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***

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The U.S. Army Defense Ammunition Center and School (USADACS), Validation Engineering Division (SIOAC-DEV), was tasked by USADACS, Transportation Engineering Division (SIOAC-DET), to conduct evaluations on the on/off-highway transport of MK82 500-pound bombs. This report contains the procedures and results from the tests conducted. A validated restraint method for the on/off-highway transport of 500-pound bombs loaded on an M872 semitrailer was determined.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>PART</th>
<th>PAGE NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. INTRODUCTION</td>
<td>1-1</td>
</tr>
<tr>
<td>A. BACKGROUND</td>
<td>1-1</td>
</tr>
<tr>
<td>B. AUTHORITY</td>
<td>1-1</td>
</tr>
<tr>
<td>C. OBJECTIVE</td>
<td>1-1</td>
</tr>
<tr>
<td>D. CONCLUSION</td>
<td>1-1</td>
</tr>
<tr>
<td>2. ATTENDEES</td>
<td>2-1</td>
</tr>
<tr>
<td>3. TEST PROCEDURES</td>
<td>3-1</td>
</tr>
<tr>
<td>4. TEST EQUIPMENT</td>
<td>4-1</td>
</tr>
<tr>
<td>5. TEST RESULTS</td>
<td>5-1</td>
</tr>
<tr>
<td>6. PHOTOGRAPHS</td>
<td>6-1</td>
</tr>
<tr>
<td>7. DRAWING</td>
<td>7-1</td>
</tr>
</tbody>
</table>
PART 1

INTRODUCTION

A. BACKGROUND. The U.S. Army Defense Ammunition Center and School (USADACS), Validation Engineering Division (SIOAC-DEV), was tasked by USADACS, Transportation Engineering Division (SIOAC-DET), to perform transportability testing on palletized MK82 500-pound bombs loaded on an M872 semitrailer.

B. AUTHORITY. This test was conducted IAW mission responsibilities delegated by the U.S. Army Armament, Munitions and Chemical Command (AMCCOM), Rock Island, IL.

C. OBJECTIVE. The objective of this test was to assess the ability of the M872 semitrailer to safely transport palletized MK82 500-pound bombs. These procedures will then be used to support planned FY 96 shipments during Operation Golden Cargo.

D. CONCLUSION. A validated restraint method for the on/off-highway transport of both full and partial pallets of MK82 500-pound bombs on an M872 semitrailer has been determined.
PART 2
18 - 19 OCTOBER 1995

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PART 3

TEST PROCEDURES

TRANSPORTABILITY TESTS. The test procedures outlined in this section were extracted from TP-94-01. This standard identifies six steps that a load must undergo if it is considered to be acceptable. The three tests that were conducted on the test specimen are synopsized below.

A. ROAD HAZARD COURSE. The test specimen was subjected to the road hazard course. Using a suitable truck/tractor or tactical vehicle, the vehicle/specimen in question was towed/driven over a hazard course two times prior to the road trip and two times following the road trip. The vehicle/specimen was towed/driven at a speed of approximately 5 mph. The speed may be increased or decreased, as appropriate, to produce the most violent load response (see Figure 1).

FIGURE 1
B. **ROAD TRIP.** Using a suitable truck/tractor and trailer, or tactical vehicle, the tactical vehicle/specimen load in question was driven/towed for a total distance of at least 30 miles over a combination of roads surfaced with gravel, concrete, and asphalt. The test route included curves, corners, railroad crossings, cattle guards, stops, and starts. The test vehicle traveled at the maximum speed suitable for the particular road being traversed, except as limited by legal restrictions. This step provides for the tactical vehicle/specimen load to be subjected to three full air brake stops while traveling in the forward direction and one in the reverse direction while traveling down a 7 degree grade. The first three stops were at 5, 10, and 15 mph, while the stop in the reverse direction was at approximately 5 mph.
C. WASHBOARD COURSE. Using a suitable truck/tractor, and/or tactical vehicle, the specimen was towed/driven over the washboard course at a speed which produced the most violent response in the particular test load (see Figure 2).
PART 4

TEST EQUIPMENT

A. MK82 500-POUND BOMB PALLET
   1. Quantity: 14 pallets
   2. Bombs Per Pallet: 6
   3. Pallet Weight: 2,945 pounds
   4. Width: 35-1/2 inches
   5. Length: 61-3/4 inches
   6. Height: 33-1/2 inches

B. M872 SEMITRAILER
   1. Capacity: 34 tons
   2. Length: 489-1/2 inches
   3. Width: 96 inches
PART 5

TEST RESULTS

TRANSPORTABILITY TESTS.

1. An M872 semitrailer was loaded with 14 pallets, each containing six 500-pound bombs. The bombs were loaded in two columns, end-to-end with the initial row secured against the forward bulkhead. The nose end of the bombs was pointed toward the rear of the trailer. A separator gate was placed between the rows of pallets. Side blocking was nailed to the floor of the trailer along the base of the pallet. The sixth row of pallets was shorter than the other six rows. Each row of pallets had two web straps extended over the top attached to removable tiedown anchors to secure them in place. The bombs were also secured by a retainer gate at the aft end, with two web straps attached to removable tiedown anchors holding the load in place.

The loaded trailer, towed by a semi-tractor, completed the railroad crosstie hazard course; the 30-mile road hazard course; the 5, 10, and 15 mph, and reverse 5 mph panic stops; and the washboard course as shown below. No damage resulted to the load.

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<tr>
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<td>30-MILE ROAD TRIP</td>
<td>47:57</td>
<td>37.5</td>
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<tr>
<td>PANIC STOPS</td>
<td></td>
<td>5, 10, 15, and Reverse 5</td>
</tr>
<tr>
<td>HAZARD COURSE NO. 3</td>
<td>00:22.8</td>
<td>2.3</td>
</tr>
<tr>
<td>HAZARD COURSE NO. 4</td>
<td>00:21.6</td>
<td>2.4</td>
</tr>
<tr>
<td>WASHBOARD COURSE</td>
<td>00:65.4</td>
<td>2.1</td>
</tr>
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</table>
2. A partial load was constructed to simulate incomplete trailer loads and loads containing short pallets. Included in this load were six full pallets, one pallet containing three bombs, one pallet containing two bombs, and one pallet containing one bomb. No pallet top was used on the pallet containing one bomb. Three rows of pallets were secured against the forward bulkhead with a retainer gate at the aft end. The pallet with three bombs was in the second row and had a support assembly placed on top. A full single pallet was centered against the retainer gate that secured the two columns of bombs. An additional retainer gate was secured with two web straps against the single pallet. The pallets containing one and two bombs were strapped down separately and secured with end braces nailed to the floor at each end.

The partial load of palletized MK82 500-pound bombs secured on the M872 semitrailer towed by a semi-tractor completed the cross-tie hazard course; the 30-mile road hazard course; the 5, 10, and 15 mph, and reverse 5 mph panic stops; and the washboard course as shown below. No damage to the load resulted.

