being inflated, requiring 3 psi, when actually the mattress requires only 2 psi and the spare tire only 1 psi. Inadvertent overinflation of these features must be avoided.

e. After the target is fully inflated it is moved by means of the carrying straps to a realistic position. If the item has a rigid support (fig. 129) this is installed and the target is adjusted for proper attitudes of the various parts. Gun barrels are placed at appropriate angles, ropes on the tank guns are adjusted to support the guns properly (fig. 138), and the item is generally "dressed-up." This procedure should include use of natural or artificial concealment materials in such a way as to obscure unrealistic features of the target (e.g., gun barrel support poles, guy lines, etc.), and the display of other materials, for increased realism, to indicate the proximity and activities of attendant troops.

f. The targets are anchored by securing the tie ropes found along the sides of the top structure to tent pins driven in the

ground, or if desirable, to nearby trees. Ropes are also provided halfway up the sides of the larger targets. More ropes than are required for anchoring under normal conditions are provided in the event strong surface winds necessitate greater anchorage. Figures 128 through 139 illustrate the different type targets fully inflated.

#### **84. Maintenance of Mounted Target**

After the targets are inflated and secured properly they can be maintained with little effort. They can also stand repeated use in many operations if handled carefully. A few vital considerations and cautions are discussed below.

*a.* When a target is to be moved after it has been inflated it should be carried by means of the carrying straps. It should never be dragged, since the resulting abrasion can cause severe damage to the tubes and fabric. The target is designed to support itself while resting on the ground. Any attempt to raise or move it by lifting on portions not in contact with the ground may result in tearing or in separation of various components.

*b.* Since temperature has a marked effect on pneumatic devices, it is necessary, in order for the target to retain its pressure and, in turn, its realistic appearance, to check an inflated target at least three times a day. In the early morning, when the temperature is low, the device may require additional air; as the temperature rises, it may be necessary to release some air; and in the evening, when the temperature again falls, the targets may once more need additional air. Furthermore, some air leakage through the fabric is always present, and additional air may be required to compensate for this minute, but constant, loss.

#### **85. Dismounting**

*a.* The anchor ropes are released, all valves are opened, the support poles, if used, are removed, and the air is pressed out manually.

*b.* The deflated target should be dry and free of grease, mud, or other foreign matter before packing.

*c.* The target is folded first from the sides toward the center, and then from the ends toward the center, forming a compact bundle.

*d.* The carrying case is spread on the ground. All foreign matter, such as rocks, sticks, or glass, is removed. The folded target



