APPROVED BY
BUREAU OF EXPLOSIVES

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LOADING AND BRACING● WITH WOODEN DUNNAGE IN HALF-HIGH ISO CONTAINERS OF PROPELLING CHARGES PACKED IN PA37 SERIES CYLINDRICAL METAL CONTAINERS

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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-FLAT CAR (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 ARMAMENT, MUNITIONS AND CHEMICAL COMMAND

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DO NOT SCALE

PROJECT CA 289-92

GENERAL NOTES

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

B. THE SPECIFIED OUTLOADING PROCEDURE IS APPLICABLE TO A 20-CONTAINER PALLET UNIT OF PROPELLING CHARGES PACKED IN THE PA37 SERIES CYLINDRICAL METAL CONTAINER. SUBSEQUENT REFERENCE TO PALLET UNIT MEANS THE PALLET UNIT WITH AMMUNITION ITEMS. SEE THE PALLET UNIT DETAIL ON PAGE 3. CAUTION: REGARDLESS OF THE QUANTITY OF UNITS TO BE SHIPPED, THE "MAXIMUM GROSS WEIGHT" OF THE ISO CONTAINER MUST NOT BE EXCEEDED.

C. THE LOAD AS SHOWN IS BASED ON 4,800 POUND 20' LONG BY 8'-0" WIDE BY 4'-3" HIGH HALF-HIGH INTERMODAL FREIGHT CONTAINER WITH INSIDE DIMENSIONS OF 19'-2-1/2" LONG BY 92" WIDE BY 40-1/2" HIGH. THE LOADS ARE DESIGNED FOR TRAILER/CONTAINER-ON-FLAT-CAR (T/COFC) SHIPMENT, HOWEVER, THE LOAD AS DESIGNED CAN ALSO BE MOVED BY OTHER SURFACE MODES OF TRANSPORT. NOTICE: OTHER CONTAINERS OF THE SAME DESIGN CONFIGURATION CAN BE USED.

D. WHEN LOADING PALLET UNITS, THEY ARE TO BE POSITIONED SO AS TO ACHIEVE A TIGHT LOAD AGAINST THE FORWARD BLOCKING ASSEMBLY AND THE SIDE FILL ASSEMBLIES OF THE SIDEWALL OF THE CONTAINER. 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 VERTICAL PIECE W/1 APPROPRIATELY SIZED NAIL EVERY 12". ADDITIONALLY, THE THICKNESS OF THE DUNNAGE LUMBER USED MAY BE ADJUSTED AS REQUIRED TO FACILITATE VARIANCE IN THE SIZE OF THE PALLET UNIT.

E. DUNNAGE LUMBER SPECIFIED IS OF A 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. 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.

G. IN SOME HALF-HIGH CONTAINERS THERE IS A SLOT AT THE CORNERS OF THE FORWARD AND REAR WALLS. A PIECE OF DUNNAGE MATERIAL MUST BE LAMINATED TO THE BUFFER PIECES ON THE FORWARD BLOCKING ASSEMBLY TO PROVIDE A FLAT SURFACE FOR THE 2" X 4" 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". THIS PIECE IS NOT REQUIRED WHEN THE FRONT WALL OF THE CONTAINER IS SMOOTH AND FLAT. NOTE: THE REAR CORNER POSTS IN THE HALF-HIGH CONTAINER WILL PROJECT INTO THE LOAD AREA SUFFICIENTLY TO ALLOW THE FILL PIECES TO BEAR AGAINST IT OR, IF NECESSARY, FILL PIECES CAN BE PLACED AGAINST EDGE OF END DOOR/RAMP.

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

(CONTINUED AT RIGHT)

(GENERAL NOTES CONTINUED)

J. PORTIONS OF THE CONTAINER DEPICTED WITHIN THIS DRAWING, SUCH AS THE SIDEWALL AND TOP RAILS, HAVE NOT BEEN SHOWN IN THE LOAD VIEW FOR CLARITY PURPOSES.

K. REQUIREMENTS CITED WITHIN THE BUREAU OF EXPLOSIVES PAMPHLET 6C APPLY WHEN THE SHIPMENT MOVES BY TRAILER/CONTAINER-ON-FLAT-CAR (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.