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<tr>
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<th>SPEED (mph)</th>
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<td>HAZARD COURSE NO. 2</td>
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<tr>
<td>PANIC STOPS</td>
<td></td>
<td>5, 10, 15 and reverse 5</td>
</tr>
<tr>
<td>HAZARD COURSE NO. 3</td>
<td>00:21.6</td>
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<tr>
<td>WASHBOARD COURSE</td>
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PART 6

PHOTOGRAPHS
U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL - SAVANNA, IL

AO317-SCN96-15-254. This photo shows the end gate and strapping method used at the aft end of the trailer.
AO317-SCN96-15-313. This photo shows pallets containing the following: a single bomb, two bombs, three bombs with a spacer, and an odd number of pallets secured on the M872 semitrailer.
LOADING AND TIEDOWN PROCEDURES
FOR THE MK82 500 LB BOMB LOADED
ON THE 34-TON M872 SEMITRAILER

INDEX

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PAGE(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENERAL NOTES AND MATERIAL SPECIFICATIONS</td>
<td>2</td>
</tr>
<tr>
<td>LOADING, TIEDOWN, AND UNLOADING PROCEDURES</td>
<td>3</td>
</tr>
<tr>
<td>14 PALLETS OF MK82 500 LB BOMB ON THE 34-TON M872 SEMITRAILER</td>
<td>4.5</td>
</tr>
<tr>
<td>13 PALLETS OF MK82 500 LB BOMB ON THE 34-TON M872 SEMITRAILER</td>
<td>6.7</td>
</tr>
<tr>
<td>12 PALLETS OF MK82 500 LB BOMB ON THE 34-TON M872 SEMITRAILER</td>
<td>8.9</td>
</tr>
<tr>
<td>FULL PALLET AND LESS THAN FULL PALLETS ON THE 34-TON M872 SEMITRAILER</td>
<td>10.11</td>
</tr>
<tr>
<td>PALLETTIZATION OF 1 THROUGH 6 BOMBS</td>
<td>12.13</td>
</tr>
<tr>
<td>DETAILS</td>
<td>14-17</td>
</tr>
<tr>
<td>RATCHET/RATCHETING DETAIL</td>
<td>18.19</td>
</tr>
<tr>
<td>TIEDOWN ANCHOR DETAIL</td>
<td>20</td>
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</tbody>
</table>

*THE PROCEDURES DEPICTED WITHIN THIS DRAWING ARE FOR ON/OFF HIGHWAY USE ONLY.

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PROJECT DET 24
GENERAL NOTES

A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR-740-1.

B. THIS DRAWING CONTAINS PROCEDURES APPLICABLE TO THE TRANSPORT OF THE MK82 500-LB BOMB, SIX PER PALLET UNIT, LOADED ON THE 34-TON M872 SEMITRAILER EQUIPPED WITH THE 10,000 POUND GP (MIDDLE MAN) ANCHORS AND HAVING AN EMPTY WEIGHT OF 16,800 LBS (APPROX.). THE MAXIMUM LOAD WEIGHT ON THE KINGPIN IS 27,600 LBS AND THE MAXIMUM LOAD WEIGHT ON THE THREE REAR AXLES IS 56,400 LBS.

C. FOR DETAIL OF THE MK82 500-LB BOMB PALLET UNIT SEE PAGE 12 OF THIS DRAWING.

D. ALL LOADS SHOWN HEREIN ARE TYPICAL AND ARE BASED ON TESTED PROCEDURES FOR ON AND/OR OFF HIGHWAY TRANSPORT OF FULL AND/OR LESS THAN FULL PALLET UNITS. COMBINATIONS OF PROCEDURES MAY BE USED. HOWEVER, THE APPROVED METHODS SPECIFIED HEREIN MUST BE FOLLOWED AS CLOSER AS POSSIBLE.


F. ADJUSTABLE SCUFF SLEEVES PROVIDED ON WEB STRAP TIE-DOWN ASSEMBLIES WILL BE LOCATED TO PROVIDE A PAD WHERE STRAPS PASS OVER SHARP EDGES, OR RATCHETS AND HOOKS ON PREVIOUSLY INSTALLED WEB STRAP TIE-DOWN ASSEMBLIES.

G. IF THE SIDERRACKS FOR A SEMITRAILER ARE TO BE TRANSPORTED ON THE LOADED TRAILER, THEY WILL BE STACKED ON THE TRAILER AND Secured WITH A SUFFICIENT QUANTITY OF WEB STRAP TIE-DOWN ASSEMBLIES TO PREVENT LOSS DURING TRANSPORT. NOTE: IF DESERED, THE SIDE RACKS FOR THE M872 SEMITRAILER MAY BE POSITIONED IN PLACE AFTER THE LOAD HAS BEEN SECURED. AFTER ALL SIDE PANELS AND REAR PANELS ARE IN POSITION, THE STAKES MUS SECURELY "PINNED" OR "WIRE-TIED" TO THE STAKE POCKETS TO PREVENT VERTICAL DISPLACEMENT DURING TRANSPORT. ALSO, THE SIDE PANELS MUST BE SECURED AT THE TOP WITH THE CROSS-CHAINS WHICH ARE PROVIDED WITH THE VEHICLE.

MATERIAL SPECIFICATIONS

STRAP ------------ WREATHING, UNIVERSAL TIE-DOWN,
NSN 5340-01-204-3069, PN992419;
NSN 5340-01-089-4997, PN1186558;
NSN 1670-00-725-1437, PN1378-035; OR
NSN 5340-00-960-9277, PN1080980.

ANTI-CAYING MATERIAL ------------ CANVAS, BURLAP, TAPE OR ANY OTHER SUITABLE MATERIAL.

LUMBER ------------ SEE TM 743-200-1 (DUNNE LUMBER) AND FED SPEC MM-L-751.

NAILS ------------ FED SPEC FF-N-105; COMMON.

PROJECT DET 24

(GENERAL NOTES CONTINUED)

H. PROCEDURES DEPICTED HEREIN ARE TYPICAL IN NATURE RELATIVE TO ITEM LOCATION ON THE VEHICLE AND THE QUANTITIES SHOWN. ITEM LOCATION AND QUANTITIES OF THE DESIGNATED ITEM MAY BE VARIED TO SATISFY OPERATIONAL REQUIREMENTS. PROVIDED LOADING AND TIE-DOWN PRINCIPLES SPECIFIED HEREIN ARE RETAINED.

J. WHEN ONE WEB STRAP TIE-DOWN ASSEMBLY IS NOT LONG ENOUGH TO SPAN THE DISTANCE DEPICTED, TWO ASSEMBLIES MAY BE HOOKED TOGETHER TO GAIN THE NEEDED LENGTH.

K. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES, AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NEEDED, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM AND ONE POUND EQUALS 0.453KG.

L. SOME TIE-DOWN METHODS WITHIN THIS DRAWING SHOW TWO HOOKS TO BE CONNECTED TO ONE TIE-DOWN EYE. THIS IS AUTHORIZED AS SPECIFIED HEREIN.

M. DURING LONG HAULS, WHEN POSSIBLE, STRAPS SHOULD BE CHECKED DURING VEHICLE STOPS AND TIGHTENED IF NECESSARY.

N. ONLY THE BED OF THE M872 SEMITRAILER IS SHOWN HEREIN TO PREVENT DISTRACTION FROM THE DETAILED LOADING AND TIE-DOWN PROCEDURES, AND IS SHOWN IN OUTLINE FORM WITH THE STRUCTURAL PORTIONS OMITTED AS NECESSARY TO IMPROVE THE CLARITY OF THE DEPICTED PROCEDURES.

O. DUE TO VARIOUS REASONS, SUCH AS ROUGH TERRAIN DURING OFF HIGHWAY TRANSPORT, PANIC STOPS, AND NORMAL STRETCH OF WEB STRAPS, LOADED ITEMS MAY SLIDE SLIGHTLY LATERALLY AND/OR LONGITUDINALLY DURING TRANSPORT. THIS IS AN ACCEPTABLE CHARACTERISTIC AND IS NOT DETRIMENTAL TO LOAD SECURITY.