*Figure 128. Decoy target gun, anti-aircraft; self-propelled, 40-mm.*



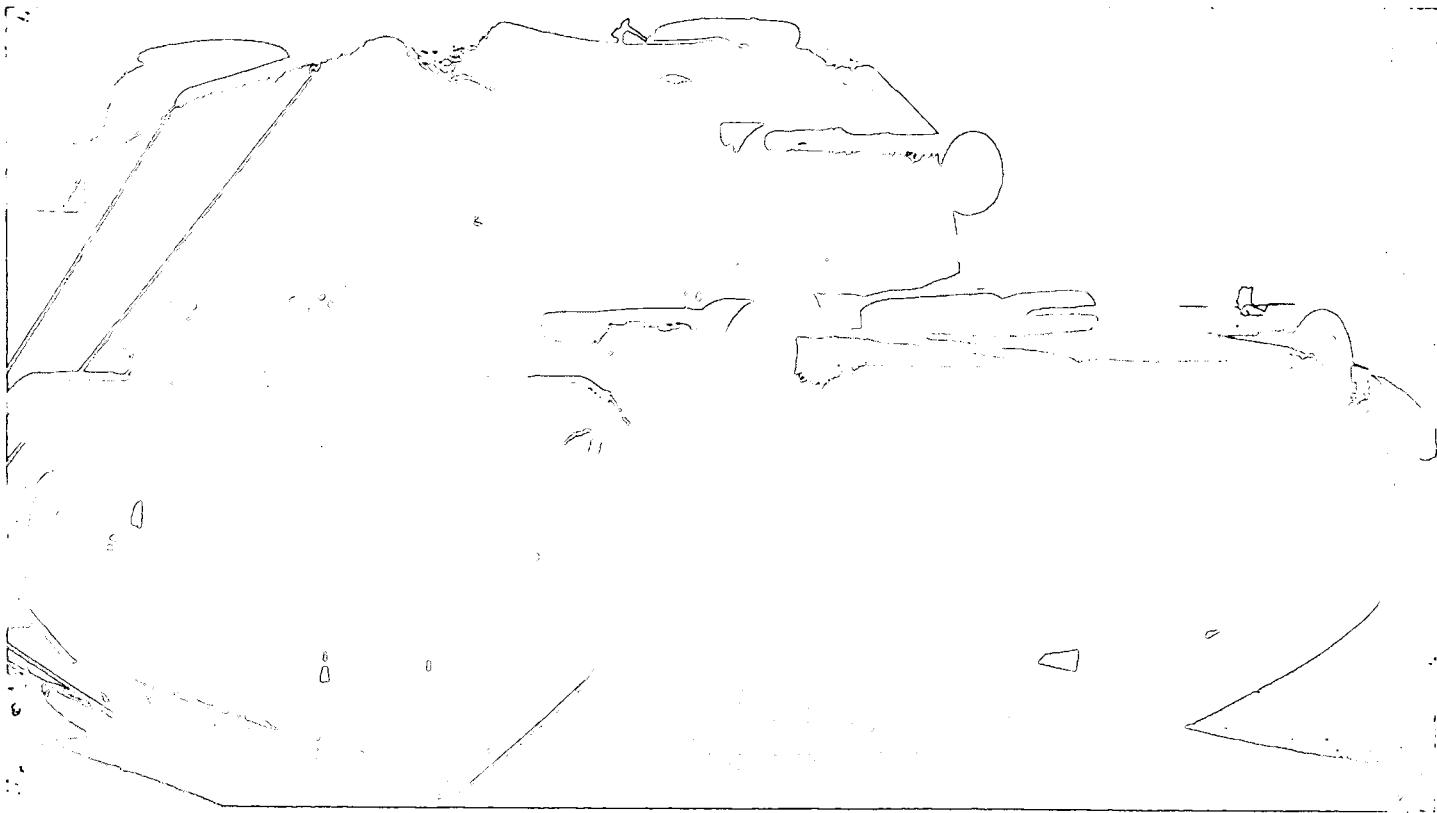
*Figure 129. Decoy target, gun; field artillery, towed, 155-mm.*



