APPROVED BY
BUREAU OF EXPLOSIVES
M. R. Miller
SUPERVISOR, MILITARY & INTERMODAL SERVICES
DATE 12/7/81

LOADING AND BRACING (CL & LCL) IN BOX CARS⌖ OF 155MM COPPERHEAD SEPARATE LOADING PROJECTILES, PACKED ONE PER METAL SHIPPING AND STORAGE CONTAINER, UNITIZED 6 CONTAINERS PER SPECIAL 4-WAY ENTRY PALLET

INDEX

⌖ 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.

DO NOT SCALE

REVISIONS			

DRAFTSMAN [illegible] PROJ ENG WRF
CHECKER JHM LOG ENGRG OFFICE [illegible]

APPROVED, U. S. ARMY ARMAMENT MATERIEL READINESS COMMAND
John P Rainford

APPROVED BY ORDER OF COMMANDING GENERAL, U. S. ARMY MATERIEL DEVELOPMENT AND READINESS COMMAND (DARCOM)
John L. Byrd Jr.
U.S. ARMY DEFENSE AMMUNITION CENTER AND SCHOOL

U. S. ARMY DARCOM DRAWING
JANUARY 1982

CLASS	DIVISION	DRAWING	FILE
19	48	4157	5PE 1003

PROJECT CA 178-80

GENERAL NOTES

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 WITHIN THIS DRAWING ARE APPLICABLE TO COPPERHEAD SEPARATE LOADING PROJECTILES, PACKED ONE PER METAL SHIPPING AND STORAGE CONTAINER, UNITIZED SIX CONTAINERS PER SPECIAL 4-WAY ENTRY PALLET. SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN MEANS THE PALLET UNIT OF CONTAINERS WITH AMMUNITION ITEMS.

C. FOR DETAILS OF THE PALLET UNIT, SEE PAGE 3 OF THIS DRAWING AND US ARMY DARCOM DRAWING 19-48-4159-20PM1003.

DIMENSIONS-----33" LONG X 61" WIDE X 27-1/2" HIGH
GROSS WEIGHT--1,358 POUNDS (APPROX).

D. THE OUTLOADING PROCEDURES SPECIFIED HEREIN ARE BASED ON CONVENTIONAL BOX CARS, OR BOX CARS EQUIPPED WITH MECHANICAL BRACING DEVICES HAVING ADJUSTABLE AND/OR FIXED WALL MEMBERS. PROCEDURES ARE ALSO INCLUDED FOR SHIPMENTS IN CUSHIONED BOX CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS. THE LOAD VIEWS DEPICT BOX CARS HAVING VARIOUS WIDTH THROUGH DOOR OPENINGS WITH DOORS OF THE CONVENTIONAL SLIDING TYPE. HOWEVER, THE DEPICTED PROCEDURES ARE ALSO APPLICABLE TO CARS WHICH ARE EQUIPPED WITH STAGGERED DOORS AND/OR PLUG TYPE DOORS. SEE GENERAL NOTES "E", "F", AND "G" BELOW FOR ADDITIONAL REQUIREMENTS APPLICABLE TO THE SPECIFIC TYPE OF CAR TO BE LOADED.

E. THE LOADS AS SHOWN ON PAGES 4 THROUGH 15 ARE FOR CONVENTIONAL TYPE BOX CARS HAVING NAILABLE FLOORS. ALL-METAL CARS WITH NAILABLE FLOORS CAN BE USED, EXCEPT FOR SHIPMENT OF A PARTIAL LAYER REQUIRING THE USE OF A K-BRACE AS TYPICALLY SHOWN IN THE LOAD VIEW ON PAGE 6. THE TYPICAL PROCEDURES DEPICTED ON PAGE 10 CAN BE USED EFFECTIVELY TO SHIP A REDUCED QUANTITY OF PALLET UNITS IN AN ALL-METAL BOX CAR.

F. THE LOADS AS SHOWN ON PAGES 26 THROUGH 29 ARE FOR BOX CARS EQUIPPED WITH MECHANICAL BRACING DEVICES, AND MAY BE ADAPTED AS REQUIRED TO FACILITATE THE USE OF BOX CARS EQUIPPED WITH VARIOUS TYPE 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 HEREIN. CAUTION: BOX CARS EQUIPPED WITH MEMBERS WHICH DO NOT MEET THE LOCATION REQUIREMENTS MUST NOT BE USED.

1. A CROSS MEMBER, WHEN USED AS SPECIFIED BY ANY ONE OF THE DEPICTED OUTLOADING METHODS, WILL NOT BE RELIED UPON TO RETAIN MORE THAN 4,000 POUNDS OF LADING ON EITHER SIDE OF THE MEMBER. 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 PERMITS. 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).

2. 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.

3. IF A CAR HAS A "BOWED END", RATHER THAN SQUARING OFF THE END BY INSTALLING DUNNAGE, ADDITIONAL CROSS MEMBERS CAN BE INSTALLED NEAR THE END OF THE CAR TO PROVIDE A "SQUARED" END. THESE CROSS MEMBERS MUST BE INSTALLED IN THE SAME QUANTITY AND AT THE SAME HEIGHTS AS THE CROSS MEMBERS USED THROUGHOUT THE LOAD AS LOAD BLOCKING MEMBERS.

(CONTINUED AT RIGHT)

MATERIAL SPECIFICATIONS

LUMBER ---------- : TM 743-200-1 (DUNNAGE LUMBER) AND FED SPEC MM-L-751.

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

STRAPPING, STEEL ---------- : FED SPEC QQ-S-781; CLASS I, TYPE I OR IV, HEAVY DUTY, FINISH A, B (GRADE 2), OR C.

SEAL, STRAP ---------- : FED SPEC QQ-S-781 TYPE D, STYLE I, II, OR IV, CLASS H, FINISH A, B (GRADE 2), OR C.

STAPLE, STRAP ---------- : FED SPEC FF-N-105; TYPE III, STYLE 3, 1-17/32" WIDE BY 3/4" LEG LENGTH, OR EQUIVALENT.

PLYWOOD ---------- : FED SPEC NN-P-530; GROUP B, PS-1 (CONSTRUCTION AND INDUSTRIAL GRADE), INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR AN EXTERIOR GRADE MAY BE SUBSTITUTED.

WIRE ---------- : FED SPEC QQ-W-461.

(GENERAL NOTES CONTINUED)

G. THE LOADS AS SHOWN ON PAGE 30 THROUGH 32 ARE FOR CUSHIONED BOX CARS WHICH ARE EQUIPPED WITH LOAD DIVIDER BULKHEADS AND WITH OR WITHOUT ADJUSTABLE SIDE FILLERS. CAUTION: 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. ALSO, ONLY CUSHIONED CARS THAT HAVE SLIDING CENTER SILL TYPE CUSHIONING DEVICES OR END-OF-CAR TYPE DEVICES WHICH HAVE AT LEAST 15" OF TRAVEL ARE ACCEPTABLE.

1. BOX CARS 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 32 FOR GUIDANCE. IF THE BACKS OF THE SIDE FILLER PANELS ARE REINFORCED WITH VERTICAL AND HORIZONTAL STEEL MEMBERS AS SHOWN IN THE "TYPICAL TYPE B" VIEW ON PAGE 32, THE "FILL PIECE" MATERIAL IS NOT REQUIRED. NOTE: DUNNAGE MATERIALS MUST NOT BE NAILED TO THE SIDE FILLERS.

2. 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.

3. CAUTION: THE WEIGHT OF THE LOAD TO BE RETAINED BY ONE LOAD DIVIDER BULKHEAD MUST NOT EXCEED ONE-HALF OF THE LOAD LIMIT WHICH IS STENCILED ON THE SIDE OF THE CAR.

H. NOTICE: A SHIPMENT WILL BE POSITIONED IN THE CAR IN COMPLIANCE WITH THE WEIGHT DISTRIBUTION REQUIREMENTS OF THE AAR. THE TOTAL WEIGHT OF A LOAD IN A CAR MUST NOT EXCEED THE LOAD LIMIT WHICH IS STENCILED ON THE SIDE OF THE CAR. ALSO, THE LOAD WEIGHT ON THE TRUCK UNDER ONE END OF THE CAR MUST NOT EXCEED ONE-HALF OF THE LOAD LIMIT.

J. THE NUMBER OF LADING UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE BOX CAR 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 DESIGNATED ITEMS.

K. THE OUTLOADING PROCEDURES SPECIFIED HEREIN CAN ALSO BE UTILIZED FOR THE SHIPMENT OF THE DEPICTED CONTAINERS WHEN THEY ARE EMPTY OR LOADED WITH AN ITEM WHICH IS IDENTIFIED DIFFERENTLY BY NOMENCLATURE THAN THE ITEM DESIGNATED WITHIN THE DRAWING TITLE.

L. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN A CAR WHICH IS PARTIALLY LOADED WITH THE DESIGNATED ITEM, PROVIDING THE 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.

M. DOORWAY PROTECTION REQUIREMENTS WITHIN THE "DOORWAY AREA" OF A CAR ARE INCLUDED IN THE PROCEDURES AND ARE APPLICABLE TO CARS HAVING EITHER CONVENTIONAL SLIDING AND/OR PLUG TYPE DOORS. THE "DOORWAY AREA" WITHIN A CAR IS DEFINED AS THE CARGO SPACE THAT IS ADJACENT TO A CONVENTIONAL TYPE AND/OR PLUG TYPE DOOR. THE LENGTH OF A "DOORWAY AREA" CAN BE AS MUCH AS 24 FEET IN SOME CARS THAT ARE EQUIPPED WITH STAGGERED DOORS. CAUTION: DUNNAGE MATERIAL MUST NOT BE NAILED TO ANY PLUG DOOR, WHETHER AUXILIARY OR MAIN, EXCEPT TO A NAILING STRIP FOR SECURING SUCH ITEMS AS THE DOORWAY SPANNER PIECE OF A K-BRACE ASSEMBLY, IF A DOOR IS SO EQUIPPED. 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 THROUGH THE HOLES IN THE DOOR LATCH ASSEMBLY ONE OR MORE TIMES, AND THE WIRE ENDS WILL BE TWISTED TOGETHER.

N. IF THE CAR BEING USED FOR A SHIPMENT IS EQUIPPED WITH A NAILABLE METAL FLOOR AND THE NAIL SIZE FOR FLOOR NAILING IS MARKED ON THE SIDE WALL OF THE CAR, THAT GUIDANCE SHOULD BE APPLIED FOR THE NAILING OF THE APPLICABLE DUNNAGE PIECES. IF THE NAIL SIZE IS NOT SPECIFIED IN THE CAR, 30d NAILS SHOULD BE USED IN LIEU OF THOSE SPECIFIED IN THE KEY NUMBERS OR NAILING SPECIFICATIONS.

O. 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. IF THOSE MEMBERS SPECIFICALLY IDENTIFIED AS "STRUTS" WITHIN THE KEY NUMBERS OF A DEPICTED LOAD ARE SPECIFIED TO BE 4" X 4" MATERIAL, IT IS PERMISSIBLE TO USE TWO LAMINATED PIECES OF 2" X 6" MATERIAL IN LIEU OF EACH 4" X 4" STRUT. DOUBLED 2" X 6" STRUTS WILL BE LAMINATED W/1-10d NAIL EVERY 6".

(CONTINUED ON PAGE 3)

(GENERAL NOTES CONTINUED FROM PAGE 2)

P. 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.

Q. WHEN ANY STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, A MINIMUM OF TWO (2) SEALS, BUTTED TOGETHER, WITH TWO (2) PAIR OF CRIMPS PER SEAL WILL BE USED TO SEAL THE JOINT. CAUTION: EXERCISE CARE DURING TENSIONING TO PREVENT DAMAGE TO THE LADING ITEMS.

R. 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 VIEWS FOR CLARITY PURPOSES.

S. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.

T. LOAD-BLOCKING STRUTS WHICH ARE 48" OR LONGER MUST BE STIFFENED BY THE APPLICATION OF HORIZONTAL AND VERTICAL STRUT BRACING. THESE PIECES ARE 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, BUT IN THE EVENT IT IS NECESSARY TO USE STRUTS WHICH ARE 8'-0" OR MORE IN LENGTH, IT WILL BE NECESSSARY 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.

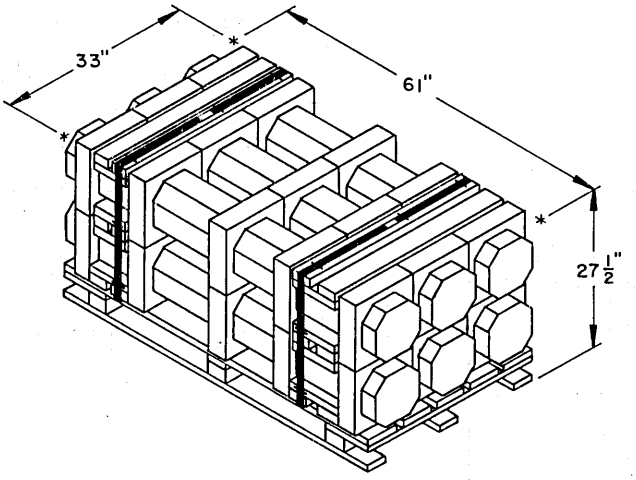
U. THE USE OF AN OFFSET LOADING PATTERN WILL FACILITATE LOADING AND UNLOADING OPERATIONS IN THE DOORWAY AREA OF THE CAR. WHEN POSSIBLE TO DO SO, A FULL LOAD SHOULD BE BUILT USING AN OFFSET LOADING PATTERN. FOR INSTANCE, A LOAD CONSISTING OF AN EVEN NUMBER OF LOAD UNITS AND HAVING TWO MORE LOAD UNITS 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 OR THREE MORE LOAD UNITS IN ONE END THAN IN THE OTHER IS CONSIDERED TO BE AN OFFSET LOAD.

V. TO ACHIEVE A TIGHTLY BLOCKED LOAD, A STRUT WILL BE CUT SLIGHTLY LONGER THAN THE MEASURED DISTANCE BETWEEN THE STRUT BEARING AREAS ON THE TWO CENTER GATES. ONE END OF THE STRUT WILL BE POSITIONED AT ITS BEARING AREA JUST ABOVE THE STRUT LEDGER ON ONE GATE, THEN THE OTHER END, WHICH CAN BE BEVELED ON THE LOWER CORNER IF DESIRED, WILL 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 22 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.

(CONTINUED AT RIGHT)

(GENERAL NOTES CONTINUED)

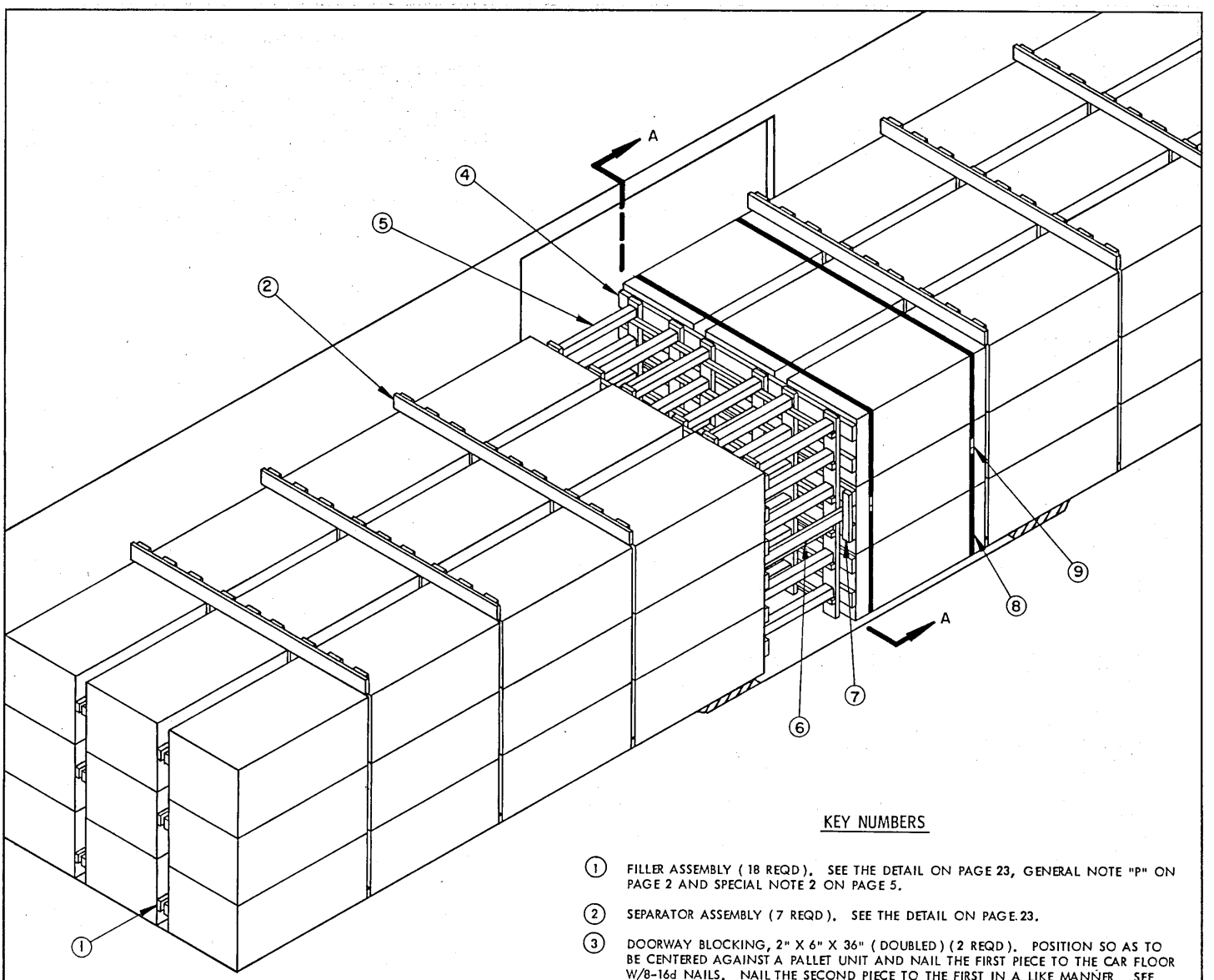
W. THE SELECTION OF RAIL CARS FOR THE TRANSPORT OF THE DESIGNATED ITEMS IS THE RESPONSIBILITY OF THE ORIGINATING CARRIER AND THE SHIPPER, ONLY CARS WHICH HAVE "SOUND" FLOORS AND ARE IN OTHERWISE PROPER CONDITION, IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE REGULATORY DOCUMENT, WILL BE SELECTED. WHEN SELECTING RAIL CARS, EVERY EFFORT SHOULD BE MADE TO OBTAIN BOX CARS THAT DO NOT HAVE BOWED END WALLS. CARS WITH BOWED ENDS CAN BE USED, HOWEVER, IF AN END WALL IS BOWED OUTWARD MORE THAN TWO INCHES (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 25 FOR GUIDANCE.



