



UC333
U5
1952

Table of Contents

Chapter I

Introduction

1. History and Background
2. General Requirements
3. Discussion of Specific Requirements
4. Functioning of System

Chapter II

Delivery of 1/4 Ton Truck, 4 x 4, by Parachute

1. Preparing the Aircraft for Aerial Delivery of Heavy Equipment by Parachute
2. Selection of Vehicles for Parachute Delivery
3. Parachute Delivery of the 1/4 Ton Truck
4. Technique of Loading Aircraft for Platform Drops

Chapter III

Delivery of 105mm Howitzer by Parachute

1. Parachute Delivery of the Howitzer, 105mm M2 A1, on Carriage, M2 A2
2. Loading the Howitzer for Parachute Delivery with the 1/4 Ton Truck
3. Installing the Shear Web Assembly and Extraction Parachute
4. Restraining Loads Within the Aircraft
5. Procedure for Dropping

Chapter IV

Delivery of 3/4 Ton Truck, 6,000 Pound Load-Bearing Platform, and A-22 Container by Parachute

Section I

1. General Consideration for Parachute Delivery of 3/4 Ton Truck

Section II

1. Parachute Delivery of Miscellaneous Equipment on the 6,000 Pound Load-Bearing Platform

Section III

1. General Considerations for Parachute Delivery of Eight A-22 Containers

Chapter V

Pilot Parachute and Ground Disconnect

Section I

1. The Pilot Parachute

Section II

1. Assembly and Installation of Parachute Ground Disconnect

Section III

1. Heavy Drop Check List

Chapter I

Introduction

1. History and Development of the Heavy Drop Technique

a. In 1946 Army Ground Forces expressed the requirement for a satisfactory method of delivering medium artillery pieces and their prime movers by parachute. The Air Materiel Command at Wright Air Force Base conducted the research and development, and in 1949, Army Field Forces Board Number 1 at Fort Bragg, North Carolina, began tests on the system developed for dropping heavy equipment. Forty drops over a ninety day period resulted in standardization of an aerial delivery kit for the 1/4 ton truck and the 105mm howitzer. However, little progress was made in procurement. The original planning of Operation "Swarm", an airborne maneuver held at Fort Bragg, North Carolina, in April 1950, envisioned only slight improvements in World War II methods of delivering artillery. Changes in maneuver planning, however, sufficiently speeded up procurement to have sixty aerial delivery kits for 1/4 ton trucks and 105mm howitzers ready to drop in Operation "Swarm". The Korean conflict gave further impetus to the testing program to such an extent that the following items now have been successfully dropped a sufficient number of times to insure the aerial delivery capability under emergency conditions:

- (1) The 6000# Load Bearing Platform (now a standard kit)
- (2) Cargo Carrier, M29C
- (3) Gun, 40mm, M1, on gun carriage (AA)
- (4) Gun, 76mm, T 124, on gun carriage, T66
- (5) Mount, trailer, multiple, cal. 50, M55mm
- (6) 2 1/2 ton truck

2. General Requirements

a. To successfully deliver heavy equipment by parachute we must first have an aircraft capable of transporting the equipment and satisfactorily ejecting it in flight. Second, we must have a system for instantaneous extraction of the equipment to insure accurate delivery. It also must be safe to land the aircraft with the load aboard, in case the load fails to extract or is not dropped. Third, we must have an instantaneous release between the parachute and the load to prevent damage from dragging or overturning of the load.

b. The first problem has been solved. By removing the clamshell doors from the tail-loading C-82 or C-119, we can fly and drop loads weighing up to approximately 13,500 pounds, depending on the range the aircraft is to fly. The second problem is more difficult. The extraction system used today is not as positive and timely as it should be, and if malfunctions occur, it is likely that they will be traced to improper rigging of the extraction system. The third requirement was met by a delayed firing device which permits the parachute to fall free of the equipment at the instant the load contacts the ground.

3. Specific Requirements

a. Specifically we need several items to accomplish a satisfactory technique. The first of these is a set of roller conveyor sections. These must be capable of being secured to the floor of the cargo compartment in order to support the weight of the cargo, and at the same time permit free rolling of the conveyor wheels. (See Figure 1 and 1a).

b. Next we need a platform of sufficient size and strength to support the load and to present a smooth surface to the conveyor wheels. The platform must have tiedown fittings by which it may be lashed to the load so that the cargo and platform do not shift or separate upon opening shock of the supporting parachute. In addition, the platform must give some support to the load on landing, to prevent damage to the equipment. (See Figure 2).

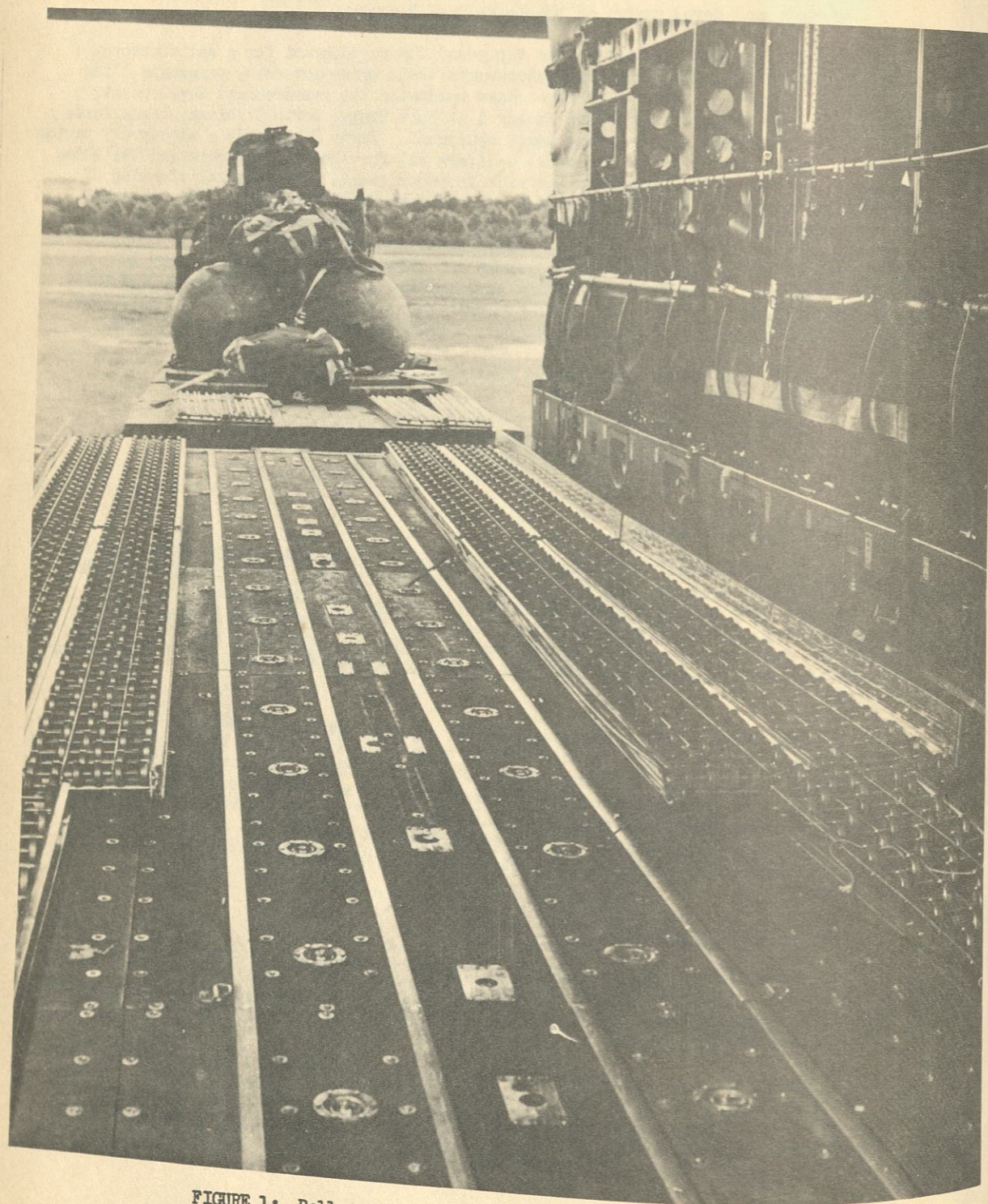


FIGURE 1: Roller conveyors installed in aircraft.

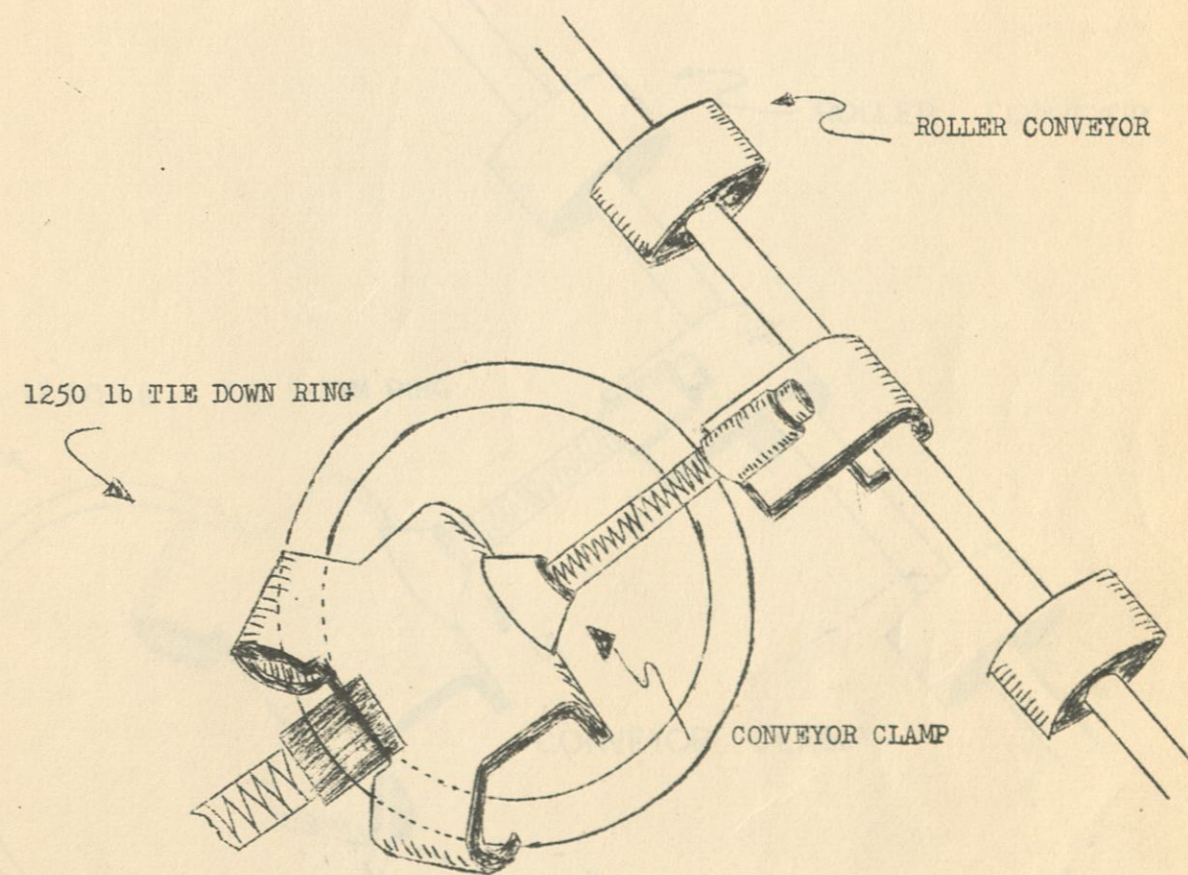


Figure 1a: Roller Conveyor clamps

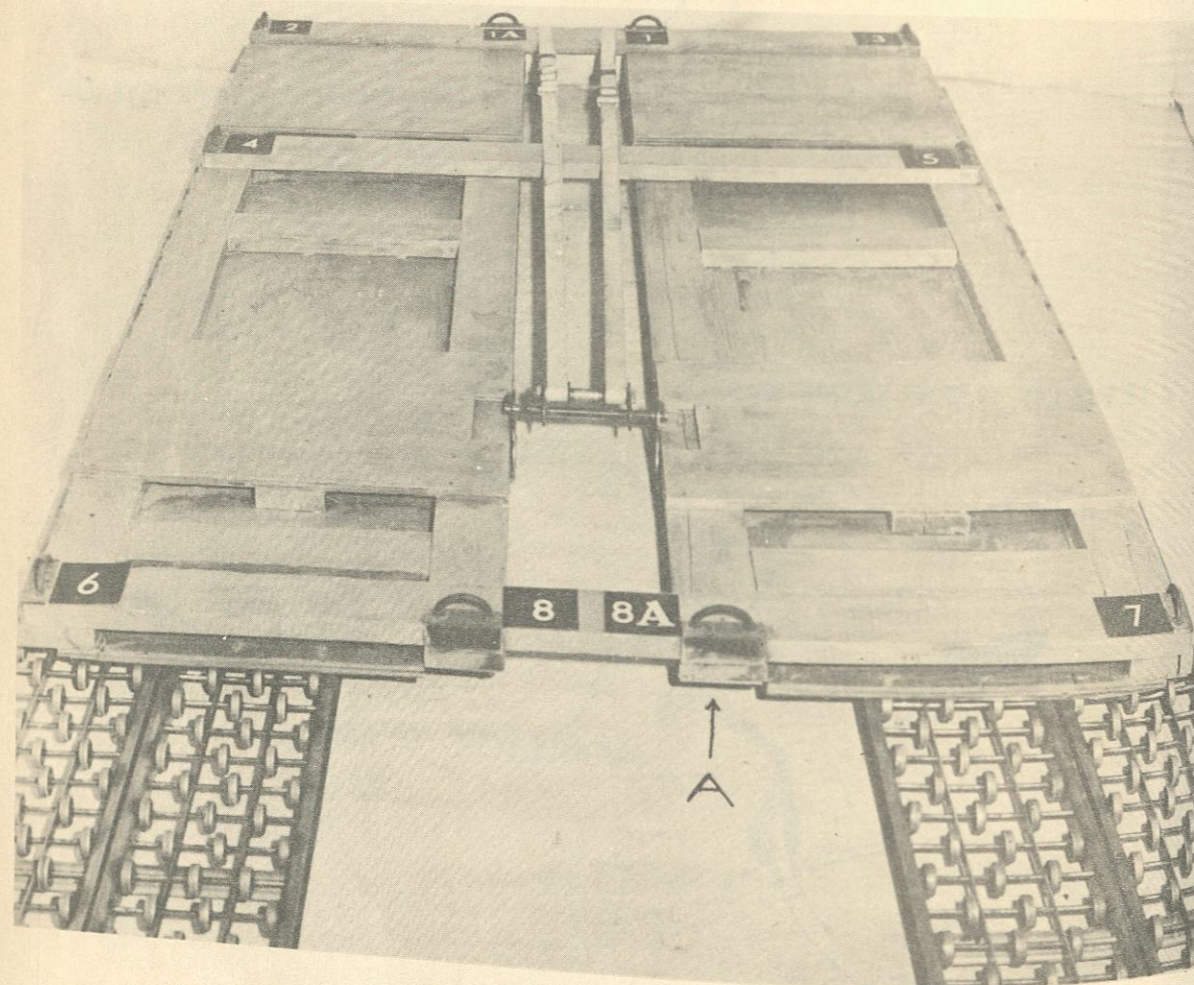


FIGURE 2: Platform for aerial delivery of heavy equipment.

c. Next, tiedown equipment is required to attach the platform to the load. The tiedowns should be of the quick release type so that the cargo can be made ready for immediate use when it is on the ground. (See Figure 3).

d. Next, additional tiedowns are needed to secure the cargo and the platform in the aircraft. Normal restraint criteria are used to determine the number of lashings that are required. Again, these are of the quick release type, so they can be released just before the drop. B-1 or C-2 tiedown devices are satisfactory. One additional tiedown is required to restrain the load until the exact time of drop. A nylon web of 10,000 pound tensile strength is used for this purpose.

e. Protection from landing shock is required. Vehicles are loaded on drop platforms with a crash frame and padding assembly that protects the load by taking up most of the landing shock.

f. Finally, we need a suspension assembly and a canopy large enough to support the load at the desirable rate of descent, 20 to 25 feet per second. The suspension webs are made of 30,000 pounds tensile strength nylon. The G-11 canopy is a 100 foot diameter parachute capable of safely dropping 3,500 pounds at 150 MPH. The point of support should be at least six feet above the load to prevent damaging the load with the suspension system on opening shock. (See Figure 4 and 4a). For loads heavier than 3,500 pounds, additional G-11 parachutes are added as required.

g. Any load delivered on a platform must be securely attached thereto. The extraction system that pulls the load out of the plane and a suspension system that supports it while in the air are attached to the load.

4. Functioning of the System

a. The load, on its platform, is then loaded into the aircraft, which has been prepared by having wheeled conveyor sections installed on its floor to support the load.

b. Before the take-off, the load is secured to the aircraft with tiedown devices. As the plane approaches the drop zone, all tiedowns except one are released. The one tiedown that is not released is a heavy web loop that is tied to a tiedown fitting at the rear of the platform.

c. As the aircraft comes over the drop point, a small pilot parachute is released at the rear of the aircraft. This parachute opens and pulls out a ribbon-extraction parachute. When the extraction parachute opens, it pulls a knife against the single remaining tiedown that is holding the load in the aircraft. The tiedown webbing is sheared, and as the extraction parachute continues dragging, it pulls the platform over the wheeled conveyor sections and out of the aircraft.

d. As the load falls free of the aircraft, the drag of the extraction parachute is transferred from the platform to the main parachute. This drag pulls the cover off the main parachute and the parachute deploys. When the main parachute is open, a break-cord breaks, separating the main parachute from its bag and the entire extraction system, which then descends as a separate group under the ribbon parachute. The main parachute carries the load to the ground. (See Figure 5).

e. A fuse-and-spring-activated disconnect assembly, installed in the suspension system between the main parachute risers and the suspension webs of the load, operates as soon as the load lands. This frees the canopy from the load and keeps the load from being turned over or dragged by any ground wind.