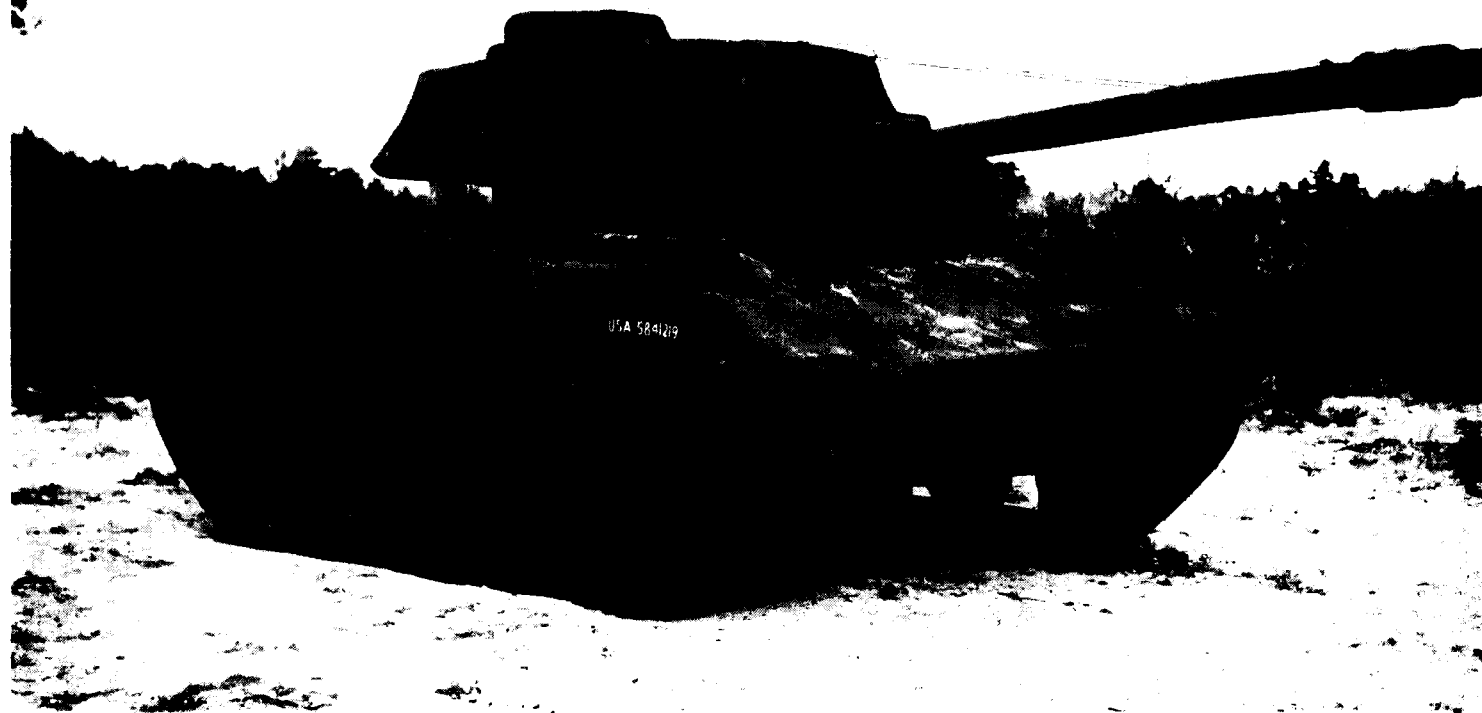
*Figure 130. Decoy target, howitzer; light, towed, 105-mm.*