Q. FOR ADDITIONAL GUIDANCE SEE THE "LOADING, TIE-DOWN, AND UNLOADING PROCEDURES" ON PAGE 3, AND THE "SPECIAL NOTES" ON EACH LOAD PAGE.
LOADING, TIEDOWN, AND UNLOADING PROCEDURES:

1. PRIOR TO LOADING AND/OR UNLOADING THE TRAILER, SET BRAKES ON THE VEHICLE AND REMOVE SIDE RACKS AND/OR TARP, IF INSTALLED. ASSURE THAT THE TRAILER FLOOR IS FREE OF EXCESSIVE AMOUNTS OF DIRT, SAND AND GRAVEL.

2. PRIOR TO LOADING THE TRAILER, DETERMINE THE QUANTITY OF PALLETs TO BE LOADED. SELECT THE BEST METHOD TO SECURE THE ITEMS FROM THE METHODS SHOWN WITHIN THIS DRAWING. NOTE: A COMBINATION OF THE METHODS SHOWN WITHIN THIS DRAWING MAY BE USED IN ON THE SAME TRAILER.


4. ALL PALLET OF BOMBS FROM ONE THROUGH SIX MUST BE LOADED WITH THE NOSE END POINTING TOWARDS THE AFT END OR FORE END OF THE TRAILER AND MUST BE BLOCKED AT EACH END TO KEEP THE BOMBS FROM "INCHING" OUT OF POSITION DURING TRANSPORT. DO NOT POSITION PALLET UNITS WITH THE NOSE END POINTING TOWARD THE SIDE OF THE TRAILER.


6. PRIOR TO LOADING THE PALLET UNITS ON THE TRAILER ASSURE THAT ALL SIX BOMBS ARE IN VERTICAL AND HORIZONTAL ALIGNMENT.

7. ASSURE THAT ALL STEEL STRAPPING ON EACH PALLET IS IN POSITION AND IS TIGHT. MISSING AND/OR LOOSE STEEL STRAPPING SHOULD BE REPLACED.

8. NOTE THAT AFTER THE 2" X 4" BY LENGTH-TO-SUIT SIDE BLOCKING AS PI ECE MARKED (1) HAS BEEN NAILED IN PLACE ON EACH SIDE OF THE LOAD, THE PALLET UNITS CAN BE REMOVED AND/OR LOADED WITHOUT REMOVING THE SIDE BLOCKING.

9. ASSURE THAT ALL PALLET UNITS ARE POSITIONED TIGHTLY AGAINST EACH OTHER LATERALLY AND LONGITUDINALLY AS LOADING PROGRESSES. THIS WILL REDUCE LOAD MOVEMENT AND THE QUANTITY OF WEB STRAPS REQUIRED TO SECURE THE LOAD. VOID SPACES BETWEEN PALLET UNITS WILL FILL IN DURING TRANSPORT CAUSING WEB STRAPPING TO BECOME LOOSE.

10. AFTER ALL LOADING PROCEDURES ARE COMPLETE, CHECK ALL WEB STRAPS FOR MAXIMUM TIGHTNESS AND RATCHET TIGHTER IF REQUIRED. PRIOR TO FOLDING UP AND TAPING THE LOOSE ENDS OF STRAPS AS INSTRUCTED IN GENERAL NOTE "E" ON PAGE 2.

KEY NUMBERS

1. SIDE BLOCKING, 2" x 4" by length-to-suit, as required to extend from the forward endwall to the aft end of the rearmost pallet base, which is a length of 39'-6" (2 reef). For positioning and installation see loading sequence notes 1 and 7 on page 5.

2. SEPARATOR GATE A (1 REEF). Position with the plywood surface tight against the forward end wall. See the detail on page 14.

3. SEPARATOR GATE B (6 REEF). Position the side with the 2" x 2" legs tight against the nose ends of the bombs. See the detail on page 14.

4. RETAINER GATE A (1 REEF). Position with the 2" x 6" bearing pieces tight against the nose ends of the bombs at the aft end of the load. See the detail on page 15.

5. WEB STRAP TIE-DOWN ASSEMBLY (14 REEF). Install each strap to extend from a tie-down anchor on side of trailer, over top of two laterally adjacent pallet units, to a tie-down anchor on the opposite side of the trailer. Position strap sufficient sleeves at sharp edges. Take up excess slack in strap and then ratchet tight. See special note 4 on page 5 and general notes "E" and "F" on page 2.

6. WEB STRAP TIE-DOWN ASSEMBLY (1 REEF). Install strap to extend from a tie-down anchor on side of trailer, and bottom of retainer gate A, to a tie-down anchor on the opposite side of the trailer. Position strap sufficient sleeves at sharp edges. Take up excess slack in strap and then ratchet tight. Note: This strap must be threaded through the opening on each side of the retainer gate A. See general notes "E" and "F" on page 2.

7. WEB STRAP TIE-DOWN ASSEMBLY (1 REEF). Install strap to extend from a tie-down anchor on side of trailer, and top of retainer gate A, to a tie-down anchor on the opposite side of the trailer. Position strap sufficient sleeves at sharp edges. Take up excess slack in strap and then ratchet tight. See general notes "E" and "F" on page 2.
SPECIAL NOTES:

1. A TYPICAL LOAD OF 14 PALLETS OF MK82 500-LB BOMBS IS SHOWN LOADED ON THE MB72 SEMITRAILER HAVING DIMENSIONS OF 46'-1/2" LONG BY 58" WIDE.

2. PRIOR TO LOADING THE 500-LB BOMB PALLETS ON THE SEMITRAILER, READ THE "LOADING SEQUENCE" NOTES ON THIS PAGE.

3. THE LOAD ON PAGE 4 IS SHOWN POSITIONED AGAINST THE FORWARD ENDWALL. IF DESIRED, THE LOAD MAY BE POSITIONED ANYWHERE ON THE TRAILER LENGTH BY OMITTING THE SEPARATOR GATE A AND POSITIONING A SECOND RETAINER GATE A WITH TWO ADDITIONAL WEB STRAPS MARKED ② AND ③ AT THE FORWARD END OF THE LOAD. SEE THE 12 PALLETS LOAD ON PAGES 8 AND 9 FOR ADDITIONAL GUIDANCE.

4. EACH LATERAL ROW OF TWO PALLETS MUST BE SECURED WITH TWO WEB STRAPS OVER THE TOP AS SHOWN. THESE TWO STRAPS MAY BE CROSSED AND/OR POSITIONED STRAIGHT ACROSS THE TOP OF A ROW, DEPENDING ON THE LOCATION OF THE TIEDOWN ANCHORS. ASSURE THAT THE STRAPS ARE POSITIONED OVER THE PALLETS AND DO NOT POSITION THE STRAPS ON/OVER THE BOMBS.

5. THE PROCEDURES SHOWN ON PAGE 4 MAY ALSO BE USED FOR TRANSPORTING 2, 4, 6, 8, 10, OR 12 PALLETS BY DELETING PALLETS FROM THE AFT END OF THE LOAD SHOWN AND REDUCING THE LENGTH OF THE SIDE BLOCKING MARKED ① AS REQUIRED.

6. A TOTAL OF 30 TYPE I (MICKEY MOUSE) TIEDOWN ANCHORS ARE REQUIRED FOR THE LOAD SHOWN. SEE LOADING SEQUENCE NOTE 9 ON THIS PAGE AND TIEDOWN ANCHOR DETAIL ON PAGE 20.

