

APPROVED BY
 BUREAU OF EXPLOSIVES
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 SUPERVISOR, MILITARY & INTERMODAL SERVICES
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LOADING AND BRACING (CL & LCL) IN BOX CARS OF 152MM CARTRIDGE, PACKED IN A CYLINDRICAL METAL CONTAINER AND PALLETIZED HORIZONTALLY, 20 PER 35" BY 45-1/2" 4-WAY ENTRY PALLET

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⊙ INCLUDES PROCEDURES FOR CONVENTIONAL BOX CARS, BOX CARS EQUIPPED WITH MECHANICAL BRACING DEVICES OF VARIOUS DESIGN AND MANUFACTURE, AND CUSHIONED BOX CARS EQUIPPED WITH LOAD DIVIDERS (BULKHEADS).

DO NOT SCALE

REVISIONS			
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U. S. ARMY DARCOM DRAWING			
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CLASS	DIVISION	DRAWING	FILE
19	48	4121	5PM 1002

GENERAL NOTES

(GENERAL NOTES CONTINUED)

- A. THIS EQUIPMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1, AND AMENDMENTS TM 743-200-1 (CHAPTER 5).
- B. THE UNLOADING PROCEDURES SPECIFIED IN THIS DRAWING ARE APPLICABLE TO THE ISOPAK CARTRIDGE, PALLETIZED, SUBSEQUENT REFERENCE TO PALLET UNIT HEREIN SPANS THE PALLET UNIT OF TWENTY (20) CYLINDRICAL METAL CONTAINERS WITH CONTENTS.
- C. FOR DETAIL OF THE PALLET UNIT SEE PAGE 3.
- DIMENSIONS ----- 36-1/4" LONG X 50-1/2" WIDE X 45-1/4" HIGH.
GROSS WEIGHT ----- 1,854 POUNDS (APPROX).
- D. THE UNLOADING PROCEDURES SPECIFIED HEREIN ARE BASED ON CONVENTIONAL BOX CARS, OR ARE BASED ON BOX CARS EQUIPPED WITH MECHANICAL BRACING DEVICES HAVING ADJUSTABLE AND/OR FIXED WALL MEMBER. 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 11 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 11. THE TYPICAL COMBINATION PROCEDURES DEPICTED ON PAGES 8 AND 9 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 14 THROUGH 17, 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 FRINTER SEAT TYPE CUSHIONING DEVICES OR END-OF-CAR TYPE DEVICES WHICH HAVE AT LEAST SEVEN INCHES (7") OF TRAVEL ARE ACCEPTABLE.
- G. SIDE 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 17 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 17, THE "FILL PIECE" MATERIAL IS NOT REQUIRED. NOTE: DUNNAGE MATERIALS MUST NOT BE NAILED TO SIDE FILLERS.
- H. 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.
- I. 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.
- C. THE LOADS AS SHOWN ON PAGES 18 THROUGH 21 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 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 HEREIN. CAUTION: BOX CARS EQUIPPED WITH MEMBERS WHICH DO NOT MEET THE LOCATION REQUIREMENTS MUST NOT BE USED.

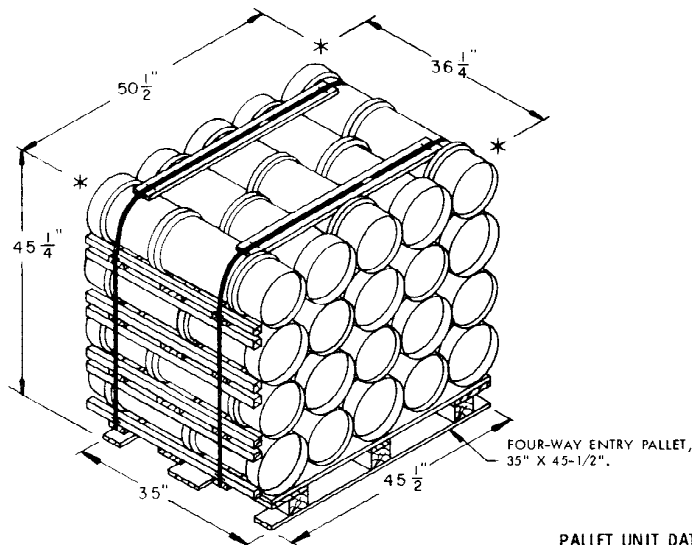
(CONTINUED AT RIGHT)

MATERIAL SPECIFICATIONS

- LUMBER ----- SEE TM 743-200-1, DUNNAGE LUMBER; FED SPEC MM-L-751.
- NAILS ----- FED SPEC FF-N-105, COMMON.
- STRAPPING, STEEL ----- CLASS I, TYPE I OR IV, HEAVY DUTY, FINISH A OR B (GRADE 2), FED SPEC QQ-S-781.
- SEAL, STRAP ----- TYPE D, STYLE I, H, OR IV, CLASS H, FED SPEC QQ-S-781.
- STAPLE, STRAP ----- TYPE III, STYLE 3, 1-17/32" WIDE BY 3/4" LEG LENGTH, OR EQUIVALENT, FED SPEC FF-N-105.
- PLYWOOD ----- GROUP B OR C, GRADE C-D (EXTERIOR), FED SPEC NN-P-530. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER EXTERIOR GRADE MAY BE SUBSTITUTED.
- WIRE ----- FED SPEC QQ-W-461.

1. A CROSS MEMBER, WHEN USED AS SPECIFIED BY ANY ONE OF THE DEPICTED UNLOADING 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 THERE WITH 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.
- 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 UNLOADING 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.
- 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 4" MATERIAL IN LIEU OF EACH 4" X 4" STRUT. DOUBLED 2" X 4" STRUTS WILL BE LAMINATED 1/1-10d NAIL EVERY 6".
- 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 SIDE WALL, HAVE BEEN OMITTED FROM THE LOAD VIEWS FOR CLARITY PURPOSES.

(CONTINUED ON PAGE 3)



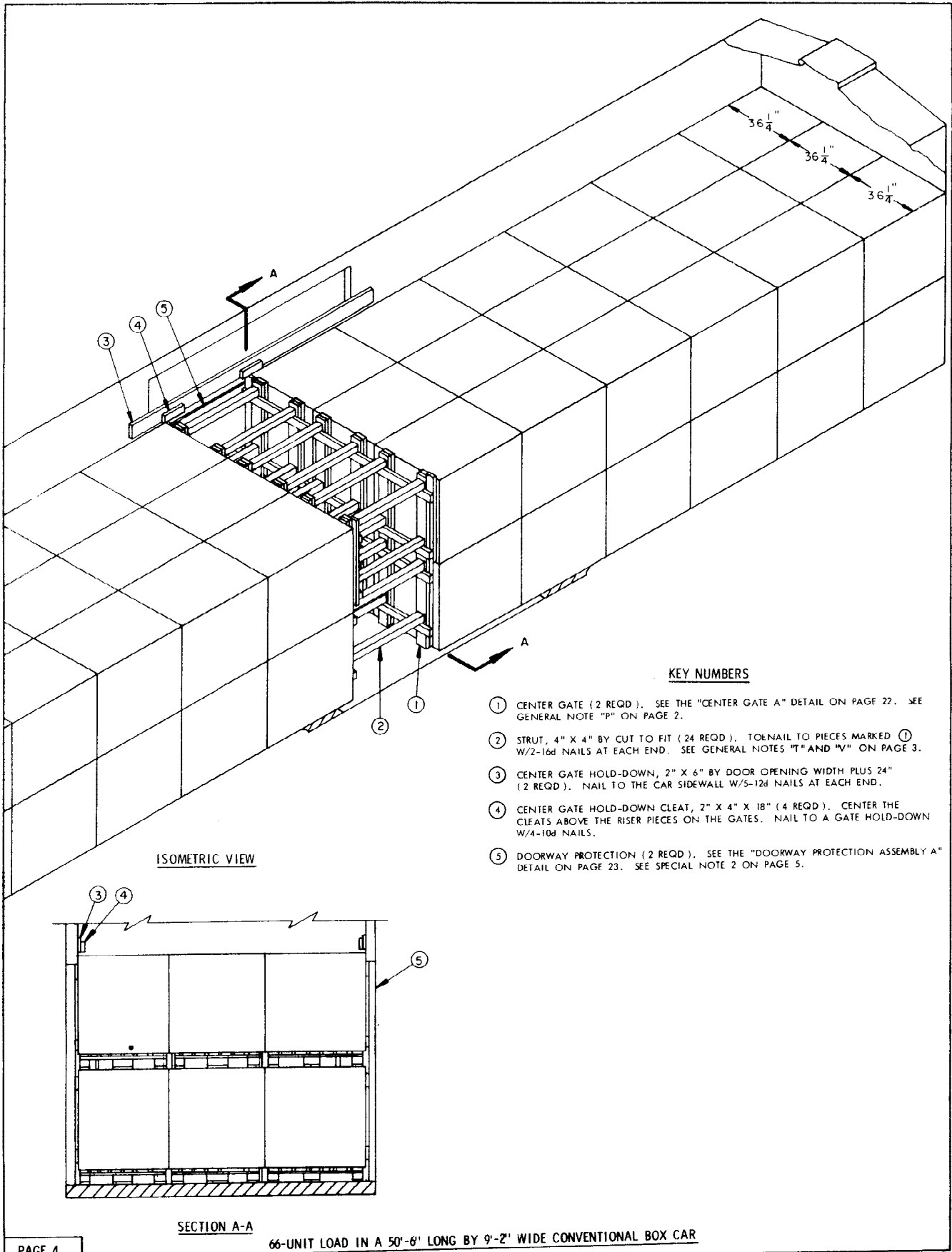
152MM CARTRIDGE, PALLETIZED

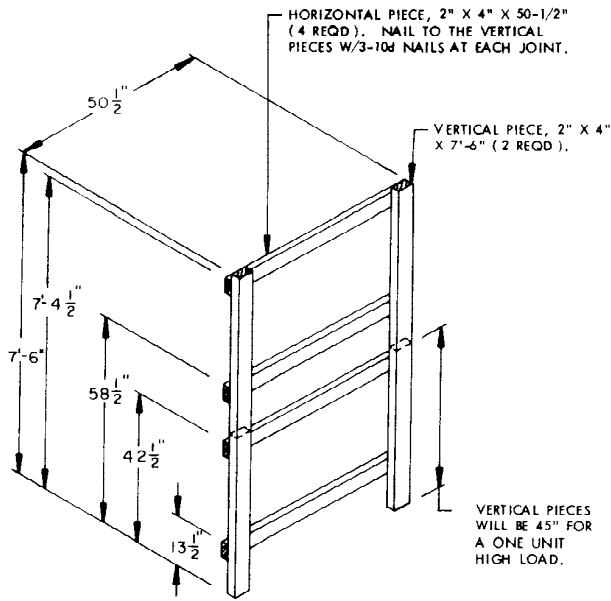
PALLET UNIT DATA:

20 EACH, 152MM CARTRIDGE IN CONTAINER @ 85 LBS.
 GROSS WEIGHT ----- 1,854 POUNDS (APPROX)
 CUBE ----- 47.9 CUBIC FEET.

(GENERAL NOTES CONTINUED FROM PAGE 2)

- 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 AS SHOWN ON PAGE 33. 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 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.
- U. THE USE OF AN OFFSET LOADING PATTERN WILL FACILITATE LOADING AND UNLOADING OPERATIONS IN THE DOORWAY AREA OF THE CAR. WHERE 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 29 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.
- 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 34 FOR GUIDANCE.





ANTI-SWAY BRACE ASSEMBLY C

THE ANTI-SWAY BRACE SHOWN ABOVE IS FOR USE BETWEEN PALLET UNITS THAT ARE POSITIONED WITH THE 50-1/2" DIMENSION PARALLEL TO THE CAR SIDE WALL AND LOADED THREE ACROSS THE CAR WIDTH. THIS ASSEMBLY IS TO BE USED WHEN THE TOTAL LATERAL SPACE BETWEEN THE PALLET UNITS POSITIONED ACROSS THE CAR IS GREATER THAN 3". ADDITIONAL MATERIAL OF A THICKNESS TO SUIT, AS REQUIRED TO FILL THE VOID, MAY BE LAMINATED TO THE VERTICAL PIECES.

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. WIDER CARS MAY BE USED TO SHIP THE LOAD AS DEPICTED. FOR PROCEDURES APPLICABLE TO NARROWER CARS, SEE THE LOAD SHOWN ON PAGES 6 AND 7. ALSO, CARS HAVING DOOR OPENINGS OF OTHER WIDTHS OR STAGGERED DOORWAYS MAY ALSO BE USED.
2. 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 LENGTH. DOORWAY PROTECTION FOR A 3-WIDE LOAD IN A CAR EQUIPPED WITH SLIDING DOORS MUST BE WOODEN DOOR GATES AS SHOWN/ SPECIFIED FOR THE LOAD ON PAGE 4. THE NAILED-DOWN DOORWAY BLOCKING AND STRAPPING METHOD CANNOT BE USED. HOWEVER, IF THE CAR BEING USED IS EQUIPPED WITH PLUG DOORS, THE DOORWAY-AREA LOAD UNITS MUST BE ENCIRCLED WITH 1-1/4" X .035" STEEL STRAPPING. TWO (2) STRAPS ARE REQUIRED AROUND A LOAD UNIT WHICH IS NOT RETAINED BY AT LEAST SIX INCHES (6") OF THE CAR SIDEWALL ON BOTH SIDES OF THE LOAD, AND ONE (1) STRAP IS REQUIRED AROUND A LOAD UNIT WHICH IS RETAINED BY AT LEAST SIX INCHES (6") BUT LESS THAN HALF OF THE UNIT LENGTH. A SPACER WILL NOT BE USED UNDER THESE STRAPS. REFER TO PAGE 13 FOR PROVISIONS FOR BOX CARS EQUIPPED WITH PLUG DOORS.
3. IF THE DELINEATED OUTLOADING METHOD IS USED FOR A SHIPMENT OF A LOAD WHICH CONTAINS LESS PALLET UNITS THAN SHOWN, SEE PAGES 6 THROUGH 9 AND "PROCEDURES FOR AN OMITTED PALLET UNIT" ON PAGE 12.
4. FOR SHIPMENT OF LESS-THAN-FULL-LOADS, REFER TO THE APPLICABLE GUIDANCE ON PAGES 10 AND 11.
5. IF A BOX CAR TO BE LOADED HAS BOWED END WALLS WHICH ARE BOWED OUTWARD TWO INCHES (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. THE CENTER GATE, SHOWN AS KEY NUMBER (C) ON PAGE 4, MAY BE USED FOR THE BULKHEAD. OMIT THE RISER PIECE AND POSITION WITH THE VERTICAL PIECES PLACED AGAINST THE LADING. SHIM MATERIAL OF A THICKNESS AND LENGTH AS REQUIRED WILL BE POSITIONED TO FILL THE VOID BETWEEN THE CAR ENDWALL AND THE BULKHEAD, AND SHALL BE NAILED TO THE STRUT LEDGERS W/3-APPLICABLY SIZED NAILS AT EACH JOINT. SEE "BULKHEAD A" ON PAGE 34.
6. FOR SHIPMENT OF PARTIAL PALLET UNITS AND/OR SHIPMENT OF LEFTOVER CONTAINERS, SEE PAGES 11, 12 AND 20.
7. IF THE TOTAL LATERAL SPACE BETWEEN THE PALLET UNITS POSITIONED ACROSS THE CAR IS GREATER THAN 3", SEE THE "ANTI-SWAY BRACE ASSEMBLY C" ON THIS PAGE.

VERTICAL PIECES WILL BE 45" FOR A ONE UNIT HIGH LOAD.

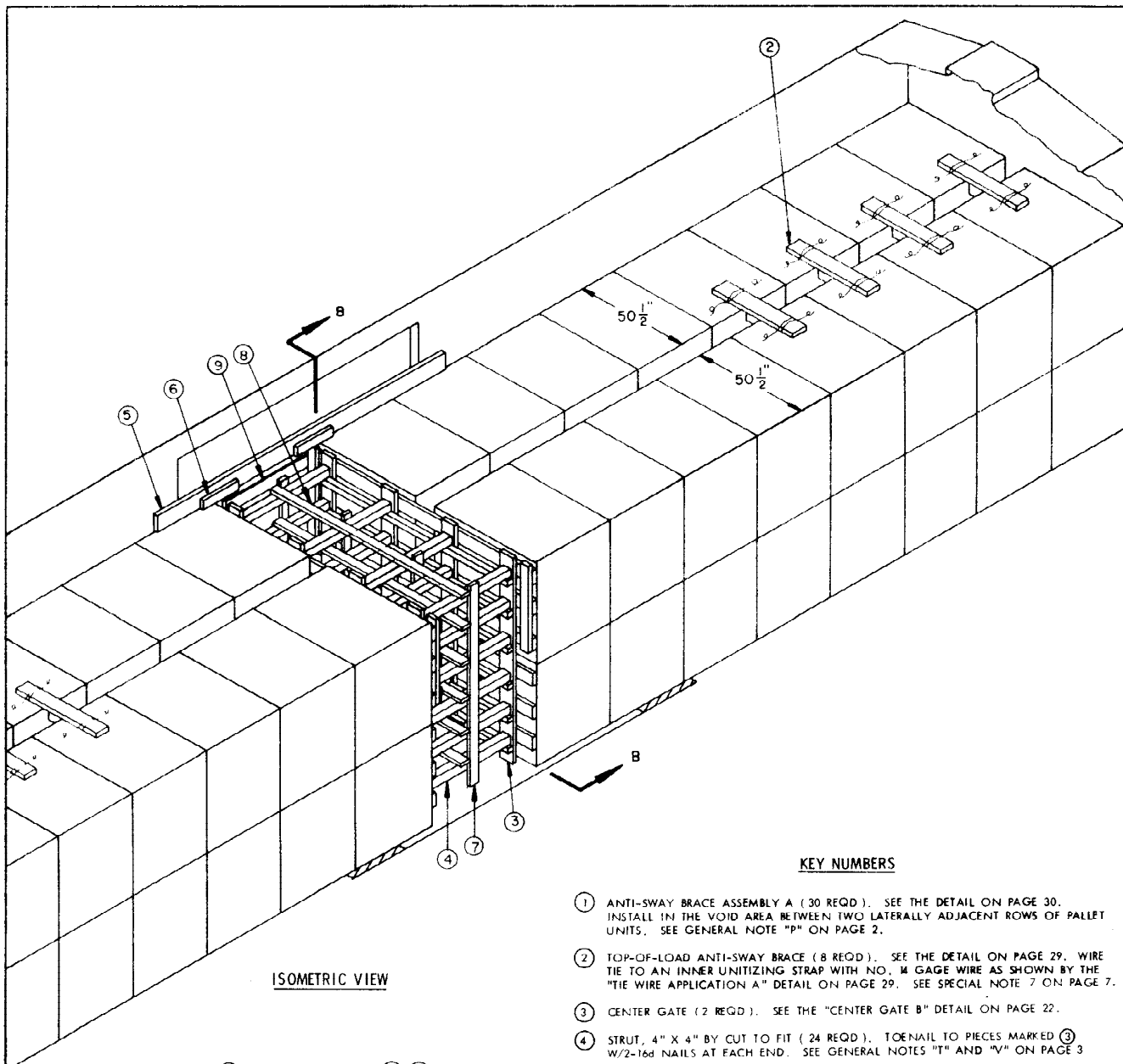
BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	80	40
2" X 3"	28	14
2" X 4"	94	63
2" X 6"	204	204
4" X 4"	89	119
NAILS	NO. REQD	POUNDS
6d (2")	48	1/2
10d (3")	280	4-1/2
12d (3-1/4")	20	1/2
16d (3-1/2")	96	2-1/4

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	66	122,364 LBS
DUNNAGE		888 LBS
TOTAL WEIGHT		123,252 LBS

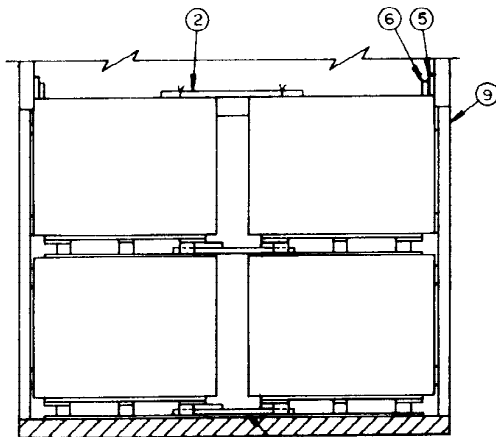
66-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL BOX CAR



ISOMETRIC VIEW

KEY NUMBERS

- ① ANTI-SWAY BRACE ASSEMBLY A (30 REQD.). SEE THE DETAIL ON PAGE 30. INSTALL IN THE VOID AREA BETWEEN TWO LATERALLY ADJACENT ROWS OF PALLET UNITS. SEE GENERAL NOTE "P" ON PAGE 2.
- ② TOP-OF-LOAD ANTI-SWAY BRACE (8 REQD.). SEE THE DETAIL ON PAGE 29. WIRE TIE TO AN INNER UNITIZING STRAP WITH NO. 4 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION A" DETAIL ON PAGE 29. SEE SPECIAL NOTE 7 ON PAGE 7.
- ③ CENTER GATE (2 REQD.). SEE THE "CENTER GATE B" DETAIL ON PAGE 22.
- ④ STRUT, 4" X 4" BY CUT TO FIT (24 REQD.). TOENAIL TO PIECES MARKED ③ W/2-16d NAILS AT EACH END. SEE GENERAL NOTES "T" AND "V" ON PAGE 3
- ⑤ CENTER GATE HOLD DOWN, 2" X 4" 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 THE CLEATS ABOVE THE RISER PIECES ON GATES. NAIL TO A GATE HOLD DOWN W/4-10d NAILS.
- ⑦ VERTICAL STRUT BRACING, 2" X 4" BY CUT-TO-EXTEND 2" ABOVE THE TOP STRUT (4 REQD.). NAIL TO THE STRUT W/3-10d NAILS AT EACH JOINT. SEE GENERAL NOTE "T" ON PAGE 3 AND "STRUT BRACING DETAIL" ON PAGE 33.
- ⑧ HORIZONTAL STRUT BRACING, 2" X 4" BY CUT-TO-FIT (6 REQD.). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.
- ⑨ DOORWAY PROTECTION (2 REQD.). SEE THE "DOORWAY PROTECTION ASSEMBLY B" DETAIL ON PAGE 23. SEE SPECIAL NOTE 2 ON PAGE 7.



