

*O ~ 1/6/97*  
DATE 9/12/97

# LOADING AND BRACING (CL & LCL) IN BOX CARS OF COMPLETE ROUNDS ⊕ PACKED IN CYLINDRICAL METAL CONTAINERS UNITIZED ON A 56" X 28" METAL PALLET

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● THIS OUTLOADING PROCEDURE DRAWING INCLUDES PROCEDURES FOR CONVENTIONAL TYPE BOX CARS, BOX CARS EQUIPPED WITH MECHANICAL BRACING DEVICES OF VARIOUS DESIGN AND MANUFACTURE, AND CUSHIONED BOX CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.

⊕ CARLOADING PROCEDURES CONTAINED WITHIN THIS DRAWING APPLY TO THE VOLCANO MINE SYSTEM.

## U.S. ARMY MATERIEL COMMAND DRAWING

APPROVED, U.S. ARMY INDUSTRIAL OPERATIONS COMMAND  <i>[Signature]</i>	ENGINEER	BASIC		DO NOT SCALE			
		REV.		WEBSITE: HTTP://WWW.DAC.ARMY.MIL			
	TECHNICIAN	BASIC	R. HAYNES	JULY 1997			
	REV.						
	DRAFTSMAN	BASIC					
		REV.					
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND  <i>[Signature]</i>  DEFENSE AMMUNITION CENTER	TRANSPORTATION ENGINEERING DIVISION		<i>W. D. Frenck</i>				
	VALIDATION ENGINEERING DIVISION		<i>[Signature]</i> TESTED	CLASS	DIVISION	DRAWING	FILE
	LOGISTICS ENGINEERING OFFICE		<i>William Ernest</i>	19	48	4242/ 81	5PM1004

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 FOR THE VOLCANO MINE PACKED IN THE PA113 CONTAINER AND UNITIZED ON A 56" X 28" METAL PALLET. SEE THE PICTORIAL VIEW ON PAGE 5. REFER TO AMC DRAWING 19-48-4231/81-20PM1006 FOR UNITIZATION PROCEDURES FOR THE PA113 SERIES CONTAINERS.
- C. THE OUTLOADING PROCEDURES DEPICTED WITHIN THIS DOCUMENT ARE APPLICABLE FOR SHIPMENTS IN CONVENTIONAL TYPE BOX-CARS, FOR SHIPMENTS IN BOXCARS EQUIPPED WITH VARIOUS TYPES OF SELF-CONTAINED MECHANICAL BRACING DEVICES, AND FOR SHIPMENTS IN CUSHIONED BOXCARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.
- D. CAUTION: METAL COMPLETE ROUND CONTAINERS THAT ARE FLUSH WITH OR OVERHANG THE PALLET END MUST NOT BE ALLOWED TO CONTACT STEEL ENDWALLS OF BOXCARS. THIS TYPE OF UNIT LOAD SHOULD BE SHIPPED IN BOXCARS HAVING WOOD ENDWALLS. IF CARS WITH WOOD ENDWALLS ARE NOT AVAILABLE, AND ALL-STEEL CARS ARE USED, THE ENDWALLS MUST BE LINED WITH DIMENSIONAL LUMBER, PLYWOOD, HARDBOARD, OR SOLID FIBERBOARD. THE LINING SHOULD BE PROVIDED WHEREVER METAL-OF-CONTAINER TO METAL-OF-CAR CONTACT IS POSSIBLE. REFER TO PAGE 35 FOR GUIDANCE.
- E. PALLET UNITS WILL BE POSITIONED WITH THE BASE ENDS OF THE CONTAINERS AGAINST THE CAR ENDWALL. LONGITUDINALLY ADJACENT LENGTHWISE UNITS WILL BE POSITIONED WITH BASE END AGAINST BASE END OR BELL END AGAINST BELL END.
- F. THE SELECTION OF RAILCARS FOR THE TRANSPORT OF PALLET UNITS OF COMPLETE ROUNDS IS THE RESPONSIBILITY OF THE ORIGINATING CARRIER AND THE SHIPPER. ONLY CARS WHICH HAVE "SOUND" FLOORS AND ARE IN OTHERWISE PROPER CONDITION, IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE REGULATORY DOCUMENTS, WILL BE SELECTED.
- G. WHEN SELECTING RAILCARS, EVERY EFFORT SHOULD BE MADE TO OBTAIN BOXCARS THAT DO NOT HAVE BOWED ENDWALLS. CARS HAVING BOWED ENDS CAN BE USED, HOWEVER, IF AN ENDWALL IS BOWED OUTWARD MORE THAN 2" 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. REFER TO PAGE 36 FOR GUIDANCE.
- H. CONVENTIONAL BOXCARS EQUIPPED WITH SLIDING DOORS HAVE BEEN SHOWN, HOWEVER, THE DEPICTED OUTLOADING PROCEDURES ARE ALSO APPLICABLE FOR CONVENTIONAL CARS EQUIPPED WITH PLUG DOORS. CAUTION: DUNNAGE MATERIAL MUST NOT BE NAILED TO ANY PLUG DOOR, WHETHER AUXILIARY OR MAIN. ALSO, AFTER THE PLUG DOORS ON A CAR ARE CLOSED AND READY FOR THE INSTALLATION OF CAR SEALS, A PIECE OF WIRE OF SUITABLE SIZE WILL BE USED IN ADDITION TO AND IN CONJUNCTION WITH EACH CAR SEAL USED TO SEAL THE CAR. THE WIRE WILL BE THREADED THRU THE HOLES IN THE DOOR LATCH ASSEMBLY ONE OR MORE TIMES, AND THE WIRE ENDS WILL BE TWISTED TOGETHER.

- J. THE USE OF AN OFFSET LOADING PATTERN WILL FACILITATE LOADING AND UNLOADING OPERATIONS IN THE DOORWAY AREA OF THE CAR. UNLESS PROHIBITED WITHIN THE SPECIAL NOTES, A FULL LOAD SHOULD BE BUILT USING AN OFFSET LOADING PATTERN. FOR INSTANCE, A LOAD CONSISTING OF AN EVEN NUMBER OF LOAD UNITS AND HAVING TWO MORE LOAD UNITS IN ONE END OF THE CAR THAN IN THE OPPOSITE END, OR A LOAD CONSISTING OF AN ODD NUMBER OF LOAD UNITS AND HAVING ONE MORE LOAD UNIT IN ONE END THAN IN THE OTHER IS CONSIDERED TO BE AN OFFSET LOAD.
- K. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN CARS WHICH ARE PARTIALLY LOADED WITH PALLET UNITS OF COMPLETE ROUNDS, PROVIDING THE TOTAL LOAD IS COMPATIBLE, EXISTING DIRECTIVES ARE NOT VIOLATED, AND THE OTHER LADING ITEMS ARE BLOCKED AND BRACED TO EQUAL THE BLOCKING AND BRACING CRITERIA SPECIFIED HEREIN. MIXED ITEMS TO BE SHIPPED IN CARS EQUIPPED WITH MECHANICAL BRACING DEVICES MUST BE SEPARATELY BLOCKED, USING THE PROCEDURES SHOWN FOR THESE CARS AS GUIDANCE.
- L. DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING 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.
- M. NOTICE: A STAGGERED NAILING PATTERN WILL BE USED WHEREVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES. ALSO, A STAGGERED NAILING PATTERN WILL BE USED WHEN DUNNAGE IS NAILED TO THE FLOOR OR SIDEWALL OF THE TRANSPORTING VEHICLE, OR WHEN LAMINATING DUNNAGE. THE NAILING PATTERN WILL BE ADJUSTED AS REQUIRED SO THAT A NAIL DOES NOT PENETRATE INTO OR NEAR A CRACK BETWEEN FLOOR BOARDS OR SIDEWALL BOARDS. 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.
- N. POWER DRIVEN STAPLES MAY BE USED AS ALTERNATIVE FASTENERS FOR NAILS WHEN CONSTRUCTING DUNNAGE ASSEMBLIES WHICH ARE TO BE USED IN THE DELINEATED BOXCAR LOADS SHOWN THROUGHOUT THIS DRAWING. THE STAPLES TO BE USED MUST BE EQUAL IN LENGTH TO THE SPECIFIED NAIL SIZE AND MUST BE SUBSTITUTED ON A ONE STAPLE FOR ONE NAIL BASIS. STAPLES WHICH ARE 2-1/2" OR LESS IN LENGTH SHOULD BE IN ACCORDANCE WITH FEDERAL SPECIFICATION FF-N-105 AS NEARLY AS PRACTICABLE. STAPLES WHICH ARE LONGER THAN 2-1/2" WILL BE A COMMERCIAL GRADE, OF A QUALITY EQUIVALENT TO THOSE MANUFACTURED BY SENCO PRODUCTS INCORPORATED. NOTE: STAPLES WILL NOT BE SUBSTITUTED FOR NAILS IN ANY LOAD RESTRAINING FLOOR DUNNAGE APPLICATION.
- O. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, A MINIMUM OF ONE SEAL WITH TWO PAIR OF NOTCHES WILL BE USED TO SEAL THE JOINT WHEN A NOTCH-TYPE SEALER IS BEING USED. A MINIMUM OF TWO SEALS, BUTTED TOGETHER, WITH TWO PAIR OF CRIMPS PER SEAL WILL BE USED TO SEAL THE JOINT WHEN A CRIMP-TYPE SEALER IS BEING USED. REFER TO THE "STRAP JOINT A" AND "STRAP JOINT B" DETAILS ON PAGE 35 FOR GUIDANCE.
- P. THROUGHOUT THIS PROCEDURAL DRAWING, PORTIONS OF THE BLOCKING COMPONENTS AND OF THE DEPICTED CARS, SUCH AS A CAR SIDEWALL, HAVE BEEN OMITTED FROM THE LOAD VIEW FOR CLARITY PURPOSES.

(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.
- WIRE, CARBON STEEL - : ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, .0800" DIA, GRADE 1006 OR BETTER.
- STAPLE, STRAP - - - : COMMERCIAL GRADE.
- HARDBOARD - - - - - : ANSI/AHA A135.4, CLASS 1.
- FIBERBOARD - - - - - : FED SPEC PPP-F-320; TYPE SF (SOLID FIBERBOARD), CLASS DOMESTIC, ALL GRADES.

- Q. THE NUMBER OF LADING UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE BOXCAR BEING LOADED OR THE QUANTITY TO BE SHIPPED, HOWEVER, THE APPROVED METHODS SPECIFIED HEREIN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING, AND STAYING OF THE UNITS. NOTICE: A SHIPMENT WILL BE POSITIONED IN THE RAILCAR IN COMPLIANCE WITH THE WEIGHT DISTRIBUTION REQUIREMENTS OF THE AAR.
- R. CAUTION: WHEN POWER OR PNEUMATIC NAILERS ARE BEING USED IN THE APPLICATION OF NAILED FLOORLINE BLOCKING OR BRACING, PALLET UNITS BEING LOADED INTO THE CONVEYANCE MUST BE POSITIONED TO ALLOW A CLEAR PATH OF EXIT FOR THE OPERATOR AT ALL TIMES, SHOULD AN EMERGENCY EXIT BECOME NECESSARY.

(CONTINUED ON PAGE 3)

- S. 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.
- T. AS REQUIRED BY THE ASSOCIATION OF AMERICAN RAILROADS (AAR), ALL 1-1/4" AND 2" STEEL STRAPPING USED FOR LOAD RESTRAINT MUST BE MARKED AS SPECIFIED WITHIN THE APPLICABLE AAR RULES GOVERNING LOADING, BLOCKING AND BRACING OF FREIGHT WITHIN THE CONVEYANCE. FOR THE SPECIFIC MARKING SIZE, FREQUENCY, ETC., REQUIRED, REFER TO THE APPROPRIATE AAR LOADING RULES.
- (FOR CONVENTIONAL TYPE BOXCARS)
- U. IF THE CAR BEING USED FOR A SHIPMENT IS EQUIPPED WITH A NAILABLE METAL FLOOR AND A NAIL SIZE FOR FLOOR NAILING IS MARKED ON THE SIDEWALL OF THE CAR, THAT GUIDANCE SHOULD BE APPLIED TO THE NAILING OF THE "DOORWAY BLOCKING" PIECES IN THE FULL LOADS AND TO THE NAILING TO THE CAR FLOOR OF THE LCL BRACES AND KNEE BRACE ASSEMBLIES IN THE LESS-THAN-FULL LOADS. IF A NAIL SIZE IS NOT SPECIFIED IN THE CAR, 30d NAILS SHOULD BE USED IN LIEU OF THOSE SPECIFIED IN THE APPLICABLE KEY NUMBERS. SEE GENERAL NOTE "M" ON PAGE 2.
- V. NOTICE: WHEN POSITIONING PALLET UNITS IN A CAR, THEY SHOULD BE PLACED TIGHTLY AGAINST A CAR SIDEWALL AND ARE TO BE PRESSED TIGHTLY TOGETHER LENGTHWISE SO AS TO ACHIEVE A TIGHT LOAD. TO AID IN ACHIEVING TIGHTNESS LENGTHWISE IN A FULL LOAD, A LOAD-COMPRESSING JACK MAY BE EMPLOYED IN THE AREA OF THE CENTER GATES TO MOVE THE PALLET UNITS INTO THEIR FINAL SHIPPING POSITION. A HYDRAULIC JACK IS RECOMMENDED FOR THIS OPERATION. CAUTION: WHEN USING A JACK TO COMPACT A LOAD, THE JACK MUST BE USED AGAINST STRONG POINTS OF THE PALLET UNITS, SUCH AS THE JOINTS BETWEEN THE LAYERS OF CONTAINERS ON THE UNIT. PADDING, OF 2" THICK LUMBER OR ANY OTHER MATERIAL OF SIMILAR CONSISTENCY, SHOULD BE PLACED BETWEEN THE JACK AND THE LADING.
- W. LOAD-BLOCKING STRUTS WHICH ARE 48" OR LONGER MUST BE STIFFENED BY THE APPLICATION OF HORIZONTAL AND VERTICAL STRUT BRACING AS SHOWN BY KEY NUMBERS ⑤ AND ⑥ ON PAGE 4. BRACING IS NOT REQUIRED IF THE STRUTS FOR THE LOAD BEING SHIPPED ARE SHORTER THAN 48". THE LENGTH OF THE LOAD-BLOCKING STRUTS SHOULD BE KEPT AS SHORT AS POSSIBLE (APPROX 18" MINIMUM), BUT IN THE EVENT IT IS NECESSARY TO USE STRUTS WHICH ARE 8'-0" OR MORE IN LENGTH, IT WILL BE NECESSARY TO APPLY AN ADDITIONAL SET OF HORIZONTAL AND VERTICAL STRUT BRACING PIECES. STRUT BRACING SHOULD BE APPLIED SO AS TO PROVIDE NEARLY EQUAL SPACES BETWEEN THE BRACING PIECES AND THE CENTER GATES AND/OR BETWEEN ADJACENT STRUT BRACING PIECES. NOTE THAT HORIZONTAL STRUT BRACING PIECES FOR THE UPPER LEVEL OF STRUTS FOR ALL BUT THE UPPERMOST TIER OF A LOAD MAY BE DIFFICULT TO APPLY TO THE TOP SURFACES OF THE STRUT AS DEPICTED. STRUT BRACING WILL BE EQUALLY EFFECTIVE IF APPLIED TO THE UNDER SIDE OF THOSE STRUTS.
- X. TO ACHIEVE A TIGHTLY BLOCKED LOAD, A STRUT WILL BE CUT APPROXIMATELY 1/4" TO 3/8" LONGER THAN THE MEASURED DISTANCE BETWEEN THE STRUT BEARING AREAS ON THE TWO CENTER GATES. MEASUREMENTS FOR STRUT LENGTHS NEED TO BE ACCOMPLISHED AT SEVERAL PLACES DURING THE BLOCKING AND BRACING PROCESS. CARE MUST BE EXERCISED WHEN MEASURING FOR AND INSTALLING STRUTS. THE SPECIFIED APPROXIMATE DIMENSION FOR A STRUT LENGTH MAY BE ADJUSTED, AS NECESSARY, TO PROVIDE FOR A TIGHTLY BLOCKED LOAD WITHOUT DISTORTING, DENTING OR OTHERWISE DAMAGING THE CONTAINERS. ONE END OF THE STRUT WILL BE POSITIONED AT ITS BEARING AREA JUST ABOVE THE STRUT LEDGER ON ONE GATE. THE OTHER END, WHICH CAN BE BEVELED ON THE LOWER CORNER IF DESIRED, WILL THEN BE DRIVEN DOWNWARD UNTIL IT CONTACTS THE STRUT LEDGER ON THE OTHER GATE. EACH END OF THE STRUT WILL BE TOENAILED TO THE ADJACENT CENTER GATE, AS SPECIFIED WITHIN THE KEY NUMBERS FOR A LOAD, IN SUCH A MANNER SO THAT AS NEARLY AS PRACTICAL EQUAL LENGTHS OF A NAIL ARE EMBEDDED IN THE STRUT AND IN THE VERTICAL PIECE OF THE CENTER GATE. SEE THE "BEVEL CUT" DETAIL ON PAGE 38 FOR BEVELING INSTRUCTIONS AND THE "STRUT INSTALLATION" DETAIL ON THAT PAGE FOR A PICTORIAL VIEW SHOWING THE PROPER POSITIONING OF A BEVELED STRUT FOR INSTALLATION. NOTE THAT THE UPPER CORNER NEEDS TO BE BEVELED ONLY IF THE STRUTS ARE VERY SHORT. IF ONLY ONE END IS BEVEL CUT, THE BEVELED EDGE WILL BE PLACED IN THE DOWNWARD POSITION SO THAT IT WILL ALLOW THE STRUT END TO SLIDE MORE FREELY DOWN THE FACE OF THE VERTICAL PIECE ON THE ADJACENT CENTER GATE AS THE STRUT IS DRIVEN DOWN INTO ITS FINAL BLOCKING POSITION.

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- Y. WHERE 2" X 2" PIECES ARE SPECIFIED FOR STRUT LEDGERS, 2" X 4" MATERIAL MAY BE SUBSTITUTED, IF DESIRED.
- Z. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.

(FOR BOXCARS EQUIPPED WITH MECHANICAL BRACING DEVICES)

- AA. THE OUTLOADING PROCEDURES FOR BOXCARS EQUIPPED WITH MECHANICAL BRACING DEVICES MAY BE ADAPTED AS REQUIRED TO FACILITATE THE USE OF BOXCARS EQUIPPED WITH VARIOUS TYPES OF SELF-CONTAINED MECHANICAL BRACING DEVICES, HOWEVER, FIXED OR ADJUSTABLE WALL MEMBERS AND DOORWAY MEMBERS WITHIN THESE CARS MUST PROVIDE FOR THE INSTALLATION OF LOAD BLOCKING CROSS MEMBERS AT THE HEIGHTS SPECIFIED. CAUTION: BOXCARS EQUIPPED WITH MEMBERS WHICH DO NOT MEET THE LOCATION REQUIREMENTS MUST NOT BE USED.
- FOR BLOCKING THE LOAD WHICH IS DEPICTED, A CROSS MEMBER WILL NOT BE RELIED UPON TO RETAIN MORE LADING ON EITHER SIDE THAN AS SHOWN. VOIDS LENGTHWISE WITHIN THE LOAD MUST BE HELD TO A MINIMUM AND CROSS MEMBERS MUST BE PLACED AGAINST THE LADING AS TIGHTLY AS THE SPACING OF THE LOCKING HOLES IN THE WALL MEMBERS PERMIT. LOCKING BARS (LEVER JACKS) SHOULD BE USED FOR THIS PURPOSE. AN ADDITIONAL 1/2" OF ADJUSTMENT CAN BE MADE BY TURNING A CROSS MEMBER END-FOR-END WHEN LOCKING PINS ON THE MEMBER ARE OFF-CENTER. NOTE: IT IS RECOMMENDED THAT EACH CROSS MEMBER BE INSTALLED WITH THE ENDS ATTACHED AS NEARLY AS POSSIBLE IN "MATED" POSITIONS (AT EQUAL HEIGHTS AND AT EQUAL DISTANCES FROM THE END OF THE CAR).
  - CAUTION: ALL BLOCKING AND BRACING COMPONENTS IN EMPTY CARS AND ALL UNUSED COMPONENTS IN LOADED CARS MUST BE "SECURED" FOR SHIPMENT -- ADJUSTABLE WALL MEMBERS TO VERTICAL WALL ATTACHMENT RAILS, AND CROSS MEMBERS TO ADJUSTABLE WALL MEMBERS OR TO FIXED HORIZONTAL WALL MEMBERS OR TO DOORWAY MEMBERS, AND DOORWAY MEMBERS TO DOOR POSTS. COMPONENTS ASSIGNED TO EACH CAR MUST REMAIN THEREWITH EVEN THOUGH UNUSED DURING SOME SHIPMENTS.

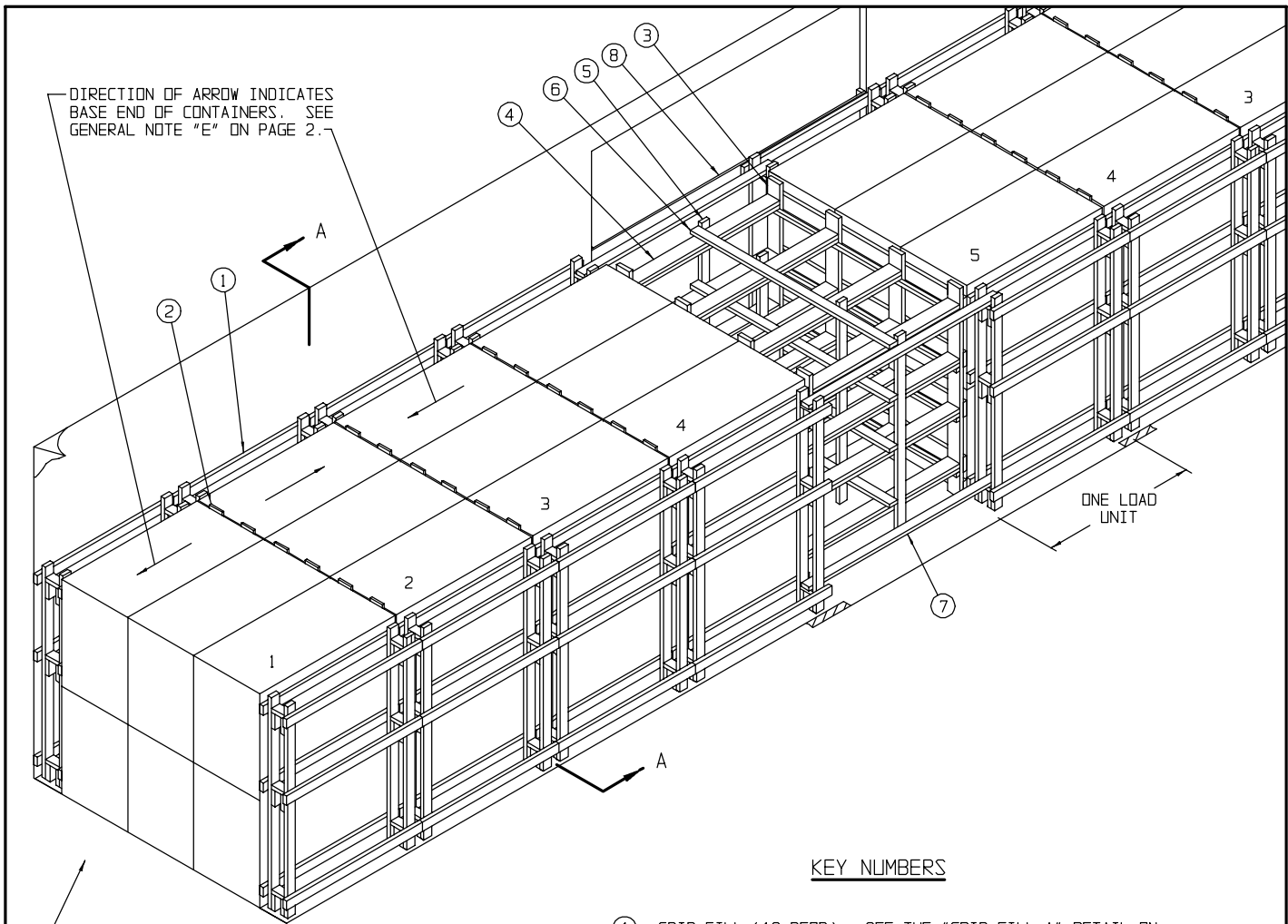
- BB. IN A CAR EQUIPPED WITH ADJUSTABLE WALL MEMBERS, PROVIDING THE FIXED WALL MEMBERS WHICH ARE PRESENT IN SOME "ADJUSTABLE" CARS ARE NOT PROPERLY POSITIONED TO PROVIDE SIDE BEARING SURFACES BETWEEN THE UNITS AND THE CAR SIDEWALLS, ADJUSTABLE WALL MEMBERS (AS REQUIRED) MUST BE INSTALLED TO PROVIDE A MINIMUM OF ONE SURFACE AREA FOR SIDE BEARING AT SOME LOCATION WITHIN THE UPPER HALF OF EACH UNIT.

- CC. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTION WHICH IS IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHOD.

(FOR CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS)

- DD. CAUTION: FOR CUSHIONED BOXCARS EQUIPPED WITH LOAD DIVIDER BULKHEADS, ONLY CARS EQUIPPED WITH LOAD DIVIDERS MANUFACTURED BY EVANS, EQUIPCO, OR PRECO MAY BE USED. LOAD DIVIDERS MANUFACTURED BY TRANSCO ARE NOT ACCEPTABLE WHETHER OF ALUMINUM OR STEEL CONSTRUCTION. THE DEPICTED PROCEDURES ARE APPLICABLE FOR CARS OF VARIOUS LENGTHS AND WIDTHS. THE AAR MECHANICAL DESIGNATION CLASS FOR THESE CARS, AS IDENTIFIED IN "THE OFFICIAL RAILWAY EQUIPMENT REGISTER", WILL BE RBL, XL, OR XLI.
- EE. THE USE OF LOAD DIVIDER EQUIPPED CARS WILL ELIMINATE THE NEED FOR CENTER GATES AND STRUTS, AND GATE HOLD DOWNS (WHEN APPLICABLE) WHICH ARE REQUIRED IN CONVENTIONAL BOXCAR LOADS. THIS WILL ACCOUNT FOR A CONSIDERABLE SAVING IN MATERIAL AND LABOR COSTS. THEREFORE, EVERY EFFORT SHOULD BE MADE TO ACQUIRE CUSHIONED CARS EQUIPPED WITH LOAD DIVIDERS FOR SHIPMENT OF COMPLETE ROUNDS. NOTICE: ONLY CUSHIONED CARS THAT HAVE SLIDING CENTER SILL TYPE CUSHIONED DEVICES OR END-OF-CAR TYPE DEVICES WHICH HAVE AT LEAST 15" OF TRAVEL ARE ACCEPTABLE.

(CONTINUED ON PAGE 11)



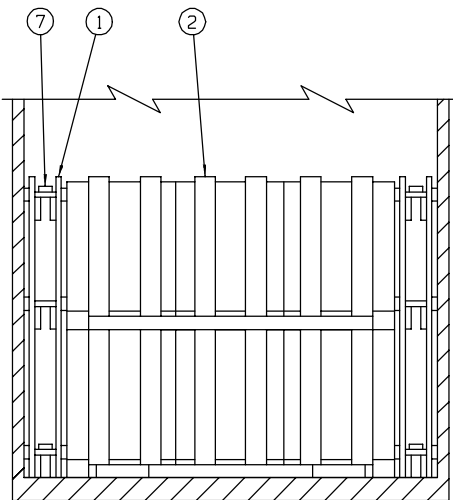
DIRECTION OF ARROW INDICATES  
BASE END OF CONTAINERS. SEE  
GENERAL NOTE "E" ON PAGE 2.

SEE GENERAL NOTES  
"D" AND "G" ON  
PAGE 2.

ISOMETRIC VIEW

KEY NUMBERS

- ① CRIB FILL (18 REQD). SEE THE "CRIB FILL A" DETAIL ON PAGE 31. SEE GENERAL NOTES "M" AND "N" ON PAGE 2.
- ② SEPARATOR GATE (7 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 32. POSITION WITH THE HORIZONTAL PIECES AGAINST THE ALREADY-LOADED UNITS. SEE SPECIAL NOTES 3 AND 4 ON PAGE 5.
- ③ CENTER GATE (2 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 31. SEE SPECIAL NOTE 3 ON PAGE 5.
- ④ STRUT, 2" X 6" BY CUT TO FIT (REF: 63-3/4") (DOUBLED) (16 REQD). LAMINATE W/1-10d NAIL EVERY 6". TOENAIL THE TOP PIECE TO THE VERTICAL PIECE OF THE CENTER GATE, PIECE MARKED ③, W/2-12d NAILS AT EACH END.
- ⑤ VERTICAL STRUT BRACING, 2" X 4" X 6'-4" (4 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT. SEE GENERAL NOTE "W" ON PAGE 3.
- ⑥ HORIZONTAL STRUT BRACING, 2" X 4" X 7'-6" (4 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.
- ⑦ CRIB FILL RETAINER, 2" X 4" BY A LENGTH TO SUIT (REF: 7'-6") (4 REQD). POSITION TO SPAN THE UPPER AND LOWER STRUTS OF THE LONGITUDINALLY ADJACENT CRIB FILL "A" ASSEMBLIES AT THE CENTER OF THE CAR AND NAIL TO EACH STRUT W/3-10d NAILS AT EACH END.
- ⑧ DOORWAY PROTECTION (2 REQD). SEE THE DETAIL ON PAGE 32. NAIL TO THE DOOR POSTS W/12d NAILS. SEE SPECIAL NOTE 6 ON PAGE 5.



SECTION A-A

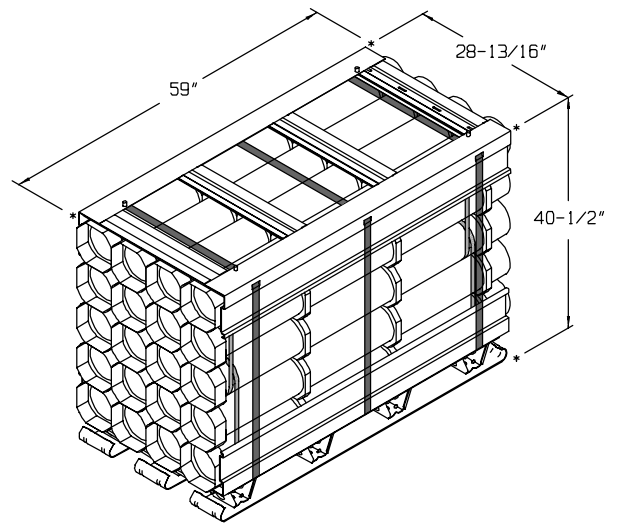
SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE WOOD-LINED CONVENTIONAL TYPE BOXCAR EQUIPPED WITH 10'-0" WIDE DOOR OPENING IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED. SEE GENERAL NOTE "D" ON PAGE 2
2. A MAXIMUM OF FORTY-TWO (42) OF THESE UNITS, FOR AN APPROXIMATE LADING WEIGHT OF 81,396 POUNDS, CAN BE PLACED IN A 40'-6" LONG CAR WHEN USING THE DEPICTED PROCEDURES; SIXTY-SIX (66) UNITS, FOR A LADING WEIGHT OF 127,908 POUNDS CAN BE LOADED IN A 60'-8" LONG CAR. NOTE THAT A LOAD LIMIT OF AT LEAST 115,000 POUNDS IS REQUIRED FOR THE DEPICTED LOAD, AND A LOAD LIMIT OF AT LEAST 137,000 POUNDS IS REQUIRED FOR A FULL LOAD IN A 60'-8" LONG CAR.
3. TO FACILITATE POSITIONING OF THE PALLET UNITS AS LOADING PROGRESSES, POSITION PALLET UNIT STACKS AGAINST THE END WALL, THEN POSITION A SEPARATOR GATE, SHOWN AS PIECE MARKED ②, SO THE 1" X 4" HORIZONTAL PIECES ARE LOCATED UNDER THE "OVERHANG" OF THE PALLET UNITS. REPEAT THIS PROCEDURE FOR THE REMAINING STACKS.
4. SEPARATOR GATES MAY BE FORMED FROM 3/8" OR THICKER PLYWOOD IN LIEU OF DIMENSIONAL LUMBER, IF DESIRED. SEE THE "ALTERNATIVE SEPARATOR GATE A" DETAIL ON PAGE 37 (FOR 2-HIGH LOAD ONLY), AND "SEPARATOR GATE D" ON PAGE 33 (FOR 1-HIGH LOAD ONLY) FOR CONSTRUCTION GUIDANCE.
5. CENTER GATE "A" MAY BE PARTIALLY FORMED FROM 1/2" OR THICKER PLYWOOD, IF DESIRED. PLYWOOD MAY BE USED IN LIEU OF THE 2" X 6" HORIZONTAL PIECES. SEE THE "PLYWOOD CENTER GATE ALTERNATIVE" DETAIL ON PAGE 37, FOR GUIDANCE.
6. DOORWAY PROTECTION IS REQUIRED FOR ALL PALLET UNIT STACKS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE STACK LENGTH. THE WOODEN GATE TYPE OF DOORWAY PROTECTION, SHOWN AS PIECES MARKED ③ IN THE LOAD ON PAGE 4, IS APPLICABLE FOR BOXCARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS AND AVAILABLE DOOR POSTS. REFER TO PAGES 39 AND 40 FOR ALTERNATIVE TYPE DOORWAY PROTECTION FOR CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS. IF THE CAR BEING LOADED IS EQUIPPED WITH PLUG DOORS OR COMBINATION PLUG AND SLIDING DOORS, NAILED FLOORLINE BLOCKING AND LOAD BUNDLING STRAPS MUST BE USED. SEE THE PROCEDURES USED ON PAGES 10 AND 12 FOR GUIDANCE.