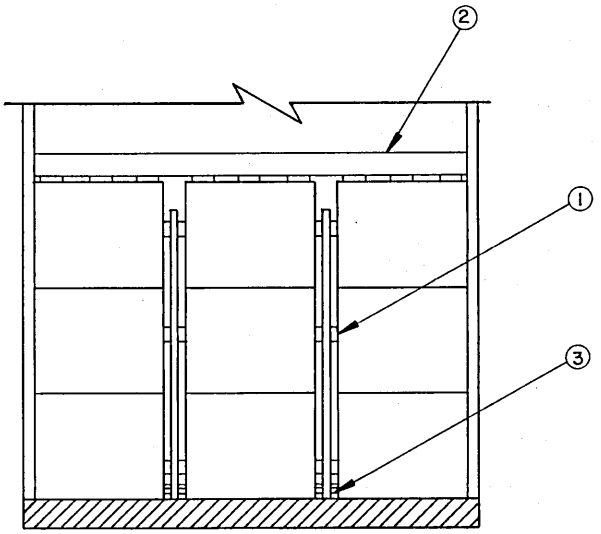
COPPERHEAD PALLET UNIT

GROSS WEIGHT----------1,358 LBS (APPROX)
CUBE----------32.0 CU FT (APPROX)

PALLET UNIT DETAILS



ISOMETRIC VIEW



SECTION A-A

KEY NUMBERS

(1) FILLER ASSEMBLY (18 REQD). SEE THE DETAIL ON PAGE 23, GENERAL NOTE "P" ON PAGE 2 AND SPECIAL NOTE 2 ON PAGE 5.

(2) SEPARATOR ASSEMBLY (7 REQD). SEE THE DETAIL ON PAGE 23.

(3) DOORWAY BLOCKING, 2" X 6" X 36" (DOUBLED) (2 REQD). POSITION SO AS TO BE CENTERED AGAINST A PALLET UNIT AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/8-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "N" ON PAGE 2.

(4) CENTER GATE (2 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 22.

(5) STRUT, 4" X 4" BY CUT-TO-FIT (36 REQD). TOENAIL TO PIECES MARKED (4) W/2-12d NAILS AT EACH END. SEE GENERAL NOTE "O" ON PAGE 2.

(6) GATE HOLD-DOWN, 2" X 4" BY CENTER DISTANCE PLUS 18" (2 REQD). POSITION TO EXTEND UNDER PALLET UNITS AND NAIL PIECES MARKED (4) W/2-10d NAILS AT EACH JOINT.

(7) GATE HOLD-DOWN RETAINER PIECE, 2" X 4" X 17" (4 REQD). POSITION AGAINST PIECE MARKED (6) AND NAIL TO THE HORIZONTAL PIECES OF A CENTER GATE W/3-10d NAILS AT EACH END.

(8) DOORWAY PROTECTION STRAP, 1-1/4" X .035" OR .031" X 34'-0" LONG STEEL STRAPPING (2 REQD). INSTALL TO ENCIRCLE THE LOAD UNITS WHICH EXTEND INTO THE DOORWAY AREA. SEE SPECIAL NOTE 3 ON PAGE 5.

(9) SEAL FOR 1-1/4" STRAPPING (4 REQD, 2 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "Q" ON PAGE 3.

81-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL BOX CAR

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.

2. A WIDER OR NARROWER CAR CAN BE USED FOR SHIPPING THE DEPICTED LOAD BY ADJUSTING THE THICKNESS AND NUMBER OF HORIZONTAL PIECES ON THE FILLER ASSEMBLIES, PIECES MARKED ①.

3. DOORWAY PROTECTION IS REQUIRED FOR ALL LOAD UNITS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY BY ONE-HALF OR MORE OF THE UNIT WIDTH. FOR ALTERNATIVE DOORWAY PROTECTION, SEE PAGE 24.

4. FOR SHIPMENT OF A LOAD WHICH CONTAINS LESS PALLETIZED UNITS THAN SHOWN, SEE THE METHODS SHOWN ON PAGES 6 THROUGH 17.

5. IF THE CAR BEING LOADED IS EQUIPPED WITH LOAD DIVIDER BULKHEADS, SEE THE PROCEDURES ON PAGES 30 AND 31.

6. IF THE CAR BEING LOADED HAS BOWED END WALLS WHICH ARE BOWED OUTWARD 2" OR MORE 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. SEE THE DETAIL ON PAGE 25 AND GENERAL NOTE "W" ON PAGE 3.

7. IF PALLETIZED UNITS WHICH DO NOT CONTAIN A FULL QUANTITY OF COPPERHEAD CONTAINERS ARE TO BE TRANSPORTED, SEE PAGES 19, 20, AND 21.

8. FOR SHIPMENT OF ONE OR MORE LEFTOVER COPPERHEAD CONTAINERS, SEE THE PROCEDURES ON PAGE 18.

9. THE DELINEATED BLOCKING AND BRACING PROCEDURES FOR A 50'-6" LONG CONVENTIONAL TYPE BOX CAR ARE ALSO APPLICABLE FOR A 40'-6" LONG CONVENTIONAL TYPE BOX CAR. THE QUANTITY OF PALLET UNITS, HOWEVER, MUST BE REDUCED FROM 81 TO 63.

10. THE LOAD AS SHOWN CAN ALSO BE INCREASED BY ONE COMPLETE LAYER OF PALLET UNITS WHEN A HIGH-CAPACITY BOX CAR IS BEING UTILIZED FOR SHIPMENT RATHER THAN THE CONVENTIONAL TYPE BOX CAR DEPICTED. NOTE: SINCE ALL DUNNAGE ASSEMBLIES SHOWN ARE FOR A THREE-LAYER LOAD, ALL ASSEMBLIES MUST BE APPROPRIATELY MODIFIED WHEN USED WITH A FOUR-LAYER LOAD.

BILL OF MATERIAL

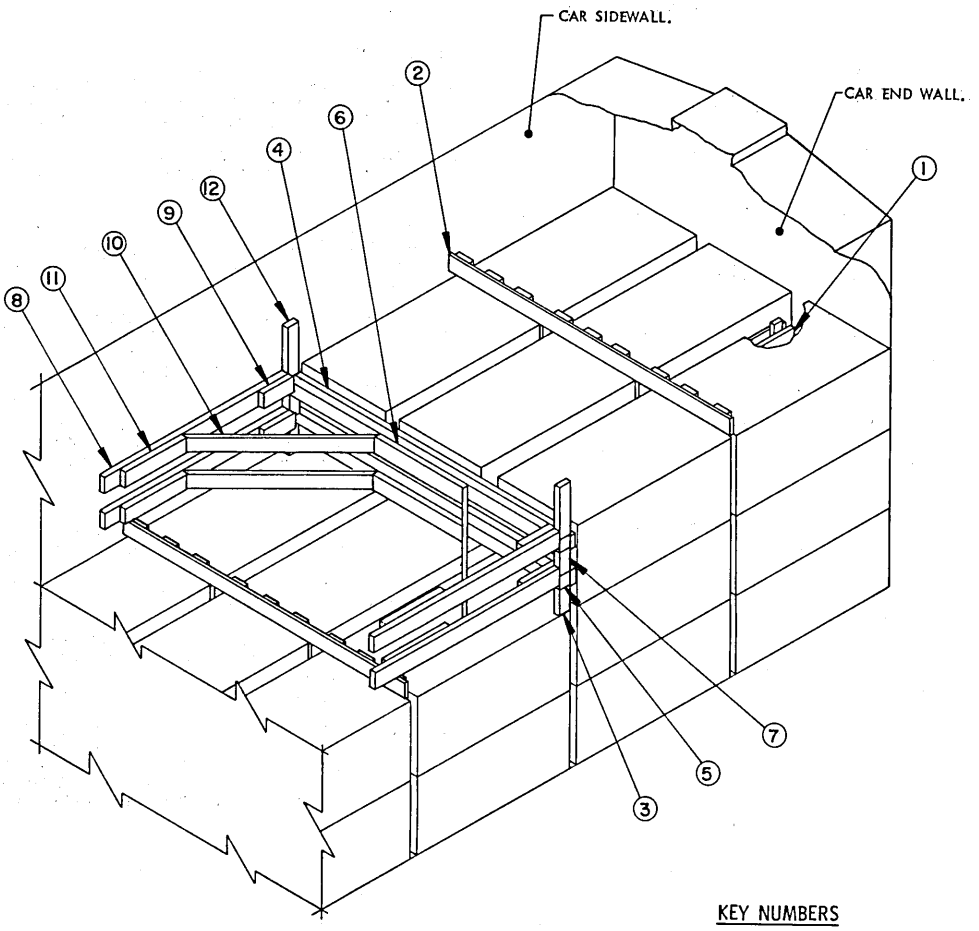
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	536	268
2" X 2"	98	33
2" X 4"	783	522
2" X 6"	203	203
4" X 4"	138	183
NAILS	**NO. REQD**	**POUNDS**
6d (2")	252	1-1/2
10d (3")	632	9-3/4
12d (3-1/4")	144	2-1/2
16d (3-1/2")	32	3/4

PLYWOOD, 1/2"----------22 SQ FT REQD ---------- 31 LBS
STEEL STRAPPING, 1-1/4" ----------68' REQD---------- 10 LBS
SEAL FOR 1-1/4" STRAPPING ---------- 4 REQD ----------NIL

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	81	109,998 LBS
DUNNAGE		2,474 LBS
TOTAL WEIGHT		112,472 LBS

81-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL BOX CAR



ISOMETRIC VIEW

KEY NUMBERS

(1) FILLER ASSEMBLY (AS REQD). SEE THE DETAIL ON PAGE 23, AND GENERAL NOTE "P" ON PAGE 2.

(2) SEPARATOR ASSEMBLY (AS REQD). SEE THE DETAIL ON PAGE 23.

(3) SUPPORT CLEAT, 2" X 4" X 8" (2 REQD). NAIL TO THE CAR SIDEWALL W/2-12d NAILS. SEE SPECIAL NOTE 3 ON PAGE 7.

(4) LOAD BEARING PIECE, 2" X 6" BY INSIDE CAR WIDTH IN LENGTH (CUT-TO-FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED (5), W/1-12d NAIL EVERY 6".

(5) CROSS CAR BRACE, 4" X 4" BY INSIDE CAR WIDTH IN LENGTH (CUT-TO-FIT) (2 REQD).

(6) CENTER CLEAT, 2" X 4" X 36" (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED (5), W/7-16d NAILS. SEE SPECIAL NOTE 4 ON PAGE 7.

(7) SPACER CLEAT, 2" X 4" X 11" (2 REQD). NAIL TO THE CAR SIDEWALL W/4-12d NAILS.

(8) HORIZONTAL WALL CLEAT, 2" X 6" X 72" (4 REQD). NAIL TO THE CAR SIDEWALL W/16-12d NAILS.

(9) POCKET CLEAT, 2" X 6" X 12" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED (8), W/4-16d NAILS.

(10) DIAGONAL BRACE, 2" X 4" X 50-1/4" (4 REQD). SEE THE "DIAGONAL BRACE A" DETAIL ON PAGE 7 FOR BEVEL CUTS REQUIRED. TOENAIL TO THE CROSS CAR BRACE, PIECE MARKED (5), AND TO THE HORIZONTAL WALL CLEAT, PIECE MARKED (8), W/2-16d NAILS AT EACH END.

(11) BACK-UP CLEAT, 2" X 6" X 24" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT PIECE MARKED (8), W/8-16d NAILS.

(12) HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.

TYPICAL LCL USING K-BRACE METHOD OF PARTIAL LAYER (TIER) BRACING

SPECIAL NOTES:

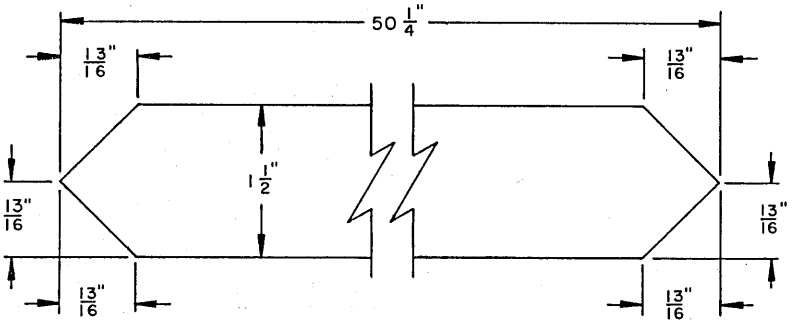
1. A TYPICAL LCL LOAD OF A PARTIAL SECOND LAYER IS SHOWN IN A 9'-2" WIDE CONVENTIONAL TYPE BOX CAR HAVING A NAILABLE SIDEWALL, CARS OF OTHER WIDTHS CAN BE USED.

2. THE K-BRACE METHOD OF PARTIAL-LAYER (TIER) BRACING SHOWN MAY BE USED IN WOOD-LINED CARS FOR THE SECUREMENT OF A PARTIAL TOP TIER. THE TYPE "A" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER OF NOT MORE THAN 6 PALLET UNITS. THE K-BRACE METHOD SHOWN MAY BE USED AT EACH END OF THE CAR.

3. 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 ③ , ④ , ⑤ , ⑦ , ⑨ AND ⑫ MUST BE SUPPORTED AT THE SIDE OF A CAR BY A CAR SIDEWALL. IT IS ALRIGHT FOR THE ENDS OF THE DIAGONAL BRACES MARKED ⑩ TO BEAR IN FRONT OF A DOOR OPENING, HOWEVER, THE ADJACENT PIECE MARKED ⑧ MUST BE DOUBLED AND EXTENDED ACROSS AND FAR ENOUGH PAST THE DOOR OPENING (REF 60"), TO PROVIDE FOR THE SPECIFIED NAILING OF EACH PIECE. LAMINATE THE SECOND PIECE OF THE DOUBLED PIECE MARKED ⑧ TO THE FIRST W/16-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THROUGH 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 ⑧ IS DOUBLED.

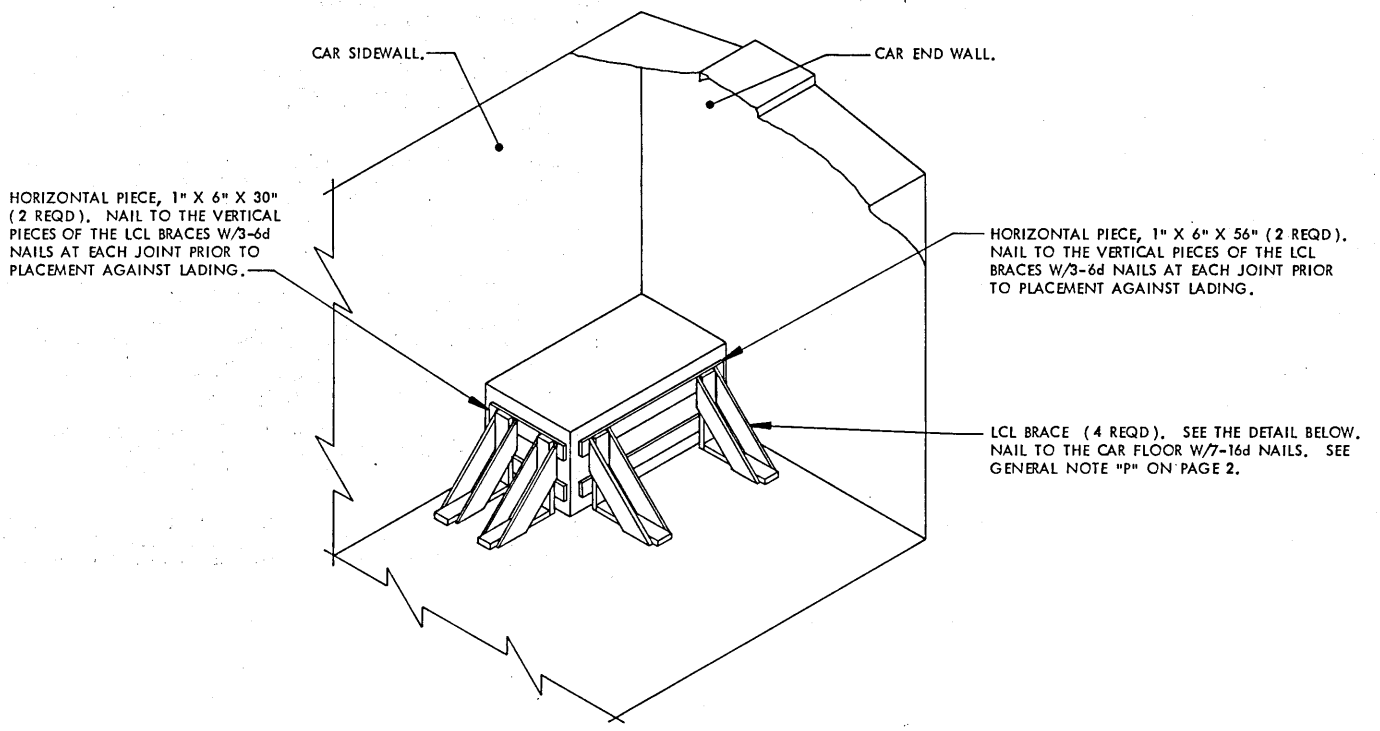
4. THE CENTER CLEAT, SHOWN AS PIECE MARKED ⑥ , WILL BE 28" LONG FOR AN 8'-6" WIDE CAR, 36" LONG FOR A 9'-2" WIDE CAR, AND 38" LONG FOR A 9'-4" WIDE CAR. ADJUST THE LENGTH PROPORTIONATELY FOR CARS OF OTHER WIDTHS.

5. ONLY THE BLOCKING AND BRACING PIECES WHICH ARE NECESSARY TO DEPICT THE PROCEDURES ARE SHOWN; REFER TO THE APPLICABLE LOAD PAGE FOR THE BLOCKING AND BRACING REQUIREMENTS FOR THE BALANCE OF THE LOAD.