SECTION B-B

60-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 DOOR OPENINGS OF OTHER WIDTHS OR STAGGERED DOORWAYS MAY ALSO BE USED.
2. 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 LENGTH. FOR ALTERNATIVE DOORWAY PROTECTION REFER TO KEY NUMBERS ⑨, ⑩ AND ⑪ ON PAGE 8.
3. IF THE DELINEATED OUTLOADING METHOD IS USED FOR A SHIPMENT OF A LOAD WHICH CONTAINS LESS PALLET UNITS THAN SHOWN, SEE PAGES 8 AND 9 AND "PROCEDURES FOR AN OMITTED PALLET UNIT" ON PAGE 12.
4. FOR SHIPMENT OF LESS-THAN-CAR-LOADS, REFER TO THE APPLICABLE GUIDANCE ON PAGES 10 AND 11.
5. IF A BOX CAR TO BE LOADED HAS BOWED END WALLS WHICH ARE BOWED OUTWARD TWO INCHES (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. THE CENTER GATE, SHOWN AS KEY NUMBER ③ ON PAGE 6, MAY BE USED FOR THE BULKHEAD. OMIT THE STRUT LEDGER AND THE RISER PIECE AND POSITION WITH THE HORIZONTAL PIECES PLACED AGAINST THE LADING. SHIM MATERIAL OF A THICKNESS AND LENGTH AS REQUIRED WILL BE POSITIONED TO FILL THE VOID BETWEEN THE CAR ENDWALL AND THE BULKHEAD, AND SHALL BE NAILED TO THE VERTICAL PIECES W/3-APPLICABLY SIZED NAILS AT EACH JOINT. SEE "BULKHEAD B" ON PAGE 34.
6. FOR SHIPMENT OF PARTIAL PALLET UNITS AND/OR SHIPMENT OF LEFTOVER CONTAINERS, SEE PAGES 11, 12, AND 20.
7. THE ANTI-SWAY BRACE ASSEMBLY A, SHOWN AS PIECES MARKED ①, AND THE TOP-OF-LOAD ANTI-SWAY BRACE, SHOWN AS PIECES MARKED ②, MAY BE OMITTED IF THE SPACE BETWEEN LATERALLY ADJACENT UNITS IS 6" OR LESS.

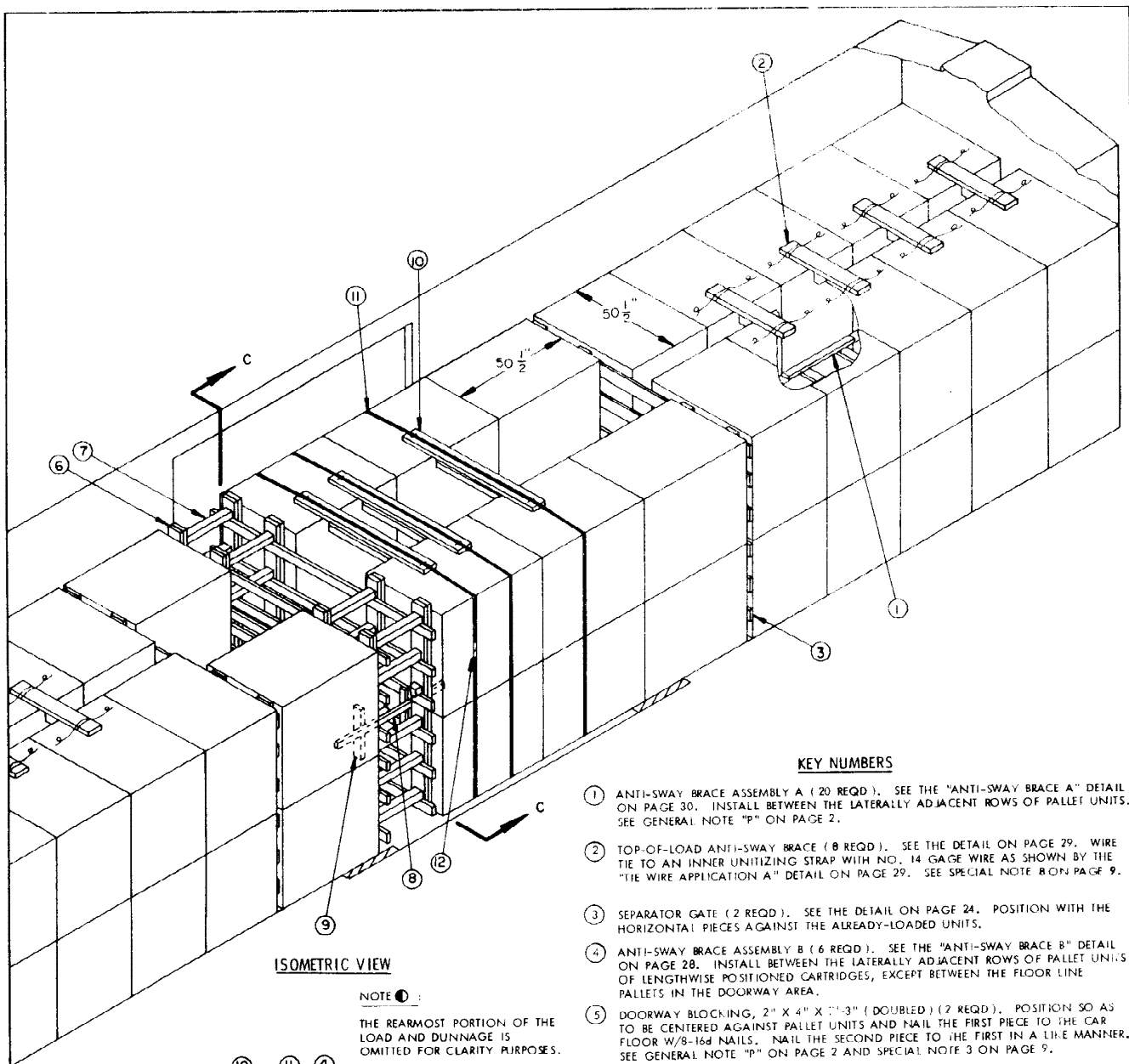
BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	80	40
2" X 2"	96	32
2" X 3"	29	15
2" X 4"	352	234
2" X 6"	230	230
2" X 8"	90	120
4" X 4"	113	151
NAILS	NO. REQD	POUNDS
6d (2")	48	1/2
10d (3")	820	12-3/4
12d (3-1/4")	44	3/4
16d (3-1/2")	96	2-1/4
WIRE, NO. 14 GAGE ----- 32' REQD ----- NIL		

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT -----	60 -----	111,240 LBS
DUNNAGE -----	-----	1,661 LBS
TOTAL WEIGHT -----		112,901 LBS

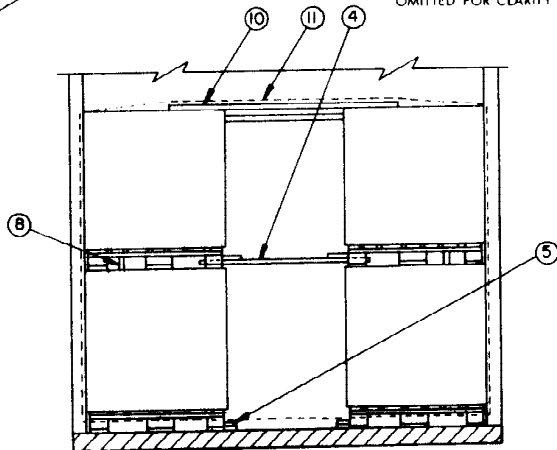
60-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL BOX CAR



ISOMETRIC VIEW

NOTE 1 :

THE REAR MOST PORTION OF THE LOAD AND DUNNAGE IS OMITTED FOR CLARITY PURPOSES.



SECTION C-C

SEE "NOTE 1" ABOVE.

TYPICAL COMBINATION LOAD IN A 50'-8" LONG BY 9'-2" WIDE CONVENTIONAL BOX CAR

KEY NUMBERS

- ① ANTI-SWAY BRACE ASSEMBLY A (20 REQD). SEE THE "ANTI-SWAY BRACE A" DETAIL ON PAGE 30. INSTALL BETWEEN THE LATERALLY ADJACENT ROWS OF PALLET UNITS. SEE GENERAL NOTE "P" ON PAGE 2.
- ② TOP-OF-LOAD ANTI-SWAY BRACE (8 REQD). SEE THE DETAIL ON PAGE 29. WIRE TIE TO AN INNER UNITIZING STRAP WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION A" DETAIL ON PAGE 29. SEE SPECIAL NOTE B ON PAGE 9.
- ③ SEPARATOR GATE (2 REQD). SEE THE DETAIL ON PAGE 24. POSITION WITH THE HORIZONTAL PIECES AGAINST THE ALREADY-LOADED UNITS.
- ④ ANTI-SWAY BRACE ASSEMBLY B (6 REQD). SEE THE "ANTI-SWAY BRACE B" DETAIL ON PAGE 28. INSTALL BETWEEN THE LATERALLY ADJACENT ROWS OF PALLET UNITS OF LENGTHWISE POSITIONED CARTRIDGES, EXCEPT BETWEEN THE FLOOR LINE PALLETS IN THE DOORWAY AREA.
- ⑤ DOORWAY BLOCKING, 2" X 4" X 3" (DOUBLED) (2 REQD). POSITION SO AS TO BE CENTERED AGAINST PALLET UNITS 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 "P" ON PAGE 2 AND SPECIAL NOTE 3 ON PAGE 9.
- ⑥ CENTER GATE (2 REQD). SEE THE "CENTER GATE C" DETAIL ON PAGE 24.
- ⑦ STRUT, 4" X 4" BY CUT TO FIT (24 REQD). TOENAIL TO PIECES MARKED ⑥ W/2-16d NAILS AT EACH END. SEE GENERAL NOTES "T" AND "V" ON PAGE 3.
- ⑧ GATE HOLD DOWN, 2" X 3" BY CENTER DISTANCE PLUS 24" (2 REQD). SEE THE "INSTALLATION OF GATE HOLD DOWN" ON PAGE 29.
- ⑨ GATE HOLD DOWN RETAINER PIECE, 2" X 4" BY LENGTH TO SUIT (4 REQD). POSITION AGAINST PIECE MARKED ⑧ AND NAIL TO THE HORIZONTAL PIECES OF A CENTER GATE W/3-10d NAILS AT EACH END. SEE THE "INSTALLATION OF GATE HOLD DOWN" ON PAGE 29.
- ⑩ SPACER (3 REQD). SEE THE DETAIL ON PAGE 33.
- ⑪ DOORWAY PROTECTION STRAP, 1-1/4" X .035" X 35'-0" LONG (REF) STEEL STRAPPING (3 REQD). INSTALL SO AS TO ENCIRCLE THE LOAD UNIT IN THE DOORWAY AREA. SECURE TO PIECE MARKED ⑩ W/2 STAPLES. SEE SPECIAL NOTE 3 ON PAGE 9.
- ⑫ SEAL FOR 1-1/4" STRAPPING (6 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "Q" ON PAGE 2.

SPECIAL NOTES:

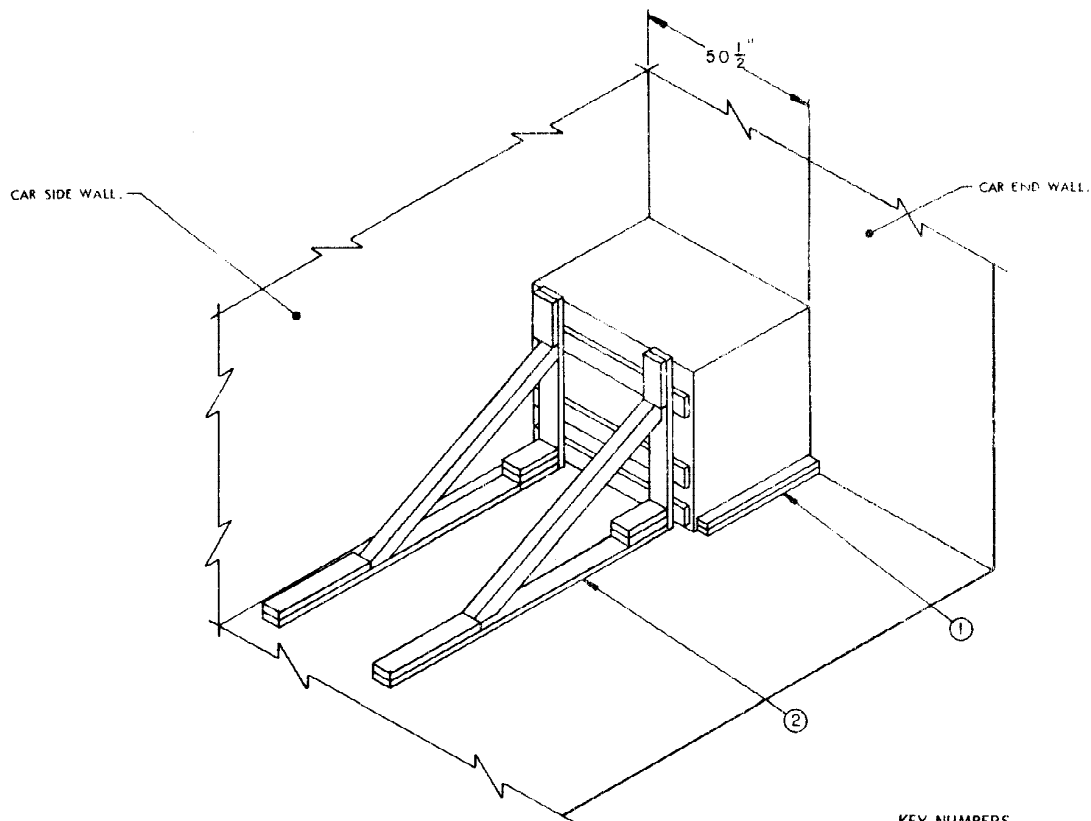
1. A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING DOOR OPENINGS OF OTHER WIDTHS OR STAGGERED DOORWAYS MAY ALSO BE USED.
2. THE PURPOSE OF THE COMBINATION LOAD SHOWN ON PAGE 8 IS TO INCREASE OR REDUCE THE QUANTITY OF UNITS IN A LOAD AND/OR TO SHORTEN THE LENGTH OF THE LOAD-BLOCKING STRUTS.
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 REFER TO PAGES 4 AND 6.
4. IF THE DELINEATED OUTLOADING METHOD IS USED FOR A SHIPMENT OF A LOAD WHICH CONTAINS LESS PALLET UNITS THAN SHOWN, SEE "PROCEDURES FOR AN OMITTED PALLET UNIT" ON PAGE 12.
5. FOR SHIPMENT OF LESS-THAN-CAR-LOADS, REFER TO THE APPLICABLE GUIDANCE ON PAGES 10 AND 11.
6. IF A BOX CAR TO BE LOADED HAS BOWED END WALLS WHICH ARE BOWED OUTWARD TWO INCHES (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. THE CENTER GATE, SHOWN AS KEY NUMBER ③ ON PAGE 6, MAY BE USED FOR THE BULKHEAD. OMIT THE STRUT LEDGER AND THE RISER PIECE AND POSITION WITH THE HORIZONTAL PIECES PLACED AGAINST THE LADING. SHIM MATERIAL OF A THICKNESS AND LENGTH AS REQUIRED WILL BE POSITIONED TO FILL THE VOID BETWEEN THE CAR ENDWALL AND THE BULKHEAD, AND SHALL BE NAILED TO THE VERTICAL PIECES W/3-APPLICABLY SIZED NAILS AT EACH JOINT.
7. FOR SHIPMENT OF PARTIAL PALLET UNITS AND/OR LEFTOVER CONTAINERS SEE PAGES 11, 12 AND 20.
8. THE ANTI-SWAY BRACE ASSEMBLY A, SHOWN AS PIECES MARKED ①, AND THE TOP-OF-LOAD ANTI-SWAY BRACE, SHOWN AS PIECES MARKED ②, MAY BE OMITTED IF THE SPACE BETWEEN LATERALLY ADJACENT UNITS IS 6" OR LESS.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	170	85
2" X 3"	9	5
2" X 4"	386	258
2" X 6"	150	150
2" X 8"	60	80
4" X 4"	48	64
NAILS	NO. REQD	POUNDS
6d (2")	144	1
10d (3")	476	7-1/2
12d (3-1/4")	34	3/4
16d (3-1/2")	128	3
STEEL STRAPPING, 1-1/4" X .035" -----	105' REQD --	15 LBS
SEAL FOR 1-1/4" STRAPPING -----	6 REQD --	NIL
STAPLES FOR 1-1/4" STRAPPING -----	6 REQD --	NIL
WIRE, NO. 14 GAGE -----	32' REQD --	NIL

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT -----	56 -----	103,824 LBS
DUNNAGE -----		1,312 LBS
TOTAL WEIGHT -----		105,136 LBS



ISOMETRIC VIEW

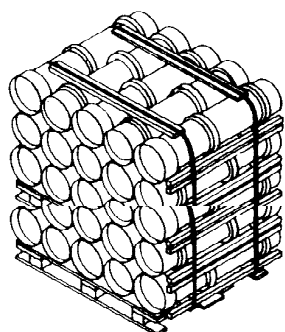
KEY NUMBERS

- ① SIDE BLOCKING, 2" X 4" X 36" (DOUBLED) (1 REQD). POSITION AGAINST THE PALLET UNIT AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/5-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "P" ON PAGE 2.
- ② KNEE BRACE ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 31 FOR CONSTRUCTION SPECIFICATIONS AND NAILING REQUIREMENTS. SEE SPECIAL NOTE 2 ON THIS PAGE.

