

APPROVED BY
 HAZARDOUS MATERIALS SYSTEMS
 (BOE) ASSOCIATION OF AMERICAN
 RAILROADS
J. H. ...
 DATE 8/19/91

LOADING AND BRACING (CL & LCL) IN BOX CARS OF PALLETTIZED PROPELLING CHARGES PACKED IN CYLINDRICAL METAL CONTAINERS PA106 SERIES CONTAINER

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

REVISIONS				DRAFTSMAN <i>tm</i>	PROJ ENG <i>RTH/WRF</i>
				CHECKED <i>W.F. Ernst</i>	LOG ENGRG OFFICE <i>W.F. Ernst</i>
APPROVED, U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND					
<i>James E. Harkins</i>					
APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND (AMC)					
<i>William F. Ernst</i>					
U.S. ARMY AMC DRAWING					
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DO NOT SCALE

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 IN THIS DRAWING ARE APPLICABLE FOR THE PA106 SERIES PROPELLING CHARGE CONTAINER WHEN UNITIZED ON A 40" X 48" FOUR-WAY ENTRY PALLET. SEE THE PICTORIAL VIEW ON PAGE 3. REFER TO THE US AMC DRAWING 19-48-4042A/23-20PM1001 FOR UNITIZATION PROCEDURES FOR THE PA106 SERIES CONTAINER.
- C. THE OUTLOADING PROCEDURES DEPICTED WITHIN THIS DOCUMENT ARE APPLICABLE FOR SHIPMENTS IN CONVENTIONAL TYPE BOX CARS, FOR SHIPMENTS IN BOX CARS EQUIPPED WITH VARIOUS TYPE OF SELF-CONTAINED MECHANICAL BRACING DEVICES, AND FOR SHIPMENTS IN CUSHIONED BOX CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.
- D. **CAUTION:** METAL PROPELLING CHARGE CONTAINERS THAT OVERHANG THE PALLET END MUST NOT BE ALLOWED TO CONTACT STEEL SIDEWALLS OR END WALLS OF BOX CARS. THIS TYPE OF UNIT LOAD SHOULD BE SHIPPED IN BOX CARS HAVING WOOD SIDEWALLS AND/OR END WALLS. IF CARS WITH WOOD SIDEWALLS AND/OR END WALLS ARE NOT AVAILABLE, AND ALL-STEEL CARS ARE USED, THE SIDEWALLS AND/OR END WALLS MUST BE LINED WITH DIMENSIONAL LUMBER, PLYWOOD, HARDBOARD, OR SOLID FIBERBOARD. THE LINING SHOULD BE PROVIDED WHEREVER METAL-OF-CAR CONTACT TO METAL-OF-CAR CONTACT IS POSSIBLE. REFER TO PAGE 43 FOR GUIDANCE.
- E. ALL THE LOADS SHOWN HEREIN ARE TYPICAL. BECAUSE OF THIS FACT, IT IS MOST LIKELY THAT THE ACTUAL QUANTITY TO BE SHIPPED WILL NOT BE DEPICTED IN ANY OF THE LOADING PROCEDURES. A LOAD PLAN SHOULD BE DEVELOPED WHICH WILL BE THE MOST EFFICIENT AS TO THE AMOUNT OF DUNNAGE REQUIRED AND AS TO THE EASE OF LOADING, FOR THE QUANTITY TO BE SHIPPED. THE LOAD PLANNING CHARTS ON PAGE 20 MAY BE USED IN CONJUNCTION WITH THE DEPICTED LOADING PROCEDURES FOR GUIDANCE.
- F. THE SELECTION OF RAIL CARS FOR THE TRANSPORT OF PALLETIZED UNITS OF PROPELLING CHARGES IS THE RESPONSIBILITY OF THE ORIGINATING CARRIER AND THE SHIPPER. ONLY CARS WHICH HAVE "SOUND" FLOORS AND ARE IN OTHERWISE PROPER CONDITION, IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE REGULATORY DOCUMENTS, WILL BE SELECTED.
- G. WHEN SELECTING RAIL CARS, EVERY EFFORT SHOULD BE MADE TO OBTAIN BOX CARS THAT DO NOT HAVE BOWED END WALLS. CARS HAVING 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 44 FOR GUIDANCE.
- H. BOX CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS HAVE BEEN SHOWN. HOWEVER, THE DEPICTED OUTLOADING PROCEDURES ARE ALSO APPLICABLE FOR CARS EQUIPPED WITH PLUG DOORS. **CAUTION:** DUNNAGE MATERIAL MUST NOT BE NAILED TO ANY PLUG DOOR, WHETHER AUXILIARY OR MAIN. ALSO, AFTER THE PLUG DOORS ON A CAR ARE CLOSED AND READY FOR THE INSTALLATION OF CAR SEALS, A PIECE OF WIRE OF SUITABLE SIZE WILL BE USED IN ADDITION TO, AND IN CONJUNCTION WITH EACH CAR SEAL USED TO SEAL THE CAR. THE WIRE WILL BE THREADED THRU THE HOLES IN THE DOOR LATCH ASSEMBLY ONE OR MORE TIMES, AND THE WIRE ENDS WILL BE TWISTED TOGETHER.
- J. THE USE OF AN OFFSET LOADING PATTERN WILL FACILITATE LOADING AND UNLOADING OPERATIONS IN THE DOORWAY AREA OF THE CAR. 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 MORE LOAD UNIT IN ONE END THAN IN THE OTHER IS CONSIDERED TO BE AN OFFSET LOAD.
- K. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN CARS WHICH ARE PARTIALLY LOADED WITH PALLETIZED UNITS OF PROPELLING CHARGES, PROVIDING THE TOTAL LOAD IS COMPATIBLE, EXISTING DIRECTIVES ARE NOT VIOLATED, AND THE OTHER LADING ITEMS ARE BLOCKED AND BRACED TO EQUAL THE BLOCKING AND BRACING CRITERIA SPECIFIED HEREIN. MIXED ITEMS TO BE SHIPPED IN CARS EQUIPPED WITH MECHANICAL BRACING DEVICES MUST BE SEPARATELY BLOCKED, USING THE PROCEDURES SHOWN FOR THESE CARS AS GUIDANCE.

(CONTINUED AT RIGHT)

MATERIAL SPECIFICATIONS

- LUMBER** -----: SEE TM 743-200-1, DUNNAGE LUMBER, FED SPEC M/M-L-751.
- NAILS** -----: COMMON, FED SPEC FF-N-105.
- STRAPPING, STEEL** ---: ASTM D 3953; FLAT STRAPPING, TYPE 1 OR 2, HEAVY DUTY, COATED FINISH (ORGANIC), ZINC-COATED (GRADE 2), OR UNCOATED.
- STRAP SFAL** -----: ASTM D 3953; CLASS H, FINISH A, B (GRADE 2), OR C, TYPE D, STYLE 1, 11, OR 1V.
- STRAP STAPLE** -----: COMMERCIAL GRADE.
- PLYWOOD** -----: GROUP B CONSTRUCTION AND INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D, FED SPEC NN-P-530. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR AN EXTERIOR GRADE MAY BE SUBSTITUTED.
- WIRE** -----: FED SPEC QQ-W-461.
- HARDBOARD** -----: ANSI/AHA A135.4, CLASS 1.
- SOLID FIBERBOARD** --: FED SPEC PP-F-230, TYPE SF, CLASS DOMESTIC, GRADE 175 OR STRONGER; OR TYPE SF, CLASS WEATHER-RESISTANT, GRADE W65 OR STRONGER.

