

APPROVED BY  
BUREAU OF EXPLOSIVES

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# LOADING AND BRACING\* WITH RAPID INTERNATIONAL STANDARDS ORGANIZATION BRACING SYSTEM (RIBS) IN SIDE OPENING ISO CONTAINERS OF MK82 (500 POUND) BOMBS ON MHU-149 SERIES METAL PALLET

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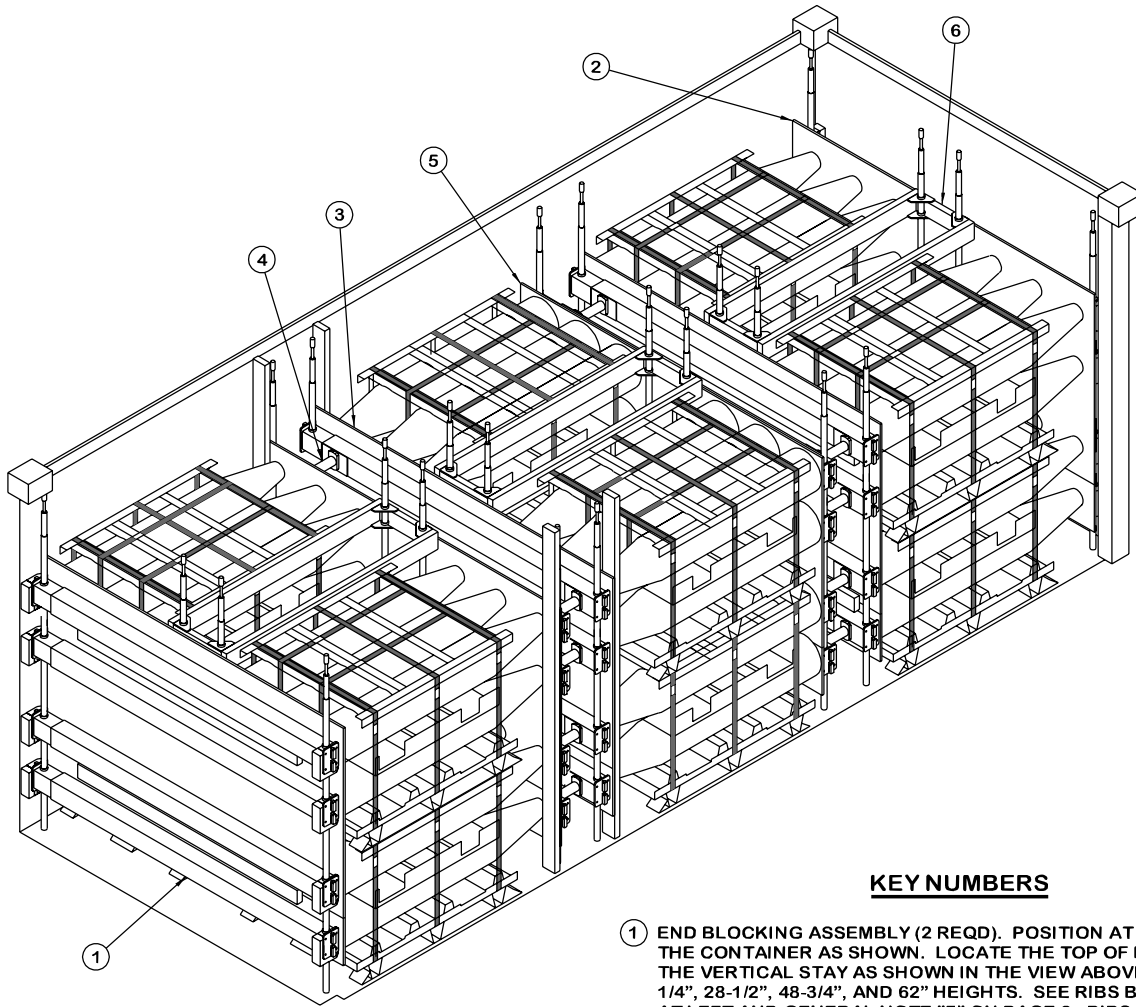
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- LOADING AND BRACING SPECIFICATIONS SET FORTH WITHIN THIS DRAWING ARE APPLICABLE TO LOADS THAT ARE TO BE SHIPPED BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC) RAIL CARRIER SERVICE. THESE SPECIFICATIONS MAY ALSO BE USED FOR LOADS THAT ARE TO BE MOVED BY MOTOR OR WATER CARRIERS.