SPECIAL NOTES:

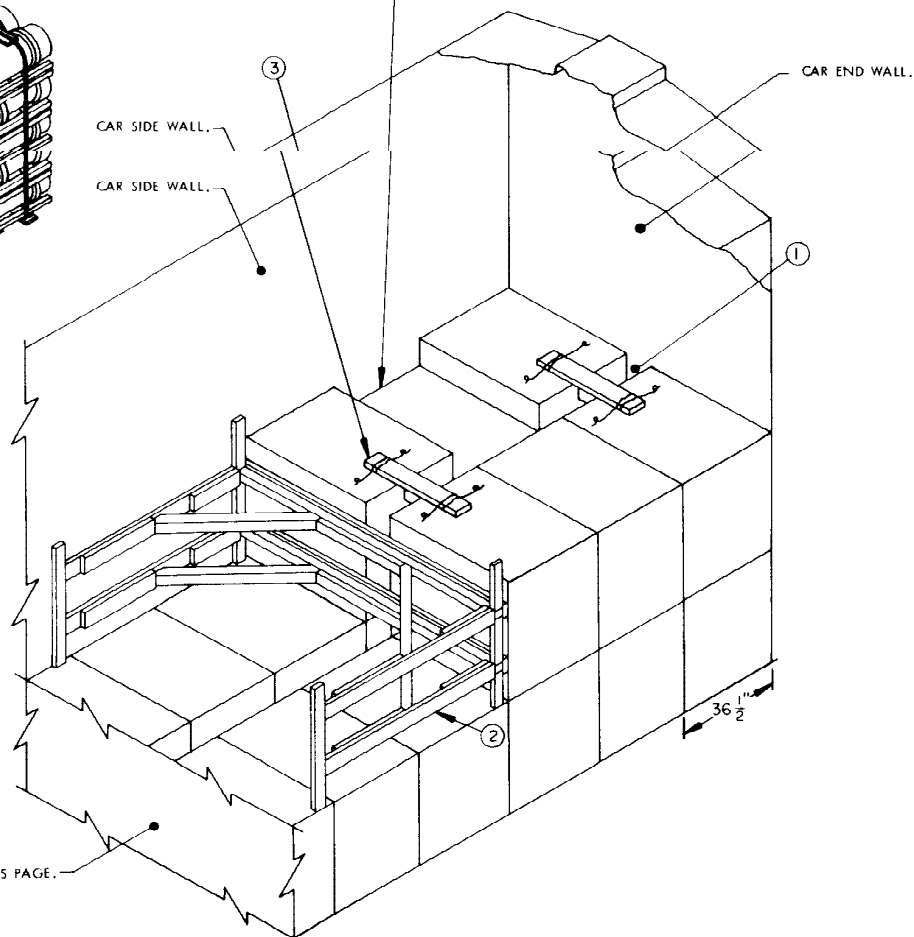
- 1. THIS LCL OUTLOADING PROCEDURE DEPICTS THE USE OF A KNEE-BRACE ASSEMBLY IN A BOX CAR EQUIPPED WITH WOOD OR NAILABLE METAL FLOORS.
- 2. ONE (1) KNEE-BRACE ASSEMBLY, AS SHOWN, IS ADEQUATE FOR RETAINING 8,500 POUNDS.
- 3. ONE OR MORE PALLET UNITS MAY BE RETAINED AT ONE AND/OR BOTH ENDS OF THE CAR.

TYPICAL LCL (1-UNIT LOAD)



PARTIAL PALLET UNIT.

INDICATES A LESS-THAN-FULL HEIGHT PALLET UNIT. SEE SPECIAL NOTES 2, 3, AND 4 AND THE "PARTIAL PALLET UNIT" DETAIL ON THIS PAGE.



SEE SPECIAL NOTE 9 ON THIS PAGE.

ISOMETRIC VIEW

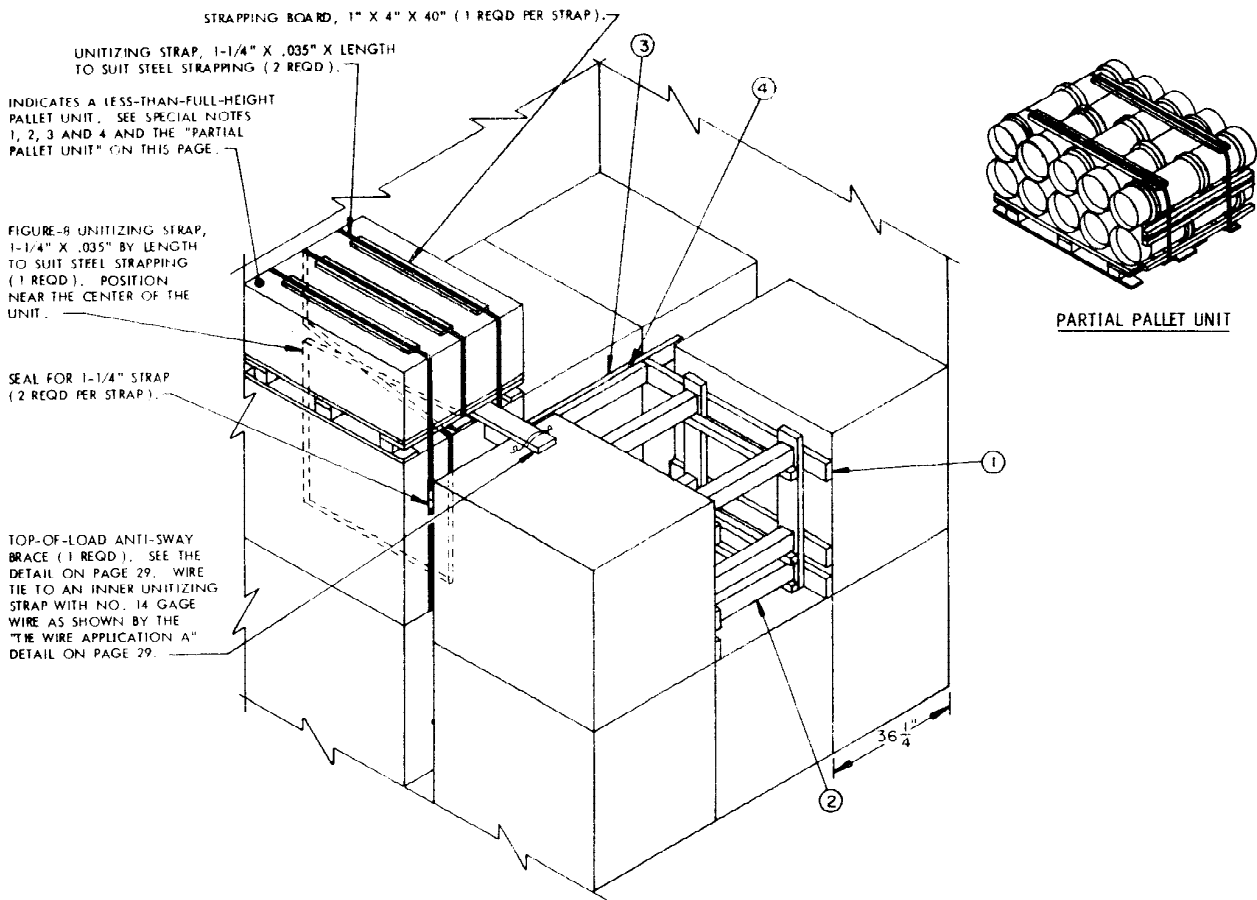
KEY NUMBERS

SPECIAL NOTES:

1. A 9'-2" WIDE CONVENTIONAL WOOD-LINED BOX CAR IS SHOWN. WOOD-LINED CARS OF OTHER WIDTHS CAN BE USED.
2. 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 UNITS WITHIN A LOAD. THE PROCEDURES ON THIS PAGE AND ON PAGE 12 ARE PRESENTED AS GUIDANCE IN THE SHIPMENT OF THESE PARTIAL UNITS.
3. ONLY PARTIAL PALLET UNITS WHICH HAVE A FULL THREE LAYERS OF CARTRIDGES SHOULD BE POSITIONED IN THE LOAD AS SHOWN. FOR SHIPMENT OF PARTIAL PALLET UNITS WHICH HAVE ONLY ONE OR TWO LAYERS OF CARTRIDGES, SEE THE PROCEDURES ON PAGE 12. FOR SHIPMENT OF "LEFTOVER" CARTRIDGES, SEE THE PROCEDURES ON PAGE 20.
4. THE LESS-THAN-FULL-HEIGHT PALLET UNIT MAY BE SHIPPED IN CONVENTIONAL BOX CARS, BOX CARS EQUIPPED WITH MECHANICAL BRACING DEVICES, AND BOX CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS. IT MUST BE POSITIONED WITHIN THE TOP TIER OF A TWO TIER LOAD.
5. THE K-BRACE DEPICTED IS APPLICABLE FOR PALLET UNITS POSITIONED CROSSWISE OR LENGTHWISE IN THE CAR.
6. THE K-BRACE METHOD OF PARTIAL LAYER BRACING, AS SHOWN ABOVE, MAY BE USED IN WOOD-LINED CARS FOR THE SECUREMENT OF A PARTIAL SECOND LAYER.
7. THE TYPE OF K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL LOAD OF NOT MORE THAN 14,000 POUNDS.
8. IF THE LATERAL SPACE BETWEEN THE PALLET UNITS POSITIONED ACROSS THE CAR WIDTH IS LESS THAN SIX INCHES, ANTI-SWAY BRACES SPECIFIED AS PIECES MARKED (1) ARE NOT REQUIRED.
9. ONLY A PARTIAL LOAD DEPICTING THE BLOCKING AND BRACING NECESSARY FOR THE INSTALLATION OF THE K-BRACE ASSEMBLY IS SHOWN. FOR THE BALANCE OF THE ONE LAYER HIGH LOAD, REFER TO THE "CENTER GATE ASSEMBLY B" DETAIL ON PAGE 22, "ANTI-SWAY BRACE ASSEMBLY A" DETAIL ON PAGE 30, AND THE "DOORWAY PROTECTION ASSEMBLY B" DETAIL ON PAGE 23.

- (1) ANTI-SWAY BRACE ASSEMBLY A (AS REQD). SEE THE DETAIL ON PAGE 30. INSTALL IN THE VOID AREA BETWEEN TWO LATERALLY ADJACENT ROWS OF PALLET UNITS. SEE GENERAL NOTE "P" ON PAGE 2.
- (2) K-BRACE ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 32.
- (3) TOP-OF-LOAD ANTI-SWAY BRACE (2 REQD). SEE THE DETAIL ON PAGE 29. WIRE TIE TO AN INNER UNITIZING STRAP WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION A" DETAIL ON PAGE 29.

TYPICAL LCL USING K-BRACE METHOD OF PARTIAL SECOND LAYER BRACING

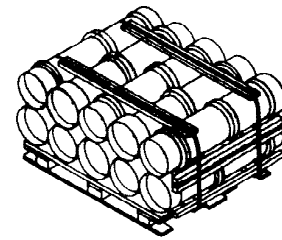


ISOMETRIC VIEW

THE ABOVE VIEW SHOWS A PORTION OF THE LOAD ON PAGE 6. ONE PALLET UNIT HAS BEEN OMITTED AND A PARTIAL PALLET UNIT HAS BEEN POSITIONED ON TOP OF A FULL PALLET UNIT. REFER TO PAGE 6 FOR BLOCKING AND BRACING THE LOAD.

SPECIAL NOTES:

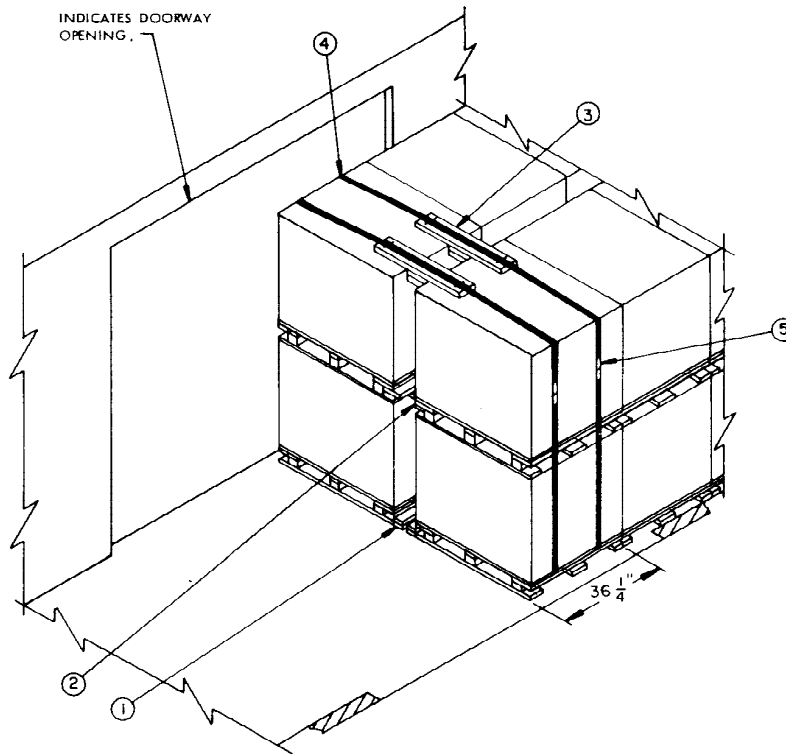
1. SHIPMENTS OF PALLETIZED UNITS SHOULD CONSIST OF FULL-HEIGHT AND FULL-LAYER UNITS TO THE MAXIMUM EXTENT POSSIBLE. HOWEVER, THE END OF A LOT, OR THE QUANTITY OF ITEMS NEEDED TO FILL A REQUISITION, MAY NECESSITATE THE SHIPMENT OF ONE OR MORE LESS-THAN-FULL UNITS WITHIN A LOAD. THE PROCEDURES ON THIS PAGE AND ON PAGE 11 ARE PRESENTED AS GUIDANCE IN THE SHIPMENT OF THESE PARTIAL UNITS.
2. THE PROCEDURES SHOWN ON THIS PAGE ARE ONLY APPLICABLE TO PARTIAL PALLET UNITS CONSISTING OF ONE OR TWO LAYERS OF CARTRIDGES. FOR SHIPMENT OF "LEFTOVER" CARTRIDGES, SEE THE PROCEDURES ON PAGE 20.
3. THE PROCEDURES SHOWN ARE APPLICABLE TO LOADS IN CONVENTIONAL BOX CARS, BOX CARS EQUIPPED WITH MECHANICAL BRACING DEVICES, AND BOX CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.
4. PALLET UNITS CONSISTING OF ONE OR TWO LAYERS OF CARTRIDGES SHALL NOT BE POSITIONED WITHIN TIERS BUT MUST BE POSITIONED ON TOP OF A PALLET LOCATED ON THE TOP TIER, AS SHOWN ABOVE.
5. **NOTE:** THE BOTTOM LATERAL PIECE ON THE OMITTED-UNIT GATE WILL SERVE AS AN ANTI-SWAY BRACE RETAINER.



PARTIAL PALLET UNIT

KEY NUMBERS

- ① OMITTED-UNIT GATE (2 REQD.). SEE DETAIL ON PAGE 28. NAIL TO THE FILLER PIECE MARKED ④ W/2-10d NAILS.
- ② STRUT, 4" X 6" BY CUT TO FIT (6 REQD.). TOENAIL TO PIECES MARKED ① W/2-10d NAILS AT EACH END.
- ③ SIDE BLOCKING, 2" X 6" X 48" (1 REQD.).
- ④ FILLER PIECE, 2" X 6" BY CUT-TO-FIT BETWEEN THE TOP LATERAL PIECES ON THE OMITTED UNIT GATES (1 REQD.). NAIL TO PIECE MARKED ③ W/5-10d NAILS.



ISOMETRIC VIEW

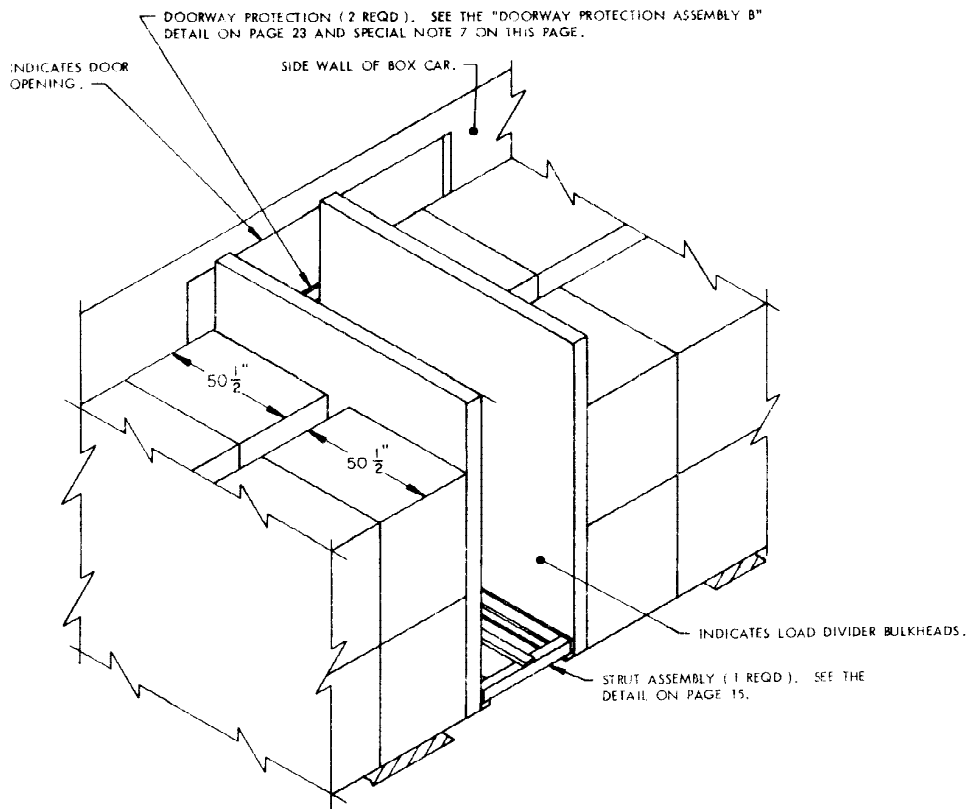
THE ABOVE VIEW SHOWS A PORTION OF THE LOAD ON PAGE 6. NOTE THAT THE CENTER GATE AND STRUTS HAVE BEEN OMITTED FOR CLARITY.

KEY NUMBERS

- ① DOORWAY BLOCKING, 2" X 4" X 36" (DOUBLED) (2 REQD). PREPOSITION AND NAIL THE FIRST PIECE TO CAR FLOOR W/7-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ② ANTI-SWAY BRACE ASSEMBLY A (AS REQD). SEE THE DETAIL ON PAGE 30. INSTALL IN THE VOID AREA BETWEEN TWO LATERALLY ADJACENT ROWS OF PALLET UNITS. SEE GENERAL NOTE "P" ON PAGE 2.
- ③ SPACER (2 REQD). SEE THE DETAIL ON PAGE 33.
- ④ DOORWAY PROTECTION STRAP, 1-1/4" X .035" X 35'-0" LONG STEEL STRAPPING (2 REQD). INSTALL SO AS TO ENCIRCLE THE LOAD UNIT IN THE DOORWAY AREA. SECURE TO PIECE MARKED ③ W/2 STAPLES.
- ⑤ SEAL FOR 1-1/4" STRAPPING (4 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "Q" ON PAGE 2.