(GENERAL NOTES CONTINUED)

- L. DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE. 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".
- M. **NOTICE:** A STAGGERED NAILING PATTERN WILL BE USED WHEREVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES. ALSO, A STAGGERED NAILING PATTERN WILL BE USED WHEN DUNNAGE IS NAILED TO THE FLOOR OR SIDEWALL OF THE TRANSPORTING VEHICLE, OR WHEN LAMINATING DUNNAGE. THE NAILING PATTERN WILL BE ADJUSTED AS REQUIRED SO THAT A NAIL DOES NOT PENETRATE INTO OR NEAR A CRACK BETWEEN FLOOR BOARDS OR SIDEWALL BOARDS. ADDITIONALLY, THE NAILING PATTERN FOR AN UPPER PIECE OF LAMINATED DUNNAGE WILL BE ADJUSTED AS REQUIRED SO THAT A NAIL FOR THAT PIECE WILL NOT BE DRIVEN THROUGH ONTO OR RIGHT BESIDE A NAIL IN A LOWER PIECE.
- N. POWER DRIVEN STAPLES MAY BE USED AS ALTERNATIVE FASTENERS FOR NAILS WHEN CONSTRUCTING DUNNAGE ASSEMBLIES WHICH ARE TO BE USED IN THE DELINEATED CAR LOADS SHOWN THROUGHOUT THIS DRAWING. THE STAPLES TO BE USED MUST BE EQUAL IN LENGTH TO THE SPECIFIED NAIL SIZE AND MUST BE SUBSTITUTED ON A ONE STAPLE FOR ONE NAIL BASIS. STAPLES WHICH ARE 2" OR LESS IN LENGTH SHOULD BE IN ACCORDANCE WITH FEDERAL SPECIFICATION FF-N-105 AS NEARLY AS PRACTICABLE. STAPLES WHICH ARE LONGER THAN 2" WILL BE A COMMERCIAL GRADE, OF A QUALITY EQUIVALENT TO THOSE MANUFACTURED BY Senco PRODUCTS INCORPORATED. **NOTE:** STAPLES WILL NOT BE SUBSTITUTED FOR NAILS IN ANY LOAD RESTRAINING FLOOR DUNNAGE APPLICATION.
- O. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, A MINIMUM OF ONE (1) SEAL WITH TWO (2) PAIR OF NOTCHES WILL BE USED TO SEAL THE JOINT WHEN A NOTCH-TYPE SEALER IS BEING USED A MINIMUM OF TWO (2) SEALS, BUTTED TOGETHER, WITH TWO (2) PAIR OF CRIMPS PER SEAL WILL BE USED TO SEAL THE JOINT WHEN A CRIMP-TYPE SEALER IS BEING USED. REFER TO THE "STRAP JOINT A" AND "STRAP JOINT B" DETAILS ON PAGE 42 FOR GUIDANCE.
- P. 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 VIEW FOR CLARITY PURPOSES.
- Q. 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 UNITS. **NOTICE:** A SHIPMENT WILL BE POSITIONED IN THE RAIL CAR IN COMPLIANCE WITH THE WEIGHT DISTRIBUTION REQUIREMENTS OF THE AAR.
- R. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES, AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM AND ONE POUND EQUALS 0.454KG.

GENERAL NOTES

(FOR CONVENTIONAL TYPE BOX CARS)

- S. IF THE CAR BEING USED FOR A SHIPMENT IS EQUIPPED WITH A NAILABLE METAL FLOOR AND A NAIL SIZE FOR FLOOR NAILING IS MARKED ON THE SIDEWALL OF THE CAR, THAT GUIDANCE SHOULD BE APPLIED TO THE NAILING OF THE "DOORWAY BLOCKING" PIECES IN THE FULL LOADS AND TO THE NAILING TO THE CAR FLOOR OF THE LCL BRACES AND KNEE BRACE ASSEMBLIES IN THE LESS-THAN-FULL LOADS. IF A NAIL SIZE IS NOT SPECIFIED IN THE CAR, 30d NAILS SHOULD BE USED IN LIEU OF THOSE SPECIFIED IN THE APPLICABLE KEY NUMBERS. SEE GENERAL NOTE "M" ABOVE.
- T. **NOTICE:** WHEN POSITIONING PALLET UNITS IN A CAR THEY SHOULD BE PLACED TIGHTLY AGAINST A CAR SIDEWALL AND ARE TO BE PRESSED TIGHTLY TOGETHER LENGTHWISE SO AS TO ACHIEVE A TIGHT LOAD. TO AID IN ACHIEVING TIGHTNESS LENGTHWISE IN A FULL LOAD, A LOAD-COMPRESSING JACK MAY BE EMPLOYED IN THE AREA OF THE CENTER GATES TO MOVE THE PALLET UNITS INTO THEIR FINAL SHIPPING POSITION. A HYDRAULIC JACK IS RECOMMENDED FOR THIS OPERATION. **CAUTION:** WHEN USING A JACK TO COMPACT A LOAD, THE JACK MUST BE USED AGAINST STRONG POINTS OF THE PALLET UNITS, SUCH AS THE JOINTS BETWEEN THE LAYERS OF CONTAINERS ON THE UNIT. PADDING OF 2-INCH (2") THICK LUMBER OR ANY OTHER MATERIAL OF SIMILAR CONSISTENCY, SHOULD BE PLACED BETWEEN THE JACK AND THE LADING.
- U. LOAD-BLOCKING STRUTS WHICH ARE 48" OR LONGER MUST BE STIFFENED BY THE APPLICATION OF HORIZONTAL AND VERTICAL STRUT BRACING AS SHOWN BY THE "STRUT BRACING" DETAIL ON PAGE 46. BRACING IS NOT REQUIRED IF THE STRUTS FOR THE LOAD BEING SHIPPED ARE SHORTER THAN 48". THE LENGTH OF THE LOAD-BLOCKING STRUTS SHOULD BE KEPT AS SHORT AS POSSIBLE (APPROX 18" MINIMUM), BUT IN THE EVENT IT IS NECESSARY TO USE STRUTS WHICH ARE 8'-0" OR MORE IN LENGTH, IT WILL BE NECESSARY TO APPLY AN ADDITIONAL SET OF HORIZONTAL AND VERTICAL STRUT BRACING PIECES. STRUT BRACING SHOULD BE APPLIED SO AS TO PROVIDE NEARLY EQUAL SPACES BETWEEN THE BRACING PIECES AND THE CENTER GATES AND/OR BETWEEN ADJACENT STRUT BRACING PIECES. NOTE THAT HORIZONTAL STRUT BRACING PIECES FOR THE UPPER LEVEL OF STRUTS FOR ALL BUT THE UPPERMOST TIER OF A LOAD MAY BE DIFFICULT TO APPLY TO THE TOP SURFACES OF THE STRUTS AS DEPICTED. STRUT BRACING WILL BE EQUALLY EFFECTIVE IF APPLIED TO THE UNDER SIDE OF THOSE STRUTS.

(GENERAL NOTES CONTINUED FROM PAGE 2)

- 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. THE OTHER END, WHICH CAN BE BEVELED ON THE LOWER CORNER IF DESIRED, WILL THEN BE DRIVEN DOWNWARD UNTIL IT CONTACTS THE STRUT LEDGER ON THE OTHER GATE. EACH END OF THE STRUT WILL BE TOENAILED TO THE ADJACENT CENTER GATE, AS SPECIFIED WITHIN THE KEY NUMBERS FOR A LOAD, IN SUCH A MANNER SO THAT AS NEARLY AS PRACTICAL EQUAL LENGTHS OF A NAIL ARE EMBEDDED IN THE STRUT AND IN THE VERTICAL PIECE OF THE CENTER GATE. SEE THE "BEVEL CUT" DETAIL ON PAGE 46 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. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.

GENERAL NOTES

(FOR BOX CARS EQUIPPED WITH MECHANICAL BRACING DEVICES)

- X. THE OUTLOADING PROCEDURES FOR BOX CARS EQUIPPED WITH MECHANICAL BRACING DEVICES 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. **CAUTION:** BOX CARS EQUIPPED WITH MEMBERS WHICH DO NOT MEET THE LOCATION REQUIREMENTS MUST NOT BE USED.
 1. FOR BLOCKING THE LOADS WHICH ARE DEPICTED, A CROSS MEMBER WILL NOT BE RELIED UPON TO RETAIN MORE LADING ON EITHER SIDE THAN AS SHOWN. VOIDS LENGTHWISE WITHIN THE LOAD MUST BE HELD TO A MINIMUM AND CROSS MEMBERS MUST BE PLACED AGAINST THE LADING AS TIGHTLY AS THE SPACING OF THE LOCKING HOLES IN THE WALL MEMBERS PERMIT. LOCKING BARS (LEVER JACKS) SHOULD BE USED FOR THIS PURPOSE. AN ADDITIONAL 1/2" OF ADJUSTMENT CAN BE MADE BY TURNING A CROSS MEMBER END-FOR-END WHEN LOCKING PINS ON THE MEMBER ARE OFF-CENTER. **NOTE:** IT IS RECOMMENDED THAT EACH CROSS MEMBER BE INSTALLED WITH THE ENDS ATTACHED AS NEARLY AS POSSIBLE IN "MATED" POSITIONS (AT EQUAL HEIGHTS AND AT EQUAL DISTANCES FROM THE END OF THE CAR).
 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 DOOR WAY MEMBERS, AND DOORWAY MEMBERS TO DOOR POSTS. COMPONENTS ASSIGNED TO EACH CAR MUST REMAIN THEREWITH EVEN THOUGH UNUSED DURING SOME SHIPMENTS.
- Y. IN A CAR EQUIPPED WITH ADJUSTABLE WALL MEMBERS, PROVIDING THE FIXED WALL MEMBERS WHICH ARE PRESENT IN SOME "ADJUSTABLE" CARS ARE NOT PROPERLY POSITIONED TO PROVIDE SIDE BEARING SURFACES BETWEEN THE UNITS AND THE CAR SIDEWALLS, ADJUSTABLE WALL MEMBERS (AS REQUIRED) MUST BE INSTALLED TO PROVIDE A MINIMUM OF ONE SURFACE AREA FOR SIDE BEARING AT SOME LOCATION WITHIN THE UPPER HALF OF EACH UNIT.
- Z. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.