7. A TOTAL OF 16 WEB STRAP TIEDOWN ASSEMBLIES ARE REQUIRED FOR THE LOAD SHOWN.

LOADING SEQUENCE:

1. PRIOR TO LOADING PALLETS, POSITION THE 2" X 4" LENGTH-TO-SUIT SIDE BLOCKING, PIECE MARKED ①, ON ONE SIDE OF THE TRAILER ONLY. POSITION ONE END AGAINST THE FORWARD ENDWALL WITH THE OUTER EDGE 9" IN FROM THE INSIDE EDGE OF THE TRAILER. NAIL TO THE TRAILER FLOOR W/1-10D NAIL EVERY 8". THE SIDE BLOCKING WILL CONSIST OF AVAILABLE LENGTHS OF 2" X 4" LUMBER FOR A DISTANCE OF 35'-0".

2. POSITION THE SEPARATOR GATE A, PIECE MARKED ②, WITH THE PLYWOOD SURFACE TIGHT AGAINST THE FORWARD ENDWALL.

3. POSITION ONE 500-LB BOMB PALLET ON THE TRAILER FLOOR WITH THE BASE END TIGHT AGAINST THE SEPARATOR GATE A AND PALLET BASE TIGHT AGAINST THE 2" X 4" SIDE BLOCKING. ASSURE THAT THE BASE END OF ALL SIX BOMBS ARE TIGHT AGAINST THE SEPARATOR GATE A.

4. POSITION THE SECOND 500-LB BOMB PALLET ON THE TRAILER FLOOR WITH THE BASE END TIGHT AGAINST THE SEPARATOR GATE A AND TIGHT AGAINST THE ADJACENT PALLET. ASSURE THAT THE BASE END OF ALL SIX BOMBS ARE TIGHT AGAINST THE SEPARATOR GATE A.

5. POSITION A SEPARATOR GATE B, PIECE MARKED ③, TIGHT AGAINST THE NOSE END OF THE BOMBS IN THE FIRST TWO PALLETS. NOTE THAT THE SIDE WITH THE 2" X 2" LEGS IS POSITIONED AGAINST THE NOSE END OF THE BOMBS.

6. REPEAT STEPS 3, 4, AND 5 UNTIL ALL 14 PALLETS OF 500 LB BOMBS ARE LOADED.

7. AFTER ALL PALLETS ARE LOADED, POSITION THE 2" X 4" BY LENGTH-TO-SUIT SIDE BLOCKING, PIECE MARKED ④, 1/2" AWAY FROM THE PALLET BASE AND AGAINST THE FORWARD ENDWALL. NAIL TO THE TRAILER FLOOR W/1-10D NAIL EVERY 8". THE SIDE BLOCKING WILL CONSIST OF AVAILABLE LENGTHS OF 2" X 4" LUMBER FOR A DISTANCE OF 35'-0". NOTE THAT THE PALLETS CAN BE REMOVED AND/OR LOADED WITHOUT REMOVING THE SIDE BLOCKING.

8. POSITION THE RETAINER GATE A, PIECE MARKED ⑤, AGAINST THE AFT END OF THE LOAD.

9. INSTALL 15 MICKEY MOUSE TIEDOWN ANCHORS ON EACH SIDE OF THE TRAILER AT EACH LOCATION A WEB STRAP TIEDOWN ASSEMBLY IS REQUIRED.

10. INSTALL WEB STRAP TIEDOWN ASSEMBLIES AS INSTRUCTED IN KEY NUMBERS ②, ⑥, AND ⑦ ON PAGE 4.

BILL OF MATERIAL

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<th>LUMBER</th>
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PLYWOOD, 1/2" ---- 85' 50 FT REQD ---- 117 LBS
WEB STRAPS ---- ---- 16 REQD ---- 80 LBS

LOAD AS SHOWN (SEE NOTE BELOW)

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<tr>
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<td>14</td>
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<tr>
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TOTAL WEIGHT ---- 42,377 LBS

NOTE: THE LOAD WEIGHT ON THE KINGPIN IS 14,847 LBS (APPROX.), AND THE LOAD WEIGHT ON THE THREE REAR AXLES IS 26,030 LBS (APPROX.). SEE GENERAL NOTE 6 ON PAGE 2.
**KEY NUMBERS**

1. **SIDE BLOCKING, 2" X 4" BY LENGTH-TO-SUIT, AS REQUIRED TO EXTEND FROM THE FORWARD ENDWALL PAST THE END OF RETAINER GATE C, PIECE MARKED (4), WHICH IS A LENGTH OF 31'-8" (2 REDS). FOR POSITIONS AND INSTALLATION SEE LOADING SEQUENCE NOTES 1 AND 7 ON PAGE 7.**

2. **SEPARATOR GATE A (1 RED). POSITION WITH THE PLYWOOD SURFACE TIGHT AGAINST THE FORWARD END WALL. SEE THE DETAIL ON PAGE 14.**


4. **RETAINER GATE C (1 RED). POSITION WITH THE 2" X 6" BEARING PIECES TIGHT AGAINST THE NOSE ENDS OF THE BOMBS AT THE AFT END OF THE TWO-WIDE LOAD. SEE THE DETAIL ON PAGE 16.**

5. **RETAINER GATE B (1 RED). POSITION WITH THE 2" X 6" BEARING PIECES TIGHT AGAINST THE NOSE ENDS OF THE BOMBS IN THE ONE PALLETT UNIT AT THE REAR OF THE LOAD. SEE THE DETAIL ON PAGE 15.**

6. **SIDE BLOCKING, 2" X 4" X 18' (4 REDS). POSITION TIGHT AGAINST THE PALLETT BASE AND NAIL TO THE TRAILER FLOOR W/6-10D NAILS.**

7. **WEB STRAP TIE-DOWN ASSEMBLY (14 REDS). INSTALL EACH STRAP TO EXTEND FROM A TIE-DOWN ANCHOR ON SIDE OF TRAILER, OVER ONE AND/ OR TWO LATERALLY ADJACENT PALLETT UNITS, TO A TIE-DOWN ANCHOR ON THE OPPOSITE SIDE OF THE TRAILER. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE SPECIAL NOTE 4 ON PAGE 7 AND GENERAL NOTES "E" AND "F" ON PAGE 2.**

8. **WEB STRAP TIE-DOWN ASSEMBLY (1 RED). INSTALL STRAP TO EXTEND FROM A TIE-DOWN ANCHOR ON SIDE OF TRAILER, AROUND BOTTOM OF RETAINER GATE B, TO A TIE-DOWN ANCHOR ON THE OPPOSITE SIDE OF THE TRAILER. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. NOTE: THIS STRAP MUST BE THREADED THROUGH THE OPENING ON EACH SIDE OF THE RETAINER GATE B. SEE GENERAL NOTES "E" AND "F" ON PAGE 2.**

9. **WEB STRAP TIE-DOWN ASSEMBLY (1 RED). INSTALL STRAP TO EXTEND FROM A TIE-DOWN ANCHOR ON SIDE OF TRAILER, AROUND TOP OF RETAINER GATE B, TO A TIE-DOWN ANCHOR ON THE OPPOSITE SIDE OF THE TRAILER. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "E" AND "F" ON PAGE 2.
SPECIAL NOTES:

1. A typical load of 13 pallets of MK82 500-lb bombs is shown loaded on the 34-ton M872 semitrailer having dimensions of 469-1/2" long by 96" wide.

