

Chg. 1, 2

FIELD MANUAL

SKS Nov 1990

AIR TRANSPORT PROCEDURES

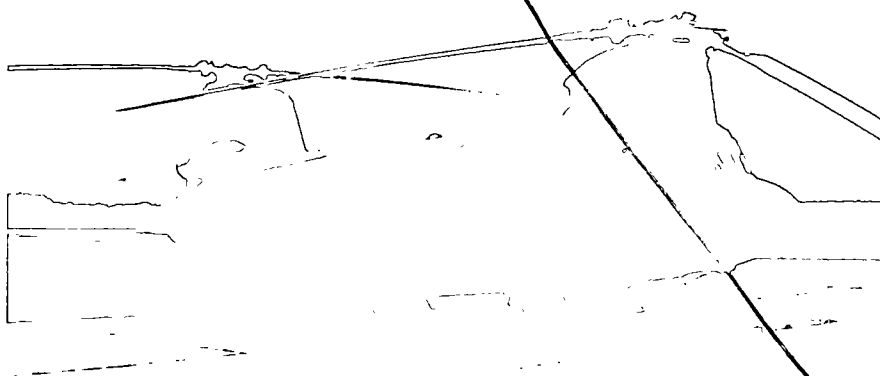
TRANSPORT OF M454 ATOMIC PROJECTILE

BY US ARMY AIRCRAFT

TRANSPORT OF M454 ATOMIC PROJECTILE

COMPLETE MISSION LOADS

BY US ARMY CH-47 HELICOPTER



RETURN TO THE ARMY LIBRARY
ROOM 1A518 PENTAGON
WASHINGTON, D.C. 20310

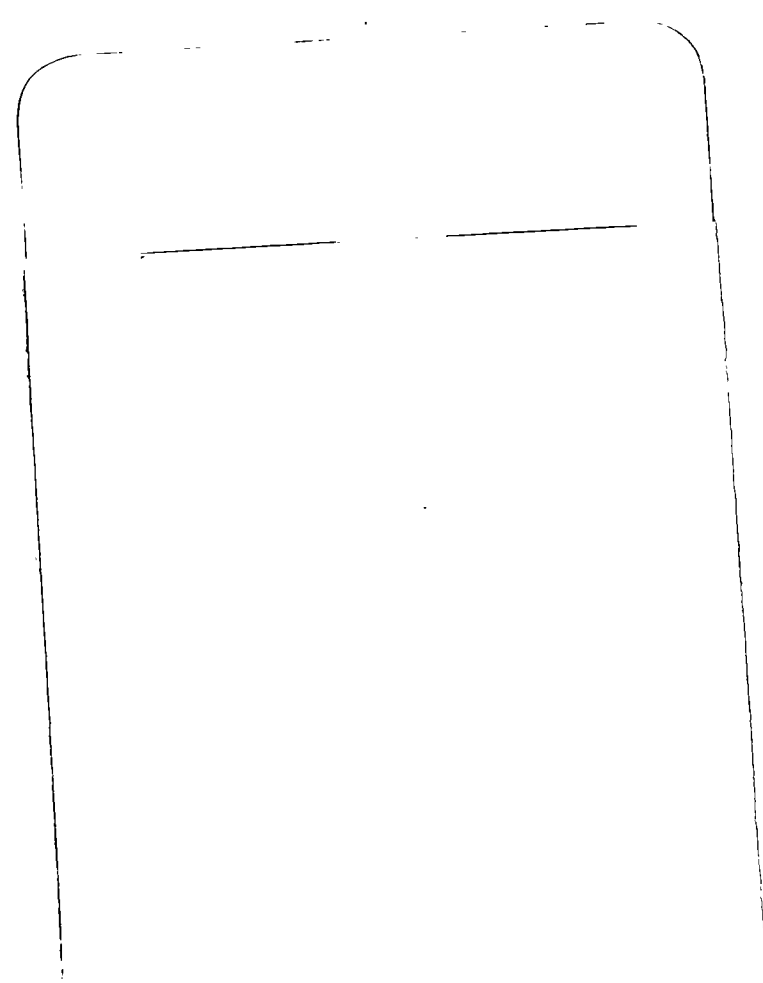
HEADQUARTERS, DEPARTMENT OF THE ARMY
NOVEMBER 1980



Handwritten text, possibly a date or initials, located near the top right edge of the page.



Handwritten text, possibly a date or initials, located near the middle right edge of the page.



HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 29 AUGUST 1988

Immediate Action
INTERIM CHANGE

*FM 55-204
INTERIM CHANGE
NO. 105
Expires 29 August 1989

Air Transport Procedures

Transport of M454 Atomic Projectile
By US Army Aircraft
Transport of M454 Atomic Projectile
Complete Mission Loads
By US Army CH-47 Helicopter

Justification: This interim change establishes new ratcheting procedures for web strap tiedowns used to secure nuclear weapons and components on board US Army helicopters. This guidance is safety related and is required to prevent the inadvertant loosening of tiedown straps during flight.

Expiration: This interim change expires 2 years from date of publication and will be destroyed at that time unless sooner rescinded or superseded by a permanent change.

1. FM 55-204, 15 November 1980, is changed as follows:

Page 2-2. Paragraph 2-2d is superseded as follows:

d. Attach tiedown straps to cargo and to tiedown fittings and rotate the takeup spool until no metal on the spool shows and the strap has made contact with itself. Tension each strap to form at least 1/2 wrap but not more than 1-1/2 wraps on the takeup spool of the tensioning ratchet. Tighten each tiedown, applying equal tension throughout the tiedown arrangement to prevent movement of the cargo. After tensioning is completed, the takeup spool locking latch must be checked to ensure that it is fully seated at both ends of the spool in the matching locking notches. During flight, tiedowns will be checked and tightened as necessary.

*This interim change supersedes interim change 103, 6 November 1986.

Pentagon Library (ANR-PL)
ATTN: Military Documents Section
Room 1A518, Pentagon
Washington, DC 20310-6050

Note

The CGU-1/B tiedown device (NSN 1670-00-725-1437) and the web tiedown strap (NSN 5340-01-089-4997) each have a rated strength of 5,000 pounds and may be used to secure items described in this manual. Tiedown strap (NSN 5340-01-204-3009) may also be used to secure the item. The 36-month useful-life limit does not apply to tiedown strap (NSN 5340-01-204-3009), but it will be marked with the unpacking date (month and year) when used.

2. Post this change per DA Pam 310-13.
3. File this interim change in front of the publication.

MTT-TRA

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

WILLIAM J. MEEHAN II
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:

ACTIVE ARMY, USAR, ARNG: To be distributed in accordance with DA Form 12-11-E, requirements for Air Transport Procedures-M454 Atomic Projectile by CH-47 and DA Form 12-35, Unit Maintenance requirements for Section III, Weapons System Literature, Projectile M454.

Copy 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 26 OCTOBER 1987

FM 55-204
INTERIM CHANGE
NO. IO4
Expires 26 October 1989

Immediate Action INTERIM CHANGE

Air Transport Procedures

Transport of M454 Atomic Projectile
By US Army Aircraft;
Transport of M454 Atomic Projectile
Complete Mission Loads
By US Army CH-47 Helicopter

Justification. This interim change revises the procedures for extending or retracting the casters on the helicopter accident resistant container (HARC) and changes the routing of the helicopter winch cable. This change also provides procedures for loading HARC's, with casters retracted, on CH-47 helicopters. These procedures are required to authorize safe transport of the M454 atomic projectile.

Expiration. This interim change expires 2 years from date of publication and will be destroyed at that time unless sooner rescinded or superseded by a permanent change.

1. FM 55-204, 15 November 1980, is changed as follows:

Page 4-23. Paragraph 4-3.d.(2) is superseded as follows:

(2) Retract or extend the casters in pairs, i.e. both rear, both front, or both on a side. The caster lock handle must be pointing down when lowering or raising the HARC. Ensure that the caster wheels do not contact the caster mount. Raise the locking tang on the jack-screw to raise or lower the HARC. Lower the HARC by using the attached ratchet wrench to turn the jack-screws counterclockwise until the weight of the HARC is off the casters. Turn the jack-screws all the way up for maximum wheel clearance. Raise the HARC by turning the jack-screws clockwise until the casters are fully extended. Engage the jack-screw locking tang before moving the HARC. Do not force the locking tangs. Ensure that they are properly aligned for easy operation.

1

Pentagon Library (ANR-PL)
ATTN: Military Documents Section
Room 1A518, Pentagon
Washington, DC 20310-6050

Page 4-29. Paragraph 4-3.f.(7) is superseded as follows:

When the HARC is at its tiedown location, apply fore and aft restraint and then release tension on the winch cable. Remove the bridle and winch cable and pass them between the casters of the already-loaded container(s). After all containers are loaded, retract the casters to allow the flat bottom of the HARC to rest on the shoring.

Page 4-29. The "CAUTION" following paragraph 4-3.f.(8) is superseded as follows:

CAUTION

During winching of the remaining HARCs, place a wooden block or other anti-chaffing material between the winch cable and the bolster of the already loaded HARCs.

Page 4-31. Paragraph 4-4 is added as follows:

4-4. Transport of HARCs with Casters Retracted or Removed

a. Straight in Loading. One or two HARCs may be loaded straight in.

b. Materials Required.

(1) Bridge shoring. Plywood, one sheet, 3/4-inch by 4- by 8-foot for each HARC.

(2) Blocking Shoring. Approximately 12 pieces, 2- by 12-inch by 2-foot.

(3) Rolling and parking shoring. Plywood, 3/4-inch by 4- by 8-foot, or cut-to-suit; or 2- by 12-inch lumber. Either type of shoring to be in sufficient quantity for rolling HARCs on roller conveyors from outside the helicopter to their tiedown locations inside the helicopter. Either type of shoring is suitable for load-spreading and floor protection at the tiedown locations.

(4) Roller conveyors Two sections, 8- or 10-foot, for each HARC.

(5) Chains. Two of the type used with the MB-1 tiedown device, 10,000-pound-capacity, or equivalent.

(6) Forklift or crane. Load tested, at least 4,000-pound capacity.

c. Loading.

(1) Space the helicopter auxiliary loading ramps to match the width of the load (about 4 feet).

(2) Lay rolling and parking shoring from the ground level to the forward tiedown location inside the helicopter. Use blocking shoring under rolling shoring and auxiliary ramps as needed.

(3) Position two sections of roller conveyors, with rollers down, on the ground level shoring. Place a sheet of plywood on the conveyors and place a HARC, with cover end facing aft and casters retracted, on the plywood. Place the HARC approximately on the center of the plywood.

(4) Connect a CGU-1/B tiedown strap to each forward (toward the aircraft) inner eyebolt tiedown of the HARC and to the aft end of the roller conveyor, to prevent the HARC from being pulled off the conveyors during winching.

(5) Form a towing bridle by attaching two chains to the forward eyebolts. Attach the helicopter winch cable hook to the towing bridle and safety-tie to prevent accidental release. If the hook has a serviceable safety latch, tying is not required.

(6) Place a wooden block under the cable at the cargo ramp hinge to protect the helicopter floor.

(7) Position guides to adjust shoring, observe clearances, and signal the winch operator as necessary.

(8) Winch the HARC to the tiedown location inside the helicopter. Attach fore and aft restraint to the container and release tension on the winch cable. Remove the bridle from the eyebolt tiedowns.

(9) Tie down the HARC (on the conveyors and shoring) at the location determined by the number of HARCs and/or other cargo to be loaded. Use the tiedown pattern shown in figure 4-22.

(10) Route the winch cable between the roller conveyors underneath the loaded HARC if another HARC is to be loaded, and repeat the loading procedure.

d. Unloading. Unloading procedures are essentially the reverse of loading procedures. The helicopter winch cable will be used as a safety restraint when the HARC is unloaded.

e. Sideways loading. Up to four HARCs may be loaded sideways.

f. Materials Required.

(1) Bridge shoring. Plywood, one sheet, 3/4-inch by 4- by 8-foot for each pair of (2) HARCs.

(2) Blocking shoring. Approximately 12 pieces, 2- by 12-inch by 2-foot.

(3) Rolling and parking shoring. Plywood, 3/4-inch by 4- by 8-foot, or cut-to-suit; or 2- by 12-inch lumber. Either type of shoring to be in sufficient quantity for rolling HARCs on roller conveyors from outside the helicopter to their tiedown locations inside the helicopter. Either type of shoring is suitable for load-spreading and floor protection at the tiedown locations.

(4) Roller conveyors. Two sections, 8- or 10-foot, for each pair of (2) HARCs.

(5) Chains. Two of the type used with the MB-1 tiedown device, 10,000-pound-capacity, or equivalent.

(6) Forklift or crane. Load tested, at least 4,000-pound-capacity.

g. Loading.

(1) Space the helicopter auxiliary loading ramps to match the width of the load (about 4 feet).

(2) Lay rolling and parking shoring from the ground level to the forward tiedown location inside the helicopter. Use blocking shoring under rolling shoring and auxiliary ramps as needed.

(3) Position two sections of roller conveyors, with rollers down, on the ground level shoring. Place a sheet of plywood on the conveyors and place a HARC, with cover end facing either side and casters retracted, at the front end of the plywood. Position the HARC so that it overhangs the plywood about the same distance on both sides. Position the second HARC in a like manner at the rear end of the plywood.

CAUTION

It is possible that the forward HARC will require connection to the conveyors to prevent being pulled off the conveyors during winching. If required, connect two CGU-1/B tiedown straps to the HARC eyebolt tiedowns or tiedown shackles and to the aft end of the roller conveyors.

(4) Form a towing bridle by attaching two chains to the forward HARC eyebolts or shackles. Attach the helicopter winch cable hook to the towing bridle and safety-tie the hook if required to prevent accidental release.

(5) Place a wooden block under the cable at the cargo ramp hinge to protect the helicopter floor.

(6) Position guides to adjust shoring, observe clearance, and signal the winch operator as necessary.

(7) Winch the HARCs to the tiedown location inside the helicopter. Attach fore and aft restraint to one of the HARCs and release tension on the winch cable. Remove the bridle from the HARC.

(8) Tie down the HARCs (on the conveyors and shoring) at the location determined by the number of HARCs and/or other cargo to be loaded. Use the tiedown pattern shown in figure 4-26.

(9) Route the winch cable between the roller conveyors underneath the loaded HARCs if other HARCs are to be loaded, and repeat the loading procedure.

h. Unloading. Unloading procedures are essentially the reverse of loading procedures. The helicopter winch cable will be used as a safety restraint when the HARCs are unloaded.

2. Post this change per DA Pam 310-13.

3. File this interim change in front of the publication.

MTT-TRA

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
Chief of Staff

Official:

R. L. DILWORTH

Brigadier General, United States Army
The Adjutant General

Distribution:

ACTIVE ARMY, ARNG, USAR: To be distributed in accordance with DA Form 12-11A requirements for Air Transport Procedures-M454 Atomic Projectile by CH-47; DA Form 12-31, -10 and CL Operators Requirements for CH-47 C and D Helicopter, Cargo Transport; and DA Form 12-35, Section III, Weapon System Literature, Unit Maintenance Requirements for Projectile M454.



Change }
No. 2 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 24 September 1987

**AIR TRANSPORT PROCEDURES
TRANSPORT OF M454 ATOMIC PROJECTILE
BY US ARMY AIRCRAFT
TRANSPORT OF M454 ATOMIC PROJECTILE
COMPLETE MISSION LOADS
BY US ARMY CH-47 HELICOPTER**

This change adds procedures for transporting the helicopter accident-resistant container (HARC), H1501, by CH-47 helicopter. This change also rescinds Interim Change No. I02.

FM 55-204, 15 November 1980, is changed as follows:

1. Interim Change No. I02, 24 January 1986, is rescinded.
2. New or changed material is indicated by a star.
3. Remove old pages and insert new pages as indicated below:

Remove Pages
i
4-21

Insert Pages
i
4-21 through 4-31

4. File this change sheet in the front of the publication for reference purposes.

By Order of the Secretary of the Army:

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

CARL E. VUONO
General, United States Army
Chief of Staff

Distribution:

ACTIVE ARMY, USAR, ARNG: To be distributed in accordance with DA Form 12-11A, requirements for Air Transport Procedures — M454 Atomic Projectile by CH-47; DA Form 12-31, -10 and CL Maintenance requirements of CH-47C Helicopter, Cargo Transport and DA Form 12-35, Section III Weapons System Literature, Unit Maintenance requirements for Projectile M454.

Pentagon Library (ANR-PL)
ATTN: Military Documents Section
Room 1A518, Pentagon
Washington, DC 20310-6050



B

-

18

-

A

-



A

-

-

-

-



HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 6 NOVEMBER 1986

FM 55-204
INTERIM CHANGE
NO. 103
Expires 6 November 1988

Immediate Action INTERIM CHANGE

*Posted
18 Dec 86
DA*

Air Transport Procedures

Transport of M454 Atomic Projectile
By US Army Aircraft
Transport of M454 Atomic Projectile
Complete Mission Loads
By US Army CH-47 Helicopter

Justification. This interim change authorizes a new tiedown strap to be used to secure nuclear weapons and components aboard US Army helicopters. This change also provides procedures for the proper application of tiedown straps when securing nuclear weapons and components on board US Army helicopters. This guidance is safety related and is required to prevent the inadvertent loosening of the tiedown straps during flight.

Expiration. This interim change expires 2 years from date of publication and will be destroyed at that time unless sooner rescinded or superseded by a permanent change.

1. FM 55-204, 15 November 1980, is changed as follows:

Page 2-2. Paragraph 2-2d is superseded as follows:

d. When tiedown straps have been attached to cargo and to tiedown fittings, tension each tiedown strap to form at least one and one-half turns on the take-up spool of the tensioning ratchet. The one and one-half turns must be taken after webbing to webbing contact. Continue to tighten each tiedown, applying approximately equal tension to all tiedowns to prevent movement of the cargo. Check tiedowns during flight and tighten as necessary.

Page 2-2. The Note after paragraph 2-2d is superseded as follows:

Note

The CGU-1/B tiedown device (NSN 1670-00-725-1437) and the web tiedown strap (NSN 5340-01-089-4997) each have a rated strength of 5,000 pounds and may be used to secure items described in this manual. Tiedown strap (NSN 5340-01-204-3009) may also be used to secure the items. The 36-month useful-life limit does not apply to tiedown strap (NSN 5340-01-204-3009), but it will be marked with the unpacking date (month and year) when used.

2. Post this change per DA Pam 310-13.

ATTN: Military Documents Section
Room 1A518, Pentagon
Washington, DC 20310-6050

FM 55-204

3. File this interim change in front of the publication.

MTT-TRA

By Order of the Secretary of the Army:

JOHN A WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

Distribution:

ACTIVE ARMY, USAR, ARNG: To be distributed in accordance with DA Form 12-11A requirements for Air Transport Procedures M454 Atomic Projectile and DA Form 12-35, Organizational Maintenance requirements for Section III EWeapons System Literature, Projectile M454.

Immediate Action INTERIM CHANGE

FM 55-204
INTERIM CHANGE
NO. IO2
Expires 24 January 1988

Air Transport Procedures

Transport of M454 Atomic Projectile
By US Army Aircraft
Transport of M454 Atomic Projectile
Complete Mission Loads
By US Army CH-47 Helicopter

Justification. This interim change provides proper orientation of the nuclear weapons containers. This guidance is safety-related and is required to provide proper spacing.

Expiration. This interim change expires 2 years from date of publication and will be destroyed at that time unless sooner rescinded or superseded by a permanent change.

1. FM 55-204, 15 November 1980, is changed as follows:

Page 4-1. At the beginning of chapter 4, add a second warning as follows:

WARNING

When two M467 containers are transported side by side, they must face in opposite directions. Figure 4-4 showing three containers side by side can only be used for emergency movement and the middle container forward end must be facing the opposite direction from the two outside containers.

Page 6-1. After paragraph 6-2b, add the following warning.

WARNING

The two rows of M467 containers shown in figures 6-1 and 6-2 must face in opposite directions, i.e., the left row of containers forward ends facing the front of aircraft and the right row of containers forward ends facing aft.

2. Post this change per DA Pam 310-13.

3. File this interim change in front of the publication.

(MTT-TRC)

Pentagon Library (ANR-PL)
ATTN: Military Documents Section
Room 1A518, Pentagon
Washington, DC 20310-6050

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

MILDRED E. HEDBERG
Brigadier General, United States Army
The Adjutant General

Distribution:

Active Army, USAR, ARNG: To be distributed in accordance with DA Form 12-11A-R, requirements for Air Transport Procedures M454 Atomic Projectile.

Headquarters,
Department of the Army
Washington, DC
25 October 1984

Immediate Action INTERIM CHANGE

FM 55-204
Interim Change
No. IO1
Expires 25 October 1986

Air Transport Procedures

Transport of M454 Atomic Projectile
By US Army Aircraft
Transport of M454 Atomic Projectile
Complete Mission Loads
By US Army CH-47 Helicopter

Justification. This interim change provides procedures for the proper application of tiedown straps used to secure nuclear weapons and components on board US Army helicopters. This guidance is safety-related and is required to prevent the inadvertent loosening of the tiedown straps during flight.

Expiration. This interim change expires 2 years from date of publication and will be destroyed at that time unless sooner rescinded or superseded by a permanent change.

1. FM 55-204, 15 November 1980, is changed as follows:

Page 2-2. Paragraph 2-2d is superseded as follows:

d. When attaching tiedown straps to cargo and to tiedown fittings, tension each tiedown strap to form at least one and one-half turns on the take-up spool of the tensioning ratchet. The one and one-half turns must be taken after webbing to webbing contact. Continue to tighten each tiedown, applying approximately equal tension throughout the tiedown arrangement to prevent movement of the cargo. Check tiedowns during flight and tighten as necessary.

2. Post this change per DA Pam 310-13.

3. File this interim change in front of the publication.

(MTT-TRC)

The Pentagon Library
Rm 1A518, Pentagon
Washington, D.C. 20310

25 October 1984

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

Distribution:

Active Army, ARNG, USAR: To be distributed in accordance with DA Form 12-31 requirements for UH-1D/H; EH-1H; CH-54A; CH-54B; CH-47B/C/D; UH-60A; DA Form 12-35 requirements for Projectile M454; and DA Form 12-34B, requirements for Nuclear Warheads and Projectiles. A.

CHANGE

No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 1 December 1981

AIR TRANSPORT PROCEDURES
TRANSPORT OF M454 ATOMIC PROJECTILE
BY US ARMY AIRCRAFT
TRANSPORT OF M454 ATOMIC PROJECTILE
COMPLETE MISSION LOADS
BY US ARMY CH-47 HELICOPTER

This change provides procedures for internal transport of the M454 projectile by UH-60A helicopter and deletes the procedures for transport of the M454 projectile by U-21A airplane. FM 55-204, 15 November 1980, is changed as follows:

1. New or changed material is indicated by a star.
2. Remove old pages and insert new pages as indicated below:

<i>Remove pages</i>	<i>Insert pages</i>
i ✓ -----	i ✓ -----
1-1 ✓ -----	1-1 ✓ -----
4-1 and 4-2 ✓ -----	4-1 through 4-2.1 ✓ -----
4-7 through 4-10 ✓ -----	4-7 through 4-10.4 ✓ -----

3. File this change sheet in the front of the publication for reference purposes.

By Order of the Secretary of the Army:

Official:

ROBERT M. JOYCE
Brigadier General, United States Army
The Adjutant General

E. C. MEYER
General, United States Army
Chief of Staff

Distribution:

Active Army, ARNG, USAR: To be distributed in accordance with DA Form 12-31 requirements for UH-1B, UH-1C/M, UH-1D/H and EH-1H, CH-54A, CH-54B, CH-47B/C, UH-60A; DA Form 12-35 requirements for Projectile M454; and DA Form 12-34B requirements for nuclear warheads and projectiles.

RETURN TO THE ARMY LIBRARY
ROOM 1A518 PENTAGON
WASHINGTON, D. C. 20310



1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100



1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100



Field Manual

No. 55-204

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 15 November 1980

**AIR TRANSPORT PROCEDURES
TRANSPORT OF M454 ATOMIC PROJECTILE
BY US ARMY AIRCRAFT
TRANSPORT OF M454 ATOMIC PROJECTILE
COMPLETE MISSION LOADS
BY US ARMY CH-47 HELICOPTER**

	<i>Paragraph</i>	<i>Page</i>
Chapter 1. INTRODUCTION		
Purpose and Scope	1-1	1-1
Reporting of Publication Improvements	1-2	1-1
Definitions	1-3	1-1
2. GENERAL SAFETY AND SECURITY MATTERS		
Warnings	2-1	2-1
Operational Precautions	2-2	2-1
3. AIR TRANSPORTABILITY AND HANDLING DATA		
General	3-1	3-1
Container Descriptions	3-2	3-1
Air Transport Limitations	3-3	3-2
4. INTERNAL TRANSPORT BY AIRCRAFT		
Transport of M454 Atomic Projectile in M467 Shipping and Storage Container	4-1	4-1
Transport of M454 Atomic Projectile Complete Mission Loads A Through H by CH-47 Helicopter	4-2	4-10.3
★Transport of Helicopter Accident-Resistant Container (HARC), H1501, by CH-47 Helicopter ..	4-3	4-22
5. EXTERNAL TRANSPORT BY HELICOPTER (Emergency Procedure)		
General	5-1	5-1
Transport of One M454 Atomic Projectile, Using Air-Delivery Cargo Slings	5-2	5-1
Transport of One, Two, or Three M454 Atomic Projectiles, Using the 5,000-Pound-Capacity Nylon Cargo Net	5-3	5-2
Transport of One, Two, or Three M454 Atomic Projectiles, Using the 8,930-Pound-Capacity Nylon Cargo Net	5-4	5-2
6. EMERGENCY MOVEMENT BY HELICOPTER		
General	6-1	6-1
Emergency Movement of M454 Atomic Projectile as Helicopter Internal Loads	6-2	6-1
Emergency Movement of M454 Atomic Projectile as Helicopter External Loads	6-3	6-4
APPENDIX REFERENCES		A-1
(Front Cover) CH-47 helicopter positioned for loading.		



CHAPTER 1

INTRODUCTION

NOTE

In this manual, references to the M454 atomic projectile apply to all models.

1-1. Purpose and Scope

a. This manual presents Department of the Army-approved procedures for transport of the M454 atomic projectile (155-mm projectile) and the M454 atomic projectile complete mission loads. It prescribes materials and personnel needed to prepare, load, tie down, and unload, or to rig and derig, the loads. Responsibilities of the transportation-providing unit, the consignor, and the consignee are shown in chapter 4, AR 50-5.

b. The procedures in this manual provide for transport of:

★(1) The M454 projectile, as an internal load, by UH-1 series, CH-47, CH-54, and UH-60A helicopters.

(2) The M454 projectile complete mission loads, as internal load, by CH-47 helicopter.

(3) The M454 projectile, as an external load, by UH-1 series, CH-47, CH-54, and UH-60A helicopters.

c. Other internal cargo, including different types of nuclear weapons and/or personnel aircraft load capacity and restrictions prescribed by AR 50-5 and pertinent safety regulations (app), may be transported.

d. This manual also provides for emergency

movement of the M454 projectile, as internal and external loads, by aircraft.

e. Times given to prepare, load, tie down, and unload, or to rig and derig, the loads described in this manual may vary with conditions that exist at the time of transport and the training of personnel involved.

★1-2. Reporting of Publication Improvements

Users of this publication are encouraged to recommend changes and give comments for its improvement. Recommendations and comments should be prepared on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded to Commander, Military Traffic Management Command Transportation Engineering Agency, ATTN: MTT-TRC, PO Box 6276, Newport News, VA 23606. (Electrically transmitted messages should be addressed to: CDRMTMC-TEA FT EUSTIS VA//MTT-TRC//.)

1-3. Definitions

a. *Warning.* Instructions that, if not followed, could result in injury to or death of personnel.

b. *Caution.* Instructions that, if not strictly observed, could result in damage to or destruction of equipment.

c. *Note.* A brief statement for use as necessary to emphasize a particular operating procedure, condition, and so forth.



—

9



10



CHAPTER 2

GENERAL SAFETY AND SECURITY MATTERS

WARNING

During a logistical movement of nuclear weapons by US Army aircraft, jettisoning is not authorized. During emergency movements (external transport by helicopter, chaps 5 and 6), the in-flight emergency procedures prescribed by the appropriate aircraft operator's manual will apply (paras 4-3i and 4-3l AR 50-5).