(CONTINUED AT RIGHT)

(SPECIAL NOTES CONTINUED)

7. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED. A 2-TIER LOAD CAN BE REDUCED BY A MULTIPLE OF SIX (6) UNITS, OR A 1-TIER LOAD CAN BE REDUCED BY A MULTIPLE OF THREE (3) UNITS BY OMITTING ONE OR MORE LOAD UNITS FROM THE CENTER PORTION OF THE LOAD. NOTE THAT AN ADDITIONAL SET OF VERTICAL AND HORIZONTAL BRACING, PIECES MARKED ⑤ AND ⑥, WILL BE REQUIRED WHEN OMITTING ONE LOAD UNIT FROM THE DEPICTED LOAD, OR, THE ENTIRE TOP TIER CAN BE OMITTED. FOR OTHER METHODS OF REDUCING A LOAD, AND FOR TYPICAL LCL PROCEDURES, REFER TO PAGES 12 THRU 26 FOR GUIDANCE.
8. IF THE CAR HEIGHT PERMITS, PALLET UNITS MAY BE ADDED IN ONE OR BOTH ENDS OF THE CAR BY EMPLOYING THE RISER METHOD DEPICTED ON PAGES 14 AND 15 OR BY USING ONE OF THE K-BRACES SHOWN ON PAGES 16 THRU 19. THE FIRST-TO-BE-ADDED UNITS SHOULD BE LOADED IN THE SHORT-LOAD END OF THE CAR TO PROVIDE FOR EQUAL WEIGHT DISTRIBUTION IN THE LENGTH OF THE CAR.
9. IF PALLET UNITS WHICH DO NOT CONTAIN A FULL QUANTITY OF CONTAINERS ARE TO BE TRANSPORTED, REFER TO PAGE 27 FOR SHIPPING GUIDANCE.
10. FOR SHIPMENT OF ONE OR MORE LEFTOVER CONTAINERS, SEE THE "PROCEDURES FOR SHIPMENT OF LEFTOVER CONTAINERS" ON PAGE 30 FOR GUIDANCE.



PALLET UNIT

CONTAINER - - - 20 EACH (2 PER CONTAINER) @ 85 LBS (APPROX)  
 CUBE - - - - - 39.8 CU. FT. (APPROX)  
 GROSS WEIGHT - - - - - 1,938 LBS (APPROX)

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	54	104,652 LBS
DUNNAGE		2,917 LBS

TOTAL WEIGHT - - - - - 107,569 LBS (APPROX)

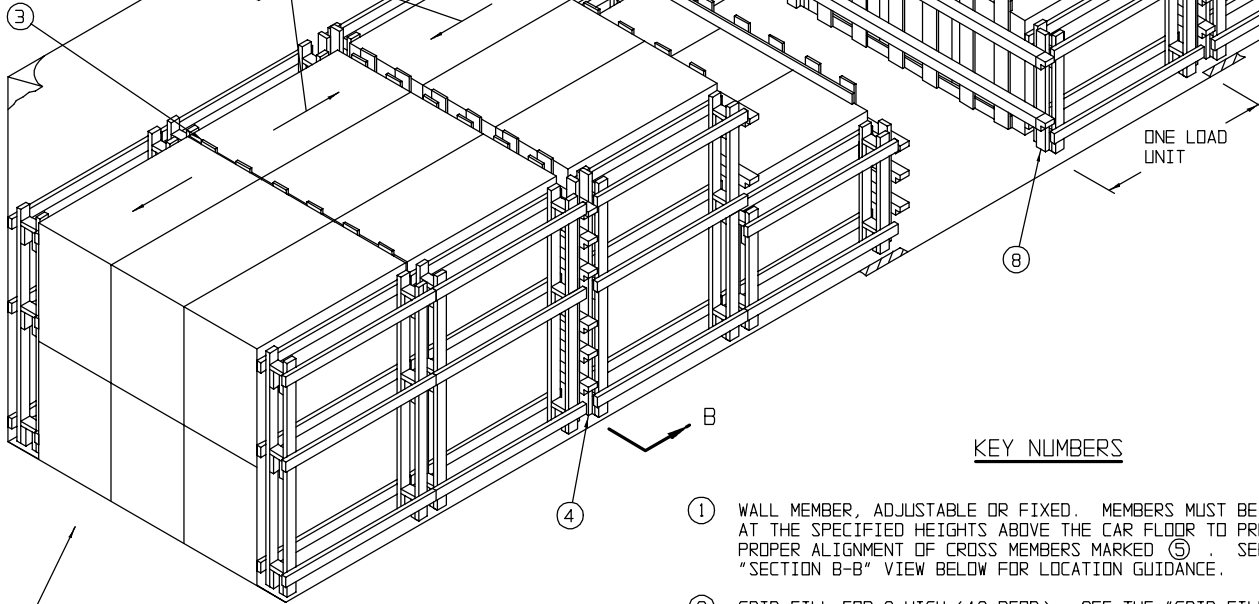
BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	89	30
1" X 6"	360	180
2" X 2"	56	19
2" X 3"	27	14
2" X 4"	1,362	908
2" X 6"	289	289
NAILS	NO. REQD	POUNDS
6d (2")	300	2
10d (3")	2,120	32-3/4
12d (3-1/4")	92	1-3/4

**CAR EQUIPMENT REQUIRED**

ADJUSTABLE WALL MEMBER - - -	32
(SEE "NOTE ▲" BELOW)	
CROSS MEMBERS - - - - -	24
DOORWAY MEMBERS - - - - -	6

NOTE ▲: FOR CARS EQUIPPED WITH FIXED WALL MEMBERS LOCATED AT THE HEIGHTS SPECIFIED IN "SECTION B-B" OMIT ALL REFERENCE TO "ADJUSTABLE WALL MEMBERS".

DIRECTION OF ARROW INDICATES BASE END OF CONTAINERS. SEE GENERAL NOTE "E" ON PAGE 2.

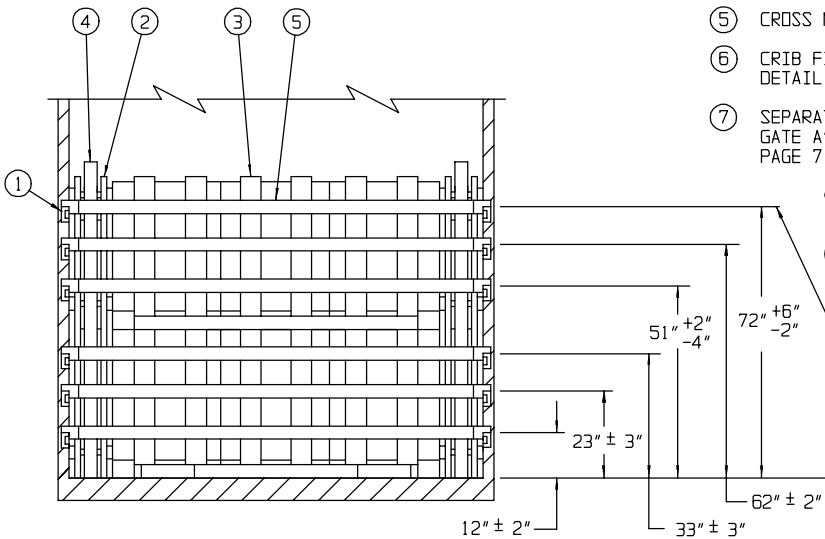


SEE GENERAL NOTES "D" AND "G" ON PAGE 2.

ISOMETRIC VIEW

KEY NUMBERS

- ① WALL MEMBER, ADJUSTABLE OR FIXED. MEMBERS MUST BE LOCATED AT THE SPECIFIED HEIGHTS ABOVE THE CAR FLOOR TO PROVIDE PROPER ALIGNMENT OF CROSS MEMBERS MARKED ⑤. SEE THE "SECTION B-B" VIEW BELOW FOR LOCATION GUIDANCE.
- ② CRIB FILL FOR 2-HIGH (12 REQD). SEE THE "CRIB FILL A" DETAIL ON PAGE 31. SEE GENERAL NOTES "M" AND "N" ON PAGE 2.
- ③ SEPARATOR GATE FOR 2-HIGH (8 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 32. AS APPLICABLE, POSITION WITH THE HORIZONTAL PIECES AGAINST THE ALREADY-LOADED UNITS. SEE SPECIAL NOTES 4 AND 5 ON PAGE 7.
- ④ STOP PIECE FOR 2-HIGH CRIB FILL, 2" X 4" X 7'-0" (8 REQD). SEE SPECIAL NOTE 6 ON PAGE 7.
- ⑤ CROSS MEMBER (24 REQD). SEE GENERAL NOTE "AA" ON PAGE 3.
- ⑥ CRIB FILL FOR 1-HIGH (6 REQD). SEE THE "CRIB FILL B" DETAIL ON PAGE 31.
- ⑦ SEPARATOR GATE FOR 1-HIGH (4 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 32. SEE SPECIAL NOTES 4 AND 5 ON PAGE 7.
- ⑧ STOP PIECE FOR 1-HIGH CRIB FILL, 2" X 4" X 40" (8 REQD). SEE SPECIAL NOTE 6 ON PAGE 7.
- ⑨ DOORWAY MEMBER (6 REQD). SEE THE "SECTION B-B" VIEW AT LEFT FOR LOCATION GUIDANCE. SEE SPECIAL NOTES 2 AND 7 ON PAGE 7.



SECTION B-B

EACH DIMENSIONED HEIGHT ABOVE THE CAR FLOOR TO AN ADJUSTABLE OR FIXED WALL MEMBER MARKED ① AND/OR A DOORWAY MEMBER MARKED ⑨ IS SPECIFIED TO LOCATE THE CENTER LINE OF A CROSS MEMBER.

INDICATES CAR FLOOR.

SPECIAL NOTES:

(SPECIAL NOTES CONTINUED)

1. A 50'-6" LONG BY 9'-2" WIDE (INSIDE CLEARANCE) WOOD-LINED BOX CAR EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS, AND WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED. IF THE 50'-6" LONG CAR FURNISHED IS EQUIPPED WITH 9'-0" OR NARROWER DOOR OPENINGS, FIFTY-ONE (51) PALLET UNITS, FOR AN APPROXIMATE LADING WEIGHT OF 98,938 POUNDS, CAN BE LOADED. A CAR HAVING A LOAD LIMIT OF AT LEAST 104,100 POUNDS WILL BE REQUIRED. A LOAD LIMIT OF AT LEAST 92,600 POUNDS IS REQUIRED FOR THE DEPICTED LOAD. SEE GENERAL NOTE "D" ON PAGE 2.
2. A MAXIMUM OF THIRTY-THREE (33) PALLET UNITS, FOR AN APPROXIMATE LADING WEIGHT OF 63,954 POUNDS, CAN BE PLACED IN A 40'-6" LONG CAR HAVING 10'-0" WIDE DOOR OPENINGS. THIRTY-NINE (39) UNITS, FOR AN APPROXIMATE LADING WEIGHT OF 75,582 POUNDS, CAN BE LOADED IN CARS HAVING 9'-0" OR NARROWER DOOR OPENINGS. A CAR HAVING A LOAD LIMIT OF AT LEAST 81,000 POUNDS WILL BE REQUIRED FOR A 39-UNIT LOAD. FIFTY-SEVEN (57) PALLET UNITS CAN BE PLACED IN A 60'-8" LONG CAR, FOR AN APPROXIMATE LADING WEIGHT OF 110,466 POUNDS, IF THE CAR HAS A LOAD LIMIT OF AT LEAST 115,700 POUNDS AND HAS 10'-0" WIDE DOOR OPENINGS. SIXTY-THREE (63) UNITS CAN BE LOADED IF THE DOOR OPENINGS ARE 9'-0" OR NARROWER. THE LADING WEIGHT WILL THEN BE APPROXIMATELY 122,094 POUNDS AND THE LOAD LIMIT MUST BE AT LEAST 127,300 POUNDS.
3. IF A CAR HAS BOWED END WALLS WHICH ARE BOWED OUTWARD TWO INCHES (2") OR MORE EITHER FROM SIDE-TO-SIDE OR FROM FLOOR-TO-ROOF, CROSS MEMBERS CAN BE INSTALLED NEAR THE END WALL OF THE CAR TO PROVIDE A "SQUARED END" RATHER THAN INSTALLING DUNNAGE AS SPECIFIED IN GENERAL NOTE "G" ON PAGE 2. THESE CROSS MEMBERS SHOULD BE INSTALLED AT THE SAME HEIGHTS AS THE CROSS MEMBERS USED THROUGHOUT THE LOAD AS BLOCKING MEMBERS. A SEPARATOR GATE SHOWN AS PIECE MARKED (3), MUST BE POSITIONED AGAINST THESE CROSS MEMBERS PRIOR TO LOADING.
4. TO FACILITATE POSITIONING OF THE PALLET UNITS AS LOADING PROGRESSES, POSITION PALLET UNIT STACKS AGAINST THE END WALL, THEN POSITION A SEPARATOR GATE, SHOWN AS PIECE MARKED (3), SO THE 1" X 4" HORIZONTAL PIECES ARE LOCATED UNDER THE "OVERHANG" OF THE PALLET UNITS. REPEAT THIS PROCEDURE FOR THE REMAINING STACKS. SEPARATOR GATES TO BE POSITIONED AGAINST CROSS MEMBERS PRIOR TO LOADING PALLET UNITS THERE SHOULD BE PLACED WITH THE HORIZONTAL PIECES LOCATED ON THE BACK SIDE BETWEEN THE CROSS MEMBERS.
5. SEPARATOR GATES MAY BE FORMED FROM 3/8" OR THICKER PLYWOOD IN LIEU OF DIMENSIONAL LUMBER, IF DESIRED. SEE THE "ALTERNATIVE SEPARATOR GATE A" DETAIL ON PAGE 37 (FOR 2-HIGH LOAD ONLY), AND "SEPARATOR GATE D" DETAIL ON PAGE (FOR 1-HIGH LOAD ONLY), FOR CONSTRUCTION GUIDANCE.

6. STOP PIECES, PIECES MARKED (4), ARE REQUIRED AT EACH SIDE OF A CROSS MEMBER BLOCKING STATION WHERE THE ADJACENT LOAD IS 2 UNITS HIGH. PIECES MARKED (5) ARE REQUIRED WHERE THE LOAD ON THE SIDE OF A CROSS MEMBER BLOCKING STATION IS 1 UNIT HIGH. A STOP PIECE ON THE END-OF-CAR SIDE OF A CROSS MEMBER BLOCKING STATION WILL BE SECURED TO THE ADJACENT CRIB FILL BY ENCIRCLING THE TOP STRUT OF THE CRIB FILL WITH NO. 14 GAGE WIRE AND TWISTING TAUT, AND THEN ENCIRCLING THE TOP OF THE STOP PIECE AND TWISTING TAUT. THE STOP PIECE ON THE CENTER-OF-CAR SIDE OF A CROSS MEMBER BLOCKING STATION WILL BE SECURED TO THE UPPER CROSS MEMBER IN A SIMILAR MANNER, PRIOR TO PLACEMENT OF THE LADING AND THE CRIB FILL.
7. IF THE CAR BEING LOADED IS EQUIPPED WITH AT LEAST TWELVE (12) DOORWAY MEMBERS, AN ADDITIONAL NINE PALLET UNITS CAN BE LOADED IN THE DOORWAY AREA. A CAR HAVING A LOAD LIMIT AT LEAST 113,400 POUNDS WILL BE REQUIRED.
8. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED. A LOAD MAY BE REDUCED BY MULTIPLES OF THREE (3) PALLET UNITS BY OMITTING LATERALLY ADJACENT UNITS FROM THE TOP LAYER OF ONE OR MORE LOAD UNITS, OR BY MULTIPLES OF SIX (6) PALLET UNITS BY OMITTING ONE OR MORE ENTIRE LOAD UNITS. TO REDUCE A LOAD BY ONE (1) PALLET UNIT, REFER TO THE LCL PROCEDURES ON PAGE 8 FOR GUIDANCE.
9. FOR SHIPMENT OF ONE OR MORE LEFTOVER CONTAINERS, SEE THE "PROCEDURES FOR SHIPMENT OF LEFTOVER CONTAINERS" ON PAGE 30 FOR GUIDANCE.

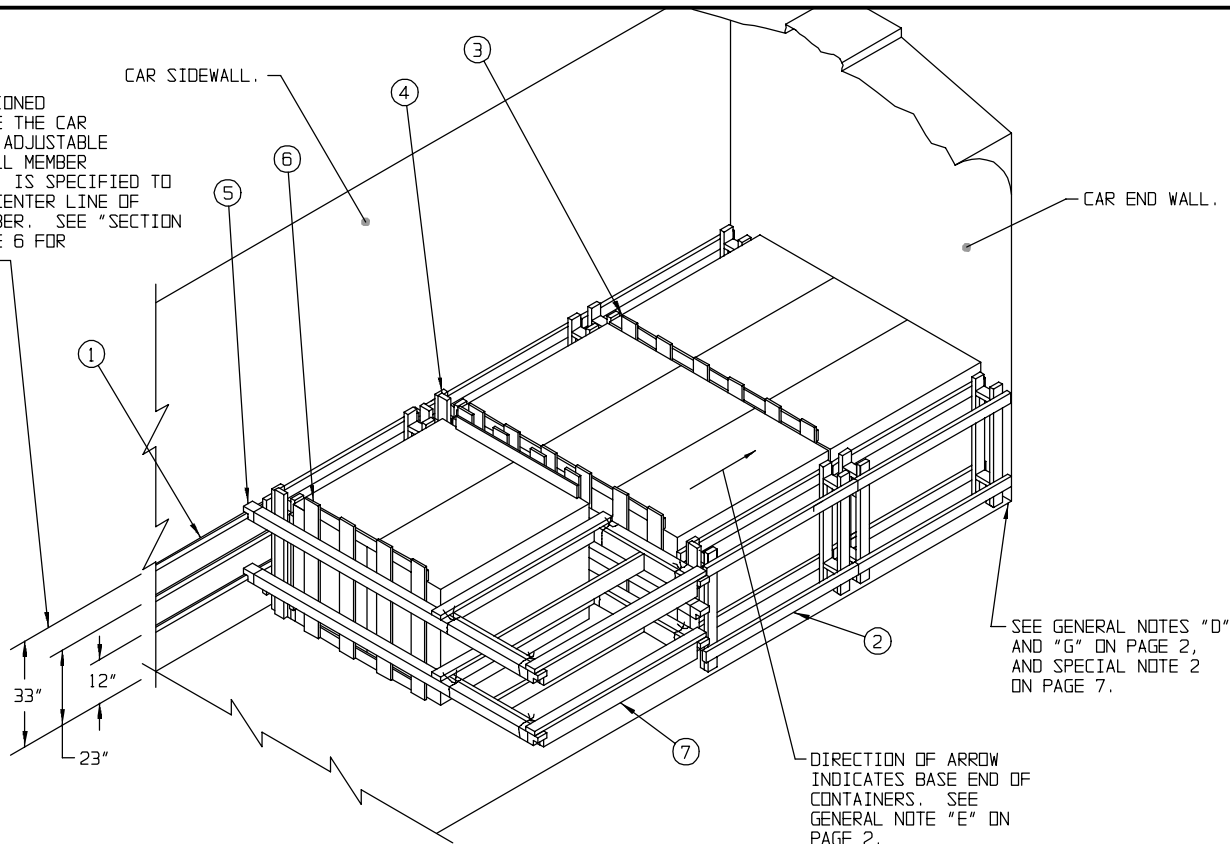
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BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	102	34
1" X 6"	410	205
2" X 4"	1,178	786
NAILS	NO. REQD	POUNDS
6d (2")	432	2-3/4
10d (3")	1,488	23
WIRE, NO. 14 GAGE	45' REQD	1 LB

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	45	87,210 LBS
DUNNAGE		2,077 LBS
TOTAL WEIGHT		89,287 LBS (APPROX)

EACH DIMENSIONED HEIGHT ABOVE THE CAR FLOOR TO AN ADJUSTABLE OR FIXED WALL MEMBER MARKED ①, IS SPECIFIED TO LOCATE THE CENTER LINE OF A CROSS MEMBER. SEE "SECTION B-B" ON PAGE 6 FOR TOLERANCES.



ISOMETRIC VIEW

KEY NUMBERS

SPECIAL NOTES:

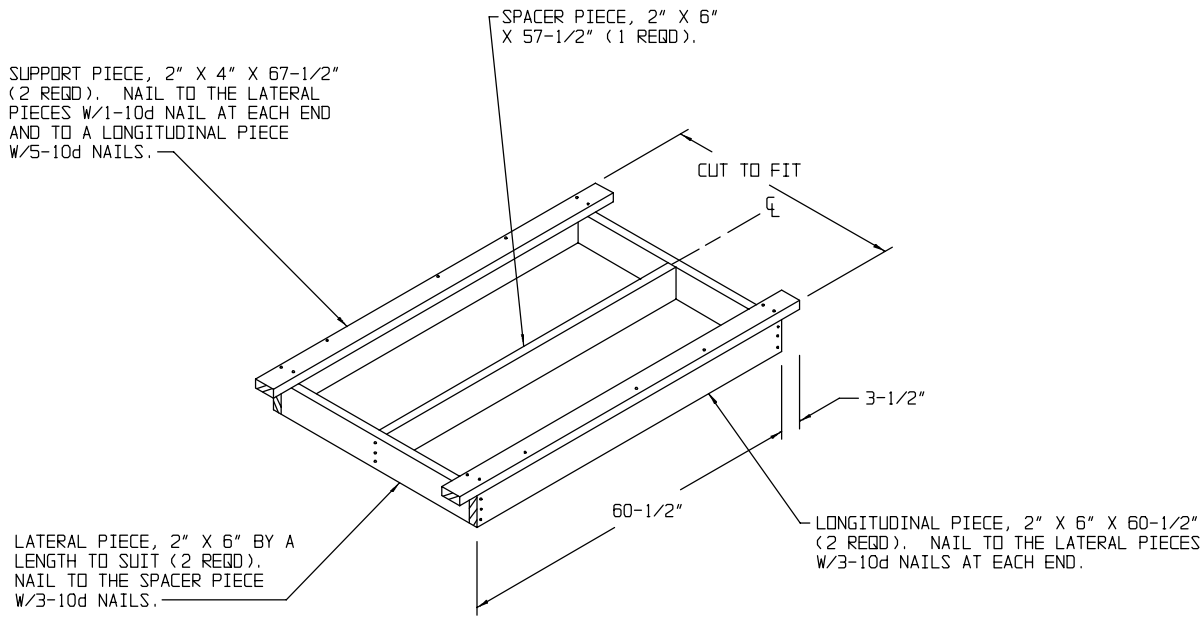
1. A 9'-0" WIDE (INSIDE CLEARANCE) WOOD-LINED BOX CAR EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED. SEE GENERAL NOTE "D" ON PAGE 2.
2. EIGHT (8) UNITS ARE SHOWN AS A TYPICAL LOAD QUANTITY. THE NUMBER OF UNITS CAN BE ADJUSTED TO SUIT THE QUANTITY TO BE SHIPPED.
3. STOP PIECES, PIECE MARKED ④, ARE REQUIRED AT EACH SIDE OF A CROSS MEMBER BLOCKING STATION WHERE THERE IS A CRIB FILL ASSEMBLY TO BE RETAINED. A STOP PIECE ON THE END-OF-CAR SIDE OF A CROSS MEMBER BLOCKING STATION WILL BE SECURED TO THE ADJACENT CRIB FILL BY ENCIRCLING THE TOP STRUT OF THE CRIB FILL WITH NO. 14 GAGE WIRE AND TWISTING TAUT, AND THEN ENCIRCLING THE TOP OF THE STOP PIECE AND TWISTING TAUT. THE STOP PIECE ON THE CENTER-OF-CAR SIDE OF A CROSS MEMBER BLOCKING STATION WILL BE SECURED TO THE UPPER CROSS MEMBER IN A SIMILAR MANNER PRIOR TO PLACEMENT OF THE LADING AND THE CRIB FILL.
4. THE SPACER ASSEMBLIES, PIECE MARKED ⑦, MAY ALSO BE USED IN THE TOP LAYER OF A LOAD FOR THE OMISSION OF A PALLET UNIT. IF THE ASSEMBLIES ARE USED NEXT TO THE CAR END WALL IN EITHER A FIRST OR SECOND LAYER, AND THE END WALL IS WOOD-LINED, CUT THE ADJACENT ENDS OFF THE SUPPORT PIECES FLUSH WITH THE LATERAL PIECE. EACH ASSEMBLY CAN THEN BE SUPPORTED BY NAILING THE LATERAL PIECE TO THE CAR END WALL W/6-10d NAILS IF OMITTING ONE PALLET UNIT OR W/9-10d NAILS IF OMITTING TWO PALLET UNITS. IF THE END WALL IS NON-NAILABLE, CROSS MEMBERS MUST BE INSTALLED AT THE END OF THE LOAD TO SUPPORT THE SPACER ASSEMBLIES. NOTE THAT "SPACER ASSEMBLY B" WILL BE USED WHEN OMITTING TWO PALLET UNITS.

- ① WALL MEMBER, ADJUSTABLE OR FIXED. MEMBERS MUST BE LOCATED AT THE SPECIFIED HEIGHTS ABOVE THE CAR FLOOR TO PROVIDE PROPER ALIGNMENT OF CROSS MEMBERS MARKED ⑤.
- ② CRIB FILL (5 REQD). SEE THE "CRIB FILL B" DETAIL ON PAGE 31. SEE GENERAL NOTES "M" AND "N" ON PAGE 2.
- ③ SEPARATOR GATE FOR 1 HIGH BY 3 WIDE (2 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 32. POSITION AS SHOWN WITH THE HORIZONTAL PIECES AGAINST THE ALREADY-LOADED UNITS. SEE SPECIAL NOTES 4 AND 5 ON PAGE 7.
- ④ CRIB FILL STOP PIECE, 2" X 4" X 40" (4 REQD). SEE SPECIAL NOTE 3 AT LEFT.
- ⑤ CROSS MEMBER (5 REQD). SEE GENERAL NOTE "AA" ON PAGE 3.
- ⑥ SEPARATOR GATE FOR 1 HIGH BY 2 WIDE (2 REQD). SEE THE "SEPARATOR GATE B" DETAIL ON PAGE 33.
- ⑦ SPACER ASSEMBLY (2 REQD). SEE THE "SPACER ASSEMBLY A" DETAIL ON PAGE 9. WIRE TIE TO CROSS MEMBERS W/2 WRAPS OF NO. 14 GAGE WIRE AT EACH CORNER. SEE SPECIAL NOTE 4 AT LEFT.

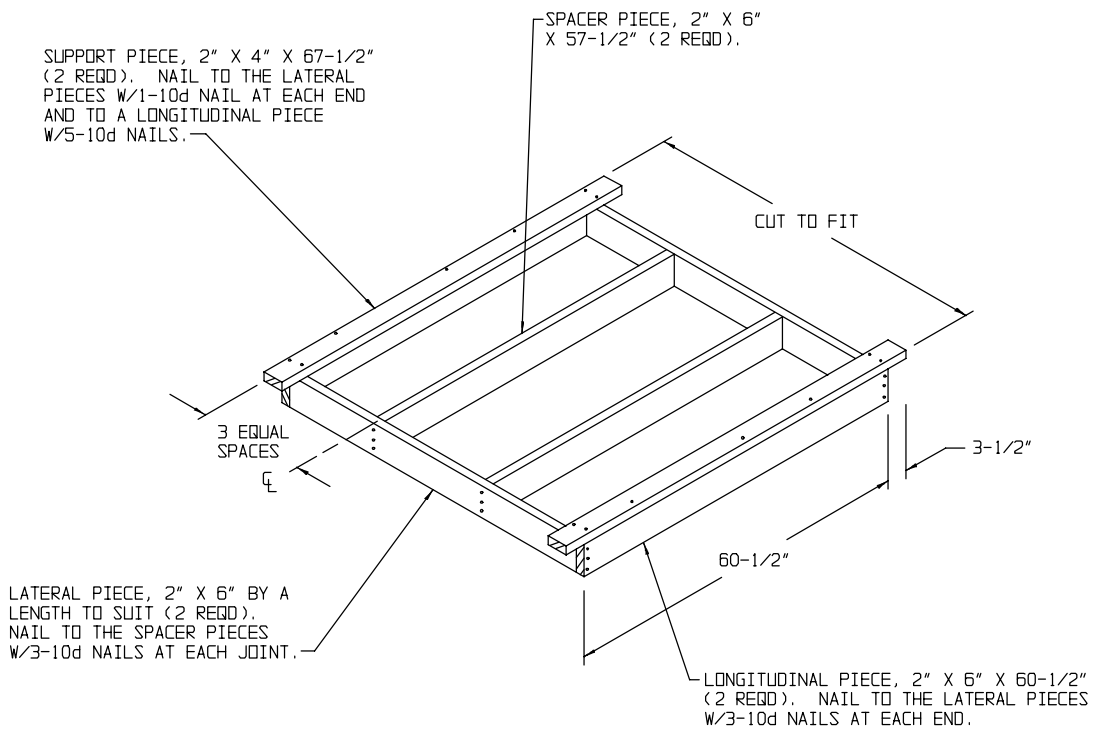
TYPICAL LCL (5-UNIT LOAD) IN A BOX CAR EQUIPPED WITH

MECHANICAL BRACING DEVICES HAVING ADJUSTABLE AND/OR FIXED WALL MEMBERS



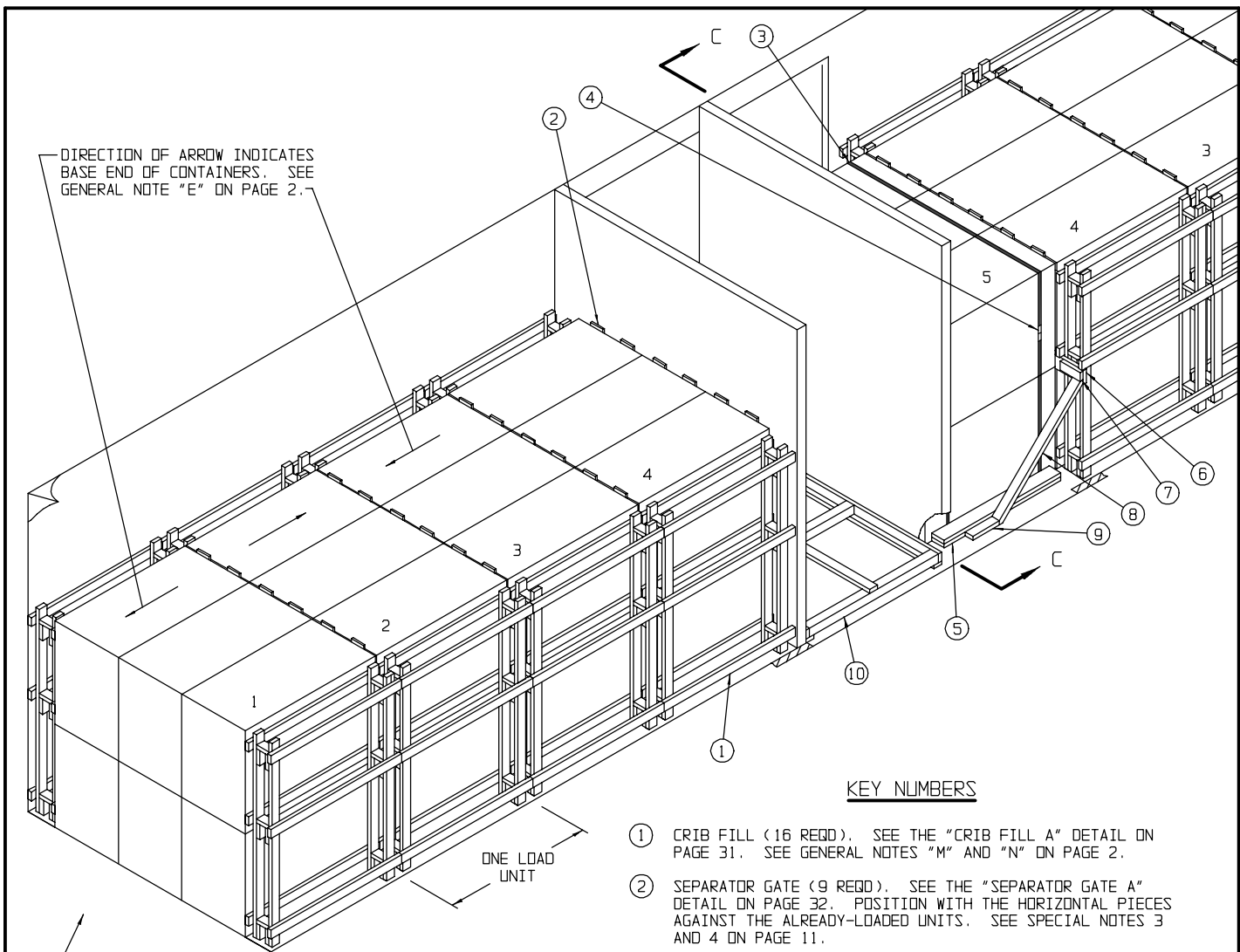


**SPACER ASSEMBLY A**  
(FOR OMISSION OF ONE PALLET UNIT)



**SPACER ASSEMBLY B**  
(FOR OMISSION OF TWO PALLET UNITS)

TYPICAL LCL (5-UNIT LOAD) IN A BOX CAR EQUIPPED WITH  
MECHANICAL BRACING DEVICES HAVING ADJUSTABLE AND/OR FIXED WALL MEMBERS



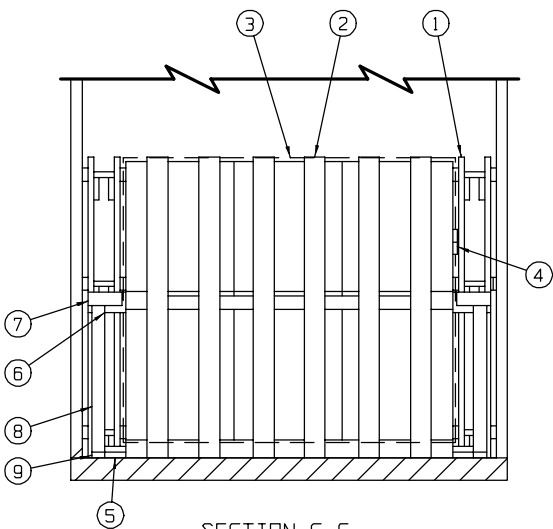
DIRECTION OF ARROW INDICATES  
BASE END OF CONTAINERS. SEE  
GENERAL NOTE "E" ON PAGE 2.