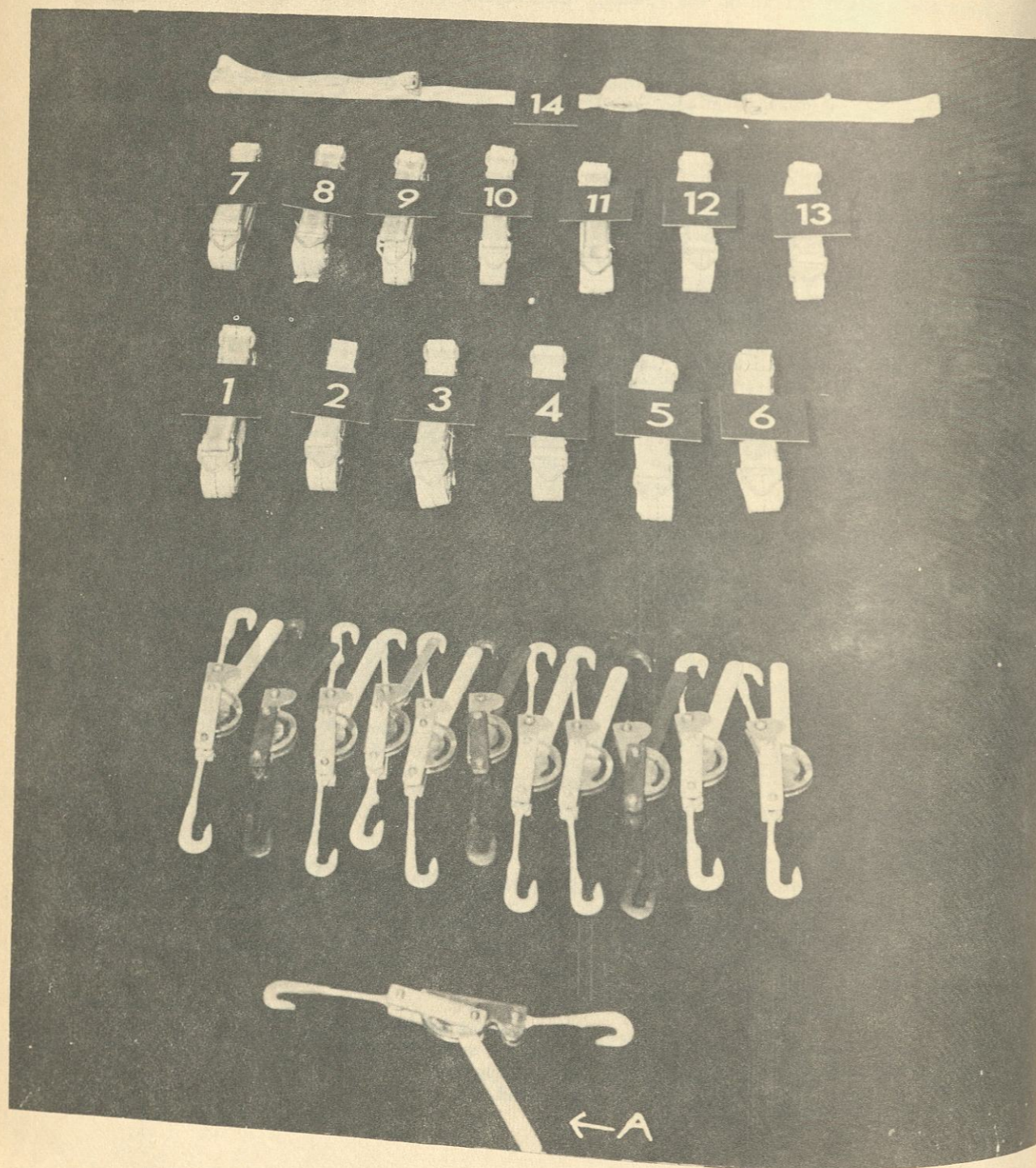


FIGURE 3: Tiedown equipment.

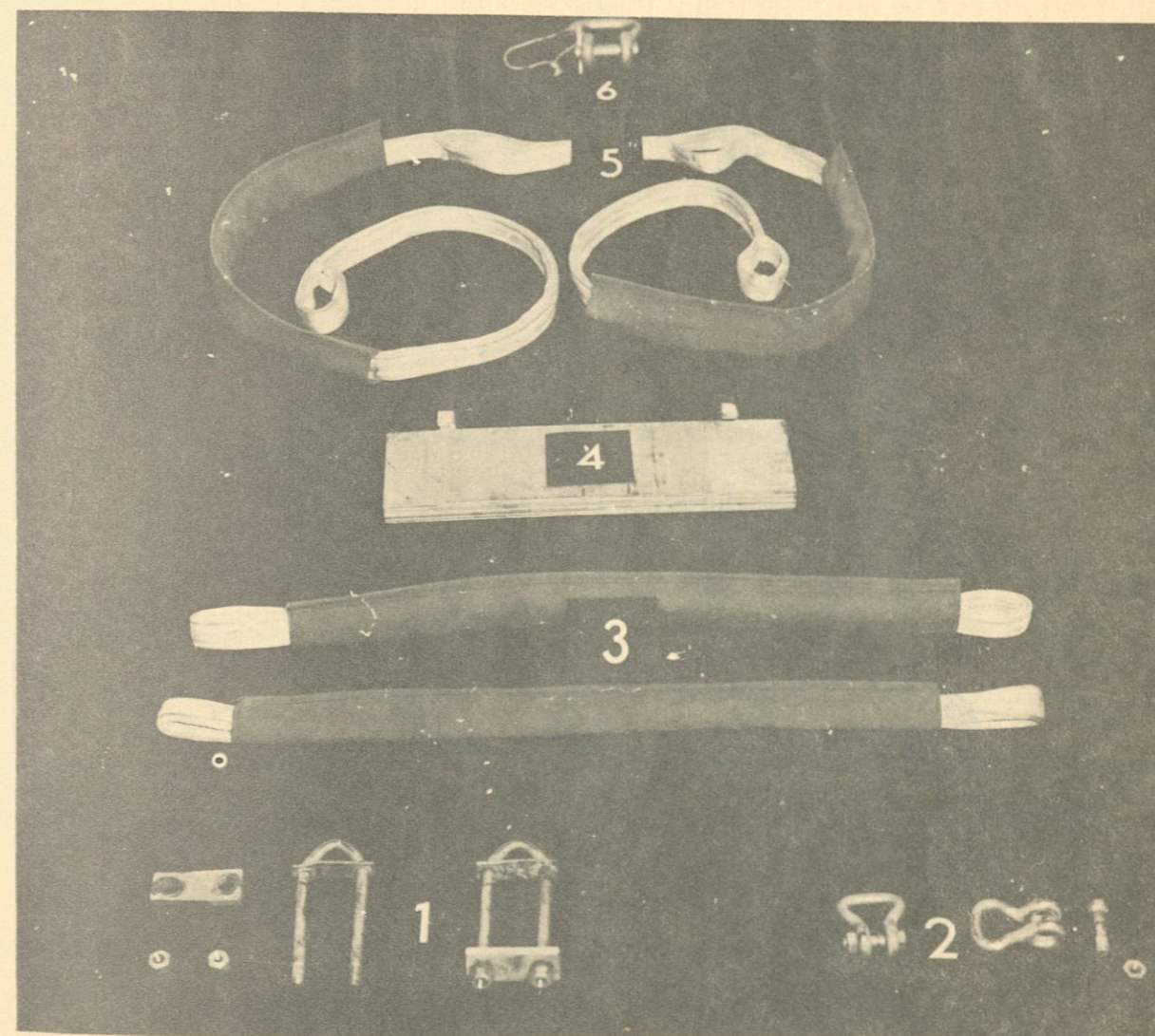


FIGURE 4: Suspension assembly for Truck, $\frac{1}{4}$ ton, 4x4, with component parts.

- (1) Frame clamps w/plate and nuts (2)
- (2) Small clevis w/nuts and bolts (2)
- (3) 4 ft suspension web (2) 3000 pounds tensile strength
- (4) Protector plate
- (5) 16 ft suspension web. 3000 pounds tensile strength
- (6) Large clevis w/pin and cotter key

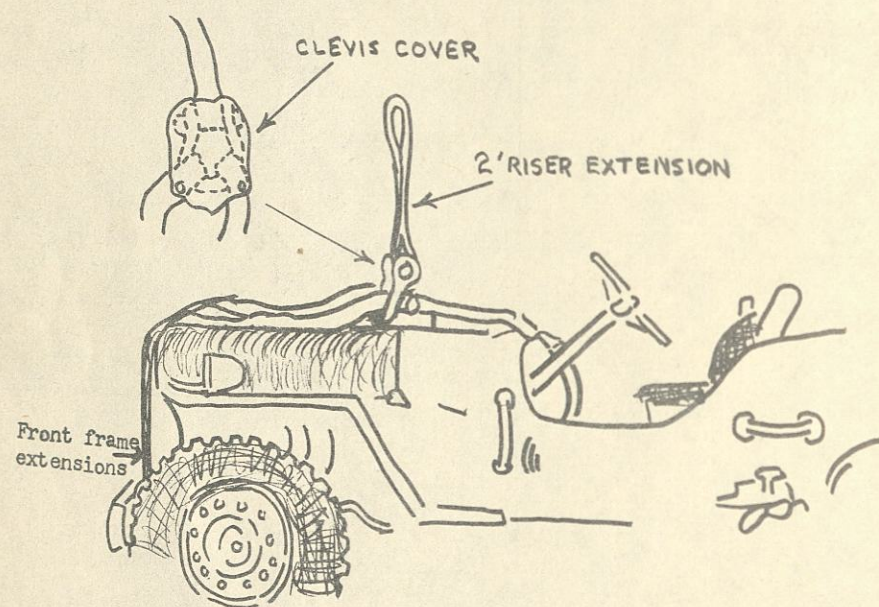


FIGURE 4a: Suspension assembly for truck, $\frac{1}{4}$ ton, 4x4, with component parts (rigged)

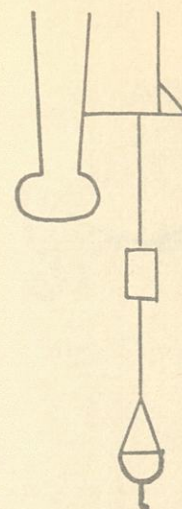


FIGURE 5a:

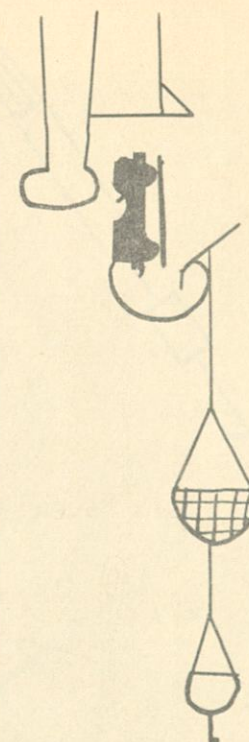


FIGURE 5c:

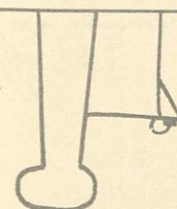


FIGURE 5

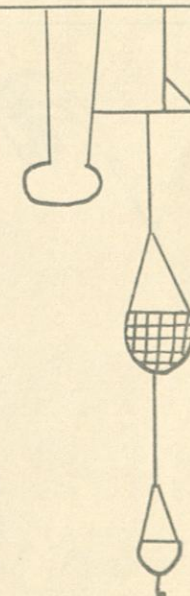


FIGURE 5b:

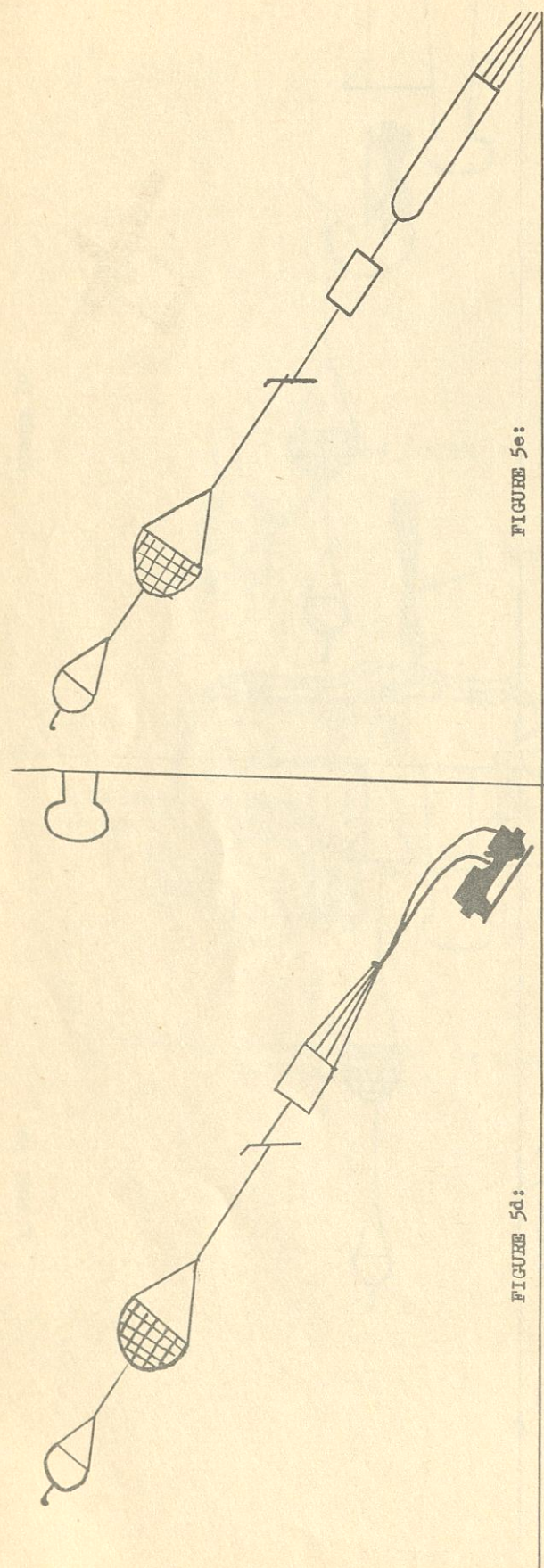


FIGURE 5d:

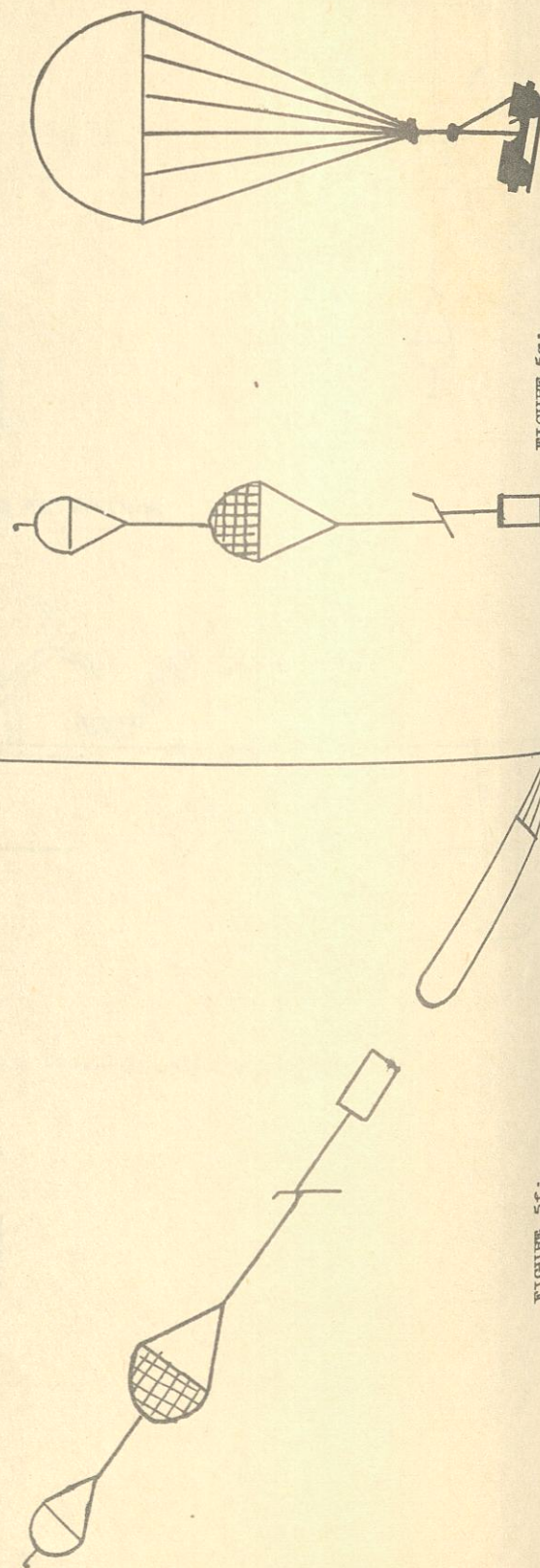


FIGURE 5e:

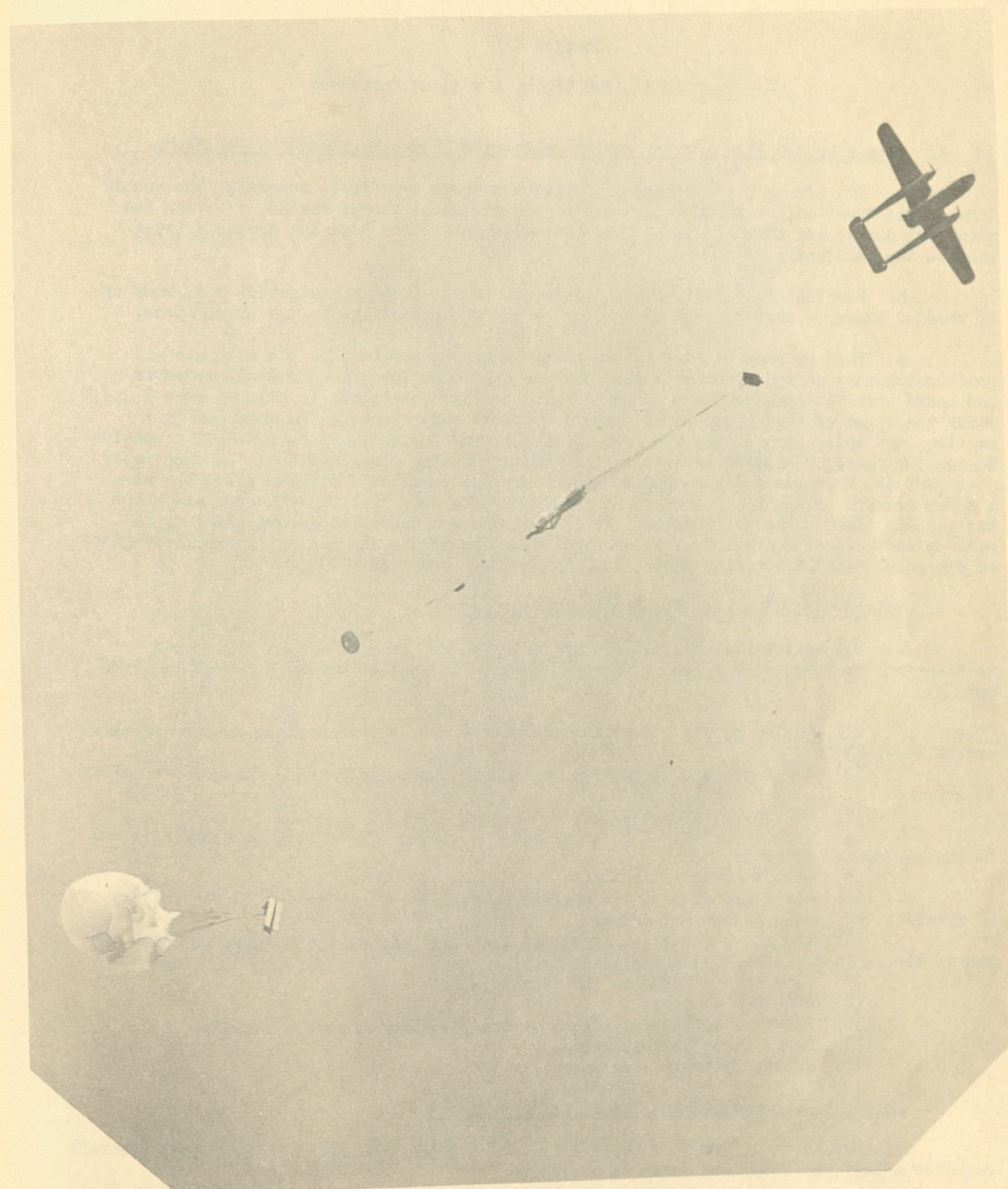


FIGURE 5h: Procedure for Dropping

Chapter II

Delivery of 1/4 Ton Truck, 4 x 4, by Parachute

1. Preparing the Aircraft for Aerial Delivery of Heavy Equipment by Parachute

a. The aircraft is prepared for platform drops by, first, releasing the anchor line cables from the points of attachment in the clamshell doors; second, removing the clamshell doors; and third, raising the seats adjacent to the load and securely tying them to the hand rails.

b. Now the aircraft is ready for the installation of the aircraft kit, made up of wheeled conveyor sections and clamps for securing the sections to the cargo floor.

c. This is done by placing ten roller conveyor sections in the aircraft and positioning them on the floor with the conveyor end hooks forward. Hook all conveyor end hooks over the spreader bars of the forward conveyor section. In tiedown rows B and F raise the rings of five 1,250-pound tiedown fittings under each inside rear conveyor section, and under each of the two forward single conveyor sections (a total of 6 sections). Engage the conveyor clam-hook bases in the tiedown fitting rings and hook the open upper jaws over the conveyor axles. Thirty clamp hooks are required. Tighten all hooks with a screw driver. Inspect all conveyor sections to make sure that the conveyor end hooks and all the clamp hooks are engaged. No clamp hooks are needed to secure the four (4) rear outside conveyor sections. If conveyor clamp hooks are not available, short lengths of 550-pound tensile strength suspension line may be used instead.

