TRANSPORTABILITY GUIDANCE
STINGER WEAPON SYSTEM

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CHAPTER 1
INTRODUCTION

1-1. Purpose and Scope
This manual provides transportability guidance for logistical movement of the STINGER weapon system components. It provides information to insure safe transport for worldwide moves of the system by air, highway, rail, and sea. Metric equivalent, as necessary, is given in parentheses following measurements.

1-2. Reporting of Recommendations and Comments
Individual users of this manual are encouraged to report errors and omissions and to make recommendations for improving it. Reports should be prepared on DA Form 2028 (Recommended Changes to DA 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/.) A reply will be furnished by the Agency.

1-3. Safety
Precautionary measures required during movement of the STINGER weapon system items are contained in chapter 3.

1-4. Definitions of Warnings, Cautions, and Notes
Throughout this manual, warnings, cautions, and notes emphasize important or critical guidance. They are used for the following conditions.

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

b. Caution. Instructions which, 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.
CHAPTER 2
TRANSPORTABILITY DATA

Section I. GENERAL

2-1. Scope
This chapter provides a general description of the items, identification photographs, and tabulated transportability characteristics and data that are necessary for the movement of the complete STINGER weapon system, figure 2-1.

NOTE
Referenced figures appear at the end of this chapter.

2-2. Descriptions

a. The STINGER weapon round is one of a family of man portable air defense (MANPADS) weapons. The STINGER weapon round is a shoulder-fired, infrared homing missile. It consists of a missile and launch motor in a launch tube with a removable gripstock. The gripstock is removed from each fired weapon and used to fire the next missile. For each firing a battery coolant unit (BCU) is inserted into the gripstock. Three BCU’s are supplied with the weapon round in each shipping and storage container. The complete STINGER weapon round in shipping and storage container is shown in figure 2-2.

b. The STINGER missile round consists of missile and launch motor in a launch tube, less the gripstock as shown in figure 2-3.

c. The identification friend or foe (IFF) interrogator set, AN/PPX-3, is transported in its shipping and storage container, figure 2-4. When in use the IFF is worn on a webb belt around the waist of the gunner.

d. Support equipment for the STINGER weapon system includes:
   (1) IFF programmer set, AN/GSX-1 in shipping and storage container, figure 2-5
   (2) Carry rack, an M4 transport harness, designed to transport four weapon rounds and two missile rounds in the M416, 1/4-ton trailer, figure 2-6.
   (3) Battery charger and batteries in shipping and storage container, figure 2-7
   (4) Field handling trainer, figure 2-7, is transported in weapon round shipping and storage container.
   (5) Tracking head trainer, figure 2-7, is transported in weapon round shipping and storage container.
   (6) IFF simulator, figure 2-7, is transported in IFF interrogator shipping and storage container.
   (7) Gas pumping unit, figure 2-7, is transported without argon gas bottle shown in photograph.
   (8) M151A2, 1/4-ton truck, and M416, 1/4-ton trailer, are used to transport command stock (four weapon rounds and two missile rounds) with each STINGER section gunner team assigned to combat units. The M151A2 truck is shown in figure 2-8.

2-3. General Transportation Policy
General transportation policy and security requirements for the STINGER Weapon System are identified by DOD 5100.76-M. Commercial carriers will move truck load (TL) shipments under continuous armed surveillance (driver and one other person, one of whom is armed) in a locked and sealed, exclusive-use vehicle. Less than truck-load (LTL) shipments will be moved under continuous armed surveillance (driver and one other person, one of whom is armed) in a locked and sealed dromedary, CONEX or a similar container with exclusive use. Similar security requirements apply to the other modes (rail, air and water) of transport. Classified material will be shipped in accordance with AR 380-5 and AR 55-355.

Section II. CHARACTERISTICS AND RELATED DATA OF ITEMS

2-4. General
The following data pertain to the identified items. Subsequent chapters show, where appropriate, dimensional data and weight for the items when configured for movement by a particular mode of transportation.

NOTE
Data contained herein are applicable to
model number, National Stock Number (NSN), or configuration shown. Changes in model number, NSN, or configuration affect the loadability of the item as related to the guidance shown in this manual.

NOTE
Whenever weights and/or measurements are critical factors for transportability purposes, each item should be weighed and measured.

2-5. Dimensions
Dimensions and weights for STINGER weapon system items are shown in Table 2-1.

2-6. CONUS Freight Classification
Rail and motor freight classification descriptions and item numbers will be determined in accordance with chapter 211, AR 55-355 and the freight classification guide system. Proper classification or description of articles must be determined and provided on the bill of lading before the shipment is released to the carrier.

Table 2-1. Dimensions and Weights for STINGER Weapon System

<table>
<thead>
<tr>
<th>Description</th>
<th>Length</th>
<th>Width</th>
<th>Height</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guided Missile System, Intercept, Aerial (Weapon Round)</td>
<td>66.0 in</td>
<td>13.0 in</td>
<td>13.4 in</td>
<td>85.75 LB</td>
</tr>
<tr>
<td>(w/gripstock control and battery coolant unit) in Shipping and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage Container</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missile Round, STINGER, complete</td>
<td>67.3 in</td>
<td>13.1 in</td>
<td>10.5 in</td>
<td>77 lb</td>
</tr>
<tr>
<td>(1.71 m)</td>
<td></td>
<td></td>
<td>(0.26 m)</td>
<td>(34 kg)</td>
</tr>
<tr>
<td>Interrogator, IFF, Kit, in Shipping and Storage Container</td>
<td>13.1 in</td>
<td>9.9 in</td>
<td>7.7 in</td>
<td>11 lb</td>
</tr>
<tr>
<td>AN/PPX-3</td>
<td>(0.33 m)</td>
<td>(0.25 m)</td>
<td>(0.20 m)</td>
<td>(5 kg)</td>
</tr>
<tr>
<td>Programmer, Interrogator, Set in Shipping and Storage Container</td>
<td>16.8 in</td>
<td>9.6 in</td>
<td>10.8 in</td>
<td>29 lb</td>
</tr>
<tr>
<td>AN/GSX-1</td>
<td>(0.43 m)</td>
<td>(0.24 m)</td>
<td>(0.27 m)</td>
<td>(13 kg)</td>
</tr>
<tr>
<td>Harness, Guided Missile Equipment Transport XM-4</td>
<td>18.0 in</td>
<td>18.0 in</td>
<td>18.0 in</td>
<td>7.0 lb</td>
</tr>
<tr>
<td>(0.46 m)</td>
<td>(0.46 m)</td>
<td>(0.46 m)</td>
<td></td>
<td>(3 kg)</td>
</tr>
<tr>
<td>Trainer, Handling, Guided Missile Launcher XM60 w/Dummy</td>
<td>15.6 in</td>
<td>13.6 in</td>
<td>18.0 in</td>
<td>83 lb</td>
</tr>
<tr>
<td>Gripstock, BCU and IFF</td>
<td>(1.68 m)</td>
<td>(0.35 m)</td>
<td>(0.46 m)</td>
<td>(38 kg)</td>
</tr>
<tr>
<td>Recharging Unit, Coolant, Training Guided Missile System XM80</td>
<td>49.0 in</td>
<td>50.0 in</td>
<td>36.0 in</td>
<td>500 lb</td>
</tr>
<tr>
<td>(contains argon gas, exempt per 49.306 (a) (1) Title 49 49CFR)</td>
<td>(1.24 m)</td>
<td>(0.35 m)</td>
<td>(0.46 m)</td>
<td>(227 kg)</td>
</tr>
<tr>
<td>Trailer, Cargo, 1/4-Ton, M416 w/4 Weapon Rounds and 2 Missile</td>
<td>61.5 in</td>
<td>61.5 in</td>
<td>44.0 in</td>
<td>1,040 lb</td>
</tr>
<tr>
<td>(2.6 m)</td>
<td>(1.56 m)</td>
<td>(1.12 m)</td>
<td></td>
<td>(472 kg)</td>
</tr>
<tr>
<td>Truck, Utility, 1/4-Ton, M151A2</td>
<td>131.5 in</td>
<td>71.0 in</td>
<td>73.8 in</td>
<td>2,450 lb</td>
</tr>
<tr>
<td>(3.34 m)</td>
<td>(1.8 m)</td>
<td>(1.88 m)</td>
<td></td>
<td>(1,111 kg)</td>
</tr>
<tr>
<td></td>
<td>131.5 in</td>
<td>525 in</td>
<td>2,450 lb</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.34 m)</td>
<td>(1.63 m)</td>
<td></td>
<td>(1,111 kg)</td>
</tr>
<tr>
<td>Truck, Utility, 1/4-Ton, M151A2, Trailer, Cargo, 1/4-Ton, M416 w/4</td>
<td>236.0 in</td>
<td>64.0 in</td>
<td>52.5 in</td>
<td>3,490 lb</td>
</tr>
<tr>
<td>Weapon Rounds and 2 Missile Rounds (reduced for air loading)</td>
<td>(5.99 m)</td>
<td>(1.63 m)</td>
<td>(1.33 m)</td>
<td>(1,583 kg)</td>
</tr>
</tbody>
</table>
Figure 2-1. STINGER weapon system equipment.

Figure 2-2. STINGER weapon round in shipping and storage container.

Figure 2-3. STINGER missile round in shipping and storage container.
Figure 2-4. Identification Frend or Foe (IFF) interrogator set, AN/PPX-3, in shipping and storage container.

Figure 2-5. IFF programmer set, AN/GSX-1, in shipping and storage container.

Figure 2-6. Carry rack for STINGER weapon rounds and missile rounds in M416, 1/4-ton trailer.
Figure 2-7. STINGER weapon system support equipment.

Figure 2-8. M151A2, 1/4-ton truck.
3-1. General
General safety consideration and precautions for movement of the STINGER weapon system are as follows:

a. All modes of transport will comply with the requirements of Code of Federal Regulations, Title 49 (CFR 49).


3-2. Specific Safety Requirements
Pertinent safety requirements by individual mode can be found, where applicable, in the appropriate chapters.
CHAPTER 4
AIR TRANSPORTABILITY GUIDANCE

Section I. GENERAL

4-1. Scope
This chapter provides Department of the Army approved air transport procedures and guidance for the movement of the STINGER weapon system components.