SEE GENERAL NOTES  
"D" AND "G" ON  
PAGE 2.

ISOMETRIC VIEW

KEY NUMBERS

- ① CRIB FILL (16 REQD). SEE THE "CRIB FILL A" DETAIL ON PAGE 31. SEE GENERAL NOTES "M" AND "N" ON PAGE 2.
- ② SEPARATOR GATE (9 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 32. POSITION WITH THE HORIZONTAL PIECES AGAINST THE ALREADY-LOADED UNITS. SEE SPECIAL NOTES 3 AND 4 ON PAGE 11.
- ③ BUNDLING STRAP, 1-1/4" X .035" OR .031" X 28'-6" LONG STEEL STRAPPING (2 REQD). INSTALL TO ENCIRCLE THE PALLET UNIT STACKS IN THE DOORWAY AREA. SEE SPECIAL NOTE 5 ON PAGE 11.
- ④ SEAL FOR 1-1/4" STRAPPING (4 REQD). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "O" ON PAGE 2.
- ⑤ SIDE BLOCKING, 2" X 6" X 56" (DOUBLED) (2 REQD). POSITION AGAINST THE PALLET UNITS IN THE DOORWAY AREA AS SHOWN ABOVE. NAIL THE FIRST PIECE TO THE CAR FLOOR W/9-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE SPECIAL NOTE 5 ON PAGE 11.
- ⑥ BEARING PIECE, 2" X 6" BY A LENGTH TO SPAN THE VERTICAL PIECES OF THE CRIB FILL, PIECE MARKED ①, PLUS 2" (REF: 11") (2 REQD). SEE THE "HEIGHT PLACEMENT OF CRIB FILL BRACING" DETAIL ON PAGE 36. NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH END.
- ⑦ HOLD DOWN PIECE, 2" X 4" X 9" (2 REQD). SEE THE "HEIGHT PLACEMENT OF CRIB FILL BRACING" DETAIL ON PAGE 36 FOR PLACEMENT GUIDANCE. NAIL TO THE BEARING PIECE, PIECE MARKED ⑥, W/3-10d NAILS.
- ⑧ DIAGONAL BRACE, 2" X 4" X 56" (2 REQD). DOUBLE BEVEL EACH END W/45° CUTS. POSITION AS SHOWN AND NAIL TO THE BEARING PIECE MARKED ⑥, AND TO THE FLOOR W/1-16d NAIL AT EACH END.
- ⑨ BACK-UP CLEAT, 2" X 4" X 12" (2 REQD). POSITION ONE END AGAINST THE DIAGONAL BRACE, PIECE MARKED ⑧, AND NAIL TO THE CAR FLOOR W/3-16d NAILS.
- ⑩ STRUT ASSEMBLY (1 REQD). SEE THE "STRUT ASSEMBLY FOR 1-PIECE BULKHEADS" DETAIL ON PAGE 41. INSTALL BETWEEN THE LOAD DIVIDER BULKHEADS. SEE SPECIAL NOTE 6 ON PAGE 11.



SECTION C-C

54-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE  
CONVENTIONAL BOX CAR EQUIPPED WITH LOAD DIVIDER BULKHEADS

SPECIAL NOTES:

(GENERAL NOTES CONTINUED FROM PAGE 3)

1. A 50'-6" LONG BY 9'-2" WIDE WOOD-LINED CUSHIONED BOX CAR EQUIPPED WITH LOAD DIVIDER BULKHEADS AND WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING NARROWER OR WIDER DOOR OPENINGS CAN BE USED. SEE GENERAL NOTES "AA" THRU "EE" ON PAGE 3.
2. A MAXIMUM OF FORTY-TWO (42) OF THESE UNITS, FOR AN APPROXIMATE LADING WEIGHT OF 81,396 POUNDS, CAN BE PLACED IN A 40'-6" LONG CAR WHEN USING THE DEPICTED PROCEDURES; SIXTY-SIX (66) UNITS, FOR A LADING WEIGHT OF 127,908 POUNDS, CAN BE LOADED IN 60'-8" LONG CAR. NOTE THAT A LOAD LIMIT OF AT LEAST 91,800 POUNDS IS REQUIRED FOR A FULL LOAD IN A 40'-6" LONG CAR, A LOAD LIMIT OF AT LEAST 137,600 POUNDS IS REQUIRED FOR A FULL LOAD IS A 60'-8" LONG CAR.
3. TO FACILITATE POSITIONING OF THE PALLET UNITS AS LOADING PROGRESSES, POSITION PALLET UNIT STACKS AGAINST THE END WALL, THEN POSITION A SEPARATOR GATE, SHOWN AS PIECES MARKED (2), SO THE 1" X 4" HORIZONTAL PIECES ARE LOCATED UNDER THE "OVER-HANG" OF THE PALLET UNITS. REPEAT THIS PROCEDURE FOR THE REMAINING STACKS.
4. SEPARATOR GATES MAY BE FORMED FROM 3/8" OR THICKER PLYWOOD IN LIEU OF DIMENSIONAL LUMBER, IF DESIRED. SEE THE "ALTERNATIVE SEPARATOR GATE A" DETAIL ON PAGE 37 (FOR 2-HIGH LOAD ONLY), AND "SEPARATOR GATE D" ON PAGE 33 (FOR 1-HIGH LOAD ONLY) FOR CONSTRUCTION GUIDANCE.
5. DOORWAY PROTECTION IS REQUIRED FOR ALL PALLET UNITS STACKS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE STACK LENGTH. THE DEPICTED DOORWAY PROTECTION IS APPLICABLE FOR CARS EQUIPPED WITH EITHER SLIDING TYPE OR PLUG TYPE DOORS, OR A COMBINATION THEREOF. IF THE CAR BEING LOADED IS EQUIPPED WITH SLIDING TYPE DOORS, WOODEN DOOR GATES, SHOWN AS PIECE MARKED (3) ON PAGE 4, OR ANY OF THE ALTERNATIVES ON PAGES 39 AND 40 MAY BE USED.
6. A STRUT ASSEMBLY, SHOWN AS PIECE MARKED (4), IN THE LOAD ON PAGE 10, IS REQUIRED BETWEEN THE LOAD DIVIDER BULKHEADS WHEN THE LOAD IN EITHER END OF THE CAR IS 50,000 POUNDS OR MORE. FOR THE DEPICTED PALLET UNIT, A STRUT ASSEMBLY WILL BE REQUIRED IF THE LOAD IN ONE END OF THE CAR CONSISTS OF MORE THAN FOUR (4) LOAD UNITS.
7. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY OF CONTAINERS TO BE SHIPPED. A 2-TIER LOAD CAN BE REDUCED BY A MULTIPLE OF SIX (6) UNITS, OR A 1-TIER LOAD CAN BE REDUCED BY A MULTIPLE OF THREE (3) UNITS BY OMITTING ONE OR MORE LOAD UNITS FROM THE CENTER PORTION OF THE LOAD, OR THE ENTIRE TOP TIER CAN BE OMITTED. FOR OTHER METHODS OF REDUCING A LOAD, AND FOR TYPICAL LCL PROCEDURES, REFER TO PAGE 13 AND PAGES 20 THRU 26 FOR GUIDANCE.
8. IF PALLET UNITS WHICH DO NOT CONTAIN A FULL QUANTITY OF CONTAINERS ARE TO BE TRANSPORTED, REFER TO PAGE 27 FOR SHIPPING GUIDANCE.
9. FOR SHIPMENT OF ONE OR MORE LEFTOVER CONTAINERS, SEE THE "PROCEDURES FOR SHIPMENT OF LEFTOVER CONTAINERS" ON PAGE 30.

FF. IF NAILING TO A CAR SIDEWALL IS NOT REQUIRED, BOXCARS EQUIPPED WITH ADJUSTABLE SIDE FILLERS THAT HAVE 3/8" OR THICKER PANELS MAY BE USED, HOWEVER, THESE SIDE FILLERS MUST NOT BE USED FOR LATERAL BLOCKING; THEY MUST BE RETRACTED AND LOCKED AGAINST THE CAR SIDEWALL. A "FILL PIECE" MUST BE INSTALLED IN THE VOID BETWEEN THE CAR SIDEWALL AND THE SIDE FILLER PANEL. SEE THE "TYPICAL TYPE A" VIEW ON PAGE 42 FOR GUIDANCE. IF THE BACK OF THE SIDE FILLER PANELS ARE REINFORCED WITH VERTICAL AND HORIZONTAL STEEL MEMBERS AS SHOWN IN THE "TYPICAL TYPE B" VIEW ON PAGE 42, THE "FILL PIECE" MATERIAL IS NOT REQUIRED.

GG. NOTICE: AFTER THE LOAD DIVIDER BULKHEADS ARE POSITIONED AGAINST THE LADING, AND THE LOCKING PINS ARE ENGAGED IN THE HOLES OF THE RAILS, THE LOWER LOCKING PINS MUST BE INSPECTED TO ENSURE THAT THE PINS ARE FULLY ENGAGED IN THE LOCKING HOLES. IF THE PINS ARE NOT FULLY SEATED IN THE LOCKING HOLES, THE LINKAGE MECHANISM WILL BE ADJUSTED AS REQUIRED SO THAT THE PINS WILL BE FULLY SEATED INTO THE LOCKING HOLES OF THE LOWER RAILS. IF PRESENT, DEBRIS MUST BE REMOVED FROM BENEATH THE LOCKING HOLES WHICH HAVE BEEN SELECTED FOR SECURING A LOAD DIVIDER BULKHEAD.

HH. A "STRUT ASSEMBLY" MUST BE INSTALLED BETWEEN THE LOAD DIVIDER BULKHEADS IF THE CAR CONTAINS HAZARD CLASS AND DIVISION 1.1, 1.2, OR 1.3 EXPLOSIVES AND THE LOAD IN EITHER END OF THE CAR WEIGHS 50,000 POUNDS OR MORE. A STRUT ASSEMBLY IS NOT REQUIRED FOR LOADS OF HAZARD CLASS AND DIVISION 1.4 EXPLOSIVES. NOTE THAT THE STRUT ASSEMBLY MAY BE OMITTED FROM LOADS OF HAZARD CLASS AND DIVISION 1.1, 1.2, OR 1.3 EXPLOSIVES WEIGHING 50,000 POUNDS WHEN THE LADING AND ADEQUATE BLOCKING AND BRACING ARE POSITIONED TO COMPLETELY FILL THE SPACE BETWEEN THE INSTALLED BULKHEADS AS SPECIFIED IN GENERAL NOTE "JJ-3" BELOW. DETAILS OF STRUT ASSEMBLIES FOR USE BETWEEN 2-PIECE BULKHEADS AND BETWEEN 1-PIECE BULKHEADS ARE SHOWN ON PAGE 41.

JJ. THE NORMAL LOADING PATTERN IN CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS IS TO POSITION THE LADING BETWEEN A CAR ENDWALL AND A LOAD DIVIDER BULKHEAD IN FULL LAYERS. OBVIOUSLY, A LOAD QUANTITY MUST THEN BE A MULTIPLE OF THE NUMBER OF PALLET UNITS WHICH ARE IN ONE LOAD UNIT. A LOAD UNIT IS DEFINED AS A STACK OF CONTAINERS WHICH IS FULL CAR WIDTH BY FULL LOAD HEIGHT BY ONE UNIT IN LENGTH. IF THE QUANTITY TO BE SHIPPED CANNOT BE ATTAINED BY ADJUSTING THE NUMBER OF TIERS IN ONE OR BOTH ENDS OF A CAR, OR BY ADJUSTING THE NUMBER OF LOAD UNITS IN EITHER END OF THE CAR, ONE OF THE FOLLOWING PROCEDURES MUST BE USED IN ORDER TO OBTAIN THE DESIRED QUANTITY.

1. ONE OR MORE RISERS CAN BE POSITIONED WITHIN A LOAD TO INCREASE A LOAD QUANTITY. SEE THE RISER PROCEDURES AND DETAILS ON PAGES 14 AND 15.
2. THE "GATES AND STRUTS" METHOD OF OMITTING A PALLET UNIT MAY BE USED TO ADJUST A LOAD QUANTITY DOWNWARD BY OTHER THAN A MULTIPLE OF A LOAD UNIT. SEE THE PROCEDURES ON PAGES 13 AND 14 FOR GUIDANCE.
3. AT LOCATION(S) WHERE K-BRACES MIGHT NORMALLY BE USED IN A LOAD IN A CONVENTIONAL CAR, LOAD DIVIDER BULKHEADS CAN BE POSITIONED. LOADING CAN THEN CONTINUE TOWARD THE CENTER OF THE CAR FROM EACH INSTALLED LOAD DIVIDER BULKHEAD IN A ONE-HIGH LOADING PATTERN. INSTALL CENTER GATES AND STRUTS AS SHOWN ON PAGE 4 OR 6 OF THE CONVENTIONAL BOXCAR DRAWING HEREIN TO PROVIDE FOR A TIGHT LOAD BETWEEN THE BULKHEADS.

4. ONE OR MORE UNITS CAN BE POSITIONED IN CONTACT WITH A LOAD DIVIDER BULKHEAD ON THE CENTER-OF-CAR SIDE. BLOCK AND BRACE WITH LCL BRACES AS SHOWN ON PAGE 26 OR WITH KNEE BRACE ASSEMBLIES, AS SHOWN ON PAGE 20.

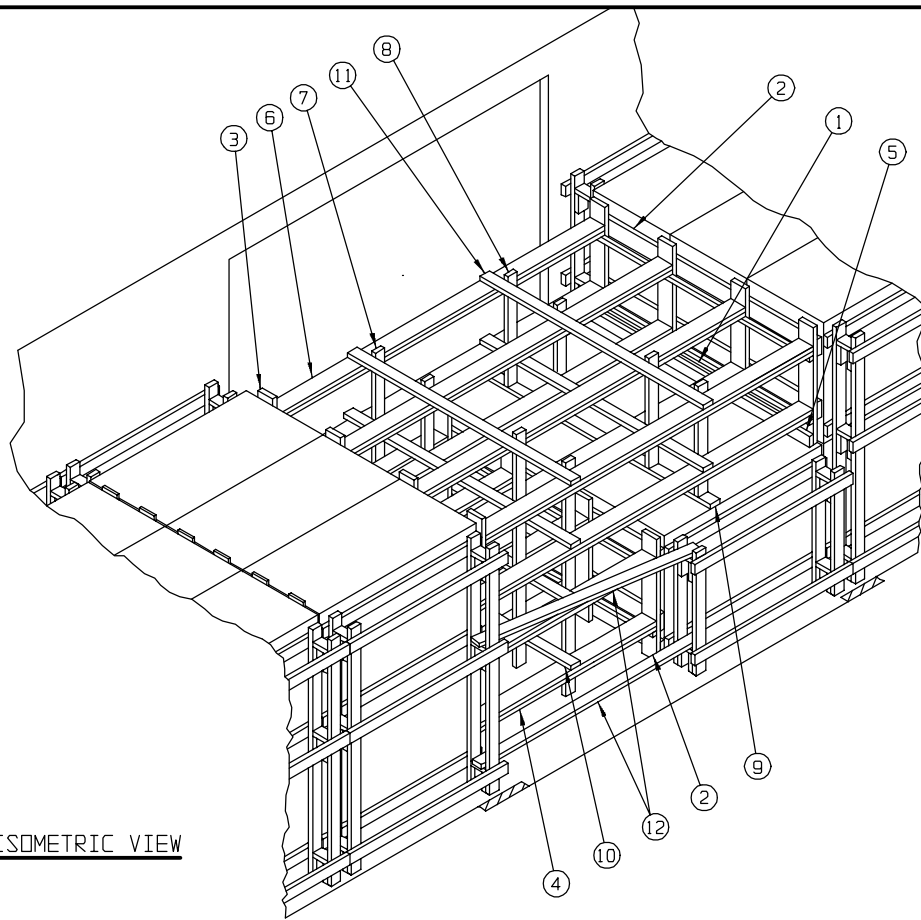
KK. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTION WHICH IS IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHOD.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	54	104,652 LBS
LUNNAGE		2,171 LBS
TOTAL WEIGHT		106,823 LBS (APPROX)

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	114	38
1" X 6"	360	180
1" X 8"	18	12
2" X 4"	1188	792
2" X 6"	21	21
4" X 4"	18	24
NAILS	NO. REQD	POUNDS
6d (2")	342	2-1/4
10d (3")	1,520	23-1/2
12d (3-1/4")	16	1/2
16d (3-1/2")	46	1
STEEL STRAPPING, 1-1/4" --- 57' REQD --- 9 LBS		
SEAL FOR 1-1/4" STRAPPING --- 4 REQD --- NIL		

54-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE  
CONVENTIONAL BOX CAR EQUIPPED WITH LOAD DIVIDER BULKHEADS



ISOMETRIC VIEW

SPECIAL NOTES:

1. ONLY THE CENTER PORTION OF A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR IS SHOWN TO PORTRAY THE STRUTTED GATE METHOD OF PARTIAL-LAYER BRACING. CARS OF OTHER DIMENSIONS CAN ALSO BE USED.
2. THE PROCEDURES FOR THE ADJUSTMENT OF A LOAD QUANTITY BY THE OMISSION OF THE TOP LAYER FROM ONE LOAD UNIT ARE SHOWN. IF SIX (6) PALLET UNITS ARE TO BE OMITTED, IT IS RECOMMENDED THAT AN ENTIRE LOAD UNIT BE OMITTED RATHER THAN OMITTING THE TOP LAYER FROM TWO LOAD UNITS.
3. ONLY THE BLOCKING AND BRACING PIECES WHICH ARE NECESSARY TO PERMIT THE OMISSION OF THE UNITS FROM THE TOP LAYER ARE SHOWN. REFER TO PAGE 4 FOR LATERAL BRACING, SEPARATOR GATES, AND DOORWAY PROTECTION REQUIREMENTS. NOTE THAT (2) TWO ONE-HIGH CRIB FILL ASSEMBLIES WILL BE USED AS SHOWN.
4. TO PROTECT THE LADING FROM BEING PUNCTURED WHEN A SET OF VERTICAL STRUT BRACING IS INSTALLED ABOVE THE LOWER LAYER OF A LOAD, A SUITABLE LENGTH PAD OF 2" X 4" MATERIAL, SHOWN AS PIECE MARKED (9), MUST BE POSITIONED UNDER AND SECURED TO EACH APPLICABLE VERTICAL STRUT BEARING PIECE.
5. THE DEPICTED PROCEDURES ARE APPLICABLE FOR A 50'-6" LONG CAR, THE PROCEDURES ARE ADAPTABLE FOR THE OMISSION OF THREE PALLET UNITS FROM A LOAD IN A 40'-6" LONG CAR OR A 60'-8" LONG CAR.

(KEY NUMBERS CONTINUED)

- (11) HORIZONTAL STRUT BRACING, 2" X 4" X 7'-0" (4 REQD). NAIL TO THE STRUTS MARKED (6) W/3-10d NAILS AT EACH JOINT.
- (12) CRIB FILL RETAINER, 2" X 4" BY LENGTH TO SUIT (REF: 7'-0") (4 REQD). POSITION TO SPAN THE STRUTS OF THE ADJACENT CRIB FILL ASSEMBLIES AT THE CENTER OF THE CAR AND NAIL TO EACH STRUT W/3-10d NAILS. NOTE THE TOP RETAINER WILL BE PLACED AT AN ANGLE SO AS TO RETAIN THE ONE-HIGH AND 2-HIGH CRIB FILLS AS SHOWN ABOVE.

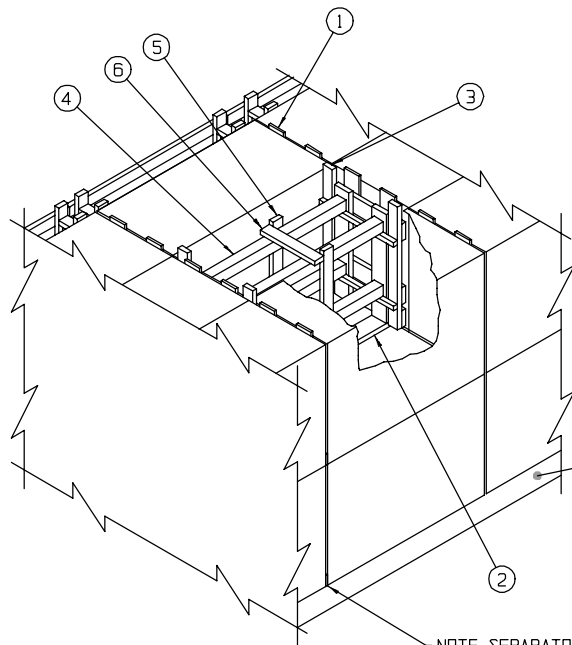
KEY NUMBERS

- (1) SEPARATOR GATE (1 REQD). SEE THE "SEPARATOR GATE C" DETAIL ON PAGE 33.
- (2) CENTER GATE FOR 1-HIGH (2 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 31. SEE GENERAL NOTES "M" AND "N" ON PAGE 2.
- (3) CENTER GATE FOR 2-HIGH (1 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 31.
- (4) STRUT, 2" X 6" BY CUT TO FIT (REF: 63-3/4") (DOUBLED) (8 REQD). LAMINATE W/1-10d NAIL EVERY 6". POSITION BETWEEN PIECE MARKED (2) AND (3) IN THE FIRST LAYER AND TOENAIL W/2-12d NAILS AT EACH END. SEE GENERAL NOTES "W" AND "X" ON PAGE 3.
- (5) SUPPORT PIECE, 2" X 4" X 7'-0" (1 REQD). NAIL TO THE VERTICAL PIECES OF CENTER GATE "A", PIECE MARKED (2), W/3-10d NAILS AT EACH JOINT.
- (6) STRUT, 2" X 6" BY CUT TO FIT (REF: 10'-3") (DOUBLED) (8 REQD). LAMINATE W/1-10d NAIL EVERY 6". POSITION BETWEEN PIECES MARKED (2) AND (3) IN THE TOP LAYER AND TOENAIL W/2-12d NAILS AT EACH END.
- (7) VERTICAL STRUT BRACING, 2" X 4" X 6'-4" (4 REQD). NAIL TO THE STRUTS MARKED (4) AND (6) W/3-10d NAILS AT EACH JOINT.
- (8) VERTICAL STRUT BRACING, 2" X 4" X 36" (4 REQD). NAIL TO THE STRUTS MARKED (6) W/3-10d NAILS AT EACH JOINT. TOENAIL TO THE STRUT BRACING PAD, PIECE MARKED (9), W/1-10d NAIL AT EACH JOINT. SEE SPECIAL NOTE 4 AT LEFT.
- (9) STRUT BRACING PAD, 2" X 4" X 7'-0" (1 REQD). POSITION UNDER THE VERTICAL STRUT BRACING AS SHOWN.
- (10) HORIZONTAL STRUT BRACING, 2" X 4" X 7'-0" (2 REQD). NAIL TO THE STRUTS MARKED (4) W/3-10d NAILS AT EACH JOINT.

(CONTINUED AT LEFT)

3-WIDE LENGTHWISE-POSITIONED PALLET UNITS

TYPICAL LCL LOAD USING STRUTTED-GATE METHOD OF PARTIAL-LAYER BRACING



NOTE CRIB FILL HAS BEEN LEFT OUT FROM THIS SIDE FOR CLARITY PURPOSES.

NOTE SEPARATOR GATES MUST BE PLACED SO THAT THE VERTICAL PIECES WILL BE AGAINST THE LOAD BEARING GATES IN BOTH DIRECTIONS.

ISOMETRIC VIEW

SPECIAL NOTES:

1. A PARTIAL VIEW OF A 9'-2" WIDE CONVENTIONAL TYPE BOX CAR IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED.
2. A UNIT OMITTED FROM THE TOP LAYER OF A 2-LAYER LOAD IS SHOWN AS TYPICAL. THE PROCEDURES ARE ALSO APPLICABLE FOR THE OMISSION OF A PALLET UNIT FROM A 1-LAYER LOAD. USE SEPARATOR GATE "H" ON PAGE 23 FOR A 1-HIGH LOAD.
3. THE OMITTED-UNIT PROCEDURES SHOULD BE APPLIED NEAR THE CENTER OF THE CAR LENGTH, BUT NOT IN THE DOORWAY AREA. ALSO, THERE SHOULD BE AT LEAST ONE (1) LOAD UNIT BETWEEN THE OMITTED UNIT AND A CENTER GATE.
4. ONLY THE BLOCKING AND BRACING FOR THE OMITTED UNIT IS SHOWN; REFER TO PAGE 4 FOR THE BLOCKING AND BRACING REQUIREMENTS FOR THE BALANCE OF THE LOAD.

KEY NUMBERS

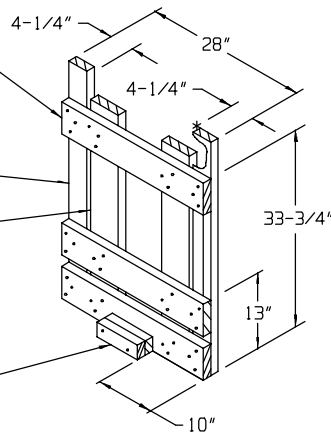
- ① SEPARATOR GATE D (2 REQD). SEE THE "SEPARATOR GATE D" DETAIL ON PAGE 34. POSITION AS SHOWN IN THE PARTIAL LOAD VIEW ABOVE.
- ② SUPPORT PIECE, 2" X 6" X 59" (2 REQD). POSITION BENEATH THE 2" X 6" VERTICAL PIECES OF THE LOAD BEARING GATE, PIECE MARKED ③.
- ③ LOAD BEARING GATE (2 REQD). SEE THE "LOAD BEARING GATE A" DETAIL BELOW. TOENAIL TO THE SUPPORT PIECE, PIECE MARKED ②, W/2-10d NAILS AT EACH JOINT. **CAUTION:** USE CARE NOT TO TOENAIL INTO A CONTAINER.
- ④ STRUT, 4" X 4" X 53" (4 REQD). TOENAIL TO PIECES MARKED ③ W/2-16d NAILS AT EACH END.
- ⑤ VERTICAL STRUT BRACING, 2" X 4" X 35" (2 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT. BRACING MUST REST ON THE SUPPORT PIECE, PIECE MARKED ②. TOENAIL TO THE SUPPORT PIECE W/1-10d NAIL. **CAUTION:** USE CARE NOT TO TOENAIL INTO CONTAINER.
- ⑥ HORIZONTAL STRUT BRACING, 2" X 4" X 20-1/2" (2 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.

HORIZONTAL PIECE, 2" X 6" X 28" (3 REQD). NAIL TO THE VERTICAL PIECES AND TO THE SIDE BEARING PIECES W/3-10d NAILS AT EACH JOINT.

SIDE BEARING PIECE, 2" X 4" X 40" (2 REQD).

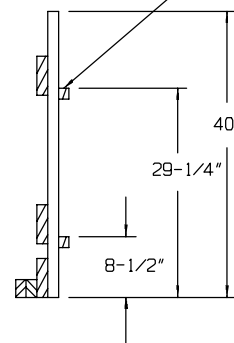
VERTICAL PIECE, 2" X 6" X 35-1/2" (2 REQD).

GATE HOLD-DOWN, 2" X 3" X 8" (DOUBLED) (1 REQD). NAIL THE FIRST PIECE TO THE BOTTOM HORIZONTAL PIECE W/2-10d NAILS. LAMINATE THE SECOND PIECE IN A LIKE MANNER.