2. Prior to loading the 500-lb bomb pallets on the semitrailer, read the "loading sequence" notes on this page.

3. The load on page 6 is shown positioned against the forward endwall. If desired, the load may be positioned anywhere on the trailer length by omitting the separator gate A and positioning a retainer gate B as shown on page 15, with two additional web straps marked □ and □ at the forward end of the load. See the 12 pallet load on pages 6 and 9 for additional guidance.

4. Each lateral row of one or two pallets must be secured with two web straps over the top as shown. These two straps may be crossed and/or positioned straight across the top of a row, depending on the location of the tie-down anchors. Ensure that the straps are positioned over the pallet frame. Do not position the straps over the bombs.

5. The procedures shown on page 6 may also be used for transporting 1 through 12 pallets by deleting pallets from the aft end of the load shown and reducing the length of the side blocking marked □ as required.

6. A total of 30 type I (Mickey Mouse) tie-down anchors are required for the load shown. See loading sequence note 11 on this page and tie-down anchor detail on page 20.

7. A total of 16 web strap tie-down assemblies are required for the load shown.

LOADING SEQUENCE:

1. Prior to loading pallet units, position the 2" x 4" by length-to-suit side blocking, piece marked □ on one side of the trailer only. Position one end against the forward end wall with the outer edge 5" in from the outside edge of the trailer. Nail to the trailer floor w/1-10d nail every 8". The side blocking will consist of available lengths of 2" x 4" lumber for a distance of 31'-6".

2. Position the separator gate A piece marked □, with the plywood surface tight against the forward end wall.

3. Position one 500-lb bomb pallet on the trailer floor with the base end tight against the separator gate A and the pallet base tight against the 2" x 4" side blocking. Ensure that the base ends of all six bombs are tight against the separator gate A.

4. Position the second 500-lb bomb pallet on the trailer floor with the base end tight against the separator gate A and tight against the adjacent pallet. Ensure that the base ends of all six bombs are tight against the separator gate A.

5. Position a separator gate B piece marked □, tight against the nose end of the bombs in the first two pallets. Note that the side with the 2" x 2" leg is positioned against the nose end of the bombs.

6. Repeat steps 3, 4, and 5 until all 12 two-wide pallets of 500-lb bombs are loaded.

7. After all 12 two-wide pallets are loaded position the 2" x 4" by length-to-suit side blocking, piece marked □, 1/2" away from the pallet base and against the forward end wall. Nail to the trailer floor w/1-10d nail every 8". The side blocking will consist of available lengths of 2" x 4" lumber for a distance of 31'-6". Note that the pallets can be removed and/or loaded without removing the side blocking.

8. Position the retainer gate C piece marked □, with the 2" x 8" bearing pieces tight against nose ends of the bombs.

9. Position one 500-lb bomb pallet in the center of the trailer width with the base end tight against the retainer gate C. Ensure that the base ends of all six bombs are tight against the retainer gate C.

10. Position the side blocking, pieces marked □, against the aft end pallet base and nail in place as instructed in key number □ on page 6.

11. Position retainer gate B piece marked □, against the aft end of the load.

12. Install 15 Mickey Mouse tie-down anchors on each side of the trailer at each location a web strap tie-down assembly is required.

13. Install web strap tie-down assemblies as instructed in key numbers □, □, and □ on page 6.

BILL OF MATERIAL

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<td>- - -</td>
<td>73' 50 FT REQD</td>
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<tr>
<td>WEB STRAPS</td>
<td>- - -</td>
<td>16 REQD</td>
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LOAD AS SHOWN (SEE NOTE BELOW)

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<tr>
<th>ITEM</th>
<th>QUANTITY</th>
<th>WEIGHT (APPROX)</th>
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<tr>
<td>PALLETS</td>
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<tr>
<td>DINGNAGE</td>
<td>- - - 393</td>
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<tr>
<td>TOTAL WEIGHT</td>
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NOTE: The load weight on the Kingpin is 18,990 LBS (Approx.), and the load weight on the three rear axles is 20,840 LBS (Approx). See general note B on page 2.
ISOMETRIC VIEW

KEY NUMBERS

1. SIDE BLOCKING, 2" x 4" BY LENGTH-TO-SUIT, AS REQUIRED TO EXTEND FROM THE BASE END OF THE BOMBS IN THE FIRST TWO LATERALLY ADJACENT PALLETS AT THE FORWARD END OF THE TRAILER TO THE NOSE END OF THE BOMBS IN THE REARMOST TWO LATERALLY ADJACENT PALLETS, WHICH IS A LENGTH OF 31'-1" (2 REQD). FOR POSITIONING AND INSTALLATION SEE LOADING SEQUENCE NOTES 1 AND 6 ON PAGE 8.


4. WEB STRAP TIEDOWN ASSEMBLY (12 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF TRAILER, OVER TOP OF EACH LATERALLY ADJACENT PALLET UNIT TO A TIEDOWN ANCHOR ON THE OPPOSITE SIDE OF THE TRAILER. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE SPECIAL NOTE 4 ON PAGE 9 AND GENERAL NOTES "E" AND "F" ON PAGE 2.

5. WEB STRAP TIEDOWN ASSEMBLY (2 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF TRAILER, AROUND BOTTOM OF RETAINER GATE A, TO A TIEDOWN ANCHOR ON THE OPPOSITE SIDE OF THE TRAILER. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. NOTE: THIS STRAP MUST BE THREADED THROUGH THE OPENING ON EACH SIDE OF THE RETAINER GATE A. SEE GENERAL NOTES "E" AND "F" ON PAGE 2.

6. WEB STRAP TIEDOWN ASSEMBLY (2 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIEDOWN ANCHOR ON SIDE OF TRAILER, AROUND TOP OF RETAINER GATE A, TO A TIEDOWN ANCHOR ON THE OPPOSITE SIDE OF THE TRAILER. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "E" AND "F" ON PAGE 2.
SPECIAL NOTES:

1. A TYPICAL LOAD OF 12 PALLETS OF M62 500-LB BOMBS IS SHOWN LOADED ON THE 34-TON MB72 SEMI TRAILER HAVING DIMENSIONS OF 486-1/2" LONG BY 96" WIDE.

2. PRIOR TO LOADING THE 500-LB BOMB PALLETS ON THE SEMI TRAILER, READ THE "LOADING SEQUENCE" NOTES ON THIS PAGE.

3. THE LOAD ON PAGE B SHOWS THE FORWARD END POSITIONED 60" FROM THE FORWARD END WALL. HOWEVER, THE LOAD MAY BE POSITIONED ANYWHERE ON THE TRAILER LENGTH BY USING A RETAINER GATE A WITH WEB STRAPS MARKED 5 AND 6 AT EACH END OF THE LOAD AS SHOWN.

4. EACH LATERAL ROW OF TWO PALLETS MUST BE SECURED WITH TWO WEB STRAPS OVER THE TOP AS SHOWN. THESE STRAPS MAY BE CROSSED AND/OR POSITIONED STRAIGHT ACROSS THE TOP OF A ROW, DEPENDING ON THE LOCATION OF THE TIEDOWN ANCHORS. ASSURE THAT THE STRAPS ARE POSITIONED OVER THE PALLET FRAME. DO NOT POSITION THE STRAPS ON/OVER THE BOMBS.