Section II. ARMY AIR TRANSPORT PROCEDURES

4-2. General
The procedures in this manual apply when the helicopter designated for the internal or external movement has an allowable cargo load capacity equal to or greater than the weight of the configured load. Loads described in this section are not maximum loads permissible for the packaged weapon round, missile round, M416 trailer, or the M151A2 truck.

4-3. External Transport
a. Nine weapon rounds and/or missile rounds or any combination thereof may be externally transported in an A-22 aerial delivery bag. The items may be individually stacked or banded together in a unitized package. Assemble the load as shown in figure 4-1.

NOTE: Referred figures appear at the end of this chapter.

b. External rigging and transport procedures for the M151 truck and M416 trailer are given in the general loading instructions in each operator's manual for the CH-47 and CH-54 helicopters.

c. The STINGER weapon system may be packaged, placed in various unitized package configurations, for air delivery as shown in figure 4-6.

Table 4-1. Tiedown Data for Unitized Package of Four STINGER Weapon Rounds or Missile Rounds in UH-ID/H Helicopters

<table>
<thead>
<tr>
<th>Tiedown fitting designation</th>
<th>capacity in 1,000 lb</th>
<th>Tiedown device type</th>
<th>capacity in 1,000 lb</th>
<th>Attach to item</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>1.25</td>
<td>CGU-1/B</td>
<td>5</td>
<td>Attach ratchet end and pass hook end through top rear container handle, around rear of top container, through opposite end handle, and attach to tiedown fitting C2.</td>
</tr>
<tr>
<td>H1</td>
<td>1.25</td>
<td>CGU-1/B</td>
<td>5</td>
<td>Attach ratchet end and pass hook end through top forward container handle, around front of top container, through opposite end handle, and attach to tiedown fitting H2.</td>
</tr>
<tr>
<td>D1</td>
<td>1.25</td>
<td>CGU-1/B</td>
<td>5</td>
<td>Pass over top of forward container to tiedown fitting D6.</td>
</tr>
<tr>
<td>E1</td>
<td>1.25</td>
<td>CGU-1/B</td>
<td>5</td>
<td>Pass over top of rear container to tiedown fitting E4.</td>
</tr>
</tbody>
</table>
Table 4-2. Tiedown Data for Unitized Package of Four STINGER Weapon Rounds or Missile Rounds in CH-47 Helicopter

<table>
<thead>
<tr>
<th>Tiedown fitting designation</th>
<th>Tiedown device capacity in 1,000 lb</th>
<th>Tiedown device type</th>
<th>Attatch to item</th>
</tr>
</thead>
<tbody>
<tr>
<td>B7</td>
<td>6</td>
<td>CGU-1/B</td>
<td>Attach ratchet end and pass hook end through top rear container handle, around rear of top container, through opposite end handle, and attach to tiedown fitting D7.</td>
</tr>
<tr>
<td>B11</td>
<td>5</td>
<td>CGU-1/B</td>
<td>Attach ratchet end and pass hook end through top forward container handle, around front of top container, through opposite end handle, and attach to tiedown fitting D11.</td>
</tr>
</tbody>
</table>

Table 4-3. Tiedown Data for Unitized Package of Four STINGER Weapon Rounds or Missile Rounds in UH-60A Helicopter

<table>
<thead>
<tr>
<th>Tiedown fitting designation</th>
<th>Tiedown device capacity in 1,000 lb</th>
<th>Tiedown device type</th>
<th>Attatch to item</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2</td>
<td>8</td>
<td>CGU-1/B</td>
<td>Attach ratchet end and pass hook end through top rear container handle, around rear of top container, through opposite end handle and attach to tiedown fitting E2.</td>
</tr>
<tr>
<td>B5</td>
<td>5</td>
<td>CGU-1/B</td>
<td>Attach ratchet end and pass hook end through top forward container handle, around front of top container, through opposite end handle and attach to tiedown fitting D5.</td>
</tr>
<tr>
<td>C3</td>
<td>5</td>
<td>CGU-1/B</td>
<td>Over top of containers to tiedown fitting C4.</td>
</tr>
<tr>
<td>E3</td>
<td>5</td>
<td>CGU-1/B</td>
<td>Overtop of containers to tiedown fitting E4.</td>
</tr>
</tbody>
</table>

Table 4-4. Tiedown Data for Unitized Package of Four STINGER Weapon Rounds or Missile Rounds in CH-54 Military Universal Pod

<table>
<thead>
<tr>
<th>Tiedown fitting designation</th>
<th>Tiedown device capacity in 1,000 lb</th>
<th>Tiedown device type</th>
<th>Attatch to item</th>
</tr>
</thead>
<tbody>
<tr>
<td>C7</td>
<td>5</td>
<td>CGU-1/B</td>
<td>Attach ratchet end and pass hook end through top rear container handle, around rear of top container, through opposite end handle, and attach to tiedown fitting D7.</td>
</tr>
<tr>
<td>C11</td>
<td>5</td>
<td>CGU-1/B</td>
<td>Attach ratchet end and pass hook end through top forward container handle, around front of top container, through opposite end handle, and attach to tiedown fitting D11.</td>
</tr>
</tbody>
</table>

Section III. TRANSPORT BY US AIR FORCE AIRCRAFT

4-5. General

The STINGER weapon system components may be pallet loaded or vehicle loaded on US Air Force aircraft provided the load complies with the provisions of TM 38-250/AFR 71-4 for hazardous materials. The STINGER load must be compatible with other cargo to be shipped on the same aircraft. Loading procedures are as shown in the general loading instructions of each Technical Order dash 9 for the aircraft to be loaded.
Figure 4-1. Assembly of nine STINGER weapon rounds or STINGER missile rounds in an A-22 aerial delivery bag for external transport by helicopter.
Figure 4-2. Unitized package of four STINGER weapon rounds or missile rounds in UH-1D helicopter.
Figure 4-3. Unitized package of four STINGER weapon rounds or missile rounds in CH-47 helicopter.

Figure 4-4. Unitized package of four STINGER weapon rounds or missile rounds, on 1/4-inch plywood, in UH-60A helicopter.
Figure 4-5. Unitized package of four STINGER weapon rounds or missile rounds in CH-54 universal military pod.
A. NA

B. THE PALLETIZATION PROCEDURES SPECIFIED IN THIS DRAWING ARE APPLICABLE TO THE STINGER GUIDED MISSILE PACKED IN WIREBOUND CONTAINER AND/OR ALUMINUM CONTAINER. SUBSEQUENT REFERENCE TO CONTAINER MEANS WIREBOUND CONTAINER AND/OR ALUMINUM CONTAINER WITH CONTENTS.

C. FOR DETAILS OF THE WIREBOUND CONTAINER, SEE US ARMY MISSILE COMMAND DRAWING NO. 11595908 AND "CONTAINER" DETAIL ON PAGE 3.

CONTAINER DIMENSIONS: 27-1/4" LONG X 13-1/8" WIDE X 10-1/2" HIGH (APPROX).
GROSS WEIGHT: 77 POUNDS (APPROX).
CUBE: 6.4 CUBIC FEET.

D. FOR DETAILS OF THE ALUMINUM CONTAINER, SEE US ARMY MISSILE COMMAND DRAWING NO. 11686523 AND "CONTAINER" DETAIL ON PAGE 3.

CONTAINER DIMENSIONS: 45-7/16" LONG X 13-1/2" WIDE X 13-3/8" HIGH (APPROX).
GROSS WEIGHT: 56-3/4 POUNDS (APPROX).
CUBE: 6.6 CUBIC FEET.

E. CAUTION: THIS ITEM MUST BE POSITIONED ON THE PALLET WITH FORWARD END OF ALL CONTAINERS POINTING IN THE SAME DIRECTION.

F. WHEN STEEL STRAPPING IS USED AT AN END-OVER-END LAP JOINT, A MINIMUM OF TWO (2) SEALS, RIFLED TOGETHER, WITH TWO (2) PAIR OF CRIMS PER SEAL MUST BE USED TO SEAL THE JOINT.

G. IN ORDER TO OBTAIN COMPACT (SOUND) UNITS, ALL STRAPS SHALL BE LOCATED IN PROPER ALIGNMENT AND TENSIONED UNTIL THEY CUT INTO THE EDGE OF THE DUMMY/GUIDES AND THE PALLET DECK.

19-48-5240-GM20SR2 March 1979

MATERIAL SPECIFICATIONS

PLYWOOD: GROUP B OR C, GRADE C-0, FED SPEC NN-72-550.
PINEBOARD HINGE: TYPE I, FED SPEC PTP-280.
STRAPPING STEEL: CLASS 1, TYPE I OR IV, HEAVY DUTY, FINISH A OR B (GRADE 2), FED SPEC QQ-S-596.
SEAL STRAP: TYPE 1, STYLE 13, OR 4, CLASS H, FED SPEC QQ-S-596.
ADHESIVE, SYNTHETIC RUBBER: TYPE, COLD RODDING, FED SPEC ANA-2-14P.
SPECIAL NOTES:

1. THE PALLET SHOWN ABOVE IS TO BE USED FOR THE WIREBOUND CONTAINERS ONLY.

2. EACH 9" HIGH BY 39-3/8" LONG HONEYCOMB PAD WILL BE FABRICATED FROM THREE (3) 3" HIGH BY 29-3/8" LONG HONEYCOMB CELLS PLACED IN VERTICAL ALIGNMENT AND SECURED WITH SYNTHETIC RUBBER ADHESIVE. NOTE: THE WIDTH OF THE HONEYCOMB PADS WILL VARY WITH THE QUANTITY OF WIREBOUND CONTAINERS TO BE POSITIONED ON THE PALLET (4" FOR A THREE CONTAINER LOAD, 5" FOR A SIX CONTAINER LOAD, AND 7" FOR A NINE CONTAINER LOAD). SEE PAGES 5, 6, AND 7.