## U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY JOINT MUNITIONS COMMAND		<b>CAUTION: VERIFY PRIOR TO USE AT WWW.DAC.ARMY.MIL/DET THAT THIS IS THE MOST CURRENT VERSION OF THIS DOCUMENT. THIS IS PAGE 1 OF 6.</b>			
<i>Patrick Dougherty</i>		<b>DO NOT SCALE</b>		<b>DECEMBER 2006</b>	
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U.S. ARMY DEFENSE AMMUNITION CENTER		CLASS	DIVISION	DRAWING	FILE
		19	48	8795	SP15PB19

PROJECT SP 494-03



**ISOMETRIC VIEW**

**KEY NUMBERS**

- ① END BLOCKING ASSEMBLY (2 REQD). POSITION AT EACH END OF THE CONTAINER AS SHOWN. LOCATE THE TOP OF EACH BEAM ON THE VERTICAL STAY AS SHOWN IN THE VIEW ABOVE AT THE 15-1/4", 28-1/2", 48-3/4", AND 62" HEIGHTS. SEE RIBS BILL OF MATERIAL AT LEFT AND GENERAL NOTE "F" ON PAGE 3. RIBS BARS SHALL BE ALIGNED WITH THE CENTER OF THE BOMBS.
- ② LINER ASSEMBLY A (2 REQD). SEE DETAIL ON PAGE 4. POSITION LINER ASSEMBLY WITH THE CLEAT AND TIE PIECE RECESSED BETWEEN RIBS BARS AT EACH END OF THE CONTAINER. SEE GENERAL NOTES "D" AND "P" ON PAGE 3.
- ③ SEPARATOR GATE (2 REQD). SEE DETAIL ON PAGE 5. POSITION SEPARATOR GATES AT THE NOSE END OF THE BOMB PALLETS AS SHOWN. SEE GENERAL NOTE "P" ON PAGE 3.
- ④ CENTER FILL ASSEMBLY (2 REQD). POSITION BETWEEN ROWS OF BOMBS AS SHOWN. LOCATE THE TOP OF EACH BEAM ON THE VERTICAL STAY AS SHOWN IN THE VIEW ABOVE AT THE 15-1/4", 28-1/2", 48-3/4", AND 62" HEIGHTS. SEE RIBS BILL OF MATERIAL AT LEFT. RIBS BARS SHALL BE ALIGNED WITH THE CENTER OF THE BOMBS.
- ⑤ LINER ASSEMBLY B (2 REQD). SEE DETAIL ON PAGE 5. POSITION LINER ASSEMBLY WITH THE CLEAT AND TIE PIECE RECESSED BETWEEN THE RIBS BARS AS SHOWN. SEE GENERAL NOTES "D" AND "P" ON PAGE 3.
- ⑥ CRADLE ASSEMBLY (3 REQD). POSITION BETWEEN BOMB PALLETS AS SHOWN. LOCATE THE TOP OF EACH LONG AND SHORT BEAM ON THE VERTICAL STAYS AS SHOWN IN THE VIEW ABOVE AT THE 7", 34-1/2", 40", AND 68" HEIGHTS. SEE RIBS BILL OF MATERIAL AT LEFT.

**RIBS BILL OF MATERIAL (PER ASSEMBLY)**

PRT #	EQUIPMENT	END ASSY	CENTER FILL	CRADLE
A10	RIBS BAR	4	8	0
A20	VERTICAL STAY	2	4	4
A50	HDS STAY MED.	0	8	0
A80	CORNER CUSHION	8	0	0
A230	CRADLE BEAM	0	0	8
A210	LONG CRADLE BEAM SHORT	0	0	8
ASSEMBLY QUANTITY		2	2	3

**BILL OF MATERIAL**

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	80	53
NAILS	NO. REQD	POUNDS
10d (3")	108	1-3/4
PLYWOOD, 1/2"	220 SQ FT REQD	302 LBS
RIBS COMPONENTS		2,676 LBS