2-1. Warnings

The following warnings will be observed by personnel performing operations, procedures, and practices that are included or implied in this manual. Disregard for these warnings could result in personal injury or death.

a. Before each nuclear cargo mission, the aircraft commander will be familiar with, and will insure compliance with, AR 50-5, AR 50-5-1, and AR 95-27. Also, the commander will be familiar with the security, safety, and technical peculiarities of the cargo that may affect air transport. Flight plans will include provisions for avoiding built-up and heavily populated areas. When transporting the M454 projectile in the universal military pod by CH-54 helicopter, the pod must be secured to the helicopter to preclude jettisoning the pod deliberately or inadvertently. Procedures for securing the pod to preclude jettisoning are prescribed in TM 55-1520-217-10-1 and TM 55-1520-217-10-2.

b. To determine compatibility of any other nuclear weapons or other cargo for transport with the M454 projectile as authorized by chapter 4, AR 50-5; and chapter 1, AR 55-203; ordnance support channels must be consulted. Information on compatibility is contained in TM 39-45-51C and TM 38-250, which are distributed to major headquarters and to direct support and general support levels. Restrictions listed in TM 39-20-7 will not be exceeded when other types of nuclear weapons are transported along with the projectile. Procedures for units with a nuclear mission operating under combat conditions are prescribed by FM 100-50.

c. *A maximum of three M454 projectiles may be transported in a single group without waiver (TM 39-20-7, TM 39-45-51A, and TM 39-45-51C).*

This maximum may be reduced by existing conditions and the allowable cargo load (ACL).

d. Emergency destruction procedures for the M454 projectile are shown in TM 39-50-8. Normally, emergency-destruct materials and nuclear weapons will not be carried on the same aircraft. However, the operational commander may authorize transport of emergency-destruct materials (including blasting caps or pre-capped branch lines) in the load-carrying aircraft. Such materials will be in packagings authorized for transportation, isolated from weapons as far as possible and tied down to prevent movement. Only the number of destruct charges necessary to destroy the projectile will be carried aboard. Blasting caps or pre-capped branch lines in their container will be tied down separately and surrounded by a restrained sandbag barrier. (Use of M2- or M19-series ammunition boxes is recommended.) Transport of electric blasting caps in helicopters is governed by paragraph C-26, TM 9-1300-206.

e. Containers will be loaded and tied down in accordance with the procedure described in this manual except that they may be repositioned for helicopter operational reasons, or for loading other nuclear weapons or other cargo and/or personnel. Mandatory requirement for minimum spacing, numerical limits, and type of array for transport of the projectile are prescribed by TM 39-20-7 and TM 39-45-51A. If a location other than that shown in the applicable tiedown diagram is used, the aircraft commander must insure that:

(1) The number and load capacity of the tiedown devices are as prescribed in this manual.

(2) Tiedown devices restraining the containers are secured to tiedown fittings in the same location relative to the containers as those fittings used in the pertinent tiedown diagram. Required restraint will be provided when the depicted tiedown pattern is maintained.

(3) The requirements prescribed by TM 39-20-7 and TM 39-45-51A are fulfilled.

2-2. Operational Precautions

The following operational precautions apply during loading, rigging, tie down, transport, and unloading of the containers.

a. Web-strap tiedown assemblies used to secure the items described in this manual are limited to a maximum useful lifespan of 36 months. The lifespan will start when the tiedowns are unpackaged for use by the using organization. At that time the straps will be marked (using stencil ink TT-I-1795, any contrasting color) with the unpackaged date (month and year) in at least 1/2-inch-high letters near the hook end of the strap. After 36 months, the tiedowns will be marked with a 2-inch-wide band on both sides of the strap, near the previously marked date (using yellow number 33538 stencil ink TT-I-1795 or enamel TT-E-516).

b. Before each use, tiedowns and external cargo carrying devices will be inspected for burns, tears, punctures, or cuts. Also, their metal components will be inspected for malfunction, corrosion, cracks, or distortion. If any of these conditions are found, the tiedowns or carrying devices must be replaced. No strength testing will be made. Other storage, inspection, and maintenance criteria are discussed in 55-450-series technical manuals (app).

c. After 36 months' use, serviceable web-strap tiedown assemblies may be used to secure nuclear weapon trainers and training devices and other cargo (para 4-3h, AR 50-5). However, when the aircraft or pod is transporting the M454 projectile or other nuclear weapon or component, all tiedowns (including those used to secure weapon trainers and training devices and other cargo) must meet the 36-month-useful-lifespan criterion.

d. When tiedown devices are attached to cargo and to tiedown fittings, about equal tension must be kept throughout tiedown arrangements. The tiedowns must be tightened to prevent movement

of cargo, and loose ends of straps must be secured. Tiedowns must be checked during flight and tightened as necessary.

Note

~~The strap, webbing, universal tiedown (NSN 5340-00-980-9277) may be used in place of the CGU-1/B tiedown device (NSN 1670-00-725-1437) or the MC-1 tiedown device. Each identified tiedown has a rated strength of 5,000 pounds.~~

*see ch
I 03*

e. Security and safety measures relative to guards, fire, or emergency destruction procedures, as established by pertinent publications (app), apply during all phases of air transport. All operations described here will be in strict compliance with AR 50-5, AR 50-5-1, AR 50-102, TM 9-1300-206, TM 9-1100-204-20, and FM 100-50.

f. During either internal or external transport, passenger seats must be available for the minimum essential security personnel (courier officer and guard).

g. The high noise level of helicopter engines and helicopter auxiliary power unit can cause permanent damage to hearing. All personnel working in the vicinity will wear ear protectors and avoid entering engine noise-danger area. Also, external cargo hookup personnel will wear goggles and protective headgear (hard hat, steel helmet, or flight helmet), and will use static electricity discharge probe, NSN 1670-00-574-8044, or a locally made probe.

h. Aircraft will be searched for unauthorized personnel, and equipment will be inspected for possible sabotage. Entry controls will be set up, by the courier officer, to maintain security integrity until completion of the nuclear mission.

CHAPTER 3

AIR TRANSPORTABILITY AND HANDLING DATA

3-1. General

a. This chapter describes the M467 shipping and storage container with the M454 projectile and the items comprising the M454 projectile mission loads. Also shown are limitations for internal and external transport of the items by aircraft.

NOTE

Personnel dosimetry (film badge) is not required for personnel engaged in operations prescribed in this manual, nor do the operations require keeping a record of exposure times. However, personnel should not stay within 1 meter of the M454 projectile any longer than is needed to accomplish each operation.

b. Items comprising the various loads must be inspected for damage other than minor scratches and abrasions. If any item is damaged to such an extent that its contents or functions might be affected, the support unit will be notified and a report submitted in accordance with chapter 5, AR 50-5.

c. Covers or lids on all containers must be secured.

d. The forward end of the M467 container should bear the marking "FWD" on the end and cover. If the container is not so marked, the forward end is the end *without* the vent assembly and relief valve.

e. The M467 container with M454 projectile may

be faced forward, aft, or to either side during internal transport. Container center of balance for M454A4 and M454A6 projectiles is about 32 inches (0.81 m) from the forward end. Container center of balance for M454A5 and M454A7 projectiles is about 31 inches (0.79 m) from the forward end.

f. The M467 container has four carrying handles and will be carried by four persons.

g. One, two, or three M467 containers with M454 projectiles make up a typical internal or external load. See paragraph 2-1c regarding single-group limitation.

h. Four persons can prepare, load, and tie down each M467 container in the respective aircraft or in the universal military pod in about 5 minutes.

i. Four persons can unload each M467 container from the respective aircraft or pod in about 5 minutes.

j. The aircraft weight and balance must be computed for all loads, to include shoring and nuclear weapon security personnel (two-person concept).

3-2. Container Descriptions

a. Identification, dimensions, and approximate weight of the M467 container with M454 projectile are shown in figure 3-1 and table 3-1.

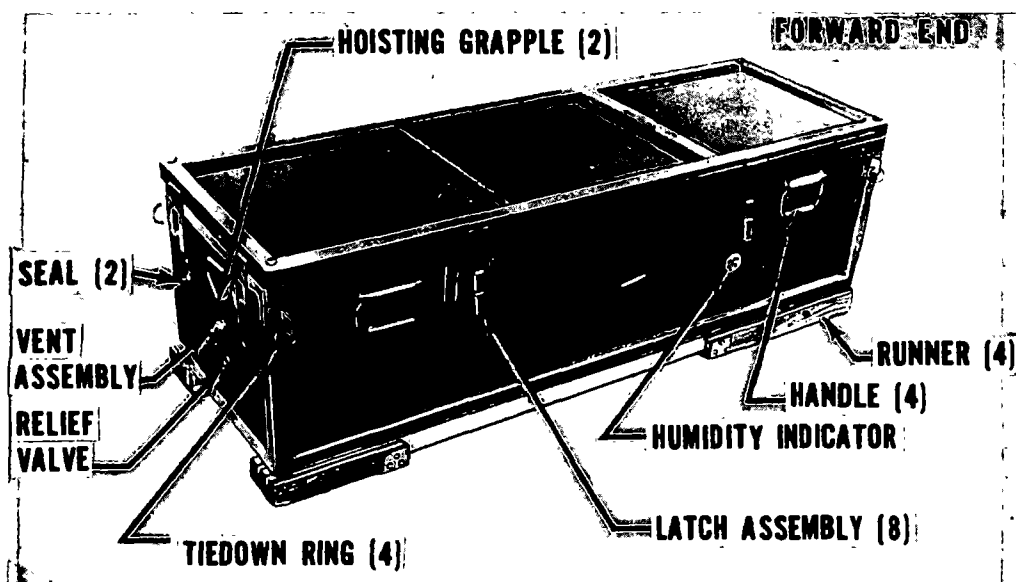


Figure 3-1. M467 container for M454 projectile.

Table 3-1.

Description of Items That Make Up the M454 Projectile Complete Mission Loads

Item	Length	Dimensions			Weight
		Width	Height	Diameter	
M467 container with M454 projectile	57.0 in. (1.45 m)	22.0 in. (0.56 m)	20.5 in. (0.52 m)	-----	266 lb* (121 kg)
M107 spotting projectile (when palletized)	28.0 in. (0.71 m)	14.0 in. (0.36 m)	32.0 in. (0.81 m)	-----	132 lb (60 kg)
NOTE: The projectile weighs 95 lb (43 kg) and the two-section pallet weighs 37 lb (17 kg).					
XM206 propelling charge in M18A2 container	26.5 in. (0.67 m)	-----	-----	8.5 in. (0.22 m)	39 lb (18 kg)
M197 or XM207 propelling charge in M18A2 container	26.5 in. (0.67 m)	-----	-----	8.5 in. (0.22 m)	49 lb (22 kg)
M3A1 propelling charge in M14A2 container	37.5 in. (0.95 m)	-----	-----	6.7 in. (0.17 m)	22 lb (10 kg) or 29 lb (13 kg)
NOTE: Either one or two M3A1 propelling charges are packaged in the M14A2 container. Each charge weighs 7 lb (3 kg) and the container weighs 15 lb (7 kg).					
M4A1 propelling charge in M13A2 container	27.5 in. (0.69 m)	-----	-----	7.8 in. (0.19 m)	30.5 lb (13 kg)

*Add 21 pounds (10 kg) for M454A5 or M454A7 projectile. Approximate weight of the empty M467 container is 138 pounds (63 kg).

b. Dimensions and approximate weight of items that make up the M454 projectile complete mission loads are shown in table 3-1.

c. Items that make up each of the M454 projectile complete mission loads A through H, with weight of each load, are shown in table 3-2.

d. Diagrams for stacking propelling charge containers for the M454 projectile complete mission loads A through H are shown in figure 3-2.

3-3. Air Transport Limitations

a. The M454 projectile normally will be transported as an internal load (chap 4). However, under emergency conditions, the projectile can be transported as an external load also (chap 5). External transport will be approved by the commander authorizing the emergency movement.

b. The M454 projectile complete mission load

Table 3-2.

Description of Items That Make Up the M454 Projectile Complete Mission Loads A Through H, and Weight of Each Load

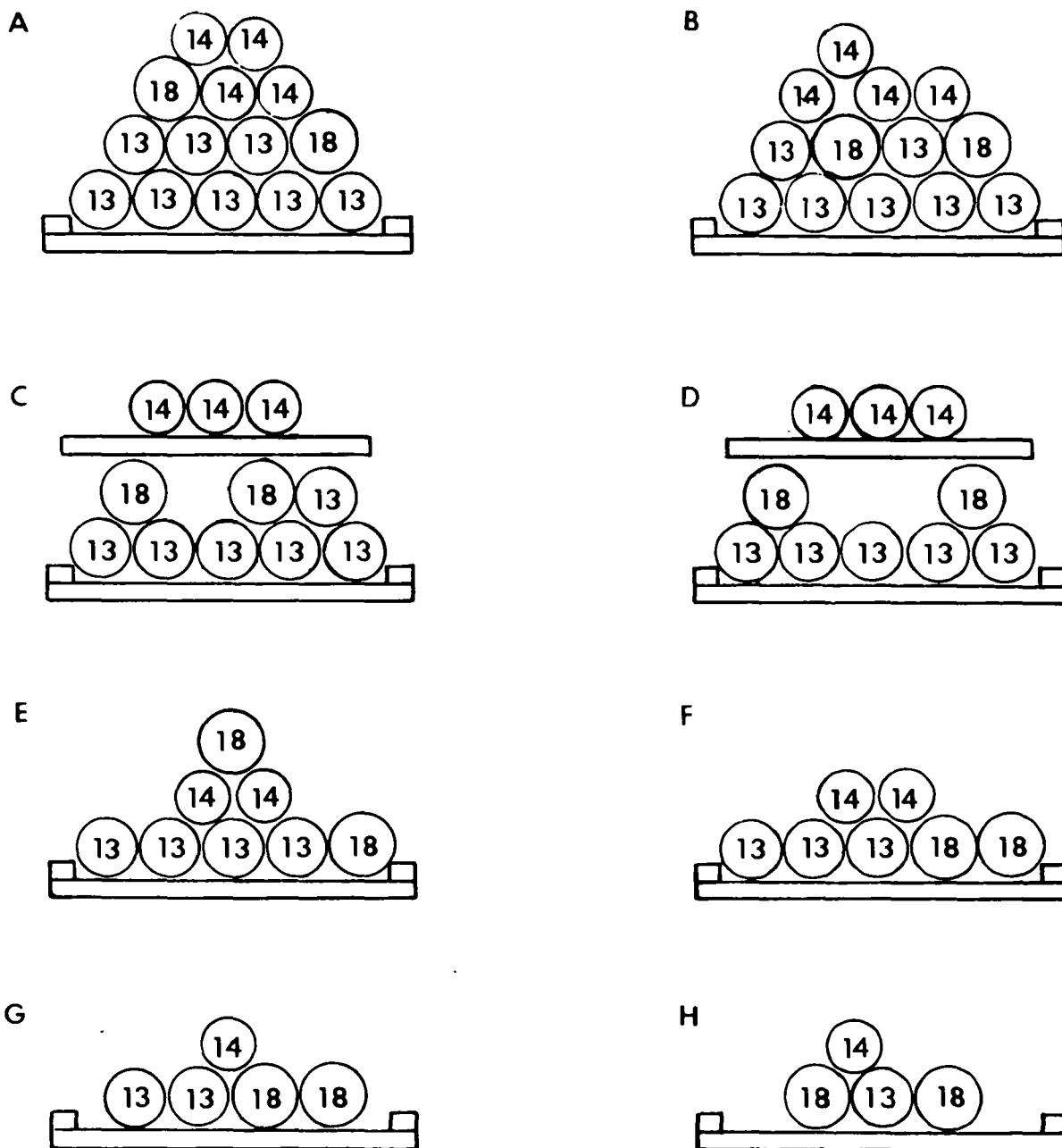
Item	Mission loads and weight of each load							
	A	B	C	D	E	F	G	H
M467 container with M454 projectile	1	1	1	1	1	1	1	1
M107 spotting projectile	8	7	6	5	4	3	2	1
XM206 propelling charge in M18A2 container	1	1	1	1	1	1	1	1
M197 or XM207 propelling charge in M18A2 container	1	1	1	1	1	1	1	1
M3A1 propelling charge in M14A2 container	8	7	6	5	4	3	2	1
(M14A2 containers required)	(4)	(4)	(3)	(3)	(2)	(2)	(1)	(1)
M4A1 propelling charge in M13A2 container	8	7	6	5	4	3	2	1
Weight	1,511 lb (685 kg)	1,378.5 lb (625 kg)	1,231 lb (558 kg)	1,098.5 lb (498 kg)	951 lb (431 kg)	818.5 lb (371 kg)	671 lb (304 kg)	538.5 lb (244 kg)

Note: All complete mission load weights include weight of two-section pallet (37 lb) for M107 spotting projectiles; however, when only one projectile is transported, it may be palletized on the base section of the pallet (19 lb) or equivalent shoring.

may be transported as an internal load by CH-47 helicopter during "CRITICAL COMBAT SITUATIONS ONLY."

c. Transport of the M454 projectile in a single

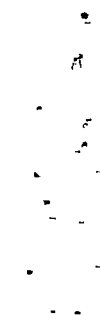
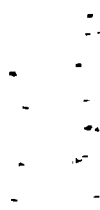
group, when exceeding the limitations shown in paragraph 2-1b, must be accompanied by waiver under the provisions of TM 39-20-7 and TM 39-45-51A.



LEGEND

- 13 - M4A1 PROPELLING-CHARGE IN M13A2 CONTAINER
- 14 - M3A1 PROPELLING-CHARGE IN M14A2 CONTAINER
- 18 - M197 OR XM207 PROPELLING-CHARGE IN M18A2 CONTAINER
- 18 - XM206 PROPELLING-CHARGE IN M18A2 CONTAINER

Figure 3-2. Diagrams for stacking propelling charge containers for the M454 projectile complete mission loads A through H.



CHAPTER 4

INTERNAL TRANSPORT BY AIRCRAFT

WARNING

Insure that the universal military pod is secured to the CH-54 helicopter to preclude jettisoning the pod either deliberately or inadvertently.

★4-1. Transport of M454 Atomic Projectile in M467 Shipping and Storage Container. For transport by UH-1 series, CH-47, CH-54 (Universal Military Pod), and UH-60A helicopters, hand carry container (fig. 3-1) into helicopter or pod, place 1/4-inch-thick shoring underneath container skids (UH-60A) only), then tie down the container according to the following figures and tables:

Helicopter	No. of containers	Figure No.	Table No.
UH-1C/M*	1	4-1	4-1
UH-1D/H	1	4-2	4-2
UH-1D/H	2	4-3	4-3
UH-1D/H	3	4-4	4-4
CH-47	3	4-5	4-5
CH-54 (universal military pod)	3	4-6	4-6

Helicopter	No. of containers	Figure No.	Table No.
UH-60A	1	4-7	4-7
UH-60A	2	4-8	4-8

*Cargo-floor-fitting pattern in the UH-1B helicopter is similar to the fitting pattern for the UH-1C/M helicopters. Strength of floor fittings in the UH-1B/C/M helicopters is the same.

Figure 4-7. Tiedown diagram for one M467 container with M454 projectile in UH-60A helicopter.

Figure 4-8. Tiedown diagram for two M467 containers with M454 projectiles in UH-60A helicopter.

Figure 4-8.1. Two M467 containers with M454 projectiles tied down in UH-60A helicopter in accordance with figure 4-8 and table 4-8 (side view).

Figure 4-8.2. Two M467 containers with M454 projectiles tied down in UH-60A helicopter in accordance with figure 4-8 and table 4-8 (front view).

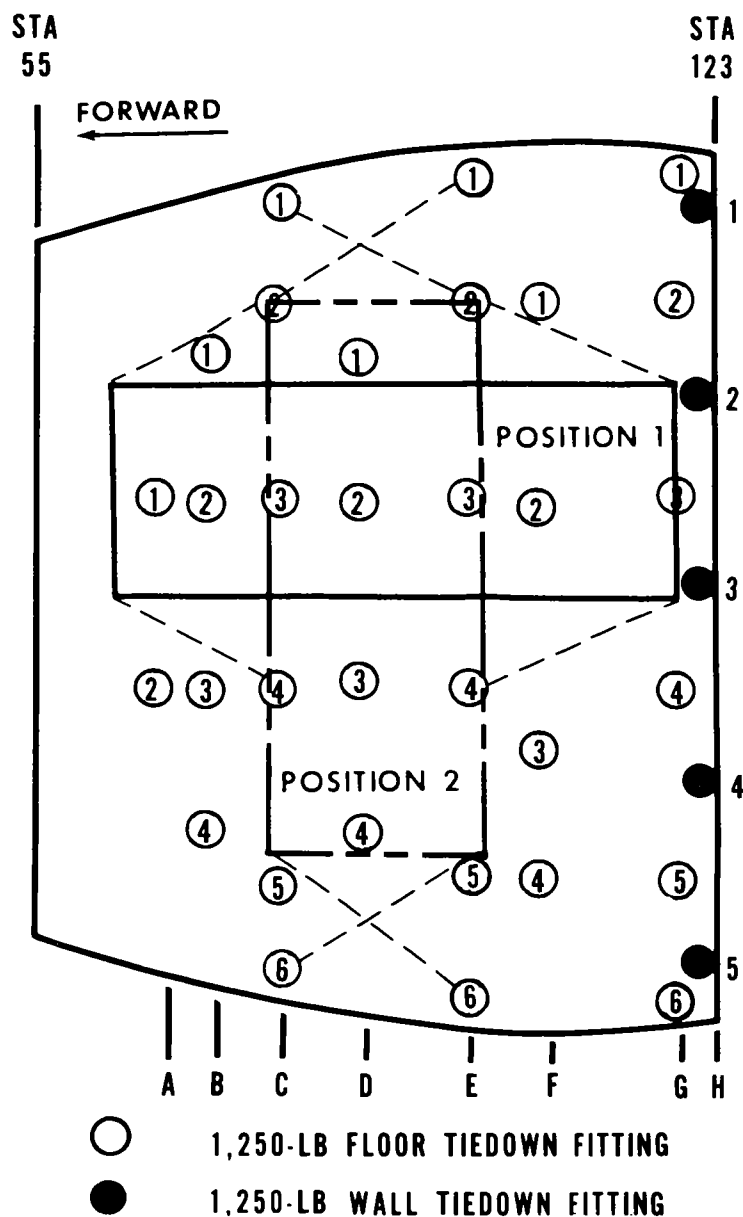


Figure 4-1. Tiedown diagram for one M467 container with M454 projectile in UH-1C/M helicopter.

Table 4-1.
Tiedown Data for One M467 Container With M454 Projectile in UH-1C/M Helicopter

Tiedown fitting		Tiedown device*		Attach to item
Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
POSITION I				
C2	1.25	CGU-1/B	5	Right front tiedown ring
C4	1.25	CGU-1/B	5	Left front tiedown ring
E2	1.25	CGU-1/B	5	Right rear tiedown ring
E4	1.25	CGU-1/B	5	Left rear tiedown ring
POSITION II				
C1	1.25	CGU-1/B	5	Right rear tiedown ring
C6	1.25	CGU-1/B	5	Left rear tiedown ring
E1	1.25	CGU-1/B	5	Right front tiedown ring
E7	1.25	CGU-1/B	5	Left front tiedown ring

* MC-1 tiedown device may be used.

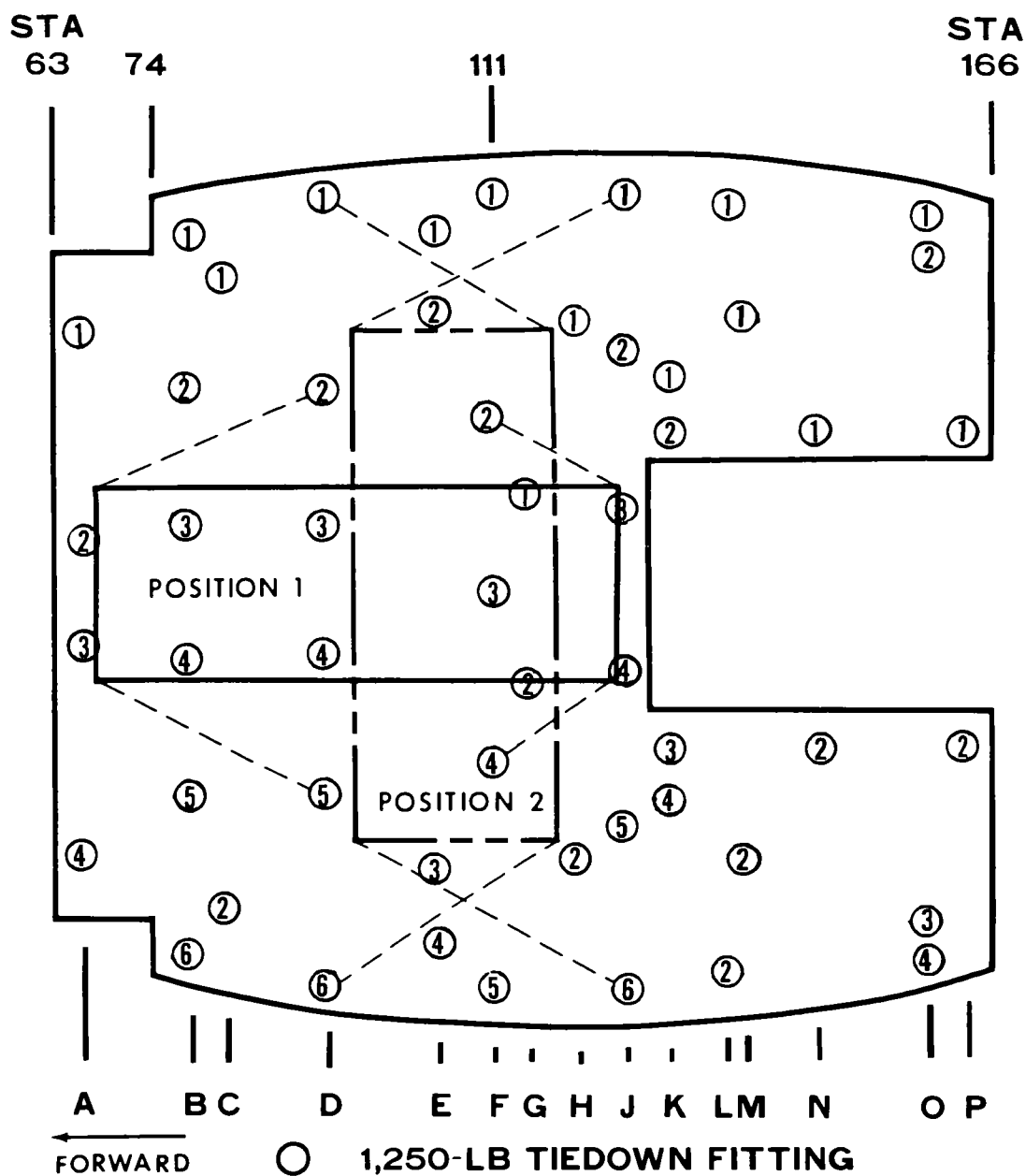


Figure 4-2. Tiedown diagram for one M467 container with M454 projectile in UH-1D/H helicopter.



Table 4-2.

Tiedown Data for One M467 Container With M454 Projectile in UH-1D/H Helicopter

Tiedown fitting		Tiedown device *		Attach to item
Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
POSITION I				
D2	1. 25	CGU-1/B	5	Right front tiedown ring
D5	1. 25	CGU-1/B	5	Left front tiedown ring
F2	1. 25	CGU-1/B	5	Right rear tiedown ring
F4	1. 25	CGU-1/B	5	Left rear tiedown ring
POSITION II				
D1	1. 25	CGU-1/B	5	Right rear tiedown ring
D6	1. 25	CGU-1/B	5	Left rear tiedown ring
J1	1. 25	CGU-1/B	5	Right front tiedown ring
J6	1. 25	CGU-1/B	5	Left front tiedown ring

*MC-1 tiedown device may be used.

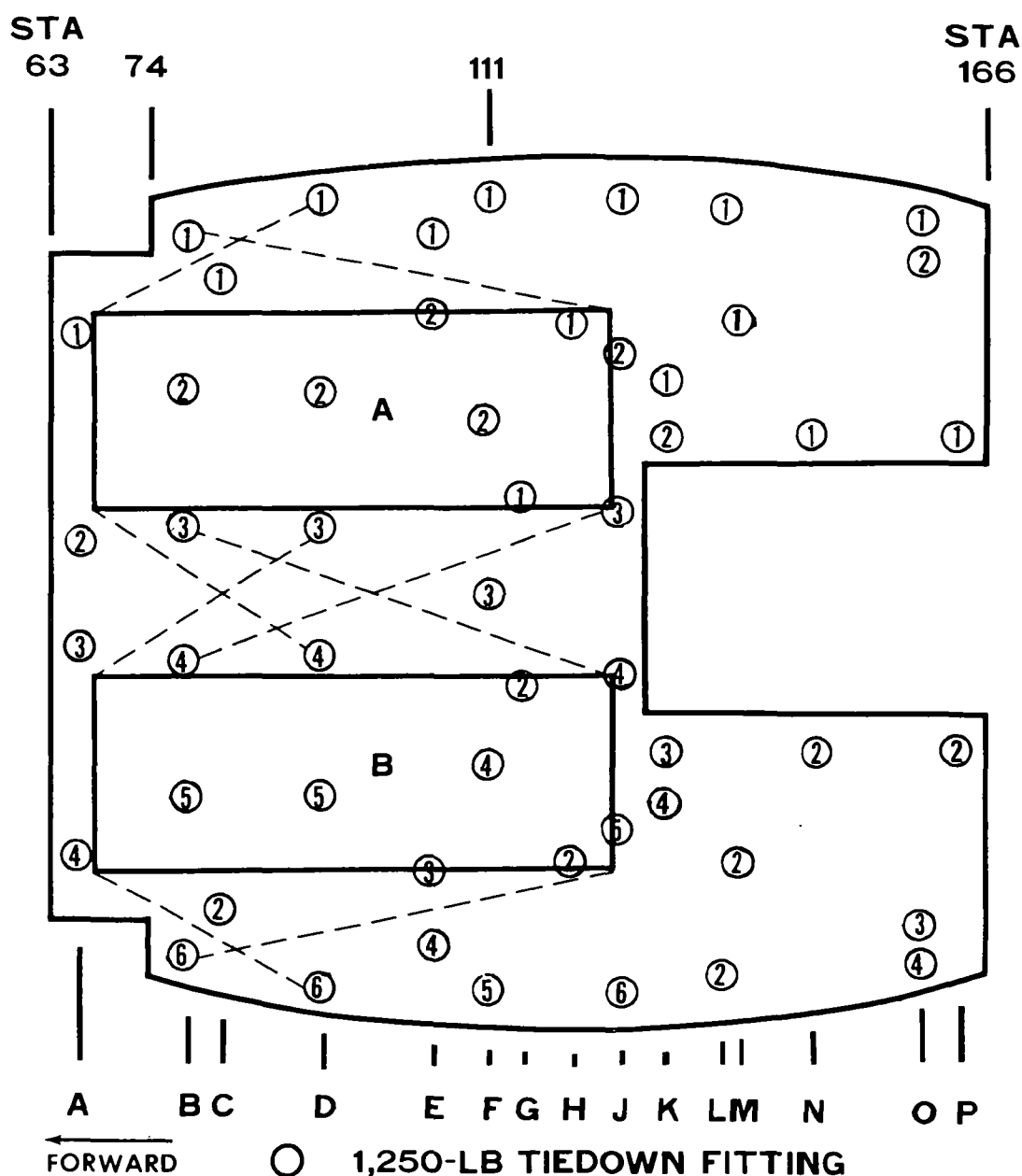


Figure 4-3. Tiedown diagram for two M467 containers with M454 projectiles in UH-1D/H helicopter.