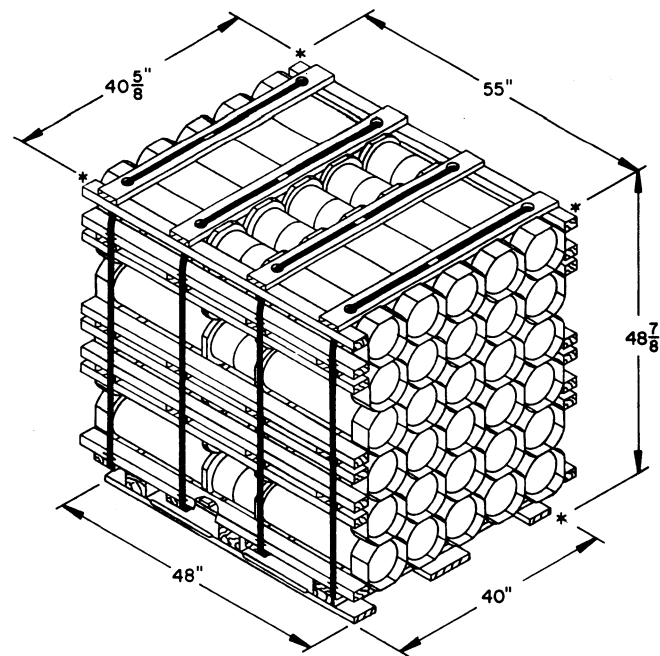
GENERAL NOTES

(FOR CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS)

- AA. **CAUTION:** FOR CUSHIONED BOX CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS, ONLY CARS EQUIPPED WITH LOAD DIVIDERS MANUFACTURED BY EVANS, EQUIPCO, OR PRECO MAY BE USED. LOAD DIVIDERS MANUFACTURED BY TRANSCO ARE NOT ACCEPTABLE, WHETHER OF ALUMINUM OR STEEL CONSTRUCTION. THE DEPICTED PROCEDURES ARE APPLICABLE FOR CARS OF VARIOUS LENGTHS AND WIDTHS. THE AAR MECHANICAL DESIGNATION CLASS FOR THESE CARS, AS IDENTIFIED IN THE OFFICIAL RAILWAY EQUIPMENT REGISTER, WILL BE RBL, XL, OR XLI.
- BB. THE USE OF LOAD DIVIDER EQUIPPED CARS WILL ELIMINATE THE NEED FOR CENTER GATES AND STRUTS, AND GATE HOLD DOWNS (WHEN APPLICABLE) WHICH ARE REQUIRED IN CONVENTIONAL BOX CAR LOADS. THIS WILL ACCOUNT FOR A CONSIDERABLE SAVING IN MATERIAL AND LABOR COSTS. THEREFORE, EVERY EFFORT SHOULD BE MADE TO ACQUIRE CUSHIONED CARS EQUIPPED WITH LOAD DIVIDERS FOR SHIPMENT OF PROPELLING CHARGES. **NOTICE:** 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.
- CC. IF NAILING TO A CAR SIDEWALL IS NOT REQUIRED, 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 52 FOR GUIDANCE. IF THE BACK OF THE SIDE FILLER PANELS ARE REINFORCED WITH VERTICAL AND HORIZONTAL STEEL MEMBERS AS SHOWN IN THE "TYPICAL TYPE B" VIEW ON PAGE 52, THE "FILL PIECE" MATERIAL IS NOT REQUIRED. (CONTINUED AT RIGHT)

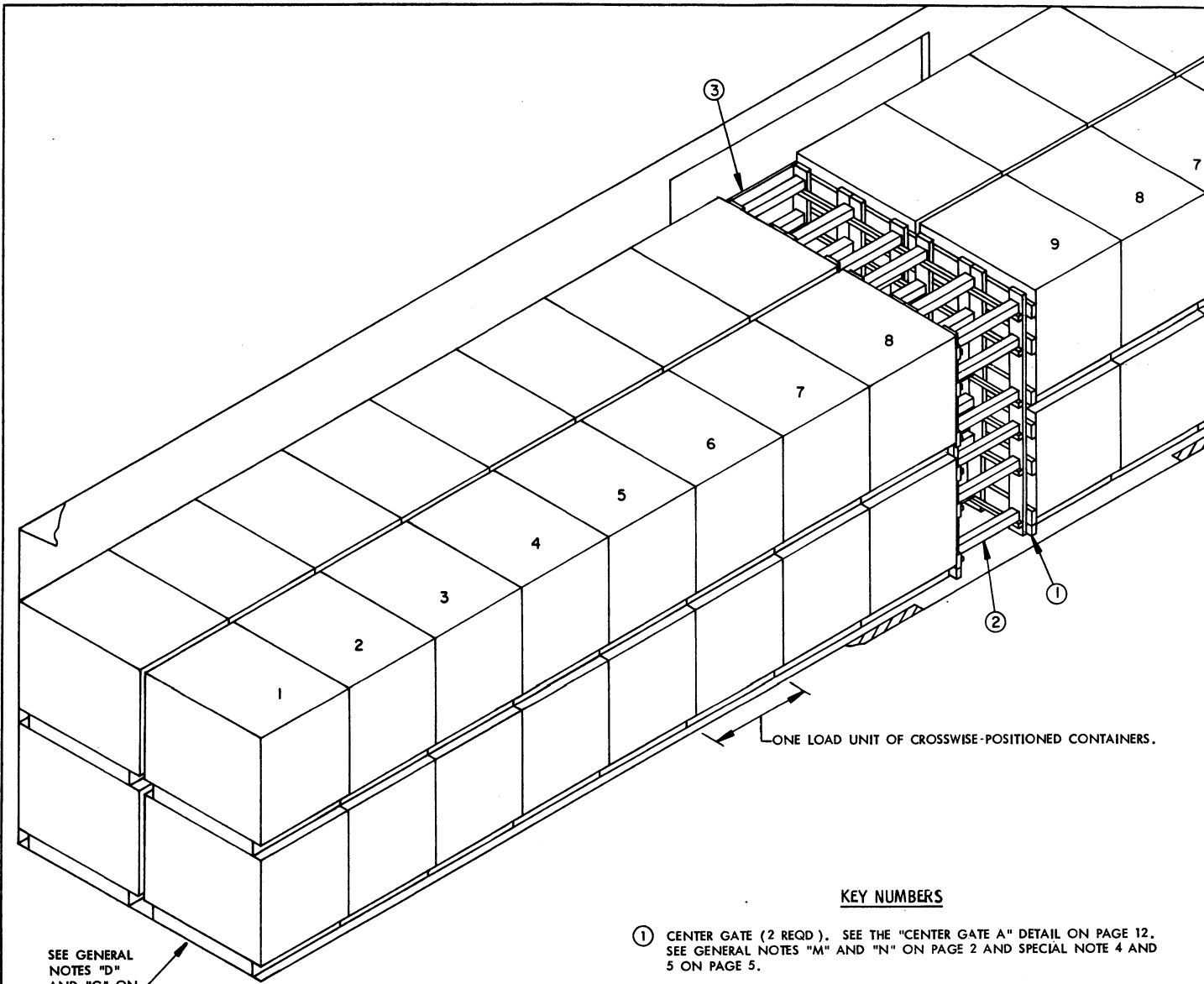
(GENERAL NOTES CONTINUED)