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

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 0.454KG.

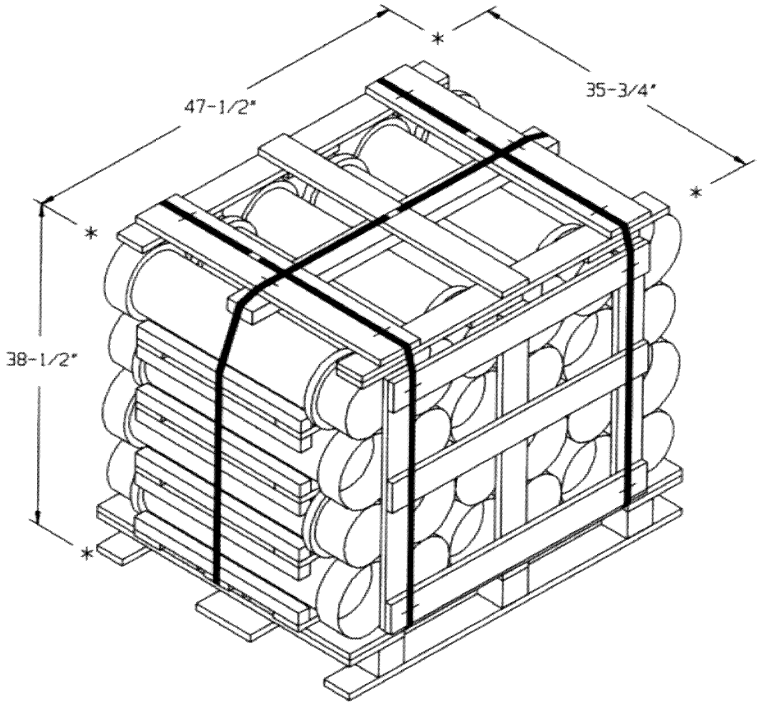
MATERIAL SPECIFICATIONS

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.

WIRE, CARBON STEEL -: ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, .0800" DIA, GRADE 1006 OR BETTER.