*Figure 131. Decoy target, howitzer; medium, towed, 155-mm.*

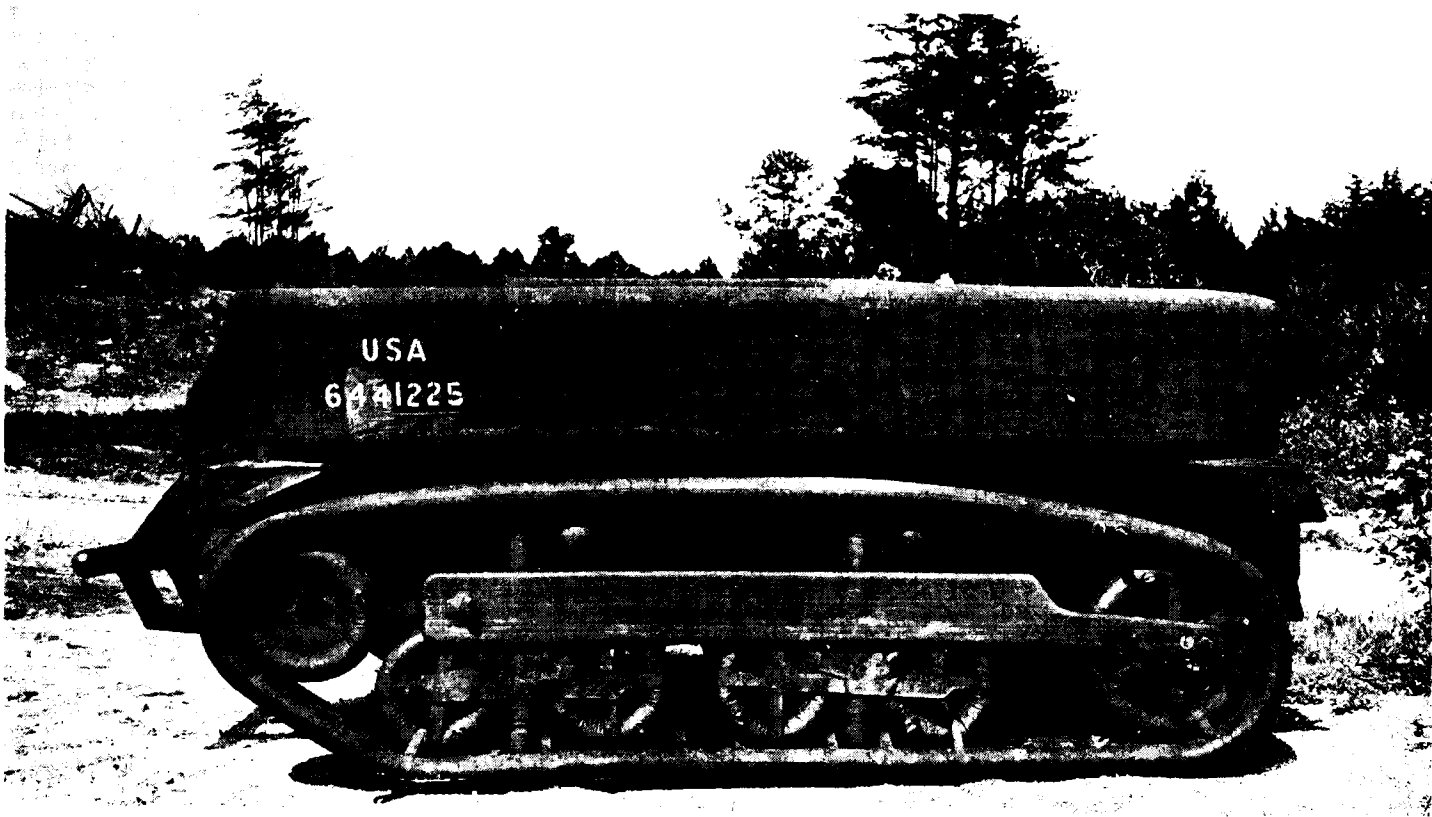


*Figure 132. Decoy