DIAGONAL BRACE A

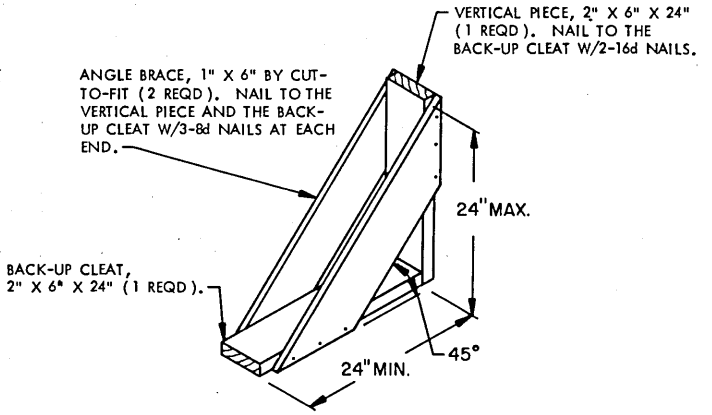
TYPICAL LCL USING K-BRACE METHOD OF PARTIAL LAYER (TIER) BRACING



ISOMETRIC VIEW

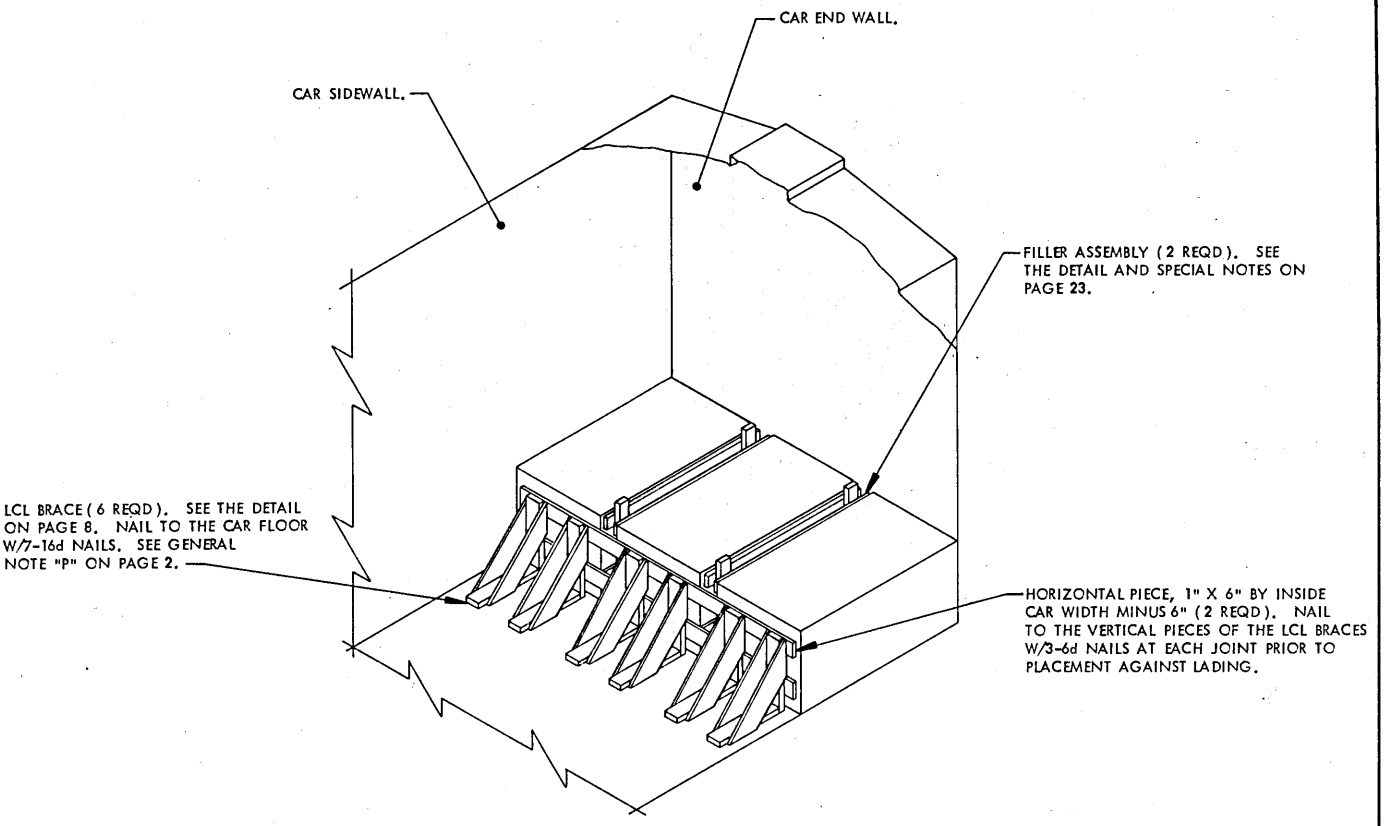
SPECIAL NOTES:

1. AN 8'-6" WIDE CONVENTIONAL TYPE BOX CAR HAVING A WOOD OR NAILABLE METAL FLOOR IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED. SEE GENERAL NOTE "E" ON PAGE 2.
2. THE LOAD SHOWN ABOVE DEPICTING THE LCL BRACE METHOD OF PARTIAL LAYER BRACING (BOTTOM TIER ONLY) IS TYPICAL. THE PROCEDURES ARE ALSO APPLICABLE FOR CROSSWISE PALLET UNITS PROVIDED THE CAPACITY OF THE BRACES IS NOT EXCEEDED.
3. EACH LCL BRACE AS APPLIED FOR LONGITUDINAL BRACING WILL RETAIN 2,000 POUNDS OF LADING. A MINIMUM OF 2 BRACES MUST BE USED FOR LONGITUDINAL BRACING. EACH LCL BRACE AS APPLIED FOR LATERAL BRACING WILL RETAIN 8,000 POUNDS OF LADING.



LCL BRACE

TYPICAL LCL LOAD USING LCL BRACE METHOD OF PARTIAL LAYER (TIER) BRACING



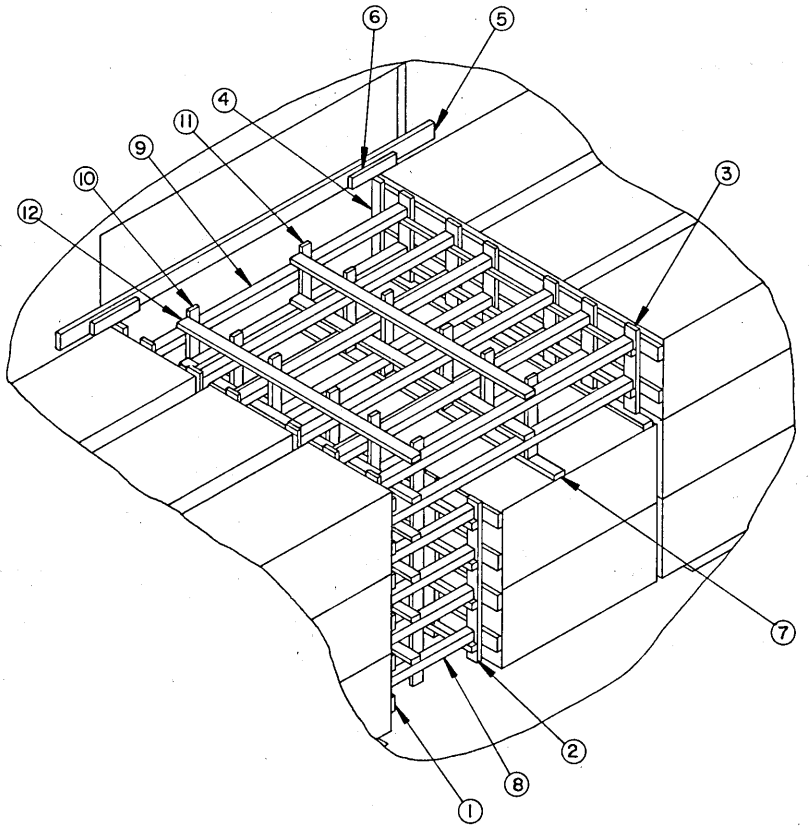
ISOMETRIC VIEW

SPECIAL NOTES:

1. A 9'-2" WIDE CONVENTIONAL TYPE BOX CAR HAVING A WOOD OR NAILABLE METAL FLOOR IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED. SEE GENERAL NOTE "E" ON PAGE 2.

2. THE LOAD SHOWN ABOVE DEPICTING THE LCL BRACE METHOD OF PARTIAL LAYER BRACING (BOTTOM TIER ONLY) IS TYPICAL. THE PROCEDURES ARE ALSO APPLICABLE FOR CROSSWISE PALLET UNITS PROVIDED THE CAPACITY OF THE BRACES IS NOT EXCEEDED.

3. EACH LCL BRACE AS APPLIED FOR LONGITUDINAL BRACING WILL RETAIN 2,000 POUNDS OF LADING. A MINIMUM OF 2 BRACES MUST BE USED FOR LONGITUDINAL BRACING. EACH LCL BRACE AS APPLIED FOR LATERAL BRACING WILL RETAIN 8,000 POUNDS OF LADING.



ISOMETRIC VIEW

KEY NUMBERS

(1) CENTER GATE FOR 3 TIERS (1 REQD). SEE THE "CENTER GATE" DETAIL ON PAGE 22.

(2) CENTER GATE FOR 2 TIERS (1 REQD). SEE THE "CENTER GATE" DETAIL AND SPECIAL NOTES ON PAGE 22.

(3) CENTER GATE FOR UPPER TIER (1 REQD). SEE THE "CENTER GATE" DETAIL AND SPECIAL NOTES ON PAGE 22.

(4) CENTER GATE HOLD-DOWN BRACE, 2" X 4" BY LENGTH-TO-SUIT (4 REQD). POSITION TO CONTACT PIECES MARKED (5) AND (6) AND NAIL TO THE HORIZONTAL PIECES ON PIECES MARKED (1) AND (3) W/3-10d NAILS AT EACH JOINT.

(5) CENTER GATE HOLD-DOWN, 2" X 6" BY DOOR OPENING WIDTH PLUS 24" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS AT EACH END.

(6) CENTER GATE HOLD-DOWN CLEAT, 2" X 4" X 18" (4 REQD). CENTER EACH CLEAT ABOVE A PIECE MARKED (4) AND NAIL TO A PIECE MARKED (5) W/5-10d NAILS.

(7) SUPPORT PIECE, 2" X 3" OR 2" X 4" BY CAR WIDTH MINUS 1/2" (2 REQD). POSITION ONE PIECE UNDER PIECE MARKED (11) AND ONE PIECE UNDER PIECE MARKED (3) . SEE SPECIAL NOTE 4 ON PAGE 11.

(8) STRUT, 4" X 4" BY CUT-TO-FIT (24 REQD). TOENAIL TO PIECES MARKED (1) AND (2) W/2-16d NAILS AT EACH END. SEE GENERAL NOTE "O" ON PAGE 2.

(9) STRUT, 4" X 4" BY CUT-TO-FIT (12 REQD). TOENAIL TO PIECES MARKED (1) AND (3) W/2-16d NAILS AT EACH END. SEE GENERAL NOTE "O" ON PAGE 2.

(10) VERTICAL STRUT BRACING, 2" X 4" BY CUT-TO-EXTEND 3" ABOVE THE TOP STRUT (6 REQD). NAIL TO PIECES MARKED (8) AND (9) W/3-10d NAILS AT EACH JOINT. SEE SPECIAL NOTE 4 ON PAGE 11.

(11) VERTICAL STRUT BRACING, 2" X 4" BY CUT-TO-EXTEND 3" ABOVE THE TOP STRUT (6 REQD). NAIL TO PIECES MARKED (8) AND (9) W/3-10d NAILS AT EACH JOINT. SEE SPECIAL NOTE 4 ON PAGE 11.

(12) HORIZONTAL STRUT BRACING, 2" X 4" BY LENGTH-TO-SUIT (8 REQD). NAIL TO PIECES MARKED (8) AND (9) W/3-10d NAILS AT EACH JOINT.

TYPICAL LCL USING STRUTTED GATE METHOD OF PARTIAL LAYER (TIER) BRACING

SPECIAL NOTES:

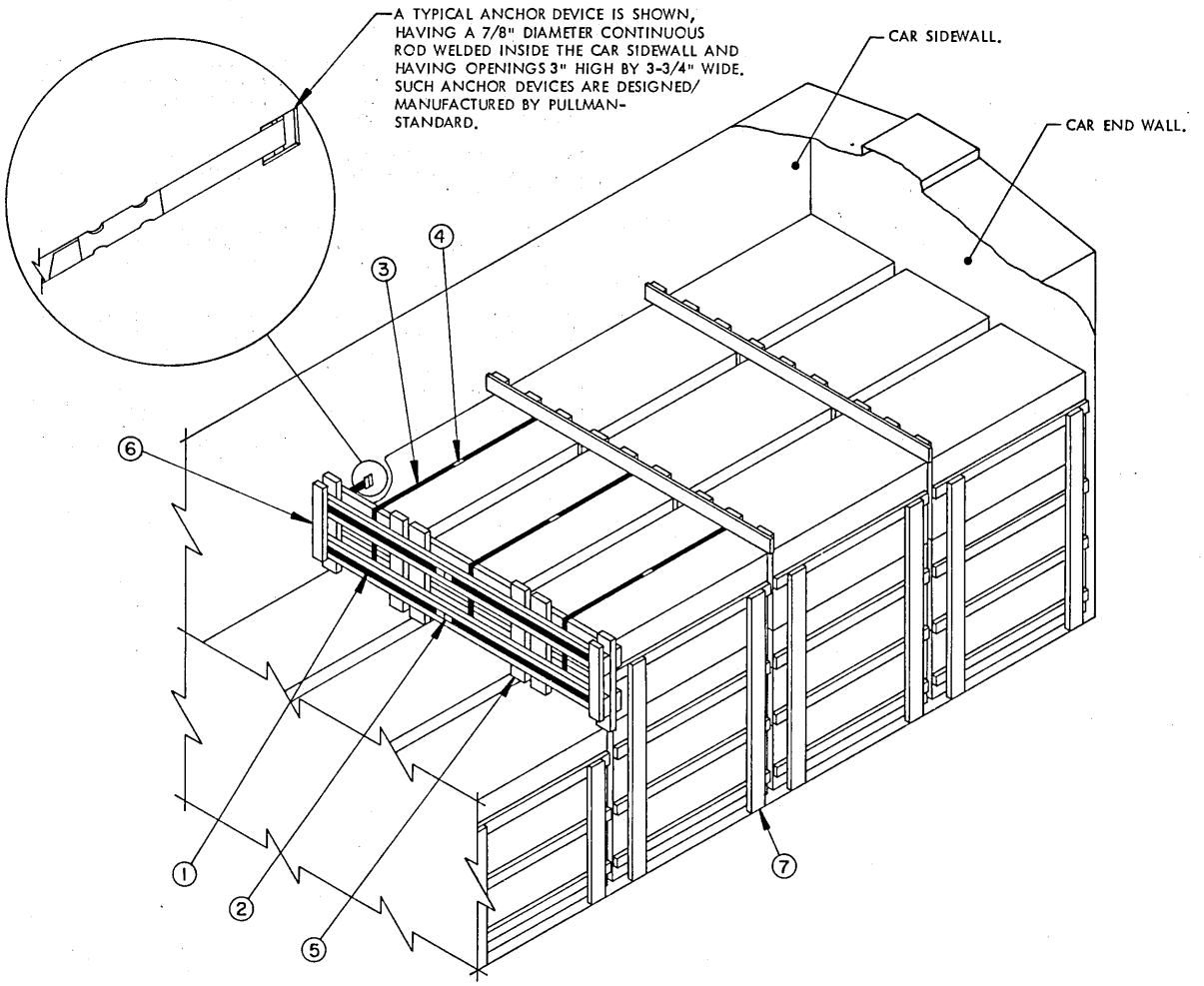
1. THE CENTER PORTION OF A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 12'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.

2. THE PROCEDURES FOR THE ADJUSTMENT OF A LOAD QUANTITY BY THE OMISSION OF THREE ADJACENT PALLETIZED UNITS FROM THE TOP TIER ARE SHOWN AS TYPICAL.

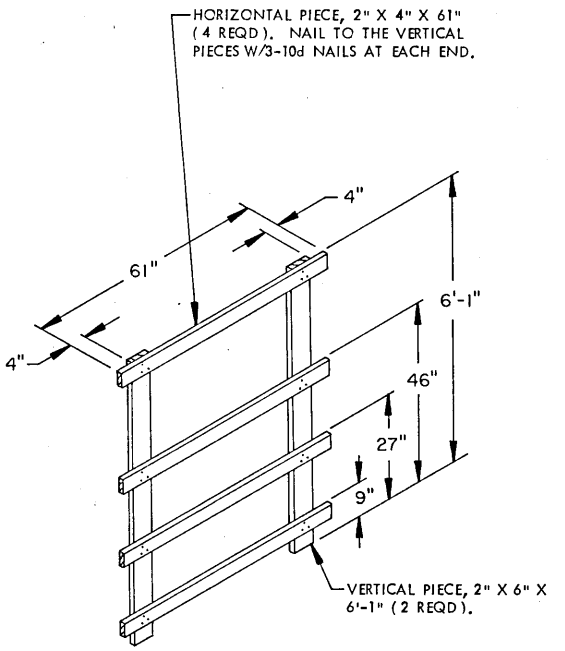
3. ONLY THE BLOCKING AND BRACING PIECES WHICH ARE NECESSARY TO PERMIT THE OMISSION OF THE UNITS FROM THE TOP TIER ARE SHOWN; REFER TO THE APPLICABLE LOAD PAGE FOR THE BLOCKING AND BRACING REQUIREMENTS FOR THE BALANCE OF THE LOAD.

4. THE LENGTH OF THE STRUTS AND/OR WIDTH OF THE OMITTED UNITS MAY REQUIRE THAT MORE THAN ONE SET OF VERTICAL STRUT BRACING BE INSTALLED. TO PROTECT THE LADING FROM BEING DAMAGED WHEN A SET OF VERTICAL STRUT BRACING IS INSTALLED ABOVE THE LOWER TIERS OF A LOAD, A SUITABLE LENGTH PAD OF 2" X 3" OR 2" X 4" MATERIAL MUST BE POSITIONED UNDER AND SECURED TO EACH APPLICABLE VERTICAL STRUT BRACING PIECE, UNLESS THE STRUT BRACING IS INSTALLED OVER THE PALLET UNIT DUNNAGE ASSEMBLIES OR CONTAINER "STAND PLATES".

TYPICAL LCL USING STRUTTED GATE METHOD OF PARTIAL LAYER (TIER) BRACING



ISOMETRIC VIEW



SIDE FILL

KEY NUMBERS

(1) BULKHEAD STRAP, 2" X .050" X 34'-0" LONG (REF) STEEL STRAPPING (2 REQD). INSTALL FROM TWO EQUAL LENGTH PIECES. SEE THE "LOAD PATTERN/STRAP APPLICATION PLAN" ON PAGE 13 FOR INSTALLATION GUIDANCE. SEE SPECIAL NOTES 3 AND 4 ON PAGE 13.

(2) SEAL FOR 2" STRAPPING (12 REQD, 6 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "Q" ON PAGE 2.

(3) BUNDLING STRAP, 1-1/4" X .035" OR .031" X 25'-0" LONG (REF) STEEL STRAPPING (3 REQD). INSTALL TO ENCIRCLE PALLETIZED UNIT AND HORIZONTAL PIECES OF THE BULKHEAD GATE. SEAL THE STRAP JOINT W/1 SEAL.

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

(5) BULKHEAD GATE (1 REQD). SEE THE DETAIL AND SPECIAL NOTE 3 ON PAGE 13.

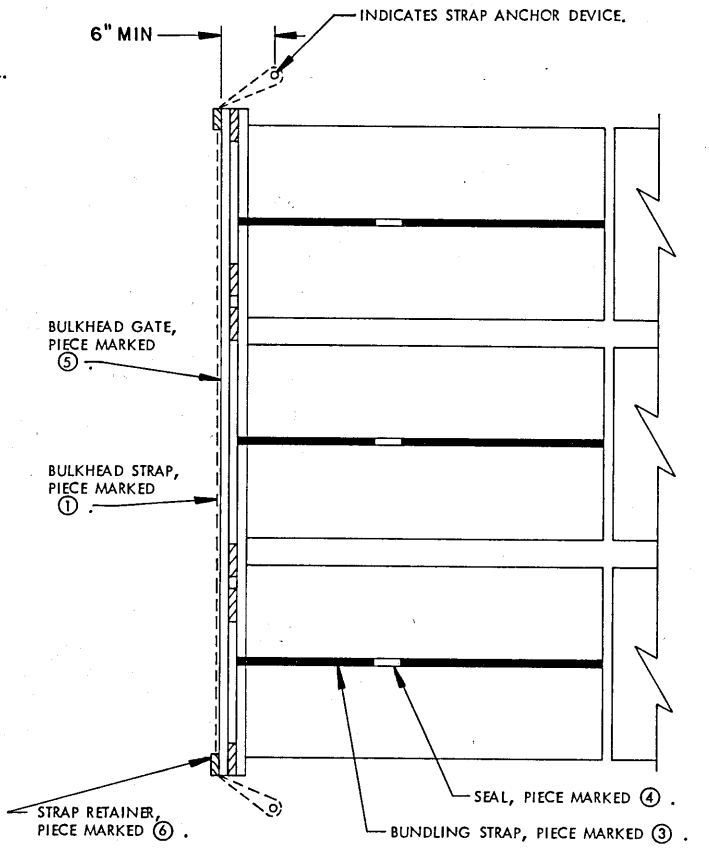
(6) STRAP RETAINER, 2" X 4" BY LENGTH-TO-SUIT (2 REQD). NAIL TO THE BULKHEAD GATE W/2-12d NAILS ABOVE AND BELOW EACH BULKHEAD STRAP.