KEY NUMBERS

1. PLYWOOD PANEL, 1/2" X 29-3/8" X 70" (2 ReqD).

2. HONEYCOMB PAD, 9" HIGH BY 29-3/8" LONG BY WIDTH-TO-SUIT (2 ReqD). SEE SPECIAL NOTE 2 ON THIS PAGE FOR WIDTH OF PAD.

3. EACH HONEYCOMB PAD SHOWN AS PIECE MARKED D, WILL BE SANDWICHED BETWEEN THE TOP AND BOTTOM PLYWOOD PANELS AT THE LOCATIONS SHOWN ABOVE. ASSUME THAT EACH PAD IS PERPENDICULAR TO THE PLYWOOD PANELS PRIOR TO SECURING WITH SYNTHETIC RUBBER ADHESIVE.
UNIT DATA

<table>
<thead>
<tr>
<th>ITEM</th>
<th>REQUIRED</th>
<th>POUNDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plywood, 1/4&quot; thick</td>
<td>38.28 SQ FT</td>
<td>52.24</td>
</tr>
<tr>
<td>Honeycomb cell</td>
<td>4 REQD</td>
<td>16.3</td>
</tr>
<tr>
<td>Steel strapping, 1 1/4&quot;</td>
<td>30 FT</td>
<td>2.35</td>
</tr>
<tr>
<td>Seal for 1 1/4&quot; strapping</td>
<td>4 REQD</td>
<td>144.4</td>
</tr>
</tbody>
</table>

KEY NUMBERS

1. Pallet (1 REQD). See the "Pallet Detail for Wirebound Containers" on page 4.
2. Steel strapping, 1 1/4" X .035 X 10'-0" long (3 REQD). Position near each end of the wirebound container as shown above. See general note "C" on page 3.
3. Seal for 1 1/4" strapping (4 REQD). Crimp each seal with two pairs of notches. See general note "F" on page 2.
**Palletized Unit**

**Unit Data**
- Wirebound (Wooden Box) - 6 Each @ 77 Pounds = 462 Lbs
- Runnings (Strapping Only) = 4 Lbs
- Pallet (Plywood Only) = 50 Lbs

**Total Weight** (Approx) = 569 Lbs

**Cube** (Approx) = 49.30 cu ft

**Key Numbers**
1. **Pallet**: (1 Req'd). See the 'Pallet Detail for Wirebound Containers' on Page 6.
2. **Steel Strapping, 1-1/4" x .035" x 15'-0" Long (2 Req'd)**. Position near each end of the wirebound containers as shown above. See General Note "D" on Page 2.
3. **Seal for 1-1/4" Strapping (4 Req'd, 2 per strap)**. Clamp each seal with two pair of notches. See General Note "F" on Page 2.

**Bill of Material**

<table>
<thead>
<tr>
<th>Item</th>
<th>Required</th>
<th>Pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plywood, 1/2&quot; Thick</td>
<td>30.36 sq ft.</td>
<td>52.06</td>
</tr>
<tr>
<td>Honeycomb Celotex</td>
<td>6 Req'd</td>
<td>5.43</td>
</tr>
<tr>
<td>Steel Strapping, 1-1/4&quot;</td>
<td>36 ft</td>
<td>NIL</td>
</tr>
<tr>
<td>Seal for 1-1/4&quot; Strapping</td>
<td>4 Req'd</td>
<td>NIL</td>
</tr>
</tbody>
</table>

**Preparation of Six (6) Wirebound Containers for Aerial Delivery**

Sheet 5 of 10
UNIT DATA

<table>
<thead>
<tr>
<th>Item</th>
<th>Required</th>
<th>Pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plywood, 1/8&quot; thick</td>
<td>3.25 sq ft</td>
<td>32.86</td>
</tr>
<tr>
<td>Honeycomb cell</td>
<td>5 ebay</td>
<td>4.00</td>
</tr>
<tr>
<td>Steel strapping, 1-1/4&quot;</td>
<td>28 ft</td>
<td>28</td>
</tr>
<tr>
<td>Seal for 1-1/4&quot; strapping</td>
<td>4 reg</td>
<td>4 NIL</td>
</tr>
</tbody>
</table>

PREPARATION OF NINE (9) WIREBOUND CONTAINERS FOR AERIAL DELIVERY  
Sheet 6 of 10
SPECIAL NOTES:

1. THE PALLET SHOWN ABOVE IS TO BE USED FOR THE ALUMINUM CONTAINERS ONLY.

2. EACH 9" HIGH BY 40" LONG HONEYCOMB PAD WILL BE FABRICATED FROM THREE 3" HIGH BY 40" LONG HONEYCOMB CELLS PLACED IN VERTICAL ALIGNMENT AND SECURED WITH SYNTHETIC RUBBER ADHESIVE. NOTE: THE WIDTH OF THE HONEYCOMB PADS WILL VARY WITH THE QUANTITY OF ALUMINUM CONTAINERS TO BE POSITIONED ON THE PALLET (4" WIDE FOR A THREE CONTAINER LOAD, 6" WIDE FOR A SIX CONTAINER LOAD, AND 9" WIDE FOR A NINE CONTAINER LOAD). SEE PAGES 9, 10, AND 11.

3. EACH HONEYCOMB PAD, SHOWN AS PIECE MARKED (3), WILL BE SANDWICHED BETWEEN THE TOP AND BOTTOM PLYWOOD PANELS AT THE LOCATIONS SHOWN ABOVE. ASSUME THAT EACH PAD IS PERPENDICULAR TO THE PLYWOOD PANELS PRIOR TO SECURING WITH SYNTHETIC RUBBER ADHESIVE.

KEY NUMBERS

1. PLYWOOD PANEL, 1/2" X 40" X 60" (2 REQD.).

2. HONEYCOMB PAD, 9" HIGH BY 40" LONG BY WIDTH-TO-SUIT (2 REQD.). SEE SPECIAL NOTE 2 ON THIS PAGE FOR WIDTH OF PAD.
PALLETTIZED UNIT

UNIT DATA

ALUMINUM CONTAINER - 3 EACH @ 86 POUNDS = 258 LBS
DURNADE (STRAFFING, SPACERS, AND FIBREBOARDS) = 34 LBS
PALLET (PLYWOOD ONLY) = 52 LBS

TOTAL WEIGHT = 344 LBS (APPROX)
CUBE = 38.37 CU FT (APPROX)

KEY NUMBERS

1. Pallet (1 reqd.), see the "Pallet Detail for Aluminum Containers" on Page 8.
2. Spacer, plywood, 1/2" x 12" x 60" (2 reqd.), position on edge between containers as shown.
3. Fibreboard pad, 1" x 34" x 36" (1 reqd.), position on top of containers as shown above.
4. Fibreboard pad, 1/2" x 4" x 6" (5 reqd.), position under steel strapping at the locations shown above.
5. Steel strapping, 1-1/4" x .035" x 10' - 6" long (1 reqd.), position to encircle all three containers as shown above.
6. Steel strapping, 1-1/4" x .035" x 6' - 6" long (7 reqd.), position as shown above. See general note "G" on page 2.
7. Seal for 1-1/4" strapping (6 reqd., 2 per strap). Crimp each seal with two pair of notches. See general note "F" on page 2.

BILL OF MATERIAL

<table>
<thead>
<tr>
<th>ITEM</th>
<th>REQUIRED</th>
<th>POUNDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plywood, 1/2&quot; thick</td>
<td>48.61 SQ FT</td>
<td>46.32</td>
</tr>
<tr>
<td>Fibreboard, 1&quot; thick</td>
<td>6.30 SQ FT</td>
<td>12.73</td>
</tr>
<tr>
<td>Fibreboard, 1/2&quot; thick</td>
<td>AS REQD</td>
<td>NIL</td>
</tr>
<tr>
<td>Honeycomb cell</td>
<td>6 REQD</td>
<td>NIL</td>
</tr>
<tr>
<td>Steel strapping, 1-1/4&quot;</td>
<td>20 FT</td>
<td>5.30</td>
</tr>
<tr>
<td>Seal for 1-1/4&quot; strapping</td>
<td>6 REQD</td>
<td>NIL</td>
</tr>
</tbody>
</table>

Preparation of Three (3) Aluminum Containers for Aerial Delivery Sheet 8 of 10 Page 9
UNIT DATA

<table>
<thead>
<tr>
<th>ITEM</th>
<th>REQUIRED</th>
<th>POUNDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLYWOOD, 1/2&quot; THICK</td>
<td>70.30 SQ FT</td>
<td>93.60</td>
</tr>
<tr>
<td>FIBREBOARD, 1&quot; THICK</td>
<td>8.20 SQ FT</td>
<td>12.75</td>
</tr>
<tr>
<td>FIBREBOARD, 1/2&quot; THICK</td>
<td>AS REQUIRED</td>
<td>NIL</td>
</tr>
<tr>
<td>HONEYCOMB CELL</td>
<td>6 REQD</td>
<td>NIL</td>
</tr>
<tr>
<td>STEEL STRAPPING, 1-1/4&quot;</td>
<td>85 PT</td>
<td>11.14</td>
</tr>
<tr>
<td>SEAL FOR 1-1/4&quot; STRAPPING</td>
<td>10 REQD</td>
<td>NIL</td>
</tr>
</tbody>
</table>

ALUMINUM CONTAINERS - See General Note "Z" on Page 2.

KEY NUMBERS

1. PAILLET (1 REQD). See the "Paillet Data for Aluminum Containers" on Page 8.
2. SPACER, PLYWOOD, 1/2" X 39" X 60" (2 REQD). Position on edge between containers as shown.
3. FIBREBOARD PAD, 1" X 34" X 34" (1 REQD). Position on top of containers as shown above.
4. FIBREBOARD PAD, 1/2" X 4" X 6" (1.6 REQD). Position under steel strapping at the locations shown above.
5. STEEL STRAPPING, 1-1/4" X .035" X 18"-0" LONG (2 REQD). Position each strap to encircle three containers as shown above.
7. SEAL FOR 1-1/4" STRAPPING (10 REQD; 2 PER STRAP). Crimp each seal with two pair of notches. See General Note "Y" on Page 2.

PREPARATION OF NINE (9) ALUMINUM CONTAINERS FOR AERIAL DELIVERY Sheet 10 of 10
CHAPTER 5
HIGHWAY TRANSPORTABILITY GUIDANCE

5-1. Scope
This chapter provides highway transportability guidance for movement of the STINGER weapon system. It covers technical and physical characteristics and safety considerations and prescribes the materials and guidance required to prepare, load, secure, and unload the vehicle.

5-2. Safety
In addition to the safety precautions contained in chapter 3, movement is subject to all the safety laws, rules, and regulations applicable to commercial carriers. In overseas areas, such movements are governed by theater regulations.

5-3. General
Highway transport of STINGER weapon system weapon rounds or missile rounds shall be in accordance with security requirements of DOD 5100.76-M. Shipments will be made in trucks and semitrailers that offer van bodies or compartments that can be locked and sealed for exclusive use. Containers or CONEX, if used, must also be locked and sealed. Materials for loading, blocking, and bracing of trucks, semitrailers, and containers are shown in figure 5-1 at the end of this chapter.