2. Selection of Vehicles for Parachute Delivery

a. The best vehicles available are selected for parachute delivery. Each vehicle that is selected is given a thorough check with special emphasis placed on these points:

- (1) Engine mounts - resiliency; brittle rubber may crack on impact and cause excessive vibration.
- (2) Radiator - rust; opening or landing shock may cause a weakened radiator to burst.
- (3) Oil cap - tight fit.
- (4) Gasoline tank - fill to within one gallon of capacity to allow airspace to absorb landing pressure.
- (5) Gasoline cap - tight fit.
- (6) Spare gasoline cans - wrap in canvas to pad and to reduce possibility of sparking on landing or opening shock.
- (7) Radiator tie rods - adjust so that the rods will not interfere with the fan if the radiator is bent backward slightly.
- (8) Generator - tight on its mountings.
- (9) Wheels - alignment.
- (10) Loads - removed and lashed on the platform under the vehicle.
- (11) Gears placed in neutral.
- (12) Emergency brake - released.

3. Parachute Delivery of the Truck, 1/4 ton, 4 x 4

a. Parachute delivery of the 1/4 ton 4 x 4 truck from the C-82 or C-119B aircraft requires a kit, the component parts of which are:

- (1) Extraction Bracket Assembly
 - (a) Two 22-ft cotton webbing connecting straps
 - (b) Extraction bracket
- (2) Platform, Extraction Assembly (See Figure 6)

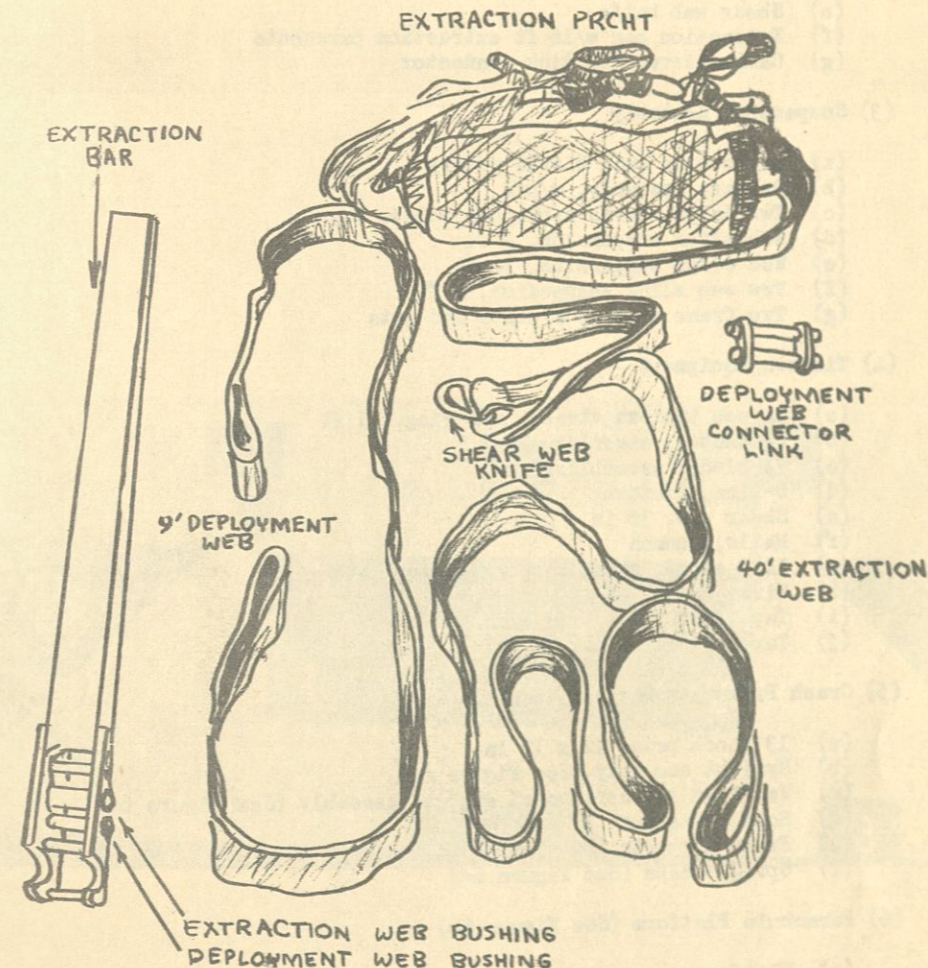


FIGURE 6: Component parts of the extraction assembly

- (a) Deployment web connector link
- (b) 9 foot deployment web
- (c) Extraction bar
- (d) 40 foot extraction web
- (e) Shear web knife
- (f) Extraction bag w/16 ft extraction parachute
- (g) Canvas cover for link connector

(3) Suspension Assembly

- (a) Two cotton duck clevis covers
- (b) Release assembly, w/pin
- (c) Two large clevis w/pin and cotter key
- (d) Web sling suspension, 2 ft
- (e) Web sling suspension, 16 ft
- (f) Two web sling suspension, 4 ft
- (g) Two frame clamps, w/plate and nuts

(4) Tiedown Equipment

- (a) 14 web tiedown straps, w/D ring, 15 ft
- (b) Protector, steering wheel
- (c) 14 binder assemblies
- (d) D-ring, tiedown
- (e) Shear web, 36 in
- (f) Nails, common
- (g) 14 fastener strap cargo tiedown, quick fit
- (h) Wire, brass, shear
- (i) Tape, cotton, 1/4 in wide
- (j) Tape, adhesive

(5) Crash Frame and Padding Assembly

- (a) 13 shock pads, 12 x 12 in
- (b) Upright assembly (See Figure 6a)
- (c) Vertical and horizontal support assembly (See Figure 6a)
- (d) Hood protector
- (e) Frame supports (See Figure 6a)
- (f) Upright caps (See Figure 6a)

(6) Parachute Platform (See Figure 6b)

- (a) Platform
- (b) Lashings

(7) Platform Assembly

- (a) Platform (11 ft x 80 in)
- (b) Ten tiedown rings

(8) Weight of Assembly - 838 pounds

In addition, one G-11 cargo parachute is required.

b. The 1/4 ton truck is loaded onto the drop platform at a site that permits the completed load to be picked up by crane, or rolled from a loading platform onto a flat-bed trailer or truck for transportation to the aircraft, or rolled onto a travel loader.

c. If the platform is issued without the extraction bracket already attached, the bracket must be bolted to the platform (8 bolts, 1/4" diameter, 3" long with washers, flat

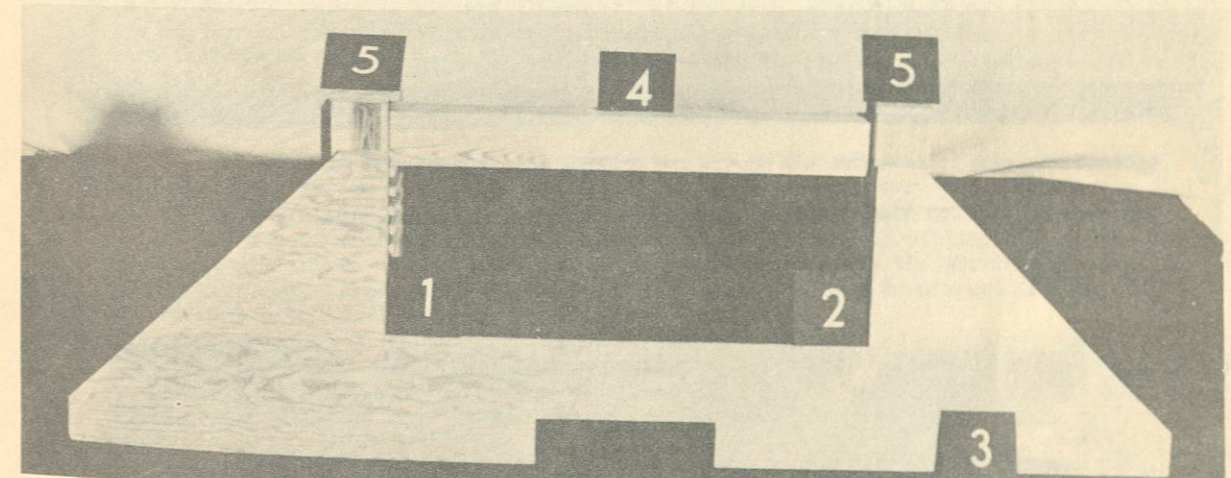
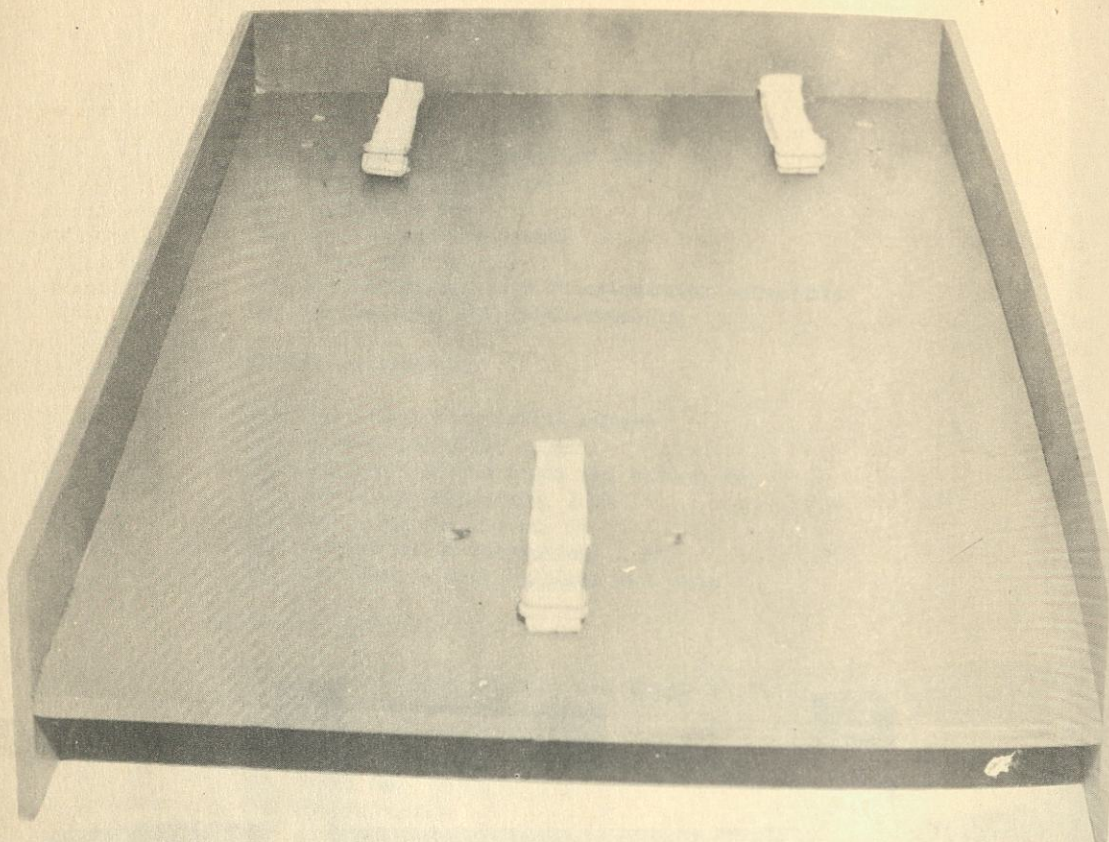
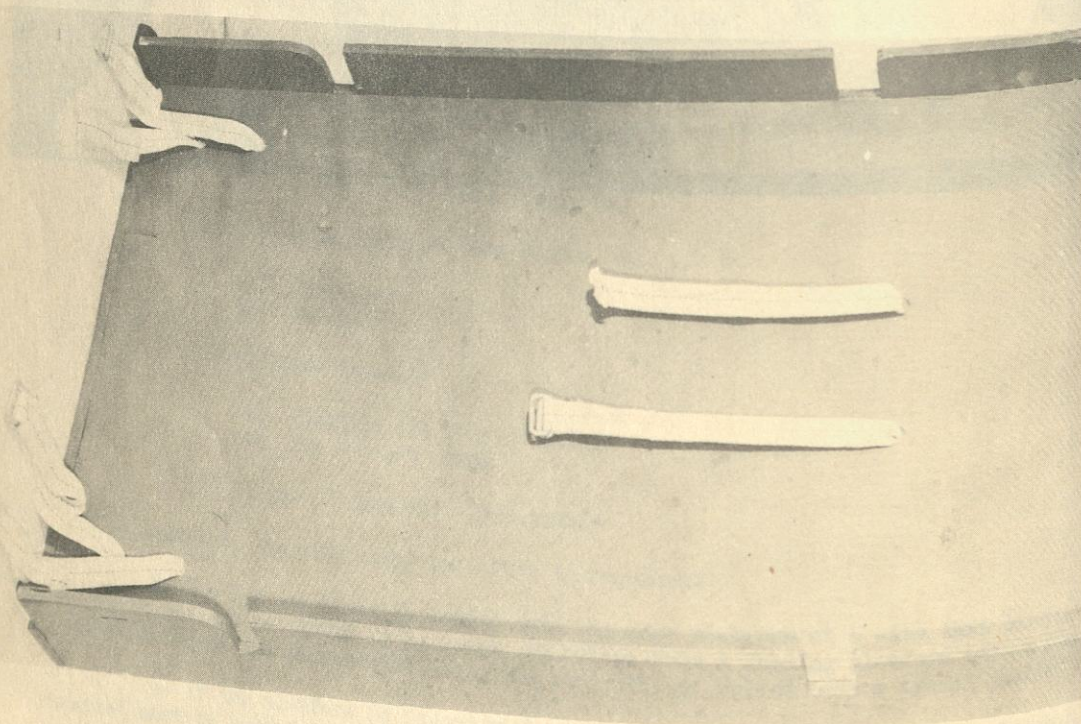


FIGURE 6a: Frame, crash assembly for truck, 1/4 ton, 4x4, assembled



Top view of parachute platform for truck, $\frac{1}{4}$ ton, 4x4



Bottom view of parachute platform for truck, $\frac{1}{4}$ ton, 4x4

FIGURE 6b: Top and bottom view of parachute platform for truck, $\frac{1}{4}$ ton, 4x4

head and counter sunk). The platform is provided with drilled holes so that the bracket axle, when hanging without tension, is $34 \frac{1}{4}$ inches from the aft end of the platform. (See Figure 7).

d. Connect the two 22-foot connecting straps to the outside sections of the axle to the forward end of the platform. The straps are adjusted as tightly as possible by hand. Loose ends of webbing are secured with tape, cord, or elastic bands. When properly tightened, the 22-foot connecting straps will hold the axle toward the forward end of the platform. The adjustment buckles will be at the forward end of the platform and on the upper sides of the loops thus formed.

e. The 40-foot extraction web is attached to the largest of the removable pins of the extraction bar. The cotter key is removed, pin extracted from the sleeve, and the sleeve falls free of the bar. Pass the extraction web loop through the extraction bar from the bottom side. Insert the sleeve into the looped end of the extraction web. Then the web loop and the sleeve are re-aligned into the extraction bar, the pin re-inserted into the sleeve, and the cotter pin replaced. The extraction web will extend from the under side of the extraction bar toward the aft end of the platform.

f. The 9 foot deployment web is attached to another removable pin and sleeve of the extraction bar just aft of the extraction web pin. (The deployment web pin and sleeve is the second removable pin and sleeve aft of the open jaws of the extraction bar.) Pass the deployment web loop through the extraction bar from the bottom side. Thread the sleeve into the looped end of the deployment web, re-align the web and sleeve into its place in the extraction bar, re-insert the pin and lock with the cotter-pin. The deployment web will extend from the under side of the extraction bar toward the rear of the platform.

g. Engage the jaws of the extraction bar in the extraction bracket assembly, with the open jaws pointed down, and fasten with one turn of five cord. Fasten the trailing end of the extraction bar to the center platform cross bar with 1 turn of 75 cord and insert a piece of webbing to permit easy release of the bar, by pulling on the web and cutting the 75 cord. This safety device is removed as soon as the platform is positioned in the airplane. Separate the deployment and extraction webs to prevent fouling, and secure both with tension under the platform.

h. Anchor the platform to prevent movement. Improvise a ramp of padding or block at the rear of the platform. Center the truck on the platform. Stop the truck with the front bumper directly over tiedown rings 1 and 1A.

i. The $\frac{1}{4}$ ton truck is prepared in the following manner: (See Figure 7a).

- (1) Remove top and bows.
- (2) Remove the windshield.
- (3) Fold the rear seat to the back of the vehicle.
- (4) Remove the spare tire and the 5-gallon gasoline can and place the gasoline can on top of the spare tire in the rear center of the bed of the truck. Lash these securely in place.
- (5) Remove the lamps from the instrument panel.
- (6) Fold the rear view mirror down against the side of the vehicle.
- (7) Remove the steering wheel from the steering column and lash it securely to the left front seat.
- (8) Raise the hood and insert the radiator protector plate.
- (9) Attach frame clamps to the vehicle in the drivers compartment.
- (10) Lay out the heavy drop suspension assembly for easy accessibility.

j. To attach the suspension assembly:

- (1) Attach the 4-foot suspension webs to the frame clamps with the small clevis and bolts. Lay out the free end of the suspension webs on the hood of the vehicle.