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	12	36,420 LBS
DUNNAGE		3,086 LBS
CONTAINER		6,050 LBS

TOTAL WEIGHT - - - - - 45,556 LBS (APPROX)

K. MAXIMUM LOAD WEIGHT CRITERIA:

THE MAXIMUM LOAD WEIGHTS ARE CONTROLLED BY EQUIPMENT CAPABILITY FACTORS. ALTHOUGH THE HEAVIEST MAXIMUM LOADS ARE DELINEATED IN THE LOAD VIEWS, PROVISIONS ARE INCLUDED WITHIN THIS DRAWING SO THAT THE BASIC LOADS CAN BE ADJUSTED TO SATISFY A LESSER QUANTITY OF LADING UNITS. DEPENDING ON TRANSPORTATION ROUTING, IT MAY BE NECESSARY TO REDUCE THE LOAD WEIGHT TO SATISFY "WEIGHT LAWS" OF CERTAIN STATES. ALSO, IT MAY BE NECESSARY TO REDUCE THE LOAD WEIGHT TO SATISFY OTHER WEIGHT RESTRICTIONS IMPOSED ON THE INTERMODAL CONTAINER SYSTEM.

L. REQUIREMENTS CITED WITHIN THE ASSOCIATION OF AMERICAN RAILROADS (AAR) INTERMODAL LOADING GUIDE APPLY WHEN THE SHIPMENT MOVES BY TRAILER/CONTAINER-ON-FLATCAR (T/COFC). SPECIAL T/COFC NOTES FOLLOW:

- 1. A LOADED CONTAINER MUST BE ON A CHASSIS EQUIPPED WITH TWO BOGIE ASSEMBLIES WHEN BEING MOVED IN TOFC SERVICE.
- 2. THE LOAD LIMIT OF A T/COFC RAILCAR MUST NOT BE EXCEEDED, NOR WILL A CAR BE LOADED SO THAT THE TRUCK UNDER ONE END OF THE CAR CARRIES MORE THAN ONE-HALF OF THE LOAD LIMIT FOR THAT CAR.

M. DURING INTRASTATE AND/OR INTERSTATE MOVES BY MOTOR CARRIER, A PROPER CHASSIS OR MODIFIED FLATBED TRAILER MUST BE USED TO PRECLUDE VIOLATION OF ONE OR MORE "WEIGHT LAWS" APPLICABLE TO THE STATE OR STATES INVOLVED.

N. WHETHER A CONTAINER IS FULL OR IS LOADED WITH A REDUCED QUANTITY OF LADING UNITS, THE LENGTHWISE CENTER OF GRAVITY OF THE LOAD MUST BE WITHIN 12", IN EITHER DIRECTION, OF THE MID-POINT OF THE CONTAINER.

O. THE QUANTITY OF PALLET UNITS SHOWN IN THE LOAD ON PAGE 2 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE LESS-THAN-FULL-LOAD PROCEDURE ON PAGE 6. THE OMITTED UNIT ASSEMBLY SHALL BE LOCATED AT THE CENTER AND TOP OF THE LOAD AS SHOWN ON PAGE 6.

P. IF APPLICABLE, PLASTIC BUFFERS, RIBS PIECE NUMBER 01015-A19, MAY BE SUBSTITUTED FOR THE LINER ASSEMBLIES AND THE SEPARATOR GATES IN THE LOADS ON PAGES 2 AND 6. TO USE, ELIMINATE ALL LINER ASSEMBLIES AND SEPARATOR GATES, AND INSTALL ONE PLASTIC BUFFER ON EACH RIBS BAR TO PREVENT METAL-TO-METAL CONTACT BETWEEN THE RIBS BARS AND THE BOMB BODIES. PLASTIC BUFFER MAY BE HELD IN PLACE WITH WIRE TIES OR NYLON STRAPS.

A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).