SPECIAL NOTES

- 1. THE ISOMETRIC VIEW DEPICTS "DOORWAY PROTECTION" APPLICABLE TO SHIPMENTS OF PALLET UNITS IN BOX CARS WHICH ARE EQUIPPED WITH PLUG DOORS.
- 2. IF A STACK OF PALLET UNITS EXTENDS INTO THE DOORWAY AREA LESS THAN ONE-HALF OF ITS LENGTH OR WIDTH, ON ONE OR BOTH SIDES OF THE BOX CAR, THE SPECIFIED DOORWAY PROTECTION IS NOT REQUIRED. IF A STACK OF PALLET UNITS EXTENDS INTO THE DOORWAY AREA ONE-HALF OR MORE OF ITS LENGTH OR WIDTH, ON ONE OR BOTH SIDES OF THE BOX CAR, ONE DOORWAY PROTECTION STRAP, ONE SPACER PIECE, AND TWO DOORWAY BLOCKING PIECES ARE REQUIRED. IF A STACK OF PALLET UNITS EXTENDS INTO THE DOORWAY AREA LEAVING ONLY 6" OR LESS OF ITS LENGTH OR WIDTH IN CONTACT WITH THE CAR SIDE WALL, OR IS COMPLETELY WITHIN THE DOORWAY AREA, ON ONE OR BOTH SIDES OF THE BOX CAR, TWO DOORWAY PROTECTION STRAPS, TWO SPACER PIECES, AND TWO DOORWAY BLOCKING PIECES ARE REQUIRED.
- 3. THE PROCEDURES SHOWN ABOVE ARE ALSO APPLICABLE TO LOADS IN CONVENTIONAL BOX CARS AND BOX CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.



ISOMETRIC VIEW

THE ABOVE VIEW SHOWS A PORTION OF THE LOAD ON PAGE 6. NOTE THAT "LOAD DIVIDER BULKHEAD" AND "STRUT ASSEMBLY" ARE USED IN LIEU OF THE "CENTER GATES", "STRUTS", AND "ANTI-SWAY BRACE RETAINER".

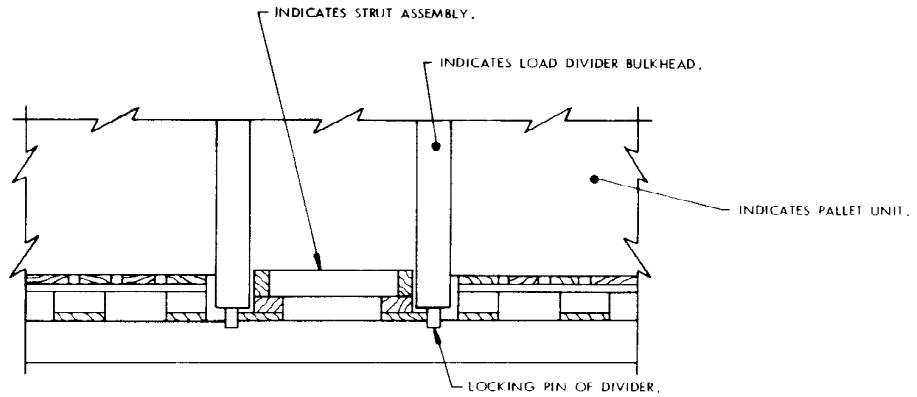
SPECIAL NOTES

1. THE PARTIAL ISOMETRIC VIEW DEPICTS A METHOD OF OUTLOADING CONTAINERS IN 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 FIFTEEN INCHES (15") OF TRAVEL ARE ACCEPTABLE.
2. 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 17 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 17, THE "FILL PIECE" MATERIAL IS NOT REQUIRED. NOTE: DUNNAGE MATERIALS MUST NOT BE NAILED TO SIDE FILLERS.
3. 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.
4. 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.

(CONTINUED AT RIGHT)

(SPECIAL NOTES CONTINUED)

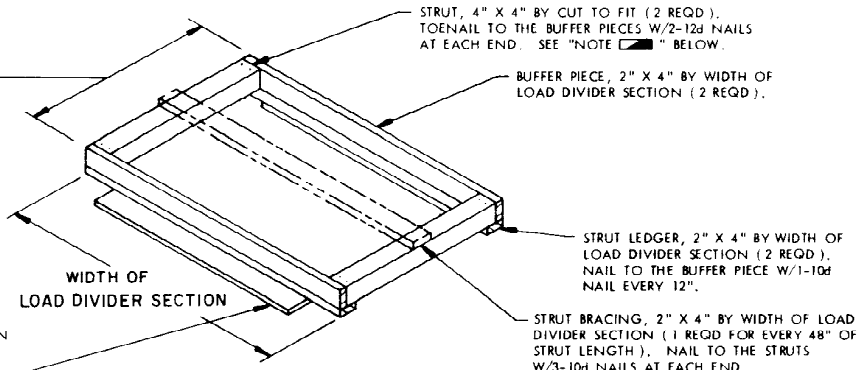
5. IF THE DELINEATED OUTLOADING METHOD IS USED FOR THE SHIPMENT OF A LESS-THAN-FULL-LOAD QUANTITY OF CONTAINERS, AND THE QUANTITY CANNOT BE SATISFIED BY OMITTING A COMPLETE LAYER OF CONTAINERS, FROM ALL THE LOAD UNITS IN EITHER OR BOTH ENDS OF THE CAR, SEE THE "PROCEDURES FOR AN OMITTED PALLET UNIT" ON PAGE 12.
6. SEE PAGE 15 FOR STRUT ASSEMBLIES REQUIRED WHEN THE LOAD BEHIND EITHER LOAD DIVIDER BULKHEAD EXCEEDS 50,000 POUNDS.
7. DOORWAY PROTECTION STRAPPING AS SHOWN ON PAGE 13 MAY BE USED IN LIEU OF THE "DOORWAY PROTECTION ASSEMBLY B" AS SHOWN ABOVE.
8. FOR SHIPMENT OF PARTIAL PALLET UNITS AND/OR SHIPMENT OF LEFT OVER CONTAINERS, SEE PAGES 11, 12, AND 20.
9. NOTE: THE LOAD DIVIDER BULKHEADS WILL SERVE AS AN ANTI-SWAY BRACE RETAINER.



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.

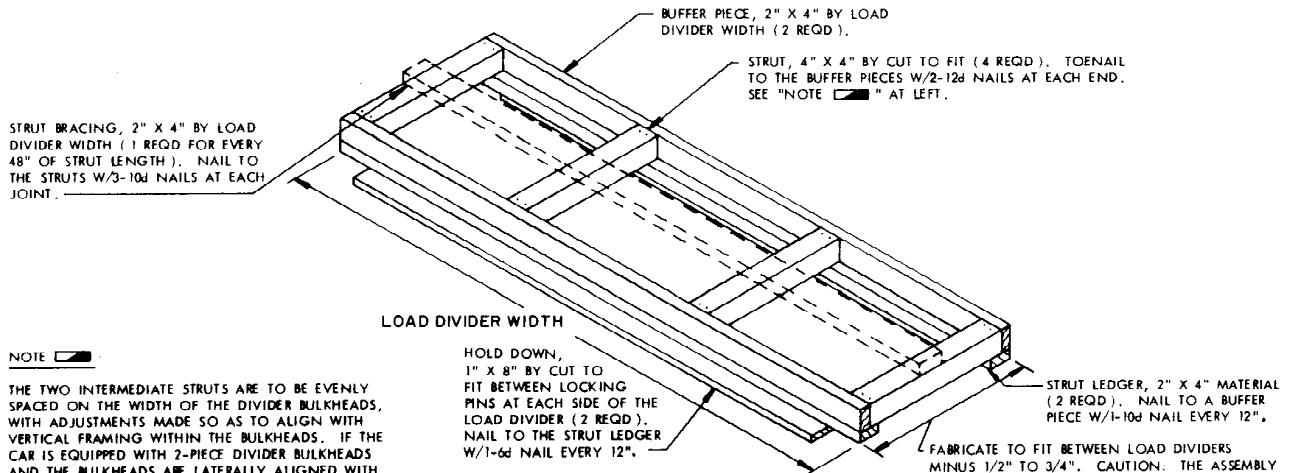
FABRICATE TO FIT BETWEEN LOAD DIVIDERS MINUS 1/2" TO 3/4". CAUTION: THE ASSEMBLY IS INTENTIONALLY DESIGNED FOR A LOOSE FIT BETWEEN THE LOAD DIVIDER BULKHEADS.



HOLD DOWN, 1" X 8" BY CUT TO FIT BETWEEN LOCKING PINS AT EACH SIDE OF THE LOAD DIVIDER SECTION (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. IF A STRUT ASSEMBLY IS LONGER THAN 12'-0", THE ASSEMBLY MUST BE HELD DOWN IN THE CENTER. SEE THE DETAILS ON PAGE 16 FOR GUIDANCE. NOTE: TWO (2) ASSEMBLIES AS SHOWN ARE REQUIRED FOR A 2-PIECE BULKHEAD IF NOT LATERALLY ALIGNED.

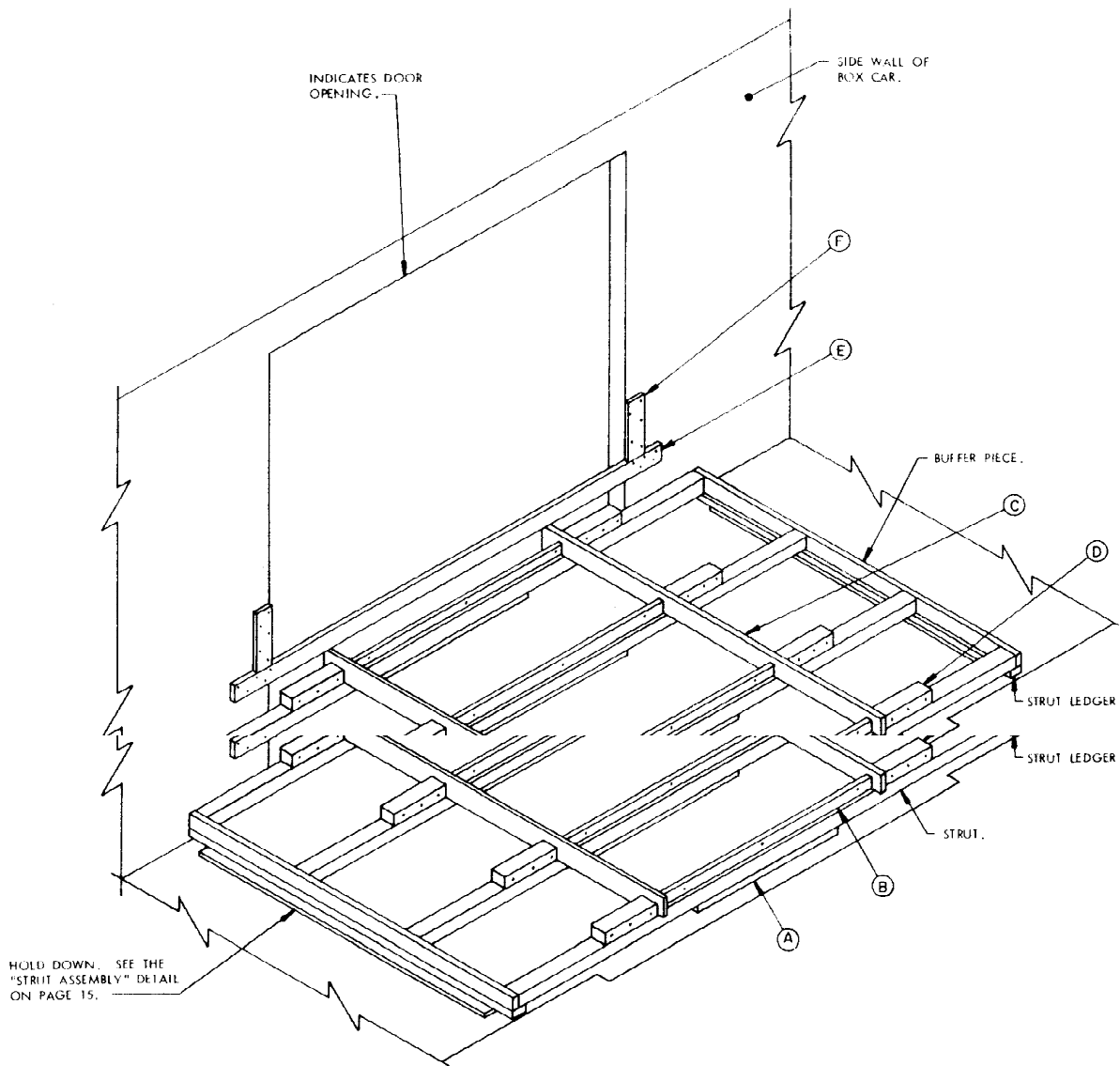


NOTE

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

A STRUT ASSEMBLY IS REQUIRED WHEN THE LOAD BEHIND EITHER LOAD DIVIDER BULKHEAD EXCEEDS 50,000 POUNDS. IF A STRUT ASSEMBLY IS 12'-0" LONG OR GREATER, THE ASSEMBLY MUST BE HELD DOWN IN THE CENTER. SEE THE DETAILS ON PAGE 16 FOR GUIDANCE.

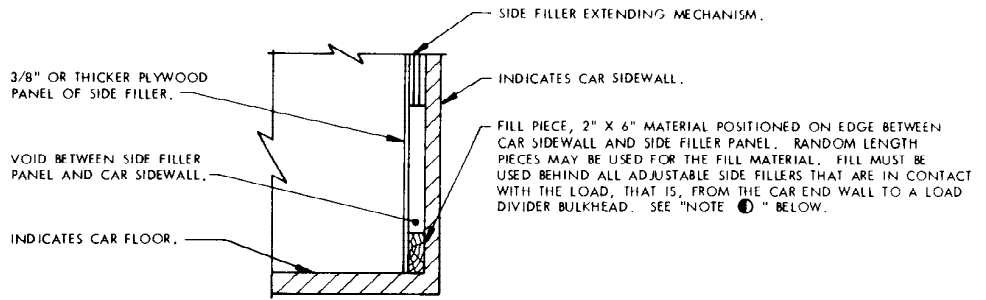


STRUT ASSEMBLY HOLD-DOWN

THIS ISOMETRIC VIEW DEPICTS THE HOLD-DOWN BLOCKING WHICH IS REQUIRED WHEN THE STRUTS OF THE "STRUT ASSEMBLY" USED IN A LOAD DIVIDER CAR ARE LONGER THAN 12'-0". NOTE THAT THE SPECIAL STRUT HOLD-DOWN AND THE STRUT ASSEMBLY ARE ONLY REQUIRED IF THE LOAD BEHIND EITHER BULKHEAD IS MORE THAN 50,000 POUNDS.

KEY LETTERS

- (A) FILLER PIECE, 2" X 4" X 48" (4 REQD). POSITION SO AS TO BE CENTERED ON THE DOORWAY AREA AND NAIL TO THE BOTTOM SURFACE OF A STRUT W/4-10d NAILS.
- (B) SPACER PIECE, 2" X 4" X 72" (4 REQD). POSITION ON EDGE AND SO AS TO BE CENTERED IN THE DOORWAY AREA AND TOENAIL TO A STRUT W/3-12d NAILS ON EACH SIDE.
- (C) HOLD-DOWN PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT IF THE CAR HAS PLUG DOORS, OR 2" X 6" BY CAR WIDTH PLUS 4" IF THE CAR HAS CONVENTIONAL SLIDING DOORS) (2 REQD). NAIL TO PIECE MARKED (B) W/2-12d NAILS AND TOENAIL TO THE STRUTS W/2-12d NAILS AT EACH JOINT.
- (D) BRACE PIECE, 4" X 4" X 18" (8 REQD). POSITION AGAINST A PIECE MARKED (C) AND TOENAIL TO A STRUT W/3-12d NAILS ON EACH SIDE.
- (E) DOOR SPANNER PIECE, 2" X 6" BY DOOR OPENING WIDTH PLUS 24" (2 REQD). NAIL TO A CAR DOOR POST/SIDE WALL OR TO A NAILING STRIP W/5-12d NAILS AT EACH END. NOTE: PRIOR TO NAILING THESE PIECES IN PLACE, THE STRUTS OF THE STRUT ASSEMBLY ARE TO BE PRESSED DOWNWARD UNTIL THE PIECES MARKED (A) ARE TOUCHING OR ARE ALMOST TOUCHING THE FLOOR OF THE CAR.
- (F) HOLD-DOWN CLEAT, 2" X 6" X 18" (4 REQD). NAIL TO A CAR DOOR POST/SIDE WALL OR TO A NAILING STRIP W/5-12d NAILS.

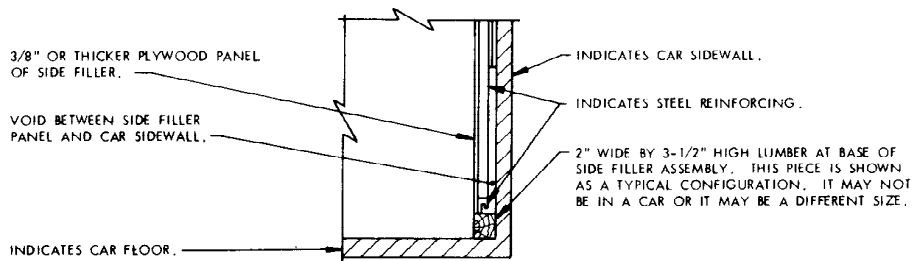


TYPICAL TYPE A

THIS VIEW SHOWS THE INSTALLATION OF A "FILL PIECE" IN A CAR EQUIPPED WITH A STANDARD ADJUSTABLE SIDE FILLER. SEE SPECIAL NOTE 2 ON PAGE 14.

