

APPROVED BY
BUREAU OF EXPLOSIVES

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LOADING AND BRACING WITH WOODEN DUNNAGE IN SIDE OPENING ISO CONTAINERS OF CHARGE, DEMOLITION, LINEAR, HE M58, M58A1 & M58A2, AND INERT M68 & M68A1, IN METAL SHIPPING AND STORAGE CONTAINER

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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			
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DO NOT SCALE

GENERAL NOTES

(GENERAL NOTES CONTINUED)

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE OUTLOADING PROCEDURES SPECIFIED IN THIS DRAWING ARE APPLICABLE TO LOADS OF LINEAR CHARGES, HE M58, M58A1, AND M58A2 AND INERT M68 AND M68A1 IN METAL SHIPPING AND STORAGE CONTAINERS. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE CONTAINER WITH CONTENTS. CAUTION: REGARDLESS OF THE QUANTITY OF UNITS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE SIDE OPENING ISO CONTAINER MUST NOT BE EXCEEDED.

- C. FOR DETAILS OF THE SHIPPING AND STORAGE CONTAINER, SEE THE DETAIL ON PAGE 3.

CONTAINER DIMENSIONS - - - - 7'-10-3/4" LONG X 54" WIDE X 25" HIGH

GROSS WEIGHT (APPROX)

- WITH HE COMP C4, M58 CHARGE, DODIC M025 - - - 3,000 LBS
- WITH HE COMP C4, M58A1 CHARGE, DODIC M025 - - 3,000 LBS
- WITH HE COMP C54, M58A1 CHARGE, DODIC M913 - 3,000 LBS
- WITH HE COMP C4, M58A2 CHARGE, DODIC M913 - - 3,000 LBS
- WITH INERT, M68 CHARGE, DODIC M051 - - - - - 3,000 LBS
- WITH INERT, M68A1 CHARGE, DODIC M051 - - - - - 3,000 LBS

CUBE - - - - - 74.0 CUBIC FEET

- D. THE LOADS AS SHOWN ARE BASED ON 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.
- E. WHEN LOADING THE UNITS, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD (TIGHT AGAINST THE DUNNAGE ASSEMBLIES). 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 LAMINATING ADDITIONAL PIECES OF APPROPRIATE THICKNESS TO THE SIDE FILL ASSEMBLIES. NAIL EACH ADDITIONAL PIECE TO THE HORIZONTAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE LENGTH OF THE STRUTS MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE SIZE OF THE CONTAINER.
- F. DUNNAGE LUMBER SPECIFIED IS OF NOMINAL SIZE. FOR EXAMPLE, 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE
- G. A STAGGERED NAILING PATTERN WILL BE USED WHENEVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES OR WHEN LAMINATING DUNNAGE. ADDITIONALLY, THE NAILING PATTERN FOR AN UPPER PIECE OF LAMINATED DUNNAGE WILL BE ADJUSTED AS REQUIRED SO THAT A NAIL FOR THAT PIECE WILL NOT BE DRIVEN THROUGH ONTO OR RIGHT BESIDE A NAIL IN A LOWER PIECE

(CONTINUED AT RIGHT)

MATERIAL SPECIFICATIONS

- LUMBER - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND FED SPEC MM-L-751.
- NAILS - - - - - : FED SPEC FF-N-105; COMMON.
- PLYWOOD - - - - - : COMMERCIAL ITEM DESCRIPTION A-A-55057, TYPE A, CONSTRUCTION AND INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR AN EXTERIOR GRADE MAY BE SUBSTITUTED.
- STRAPPING, STEEL - - : ASTM D3953; FLAT STRAPPING, TYPE 1, HEAVY DUTY, FINISH A, B (GRADE 2), OR C.
- SEAL, STRAP - - - - : ASTM D3953; CLASS H, FINISH A, B (GRADE 2), OR C, DOUBLE NOTCH TYPE, STYLE I, II, OR IV.
- ANTI-CHAFING MATERIAL - - - - - : MIL-B-121 (OR EQUAL); NEUTRAL BARRIER MATERIAL.

- H. IN SOME CONTAINERS THERE IS A SLOT AT THE CORNERS OF THE ENDWALLS. PIECES OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE BUFFER PIECES ON THE END BLOCKING ASSEMBLY TO PROVIDE A FLAT SURFACE FOR THE BUFFER PIECES. A PIECE OF 2" X 4", 2" X 3" OR A SPECIAL WIDTH PIECE CUT-TO-FIT CAN BE USED. THIS FILL PIECE WILL BE NAILED WITH ONE APPROPRIATELY SIZED NAIL EVERY 12". NOTE THAT SOME CONTAINERS ARE EQUIPPED WITH "TIE-BARS" IN THE CORNER SLOT, WHICH PRECLUDE THE USE OF A FULL HEIGHT FILL PIECE. WHEN "TIE-BARS" ARE PRESENT, THE FILL PIECE MUST BE INSTALLED IN SEGMENTS DESIGNED TO FIT BETWEEN THE "TIE-BARS" VERTICALLY. THE FILL PIECE(S) IS NOT REQUIRED WHEN THE CORNER PORTIONS OF THE CONTAINER ENDWALLS ARE SMOOTH AND FLAT. DO NOT ALLOW ANY DUNNAGE ASSEMBLY TO CONTACT THE CONTAINER ENDWALLS, ONLY THE CORNER POSTS OF THE CONTAINER SHOULD BE USED FOR LONGITUDINAL BLOCKING.