NOTE
Figure 5-1 is extracted from US Army Development and Research Command missile drawing number 5947 GM 11SR1. Complete drawing, pages 1 through 56, may be obtained from US Army Defense Ammunition Center and School (SARAC-DEV) Savanna, IL 61074.
Figure 5-1. Loading and bracing (TL and LTL) of the complete STINGER round in closed- or open-top van trailers, packed in wirebound and/or aluminum container (unitized and ununitized or palletized and unpalletized) (sheets 1 through 14).
1. These LTL outloading procedures are shown depicting the use of "Knee-Brace" blocking in a 7-1/4" wide trailer. Wider or narrower trailers can be used.

2. The "Knee-Brace" blocking, shown as pieces marked 1 through 5, is adequate for retaining not more than 18,000 pounds of loading.

3. Pieces marked 1 through 5 are for use in a trailer which has a salable floor and should be used. If possible, in lieu of pieces marked 1 through 5, which apply to trailers having non-salable floors. These (3) back-up cleats, shown as pieces marked 5 and 6, are adequate for retaining a maximum size LTL load of 18,000 pounds.

4. One or more fillers assembly, shown as piece marked 7 on page 5, may be used in place of limited containers in the top layer only. A filler piece marked 7, must be used when longitudinally adjacent stacks are stepped up or down.

5. If the trailer being loaded has a round-front or rounded corners at the forward end, refer to page 6 for "Forward Blocking" specifications which must be used.

6. If the trailer being outloaded contains mechanical macing devices, they may be used in lieu of and 28" height fillers at the 7-1/4"idth fillers at the 7-1/4" width of the trailer. Cross members tightly against the rear-of-load gate.

7. The use of a Riser Assembly is specified for thereferred to only to show a typical application. Riser Assemblies may be used in the load as required to adjust the loading pattern for the number of containers to be shipped.

TYPICAL LTL - 74 UNPALLETTIZED ALUMINUM CONTAINERS IN A CONVENTIONAL TYPE VAN TRAILER.
SPACER ASSEMBLY

This spacer assembly is designed for use in loads of unpalletedized aluminum containers.

REAR ASSEMBLY

This rear assembly is designed for use in loads of unpalletedized aluminum containers.
TM 55-1425-429-14

5-5

**Spacer Assembly**

This spacer assembly is designed for use in loads of unpalletized aluminum containers.

**Separator Gate**

This separator gate is designed for use in loads of unpalletized aluminum containers.
**CHART A**

<table>
<thead>
<tr>
<th>THREE (3) LAYER LOAD</th>
<th>DIM A</th>
<th>DIM B</th>
</tr>
</thead>
<tbody>
<tr>
<td>WIREBOUND CONTAINERS</td>
<td>31-1/2&quot;</td>
<td>10&quot;</td>
</tr>
<tr>
<td>ALUMINUM CONTAINERS</td>
<td>30-1/2&quot;</td>
<td>10-1/2&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TWO (2) LAYER LOAD</th>
<th>DIM A</th>
<th>DIM B</th>
</tr>
</thead>
<tbody>
<tr>
<td>WIREBOUND CONTAINERS</td>
<td>31&quot;</td>
<td>#</td>
</tr>
<tr>
<td>ALUMINUM CONTAINERS</td>
<td>30-1/2&quot;</td>
<td>#</td>
</tr>
</tbody>
</table>

*HORIZONTAL PIECE NOT REQUIRED AT THIS LOCATION.*

**NOTE:**

If desired 1/2" plywood may be used in lieu of the 2" x 6" horizontal pieces. The plywood must be trailer width minus 1/2" by load height. Secure the plywood to the vertical pieces W/1-16 nails every 12". All plywood joints must center on the middle vertical piece.

**REAR OF LOAD GATE C**

This gate is designed for use at the rear end of a three (3) layer load of unaltered wirebound containers or unaltered aluminum containers as depicted on page 4 and 5. NOTE: This type of gate can only be used against the rear of a two or three layer unaltered load. See "CHART A." on this page for guidance in fabricating gates.

**FILLER ASSEMBLY D**

The filler assembly shown above is to be used within loads to take the place of an omitted aluminum container. It must be used in the top layer only.
TM 55-1425-429-14

FORWARD BLOCKING ASSEMBLY

SEE "NOTE 5", "NOTE 6", AND "NOTE 8" ON THIS PAGE.

1. **Front Horizontal Piece, 2" x 6' by Cut-To-Fit (3 Req'd Per Tier)**: Position at same height as rear horizontal piece and nail to the vertical pieces w/3-16 nails at each joint.

2. **Trailer Width Minus 1/2"**: 2" x 6" by Cut-To-Fit (3 Req'd), level & level end with 3/4" x 45° cuts as shown.

3. **Filler Cleat, 2" x 6" by Cut-To-Fit (3 Req'd)**: Nail to the horizontal pieces w/7-16 nails.

4. **Spacer Cleat, 2" x 6" by Trailer Width Minus 8-1/2" (3 Req'd)**: Nail to the filler pieces w/7-16 nails.

5. **Vertical Piece, 2" x 6" by Load Height (2 Req'd)**: Nail to the horizontal pieces w/3-16 nails at each joint.

6. **Note 2**: Forward blocking assembly A is designed for use at the forward end of an eight (8) layer load of unitized round or square baulk containers which is to be transported in a trailer having rounded corners of a radius of 3" or less. Additional pieces of 2" x 6" material must be laminated to the spacing cleats if the radius of the rounded corners is greater than 3". Adjust height of the "forward blocking assembly A" as necessary for loads which are less than eight (8) layers high.

7. **Note 3**: If the trailer to be loaded has sharp corners on the inside of the front end, the "forward blocking assembly A" may be omitted and the units positioned directly against the front wall.

8. **Note 4**: If desired, 1/2" plywood may be used in lieu of the 2" x 6" horizontal pieces. The plywood must be trailer width minus 1/2" by load height. Secure the plywood to the vertical w/7-16 nails every 12".

9. **Note 5**: Forward blocking assembly B is designed for use at the forward end of a 5-tier or 3-tier load of palletized aluminum containers or skid load units of wirebound containers which is to be transported in a trailer having rounded corners of a radius greater than 3". If the trailer has rounded corners with a radius greater than 6", the vertical pieces must be 2" x 6" material in lieu of 2" x 4" material.

### CHART B

<table>
<thead>
<tr>
<th>CONTAINER TYPE</th>
<th>DIM A</th>
<th>DIM B</th>
<th>DIM C</th>
<th>DIM D</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALUMINUM</td>
<td>38&quot;</td>
<td>38&quot;</td>
<td>38&quot;</td>
<td>94&quot;</td>
</tr>
<tr>
<td>WIREBOUND</td>
<td>11-1/2&quot;</td>
<td>36&quot;</td>
<td>48&quot;</td>
<td>72&quot;</td>
</tr>
</tbody>
</table>
KEY NUMBERS

1. ANTI-SWAY BRACE ASSEMBLY (7 REQD). SEE THE "ANTI-SWAY BRACE ASSEMBLY" DETAIL ON PAGE 8. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLETTIZED UNITS. SEE SPECIAL NOTE 2 AND 3 ON PAGE 8.

2. TIE PIECE, 2" X 4" BY TRAILER WIDTH MINUS 1/2" IN LENGTH. SEE SPECIAL NOTE 4 ON PAGE 8.

3. SOLID FILL, 4" WIDE MATERIAL BY 12" LONG BY THICKNESS TO SUIT (AS REQD). NAIL FIRST PIECE TO PIECE MARKED 2 WITH 16 HAMMER NAILS. NAIL EACH ADDITIONAL PIECE TO THE FIRST PIECE WITH 2-16 HAMMER NAILS. SEE SPECIAL NOTE 4 ON PAGE 8.

4. BUNDLING STRAP, 1-1/4" X .025" X 20'-4" LONG STEEL STRAPPING (4 REQD). PREPOSITION AND INSTALL SO AS TO BLOCK TWO (2) PALLETTIZED UNIT STACKS AS SHOWN.

5. SEAL FOR 1-1/4" STRAPPING (8 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL.

ISOMETRIC VIEW

SECTION G-G

26 PALLETTIZED UNITS OF ALUMINUM CONTAINERS IN A 48'-0" LONG CONVENTIONAL TYPE VAN TRAILER.
1. A load of 26 palletized units is shown in a 40'-0" long by 7'-4" wide (inside dimension) conventional type van trailer.

2. A wider or narrower trailer than shown may be used for shipping the depicted load. Adjust the width of the "anti-sway brace assembly" as necessary.

3. The anti-sway bracing may be omitted if the space between laterally adjacent units is 5' or less, as measured from container to container on laterally adjacent units.

4. If the void at the rear of the load, between the palletized containers and the rear doors, measures 1-1/2' or less, no rear blocking is required. If the void at the rear of the load is greater than 1-1/2' but less than 12', additional fill pieces of 6'-0" wide material must be laminated to pieces marked (1). If the void at the rear of the load exceeds 12', use rear blocking as shown on page 4.

5. To satisfy the quantity of palletized units to be shipped, the load as shown may be decreased by omitting two (2) adjacent palletized units at a time. Two additional pallet units can be loaded if door height permits.

6. If the trailer being loaded has a round-front or rounded corners at the forward end, refer to page 6 for "forward blocking" specifications which must be used.

7. If the trailer being unloaded contains mechanical bracing devices, such as a wall belt rail and load blocking cross members, which conform to specifications set forth within the Bureau of Explosives Handbook 4C and Appendixes therein, they may be used at the rear of the load as shown in the "partial elevation view" on this page. The mechanical bracing device system of a trailer must have a length of at least 30'-4" as measured from the front wall of the trailer.