NOTE 1 :

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

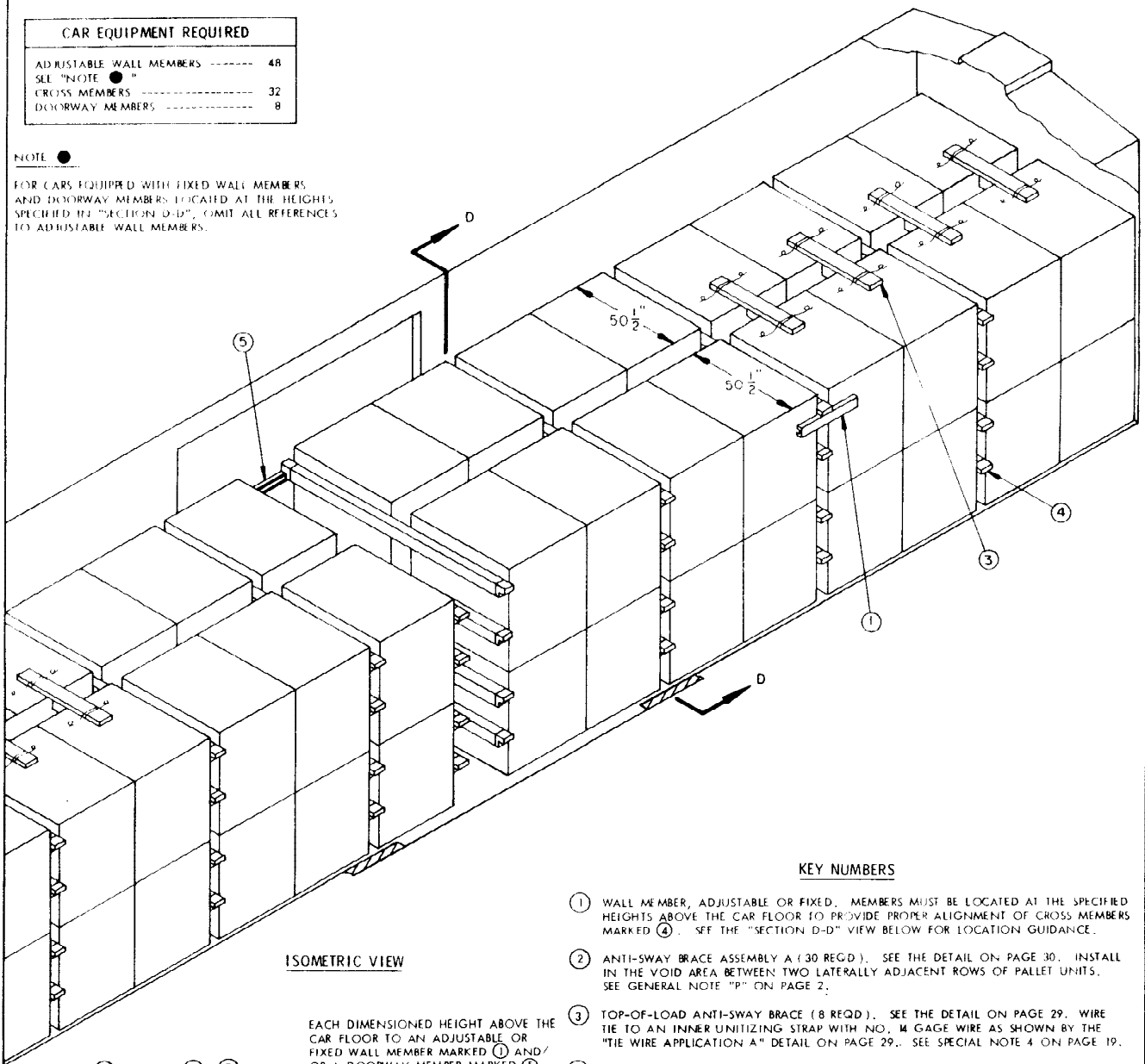
THIS VIEW SHOWS A TYPICAL SECTION OF A CAR EQUIPPED WITH HEAVY DUTY STEEL REINFORCED, ADJUSTABLE SIDE FILLERS. A "FILL PIECE", AS SHOWN IN THE "TYPICAL TYPE A" DETAIL ABOVE, IS NOT REQUIRED IN CARS SO EQUIPPED. SEE SPECIAL NOTE 2 ON PAGE 14.

CAR EQUIPMENT REQUIRED

ADJUSTABLE WALL MEMBERS	-----	48
SEE "NOTE ●"		
CROSS MEMBERS	-----	32
DOORWAY MEMBERS	-----	8

NOTE ●

FOR CARS EQUIPPED WITH FIXED WALL MEMBERS AND DOORWAY MEMBERS LOCATED AT THE HEIGHTS SPECIFIED IN "SECTION D-D", OMIT ALL REFERENCES TO ADJUSTABLE WALL MEMBERS.

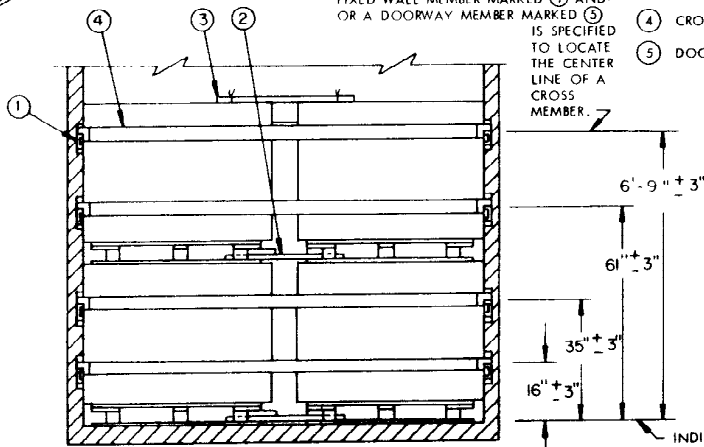


ISOMETRIC VIEW

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 ④. SEE THE "SECTION D-D" VIEW BELOW FOR LOCATION GUIDANCE.
- ② ANTI-SWAY BRACE ASSEMBLY A (30 REQD.). SEE THE DETAIL ON PAGE 30. INSTALL IN THE VOID AREA BETWEEN TWO LATERALLY ADJACENT ROWS OF PALLET UNITS. SEE GENERAL NOTE "P" ON PAGE 2.
- ③ TOP-OF-LOAD ANTI-SWAY BRACE (8 REQD.). SEE THE DETAIL ON PAGE 29. WIRE TIE TO AN INNER UNITIZING STRAP WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION A" DETAIL ON PAGE 29. SEE SPECIAL NOTE 4 ON PAGE 19.
- ④ CROSS MEMBER (32 REQD.). SEE GENERAL NOTE "G" ON PAGE 2.
- ⑤ DOORWAY MEMBER (8 REQD.). SEE THE "SECTION D-D" VIEW BELOW.

EACH DIMENSIONED HEIGHT ABOVE THE CAR FLOOR TO AN ADJUSTABLE OR FIXED WALL MEMBER MARKED ① AND/OR A DOORWAY MEMBER MARKED ⑤ IS SPECIFIED TO LOCATE THE CENTER LINE OF A CROSS MEMBER.



SECTION D-D

60-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR
EQUIPPED WITH MECHANICAL BRACING DEVICES HAVING ADJUSTABLE OR FIXED WALL MEMBERS

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE (INSIDE CLEARANCE) 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. FOR SHIPMENT OF LESS-THAN-CAR-LOADS, REFER TO THE APPLICABLE GUIDANCE ON PAGES 20 AND 21.
3. FOR SHIPMENT OF PARTIAL PALLET UNITS AND/OR SHIPMENT OF LEFTOVER CONTAINERS, SEE PAGES 11, 12, AND 20. NOTE: IF THE THREE LAYER PALLET UNIT, AS SHOWN ON PAGE 11, IS POSITIONED WITHIN A LOAD IT MUST BE IN THE TOP LAYER AND MUST BE RETAINED BY TWO CROSS MEMBERS.
4. THE ANTI-SWAY BRACE ASSEMBLY A, SHOWN AS PIECES MARKED (2), AND THE TOP-OF-LOAD ANTI-SWAY BRACE, SHOWN AS PIECES MARKED (3), MAY BE OMITTED IF THE SPACE BETWEEN LATERALLY ADJACENT UNITS IS 6" OR LESS.
5. IF THE BOX CAR TO BE LOADED HAS BOWED END WALLS WHICH ARE BOWED OUTWARD TWO INCHES (2") OR MORE EITHER FROM SIDE TO SIDE OR FROM FLOOR TO ROOF, SEE GENERAL NOTE "G" ON PAGE 2.

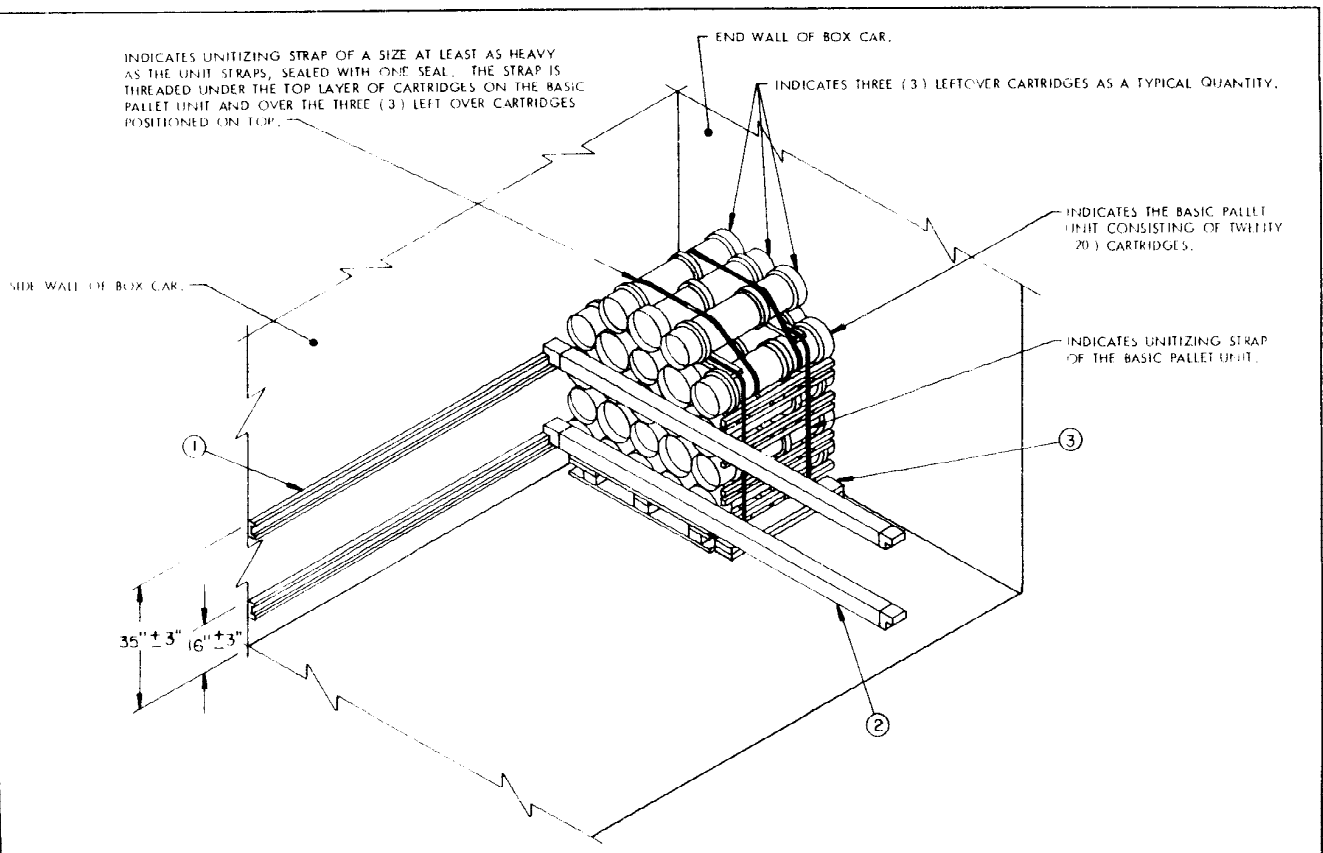
BILL OF LADING

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	255	170
2" X 6"	32	32
2" X 8"	90	120
NAILS	NO. REQD	POUNDS
10d (3")	360	5-3/4
12d (3-1/4")	16	1/2
WIRE, NO. 14 GAGE ----- 32' REQD -----		3/4 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT -----	60 -----	111,240 LBS
DUNNAGE -----		651 LBS
TOTAL WEIGHT -----		111,891 LBS

**60-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR
EQUIPPED WITH MECHANICAL BRACING DEVICES HAVING ADJUSTABLE OR FIXED WALL MEMBERS**



ISOMETRIC VIEW

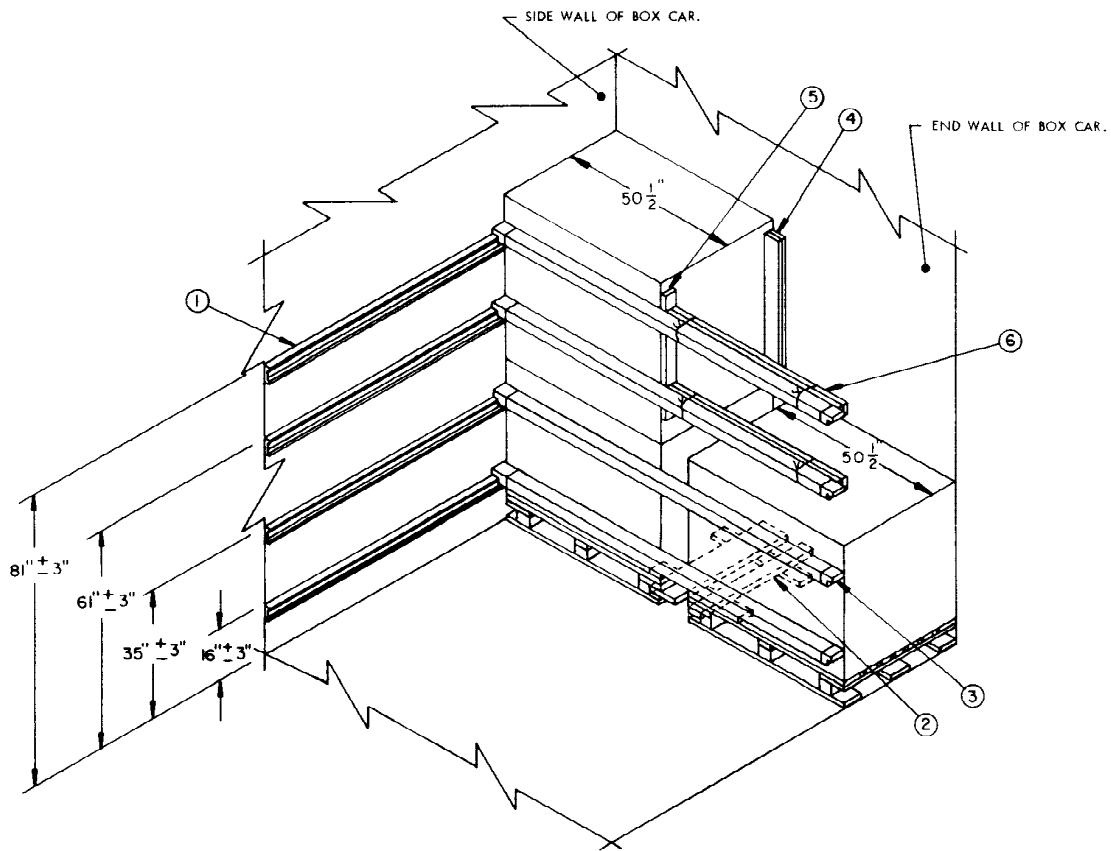
KEY NUMBERS

- 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 ②.
- ② CROSS MEMBER (2 REQD.). SEE GENERAL NOTE "G" ON PAGE 2.
- ③ SIDE BLOCKING, 2" X 6" X 36" (DOUBLED) (1 REQD.). 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 "D" ON PAGE 2.

SPECIAL NOTES

1. SHIPMENTS OF PALLETIZED UNITS SHOULD CONSIST OF FULL-HEIGHT 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 CARTRIDGES. LEFTOVER CARTRIDGES ARE DESCRIBED AS A QUANTITY OF CARTRIDGES WHICH IS INSUFFICIENT TO FORM A FULL-LAYERED PARTIAL UNIT FOR SHIPMENT EITHER ON TOP OF A LOAD AS SHOWN ON PAGE 12 OR WITHIN A TIER AS SHOWN ON PAGE 11. THEY ARE USUALLY CARTRIDGES OF THE SAME AMMUNITION ITEM AS THE BALANCE OF THE LOAD ALTHOUGH THEY MAY BE ANY OTHER COMPATIBLE ITEM.
2. SHIPMENT OF LEFTOVER CARTRIDGES IS APPLICABLE FOR 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 CARTRIDGES 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. THE PROCEDURES ON THIS PAGE ARE PRESENTED AS GUIDANCE IN THE SECUREMENT OF LEFTOVER CARTRIDGES FOR SHIPMENT. A MAXIMUM OF THREE CARTRIDGES MAY BE SECURED TO A FULL-HEIGHT AND/OR PARTIAL PALLET UNIT. IF THE QUANTITY OF LEFTOVER CARTRIDGES IS GREATER THAN THREE, ADDITIONAL PALLET UNITS MAY BE ASSEMBLED IN THE MANNER SHOWN. HOWEVER, IT IS PREFERABLE TO SHIP FULL LAYER PARTIAL PALLET UNITS AS TYPICALLY DEPICTED ON PAGES 11 AND 12.
4. LEFTOVER CARTRIDGES MUST BE SECURED TO A FULL OR PARTIAL UNIT WITH A MINIMUM OF TWO (2) PIECES OF STEEL STRAPPING (SEPARATE FROM UNIT STRAPS) OF A SIZE AT LEAST AS HEAVY AS THE STRAPPING USED TO SECURE THE CARTRIDGES ON THE PALLETIZED UNIT UNDERNEATH THE LEFTOVER CARTRIDGES. THREAD A STRAP UNDER THE TOP LAYER OF CARTRIDGES, AS NEAR AS PRACTICAL TO THE ADJACENT UNIT STRAP, ENCIRCLE THE LEFTOVER CARTRIDGES, TENSION, AND SEAL THE JOINT WITH ONE DOUBLE CRIMPED SEAL.
5. THE PROCEDURES SHOWN ARE ALSO APPLICABLE TO LOADS IN CONVENTIONAL BOX CARS AND BOX CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.

TYPICAL LCL (1-UNIT LOAD) IN A BOX CAR EQUIPPED WITH MECHANICAL BRACING DEVICES HAVING ADJUSTABLE OR FIXED WALL MEMBERS



ISOMETRIC VIEW

SPECIAL NOTES:

1. A THREE PALLET UNIT LOAD IS SHOWN AS TYPICAL. THE NUMBER OF UNITS CAN BE ADJUSTED TO SUIT THE QUANTITY TO BE SHIPPED.
2. THE PROCEDURES SHOWN ABOVE MAY BE USED FOR AN OMITTED PALLET UNIT WITHIN A FULL CARLOAD. IF THE OMITTED PALLET LOCATION IS NOT ADJACENT TO THE CAR END WALL, ADDITIONAL PIECES (3), (5) AND (6) MAY BE USED IN LIEU OF PIECE MARKED (4).

KEY NUMBERS

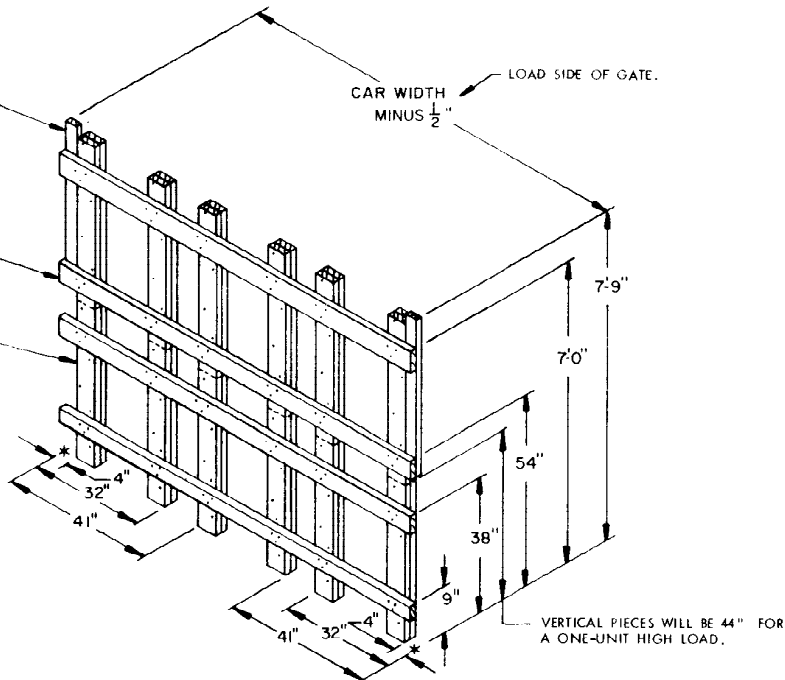
- (1) WALL MEMBER, ADJUSTABLE OR FIXED. MEMBERS MUST BE LOCATED AT THE SPECIFIED HEIGHTS ABOVE THE CAR FLOOR TO PROVIDE PROPER ALIGNMENT OF CROSS MEMBERS MARKED (3).
- (2) ANTI-SWAY BRACE ASSEMBLY A (1 REQD). SEE THE DETAIL ON PAGE 30. INSTALL IN THE VOID AREA BETWEEN TWO LATERALLY ADJACENT ROWS OF PALLETIZED UNITS. SEE GENERAL NOTE "P" ON PAGE 2.
- (3) CROSS MEMBER (4 REQD). SEE GENERAL NOTE "G" ON PAGE 2.
- (4) SIDE BLOCKING, 2" X 4" X 36" (DOUBLED) (1 REQD). NAIL THE FIRST PIECE TO THE CAR END WALL W/6-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- (5) LOAD BEARING PIECE, 2" X 4" X 36" (1 REQD). NAIL TO FIRST PIECE OF PIECE MARKED (4) W/2-10d NAILS AT EACH JOINT.
- (6) SIDE BLOCKING, 2" X 4" BY CUT TO FIT BETWEEN LOAD BEARING PIECE AND SIDE WALL OF THE CAR (DOUBLED) (2 REQD). LAMINATE W/5-10d NAILS AND WIRE TIE TO CROSS MEMBER W/2 WRAPS OF NO. 14 GAGE WIRE AT EACH END.