PALLET UNIT

UNIT WEIGHT - - - - - 1,160 POUNDS (APPROX)
CUBE - - - - - - - - - 37.9 CUBIC FEET

PALLET UNIT DETAIL

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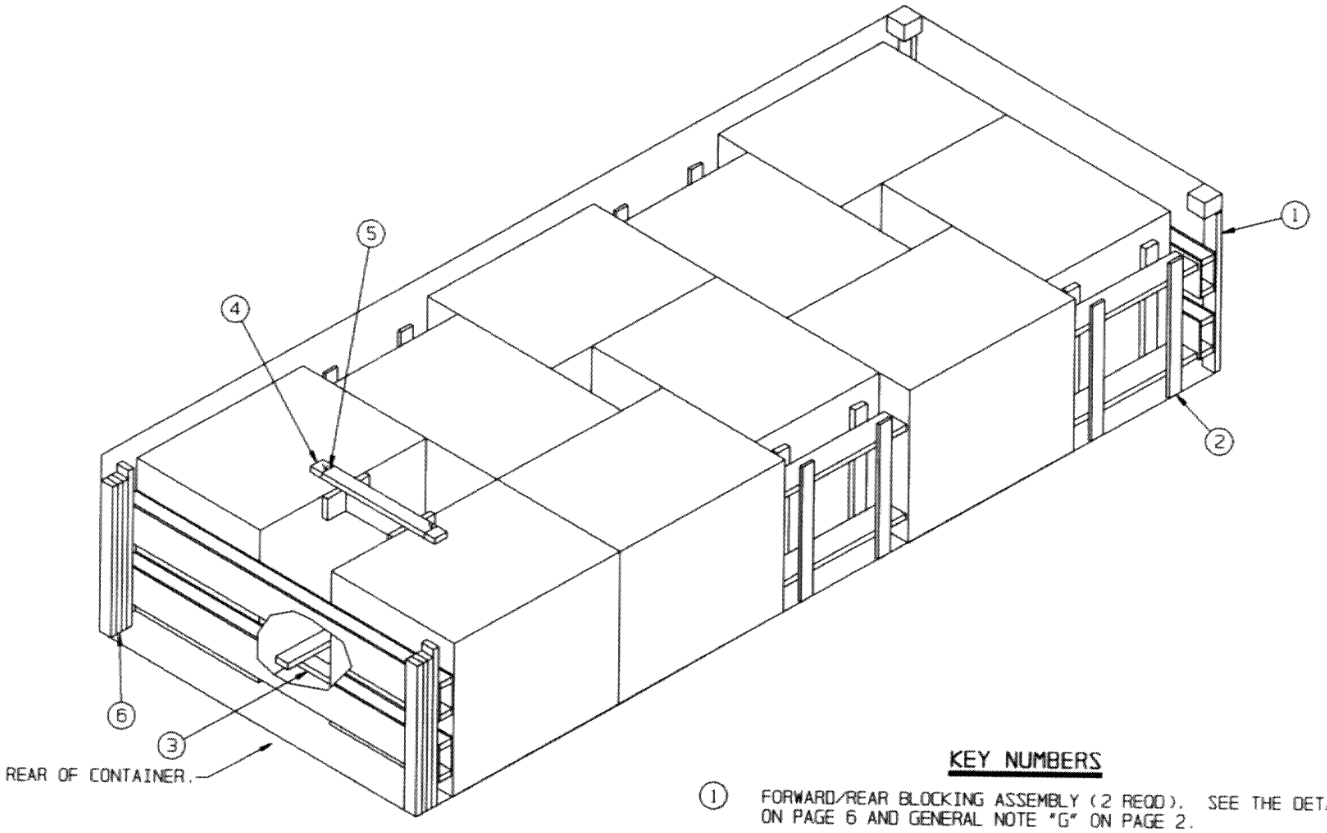


ISOMETRIC VIEW

KEY NUMBERS

(1) FORWARD/REAR BLOCKING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 6 AND GENERAL NOTE "G" ON PAGE 2.

(2) SIDE FILL ASSEMBLY (4 REQD). SEE THE DETAIL ON PAGE 7.

(3) ANTI-SWAY BRACE (1 REQD). SEE THE DETAIL ON PAGE 7.

(4) TOP SPACER (1 REQD). SEE THE DETAIL ON PAGE 6.

(5) TIE WIRE, NO. 14 GAGE WIRE 24" LONG (2 REQD). INSTALL THE WIRE TO FORM A COMPLETE LOOP AROUND THE TOP SPACER AND TOP DUNNAGE ASSEMBLY OF THE PALLET UNIT. BRING ENDS TOGETHER AND TWIST TAUT.

(6) FILL MATERIAL, 4" WIDE BY 40" LONG MATERIAL (AS REQD). TOENAIL FIRST PIECE TO THE REAR BLOCKING ASSEMBLY W/5-10d NAILS OF A SUITABLE SIZE (10d NAILS FOR 2" THICK MATERIAL). TOENAIL EACH ADDITIONAL PIECE TO THE PREVIOUS PIECE IN A LIKE MANNER. NOTE: MULTIPLE PIECES MAY BE LAMINATED TOGETHER FIRST AND THEN TOENAILED TO THE REAR BLOCKING ASSEMBLY. IF MORE THAN SIX INCHES OF FILL MATERIAL ARE REQUIRED, SEE PAGE 8 FOR GUIDANCE.

RECOMMENDED SEQUENTIAL LOADING PROCEDURES

1. PRE-FABRICATE TWO FORWARD/REAR BLOCKING ASSEMBLIES, FOUR SIDE FILL ASSEMBLIES, AND ONE TOP SPACER.
2. INSTALL THE FORWARD BLOCKING ASSEMBLY.
3. INSTALL ONE SIDE FILL ASSEMBLY AND LOAD TWO PALLET UNITS.
4. REPEAT STEP 3 THREE TIMES.
5. LOAD THE LAST TWO PALLET UNITS.
6. INSTALL ONE TOP SPACER W/TIE WIRE AND ONE ANTI-SWAY BRACE.
7. INSTALL THE REAR BLOCKING ASSEMBLY.
8. INSTALL THE FILL MATERIAL BETWEEN THE REAR BLOCKING ASSEMBLY AND THE CORNER POST AND/OR EDGE OF DOOR.