---

**Bill of Material**

<table>
<thead>
<tr>
<th>Lumber</th>
<th>Linear Feet</th>
<th>Board Feet</th>
</tr>
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<tbody>
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<td>2&quot; x 4&quot;</td>
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<td>362</td>
</tr>
<tr>
<td>1&quot; x 4&quot;</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>2&quot; x 6&quot;</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>MAILS</td>
<td>NO, REQD</td>
<td>POUNDS</td>
</tr>
<tr>
<td>1X1 (3&quot;)</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td>STEEL STRAPPING, 1-1/4&quot; x .035&quot;</td>
<td>154' REQD</td>
<td>22 LBS</td>
</tr>
<tr>
<td>STEEL STRAPPING, 1-1/4&quot;</td>
<td>8 REQD</td>
<td>NIL</td>
</tr>
</tbody>
</table>

**Partial Elevation View**

- The view shown above indicates the rear of the load shown on page 7. See Special Note 7 on this page.
- The load as shown

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Weight (Approx)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palletized Unit</td>
<td>26</td>
<td>22,178 LBS</td>
</tr>
<tr>
<td>Dunnage</td>
<td></td>
<td>250 LBS</td>
</tr>
<tr>
<td><strong>Total Weight</strong></td>
<td></td>
<td><strong>25,428 LBS</strong></td>
</tr>
</tbody>
</table>
ANTI-SWAY BRACE ASSEMBLY F

This anti-sway brace is designed for use between 1-TIB or 2-TIB loads of palletized aluminum containers.

Strut, 4" x 4" by cut-to-fit (4 reqd.), toenail to the header with 1-3/4" nails at each end.

NOTE:
If the void space between laterally adjacent palletized units is greater than 7-1/2", additional pieces of 4" wide material by thickness-to-fit may be laminated to the horizontal pieces. If the void space is less than 6-1/4" 2" x 4" material may be used for the horizontal pieces in lieu of 2" x 4" material.

REAR BLOCKING ASSEMBLY

This rear blocking assembly is designed for use at the rear end of a load of palletized aluminum containers when the distance between the rear of the load and the rear doors when they are closed measures 12" or more. Caution: Struts longer than 7-1/4" will not be used. Use a 6-1/4" type of rear blocking as depicted on page 36 to facilitate compliance with this rule. If 4" x 4" material is not available, see the "alternative rear blocking" detail at the right.

Header riser, 1" x 4" by cut-to-fit (4 reqd.), nail to the header with 1-3/4" nails every 8".

ALTERNATIVE REAR BLOCKING

Strut riser, 1" x 4" by cut-to-fit (4 reqd.), nail to the strut with 1-3/4" nails every 8".
WIREBOUND CONTAINER DATA:
GROSS WEIGHT ——— 77 LBS (APPROX)
CUBE ———— 3.4 CU FT (APPROX)

SKIDDED UNIT DATA:
GROSS WEIGHT ——— 749 LBS (APPROX)
CUBE ———— 35.98 CU FT (APPROX)

SKIDDED UNIT OF NINE (9) GUIDED MISSILES,
Packed ONE (1) PER WIREBOUND (WOODEN) BOX
BILL OF MATERIAL

<table>
<thead>
<tr>
<th>LUMBER</th>
<th>LINEAR FEET</th>
<th>BOARD FEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>2&quot; x 4&quot;</td>
<td>54</td>
<td>131</td>
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<tr>
<td>2&quot; x 8&quot;</td>
<td>54</td>
<td>54</td>
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<tr>
<td>NAILS</td>
<td>NO. REQD</td>
<td>POUNDS</td>
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<tr>
<td>16</td>
<td>200</td>
<td>31-1/4</td>
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LOAD AS SHOWN

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<tr>
<th>ITEM</th>
<th>QUANTITY</th>
<th>WEIGHT (APPROX)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SKIDDED UNITS</td>
<td>28</td>
<td>30,792 Lbs</td>
</tr>
<tr>
<td>DRUMS</td>
<td>1</td>
<td>798 Lbs</td>
</tr>
<tr>
<td>TOTAL WEIGHT</td>
<td>31,560 Lbs</td>
<td></td>
</tr>
</tbody>
</table>

KEY NUMBERS:

1. ANTI-SWAY BRACE ASSEMBLY (1 NEEDED). SEE THE "ANTI-SWAY BRACE ASSEMBLY" ON PAGE 12, INSTALL BETWEEN LATERALLY ADJACENT RUNS OF SKIDDED UNITS. SEE SPECIAL NOTES 2 AND 3.

2. HORIZONTAL PIECE, 2" x 6" x 10' BY TRAILER WIDTH MINUS 1/2" IN LENGTH (4 REQUIRED), POSITION AGAINST TOP AND BOTTOM BOX ON EACH SKIDDED UNIT IN THE BACK STACK, AS SHOWN ABOVE. SEE SPECIAL NOTE 4.

3. VERTICAL PIECE, 6" WIDE MATERIAL BY THICKNESS TO SUIT BY LOAD HEIGHT (3 REQUIRED). NAIL TO HORIZONTAL PIECE W/ APPROXIMATELY SIZED NAILS AT EACH JOINT. SEE SPECIAL NOTE 4.

4. SOLID FILL, 6" WIDE MATERIAL BY THICKNESS TO SUIT (4 REQUIRED). NAIL TO HORIZONTAL PIECES W/ APPROXIMATELY SIZED NAILS IN EACH PIECE. SEE SPECIAL NOTE 4.

SPECIAL NOTES:

1. A LOAD OF 28 SKIDDED UNITS IS SHOWN IN A 40'-0" LONG BY 7'-6" WIDE (INSIDE DIMENSIONS) CONVENTIONAL TYPE VAN TRAILER.

2. A WIDER OR NARROWER TRAILER THAN SHOWN MAY BE USED FOR SHIPMENT OF THE DEFLECTED LOAD. ADJUST THE WIDTH OF THE "ANTI-SWAY BRACE ASSEMBLY" AS NECESSARY.

3. THE ANTI-SWAY BRACING MAY BE OMITTED IF THE SPACE BETWEEN LATERALLY ADJACENT UNITS IS 2" OR LESS, AS MEASURED FROM CONTAINER TO CONTAINER ON LATERALLY ADJACENT UNITS.

4. IF THE VOID AT THE REAR OF THE LOAD, BETWEEN THE SKIDDED UNITS AND THE REAR DOORS, MEASURED 1'-1/2" OR LESS, NO REAR BLOCKING IS REQUIRED. IF THE VOID AT THE REAR OF THE LOAD IS GREATER THAN 1'-1/2" BUT LESS THAN 2", ADDITIONAL FILLED PIECES OF 6" WIDE MATERIAL MUST BE LAMINATED TO PIECES MARKED "H" AND PIECES MARKED "I" WITH APPROXIMATELY SIZED NAILS.

28 SKIDDED UNITS OF WIREBOUND CONTAINERS IN A 40'-0" LONG CONVENTIONAL TYPE VAN TRAILER.
ANTI-SWAY BRACE ASSEMBLY G

This anti-sway brace is designed for use between 1-tier or 2-tier loads of unitized wirebound containers (skidded units). See the "Positioning of Anti-Sway Brace Assembly G" on this page.

POSITIONING OF ANTI-SWAY BRACE ASSEMBLY G

1. The "Anti-Sway Brace Assembly G" must be fabricated in place between laterally adjacent skidded units.
   A. Position the first retainer piece just behind the near posts of the laterally adjacent skidded units, spanning the void between them and resting on the bottom boards of the skidded units.
   B. Position a 2" X 4" X 6" buffer piece 4" from the end of the first retainer piece and extending 3-3/4" beyond the edge of the first retainer piece. Nail the buffer piece to the retainer piece with 3-10d nails.
   C. Keeping the first buffer piece against the side of a skidded unit, position the second buffer piece against the side of the laterally adjacent skidded unit and extending 3-3/4" beyond the edge of the first retainer piece. Nail the buffer piece to the retainer piece with 3-10d nails.
   D. Hold the ends of both buffer pieces and push the partial assembly forward until the first retainer piece contacts the skidded unit posts on the far end.
   E. Position the second retainer piece just behind and contacting the near posts on laterally adjacent skidded units.
   F. Keep the two buffer pieces against the sides of the laterally adjacent skidded units and nail each one to the second retainer piece with 3-10d nails.
ISOMETRIC VIEW

NOTE:

These limits on the number of containers are shown for use in the blocking of a type 7-1/2" wide trailer. The wider or narrower trailers may be used.

The "Knee" blocking, shown as pieces marked ① through ④, is used to retain loads not more than 15,000 pounds of loading.

Pieces marked ⑤ and ⑥ are for use in a trailer having a non-Nailable floor. The use of these blocking results in a maximum load of 15,000 pounds.

Spacers, pieces marked ①, should be offset throughout the length of the trailer as shown.

The use of the knee brace is specified for use in the blocking of a type 7-1/2" wide trailer. The width of the trailer is determined by the height of the containers to be shipped.

KEY NUMBERS

① Spacer assembly (3 reqd.). See the "Spacer Assembly B" detail on page 14. See special note 4 on this page.
② Spacer assembly (1 reqd.). See the "Spacer Assembly B" detail on page 14. See special notes 4 and 7 on this page.
③ Rear-of-load gate (1 reqd.). See the "Rear-of-load Gate Assembly A" detail on page 15. See special note 4 on this page.
④ Floor cleat, 2" x 4" x 18" (1 reqd.). See the "Clear Floor Rail" detail on page 16. See special note 4 on this page.
⑤ Pocket cleat, 2" x 4" x 18" (1 reqd.). See the "Pocket Cleat" detail on page 16. See special note 4 on this page.
⑥ Knee brace, 4" x 4" x 27-1/2" (1 reqd.). See the "Knee Brace" detail on page 16. See special note 4 on this page.
⑦ Rear brace, 4" x 4" x 38" (1 reqd.). See the "Rear Brace" detail on page 16. See special note 4 on this page.
⑧ Front brace, 4" x 4" x 38" (1 reqd.). See the "Front Brace" detail on page 16. See special note 4 on this page.
⑨ Front side, 2" x 4" x 18" (1 reqd.). See the "Front Side" detail on page 16. See special note 4 on this page.
⑩ Center cleat, 2" x 4" x 18" (1 reqd.). See the "Center Cleat" detail on page 16. See special note 4 on this page.
⑪ Diagonal brace, 2" x 4" x 18" (1 reqd.). See the "Diagonal Brace" detail on page 16. See special note 4 on this page.
⑫ Back-up cleat, 2" x 4" x 18" (1 reqd.). See the "Back-up Cleat" detail on page 16. See special note 4 on this page.
⑬ Strut, 2" x 4" x 18" (1 reqd.). See the "Strut" detail on page 16. See special note 4 on this page.
**Spacer Assembly H**

This spacer assembly is designed for use in loads of ununitized wirebound containers.