- J. CAUTION: DO NOT NAIL DUNNAGE MATERIAL TO THE CONTAINER WALLS OR FLOOR. ALL NAILING WILL BE WITHIN THE DUNNAGE.
- K. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDE DOORS, HAVE NOT BEEN SHOWN IN THE LOAD VIEW FOR CLARITY PURPOSES.
- L. 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.

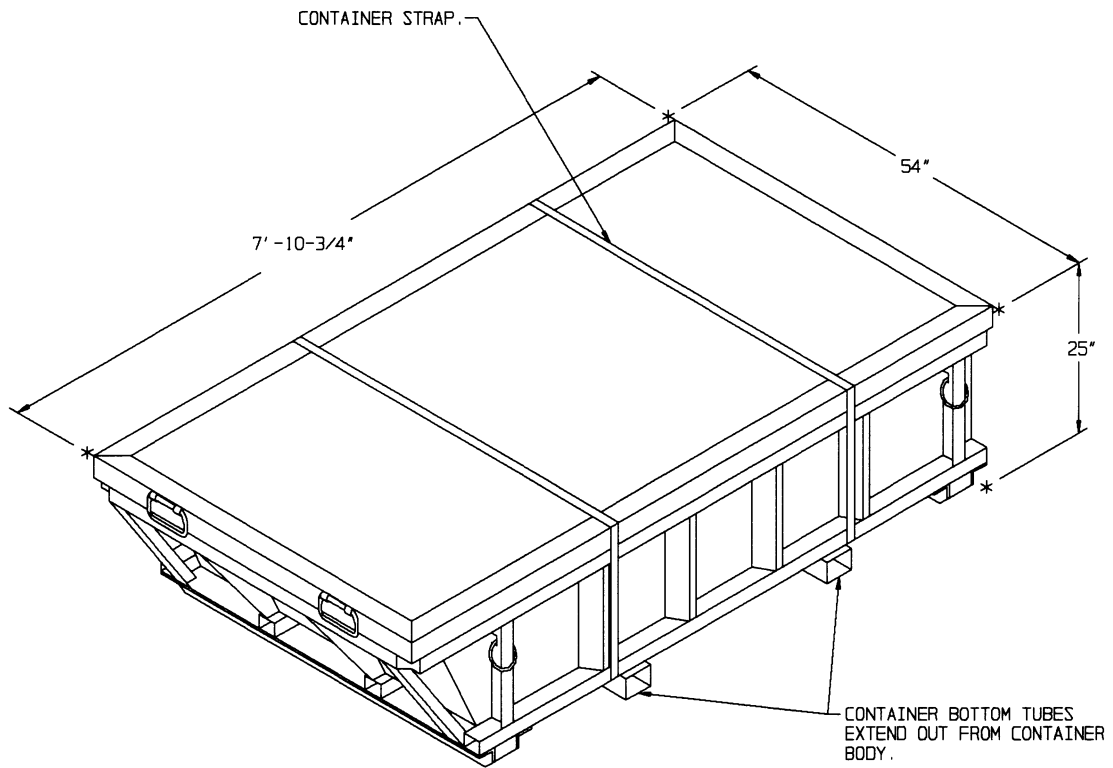
- M. MAXIMUM LOAD WEIGHT CRITERIA:
THE MAXIMUM LOAD WEIGHTS ARE CONTROLLED BY EQUIPMENT CAPABILITY FACTORS. ALTHOUGH THE HEAVIEST MAXIMUM LOADS ARE DELINEATED IN THE LOAD VIEWS, PROVISIONS ARE INCLUDED WITHIN THIS DRAWING SO THAT THE BASIC LOADS CAN BE ADJUSTED TO SATISFY A LESSER QUANTITY OF LADING 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.

- N. REQUIREMENTS CITED WITHIN THE BUREAU OF EXPLOSIVES PAMPHLET 6C 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.

- O. 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.