(2) Stretch the 16-foot suspension web over the frame of the truck immediately in rear of the front bumper and then center the web. Pass the ends of the 16-foot suspension web around the outside of, and under the front spring shackles, and up through the loops in the middle of the suspension web. Lay the ends on the hood of the vehicle. Fasten the suspension web to the spring shackle with one turn of 75-pound shock cord.

(3) Place the large clevis on the hood between the 4-foot suspension web ends with the open arms up. Pass the loops in the 4-foot webs over the clevis arm. Place the loops of the 16-foot suspension web over the clevis arms. Place the pin in the clevis and secure with a cotter pin.

k. To mount the crash-frame and padding assembly:

(1) Raise the rear wheels of the vehicle approximately 3 inches, with the jack under the center of the frame.

(2) Install two axle pads under the left and right rear springs. Install one pad between the axle and body on each side of the rear axle.

(3) Raise the front wheels of the vehicle approximately 3 inches, with the jack under the center of the front bumper.

(4) Install two pads under the right and left front springs. Install 3 pads under the oil pan shield.

(5) Arrange the crash-frame assembly parts for easy accessibility.

(a) Place the upright assembly behind the front bumper along the outside of the main frame extension, with the base of the assembly approximately 2 inches behind the front cross beam of the platform, and with the triangular edges of the assembly pointing to the rear.

(b) Insert the two-by-fours under the bumper, and adjust to the uprights so they will support the weight of the vehicle.

(c) Install the vertical and horizontal support assembly immediately behind the bumper, and adjust the uprights to fit flush against it. Nail the three pieces together.

(d) Nail the caps on the tops of the uprights to enclose the frame supports.

(e) Remove the jack. There should be approximately 1-1/3 inches clearance under the front wheels.

1. Fourteen lashings are used to secure the load to the 10 tiedown rings on the platform. Each tiedown ring can sustain an ultimate load of 4,000 pounds.

(1) A description of the tiedown equipment used is as follows:

(a) Lashings 1 through 13 are made of type C-10 webbing and can sustain a 5,000 pound ultimate load. They are 15 feet in length.

(b) Lashing number 14 is specially made with a small sack near the center of the webbing to fit over the steering column after the steering wheel has been removed. It is a buckle-type lashing of C-8 type webbing and can sustain a 2,900 pound load.

(c) Quick-release binder assemblies that can sustain a 4,000 pound maximum load are used to secure the cargo tiedown fastener straps to the tiedown rings.

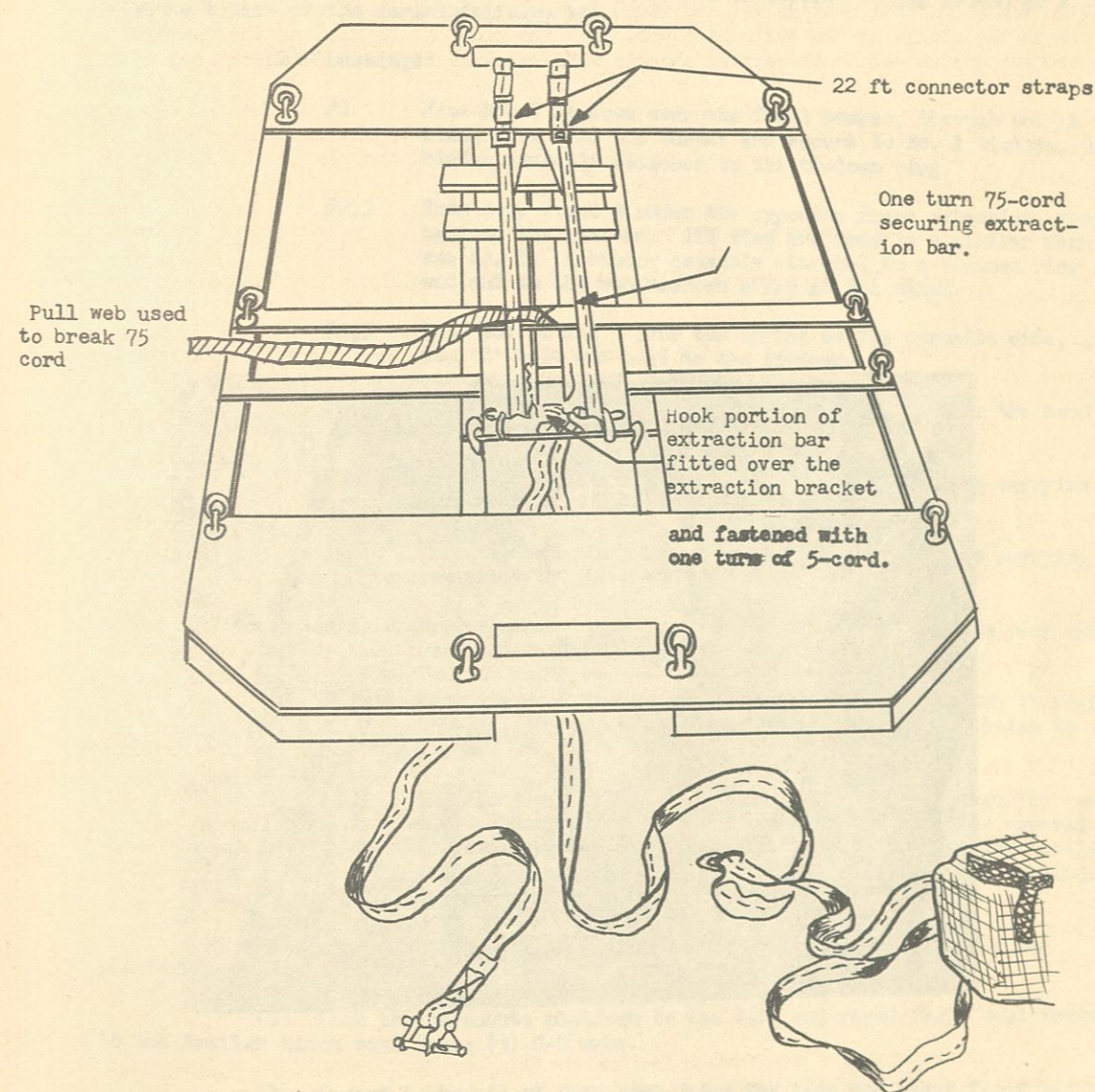


FIGURE 7: Platform with extraction assembly

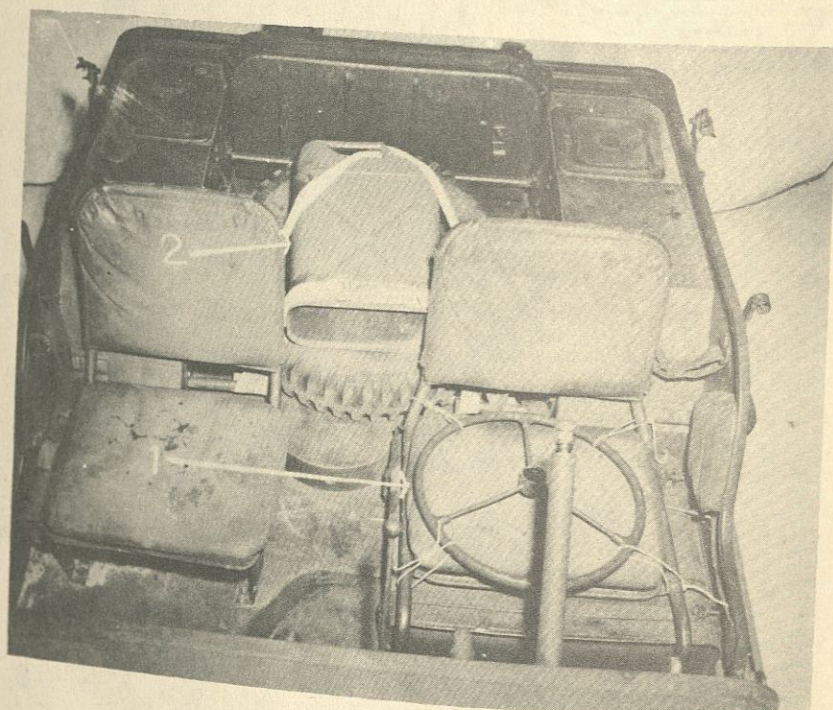


FIGURE 7a: (1) Remove steering wheel from steering column, lash securely to left front seat.
(2) Fold rear seat, place spare tire and wheel, five gallon gas can in center rear portion of vehicle, lash securely.

(d) For all lashings except number 6 and number 14, 1 quick-release binder assembly is necessary. Number 6 lashing requires two, and number 14, a buckle-type lashing, requires none. Fourteen quick-release binder assemblies are issued as a component part of the aerial delivery kit.

(2) Lashings:

- #1 From No. 1 tiedown over the front bumper, through No. 1A tiedown ring, back over the bumper and secure to No. 1 tiedown, using a binder assembly attached to the tiedown ring.
- #2,3 From Nos. 2 and 3 under the opposite frame extension, over and back to the tiedown. All ties are made in a similar manner as was No. 1. A binder assembly attached to a tiedown ring at one end and to the web tiedown strap at the other.
- #4,5 From Nos. 4 and 5 over the spring on the opposite side, around the 'U' bolt and back to the tiedown.
- #6 From binder assembly at tiedown ring No. 4, over the hood to the binder assembly at tiedown ring No. 5.
- #7,8 From tiedown rings No. 4 and 5 to right and left carrying handle respectively over it and back.
- #9,10 From tiedown rings No. 6 and 7 to right and left carrying handle respectively, over and back.
- #11,12 From tiedown rings No. 6 and 7 under the opposite rear main frame, over and back.
- #13 From tiedown ring No. 8A through the trailer hitch through tiedown ring No. 8 and back through the trailer hitch to tiedown No. 8A.
- #14 This lashing is specially made with a sack through the center of the webbing to fit over the steering column after removal of the steering wheel. It passes through the carrying handles and the safety belt eyelet. It is constructed of C-8 webbing. (See Figures 8, 8a and 8b).

m. Place the parachute platform on the truck, fitting the slots in the platform over the seat frames and the rear of the truck bed.

(1) Lash the parachute platform to the left and right front seat frames and to the trailer hitch with three (3) C-8 webs.

(2) Insert 2 strands of five cord under the left and right front lashings.

(3) Place the parachute on the platform, risers on top, bridle extending to the rear. (See Figure 9).

(4) To prevent the parachute from slipping off the platform while the vehicle is being loaded into the aircraft, tie one turn of 75 cord from the forward end of the parachute on each side to the safety rings on the dashboard of the vehicle.

(5) To prevent the deployment web and extraction web from becoming entangled while the aircraft is being loaded, pull them tight and lash them on the left and right sides, respectively, of the platform and secure each with 1 turn of five cord.

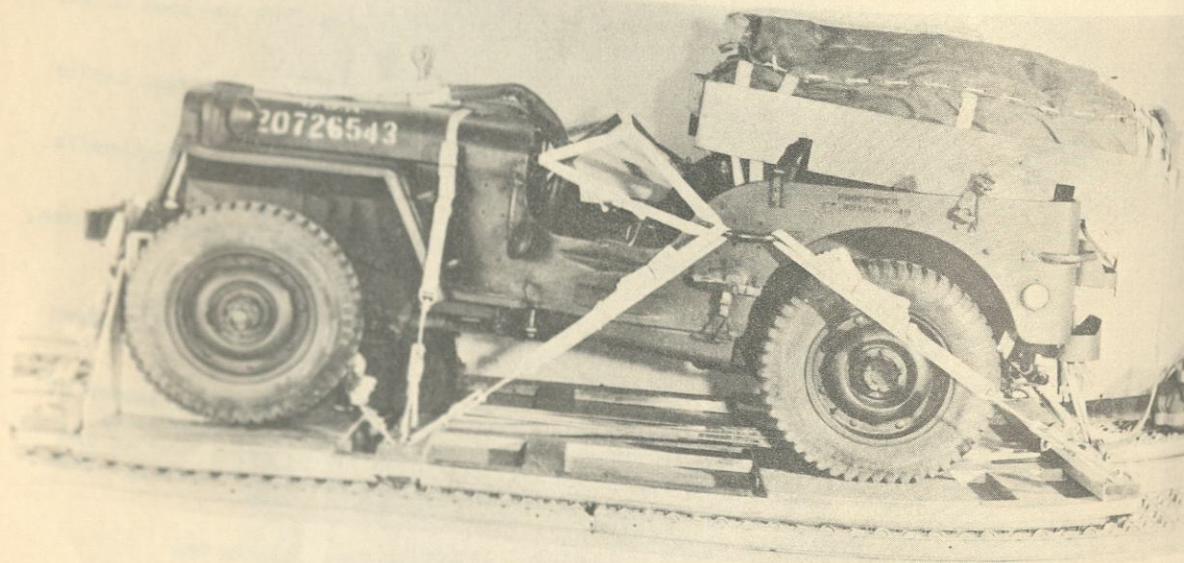


FIGURE 8: Side view of truck on heavy drop platform prepared for heavy drop.

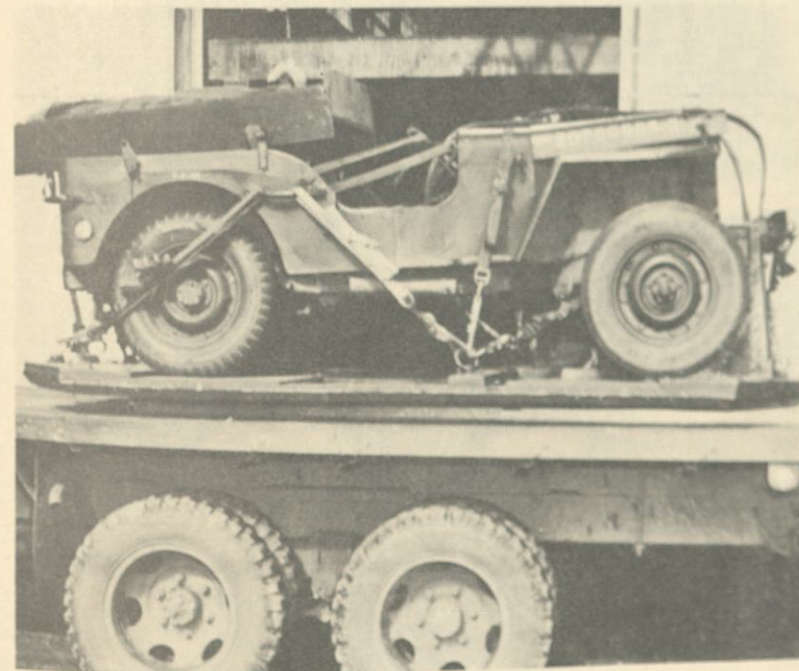


FIGURE 8a: 1/4 Ton Truck loaded on flatbed truck

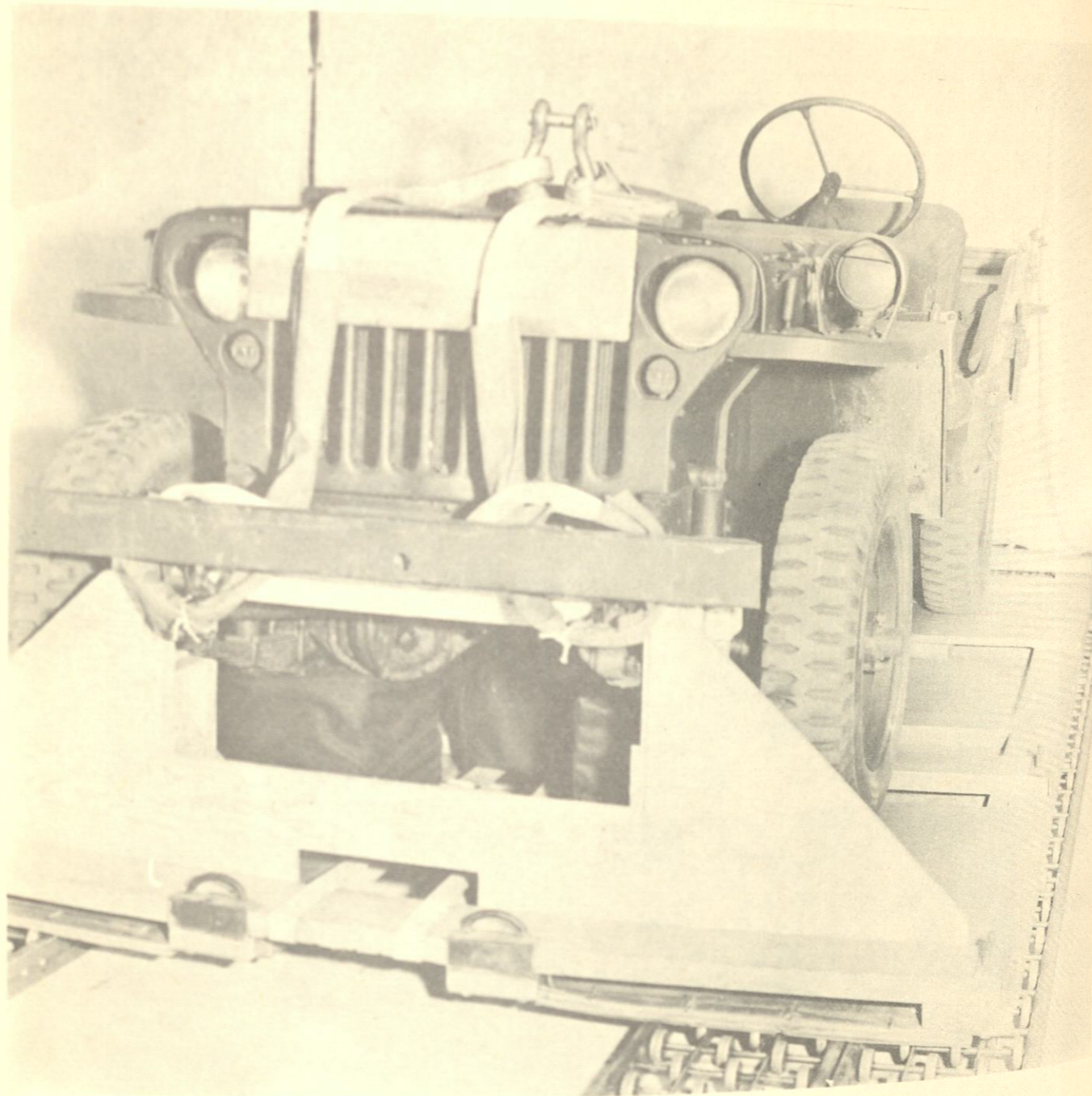


FIGURE 8b: Front view of truck, $\frac{1}{2}$ ton, 4x4, on heavy drop platform complete with extraction assembly, suspension assembly, padding assembly, and frame, crash assembly.