**Riser Assembly Z**

This riser assembly is designed for use in loads of ununitized wirebound containers.
6-1. Scope
This chapter provides marine and terminal transportability guidance for movement of the STINGER weapon system. It covers significant technical and physical characteristics and prescribes the materials and guidance required to prepare, load, and unload the items. Unloading is the reverse of loading.

NOTE
The methods described in this chapter for lifting and securing items are suggested procedures. Other methods of handling and stowage may be used, providing they will insure safe delivery without damage.

6-2. General Rules for Stowing Crated, Unitized, Palletized, or Containerized Loads
Crated, unitized, palletized, or containerized loads are blocked, braced, shored, lashed, and tommed, as required, to prevent movement. When loading, a full hold of large pieces, it is advantageous to leave wire rope slings attached to the last piece loaded for ease of unloading.

6-3. Safety
In addition to the safety precautions contained in chapter 3, the following are applicable.

a. Missiles will be handled and stowed in accordance with provisions contained in 49 Code of Federal Regulations (CFR) or in Water Carriers Tariff No. 31 or reissues thereof.

b. Vessel equipment will be inspected as required by 46 CFR 146. Lifting devices (fig 6-1) must be included in the inspection. Note that one piece of 1/2-inch plywood, 42 by 60 inches, is banded on top of the load to protect the load from sling abrasion.

6-4. Lifting and Loading
Figure 6-1 is a lifting diagram for crated, unitized, or palletized loads. Containerized loads are lifted with the special container adapter slings normally used in a port or terminal for the type of container used.
Figure 6-1. Lifting diagram for crated, unitized or palletized loads of STINGER weapon system items.
CHAPTER 7

RAIL TRANSPORTABILITY GUIDANCE

Section I. GENERAL

7.1. Scope
This chapter provides rail transportability guidance for movement of the STINGER weapon system, XFIM-92A in shipping and storage containers. It covers significant technical and physical characteristics and prescribes the materials and guidance required to prepare, load, tie down, and unload the items.

7-2. Maximum Utilization of Railcars
Additional cargo, as approved by the activity offering the items for transport, may be transported with the items.

Section II. TRANSPORT ON CONUS RAILWAYS

7-3. General
The transportability guidance in this section is applicable when the items are transported on CONUS railways. All items, when loaded on suitable railcars, can be transported without sectionlization or major disassembly within the Association of American Railroads Outline Diagram for Single Loads, Without End Overhang, on Open-Top Cars, as shown in both the Railway Line Clearance Publications and the Official Railway Equipment Register.

7-4. Preparation of Items
The degree of preparation of the items prior to being transported is dependent upon the operational commitment.

7-5. Loading

a. The STINGER weapon system items in shipping and storage containers may be loaded one at a time, or in unitized packages, into boxcars by use of a forklift.

b. After placement at the securing position, the items will be secured in accordance with Figure 7-1.

NOTE
Figure 7-1 is extracted from US Army Development and Research Command missile drawing number 5514 GM 5SR1. Complete drawing, pages through 88, may be obtained from S Army Defense Ammunition Center and School (SARAC-DEV) Savanna, IL 61074.

Section III. TRANSPORT ON FOREIGN RAILWAYS

7-6. General
The transportability guidance contained in this section is applicable when the STINGER missiles system is transported on foreign railways. The items can be transported without restrictions on all foreign national boxcars. Because of the various designation systems used by different countries, foreign railcars are not easily classified. Consequently, evaluation of transportability capability must be made on an individual basis. The STINGER weapon system shipping and storage containers can be loaded in foreign railway boxcars, using methods similar to those used for securing the items on American railroad cars.
Figure 7-1. Loading and bracing (CL and LCL) of STINGER weapon system complete round in boxcars, packed in wirebound and/or aluminum container (unitized and ununitized or palletized and unpalletized) (sheets 1 through 18).
KEY NUMBERS

1. Spacer assembly (12 reqd). See the "Spacer Assembly A" detail on page 4. Wire tie last assembly to pallet unit. See key number 3 on this page.

2. Center gate assembly (4 reqd). See the "Center Gate Assembly B" detail on page 4.

3. Strut, 4" x 4" by cut-to-fit (16 reqd). toenail to pieces made. W/2-16 nails at each end.

4. Vertical strut bracing, 2" x 4" by cut-to-extend 2" above top strut (2 reqd). Nail to the struts W/2-16 nails at each joint.

5. Horizontal strut bracing, 2" x 4" by cut-to-fit (4 reqd). Nail to the struts W/2-16 nails at each joint.

6. Gate hinged down, 3" x 4" center space plus 18" (4 reqd). Nail to vertical on center gate assembly B. W/2-16 nails at each joint.

7. Anti-sway bracing, 2" x 4" by cut-to-fit (2 reqd). Position across top and bottom layer struts, center on the bracket struts and nail W/2-16 nails at each joint.


9. Tie wire, No. 16 gage wire by length-to-fit (4 reqd). Wire tie the last "Spacer Assembly A" to the unitizing straps on the adjacent palletized unit.
SPECIAL NOTE:

1. A 50'-4" long by 9'-4" wide conventional type box car equipped with 8'-0" wide door openings is shown. Cars of other dimensions and cars having wider or narrower door openings can be used.

2. A wider or narrower car can be used for shipping the depicted load by adjusting the width of the "spacer assembly A." Additional pieces of 6" wide material may be laminated to the horizontal pieces or pieces of 1" thick by 6" wide material may be used in lieu of the 2" thick by 6" wide material.

3. If the car being loaded has "thru" plug doors or staggered plug doors of any width, " Bundling Straps" as shown in the "plug door procedures" on this page will be required. If the car being loaded has staggered conventional sliding doors (any width) or "thru" conventional sliding doors (any width), doorway protection gates, shown as piece marked 3 on page 8, will always be required to retain the palletized units.

4. If the car being loaded has bowed end walls which are bowed outward two inches (2") or more either from side-to-side or from floor-to-roof, an end-of-car bulkhead must be installed to provide a "squared off" surface for the load at the end of the car.

BUNDLING STRAP: 1-1/4" X .070 X 36'-0" long (rep.)
Steel Strapping (as reqd.) Install so as to encircle the load units in the doorway area. Seal with two 1-1/4" seals per each strap. Double crimp each seal.

PLUG DOOR PROCEDURES

These procedures will apply to plug doors whether auxiliary or main. For each stack of palletized units which extends more than one-half (1/2) of its length or width past a door post into the doorway area on one or both sides of the car being loaded, one bundling strap is required. For each stack of palletized units which extends more than three-quarters (3/4) of its length or width past a door post into the doorway area, two bundling straps are required.

| BILL OF MATERIAL |
|------------------|------------------|------------------|
|                  | NUMBER | LINEAR FEET | BOARD FEET |
| 2" X 4"          | 64     | 8            | 32           |
| 3" X 4"          | 52     | 8            | 25           |
| 4" X 4"          | 74     | 8            | 29           |
| 4" X 6"          | 530    | 8            | 530          |
| 2" X 12"         | 596    | 8            | 596          |
| 4" X 12"         | 104    | 8            | 104          |
| 11/2" X 12"      | 104    | 8            | 104          |
| WIRE, NO. 14 GADE | 12 REGO | 1/2           | 6.5         |
|                  | 10 REGO | 1/2 X 1/4    | 2.27         |
|                  | 1/2 REGO | 1/2 X 1/4   | 1.14         |

LOAD AS SHOWN

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<tr>
<th>ITEM</th>
<th>QUANTITY</th>
<th>WEIGHT (APPROX)</th>
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<td>PALLETTIZED UNITS</td>
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<tr>
<td>DURRHAGE</td>
<td>1,463 LBS.</td>
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<td>TOTAL WEIGHT</td>
<td>41,063 LBS.</td>
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42 PALLETTIZED UNITS OF ALUMINUM CONTAINERS IN A 50'-4" LONG BY 9'-4" WIDE CONVENTIONAL BOX CAR
**Spacer Assembly A**

For use with palletized aluminum containers. When fabricating this assembly, field check the 12-1/2" and 7-0" dimensions for the load bearing pieces to assure they will be in line with the horizontal drainage on the palletized unit.

**Center Gate Assembly B**

For use with palletized aluminum containers. The gate shown above is for a two tier load.

**Doorway Protection Gate C**

For use with palletized aluminum containers. The gate shown is for a two tier load.
**ISOMETRIC VIEW**

**KEY NUMBERS**

1. SPACER ASSEMBLY (31 RECD). SEE THE "SPACER ASSEMBLY III" DETAIL ON PAGE 8.

2. FILLER ASSEMBLY (1 RECD). SEE THE "FILLER ASSEMBLY III" DETAIL ON PAGE 7.


4. SEPARATOR GATE ASSEMBLY (2 RECD). SEE THE "SEPARATOR GATE ASSEMBLY III" DETAIL ON PAGE 8.

5. LCL GATE ASSEMBLY (1 RECD). SEE THE "LCL GATE ASSEMBLY III" DETAIL ON PAGE 8.

6. FLOOR CLEAT, 2" X 4" X 1-3/8" (4 RECD). ALIGN WITH VERTICAL PIECES ON THE LCL GATE ASSEMBLY AND NAIL TO THE CAR FLOOR W/1-1/4" NAIL EVERY 8".

7. SUPPORT PIECE, 2" X 4" X 10" (4 RECD). NAIL TO PIECE MARKED 3 W/1-1/4" NAILS AND TO NAIL TO THE VERTICAL PIECES OF THE LCL GATE ASSEMBLY W/2-1/4" NAILS.

8. DIAGONAL BRACE, 4" X 4" X 0.75" (4 RECD). SEE THE "DIAGONAL BRACE" DETAIL ON THIS PAGE FOR SERRATE CUTS REQUIRED. TO NAIL TO THE VERTICAL PIECE ON THE LCL GATE ASSEMBLY AND THE FLOOR CLEAT W/2-1/4" NAILS AT EACH END.

9. BACK-UP CLEAT, 2\" X 4\" X 30(4 RECD). NAIL TO PIECE MARKED 1 W/6-6\# NAILS.

10. DIAGONAL BRACE SUPPORT, 2" X 4" BY CUT-TO-FIT (4 RECD). SERRATE THE BOTTOM END WITH A 45\(^\circ\) CUT, CENTER ON THE DIAGONAL BRACE AND NAIL TO PIECES MARKED 3 AND 4 W/2-1/4" NAILS AT EACH END.