5. THE PROCEDURES SHOWN ON PAGE B MAY ALSO BE USED FOR TRANSPORTING 2, 4, 6, 8, OR 10 PALLETS BY DELETING PALLETS FROM THE AFT END OF THE LOAD SHOWN AND REDUCING THE LENGTH OF THE SIDE BLOCKING MARKED 3 AS REQUIRED.

6. A TOTAL OF 28 TYPE I (MICKEY MOUSE) TIEDOWN ANCHORS ARE REQUIRED FOR THE LOAD SHOWN. SEE LOADING SEQUENCE NOTE B ON THIS PAGE AND TIEDOWN ANCHOR DETAIL ON PAGE 20.

7. A TOTAL OF 16 WEB STRAP TIEDOWN ASSEMBLIES ARE REQUIRED FOR THE LOAD SHOWN.

LOADING SEQUENCE:

1. PRIOR TO LOADING PALLET UNITS, POSITION THE 2" X 4" BY LENGTH-TO-SUIT SIDE BLOCKING, PIECE MARKED (1), ON ONE SIDE OF THE TRAILER ONLY. AFTER DETERMINING HOW FAR THE BASE ENDS OF THE BOMBS ON THE FORWARD TWO PALLETS ARE TO BE FROM THE FORWARD END WALL, MAKE A MARK ON THE TRAILER FLOOR. POSITION ONE END ON THE MARK WITH THE OUTER EDGE 8" IN FROM THE OUTSIDE EDGE OF THE TRAILER. NAIL TO THE TRAILER FLOOR W/1-10D NAIL EVERY 8". THE SIDE BLOCKING WILL CONSIST OF AVAILABLE LENGTHS OF 2" X 4" LUMBER FOR A DISTANCE OF 31'-1".

2. POSITION ONE 500-LB BOMB PALLET ON THE TRAILER FLOOR WITH THE BASE END IN LINE WITH THE FORWARD END OF THE 2" X 4" SIDE BLOCKING AND THE PALLET BASE TIGHT AGAINST THE SIDE BLOCKING.

3. POSITION THE SECOND 500-LB BOMB PALLET ON THE TRAILER FLOOR IN LINE WITH AND TIGHT AGAINST THE FIRST PALLET.

4. POSITION A SEPARATOR GATE B, PIECE MARKED (2), TIGHT AGAINST THE NOSE ENDS OF THE BOMBS IN THE FIRST TWO PALLETS. NOTE THAT THE SIDE WITH THE 2" X 2" LEGS IS POSITIONED AGAINST THE NOSE END OF THE BOMBS.

5. REPEAT STEPS 2, 3, AND 4 UNTIL ALL 12 TWO-WIDE PALLETS OF 500-LB BOMBS ARE LOADED.

6. AFTER ALL 12 PALLETS ARE LOADED, POSITION THE 2" X 4" BY LENGTH-TO-SUIT SIDE BLOCKING, PIECE MARKED (3), 1/2" AWAY FROM THE PALLET BASE AND IN LINE WITH THE SIDE BLOCKING ON THE OPPOSITE SIDE OF THE TRAILER. NAIL TO THE TRAILER FLOOR W/1-10D NAIL EVERY 8".

7. POSITION A RETAINER GATE A, PIECE MARKED (4), AT EACH END OF THE LOAD. NOTE THAT THE 2" X 8" BEARING PIECE IS POSITIONED AGAINST THE NOSE AND/OR BASE END OF THE BOMBS.

8. INSTALL 14 MICKEY MOUSE TIEDOWN ANCHORS ON EACH SIDE OF THE TRAILER AT EACH LOCATION A WEB STRAP TIEDOWN ASSEMBLY IS REQUIRED.

9. INSTALL WEB STRAP TIEDOWN ASSEMBLIES AS INSTRUCTED IN KEY NUMBERS (5), (6), AND (7) ON PAGE B.

BILL OF MATERIAL

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</tr>
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<td>WEB STRAPS</td>
<td>16 REOED</td>
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LOAD AS SHOWN (SEE NOTE BELOW)

ITEM       QUANTITY  WEIGHT (APPROX)
Pallet------ 12         36,420 LBS
Dunnage---- 12         396 LBS
Total Weight----- 36,816 LBS

WEB STRAP TIEDOWN ASSEMBLY (8 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIE-DOWN ANCHOR ON SIDE OF TRAILER, OVER TOP OF TWO LATERALLY ADJACENT PALLETS, TO A TIE-DOWN ANCHOR ON THE OPPOSITE SIDE OF THE TRAILER, POSITION STRAP SCUFF SLEEVES AT SHARP EDGES, TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. NOTE: POSITION THESE STRAPS OVER TOP OF THE SUPPORT ASSEMBLY, PIECE MARKED 6. SEE GENERAL NOTES "E" AND "F" ON PAGE 2.

WEB STRAP TIEDOWN ASSEMBLY (1 REQD). INSTALL STRAP TO EXTEND FROM A TIE-DOWN ANCHOR ON SIDE OF TRAILER, AROUND BOTTOM OF RETAINER GATE B, TO A TIE-DOWN ANCHOR ON THE OPPOSITE SIDE OF THE TRAILER. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES, TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. NOTE: THIS STRAP MUST BE THREADED THROUGH THE OPENING ON EACH SIDE OF THE RETAINER GATE B. SEE GENERAL NOTES "E" AND "F" ON PAGE 2.

WEB TIE-DOWN ASSEMBLY (1 REQD). INSTALL STRAP TO EXTEND FROM A TIE-DOWN ANCHOR ON SIDE OF TRAILER, AROUND TOP OF RETAINER GATE B, TO A TIE-DOWN ANCHOR ON THE OPPOSITE SIDE OF THE TRAILER. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES, TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "E" AND "F" ON PAGE 2.

WEB TIE-DOWN ASSEMBLY (4 REQD). INSTALL EACH STRAP TO EXTEND FROM A TIE-DOWN ANCHOR ON SIDE OF TRAILER, OVER TOP OF THE ONE AND/OR TWO-BOMB PALLETS, TO A TIE-DOWN ANCHOR ON THE OPPOSITE SIDE OF THE TRAILER. POSITION STRAP SCUFF SLEEVES AT SHARP EDGES AND POSITION ONE STRAP SCUFF SLEEVE ON TOP OF THE ONE BOMB AT EACH STRAP LOCATION. TAKE UP EXCESS SLACK IN STRAP AND THEN RATCHET TIGHT. SEE GENERAL NOTES "E" AND "F" ON PAGE 2.
1. A typical load depicting full pallets and less-than-full pallets of the 500-lb bomb is shown loaded on the 34-ton M872 semitrailer having dimensions of 489-1/2" long by 96" wide.

2. Prior to loading the 500-lb bomb pallets on the semitrailer, read the "Loading Sequence" notes on this page.

3. The purpose of this load is to depict methods of securing less-than-full pallets of bombs as shown on pages 12 and 13:

   (A) Pallets containing one, two, or three bombs can be positioned on the trailer floor and secured with side blocking, end braces, and web straps as shown on page 10.

   (B) Pallets containing two or three bombs can also be positioned within a load of six-bomb pallets as shown in the load on page 10.

   (C) Pallets containing four and/or five bombs can be positioned within a load and secured in the same manner as full six-bomb pallets.

4. Each lateral row of one or two pallets must be secured with two web straps over the top as shown. These two straps may be crossed and/or positioned straight across the top of a row, depending on the location of the tie-down anchors. Assume that the straps are positioned over the pallet frame. Do not position the straps over the bombs unless a one-bomb pallet is being loaded.