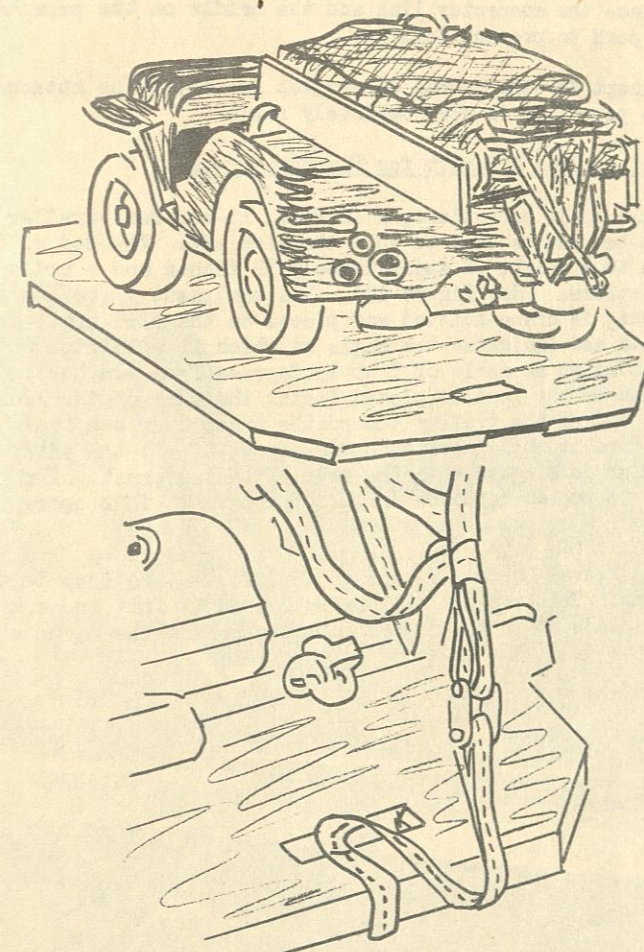


FIGURE 9: Cargo parachute loaded on parachute platform

(6) Connect the bridle tongue to the deployment web connector link and lace a clevis cover securely over the connector link. If a clevis cover is not available, tape the connector link securely with masking tape or some other material two inches on either side of the connector link.

(7) Place the connector link and the bridle on the parachute and secure it with 1 turn of five cord to prevent fouling.

(8) Except for the ground disconnect device, to be attached after the load is in the aircraft, the parachute is now completely rigged.

4. Technique of Loading Aircraft for Platform Drops

a. For small scale operations, a 40-foot, 12-ton semi-trailer or a 2-1/2 ton truck with a 17 foot bed can be used to load the aircraft. The bed of the vehicle is raised by a platform to a height of approximately 52 inches and a roller-conveyor system is mounted on the platform. (See Figure 10). The equipment to be loaded, previously lashed to its platform, is crane-hoisted and placed on the platform. This also tests the suspension of the load and indicates the angle at which it will strike the ground. The load should be suspended at an angle of 5 to 15 degrees from the horizontal, rear end down. The forward end of the load is placed facing the rear of the trailer or truck, and the parachute at the end of the trailer toward the tractor or cab. The platform is lashed to the trailer to secure it while moving to the aircraft. At the aircraft loading site, the rear of the trailer is aligned with the rear of the aircraft. Temporary lashings are removed and the load is pushed into the cargo compartment. This operation requires four men.

b. The Lull Travel Loader, a commercial lift, may be used to speed loading for large scale operations. This vehicle will raise a load 12 feet and can be adjusted for horizontal travel to place it in the proper position behind the cargo compartment. See figure 10b.

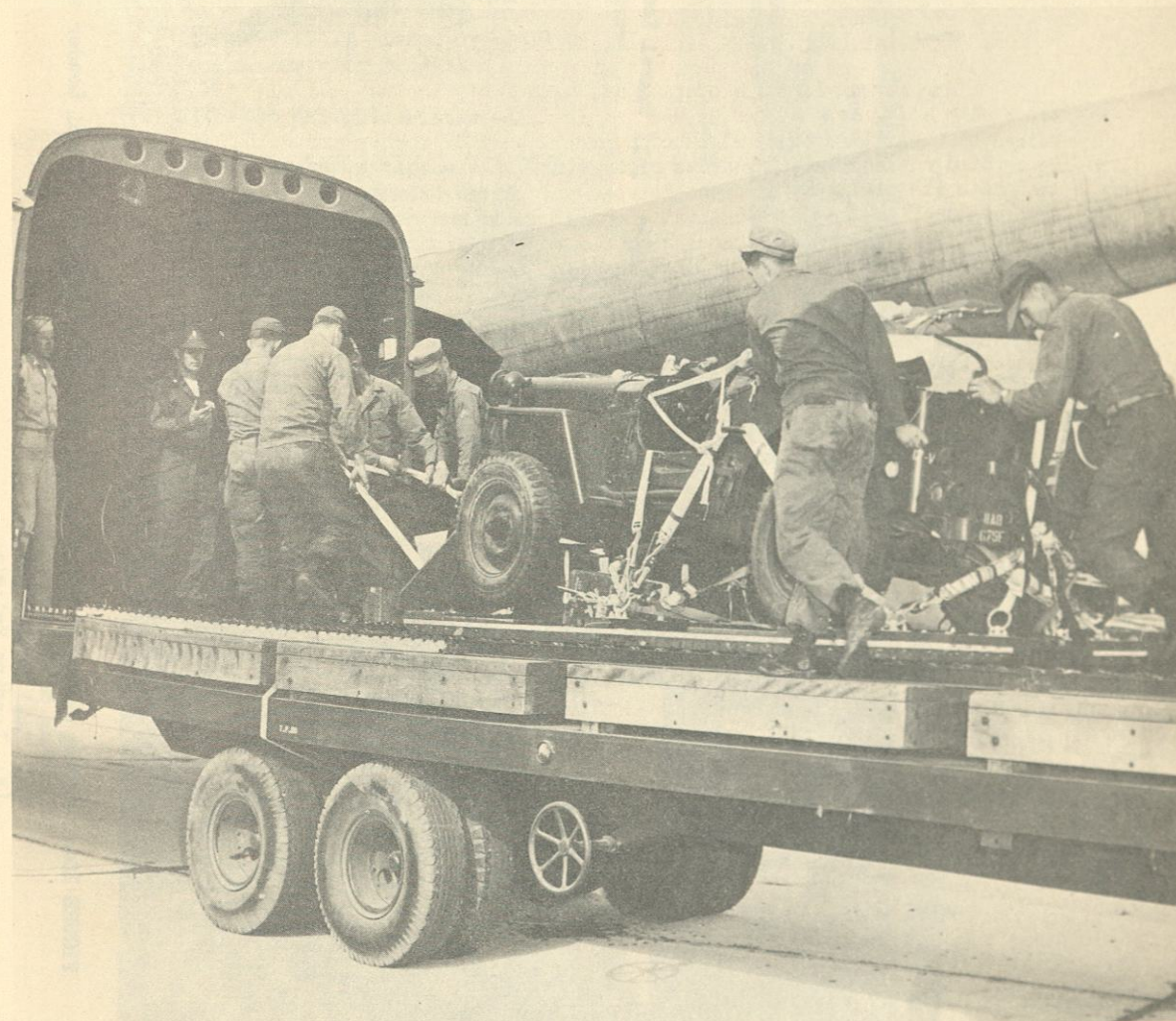


FIGURE 10: 12 ton truck being loaded aboard the aircraft

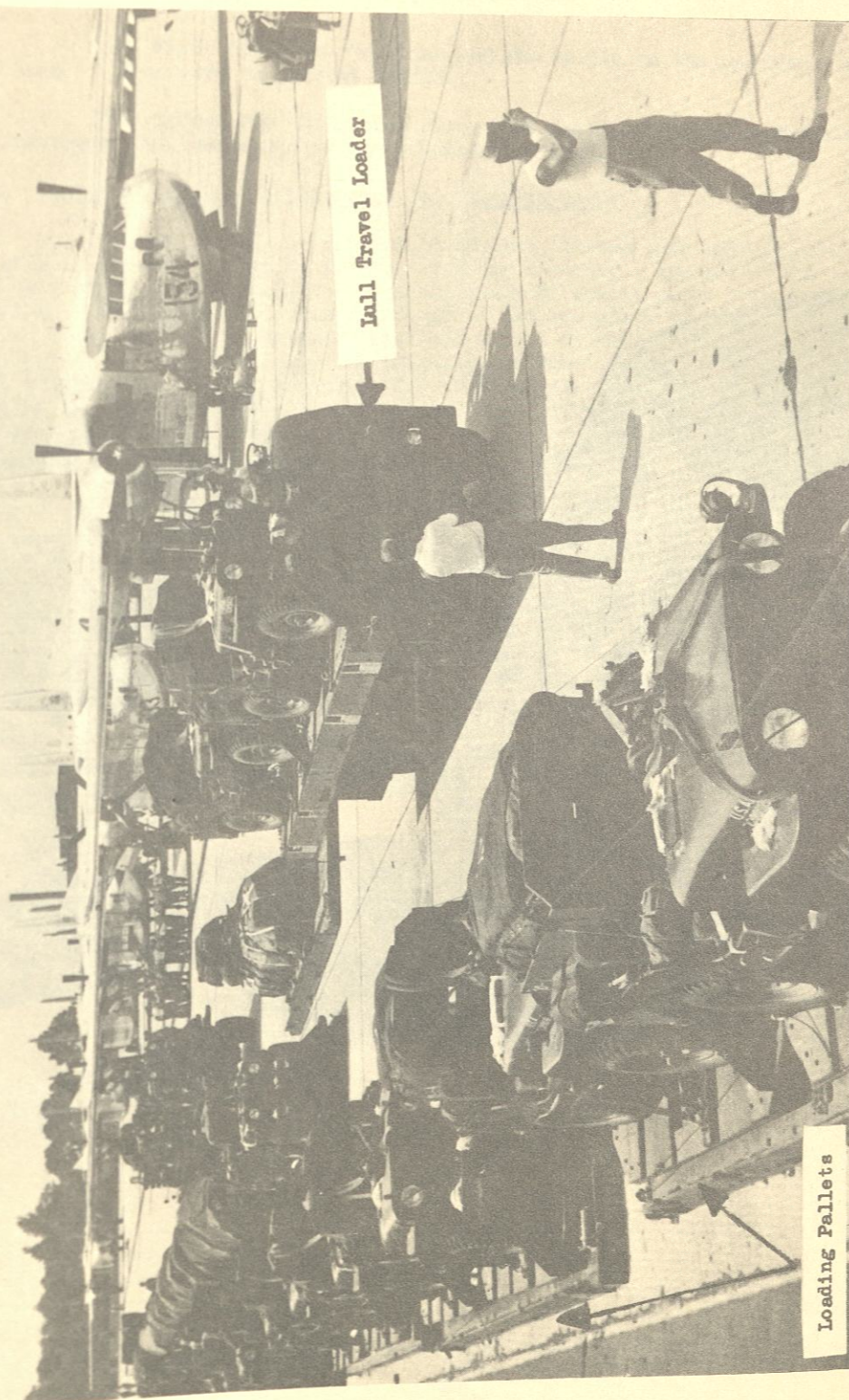


FIGURE 10a: Moving prepared loads to the aircraft using Lull Travel Loader and loading pallets.
(A) Lull Travel Loader
(B) Loading Pallets

Chapter III

Delivery of 105mm Howitzer by Parachute

1. Parachute Delivery of the Howitzer, M2A1, on Carriage, M2A2

a. Parachute delivery of the 105mm M2A1 howitzer on the M2A2 carriage from the C-82 or C-119 aircraft requires a kit consisting of:

- (1) Extraction Bracket Assembly
 - (a) Two 22 ft connecting straps
 - (b) Extraction bracket
- (2) Platform Extraction Assembly
 - (a) Extraction bag, w/16 ft extraction parachute
 - (b) 40 foot extraction web
 - (c) Deployment web connector link
 - (d) 9 ft deployment web
 - (e) Extraction bar
 - (f) Shear web knife
 - (g) Canvas cover for link connector
- (3) Howitzer Sight Protector Assembly
 - (a) Sight protector housing
 - (b) Sight protector lashings
- (4) Howitzer Suspension Assembly
 - (a) Wheel plate clevis (2)
 - (b) Wheel suspension plate (2)
 - (c) Wheel suspension webs (5 ft)
 - (d) Two (2) sling combinations, 20 ft and 16 ft sling combination heavy
 - (e) Barrel suspension web, 7 ft
 - (f) Sling suspension web, 2 ft
 - (g) Four (4) clevis canvas covers
 - (h) Four (4) suspension clevises, heavy
 - (i) Release assembly with pin
 - (j) Recoil extension bar
- (5) Tiedown Devices
 - (a) 16 web tiedown straps, 15 ft, w/D ring
 - (b) 16 binder assemblies
 - (c) D ring tiedown
 - (d) Shear web, 36 in
 - (e) Nails, common
 - (f) 16 fastener straps, cargo tiedown, quick fit
 - (g) Wire brass shear
 - (h) Tape, cotton, 1/4 in wide
 - (i) Tape, adhesive
 - (j) Two wheel tiedown
 - (k) Two ring webbings for 105mm Howitzer
- (6) Padding Assembly
 - (a) 10 shock pads, 18" x 18"

- (b) Block, wood, 2" x 8" x 36"
- (c) Block, wood, 2" x 8" x 24"
- (d) Shock pad support

(7) Parachute Platform

- (a) Platform
- (b) Lashings

(8) Platform

- (a) Platform (15' x 80")
- (b) Ten tiedown rings

(9) Weight of Assembly - 1,268 pounds

In addition, two (2) cargo type G-11 parachute assemblies are required.

b. Anchor the platform to prevent movement. Improvise a ramp of padding or blocks at the rear of the platform. When loading, center the howitzer on the platform laterally and longitudinally, with the wheels between tiedown rings 2 and 3 and the cross beam to the rear of tiedown rings 2 and 3.

c. Unlock and spread the trails. Depress the tube to level. Remove the recoil nut and slide the recoil system 28 inches to the rear. Attach the recoil extension bar to the recoil nut. The howitzer is now locked in recoil, and movement of the recoil system during parachute delivery is prevented. Tape the end of the barrel. Place the howitzer in the travelling position. Lay out the howitzer sight protector assembly for easy accessibility. Lower the sight protector housing over the sight mount and assemble the front and rear sight protector assembly chocks. Lash the protector chocks to the tube by inserting 2 turns of 75-pound shock cord through the holes in the chocks and tying securely. Lay out the 18-foot lashings, centered over the left edge and parallel with the tube. Pass both ends under the carriage and up over the right top side of the protector housing. Secure the ends and stow the excess webbing. Pass the 8-foot lashings through the slots at the bottom of the protector housing, under the axle, and secure them, stowing the excess webbing. (See Figure 10a). Secure the breech block by placing a metal clip around the base of the operating handle to prevent the release of the operating handle catch. The padding assembly consists of 10 crash pads, short pieces of wooden blocks that serve as load spreaders, and a crash pad support. Install the padding as follows:

(1) Install the rear-trail padding forward of the howitzer trail-lifting handles, with the load spreader beneath the pads and the pad protectors above the pads.

(2) Place the base section of the center-trail padding beneath the locking cradle and install the padding.

(3) Elevate one wheel with the jack and install the axle padding. Do not remove the jack until the suspension assembly has been installed. (See Figure 11).

d. The howitzer suspension assembly is installed in this sequence:

(1) Stretch the 16-foot suspension web over the trails in rear of the locking cradle and then center it. Pass the ends of the 16-foot web around and under the trails and up through the loops in the middle of the suspension web. Lay the running ends of the web on the sight protector housing.

(2) Insert the 2-foot sling suspension web through the ends of the 16-foot suspension web.

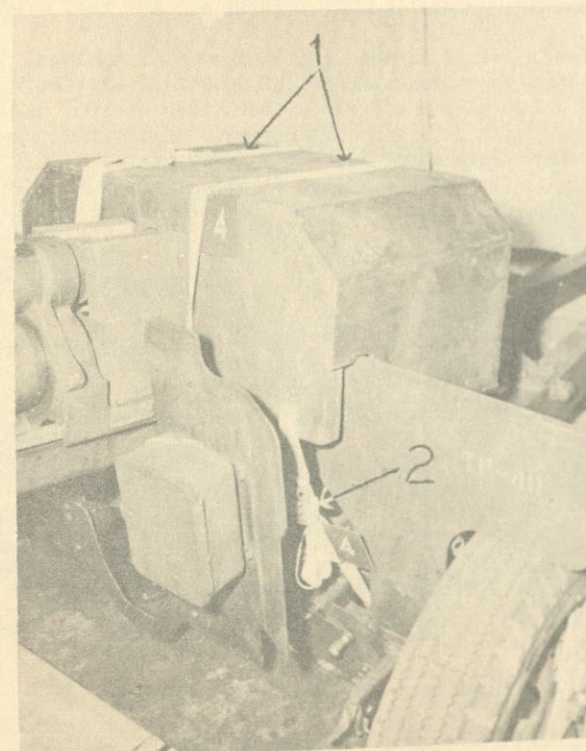


FIGURE 10b: Stowing of excess webbing.

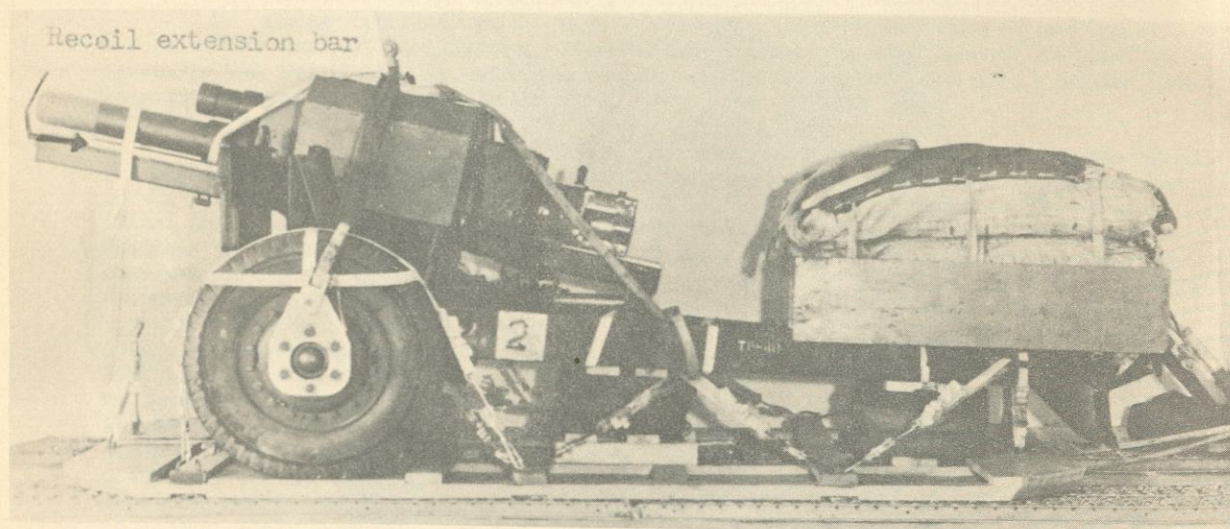


FIGURE 11: 105 mm howitzer on heavy drop platform prepared for heavy drop.

(3) Jack the wheels up and remove the wheel lugs. Then attach the wheel plate, rotating the wheels until the wheel plate aperture is 10° to the rear of the vertical. Remove the jack. Attach the wheel plate clevises to the wheel plates, and the 5-foot wheel suspension webs to the clevises. Use cotter keys to secure all pins. Lay the running ends of the wheel suspension webs on the protector housing.