**DIAGONAL BRACE III**
SPECIAL NOTES:

1. A typical LCL load of 79 aluminum containers is shown in a 9'-2" wide
   conventional type box car having a wood or metal floor. Cars of other widths can be used.
2. Four knee brace assemblies as shown are adequate for retaining a
   maximum size LCL load.
3. If the lading extends into the doorway area more than one-half of an
   aluminum container length, use doorway protection plate 3" detail
   on page 8.
4. Filler assemblies, shown as piece marked (5), may be used as required in
   the top layer only. DO NOT USE IN THE LAYER ADJACENT TO THE LCL GATE
   ASSEMBLY.
5. A riser assembly, shown as piece marked (6), may be used to step down
   aluminum containers as shown to meet the requirements of special note
   7. DO NOT USE UNDER THE STACK ADJACENT TO THE LCL GATE ASSEMBLY.
6. The use of the "riser assembly" and the "filler assembly" are specified for
   the depicted load only to show a typical application. They may be used
   in the load as required to adjust the loading pattern for the quantity
   of containers to be shipped.
7. The maximum stack height adjacent to the LCL gate assembly is three (3)
   containers high.
8. The aluminum containers must be positioned with the 15" dimension across
   the car width as shown in the "Isometric View" on page 8.
9. If the car being loaded is less than 9'-2" wide, only seven (7) aluminum
   containers can be positioned across the car width.
10. If the car being loaded has bowed end walls which are bowed outward
    two inches (3") or more either from side-to-side or from floor-to-roof,
    an end-of-car buckhead must be installed to provide a "squared-off"
    surface for the load at the end of the car.
11. Position the diagonal bracing, shown as piece marked (7), tight against
    the hold-down cleat on the LCL gate assembly and in line with the inside
    edge of the floor cleat, as shown above, to facilitate positioning of
    the diagonal brace support, shown as piece marked (8) on page 8.

HOLD-DOWN BLOCK, 3" x 6" x 12"
(4 REQD). HAIL TO THE VERTICAL
PIECE W/3-16 NAILS.

VERTICAL PIECE,
2" x 6" x 42" 
(4 REQD)

LOAD BEARING PIECE, 2" x 4" x 42"
CAR WIDTH MINUS 1/2" IN LENGTH
(3 REQD). HAIL TO THE VERTICAL
PIECES W/3-16 NAILS AT EACH JOINT.

LCL GATE ASSEMBLY M

TYPICAL LCL USING KNEE BRACE METHOD
FILLER ASSEMBLY E

The filler assembly shown above is to be used within loads to take the place of an omitted aluminum container. It must be used in the top layer only.

DECK PIECE, 3" x 6" by car width minus 6" (3 REQD). NAIL TO THE SUPPORT PIECES w/5-10M NAILS AT EACH END.

TIE PIECE, 3" x 6" x 65" (2 REQD). NAIL TO THE SUPPORT PIECES w/5-10M NAILS AT EACH END.

CAR WIDTH MINUS 6"

SUPPORT PIECE, 3" x 6" by cut-to-fit (3 REQD). CENTER THE CENTER SUPPORT PIECE UNDER THE CENTER DECK PIECE AND ALIGN THE OUTER SUPPORT PIECES WITH THE INSIDE EDGE OF THE DECK PIECES AS SHOWN.

RISER ASSEMBLY F

FOR USE WITH UNPALLETIZED ALUMINUM CONTAINERS.
**SPACER ASSEMBLY**

For use with unpalletized aluminum containers.

- **TIE PIECE, 1" x 4" x 45-1/2" (2 REQD).**
  Nail to the retainer piece and the bearing piece w/2-3M nails at each joint and clinch.

- **BEARING PIECE, 1" x 4" by load height (2 REQD).**

- **LOAD HEIGHT PLUS 4"**

---

**SPACER ASSEMBLY #2**

For use with unpalletized aluminum containers.

- **TIE PIECE, 3" x 4" x 45-1/2" (2 REQD).**
  Nail to the retainer pieces and the bearing pieces w/2-3M nails at each joint.

- **FILLER PIECE, 2" x 4" by load height minus 7" (2 REQD).**
  Nail to the retainer piece w/1-3M nails every 12".

- **BEARING PIECE, 2" x 6" by load height (2 REQD).**

- **LOAD HEIGHT**
**Skidded Unit Data:**
- Gross Weight: 79 Lbs (Approx.)
- Cube: 35.92 Cu Ft (Approx.)

**Skidded Unit of Nine (9) Guided Missiles, Packed One (1) per Wirebound (Wooden) Box**

**Wirebound Container Data:**
- Gross Weight: 77 Lbs (Approx.)
- Cube: 3.4 Cu Ft (Approx.)

**Wirebound Container**
48 Skidded Units of Wirebound Containers in a 30'-0" Long by 9'-2" Wide Conventional Box Car
SPECIAL NOTES:

1. A 36'-6" long by 9'-3" wide conventional type box car equipped with 10'-0" wide door openings is shown. Cars of other dimensions and cars having wider or narrower door openings can be used.

2. Top-of-load anti-sway braces must be installed on the first two (2) stacks at each end of the box car, as shown on Page 11, and wire tied to a unisiting strap with No. 14 gage wire as shown by the "Positioning of Top-of-load Anti-Sway Brace Assembly B" detail on Page 11B. Use two (2) top-of-load anti-sway braces on top of the two stacks within the doorway area of the car, as shown on Page 11.

3. A wider or narrower car can be used for shipping the depicted load by adjusting the pieces marked 1 and 2.

4. If the car being loaded has "Thrul" plug doors or staggered plug doors of any width, doorway protection straps, shown as piece marked 3 on Page 11, will be required. If the car being loaded has staggered conventional sliding doors (any width) or "Thrul" conventional sliding doors (any width), doorway protection straps, shown as piece marked 4, on Page 11, will be required.

5. For each load unit of six skidded units which extends more than 23' past a door post into the doorway area on one or both sides of the car being loaded, one (1) set of pieces marked 5, 6, 7, and 8 must be installed to bundle that unit. For each load unit of six skidded units which extends 34' or more past a door post into the doorway area, pieces marked 3 and two (2) sets of pieces marked 5, 6, 7, and 8 must be installed to bundle that unit as shown within the basic load views.

6. The specific blocking and bracing Dunnage and the basic method of application is also adequate for retaining a full load in a 40'-4" long by 9'-9" wide car. Thirty-six (36) skidded units may be shipped in a 40'-4" long car, with 24 units loaded within one end of the car and 12 units loaded within the other end. Adjust quantities of Dunnage as required.

7. If the car being loaded has bowed end walls which are bowed outward two inches (2") or more either from side-to-side or from floor-to-ceiling, an end-of-car blockhead must be installed to provide a "squared off" surface for the load at the end of the car.

---

**BILL OF MATERIAL**

<table>
<thead>
<tr>
<th>LUMBER</th>
<th>LINEAR FEET</th>
<th>BOARD FEET</th>
</tr>
</thead>
<tbody>
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<td>2&quot; X 2&quot;</td>
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<td>37</td>
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<td>2&quot; X 3&quot;</td>
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<td>4&quot; X 4&quot;</td>
<td>143</td>
<td>143</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NAILS</th>
<th>NO. REQUIRED</th>
<th>POUNDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot; (2&quot;)</td>
<td>650</td>
<td>10-1/4</td>
</tr>
<tr>
<td>1/4&quot; (3/4&quot;)</td>
<td>130</td>
<td>2-1/2</td>
</tr>
</tbody>
</table>

| STEEL STRAPPING, 1-1/4" X .059" | 76' REQUIRED | 11 LBS |
| STEEL STRAPPING, 1-1/4" STRAP | 4 REQUIRED   |    NIL |
| STEEL WIRE, NO. 14 GAGE | 25' REQUIRED |      NIL |

**LOAD AS SHOWN**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>QUANTITY</th>
<th>WEIGHT (APPROX.)</th>
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</thead>
<tbody>
<tr>
<td>SKIDDED UNIT</td>
<td>48</td>
<td>38,932 LBS</td>
</tr>
<tr>
<td>DUNNAGE (OIL)</td>
<td></td>
<td>1,024 LBS</td>
</tr>
<tr>
<td>TOTAL WEIGHT</td>
<td></td>
<td>39,956 LBS</td>
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</tbody>
</table>
TOP-OF-LOAD ANTI-SWAY BRACE ASSEMBLY B

This assembly is designed for use between the top of laterally adjacent skidded units of wirewound containers. Position between stacks in each end of gap to prevent units from toppling into void area. The assembly will be wire tied to the skidded unit unitizing strap to prevent displacement.

POSITIONING OF TOP-OF-LOAD ANTI-SWAY BRACE ASSEMBLY B

This view depicts the securing of a top-of-load anti-sway brace to the top of a skidded unit by wire tying to the unitizing strap with No. 14 gage wire.

POSITIONING OF ANTI-SWAY BRACE ASSEMBLY A:

1. The "anti-sway brace assembly A" must be fabricated in place between laterally adjacent skidded units.
   A. Position the first retainer piece just behind the near posts on laterally adjacent skidded units, spanning the void between them and resting on the bottom boards of the skid's units.
   B. Position a 3" x 4" x 6" buffer piece 3" from the end of the first retainer piece and extending 3-3/4" beyond the edge of the first retainer piece. Nail the buffer piece to the retainer piece w/5-5/8 nails.
   C. Keeping the first buffer piece against the 3", position the second buffer piece against the side of the laterally adjacent skidded unit and extending 3-3/4" beyond the edge of the first retainer piece. Nail the buffer piece to the retainer piece w/5-5/8 nails.
   D. Hold the ends of both buffer pieces and push the partial assembly forward until the first retainer piece contacts the skidded unit posts on the far end.
   E. Position the second retainer piece just serving and contacting the near posts on laterally adjacent skidded units.
   F. Keep the two buffer pieces against the side of the laterally adjacent skidded units and nail each one to the second retainer piece w/5-5/8 nails.

FOR USE WITH UNITIZED WIREWOUND CONTAINERS, see "Positioning of Anti-Sway Brace Assembly A" on this page.
1. SPACER ASSEMBLY (3 REQD). SEE THE "SPACER ASSEMBLY" DETAIL ON PAGE 17, SEE SPECIAL NOTES 9 AND 10 ON PAGE 16.