- DD. **NOTICE:** AFTER THE LOAD DIVIDER BULKHEADS ARE POSITIONED AGAINST THE LADING, AND THE LOCKING PINS ARE ENGAGED IN THE HOLES OF THE RAILS, THE LOWER LOCKING PINS MUST BE INSPECTED TO ENSURE THAT THE PINS ARE FULLY ENGAGED IN THE LOCKING HOLES. IF THE PINS ARE NOT FULLY SEATED IN THE LOCKING HOLES, THE LINKAGE MECHANISM WILL BE ADJUSTED AS REQUIRED SO THAT THE PINS WILL BE FULLY SEATED INTO THE LOCKING HOLES OF THE LOWER RAILS. IF PRESENT, DEBRIS MUST BE REMOVED FROM BENEATH THE LOCKING HOLES WHICH HAVE BEEN SELECTED FOR SECURING A LOAD DIVIDER BULKHEAD.
- EE. A "STRUT ASSEMBLY" MUST BE INSTALLED BETWEEN THE LOAD DIVIDER BULKHEADS IF THE CAR CONTAINS CLASS A OR CLASS B EXPLOSIVES AND THE LOAD IN EITHER END OF THE CAR WEIGHS 50,000 POUNDS OR MORE. A STRUT ASSEMBLY IS NOT REQUIRED FOR LOADS OF CLASS C EXPLOSIVES. NOTE THAT THE STRUT ASSEMBLY MAY BE OMITTED FROM LOADS OF CLASS A OR B EXPLOSIVES WEIGHING 50,000 POUNDS WHEN THE LADING AND ADEQUATE BLOCKING AND BRACING ARE POSITIONED TO COMPLETELY FILL THE SPACE BETWEEN THE INSTALLED BULKHEADS AS SPECIFIED IN GENERAL NOTE "FF-3" BELOW. DETAILS OF STRUT ASSEMBLIES FOR USE BETWEEN 2-PIECE BULKHEADS AND BETWEEN 1-PIECE BULKHEADS ARE SHOWN ON PAGE 51.
- FF. THE NORMAL LOADING PATTERN IN CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS IS TO POSITION THE LADING BETWEEN A CAR END WALL AND A LOAD DIVIDER BULKHEAD IN FULL LAYERS. OBVIOUSLY, A LOAD QUANTITY MUST THEN BE A MULTIPLE OF THE NUMBER OF PALLET UNITS WHICH ARE IN ONE LOAD UNIT. A LOAD UNIT IS DEFINED AS A STACK OF CONTAINERS WHICH IS FULL CAR WIDTH BY FULL LOAD HEIGHT BY ONE UNIT IN LENGTH. IF THE QUANTITY TO BE SHIPPED CANNOT BE ATTAINED BY ADJUSTING THE NUMBER OF TIERS IN ONE OR BOTH ENDS OF A CAR, ONE OF THE FOLLOWING PROCEDURES MUST BE USED IN ORDER TO OBTAIN THE DESIRED QUANTITY.
 1. ONE OR MORE RISERS CAN BE POSITIONED WITHIN A LOAD TO INCREASE A LOAD QUANTITY. SEE THE RISER PROCEDURES AND DETAILS ON PAGE 25 THRU 27.
 2. THE "GATES AND STRUTS" METHOD OF OMITTING A PALLET UNIT MAY BE USED TO ADJUST A LOAD QUANTITY DOWNWARD BY OTHER THAN A MULTIPLE OF A LOAD UNIT. SEE THE PROCEDURES ON PAGES 22 THRU 24 FOR GUIDANCE.
 3. AT LOCATION(S) WHERE K-BRACES MIGHT NORMALLY BE USED IN A LOAD IN A CONVENTIONAL CAR, LOAD DIVIDER BULKHEADS CAN BE POSITIONED. LOADING CAN THEN CONTINUE TOWARD THE CENTER OF THE CAR FROM EACH INSTALLED LOAD DIVIDER BULKHEAD; IN EVEN LAYERS WHICH ARE ONE OR MORE LESS IN HEIGHT THAN THE LOAD IN THE ENDS OF THE CAR. INSTALL CENTER GATES, STRUTS AND GATE HOLD DOWNS AS SHOWN IN THE APPLICABLE CONVENTIONAL BOX CAR DRAWING HEREIN, TO PROVIDE FOR A TIGHT LOAD BETWEEN THE BULKHEADS.
 4. ONE OR MORE UNITS CAN BE POSITIONED IN CONTACT WITH A LOAD DIVIDER BULKHEAD ON THE CENTER-OF-CAR SIDE. BLOCK AND BRACE WITH LCL BRACES AS SHOWN ON PAGE 38, OR WITH KNEE BRACE ASSEMBLIES, AS SHOWN ON PAGE 34.
- GG. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.



PALLET UNIT

CONTAINER ---- 60 EACH @ 33 LBS (APPROX)
 CUBE ----- 63.2 CUBIC FEET (APPROX)
 GROSS WEIGHT - 2,186 LBS (APPROX)



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

ISOMETRIC VIEW

ONE LOAD UNIT OF CROSSWISE-POSITIONED CONTAINERS.

KEY NUMBERS

- ① CENTER GATE (2 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 12. SEE GENERAL NOTES "M" AND "N" ON PAGE 2 AND SPECIAL NOTE 4 AND 5 ON PAGE 5.
- ② STRUT, 4" X 4" BY CUT TO FIT (REF: 31") (36 REQD). TOENAIL TO PIECES MARKED ① W/2-16d NAILS AT EACH END. SEE GENERAL NOTES "L" AND "U" ON PAGE 2 AND GENERAL NOTE "V" ON PAGE 3.
- ③ DOORWAY PROTECTION (2 REQD). SEE "DOORWAY PROTECTION B" DETAIL ON PAGE 14. NAIL TO THE DOOR POSTS W/12d NAILS. SEE SPECIAL NOTE 7 ON PAGE 5.

SPECIAL NOTES:

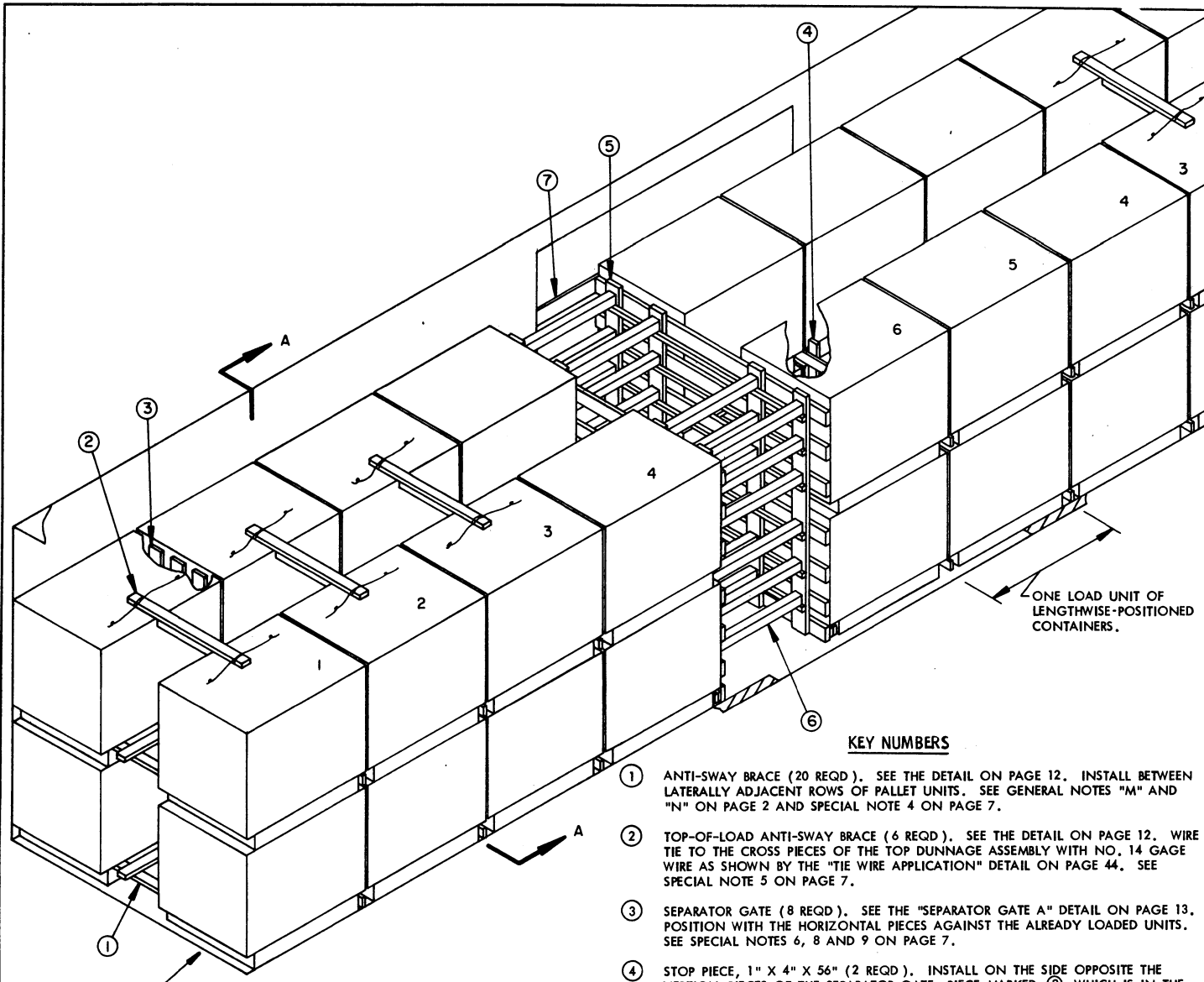
1. A 60'-8" LONG BY 9'-4" WIDE WOOD-LINED CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. WIDER CARS, CARS OF OTHER LENGTHS, AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED. SEE GENERAL NOTE "D" ON PAGE 2 AND SPECIAL NOTE 3 BELOW.
2. A MAXIMUM OF FIFTY-SIX (56) OF THESE UNITS FOR AN APPROXIMATE LADING WEIGHT OF 122,416 POUNDS CAN BE PLACED IN A 50'-6" CAR WHEN USING THE DEPICTED PROCEDURES; FORTY-FOUR (44) UNITS, FOR AN APPROXIMATE LADING WEIGHT OF 96,184 POUNDS, CAN BE LOADED IN A 40'-6" CAR.
3. ANTI-SWAY BRACING BETWEEN LATERALLY ADJACENT ROWS OF PALLET UNITS IS NOT REQUIRED REGARDLESS OF THE WIDTH OF THE CAR BEING LOADED.
4. CENTER GATE "A" MAY BE PARTIALLY FORMED FROM 1/2" OR THICKER PLYWOOD IF DESIRED. PLYWOOD MAY BE USED IN LIEU OF THE 2" X 6" HORIZONTAL PIECES. SEE THE "PLYWOOD CENTER GATE ALTERNATIVE" DETAIL ON PAGE 45 FOR GUIDANCE.
5. FOR EASE OF HANDLING, SPLIT CENTER GATES, WHICH ARE NOT DEPENDENT UPON THE WIDTH OF THE CAR, MAY BE USED AS AN ALTERNATIVE TO THE CAR-WIDTH GATES. IN LIEU OF EACH "CENTER GATE A" SHOWN AS PIECE MARKED ① IN THE LOAD ON PAGE 4, INSTALL TWO (2) "CENTER GATES C" AS SHOWN ON PAGE 15. AFTER THE SPLIT GATES AND STRUTS HAVE BEEN INSTALLED, THE SPLIT GATES MUST BE TIED TOGETHER AS DEPICTED BY THE "TIE PIECE APPLICATION" DETAIL ON PAGE 45.
6. DOOR SPANNER TYPE GATE HOLD DOWN MAY BE USED IN LIEU OF THE DOUBLED 2" X 3" HOLD DOWNS ON CENTER GATE "A", PROVIDING THE CAR HAS NAILABLE SIDEWALLS. SEE THE "ALTERNATIVE GATE HOLD-DOWN" AND "CENTER GATE "A" MODIFICATION" DETAILS ON PAGE 47 FOR GUIDANCE.
7. DOORWAY PROTECTION IS REQUIRED FOR ALL PALLET UNIT STACKS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE STACK LENGTH. THE WOODEN GATE TYPE OF DOORWAY PROTECTION, SHOWN AS PIECES MARKED ③ IN THE LOAD ON PAGE 4, IS APPLICABLE FOR BOX CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS AND NAILABLE DOOR POSTS. REFER TO PAGES 48 THRU 50 FOR ALTERNATIVE DOORWAY PROTECTION FOR CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS. IF THE CAR BEING LOADED IS EQUIPPED WITH PLUG TYPE DOORS OR COMBINATION PLUG AND SLIDING DOORS, NAILED FLOOR LINE BLOCKING AND LOAD BUNDLING STRAPS MUST BE USED. SEE THE "ALTERNATIVE DOORWAY PROTECTION E" DETAIL ON PAGE 50 FOR GUIDANCE. NOTE THAT NAILED FLOORLINE BLOCKING AND LOAD BUNDLING STRAPS MAY ALSO BE USED IN CARS EQUIPPED WITH SLIDING DOORS.
8. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED. A 2-TIER LOAD CAN BE REDUCED BY A MULTIPLE OF FOUR (4) PALLET UNITS OR A 1-TIER LOAD CAN BE REDUCED BY A MULTIPLE OF TWO (2) UNITS BY OMITTING ONE OR MORE LOAD UNITS FROM THE CENTER PORTION OF THE LOAD. OR, THE ENTIRE TOP TIER CAN BE OMITTED. FOR OTHER METHODS OF REDUCING A LOAD, AND FOR TYPICAL LCL PROCEDURES, REFER TO PAGES 18 THRU 42 FOR GUIDANCE.
9. IF PALLET UNITS WHICH DO NOT CONTAIN A FULL QUANTITY OF CONTAINERS ARE TO BE TRANSPORTED, REFER TO PAGES 39 AND 42 FOR SHIPPING GUIDANCE.
10. FOR SHIPMENT OF ONE OR MORE LEFTOVER CONTAINERS, SEE THE "PROCEDURES FOR SHIPMENT OF LEFTOVER CONTAINERS" ON PAGE 41 FOR GUIDANCE.
11. A CAR TO BE USED FOR SHIPMENT OF THE DEPICTED 68- UNIT LOAD MUST HAVE A LOAD LIMIT OF AT LEAST 150,300 POUNDS. AN EVENLY DISTRIBUTED 56- UNIT LOAD IN A 50'-6" LONG CAR WILL REQUIRE A LOAD LIMIT OF AT LEAST 123,800 POUNDS; AN OFFSET 56- UNIT LOAD WILL REQUIRE A CAR HAVING A LOAD LIMIT OF 124,500 POUNDS OR GREATER. A 44- UNIT LOAD IN A 40'-6" LONG CAR REQUIRES A LOAD LIMIT OF AT LEAST 98,000 POUNDS.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	80	40
2" X 2"	108	36
2" X 3"	39	20
2" X 4"	18	12
2" X 6"	240	240
4" X 4"	94	126
NAILS	NO. REQD	POUNDS
6d (2")	48	1/2
10d (3")	536	8-1/4
12d (3-1/4")	28	1/2
16d (3-1/2")	144	3-1/4

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT -----	68 -----	148,648 LBS
DUNNAGE -----	-----	961 LBS
TOTAL WEIGHT -----		149,609 LBS

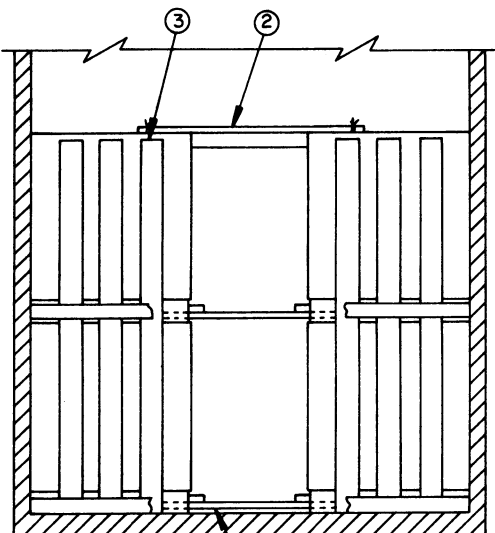


ISOMETRIC VIEW

SEE GENERAL NOTE "G" ON PAGE 2.

KEY NUMBERS

- ① ANTI-SWAY BRACE (20 REQD). SEE THE DETAIL ON PAGE 12. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLET UNITS. SEE GENERAL NOTES "M" AND "N" ON PAGE 2 AND SPECIAL NOTE 4 ON PAGE 7.
- ② TOP-OF-LOAD ANTI-SWAY BRACE (6 REQD). SEE THE DETAIL ON PAGE 12. WIRE TIE TO THE CROSS PIECES OF THE TOP DUNNAGE ASSEMBLY WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION" DETAIL ON PAGE 44. SEE SPECIAL NOTE 5 ON PAGE 7.
- ③ SEPARATOR GATE (8 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 13. POSITION WITH THE HORIZONTAL PIECES AGAINST THE ALREADY LOADED UNITS. SEE SPECIAL NOTES 6, 8 AND 9 ON PAGE 7.
- ④ STOP PIECE, 1" X 4" X 56" (2 REQD). INSTALL ON THE SIDE OPPOSITE THE VERTICAL PIECES OF THE SEPARATOR GATE, PIECE MARKED ③ WHICH IS IN THE DOORWAY AREA. POSITION IN CONTACT WITH THE ADJACENT PALLET UNITS AND NAIL TO THE HORIZONTAL PIECES W/3-6d NAILS AT EACH JOINT AND CLINCH. SEE SPECIAL NOTE 7 ON PAGE 7.
- ⑤ CENTER GATE (2 REQD). SEE THE "CENTER GATE B" DETAIL ON PAGE 13. SEE SPECIAL NOTES 10, 11, 12, AND 13 ON PAGE 7.
- ⑥ STRUT, 4" X 4" BY CUT TO FIT (REF: 44") (24 REQD). TOENAIL TO PIECES MARKED ⑤ W/2-16d NAILS AT EACH END. SEE GENERAL NOTES "L" AND "U" ON PAGE 2 AND GENERAL NOTE "V" ON PAGE 3.
- ⑦ DOORWAY PROTECTION (2 REQD). SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 14. NAIL TO THE DOOR POSTS W/12d NAILS. SEE SPECIAL NOTE 13 ON PAGE 7.