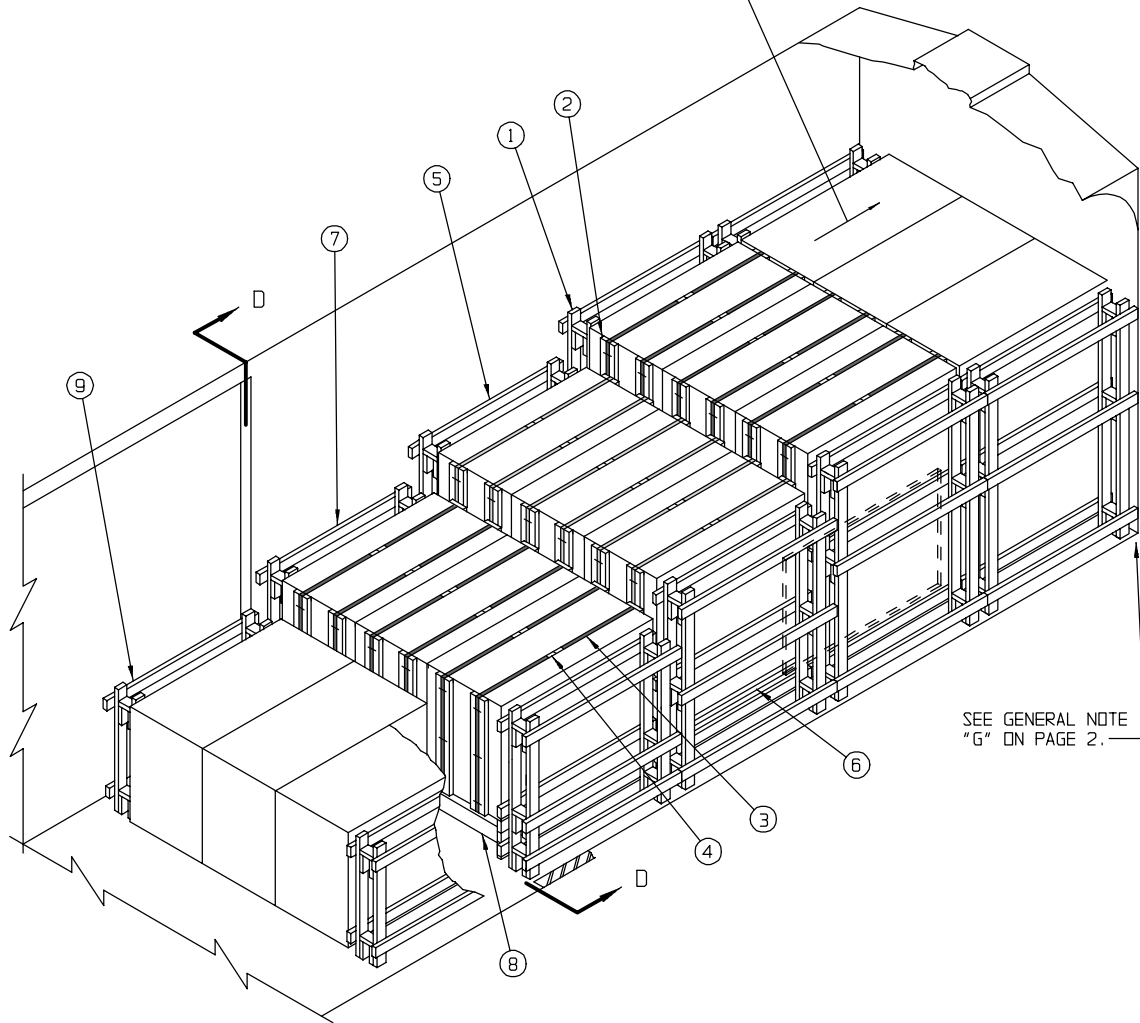
LOAD BEARING GATE A

STRUT LEDGER, 2" X 2" X 20" (2 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.



END VIEW

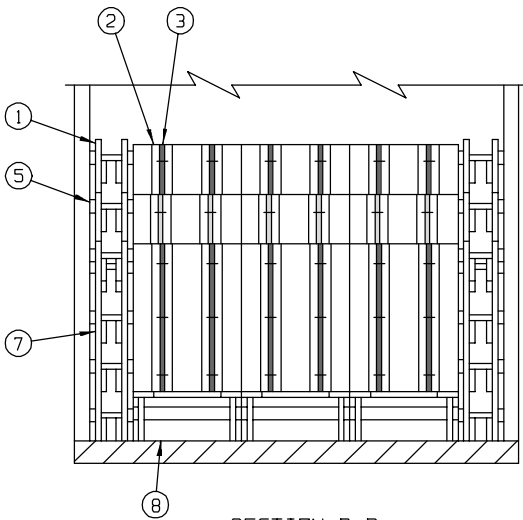
DIRECTION OF ARROW INDICATES  
BASE END OF CONTAINERS. SEE  
GENERAL NOTE "E" ON PAGE 2.



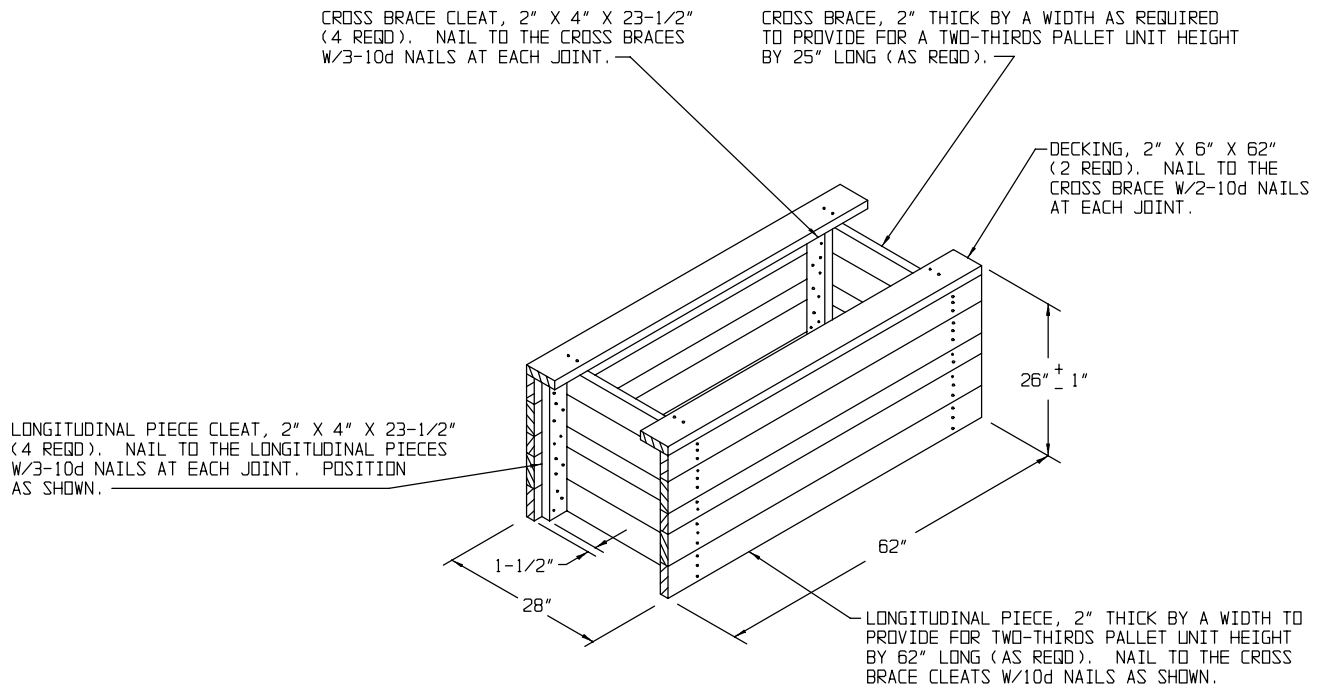
ISOMETRIC VIEW

KEY NUMBERS

- ① CRIB FILL (4 REQD). SEE THE "CRIB FILL A" DETAIL ON PAGE 31. SEE GENERAL NOTES "M" AND "N" ON PAGE 2.
- ② STRAPPING BOARD, 2" X 6" X 33" (48 REQD/4 PER PALLET UNIT). POSITION SO AS TO BE CENTERED ON THE JOINT BETWEEN THE OUTER TWO STACKS OF CONTAINERS.
- ③ REINFORCING STRAP, 1-1/4" X .035" OR .031" X 17'-0" LONG STEEL STRAPPING (24 REQD). INSTALL TO ENIRCLE THE PALLET UNIT AND THE STRAPPING BOARDS, PIECE MARKED ②. SECURE TO STRAPPING BOARD W/3 STAPLES.
- ④ SEAL FOR 1-1/4" STRAPPING (48 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "D" ON PAGE 2.
- ⑤ CRIB FILL (2 REQD). SEE THE "CRIB FILL C" DETAIL ON PAGE 34.
- ⑥ RISER ASSEMBLY (3 REQD). SEE THE "RISER ASSEMBLY A" DETAIL ON PAGE 15.
- ⑦ CRIB FILL (2 REQD). SEE THE "CRIB FILL D" DETAIL ON PAGE 34.
- ⑧ RISER ASSEMBLY (3 REQD). SEE THE "RISER ASSEMBLY B" DETAIL ON PAGE 15.
- ⑨ CRIB FILL (2 REQD). SEE THE "CRIB FILL B" DETAIL ON PAGE 31.



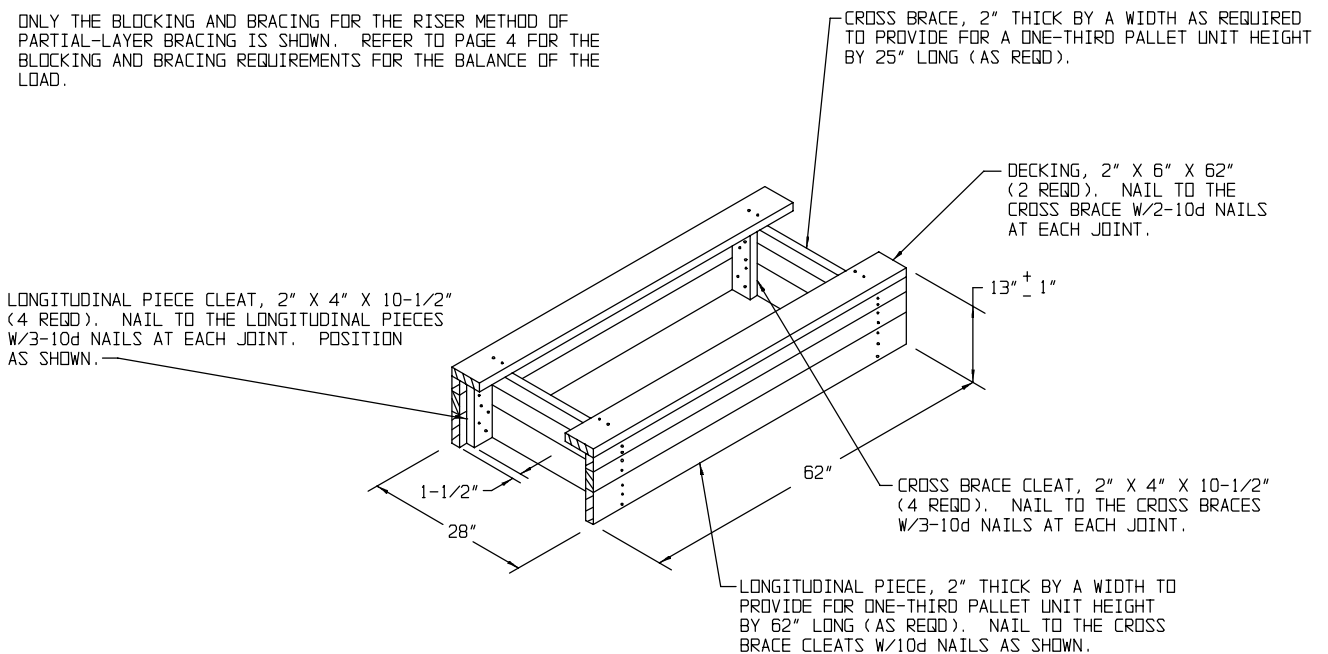
SECTION D-D



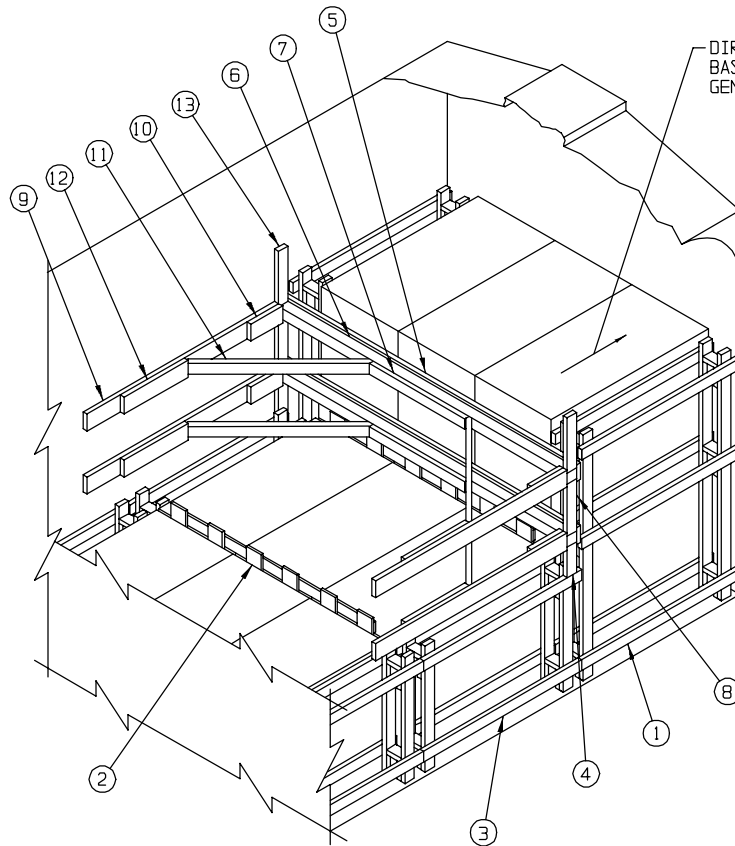
RISER ASSEMBLY A

SPECIAL NOTES:

1. A 9'-2" WIDE CONVENTIONAL TYPE WOOD-LINED BOX CAR IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED. SEE GENERAL NOTE "Q" ON PAGE 2.
2. THE RISER METHOD OF PARTIAL-LAYER BRACING IS ONLY APPLICABLE FOR PALLET UNITS POSITIONED LENGTHWISE IN THE CAR.
3. ONLY THE BLOCKING AND BRACING FOR THE RISER METHOD OF PARTIAL-LAYER BRACING IS SHOWN. REFER TO PAGE 4 FOR THE BLOCKING AND BRACING REQUIREMENTS FOR THE BALANCE OF THE LOAD.



RISER ASSEMBLY B



DIRECTION OF ARROW INDICATES  
BASE END OF CONTAINERS. SEE  
GENERAL NOTE "E" ON PAGE 2.

IF THE CAR HAS A BOWED END WALL,  
A BULKHEAD GATE MUST BE INSTALLED.  
SEE THE "END-OF-CAR BULKHEAD A"  
DETAIL ON PAGE 36.

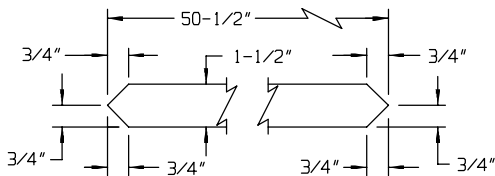
ISOMETRIC VIEW

KEY NUMBERS

SPECIAL NOTES:

1. A 9'-2" WIDE CONVENTIONAL WOOD-LINED BOX CAR IS SHOWN. WOOD-LINED CARS OF OTHER WIDTHS CAN BE USED.
2. THE K-BRACE METHOD OF PARTIAL-LAYER BRACING SHOWN MAY BE USED IN WOOD-LINED CARS FOR THE SECUREMENT OF EITHER A PARTIAL SECOND LAYER OR A PARTIAL FIRST LAYER. THE TYPE "A" K-BRACE IS ADEQUATE FOR RETAINING NOT MORE THAN THREE (3) PALLET UNITS. IF IT IS NECESSARY TO BLOCK A HEAVIER LOAD, REFER TO THE DETAILS ON PAGES 17 THRU 19 FOR SELECTION OF THE APPLICABLY SIZED K-BRACE TO USE AND THE DESIGN SPECIFICATIONS FOR THE BRACE.
3. THE CENTER CLEAT, SHOWN AS PIECE MARKED (7), WILL BE 28" LONG FOR AN 8'-6" WIDE CAR, 36" LONG FOR A 9'-2", 38" FOR A 9'-4", AND 40" FOR A 9'-6" WIDE CAR. ADJUST THE LENGTH PROPORTIONATELY FOR CARS OF OTHER WIDTHS.
4. THE OMITTED UNITS PROCEDURES DEPICTED ON PAGE 13 MAY BE USED IN REDUCING THE QUANTITY OF UNITS IN A PARTIAL LAYER.

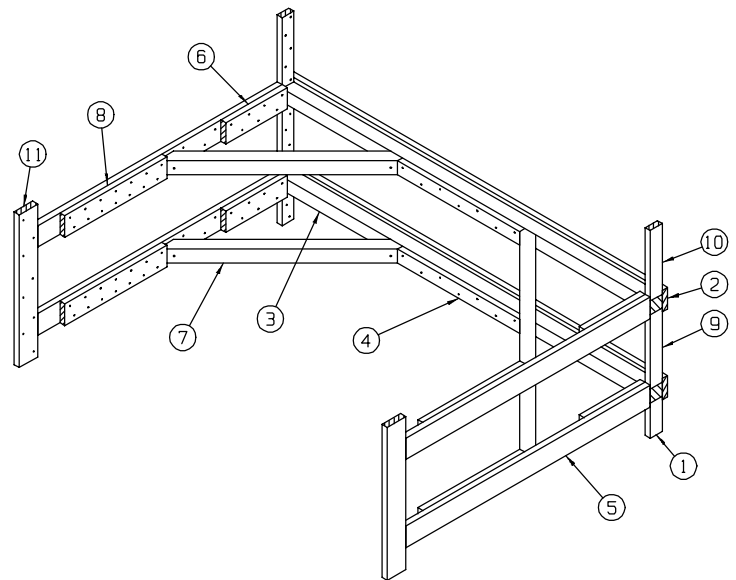
- (1) CRIB FILL (2 REQD). SEE THE "CRIB FILL A" DETAIL ON PAGE 31. SEE GENERAL NOTE "M" ON PAGE 2.
- (2) SEPARATOR GATE FOR 1-HIGH (2 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 32.
- (3) CRIB FILL (AS REQD). SEE THE "CRIB FILL B" DETAIL ON PAGE 31.
- (4) SUPPORT PIECE, 2" X 4" X 10" (2 REQD). POSITION VERTICALLY AS SHOWN SO AS TO CENTER PIECES MARKED (5) AND (6) ON THE JOINT BETWEEN THE BOTTOM TWO LAYERS OF CONTAINERS ON THE UNITS. NAIL TO THE CAR SIDEWALL W/3-12d NAILS.
- (5) HORIZONTAL PIECE, 2" X 6" BY CAR WIDTH IN LENGTH (CUT TO FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED (6), W/1-12d NAIL EVERY 6".
- (6) CROSS CAR BRACE, 4" X 4" BY CAR WIDTH IN LENGTH (CUT TO FIT) (2 REQD).
- (7) CENTER CLEAT, 2" X 4" X 36" (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED (6), W/7-16d NAILS. SEE SPECIAL NOTE 3 AT LEFT.
- (8) SPACER CLEAT, 2" X 4" X 17" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- (9) HORIZONTAL WALL CLEAT, 2" X 6" X 72" (4 REQD). NAIL TO THE CAR SIDEWALL W/16-12d NAILS.
- (10) POCKET CLEAT, 2" X 6" X 12" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED (9), W/4-16d NAILS.
- (11) DIAGONAL BRACE, 2" X 4" X 50-1/4" (4 REQD). SEE THE DETAIL AT LEFT FOR BEVEL CUTS REQUIRED. TOENAIL TO THE CROSS BRACE AND HORIZONTAL WALL CLEAT, PIECES MARKED (6) AND (9), W/2-16d NAILS AT EACH END.
- (12) BACK-UP CLEAT, 2" X 6" X 24" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED (9), W/8-16d NAILS.
- (13) HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.



DIAGONAL BRACE



CAPACITY/DOOR SIZE			
CAR LENGTH	NO. LONG	NO. UNITS	MAX THRU DOOR SIZE
60' -8"	3	7	20'
	2	4-6	20'
50' -6"	3	7	16'
	2	4-6	20'
40' -6"	3	7	7'
	2	4-6	16'



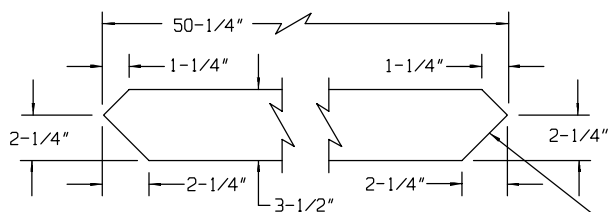
ISOMETRIC VIEW

KEY NUMBERS

- ① SUPPORT CLEAT, 2" X 4" X 10" (2 REQD). POSITION VERTICALLY AS SHOWN SO AS TO CENTER PIECES MARKED ② AND ③ ON THE JOINT BETWEEN THE BOTTOM TWO LAYERS OF CONTAINERS ON THE UNITS. NAIL TO THE CAR SIDEWALL W/3-12d NAILS.
- ② LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6". SEE GENERAL NOTE "M" ON PAGE 2.
- ③ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH (CUT TO FIT) (2 REQD).
- ④ CENTER CLEAT, 2" X 4" X 36" (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/7-16d NAILS. SEE SPECIAL NOTE 3 AT LEFT.
- ⑤ HORIZONTAL WALL CLEAT, 2" X 6" X 72" (4 REQD). NAIL TO THE CAR SIDEWALL W/16-12d NAILS.
- ⑥ POCKET CLEAT, 2" X 6" X 18" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/7-16d NAILS.
- ⑦ DIAGONAL BRACE, 4" X 4" X 50-1/4" (4 REQD). SEE THE DETAIL BELOW FOR BEVEL-CUTS REQUIRED. TOENAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, AND TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/1-60d NAIL AT EACH END.
- ⑧ BACK-UP CLEAT, 2" X 6" X 30" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/14-16d NAILS.
- ⑨ SPACER CLEAT, 2" X 4" X 17" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ⑩ HOLD-DOWN CLEAT, 2" X 6" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ⑪ VERTICAL BACK-UP CLEAT, 2" X 6" X 40" (2 REQD). NAIL TO THE CAR SIDEWALL W/8-12d NAILS.

SPECIAL NOTES:

1. THE TYPE "B" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER OF NOT MORE THAN SEVEN PALLET UNITS. IF IT IS NECESSARY TO BLOCK MORE THAN SEVEN PALLET UNITS, REFER TO THE DETAILS ON PAGES 18 AND 19 FOR SELECTION OF THE APPLICABLY SIZED K-BRACE TO USE AND THE DESIGN SPECIFICATIONS FOR THE BRACE. IF ONLY TWO OR THREE PALLET UNITS ARE TO BE SHIPPED IN THE PARTIAL LAYER, THE TYPE "A" K-BRACE DEPICTED ON PAGE 16 MAY BE USED.
2. CAUTION: SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL-LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL TIER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ①, ②, ③, ⑥, ⑨, ⑩, AND ⑪, MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDEWALL. IT IS ALRIGHT FOR THE ENDS OF THE DIAGONAL BRACES MARKED ⑦ TO BEAR IN FRONT OF A DOOR OPENING, HOWEVER, THE ADJACENT PIECE MARKED ⑤ MUST BE DOUBLED AND EXTENDED ACROSS AND FAR ENOUGH PAST THE DOOR OPENING (REF: 54") TO PROVIDE FOR THE SPECIFIED NAILING OF EACH PIECE. LAMINATE THE SECOND PIECE OF THE DOUBLED PIECE MARKED ⑤ TO THE FIRST W/16-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL WALL CLEAT WITHIN THE DOOR OPENING. NOTE THAT THE DIAGONAL BRACE WILL BE 49-1/8" LONG IN LIEU OF 50-1/4" WHEN PIECE MARKED ⑤ IS DOUBLED.
3. THE CENTER CLEAT, SHOWN AS PIECE MARKED ④, WILL BE 28" LONG FOR AN 8'-6" WIDE CAR, 36" LONG FOR A 9'-2", AND 38" LONG FOR A 9'-4" WIDE CAR. ADJUST THE LENGTH PROPORTIONATELY FOR CARS OF OTHER WIDTHS.
4. REFER TO PAGE 16 FOR A TYPICAL INSTALLATION OF A K-BRACE.



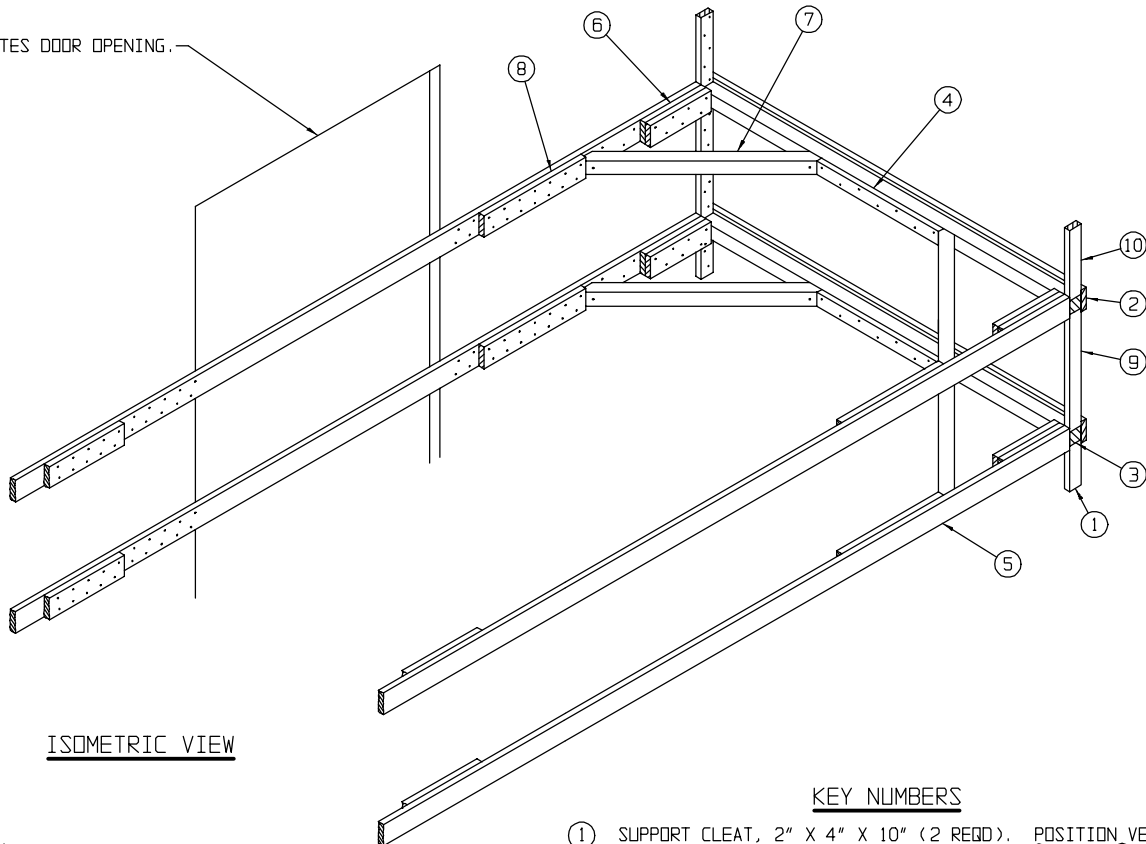
DIAGONAL BRACE

SEE SPECIAL NOTE 2 ABOVE.

THIS BEARING SURFACE MUST BE POSITIONED SO AS TO BE IN CONTACT WITH A CROSS CAR BRACE, PIECE MARKED ③, OR A HORIZONTAL WALL CLEAT, PIECE MARKED ⑤.

TYPE "B" K-BRACE

INDICATES DOOR OPENING.



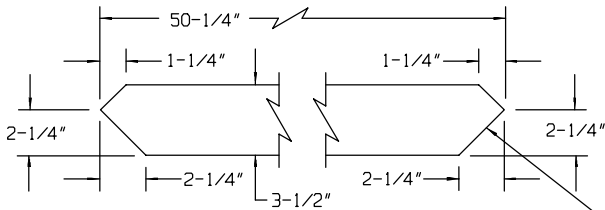
ISOMETRIC VIEW

KEY NUMBERS

SPECIAL NOTES:

1. THE TYPE "C" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER OF NOT MORE THAN 20,000 POUNDS. THIS WILL BE NOT MORE THAN TEN (10) PALLET UNITS. THE OMITTED UNIT ASSEMBLY SHOWN ON PAGE 13 MAY BE USED TO OBTAIN THE DESIRED QUANTITY POSITION THE ASSEMBLY SO AS TO PROVIDE FOR A SYMMETRICAL LOAD TO THE MAXIMUM EXTENT POSSIBLE. IF IT IS NECESSARY TO BLOCK A HEAVIER LOAD, REFER TO THE DETAIL ON PAGE 19 FOR THE DESIGN SPECIFICATIONS FOR THE BRACE. FOR SHIPMENT OF A LIGHTER LOAD, REFER TO THE DETAILS ON PAGES 16 AND 17 FOR SELECTION OF THE APPLICABLY SIZED K-BRACE TO USE AND THE DESIGN SPECIFICATIONS.
2. **CAUTION:** SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL-LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL TIER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ①, ②, ③, ⑥, ⑧ AND ⑩ MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDEWALL. IT IS ALRIGHT FOR THE ENDS OF THE DIAGONAL BRACES MARKED ⑦ TO BEAR IN FRONT OF A DOOR OPENING, HOWEVER, THE ADJACENT PIECE MARKED ⑤ MUST BE DOUBLED. LAMINATE THE SECOND PIECE TO THE FIRST W/40-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL WALL CLEAT WITHIN THE DOOR OPENING. NOTE THAT THE DIAGONAL BRACE WILL BE 49-1/8" LONG IN LIEU OF 50-1/4" WHEN PIECE MARKED ⑤ IS DOUBLED.
3. THE CENTER CLEAT, SHOWN AS PIECE MARKED ④, WILL BE 28" LONG FOR AN 8'-6" WIDE CAR, 36" LONG FOR A 9'-2", AND 38" LONG FOR A 9'-4" WIDE CAR. ADJUST THE LENGTH PROPORTIONATELY FOR CARS OF OTHER WIDTHS.
4. **CAUTION:** A TYPE "C" K-BRACE MUST BE USED IN BOTH ENDS OF THE CAR; THE BRACE IS NOT DESIGNED FOR USE IN ONLY ONE END. NOTE THAT EXCEPT FOR PIECES MARKED ⑤, THE QUANTITIES SPECIFIED ARE APPLICABLE ONLY FOR THE BRACE IN ONE END.

- ① SUPPORT CLEAT, 2" X 4" X 10" (2 REQD). POSITION VERTICALLY AS SHOWN SO AS TO CENTER PIECES MARKED ② AND ③ ON THE JOINT BETWEEN THE BOTTOM TWO LAYERS OF CONTAINERS ON THE UNITS. NAIL TO THE CAR SIDEWALL W/3-12d NAILS.
- ② LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6". SEE GENERAL NOTE "M" ON PAGE 2.
- ③ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH (CUT TO FIT) (2 REQD).
- ④ CENTER CLEAT, 2" X 4" X 36" (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/7-16d NAILS. SEE SPECIAL NOTE 3 AT LEFT.
- ⑤ HORIZONTAL WALL CLEAT, 2" X 6" BY CUT TO FIT (4 REQD). A CLEAT WILL BE OF A LENGTH AS NECESSARY TO EXTEND ACROSS AND FAR ENOUGH PAST THE DOOR OPENINGS TO CONTACT PIECE MARKED ③ OF THE K-BRACE IN THE OPPOSITE END OF THE CAR. NAIL TO THE CAR SIDEWALL W/40-12d NAILS.
- ⑥ POCKET CLEAT, 2" X 6" X 18" (DOUBLED) (4 REQD). NAIL THE FIRST PIECE TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/7-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑦ DIAGONAL BRACE, 4" X 4" X 50-1/4" (4 REQD). SEE THE DETAIL BELOW FOR BEVEL-CUTS REQUIRED. TOENAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, AND TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/1-60d NAIL AT EACH END.
- ⑧ BACK-UP CLEAT, 2" X 6" X 30" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/14-16d NAILS.
- ⑨ SPACER CLEAT, 2" X 4" X 17" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ⑩ HOLD-DOWN CLEAT, 2" X 6" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.