2. FILLER ASSEMBLY (1 REQD). SEE THE "FILLER ASSEMBLY" DETAIL ON PAGE 17, SEE SPECIAL NOTE 4 ON PAGE 16.

3. RISER ASSEMBLY (1 REQD). SEE THE "RISER ASSEMBLY" DETAIL ON PAGE 17, SEE SPECIAL NOTE 5 ON PAGE 16.

4. LCL GATE ASSEMBLY (1 REQD). SEE THE "LCL GATE ASSEMBLY" DETAIL ON PAGE 18 AND SPECIAL NOTE 7 ON PAGE 16.

5. FLOOR CLEAT, 2" X 6" X 8'-4" (4 REQD). ALIGN WITH VERTICAL PIECES ON THE LCL GATE ASSEMBLY AND NAIL TO THE CAR FLOOR W/1-16" NAIL EVERY 8", SEE GENERAL NOTE "E" ON PAGE 3.

6. SUPPORT PIECE, 2" X 6" X 18" (4 REQD). NAIL TO PIECE MARKED 3 W/4-16" NAILS AND TO NAIL TO THE VERTICAL PIECES OF THE LCL GATE ASSEMBLY W/2-16" NAILS.

7. DIAGONAL BRACE, 4" X 4" X 6'-9" (4 REQD). SEE THE "DIAGONAL BRACE" DETAIL ON THIS PAGE FOR BEVEL CUTS REQUIRED. TOUNAIL TO THE VERTICAL PIECE ON THE LCL GATE ASSEMBLY AND THE FLOOR CLEAT W/2-16" NAILS AT EACH END, SEE SPECIAL NOTE 12 ON PAGE 16.

8. BACK-UP CLEAT, 2" X 6" X 30" (4 REQD). NAIL TO PIECE MARKED 5 W/4-16" NAILS.

9. DIAGONAL BRACE SUPPORT, 2" X 4" BY CUT-TO-FIT (4 REQD). BEVEL THE BOTTOM END WITH A 60° CUT. CENTER ON THE DIAGONAL BRACE AND NAIL TO PIECES MARKED 8 AND 9 W/2-16" NAILS AT EACH END.
SPECIAL NOTES:

1. A TYPICAL LCL LOAD OF 100 WIREBOUND CONTAINERS IS SHOWN IN A 9'-0" WIDE CONVENTIONAL TYPE BOX CAR HAVING A WOOD OR NAILABLE METAL FLOOR. CHS OR OTHER WIDTHS CAN BE USED.

2. FOUR RISER BRACE ASSEMBLIES AS SHOWN ARE ADEQUATE FOR RETAINING A MAXIMUM SIZE LCL LOAD.

3. IF THE LOADING EXTENDS INTO THE DOORWAY AREA MORE THAN ONE-HALF OF A WIREBOUND CONTAINER LENGTH, USE "DOORWAY PROTECTION GATE 3" ON THIS PAGE.

4. FILLER ASSEMBLIES, SHOWN AS PIECE MARKED ②, MAY BE USED AS REQUIRED IN THE TOP LAYER ONLY. DO NOT USE IN THE LAYER ADJACENT TO THE LCL GATE ASSEMBLY.

5. A RISER ASSEMBLY, SHOWN AS PIECE MARKED ④, MAY BE USED TO STEP DOWN WIREBOUND CONTAINERS AS SHOWN TO MEET THE REQUIREMENTS OF SPECIAL NOTE 7. DO NOT USE UNDER THE STACK ADJACENT TO THE LCL GATE ASSEMBLY.

6. THE USE OF THE "RISER ASSEMBLY" AND THE "FILLER ASSEMBLY" ARE SPECIFIED FOR THE DEFINED LOAD ONLY TO SHOW A TYPICAL APPLICATION. THEY MAY BE USED IN THE LOAD AS REQUIRED TO ADJUST THE LOADING PATTERN FOR THE QUANTITY OF CONTAINERS TO BE SHIPPED.

7. THE MAXIMUM STACK HEIGHT ADJACENT TO THE LCL GATE ASSEMBLY IS FOUR (4) CONTAINERS HIGH.


9. IF A WIDER CAR IS USED FOR SHIPPING THE DEFINED LOAD, THE WIDTH OF THE "SPACER ASSEMBLY ⑧" MAY BE INCREASED BY LAMINATING 4" WIDE BY LOAD HEIGHT BY THICKNESS TO SUIT MATERIAL TO THE LOAD BEARING PIECES.

10. IF A NARROWER CAR IS USED FOR SHIPPING THE DEFINED LOAD, THE WIDTH OF THE "SPACER ASSEMBLY ⑧" MAY BE DECREASED BY USING 1" THICK MATERIAL IN LIEU OF 2" THICK MATERIAL FOR THE LOAD BEARING PIECES. IF AN 8'-0" WIDE CAR IS USED, ONLY SEVEN (7) WIREBOUND CONTAINERS CAN BE POSITIONED ACROSS THE CAR WIDTH. IF THE EXCESS SPACE ACROSS THE WIDTH OF THE CAR IS 1'-0" OR LESS, NO SPACER ASSEMBLY IS REQUIRED.

11. IF THE CAR BEING LOADED HAS SLOPED END WALLS WHICH ARE SLODED OUTWARD TWO INCHES (2") OR MORE EITHER FROM SIDE-TO-SIDE OR FROM FLOOR-TO-DOOR, AN END-OF-CAR BUILDUP MUST BE INSTALLED TO PROVIDE A "SQUARED OFF" SURFACE FOR THE LOAD AT THE END OF THE CAR.


---

DOOR OPENING WIDTH

VERTICAL PIECE, 2" x 3/8" BY LOAD HEIGHT (2 REQ'D). NAIL TO A DOOR POST W/2 1/2" NAILS.

HORIZONTAL PIECE, 1" x 8" BY DOOR OPENING WIDTH (2 REQ'D). NAIL TO THE VERTICAL PIECE W/3-4 6d NAILS EACH END.

DOORWAY PROTECTION GATE 3

FOR USE WITH UNLACQUERED WIREBOUND CONTAINERS. THE GATE SHOWN ABOVE IS FOR A NINE TIER LOAD. SEE "CHART C" ON THIS PAGE FOR LESS THAN NINE TIER LOADS. NOTE: IF THE DOOR POSTS ARE NOT NAILABLE, REFER TO THE "ALTERNATIVE DOORWAY PROTECTION" ON THIS PAGE.

---

**CHART C**

| LAYERS OF | HEIGHT OF HORIZONTAL PIECES REQUIRED |
| GATES    |                                      |
| 2        | 6"   21"  21"  21"  21"  21"  21"  21"  21" |
| 3        | 15-1/2" 31-1/2" 31-1/2" 31-1/2" 31-1/2" 31-1/2" 31-1/2" 31-1/2" |
| 4        | 6"   24"  24"  24"  24"  24"  24"  24"  24" |
| 5        | 15-1/2" 34-1/4" 32-1/2" 32-1/2" 32-1/2" 32-1/2" 32-1/2" 32-1/2" |
| 6        | 6"   24"  45"  45"  45"  45"  45"  45"  45" |
| 7        | 15-1/2" 34-1/4" 32-1/2" 32-1/2" 32-1/2" 32-1/2" 32-1/2" 32-1/2" |
| 8        | 6"   24"  45"  66"  66"  66"  66"  66"  66" |
| 9        | 15-1/2" 34-1/4" 32-1/2" 32-1/2" 32-1/2" 32-1/2" 32-1/2" 32-1/2" |

* HORIZONTAL PIECE IS NOT REQUIRED.
**SPACER ASSEMBLY E**

For use with unjacketed wirebund containers.

**FILLER ASSEMBLY F**

The filler assembly shown above is to be used within loads to take the place of an omitted wirebund container. It must be used in the top layer only.
LCL GATE ASSEMBLY M

FOR USE WITH UNUNITIZED WIREBOUND CONTAINERS.

RISER ASSEMBLY @

FOR USE WITH UNUNITIZED WIREBOUND CONTAINERS.
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)**

   - 55-15 Land Transportation Within Areas Outside the Continental United States
   - 55-29 Military Convoy Operations in CONUS
   - 55-162 Permits for Oversize, Overweight, or Other Special Military Movements on Public Highways in the United States
   - 55-228 Transportation by Water of Explosives and Hazardous Cargo
   - 55-355 Military Traffic Management Regulation
   - 70-47 Engineering for Transportability
   - 95-27 Operational Procedures for Aircraft Carrying Hazardous Materials
   - 360-5 Public Information
   - 380-5 Department of the Army Information Security Program
   - 385-40 Accident Reporting and Records
   - 740-1 Storage and Supply Activity Operations
   - 746-1 Packaging of Army Material for Shipment and Storage

3. **Army Field Manuals (FM)**

   - 5-36 Route Reconnaissance and Classification
   - 55-15 Transportation Reference Data
   - 55-17 Terminal Operations Coordinator’s Handbook
   - 55-450-19 Army Helicopter External Load Operations

4. **Army Supply Bulletins (SB)**

   - 700-20 Army Adopted/Other Items Selected for Authorization/List of Reportable Items

5. **Army Technical Bulletins (TB)**

   - 55-46-1 Standard Characteristics (Dimensions, Weight, and Cube) for Transportability of Military Vehicles and Other Outsize, Overweight Equipment

6. **Army Technical Manuals (TM)**

   - 5-315 Fire Fighting and Rescue Operations in Theaters of Operations
   - 5-725 Rigging
   - 9-1300-206 Ammunition and Explosives Standards
   - 38-250 (AFR 71-4) Packaging and Materials Handling: Preparation of Hazardous Materials for Military Air Shipment
   - 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
7. Air Force Manuals (AFM)

TO 1-1B-40 Handbook of Weight and Balance Data
TO 1C-130A-9 Cargo Loading Instructions USAF Series C-130 Aircraft
TO 1C-141A-9 Cargo Loading Instructions USAF Series C-141 Aircraft
TO 1C-5A-9 Cargo Loading Instructions USAF Series C-5 Aircraft

NOTE
Air Force Technical Orders (T.O.) that have not been integrated into the Department of the Army publications system may be requisitioned through the Adjutant General Office in accordance with AR 310-70.

8. Department of Transportation
Code of Federal Regulations, Title 49 Transportation (Rail, Highway, and Water).

Available from:
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General, United States Army
Chief of Staff

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Major General, United States Army
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<tr>
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<td>PARA.</td>
<td>FIGURE NO.</td>
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