TYPICAL LCL (3-UNIT LOAD) IN A BOX CAR EQUIPPED WITH MECHANICAL BRACING DEVICES HAVING ADJUSTABLE OR FIXED WALL MEMBERS

GATE HOLD-DOWN RISER PIECE, 2" X 4" BY 45" (2 REQD PER GATE). SECURE BY NAILING TO THE STRUT LEDGER W/3-10d NAILS AT EACH JOINT.

STRUT LEDGER, 2" X 4" BY CAR WIDTH MINUS 1/2" IN LENGTH (4 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.

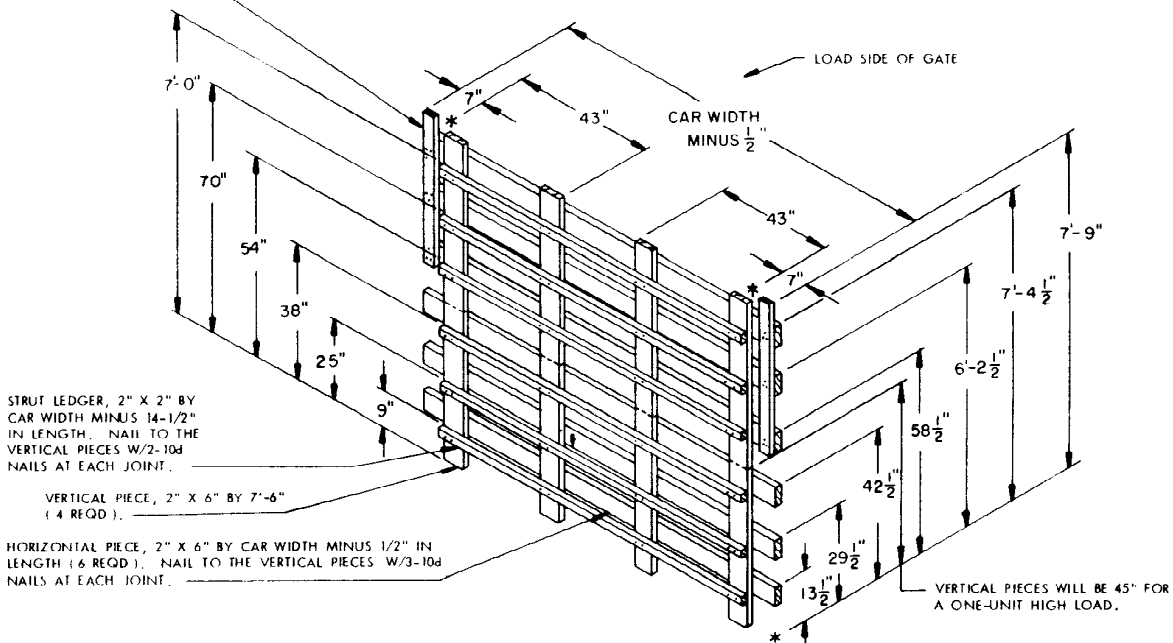
VERTICAL PIECE, 2" X 6" X 7'-6" (DOUBLED) (6 REQD). LAMINATE W/1-10d NAIL EVERY 12".



CENTER GATE ASSEMBLY A

GATE HOLD-DOWN RISER PIECE, 2" X 4" BY 40" (2 REQD PER GATE). SECURE BY NAILING TO THE HORIZONTAL PIECE W/3-10d NAILS AT EACH JOINT.

FOR EASE OF HANDLING, SPLIT GATES, CONSTRUCTED IN ACCORDANCE WITH THE "ALTERNATIVE CENTER GATE ASSEMBLY A" ON PAGE 25 MAY BE USED. USE THREE (3) GATES, TIED TOGETHER AS SHOWN BY THE "TIE PIECE APPLICATION A" DETAIL ON PAGE 25. ALSO, SEE THE "PLYWOOD GATE ALTERNATIVE" DETAILS ON PAGE 34.



CENTER GATE ASSEMBLY B

FOR EASE OF HANDLING, SPLIT GATES, CONSTRUCTED IN ACCORDANCE WITH THE "ALTERNATIVE CENTER GATE ASSEMBLY B" ON PAGE 26 MAY BE USED. USE TWO (2) GATES, TIED TOGETHER AS SHOWN BY THE "TIE PIECE APPLICATION B" DETAIL ON PAGE 26. ALSO, SEE THE "PLYWOOD GATE ALTERNATIVE" DETAIL ON PAGE 34.

VERTICAL PIECE, 2" X 3" X 7'-0" (2 REQD).
NAIL TO A DOOR POST W/12d NAILS.

DOOR
OPENING

7'-0"

54"

38"

9"

TWO-UNIT HIGH LOAD.

ONE-UNIT HIGH LOAD.

HORIZONTAL PIECE, 1" X 6" BY DOOR
OPENING WIDTH (2 REQD PER TIER).
NAIL TO THE VERTICAL PIECES W/3-6d
NAILS AT EACH END.

DOORWAY PROTECTION ASSEMBLY A

THIS METHOD OF DOORWAY PROTECTION IS FOR USE IN CARS
EQUIPPED WITH CONVENTIONAL SLIDING DOORS WHEN THE
DOOR POSTS ARE WOODEN, OR ARE STEEL AND HAVE HOLES
IN WHICH TO ACCOMPLISH THE NAILING OF THE VERTICAL
PIECES.

DOOR
OPENING

7'-3"

57"

42"

14"

TWO-UNIT HIGH LOAD.

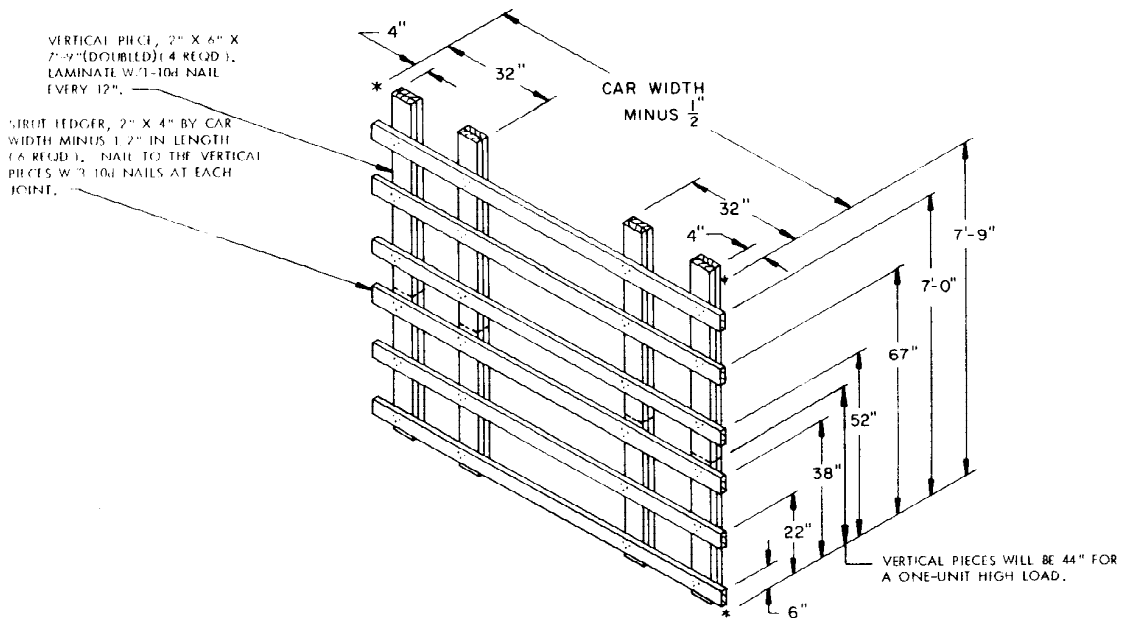
ONE-UNIT HIGH LOAD.

VERTICAL PIECE, 2" X 3" X 87"
(2 REQD).

HORIZONTAL PIECE, 1" X 6" BY
DOOR OPENING WIDTH (2 REQD
PER TIER). NAIL TO THE VERTICAL
PIECES W/3-6d NAILS AT EACH
END.

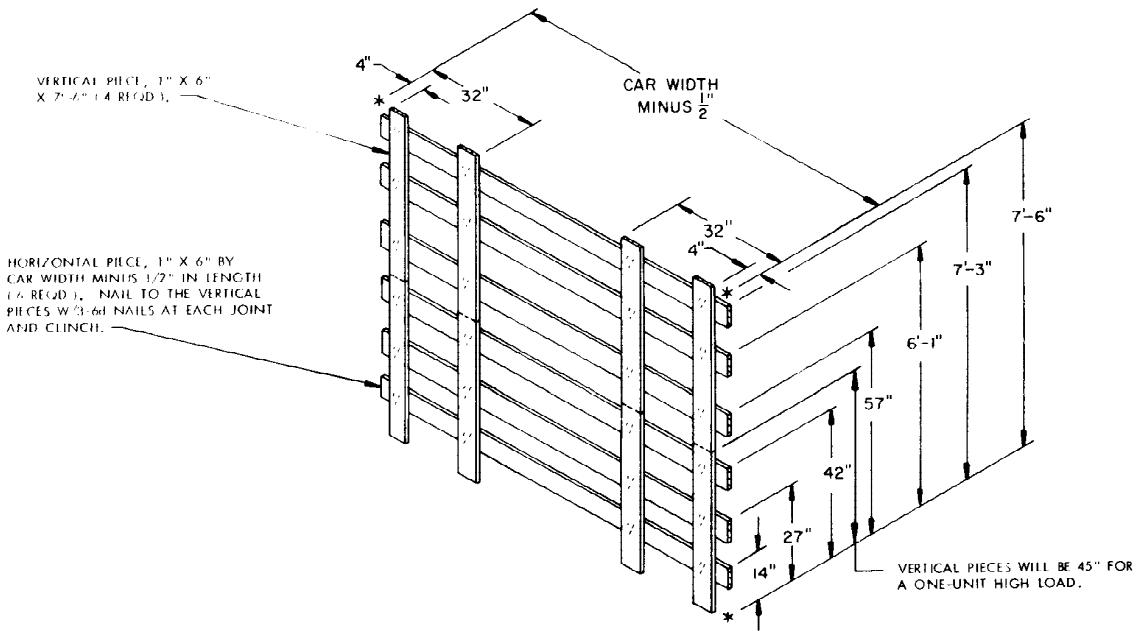
DOORWAY PROTECTION ASSEMBLY B

THIS METHOD OF DOORWAY PROTECTION IS FOR USE IN CARS
EQUIPPED WITH CONVENTIONAL SLIDING DOORS WHEN THE DOOR POSTS ARE
WOODEN, OR ARE STEEL AND HAVE HOLES
IN WHICH TO ACCOMPLISH
THE NAILING OF THE VERTICAL
PIECES.



CENTER GATE ASSEMBLY C

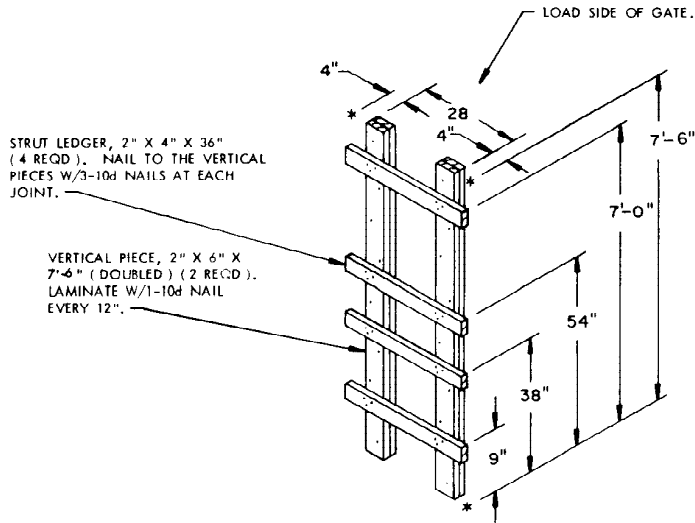
FOR EASE OF HANDLING, SPLIT GATES, CONSTRUCTED IN ACCORDANCE WITH THE "ALTERNATIVE CENTER GATE ASSEMBLY C" ON PAGE 27 MAY BE USED. USE TWO (2) GATES, TIED TOGETHER AS SHOWN BY THE "TIE PIECE APPLICATION C" DETAIL ON PAGE 27. ALSO, SEE THE "PLYWOOD GATE ALTERNATIVE" DETAIL ON PAGE 34.



SEPARATOR GATE

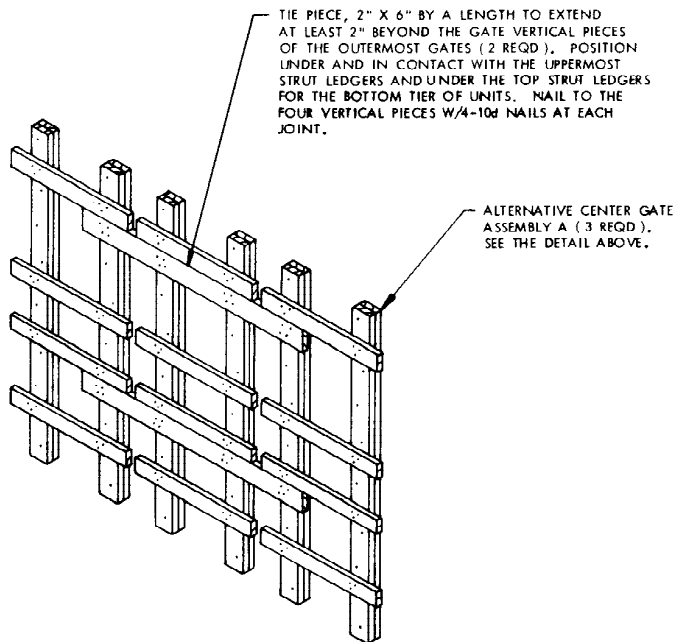
FOR USE OF THIS GATE, SEE THE LOAD ON PAGE 8.

DETAILS



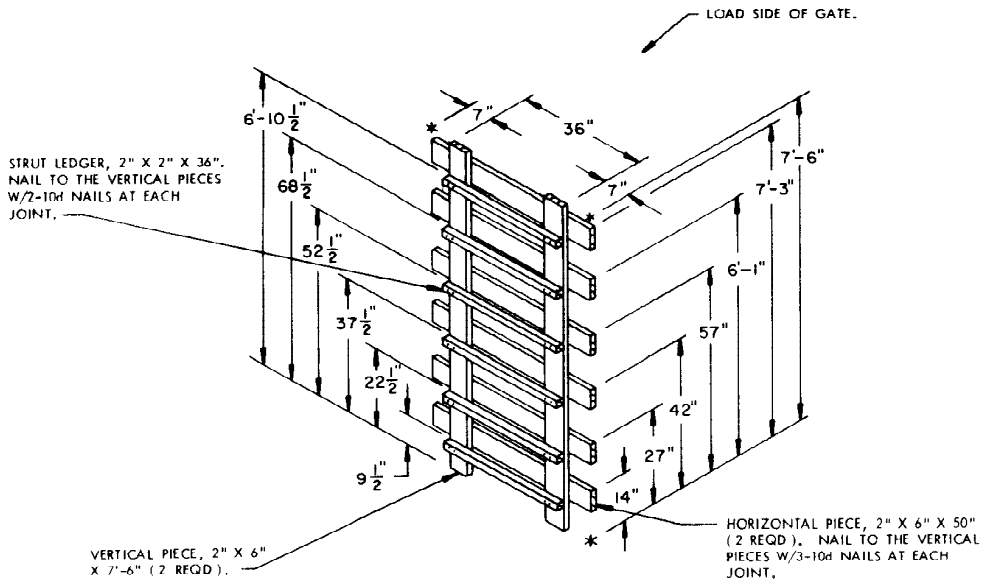
ALTERNATIVE CENTER GATE ASSEMBLY A

THIS CENTER GATE MAY BE USED IN LIEU OF THE "CENTER GATE ASSEMBLY A" SHOWN ON PAGE 22. SEE "TIE PIECE APPLICATION A" BELOW.



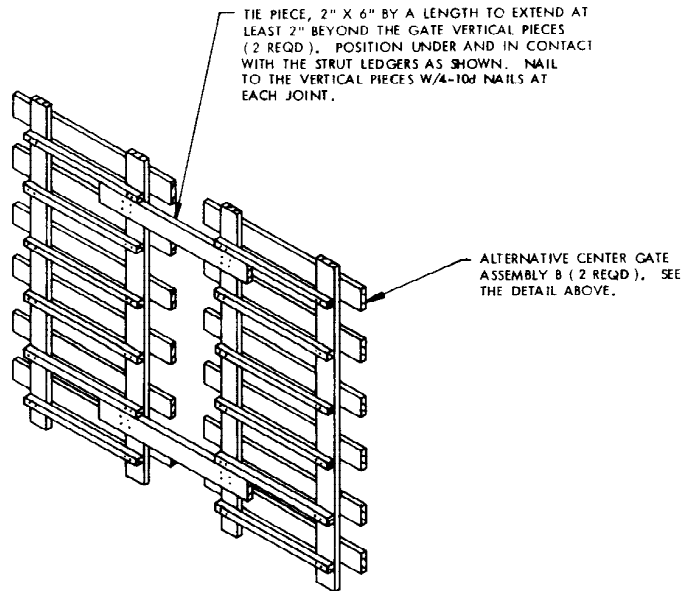
TIE PIECE APPLICATION A

THIS PROCEDURE IS APPLICABLE FOR USE WITH THREE ALTERNATIVE CENTER GATES A. NOTE THAT THE TIE PIECES SHOULD BE APPLIED AFTER THE GATES AND STRUTS HAVE BEEN INSTALLED.



ALTERNATIVE CENTER GATE ASSEMBLY B

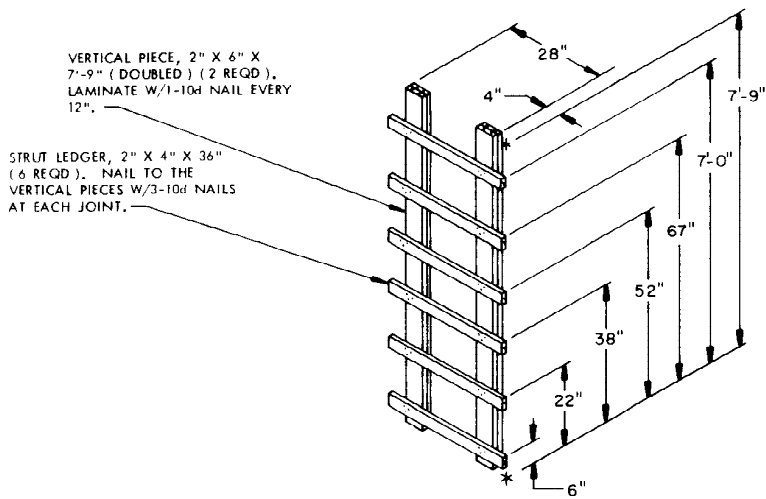
THIS CENTER GATE MAY BE USED IN LIEU OF THE "CENTER GATE ASSEMBLY B" SHOWN ON PAGE 22. SEE THE "TIE PIECE APPLICATION B" BELOW.