SECTION A-A

(SPECIAL NOTES CONTINUED)

14. IF THE NAILED FLOORLINE BLOCKING AND LOAD-BUNDLING STRAP ALTERNATIVE DOORWAY PROTECTION PROCEDURES SHOWN ON PAGE 10 ARE USED IN LIEU OF THE WOODEN DOORWAY PROTECTION, PIECES MARKED ⑦, THE CENTER GATES MUST BE RESTRAINED FROM LATERAL MOVEMENT. THIS CAN BE ACCOMPLISHED BY NAILING TO THE CAR FLOOR A DOUBLED 2" X 4" X 18" PIECE POSITIONED LONGITUDINALLY SO AS TO BE CENTERED AGAINST THE FILL PIECE OF A CENTER GATE. TWO (2) PIECES WILL BE REQUIRED FOR EACH CENTER GATE WHICH IS IN THE DOOR OPENING OR WITHIN SIX INCHES (6") OF BEING IN THE DOOR OPENING. IF NAILING TO THE CAR FLOOR IS NOT FEASIBLE OR DESIRABLE, DOUBLED 2" X 6" X 12" MATERIAL STOP PIECES MAY BE NAILED TO EACH GATE AS DEPICTED BY THE PHANTOM LINES ON THE "CENTER GATE B" DETAIL ON PAGE 13. NAIL THE FIRST PIECE TO A HORIZONTAL PIECE ON THE GATE W/3-10d NAILS. LAMINATE THE SECOND PIECE IN A LIKE MANNER.
15. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED. A 2-TIER LOAD CAN BE REDUCED BY A MULTIPLE OF FOUR (4) UNITS, OR A 1-TIER LOAD CAN BE REDUCED BY A MULTIPLE OF TWO (2) UNITS BY OMITTING ONE OR MORE LOAD UNITS FROM THE CENTER PORTION OF THE LOAD. OR, THE ENTIRE TOP TIER CAN BE OMITTED. FOR OTHER METHODS OF REDUCING A LOAD, AND FOR TYPICAL LCL PROCEDURES, REFER TO PAGES 18 THRU 42 FOR GUIDANCE.
16. IF PALLET UNITS WHICH DO NOT CONTAIN A FULL QUANTITY OF CONTAINERS ARE TO BE TRANSPORTED, REFER TO PAGE 40 FOR SHIPPING GUIDANCE.
17. FOR SHIPMENT OF ONE OR MORE LEFTOVER CONTAINERS, SEE THE "PROCEDURES FOR SHIPMENT OF LEFTOVER CONTAINERS" ON PAGE 41 FOR GUIDANCE.

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE WOOD-LINED 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. SEE GENERAL NOTE "D" ON PAGE 2 AND SPECIAL NOTE 3 BELOW.
2. A MAXIMUM OF FORTY-EIGHT (48) OF THESE UNITS, FOR AN APPROXIMATE LADING WEIGHT OF 104,928 POUNDS, CAN BE PLACED IN A 60'-8" LONG CAR WHEN USING THE DEPICTED PROCEDURES; THIRTY-TWO (32) UNITS, FOR AN APPROXIMATE LADING WEIGHT OF 69,952 POUNDS, CAN BE LOADED IN A 40'-6" LONG CAR. NOTE THAT WHEN USING THIS METHOD IN A 60'-8" LONG CAR, STRUT BRACING IS REQUIRED. SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 46. IF A 40'-6" LONG CAR IS USED, ONLY EIGHT (8) STRUTS ARE REQUIRED PER LAYER. ELIMINATE THE CENTER STRUTS FOR EACH LAYER.
3. THE DEPICTED LOADING PATTERN IS ADEQUATE FOR CARS HAVING DOOR OPENINGS 9' THRU 10' OR WIDER. IF THE CAR TO BE LOADED HAS DOOR OPENINGS LESS THAN 9'-0" WIDE AND NOT OF SUFFICIENT HEIGHT TO ALLOW PERSONNEL TO EXIT THE CAR OVER THE TOP OF THE LOAD, THE PALLETS SHOULD BE POSITIONED SO THERE ARE FIVE (5) LOAD UNITS IN EACH END. NOTE THAT ALTHOUGH CARS HAVING DOOR OPENINGS AS NARROW AS 6'-0" WIDE CAN BE USED FOR FULL LOADS, LOADING IS PROGRESSIVELY MORE DIFFICULT AS THE WIDTH OF THE DOOR OPENING DECREASES.
4. IF THE NAILED FLOORLINE BLOCKING AND LOAD BUNDLING STRAP DOORWAY PROTECTION PROCEDURES AS SHOWN ON PAGE 10 ARE USED IN LIEU OF THE WOODEN DOOR GATE TYPE PROTECTION, PIECE MARKED ⑦, NAILED FLOORLINE BLOCKING MUST BE USED IN LIEU OF EACH LOWER ANTI-SWAY BRACE IN THE DOORWAY AREA. NAILED BLOCKING IS REQUIRED FOR ALL PALLET STACKS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE STACK WIDTH ON EITHER SIDE OF THE CAR.
5. TOP-OF-LOAD ANTI-SWAY BRACES, SHOWN AS PIECES MARKED ② IN THE LOAD ON PAGE 6, MUST BE INSTALLED IN EACH END OF THE CAR AND WIRE TIED TO THE INNER CROSS PIECES OF THE TOP DUNNAGE ASSEMBLY WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION" DETAIL ON PAGE 44. THREE (3) BRACES ARE REQUIRED IN EACH END OF A LOAD REGARDLESS OF THE CAR LENGTH.
6. TO FACILITATE POSITIONING OF THE PALLET UNITS AS LOADING PROGRESSES, POSITION PALLET UNIT STACKS AGAINST THE END WALL, THEN POSITION A SEPARATOR GATE, SHOWN AS PIECE MARKED ③, SO THE 1" X 4" HORIZONTAL PIECES ARE LOCATED UNDER THE "OVERHANG" OF THE PALLET UNITS. REPEAT THIS PROCEDURE FOR THE REMAINING STACKS.
7. SEPARATOR GATES IN THE DOORWAY AREA OF A CAR EQUIPPED WITH CONVENTIONAL SLIDING DOORS MUST BE PREVENTED FROM SHIFTING INTO A DOOR OPENING BY THE APPLICATION OF THE STOP PIECES, PIECES MARKED ④. IN CARS EQUIPPED WITH STAGGERED DOORS, STOP PIECES MAY BE REQUIRED ON UP TO FOUR SEPARATOR GATES.
8. WHEN NAILED FLOORLINE BLOCKING IS USED FOR DOORWAY PROTECTION, THE SEPARATOR GATES ADJACENT TO THE NAILED BLOCKING MUST BE MODIFIED. SEE THE "SEPARATOR GATE E" DETAIL ON PAGE 17. THE USE OF THIS MODIFIED GATE WILL ALLOW THE SEPARATOR GATE TO CLEAR THE NAILED FLOORLINE BLOCKING DURING THE NORMAL SHIFTING OF THE LOAD. NOTE THAT THE STOP PIECES, PIECE MARKED ④, WILL BE 58" FOR A 2-HIGH LOAD AND 12" FOR A 1-HIGH LOAD WHEN SEPARATOR GATE "E" IS BEING USED IN A CAR EQUIPPED WITH SLIDING DOORS. STOP PIECES ARE NOT REQUIRED IN CARS EQUIPPED WITH PLUG DOORS.
9. SEPARATOR GATES MAY BE FORMED FROM 3/8" OR THICKER PLYWOOD IN LIEU OF DIMENSIONAL LUMBER, IF DESIRED. SEE THE "ALTERNATIVE SEPARATOR GATE" DETAIL ON PAGE 44 FOR CONSTRUCTION GUIDANCE.
10. CENTER GATE "B" MAY BE PARTIALLY FORMED FROM 1/2" OR THICKER PLYWOOD, IF DESIRED. PLYWOOD MAY BE USED IN LIEU OF THE 2" X 6" HORIZONTAL PIECES. SEE THE "PLYWOOD CENTER GATE ALTERNATIVE" DETAIL ON PAGE 45 FOR GUIDANCE.
11. FOR EASE OF HANDLING, SPLIT CENTER GATES, WHICH ARE NOT DEPENDENT UPON THE WIDTH OF THE CAR, MAY BE USED AS AN ALTERNATIVE TO THE CAR WIDTH GATES. IN LIEU OF EACH "CENTER GATE B", SHOWN AS PIECE MARKED ⑤ IN THE LOAD ON PAGE 6, INSTALL TWO (2) "CENTER GATES D" AS SHOWN ON PAGE 15. AFTER THE SPLIT GATES AND STRUTS HAVE BEEN INSTALLED, THE SPLIT GATES MUST BE TIED TOGETHER AS DEPICTED BY THE "TIE PIECE APPLICATION" DETAIL ON PAGE 45.
12. DOOR SPANNER TYPE GATE HOLD DOWN MAY BE USED IN LIEU OF THE DOUBLED 2" X 4" MATERIAL NAILED TO CENTER GATE "B" PROVIDING THE CAR BEING LOADED HAS NAILABLE SIDEWALLS. SEE THE "ALTERNATIVE GATE HOLD-DOWN" AND "CENTER GATE "B" MODIFICATION" DETAILS ON PAGE 47 FOR GUIDANCE.
13. DOORWAY PROTECTION IS REQUIRED FOR ALL PALLET UNIT STACKS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE STACK WIDTH. THE WOODEN GATE TYPE OF DOORWAY PROTECTION, SHOWN AS PIECE MARKED ⑦ IN THE LOAD ON PAGE 6, IS APPLICABLE FOR BOX CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS AND NAILABLE DOOR POSTS. REFER TO PAGES 48 THRU 50 FOR ALTERNATIVE DOORWAY PROTECTION FOR CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS. IF THE CAR BEING LOADED IS EQUIPPED WITH PLUG TYPE DOORS OR COMBINATION PLUG AND SLIDING DOORS, NAILED FLOORLINE BLOCKING AND LOAD BUNDLING STRAPS MUST BE USED. SEE PIECES MARKED ④, ⑥, ⑦ AND ⑧ ON PAGE 10 FOR GUIDANCE. NOTE THAT NAILED FLOORLINE BLOCKING AND LOAD BUNDLING STRAPS MAY ALSO BE USED IN CARS EQUIPPED WITH SLIDING DOORS. SEE SPECIAL NOTE 14.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	156	52
1" X 6"	464	232
2" X 2"	100	34
2" X 3"	31	16
2" X 4"	334	223
2" X 6"	187	187
4" X 4"	88	118
NAILS	NO. REQD	POUNDS
6d (2")	348	2-1/4
10d (3")	544	8-1/2
12d (3-1/4")	58	1
16d (3-1/2")	96	2-1/4
WIRE, NO. 14 GAGE ----- 72' REQD ----- 1-1/4 LBS		