B. THE SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO THE MK82 (500 POUND) BOMBS ON MHU-149 SERIES METAL PALLETS. SUBSEQUENT REFERENCE TO THE PALLET UNIT HEREIN MEANS THE MHU-149 SERIES METAL PALLET WITH THE MK82 BOMBS INSTALLED. THIS OUTLOADING PROCEDURE UTILIZES THE RAPID INTERNAL STANDARDS BRACING SYSTEM (RIBS) DEVELOPED BY MOBILE SHELTER SYSTEMS AND SUCCESSFULLY TESTED BY THE DEFENSE AMMUNITION CENTER. THE RIBS COMPONENTS USED IN THIS OUTLOADING PROCEDURE PROVIDE END BLOCKING, CRIB FILL, AND CENTER FILL RESTRAINT OF THE LOAD. SEE PAGE 4 FOR DETAIL OF THE PALLET UNIT. CAUTION: REGARDLESS OF THE QUANTITY OF PALLET UNITS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE SIDE OPENING ISO CONTAINER MUST NOT BE EXCEEDED.

C. THE LOAD AS SHOWN IS BASED ON A 6,050 POUND 20' LONG BY 8' WIDE BY 8'-6" HIGH SIDE OPENING ISO CONTAINER WITH INSIDE DIMENSIONS OF 19'-4" LONG BY 89" WIDE BY 88" HIGH AND A MAXIMUM GROSS WEIGHT OF 52,910 POUNDS. THE LOAD IS DESIGNED FOR TRAILER/CONTAINER-ON-FLATCAR (T/COFC) SHIPMENT; HOWEVER, THE LOAD AS DESIGNED CAN ALSO BE MOVED BY MOTOR OR WATER CARRIERS. NOTICE: OTHER CONTAINERS OF THE SAME DESIGN CONFIGURATION CAN ALSO BE USED.

D. WHEN LOADING THE BOMB PALLET UNITS, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD (TIGHT AGAINST THE RIBS). THE UNBLOCKED SPACE ACROSS THE WIDTH OF A LOAD BAY IS NOT TO EXCEED 1-1/2". EXCESSIVE SLACK CAN BE ELIMINATED FROM A LOAD BY ADJUSTMENT OF THE RIBS COMPONENTS. NOTE: METAL TO METAL CONTACT BETWEEN BOMB BODIES AND/OR RIBS COMPONENTS IS PROHIBITED; THEREFORE, LINER ASSEMBLIES AND SEPARATOR GATES ARE POSITIONED BETWEEN THE BASE AND NOSE OF THE BOMBS AND THE RIBS COMPONENTS. THE CRADLE ASSEMBLIES DO NOT REQUIRE A LINER BETWEEN THE SIDE OF THE PALLET UNITS AND THE CRADLE ASSEMBLY. INSTALLATION OF RIBS COMPONENTS SHALL BE IN ACCORDANCE WITH MOBILE SHELTER SYSTEMS INSTRUCTION MANUAL FOR ASSEMBLY OF RAPID ISO BRACING SYSTEM (RIBS), 01015. CONTACT INFORMATION: MOBILE SHELTER SYSTEMS USA, 3527 S. FEDERAL WAY, SUITE 103 #337, BOISE, ID 83705, PH# 208-869-4490 OR WWW.MSSNO.COM.

E. DUNNAGE LUMBER SPECIFIED IS OF NOMINAL SIZE. FOR EXAMPLE, 1" X 4" MATERIAL IS ACTUALLY 3/4" THICK BY 3-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE.

F. THE END BLOCKING ASSEMBLIES MUST BE POSITIONED SO THAT THE LOAD WILL TRANSFER TO THE CONTAINER CORNER POSTS. THIS MAY BE ACCOMPLISHED BY USE OF THE RIBS CORNER CUSHIONS. DO NOT ALLOW THE RIBS HORIZONTAL PIECES TO CONTACT THE CONTAINER ENDWALLS. ONLY THE CORNER POSTS OF THE CONTAINER SHOULD BE USED FOR LONGITUDINAL BLOCKING.

G. CAUTION: DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.

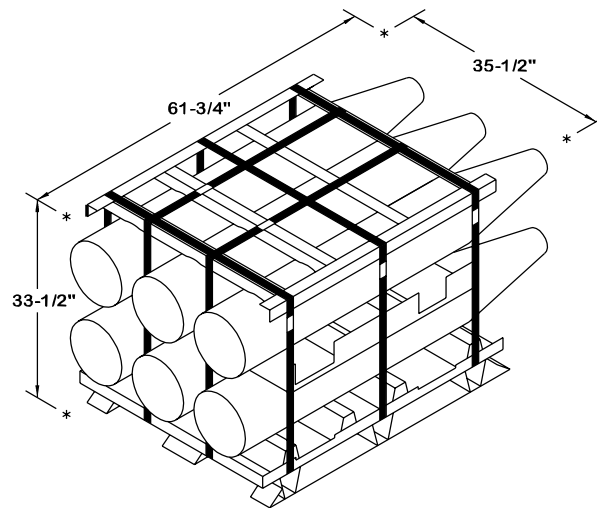
H. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDEWALL, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.

J. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM AND ONE POUND EQUALS 0.454 KG.

(CONTINUED AT LEFT)

MATERIAL SPECIFICATIONS

- RIBS - - - - - -: MOBILE SHELTER SYSTEMS INSTRUCTION MANUAL FOR ASSEMBLY OF RAPID ISO BRACING SYSTEM (RIBS), RIBS 01015.
- LUMBER - - - - - -: SEE TM 743-200-1 (DUNNAGE LUMBER) AND VOLUNTARY PRODUCT STANDARD PS 20.
- NAILS - - - - - -: ASTM F1667; COMMON STEEL NAIL (NLCMS OR NLCMMS).
- PLYWOOD - - - - - -: COMMERCIAL ITEM DESCRIPTION A- A-55057, INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D, IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR EXTERIOR GRADE MAY BE SUBSTITUTED.
- WIRE, CARBON STEEL -: ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, 0.0800" DIA, GRADE 1006 OR BETTER.



**MK82 BOMBS ON MHU-149 SERIES PALLET**

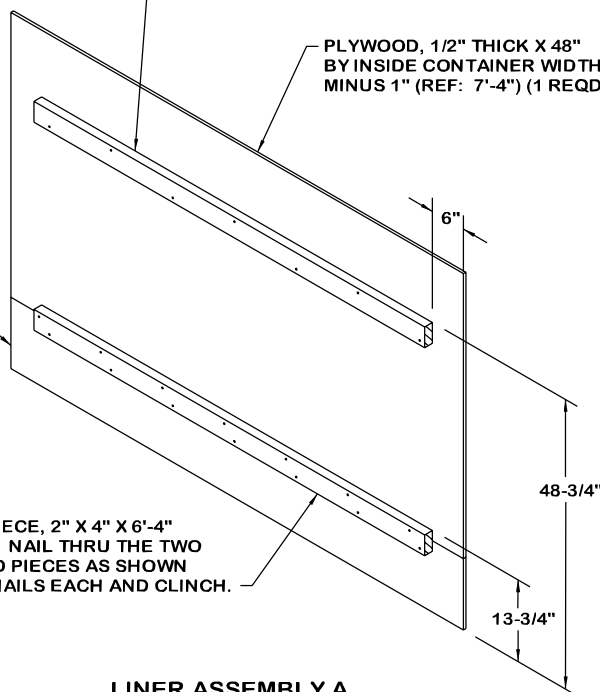
GROSS WEIGHT - - - - - 3,035 LBS (APPROX)  
 CUBE - - - - - 42.5 CU FT (APPROX)

CLEAT, 2" X 4" X 6'-4" (1 REQD).  
 NAIL THRU THE PLYWOOD  
 W/7-10d NAILS AND CLINCH.

PLYWOOD, 1/2" THICK X 48"  
 BY INSIDE CONTAINER WIDTH  
 MINUS 1" (REF: 7'-4") (1 REQD).