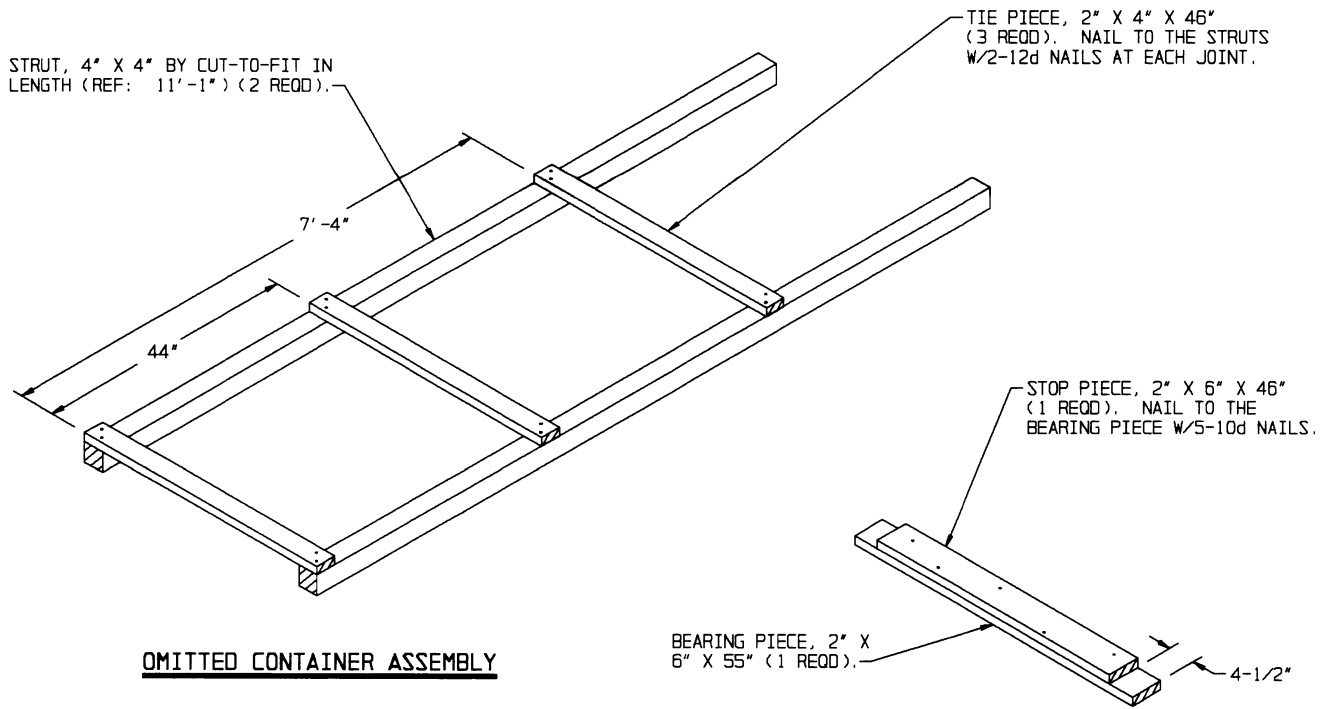
- P. THE QUANTITY OF CONTAINERS SHOWN IN THE LOAD ON PAGE 4 MAY BE REDUCED FOR SHIPMENT, IF DESIRED. SEE THE "LESS-THAN-FULL-LOAD" DETAIL ON PAGE 8. WHEN A CONTAINER IS TO BE LOADED WITH A REDUCED QUANTITY OF LADING UNITS, THE LENGTHWISE CENTER OF GRAVITY OF THE LOAD MUST BE WITHIN 12", IN EITHER DIRECTION, OF THE MID-POINT OF THE CONTAINER.

- Q. ANTI-CHAFING MATERIAL MAY BE INSTALLED BETWEEN CONTAINERS AND STEEL STRAPPING, IF DESIRED, TO PREVENT CHAFING DAMAGE TO CONTAINER PAINT AND MARKINGS.