TIE PIECE APPLICATION B

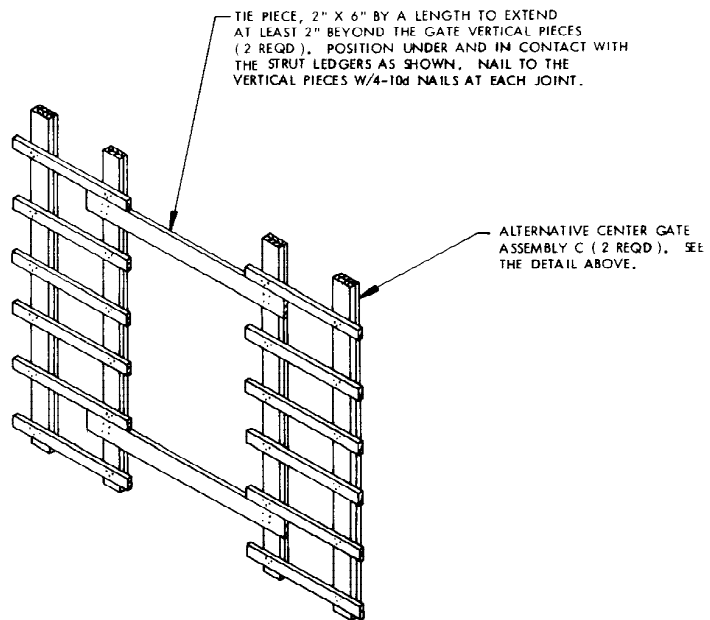
THIS PROCEDURE IS APPLICABLE FOR USE WITH TWO ALTERNATIVE CENTER GATES B. NOTE THAT THE TIE PIECES SHOULD BE APPLIED AFTER THE GATES AND STRUTS HAVE BEEN INSTALLED.

DETAILS



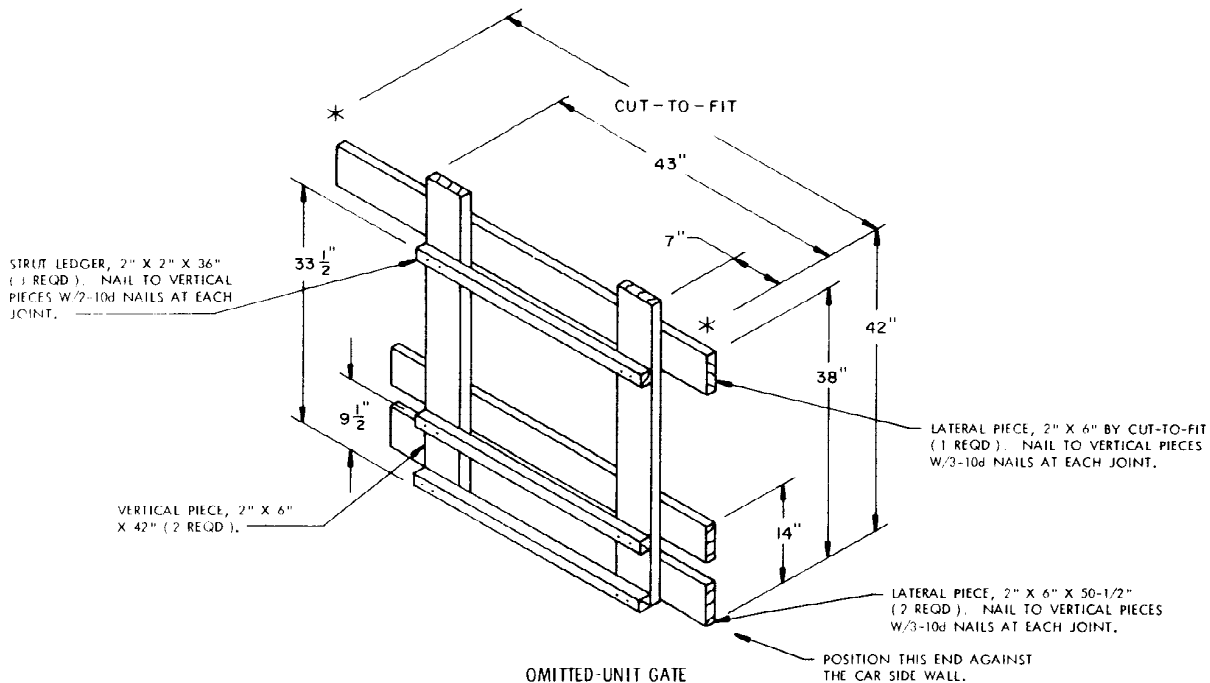
ALTERNATIVE CENTER GATE ASSEMBLY C

THIS CENTER GATE MAY BE USED IN LIEU OF THE "CENTER GATE ASSEMBLY C" SHOWN ON PAGE 24. SEE THE "TIE PIECE APPLICATION C" BELOW.



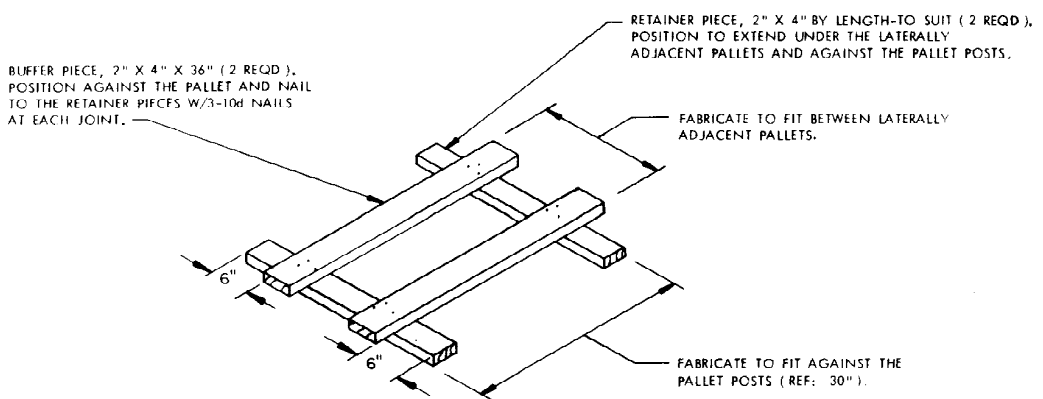
TIE PIECE APPLICATION C

THIS PROCEDURE IS APPLICABLE FOR USE WITH TWO ALTERNATIVE CENTER GATES C. NOTE THAT THE TIE PIECES SHOULD BE APPLIED AFTER THE GATES AND STRUTS HAVE BEEN INSTALLED.



OMITTED-UNIT GATE

ONE (1) GATE REQUIRED AS SHOWN AND ONE (1) GATE REQUIRED WITH VERTICAL PIECES AND STRUT LEDGERS ON OPPOSITE SIDE OF LATERAL PIECES. FOR USE OF THIS GATE, SEE PAGE 12.



ANTI-SWAY BRACE ASSEMBLY B

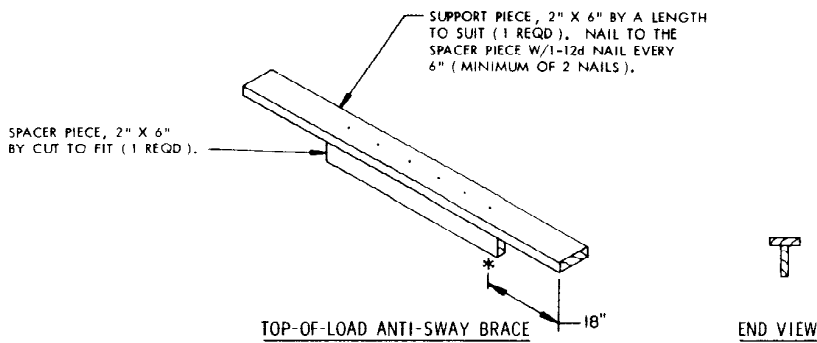
(SPECIAL NOTE CONTINUED)

SPECIAL NOTE:

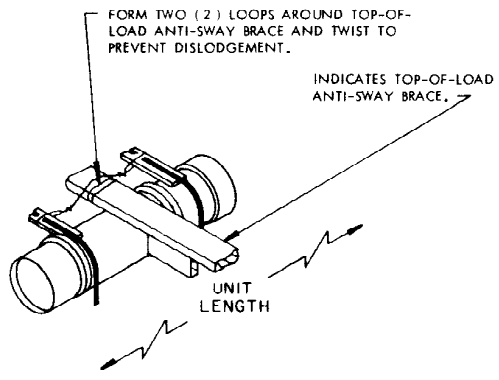
1. THE "ANTI-SWAY BRACE ASSEMBLY B" MUST BE FABRICATED IN PLACE BETWEEN LATERALLY ADJACENT PALLETIZED UNITS. POSITIONED WITH THE 30-1/2" DIMENSION PARALLEL TO THE CAR SIDE WALL.
 - A. POSITION THE FIRST RETAINER PIECE BETWEEN THE CENTER PALLET POST AND THE PALLET POST WHICH IS FURTHEST AWAY. THE RETAINER PIECE IS TO SPAN THE VOID BETWEEN LATERALLY ADJACENT PALLETS AND REST ON THE BOTTOM BOARDS OF THE PALLETS.
 - B. POSITION A 2" X 4" X 36" BUFFER PIECE 6" FROM THE END OF THE FIRST RETAINER PIECE AND EXTENDING 3" BEYOND THE EDGE OF THE FIRST RETAINER PIECE. NAIL THE BUFFER PIECE TO THE RETAINER PIECE W/3-10d NAILS.
 - C. KEEPING THE FIRST BUFFER PIECE AGAINST THE SIDE OF A PALLETIZED UNIT, POSITION THE SECOND BUFFER PIECE AGAINST THE SIDE OF THE LATERALLY ADJACENT PALLETIZED UNIT AND EXTENDING 3" BEYOND THE EDGE OF THE FIRST RETAINER PIECE. NAIL THE BUFFER PIECE TO THE RETAINER PIECE W/3-10d NAILS.

- D. HOLD THE ENDS OF BOTH BUFFER PIECES AND PUSH THE PARTIAL ASSEMBLY FORWARD UNTIL THE FIRST RETAINER PIECE CONTACTS THE PALLETIZED UNIT POSTS ON THE FAR END.
- E. POSITION THE SECOND RETAINER PIECE AGAINST THE INSIDE OF THE NEAREST PALLET POST. THE RETAINER PIECE IS TO SPAN THE VOID BETWEEN LATERALLY ADJACENT PALLETS AND REST ON THE BOTTOM BOARDS OF THE PALLETS.
- F. KEEP THE TWO BUFFER PIECES AGAINST THE SIDES OF THE LATERALLY ADJACENT PALLETIZED UNITS AND NAIL EACH ONE TO THE SECOND RETAINER PIECE W/3-10d NAILS.

(CONTINUED AT RIGHT)

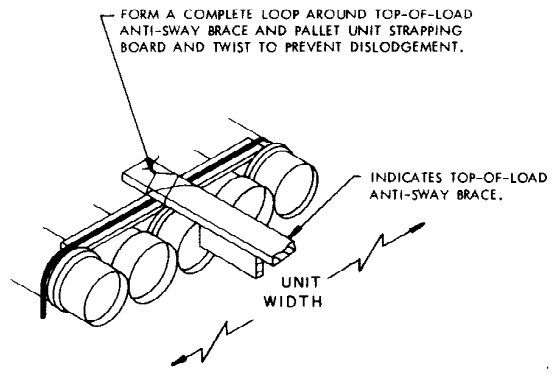


THIS ASSEMBLY IS DESIGNED FOR USE BETWEEN THE TOPS OF THE FIRST FOUR LATERALLY ADJACENT PALLET UNIT STACKS IN EACH END OF THE CAR TO PREVENT PALLET UNITS FROM TOPPLING INTO THE VOID AREA. THE ASSEMBLY WILL BE WIRE TIED TO THE PALLET UNIT UNITIZING STRAPS TO PREVENT DISPLACEMENT. SEE "TIE WIRE APPLICATION A" AND "TIE WIRE APPLICATION B" BELOW.



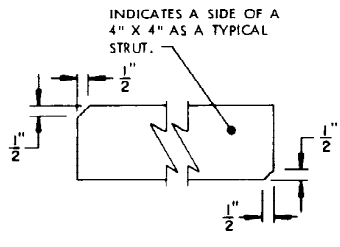
TIE WIRE APPLICATION A

THIS VIEW DEPICTS THE SECUREMENT OF A TOP-OF-LOAD ANTI-SWAY BRACE TO THE TOP OF A PALLET UNIT BY WIRE TYING TO THE STRAPPING BOARD WITH NO. 14 GAGE WIRE. THIS PROCEDURE IS APPLICABLE FOR UNITS POSITIONED WITH THE CARTRIDGES LENGTHWISE IN THE CAR. SEE "TOP-OF-LOAD ANTI-SWAY BRACE" ABOVE.



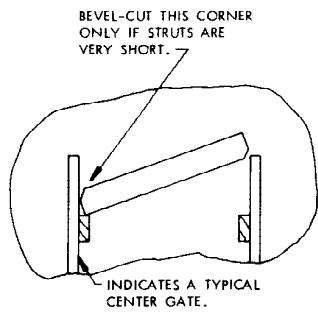
TIE WIRE APPLICATION B

THIS VIEW DEPICTS THE SECUREMENT OF A TOP-OF-LOAD ANTI-SWAY BRACE TO THE TOP OF A PALLET UNIT BY WIRE TYING TO THE STRAPPING BOARD WITH NO. 14 GAGE WIRE. THIS PROCEDURE IS APPLICABLE FOR UNITS POSITIONED WITH THE CARTRIDGES CROSSWISE IN THE CAR. SEE "TOP-OF-LOAD ANTI-SWAY BRACE" ABOVE.



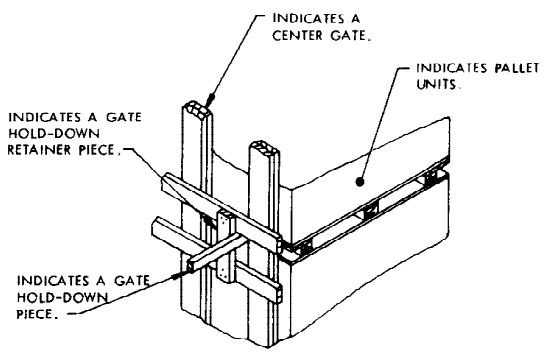
BEVEL CUT

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").

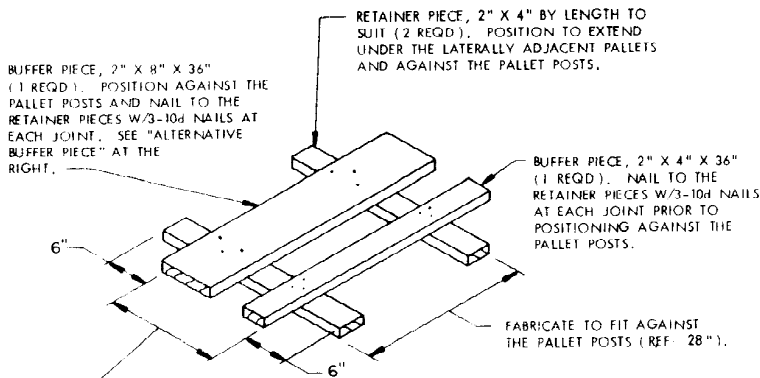


STRUT INSTALLATION

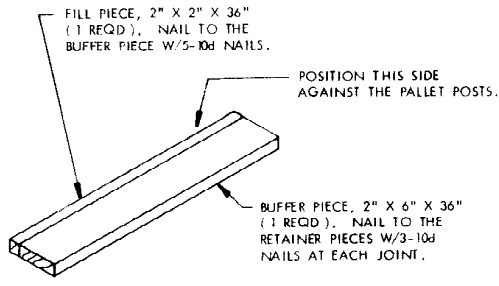
SEE GENERAL NOTE "V" ON PAGE 3 FOR ADDITIONAL STRUT INSTALLATION GUIDANCE.



INSTALLATION OF GATE HOLD DOWN



ANTI-SWAY BRACE ASSEMBLY A



ALTERNATIVE BUFFER PIECE

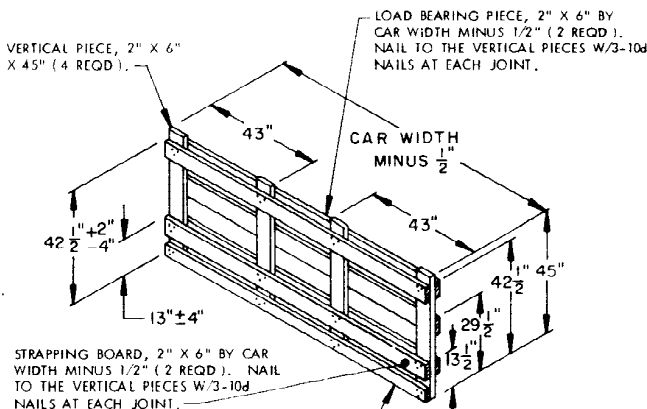
SEE SPECIAL NOTE F BELOW

SPECIAL NOTES: (FOR ANTI-SWAY BRACE ASSEMBLY A)

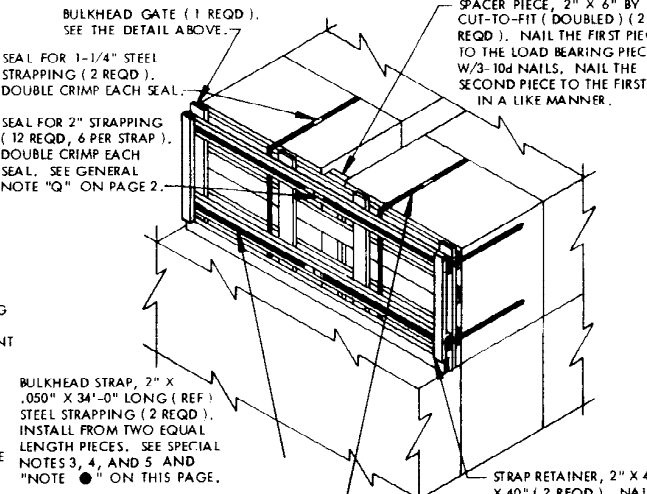
1. THE ANTI-SWAY BRACE SHOWN ABOVE IS FOR USE BETWEEN PALLET UNITS THAT ARE POSITIONED WITH THE 36-1/4" DIMENSION PARALLEL TO THE CAR SIDE WALL.
2. THE ASSEMBLY MUST BE FABRICATED IN PLACE BETWEEN PALLETS.
 - A. POSITION THE FIRST RETAINER PIECE BETWEEN THE CENTER PALLET POST AND THE PALLET POST WHICH IS FURTHEST AWAY. THE RETAINER PIECE IS TO SPAN THE VOID BETWEEN LATERALLY ADJACENT PALLETS.
 - B. POSITION THE SECOND RETAINER PIECE AGAINST THE INSIDE OF THE NEAREST PALLET POST SO AS TO SPAN THE VOID BETWEEN LATERALLY ADJACENT PALLETS.
 - C. POSITION THE 2" X 4" X 36" BUFFER PIECE 6" FROM THE END OF THE FIRST RETAINER PIECE AND EXTENDING BEYOND THE RETAINER PIECE. NAIL TO THE RETAINER PIECE W/3-10d NAILS.
 - D. PUSH THE PARTIAL ASSEMBLY FORWARD UNTIL THE FIRST RETAINER PIECE CONTACTS THE PALLET POST ON THE FAR SIDE OF THE PALLET. NAIL THE BUFFER PIECE TO THE SECOND RETAINER PIECE W/3-10d NAILS.
 - E. PUSH THE PARTIAL ASSEMBLY SIDWAYS UNTIL THE 2" X 4" X 36" BUFFER PIECE IS AGAINST THE PALLET POSTS AND RESTING ON THE BOTTOM SUPPORT BOARDS OF THE PALLET.
 - F. POSITION THE 2" X 8" X 36" BUFFER PIECE AGAINST THE PALLET POSTS ON THE OPPOSITE SIDE OF THE VOID AND NAIL TO THE RETAINER PIECES W/3-10d NAILS AT EACH JOINT. NOTE IF 2" X 8" MATERIAL IS NOT AVAILABLE, USE THE "ALTERNATIVE BUFFER PIECE" WHICH IS DETAILED ABOVE.