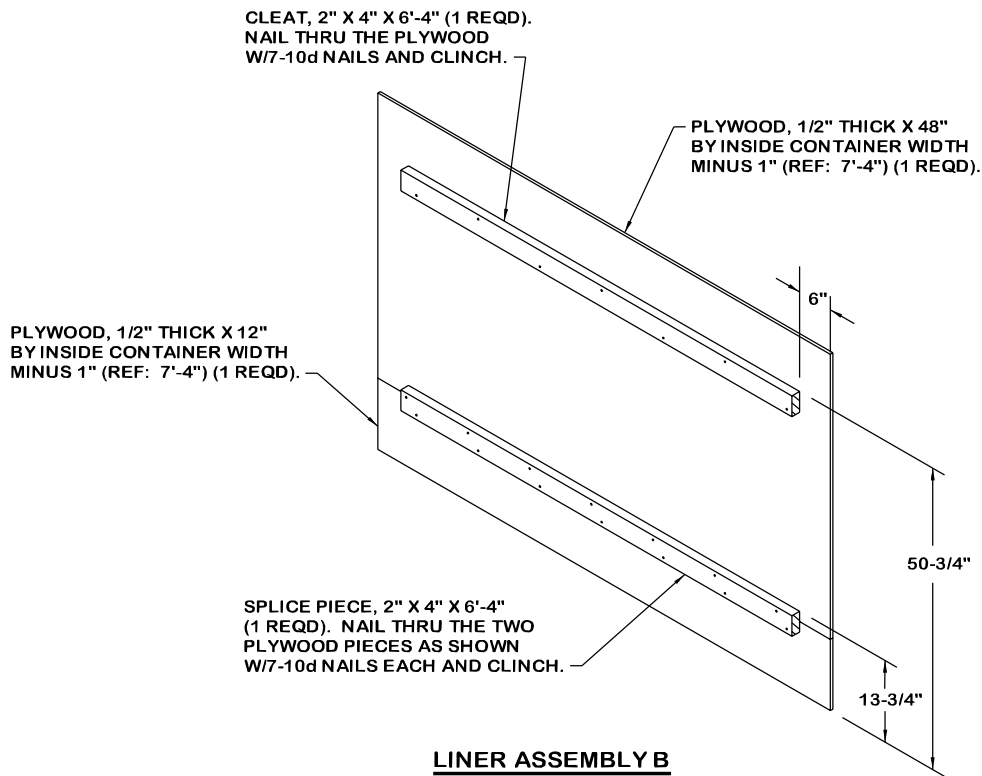
PLYWOOD, 1/2" THICK X 12"  
 BY INSIDE CONTAINER WIDTH  
 MINUS 1" (REF: 7'-4") (1 REQD).

SPLICE PIECE, 2" X 4" X 6'-4"  
 (1 REQD). NAIL THRU THE TWO  
 PLYWOOD PIECES AS SHOWN  
 W/7-10d NAILS EACH AND CLINCH.