Table 4-3.

Tiedown Data for Two M467 Containers With M454 Projectile in UH-1D/H Helicopter

Item	Tiedown fitting		Tiedown device*		Attach to item
	Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
A	B1	1.25	CGU-1/B	5	Right rear tiedown ring
	B4	1.25	CGU-1/B	5	Left rear tiedown ring
	D1	1.25	CGU-1/B	5	Right front tiedown ring
	D4	1.25	CGU-1/B	5	Left front tiedown ring
B	B3	1.25	CGU-1/B	5	Right rear tiedown ring
	B6	1.25	CGU-1/B	5	Left rear tiedown ring
	D3	1.25	CGU-1/B	5	Right front tiedown ring
	D6	1.25	CGU-1/B	5	Left front tiedown ring

* MC-1 tiedown device may be used.

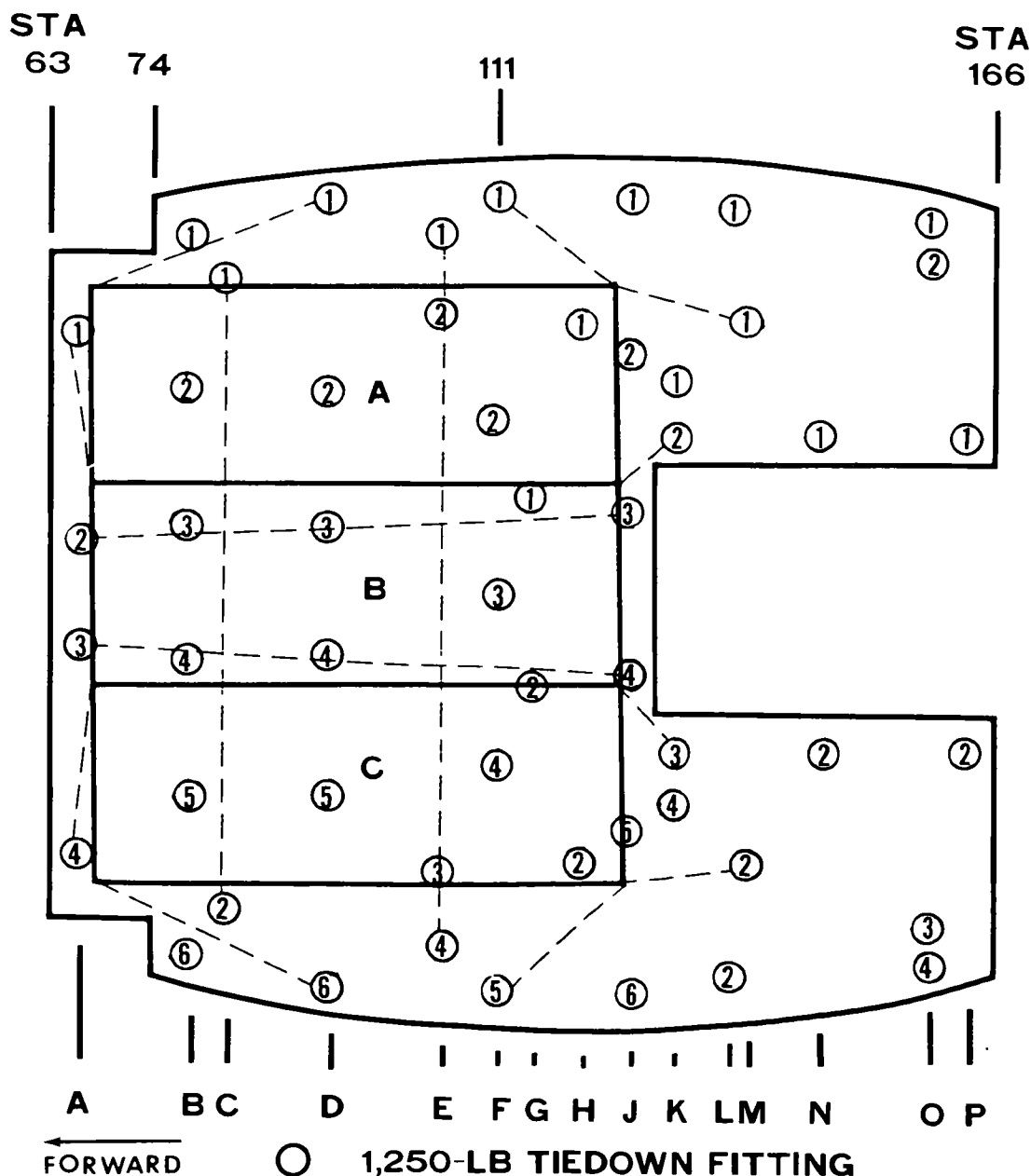


Figure 4-4. Tiedown diagram for three M467 containers with M454 projectiles in UH-1D/H helicopter.

Table 4-4.

Tiedown Data for Three M467 Containers With M454 Projectiles in UH-1D/H Helicopter

Item	Tiedown fitting		Tiedown device*		Attach to item
	Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
A, B, and C	A1	1. 25	CGU-1/B	5	Through aligned front tiedown rings of items A and B
	A2/J3	1. 25	CGU-1/B	5	Over item B
	A3/J4	1. 25	CGU-1/B	5	Over item B
	A4	1. 25	CGU-1/B	5	Through aligned front tiedown rings of items B and C
	C1/C2	1. 25	CGU-1/B	5	Over items A, B, and C
	D1	1. 25	CGU-1/B	5	Right front tiedown ring of item A
	D6	1. 25	CGU-1/B	5	Left front tiedown ring of item C
	E1/E4	1. 25	CGU-1/B	5	Over items A, B, and C
	F1	1. 25	CGU-1/B	5	Right rear tiedown ring of item A
	F5	1. 25	CGU-1/B	5	Left rear tiedown ring of item C
	K2	1. 25	CGU-1/B	5	Through aligned rear tiedown rings of items A and B
	K3	1. 25	CGU-1/B	5	Through aligned rear tiedown rings of items B and C
	M1**	1. 25	CGU-1/B	5	Right rear tiedown ring of item A
	M2***	1. 25	CGU-1/B	5	Left rear tiedown ring of item C

*MC-1 tiedown device may be used.

**Tiedown fitting K1 may be used.

***Tiedown fitting K4 may be used.

Table 4-5.

Tiedown Data for Three M467 Containers With M454 Projectiles in CH-47 Helicopter

Item	Tiedown fitting		Tiedown device*		Attach to item
	Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
A	B5	5	CGU-1/B	5	Left front tiedown ring
	D5	5	CGU-1/B	5	Right front tiedown ring
	B6	5	CGU-1/B	5	Left rear tiedown ring
	D5	5	CGU-1/B	5	Right rear tiedown ring

B and C—Restrain items in positions shown in figure 4-5 and in manner prescribed for item A above.

* MC-1 tiedown device may be used.

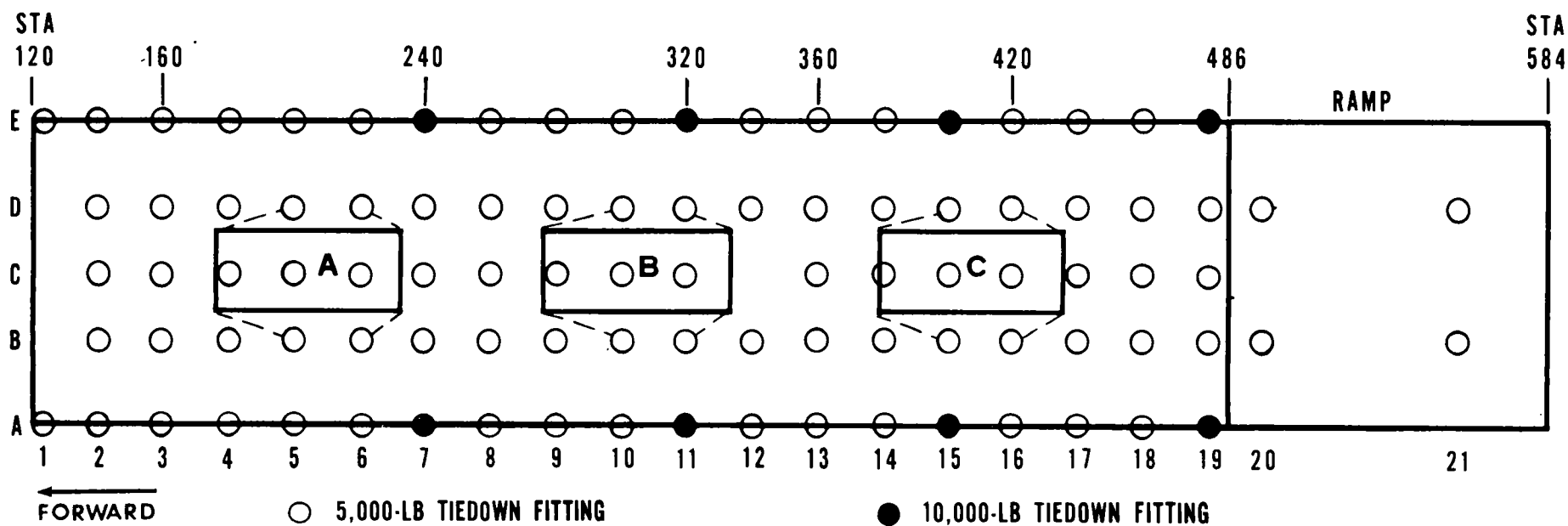
Table 4-6.

Tiedown Data for Three M467 Containers With M454 Projectiles in CH-54 Helicopter Universal Military Pod

Item	Tiedown fitting		Tiedown device*		Attach to item
	Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
A	B4	5	CGU-1/B	5	Left rear tiedown ring
	E4	5	CGU-1/B	5	Right rear tiedown ring
	B5	5	CGU-1/B	5	Left front tiedown ring
	E5	5	CGU-1/B	5	Right front tiedown ring

B and C—Restrain items in positions shown in figure 4-6 and in manner prescribed for item A above.

* MC-1 tiedown device may be used.



NOTE: UTILITY HATCH DOOR IS LOCATED IN THE CENTER OF THE FLOOR BETWEEN STATIONS 320 AND 360

Figure 4-5. Tiedown diagram for three M467 containers with M454 projectiles in CH-47 helicopter.

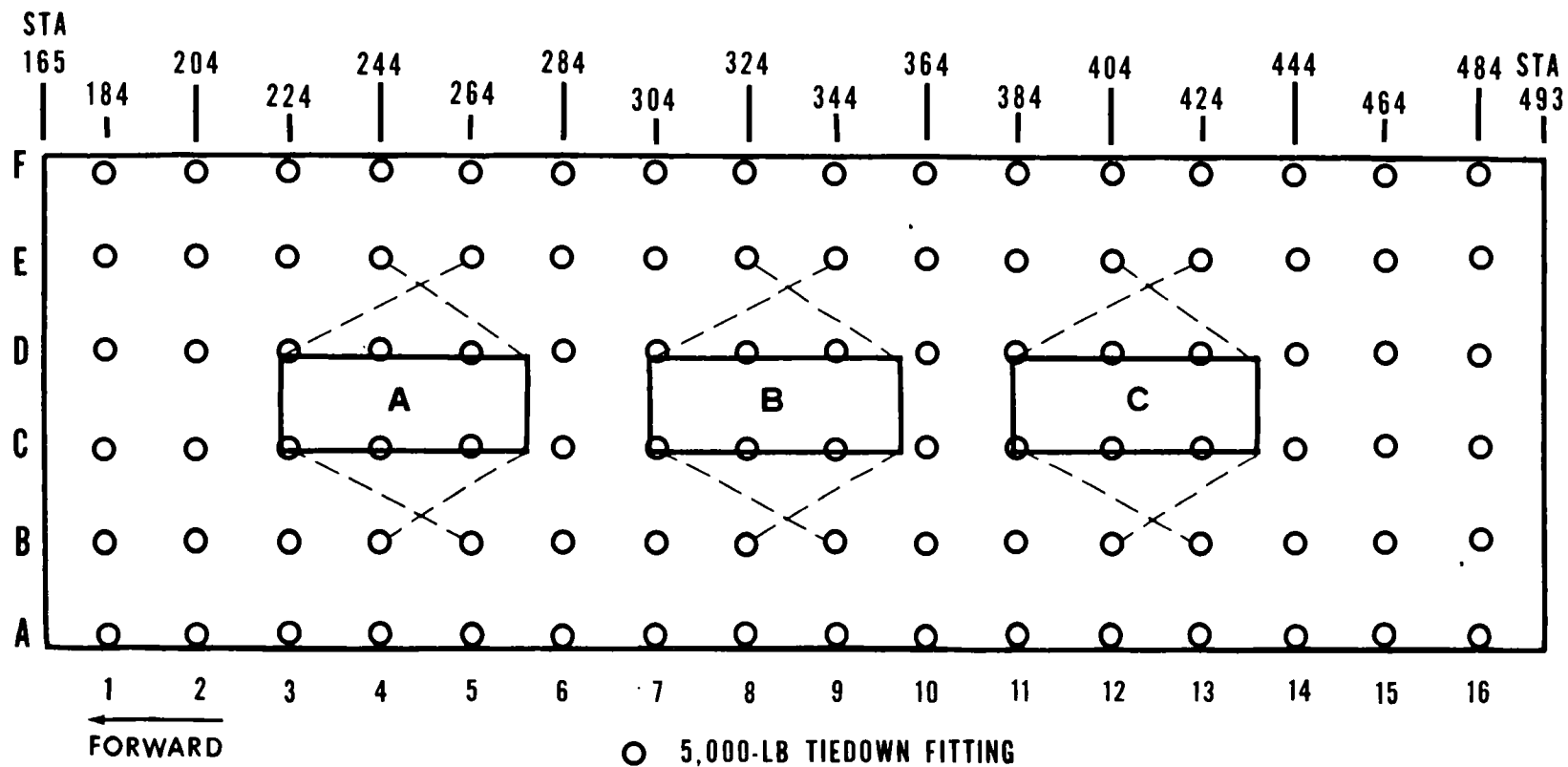


Figure 4-6. Tiedown diagram for three M467 containers with M454 projectiles in CH-54 helicopter universal military pod.

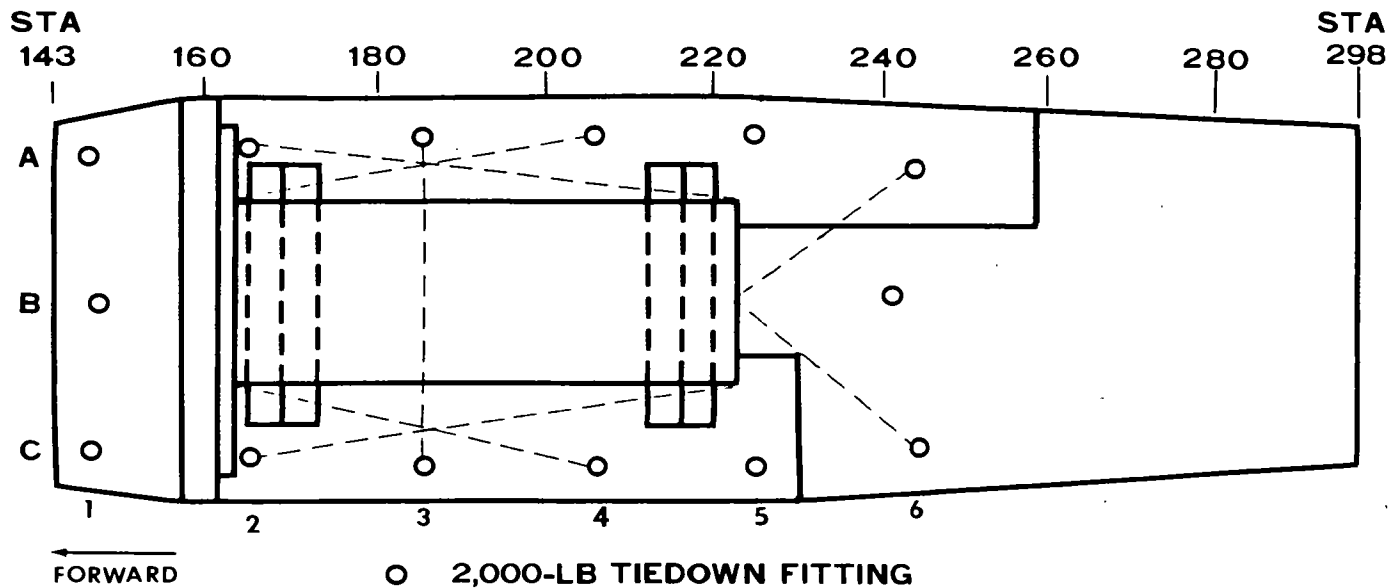


Figure 4-7. Tiedown diagram for one M467 container with M454 projectile in U-21A aircraft.

Table 4-7.

Tiedown Data for One M467 Container With M454 Projectile in U-21A Aircraft

Tiedown fitting		Tiedown device*		Attach to item
Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
A2	2	CGU-1/B	5	Right rear tiedown ring
C2	2	CGU-1/B	5	Left rear tiedown ring
A3/C3	2	CGU-1/B	5	Over the item
A4	2	CGU-1/B	5	Right front tiedown ring
C4	2	CGU-1/B	5	Left front tiedown ring
A6	2	CGU-1/B	5	Rear hoisting grapple
C6	2	CGU-1/B	5	Rear hoisting grapple

* MC-1 tiedown device may be used.

(b) Loading.

1. Place the 44-inch piece of lumber on edge crosswise in cargo compartment to rest against the aft side of the forward spar covering (at cargo compartment station 163) to function as buffer.

2. Stack three pieces of plywood in recessed walking area of cargo compartment to level compartment floor.

3. Hand-carry containers into cargo compartment and position at tiedown locations (fig 4-8). Place two pieces of 45-inch lumber crosswise beneath runners at each end of containers (fig 4-8).

4. Tie down the containers in accordance with figure 4-8 and table 4-8.

4-2. Transport of M454 Atomic Projectile Complete Mission Loads A Through H (Table 3-1) by CH-47 Helicopter

a. Complete Mission Load A.

(1) Parking shoring.

(a) Four pieces, 2- by 12- by 26-inch, for use beneath unitized projectile package. (The shoring may be of any size to attain a 3½- by 22- by 26-inch parking shoring.)

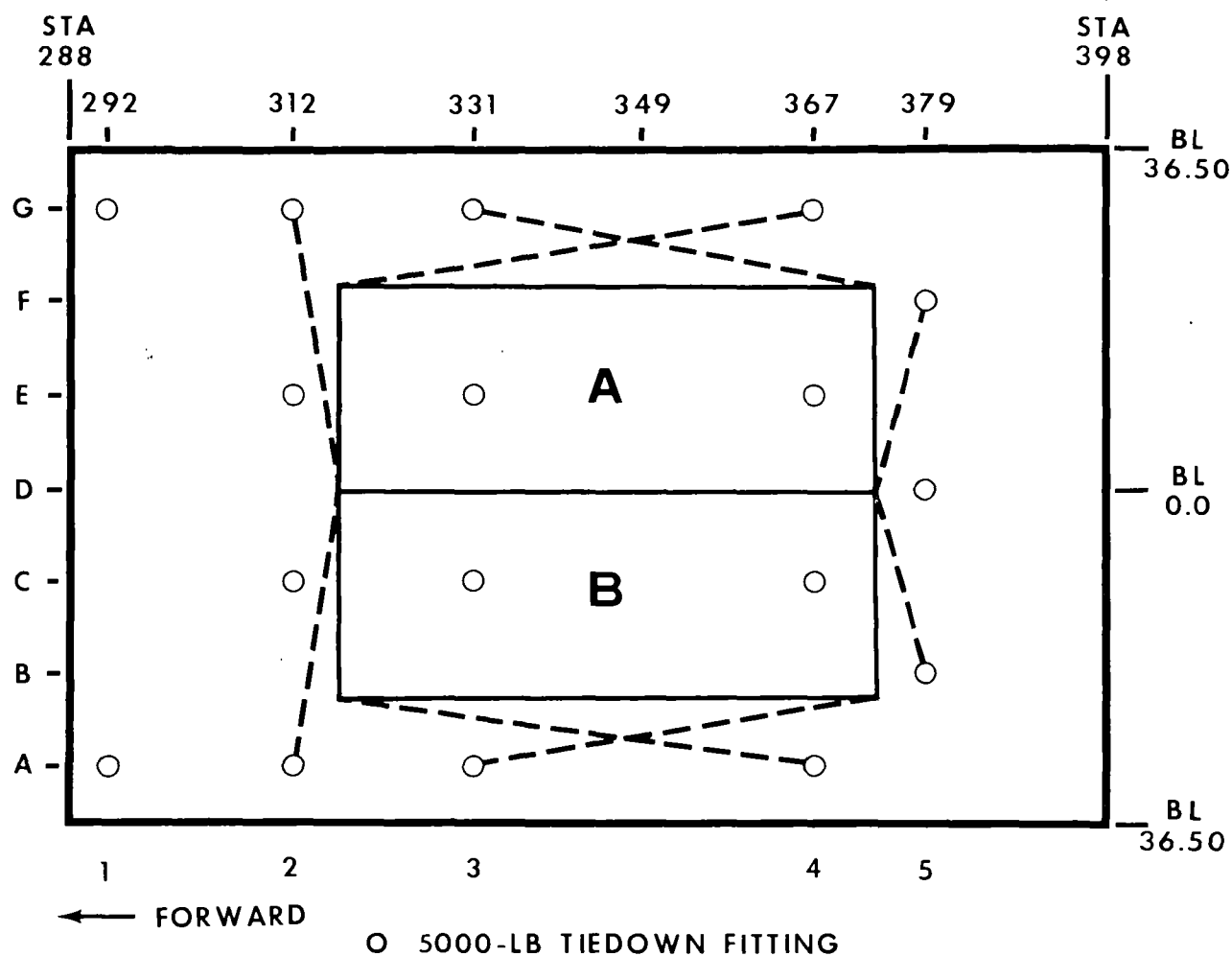
(b) Two pieces, 2- by 6- by 42-inch, for use beneath stacked propelling-charge containers (1 stack).

(2) Blocking shoring.

(a) One piece plywood, 1- by 22- by 38-inch (notched at center of 22-inch sides to accommodate tiedown devices), for use as lateral blocking at outboard end of stacked propelling-charge containers.

(b) One piece of 1-inch plywood for use as lateral blocking at inboard ends of stacked propelling-charge containers. Shape plywood as shown in figure 4-9.

(c) Two pieces, 2- by 4- by 18-inch, nailed to ends of parking shoring to provide end blocking for stacked propelling-charge containers.



NOTE: CARGO HOOK ACCESS DOOR IS LOCATED IN THE CENTER OF THE FLOOR BETWEEN STATIONS 343 AND 363

Figure 4-8. Tiedown diagram for two M467 containers with M454 projectiles in UH-60A helicopter.

*Table 4-8.
Tiedown Data for Two M467 Containers With M454 Projectiles in UH-60A Helicopter*

Item	Tiedown fitting		Tiedown device		Attach to item
	Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
A and B	A2	5	CGU-1/B	5	Through aligned front tiedown rings of both items
	G2	5	CGU-1/B	5	Through aligned front tiedown rings of both items
	A3	5	CGU-1/B	5	Left rear tiedown ring of item B
	G3	5	CGU-1/B	5	Right rear tiedown ring of item A
	A4	5	CGU-1/B	5	Left front tiedown ring of item B
	G4	5	CGU-1/B	5	Right front tiedown ring of item A
	B5	5	CGU-1/B	5	Through aligned rear tiedown rings of both items
	F5	5	CGU-1/B	5	Through aligned rear tiedown rings of both items

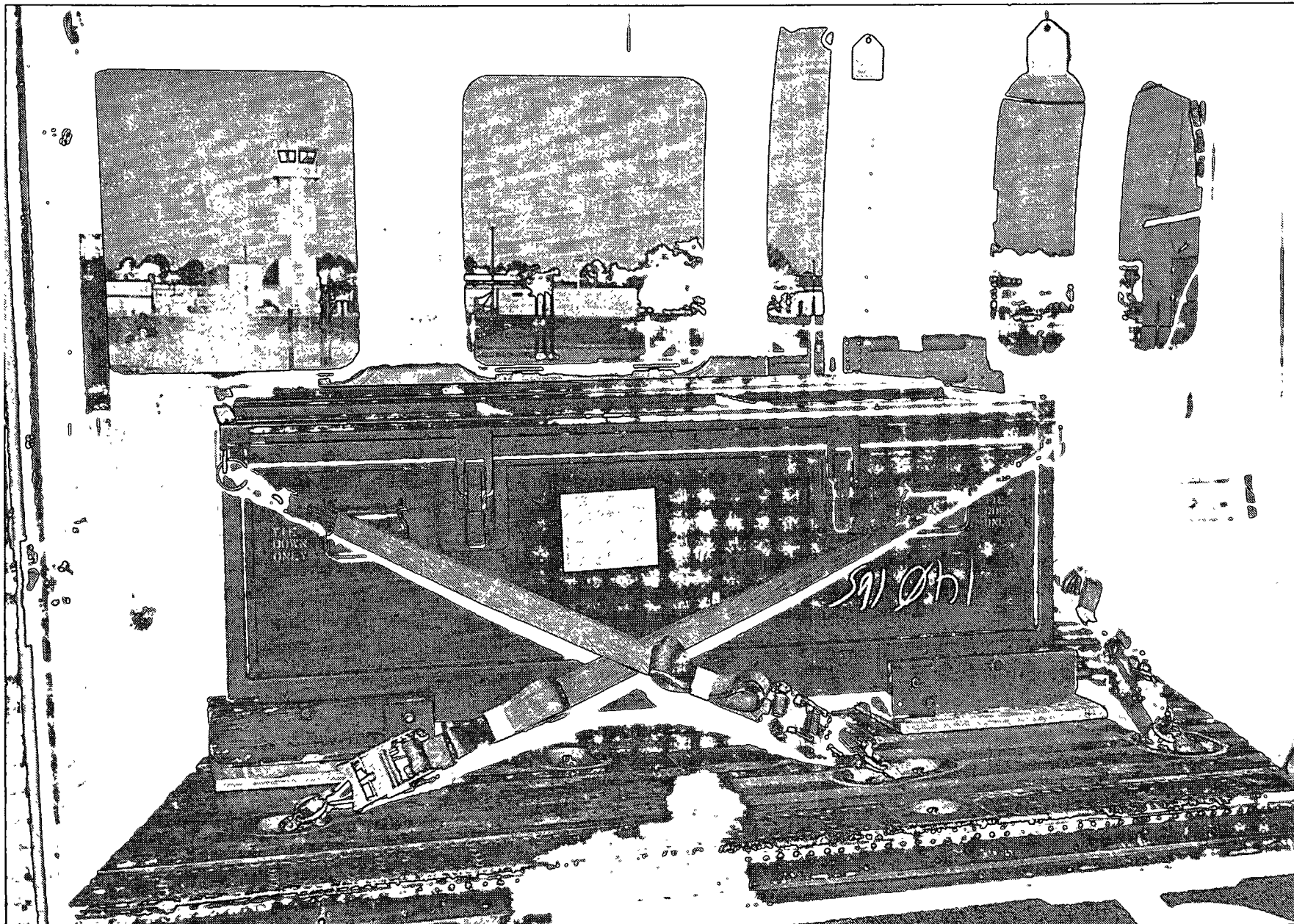


Figure 4-8.1. Two M467 containers with M454 projectiles tied down in UH-60A helicopter in accordance with figure 4-8 and table 4-8 (side view).