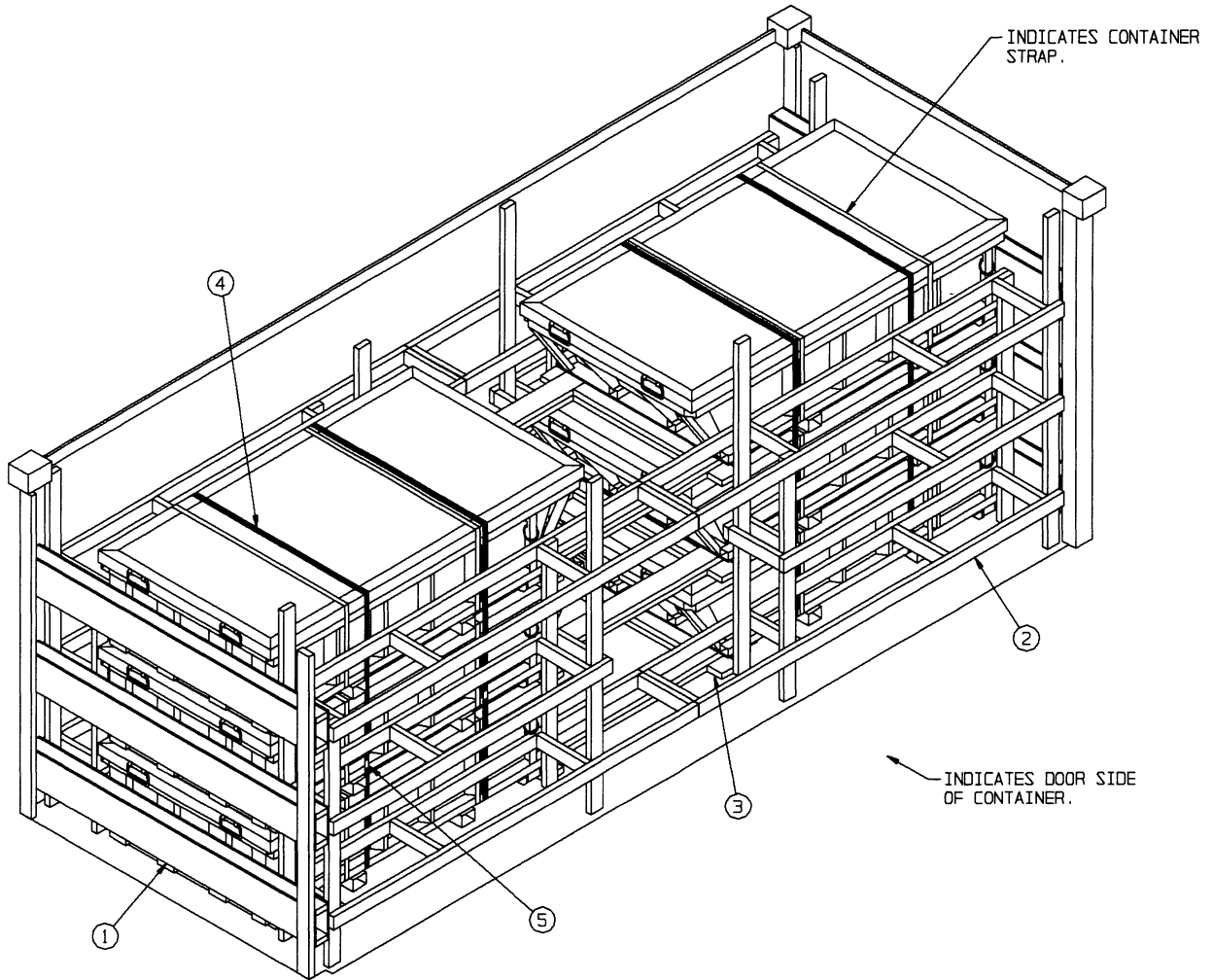
SHIPPING AND STORAGE CONTAINER

GROSS WEIGHT ----- 3,000 LBS (APPROX)
 CUBE ----- 74.0 CUBIC FEET (APPROX)



OMITTED CONTAINER ASSEMBLY

BEARING ASSEMBLY



ISOMETRIC VIEW

KEY NUMBERS

- ① END BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 6.
- ② SIDE FILL ASSEMBLY (4 REQD). SEE THE DETAIL ON PAGE 6.
- ③ CENTER BLOCKING ASSEMBLY (3 REQD). SEE THE DETAILS ON PAGE 7.
- ④ BUNDLING STRAP, 1-1/4" X .035" OR .031" BY LENGTH TO SUIT (REF: 22'-0") (4 REQD, 2 PER STACK). INSTALL TO ENCIRCLE EACH STACK OF THREE CONTAINERS.
- ⑤ SEAL FOR 1-1/4" STRAPPING (4 REQD). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES.