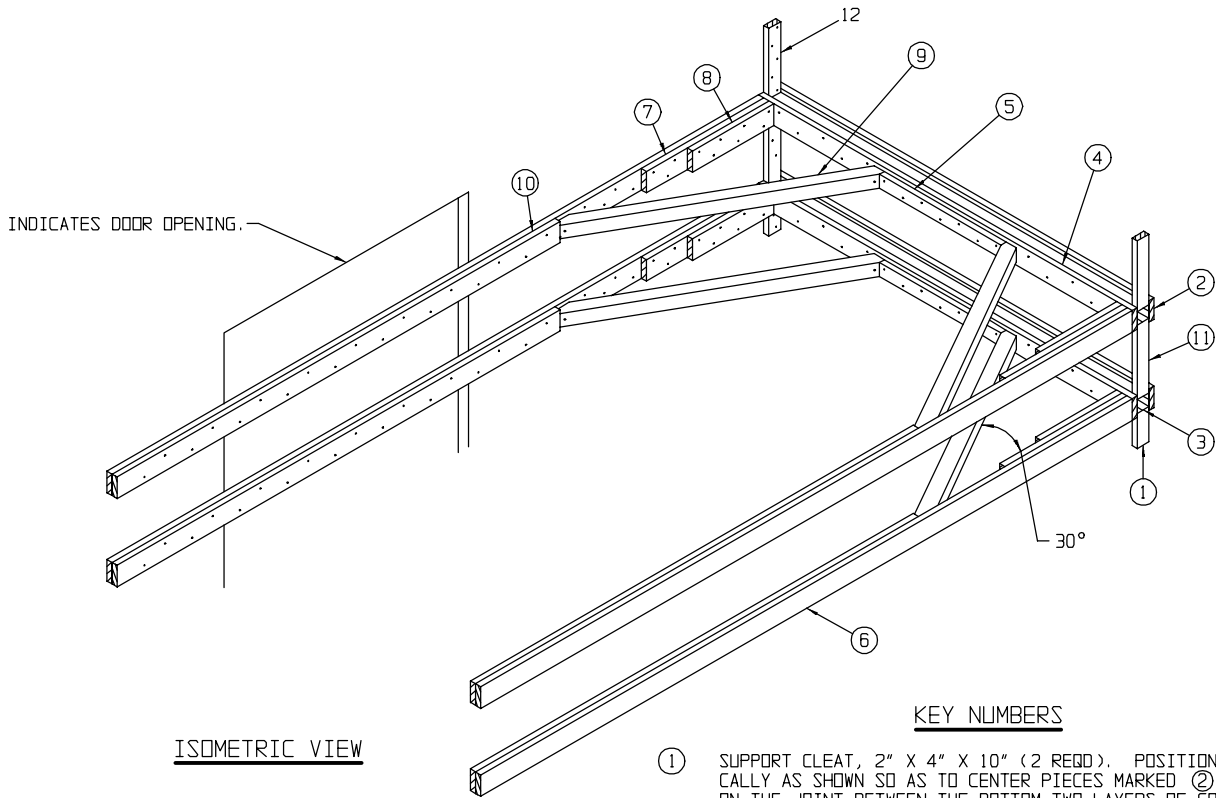


DIAGONAL BRACE

SEE SPECIAL NOTE 2 ABOVE.

THIS BEARING SURFACE MUST BE POSITIONED SO AS TO BE IN CONTACT WITH A CROSS CAR BRACE, PIECE MARKED ③, OR A HORIZONTAL WALL CLEAT, PIECE MARKED ⑤.

TYPE "C" K-BRACE



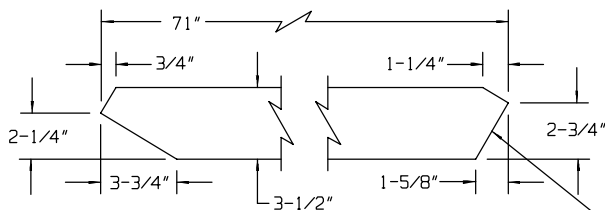
ISOMETRIC VIEW

KEY NUMBERS

SPECIAL NOTES:

1. THE TYPE "D" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER OF NOT MORE THAN 25,000 POUNDS. IF THE PARTIAL TIER TO BE BRACED IS ONLY 10 PALLET UNITS, THE TYPE "C" K-BRACE DEPICTED ON PAGE 18 MAY BE USED. IF SIX PALLET UNITS ARE TO BE SHIPPED, THE TYPE "B" K-BRACE DEPICTED ON PAGE 17 MAY BE USED. IF THE PARTIAL TIER IS ONLY TWO OR FOUR PALLET UNITS, THE TYPE "A" K-BRACE DEPICTED ON PAGE 16 WILL BE ADEQUATE.
2. CAUTION: SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL-LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL TIER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ①, ②, ③, ④, ⑦, ⑧, ⑩, AND ⑫ MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDEWALL. IT IS ALRIGHT FOR THE ENDS OF THE DIAGONAL BRACES MARKED ⑨ TO BEAR IN FRONT OF A DOOR OPENING, HOWEVER, THE ADJACENT PIECE MARKED ⑥ MUST BE DOUBLED. LAMINATE THE SECOND PIECE TO THE FIRST W/40-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL WALL CLEAT WITHIN THE DOOR OPENING. NOTE THAT THE DIAGONAL BRACE WILL BE 70-1/4" LONG IN LIEU OF 71" LONG WHEN PIECE MARKED ⑥ IS DOUBLED.
3. THE CENTER CLEAT, SHOWN AS PIECE MARKED ⑤, WILL BE 28" LONG FOR AN 8'-6" WIDE CAR, 36" LONG FOR A 9'-2", AND 38" LONG FOR A 9'-4" WIDE CAR. ADJUST THE LENGTH PROPORTIONATELY FOR CARS OF OTHER WIDTHS.
4. CAUTION: A TYPE "D" K-BRACE MUST BE USED IN BOTH ENDS OF THE CAR; THE BRACE IS NOT DESIGNED FOR USE IN ONLY ONE END. NOTE THAT EXCEPT FOR PIECES MARKED ⑥ AND ⑩, THE QUANTITIES SPECIFIED ARE APPLICABLE ONLY FOR THE BRACE IN ONE END.

- ① SUPPORT CLEAT, 2" X 4" X 10" (2 REQD). POSITION VERTICALLY AS SHOWN SO AS TO CENTER PIECES MARKED ② AND ③ ON THE JOINT BETWEEN THE BOTTOM TWO LAYERS OF CONTAINERS ON THE UNITS. NAIL TO THE CAR SIDEWALL W/3-12d NAILS.
- ② LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6". SEE GENERAL NOTE "M" ON PAGE 2.
- ③ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH (CUT TO FIT) (2 REQD).
- ④ HORIZONTAL PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6".
- ⑤ CENTER CLEAT, 2" X 4" X 36" (2 REQD). NAIL TO THE HORIZONTAL PIECE, PIECE MARKED ④, W/7-16d NAILS. SEE SPECIAL NOTE 3 AT LEFT.
- ⑥ HORIZONTAL WALL CLEAT, 2" X 6" BY CUT TO FIT (4 REQD). A CLEAT WILL BE OF A LENGTH AS NECESSARY TO EXTEND ACROSS AND FAR ENOUGH PAST THE DOOR OPENINGS TO CONTACT PIECE MARKED ④ OF THE K-BRACE IN THE OPPOSITE END OF THE CAR. NAIL TO THE CAR SIDEWALL W/40-12d NAILS.
- ⑦ POCKET CLEAT, 2" X 6" X 36" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/10-16d NAILS.
- ⑧ POCKET CLEAT, 2" X 6" X 24" (4 REQD). NAIL TO THE POCKET CLEAT, PIECE MARKED ⑦, W/7-16d NAILS.
- ⑨ DIAGONAL BRACE, 4" X 4" X 71" (4 REQD). SEE THE DETAIL BELOW FOR BEVEL-CUTS REQUIRED. TOENAIL TO THE HORIZONTAL PIECE, PIECE MARKED ④, AND TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/1-60d NAIL AT EACH END.
- ⑩ BACK-UP CLEAT, 2" X 6" BY CUT TO FIT (4 REQD). A CLEAT WILL BE OF A LENGTH AS NECESSARY TO EXTEND TO CONTACT THE DIAGONAL BRACE, PIECE MARKED ⑨, IN THE OPPOSITE END OF THE CAR. NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/18-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL WALL CLEAT WITHIN THE DOOR OPENING, IF APPLICABLE.
- ⑪ SPACER CLEAT, 2" X 4" X 17" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ⑫ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.

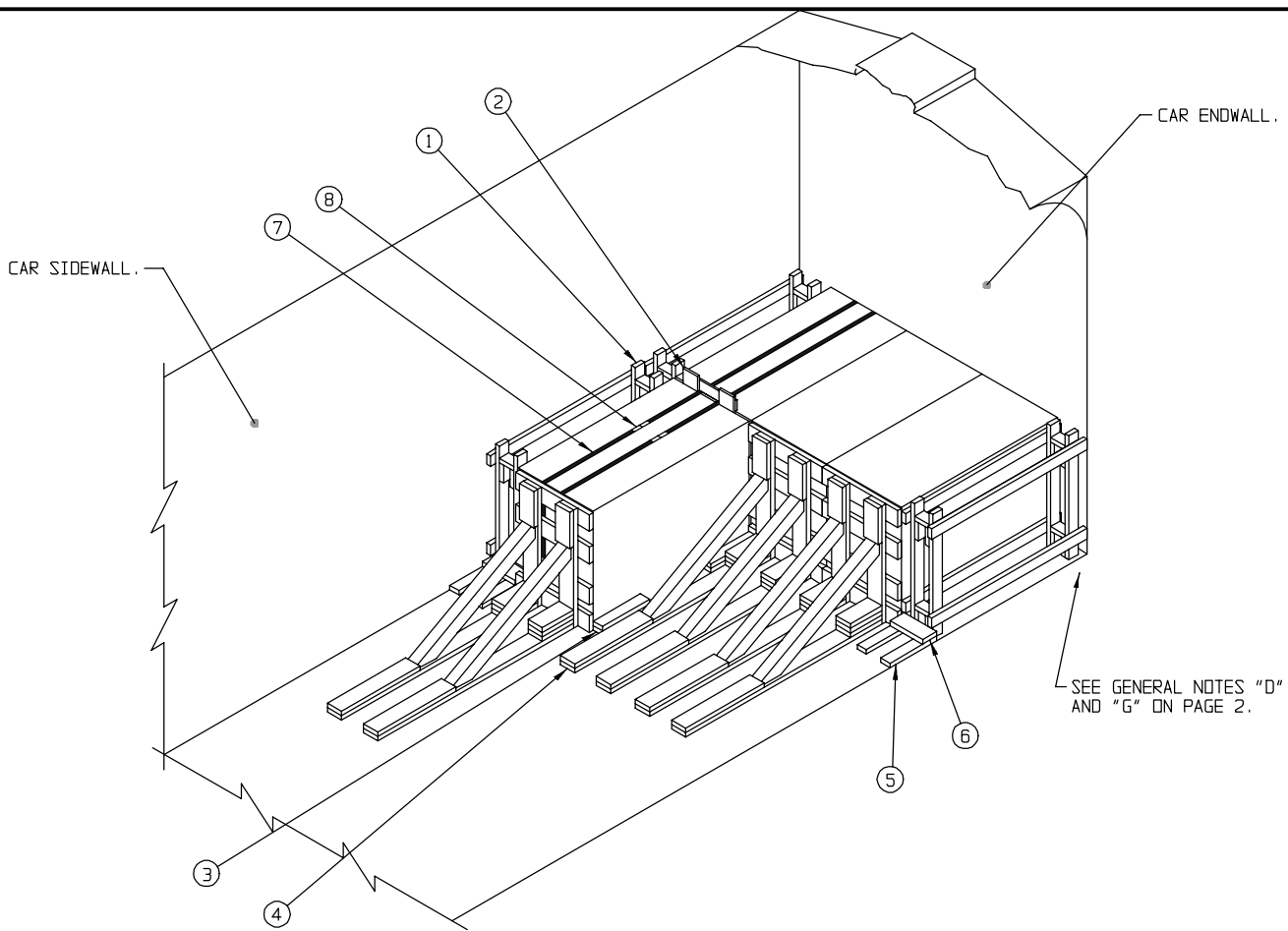


DIAGONAL BRACE

SEE SPECIAL NOTE 2 ABOVE.

THIS BEARING SURFACE MUST BE POSITIONED SO AS TO BE IN CONTACT WITH A CROSS CAR BRACE, PIECE MARKED ③.

TYPE "D" K-BRACE



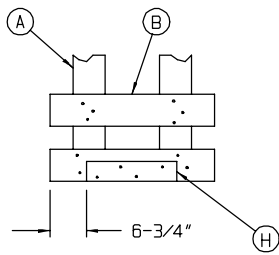
ISOMETRIC VIEW

KEY NUMBERS

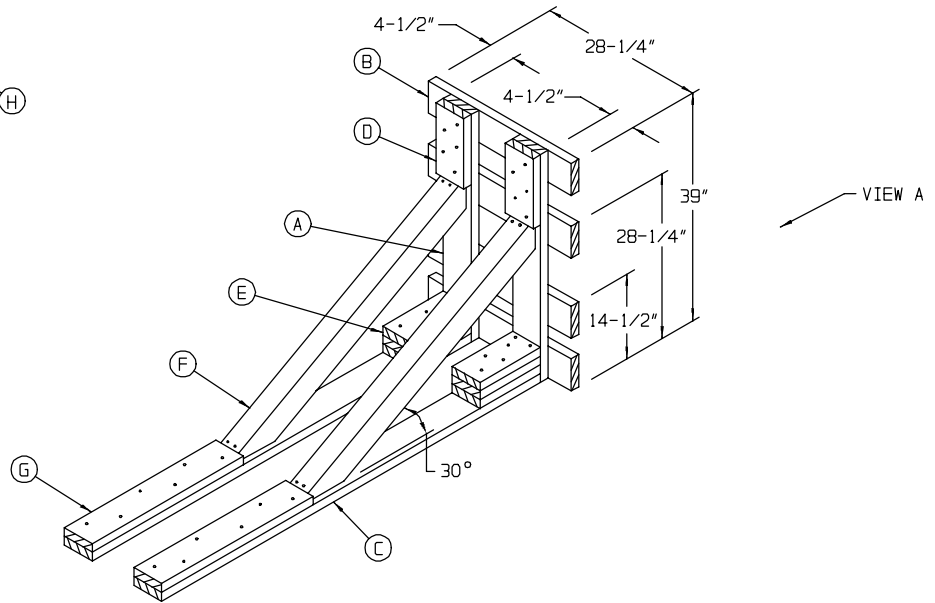
SPECIAL NOTES:

1. A 9'-2" WIDE WOOD-LINED CONVENTIONAL TYPE BOX CAR HAVING A WOOD OR NAILABLE METAL FLOOR IS SHOWN. CARS OF OTHER WIDTHS AND CARS HAVING METAL LININGS CAN BE USED.
2. THE KNEE BRACE METHOD OF LCL BRACING IS ONLY APPLICABLE FOR THE BRACING OF PALLET UNITS POSITIONED LENGTHWISE IN THE CAR.
3. THE LOAD SHOWN DEPICTING THE KNEE BRACE METHOD OF PARTIAL LAYER BRACING IS TYPICAL. THE QUANTITY MAY BE ADJUSTED TO SUIT, PROVIDED THE LIMITATIONS OF THE KNEE BRACE AS SET FORTH IN SPECIAL NOTE 4 ARE NOT EXCEEDED.
4. A KNEE BRACE ASSEMBLY WILL BE USED FOR EACH ROW OF PALLET UNITS. ONE (1) KNEE BRACE ASSEMBLY IS ADEQUATE FOR RETAINING A MAXIMUM LCL LOAD OF NOT MORE THAN (3) PALLET UNITS. AN ADDITIONAL "KNEE" MAY BE ADDED IF IT IS NECESSARY TO BRACE FOUR (4) OR FIVE (5) PALLET UNITS.

- ① CRIB FILL (3 REQD). SEE THE "CRIB FILL B" DETAIL ON PAGE 31. SEE GENERAL NOTE "M" ON PAGE 2.
- ② SEPARATOR GATE (1 REQD). SEE THE "SEPARATOR GATE E" DETAIL ON PAGE 23. POSITION WITH THE HORIZONTAL PIECES AGAINST THE ALREADY-LOADED UNIT.
- ③ SIDE BLOCKING, 2" X 4" X 18" (DOUBLED) (2 REQD). POSITION AS SHOWN AGAINST EACH END OF THE METAL PALLET. NAIL THE FIRST PIECE TO THE CAR FLOOR W/4-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ④ KNEE BRACE ASSEMBLY (3 REQD). SEE THE "KNEE BRACE ASSEMBLY" DETAIL ON PAGE 21 FOR CONSTRUCTION SPECIFICATIONS AND NAILING REQUIREMENTS.
- ⑤ CRIB FILL BLOCKING, 2" X 4" X 18" (4 REQD). NAIL TO THE CAR FLOOR W/2-16d NAILS.
- ⑥ CRIB FILL BLOCKING, 2" X 6" BY A LENGTH TO SUIT (REF: 12-1/2") (2 REQD). NAIL TO PIECES MARKED ⑤ W/2-10d NAILS AT EACH END.
- ⑦ BUNDLING STRAP, 1-1/4" X .035" OR .031" X 27'-6" LONG STEEL STRAPPING (2 REQD). PRE-POSITION UNDER THE PALLET DECK AND THREAD THRU THE SEPARATOR GATE, PIECE MARKED ②.
- ⑧ SEAL FOR 1-1/4" STEEL STRAPPING (4 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "O" ON PAGE 2.



VIEW A

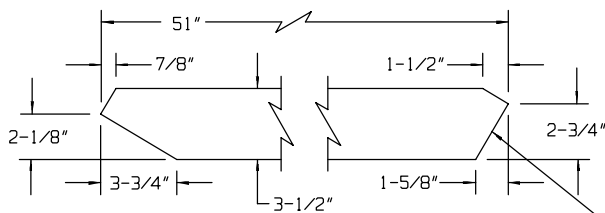


VIEW A

KNEE BRACE ASSEMBLY

KEY LETTERS

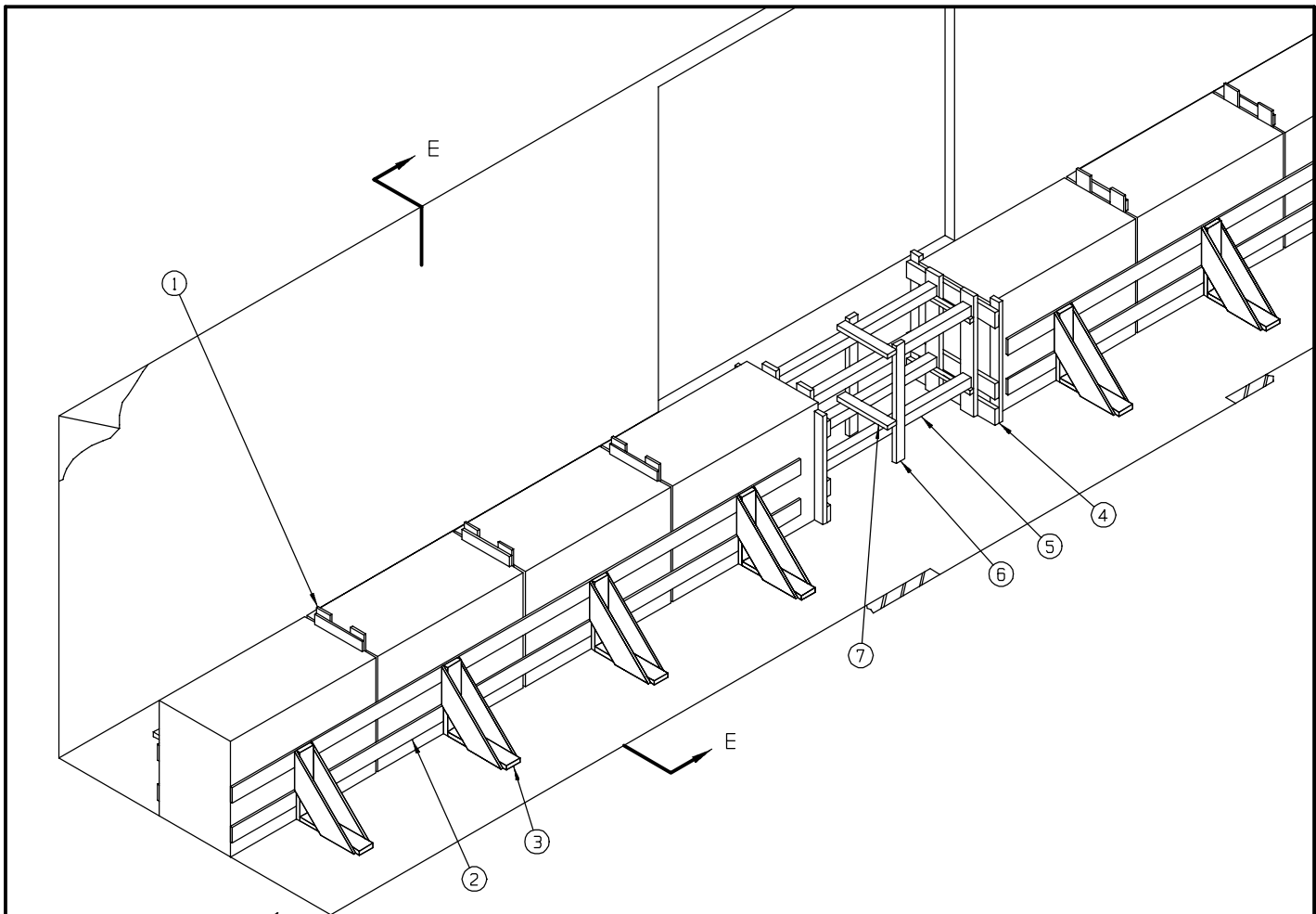
- (A) VERTICAL PIECE, 2" X 6" X 39" (2 REQD).
- (B) HORIZONTAL PIECE, 2" X 6" X 28-1/4" (4 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT. SEE GENERAL NOTES "M" AND "N" ON PAGE 2.
- (C) FLOOR CLEAT, 2" X 6" X 6'-3" (2 REQD). ALIGN WITH A VERTICAL PIECE AND NAIL TO THE CAR FLOOR W/1-16d NAIL EVERY 8". SEE GENERAL NOTE "U" ON PAGE 3.
- (D) HOLD-DOWN CLEAT, 2" X 6" X 12" (2 REQD). NAIL TO A VERTICAL PIECE W/5-10d NAILS.
- (E) POCKET CLEAT, 2" X 6" X 12" (TRIPLED) (2 REQD). NAIL THE FIRST PIECE TO THE FLOOR CLEAT, PIECE MARKED (C), W/4-16d NAILS. NAIL THE SECOND AND THIRD PIECES IN A LIKE MANNER AND TOENAIL THE THIRD PIECE TO THE VERTICAL PIECE, PIECE MARKED (A), W/2-16d NAILS.
- (F) BRACE, 4" X 4" X 51" (2 REQD). SEE THE DETAIL AT LEFT FOR BEVEL CUTS REQUIRED. TOENAIL TO THE VERTICAL PIECE AND TO THE FLOOR CLEAT, PIECES MARKED (A) AND (C), W/2-16d NAILS AT EACH END.
- (G) BACK-UP CLEAT, 2" X 6" X 30" (2 REQD). NAIL TO THE FLOOR CLEAT, PIECE MARKED (C), W/6-40d NAILS.
- (H) HOLD-DOWN CLEAT, 2" X 4" X 14-1/2" (DOUBLED) (1 REQD). NAIL THE FIRST PIECE TO A HORIZONTAL PIECE W/3-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE "VIEW A" DETAIL ABOVE FOR LOCATION DIMENSIONS.



BRACE

4" X 4" MATERIAL

THIS BEARING SURFACE MUST BE POSITIONED SO AS TO BE IN CONTACT WITH THE VERTICAL PIECE MARKED (A).

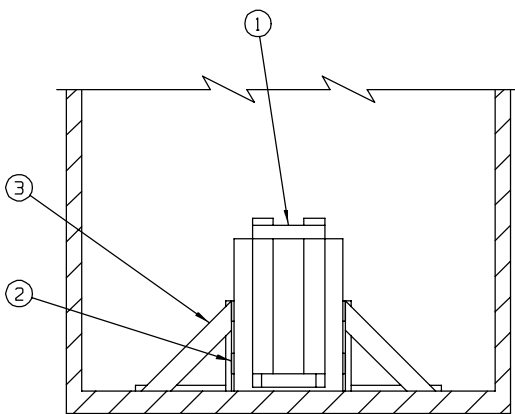


SEE GENERAL NOTE "G" ON PAGE 2.

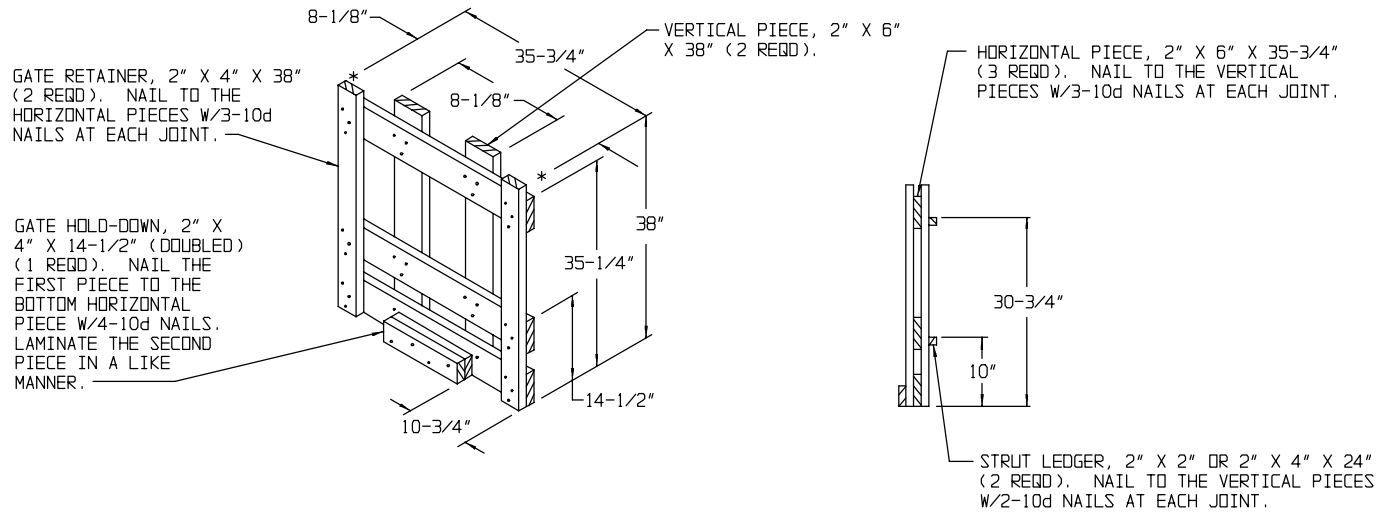
ISOMETRIC VIEW

KEY NUMBERS

- ① SEPARATOR GATE (7 REQD). SEE THE "SEPARATOR GATE E" DETAIL ON PAGE 23. POSITION WITH THE HORIZONTAL PIECES AGAINST THE ALREADY LOADED UNITS. SEE GENERAL NOTES "M" AND "N" ON PAGE 2.
- ② HORIZONTAL PIECE, 1" X 6" BY A LENGTH TO SUIT (8 REQD). NAIL TO THE VERTICAL PIECES OF THE LCL BRACES W/3-6d NAILS AT EACH JOINT PRIOR TO PLACEMENT AGAINST THE LADING. SEE THE "LCL BRACE" DETAIL ON PAGE 26 FOR HEIGHT LOCATION GUIDANCE.
- ③ LCL BRACE (18 REQD). SEE THE DETAIL ON PAGE 26 AND SPECIAL NOTE 3 ON PAGE 23. NAIL TO THE CAR FLOOR W/7-16d NAILS. SEE GENERAL NOTE "U" ON PAGE 3.
- ④ CENTER GATE (2 REQD). SEE THE "CENTER GATE B" DETAIL ON PAGE 23. SEE SPECIAL NOTES 2 AND 3 ON PAGE 23.
- ⑤ STRUT, 4" X 4" BY CUT TO FIT (REF: 63-3/4") (4 REQD). TOENAIL TO PIECES MARKED ④ W/2-16d NAILS AT EACH END. SEE GENERAL NOTE "L" ON PAGE 2 AND GENERAL NOTE "X" ON PAGE 3.
- ⑥ VERTICAL STRUT BRACING, 2" X 4" X 36" (2 REQD). NAIL TO THE STRUTS, PIECE MARKED ⑤, W/3-10d NAILS AT EACH JOINT.
- ⑦ HORIZONTAL STRUT BRACING, 2" X 4" X 32" (2 REQD). NAIL TO THE STRUTS, PIECE MARKED ⑤, W/3-10d NAILS AT EACH JOINT. SEE GENERAL NOTE "W" ON PAGE 3.



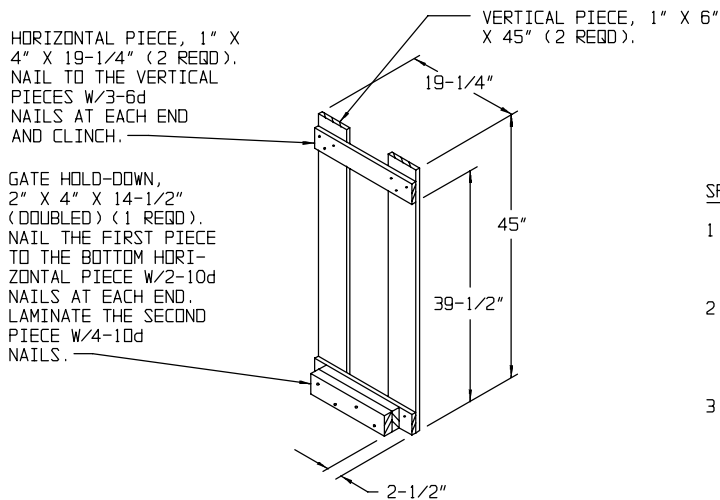
SECTION E-E



**CENTER GATE B**

FOR 50'-6" CAR LENGTHWISE LOAD SHOWN ON PAGE 22. THE GATE IS ALSO APPLICABLE FOR LOADS IN 60'-8" AND 40'-6" LONG CARS.