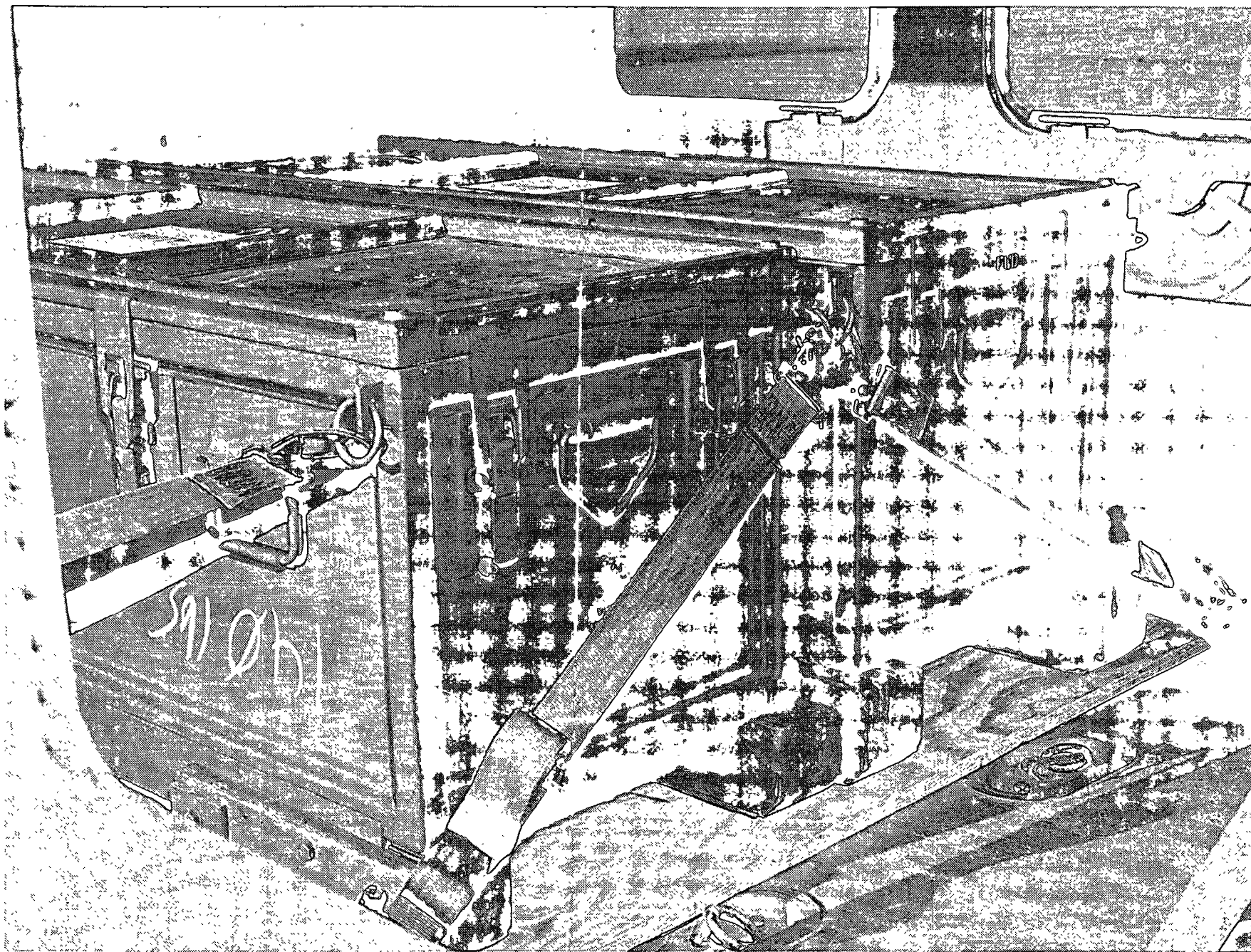


Figure 4-8.2. Two M467 containers with M454 projectiles tied down in UH-60A helicopter in accordance with figure 4-8 and table 4-8 (front view).

4-2. Transport of M454 Atomic Projectile Complete Mission Loads A Through H (Table 3-1) by CH-47 Helicopter

a. Complete Mission Load A.

(1) Parking shoring.

(a) Four pieces, 2- by 12- by 26-inch, for use beneath unitized projectile package. (The shoring may be of any size to attain a 3½- by 22- by 26-inch parking shoring.)

(b) Two pieces, 2- by 6- by 42-inch, for use beneath stacked propelling-charge containers (1 stack).

(2) Blocking shoring.

(a) One piece plywood, 1- by 22- by 38-inch (notched at center of 22-inch sides to accommodate tiedown devices), for use as lateral blocking at outboard end of stacked propelling-charge containers.

(b) One piece of 1-inch plywood for use as lateral blocking at inboard ends of stacked propelling-charge containers. Shape plywood as shown in figure 4-9.

(c) Two pieces, 2- by 4- by 18-inch, nailed to ends of parking shoring to provide end blocking for stacked propelling-charge containers.

(d) Eight nails, 8d (2½-inch), two used at each joint to secure end blocks to shoring for stacked propelling-charge containers. Construct shoring (outside helicopter) for containers (fig. 4-10).

(3) Tiedowns. Sixteen CGU-1/B tiedown devices (four on M467 container, six on projectile package (to include two used to unitize package) and six on stack of propelling-charge containers (to include one used to unitize containers and one used to wrap around protruding ends of M14A2 containers)).

(4) Loading.

(a) Hand-carry M467 container to tiedown position shown in figure 4-11.

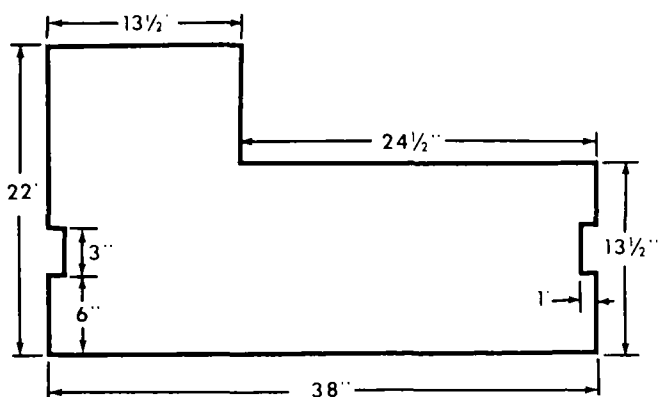


Figure 4-9. Plywood prepared for use as lateral blocking at inboard ends of stacked propelling-charge containers.

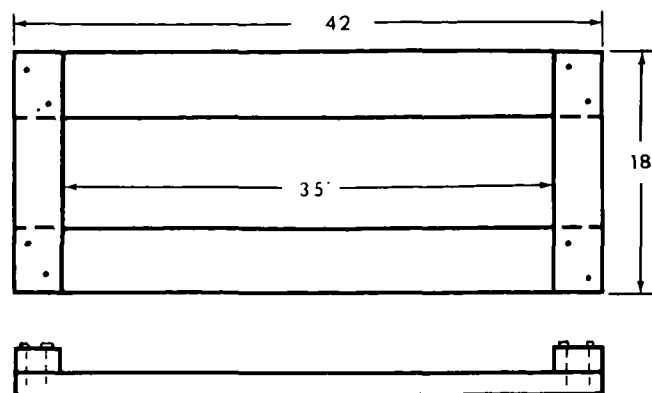


Figure 4-10. Shoring for stacked propelling-charge containers.

(b) Position parking shoring and bottom section of projectile-pallet at tiedown location for M107 spotting projectiles (fig. 4-11). Disassemble projectile package outside helicopter, and hand-carry individual projectiles to tiedown location. Place top section of pallet on projectiles, then unitize projectile package with a CGU-1/B tiedown device placed outside each skid (bottom) and inside each outboard row of projectiles (top) (figure 4-12).

(c) Position parking shoring at tiedown location for propelling-charge containers (figure 4-11). Pre-position tiedown device beneath end blocks of shoring to unitize containers and shoring.

(d) Hand-carry propelling-charge containers to tiedown location and stack on shoring in accordance with figure 3-2 (mission load A). Face cap ends of all containers outboard, and secure containers with tiedown device (fig. 4-13).

(e) Tie down the complete mission load A in accordance with figures 4-11, 4-12, and 4-13 and table 4-9.

(f) Four persons can prepare, load, and tie down the complete mission load A in about 30 minutes.

(5) Unloading. Procedures for unloading are essentially the reverse of procedures for loading. Four persons can unload the complete mission load A in about 10 minutes.

b. Complete Mission Load B.

(1) Parking shoring. Items shown in a(1) above.

(2) Blocking shoring. Items shown in a(2) above.

(3) Tiedowns. Items shown in a(3) above.

(4) Loading.

(a) Follow procedures shown in a(4)(a) through a(4)(c).

(b) Hand-carry propelling-charge containers to tiedown location and stack on shoring in accordance with figure 3-2 (mission load B). Face cap ends of all containers outboard, and secure containers with tiedown device (fig 4-13).

(c) Tie down the complete mission load B, using figures 4-11, 4-12, and 4-13 and table 4-9 for guidance.

(d) Four persons can prepare, load, and tie down the complete mission load B in about 30 minutes.

(5) Unloading. Procedures for unloading are essentially the reverse of procedures for loading. Four persons can unload the complete mission load B in about 10 minutes.

c. Complete Mission Load C.

(1) Parking shoring. Items shown in a(1) above.

(2) Blocking shoring.

(a) Items shown in a(2) above.

(b) Two pieces, 2- by 6- by 36-inch, for use between middle and top layers of stacked propelling-charge containers (fig 3-2, mission load C).

(3) Tiedowns. Fifteen CGU-1/B tiedown devices (four on M467 container, six on projectile package (to include two used to unitize package), and five on stack of propelling-charge containers (to include one used to wrap around protruding ends of M14A2 containers)).

(4) Loading.

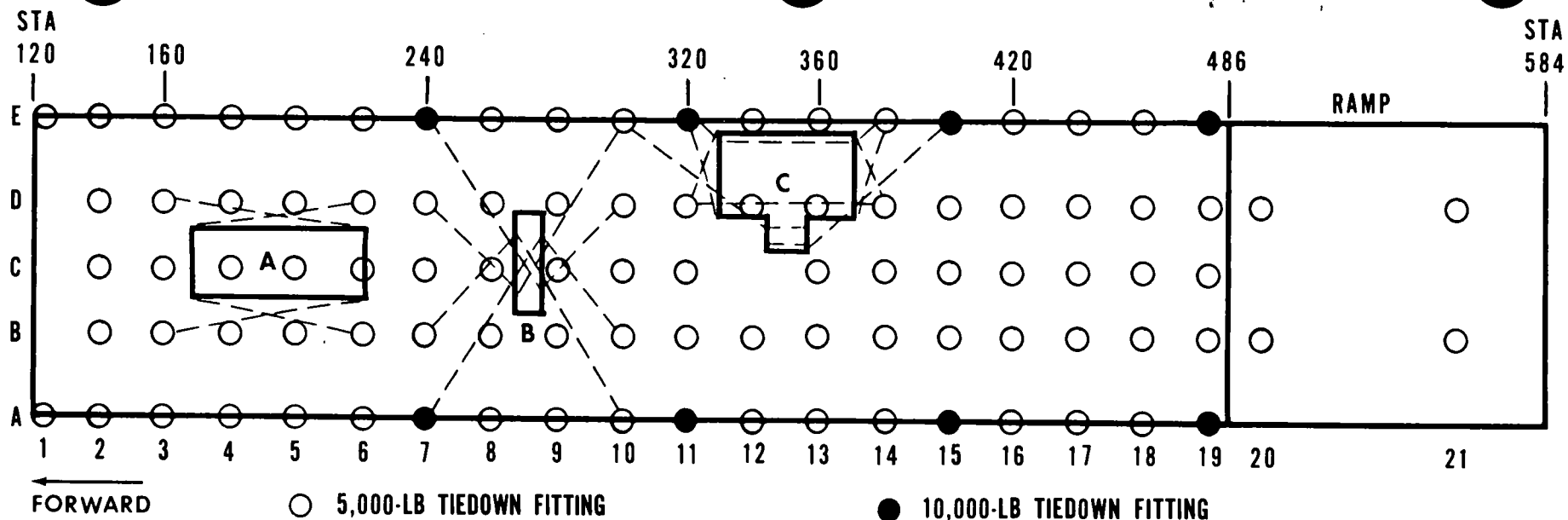
(a) Follow procedures shown in a(4)(a) through a(4)(c) above except that a tiedown device is not used to unitize propelling-charge containers and shoring.

(b) Hand-carry propelling-charge containers to tiedown location and stack on shoring in accordance with figure 3-2 (mission load C). Face cap ends of all containers outboard.

(c) Tie down the complete mission load C, using figures 4-11, 4-12, and 4-13 and table 4-9 for guidance.

(d) Four persons can prepare, load, and tie down the complete mission load C in about 30 minutes.

(5) Unloading. Procedures for unloading are essentially the reverse of procedures for loading.



NOTE: UTILITY HATCH DOOR IS LOCATED IN THE CENTER OF THE FLOOR BETWEEN STATIONS 320 AND 360

ITEM	DESCRIPTION OF ITEM	ITEM FACING	LOCATION OF REFERENCE POINT		LOCATION OF CG (STA)	APPROX WT (LB)
			REFERENCE POINT	STATION		
A	M467 CONTAINER WITH M454 PROJECTILE	FORWARD	FORWARD EDGE	166	198	266
B	UNITIZED PACKAGE OF EIGHT M107 PROJECTILES	UPRIGHT	FORWARD EDGE	264	271	797
C	STACKED PROPELLING-CHARGE CONTAINERS (SEE TABLE 3-1 AND FIG 3-2 FOR DETAILS)	LATERAL	FORWARD EDGE	328	349	448
					TOTAL	1511

Figure 4-11. Tiedown diagram for M454 projectile complete mission load A in CH-47 helicopter.



Figure 4-12. M454 projectile complete mission load A tied down in CH-47 helicopter. Note placement of tiedowns on pallet-load of eight M107 spotting projectiles (center).

Four persons can unload the complete mission load C in about 10 minutes.

d. Complete Mission Load D.

(1) Parking shoring. Items shown in *a*(1) above.

(2) Blocking shoring.

(a) Items shown in *a*(2) above.

(b) Two pieces, 2- by 6- by 36- inch, for use between middle and top layers of stacked propelling-charge containers (fig 3-2, mission load D).

(3) Tiedowns. Sixteen CGU-1/B tiedown devices (four on M467 container, six on projectile package (to include two used to unitize package), and six on stack of propelling-charge containers (to include one used to unitize containers and one used to wrap around protruding ends of M14A2 containers)).

(4) Loading.

(a) Follow procedures shown in *a*(4)(a) through *a*(4)(c) above.

(b) Hand-carry propelling-charge containers for bottom layer (fig 3-2, mission load D), place on shoring, and secure containers with tiedown device. Hand-carry and stack remainder of containers in

accordance with figure 3-2 (mission load D). Face cap ends of all containers outboard.

(c) Tie down the complete mission load D, using figures 4-11, 4-12, and 4-13 and table 4-9 for guidance.

(d) Four persons can prepare, load, and tie-down the complete mission load D in about 30 minutes.

(5) Unloading. Procedures for unloading are essentially the reverse of procedures for loading. Four persons can unload the complete mission load D in about 10 minutes.

e. Complete Mission Load E.

(1) Parking shoring. Items shown in *a* (1) above.

(2) Blocking shoring.

(a) Items shown in *a* (2) above except that the one piece of plywood (fig 4-9) is not used for lateral blocking at inboard end of stacked propelling-charge containers.

(b) One piece, 2- by 6- by 36-inch, for use as lateral blocking at inboard end of bottom layer of stacked propelling-charge containers (fig 3-2, mission load E.)

(3) Tiedowns. Fifteen CGU-1/B tiedown devices (four on M467 container, six on projectile



Figure 4-13. Propelling-charge containers for M454 projectile complete mission load A tied down in CH-47 helicopter. Note placement of tiedown that unitizes all containers and shoring.

package (to include two used to unitize package), and five on stack of propelling-charge containers (to include one used to unitize bottom layer of containers and shoring)).

(4) Loading.

(a) Follow procedures shown in *a* (4)(a) through *a* (4)(c) above.

(b) Hand-carry propelling-charge containers for bottom layer (fig 3-2, mission load E), place on shoring, and secure containers with tiedown device. Hand-carry and stack remainder of containers in accordance with figures 3-2 (mission load E) and 3-14. Face cap ends of all containers outboard.

(c) Tie down the complete mission load E, using figures 4-11 and 4-14 and table 4-9 for guidance. Exceptions to table 4-9 are: forward and aft tiedowns D11/D14 and E11/E14 are looped around

the two containers in middle layer and one container on top of stack. Lateral tiedown E10/E15 goes around 2- by 6- by 36-inch shoring at inboard ends of five containers in bottom layer.

(d) Four persons can prepare, load, and tie down the complete mission load E in about 30 minutes.

(5) Unloading. Procedures for unloading are essentially the reverse of procedures for loading. Four persons can unload the complete mission load E in about 10 minutes.

f. Complete Mission Load F.

(1) Parking shoring. Items shown in *a* (1) above.

(2) Blocking shoring.

(a) Items shown in *a* (2) above except that the one piece of plywood (fig 4-9) is not used for

Table 4-9.

Tiedown Data for M454 Projectile Complete Mission Load A in CH-47 Helicopter

Item	Tiedown fitting		Tiedown device*		Attach to item
	Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
A	B3	5	CGU-1/B	5	Left rear tiedown ring
	D3	5	CGU-1/B	5	Right rear tiedown ring
	B6	5	CGU-1/B	5	Left front tiedown ring
	D6	5	CGU-1/B	5	Right front tiedown ring
B	A7/A10*	10/5	CGU-1/B	5	Over top of pallet, under right end, and over top of pallet
	E7/E10*	10/5	CGU-1/B	5	Over top of pallet, under left end, and over top of pallet
	B7/D7	5	CGU-1/B	5	Around aft projectiles above bourrelets
	B10/D10	5	CGU-1/B	5	Around forward projectiles above bourrelets
C	D11/D14**	5	CGU-1/B	5	Over top of stacked propelling-charge containers
	E11/E14	10/5	CGU-1/B	5	Over top of stacked propelling-charge containers
	D11/D14	5	CGU-1/B	5	Around plywood at outboard ends of stacked propelling-charge containers
	E11/E14	10/5	CGU-1/B	5	Around plywood at inboard ends of stacked propelling-charge containers
	E10/E15	5/10	LCGU-1/B	5	One complete loop around the protruding M14A2 containers

*Straps may bind, preventing uniform tension.

**Use one additional CGU-1/B tiedown device around stacked propelling-charge containers and end blocks of shoring to unitize containers and shoring.

lateral blocking at inboard end of stacked propelling-charge containers.

(b) One piece, 2- by 6- by 36-inch, for use as lateral blocking at inboard end of bottom layer of stacked propelling-charge containers (fig 3-2, mission load F).

(3) Tiedowns. Fifteen CGU-1/B tiedown devices (four on M467 container, six on projectile package (to include two used to unitize package), and five on stack of propelling-charge containers (to include one used to unitize bottom layer of containers and shoring).)

(4) Loading.

(a) Hand-carry M467 container to tiedown position shown in figure 4-11.

(b) Position parking shoring and bottom section of projectile-pallet at tiedown location for M107 spotting projectiles (fig 4-11). Disassemble projectile package outside helicopter, and hand-carry individual projectiles to tiedown location. Place the three projectiles in center positions on the pallet. Place top section of pallet on projectiles, and utilize projectile package with a CGU-1/B tiedown device

placed inside each skid (bottom) and outside projectiles (top) (fig 4-15).

(c) Position parking shoring at tiedown location for propelling-charge containers (fig 4-11). Pre-position tiedown device beneath end blocks of shoring to unitize containers and shoring (fig 4-16).

(d) Hand-carry propelling-charge containers for bottom layer (fig 3-2, mission load F), place on shoring, and secure containers with tiedown device (fig 4-16). Hand-carry and stack remainder of containers in accordance with figures 3-2 (mission load F) and 4-16. Face cap ends of all containers outboard,

(e) Tie down the complete mission load F. using figures 4-11, 4-15, and 4-16 and table 4-9 for guidance. Exceptions to table 4-9 are: forward and aft tiedowns D11/D14 and E11/E14 are looped around the two containers on top of stack. Lateral tiedown E10/E15 goes around 2- by 6- by 36-inch shoring at inboard ends of five containers in bottom layer.

(f) Four persons can prepare, load, and tie down the complete mission load F in about 30 minutes.

(5) Unloading. Procedures for unloading are

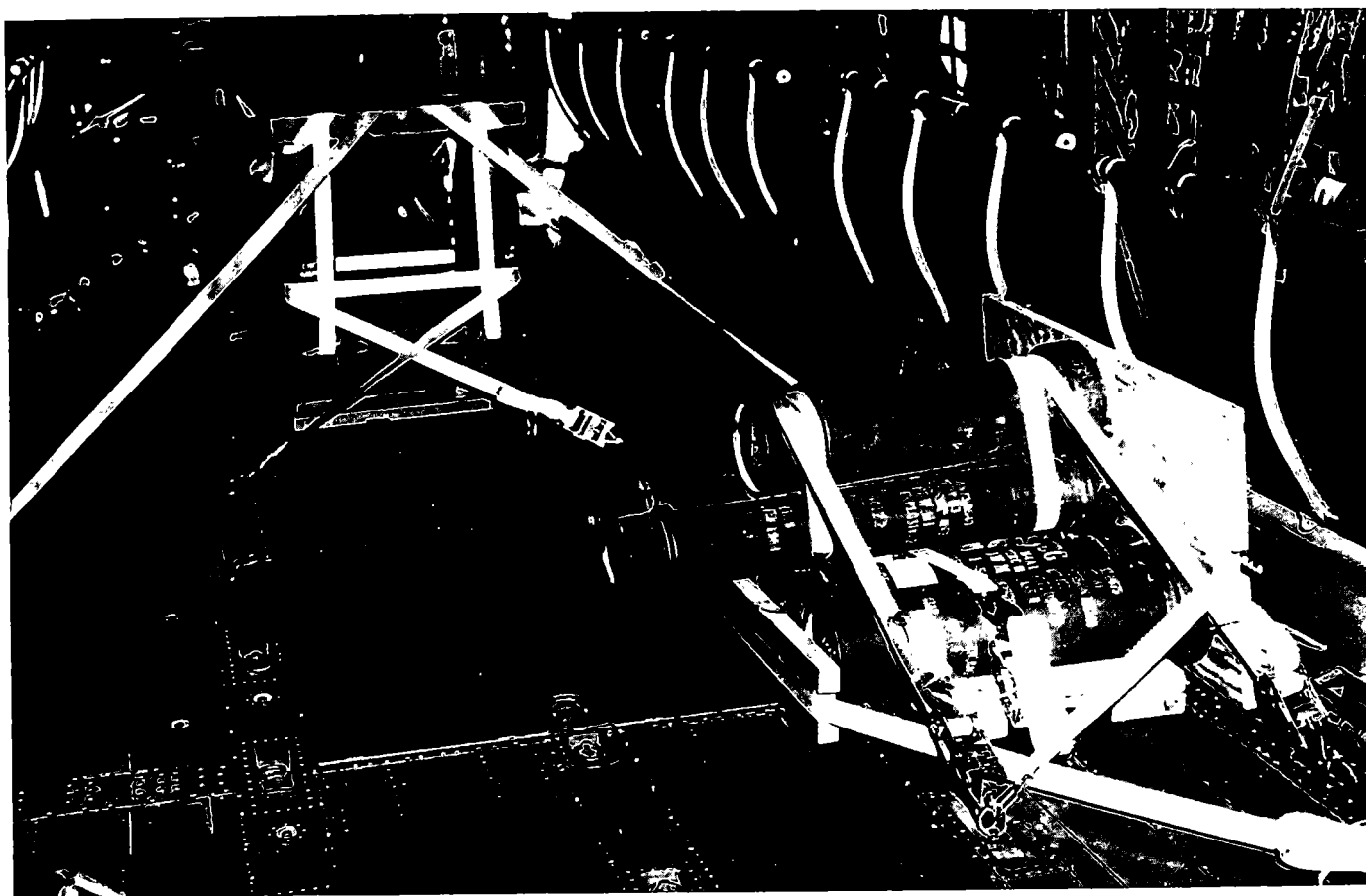


Figure 4-14. Propelling-charge containers for M454 projectile complete mission load E tied down in CH-47 helicopter. Note use of tiedown device to unitize bottom layer of containers and shoring. Pallet load of four M107 spotting projectiles is tied down forward of the containers.

essentially the reverse of procedures for loading. Four persons can unload the complete mission load F in about 10 minutes.

g. Complete Mission Load G.

(1) Parking shoring. Items shown in *a*(1) above.

(2) Blocking shoring.

(a) Items shown in *a*(2) above except that the one piece of plywood (fig 4-9) is not used for lateral blocking at inboard end of stacked propelling-charge containers.

(b) One piece, 2- by 6- by 36-inch, for use as lateral blocking at inboard end of bottom layer of stacked propelling-charge containers (fig 3-2, mission load G).

(3) Tiedowns. Fifteen CGU-1/B tiedown devices (four on M467 container, six on projectile package (to include two used to unitize package), and five on stack of propelling-charge containers (to include one used to unitize bottom layer of containers and shoring)).

(4) Loading.

(a) Hand-carry M467 container to tiedown position shown in figure 4-11.

(b) Position parking shoring and bottom section of projectile-pallet at tiedown location for M107 spotting projectiles (fig 4-11). Disassemble projectile package outside helicopter, and hand-carry individual projectiles to tiedown location. Place the two projectiles in center positions on the pallet. Place top section of pallet on projectiles, and unitize projectile package with a CGU-1/B tiedown device placed inside each skid (bottom) and outside projectiles (top) (fig 4-17).

(c) Position parking shoring at tiedown location for propelling-charge containers (fig 4-11). Pre-position tiedown device beneath end blocks of shoring to unitize containers and shoring..

(d) Hand-carry propelling-charge containers for bottom layer (fig 3-2, mission load G), place on shoring, and secure containers with tiedown device. Position remaining container in accordance with figure 3-2 (mission load G). Face cap ends of all containers inboard.

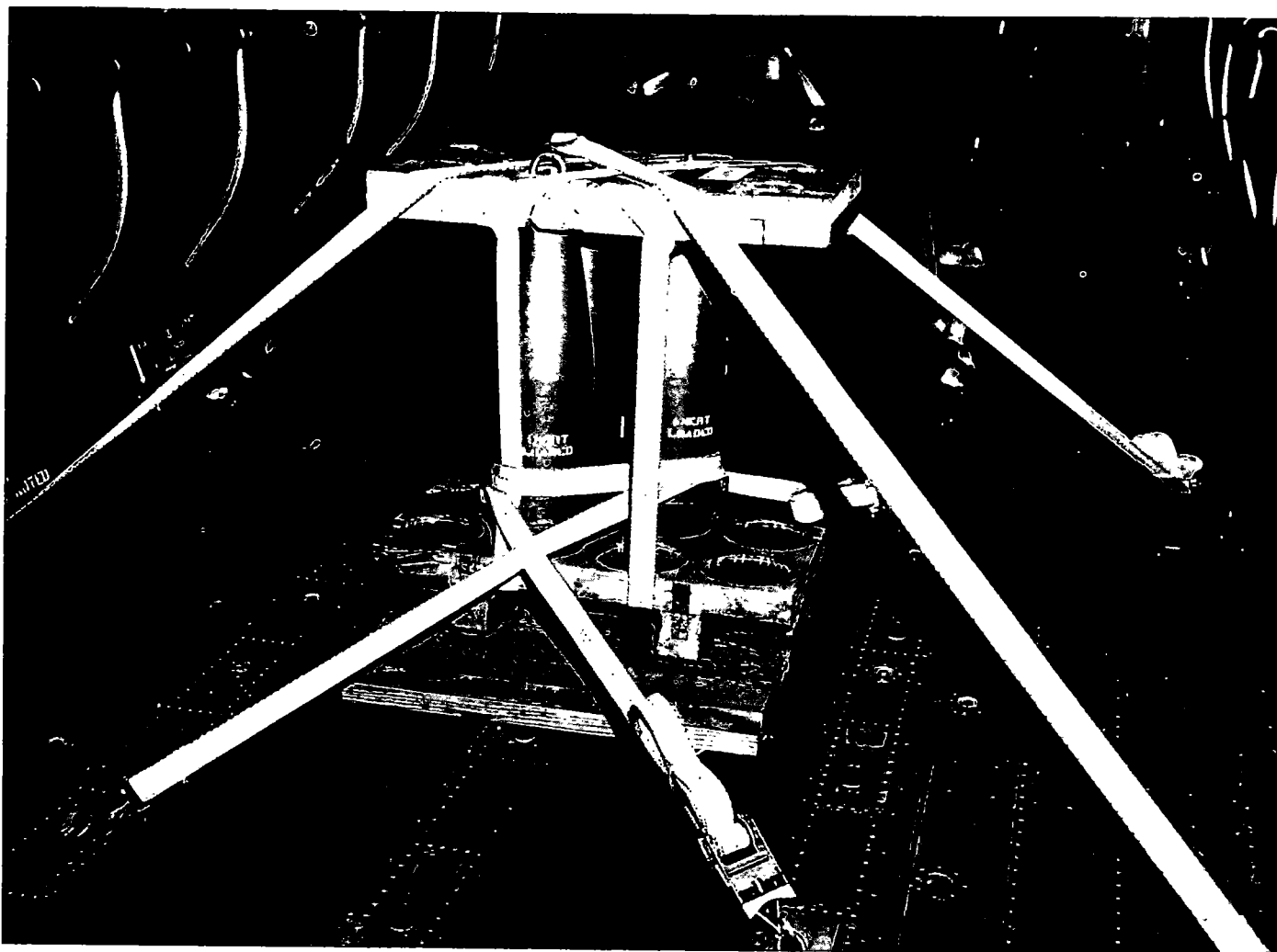


Figure 4-15. Three M107 spotting projectiles, complete mission load F, tied down in CH-47 helicopter. Note position of two tiedowns used to unitize projectile package.

(e) Tie down the complete mission load G, using figure 4-11 and 4-17 and table 4-9 for guidance. Exceptions to table 4-9 are: forward and aft tiedowns D11/D14 and E11/E14 are looped around the one container on top of stack. Lateral tiedown E10/E15 goes around 2- by 6- by 36-inch shoring at inboard ends of four containers in bottom layer.

(f) Four persons can prepare, load, and tie down the complete mission load G in about 30 minutes.

(5) Unloading. Procedures for unloading are essentially the reverse of procedures for loading. Four persons can unload the complete mission load G in about 10 minutes.

h. Complete Mission Load H.

(1) Parking shoring

(a) Bottom section (inverted) of two-section pallet used to unitize M107 spotting projectiles (or equivalent shoring) for the single M107 projectile,

(b) Two pieces, 2- by 6- by 42-inch, for use beneath stacked propelling-charge containers (1 stack).