(7) SIDE FILL (AS REQD). SEE THE DETAIL AT LEFT.

TYPICAL LCL USING BULKHEAD GATE METHOD OF PARTIAL LAYER (TIER) BRACING

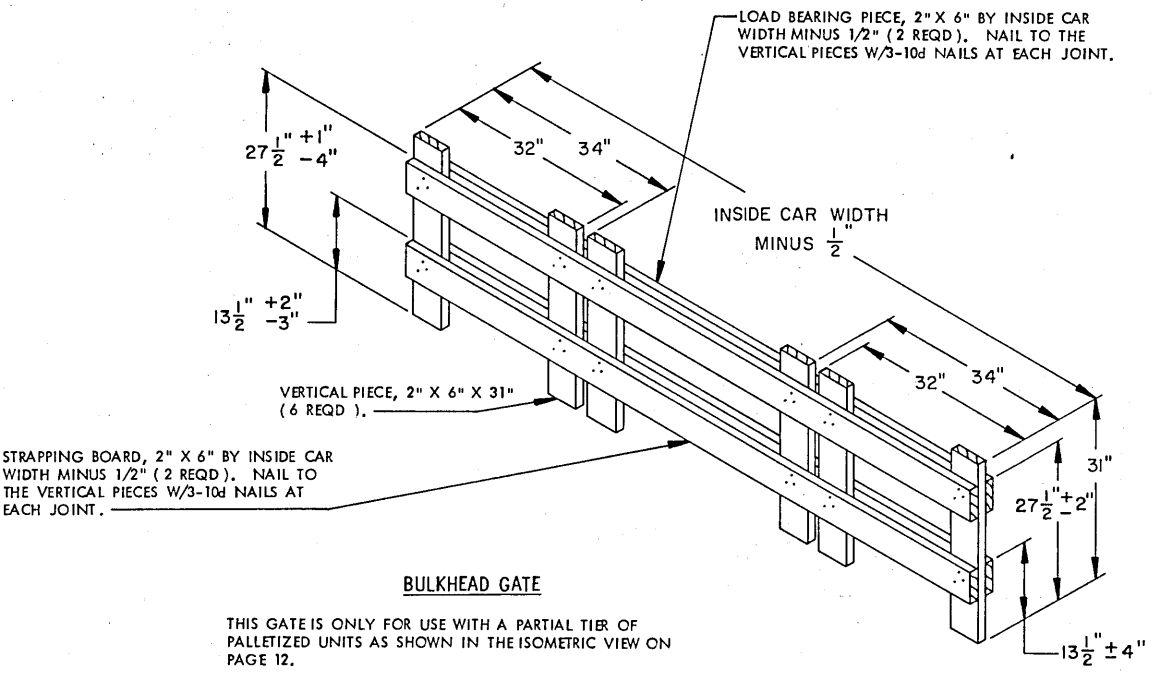
SPECIAL NOTES:

1. A 9'-6" WIDE ALL-METAL BOX CAR EQUIPPED WITH STRAP ANCHOR DEVICES AND HAVING AN AAR MECHANICAL DESIGNATION CLASS OF XL IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED.
2. THE PROCEDURES SHOWN DEPICTING THE BULKHEAD GATE METHOD OF PARTIAL-LAYER (TIER) BRACING FOR THE ADJUSTMENT OF A LOAD QUANTITY IS TYPICAL.
3. A BULKHEAD GATE USED IN CONJUNCTION WITH TWO STRAPS WILL RETAIN A MAXIMUM OF 9 PALLET UNITS.
4. BULKHEAD STRAPS WILL BE 2" WIDE STEEL STRAPPING; 1-1/4" STRAPPING MUST NOT BE USED. A BULKHEAD STRAP WILL BE OF A LENGTH TO SUIT AND WILL BE THREADED THRU THE ANCHOR DEVICE (PRIOR TO POSITIONING THE ADJACENT UNITS) FAR ENOUGH TO PROVIDE FOR ONE LEG BEING APPROXIMATELY 48" LONGER THAN THE OTHER. THE STRAP ATTACHED TO THE MATING ANCHOR DEVICE WILL HAVE THE OPPOSITE LEG EXTENDING 48". THE TWO LEGS OF EACH HALF OF A STRAP WILL BE SECURED NEAR THE ANCHOR DEVICE WITH ONE DOUBLE NOTCHED SEAL. NOTE THAT THIS SEAL MUST BE POSITIONED EITHER CLOSE ENOUGH TO OR FAR ENOUGH AWAY FROM THE ANCHOR DEVICE SO AS NOT TO BE AT THE POINT WHERE THE STRAP BENDS AROUND THE END OF THE BULKHEAD GATE OR AROUND THE CORNER OF THE ADJACENT UNITS. THE STRAP ENDS OF EACH PAIR OF LONG AND SHORT LEGS WILL BE SECURED WITH 2 SEALS BUTTED TOGETHER AND DOUBLE NOTCHED.
5. THE STRAPPING BOARDS ON A BULKHEAD GATE ARE TO BE ALIGNED AS NEARLY AS POSSIBLE WITH THE ANCHOR DEVICES IN THE CAR TO WHICH THE STRAPS ARE ATTACHED. A TOLERANCE IS ALLOWED ON DIMENSIONS TO PROVIDE FOR THIS ALIGNMENT.
6. ONLY THE BLOCKING AND BRACING PIECES WHICH ARE NECESSARY TO DEPICT THE PROCEDURES ARE SHOWN; REFER TO THE APPLICABLE LOAD PAGE FOR THE BLOCKING AND BRACING REQUIREMENTS FOR THE REMAINDER OF THE LOAD.
7. IF THE CAR BEING LOADED HAS BOWED END WALLS WHICH ARE BOWED OUTWARD 2" OR MORE 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. SEE THE DETAIL ON PAGE 25 AND GENERAL NOTE "W" ON PAGE 3.



LOAD PATTERN/STRAP INSTALLATION PLAN

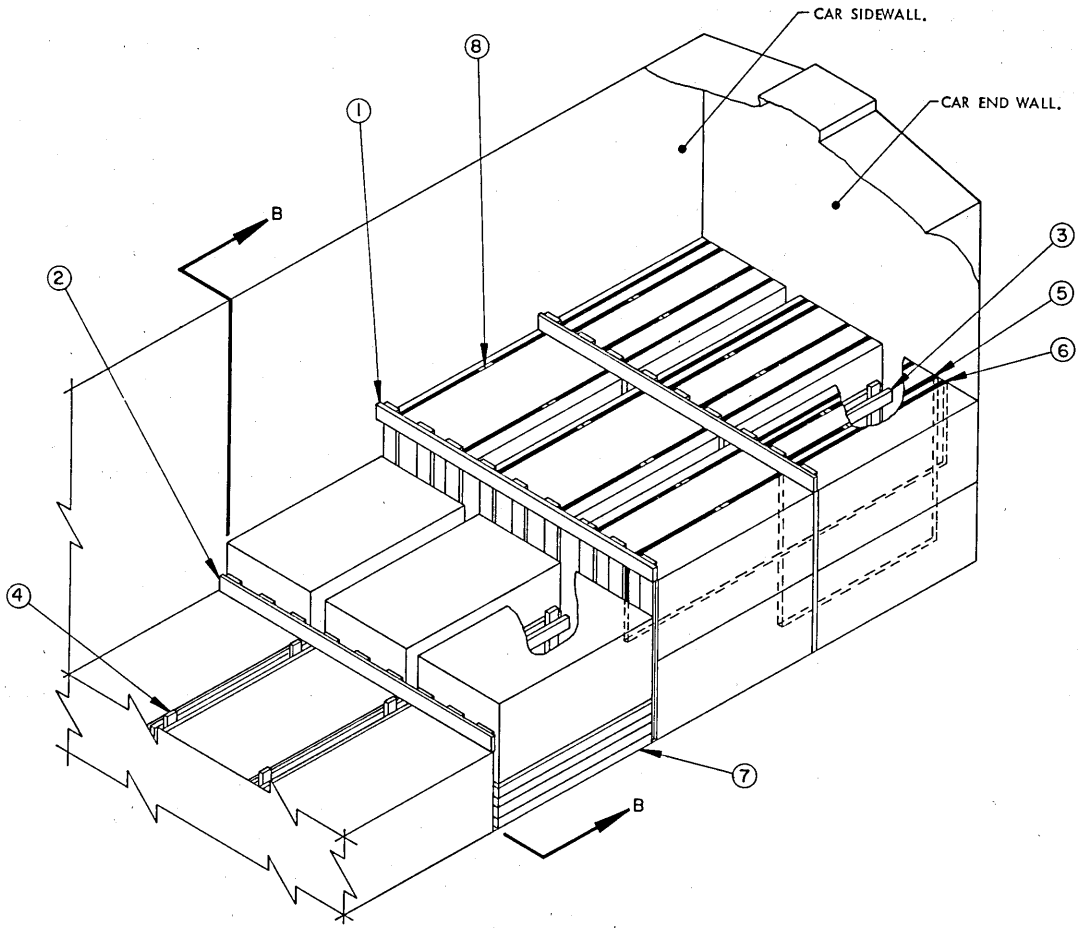
THE PARTIAL TOP VIEW SHOWN ABOVE DEPICTS THE POSITION OF PIECES MARKED ① THROUGH ⑥ .



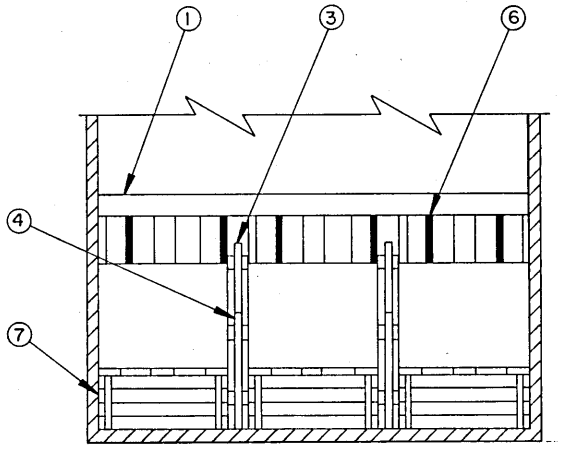
BULKHEAD GATE

THIS GATE IS ONLY FOR USE WITH A PARTIAL TIER OF PALLETIZED UNITS AS SHOWN IN THE ISOMETRIC VIEW ON PAGE 12.

TYPICAL LCL USING BULKHEAD GATE METHOD OF PARTIAL LAYER (TIER) BRACING



ISOMETRIC VIEW



SECTION B-B

KEY NUMBERS

1. SEPARATOR GATE FOR TWO-TIER LOAD (AS REQD). SEE THE DETAIL AND SPECIAL NOTE 2 ON PAGE 23.
2. SEPARATOR GATE FOR ONE-TIER LOAD (AS REQD). SEE THE DETAIL AND SPECIAL NOTE 2 ON PAGE 23.
3. FILLER ASSEMBLY FOR TWO-TIER LOAD (AS REQD). SEE THE DETAIL AND SPECIAL NOTE 1 ON PAGE 23.
4. FILLER ASSEMBLY FOR ONE-TIER LOAD (AS REQD). SEE THE DETAIL AND SPECIAL NOTE 1 ON PAGE 23.
5. VERTICAL UNITIZING STRAP, 1-1/4" X .035" OR .031" X 21'-0" LONG (REF) STEEL STRAPPING (6 REQD, 2 PER STACK). INSTALL SO AS TO ENCIRCLE TWO PALLETIZED UNITS, AND SEAL THE JOINT W/2 SEALS, PRIOR TO FINAL POSITIONING OF THE STACK IN THE CAR. SEE SPECIAL NOTE 3 ON PAGE 15.
6. HORIZONTAL UNITIZING STRAP, 1-1/4" X .035" OR .031" X 27'-0" LONG (REF) STEEL STRAPPING (6 REQD, 2 PER ROW). PRE-POSITION AROUND THE TOP UNIT OF THE UNITIZED 2-HIGH STACK. INSTALL SO AS TO ENCIRCLE THE TWO LONGITUDINALLY ADJACENT PALLETIZED UNITS AND SEAL THE JOINT W/2 SEALS. SEE SPECIAL NOTE 3 ON PAGE 15.
7. RISER ASSEMBLY (3 REQD). SEE THE DETAIL ON PAGE 25.
8. SEAL FOR 1-1/4" STRAPPING (24 REQD, 2 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "Q" ON PAGE 3.

TYPICAL LCL USING RISER METHOD OF PARTIAL LAYER (TIER) BRACING

SPECIAL NOTES:

1. A TYPICAL LCL LOAD OF A PARTIAL SECOND LAYER IS SHOWN IN A 9'-2" WIDE CONVENTIONAL TYPE BOX CAR. ALL-METAL OR WOOD-LINED CARS OF OTHER WIDTHS CAN BE USED.

2. THE RISER METHOD OF PARTIAL-LAYER BRACING MAY BE USED IN ALL-METAL OR WOOD-LINED CARS FOR THE SECUREMENT OF A PARTIAL TOP TIER OF NOT MORE THAN 24,000 POUNDS (8,000 POUNDS IN EACH ROW WHICH IS RETAINED BY A RISER). THE RISER MUST ALWAYS BE POSITIONED ON THE CAR FLOOR.

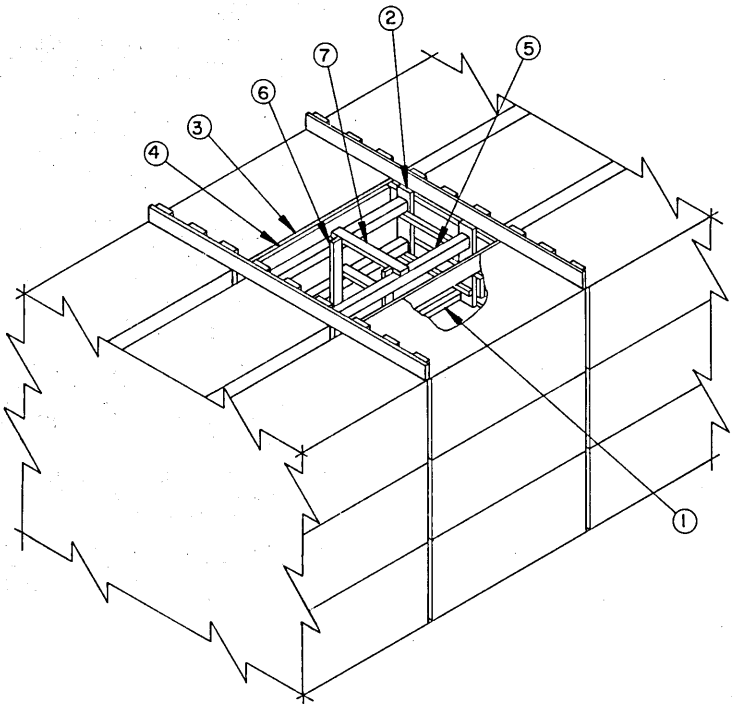
3. THE POSITIONING OF THE VERTICAL UNITIZING STRAPS AND THE HORIZONTAL UNITIZING STRAPS IS APPLICABLE FOR LCL LOADS WHICH ARE AT LEAST TWO LOAD UNITS LONG IN THE UPPERMOST TIER. IF THE UPPERMOST TIER IS ONLY ONE LOAD UNIT IN LENGTH, THE VERTICAL UNITIZING STRAPS WILL BE INSTALLED SO AS TO ENCIRCLE A STACK IN THAT LOAD UNIT AND THE HORIZONTAL UNITIZING STRAPS WILL BE OMITTED.

4. IF THE CAR BEING LOADED HAS BOWED END WALLS WHICH ARE BOWED OUTWARD 2" OR MORE 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. SEE THE DETAIL ON PAGE 25 AND GENERAL NOTE "W" ON PAGE 3.

5. SEPARATOR GATES ARE REQUIRED BETWEEN THE LONGITUDINAL ADJACENT PALLETIZED UNITS NEXT TO THE RISER ASSEMBLY FOR A BETTER LOAD BEARING DISTRIBUTION.

6. ONLY THE BLOCKING AND BRACING PIECES WHICH ARE NECESSARY TO DEPICT THE PROCEDURES ARE SHOWN; REFER TO THE APPLICABLE LOAD PAGE FOR THE BLOCKING AND BRACING REQUIREMENTS FOR THE REMAINDER OF THE LOAD.

TYPICAL LCL USING RISER METHOD OF PARTIAL LAYER (TIER) BRACING



ISOMETRIC VIEW

KEY NUMBERS

(1) GATE HOLD-DOWN, 2" X 3" X 7'-0" (2 REQD). NAIL TO THE VERTICAL PIECES OF PIECE MARKED (2) W/2-10d NAILS AT EACH JOINT.

(2) LOAD BEARING GATE (2 REQD). SEE THE DETAIL ON PAGE 17. NAIL TO PIECE MARKED (4) W/3-10d NAILS. TOENAIL TO PIECE MARKED (1) W/2-10d NAILS AT EACH LOCATION.

(3) ANTI-SWAY BEARING PIECE, 2" X 6" X 72" (2 REQD).

(4) FILL PIECE, 2" X 6" BY CUT-TO-FIT (2 REQD). NAIL TO PIECE MARKED (3) W/5-10d NAILS.

(5) STRUT, 4" X 4" BY CUT-TO-FIT (4 REQD). TOENAIL TO PIECE MARKED (2) W/2-12d NAILS AT EACH END. SEE GENERAL NOTE "O" ON PAGE 2.

(6) VERTICAL STRUT BRACING, 2" X 4" X 28" (2 REQD). NAIL TO PIECES MARKED (5) W/3-10d NAILS AT EACH JOINT.

(7) HORIZONTAL STRUT BRACING, 2" X 4" BY CUT-TO-FIT (2 REQD). NAIL TO PIECES MARKED (5) W/3-10d NAILS AT EACH JOINT.

TYPICAL LCL-ONE PALLETIZED UNIT OMITTED FROM THE TOP LAYER (TIER)

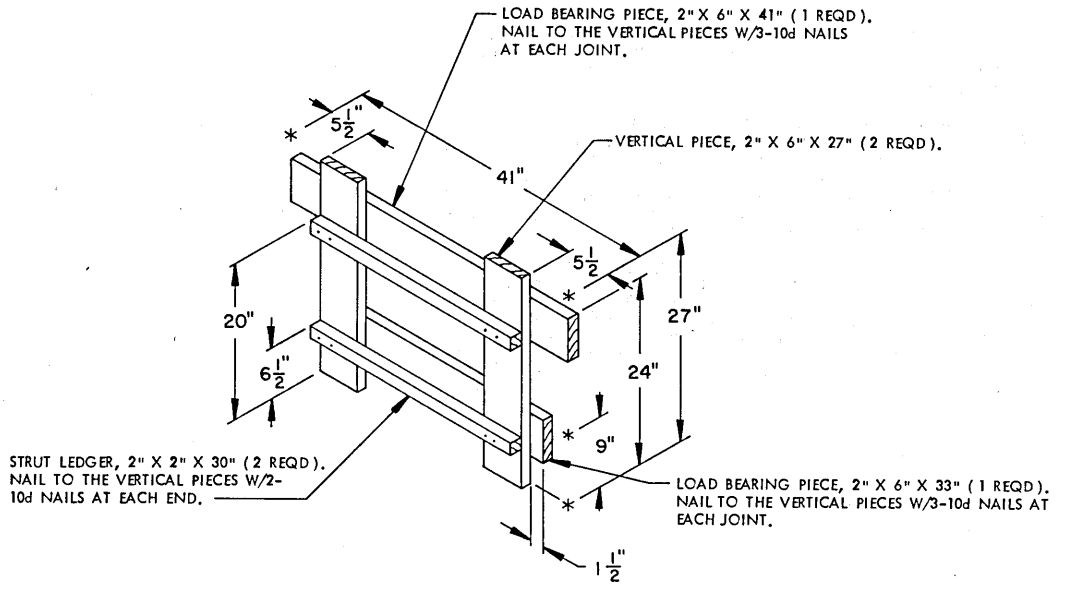
SPECIAL NOTES:

1. A PARTIAL VIEW OF A LOAD IN A 9'-2" WIDE CONVENTIONAL TYPE BOX CAR HAVING ONE PALLETIZED UNIT OMITTED FROM THE TOP LAYER IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED.