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LOAD AS SHOWN

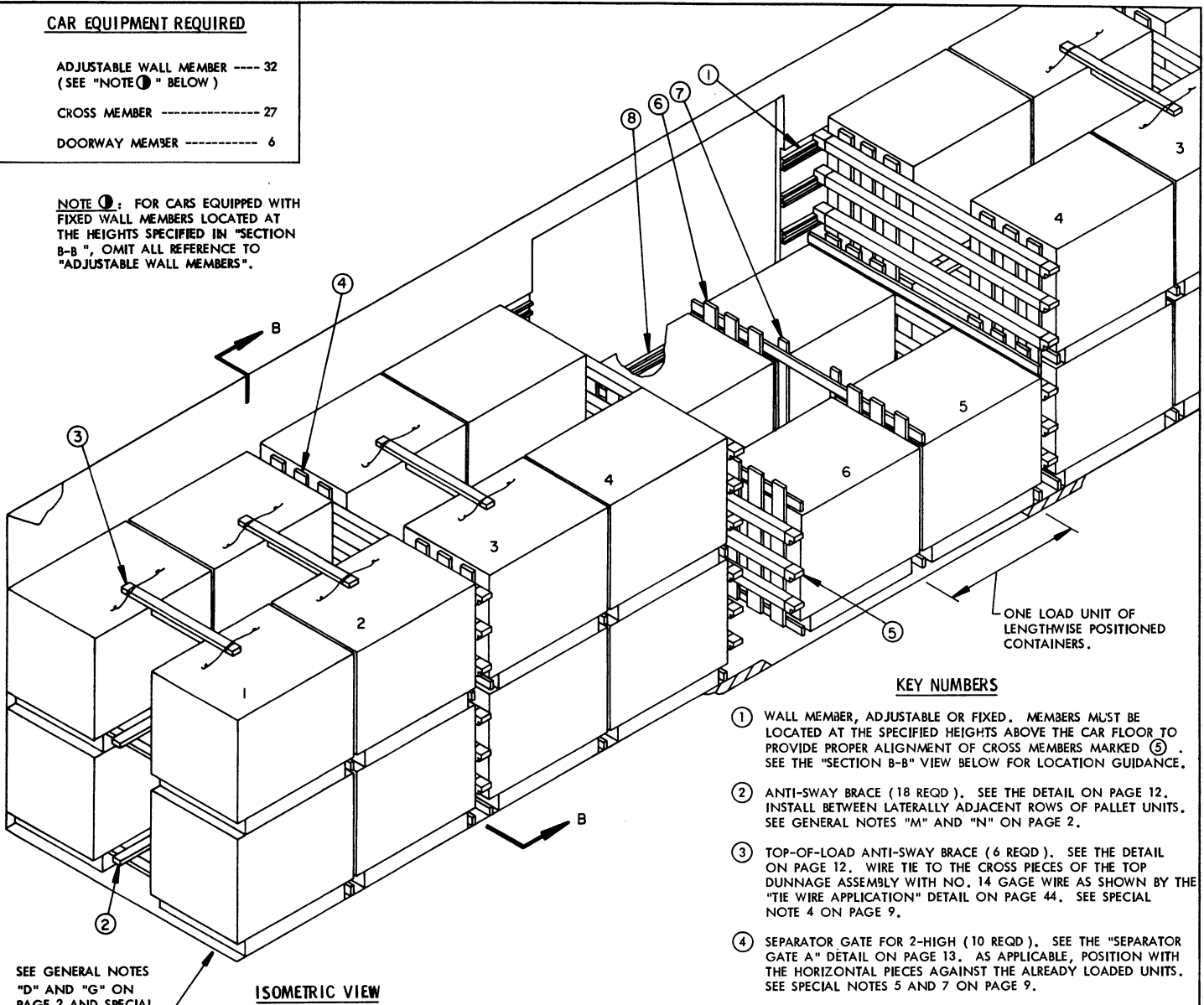
ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNITS	40	87,440 LBS
DUNNAGE		1,740 LBS
TOTAL WEIGHT		89,180 LBS

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

CAR EQUIPMENT REQUIRED

- ADJUSTABLE WALL MEMBER ----- 32
(SEE "NOTE 1" BELOW)
- CROSS MEMBER ----- 27
- DOORWAY MEMBER ----- 6

NOTE 1: FOR CARS EQUIPPED WITH FIXED WALL MEMBERS LOCATED AT THE HEIGHTS SPECIFIED IN "SECTION B-B", OMIT ALL REFERENCE TO "ADJUSTABLE WALL MEMBERS".



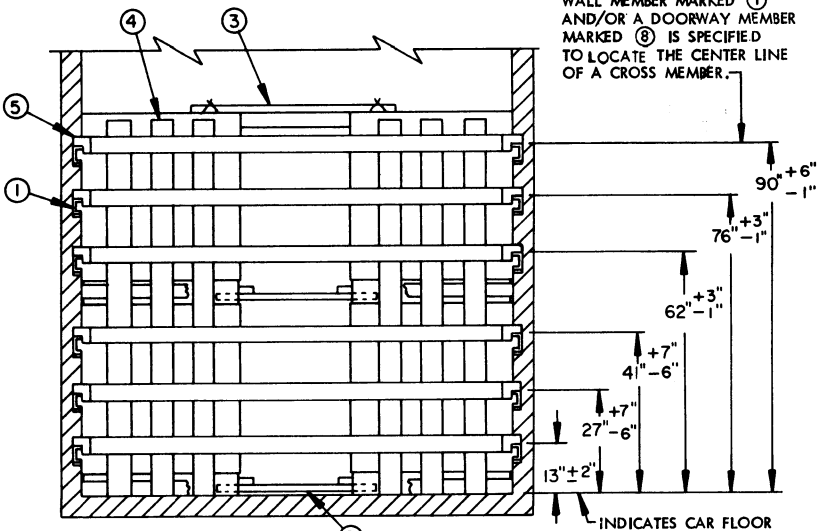
ISOMETRIC VIEW

SEE GENERAL NOTES "D" AND "G" ON PAGE 2 AND SPECIAL NOTE 3 ON PAGE 9.