(2) Blocking shoring.

(a) One piece plywood, 1- by 22- by 38-inch (notched at center of 22-inch sides to accommodate tiedown device), for use as lateral blocking at outboard end of stacked propelling-charge containers.

(b) Two pieces, 2- by 4- by 18-inch, nailed to ends of parking shoring to provide end blocking for stacked propelling-charge containers.

(c) Eight nails, 8d (2½-inch), two used at each joint to secure end blocks to shoring for stacked propelling-charge containers. Construct shoring (outside helicopter) for containers (fig 4-10).

(3) Tiedowns. Twelve CGU-1/B tiedown devices (four on M467 container, three on spotting projectile (to include one used to unitize projectile and shoring), and five on stack of propelling-charge containers (to

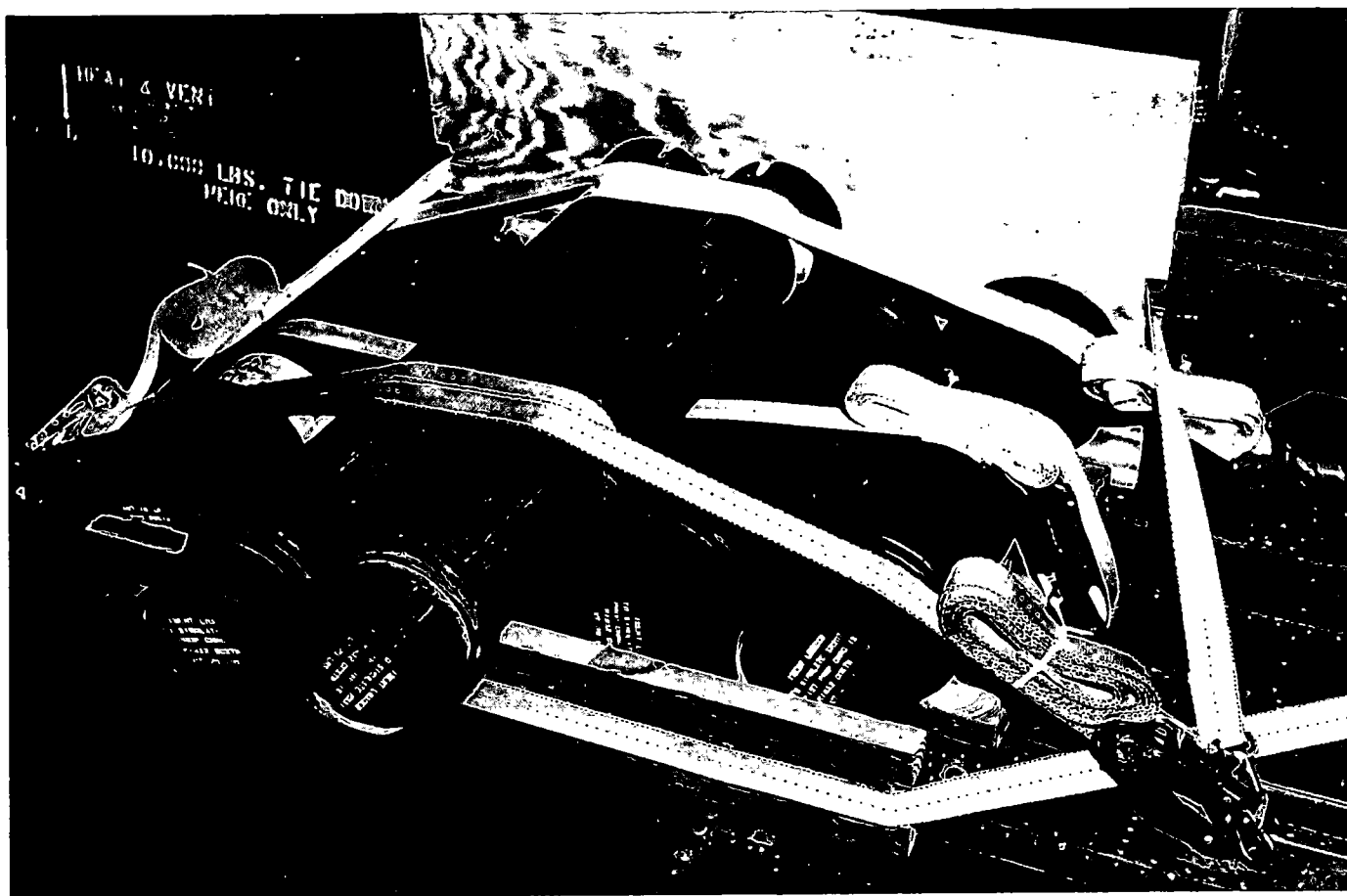


Figure 4-16. Propelling-charge containers for M454 projectile complete mission load F tied down in CH-47 helicopter. Note use of tiedown device to unitize bottom layer of containers and shoring.

include one used to unitize bottom layer of containers and shoring).

(4) Loading.

(a) Hand-carry M467 container to tiedown position shown in figure 4-18.

(b) Position parking shoring at tiedown location for spotting projectile, and hand-carry projectile to tiedown location (figs 4-18 and 4-19). When inverted pallet is used, place spacer block between projectile and skids of pallet.

(c) Position parking shoring at tiedown location for propelling-charge containers (fig 4-18). Pre-position tiedown device beneath end blocks of shoring to unitize bottom layer of containers and shoring.

(d) Hand-carry propelling-charge containers

for bottom layer (fig 3-2, mission load H), place on shoring, and secure containers with tiedown device (loop tiedown around containers on each end of bottom layer). Position remaining container in accordance with figures 3-2 (mission load H) and 4-20. Face cap ends of all containers inboard.

(e) Tie down the complete mission load H in accordance with figures 4-18, 4-19, and 4-20 and table 4-10.

(f) Four persons can prepare, load, and tie down the complete mission load H in about 20 minutes.

(5) Unloading. Procedures for unloading are essentially the reverse of procedures for loading. Four persons can unload the complete mission load H in about 5 minutes.

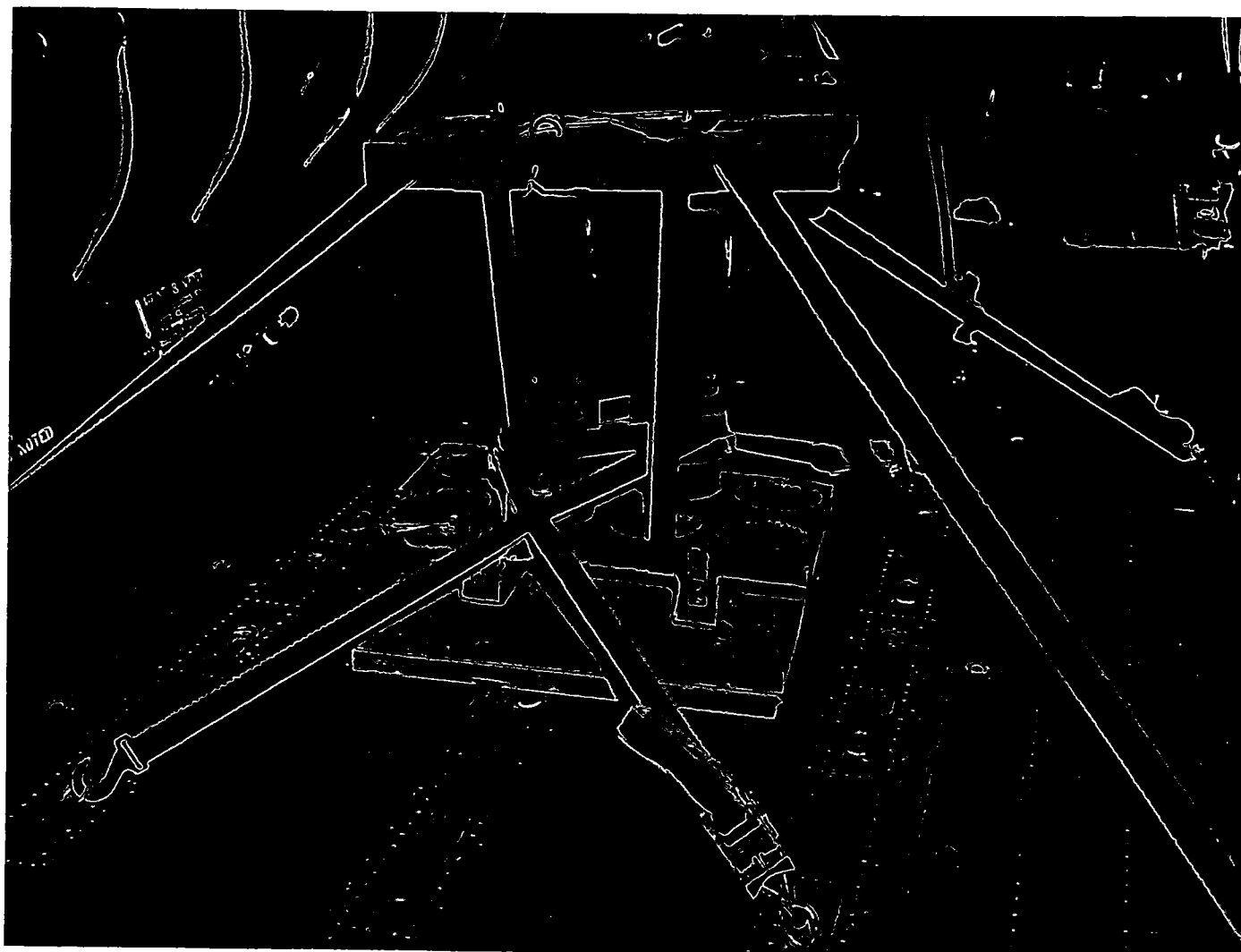
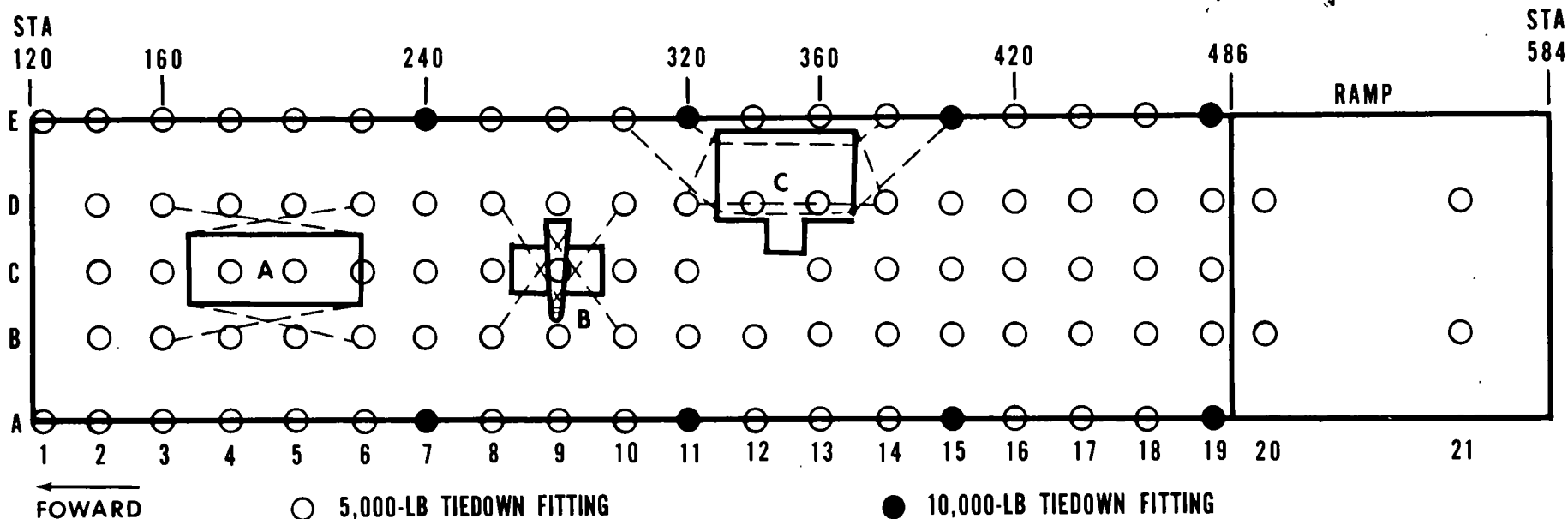


Figure 4-17. Two M107 spotting projectiles, complete mission load G, tied down in CH-47 helicopter. Note position of two tiedowns used to unitize projectile package.



NOTE: UTILITY HATCH DOOR IS LOCATED IN THE CENTER OF THE FLOOR BETWEEN STATIONS 320 AND 360

ITEM	DESCRIPTION OF ITEM	ITEM FACING	LOCATION OF REFERENCE POINT		LOCATION OF CG (STA)	APPROX WT (LB)
			REFERENCE POINT	STATION		
A	M467 CONTAINER WITH M454 PROJECTILE	FORWARD	FORWARD EDGE	166	198	266
B	M107 SPOTTING PROJECTILE (ON PALLET)	LATERAL	FORWARD EDGE	266	280	132
C	STACKED PROPELLING-CHARGE CONTAINERS (SEE TABLE 3-1 AND FIG 3-2 FOR DETAILS)	LATERAL	FORWARD EDGE	328	349	140.5
					TOTAL	538.5

Figure 4-18. Tiedown diagram for M454 projectile complete mission load H in CH-47 helicopter.

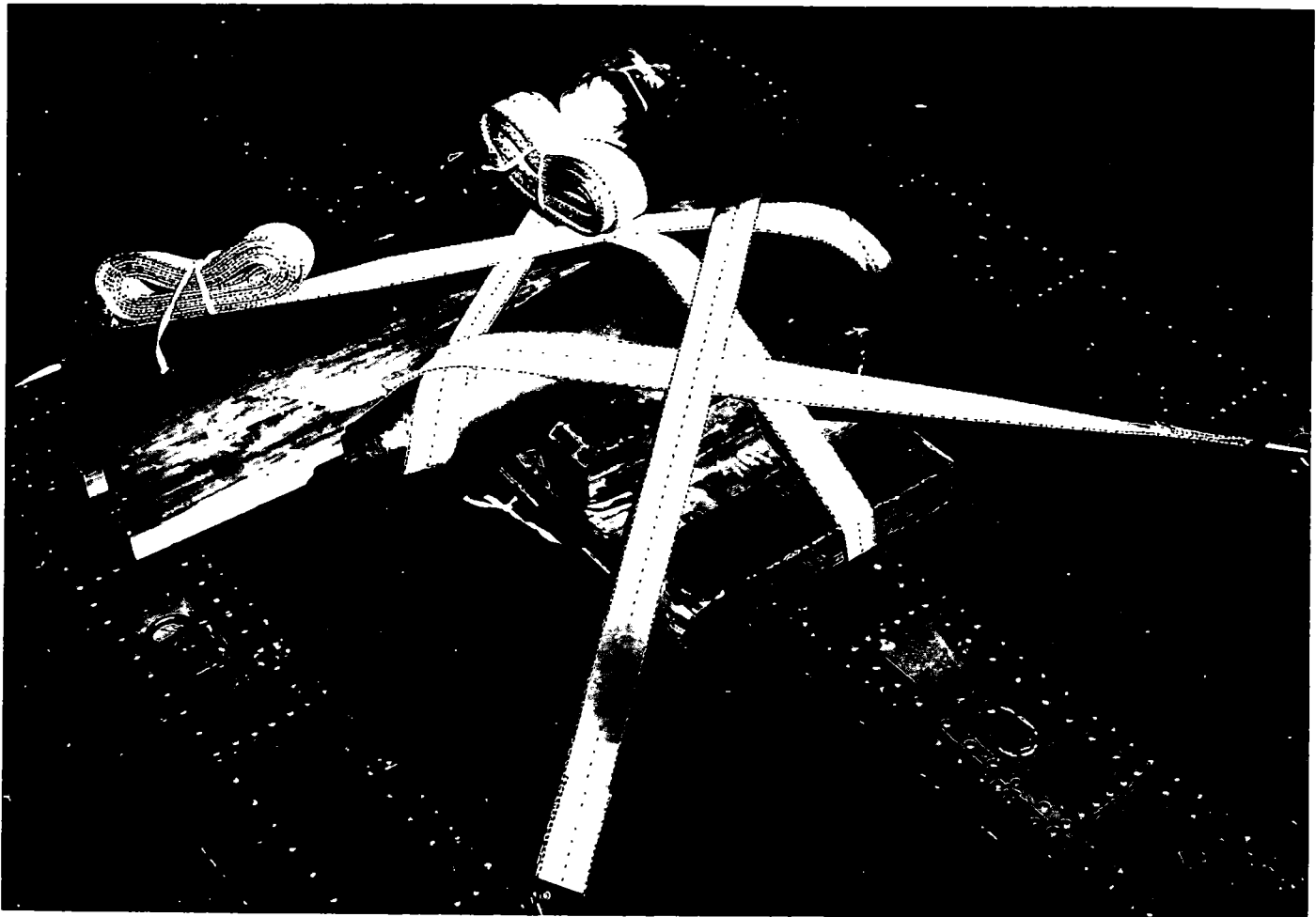


Figure 4-19. M107 spotting projectile complete mission load H tied down in CH-47 helicopter. Note use of tiedown to utilize projectile and inverted pallet, and placement of spacer block

Table 4-10.

Tiedown Data for M454 Projectile Complete Mission Load H in CH-47 Helicopter

Item	Tiedown fitting		Tiedown device		Attach to item
	Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
A	B3	5	CGU-1/B	5	Left rear tiedown ring
	D3	5	CGU-1/B	5	Right rear tiedown ring
	B6	5	CGU-1/B	5	Left front tiedown ring
	D6	5	CGU-1/B	5	Right front tiedown ring
B	B8/B10	5	CGU-1/B	5	Around projectile base end (rear of bourrelet)
	D8/D10	5	CGU-1/B	5	Around projectile forward end (aft of ring plug)
C	D11/D14	5	CGU-1/B	5	Over top of stacked propelling- charge containers and around container on top of stack
	D11/D14	5	CGU-1/B	5	Around plywood at outboard ends of stacked propelling- charge containers
	E11/E14	10/5	CGU-1/B	5	Overtop of stacked propelling- charge containers and around container on top of stack
	E10/E15	5/10	CGU-1/B	5	One complete loop around containers on each end of bot- tom layer of stacked propell- ing-charge containers

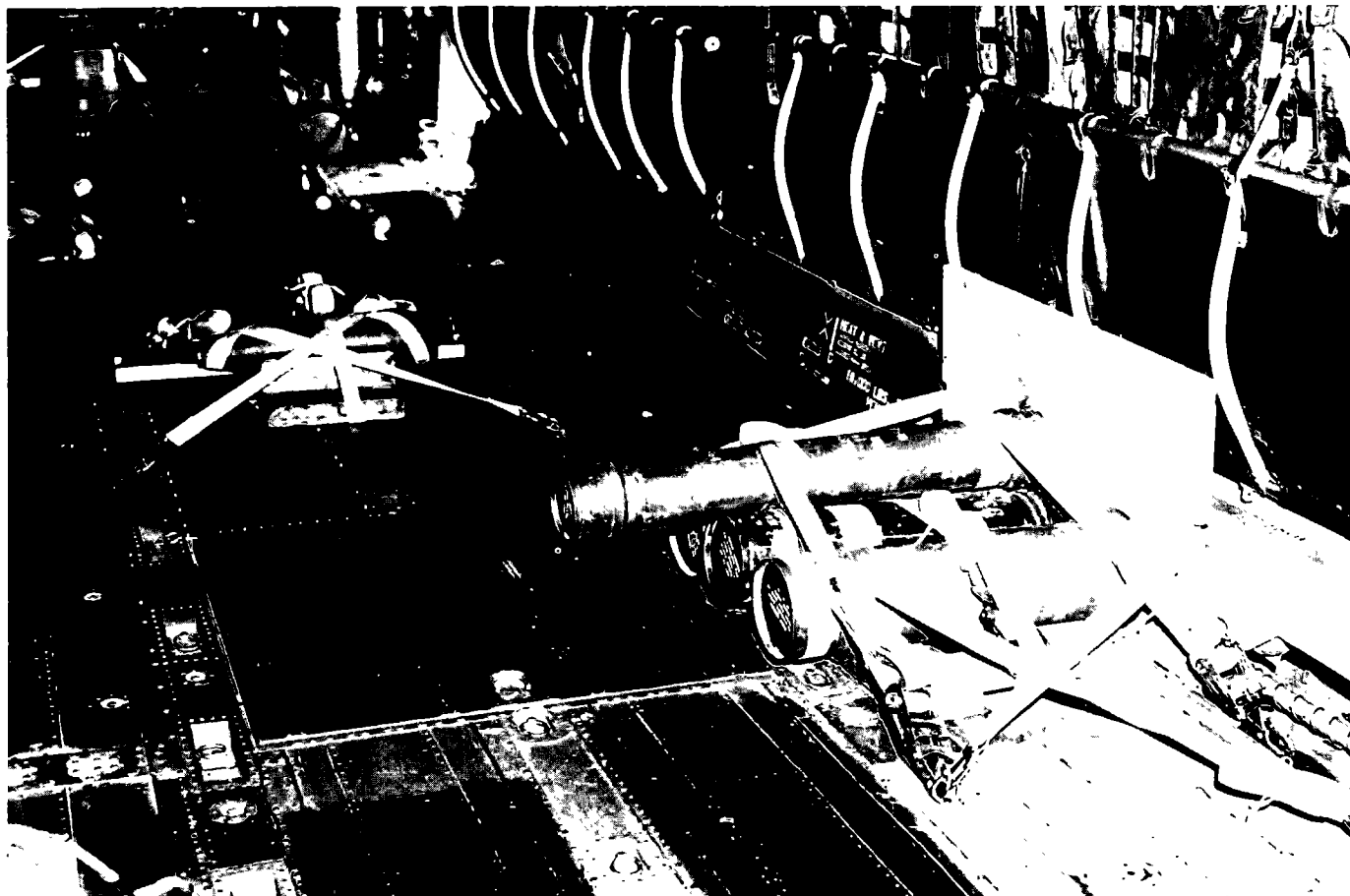


Figure 4-20. Propelling-charge containers for M454 projectile complete mission load H tied down in CH-47 helicopter. M107 projectile and M467 container are tied down forward of the propelling-charge containers.

★4-3. Transport of Helicopter Accident-Resistant Container (HARC), H1501, by CH-47 Helicopter

NOTE

These procedures pertain to helicopter accident-resistant containers loaded with the W48 warhead.

a. Description.

Weight Empty	Weight Loaded	Length	Width	Height
2,034 lb (922.6 kg)	2,155 lb (975.4 kg)	70 in. (1.78 m)	on casters 52 in. (1.32 m) without casters 36 in. (0.91 m)	on casters 42 in. (1.07 m) casters retracted 38.7 in. (0.98 m)

Four shackle tiedown/lift points (two on each side) are located midway on the container sides, and eight eyebolt tiedowns are located on the four base hardpoint mounts just behind the caster mount. Each eyebolt pair is termed "inner" (facing the middle of the container) and "outer" (facing the end of the container). The container can be lifted by forklift from either side. The HARC is mounted on four retractable, swiveling casters. When the casters are retracted, the flat base

of the HARC has a floor contact area of 2,163 square inches.

b. Transporting One, Two, Three, or Four HARC's. The HARC (fig 4-21), if loaded straight in, will be transported with the cover end facing aft. The center of balance of the HARC with one W48 warhead is 35 inches from the cover end of the container and 19 inches up from the bottom of the base.

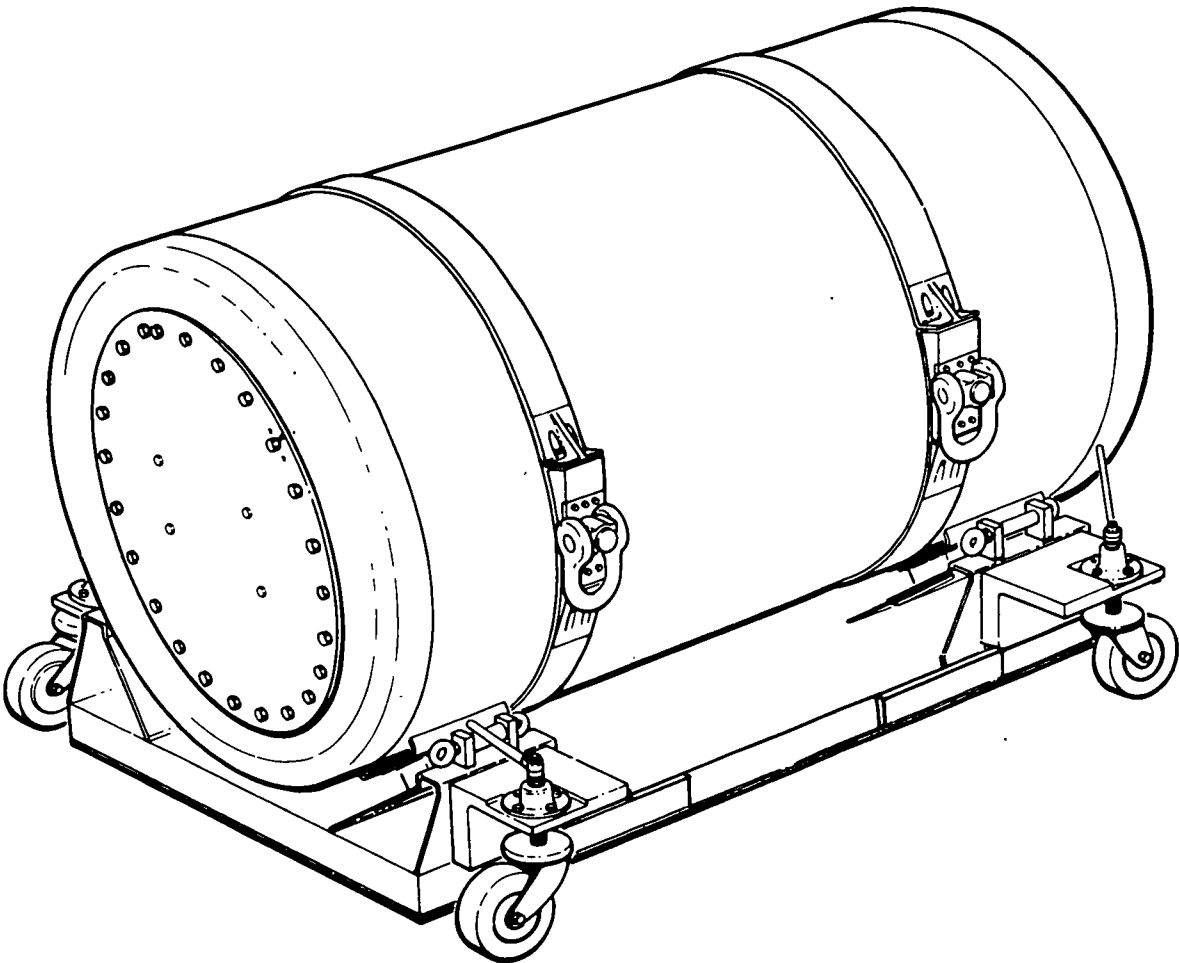


Figure 4-21. Helicopter accident-resistant container, H1501.

c. Materials Required.

(1) Rolling and parking shoring. For one or two HARC's, 10 pieces of $\frac{3}{4}$ - by 24-inch by 8-foot plywood, or equivalent; for three or four HARC's, 12 pieces of $\frac{3}{4}$ - by 24-inch by 8-foot plywood, or equivalent.

(2) Chains. Two of the type used with the MB-1 tiedown device, 10,000-pound capacity, or equivalent.

(3) Safety restraint device. One web strap.

(4) Strap fastener. One, NSN 1670-00-360-0340.

d. Loading HARC's Straight In.

(1) Position the helicopter auxiliary loading ramps to match the width of the HARC casters (52 inches). Lay the plywood rolling and parking shoring, spaced to match the width of the HARC casters, on the parking ramp behind the helicopter, on the auxiliary ramps, on the cargo ramp and inside the helicopter. The shoring must reach to the most forward tiedown location, depending on the number of HARC's to be transported. Place a HARC, with the cover end facing aft, on the shoring behind the helicopter. The casters must be *fully extended*.

(2) Retract or extend the casters by disengaging the locking pin from the jack-screw. Turn the locking pin 90 degrees so that it remains disengaged and retract or extend the casters by operating the ratchet handle attached to each jack-screw. When the casters are fully retracted or extended, turn the locking pin so that it re-engages the jack-screw.

(3) Form a towing bridle by attaching the chains to the forward eyebolts of the first HARC. Attach the helicopter winch cable hook to the towing bridle, and safety-tie the hook to prevent accidental release. If the hook has a serviceable safety latch, tying is not required.

(4) Attach the safety restraining strap to a tiedown shackle on the forward end of the HARC. Pass the free end of the strap through a strap fastener that is attached to a tiedown fitting in the forward part of the helicopter. Man the free end of the strap outside and to the rear and side of the helicopter. Take up the slack in the restraint after the HARC is winched into the helicopter.

(5) Position guides to adjust shoring, observe clearances, and signal the winch operator as necessary.

(6) Winch the HARC slowly. Two persons are required to keep the HARC aligned with and on the shoring.

(7) When the HARC is at its tiedown location, apply fore and aft restraint and then release tension on the winch cable. The bridle and winch cable may be left attached to the container. If another container is to be loaded, remove the bridle and winch cable and pass them between the casters of the first container.

(8) Use the procedures in 4-3d (1) through (7) to load other containers. After all containers are loaded, retract the casters to allow the flat bottom of the HARC to rest on the shoring.