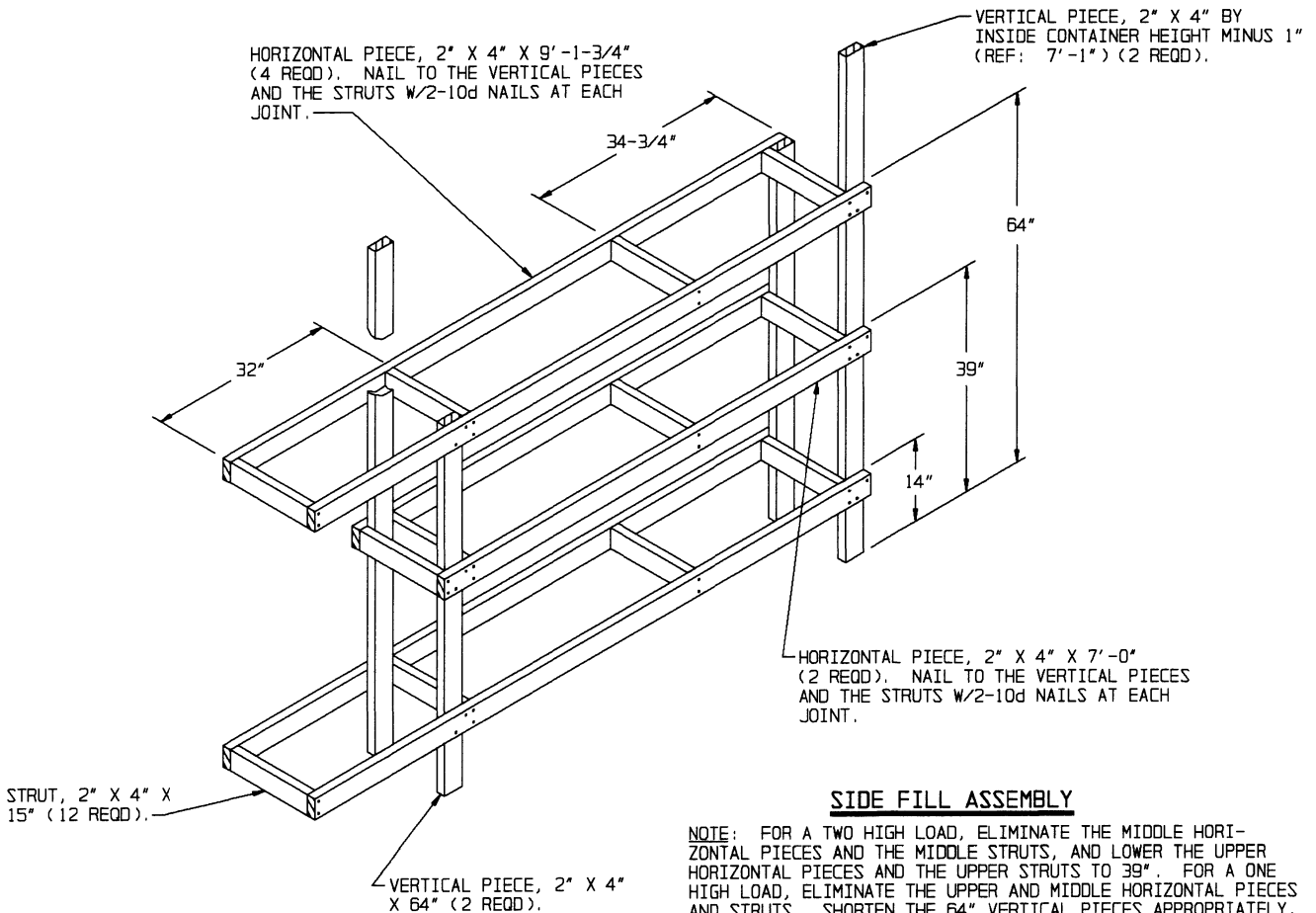
RECOMMENDED SEQUENTIAL LOADING PROCEDURES

1. PREFABRICATE TWO END BLOCKING ASSEMBLIES, FOUR SIDE FILL ASSEMBLIES AND THREE CENTER BLOCKING ASSEMBLIES.
2. INSTALL ONE END BLOCKING ASSEMBLY.
3. INSTALL ONE SIDE FILL ASSEMBLY AND LOAD THREE CONTAINERS WITH BUNDLING STRAPS AND SEALS.
4. REPEAT STEP 3.
5. INSTALL THREE CENTER BLOCKING ASSEMBLIES.
6. INSTALL TWO SIDE FILL ASSEMBLIES.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	476	318
2" X 6"	99	99
NAILS	NO. REQD	POUNDS
6d (2")	264	1-3/4
10d (3")	426	6-3/4
STEEL STRAPPING, 1-1/4" --- 88' REQD --- 13 LBS		
SEAL FOR 1-1/4" STRAPPING --- 4 REQD --- NIL		
PLYWOOD, 1/2" --- 68.08 SQ FT REQD --- 93.61 LBS		