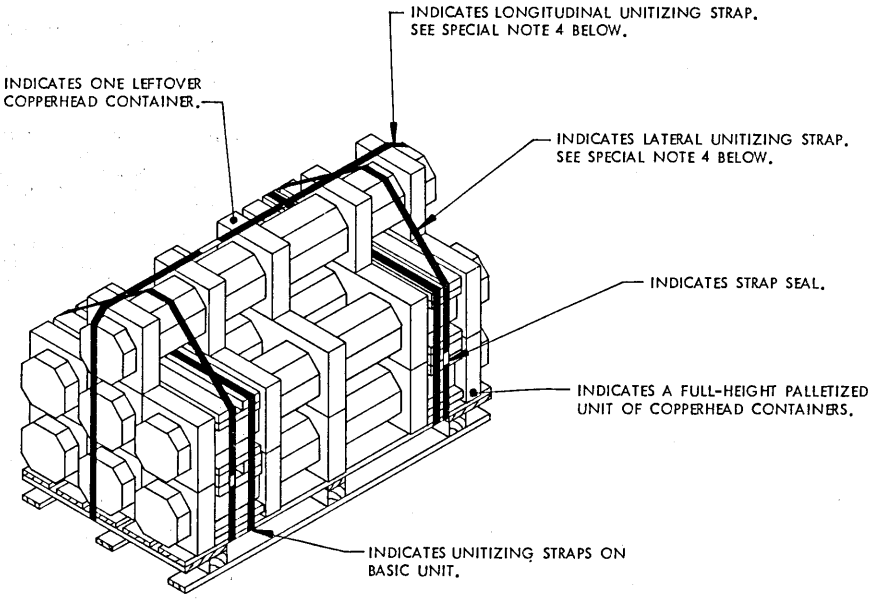
2. THIS METHOD OF PARTIAL-LAYER (TIER) BRACING (OMITTING A UNIT FROM THE TOP TIER FOR ADJUSTMENT OF LOAD QUANTITY) IS APPLICABLE FOR USE IN CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS AS WELL AS CONVENTIONAL BOX CARS. THE OMISSION OF A THIRD-TIER UNIT IS SHOWN AS TYPICAL.

3. THE OMITTED-UNIT PROCEDURE SHOULD BE APPLIED NEAR THE CENTER OF THE CAR LENGTH, BUT NOT IN THE DOORWAY AREA OF THE CAR. ALSO, THERE SHOULD BE AT LEAST ONE PALLET UNIT BETWEEN THE OMITTED UNIT AND A LOAD DIVIDER BULKHEAD, OR BETWEEN THE OMITTED UNIT AND A CENTER GATE FOR A LOAD IN A CONVENTIONAL BOX CAR.

4. ONLY THE BLOCKING AND BRACING PIECES WHICH ARE NECESSARY TO DEPICT THE OMITTED UNIT PROCEDURES ARE SHOWN; REFER TO THE APPLICABLE LOAD PAGE FOR THE BLOCKING AND BRACING REQUIREMENTS FOR THE REMAINDER OF THE LOAD.



LOAD BEARING GATE



SECUREMENT OF LEFTOVER CONTAINERS

SPECIAL NOTES:

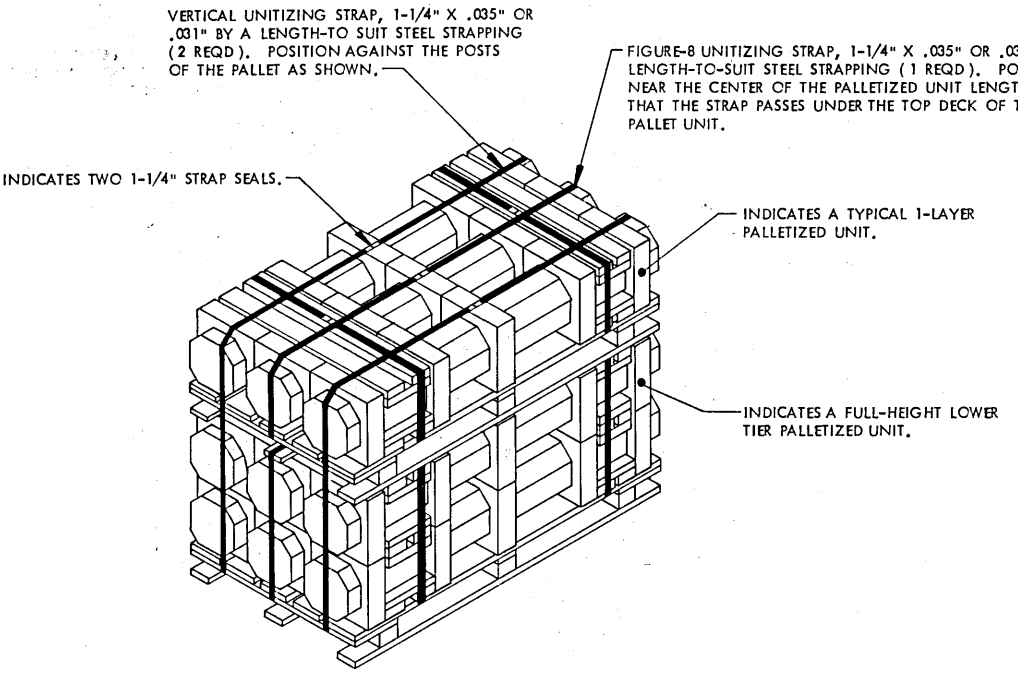
1. THE ISOMETRIC VIEW SHOWN ABOVE DEPICTS PROCEDURES TO BE USED FOR SECUREMENT OF A LEFTOVER COPPERHEAD CONTAINER TO A PALLETIZED UNIT.

2. SHIPMENTS OF PALLETIZED UNITS 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.

3. THE QUANTITY OF LEFTOVER CONTAINERS WHICH CAN BE SECURED TO A FULL-HEIGHT PALLET UNIT SHALL NOT EXCEED ONE. ADDITIONALLY, THE QUANTITY OF LEFTOVER CONTAINERS WHICH CAN BE SECURED TO A PARTIAL PALLET UNIT SHALL NOT EXCEED ONE.

4. LEFTOVER CONTAINERS MUST BE SECURED TO A FULL OR PARTIAL HEIGHT PALLET UNIT WITH THREE LENGTHS OF STEEL STRAPPING AT LEAST AS HEAVY AS THE UNITIZING STRAPPING. TWO OF THESE STRAPS SHOULD ENCIRCLE THE LEFTOVER CONTAINER AND PALLET UNIT LATERALLY AS SHOWN ABOVE. THE REMAINING STRAP SHOULD THEN BE PLACED TO ENCIRCLE THE CONTAINER AND PALLET UNIT LONGITUDINALLY, ALSO AS SHOWN ABOVE. ALL STRAPS SHALL BE SEALED USING ONE SEAL. CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES.

5. SHIPMENT OF LEFTOVER CONTAINERS IS APPLICABLE FOR CONUS OR OCONUS RAILROAD SHIPMENTS FROM DEPOT TO DEPOT OR FROM DEPOTS 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 IS SECURED TO THE TOP OF A FULL OR PARTIAL UNIT, MUST NOT BE DESTINED FOR SHIPMENT OVERSEAS BY WATER CARRIER.



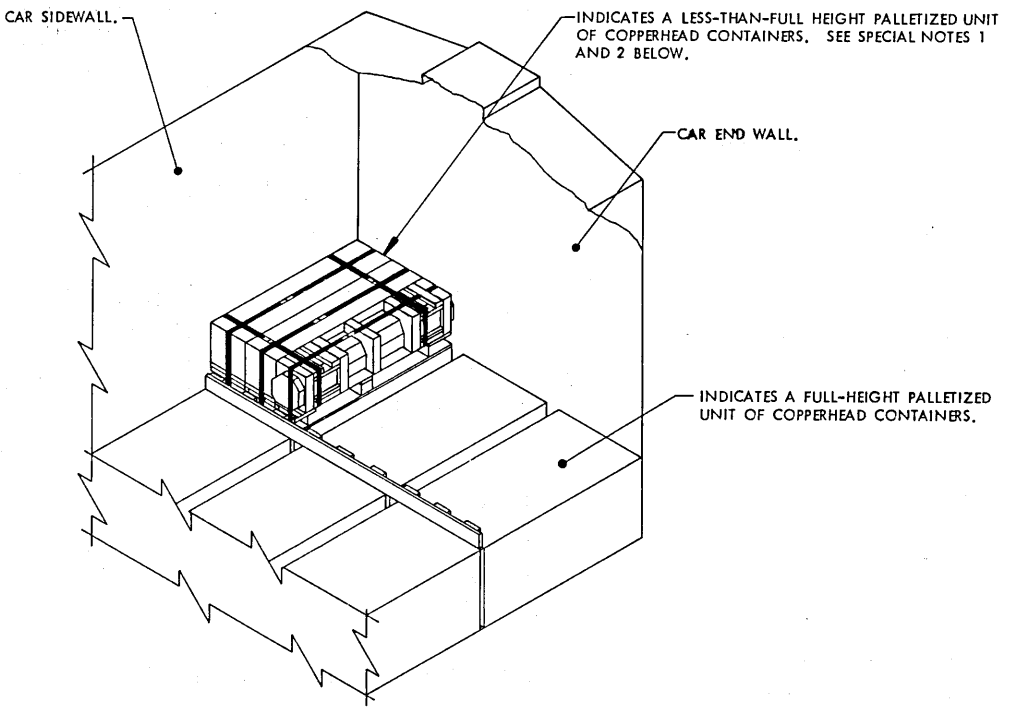
SECUREMENT OF A PARTIAL PALLETIZED UNIT ON TOP OF A FULL PALLETIZED UNIT

SPECIAL NOTES:

1. SHIPMENTS OF PALLETIZED UNITS 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 PALLETIZED UNITS WITHIN A LOAD. THE PROCEDURES ON THIS PAGE AND ON PAGES 20 AND 21 ARE PRESENTED AS GUIDANCE IN THE SHIPMENT OF THESE PARTIAL UNITS.

2. THE PARTIAL PALLETIZED UNIT WILL BE STRAPPED TO THE PALLETIZED UNIT DIRECTLY BELOW IT WITH TWO VERTICAL UNITIZING STRAPS AND A FIGURE-8 UNITIZING STRAP, AS SHOWN ABOVE. PLACEMENT WITHIN THE LOAD IS OPTIONAL.

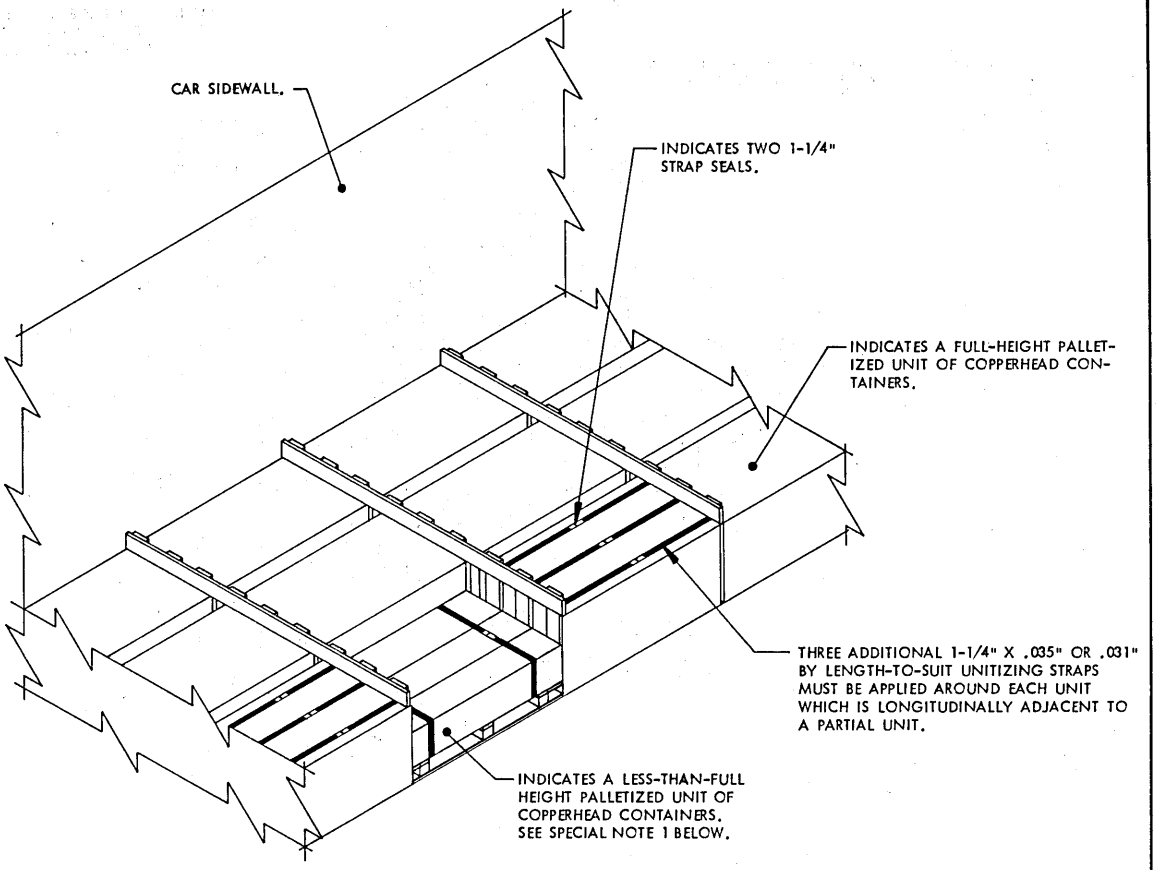
3. FOR SECUREMENT AND SHIPMENT OF "LEFTOVER" CONTAINERS, SEE THE PROCEDURES ON PAGE 18.



POSITIONING OF A PARTIAL PALLETIZED UNIT
ON TOP OF A TIER

SPECIAL NOTES:

1. THE ISOMETRIC VIEW SHOWN ABOVE DEPICTS PROCEDURES TO BE USED FOR THE SHIPMENT OF A PARTIAL PALLETIZED UNIT POSITIONED ON TOP OF A TIER.
2. FOR SECUREMENT OF A PARTIAL PALLETIZED UNIT ON TOP OF A FULL-HEIGHT PALLETIZED UNIT, SEE PAGE 19.
3. THE PROCEDURES CONTAINED ON THIS PAGE AND ON PAGE 21 ARE PRESENTED AS GUIDANCE IN THE SHIPMENT OF PARTIAL UNITS.
4. THE PROCEDURES SHOWN ON THIS PAGE ARE ONLY APPLICABLE TO PARTIAL PALLETIZED UNITS CONSISTING OF ONE LAYER OF CONTAINERS. FOR THE SHIPMENT OF "LEFTOVER" CONTAINERS, SEE THE PROCEDURES ON PAGE 18.
5. THE SHIPMENT OF A PARTIAL PALLETIZED UNIT AS SHOWN ABOVE IS APPLICABLE FOR LOADS IN CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS AS WELL AS FOR LOADS IN CONVENTIONAL BOX CARS.



POSITIONING OF A PARTIAL PALLETIZED UNIT

WITHIN A TIER

SPECIAL NOTES:

1. THE ISOMETRIC VIEW SHOWN ABOVE DEPICTS PROCEDURES TO BE USED FOR THE SHIPMENT OF A PARTIAL PALLETIZED UNIT POSITIONED WITHIN A TIER.

2. FOR SECUREMENT OF A PARTIAL PALLETIZED UNIT ON TOP OF A FULL-HEIGHT PALLETIZED UNIT, SEE PAGE 19.

3. THE PROCEDURES CONTAINED ON THIS PAGE AND ON PAGE 20 ARE PRESENTED AS GUIDANCE IN THE SHIPMENT OF PARTIAL UNITS.

4. THE PROCEDURES SHOWN ON THIS PAGE ARE ONLY APPLICABLE TO PARTIAL PALLETIZED UNITS CONSISTING OF ONE LAYER OF CONTAINERS. FOR THE SHIPMENT OF "LEFTOVER" CONTAINERS, SEE SPECIAL NOTE 5 AND THE PROCEDURES CONTAINED ON PAGE 18.

5. A LEFTOVER CONTAINER CAN BE SECURED TO THE TOP OF A PARTIAL UNIT FOR PLACEMENT WITHIN A TIER, WITH THE FOLLOWING LIMITATIONS.

   A. LEFTOVER CONTAINERS ON TOP OF PARTIAL UNITS ARE APPLICABLE FOR CONUS AND OCONUS RAILROAD SHIPMENTS FROM DEPOT TO DEPOT OR FROM DEPOTS 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 SECURED TO THE TOP OF PARTIAL UNITS, MUST NOT BE DESTINED FOR SHIPMENT OVERSEAS BY WATER CARRIER.

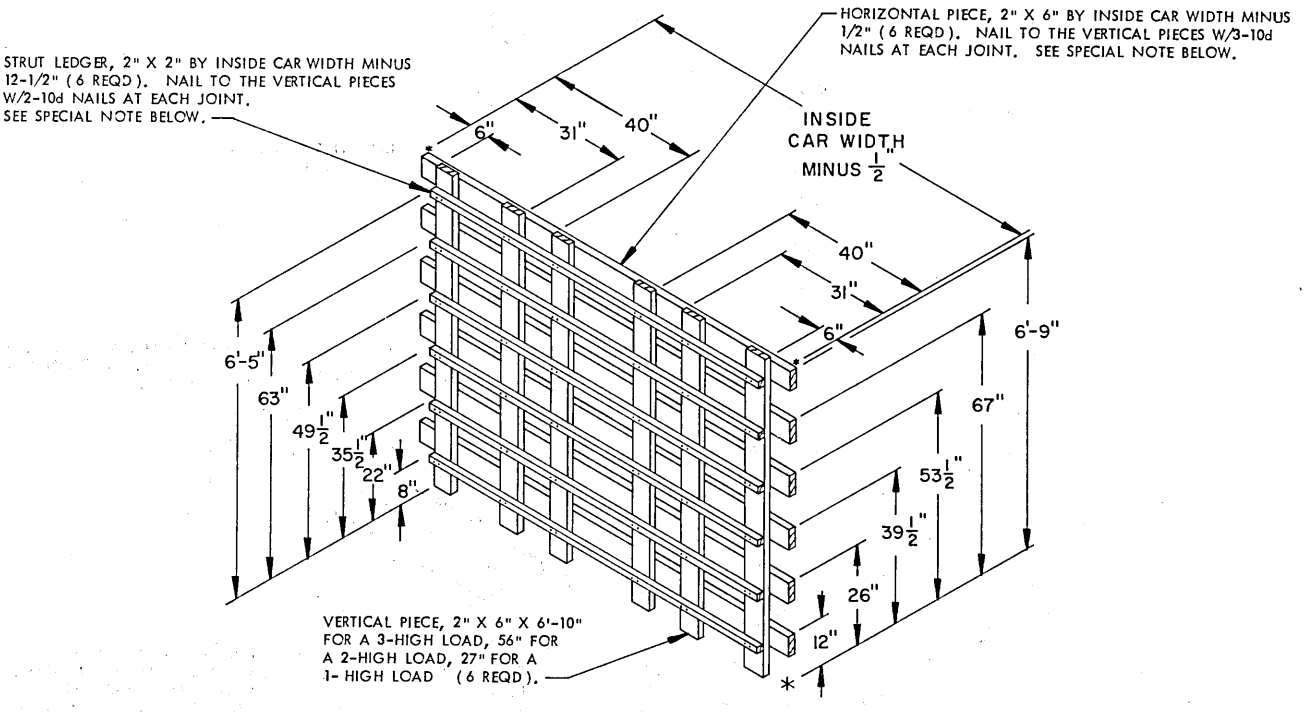
   B. THE LEFTOVER CONTAINERS MUST BE SECURED TO THE PARTIAL UNITS WITH THEIR OWN STRAPPING, SEPARATE FROM THE STRAPS FOR THE PARTIAL UNIT. SEE PAGE 18 FOR STRAP APPLICATION GUIDANCE.