**END VIEW**



**SEPARATOR GATE E**

(FOR A 1-WIDE LENGTHWISE LOAD)

**SPECIAL NOTES:**

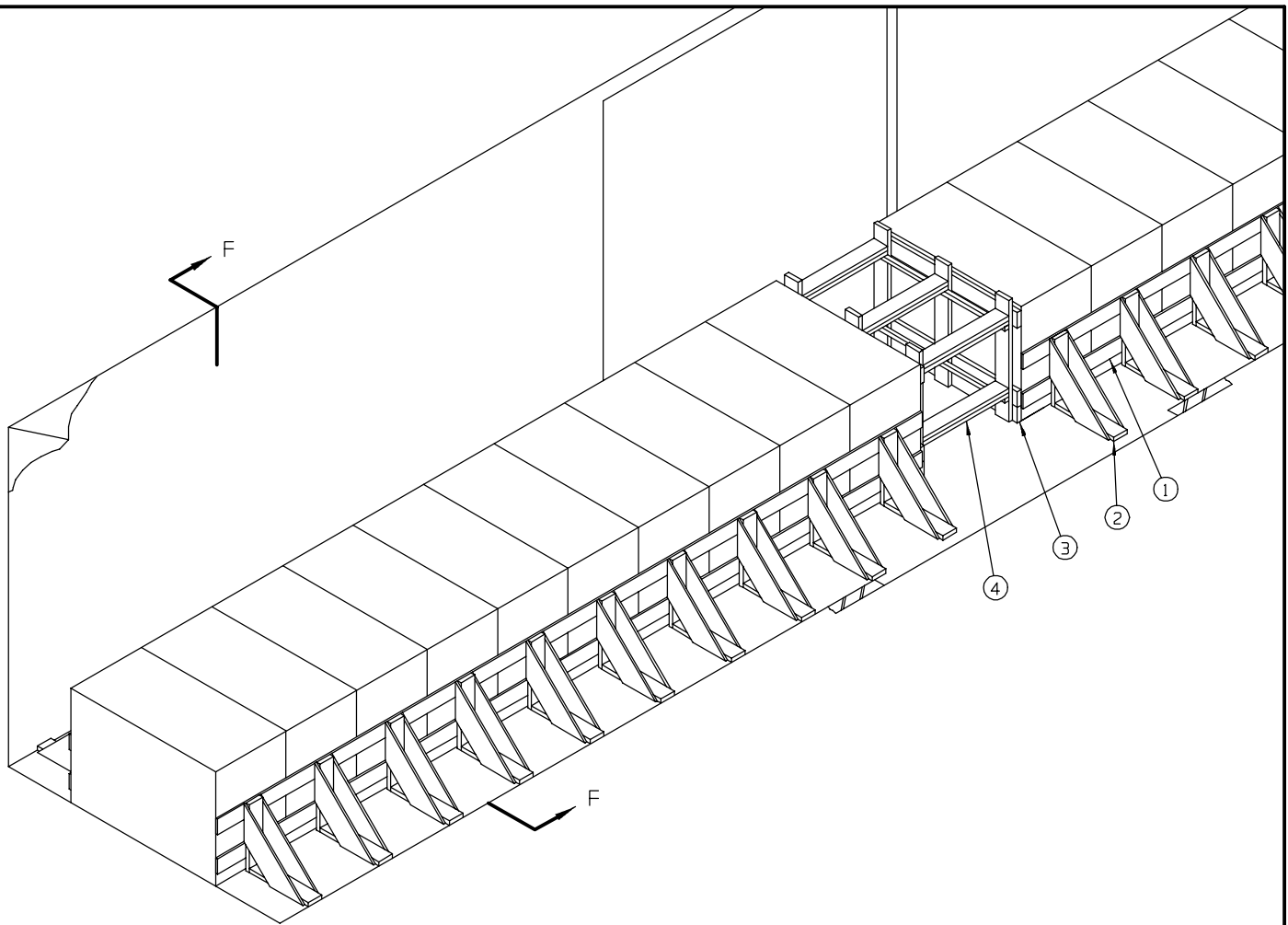
1. A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR IS SHOWN. CARS OF OTHER WIDTHS AND LENGTHS CAN BE USED. SEE SPECIAL NOTE 2.
2. A 1-WIDE LENGTHWISE LOAD IN A 50'-6" LONG CAR IS SHOWN AS TYPICAL. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR A 7-UNIT LENGTHWISE LOAD IN A 40'-6" LONG CAR, AND A 11-UNIT LENGTHWISE LOAD IN A 60'-8" LONG CAR.
3. ONE (1) LCL BRACE WILL BE USED AT EACH SIDE OF EACH PALLET UNIT. THE BRACES WILL BE LOCATED NEAR THE CENTER OF THE LENGTH OF THE UNITS.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	23	8
1" X 6"	328	219
2" X 2"	8	3
2" X 4"	45	30
2" X 6"	103	103
4" X 4"	22	30
NAILS	NO. REQD	POUNDS
6d (2")	192	1-1/4
8d (2-1/2")	216	2-1/2
10d (3")	184	3
16d (3-1/2")	142	3-1/4

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	9	17,442 LBS
DUNNAGE		796 LBS
<b>TOTAL WEIGHT</b>		<b>18,238 LBS (APPROX)</b>

TYPICAL LCL LOAD USING A 1-WIDE LENGTHWISE-LOADING METHOD

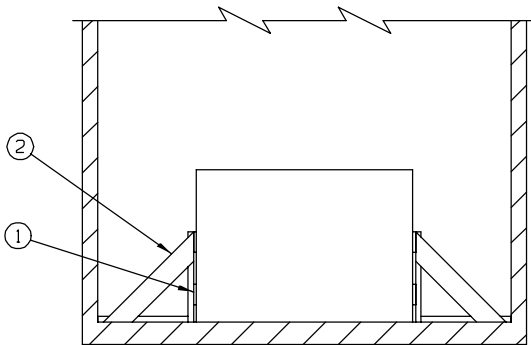


SEE GENERAL NOTE  
"G" ON PAGE 2.

ISOMETRIC VIEW

KEY NUMBERS

- ① HORIZONTAL PIECE, 1" X 6" BY A LENGTH TO SUIT (8 REQD). NAIL TO THE VERTICAL PIECES OF THE LCL BRACES W/3-6d NAILS AT EACH JOINT PRIOR TO PLACEMENT AGAINST THE LADING. SEE THE "LCL BRACE" DETAIL ON PAGE 26 FOR HEIGHT LOCATION GUIDANCE. SEE GENERAL NOTE "M" ON PAGE 2.
- ② LCL BRACE (40 REQD). SEE THE DETAIL ON PAGE 26 AND SPECIAL NOTE 3 ON PAGE 25. NAIL TO THE CAR FLOOR W/7-16d NAILS. SEE GENERAL NOTE "U" ON PAGE 3.
- ③ CENTER GATE (2 REQD). SEE THE "CENTER GATE C" DETAIL ON PAGE 25.
- ④ STRUT, 2" X 6" BY CUT TO FIT (REF: 35") (DOUBLED) (6 REQD). LAMINATE W/1-10d NAIL EVERY 6". TOENAIL THE TOP PIECE TO THE VERTICAL PIECES OF PIECE MARKED ③ W/2-12d NAILS AT EACH END.



SECTION F-F

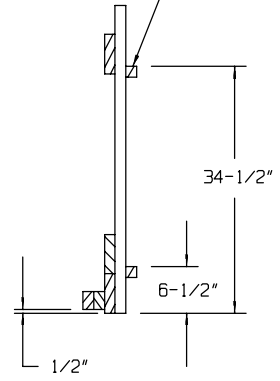
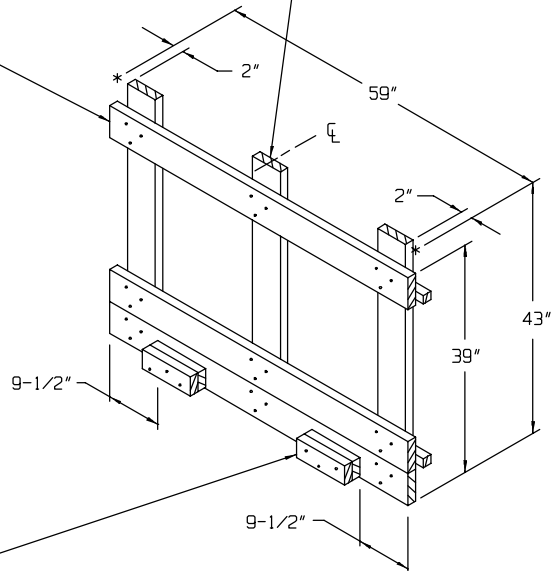


HORIZONTAL PIECE, 2" X 6" X 59"  
(3 REQD). NAIL TO THE VERTICAL  
PIECES W/3-10d NAILS AT EACH  
JOINT.

VERTICAL PIECE, 2" X 6"  
X 43" (3 REQD).

STRUT LEDGER, 2" X 2" OR 2" X 4"  
X 59" (2 REQD). NAIL TO THE  
VERTICAL PIECES W/2-10d NAILS AT  
EACH JOINT.

GATE HOLD-DOWN,  
2" X 3" X 9-1/2"  
(DOUBLED) (2 REQD).  
NAIL THE FIRST PIECE TO  
THE BOTTOM HORIZONTAL  
PIECE W/3-10d NAILS.  
LAMINATE THE  
SECOND PIECE IN A  
LIKE MANNER.



END VIEW

CENTER GATE C

FOR 50'-6" CAR CROSSWISE LOAD

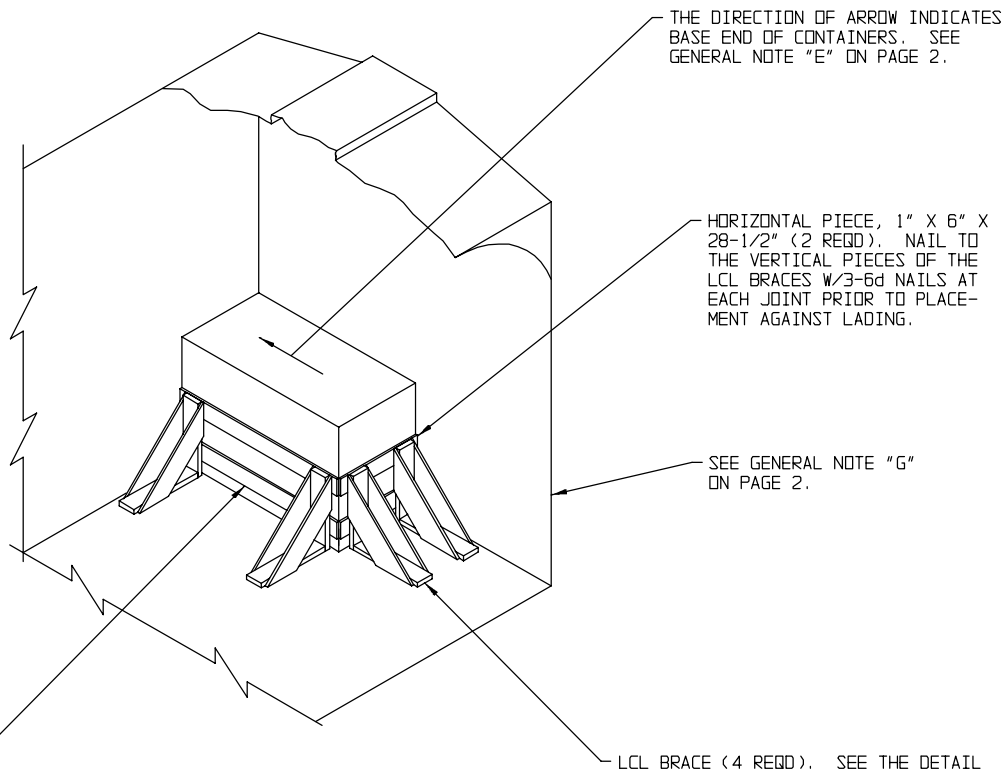
SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-4" WIDE CONVENTIONAL TYPE BOX CAR IS SHOWN. WIDER CARS AND CARS OF OTHER LENGTHS CAN BE USED. SEE SPECIAL NOTE 2.
2. A 1-WIDE CROSSWISE LOAD IN A 50'-6" LONG CAR IS SHOWN AS TYPICAL. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR A 16-UNIT CROSSWISE LOAD IN A 40'-6" LONG CAR, AND A 24-UNIT CROSSWISE LOAD IN A 60'-8" LONG CAR. NOTE THAT IF A 40'-6" LONG CAR IS USED, THE DOUBLED 2" X 6" STRUTS MAY BE REPLACED BY 4" X 4" MATERIAL, IF DESIRED. ALSO, IF A 60'-8" LONG CAR IS TO BE LOADED, THE STRUTS MUST BE TRIPLED IN LIEU OF DOUBLED AND THE STRUT LEDGERS MUST BE LOWERED 3/4" TO ACCOMMODATE THE TRIPLED STRUTS.
3. ONE (1) LCL BRACE WILL BE USED AT EACH SIDE OF EACH PALLET UNIT. THE BRACES WILL BE CENTERED ON THE WIDTH OF THE UNITS.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	399	200
2" X 2"	20	7
2" X 3"	7	4
2" X 6"	246	246
NAILS	NO. REQD	POUNDS
6d (2")	240	1-1/2
8d (2-1/2")	480	5-1/4
10d (3")	138	2-1/4
12d (3-1/4")	24	1/2
16d (3-1/2")	280	6-1/4

LOAD AS SHOWN

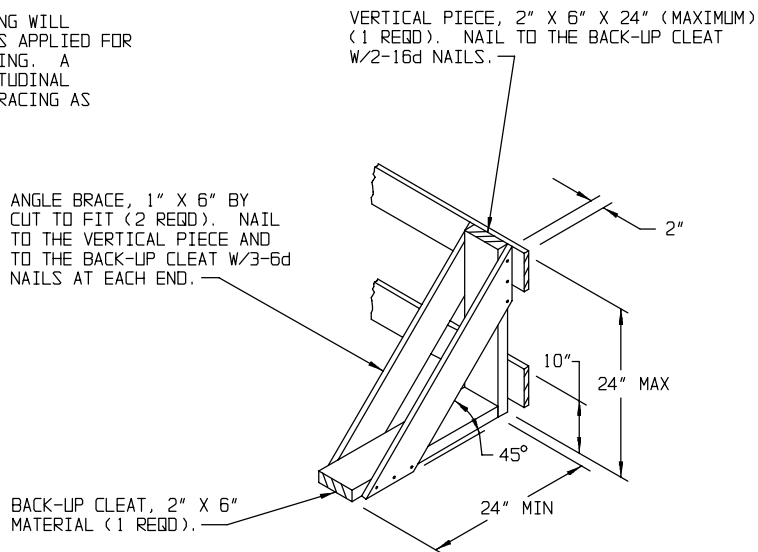
ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	20	38,760 LBS
DUNNAGE		930 LBS
TOTAL WEIGHT		39,690 LBS (APPROX)



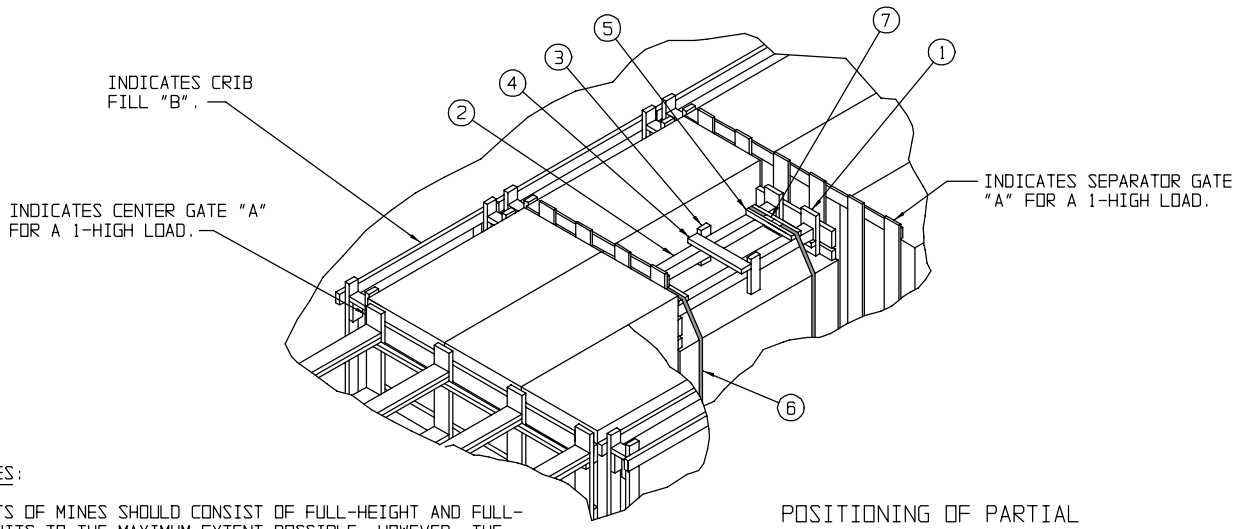
ISOMETRIC VIEW

SPECIAL NOTES:

1. A 9'-2" WIDE WOOD-LINED CONVENTIONAL TYPE BOX CAR HAVING A WOOD OR NAILABLE METAL FLOOR IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED. SEE GENERAL NOTES "D" AND "G" ON PAGE 2.
2. THE LOAD SHOWN DEPICTING THE LCL BRACE METHOD OF PARTIAL-LAYER BRACING IS TYPICAL. A CROSSWISE UNIT IS SHOWN, HOWEVER, THE PROCEDURES ARE ALSO APPLICABLE FOR LENGTHWISE UNITS AND FOR OTHER QUANTITIES AS LONG AS THE CAPACITY OF THE BRACES IS NOT EXCEEDED. SEE SPECIAL NOTE 3.
3. EACH LCL BRACE AS APPLIED FOR LONGITUDINAL BRACING WILL RETAIN 2,000 POUNDS OF LADING. EACH LCL BRACE AS APPLIED FOR LATERAL BRACING WILL SUPPORT 8,000 POUNDS OF LADING. A MINIMUM OF TWO (2) BRACES MUST BE USED FOR LONGITUDINAL BRACING. BRACES MAY BE ADDED FOR LONGITUDINAL BRACING AS NECESSARY.



LCL BRACE



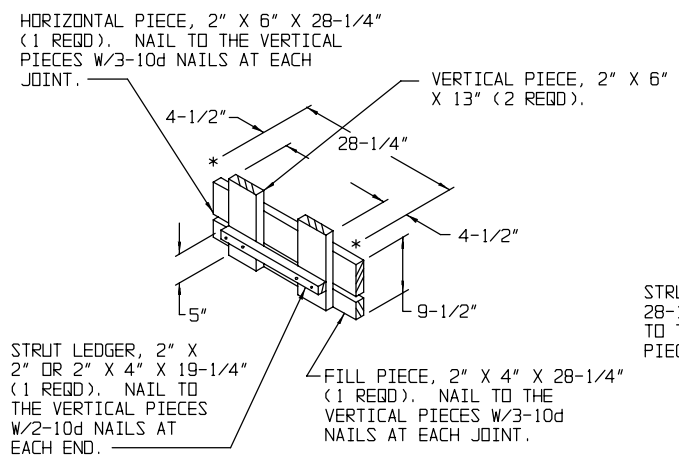
**SPECIAL NOTES:**

1. SHIPMENTS OF MINES SHOULD CONSIST OF FULL-HEIGHT AND FULL-LAYER UNITS TO THE MAXIMUM EXTENT POSSIBLE, HOWEVER, THE END OF A LOT OR THE QUANTITY OF ITEMS NEEDED TO FILL A REQUISITION, MAY NECESSITATE THE SHIPMENT OF ONE OR MORE LESS-THAN-FULL PALLET UNITS WITHIN A LOAD. THE PROCEDURES ON THIS PAGE ARE FOR GUIDANCE IN THE SHIPMENT OF A PARTIAL UNIT WITHIN A 1-LAYER LENGTHWISE LOAD. THE PRINCIPLES MAY ALSO BE APPLIED FOR SHIPMENT OF A PARTIAL UNIT IN THE SECOND LAYER.
2. A LESS-THAN-FULL HEIGHT PALLET UNIT OF LENGTHWISE-POSITIONED MINES WHICH IS TO BE SHIPPED WITHIN A LAYER OF A LOAD WILL BE LIMITED TO NOT LESS THAN THREE (3) LAYERS OF CONTAINERS ON THE PARTIAL UNIT. THE DEPICTED PROCEDURES SHOW THE BRACING OF A 3-LAYER UNIT WITHIN A LOAD. THE PRINCIPLES CAN BE ADAPTED TO SUIT 4-LAYER PARTIAL UNITS. PARTIAL-UNIT GATE DETAILS ARE SHOWN FOR UNITS REDUCED BY ONE AND TWO LAYERS.
3. A PARTIAL UNIT MUST CONSIST OF FULL LAYERS OF FIVE (5) CONTAINERS, OR EMPTY CONTAINERS MUST BE POSITIONED IN THE PLACE OF THE OMITTED FILLED CONTAINERS. SEE GENERAL NOTE "D" OF THE "BASIC PROCEDURES" DRAWING 19-48-4231-20PM1000.
4. THE EMPTY CONTAINERS, AS REFERENCED IN SPECIAL NOTE 3, SHOULD REMAIN WITH THE UNIT DURING STORAGE (IF APPLICABLE) FOR POSSIBLE USE IN FUTURE SHIPMENTS; THE DUNNAGE DEPICTED ABOVE FOR THE SHIPMENT OF THE PARTIAL UNIT MAY BE REMOVED WHEN A SHIPMENT REACHES ITS DESTINATION.
5. THE VIEW ABOVE DEPICTS A PORTION OF A CONVENTIONAL BOX CAR LOAD, HOWEVER, THE PROCEDURES ARE ALSO APPLICABLE FOR LOADS IN CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.
6. THE PARTIAL UNIT PROCEDURES SHOULD BE APPLIED NEAR THE CENTER OF THE CAR LENGTH, BUT NOT IN THE DOORWAY AREA. ALSO, THERE SHOULD BE AT LEAST ONE (1) LOAD UNIT BETWEEN THE PARTIAL UNIT AND A CENTER GATE.

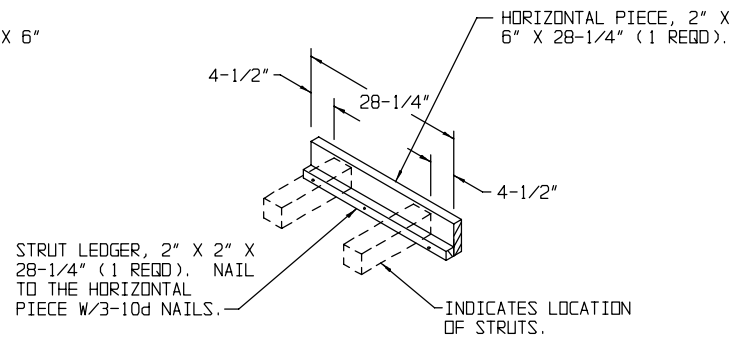
**POSITIONING OF PARTIAL LENGTHWISE UNIT WITHIN A LAYER**

**KEY NUMBERS**

- ① PARTIAL-UNIT GATE (2 REQD). SEE THE "PARTIAL-UNIT GATE A" DETAIL BELOW. SEE GENERAL NOTE "M" ON PAGE 2 AND SPECIAL NOTE 2 AT LEFT.
- ② STRUT, 4" X 4" X 53" (2 REQD). TOENAIL TO THE VERTICAL PIECES OF THE PARTIAL-UNIT GATE, PIECE MARKED ①, W/2-16d NAILS AT EACH END.
- ③ VERTICAL STRUT BRACING, 2" X 4" X 10-1/2" (2 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT. BRACING MUST BE PLACED ON THE CENTER ROW OF THE TOP FRAME ASSEMBLY, SO AS TO PROTECT THE CONTAINERS.
- ④ HORIZONTAL STRUT BRACING, 2" X 4" X 21" (1 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH END.
- ⑤ STRAPPING BOARD, 2" X 4" X 17-1/4" (2 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH END.
- ⑥ UNITIZING STRAP, 1-1/4" X .031" OR .035" X 15'-0" LONG STEEL STRAPPING (2 REQD). PRE-POSITION UNDER THE PALLET.
- ⑦ SEAL FOR 1-1/4" STRAPPING (4 REQD, 2 PER STRAP). SEE GENERAL NOTE "D" ON PAGE 2. DOUBLE CRIMP EACH SEAL.

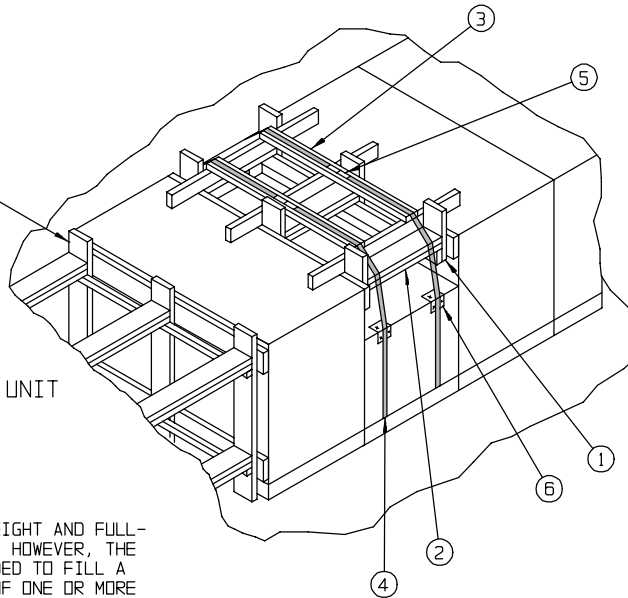


**PARTIAL-UNIT GATE A**  
FOR 3 CONTAINER HIGH PARTIAL UNIT.



**PARTIAL-UNIT GATE B**  
FOR 4 CONTAINER HIGH PARTIAL UNIT.

INDICATES CENTER GATE "D".  
NOTE THAT THE HORIZONTAL  
PIECES AND THE LCL BRACING  
PIECES MARKED ① AND ②  
IN THE 1-WIDE LOAD SHOWN  
ON PAGE 24, HAVE BEEN  
OMITTED FOR CLARITY.



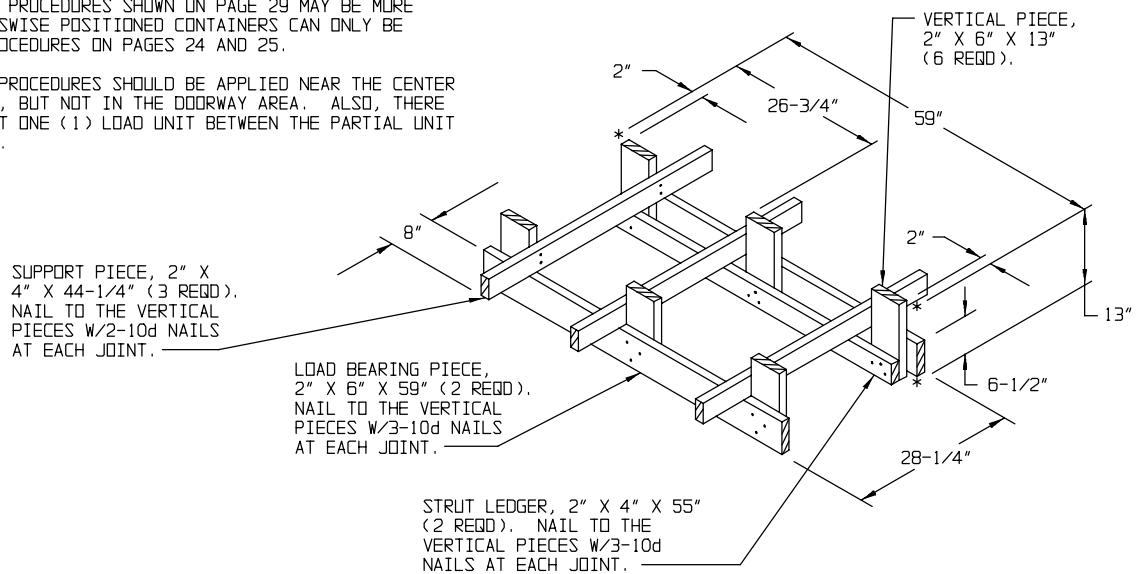
**POSITIONING OF PARTIAL CROSSWISE UNIT  
WITHIN A LAYER**

**SPECIAL NOTES:**

1. SHIPMENT OF MINES SHOULD CONSIST OF FULL-HEIGHT AND FULL-LAYER UNITS TO THE MAXIMUM EXTENT POSSIBLE, HOWEVER, THE END OF A LOT, OR THE QUANTITY OF ITEMS NEEDED TO FILL A REQUISITION, MAY NECESSITATE THE SHIPMENT OF ONE OR MORE LESS-THAN-FULL PALLET UNITS WITHIN A LOAD. THE PROCEDURES ON THIS PAGE ARE PRESENTED AS GUIDANCE IN THE SHIPMENT OF A PARTIAL UNIT WITHIN A 1-LAYER CROSSWISE LOAD.
2. A LESS-THAN-FULL HEIGHT PALLET UNIT OF CROSSWISE-POSITIONED PALLET UNITS WHICH IS TO BE SHIPPED WITHIN A LAYER OF A LOAD WILL BE LIMITED TO NOT LESS THAN THREE (3) LAYERS OF CONTAINERS ON THE PARTIAL UNIT. THE DEPICTED PROCEDURES SHOW THE BRACING OF A 3-LAYER UNIT WITHIN A LOAD. THE PROCEDURES ALSO APPLY TO SHIPMENTS OF 4-LAYER PARTIAL UNITS.
3. A PARTIAL UNIT MUST CONSIST OF FULL LAYERS OF FIVE (5) CONTAINERS, OR EMPTY CONTAINERS MUST BE POSITIONED IN THE PLACE OF OMITTED FILLED CONTAINERS. SEE GENERAL NOTE "D" OF THE "BASIC PROCEDURE" DRAWING 19-48-4231-20PM1006 FOR FURTHER GUIDANCE.
4. THE EMPTY CONTAINERS, AS REFERENCED IN SPECIAL NOTE 3, SHOULD REMAIN WITH THE UNIT DURING STORAGE (IF APPLICABLE) FOR POSSIBLE USE IN A FUTURE SHIPMENT. THE DUNNAGE DEPICTED ABOVE FOR THE SHIPMENT OF THE PARTIAL UNIT MUST BE REMOVED WHEN A SHIPMENT REACHES DESTINATION.
5. THE VIEW ABOVE DEPICTS A PORTION OF A CONVENTIONAL BOX CAR LOAD, HOWEVER, THE PROCEDURES ARE ALSO APPLICABLE FOR LOADS IN CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.
6. FOR THE SHIPMENT OF A PARTIAL UNIT CONSISTING OF ONE OR TWO LAYERS, THE PROCEDURES SHOWN ON PAGE 29 MUST BE USED IN LIEU OF THE ABOVE DEPICTED PROCEDURE. FOR SHIPMENT OF A 3-LAYER PARTIAL UNIT, THE PROCEDURES SHOWN ON PAGE 29 MAY BE MORE ECONOMICAL. CROSSWISE POSITIONED CONTAINERS CAN ONLY BE SHIPPED BY THE PROCEDURES ON PAGES 24 AND 25.
7. THE PARTIAL UNIT PROCEDURES SHOULD BE APPLIED NEAR THE CENTER OF THE CAR LENGTH, BUT NOT IN THE DOORWAY AREA. ALSO, THERE SHOULD BE AT LEAST ONE (1) LOAD UNIT BETWEEN THE PARTIAL UNIT AND A CENTER GATE.

**KEY NUMBERS**

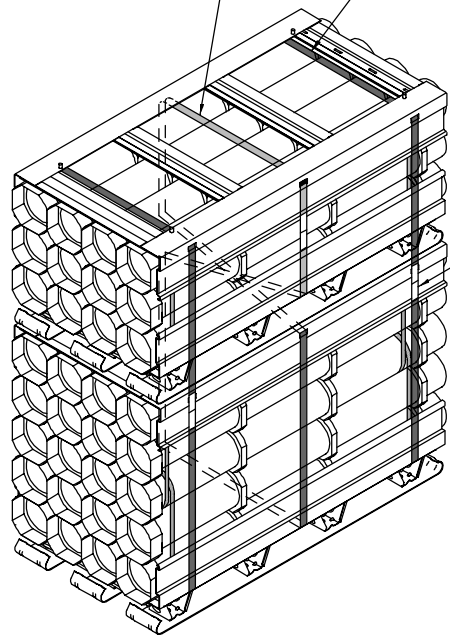
- ① PARTIAL-UNIT GATE (1 REQD). SEE THE "PARTIAL-UNIT GATE C" DETAIL BELOW. SEE GENERAL NOTE "M" ON PAGE 2.
- ② STRUT, 2" X 6" X 22-1/4" (DOUBLED) (3 REQD). LAMINATE W/4-10d NAILS. TOENAIL TOP PIECE TO THE VERTICAL PIECES OF PIECE MARKED ① W/2-10d NAILS AT EACH END.
- ③ STRAPPING BOARD, 2" X 4" X 44" (2 REQD). NAIL TO THE SUPPORT PIECES OF PIECE MARKED ① W/2-10d NAILS AT EACH JOINT.
- ④ UNITIZING STRAP, 1-1/4" X .031" OR .035" BY LENGTH TO SUIT STEEL STRAPPING (2 REQD). PRE-POSITION UNDER THE PALLET.
- ⑤ SEAL FOR 1-1/4" STRAPPING (4 REQD, 2 PER STRAP). SEE GENERAL NOTE "D" ON PAGE 2. DOUBLE CRIMP EACH SEAL.
- ⑥ ANTI-CHAFING NEUTRAL BARRIER MATERIAL. POSITION BETWEEN CONTAINERS AND STRAPPING AT POINTS OF CONTACT.



**PARTIAL-UNIT GATE C  
FOR CROSSWISE LOAD.**

FIGURE 8 UNITIZING STRAP, 1-1/4" X .031"  
OR .035" BY A LENGTH TO SUIT STEEL  
STRAPPING (1 REQD). POSITION OVER THE  
CENTER UNITIZING STRAP, WHERE APPLICABLE.

VERTICAL UNITIZING STRAP, 1-1/4" X .031" OR .035" BY  
A LENGTH TO SUIT STEEL STRAPPING (2 REQD). POSITION  
OVERTOP THE OUTER UNITIZING STRAPS, WHERE APPLICABLE.