(9) Tie down the containers in accordance with figure 4-22, 4-23, 4-24, or 4-25 and tables 4-11 through 4-14. Attach the CGU-1/B tiedown straps, or other tiedown devices authorized in paragraph 2-2d *Note*, to the tiedown shackles on the side of the HARC. The HARC's may be repositioned in the helicopter to satisfy the weight and balance requirements or to accommodate passengers or other cargo. If the tiedown patterns shown in figures 4-22 through 4-25 are maintained, the required restraint will be provided.

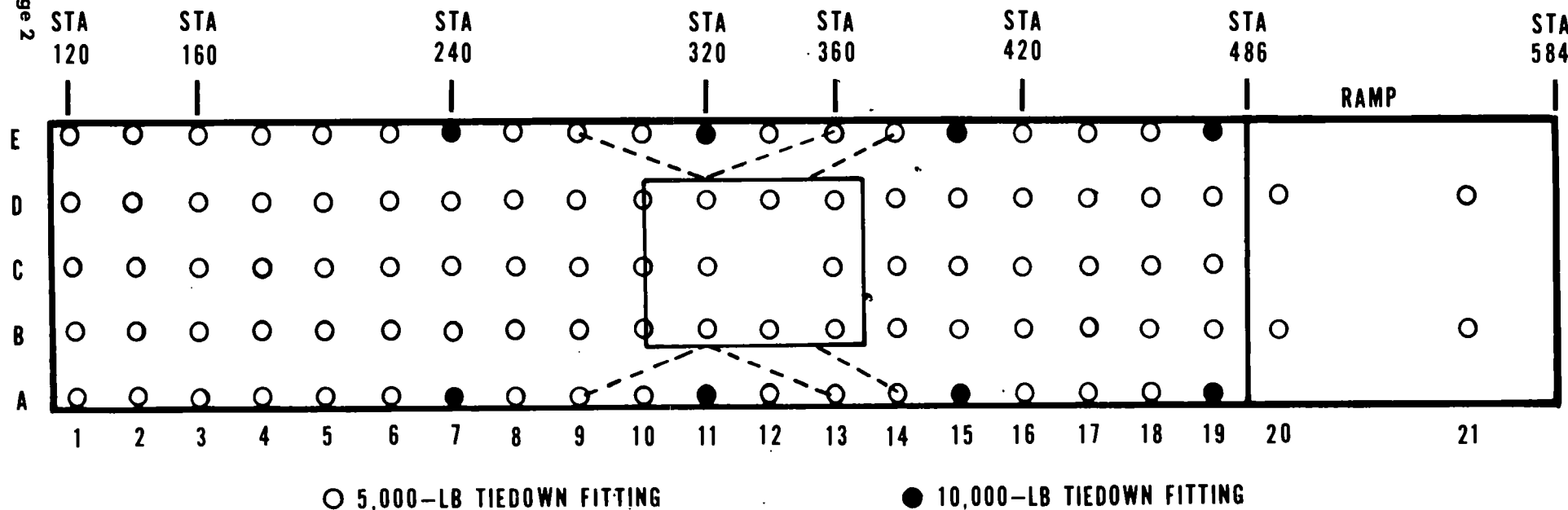
(10) Load shoring materials required for unloading and tie them down as directed by the aircraft commander.

(11) Compute the weight and balance of the helicopter to include security personnel.

e. Transporting Five HARC's. Five HARC's can be loaded sideways using the same materials described in paragraph 4-3c.

f. Loading HARC's Sideways.

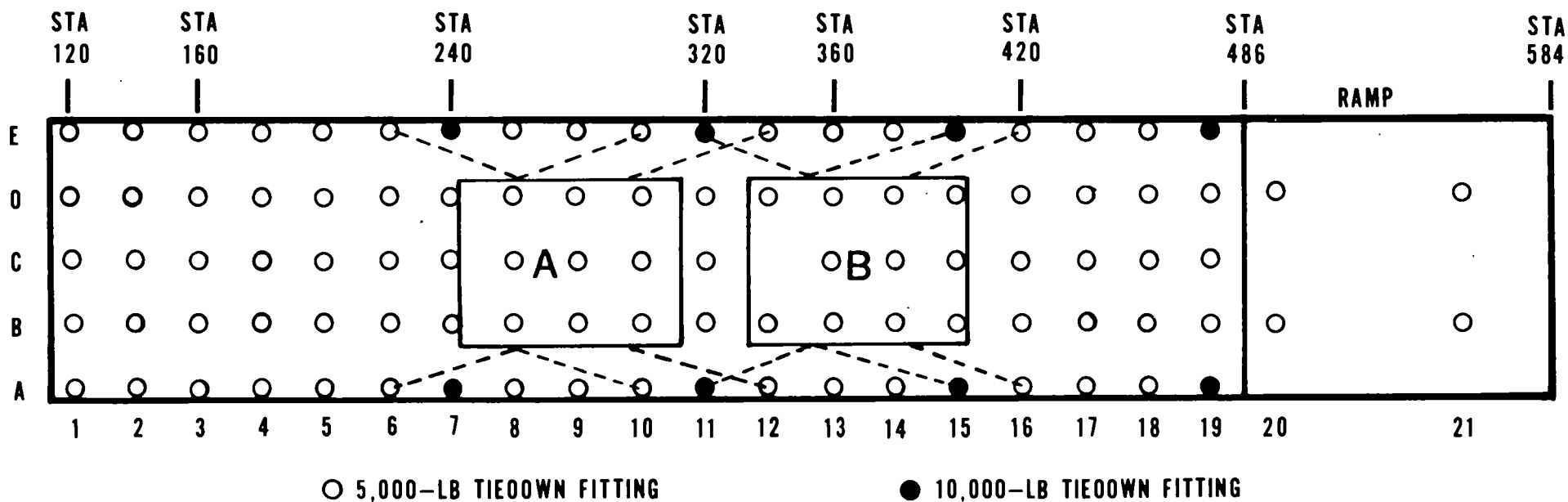
(1) Position the helicopter auxiliary loading ramps to match the width of the HARC casters (53 inches). Lay the plywood rolling and parking shoring, spaced to match the width of the casters, on the parking ramp behind the helicopter, on the auxiliary ramps, on the cargo ramp, and inside the helicopter to station 160. Place a HARC, with the cover end facing either side, on the shoring behind the helicopter. The caster jack-screws must be *fully extended*.



NOTE: UTILITY HATCH DOOR IS LOCATED IN THE CENTER OF THE FLOOR BETWEEN STATIONS 320 AND 360.

ITEM	DESCRIPTION OF ITEM	ITEM FACING	LOCATION OF REFERENCE POINT		LOCATION OF CG (STA)	APPROX WT (LB).
			REFERENCE POINT	STATION		
A	HARC, H1501	AFT	COVER END	370	338	2,155

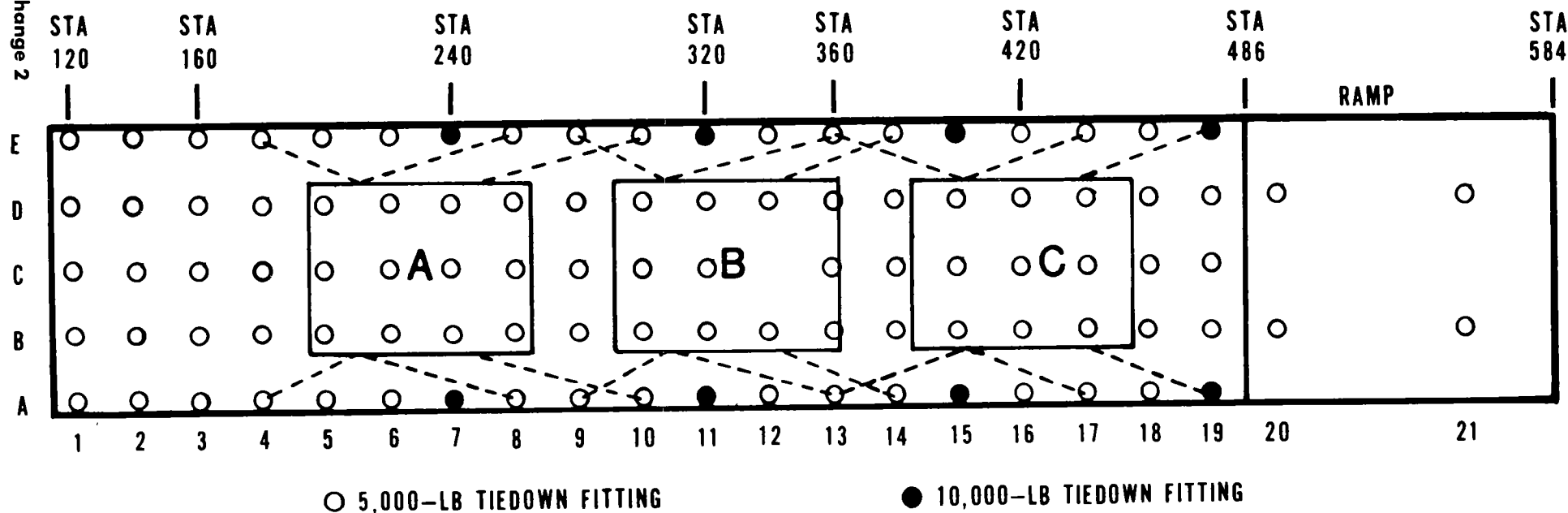
Figure 4-22. Tiedown diagram for one HARC in CH-47 helicopter.



NOTE: UTILITY HATCH DOOR IS LOCATED IN THE CENTER OF THE FLOOR BETWEEN STATIONS 320 AND 360.

ITEM	DESCRIPTION OF ITEM	ITEM FACING	LOCATION OF REFERENCE POINT		LOCATION OF CG (STA)	APPROX WT (LB).
			REFERENCE POINT	STATION		
A	HARC, H1501	AFT	COVER END	315	280	2,155
B	HARC, H1501	AFT	COVER END	401	366	2,155

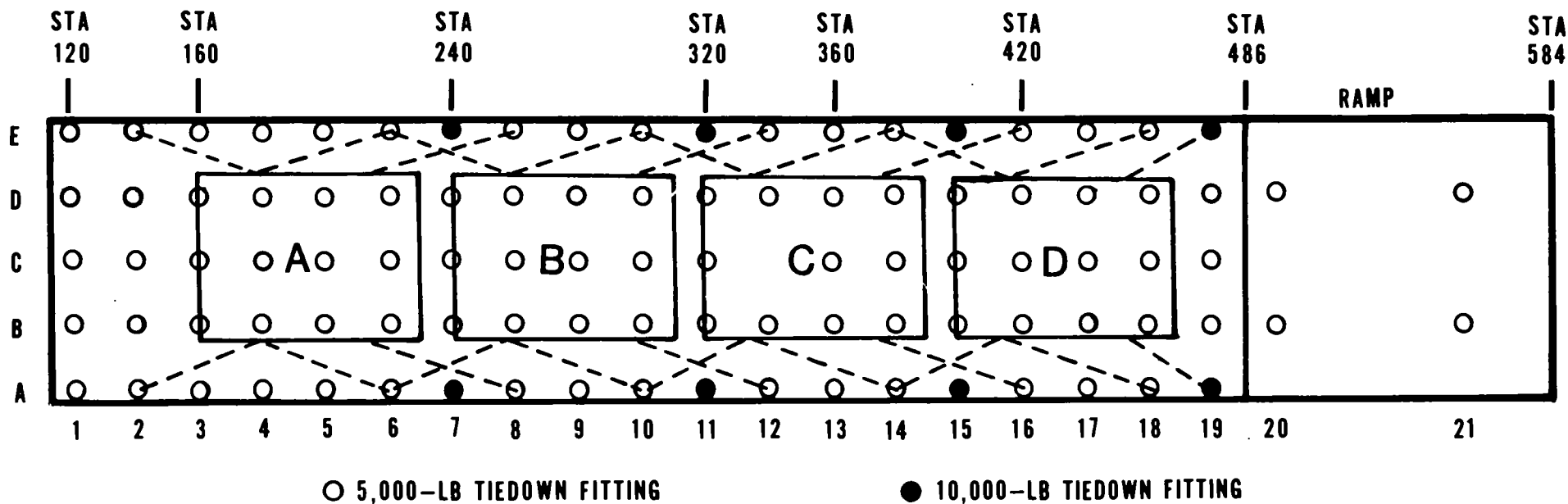
Figure 4-23. Tiedown diagram for two HARC's in CH-47 helicopter.



NOTE: UTILITY HATCH DOOR IS LOCATED IN THE CENTER OF THE FLOOR BETWEEN STATIONS 320 AND 360.

ITEM	DESCRIPTION OF ITEM	ITEM FACING	LOCATION OF REFERENCE POINT		LOCATION OF CG (STA)	APPROX WT (LB).
			REFERENCE POINT	STATION		
A	HARC, H1501	AFT	COVER END	265	230	2,155
B	HARC, H1501	AFT	COVER END	360	325	2,155
C	HARC, H1501	AFT	COVER END	458	423	2,155

Figure 4-24. Tiedown diagram for three HARC's in CH-47 helicopter.



NOTE: UTILITY HATCH DOOR IS LOCATED IN THE CENTER OF THE FLOOR BETWEEN STATIONS 320 AND 360.

ITEM	DESCRIPTION OF ITEM	ITEM FACING	LOCATION OF REFERENCE POINT		LOCATION OF CG (STA)	APPROX WT (LB).
			REFERENCE POINT	STATION		
A	HARC, H1501	AFT	COVER END	230	195	2,155
B	HARC, H1501	AFT	COVER END	310	275	2,155
C	HARC, H1501	AFT	COVER END	390	355	2,155
D	HARC, H1501	AFT	COVER END	470	435	2,155

Figure 4-25. Tiedown diagram for four HARC's in CH-47 helicopter.

Table 4-11. Tiedown Data for One HARC in CH-47 Helicopter

Tiedown fitting		Tiedown device*		Attach to item
Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
A9	5	CGU-1/B	5	Left front tiedown shackle
E9	5	CGU-1/B	5	Right front tiedown shackle
A13	5	CGU-1/B	5	Left front tiedown shackle
E13	5	CGU-1/B	5	Right front tiedown shackle
A14	5	CGU-1/B	5	Left rear tiedown shackle
E14	5	CGU-1/B	5	Right rear tiedown shackle

*Tiedown straps authorized in chapter 2 may be used. MB-1 chain assemblies may be used. Do not mix straps and chains on the same item.

Table 4-12. Tiedown Data for Two HARC's in CH-47 Helicopter

Item	Tiedown fitting		Tiedown device		Attach to item
	Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
A	A6	5	CGU-1/B	5	Left front tiedown shackle
	E6	5	CGU-1/B	5	Right front tiedown shackle
	A10	5	CGU-1/B	5	Left front tiedown shackle
	E10	5	CGU-1/B	5	Right front tiedown shackle
	A12	5	CGU-1/B	5	Left rear tiedown shackle
B	E12	5	CGU-1/B	5	Right rear tiedown shackle
	A11	10	CGU-1/B	5	Left front tiedown shackle
	E11	10	CGU-1/B	5	Right front tiedown shackle
	A15	10	CGU-1/B	5	Left front tiedown shackle
	E15	10	CGU-1/B	5	Right front tiedown shackle
	A16	5	CGU-1/B	5	Left rear tiedown shackle
	E16	5	CGU-1/B	5	Right rear tiedown shackle

*Tiedown straps authorized in chapter 2 may be used. MB-1 chain assemblies may be used. Do not mix straps and chains on the same item.

Table 4-13. Tiedown Data for Three HARC's in CH-47 Helicopter

Item	Tiedown fitting		Tiedown device		Attach to item
	Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
A	A4	5	CGU-1/B	5	Left front tiedown shackle
	E4	5	CGU-1/B	5	Right front tiedown shackle
	A8	5	CGU-1/B	5	Left front tiedown shackle
	E8	5	CGU-1/B	5	Right front tiedown shackle
	A10	5	CGU-1/B	5	Left rear tiedown shackle
B	E10	5	CGU-1/B	5	Right rear tiedown shackle
	A9	5	CGU-1/B	5	Left front tiedown shackle
	E9	5	CGU-1/B	5	Right front tiedown shackle
	A13	5	CGU-1/B	5	Left front tiedown shackle
	E13	5	CGU-1/B	5	Right front tiedown shackle
	A14	5	CGU-1/B	5	Left rear tiedown shackle
	E14	5	CGU-1/B	5	Right rear tiedown shackle
C	A13	5	CGU-1/B	5	Left front tiedown shackle
	E13	5	CGU-1/B	5	Right front tiedown shackle
	A17	5	CGU-1/B	5	Left front tiedown shackle
	E17	5	CGU-1/B	5	Right front tiedown shackle
	A19	10	CGU-1/B	5	Left rear tiedown shackle
	E19	10	CGU-1/B	5	Right rear tiedown shackle

*Tiedown straps authorized in chapter 2 may be used. MB-1 chain assemblies may be used. Do not mix straps and chains on the same item.

Table 4-14. Tiedown Data for Four HARCs in CH-47 Helicopter

Item	Tiedown fitting		Tiedown device		Attach to item
	Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
A	A2	5	CGU-1/B	5	Left front tiedown shackle
	E2	5	CGU-1/B	5	Right front tiedown shackle
	A6	5	CGU-1/B	5	Left front tiedown shackle
	E6	5	CGU-1/B	5	Right front tiedown shackle
	A8	5	CGU-1/B	5	Left rear tiedown shackle
B	E8	5	CGU-1/B	5	Right rear tiedown shackle
	A6	5	CGU-1/B	5	Left front tiedown shackle
	E6	5	CGU-1/B	5	Right front tiedown shackle
	A10	5	CGU-1/B	5	Left front tiedown shackle
	E10	5	CGU-1/B	5	Right front tiedown shackle
C	A12	5	CGU-1/B	5	Left rear tiedown shackle
	E12	5	CGU-1/B	5	Right rear tiedown shackle
	A10	5	CGU-1/B	5	Left front tiedown shackle
	E10	5	CGU-1/B	5	Right front tiedown shackle
	A14	5	CGU-1/B	5	Left front tiedown shackle
D	E14	5	CGU-1/B	5	Right front tiedown shackle
	A16	5	CGU-1/B	5	Left rear tiedown shackle
	E16	5	CGU-1/B	5	Right rear tiedown shackle
	A14	5	CGU-1/B	5	Left front tiedown shackle
	E14	5	CGU-1/B	5	Right front tiedown shackle
	A18	5	CGU-1/B	5	Left front tiedown shackle
	E18	5	CGU-1/B	5	Right front tiedown shackle
	A19	10	CGU-1/B	5	Left rear tiedown shackle
	E19	10	CGU-1/B	5	Right rear tiedown shackle

*Tiedown straps authorized in chapter 2 may be used. MB-1 chain assemblies may be used. Do not mix straps and chains on the same item.

(2) Retract or extend the casters by disengaging the locking pin from the jack-screw. Turn the locking pin 90 degrees so that it remains disengaged and retract or extend the casters by operating the ratchet handle attached to each jack-screw. When the casters are retracted or extended, turn the locking pin so that it re-engages the jack-screw.

(3) Form a towing bridle by attaching the chains to the inner eye-bolts on the side of the HARC. Attach the helicopter winch cable hook to the towing bridle, and safety tie the hook to prevent accidental release. If the hook has a servicable safety latch, tying is not required.

(4) Attach the safety restraining strap to a tiedown shackle on the side of the HARC. Pass the free end of the strap through a strap fastener that is attached to a tiedown fitting in the forward part of the helicopter. Man the free end of the strap outside and to the rear and side of the helicopter. Take up the slack in the restraining strap as the HARC is winched into the helicopter.

(5) Position guides to adjust shoring, observe clearances, and signal the winch operator as necessary.

(6) Winch the HARC slowly. Two persons are required to keep the HARC aligned with and on the shoring.

(7) When the HARC is at its tiedown location, apply fore and aft restraint and then release tension on the winch cable. Retract the casters to allow the flat bottom of the HARC to rest on the shoring. Remove

the bridle and winch cable and pass them through the space between the bolster and the container portion of the HARC.

(8) Tiedown the HARC in accordance with figure 4-26 and table 4-15.

NOTE

Place protective material at points of contact between the tiedown straps and the jack-screws to protect the straps from grease.

CAUTION

During winching of the remaining HARCs, place a wooden block or other anti-chaffing material under the winch cable at the point where the cable contacts the bolster of the already-loaded HARC.

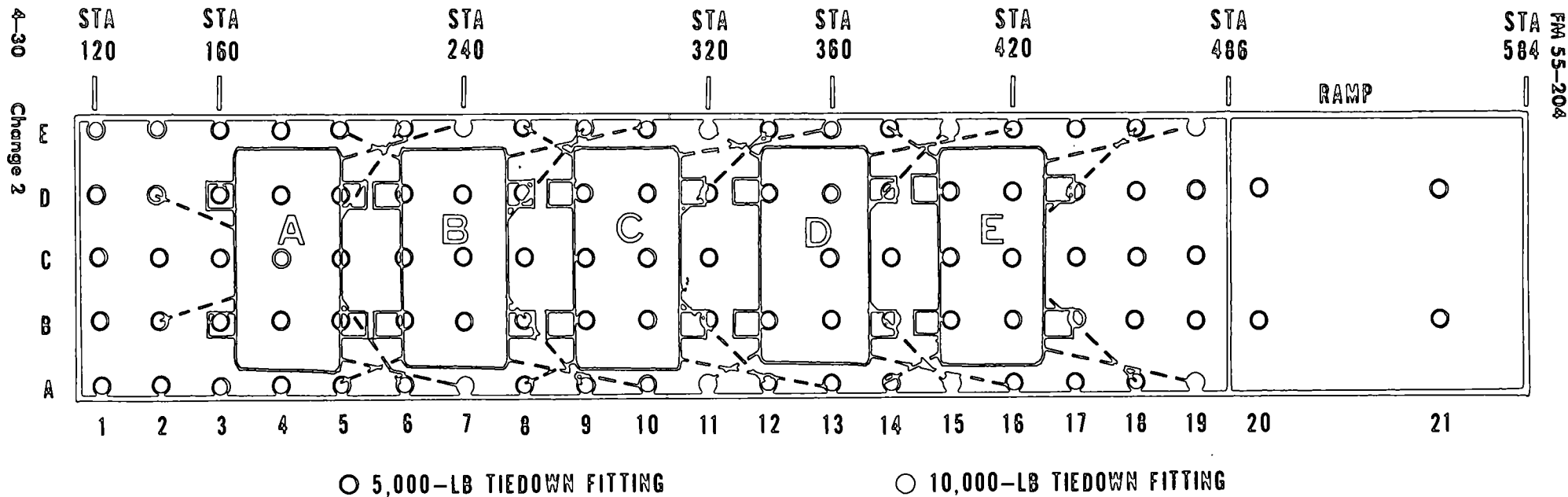
(9) Use the procedures in paragraphs 4-3f.(1) through (8) to load and tie down the other containers.

(10) Compute the helicopter weight and balance to include security personnel.

NOTE

Six empty HARCs may be transported sideways, providing that there is no requirement for seating for security personnel,

g. Unloading. Unloading procedures are essentially the reverse of loading procedures. The helicopter winch will be used as a safety restraint when the container is manhandled from the helicopter. Care must be taken when the container passes over the cargo ramp.



NOTE: UTILITY HATCH DOOR IS LOCATED IN THE CENTER OF THE FLOOR BETWEEN STATIONS 320 AND 360.

ITEM	DESCRIPTION OF ITEM	ITEM FACING	LOCATION OF REFERENCE POINT		LOCATION OF CG (STA)	APPROX. WT (LB)
			REFERENCE POINT	STATION		
A	HARC	SIDEWAYS	FORWARD EDGE	160	186	2,155
B	HARC	SIDEWAYS	FORWARD EDGE	215	241	2,155
C	HARC	SIDEWAYS	FORWARD EDGE	270	296	2,155
D	HARC	SIDEWAYS	FORWARD EDGE	331	357	2,155
E	HARC	SIDEWAYS	FORWARD EDGE	391	417	2,155

Figure 4-26. Tiedown diagram for five HARC's in CH-47 helicopter.

Table 4-15. Tiedown Data for Five HARCs in CH-47 Helicopter

Item	Tiedown fitting		Tiedown device		Attach to item
	Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
A	B2	5	CGU-1/B	5	Left front tiedown shackle
	D2	5	CGU-1/B	5	Right front tiedown shackle
	A6	5	CGU-1/B	5	Left rear tiedown shackle
	E6	5	CGU-1/B	5	Right rear tiedown shackle
	A7	10	CGU-1/B	5	Left rear outer eyebolt.
	E7	10	CGU-1/B	5	Right rear outer eyebolt
B	A5	5	CGU-1/B	5	Left front outer eyebolt
	E5	5	CGU-1/B	5	Right front outer eyebolt
	A9	5	CGU-1/B	5	Left rear tiedown shackle
	E9	5	CGU-1/B	5	Right rear tiedown shackle
	A10	5	CGU-1/B	5	Left rear outer eyebolt
	E10	5	CGU-1/B	5	Right rear outer eyebolt
C	A8	5	CGU-1/B	5	Left front outer eyebolt
	E8	5	CGU-1/B	5	Right front outer eyebolt
	A12	5	CGU-1/B	5	Left rear tiedown shackle
	E12	5	CGU-1/B	5	Right rear tiedown shackle
	A13	5	CGU-1/B	5	Left rear outer eyebolt
	E13	5	CGU-1/B	5	Right rear outer eyebolt
D	A11	10	CGU-1/B	5	Left front outer eyebolt
	E11	10	CGU-1/B	5	Right front outer eyebolt
	A15	10	CGU-1/B	5	Left rear tiedown shackle
	E15	10	CGU-1/B	5	Right rear tiedown shackle
	A16	5	CGU-1/B	5	Left rear outer eyebolt
	E16	5	CGU-1/B	5	Right rear outer eyebolt
E	A14	5	CGU-1/B	5	Left front outer eyebolt
	E14	5	CGU-1/B	5	Right front outer eyebolt
	A18	5	CGU-1/B	5	Left rear tiedown shackle
	E18	5	CGU-1/B	5	Right rear tiedown shackle
	A19	10	CGU-1/B	5	Left rear outer eyebolt
	E19	10	CGU-1/B	5	Right rear outer eyebolt

*Tiedown straps authorized in chapter 2 may be used.

CHAPTER 5

EXTERNAL TRANSPORT BY HELICOPTER (EMERGENCY PROCEDURE)

5-1. General. This chapter prescribes procedures for external transport of the M454 projectile in M467 shipping and storage container, using cargo slings and cargo nets. Information pertaining to the container with projectile is shown in chapter 3.

WARNING

The contents of this chapter are for information and training purposes only and are not to be construed as authority for external-load transport, by helicopter, of the M467 container with M454 projectile. Only dummy loads may be used for practice and/or training exercises. *Nuclear weapons will not be moved by external helicopter transport except in emergency conditions (such as emergency evacuation ordered to maintain US custody or to prevent loss because of fire or flood) and only when the situation does not allow time to prepare and move the nuclear weapons by internal transport (chap 4).*

WARNING

Always assume that a charge of static electricity is present on the helicopter. Use some type of discharge apparatus (static probe) (see fig 2-3, FM 55-413) to ground the hook and discharge electricity to prevent shock when touching the hook. After electricity is discharged, grasp the hook quickly and hold firmly, if possible, until the hookup is completed. If contact with the hook is lost after initial grounding, ground the hook before touching it again. Do not use the load as a ground contact. After the load is air delivered and before it is handled, ground the load again to discharge any accumulated/retained static electricity.

CAUTION

When transporting an external load by CH-54 helicopter, use a metal apex fitting or a large metal clevis to attach the load to the cargo hook, because a nylon sling ring will tend to adhere to the cargo hook beam and prevent release of the load.

CAUTION

Multiple M467 containers with M454 projectiles, within limitations (para 2-1c), may be transported in either the 5,000- or 8,930-pound-capacity nylon cargo net. The 10,000-pound-capacity nylon cargo net may also be used. Loads must not exceed the restrictions shown in TM 39-20-7 and TM 39-45-51A.

5-2. Transport of One M454 Atomic Projectile, Using Air-Delivery Cargo Slings

a. Materials.

(1) Four 8-foot, two-loop, air-delivery cargo slings (NSN 1670-00-753-3789) (each has rated capacity of 6,500 pounds).

(2) One 3-foot, three-loop, air-delivery cargo sling ring (NSN 1670-00-753-3788) (has rated capacity of 10,000 pounds), with link assembly, type IV (NSN 1670-00-783-5988).

(3) Tape, adhesive, 2-inch wide (NSN 7510-00-266-5016), or equivalent.

(4) One large clevis assembly, air-delivery, type I (NSN 1670-00-090-5354), for use with CH-54 helicopter.

(5) Four small clevis assemblies, air-delivery (NSN 1670-00-360-0304). Medium clevis assembly (NSN 1670-00-678-8562) or large clevis assembly (NSN 1670-00-090-5354) may be used.

b. Preparation and Rigging.

(1) Use a small clevis assembly (or equivalent) to attach a sling leg to each tiedown ring on the container. Four persons can rig the container for external-load transport in about 5 minutes.

(2) Twist each sling leg one turn for each 3 feet of sling.

(3) Combine the free ends of the sling legs to form a single loop, and attach to the 3-foot sling. Connect the free ends of the 3-foot sling with the link assembly. The 3-foot sling forms the apex for attachment to the helicopter cargo hook.

(4) Cluster and tape sling legs (breakaway technique) to prevent fouling during lift-off.

(5) Attach apex to the helicopter cargo hook. Helicopter must be centered over load before tension is placed on the slings.

c. Derigging. Four persons can derig the container in about 5 minutes.

NOTE

The M454 atomic projectile in M467 shipping and storage container may also be rigged for external-load transport, using one of the following slings:

Twenty-three-foot, nylon and chain, four-leg (NSN 1670-00-902-3080) (has rated capacity of 15,000 pounds).