target, howitzer; self-propelled, 105-mm.*



*Figure 133. Decoy target, tank; combat, full-tracked, medium, 76-mm gun, M41.*





*Figure 134. Decoy target, tractor; full-tracked, high-speed, M5.*

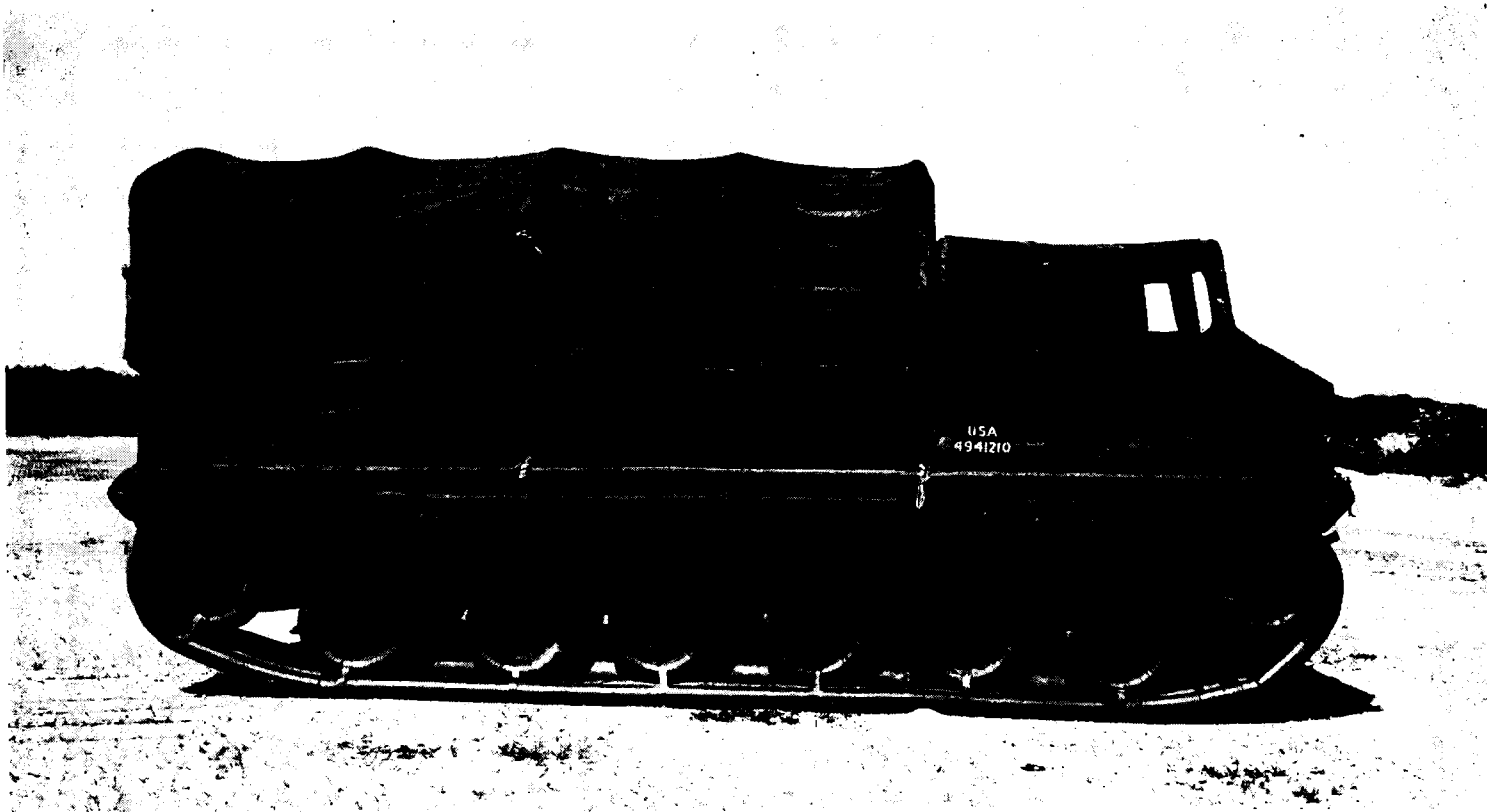
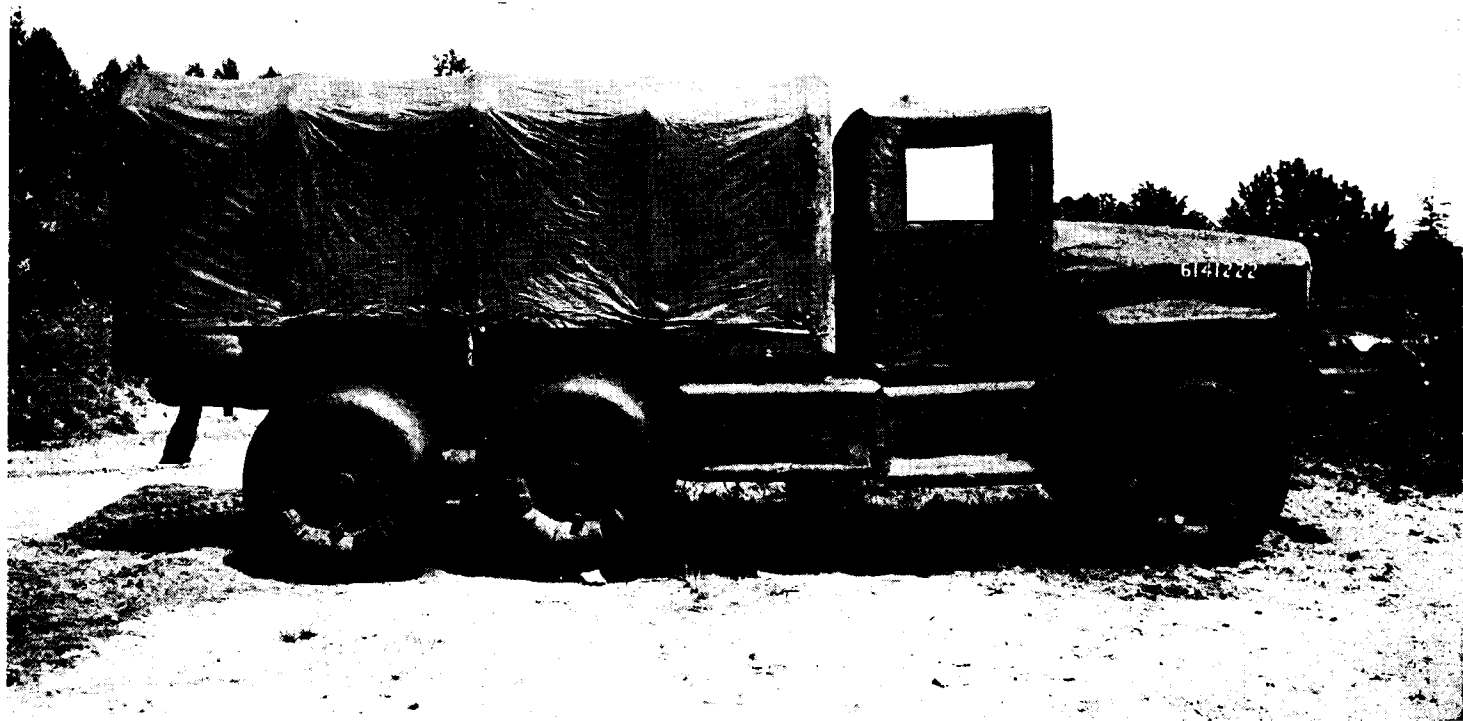