INDICATES TWO  
(2) 1-1/4" STRAP  
SEALS.

#### SECUREMENT OF PARTIAL UNIT ON TOP

##### SPECIAL NOTES:

1. THIS PROCEDURE IS APPLICABLE ONLY FOR USE IN A CROSSWISE LOAD. CAUTION: THE PARTIAL UNIT ON TOP IS LIMITED TO NOT MORE THAN THREE (3) LAYERS OF CONTAINERS. FOR SHIPMENT OF FOUR LAYERS OF CONTAINERS, OR AN ALTERNATIVE METHOD FOR THREE LAYERS, REFER TO THE PROCEDURES ON PAGES 27 AND 28.
2. IF THE PARTIAL UNIT CONSISTS OF EITHER ONE OR TWO LAYERS, THE STRAPS UNITIZING THE TOP TWO LAYERS OF CONTAINERS WILL NOT BE REQUIRED.
3. CROSSWISE LOADS OF THESE UNITS CAN ONLY BE SHIPPED BY USING THE CROSSWISE LOADING PROCEDURES SHOWN ON PAGES 24 AND 25.

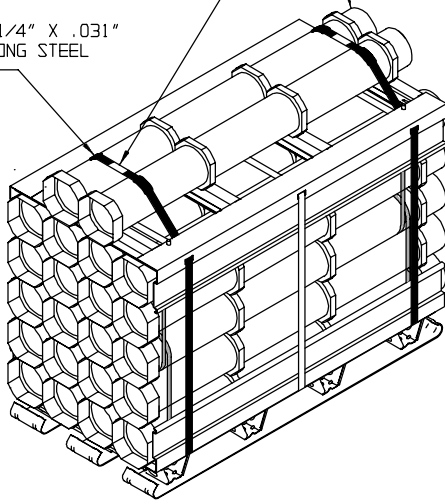
SPECIAL NOTES:

1. SHIPMENTS OF MINES SHOULD CONSIST OF FULL HEIGHT AND FULL-LAYER UNITS TO THE MAXIMUM EXTENT POSSIBLE. HOWEVER, THE END OF A LOT, OR THE QUANTITY OF ITEMS NEEDED TO FILL A REQUISITION MAY NECESSITATE THE SHIPMENT OF ONE OR MORE LEFTOVER CONTAINERS. LEFT-OVER CONTAINERS ARE DESCRIBED AS A QUANTITY OF CONTAINERS WHICH IS INSUFFICIENT TO FORM A FULL-LAYERED PARTIAL UNIT FOR SHIPMENT EITHER ON TOP OF A LOAD AS SHOWN ON PAGE 29 OR WITHIN A LAYER AS SHOWN ON PAGES 27 AND 28.
2. SHIPMENT OF LEFTOVER CONTAINERS IS APPLICABLE FOR CONUS AND OCONUS RAILROAD SHIPMENTS FROM DEPOT TO DEPOT OR FROM DEPOT TO POSTS, CAMPS, AND STATIONS, OR UPON APPROVAL FROM HIGHER HEADQUARTERS, FOR SHIPMENTS FROM LOAD, ASSEMBLE, AND PACK PLANTS TO DEPOTS. CAUTION: A LOAD CONTAINING LEFTOVER CONTAINERS IN AN AMOUNT WHICH IS LESS THAN A FULL LAYER, AND SECURED TO THE TOP OF A FULL OR PARTIAL UNIT, MUST NOT BE DESTINED FOR SHIPMENT OVERSEAS BY WATER CARRIER.
3. OBVIOUSLY, A PALLET UNIT WITH ONE OR MORE CONTAINERS STRAPPED TO THE TOP MUST BE POSITIONED IN THE TOP LAYER OF A LOAD. THE PREFERRED LOCATION WOULD BE NEAR THE CENTER AREA OF A CAR IF A FULL LOAD IS BEING SHIPPED, BUT NOT IN THE DOORWAY AREA.
4. THE PROCEDURES ON THIS PAGE ARE APPLICABLE FOR THE SHIPMENT OF LEFTOVER CONTAINERS IN ANY OF THE LOADS DEPICTED HEREIN.

POSITION CONTAINERS SO AS TO BE CENTERED ON THE WIDTH OF THE UNIT.

SEAL FOR 1-1/4" STRAP (2 REQD). SEE GENERAL NOTE "D" ON PAGE 2. DOUBLE NOTCH EACH SEAL.

UNITIZING STRAP, 1-1/4" X .031" OR .035" X 13'-0" LONG STEEL STRAPPING (2 REQD).



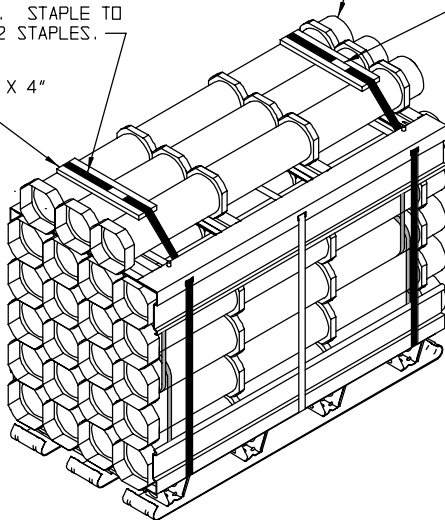
SECUREMENT OF TWO CONTAINERS

POSITION CONTAINERS SO AS TO BE CENTERED ON THE WIDTH OF THE UNIT.

UNITIZING STRAP, 1-1/4" X .031" OR .035" X 14'-0" LONG STEEL STRAPPING (2 REQD). STAPLE TO STRAPPING BOARD W/2 STAPLES.

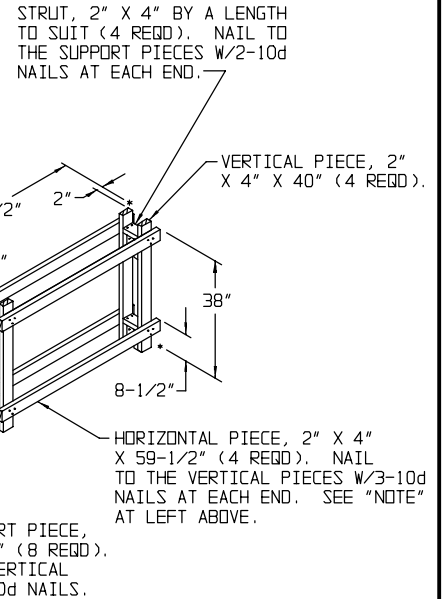
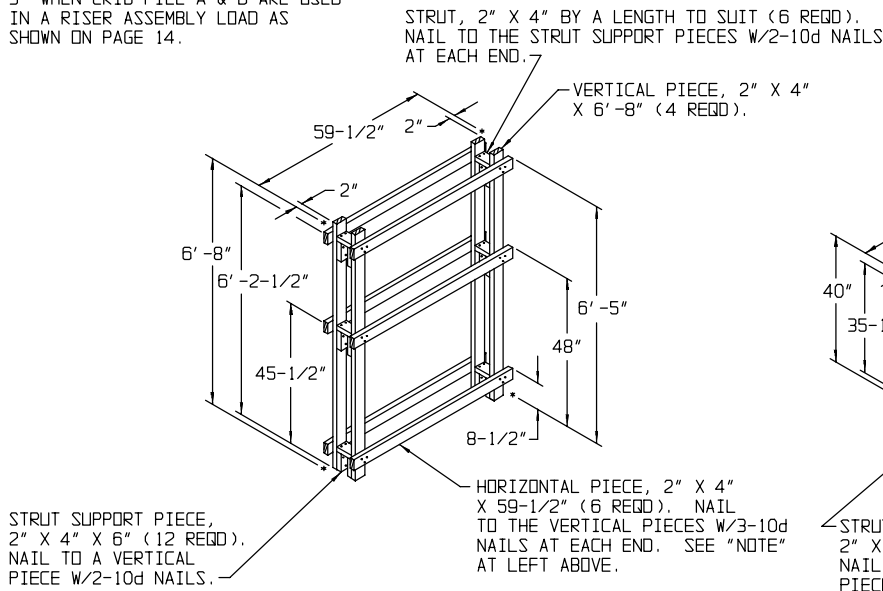
STRAPPING BOARD, 1" X 4" X 14" (2 REQD).

SEAL FOR 1-1/4" STRAP (2 REQD). SEE GENERAL NOTE "D" ON PAGE 2. DOUBLE NOTCH EACH SEAL.



SECUREMENT OF THREE CONTAINERS

NOTE: THE 59-1/2" LONG HORIZONTAL PIECES WILL BE 62" AND THE VERTICAL INSET ON THE HORIZONTAL PIECES WILL CHANGE FROM 2" TO 3" WHEN CRIB FILL A & B ARE USED IN A RISER ASSEMBLY LOAD AS SHOWN ON PAGE 14.

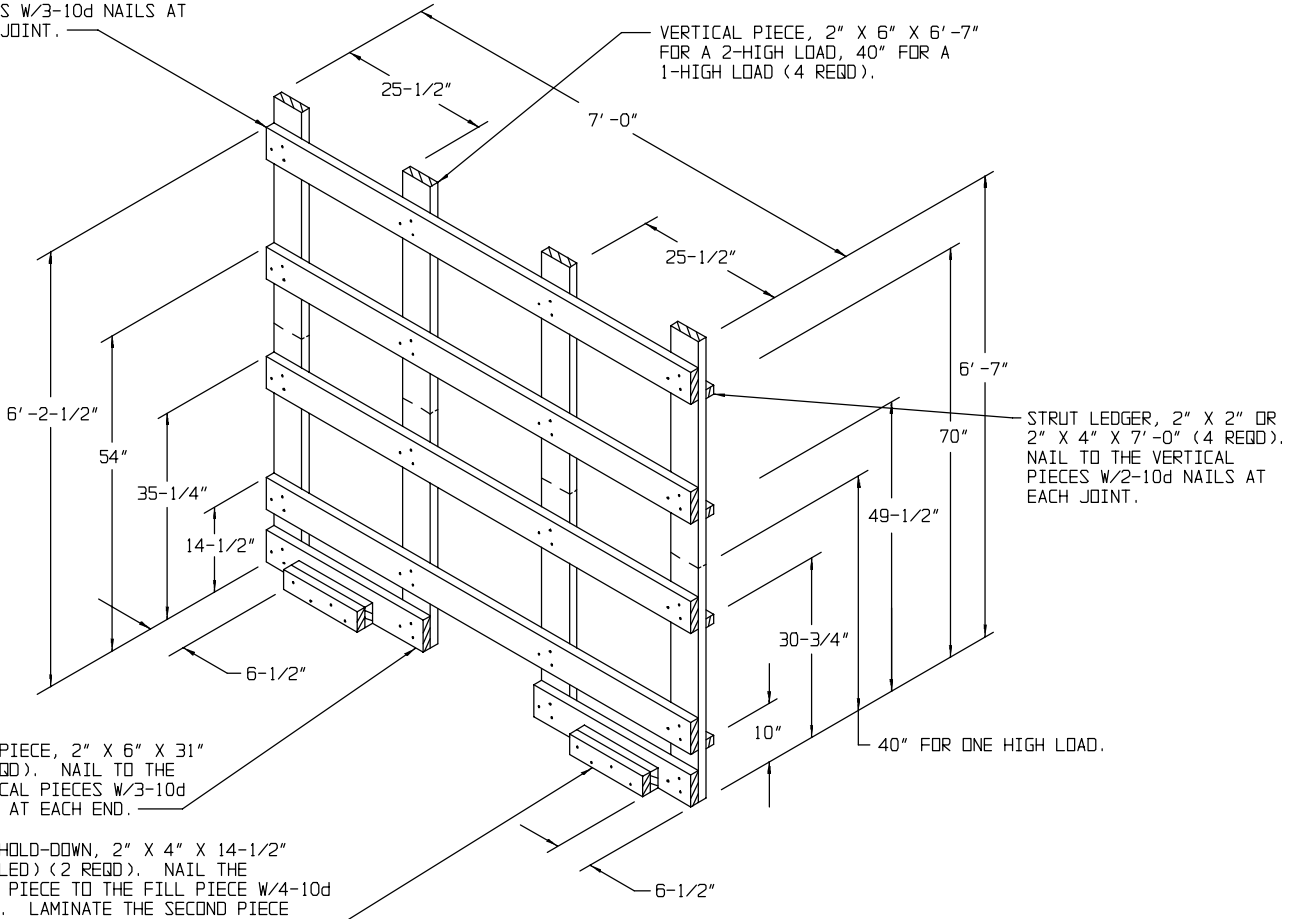


**CRIB FILL A**

CRIB FILL ASSEMBLIES "A" AND "B" SHOULD BE PRE-FABRICATED. CONSTRUCT TO BE 1/2" TO 3/4" LESS IN WIDTH THAN THE DISTANCE BETWEEN THE PALLET UNITS AND THE CAR WALL.

**CRIB FILL B**

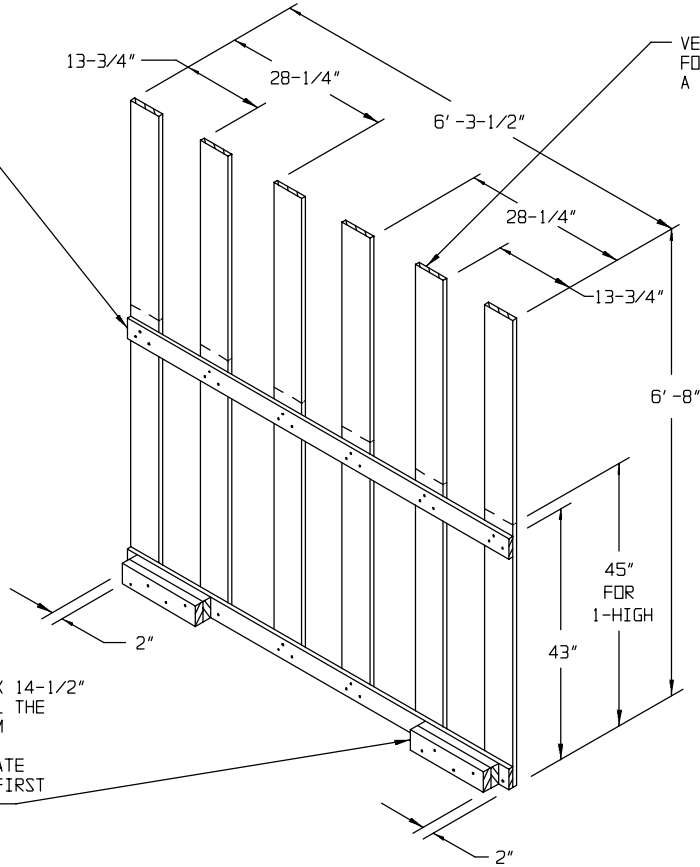
HORIZONTAL PIECE, 2" X 6" X 7'-0" (4 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.



**CENTER GATE A**

**DETAILS**

HORIZONTAL PIECE, 1" X 4" X 6'-3-1/2"  
(2 REQD). NAIL TO THE VERTICAL  
PIECES W/3-6d NAILS AT EACH JOINT  
AND CLINCH.

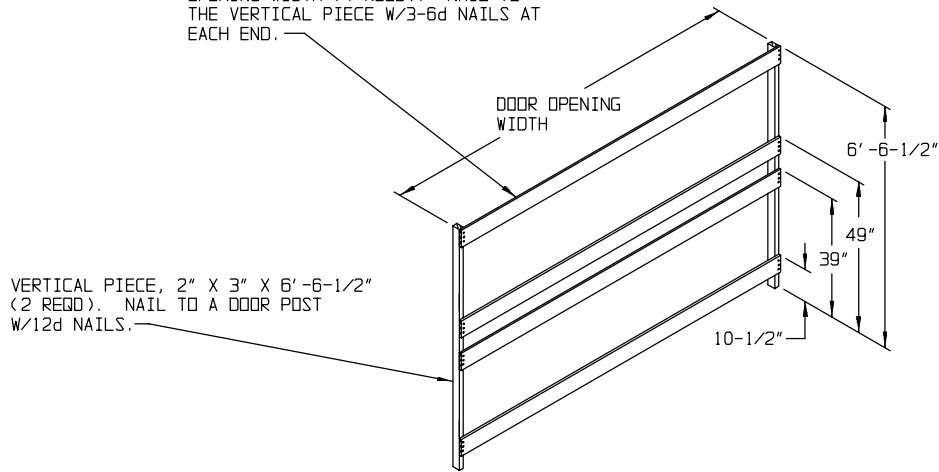


VERTICAL PIECE, 1" X 6" X 6'-8"  
FOR A 2-HIGH LOAD, 45" FOR  
A 1-HIGH LOAD (6 REQD).

GATE HOLD-DOWN, 2" X 4" X 14-1/2"  
(DOUBLED) (2 REQD). NAIL THE  
FIRST PIECE TO THE BOTTOM  
HORIZONTAL PIECE W/2-10d  
NAILS AT EACH END. LAMINATE  
THE SECOND PIECE TO THE FIRST  
W/4-10d NAILS.

SEPARATOR GATE A

HORIZONTAL PIECE, 1" X 6" BY DOOR  
OPENING WIDTH (4 REQD). NAIL TO  
THE VERTICAL PIECE W/3-6d NAILS AT  
EACH END.



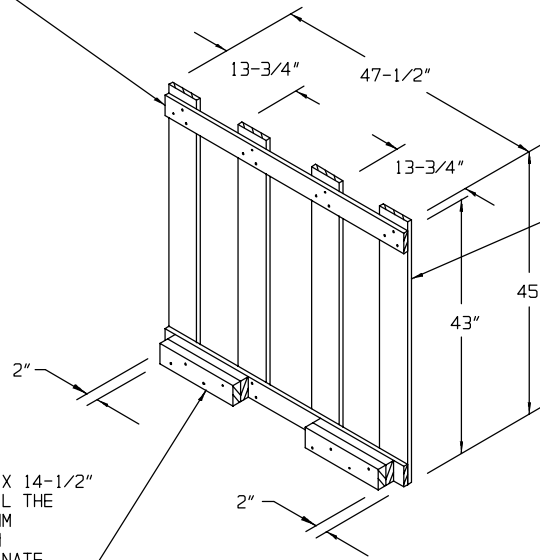
VERTICAL PIECE, 2" X 3" X 6'-6-1/2"  
(2 REQD). NAIL TO A DOOR POST  
W/12d NAILS.

DOORWAY PROTECTION

DETAILS



HORIZONTAL PIECE, 1" X 4" X 47-1/2"  
(2 REQD). NAIL TO THE VERTICAL  
PIECES W/3-6d NAILS AT EACH  
JOINT AND CLINCH.



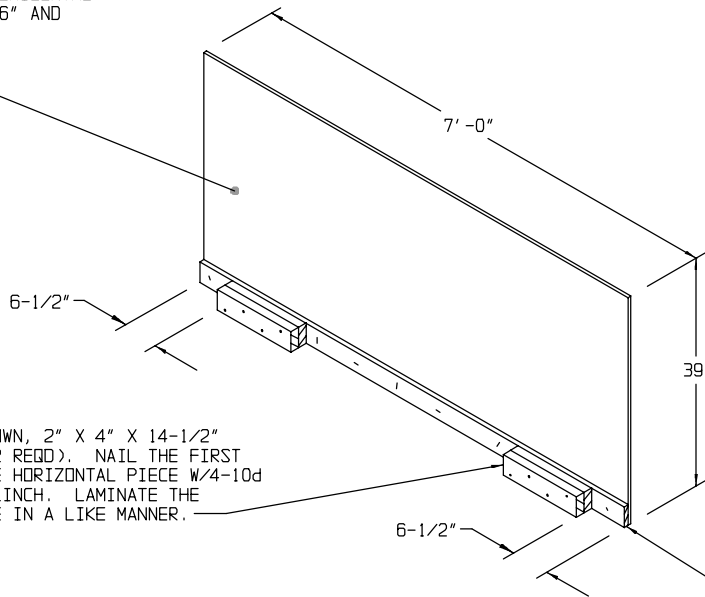
VERTICAL PIECE, 1" X 6"  
X 45" (4 REQD).

GATE HOLD-DOWN, 2" X 4" X 14-1/2"  
(DOUBLED) (2 REQD). NAIL THE  
FIRST PIECE TO THE BOTTOM  
HORIZONTAL PIECE W/2-10d  
NAILS AT EACH END. LAMINATE  
THE SECOND PIECE W/4-10d NAILS.

### SEPARATOR GATE B

FOR USE IN THE LOAD SHOWN  
ON PAGE 8.

PLYWOOD, 3/8" X 39" X 7'-0"  
(1 REQD). NAIL TO THE HORIZONTAL  
PIECE W/1-6d NAIL EVERY 6" AND  
CLINCH.



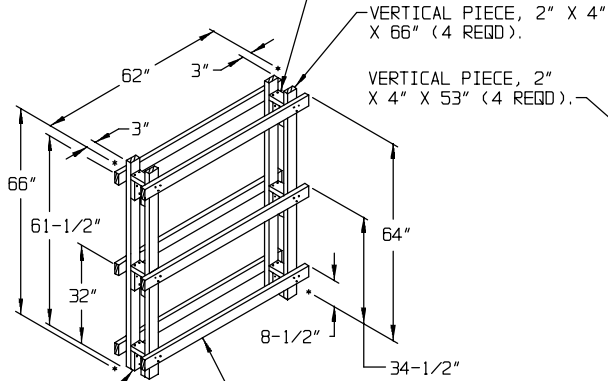
GATE HOLD-DOWN, 2" X 4" X 14-1/2"  
(DOUBLED) (2 REQD). NAIL THE FIRST  
PIECE TO THE HORIZONTAL PIECE W/4-10d  
NAILS AND CLINCH. LAMINATE THE  
SECOND PIECE IN A LIKE MANNER.

HORIZONTAL PIECE, 1" X 4"  
X 7'-0" (1 REQD).

### SEPARATOR GATE C

FOR USE IN THE STRUTTED-GATE PROCEDURES SHOWN ON PAGE 12.  
NOTE THIS GATE MAY ALSO BE USED IN 1-HIGH LOADS, REPLACING  
A 1-HIGH SEPARATOR GATE "A".

STRUT, 2" X 4" BY A LENGTH TO SUIT (6 REQD). NAIL TO THE STRUT SUPPORT PIECES W/2-10d NAILS AT EACH END.



STRUT SUPPORT PIECE, 2" X 4" X 6" (12 REQD). NAIL TO A VERTICAL PIECE W/2-10d NAILS.

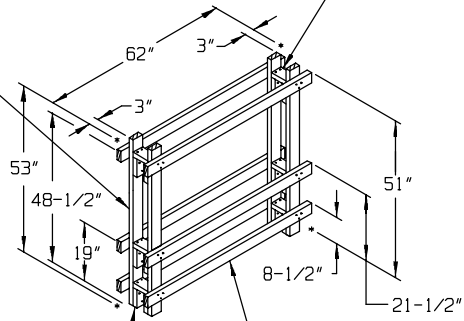
VERTICAL PIECE, 2" X 4" X 66" (4 REQD).

VERTICAL PIECE, 2" X 4" X 53" (4 REQD).

HORIZONTAL PIECE, 2" X 4" X 62" (6 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH END.

CRIB FILL C

STRUT, 2" X 4" BY A LENGTH TO SUIT (6 REQD). NAIL TO THE SUPPORT PIECES W/2-10d NAILS AT EACH END.

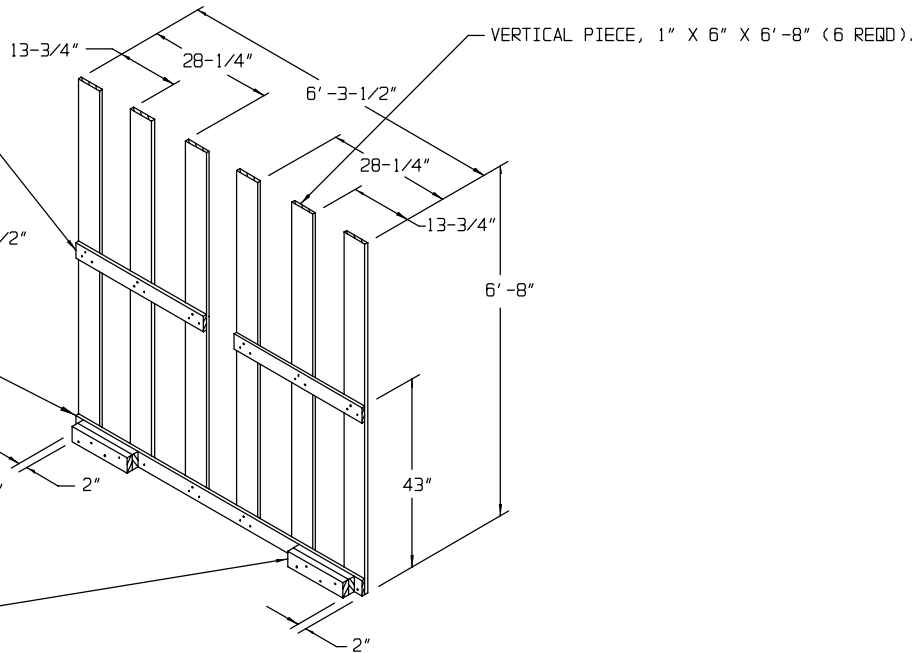


STRUT SUPPORT PIECE, 2" X 4" X 6" (12 REQD). NAIL TO A VERTICAL PIECE W/2-10d NAILS.

HORIZONTAL PIECE, 2" X 4" X 62" (6 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH END.

CRIB FILL D

TIE PIECE, 1" X 4" X 33-3/4" (2 REQD). NAIL TO THE VERTICAL PIECES W/3-6d NAILS AT EACH JOINT AND CLINCH.



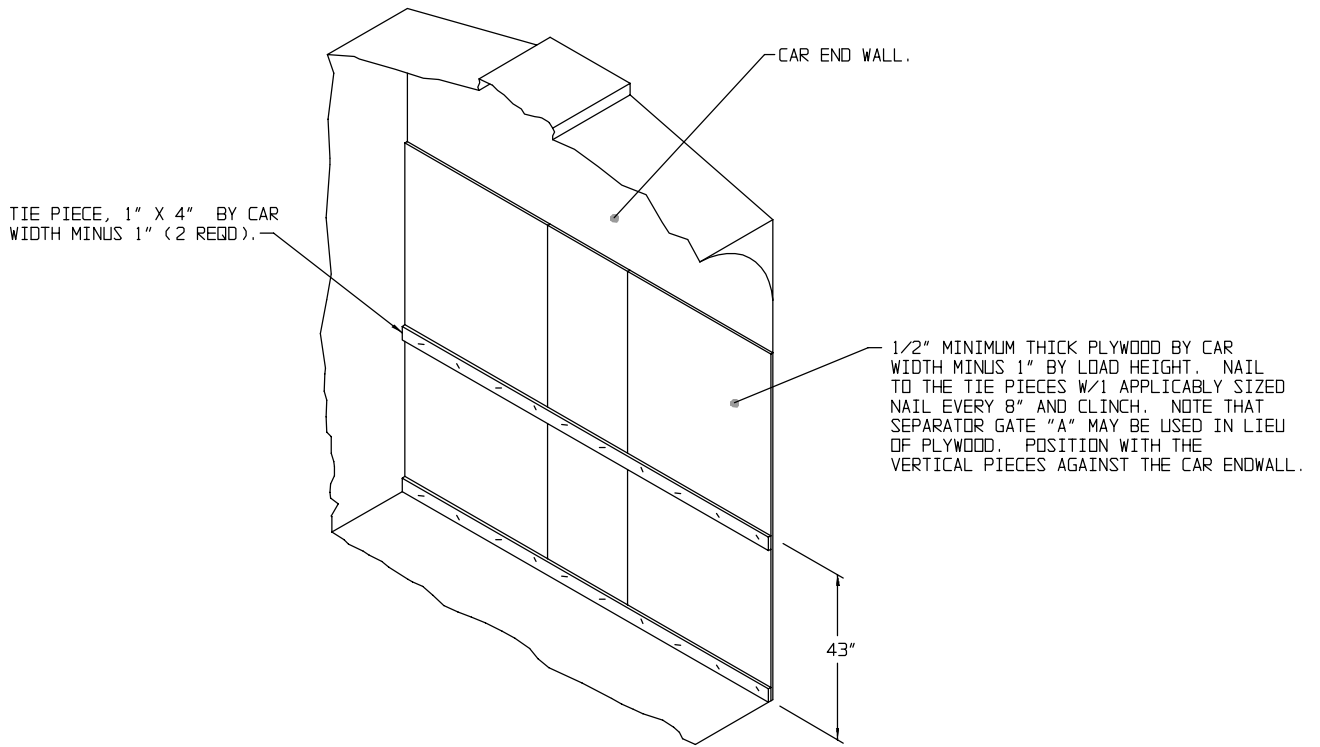
HORIZONTAL PIECE, 1" X 4" X 6'-3-1/2" (1 REQD). NAIL TO THE VERTICAL PIECES W/3-6d NAILS AT EACH JOINT AND CLINCH.

VERTICAL PIECE, 1" X 6" X 6'-8" (6 REQD).

GATE HOLD-DOWN, 2" X 4" X 14-1/2" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE BOTTOM HORIZONTAL PIECE W/2-10d NAILS AT EACH END. LAMINATE THE SECOND PIECE TO THE FIRST W/4-10d NAILS.

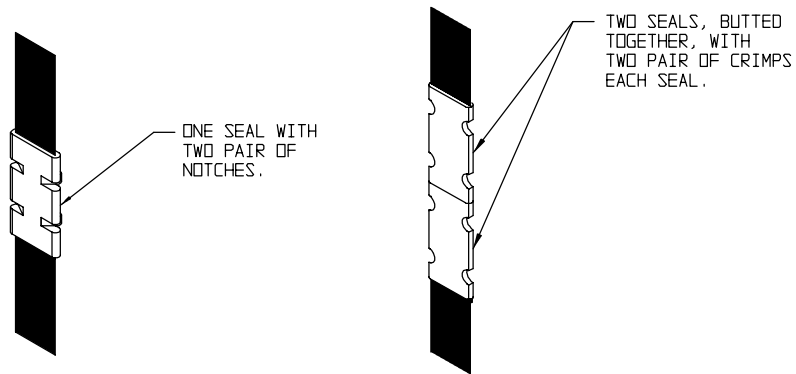
SEPARATOR GATE D

FOR USE IN THE OMITTED-UNIT PROCEDURES SHOWN ON PAGE 13.



END WALL LINING

THIS VIEW DEPICTS LINING FOR A LENGTHWISE LOAD IN A CAR EQUIPPED WITH STEEL END WALL.