5. A total of 24 type I (Mickey Mouse) tie-down anchors are required for the load shown. See loading sequence note 15 on this page and tie-down anchor detail on page 20.

6. A total of 16 web strap tie-down assemblies are required for the load shown.

7. Prior to loading the two wide pallet units, position the 2' x 4' by length-to-suit side blocking, piece marked 1, on one side of the trailer only. Position one end against the forward end wall with the outer edge 9" in from the outside edge of the trailer. Nail to the trailer floor w/1-10d nail every 8". The side blocking will consist of available lengths of 2' x 4' lumber for a distance of 16'-0".

8. Position the separator gate A, piece marked 2, with the plywood surface tight against the forward endwall.

9. Position one 500-lb bomb pallet on the trailer floor with the base end tight against the separator gate A and the pallet base tight against the 2' x 4' side blocking. assure that the base ends of all six bombs are tight against the separator gate A.

10. Position the second 500-lb bomb pallet on the trailer floor with the base end tight against the separator gate A and tight against the adjacent pallet. Assume that the base ends of all six bombs are tight against the separator gate A.

11. Position a separator gate B, piece marked 3, tight against the nose end of the bombs in the first two pallets. Note that the side with the 2' x 2' legs is positioned against the nose end of the bombs.

12. Repeat steps 3, 4, and 5 until all 6 two-wide pallets of 500-lb bombs are loaded.

13. After all 6 two-wide pallets are loaded, position the 2' x 4' by length-to-suit side blocking, piece marked 1, 1/2" away from the pallet edges and against the forward endwall. Nail to the trailer floor w/1-10d nail every 8". The side blocking will consist of available lengths of 2' x 4' lumber for a distance of 16'-0". Note that the pallets can be removed and/or loaded without removing the side blocking.

14. Position a retainer gate C, piece marked 4, with the 2' x 6" bearing piece tight against the nose ends of the bombs at the aft end or the two-wide load.

15. Position the support assembly, piece marked 5, on top of the 3-bomb pallet as instructed in Key Number 6.

16. Position one 500-lb bomb pallet in the center of the trailer width with the base end tight against the retainer gate C. Assure that the base ends of all six bombs are tight against the retainer gate C.

17. Position the retainer gate B, piece marked 6, with the load bearing pieces tight against the nose end of the bombs in the one pallet unit at the rear of the two-wide pallet units.

18. Position the one-bomb and two-bomb pallets on the trailer floor at a location that will allow room for the end brace, piece marked 7, to be positioned at each end of the bombs.

19. Position the end braces, pieces marked 7, as instructed in Key Number 7.

20. Position the side blocking, pieces marked 8, as instructed in Key Number 8.

21. Install 12 type I (Mickey Mouse) tie-down anchors on each of side of the trailer at each location a web strap tie-down assembly is required.

22. Install web strap tie-down assemblies as instructed in Key Numbers 9, 10, 11, 12, and 13.
STEEL STRAPPING, 1-1/4" X .035" OR .031" BY 12'-0" LONG (2 REQD). ENCIRCLE THE TOP ASSEMBLY AND THE BASE ASSEMBLY AT LOCATIONS SHOWN.

TOP ASSEMBLY (1 REQD).

SEAL FOR 1-1/4" STEEL STRAPPING (5 REQD). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES.

STEEL STRAPPING, 1-1/4" X .035" OR .031" BY 12'-0" LONG (3 REQD). ENCIRCLE THE TOP ASSEMBLY AND THE BASE ASSEMBLY AT LOCATIONS SHOWN.

INTERMEDIATE ASSEMBLY (1 REQD).

BASE ASSEMBLY (1 REQD).

6-BOMB PALLET UNIT
GROSS WEIGHT ------- 3,035 LBS (APPROX)
CUBE --------------- 42.7 CU FT (APPROX)

5-BOMB PALLET UNIT
OMIT CENTER BOMB IN THE TOP LAYER FROM 6-BOMB PALLET UNIT.

4-BOMB PALLET UNIT
OMIT CENTER BOMBS IN THE TOP AND BOTTOM LAYER FROM 6-BOMB PALLET UNIT.

4 THROUGH 6 500-LB BOMBS

PROJECT DET 24
STEEL STRAPPING, 1-1/4" X .035" OR .031" BY 10'-0" LONG (2 REEL). ENCIRCLE THE TOP ASSEMBLY AND THE BASE ASSEMBLY AT LOCATIONS SHOWN.

SEAL FOR 1-1/4" STEEL STRAPPING (3 REEL). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES.

BASE ASSEMBLY (1 REEL).

3-BOMB PALLETS UNIT

STEEL STRAPPING, 1-1/4" X .035" OR .031" BY 10'-0" LONG (3 REEL). ENCIRCLE THE TOP ASSEMBLY AND THE BASE ASSEMBLY AT LOCATIONS SHOWN.

SEAL FOR 1-1/4" STEEL STRAPPING (3 REEL). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES.

ANTI-CHAFING MATERIAL, PAPER, BURLAP, TAPE OR OTHER SUITABLE MATERIAL.

STEEL STRAPPING, 1-1/4" X .035" OR .031" BY 8'-0" LONG (3 REEL). ENCIRCLE THE BASE ASSEMBLY AT LOCATIONS SHOWN.

BASE ASSEMBLY (1 REEL).

2-BOMB PALLETS UNIT

OMIT CENTER BOMB FROM 3-BOMB PALLETS UNIT.

1-BOMB PALLETS UNIT

POSITION BOMB IN CENTER OF THE BASE ASSEMBLY.

NOTE:
IF LOADING LESS-THAN-PULL PALLETS UNITS SEE THE LOAD ON PAGE 10 AND SPECIAL NOTE 3 ON PAGE 11.

1 THROUGH 3-500 LB BOMBS

PAGE 13

PROJECT DET 24
SEPARATOR GATE A
POSITION AGAINST FORWARD BULKHEAD AS SHOWN IN THE LOAD ON PAGES 4, 6, AND 10.

SEPARATOR GATE B
POSITION BETWEEN ROWS OF BOMBS AS SHOWN IN THE LOAD ON PAGES 4, 6, 8, AND 10.
**VERTICAL PIECE 2" X 4" X 33" (2 REQD). NAIL TO BEARING PIECES W/3-10d NAILS EACH JOINT.**

**RETAINER GATE A**

POSITION AGAINST TWO-WIDE PALLETS AT END OF LOAD AS SHOWN IN THE LOAD ON PAGES 4 AND 8.

**VERTICAL PIECE 2" X 4" X 35" (Doubled) (2 REQD). LAMINATE W/1-10d NAIL EVERY 8".**

**BEARING PIECE, 2" X 8" X 70" (Doubled) (2 REQD).**

POSITION THIS SIDE AGAINST THE LOAD.

**RETAINER GATE B**

POSITION AGAINST ONE-WIDE PALLET AT END OF LOAD AS SHOWN IN THE LOAD ON PAGES 6 AND 10.

**RETAINER GATE B**

POSITION AGAINST ONE-WIDE PALLET AT END OF LOAD AS SHOWN IN THE LOAD ON PAGES 6 AND 10.
VERTICAL PIECE, 2" X 4" X 33" (2 REQD). NAIL TO THE HORIZONTAL PIECES W/2-10d NAILS AT EACH JOINT.

HORIZONTAL PIECE, 2" X 6" X 70" (DOUBLED) (2 REQD). LAMINATE WITH 1-10d NAIL EVERY 8".