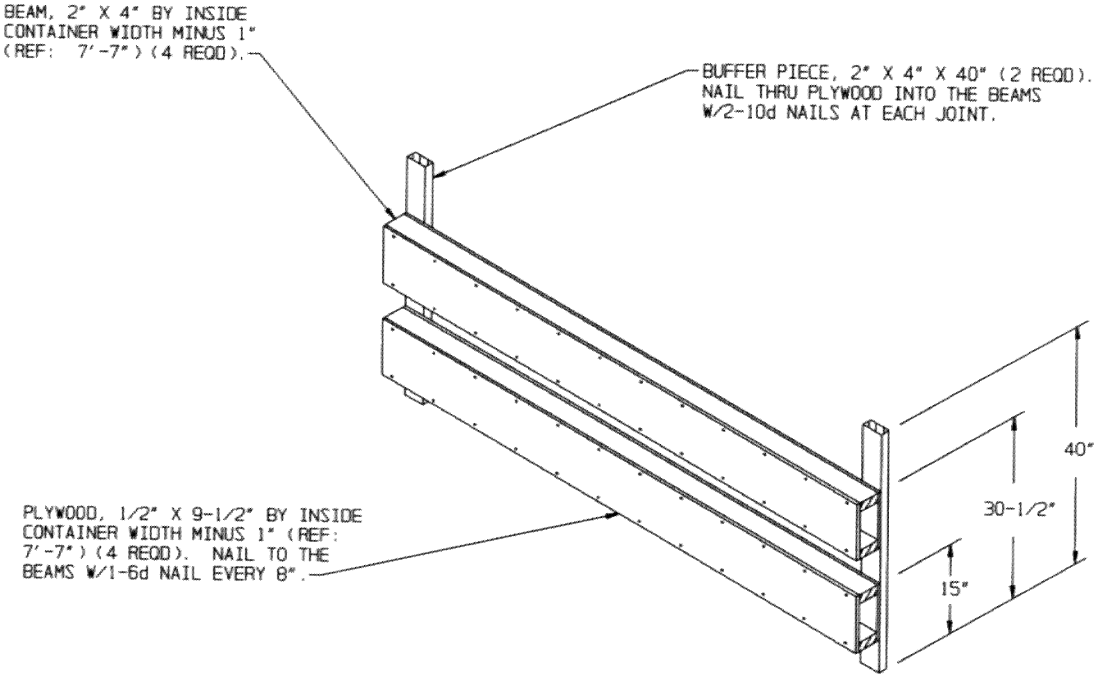
BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	23	8
2" X 3"	12	6
2" X 4"	131	88
2" X 6"	15	15
NAILS	**NO. REQD**	**POUNDS**
6d (2")	192	1-1/4
10d (3")	158	2-1/2
PLYWOOD, 1/2" - - - 48.02 SQ FT REQD - - 66.03 LBS		
WIRE, NO. 14 GAGE - - - - - - 2' REQD - - - - 1/4 LB		

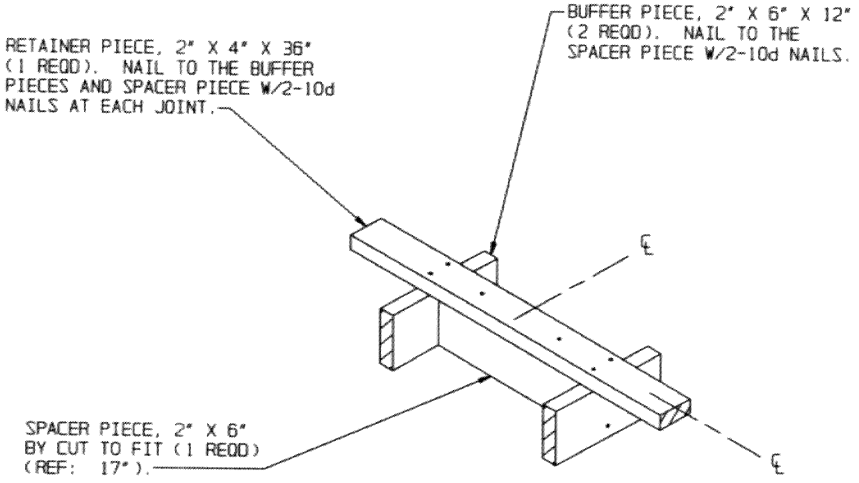
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	10	11,600 LBS
DUNNAGE		304 LBS
CONTAINER		4,700 LBS
TOTAL WEIGHT		16,604 LBS (APPROX)