SPECIAL NOTES: (FOR BULKHEAD GATE METHOD)

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 (2) STRAPS WILL RETAIN UP TO 12,000 POUNDS OF LADING.
4. BULKHEAD STRAPS WILL BE TWO INCH (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 CRIMPED 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 TWO (2) SEALS BUTTED TOGETHER AND DOUBLE CRIMPED.
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 BULKHEAD 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 BALANCE OF THE LOAD.

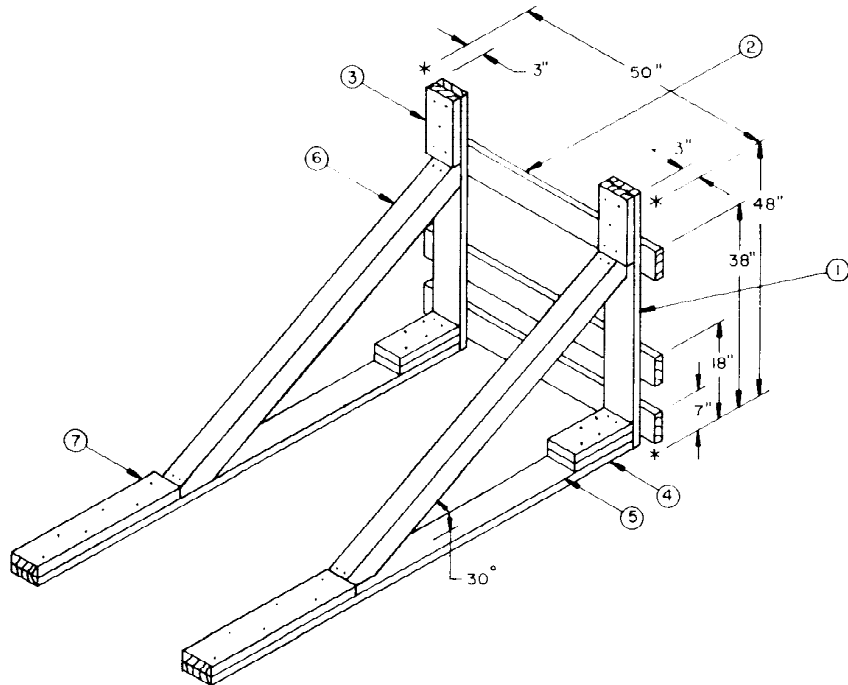


BULKHEAD GATE



BULKHEAD GATE METHOD OF PARTIAL-LAYER (TIER) BRACING

NOTE ●: TYPICAL ANCHOR DEVICES, SUCH AS THOSE DESIGNED/MANUFACTURED BY PULLMAN-STANDARD, WILL HAVE A 7/8" DIAMETER CONTINUOUS ROD WELDED INSIDE THE CAR SIDEWALL AND OPENINGS 3" HIGH BY 3-3/4" WIDE.

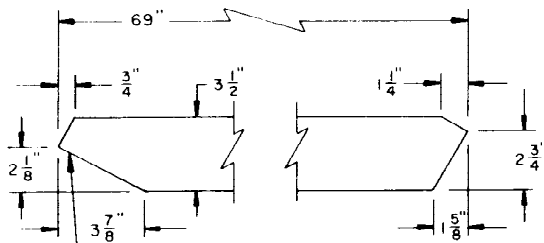


KNEE BRACE ASSEMBLY

FOR USE OF THIS ASSEMBLY, SEE PAGE 10.

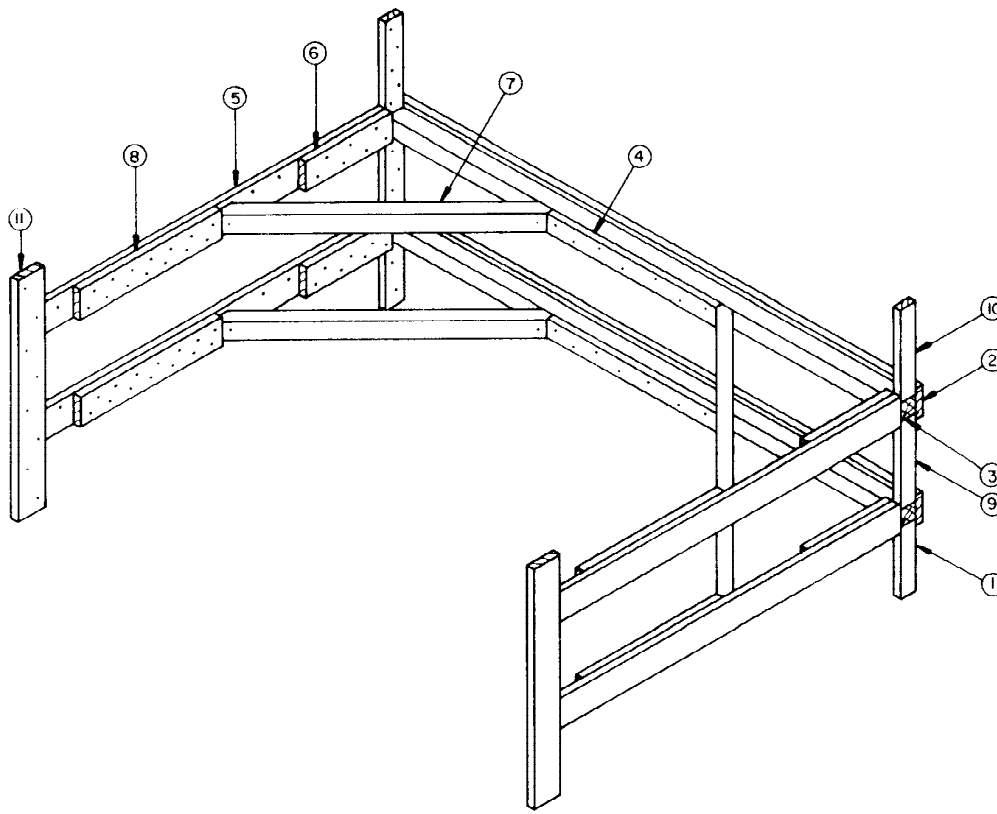
KEY NUMBERS

- ① VERTICAL PIECE, 2" X 6" X 48" (2 REQD.)
- ② LOAD BEARING PIECE, 2" X 6" X 50" (3 REQD.) NAIL TO VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.
- ③ KNEE BRACE HOLD-DOWN CLEAT, 2" X 6" X 12" (2 REQD.) NAIL TO VERTICAL PIECE W/5-10d NAILS.
- ④ FLOOR CLEAT, 2" X 6" X 90" (2 REQD.) ALIGN WITH VERTICAL PIECE MARKED ① AND NAIL TO THE CAR FLOOR W/1-16d NAIL EVERY 8".
- ⑤ POCKET CLEAT, 2" X 6" X 12" (DOUBLED) (2 REQD.) NAIL THE FIRST PIECE TO THE FLOOR CLEAT MARKED ④ W/4-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER AND TOENAIL TO THE VERTICAL MARKED ① W/2-16d NAILS.
- ⑥ KNEE-BRACE, 4" X 4" X 69" (2 REQD.) SEE THE DETAIL BELOW. TOENAIL TO VERTICAL MARKED ① AND TO FLOOR CLEAT MARKED ④ W/2-16d NAILS AT EACH END.
- ⑦ BACK-UP CLEAT, 2" X 6" X 30" (2 REQD.) NAIL TO THE FLOOR CLEAT MARKED ④ W/6-40d NAILS.



KNEE BRACE
4" X 4" MATERIAL.

THIS BRACE MUST BE INSTALLED SO THAT THIS BEARING SURFACE WILL BE IN CONTACT WITH THE FLOOR CLEAT MARKED ④.



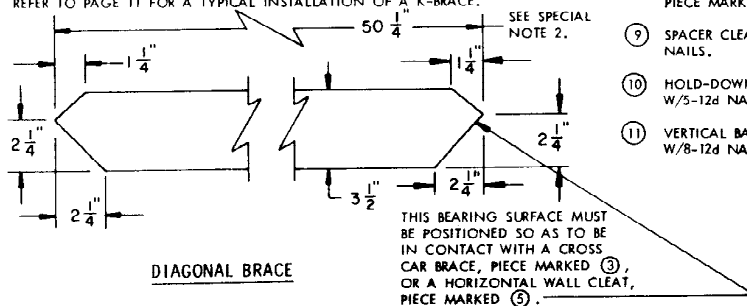
ISOMETRIC VIEW

KEY NUMBERS

SPECIAL NOTES:

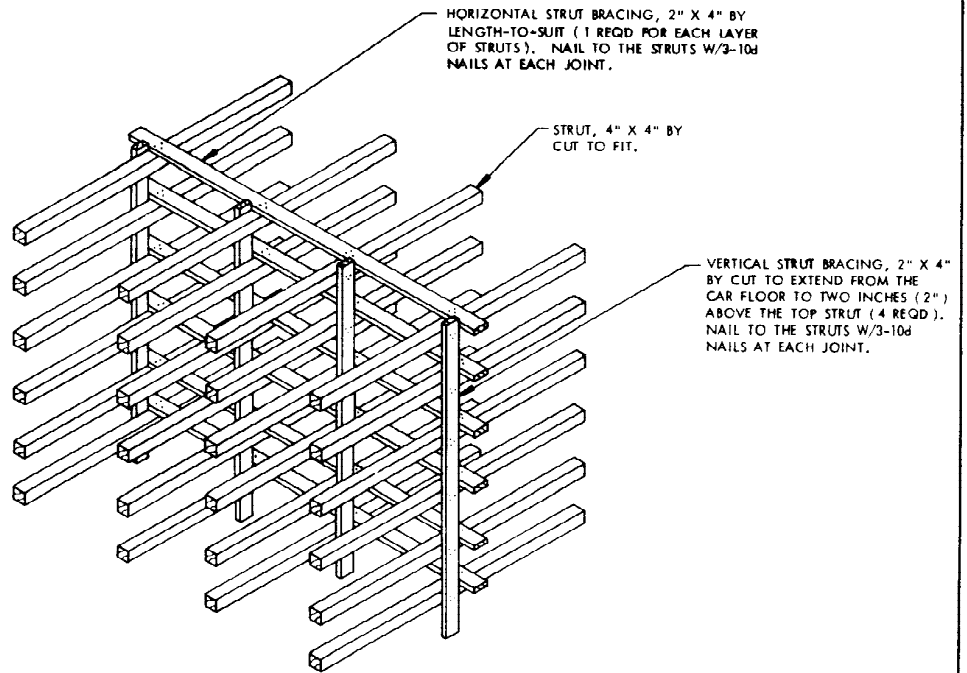
1. THE K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL LOAD OF NOT MORE THAN 14,000 POUNDS.
2. **CAUTION:** SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL-LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL TIER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ①, ②, ③, ④, ⑤, ⑥, ⑦, ⑧, 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 ③ 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 ③ 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 11 FOR A TYPICAL INSTALLATION OF A K-BRACE. SEE SPECIAL NOTE 2.

- ① SUPPORT CLEAT, 2" X 4" X 13-1/2" (2 REQD). NAIL TO THE CAR SIDEWALL W/2-12d NAILS. SEE SPECIAL NOTE 2 AT LEFT.
- 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 "P" 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 16-1/2" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ⑩ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ⑪ VERTICAL BACK-UP CLEAT, 2" X 6" BY 45" (2 REQD). NAIL TO THE CAR SIDEWALL W/8-12d NAILS.



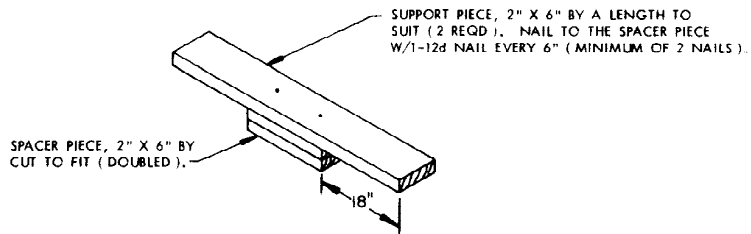
DIAGONAL BRACE

DETAILS



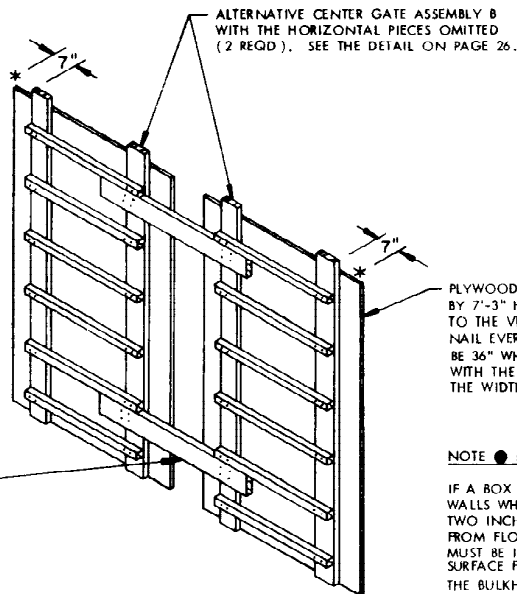
STRUT BRACING DETAIL

STRUT BRACING IS REQUIRED WHEN STRUTS ARE 48" OR GREATER IN LENGTH. ONE SET AS SHOWN IS REQUIRED FOR EVERY 48" OF STRUT LENGTH. FOR USE OF STRUT BRACING, SEE THE LOAD ON PAGE 6.



SPACER

THIS ASSEMBLY IS DESIGNED FOR USE BETWEEN THE TOPS OF LATERALLY ADJACENT PALLET UNITS IN THE DOORWAY AREA OF A CAR IN CONJUNCTION WITH DOORWAY PROTECTION STRAPS. THE STRAPPING WILL BE STAPLED TO THE SPACER TO PREVENT DISPLACEMENT. FOR USE OF THIS ASSEMBLY, SEE THE LOAD ON PAGE 8.



ALTERNATIVE CENTER GATE ASSEMBLY B WITH THE HORIZONTAL PIECES OMITTED (2 REQD). SEE THE DETAIL ON PAGE 26.

PLYWOOD, 1/2" THICK BY 48" WIDE BY 7'-3" HIGH (2 REQD). NAIL TO THE VERTICAL PIECES W/1-6d NAIL EVERY 6". NOTE: WIDTH TO BE 36" WHEN PALLET UNIT IS TURNED WITH THE 36-1/4" DIMENSION ACROSS THE WIDTH OF THE CAR.

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-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.

TIE-PIECE, 2" X 6" BY A LENGTH TO EXTEND AT LEAST 2" BEYOND THE VERTICAL PIECES ON THE GATE (2 REQD). POSITION UNDER AND IN CONTACT WITH THE STRUT LEDGER, AS SHOWN. NAIL TO THE VERTICAL PIECES W/4-10d NAILS AT EACH JOINT.

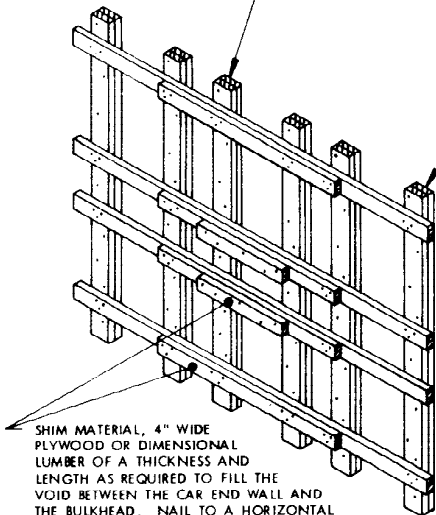
PLACE THIS SIDE OF THE BULKHEAD AGAINST THE LOAD.

PLYWOOD GATE ALTERNATIVE

ALTERNATIVE CENTER GATE ASSEMBLY B IS SHOWN AS TYPICAL. PLYWOOD MAY BE USED IN LIEU OF THE HORIZONTAL PIECES AS SHOWN IN THE "ALTERNATIVE CENTER GATE ASSEMBLY B" DETAIL ON PAGE 26. THE SAME PRINCIPLE MAY BE APPLIED TO ALL CENTER GATES OR SEPARATOR GATES SHOWN HEREIN.

A MODIFIED CENTER GATE A IS SHOWN. NOTE THAT THE GATE HOLD-DOWN RISER PIECES HAVE BEEN OMITTED.

SHIM MATERIAL, 6" WIDE PLYWOOD OR DIMENSIONAL LUMBER OF A THICKNESS AND LENGTH AS REQUIRED TO FILL THE VOID BETWEEN THE CAR END WALL AND THE BULKHEAD. NAIL TO FILLER PIECE AND/OR LAMINATE W/1 APPLICABLY SIZED NAIL EVERY 6"



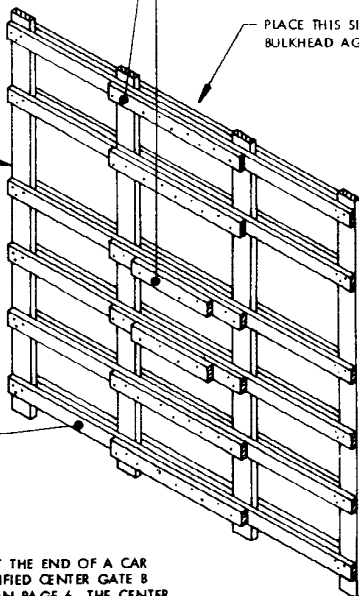
SHIM MATERIAL, 4" WIDE PLYWOOD OR DIMENSIONAL LUMBER OF A THICKNESS AND LENGTH AS REQUIRED TO FILL THE VOID BETWEEN THE CAR END WALL AND THE BULKHEAD. NAIL TO A HORIZONTAL PIECE AND/OR LAMINATE W/1 APPLICABLY SIZED NAIL EVERY 6".

BULKHEAD A

THIS BULKHEAD IS APPLICABLE FOR USE AT THE END OF A CAR WHICH HAS BOWED END WALLS. A MODIFIED CENTER GATE A IS SHOWN AS TYPICAL. SEE THE LOAD ON PAGE 4, THE CENTER GATE A DETAIL ON PAGE 22, AND "NOTE ●" ON THIS PAGE.

A MODIFIED CENTER GATE B IS SHOWN. NOTE THAT THE STRUT LEDGERS AND THE GATE HOLD-DOWN RISER PIECES HAVE BEEN OMITTED.

PLACE THIS SIDE OF THE BULKHEAD AGAINST THE LOAD.



FILLER, 2" X 6" BY CAR WIDTH MINUS 1/2" IN LENGTH (ONE REQUIRED FOR EACH HORIZONTAL PIECE ON THE CENTER GATE ASSEMBLY). ALIGN WITH THE HORIZONTAL PIECES AND NAIL TO THE VERTICAL PIECES OF THE BULKHEAD W/3-10d NAILS AT EACH JOINT.

BULKHEAD B

THIS BULKHEAD IS APPLICABLE FOR USE AT THE END OF A CAR WHICH HAS BOWED END WALLS. A MODIFIED CENTER GATE B IS SHOWN AS TYPICAL. SEE THE LOAD ON PAGE 6, THE CENTER GATE B DETAIL ON PAGE 22, AND "NOTE ●" ON THIS PAGE.

DETAILS