(4) Center the 7-foot barrel-suspension web under the barrel and lay the running ends on the protector housing. Pass the arms of the large clevis through the loops of the 2-foot sling suspension web, the loops of the 5-foot wheel-suspension webs, and, finally, the loops on the ends of the 7-foot barrel-suspension web. Insert a pin through the eyelets of the clevis and secure with a cotter key.

e. Lashing the Platform to the Howitzer: Fifteen lashings are used to secure the 12 tiedown fittings on the platform to the load. Each platform tiedown can withstand 5,000 pounds maximum load. A description of the lashing equipment used follows:

- (1) Lashings 1 through 14 are made of type C-10 webbing.
- (2) Lashings 1 through 14, with exception of lashings 4 and 5, are 15 feet long. Numbers 4 and 5 are constructed to fit the wheels of the howitzer.
- (3) Lashing 15 is 6 feet long.
- (4) Quick-releases are all metal lever-type (binder assemblies).
- (5) Lashing #1 requires 2 quick-release devices. Lashings 2 through 14 require 1 each. No quick-release device is required for lashing 15. Total requirement for quick-release devices: 15

f. Lashings:

- #1 from ring 1 over barrel and down to ring 1A. Attach the tow hook loop to the left front tow hook. Attach the back part of the tow hook loop to the left rear tow hook. Attach second tow hook in a similar manner on right front and rear to hooks.
- #2 from ring 2 to right tow hook loop back to ring #2.
- #3 from ring 3 to left tow hook loop back to ring #3.
- #4 from ring 2 over left wheel to ring #4.
- #5 from ring 3 over right wheel to ring #5.
- #6 from ring 6 to right tow hook loop back to #6.
- #7 from ring 7 to left tow hook loop back to #7.
- #8 from ring 4 around right trail aft of uncradle lock back to #4.
- #9 from ring 5 around left trail aft of uncradle lock back to #5.
- #10 from ring 6 around trail forward of cradle lock back to #6.
- #11 from ring 7 around left trail forward of cradle lock back to #7.
- #12 from ring 8 through left lifting handle back to ring #8.
- #13 from ring 9 through right lifting handle back to ring #9.
- #14 from ring 10 across trails and down to 10A.
- #15 from the left lifting handle to the right locking eyelet of the lunette.

Allow lunette to rest about 60° from the locking position. (See Figure 12).

g. To prepare the parachute platform for attachment to the howitzer:

(1) Thread the running ends of two lengths of C-8 webbing through the holes drilled at each side of the open end of the platform. Pass the web from under the platform, over the top and down the opposite hole.

(2) Seat the platform over the trails, open and facing trailwards.

(3) Secure the front lashings to the left and right trails and the rear lashings to the left and right lifting handles.

h. Place the parachute cluster on the platform with the bridles extending to the rear and risers forward. The bridles hang over the lunette.

i. To keep the cluster in place while loading, secure the cluster to the left and right of the cradle lock with 1 turn of 75-pound shock cord. Attach the bottom parachute bridle to the top deployment-web connector link. Attach the top parachute bridle to the bottom deployment-web connector link. To prevent snagging during movement or deployment, lace a clevis cover over the connector links or securely tape the bridle and deployment web from 2 inches below the connector link to 2 inches above. To prevent the deployment and extraction webs from dragging or becoming entangled while loading, secure them to the left locking eyelet of the lunette with 1 turn of five cord. For the same purpose, place the taped or sleeved connector links and bridles on top of the parachutes and secure with 1 turn of five cord. (See Figure 12).

2. Loading the 1/4-Ton Truck and the 105-MM Howitzer in the (C-82) (C-119) Aircraft for Parachute Delivery

a. Before loading the aircraft, lay out the safety cable to reach from the aft end to the forward end of the cargo compartment, leaving at least 2 feet of slack in the cable. Tape the cable to the left inside conveyor section to secure it. The cable is used to secure the pilot parachute. After the cable is installed, the 1/4 ton truck and the 105mm howitzer, lashed to their platforms, are pushed into the aircraft prepared for loading. The truck is put in first, with the parachute end of load toward the rear of the aircraft. The howitzer is then pushed in with its parachute pointed aft. (See Figure 13). The 75-pound cord is cut from the extraction bar when the load is in position in the aircraft.

3. Installing the Shear-Web Assembly and the Extraction Parachute

a. Lay out the shear-web assembly and the pilot parachute for easy accessibility.

b. Install the shear-web D-rings in tiedown rings, numbers 15 and 24 in the center row for the C-82. In the C-119 use tiedown fittings 37 and 46. Thread the shear web through the rings. This is a general guide only - the senior airborne officer is responsible for determining the final position of the load in the aircraft. He will check with the pilot to see that the load is placed within the center of gravity limits of the aircraft. Place the extraction parachute on the aircraft floor between the conveyor sections and near the aft end of the cargo compartment; secure each end of the extraction parachute to the floor with two turns of five cord. Secure the four corners of the pilot parachute with one turn of suspension line to the extraction parachute; fasten the pilot parachute bridle line to a tiedown fitting. Open the glider-tow release assembly with the operating handle. Place the glider-tow plug, with shot weight attached, into the glider-tow release assembly, leaving at least 6 inches of slack in the drag line. When the plug is seated, a light in the pilot's compartment glows. Check by dropping the plug 3 times from the pilot's compartment using both release handles. Place the drag line loop of the pilot parachute over the cone. Place the fastener, parachute pack, over the cone.

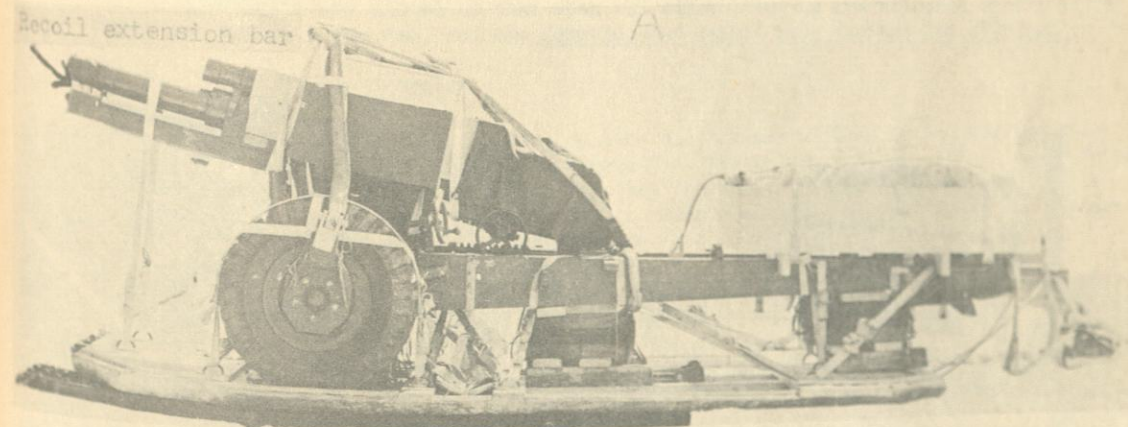
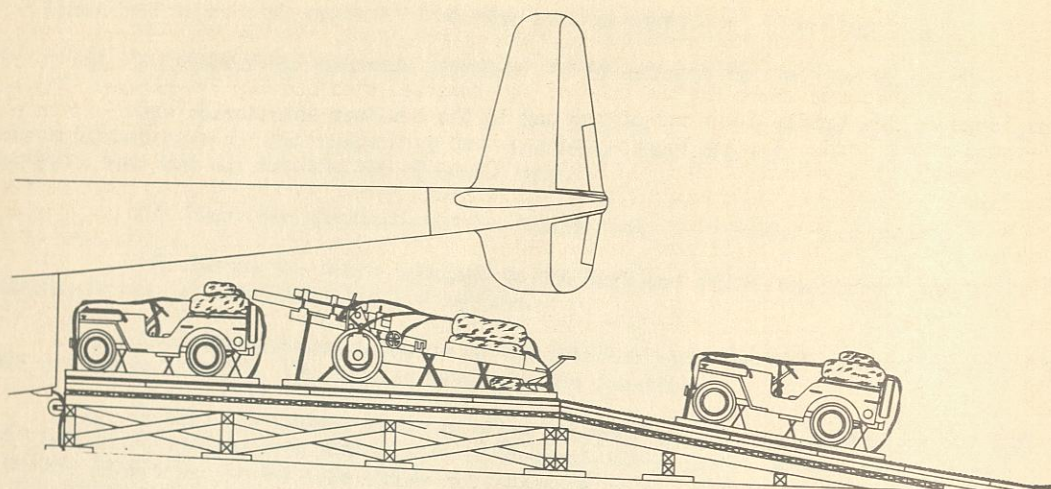


FIGURE 12: 105 mm howitzer attached to platform for dropping



Recommended method of loading heavy equipment in C-82 and C-119 airplane

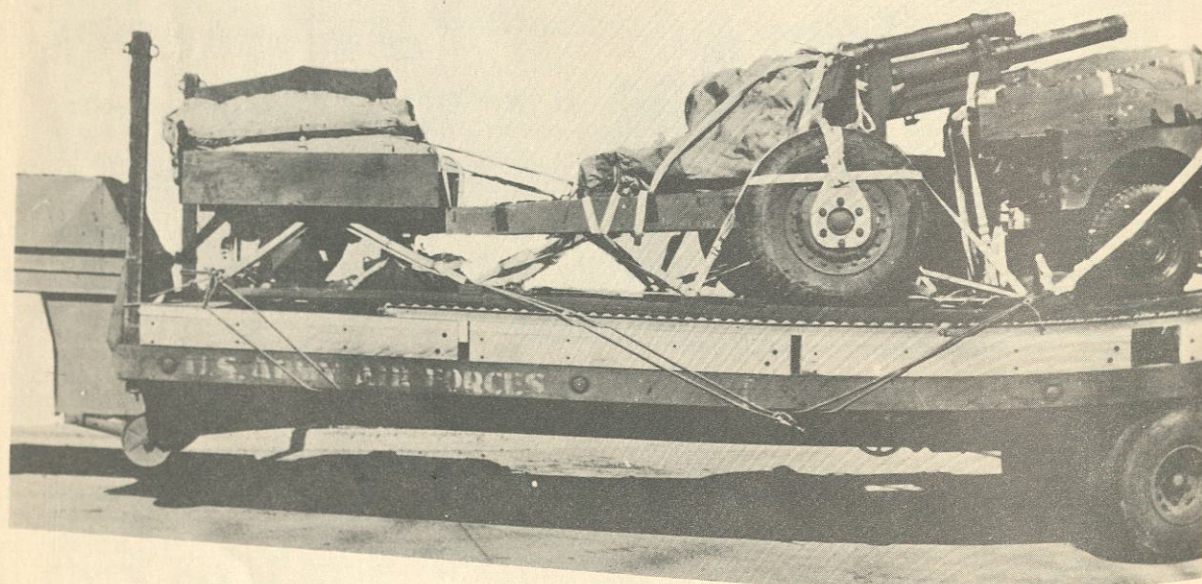


FIGURE 13: Howitzer and vehicle loaded on semi-trailer for loading in airplane

- (1) Secure vehicle to semi-trailer with guide lines to prevent forward and rearward movement.
- (2) The vehicle and howitzer are loaded into the airplane nose first with parachutes pointed towards the rear of the airplane after being loaded.
- (3) The rear of the semi-trailer is centered behind the airplane and equipment is pushed into the cargo compartment over the conveyors. Operation requires four men.

Insert the safety pin on the end of the release cable through the cone and elastic loop on the pilot parachute. Secure with one turn of 16-4 cord. Fasten the vehicle extraction parachute to the howitzer tube, with the extraction-web end toward the vehicle. Attach the parachute cover to the tube of the howitzer with the bag tie-straps. Fasten the loops on the bridle loop end of the bag to the howitzer shieldbrace with 5 turns of 75-pound shock cord. Fasten the apex of the drag parachute to the howitzer shieldbrace with 5 turns of five cord. For the howitzer load, take the shear web that has already been threaded through the number 24 tiedown ring and thread it through the knife on the extraction web of the extraction parachute. Attach the shear web around the main cross beam at the end of the platform. Make sure the pull is against the large shoulder of the buckle and that the buckle is centered on top of the main cross beam.

c. For the vehicle load, repeat the steps listed for the howitzer above, except that the shear web used is the one that was previously threaded through the number 15 tiedown ring.

4. Restraining Loads Within the Aircraft

a. Individual computations are made for each load. These are based on the actual weight of each load and the center of gravity of each aircraft. No special tiedown devices are required although they should be of a type that can be rapidly removed and have a tensile strength of 5,000 or 10,000 pounds.

b. Loads are placed so that when all other tiedowns are released each load is restrained by the shear web, and the forward load cannot rest against the aft load.

5. Procedure for Dropping

a. On signal from the pilot, release all tiedown devices except the two shear webs. Check to see that no one in the aircraft is behind any part of either load. Notify the pilot that all personnel are clear and that the tiedowns have been released. On a signal from the pilot, pull the handle on the release cable. This withdraws the release-cable safety pin from the pilot-parachute cone.

b. As the aircraft comes over the drop point, the pilot, recognizing the point or acting on a signal from the ground, opens the glider-tow release assembly. This frees the weighted plug. When the plug drops, it pulls the loop from around the pilot-parachute cone, opening the pack cover of the pilot-parachute. The weight continues falling and pulls the pilot parachute into the slip stream. When the pilot parachute hits the slip stream of the aircraft, it exerts a drag on the extraction parachute, breaking the 2 five-cord ties restraining it in the aircraft. The pilot-parachute pulls the extraction parachute into the slip stream to the limit of the extraction web. Then the drag is exerted against the pack cover of the extraction parachute causing the extraction parachute to deploy. The force of the drag caused by the extraction parachute cuts the shear web.

c. This releases the howitzer, and the extraction web then pulls on the extraction bar. This pulls the howitzer out of the aircraft and the howitzer falls free. As the howitzer clears the aircraft, the drag of the extraction web is exerted against the extraction bar, and causes the extraction bar to swing free from the platform. The drag of the extraction parachute is now exerted through the extraction web to the extraction bar and thence to the deployment web. This web now acts as a static line, pulling off the pack covers of the G-11 parachute. The pilot-parachute, the pack cover of the extraction chute, the extraction parachute, the extraction web, the deployment web, and the pack covers of the two G-11 parachutes descend as a unit supported by the extraction parachute. (See Figure 5).

d. As the howitzer moves out the cargo compartment, it takes the extraction parachute of the vehicle with it. The vehicle-extraction parachute cuts the shear web, drags the vehicle out of the aircraft, and opens the G-11 parachute. The vehicle-extraction

parachute works the same way as the howitzer-extraction parachute. The ground-disconnect devices of both vehicle and howitzer are put in operation when the main parachutes are deployed. The opening shock breaks the 550-pound suspension line cinching the parachute riser clevis to the main body of the ground disconnect and pulls the firing pins of the cartridge cutters. Ten seconds later the cutters fire, cut, burn and shear the tie cords, letting the cutters drop out. This permits the hinges of the main body to open so that, immediately upon achieving a "no-load condition", the ejection plungers within the main body force the disconnect pin up and out of its seat in the main body. This frees the parachutes and permits them to blow free of the load without overturning it.

Chapter IV

Delivery of the 3/4 Ton Truck, 6,000 Pound Load Bearing Platform, and A-22 Container by Parachute

Section I

1. General Considerations

a. Parachute delivery of the 3/4 ton truck requires a kit, the component parts of which are similar to those of the 1/4 ton aerial delivery kit. In addition, two 100 foot cargo parachutes, type G-11, are issued separate from the kit.

b. In preparing the truck for dropping, the following steps must be taken before loading it on the platform:

- (1) Remove canvas top and bows.
- (2) Remove windshield and tape ends of windshield wiper hose.
- (3) Remove spare wheel and tire.
- (4) Fold rear view mirror in downward position.
- (5) Fold seat backs down and secure safety strap with 1 turn 550 cord.

(6) Anchor foremost part of platform to prevent any forward movement while loading truck on platform.

(7) Place blocks or padding at rear of platform to give elevation for truck when loading.

c. For detailed instructions in preparing the platform for loading, see Chapter II.

d. Drive the vehicle on to the platform and center it laterally and longitudinally with the front bumper over a point six inches aft of the end of the platform. Remove the steering wheel and lash it to the left front seat. Pad the steering column. Tilt the two front seats forward and secure with 2 turns of 550 cord.

e. Install the left and right suspension bracket assemblies on the front bumper so that they are secured to the bumper on a line with each main frame extension. Attach the two front suspension webs, (each of five (5) foot length) to the suspension bracket assemblies by removing the pins, inserting and aligning the loops with the holes bored in the brackets, inserting the pins, and replacing the nuts which lock the bolt in place. Attach the grille protector plate and secure it to the wire mesh in front of each headlight. Install the left and right rear longitudinal frame suspension webs. A modification is made to accomplish this. Two holes are cut in the bed of the truck, each three (3) inches square. The centers of the holes are twelve (12) inches aft of the bulkhead of the truck bed and centered over the frame on each side. On each side pass the sixteen (16) foot web through the hole, under the frame and back up through the hole. Pad well where the web goes around the frame and where it goes through the hole. Align the webs evenly for equal length and place them on their respective arms of the large clevis. Then place the two front suspension webs on the clevis, and insert pin and cotter key.

f. Raise the front end of the vehicle with jacks, high enough to insert the left and right uprights behind the front bumper. Insert the main front supports (two 2 x 6's). Nail on the upright caps and the vertical and horizontal support assembly.

g. Forty (40) shock pads are needed. Padding is mounted as follows:

- (1) Left and right front axle - 4 pads each
- (2) Motor and transmission - 8 pads
- (3) Left and right longitudinal frame padding - 12 pads each

(For additional support, use two 2 x 6's 40 inches long between the pads and the frame.)

h. Next, an engine support strap, made of nylon, specially designed to keep the engine mounts from being broken during landing, is installed. This is done by passing the strap over the left longitudinal frame under the engine just forward of the oil pan and over the right longitudinal frame. Adjust the "V" rings and tighten with one binder assembly.

i. In lashing the truck to the platform, fifteen (15) lashings, each fifteen feet in length, and fifteen (15) binder assemblies are required, as follows:

j. Lashings:

- #1 from tie-down ring 1 under and over front bumper to quick release device at ring #1A.
- #2 from tie-down ring 2 around right main frame extension and back to quick release device at tie-down ring #2.
- #3 from tie-down ring 3 around left main frame extension and back to quick release device at tie-down ring #3.
- #4 from tie-down ring 2 around right front axle spring coupling and back to quick release device at tie-down ring #2.
- #5 from tie-down ring 3 to left front axle spring coupling and back to quick release device at tie-down ring #3.
- #6 from tie-down ring 4 around left front axle coupling and back to quick release device at tie-down ring #4.
- #7 from tie-down ring 5 around right front axle spring coupling and back to quick release device at tie-down ring #5.
- #8 from tie-down ring 4 around left fender support and back to quick release device at tie-down ring #4.
- #9 from tie-down ring 5 around right fender support and back to quick release device at tie-down ring #5.
- #10 from tie-down ring 4 around left rear axle and back to quick release device at tie-down ring #4.
- #11 from tie-down ring 5 around right rear axle and back to quick release device at tie-down ring #4.
- #12 from tie-down ring 6 under left and right longitudinal frames, through tie-down ring #7, back over frames to quick release device at tie-down ring #6.
- #13 from tie-down ring 8A around left rear axle spring coupling and back to device at tie-down ring #8A.