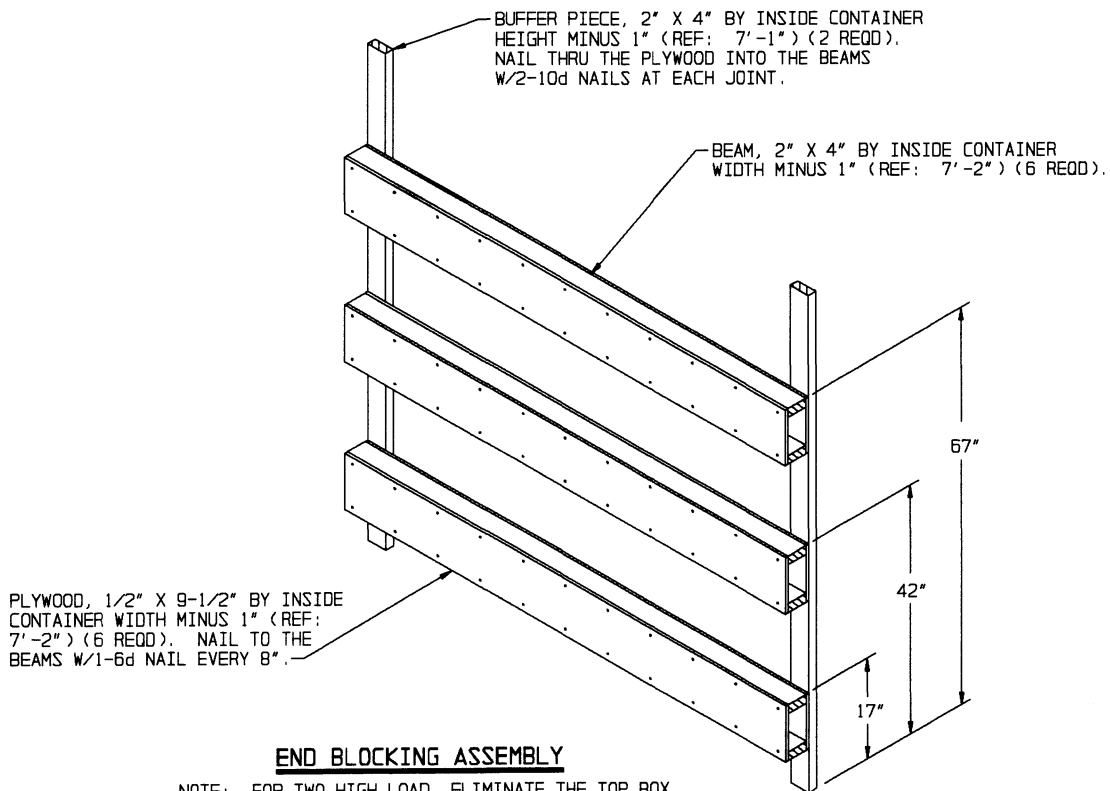
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CONTAINER	6	18,000 LBS
DUNNAGE		950 LBS
CONTAINER		6,050 LBS
TOTAL WEIGHT		25,000 LBS (APPROX)



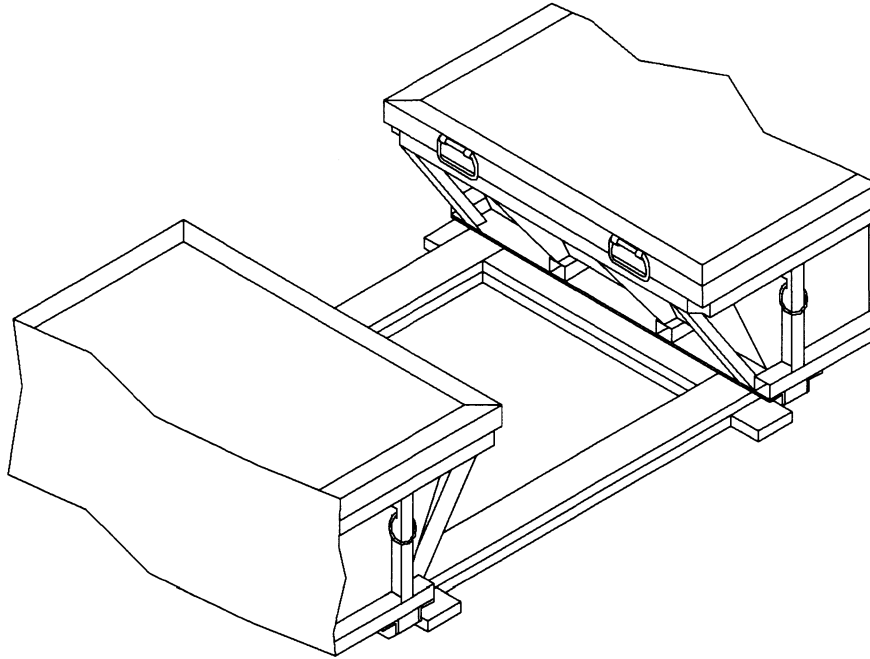
SIDE FILL ASSEMBLY

NOTE: FOR A TWO HIGH LOAD, ELIMINATE THE MIDDLE HORIZONTAL PIECES AND THE MIDDLE STRUTS, AND LOWER THE UPPER HORIZONTAL PIECES AND THE UPPER STRUTS TO 39". FOR A ONE HIGH LOAD, ELIMINATE THE UPPER AND MIDDLE HORIZONTAL PIECES AND STRUTS. SHORTEN THE 64" VERTICAL PIECES APPROPRIATELY. THE LENGTH OF THE STRUTS IS DEPENDENT ON THE VOID AT THE SIDES OF THE LOAD.