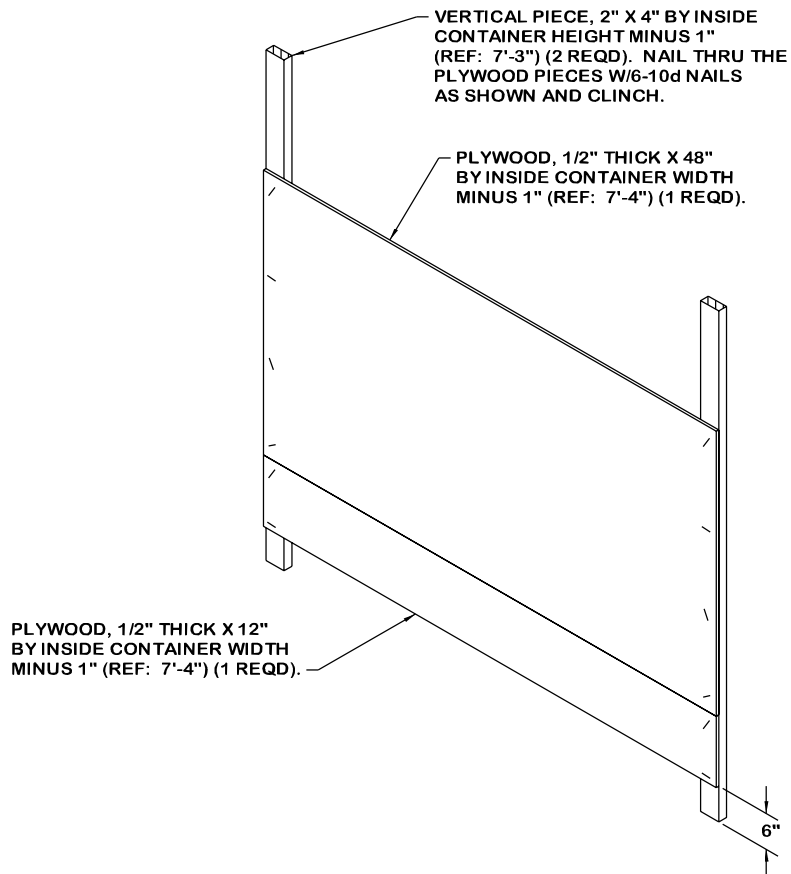
**LINER ASSEMBLY A**

POSITION LINER ASSEMBLY "A" BETWEEN THE BOMB PALLETS AND THE  
 END BLOCKING ASSEMBLY AT EACH END OF THE LOAD AS SHOWN ON  
 PAGE 2. THE CLEAT SHALL BE RECESSED BETWEEN THE RIBS BARS.  
 FIELD CHECK TO INSURE PROPER CLEAT LOCATION. SEE GENERAL  
 NOTES "D" AND "P" ON PAGE 3.