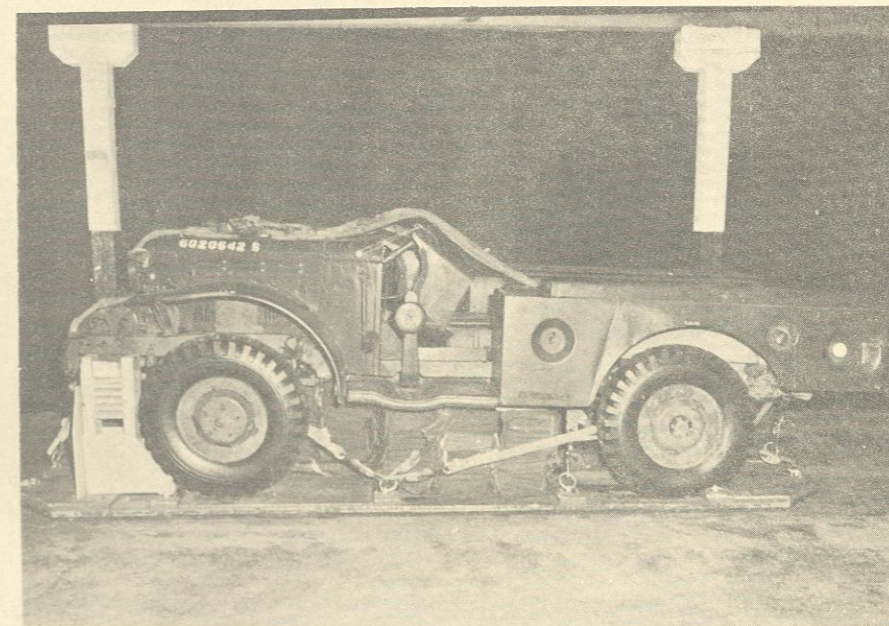


FIGURE 14: 3/4 Ton Truck prepared for parachute drop.

#14 from tie-down ring 8 around right rear axle coupling and back to device at tie-down ring #8.

#15 Pass through tie-down ring 8A, pass up and through lunette and down to device at tie-down ring #8. (See Figure 14).

k. Instructions for securing the parachute cluster, attaching the deployment web-connector link, and securing deployment and extraction webs, are prescribed in detail in Chapter III.

No parachute tray is needed. Instead, the parachutes are placed one on top of the other in the bed of the truck.

Section II

1. Delivery of Miscellaneous Equipment on the 6,000 Pound Load Bearing Platform

a. The 6,000 pound load bearing platform is designed to support bulk supplies and items of equipment whose construction does not permit the attachment of a suspension system directly to the load. The platform is 80" x 12' and weighs 1,385 pounds, with component parts. It is made of metal with 16 tie-down rings and 6 suspension clamps on the top of the platform.

b. A 40" extraction bar is used to extract the load, and it is installed in a manner similar to other platform loads. On the presently issued platform it is necessary to wedge a block 2" x 4" x 8" behind the extraction bracket to prevent the bar from sliding off the bracket and becoming locked between it and the platform, preventing the deployment of the 100' parachutes. The shear web passes through a "D" ring at the end of the platform rather than through a slot. The remainder of the extraction system and the method of attachment is the same as for a 1/4 ton truck. Two such platforms can be loaded and flown in a C-82 or C-119 type aircraft or they may be used with a 3/4 ton truck, 105mm howitzer or other equivalent size load.

c. There are three suspension webs having a tensile strength of 30,000 pounds each, which come in two lengths. The longer webs are used at either end of the platform. The other is used with the two center suspension clamps. Care must be taken to straighten the webbing, from the clamps to the larger clevis, at the point of suspension.

d. The webbing, binder assemblies, padding and canvas sections which form this kit are used in varying amounts according to the type of load. There is no standard method of preparing these loads but the same general principles are applied for all loads. Sufficient webbing is used to secure the load to the platform during opening shock. Enough tie-downs should be used to overcome a thrust factor of four G's in all directions. With a 6,000 pound load this would require six tiedowns against each direction of thrust. Tie-downs are made in the same manner as for any other load. (See Figure 15 and 15a).

e. A single G-11 canopy may be used with non-fragile loads up to 6,000 pounds in weight. However, the rate of descent will be about 58' per second. It is recommended that two such parachutes be used, or that fewer items be placed on the platform. The minimum load to be dropped with this platform is 1,000 pounds. The parachutes are attached to a parachute tray which is lashed to the top of the load. Care must be taken to stow the suspension webs carefully and secure all loose ends of the webbing.

f. The platform must be checked carefully after each drop to find and repair all strips and sections of metal which have come loose.

Section III

1. General Considerations for Delivery of Eight A-22 Containers by Parachute

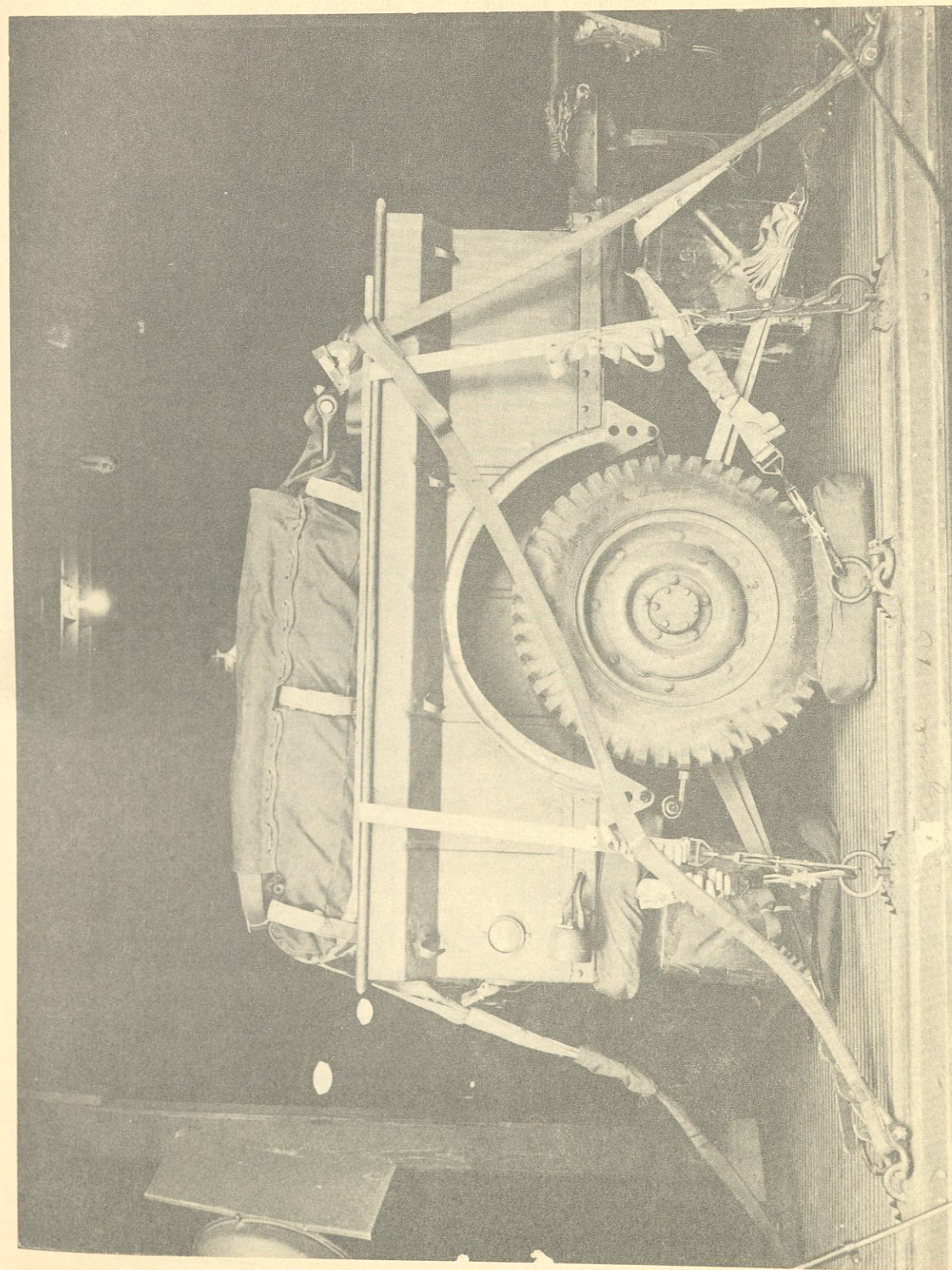


FIGURE 15: Platform and load (side view) rigged for dropping.

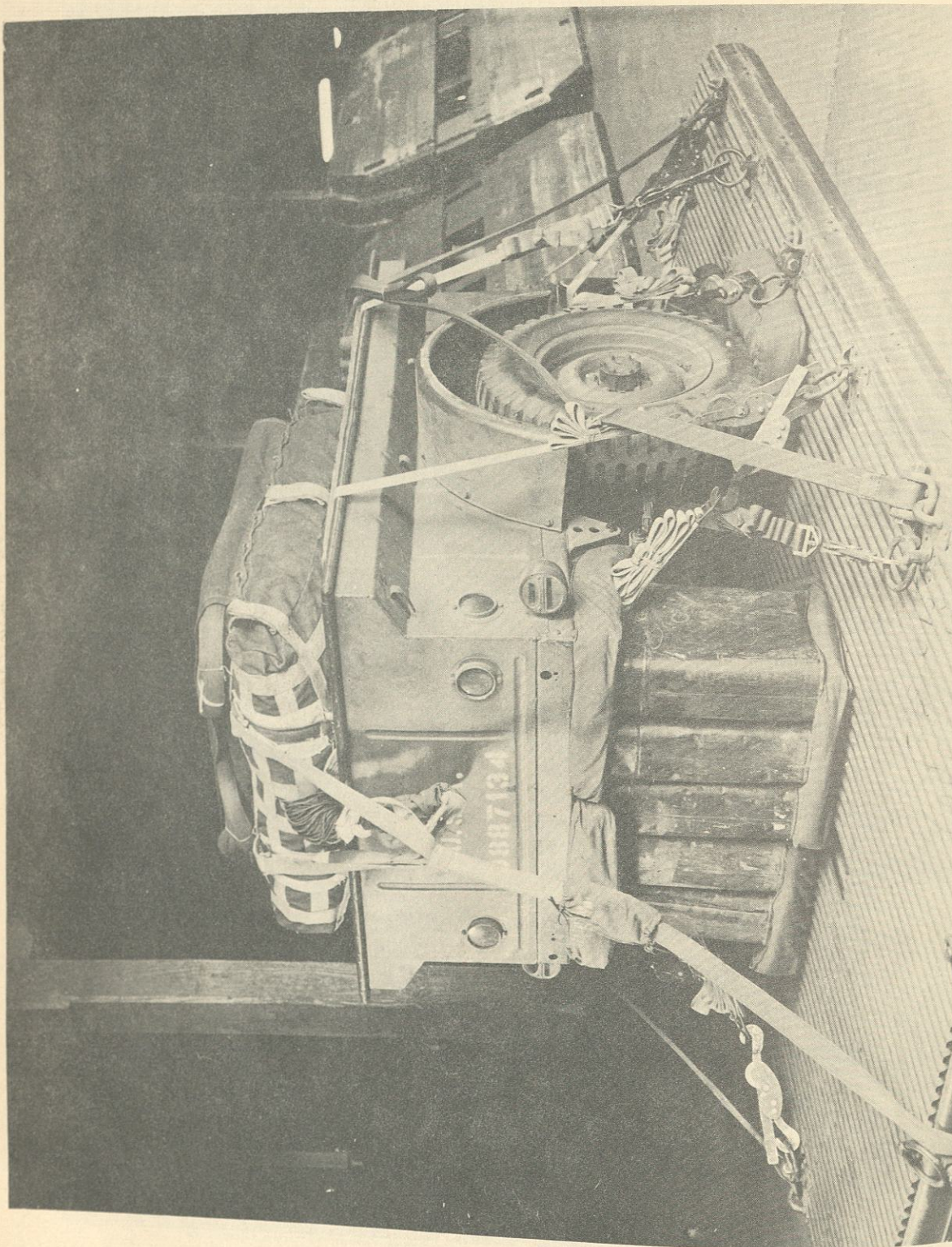


FIGURE 15a: Platform and load (oblique view) rigged for dropping.

a. The A-22 container has been designed to deliver 2,200 pounds of equipment from the rear of a C-82 or C-119 aircraft, using wheeled conveyors. This container is a canvas sling with canvas sides, felt spaces, and with a plywood base attached to facilitate the extraction from the aircraft.

b. This container has maximum dimensions of 52" x 43" x 60". Suspension extractions are used when necessary to attach all corners to a single clevis. Bulk supplies of rations, ammunition, clothing, small arms, petroleum, oil and lubricants can be dropped with this container.

c. Up to nine such containers can be dropped from a C-82 or C-119 depending upon the allowable cargo load of the aircraft. All containers are rolled into the cargo compartment on sets of conveyors spaced 2' apart and tied down for flight. A 10,000 pound nylon tie-down, consisting of two shear webs and two straps, which are anchored to the side of the cargo compartment, is attached to the rear load. While in the air, approximately 15 minutes prior to drop, bungee or elastic cord is secured under tension to the tie-down adjacent to the shear webs and to the sides of the aircraft, so that, when the shear webs are cut, the tie-downs will snap back to the sides of the aircraft and permit easy exit of the containers. An additional 10,000 pound nylon tie-down with shear web* is attached from the base of the container to a "D" ring in the cargo floor. A normal shot bag, pilot parachute and extraction parachute are used with an extension attached to the end of the 40' extraction web and two additional shear knives to cut the other shear webs. This system is operated the same as any for other heavy drop, except that the plane is flown in an extreme nose high position at the time of drop so that the containers roll out by gravity when the shear webs are cut. This gives a very small ground pattern, about 150 yards for the nine containers.

The G-12 parachute is used with this container and is static line activated. It has a 20' static line which is tied in accordance with Figure 16. Care must be taken to see that the static lines are stowed so as to deploy freely and without entanglements. The parachute is placed on top of the container, with the pack secured with one turn of suspension line at one corner and one turn of 75 pound cord at the other three corners.

d. The container may also be used with heavy equipment when the A-22 is the forward load in the aircraft. It is allowed to rest against the heavy equipment and follow it out by gravity ejection. (See Figure 16 and 16A).

* Labeled A in Figure 16A.

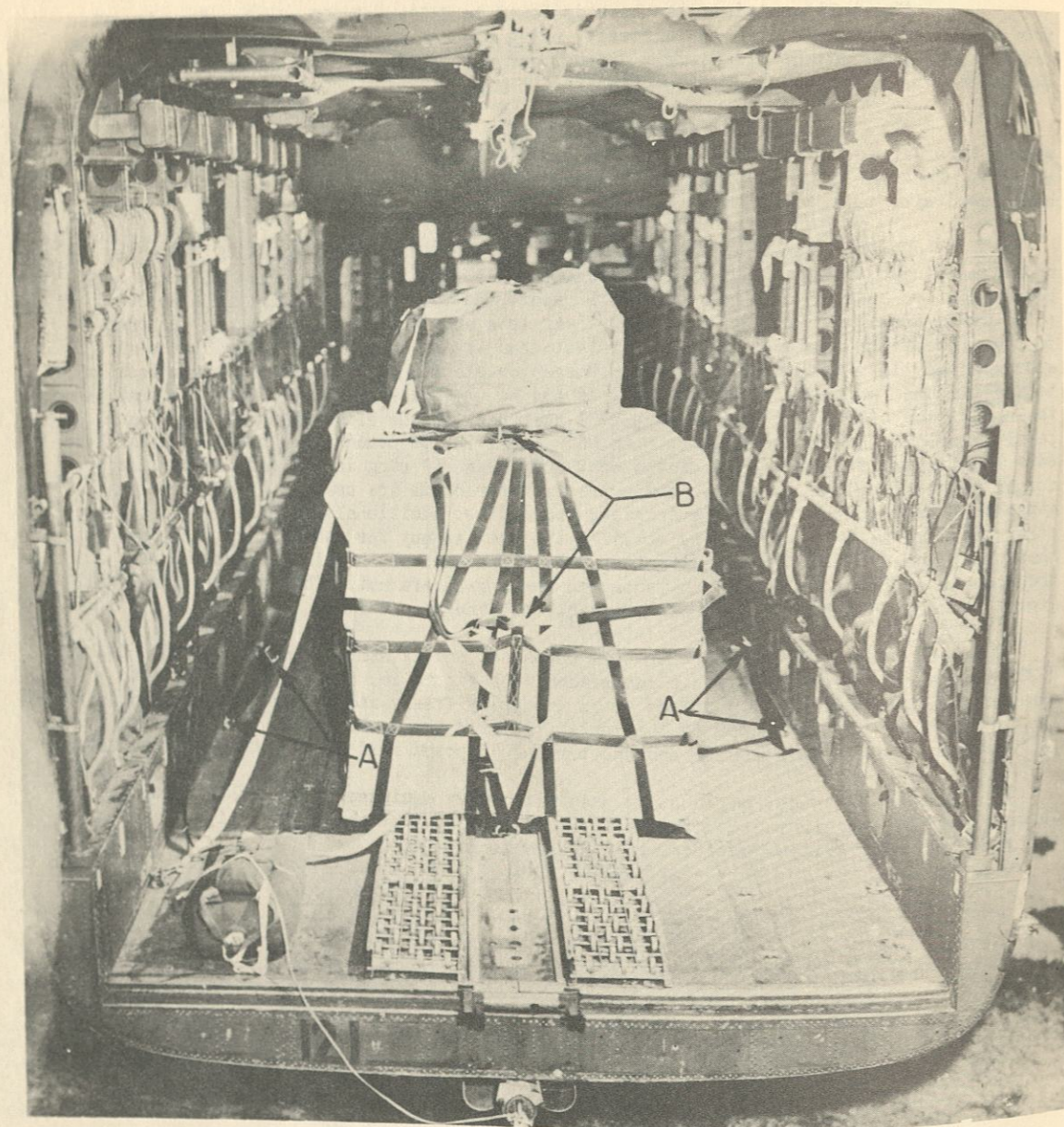


FIGURE 16: 2,000 Pound A-22 Container

- (A) Thread running ends of tiedown straps through tiedown rings in floor of aircraft and through fixed adapter on straps. Lock in place.
- (B) Shear webs have been attached at these points to the running ends of the legs of tiedown straps.

NOTE: For tiedown arrangement of other containers in aircraft see Figure 16A.