END BLOCKING ASSEMBLY

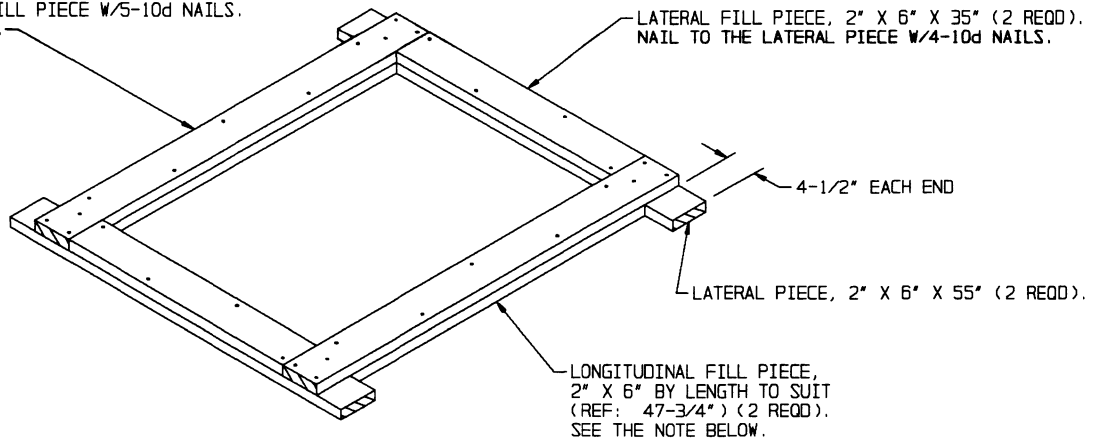
NOTE: FOR TWO HIGH LOAD, ELIMINATE THE TOP BOX BEAM ASSEMBLY, AND FOR A ONE HIGH LOAD, ELIMINATE THE TOP TWO BOX BEAM ASSEMBLIES. SEE THE SPECIAL NOTES ON PAGE 8 FOR REDUCED LOADS.



CENTER BLOCKING LOCATION DETAIL

LONGITUDINAL PIECE, 2" X 6" BY LENGTH TO SUIT (REF: 58-3/4") (2 REQD). NAIL TO THE LATERAL PIECES W/3-10d NAILS AT EACH JOINT AND TO THE LONGITUDINAL FILL PIECE W/5-10d NAILS. SEE THE NOTE BELOW.

LATERAL FILL PIECE, 2" X 6" X 35" (2 REQD). NAIL TO THE LATERAL PIECE W/4-10d NAILS.



4-1/2" EACH END

LATERAL PIECE, 2" X 6" X 55" (2 REQD).

LONGITUDINAL FILL PIECE, 2" X 6" BY LENGTH TO SUIT (REF: 47-3/4") (2 REQD). SEE THE NOTE BELOW.