STRAP JOINT A

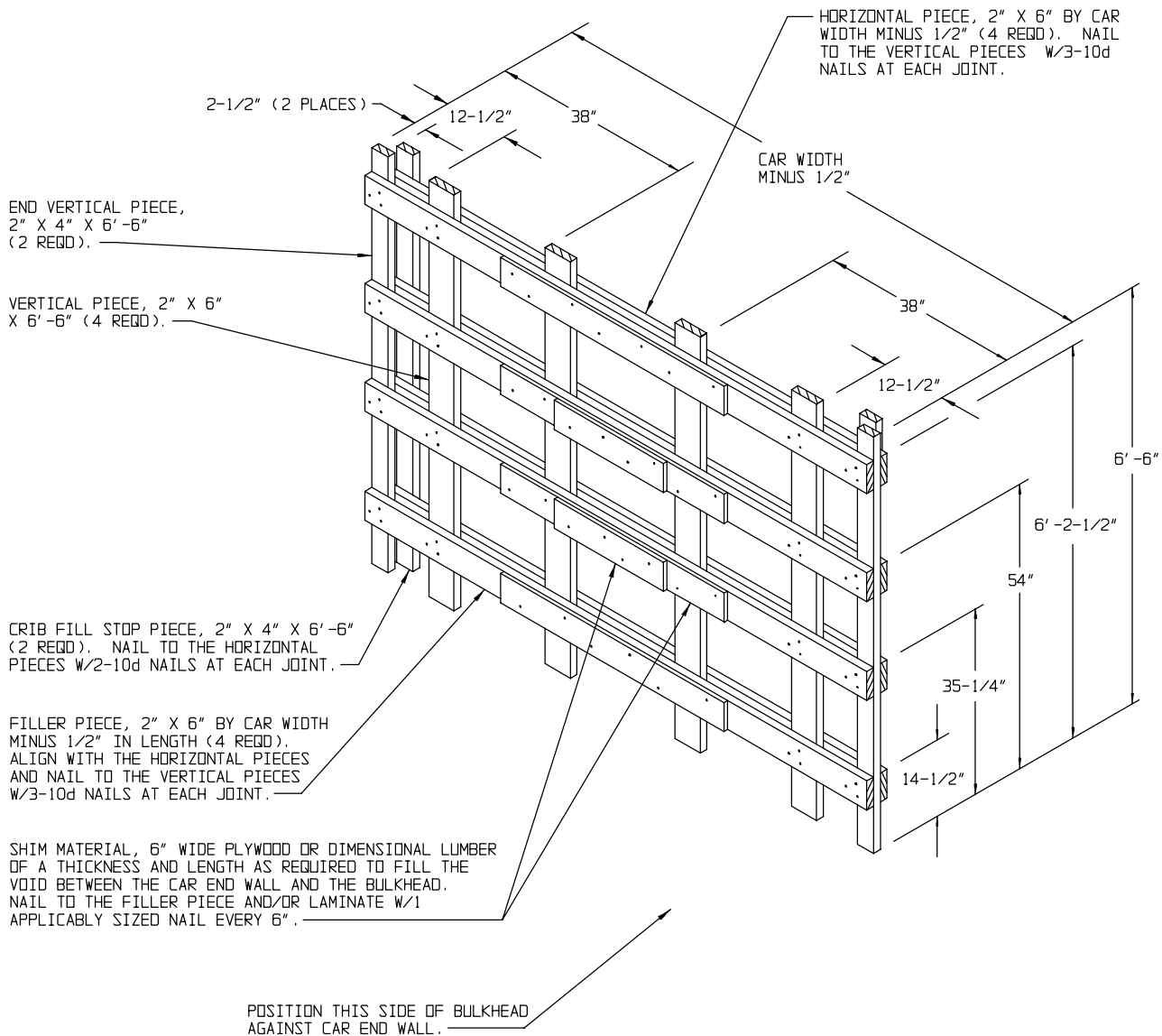
METHOD OF SECURING A STRAP JOINT WHEN USING A NOTCH-TYPE SEALER.

STRAP JOINT B

METHOD OF SECURING A STRAP JOINT WHEN USING A CRIMP-TYPE SEALER.

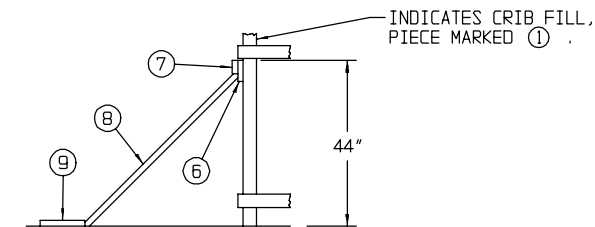
END-OVER-END LAP JOINT DETAILS

DETAILS



**END-OF-CAR BULKHEAD**

SEE "NOTE ▲" BELOW.

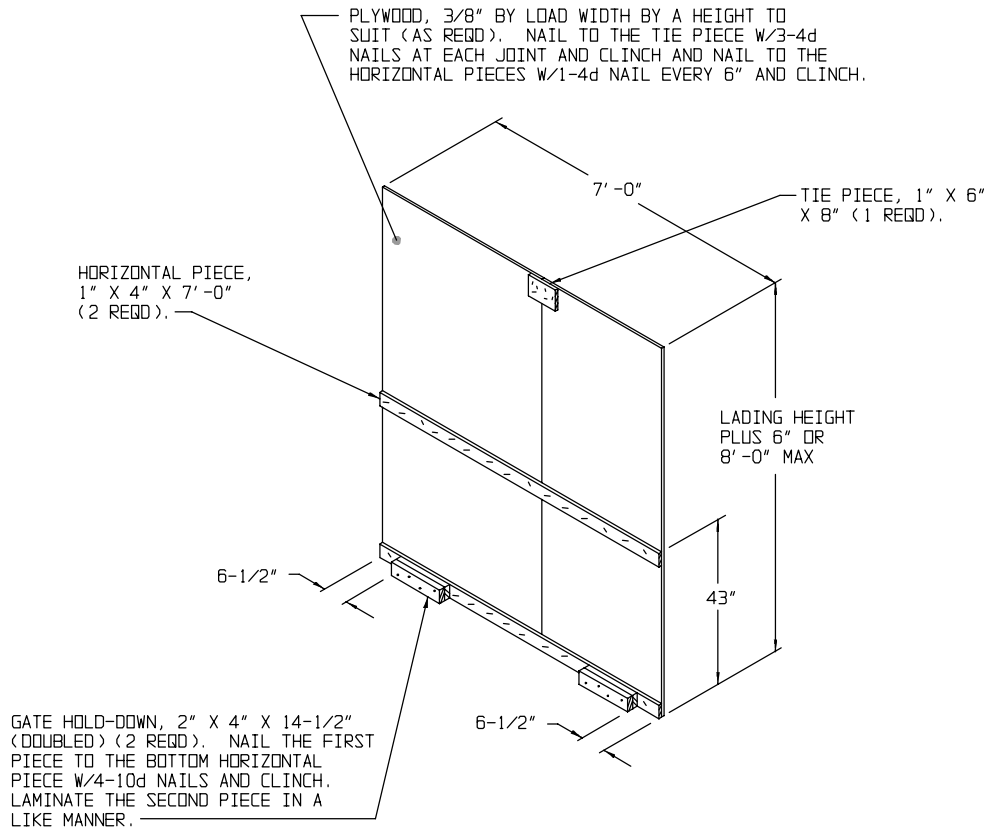


**HEIGHT PLACEMENT OF CRIB-FILL BRACING**

FOR USE IN THE LOAD SHOWN ON PAGE 10.

**NOTE ▲:**

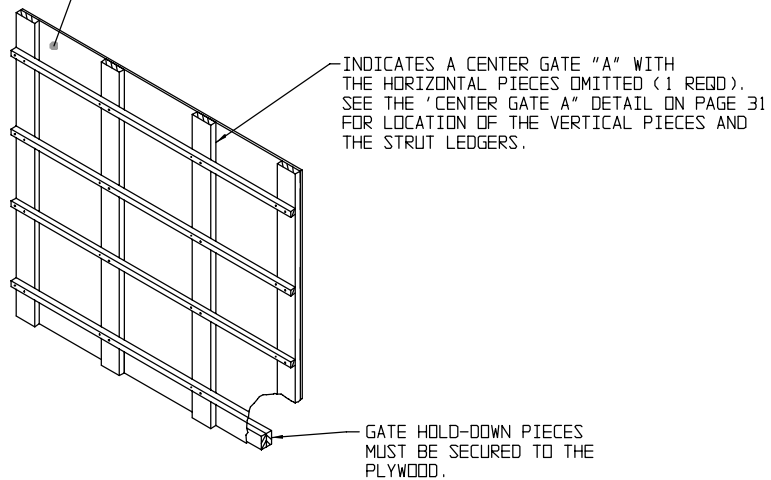
IF A BOX CAR TO BE LOADED HAS BOWED END WALLS WHICH ARE BOWED OUTWARD MORE THAN TWO INCHES (2"), EITHER FROM SIDE TO SIDE OR FROM FLOOR TO ROOF, AN END-OF-END BULKHEAD MUST BE INSTALLED TO PROVIDE A "SQUARED OFF" SURFACE FOR THE LOAD AT THE END OF THE CAR. THE BULKHEAD IS APPLICABLE FOR USE AT THE END OF A LOAD IN A CONVENTIONAL BOX CAR OR IN A CAR EQUIPPED WITH LOAD DIVIDER BULKHEADS, OR AT THE END OF A CAR EQUIPPED WITH MECHANICAL BRACING DEVICES, IF DESIRED, IN LIEU OF USING CROSS MEMBERS. THE "CENTER GATE A", AS DETAILED ON PAGE 31, CAN BE MODIFIED FOR USE AS PART OF THE END-OF-CAR BULKHEAD" BY OMITTING THE STRUT LEDGERS AND GATE HOLD-DOWN PIECES.



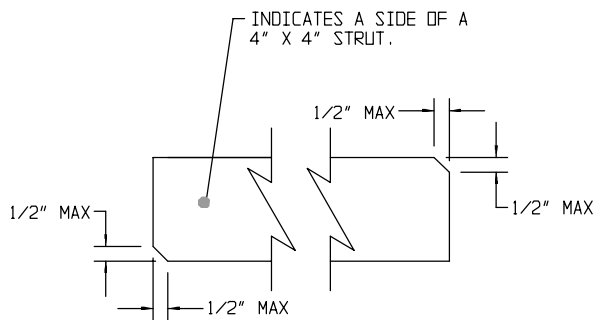
ALTERNATIVE SEPARATOR GATE

THE "ALTERNATIVE SEPARATOR GATE" MAY BE USED IN LIEU OF THE SEPARATOR GATE SHOWN WITHIN A LOAD WHICH IS FABRICATED FROM 1" X 4" AND 1" X 6" MATERIAL. IF THE LOAD IS ONLY 1-HIGH, USE SEPARATOR GATE "C" ON PAGE 33.

PLYWOOD, 1/2" THICK BY THE LOAD WIDTH BY THE LOAD HEIGHT (AS REQD). NAIL TO THE VERTICAL PIECES W/1-6d NAIL EVERY 6".

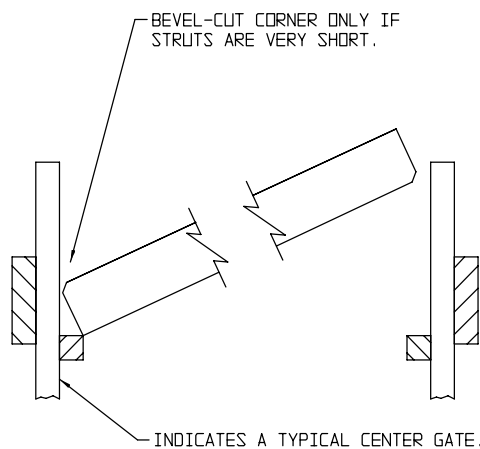


PLYWOOD CENTER GATE ALTERNATIVE



BEVEL-CUT

BEVEL CUTTING THE STRUTS AS SPECIFIED WILL FACILITATE INSTALLING THE STRUTS WITH A "DRIVE FIT". CAUTION: DO NOT BEVEL A CORNER MORE THAN ONE-HALF INCH (1/2").



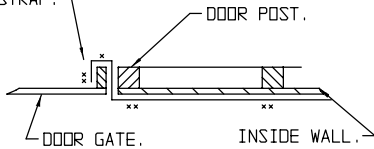
STRUT INSTALLATION

SEE GENERAL NOTE "U" ON PAGE 3 FOR ADDITIONAL STRUT INSTALLATION GUIDANCE.

HORIZONTAL PIECE, 1" X 6" BY DOOR OPENING WIDTH (2 REQD PER LAYER). NAIL TO THE VERTICAL PIECES W/3-6d NAILS AT EACH END. SEE THE "DOORWAY PROTECTION" DETAIL ON PAGE 32 FOR HEIGHT LOCATIONS.

DOORWAY PROTECTION-GATE STRAP, 1-1/4" X .035" X 3'-0" (REF) NAIL-ON TYPE STEEL STRAPPING (4 REQD PER LAYER OF LOAD). NAIL TO GATE AND CAR SIDEWALL AS SHOWN BY THE "VIEW B" SKETCH BELOW. NOTE THAT TYPE 1 STRAPPING MAY BE PUNCHED FOR NAILING IF TYPE 2 STRAPPING IS NOT AVAILABLE.

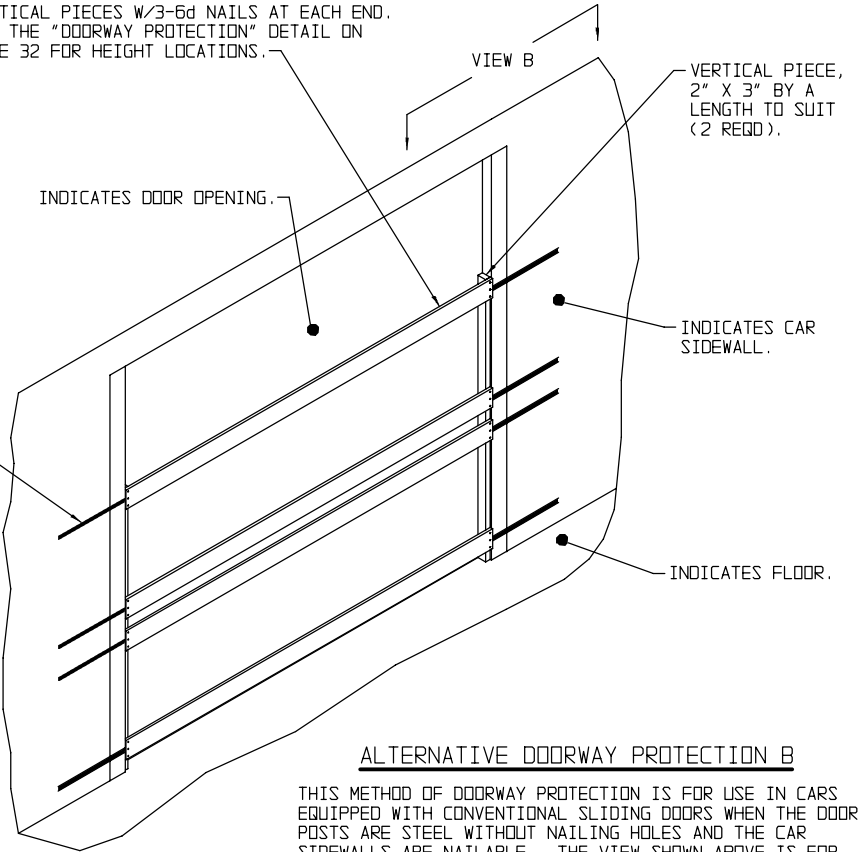
INDICATES LOCATION OF 7 (MIN) 4d NAILS PER STRAP.



VIEW B

THIS VIEW DEPICTS THE LOCATION OF THE NAILS FOR SECURING THE DOORWAY PROTECTION GATE STRAP. NOTE THAT THE STRAPS MUST BE APPLIED TO THE CAR SIDEWALL PRIOR TO POSITIONING THE ADJACENT UNITS.

INDICATES DOOR OPENING.



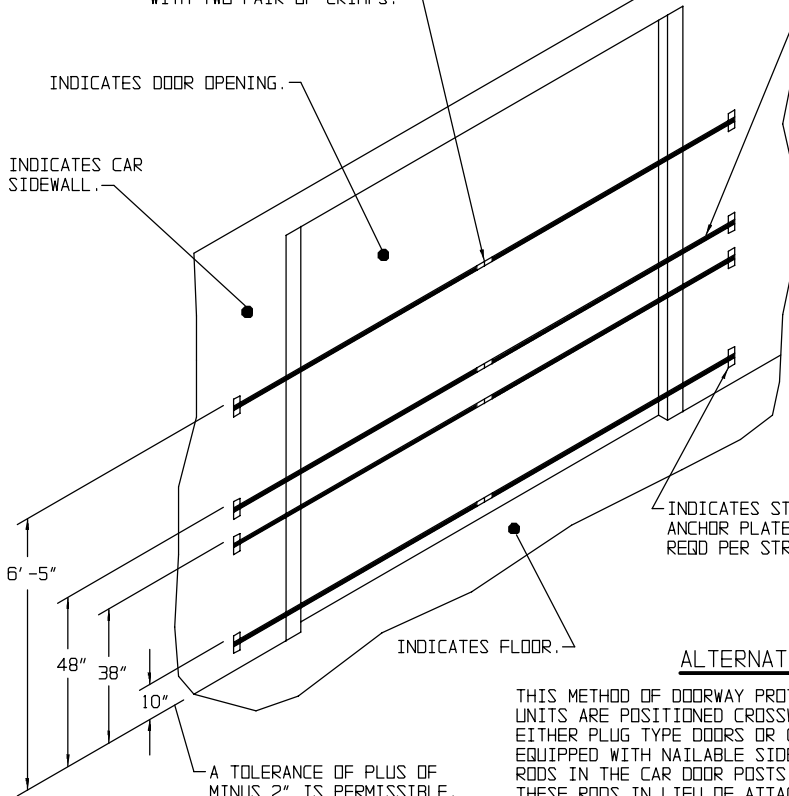
ALTERNATIVE DOORWAY PROTECTION B

THIS METHOD OF DOORWAY PROTECTION IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS WHEN THE DOOR POSTS ARE STEEL WITHOUT NAILING HOLES AND THE CAR SIDEWALLS ARE NAILABLE. THE VIEW SHOWN ABOVE IS FOR A TWO-LAYER LOAD.

SEAL FOR 1-1/4" STRAP (2 REQD PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF CRIMPS.

INDICATES DOOR OPENING.

INDICATES CAR SIDEWALL.

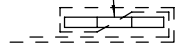
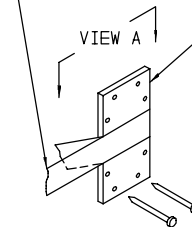


DOORWAY PROTECTION STRAP, 1-1/4" X .035" OR .031" STEEL STRAPPING BY DOOR OPENING WIDTH PLUS 8'-0" IN LENGTH (2 REQD PER LAYER). INSTALL FROM TWO PIECES. THREAD ONE END THRU A STRAP ANCHOR PLATE AS SHOWN BY THE "APPLICATION OF STRAPPING TO STRAP ANCHOR PLATE" DETAILS BELOW. NAIL STRAP ANCHOR PLATE TO CAR SIDEWALL W/4 SIGNODE MICRO-LOCK NAILS.

DOOR SPANNER END OF STRAP.

VIEW A

INDICATES STRAP ANCHOR PLATE.



ISOMETRIC VIEW

VIEW A

APPLICATION OF STRAPPING TO STRAP ANCHOR PLATE

THESE VIEWS DEPICT THE PROPER THREADING OF A DOORWAY PROTECTION STRAP THRU AN ANCHOR PLATE.

ALTERNATIVE DOORWAY PROTECTION C

THIS METHOD OF DOORWAY PROTECTION IS ONLY FOR USE WITH LOADS IN WHICH THE PALLET UNITS ARE POSITIONED CROSSWISE. THE METHOD MAY BE USED IN CARS EQUIPPED WITH EITHER PLUG TYPE DOORS OR CONVENTIONAL SLIDING DOORS, BUT ONLY IF THE CAR IS EQUIPPED WITH NAILABLE SIDEWALLS. IF THE CAR IS EQUIPPED WITH SPECIAL ANCHOR RODS IN THE CAR DOOR POSTS, THE DOORWAY PROTECTION STRAPS MAY BE SECURED TO THESE RODS IN LIEU OF ATTACHING TO THE CAR SIDEWALL WITH STRAP ANCHOR PLATES.

DOORWAY PROTECTION

DOOR SPANNER, 2" X 6" BY DOOR OPENING WIDTH PLUS 24" (1 REQD). POSITION ABOVE THE LOAD AND NAIL THRU A FILLER BLOCK INTO A VERTICAL PIECE W/3-12d NAILS AT EACH JOINT. NAIL TO THE CAR SIDEWALL W/2-12d NAILS AT EACH END (OPTIONAL).

DOOR OPENING WIDTH

FILLER BLOCK, 1" X 4" X 9" (2 REQD). NAIL TO A VERTICAL PIECE W/4-6d NAILS.

12"

VERTICAL PIECE, 2" X 3" BY A LENGTH TO SUIT (2 REQD).

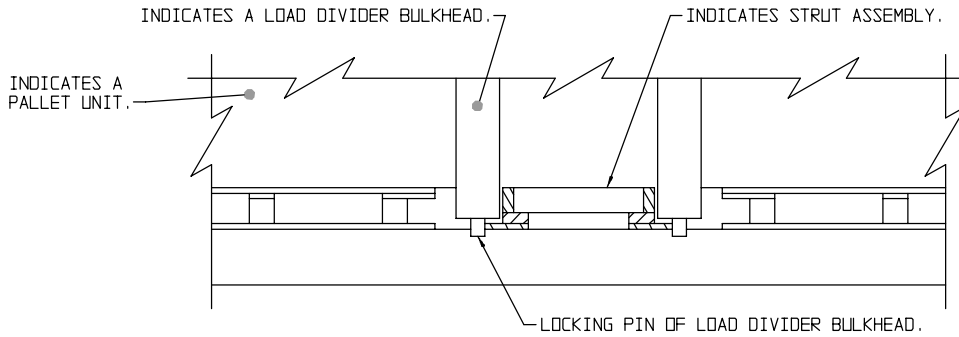
HORIZONTAL PIECE, 1" X 6" BY DOOR OPENING WIDTH (2 REQD PER LAYER). LOCATE AT HEIGHTS AS SPECIFIED BY THE "DOORWAY PROTECTION" DETAIL ON PAGES 32. NAIL TO THE VERTICAL PIECES W/3-6d NAILS AT EACH END.

SPREADER PIECE, 2" X 3" MATERIAL CUT SLIGHTLY LONGER THAN MEASURED DISTANCE (2 REQD). DRIVE INTO POSITION TO PROVIDE FOR A WEDGE FIT. TOENAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH END.

ALTERNATIVE DOORWAY PROTECTION C

THIS METHOD OF DOORWAY PROTECTION IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS, WHEN THE DOOR POSTS ARE NOT NAILABLE. IF THE CAR HAS NAILABLE SIDEWALLS, NAIL-ON TYPE STRAPPING MAY BE USED TO SECURE THE GATE IN LIEU OF USING THE SPREADER PIECES. SEE THE "ALTERNATIVE DOORWAY PROTECTION B" DETAIL ON PAGE 39 FOR GUIDANCE.



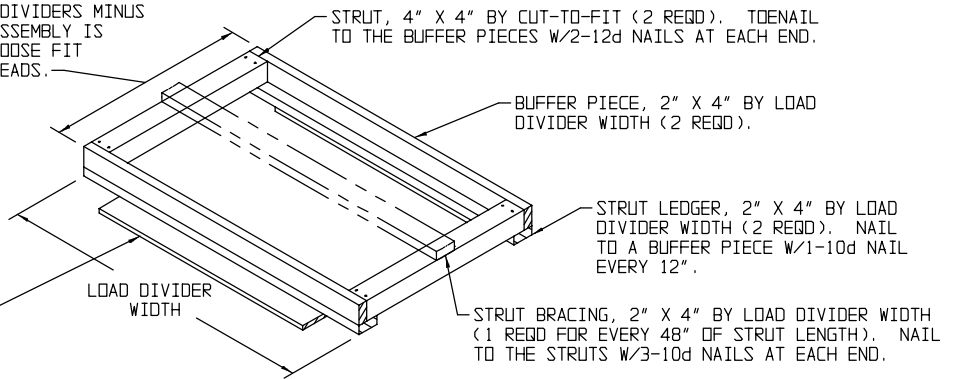


**INSTALLATION OF STRUT ASSEMBLY**

THIS SIDE ELEVATION VIEW SHOWS THE STRUT ASSEMBLY INSTALLED BETWEEN THE LOAD DIVIDER BULKHEADS. NOTE THE 1/2" TO 3/4" (TOTAL) SPACE INTENTIONALLY PROVIDED BETWEEN THE ASSEMBLY AND THE BULKHEADS.

FABRICATE TO FIT BETWEEN LOAD DIVIDERS MINUS 1/2" TO 3/4". CAUTION: THE ASSEMBLY IS INTENTIONALLY DESIGNED FOR A LOOSE FIT BETWEEN THE LOAD DIVIDER BULKHEADS.

HOLD DOWN, 1" X 8" BY CUT-TO-FIT BETWEEN LOCKING PINS AT EACH SIDE OF THE LOAD DIVIDER (2 REQD). NAIL TO THE STRUT LEDGER W/1-6d NAIL EVERY 12".

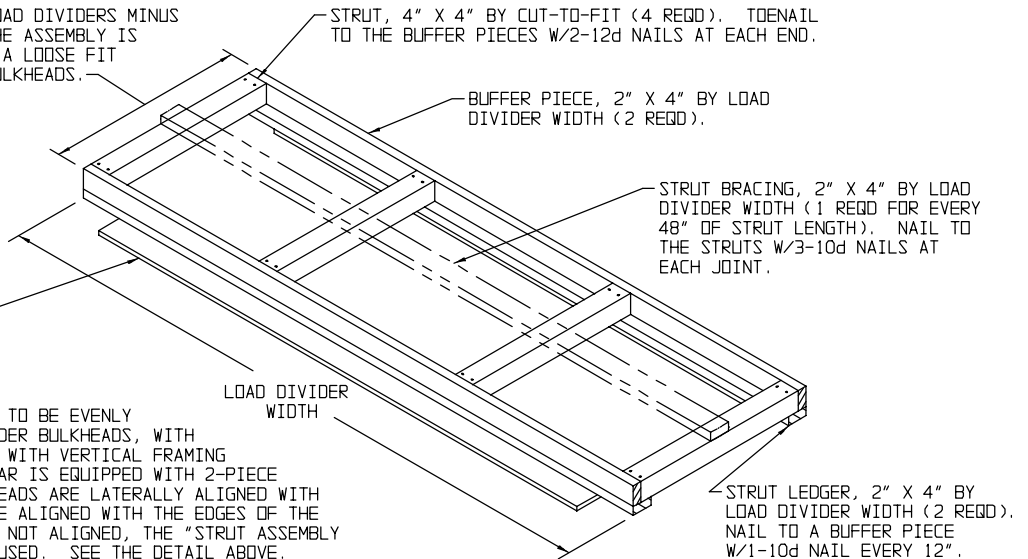


**STRUT ASSEMBLY FOR 2-PIECE BULKHEADS**

A STRUT ASSEMBLY IS REQUIRED WHEN THE LOAD BEHIND EITHER LOAD DIVIDER BULKHEAD EXCEEDS 50,000 POUNDS OF HAZARD CLASS AND DIVISION 1.1, 1.2, OR 1.3 EXPLOSIVES. A STRUT ASSEMBLY IS NOT REQUIRED FOR LOADS OF HAZARD CLASS AND DIVISION 1.4 EXPLOSIVES, REGARDLESS OF THE WEIGHT OF THE LOAD. NOTE: TWO ASSEMBLIES AS SHOWN ARE REQUIRED FOR A 2-PIECE BULKHEAD IF NOT LATERALLY ALIGNED. SEE "NOTE ▲" BELOW.

FABRICATE TO FIT BETWEEN LOAD DIVIDERS MINUS 1/2" TO 3/4". CAUTION: THE ASSEMBLY IS INTENTIONALLY DESIGNED FOR A LOOSE FIT BETWEEN THE LOAD DIVIDER BULKHEADS.

HOLD DOWN, 1" X 8" BY CUT-TO-FIT BETWEEN LOCKING PINS AT EACH SIDE OF THE LOAD DIVIDER (2 REQD). NAIL TO THE STRUT LEDGER W/1-6d NAIL EVERY 12".

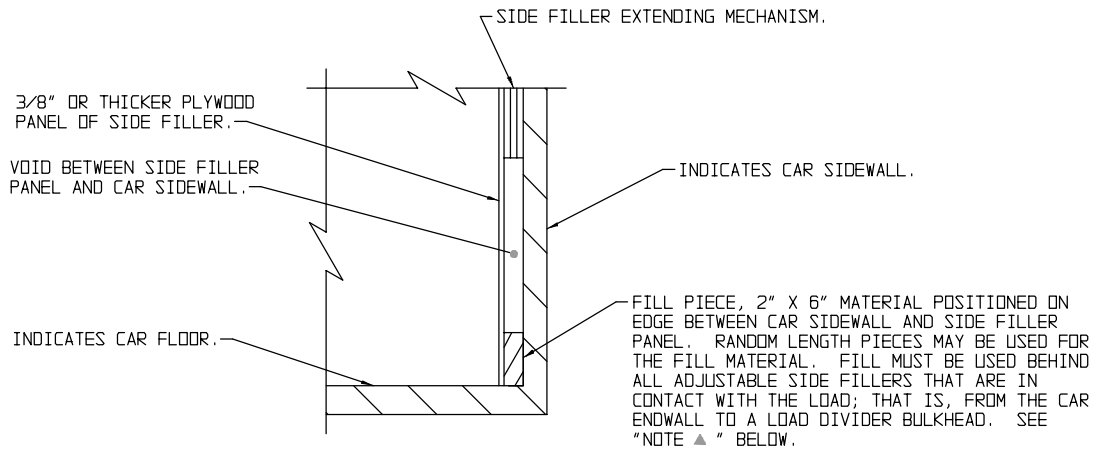


**NOTE ▲:**

THE TWO INTERMEDIATE STRUTS ARE TO BE EVENLY SPACED ON THE WIDTH OF THE DIVIDER BULKHEADS, WITH ADJUSTMENTS MADE SO AS TO ALIGN WITH VERTICAL FRAMING WITHIN THE BULKHEADS. IF THE CAR IS EQUIPPED WITH 2-PIECE DIVIDER BULKHEADS AND THE BULKHEADS ARE LATERALLY ALIGNED WITH EACH OTHER, THE STRUTS SHOULD BE ALIGNED WITH THE EDGES OF THE BULKHEADS; IF THE BULKHEADS ARE NOT ALIGNED, THE "STRUT ASSEMBLY FOR 2-PIECE BULKHEADS" MUST BE USED. SEE THE DETAIL ABOVE.

**STRUT ASSEMBLY FOR 1-PIECE BULKHEADS**

A STRUT ASSEMBLY IS REQUIRED WHEN THE LOAD BEHIND EITHER LOAD DIVIDER BULKHEAD EXCEEDS 50,000 POUNDS OF HAZARD CLASS AND DIVISION 1.1, 1.2, OR 1.3 EXPLOSIVES. A STRUT ASSEMBLY IS NOT REQUIRED FOR LOADS OF HAZARD CLASS AND DIVISION 1.4 EXPLOSIVES, REGARDLESS OF THE WEIGHT OF THE LOAD.

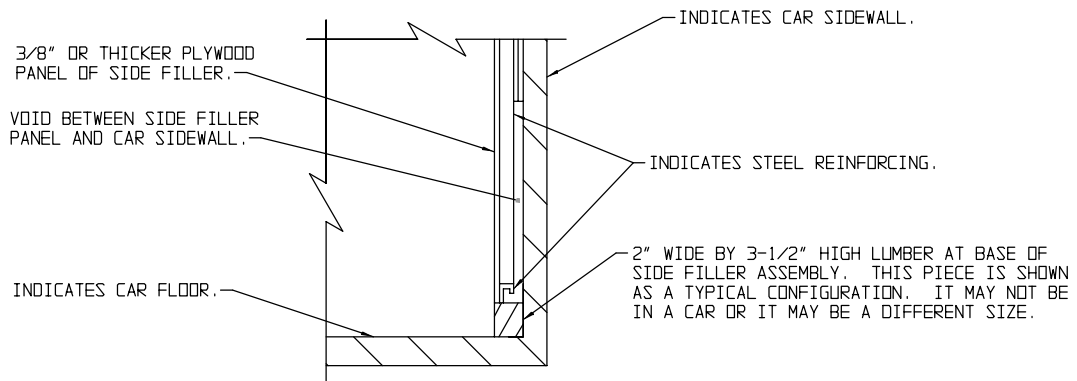


TYPICAL TYPE A

THIS VIEW SHOWS THE INSTALLATION OF A "FILL PIECE" IN A CAR EQUIPPED WITH A STANDARD ADJUSTABLE SIDE FILLER.

NOTE ▲:

NAILING OF "FILL PIECES" IS NOT REQUIRED EXCEPT THAT EACH "FILL PIECE" LOCATED NEAREST THE DOOR OPENINGS OF THE CAR WILL BE SECURED AGAINST LONGITUDINAL MOVEMENT W/1-6d NAIL DRIVEN THROUGH THE SIDE FILLER PANEL AND INTO THE "FILL PIECE".



TYPICAL TYPE B

THIS VIEW SHOWS A TYPICAL SECTION OF A CAR EQUIPPED WITH HEAVY DUTY, STEEL REINFORCED, ADJUSTABLE SIDE FILLERS. A "FILL PIECE", AS SHOWN IN THE "TYPICAL TYPE A" DETAIL ABOVE, IS NOT REQUIRED IN CARS SO EQUIPPED.