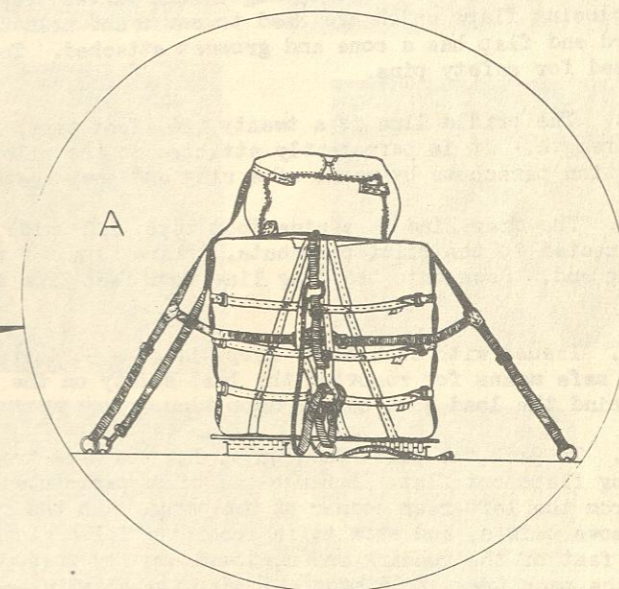
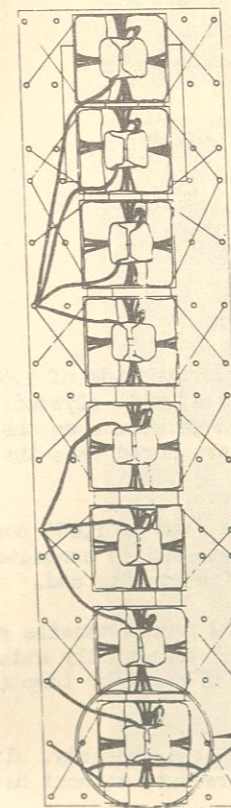


FIGURE 16a: Method of installing A-22 Containers in aircraft.

- (A) The rear container is secured with the release kit assembly. Remaining containers are secured with standard tiedown devices furnished with the aircraft.

Chapter V

Pilot Parachute and Ground Disconnect

Section I

1. The Pilot Parachute

a. The component parts of the pilot parachute are:

- (1) The parachute
- (2) The pack tray
- (3) The bridle line
- (4) The drag line

b. The pilot parachute is a two (2) foot, vane type parachute made of 1.6 oz nylon. The pack tray is a five by eight inch canvas tray, reinforced with plywood. It has four closing flaps which are used to cover and hold the packed parachute on the tray. The forward end flap has a cone and grommet attached. Two holes are bored into the cone and are used for safety pins.

c. The bridle line is a twenty (20) foot tape, 1/2" wide, and of 1,000 pounds tensile strength. It is permanently attached to the pilot parachute and is connected to the extraction parachute by means of a ring and snap fastener on its running end.

d. The drag line is a nine foot tape, 1/2" wide, of 1,000 pounds tensile strength, and is connected to the pilot parachute. There is a ten pound shot permanently attached to its running end. Sewn onto the drag line four feet from the shot is a safety loop 4 inches long.

e. Issued with each heavy drop kit is a 36 foot cable release assembly. It provides a safe means for removing the last safety on the pilot parachute without having to move behind the load just before drop time.

f. To pack the pilot parachute, lay the pack tray on a flat surface. Lay the four closing flaps out flat. Arrange the pilot parachute so that its drag line extends out and away from the left rear corner of the tray. Run the bridle line out to its fullest length, remove twists, and stow it in accordion folds along the length of the tray. Leave about four feet of the running end unstowed and lay that portion out across the right rear corner of the pack tray, fold over and snap the elastic tape. Fold the pilot parachute in accordion folds, commencing from the apex of the parachute, and place it on top of the stowed bridle line, making sure that the folds are the same length and width as the tray. Fold over the side closing flaps and secure with one turn of #5 cord. This is a temporary safety factor which is to be cut later just before drop time. Stow all but four feet of the drag line in accordion folds across the rear of the tray. Fold over the rear end flap. Bring up the forward end flap and thread the cone through the metal eyelets in each end flap. Place the grommet over the cone and insert a temporary pin into the bottom hole of the cone. (See Figure 17).

g. During that phase of loading when the roller conveyor sections are installed on the cargo floor, the 36 foot cable release is laid down the center of the cargo floor handle towards the pilots' compartment. It is tied every two feet to the right set of conveyors and the cable release pin is placed near the rear edge of the cargo floor.

h. After the load is properly placed aboard the aircraft, the extraction parachute is tied with two turns of five cord at each corner to the cargo floor, apex to the rear, about two feet from the rear edge of the cargo floor and centered. Using the four pairs of

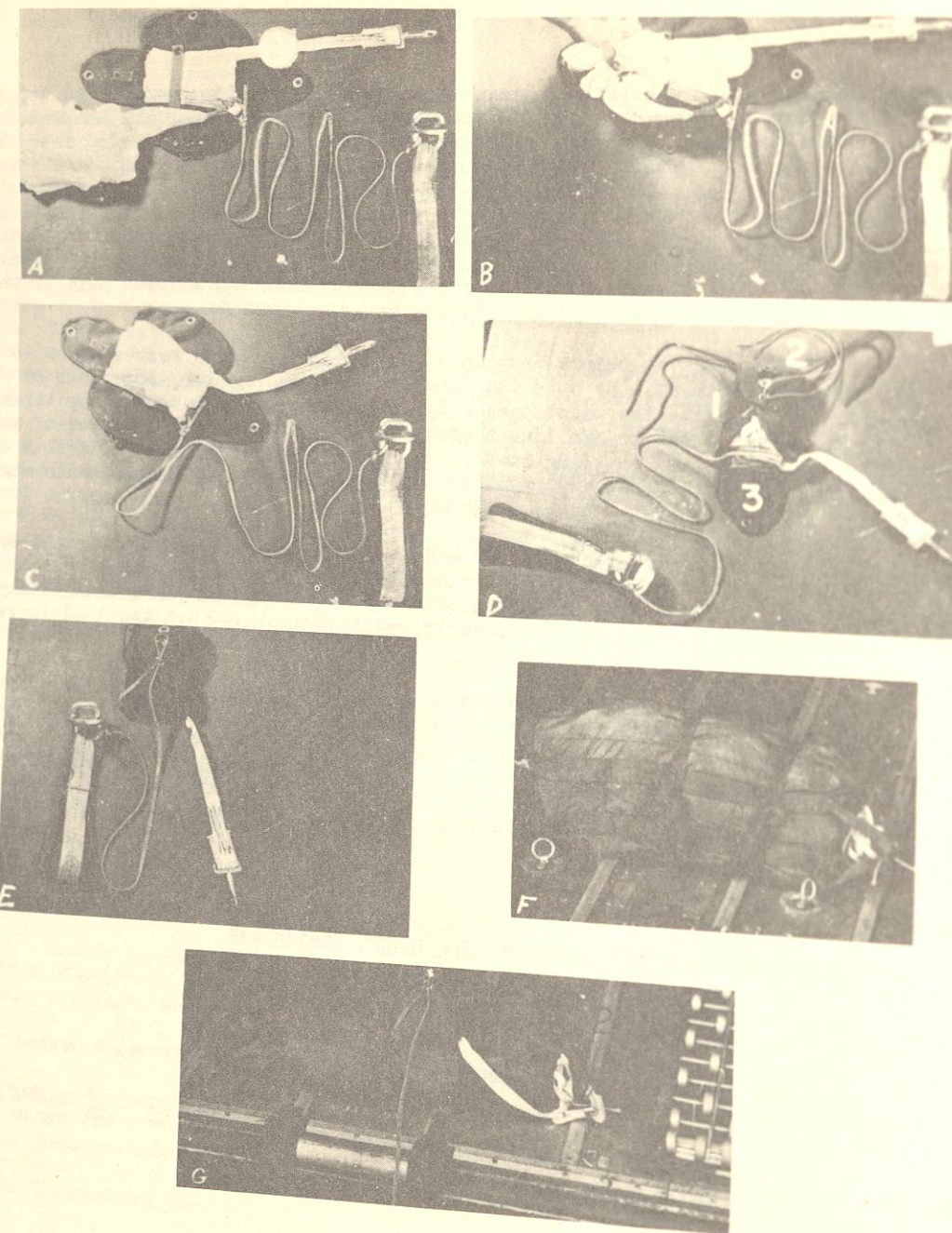


FIGURE 17: Method of packing pilot parachute

- A. Stow parachute bridle line in pack.
- B. Fold pilot parachute canopy into accordion fold starting at the apex.
- C. Pilot parachute folded and placed on top of bridle line.
- D. The closure of pilot parachute pack flaps. (1) Close end flaps by threading elastic loop through grommet; (2) Close end flap in similar manner; (3) Stow excess drag line in end of pack.
- E. Close end flap and thread drag line through elastic loop. Loop thus formed by drag line is placed around the cone on end flap.
- F. Secure extraction parachute to tiedown by two turns 3-cord.
- G. Secure pilot parachute at four corners to extraction parachute bridle loop through lifting handles to bag and apex lines of extraction parachute.

tapes on the pilot parachute pack tray, the pilot parachute is tied to the top of the extraction parachute bag. The bridle line ring and snap fastener are snapped to the nearest tie-down ring. The shot on the end of the drag line is inserted into the glider-tow release assembly after testing its operation three times. To test its operation, the crew chief operates the glider-tow release handle in the pilot's compartment while the senior airborne member visually checks positive opening and closing of the glider tow release jaws after seating the glider-tow plug in place. A light turns on in the pilot's compartment when the glider tow plug is properly seated. Allow six inches of slack in the drag line. Insert the safety pin of the drag line into the lower hole of the cone. Insert the cable release safety pin into the upper hole of the cone.

i. Five minutes before drop time, the senior airborne member moves to the rear of the cargo compartment. He cuts the five cord holding the two side flaps on the pilot parachute. He connects the pilot parachute to the extraction parachute by threading the snap fastener of the bridle line through the carrying handles and apex of the extraction parachute and snapping it to the ring of the bridle line. (If this connection was made prior to this time, any premature deployment of the pilot parachute might cause the entire extraction system to be deployed.)

j. After the other checks are made (see heavy drop check list), the senior airborne member removes the final safety on the pilot parachute by pulling on the cable release handle. This is done about one minute before drop time, and immediately thereafter the senior airborne member will personally notify the pilot that the load is ready to drop.

k. When the aircraft is over the drop point, the pilot pulls the glider tow release handle. This opens the glider-two release jaws, allowing the shot to fall. In falling, the shot pulls the drag line safety pin out of the cone. After the drag line fully deploys, the pilot parachute is pulled out of pack and in turn, the bridle line is pulled out of its stows. When the latter is fully deployed it pulls the extraction parachute out into the slipstream. Action continues as previously described in Chapter I.

Section II

1. Assembly and Installation of the Ground Disconnect

a. The parachute ground disconnect device should be rigged where a vise is available. This sequence is as follows:

- (1) Arrange the component parts of the ground disconnect device for easy accessibility.
- (2) The parachute ground disconnect device with component parts consists of the following:

- (a) Main body
- (b) Disconnect pin
- (c) Disconnect pin suspension web
- (d) Time cutters
- (e) Time cutter tie cords
- (f) Clevis cover
- (g) Clevis with pin and cotter key

(3) Secure the main body in a vise. Insert the disconnect pin in the loop of the disconnect pin suspension webbing. Place the disconnect pin in the recess of the main body. Insert a crow bar between the disconnect pin and the permanent web and apply enough pressure to force the disconnect pin down into the recesses of the main body, compressing the ejection springs. Insert the time cutters in the main body hinges, with the cutter pull-pins on the top side of the hinge after they are inserted. Rotate the hinges forward to the horizontal position and slide the time cutters into the caps on the main body, aligning the holes in the time cutter with the holes in the cap. Insert the time-cutter tie cords through the holes in the time cutter and the cap, and tie the cords in a square knot. Cut away the excess cord. Attach the permanent web clevis to the main parachute risers, secure the clevis pin with the cotter key, and pull the canvas cover over the clevis and tie it in place. Attach the disconnect pin suspension web to the main suspension web assembly clevis. Make sure that the time cutters are on the top side of the main body. Pull the canvas cover over the main suspension assembly and tie it in place. Make sure the pull pins on the time cutters point toward the rear of the aircraft in the direction of the main parachute. Tie one turn of 550 pound suspension line around the parachute riser clevis and the permanent web attachment bar of the disconnect device. Tighten this until the parachute riser clevis is cinched firmly against the main body of the disconnect device. Tie the line securely in a square knot. This puts a 10-inch loop in the permanent web, preventing premature firing of the time cutter. Put one turn of 550 pound suspension line through the eyes of the pull pins and around the parachute riser clevis and tie it in a square knot. Leave a very loose loop to permit movement of the parachute riser clevis without firing the time cutters prematurely. (See Figure 18).

Section III - Heavy Drop Check List

1. Aircraft Inspected Prior to Loading

- a. Required tie-down devices and rings provided.
- b. Glider tow release system functions properly.
- c. Light and intercommunications system functions properly.
- d. Usable space not taken up with removable equipment.
- e. All seats not in use secured to sides of aircraft.
- f. Sides and floor of aircraft.

2. Loading Procedure

- a. Representative of aircraft commander present during loading.
- b. Extraction bar.
 - (1) Tie-down '75 cord cut.
 - (2) Seated on extraction bracket and secured.
- c. Main Parachute
 - (1) Attached to ground disconnect.
 - (2) Risers straight (Riser extensions attached).
 - (3) Secured with two turns 5 cord to pack tray.
 - (4) Secured with 75 cord against takeoff.

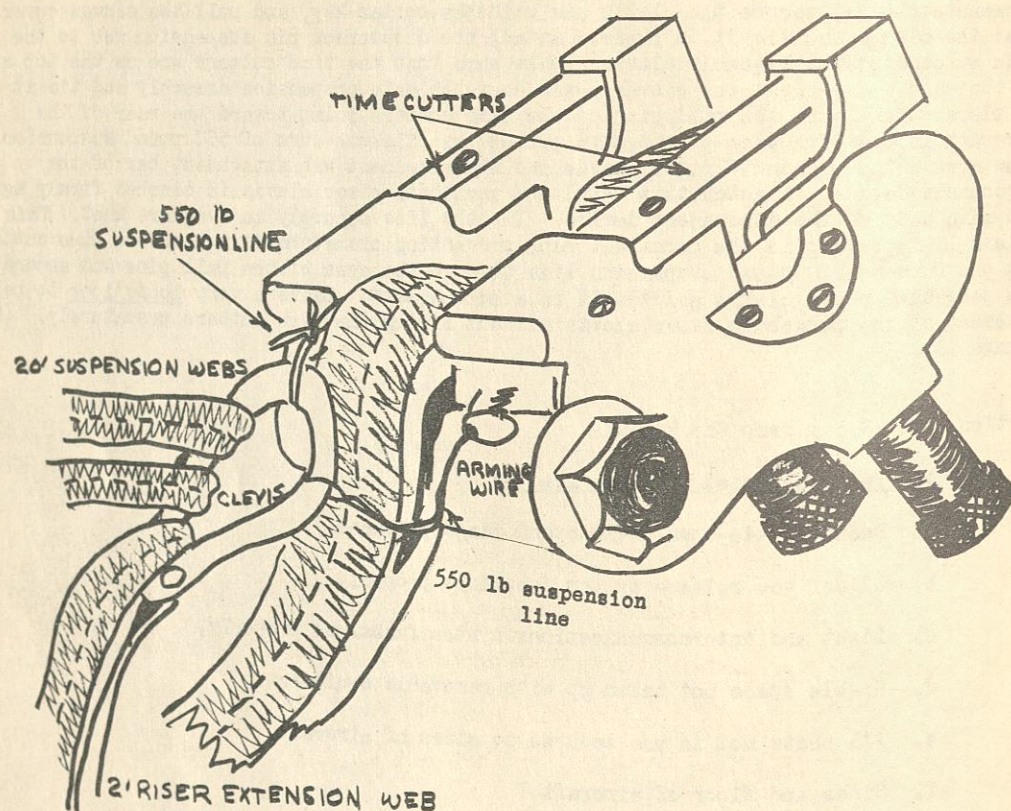


FIGURE 18: Ground disconnect device

d. Ground Disconnect Device

- (1) Cutters on top.
- (2) Both cutters locked together.
- (3) Live cutter secured - dead cutter free.
- (4) Cords tied and secured.
- (5) Disconnect pin attached to load-device connected to parachute.

e. Shear Web

- (1) Buckle on top of platform.
- (2) Web taut.
- (3) Passes through "D" ring and shear knife.

f. Deployment Web

- (1) Attached to extraction bar and G-11.
- (2) Taut.
- (3) Tacked to G-11.

g. Extraction Web

- (1) Attached to extraction bar.
- (2) Taut.
- (3) Secured to deploy in straight pull.

h. Extraction parachute

- (1) Tied with two turns 5 cord in two places if first load.
- (2) Tied with five turns 75 cord and five turns 5 cord if second load.
- (3) Extraction web free of pack loops and pulls in straight alignment.
- (4) Back in aircraft away from shipsteam.

i. Pilot Parachute

- (1) Tied to extraction parachute.
- (2) Properly secured.
- (3) End flap opens first.
- (4) Attached to floor until time of drop.

j. Crash System

- (1) Frame properly positioned.
- (2) Pads properly positioned.

k. Vehicle

- (1) Gears in neutral.
- (2) Brakes released.

l. Tie-downs

- (1) Taut.
- (2) Clear of aircraft and load.

m. Aircraft

- (1) Glider intercom hook removed and plug taped.
- (2) Rollers taped.

n. Pilot Check of Load Position

- (1) Weight and balance correct.
- (2) Seat with safety belt for each passenger.

3. Procedure for Dropping

a. Five minutes prior to drop, remove all metallic tie-down devices except three against rearward movement.

b. One person will move behind the loads to attach the pilot parachute bridle line through the pack loop handles and the apex of the ribbon parachute. At this point the pack cover of the pilot parachute will be checked to insure proper deployment.

c. Two minutes prior to drop, the remaining tie-downs are removed.

d. No one will be behind a load when the last tie-down is removed from it.

e. Drift all loads to the rear slowly as soon as the last tie-down is removed in order to insure the shear web being taut.

f. The safety pin is removed from the pilot parachute one minute prior to drop.

g. The drop master will move forward to the pilot's compartment and personally notify the pilot that the load is ready to drop.

This means:

- (1) All metallic tie-downs are removed.
- (2) The extraction system is properly prepared.
- (3) No one is behind either of the loads.

h. In the event either load fails to extract:

- (1) Notify the pilot that the load has failed to extract and wait 60 seconds.
- (2) Begin attaching metallic tie-downs to the front of the forward load.
- (3) When three tie-downs have been attached one person will move alongside the forward load and cut the ribbon parachute free of the rearward load.
- (4) Attach three tie-downs to the rearward load.

(5) Move alongside the rear load and remove the pilot parachute bridle line from the ribbon parachute and attach it to a tie-down on the floor. *

(6) Reattach all metallic tie-downs.

(7) IN NO CASE WILL ANY PERSON MOVE BEHIND A LOAD AND ATTEMPT TO ACTIVATE THE EXTRACTION SYSTEM. This means moving behind the forward edge of the platform.

(8) No attempt will be made to drop the load. Return and land for examination of the cause of malfunction.

(9) The following items should be available in the aircraft during a heavy drop:

- (a) Sharp knife.
- (b) Suspension line, 75 cord and 5 cord.
- (c) Masking tape.
- (d) C-10 web tie-downs and eccentrics.

* In the event the ribbon parachute is deployed but has not extracted, cut the extraction web between the shear knife and the extraction bar.