6. CAUTION: THE PARTIAL UNIT MUST BE LOCATED IN THE TOP TIER OF A LOAD; OTHER UNITS MUST NOT BE PLACED ON TOP OF THE PARTIAL UNIT. THE PARTIAL UNIT SHOULD BE PLACED IN THE LOAD SO THAT THERE IS AT LEAST ONE FULL-HEIGHT UNIT BETWEEN IT AND THE CENTER GATE; HOWEVER, THE PARTIAL UNIT IS NOT TO BE WITHIN A LOAD UNIT WHICH IS TO BE ENCIRCLED WITH DOORWAY PROTECTION STRAPS. THE ONLY ADDITIONAL DUNNAGE NEEDED IS THE SIX 1-1/4" X .035" OR .031" STEEL UNITIZING STRAPS WHICH MUST BE APPLIED, THREE TO EACH OF THE UNITS LONGITUDINALLY ADJACENT TO THE PARTIAL UNIT. SEE THE ISOMETRIC VIEW ABOVE FOR ADDITIONAL GUIDANCE.

(CONTINUED AT RIGHT)

(SPECIAL NOTES CONTINUED)

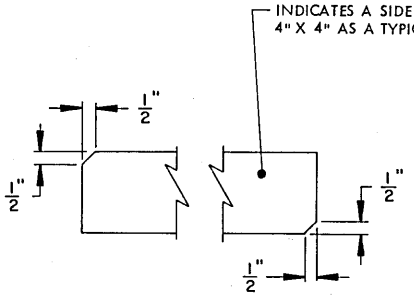
7. THE ISOMETRIC VIEW ABOVE DEPICTS A PORTION OF A CONVENTIONAL BOX CAR LOAD. HOWEVER, THE PROCEDURES CONTAINED ON THIS PAGE ARE ALSO APPLICABLE FOR LOADS IN CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.



CENTER GATE

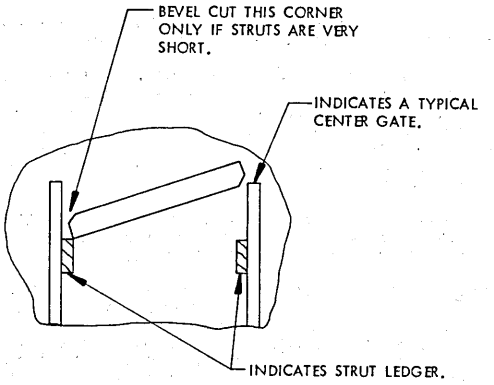
SPECIAL NOTE:

THE CENTER GATE DEPICTED ABOVE IS FOR USE WITH A 3-LAYER (TIER) LOAD. FOR USE IN A 2-LAYER (TIER) LOAD, THE ABOVE GATE MUST BE MODIFIED BY OMITTING THE TWO UPPERMOST HORIZONTAL PIECES AND TWO UPPERMOST STRUT LEDGERS AND BY REDUCING THE HEIGHT OF THE VERTICAL PIECES TO 56". FOR USE IN A 1-LAYER (TIER) LOAD, THE ABOVE GATE MUST BE MODIFIED BY OMITTING THE FOUR UPPERMOST HORIZONTAL PIECES AND FOUR UPPERMOST STRUT LEDGERS AND BY REDUCING THE HEIGHT OF THE VERTICAL PIECES TO 27".

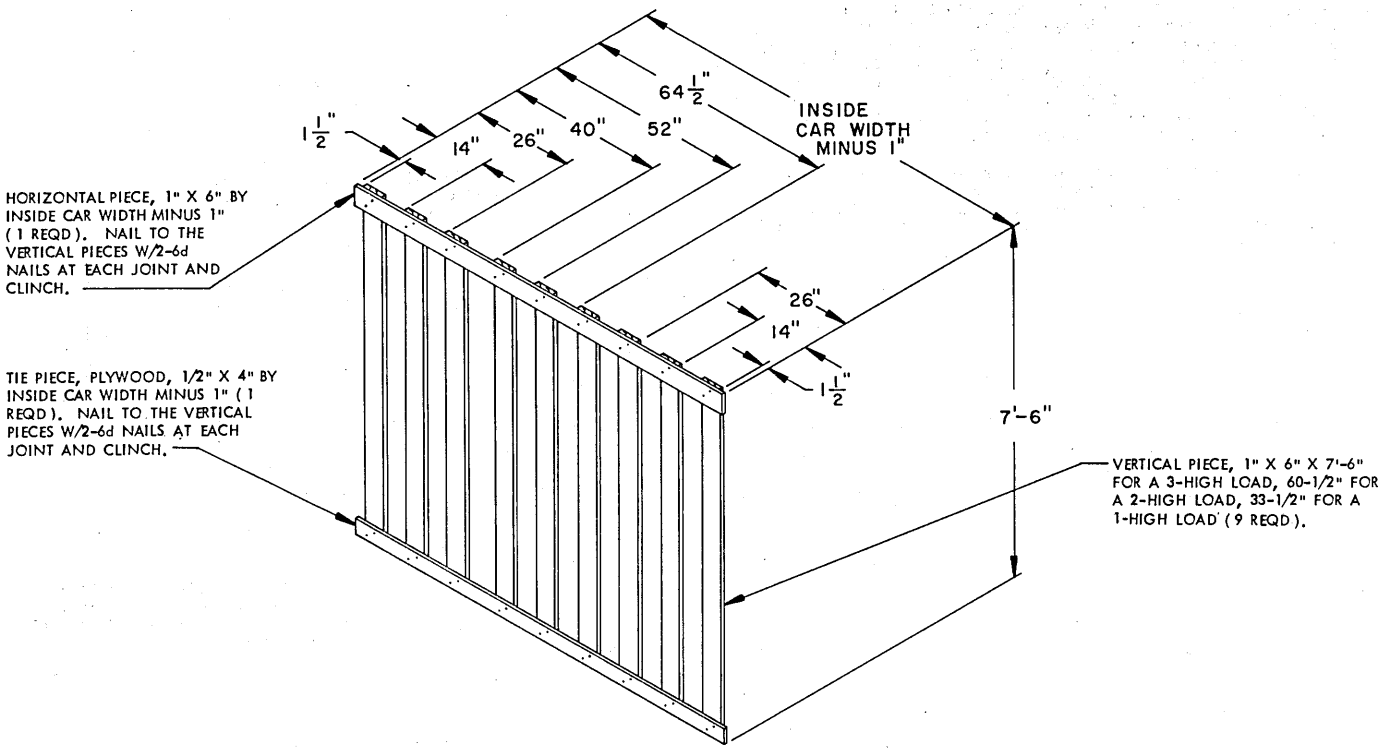


BEVEL CUT

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



STRUT INSTALLATION

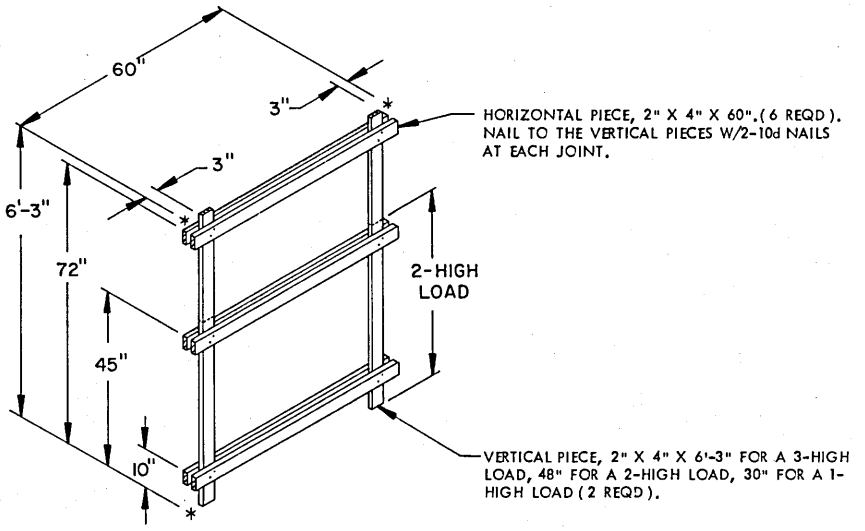


SEPARATOR GATE

SPECIAL NOTES:

1. THE FILLER ASSEMBLY DEPICTED BELOW IS FOR USE IN A 3-LAYER (TIER) LOAD. FOR USE IN A 2-LAYER LOAD, THE ASSEMBLY MUST BE MODIFIED BY OMITTING THE TWO UPPERMOST HORIZONTAL PIECES AND BY REDUCING THE HEIGHT OF THE VERTICAL PIECES TO 48". FOR USE IN A 1-LAYER LOAD, THE ASSEMBLY MUST BE MODIFIED BY OMITTING THE TWO UPPERMOST HORIZONTAL PIECES, BY RELOCATING THE TWO MIDDLE HORIZONTAL PIECES TO 27" HIGH, AND BY REDUCING THE HEIGHT OF THE VERTICAL PIECES TO 30".

2. THE SEPARATOR GATE DEPICTED ABOVE IS FOR USE IN A 3-LAYER (TIER) LOAD. FOR USE IN A 2-LAYER LOAD, THE GATE MUST BE MODIFIED BY REDUCING THE VERTICAL PIECES HEIGHT TO 60-1/2". FOR USE IN A 1-LAYER LOAD, THE GATE MUST BE MODIFIED BY REDUCING THE VERTICAL PIECES HEIGHT TO 33-1/2".

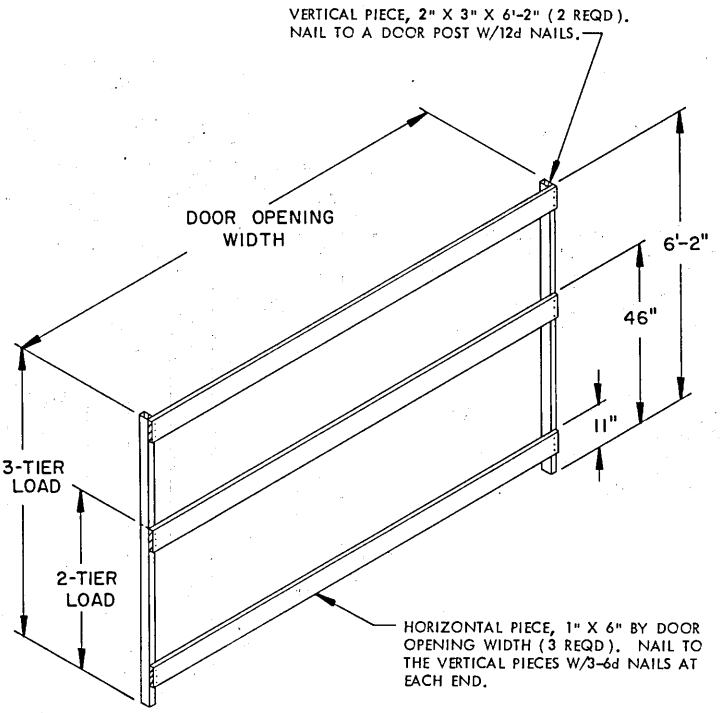


FILLER ASSEMBLY

SPECIAL NOTES:

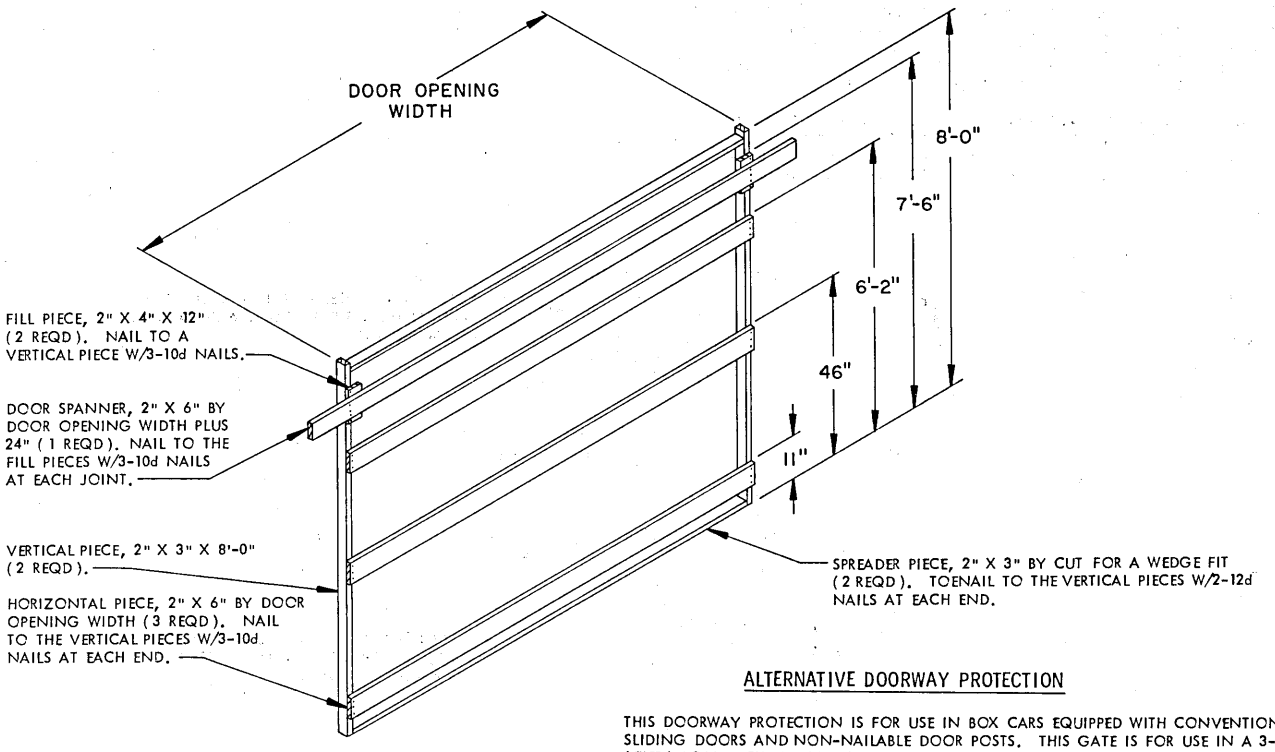
1. THE "DOORWAY PROTECTION GATE" DEPICTED AT RIGHT CAN BE USED WHEN THE LOAD BEING SHIPPED IS ONLY ONE OR TWO TIERS BY MAKING MODIFICATIONS AS FOLLOWS. FOR A 2-TIER LOAD, THE TOP HORIZONTAL PIECE IS TO BE ELIMINATED AND THE HEIGHT OF THE VERTICAL PIECES IS TO BE SHORTENED TO 46". FOR A 1-TIER LOAD, THE TOP HORIZONTAL PIECE IS TO BE ELIMINATED, THE MIDDLE HORIZONTAL PIECE IS TO BE MOVED DOWN TO A HEIGHT OF 28", AND THE HEIGHT OF THE VERTICAL PIECES IS TO BE SHORTENED TO 28".

2. IF THE BOX CAR BEING LOADED IS NOT EQUIPPED WITH NAILABLE DOOR POSTS, THE "ALTERNATIVE DOORWAY PROTECTION" PROCEDURES MUST BE USED IN LIEU OF THE "DOORWAY PROTECTION GATE" DEPICTED AT RIGHT. FOR ADDITIONAL GUIDANCE, SEE THE "ALTERNATIVE DOORWAY PROTECTION" DETAIL BELOW.



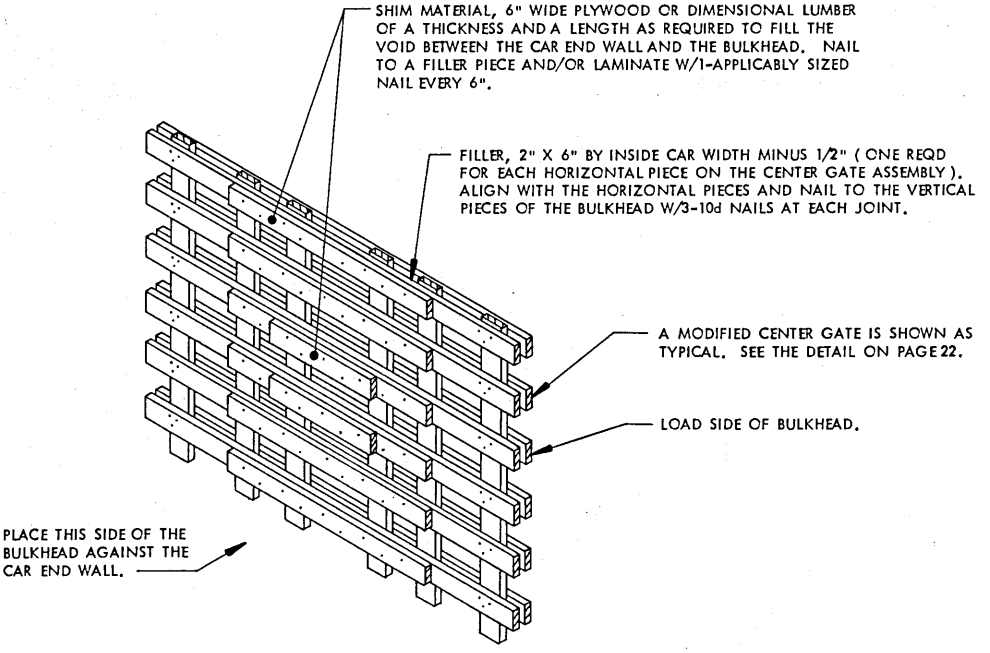
DOORWAY PROTECTION GATE

THE GATE SHOWN ABOVE IS FOR USE IN A 3-LAYER (TIER) LOAD. FOR MODIFICATIONS REQUIRED FOR USE IN A 1-LAYER OR 2-LAYER LOAD, SEE SPECIAL NOTE 1 ABOVE.



ALTERNATIVE DOORWAY PROTECTION

THIS DOORWAY PROTECTION IS FOR USE IN BOX CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS AND NON-NAILABLE DOOR POSTS. THIS GATE IS FOR USE IN A 3-LAYER (TIER) LOAD. THE HEIGHT OF THE VERTICAL PIECES AND THE NUMBER OF HORIZONTAL PIECES WILL HAVE TO BE ADJUSTED WHEN USED IN A 1-LAYER OR 2-LAYER LOAD.