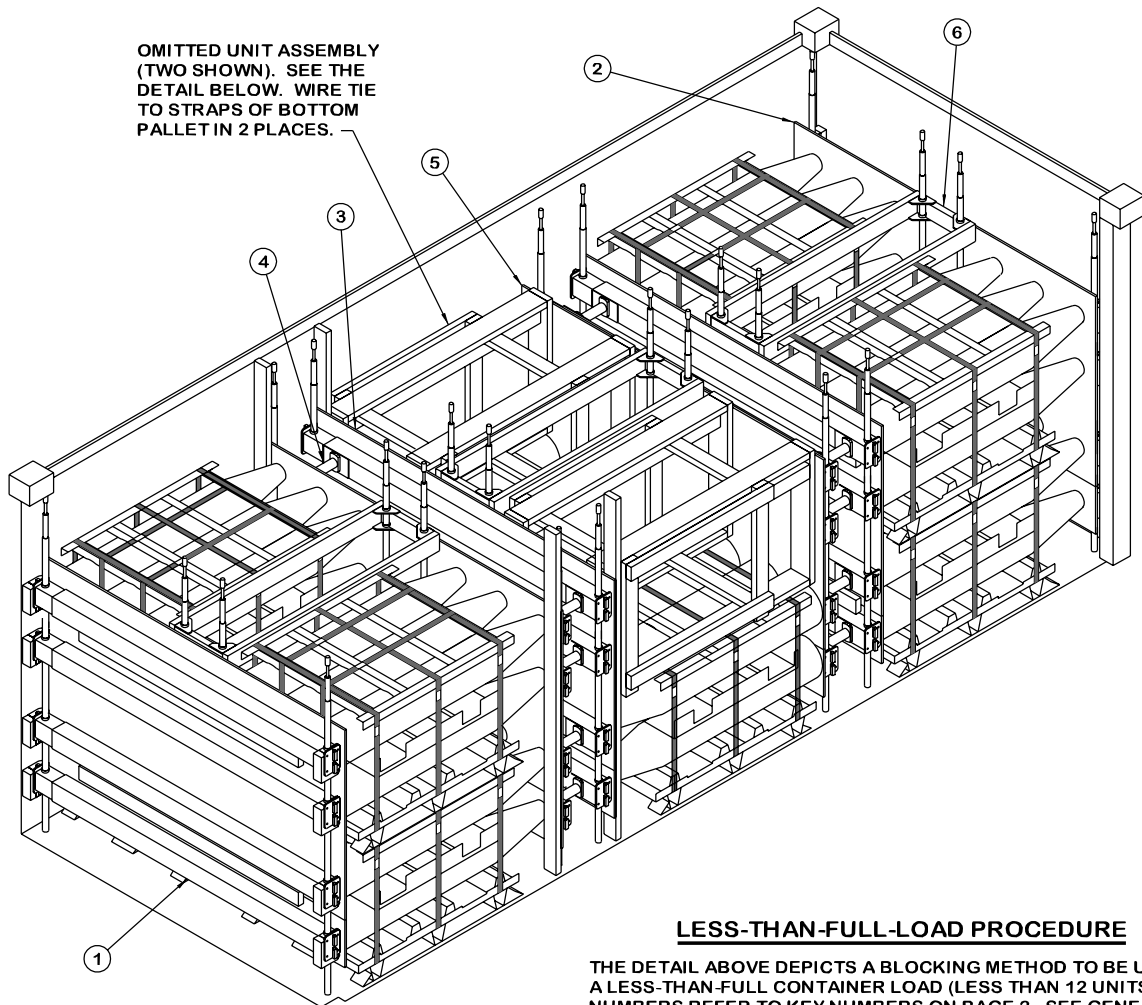
**LINER ASSEMBLY B**

POSITION LINER ASSEMBLY "B" AGAINST THE BASE OF THE BOMB PALLETS AS SHOWN IN THE LOAD ON PAGE 2. THE CLEAT AND SPLICE PIECE SHALL BE RECESSED BETWEEN THE RIBS BARS. FIELD CHECK TO INSURE PROPER CLEAT LOCATION. SEE GENERAL NOTES "D" AND "P" ON PAGE 3.



**SEPARATOR GATE**

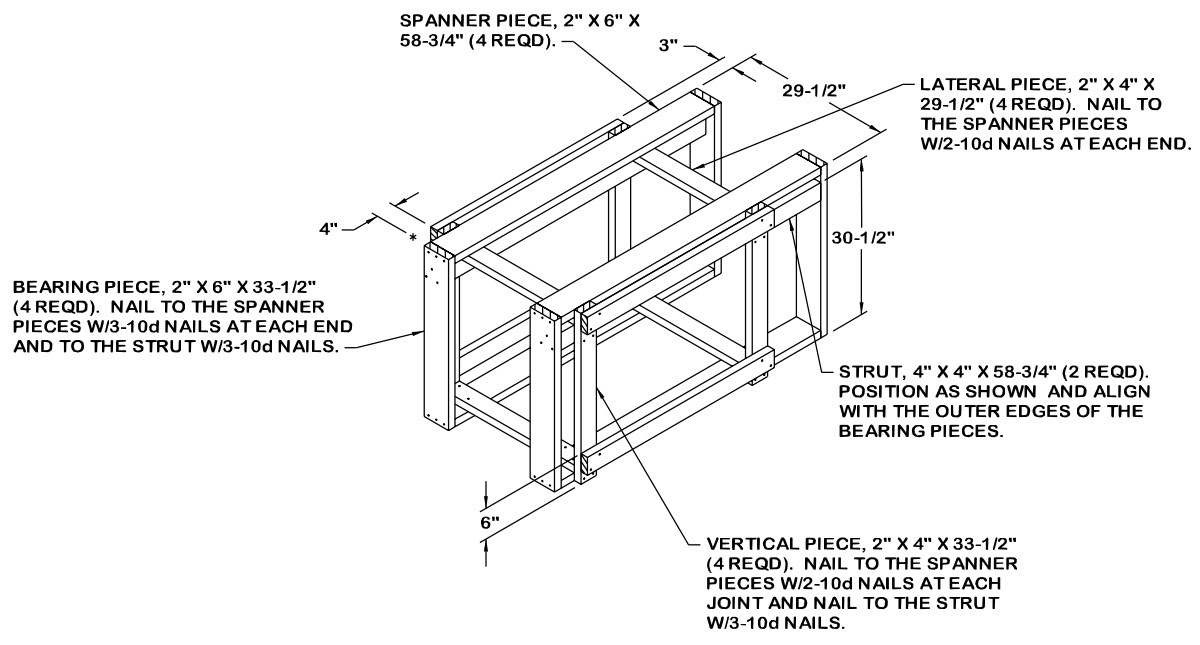
POSITION SEPARATOR GATE BETWEEN THE NOSE END OF THE BOMB PALLETS AND THE CENTER FILL ASSEMBLY IN TWO LOCATIONS AS SHOWN ON PAGE 2. SEE GENERAL NOTES "D" AND "P" ON PAGE 3.



OMITTED UNIT ASSEMBLY (TWO SHOWN). SEE THE DETAIL BELOW. WIRE TIE TO STRAPS OF BOTTOM PALLET IN 2 PLACES.

**LESS-THAN-FULL-LOAD PROCEDURE**

THE DETAIL ABOVE DEPICTS A BLOCKING METHOD TO BE USED IN A LESS-THAN-FULL CONTAINER LOAD (LESS THAN 12 UNITS). KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 2. SEE GENERAL NOTE "N" ON PAGE 3.



**OMITTED UNIT ASSEMBLY**