Helicopter, cargo-carrying external, four-leg (NSN 1670-01-027-2902) (has rated capacity of 10,000 pounds).

Helicopter, cargo-carrying external, four-leg (NSN 1670-01-027-2900) (has rated capacity of 25,000 pounds).

NOTE

Each leg of the nylon and chain, four-leg sling is constructed of a 15-foot nylon web sling with a metal grab link on its lower end. The grab link is about 10 inches long and is equipped with a spring-loaded keeper. Attached to the lower or small end of the grab link is a hammer lock, which connects the chain leg to the grab link. The chain leg is about 6 feet long and has 64 links. The link at the free end is referred to as link number 1.

NOTE

Each leg of the sling, helicopter, cargo-carrying external, four-leg, either 10,000- or 25,000-pound capacity, is constructed of a 12-foot antiabrasive nylon braided rope and an 8-foot chain. The rope and chain are connected by a grab hook that is equipped with a spring-loaded keeper. The chain leg of the 10,000-pound-capacity sling consists of about 111 links. The chain leg of the 25,000-pound-capacity sling consists of about 88 links. On each sling, the link at the free end of the chain is referred to as link number 1.

5-3. Transport of One, Two, or Three M454 Atomic Projectiles, Using the 5,000-Pound-Capacity Nylon Cargo Net

a. Materials.

(1) Net, cargo, nylon, 5,000-pound-capacity (NSN 1670-01-058-3811).

(2) Cord, nylon, $\frac{1}{8}$ -inch nominal diameter, 330-pound breaking strength (NSN 4020-00-903-8594) or equivalent.

b. Preparation and Rigging.

(1) Spread cargo net, and center container(s) on net inside the area marked by gold cord. Four persons can prepare the container and rig the net for external-load transport in about 10 minutes.

(2) Draw the net up around the load, and secure the four corner hooks in net apex stirrup.

(3) Lace nylon cord through the net above the load.

(4) Attach the cargo net apex stirrup to the helicopter cargo hook. Helicopter must be centered over load before tension is placed on the net.

c. Derigging. Four persons can derig the container in about 5 minutes.

5-4. Transport of One, Two, or Three M454 Atomic Projectiles, Using the 8,930-Pound-Capacity Nylon Cargo Net

a. Materials.

(1) One sling, cargo net, nylon, 8,930-pound-capacity (NSN 3940-00-892-4374) (for use in combination with slings described below in either (2), (4), (5), or (6)).

(2) Two 16-foot, two-loop, air-delivery cargo slings (NSN 1670-00-753-3793) (each has rated capacity of 6,500 pounds).

(3) One 3-foot, three-loop, air-delivery cargo sling ring (NSN 1670-00-753-3788) (has rated capacity of 10,000 pounds), with link assembly, type IV (NSN 1670-00-783-5988).

(4) One 23-foot, nylon and chain, four-leg sling (NSN 1670-00-902-3080) (has rated capacity of 15,000 pounds).

(5) One sling, helicopter, cargo-carrying external, four-leg (NSN 1670-01-027-2902) (has rated capacity of 10,000 pounds).

(6) One sling, helicopter, cargo-carrying external, four-leg (NSN 1670-01-027-2900) (has rated capacity of 25,000 pounds).

(7) Cord, nylon, $\frac{1}{8}$ -inch nominal diameter, 330-pound breaking strength (NSN 4020-00-903-8594) or equivalent.

(8) Tape, adhesive, 2-inch wide (NSN 7510-00-266-5016), or equivalent.

b. Preparation and rigging when using two 16-foot, air delivery cargo slings to rig nylon cargo net.

(1) Spread cargo net and center container(s) on net. Four persons can prepare the container and rig the net for external-load transport in about 10 minutes.

(2) Pass the first cargo-sling end through two adjoining hoist links on cargo net. Pass the second cargo-sling end through the other two hoist links on cargo net.

(3) Combine the four ends of the cargo slings to form a single loop, and attach loop to the 3-foot sling. Connect free ends of the 3-foot sling with the link assembly. The 3-foot sling forms the apex for attachment to the helicopter cargo hook.

(4) Lace nylon cord through the cargo net above the load.

(5) Cluster and tape or tie sling legs (breakaway technique) to prevent fouling during lift-off.

(6) Attach apex to the helicopter cargo hook. Helicopter must be centered over load before tension is placed on the net.

c. Preparation and rigging when using the 23-foot, nylon and chain, four-leg sling, or the sling, heli-

copter, cargo-carrying external, four-leg (either the 10,000- or the 25,000-pound-capacity sling), to rig nylon cargo net.

(1) Spread cargo net and center container(s) on net. Four persons can prepare the container and rig the net for external-load transport in about 10 minutes.

(2) Pass each of the sling chain legs through a single hoist link on cargo net, then insert link number 3 of each chain into grab link or hook to form hitch.

(3) The 12-inch ring of the nylon and chain, four-leg sling forms the apex for attachment to the helicopter cargo hook.

(4) The metal clevis of the sling, helicopter, cargo-carrying external, four-leg, forms the apex for attachment to the helicopter cargo hook.

(5) Observe procedures in b(4) through b(6) above.

d. Derigging. Four persons can derig the cargo net in about 5 minutes.



CHAPTER 6

EMERGENCY MOVEMENT BY HELICOPTER

6-1. General

a. This chapter provides procedures for emergency logistic movement (para 2-11, TM 39-45-51C) of the M454 projectile in the M467 shipping and storage container (para 3-2) for military contingency or for logistic supply during periods of tension. It also provides for emergency evacuation under political or military conditions of such nature that noncompliance with portions of the nuclear and flight safety regulations is the only alternative to destruction of the weapon.

b. Emergency movement is authorized only in situations wherein the security of nuclear assets is endangered or emergency logistic movement is dictated by a pending regional or world crisis. Emergency movement will be approved and ordered by the theater commander.

c. Minimum spacing and numerical limits for nuclear weapons and class II nuclear components are necessary to prevent the possibility of nuclear material interaction and to minimize sympathetic detonation of high-explosive components in the event of an accident. The requirements for minimum spacing between nuclear weapons and/or class II nuclear components, provided in section 4, TM 39-45-51A, must be scrupulously observed to prevent the possibility of nuclear material interaction.

d. If emergency logistic movement is directed, there may be an operational necessity to airlift dangerous items that should not be mixed, as indicated in table 2-1, TM 39-45-51C. Should this occur, the commander who ordered the emergency movement may waive the requirements of table 2-1.

NOTE

Table and tiedown diagrams have not been developed for mixed loads of nuclear weapons or class II nuclear components. This, however, does not prevent the shipment of mixed loads if the limitations specified in TM 39-45-51A and TM 93-20-7 are adhered to.

6-2. Emergency Movement of M454 Atomic Projectile as Helicopter Internal Loads

a. Materials and procedures for transporting the M454 projectile are prescribed by paragraph 4-2.

b. A waiver is required (TM 39-20-7 and TM 39-45-51A) before more than three M454 projectiles may be transported in a single group.

c. Tie down the M467 container with M454 projectile in the helicopter or in the pod in accordance with the following figures and tables:

Helicopter	Figure No.	Table No.
CH-47	6-1	6-1
CH-54 (universal military pod)	6-2	6-2

Table 6-1.

Tiedown Data for Maximum Load of Eight M467 Containers With M454 Projectiles in CH-47 Helicopter

Item	Tiedown fitting		Tiedown device*		Attach to item
	Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
A	C4	5	CGU-1/B	5	Left front tiedown ring
	E4	5	CGU-1/B	5	Right front tiedown ring
	C5	5	CGU-1/B	5	Left rear tiedown ring
	E5	5	CGU-1/B	5	Right rear tiedown ring

B through H—Restrain each item in position shown in figure 6-1 and in manner prescribed for item A above.

*MC-1 tiedown device may be used.

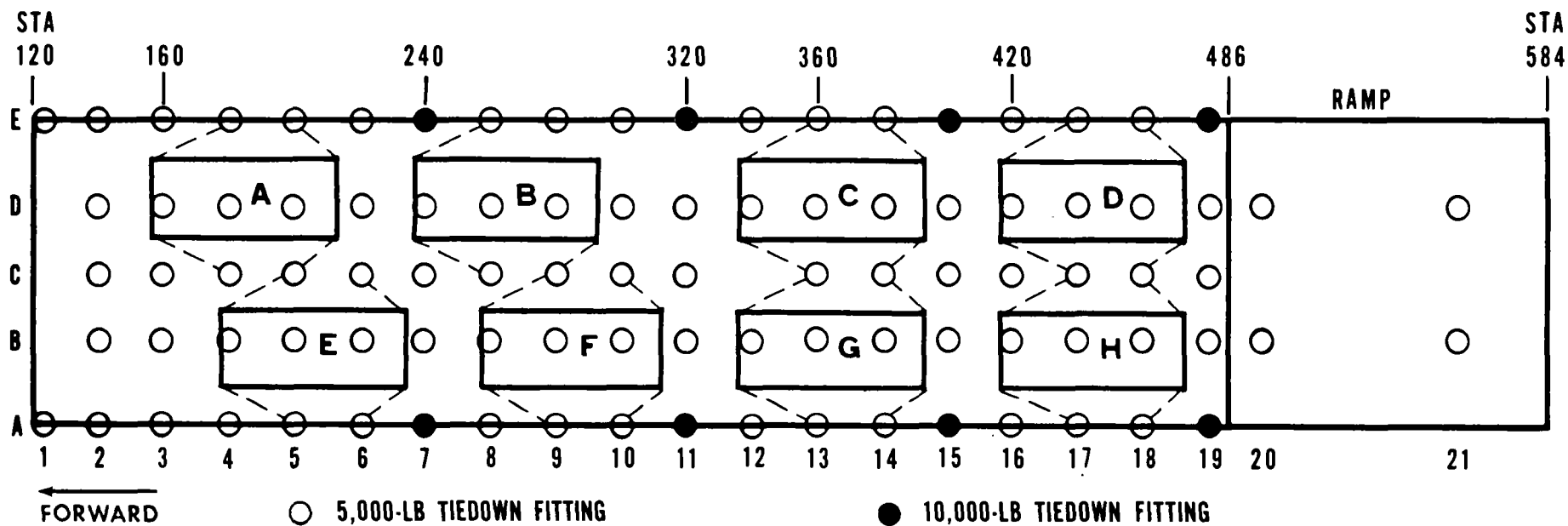
Table 6-2.

Tiedown Data for Maximum Load of Eight M467 Containers With M454 Projectiles in CH-54 Helicopter Universal Military Pod

Item	Tiedown fitting		Tiedown device*		Attach to item
	Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
A	D2	5	CGU-1/B	5	Left rear tiedown ring
	F2	5	CGU-1/B	5	Right rear tiedown ring
	D3	5	CGU-1/B	5	Left front tiedown ring
	F3	5	CGU-1/B	5	Right front tiedown ring

B through H—Restrain each item in position shown in figure 6-2 and in manner prescribed for item A above.

*MC-1 tiedown device may be used.



NOTE: UTILITY HATCH DOOR IS LOCATED IN THE CENTER OF THE FLOOR BETWEEN STATIONS 320 AND 360

Figure 6-1. Tiedown diagram for maximum load of eight M467 containers with M454 projectiles in CH-47 helicopter.

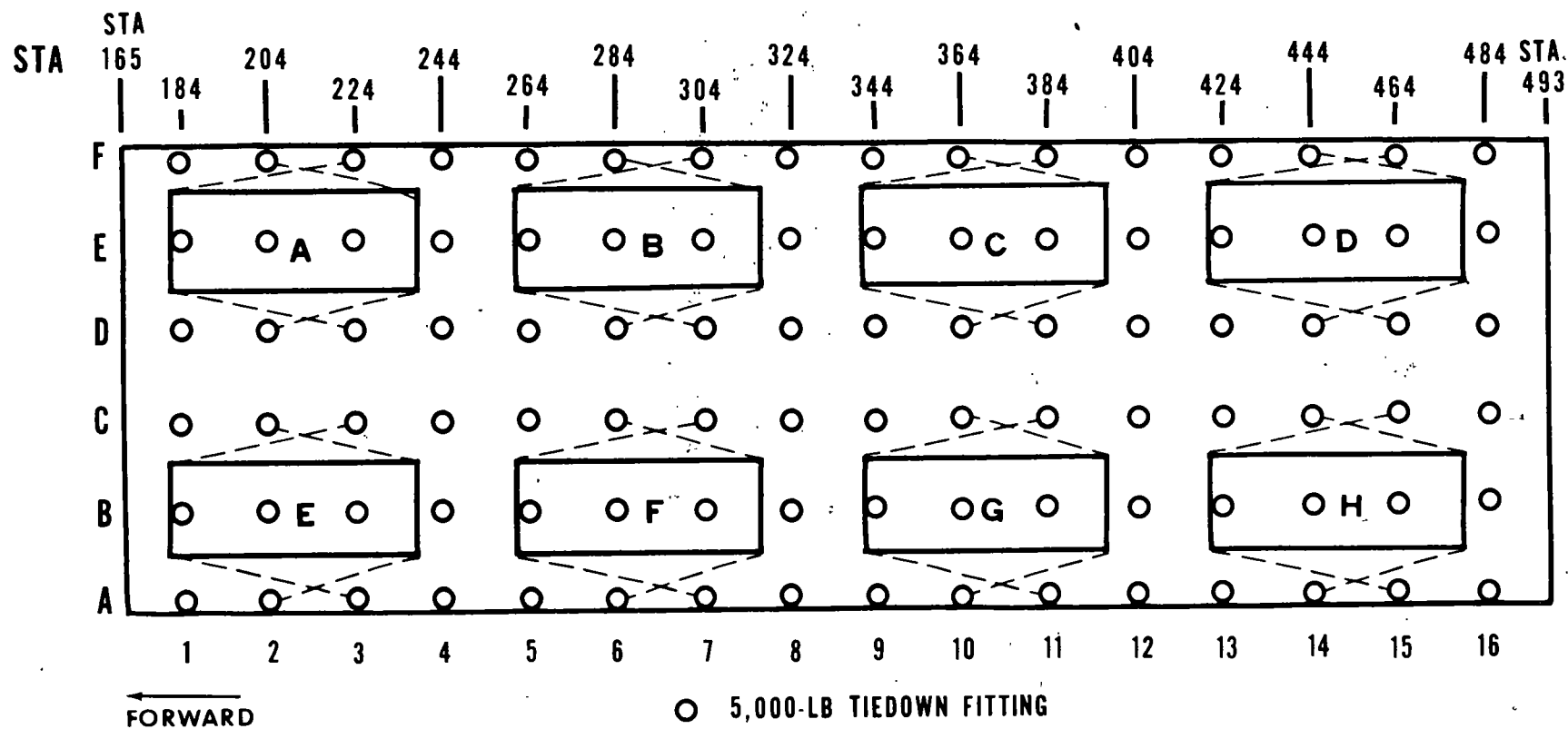


Figure 6-2. Tiedown diagram for maximum load of eight M467 containers with M454 projectiles in CH-54 helicopter universal military pod.

6-3. Emergency Movement of M454 Atomic Projectile as Helicopter External Loads

NOTE

External loads have not been developed for maximum loads of individual or mixed nuclear weapons or class II nuclear components. This, however, does not prevent such external loads if the limitations specified in TM 39-45-51A and TM 39-20-7 are adhered to and if the loads are justifiable and directed. Also applicable are the limita-

tations for external transport by helicopter (chap 5).

a. Materials and procedures for transporting the M454 projectile are prescribed by paragraphs 5-2 through 5-4.

b. External loads of the M454 projectile must not exceed the rigging material capacities shown in chapter 5 or the helicopter capability.

c. A waiver is required (TM 39-20-7 and TM 39-45-51A) for the transport of more than three M454 projectiles in a single group.

APPENDIX

REFERENCES

1. Publication Indexes

Department of the Army pamphlets of the 310-series should be consulted frequently for the latest changes or revisions of references given in this appendix and for new publications relating to material covered in this manual.

2. Army Regulations (AR)

- 10-16 US Army Nuclear Agency
- 40-14 Control and Recording Procedures: Occupational Exposure to Ionizing Radiation
- 50-5 Nuclear and Chemical Weapons and Materiel: Nuclear Surety
- (C) 50-5-1 Nuclear and Chemical Weapons and Materiel: Nuclear Surety (U)
- (C) 50-102 Safety Rules for the Operation of the 155MM Howitzer/W48 MOD 1/M454 Nuclear Weapon System (U)
- 55-203 Movement of Nuclear Weapons, Nuclear Components, and Related Classified Nonnuclear Materiel
- 95-1 Army Aviation: General Provisions and Flight Regulations
- 95-27 Operational Procedures for Aircraft Carrying Dangerous Materials
- 360-5 Army Information: Public Information Policies
- 385-40 Accident Reporting and Records
- 700-65 Nuclear Weapons and Nuclear Weapons Materiel
- 740-1 Storage and Supply Activity Operations

3. Army Field Manuals (FM)

- 55-413 Aerial Recovery of US Army and Air Force Aircraft
- 55-450-19 Army Helicopter External Load Operations (to be published).
- 100-50 Operations for Nuclear-Capable Units
- 101-20 US Army Aviation Planning Manual

4. Army Technical Bulletins (TB)

- (SRD) 9-1100-811-40 Security Classification of Nuclear Weapons Information (U)
- 385-2 Nuclear Weapons Firefighting Procedures

5. Army Technical Manuals (TM)

- 5-315 Fire Fighting and Rescue Procedures in Theaters of Operations
- 9-1100-204-10 Operator's Manual: M454 Atomic Projectile
- 9-1100-204-20 Organizational Maintenance: M454 Atomic Projectile, M455 Training Atomic Projectile
- 9-1300-206 Ammunition and Explosives Standards
- 38-250 Packaging and Materials Handling: Preparation of Hazardous Materials for Military Air Shipment
- 39-0-1A Numerical Index to Joint Nuclear Weapons Publications (Including Related Publications) (Army Supplement)
- (SRD) 39-20-7 Nuclear Safety Criteria (U)
- (C) 39-20-11 General Firefighting Guidance (U)
- 39-45-51 Transportation of Nuclear Weapons Materiel
- (SRD) 39-45-51A Transportation of Nuclear Weapons Materiel (Supplement): Shipping and Identification Data for Stockpile Major Assemblies (U)
- 39-45-51C Transportation of Nuclear Weapons Materiel (Supplement): Military Criteria for Shipment
- (CRD) 39-50-8 Emergency Destruction of Nuclear Weapons (U)
- 55-450-8 Air Transport of Supplies and Equipment: External Transport Procedures
- 55-450-11 Air Transport of Supplies and Equipment: Helicopter External Loads Rigged with Air-Delivery Equipment
- 55-450-12 Air Transport of Supplies and Equipment: Helicopter External Loads for Sling, Nylon and Chain, Multiple Leg
- 55-450-15 Air Movement of Troops and Equipment (Nontactical)
- 55-450-18 Air Transport of Supplies and Equipment: Internal and External Loads, CH-47 Helicopter
- 55-450-19 Air Transport of Supplies and Equipment: Helicopter External Lift Rigging Materiel, Techniques and Procedures
- 55-1520-209-10 Operator's Manual: Army Model CH-47A Helicopter

FM 55-204

55-1520-210-10 Operator's Manual: Army
Model, UH-1D/H and EH-1H Helicopters
55-1520-217-10-1 Operator's Manual: Army
Model CH-54A Helicopters
55-1520-217-10-2 Operator's Manual: Army
Model, CH-54B Helicopters
55-1520-219-10 Operator's Manual: Army
Model, UH-1B Helicopter

55-1520-220-10 Operator's Manual: Army
Model, UH-1C/M Helicopter
55-1520-227-10-1 Operator's Manual: Army
Model, CH-47B Helicopter
55-1520-227-10-2 Operator's Manual: Army
Model CH-47C Helicopter
55-1520-237-10 Operator's Manual: UH-60A
Helicopter

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Major General, United States Army
The Adjutant General

Distribution:

Active Army, ARNG, USAR: To be distributed in accordance with DA Form 12-31 requirements for UH-1B, UH-1C/M, UH-1D, CH-54A, CH-54B, CH-47B/C, UH-60A; DA Form 12-35 requirements for Projectile M545; and DA Form 12-34B, requirements for nuclear warheads and projectiles.



10



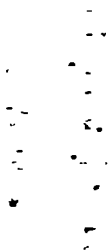
11











S / S

S/S
pages
7

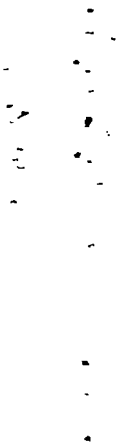
FIELD MANUAL

No. 55-204

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 15 November 1980

AIR TRANSPORT PROCEDURES
TRANSPORT OF M454 ATOMIC PROJECTILE
BY US ARMY AIRCRAFT
TRANSPORT OF M454 ATOMIC PROJECTILE
COMPLETE MISSION LOADS
BY US ARMY CH-47 HELICOPTER

CHAPTER 1. INTRODUCTION	Paragraph	Page
Purpose and Scope.....	1-1	
Reporting of Publication Improvements.....	1-2	
Definitions.....	1-3	
2. GENERAL SAFETY AND SECURITY MATTERS		
Warnings.....	2-1	
Operational Precautions.....	2-2	
3. AIR TRANSPORTABILITY AND HANDLING DATA		
General.....	3-1	
Container Descriptions.....	3-2	
Air Transport Limitations.....	3-3	
4. INTERNAL TRANSPORT BY AIRCRAFT		
Transport of M454 Atomic Projectile in M467 Shipping and Storage Container.....	4-1	
Transport of M454 Atomic Projectile Complete Mission Loads A through H by CH-47 Helicopter.....	4-2	
5. EXTERNAL TRANSPORT BY HELICOPTER (Emergency Procedure)		
General.....	5-1	
Transport of One M454 Atomic Projectile, Using Air-Delivery Cargo Slings.....	5-2	
Transport of One, Two, or Three M454 Atomic Projectiles, Using the 5,000-Pound-Capacity Nylon Cargo Net.....	5-3	
Transport of One, Two, or Three M454 Atomic Projectiles, Using the 8,930-Pound-Capacity Nylon Cargo Net.....	5-4	
6. EMERGENCY MOVEMENT BY HELICOPTER		
General.....	6-1	
Emergency Movement of M454 Atomic Projectile as Helicopter Internal Loads.....	6-2	
Emergency Movement of M454 Atomic Projectile as Helicopter External Loads.....	6-3	
APPENDIX. REFERENCES.....		A-1
(Front cover) CH-47 helicopter positioned for loading.		



CHAPTER I

INTRODUCTION

NOTE

In this manual, references to the M454 atomic projectile apply to all models.

1-1. Purpose and Scope

a. This manual presents Department of the Army-approved procedures for transport of the M454 atomic projectile (155-mm projectile) and the M454 atomic projectile complete mission loads. It prescribes materials and personnel needed to prepare, load, tie down, and unload, or to rig and derig, the loads. Responsibilities of the transportation-providing unit, the consignor, and the consignee are shown in chapter 4, AR 50-5.

b. The procedures in this manual provide for transport of:

(1) The M454 projectile, as an internal load by UH-1-series, CH-47, and CH-54 helicopters and the U-21A airplane.

(2) The M454 projectile complete mission loads, as internal load, by CH-47 helicopter.

(3) The M454 projectile, as an external load, by UH-1-series, CH-47, CH-54, and UH-60A helicopters.

c. Other internal cargo, including different types of nuclear weapons and/or personnel aircraft load capacity and restrictions prescribed by AR 50-5 and pertinent safety regulations (app), may be transported.

d. This manual also provides for emergency

movement of the M454 projectile, as internal and external loads, by aircraft.

e. Times given to prepare, load, tie down, and unload, or to rig and derig, the loads described in this manual may vary with conditions that exist at the time of transport and the training of personnel involved.

1-2. Reporting of Publication Improvements

Users of this publication are encouraged to recommend changes and give comments for its improvement. Recommendations and comments should be prepared on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded to Director, Military Traffic Management Command Transportation Engineering Agency, ATTN: MTT-TRC, PO Box 6276, Newport News, VA 23606. (Electrically transmitted messages should be addressed to: DIRMTMCTEA FT EUSTIS VA//MTT-TRC//.)

1-3. Definitions

a. *Warning.* Instructions that, if not followed, could result in injury to or death of personnel.

b. *Caution.* Instructions that, if not strictly observed, could result in damage to or destruction of equipment.

c. *Note.* A brief statement for use as necessary to emphasize a particular operating procedure, condition, and so forth.



1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100



1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100



CHAPTER 4

INTERNAL TRANSPORT BY AIRCRAFT

WARNING

Insure that the universal military pod is secured to the CH-54 helicopter to preclude jettisoning the pod either deliberately or inadvertently.

4-1. Transport of M454 Atomic Projectile in M467 Shipping and Storage Container

a. *UH-1 Series, CH-47, and CH-54 (Universal Military Pod) Helicopters.* Hand-carry container (fig 3-1) into helicopter or into pod, then tie down the container in accordance with the following figures and tables:

Helicopter	No. of containers	Figure No.	Table No.
UH-1C/M*	1	4-1	4-1
UH-1D/H	1	4-2	4-2
UH-1D/H	2	4-3	4-3
UH-1D/H	3	4-4	4-4
CH-47	3	4-5	4-5
CH-54 (universal military pod)	3	4-6	4-6

*Cargo-floor-fitting pattern in the UH-1B helicopter is similar to the fitting pattern for the UH-1C/M helicopters. Strength of floor fittings in the UH-1B/C/M helicopters is the same.

b. *U-21A Aircraft.*

(1) Materials and procedures for transporting one M454 projectile in M467 container.

(a) *Shoring:* One piece, 2- by 4- by 44-inch lumber; three pieces, 16- by 60- by 1-inch plywood; and four pieces, 2- by 4- by 32-inch lumber; or respective equivalents.

(b) *Loading.*

1. Place the 44-inch piece of lumber on edge crosswise in cargo compartment to rest against the aft side of the forward spar covering (at cargo compartment station 163) to function as buffer.

2. Stack three pieces of plywood in recessed walking area of cargo compartment to level compartment floor.

3. Hand-carry container into cargo compartment and position at tiedown location (fig 4-7). Place two pieces of 32-inch lumber crosswise beneath runners at each end of container (fig 4-7).

4. Tie down the container in accordance with figure 4-7 and table 4-7.

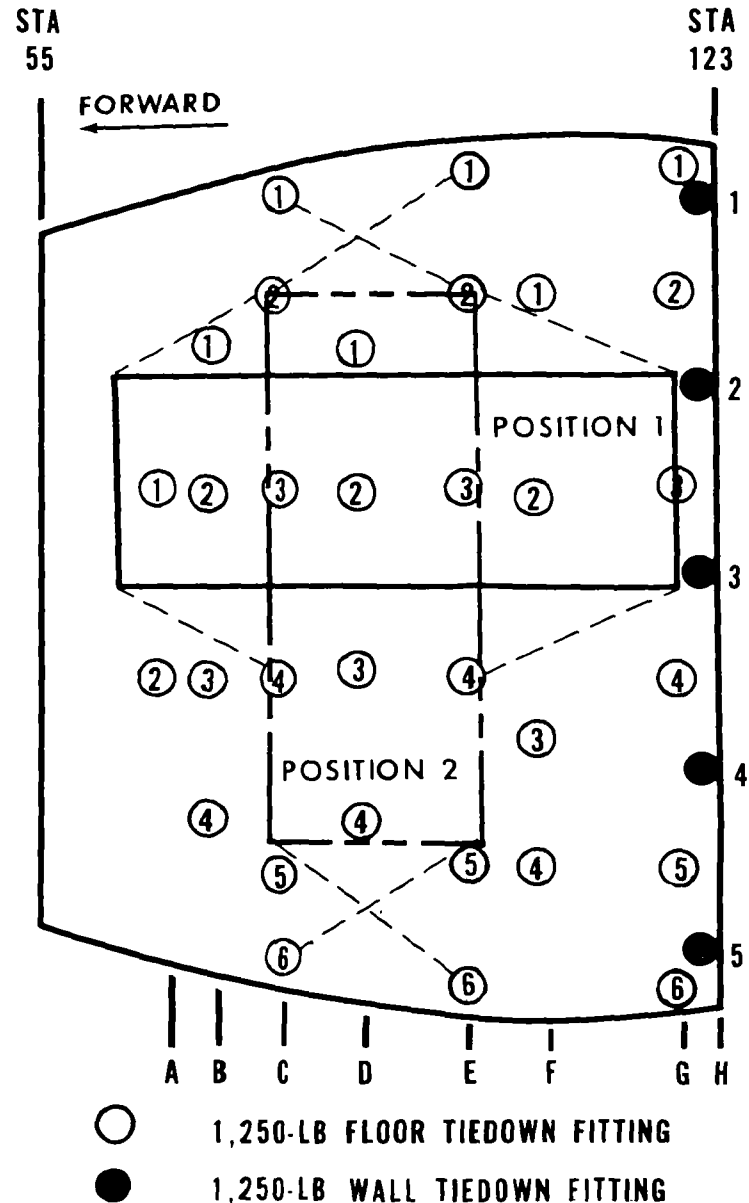


Figure 4-1. Tiedown diagram for one M467 container with M454 projectile in UH-1C/M helicopter.

(2) Materials and procedures for transporting two M454 projectiles in M467 containers.

(a) *Shoring:* One piece, 2- by 4- by 44-inch lumber; three pieces, 16- by 60- by 1-inch plywood; and four pieces 2- by 4- by 32-inch lumber; or respective equivalents.

Table 4-1.