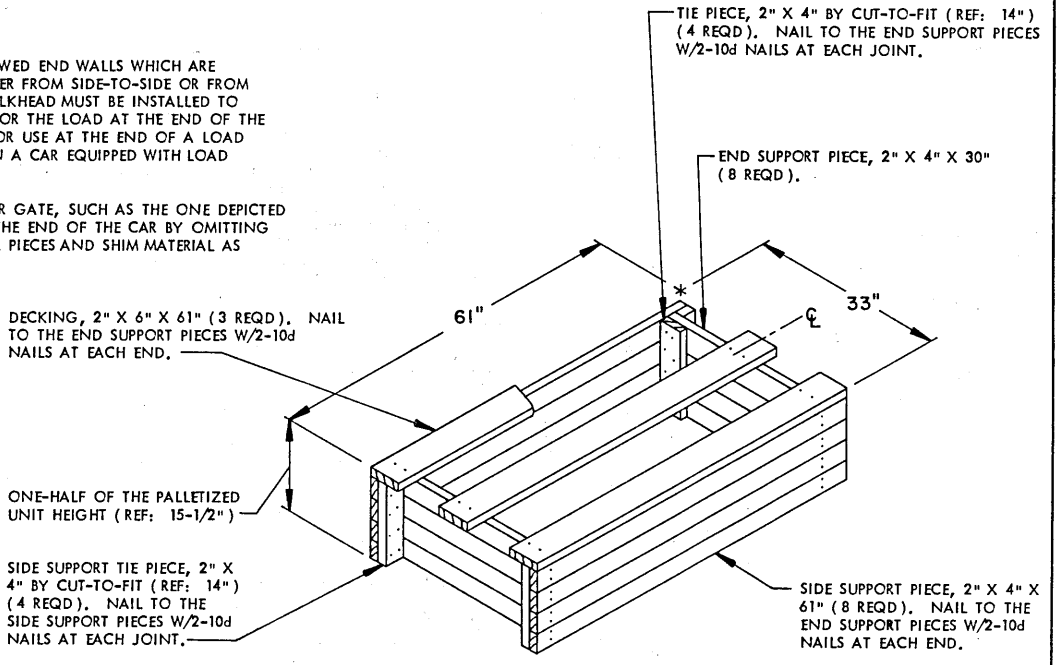


END-OF-CAR BULKHEAD

THIS BULKHEAD IS TYPICAL ONLY AND IS APPLICABLE FOR USE AT THE END OF A CAR. A MODIFIED CENTER GATE IS SHOWN. SEE THE LOAD ON PAGE 4 AND SPECIAL NOTE 2 AT LEFT.

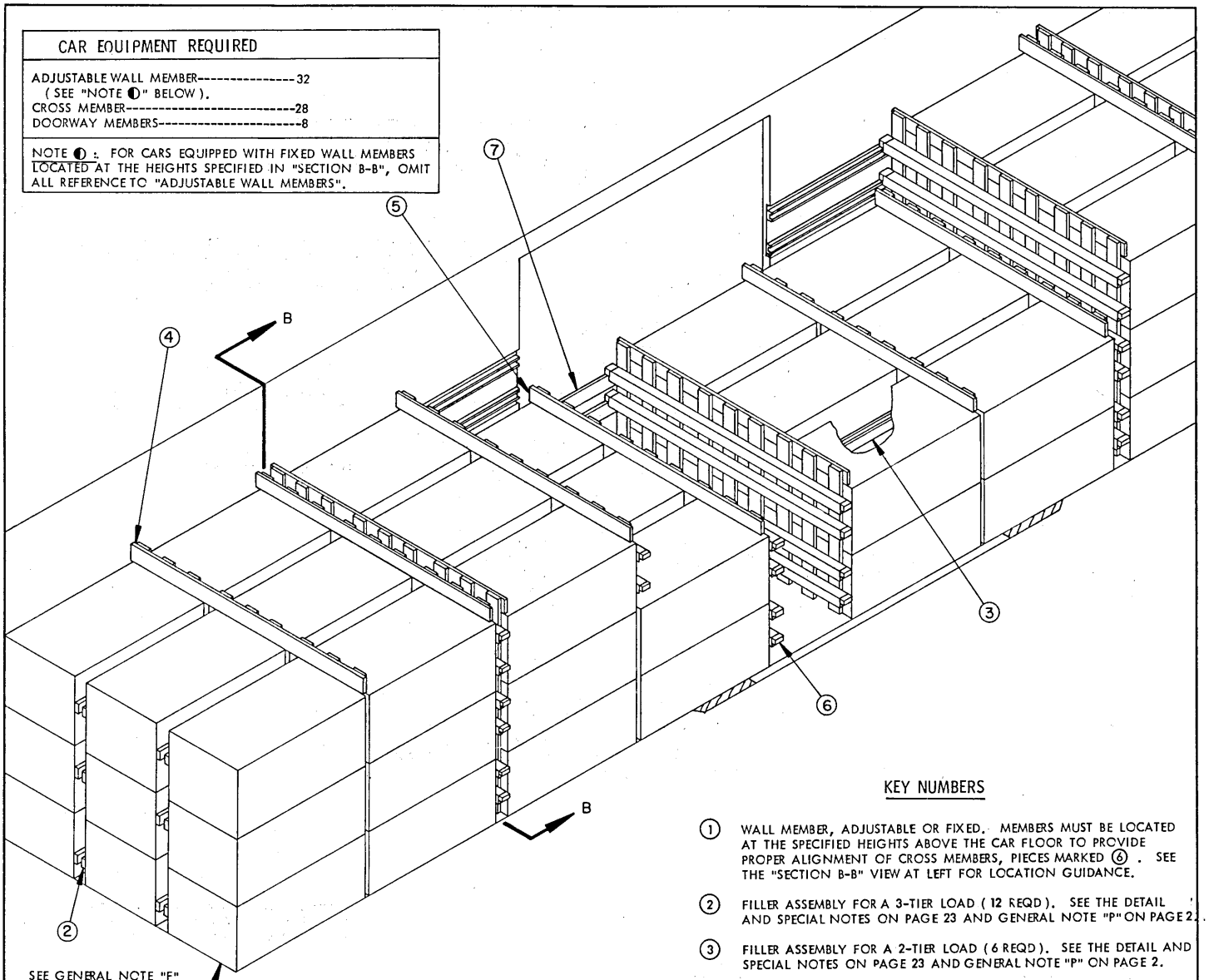
SPECIAL NOTES:

1. IF A BOX CAR TO BE LOADED HAS BOWED END WALLS WHICH ARE 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. 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.
2. THE BULKHEAD CONSISTS OF A CENTER GATE, SUCH AS THE ONE DEPICTED ON PAGE 22, MODIFIED FOR USE AT THE END OF THE CAR BY OMITTING THE STRUT LEDGERS AND ADDING FILL PIECES AND SHIM MATERIAL AS SHOWN.



RISER ASSEMBLY

CAR EQUIPMENT REQUIRED
ADJUSTABLE WALL MEMBER----------32 (SEE "NOTE ◐" BELOW). CROSS MEMBER----------28 DOORWAY MEMBERS----------8
NOTE ◐ : FOR CARS EQUIPPED WITH FIXED WALL MEMBERS LOCATED AT THE HEIGHTS SPECIFIED IN "SECTION B-B", OMIT ALL REFERENCE TO "ADJUSTABLE WALL MEMBERS".

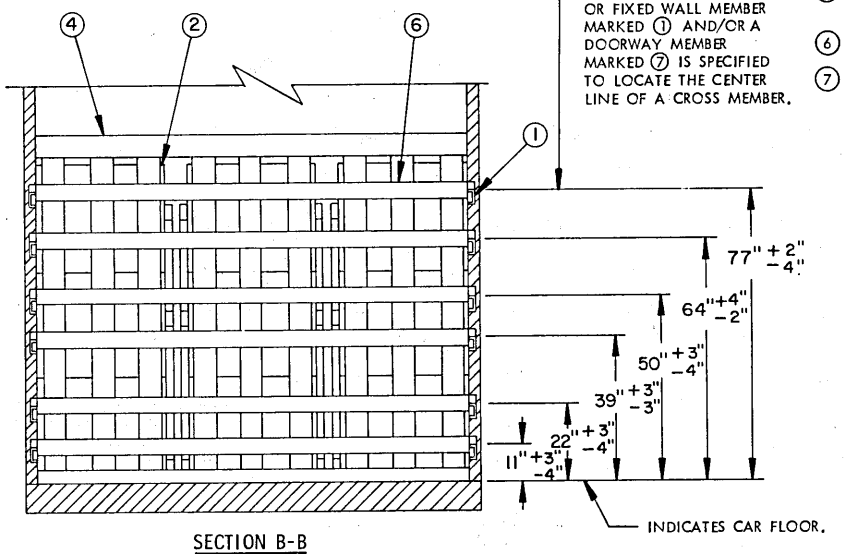


SEE GENERAL NOTE "F" ON PAGE 2 AND SPECIAL NOTE 2 ON PAGE 27.

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, PIECES MARKED ⑥ . SEE THE "SECTION B-B" VIEW AT LEFT FOR LOCATION GUIDANCE.
2. FILLER ASSEMBLY FOR A 3-TIER LOAD (12 REQD). SEE THE DETAIL AND SPECIAL NOTES ON PAGE 23 AND GENERAL NOTE "P" ON PAGE 2.
3. FILLER ASSEMBLY FOR A 2-TIER LOAD (6 REQD). SEE THE DETAIL AND SPECIAL NOTES ON PAGE 23 AND GENERAL NOTE "P" ON PAGE 2.
4. SEPARATOR GATE FOR A 3-TIER LOAD (8 REQD). SEE THE DETAIL AND SPECIAL NOTES ON PAGE 23.
5. SEPARATOR GATE FOR A 2-TIER LOAD (4 REQD). SEE THE DETAIL AND SPECIAL NOTES ON PAGE 23.
6. CROSS MEMBER (28 REQD). SEE GENERAL NOTE "F" ON PAGE 2.
7. DOORWAY MEMBER (8 REQD). SEE THE "SECTION B-B" VIEW AT LEFT FOR LOCATION GUIDANCE.



EACH DIMENSIONED HEIGHT ABOVE THE CAR FLOOR TO AN ADJUSTABLE OR FIXED WALL MEMBER MARKED ① AND/OR A DOORWAY MEMBER MARKED ⑦ IS SPECIFIED TO LOCATE THE CENTER LINE OF A CROSS MEMBER.

SECTION B-B

72-UNIT LOAD IN A 50'-6" LONG BY 9'-0" WIDE BOX CAR EQUIPPED WITH MECHANICAL BRACING DEVICES

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-0" WIDE 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.

2. IF A CAR HAS BOWED END WALLS WHICH ARE BOWED OUTWARD 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 "W" ON PAGE 3. 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 ④, MUST BE POSITIONED AGAINST THESE CROSS MEMBERS PRIOR TO LOADING.

3. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY OF PALLETIZED UNITS TO BE SHIPPED. A LOAD MAY BE REDUCED BY MULTIPLES OF 3 PALLET UNITS BY OMITTING LATERALLY ADJACENT UNITS FROM THE TOP LAYER OF ONE OR MORE LOAD UNITS, BY MULTIPLES OF 6 PALLET UNITS BY OMITTING LATERALLY ADJACENT UNITS FROM THE TOP TWO LAYERS OF ONE OR MORE LOAD UNITS, OR BY MULTIPLES OF 9 PALLET UNITS BY OMITTING ONE OR MORE ENTIRE LOAD UNITS. TO REDUCE A LOAD BY ONE OR TWO PALLET UNITS, REFER TO THE LCL PROCEDURES ON PAGES 28 AND 29 FOR GUIDANCE.

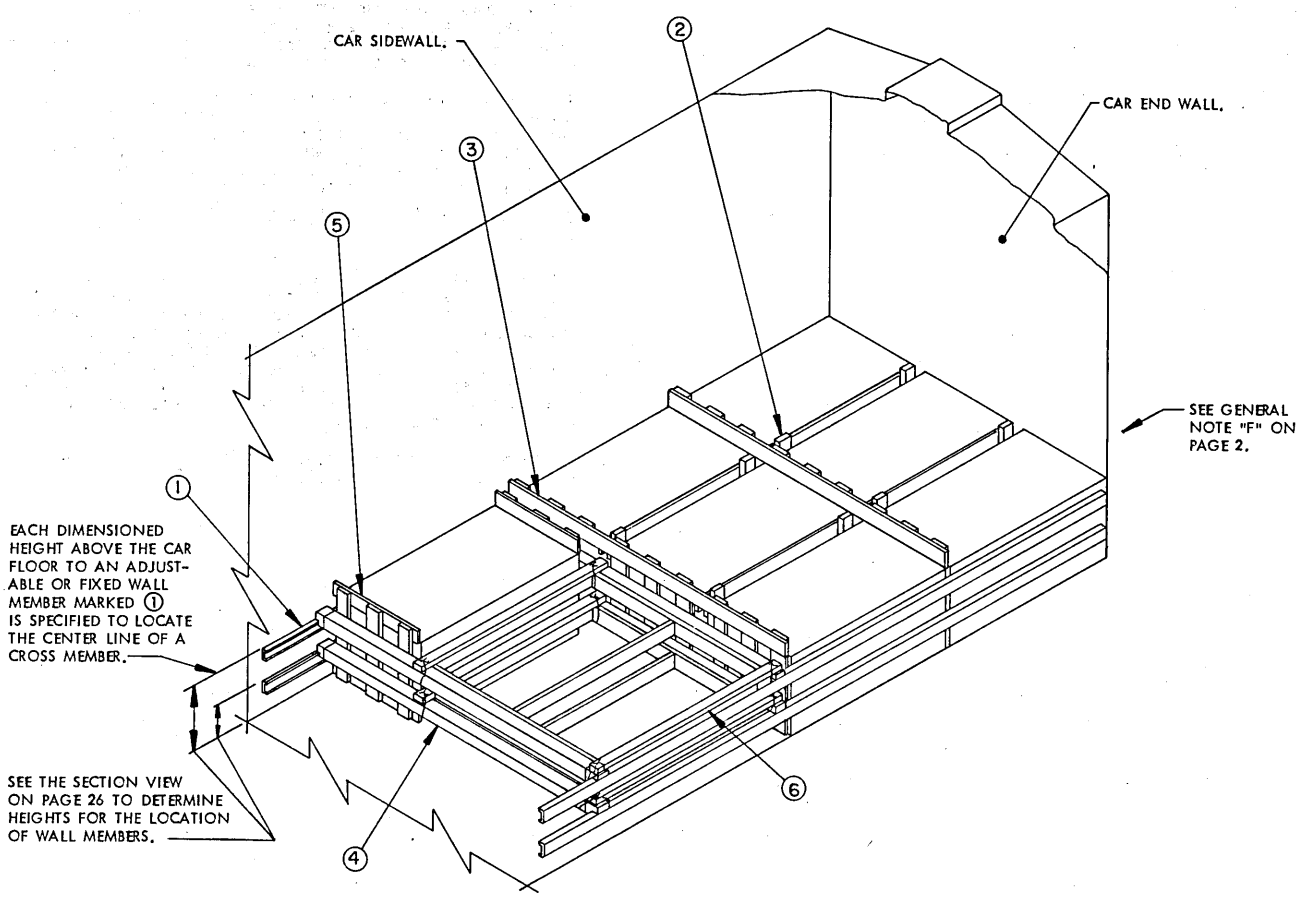
4. FOR SHIPMENT OF ONE OR MORE LEFTOVER CONTAINERS, SEE THE GUIDANCE CONTAINED ON PAGE 18.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 6" 2" X 4"	831 678	416 452
NAILS	NO. REQD	POUNDS
6d (2") 10d (3")	432 384	2-3/4 6
PLYWOOD, 1/2"----------37 SQ FT REQD----------50 LBS		

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	72	97,776 LBS
DUNNAGE		1,795 LBS
TOTAL WEIGHT		99,571 LBS

72-UNIT LOAD IN A 50'-6" LONG BY 9'-0" WIDE BOX CAR EQUIPPED WITH MECHANICAL BRACING DEVICES



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, PIECES MARKED ④.

② FILLER ASSEMBLY FOR A 1-TIER LOAD (4 REQD). SEE THE DETAIL AND SPECIAL NOTES ON PAGE 23 AND GENERAL NOTE "P" ON PAGE 2.

③ SEPARATOR GATE FOR A 1-TIER LOAD (2 REQD). SEE THE DETAIL AND SPECIAL NOTES ON PAGE 23.

④ CROSS MEMBER (4 REQD). SEE GENERAL NOTE "F" ON PAGE 2.

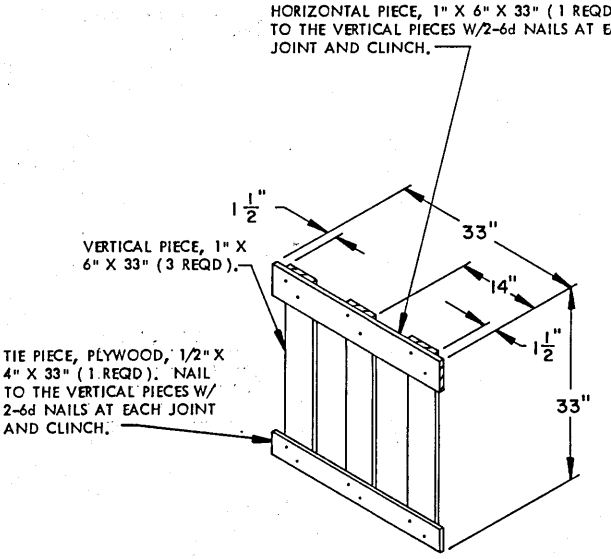
⑤ SEPARATOR GATE FOR 1-HIGH AND 1-WIDE (2 REQD). SEE THE DETAIL ON PAGE 29.

⑥ SPACER ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 29. WIRE TIE TO CROSS MEMBERS W/2 WRAPS OF NO. 14 GAGE WIRE AT EACH CORNER.