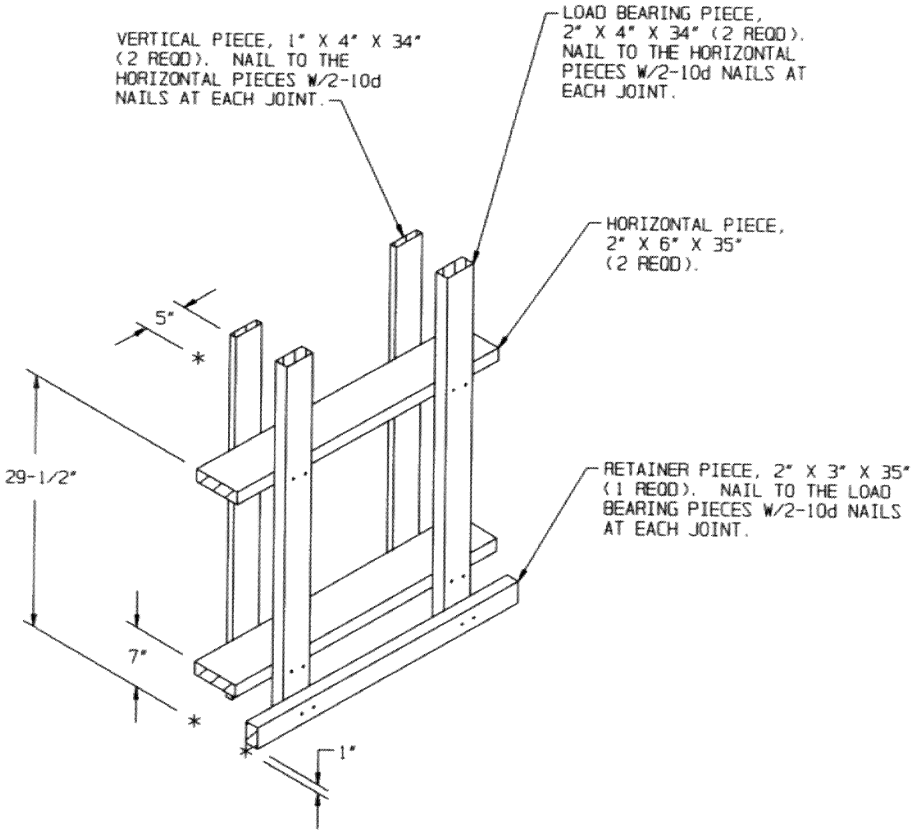
10-UNIT LOAD



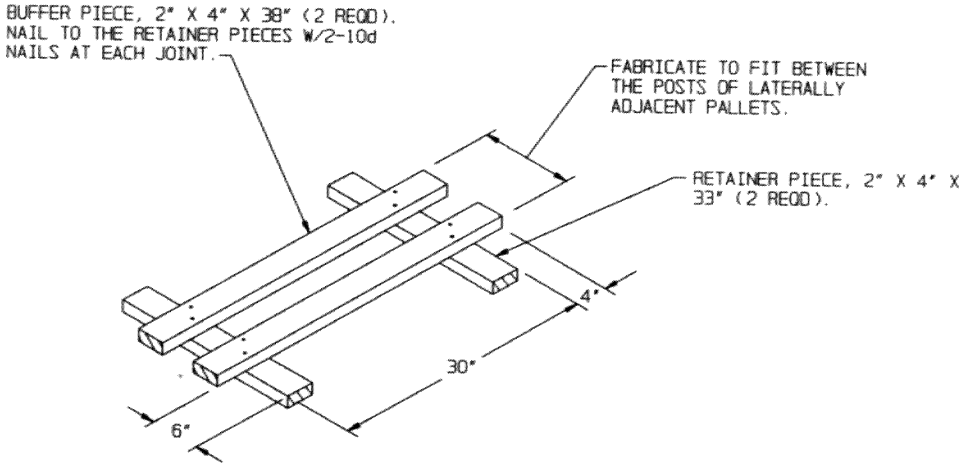
FORWARD/REAR BLOCKING ASSEMBLY



TOP SPACER



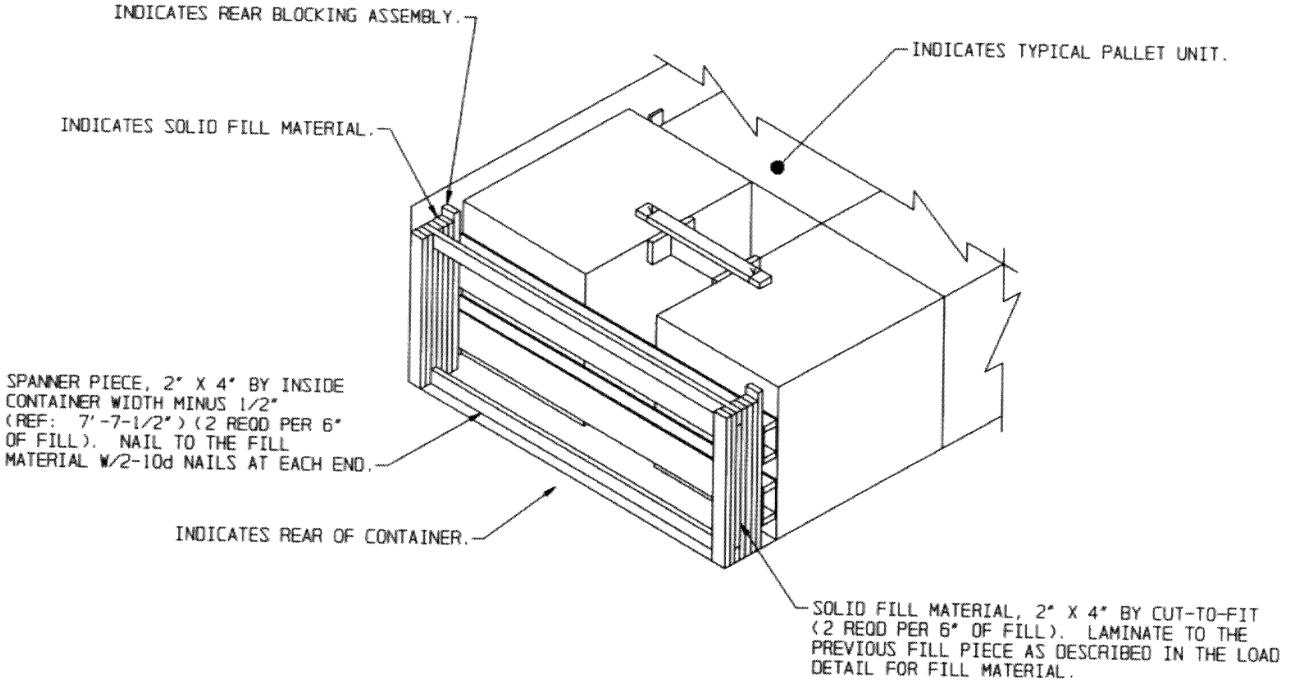
SIDE FILL ASSEMBLY



ANTI-SWAY BRACE

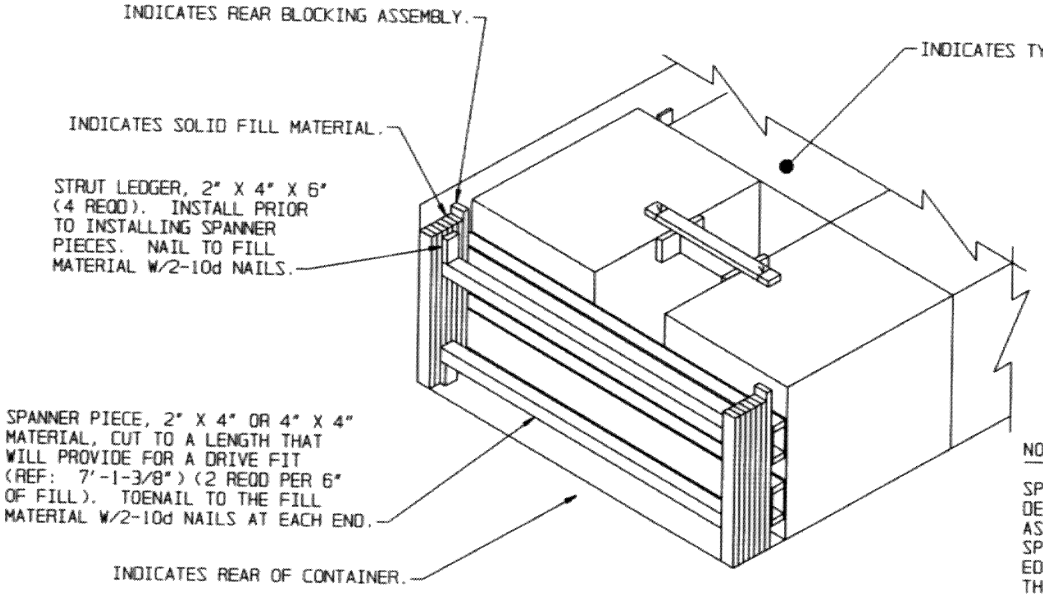
THIS ASSEMBLY MUST BE FABRICATED IN PLACE BETWEEN PALLETS.

DETAILS



SPANNER/FILL INSTALLATION

THE DETAILS ABOVE AND BELOW DEPICT THE PROCEDURES TO BE USED WHEN INSTALLING MORE THAN FOUR PIECES PER SIDE (6") OF SOLID FILL MATERIAL AT THE REAR OF THE LOAD. ONE SET OF TWO