Tiedown Data for One M467 Container With M454 Projectile in UH-1C/M Helicopter

Tiedown fitting		Tiedown device *		Attach to item
Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
POSITION I				
C2	1. 25	CGU-1/B	5	Right front tiedown ring
C4	1. 25	CGU-1/B	5	Left front tiedown ring
E2	1. 25	CGU-1/B	5	Right rear tiedown ring
E4	1. 25	CGU-1/B	5	Left rear tiedown ring
POSITION II				
C1	1. 25	CGU-1/B	5	Right rear tiedown ring
C6	1. 25	CGU-1/B	5	Left rear tiedown ring
E1	1. 25	CGU-1/B	5	Right front tiedown ring
E7	1. 25	CGU-1/B	5	Left front tiedown ring

*MC-1 tiedown device may be used.

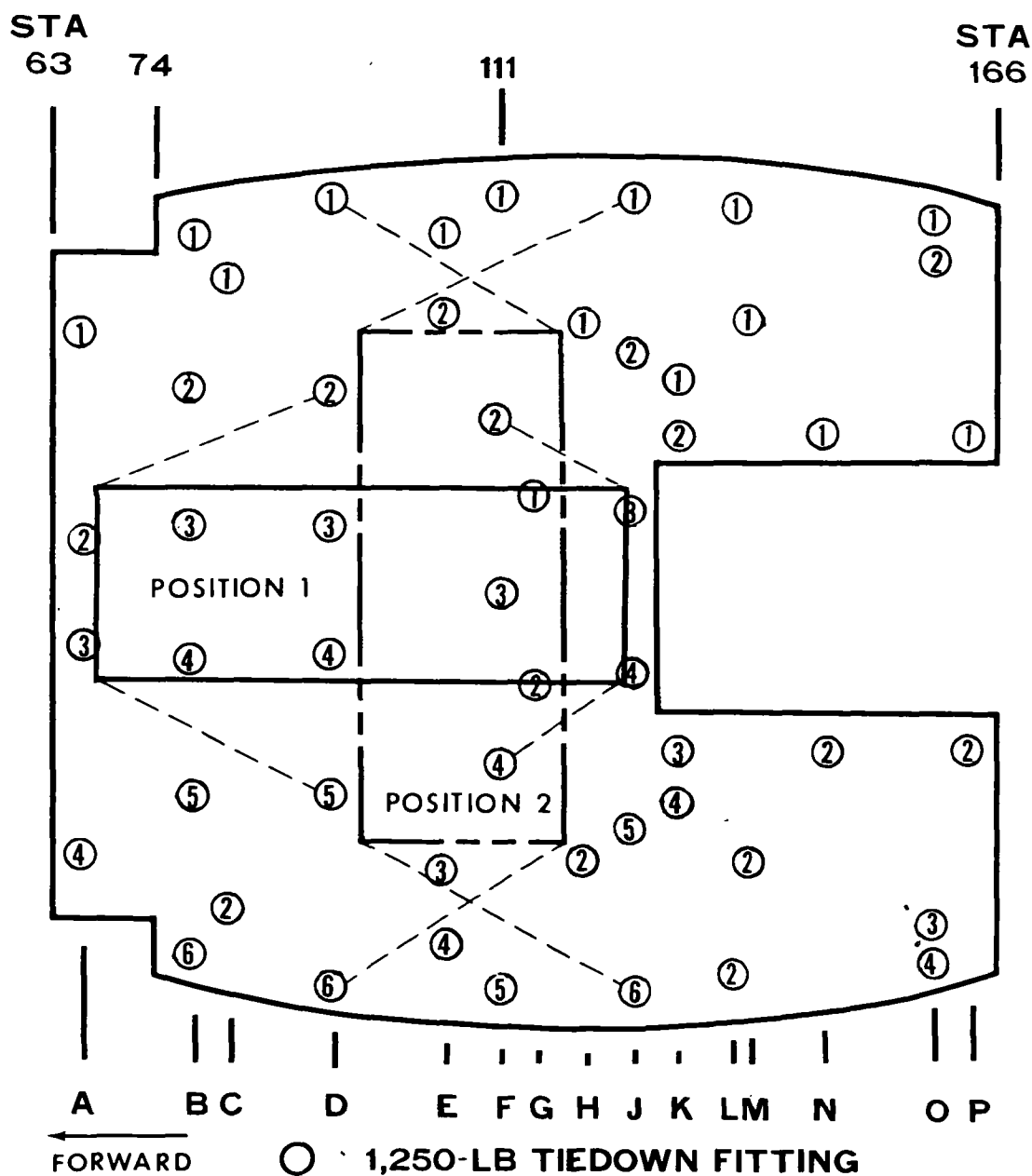


Figure 4-2. Tiedown diagram for one M467 container with M454 projectile in UH-1D/H helicopter.

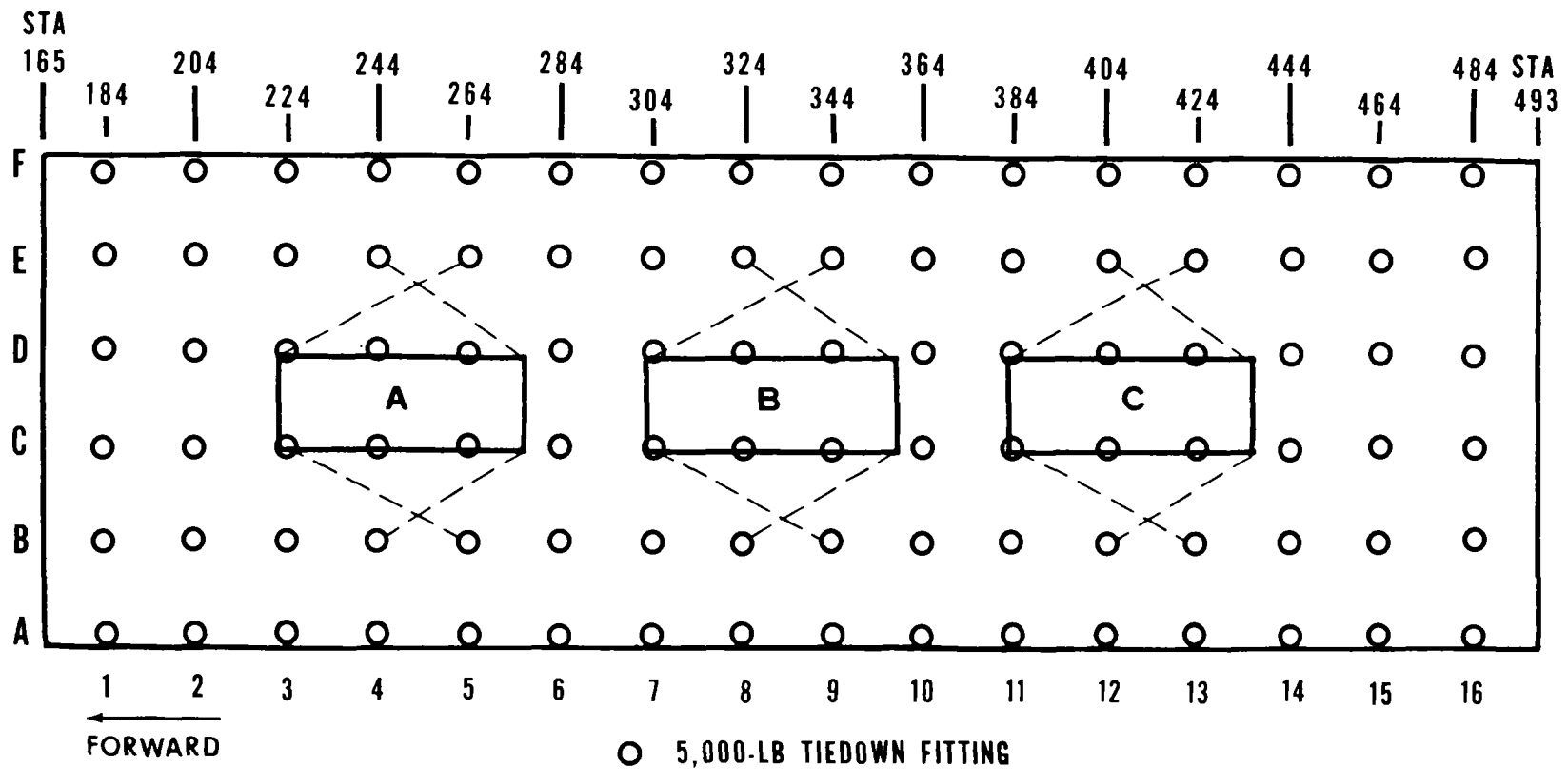
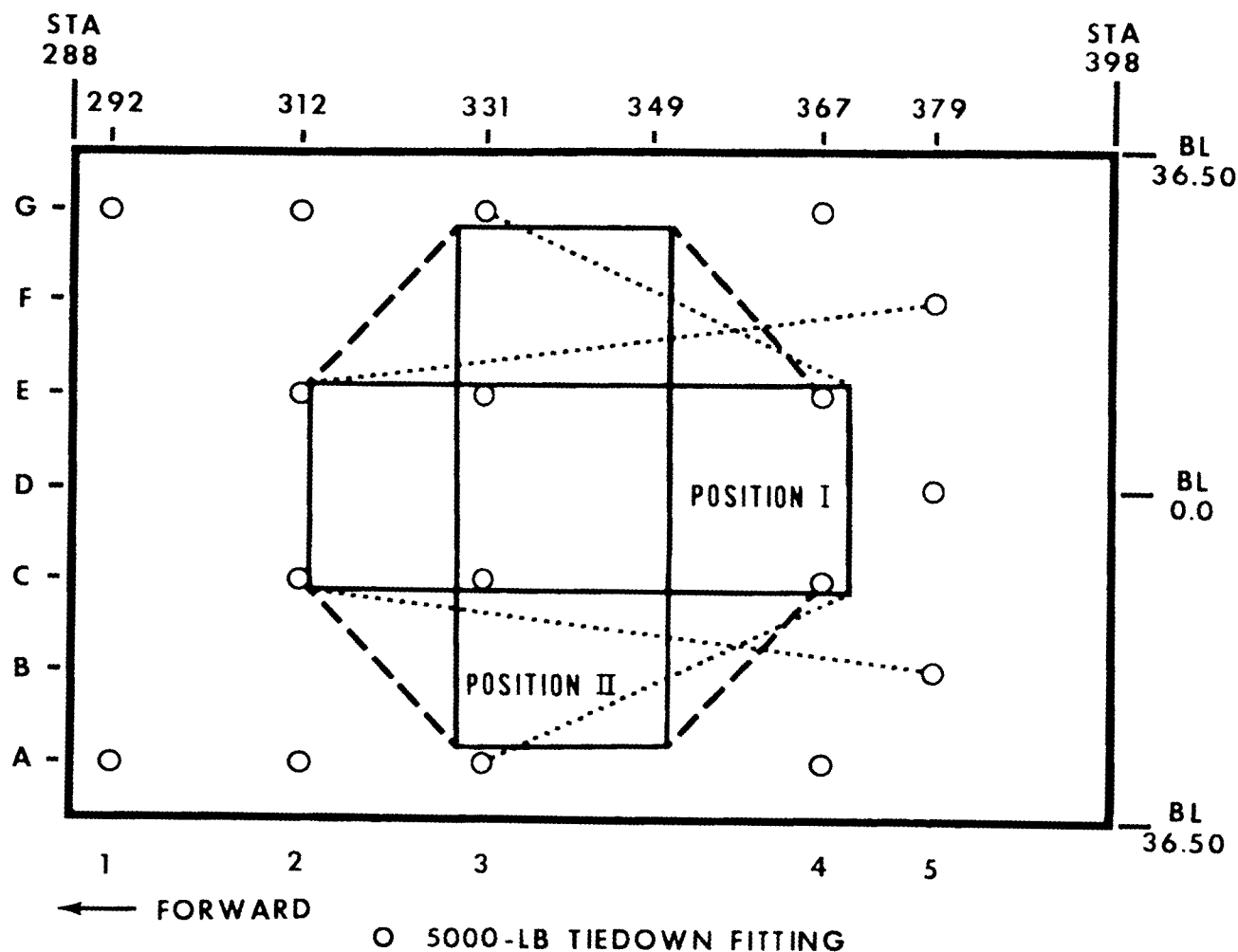


Figure 4-6. Tiedown diagram for three M467 containers with M454 projectiles in CH-54 helicopter universal military pod.



NOTE: CARGO HOOK ACCESS DOOR IS LOCATED IN THE CENTER OF THE FLOOR BETWEEN STATIONS 343 AND 363

Figure 4-7. Tiedown diagram for one M467 container with M454 projectile in UH-60A helicopter.

Table 4-7.
Tiedown Data for One M467 Container With M454 Projectile in UH-60A Helicopter

Tiedown fitting		Tiedown device*		Attach to item
Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
POSITION I				
A3	5	CGU-1/B	5	Left rear tiedown ring.
G3	5	CGU-1/B	5	Right rear tiedown ring
B5	5	CGU-1/B	5	Left front tiedown ring
F5	5	CGU-1/B	5	Right front tiedown ring
POSITION II				
C2	5	CGU-1/B	5	Left front tiedown ring
E2	5	CGU-1/B	5	Right front tiedown ring
C4	5	CGU-1/B	5	Left rear tiedown ring
E4	5	CGU-1/B	5	Right rear tiedown ring

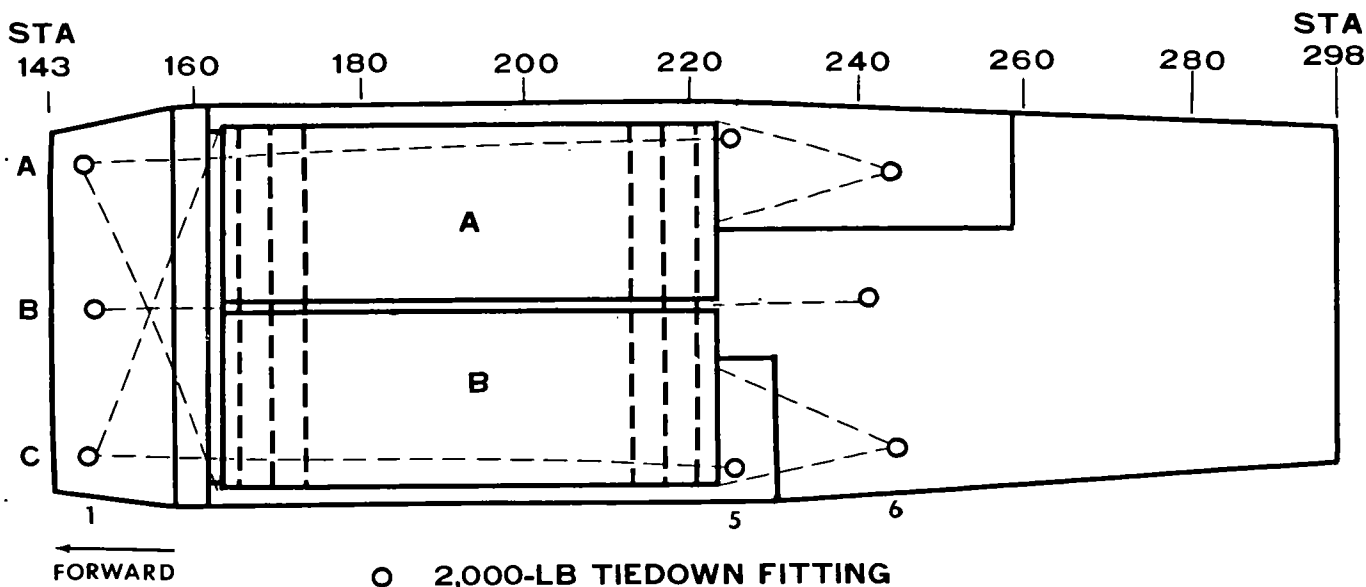


Figure 4-8. Tiedown for two M467 containers with M454 projectiles in U-21A aircraft.

Table 4-8.

Tiedown Data for Two M467 Containers With M454 Projectiles in U-21A Aircraft

Item	Tiedown fitting		Tiedown device*		Attach to item
	Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
A and B	A1	2	CGU-1/B	5	Left front tiedown ring of item B
	C1	2	CGU-1/B	5	Right front tiedown ring of item A
	B1	2	CGU-1/B	5	Through aligned front tiedown rings of items A and B
	A1/A5	2	CGU-1/B	5	Over item A
	C1/C5	2	CGU-1/B	5	Over item B
	A6	2	CGU-1/B	5	Right rear tiedown ring of item A
	A6	2	CGU-1/B	5	Rear hoisting grapple of item A
	B6	2	CGU-1/B	5	Through aligned rear tiedown rings of items A and B
	C6	2	CGU-1/B	5	Left rear tiedown ring of item B
	C6	2	CGU-1/B	5	Rear hoisting grapple of item B

* MC-1 tiedown device may be used.

(d) Eight nails, 8d (2½-inch), two used at each joint to secure end blocks to shoring for stacked propelling-charge containers. Construct shoring (outside helicopter) for containers (fig. 4-10).

(3) Tiedowns. Sixteen CGU-1/B tiedown devices (four on M467 container, six on projectile package (to include two used to unitize package), and six on stack of propelling-charge containers (to

include one used to unitize containers and one used to wrap around protruding ends of M14A2 containers)).

(4) Loading.

(a) Hand-carry M467 container to tiedown position shown in figure 4-11.

(b) Position parking shoring and bottom section of projectile-pallet at tiedown location for M107

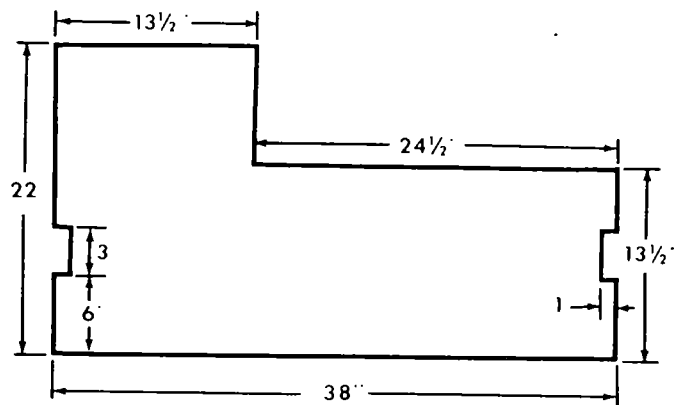


Figure 4-9. Plywood prepared for use as lateral blocking at inboard ends of stacked propelling-charge containers.

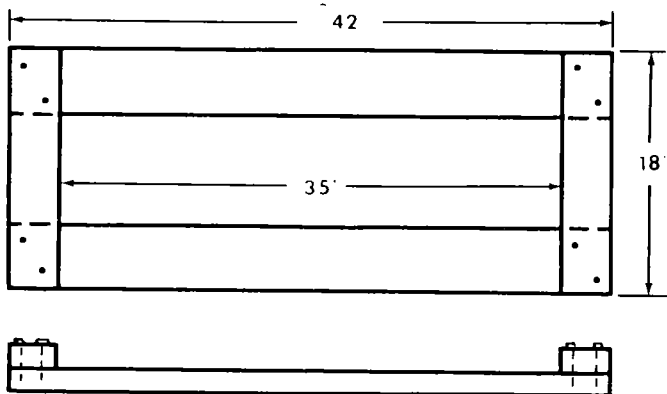


Figure 4-10. Shoring for stacked propelling-charge containers.

spotting projectiles (fig. 4-11). Disassemble projectile package outside helicopter, and hand-carry individual projectiles to tiedown location. Place top section of pallet on projectiles, then unitize projectile package with a CGU-1/B tiedown device placed outside each skid (bottom) and inside each outboard row of projectiles (top) (figure 4-12).

(c) Position parking shoring at tiedown location for propelling-charge containers (figure 4-11). Pre-position tiedown device beneath end blocks of shoring to unitize containers and shoring.

(d) Hand-carry propelling-charge containers to tiedown location and stack on shoring in accordance with figure 3-2 (mission load A). Face cap ends of all containers outboard, and secure containers with tiedown device (fig 4-13).

(e) Tie down the complete mission load A in accordance with figures 4-11, 4-12, and 4-13 and table 4-9.

(f) Four persons can prepare, load, and tie down the complete mission load A in about 30 minutes.

(5) Unloading. Procedures for unloading are essentially the reverse of procedures for loading. Four persons can unload the complete mission load A in about 10 minutes.

b. Complete Mission Load B.

(1) Parking shoring. Items shown in *a*(1) above.

(2) Blocking shoring. Items shown in *a*(2) above.

(3) Tiedowns. Items shown in *a*(3) above.

(4) Loading.

(a) Follow procedures shown in *a*(4)(a) through *a*(4)(c).

(b) Hand-carry propelling-charge containers to tiedown location and stack on shoring in accordance with figure 3-2 (mission load B). Face cap ends of all containers outboard, and secure containers with tiedown device (fig 4-13).

(c) Tie down the complete mission load B, using figures 4-11, 4-12, and 4-13 and table 4-9 for guidance.

(d) Four persons can prepare, load, and tie down the complete mission load B in about 30 minutes.

(5) Unloading. Procedures for unloading are essentially the reverse of procedures for loading. Four persons can unload the complete mission load B in about 10 minutes.

c. Complete Mission Load C.

(1) Parking shoring. Items shown in *a*(1) above.

(2) Blocking shoring.

(a) Items shown in *a*(2) above.

(b) Two pieces, 2- by 6- by 36-inch, for use between middle and top layers of stacked propelling-charge containers (fig 3-2, mission load C).

(3) Tiedowns. Fifteen CGU-1/B tiedown devices (four on M467 container, six on projectile package (to include two used to unitize package), and five on stack of propelling-charge containers (to include one used to wrap around protruding ends of M14A2 containers)).

(4) Loading.

(a) Follow procedures shown in *a*(4)(a) through *a*(4)(c) above except that a tiedown device is not used to unitize propelling-charge containers and shoring.

(b) Hand-carry propelling-charge containers to tiedown location and stack on shoring in accordance with figure 3-2 (mission load C). Face cap ends of all containers outboard.

(c) Tie down the complete mission load C, using figures 4-11, 4-12, and 4-13 and table 4-9 for guidance.

(d) Four persons can prepare, load, and tie down the complete mission load C in about 30 minutes.

(5) Unloading. Procedures for unloading are essentially the reverse of procedures for loading.

FIELD MANUAL

No. 55-204

C 1, FM 55-204

*FM 55-204

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 15 November 1980

AIR TRANSPORT PROCEDURES
TRANSPORT OF M454 ATOMIC PROJECTILE
BY US ARMY AIRCRAFT
TRANSPORT OF M454 ATOMIC PROJECTILE
COMPLETE MISSION LOADS
BY US ARMY CH-47 HELICOPTER

	Paragraph	Page
CHAPTER 1. INTRODUCTION		
Purpose and Scope	1-1	1-1
Reporting of Publication Improvements	1-2	1-1
Definitions	1-3	1-1
2. GENERAL SAFETY AND SECURITY MATTERS		
Warnings	2-1	2-1
Operational Precautions	2-2	2-1
3. AIR TRANSPORTABILITY AND HANDLING DATA		
General	3-1	3-1
Container Descriptions	3-2	3-1
Air Transport Limitations	3-3	3-2
4. INTERNAL TRANSPORT BY AIRCRAFT		
Transport of M454 Atomic Projectile in M467 Shipping and Storage Container	4-1	4-1
Transport of M454 Atomic Projectile Complete Mission Loads A through H by CH-47 Helicopter	4-2	4-10.3
5. EXTERNAL TRANSPORT BY HELICOPTER (Emergency Procedure)		
General	5-1	5-1
Transport of One M454 Atomic Projectile, Using Air-Delivery Cargo Slings	5-2	5-1
Transport of One, Two, or Three M454 Atomic Projectiles, Using the 5,000-Pound-Capacity Nylon Cargo Net	5-3	5-2
Transport of One, Two, or Three M454 Atomic Projectiles, Using the 8,930-Pound-Capacity Nylon Cargo Net	5-4	5-2
6. EMERGENCY MOVEMENT BY HELICOPTER		
General	6-1	6-1
Emergency Movement of M454 Atomic Projectile as Helicopter Internal Loads	6-2	6-1
Emergency Movement of M454 Atomic Projectile as Helicopter External Loads	6-3	6-4
APPENDIX. REFERENCES		A-1
(Front cover) CH-47 helicopter positioned for loading.		

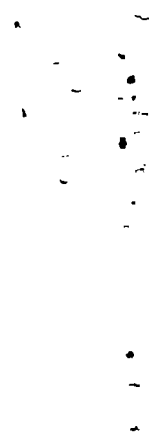


Table 4-10.

Tiedown Data for M454 Projectile Complete Mission Load H in CH-47 Helicopter

Item	Tiedown fitting		Tiedown device		Attach to item
	Designation	Capacity in 1,000 lb	Type	Capacity in 1,000 lb	
A	B3	5	CGU-1/B	5	Left rear tiedown ring
	D3	5	CGU-1/B	5	Right rear tiedown ring
	B6	5	CGU-1/B	5	Left front tiedown ring
	D6	5	CGU-1/B	5	Right front tiedown ring
B	B8/B10	5	CGU-1/B	5	Around projectile base end (rear of bourrelet)
	D8/D10	5	CGU-1/B	5	Around projectile forward end (aft of ring plug)
C	D11/D14	5	CGU-1/B	5	Over top of stacked propelling- charge containers and around container on top of stack
	D11/D14	5	CGU-1/B	5	Around plywood at outboard ends of stacked propelling- charge containers
	E11/E14	10/5	CGU-1/B	5	Over top of stacked propelling- charge containers and around container on top of stack
	E10/E15	5/10	CGU-1/B	5	One complete loop around containers on each end of bottom layer of stacked propelling-charge containers

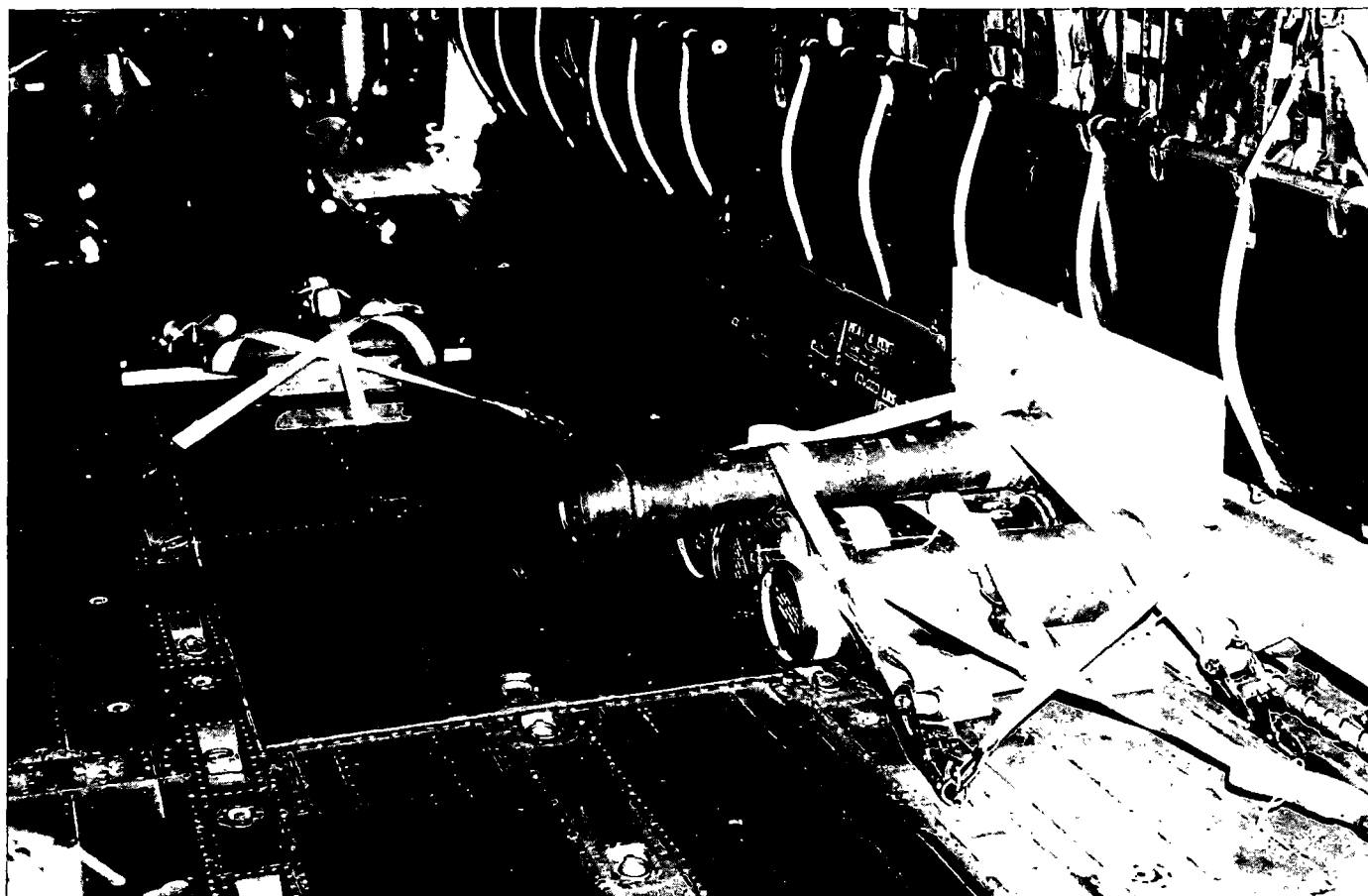


Figure 4-20. Propelling-charge containers for M454 projectile complete mission load H tied down in CH-47 helicopter. M107 projectile and M467 container are tied down forward of the propelling-charge containers.

3000021249



1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100



1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100