TYPICAL LCL (7-UNIT LOAD) IN A BOX CAR EQUIPPED WITH
MECHANICAL BRACING DEVICES HAVING ADJUSTABLE OR FIXED WALL MEMBERS

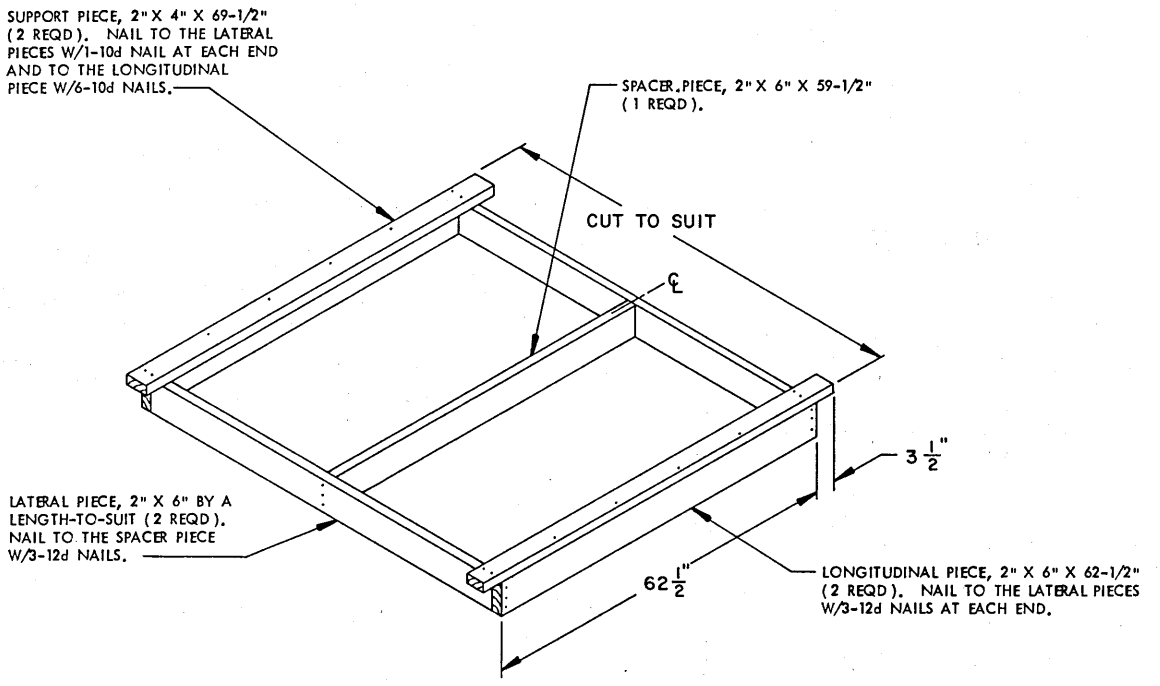
SPECIAL NOTES:

1. A 9'-0" WIDE WOOD-LINED BOX CAR EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED.
2. SEVEN PALLETIZED UNITS ARE SHOWN AS A TYPICAL LOAD QUANTITY. THE NUMBER OF UNITS CAN BE ADJUSTED TO SUIT THE QUANTITY TO BE SHIPPED.
3. THE SPACER ASSEMBLIES, SHOWN AS PIECES MARKED ⑥ , CAN ALSO BE USED IN AN UPPER 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 LAYER OR IN AN UPPER 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 THE END WALL IS NON-NAILABLE, CROSS MEMBERS MUST BE INSTALLED AT THE END OF THE LOAD TO SUPPORT THE SPACER ASSEMBLIES.



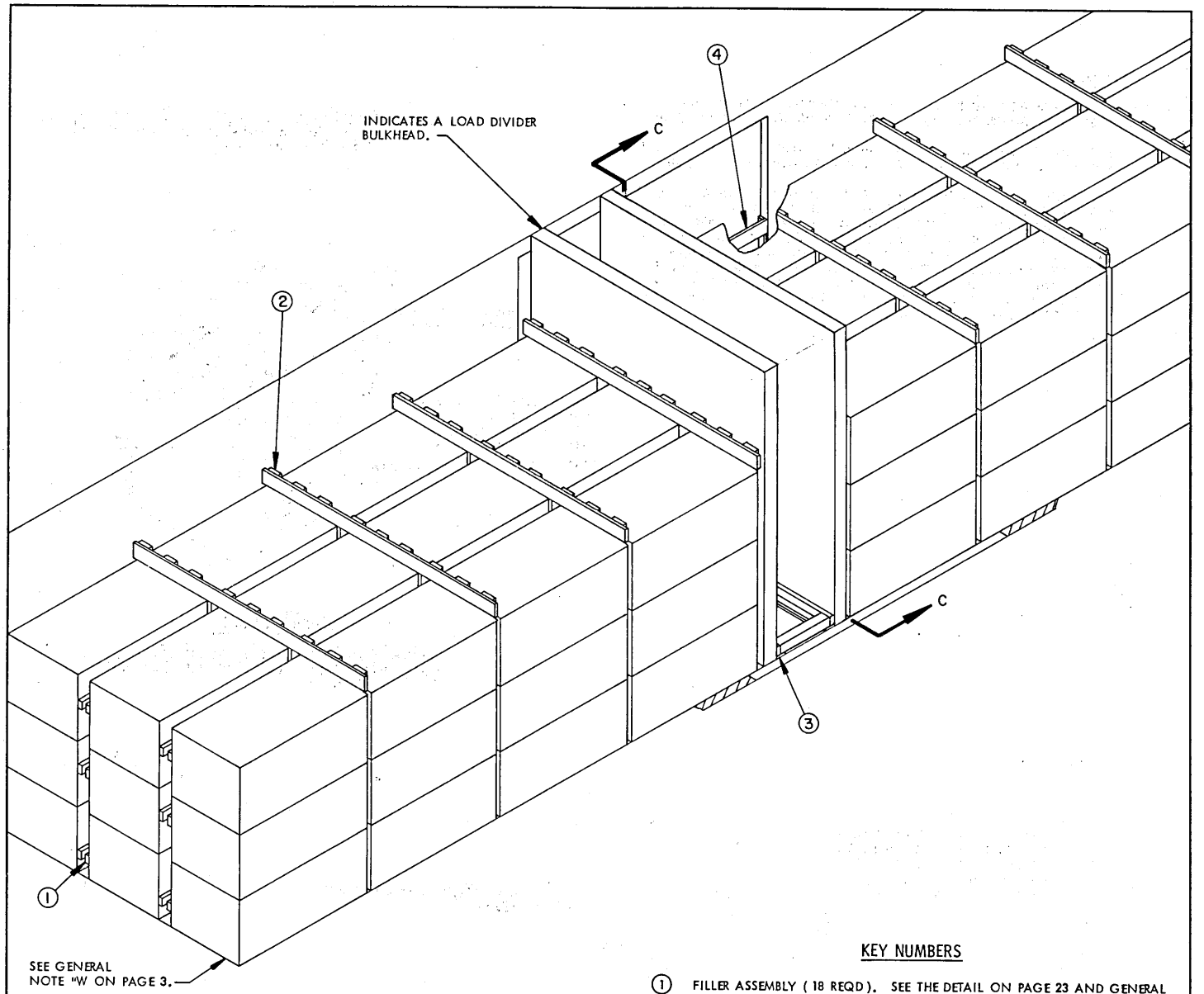
SEPARATOR GATE

THE ABOVE SEPARATOR GATE IS FOR USE IN A ONE PALLET UNIT HIGH, 1 PALLET UNIT WIDE LOAD BAY CONFIGURATION.

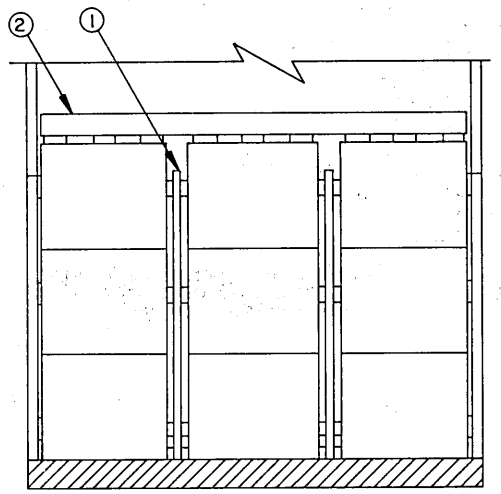


SPACER ASSEMBLY

TYPICAL LCL (7-UNIT LOAD) IN A BOX CAR EQUIPPED WITH
MECHANICAL BRACING DEVICES HAVING ADJUSTABLE OR FIXED WALL MEMBERS



ISOMETRIC VIEW



SECTION C-C

KEY NUMBERS

(1) FILLER ASSEMBLY (18 REQD). SEE THE DETAIL ON PAGE 23 AND GENERAL NOTE "P" ON PAGE 2.

(2) SEPARATOR ASSEMBLY (9 REQD). SEE THE DETAIL ON PAGE 23.

(3) STRUT ASSEMBLY (1 REQD). SEE THE "STRUT ASSEMBLY FOR 1-PIECE BULKHEADS" DETAIL ON PAGE 32. INSTALL BETWEEN THE LOAD DIVIDER BULKHEADS. SEE SPECIAL NOTE 5 ON PAGE 31.

(4) DOORWAY PROTECTION (2 REQD). SEE THE "DOORWAY PROTECTION GATE" DETAIL ON PAGE 24. NAIL TO THE DOOR POSTS W/12*d* NAILS. SEE SPECIAL NOTE 7 ON PAGE 31.

81-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR EQUIPPED WITH LOAD DIVIDERS

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CUSHIONED BOX CAR EQUIPPED WITH LOAD DIVIDER BULKHEADS AND WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.

2. IF THE CAR BEING LOADED HAS BOWED END WALLS WHICH ARE BOWED OUTWARD 2" OR MORE 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. SEE THE DETAIL ON PAGE 25 AND GENERAL NOTE "W" ON PAGE 3.

3. IF PALLETIZED UNITS WHICH DO NOT CONTAIN A FULL QUANTITY OF CONTAINERS ARE TO BE TRANSPORTED, SEE PAGES 19, 20, AND 21 FOR SHIPPING GUIDANCE.

4. FOR SHIPMENT OF ONE OR MORE LEFTOVER CONTAINERS, SEE THE GUIDANCE CONTAINED ON PAGE 18.

5. THE STRUT ASSEMBLY, SHOWN AS PIECE MARKED ③ IN THE LOAD ON PAGE 30, IS REQUIRED WHEN THE LOAD IN EITHER END OF THE CAR IS 50,000 POUNDS OR MORE.

6. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY OF PALLETIZED UNITS TO BE SHIPPED. FOR METHODS OF REDUCING A LOAD, AND FOR TYPICAL LCL PROCEDURES, REFER TO PAGES 6 THROUGH 17.

7. DOORWAY PROTECTION IS REQUIRED FOR ALL LOAD UNITS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY BY ONE-HALF OR MORE OF THE UNIT WIDTH. FOR ALTERNATIVE DOORWAY PROTECTION, SEE PAGE 24. FOR CARS EQUIPPED WITH PLUG TYPE DOORS, NAILED FLOORLINE BLOCKING AND LOAD BUNDLING STRAPS, SUCH AS THAT SHOWN ON PAGES 4 AND 5, MUST BE USED.

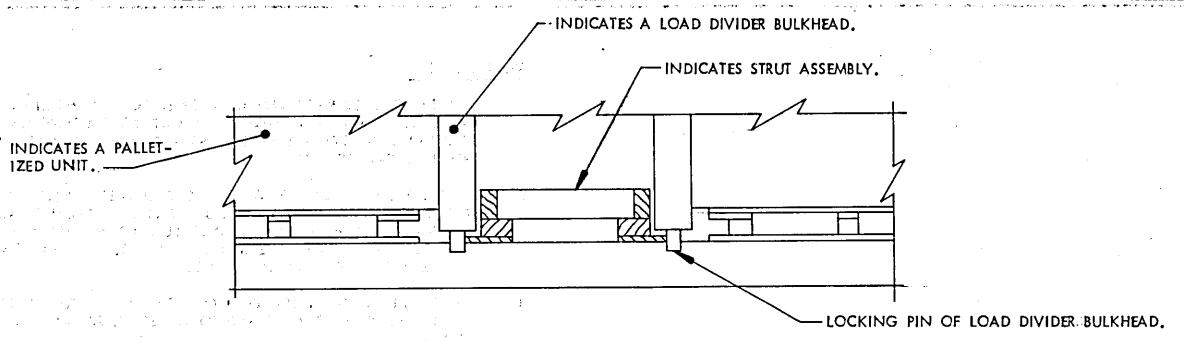
BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	750	375
1" X 8"	9	6
2" X 3"	25	13
2" X 4"	801	534
4" X 4"	12	16
NAILS	**NO. REQD**	**POUNDS**
6d (2")	370	2-1/4
10d (3")	452	7
12d (3-1/4")	40	3/4

LOAD AS SHOWN

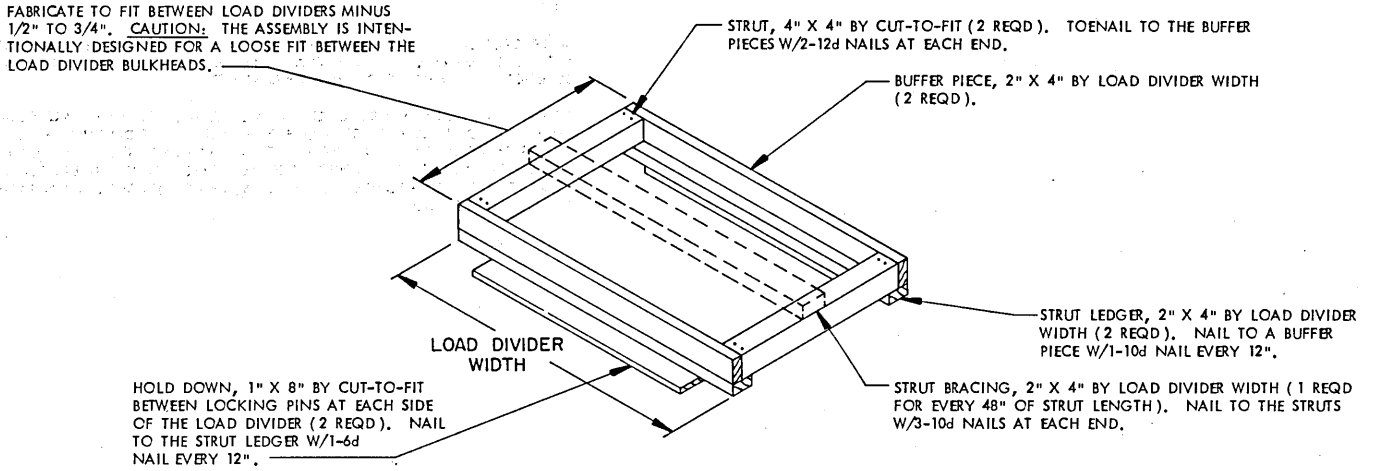
ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	81	109,998 LBS
DUNNAGE		1,898 LBS
TOTAL WEIGHT		111,896 LBS

81-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR EQUIPPED WITH LOAD DIVIDERS



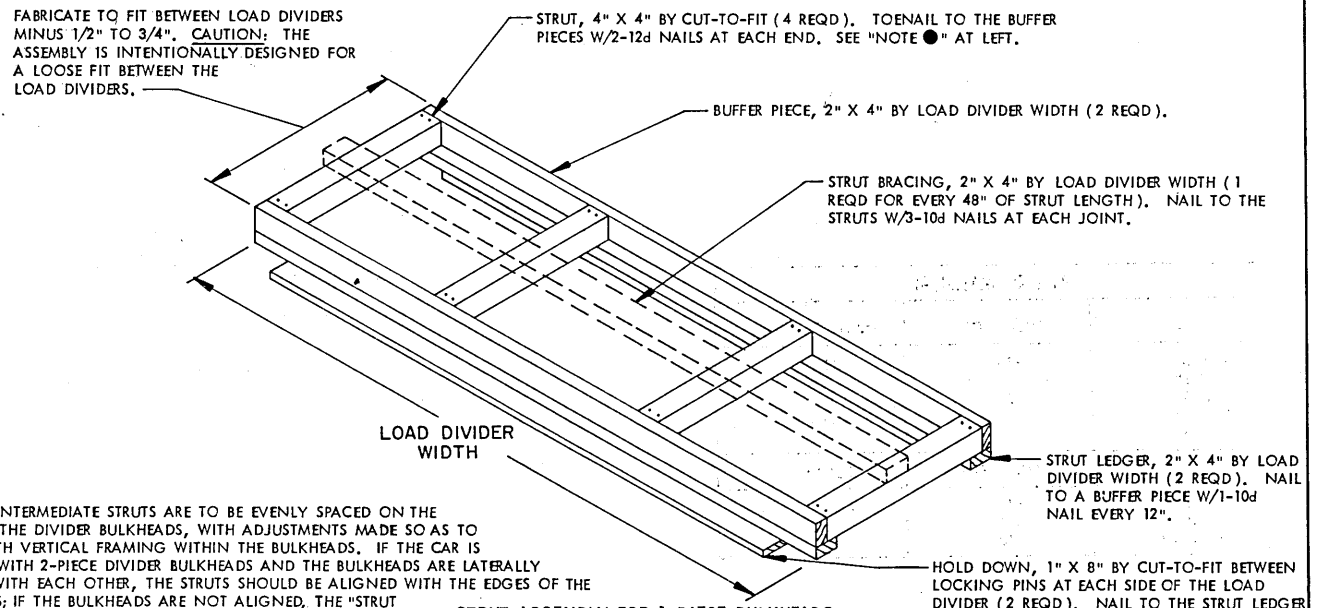
INSTALLATION OF STRUT ASSEMBLY

THIS 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.



STRUT ASSEMBLY FOR 2-PIECE BULKHEADS

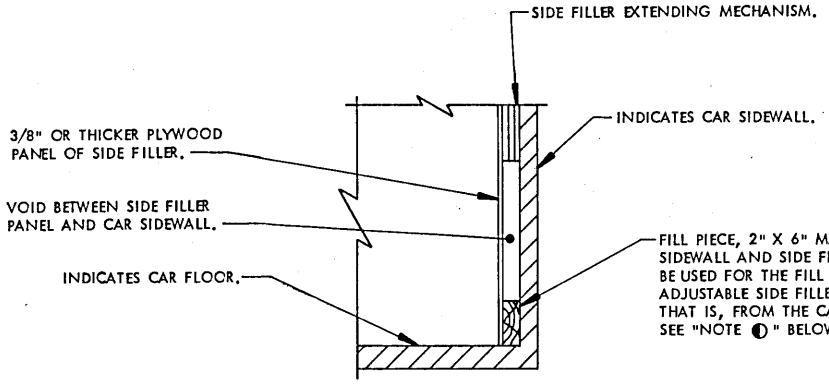
A STRUT ASSEMBLY IS REQUIRED WHEN THE LOAD BEHIND EITHER LOAD DIVIDER BULKHEAD EXCEEDS 50,000 POUNDS OF CLASS A OR CLASS B EXPLOSIVES. A STRUT ASSEMBLY IS NOT REQUIRED FOR LOADS OF CLASS C EXPLOSIVFS, REGARDLESS OF THE WEIGHT OF THE LOAD.
NOTE: TWO ASSEMBLIES AS SHOWN ARE REQUIRED FOR A 2-PIECE BULKHEAD IF NOT LATERALLY ALIGNED.



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

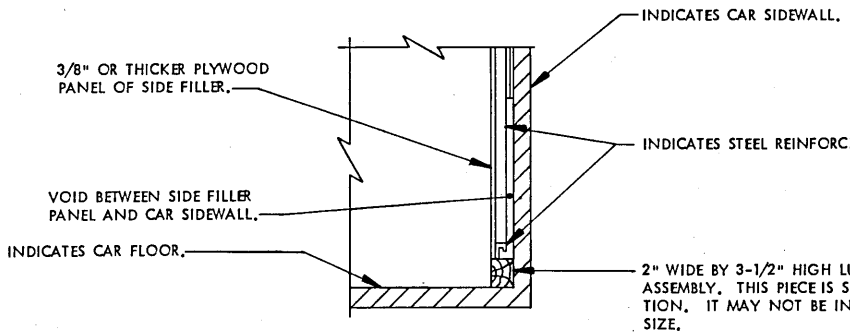
A STRUT ASSEMBLY IS REQUIRED WHEN THE LOAD BEHIND EITHER LOAD DIVIDER BULKHEAD EXCEEDS 50,000 POUNDS OF CLASS A OR CLASS B EXPLOSIVES. A STRUT ASSEMBLY IS NOT REQUIRED FOR LOADS OF CLASS C EXPLOSIVES, REGARDLESS OF THE WEIGHT OF THE LOAD.



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.