RETAINER GATE C
POSITION AGAINST TWO-WIDE PALLETS AS SHOWN IN THE LOAD ON PAGES 6 AND 10.

TIE-PIECE, 2" X 4" X 35" (4 REQD). NAIL TO THE LOAD BEARING PIECES W/2-10d NAILS EACH JOINT.

LOAD BEARING PIECE, 2" X 6" X 61" (3 REQD). POSITION ON EDGE AT LOCATIONS SHOWN.

SUPPORT ASSEMBLY
THIS ASSEMBLY IS FOR USE ON TOP OF A TWO OR THREE-BOMB PALLET UNIT POSITIONED IN BETWEEN TWO SIX-BOMB PALLET UNITS, AS SHOWN IN THE LOAD ON PAGE 10.
LOAD BEARING PIECE, 2" X 10" X 16" (1 REQD), NAIL TO THE VERTICAL PIECE w/4-10d NAILS.

ANGLE BRACE, 2" X 4" BY CUT-TO-FIT (2 REQD). NAIL TO THE VERTICAL PIECE AND BACK-UP CLEAT w/4-10d NAILS AT EACH END. SEE THE DETAIL BELOW.

BACK-UP CLEAT, 2" X 6" X 24" (1 REQD).

VERTICAL PIECE, 2" X 6" X 16" (1 REQD). NAIL TO THE BACK-UP CLEAT w/3-10d NAILS.

END BRACE

FABRICATE THIS BRACE PRIOR TO POSITIONING AGAINST THE BOMBS. POSITION WITH THE LOAD BEARING PIECE TIGHT AGAINST THE NOSE AND/OR BASE END OF THE BOMB AND NAIL TO THE TRAILER FLOOR w/7-10d NAILS. THIS BRACE IS FOR ONE, TWO, OR THREE-BOMB PALLETS ONLY. SEE THE LOAD ON PAGE 10 FOR ADDITIONAL GUIDANCE.

ANGLE BRACE
2 REQD PER EACH END BRACE SHOWN ABOVE.
STEP 1

In this view part of the ratchet housing is shown broken away to depict webbing-to-webbing contact on the take-up spool of the ratchet. Webbing-to-webbing contact is achieved when the operator holds the double line of webbing in an "in line plane to the ratchet" and it makes contact with the single line of webbing.

MARK ON SIDE OF RATCHET HANDLE.
MARK ON END OF TAKE-UP SPOOL.

STEP 2

This view depicts the location of the fixed mark on the ratcheting handle, with another matching mark on the take-up spool, after webbing-to-webbing contact has been made.

MARK ON SIDE OF RATCHET HANDLE.
MARK ON END OF TAKE-UP SPOOL.

STEP 3

This view depicts the location of the mark on the end of the take-up spool after the spool has been rotated one-half turn, after webbing-to-webbing contact has been made.

MARK ON SIDE OF RATCHET HANDLE.
MARK ON END OF TAKE-UP SPOOL.

STEP 4

This view depicts the location of the mark on the end of the take-up spool after the spool has been rotated one full turn, after webbing-to-webbing contact has been made.
STEP 5

This view depicts the location of the mark on the end of the take-up spool. After the spool has been rotated one and one-half turns, after webbing-to-webbing contact has been made, the ratchet handle is broken away to show the locking bar fully seated in the matching locking notch (sprocket gear teeth).

SPECIAL NOTES:

1. The purpose of the ratchet details on page 18 and the detail and notes on this page are to augment the guidance set forth within general note "E" on page 2.

2. The requirements for 1/2 but not more than 1-1/2 wraps of strap on the take-up spool of the tensioning ratchet, as specified within general note "E" on page 2, actually means 1/2 to 1-1/2 wraps of double webbing. Also, the 1/2 to 1-1/2 wraps (turns) are to be accomplished only after enough webbing has been wound onto the spool to achieve a webbing-to-webbing configuration, as shown in the "step 1" detail on page 18.

3. One method that can be used to ensure that the 1/2 to 1-1/2 wraps are wound onto the take-up spool, after webbing-to-webbing contact has been made, is to place a fixed mark (paint or similar material) on the side of the ratchet handle, with the handle in its closed (down) position, and another short matching mark on the end of the spool, as shown in the "step 2" detail on page 18. As the spool is rotated to tension a tie-down strap assembly, the number of wraps (turns) can be determined visually by comparing the "mark" location on the spool to the "mark" location on the ratchet handle with the handle in closed position. See the "step 3" and "step 4" details on page 18, and "step 5" above.

4. Another method that can be used to ensure that the 1/2 to 1-1/2 wraps are achieved, after webbing-to-webbing contact has been made, is to count the audible clicks made by the ratchet assembly as a web strap assembly is being tensioned. The ratchet assembly on most web strap assemblies have 11 teeth on the gearlike device on each end of the take-up spool; some other strap assemblies have only 8 teeth. Therefore, after initial webbing-to-webbing contact has been made, rotate (turn) the spool through a minimum of 6 to a maximum of 16 clicks (1/2 to 1-1/2 wraps) when the gear has 11 teeth, and rotate (turn) the spool through a minimum of 5 to a maximum of 13 clicks (1/2 to 1-1/2 wraps) if the gear has 8 teeth.

(Special notes continued)

5. After a strap assembly has been properly tensioned, care must be exercised to assure that the take-up spool locking latch (spring loaded device with a locking bar on each side of the ratchet assembly) is fully seated on both sides in matching locking notches, which are similar to sprocket gear teeth, that are located on each end of the take-up spool. See "step 5" detail above. The locking latch is "fully seated" when the handle will close and the locking ear, or similar device on the handle, prevents the accidental withdrawal of the locking latch. See "step 1" detail on page 18. If the fully seated condition cannot be achieved, the strap must be released and hand tensioned as tight as possible to achieve the fully seated condition.

6. Another visual method of determining when there is 1/2 to 1-1/2 wraps of webbing on the take-up spool, after initial webbing-to-webbing contact has been made, is to look at the spool. When a tie-down is complete, the strap webbing on the spool of the ratchet should be above the lower curve of the locking notch, and should be below the tips of the teeth of the ratchet as identified in "step 5" above. It should be noted that any procedures that ensure proper tensioning are acceptable and methods on the drawing only provide some methods.

(Continued at right)
**REMOVABLE TIE DOWN ANCHOR (TOP VIEW)**

This tie down anchor is rated at 10,000 pounds and is installed on the M872 semitrailers. It is commonly referred to as the "Mickey Mouse" tie down anchor. There are approximately twenty-eight locations in each side rail of the M872 semitrailer. For installation of this tie down anchor, it is positioned by reaching under the floor of the semitrailer, inserting it up through the hole and rotating it counterclockwise until the center of the tie down ring points directly across the trailer width. This tie down anchor is further identified as NSN 2540-01-112-1732. See special note 11 on page 3.

**TEE-HOOK TIE DOWN ANCHOR (ISOMETRIC VIEW)**

This tie down anchor is rated at 5,000 pounds and is installed on the M872 semitrailers. It is commonly referred to as the "Tee-Hook" tie down anchor. There are five tie down anchor locations in each side rail of the M872 semitrailer. For installation of this tie down anchor, it is positioned by inserting it from the top into one of the elongated slotted holes located in the siderail. Ensure that the tie down anchor is firmly seated and rotated approximately 45° to engaged position before attaching the web strap tie down assembly. This tie down anchor is further identified as NSN 2540-01-113-9285. See special note 11 on page 3.