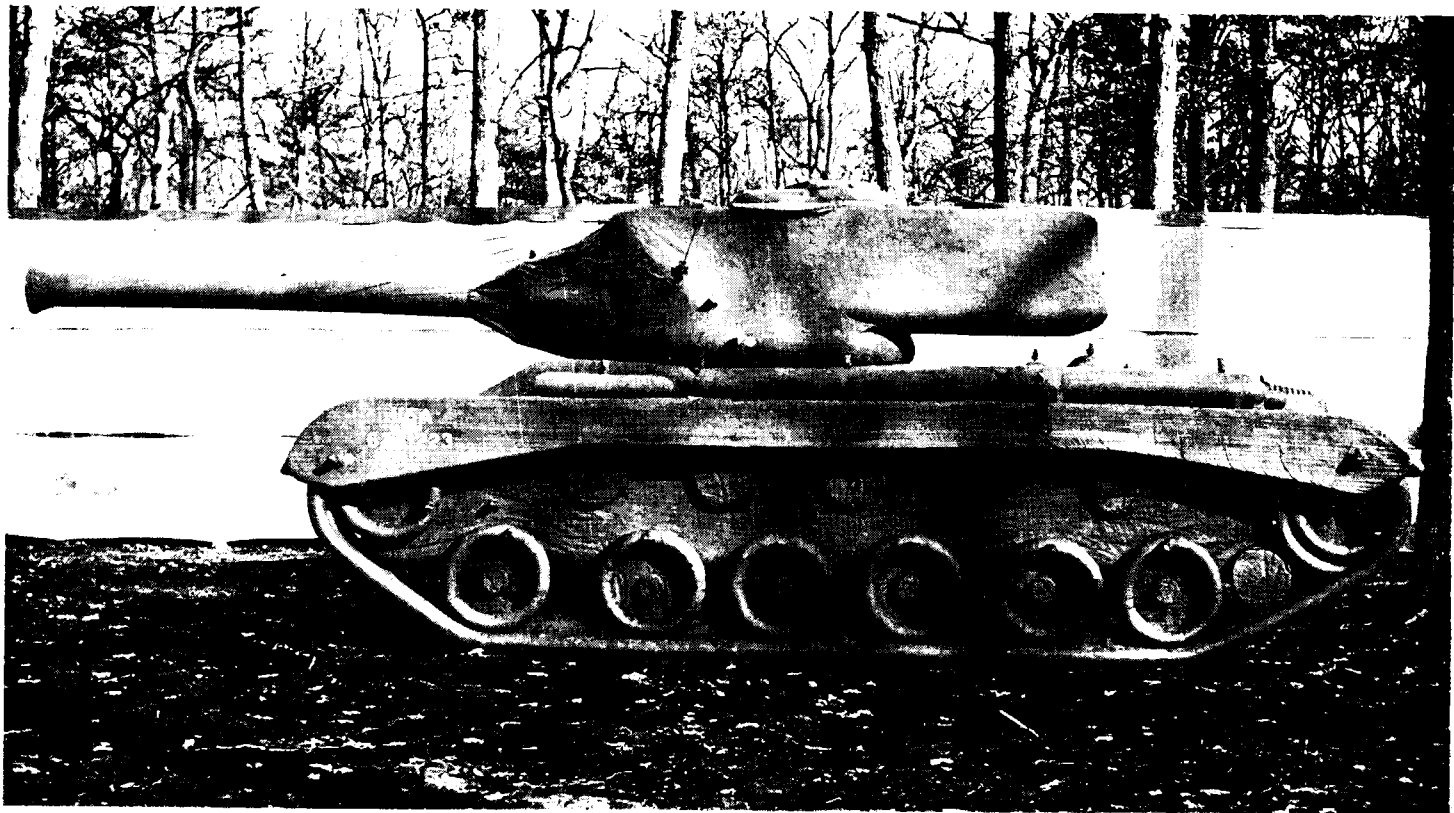
Figure 135. Decoy target, tractor; full-tracked, high-speed, M8A1.



*Figure 136. Decoy target, truck; cargo, 2½-ton, 6x6, M34.*



*Figure 137. Decoy target, truck; wrecker, medium, 5-ton, 6x6, M62, w/winch, W/E.*



*Figure 138. Decoy target, tank, 90-mm.*



Figure 139. Decoy target, vehicle, utility, armored.

is placed in the center of the case and the flaps are drawn around the bundle by means of the ropes and lacing rings. The lacings are drawn successively tighter with a series of pulls, so as to deflate the device completely and reduce its bulk.

e. If the device is to be stored, the tubes should be sprinkled with talcum powder before storage.

## **86. Care and Repair**

a. The care and repair of targets does not require the employment of excessive precautions or involved procedures. Repair Equipment, Pneumatic Target: Set 8, may be requisitioned in accordance with DA Pam 30-30, and maintenance may be performed by all maintenance echelons. See TB ENG 28, "Repair of Engineer Pneumatic Equipment," 1958, Section IV, for methods and procedures to use in the repair of pneumatic simulation devices.

in paragraph 11*d* of TB ENG 145.

b. A description on repair of air-mattress fabric is contained

[AG 618.33 (14 Sep 60)]

By Order of *Wilber M. Brucker*, Secretary of the Army:

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