SPANNER PIECES AND TWO CUT-TO-FIT FILL PIECES OR TWO SPANNER PIECES AND THE OPTIONAL STRUT LEDGERS MUST BE INSTALLED FOR EVERY FOUR SOLID FILL PIECES USED PER SIDE. THE HEIGHT OF THE SOLID FILL PIECES USED SHOULD BE AT LEAST THE HEIGHT OF TOP OF THE UPPERMOST BEAM ASSEMBLY OR BOX BEAM ASSEMBLY IN THE REAR BLOCKING ASSEMBLY PLUS 4". EITHER 2" OR 4" THICK MATERIAL MAY BE USED FOR SPANNER PIECES IN THE DETAIL BELOW. NOTE: IF MORE THAN SIX INCHES OF SOLID FILL MATERIAL IS REQUIRED, FILL MATERIAL MAY BE ADDED TO BOTH THE FORWARD AND REAR BLOCKING ASSEMBLIES IN LIEU OF THE "SPANNER/FILL INSTALLATION" PROCEDURES DEPICTED ON THIS PAGE.



NOTE:

SPANNER PIECES SHOWN IN THE DETAIL AT LEFT MUST BE INSTALLED AS FOLLOWS. INSTALL THE UPPER SPANNER PIECE SUCH THAT THE TOP EDGE OF TOP SPANNER PIECE IS AT THE SAME HEIGHT AS THE TOP EDGE OF THE TOP BOX BEAM ASSEMLBY OR BEAM ASSEMBLY IN THE REAR BLOCKING ASSEMBLY. INSTALL THE LOWER SPANNER PIECE SUCH THAT THE BOTTOM OF THE LOWER SPANNER PIECE IS AT THE SAME HEIGHT AS THE BOTTOM EDGE OF THE LOWEST BOX BEAM ASSEMBLY OR BEAM ASSEMBLY.