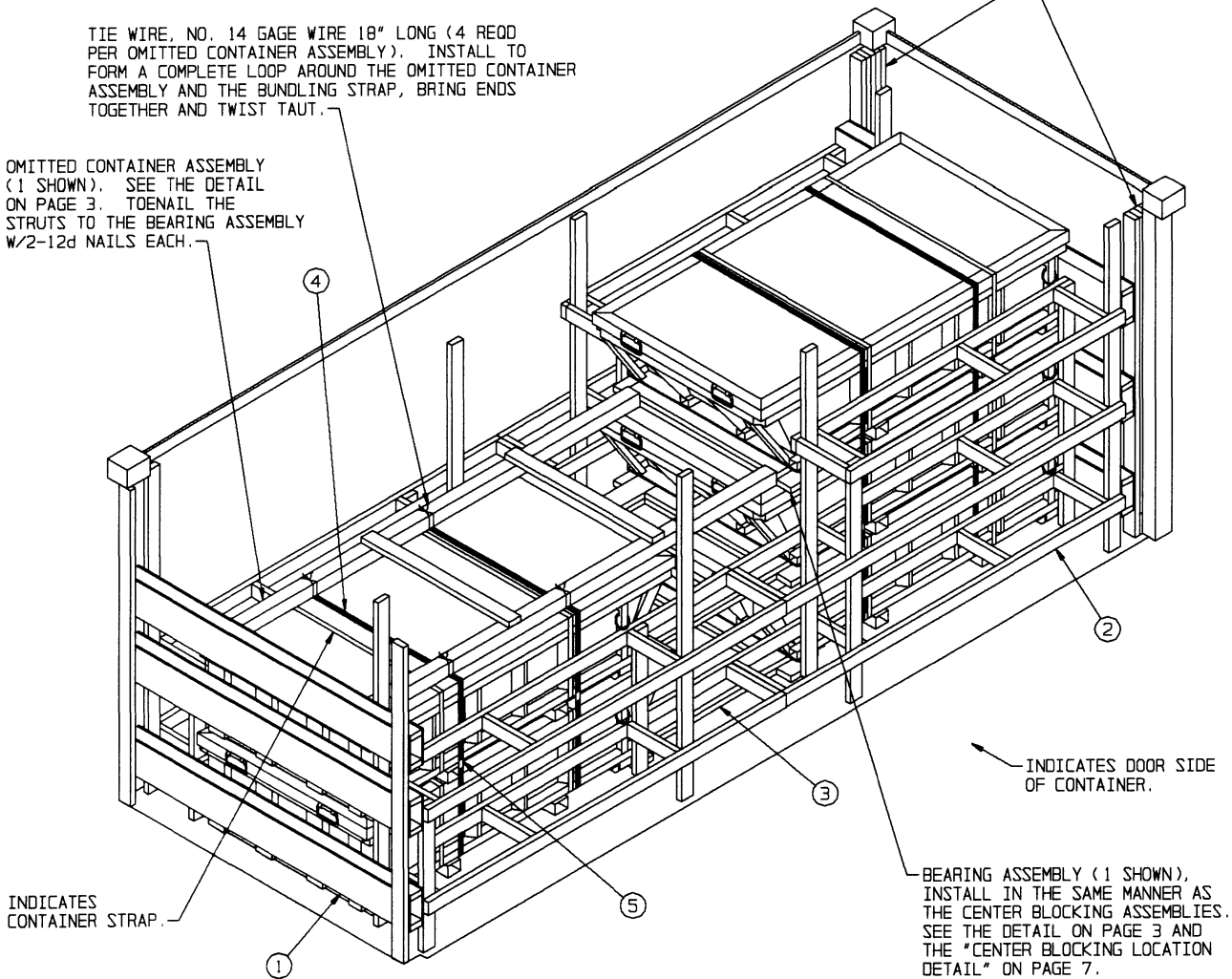
CENTER BLOCKING ASSEMBLY

NOTE: THE DISTANCE BETWEEN LOADED CONTAINER SKIDS SHOULD BE FIELD CHECKED PRIOR TO FABRICATING THIS ASSEMBLY TO VERIFY THE ACTUAL LENGTH OF THE LONGITUDINAL PIECE AND THE LONGITUDINAL FILL PIECE.

FILL PIECE, 2" X 4" BY INSIDE CONTAINER HEIGHT MINUS 1" (REF: 7'-1") (QUADRUPLED) (2 REQD). LAMINATE THE FIRST PIECE TO THE BUFFER PIECE OF PIECE MARKED ① W/6-10d NAILS. LAMINATE EACH ADDITIONAL PIECE TO THE PREVIOUS PIECE IN A LIKE MANNER. SEE THE SPECIAL NOTE BELOW.

TIE WIRE, NO. 14 GAGE WIRE 18" LONG (4 REQD PER OMITTED CONTAINER ASSEMBLY). INSTALL TO FORM A COMPLETE LOOP AROUND THE OMITTED CONTAINER ASSEMBLY AND THE BUNDLING STRAP, BRING ENDS TOGETHER AND TWIST TAUT.

OMITTED CONTAINER ASSEMBLY (1 SHOWN). SEE THE DETAIL ON PAGE 3. TOENAIL THE STRUTS TO THE BEARING ASSEMBLY W/2-12d NAILS EACH.



ISOMETRIC VIEW

LESS-THAN-FULL-LOAD PROCEDURE

KEY NUMBERS REFER TO KEY NUMBERS ON PAGE 4.

SPECIAL NOTE:

WHEN LOADING AN ODD NUMBER OF CONTAINERS, AS SHOWN ABOVE, THE FOLLOWING MODIFICATIONS MUST BE MADE TO THE DUNNAGE ASSEMBLIES AND THE LOAD:

1. THE TOP BEAM ASSEMBLY ON THE END BLOCKING ASSEMBLY ADJACENT TO THE OMITTED CONTAINER MUST BE LOWERED BY 7'-1/2".
2. THE 9'-1-1/2" HORIZONTAL PIECES AND THE EXTRA STRUT ON THE SIDE FILL ASSEMBLIES ADJACENT TO THE TALLER STACK OF CONTAINERS MUST BE SWITCHED WITH THE 7'-0" HORIZONTAL PIECES, SO THAT THE 9'-1-1/2" PIECES ARE IN THE MIDDLE, AND THE 7'-0" PIECES ARE ON THE TOP OF THE ASSEMBLY. ALSO, THE WHOLE ASSEMBLY MUST BE SHORTENED BY 6", TO 8'-7-1/2".
3. THE SIDE FILL ASSEMBLIES ADJACENT TO THE SHORT STACK OF CONTAINERS MUST BE MODIFIED AS DESCRIBED ON PAGE 6 FOR A TWO HIGH LOAD.
4. FOUR FILL PIECES (6" TOTAL) MUST BE LAMINATED TO EACH OF THE BUFFER PIECES OF THE END BLOCKING ASSEMBLY ADJACENT TO THE TALLER STACK. THIS WILL SHIFT THE CENTER OF GRAVITY TO WITHIN 12" OF THE CENTER OF THE CONTAINER, AS REQUIRED IN GENERAL NOTE "P" ON PAGE 2.