KEY NUMBERS

- ① WALL MEMBER, ADJUSTABLE OR FIXED. MEMBERS MUST BE LOCATED AT THE SPECIFIED HEIGHTS ABOVE THE CAR FLOOR TO PROVIDE PROPER ALIGNMENT OF CROSS MEMBERS MARKED ⑤. SEE THE "SECTION B-B" VIEW BELOW FOR LOCATION GUIDANCE.
- ② ANTI-SWAY BRACE (18 REQD). SEE THE DETAIL ON PAGE 12. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLET UNITS. SEE GENERAL NOTES "M" AND "N" ON PAGE 2.
- ③ TOP-OF-LOAD ANTI-SWAY BRACE (6 REQD). SEE THE DETAIL ON PAGE 12. WIRE TIE TO THE CROSS PIECES OF THE TOP DUNNAGE ASSEMBLY WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION" DETAIL ON PAGE 44. SEE SPECIAL NOTE 4 ON PAGE 9.
- ④ SEPARATOR GATE FOR 2-HIGH (10 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 13. AS APPLICABLE, POSITION WITH THE HORIZONTAL PIECES AGAINST THE ALREADY LOADED UNITS. SEE SPECIAL NOTES 5 AND 7 ON PAGE 9.
- ⑤ CROSS MEMBER (27 REQD). SEE GENERAL NOTE "X" ON PAGE 3.
- ⑥ SEPARATOR GATE FOR 1-HIGH (3 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 13. AS APPLICABLE, POSITION WITH THE HORIZONTAL PIECES AGAINST THE ALREADY LOADED UNITS.
- ⑦ STOP PIECE, 1" X 4" X 56" (4 REQD). POSITION AGAINST PALLET UNITS IN THE DOORWAY AREA AND NAIL TO THE HORIZONTAL PIECES OF PIECE MARKED ⑥ W/3-6d NAILS AT EACH JOINT AND CLINCH. SEE SPECIAL NOTE 6 ON PAGE 9.
- ⑧ DOORWAY MEMBER (6 REQD). SEE THE "SECTION B-B" VIEW AT LEFT FOR LOCATION GUIDANCE. SEE SPECIAL NOTE 8 ON PAGE 9.

EACH DIMENSIONED HEIGHT ABOVE THE CAR FLOOR TO AN ADJUSTABLE OR FIXED WALL MEMBER MARKED ① AND/OR A DOORWAY MEMBER MARKED ⑧ IS SPECIFIED TO LOCATE THE CENTER LINE OF A CROSS MEMBER.



SECTION B-B

SPECIAL NOTES:

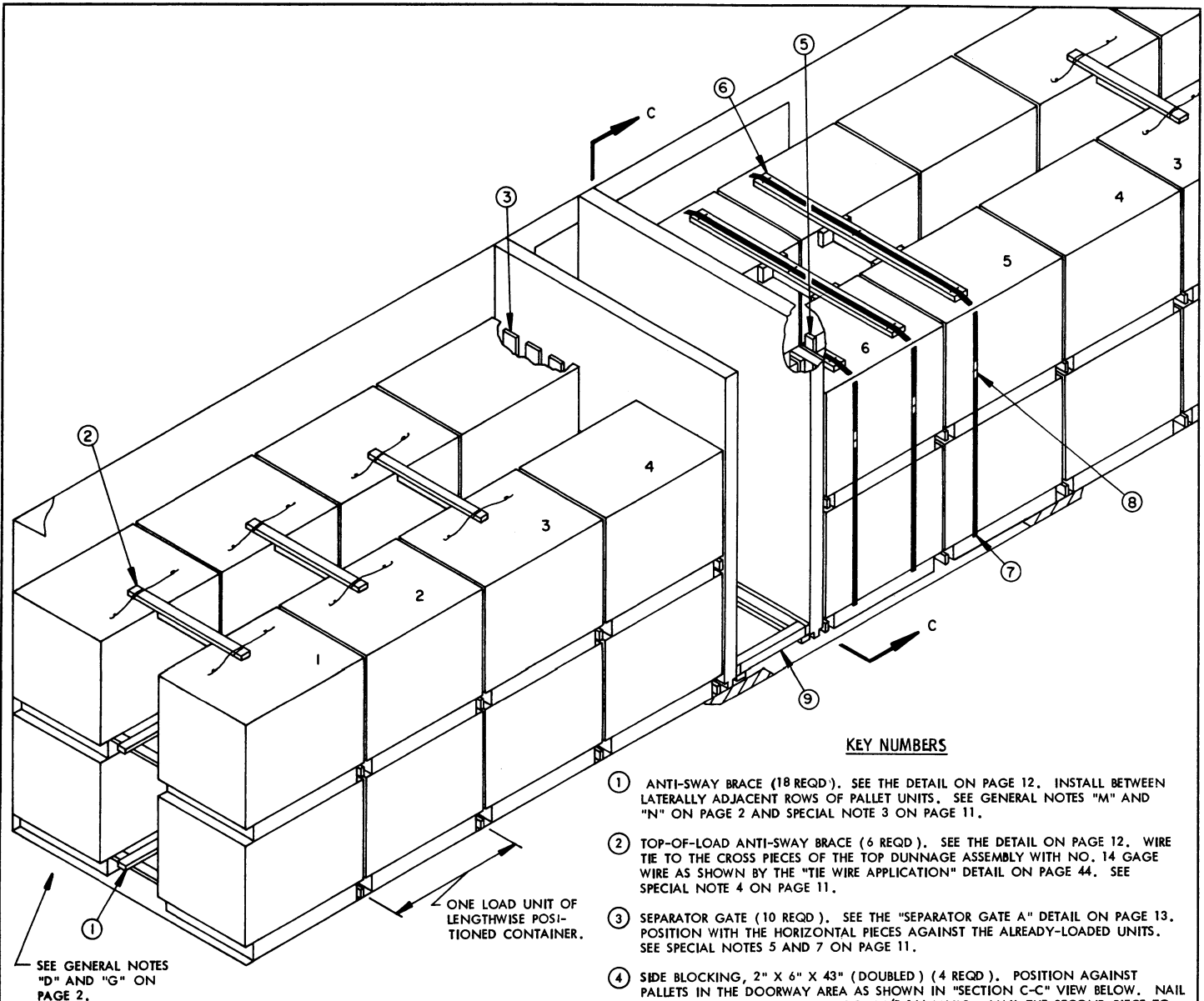
1. A 50'-6" LONG BY 9'-0" WIDE (INSIDE CLEARANCE) WOOD-LINED BOX CAR EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS, AND WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED. SEE GENERAL NOTE "D" ON PAGE 2.
2. A MAXIMUM OF TWENTY-EIGHT (28) OF THESE UNITS, FOR AN APPROXIMATE LADING WEIGHT OF 61,208 POUNDS, CAN BE PLACED IN A 40'-6" LONG CAR.
3. IF A CAR HAS BOWED END WALLS WHICH ARE BOWED OUTWARD TWO INCHES (2") OR MORE EITHER FROM SIDE-TO-SIDE OR FROM FLOOR-TO-ROOF, CROSS MEMBERS CAN BE INSTALLED NEAR THE END WALL OF THE CAR TO PROVIDE A "SQUARED END" RATHER THAN INSTALLING DUNNAGE AS SPECIFIED IN GENERAL NOTE "G" ON PAGE 2. THESE CROSS MEMBERS SHOULD BE INSTALLED AT THE SAME HEIGHTS AS THE CROSS MEMBERS USED THROUGHOUT THE LOAD AS BLOCKING MEMBERS. A SEPARATOR GATE, SHOWN AS PIECE MARKED (4), MUST BE POSITIONED AGAINST THESE CROSS MEMBERS PRIOR TO LOADING.
4. TOP-OF-LOAD ANTI-SWAY BRACES, SHOWN AS PIECE MARKED (3) IN THE LOAD ON PAGE 8, MUST BE INSTALLED IN EACH END OF THE CAR AND WIRE TIED TO THE INNER CROSS PIECES OF THE TOP DUNNAGE ASSEMBLY WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION" DETAIL ON PAGE 44. THREE (3) BRACES ARE REQUIRED IN EACH END OF A LOAD REGARDLESS OF THE CAR LENGTH.
5. TO FACILITATE POSITIONING OF THE PALLET UNITS AS LOADING PROGRESSES, POSITION PALLET UNIT STACKS AGAINST THE END WALL, THEN POSITION A SEPARATOR GATE, SHOWN AS PIECE MARKED (4), SO THE 1" X 4" TIE PIECES ARE LOCATED UNDER THE "OVERHANG" OF THE PALLET UNITS. REPEAT THIS PROCEDURE FOR THE REMAINING STACKS.
6. SEPARATOR GATES IN THE DOORWAY MUST BE PREVENTED FROM SHIFTING INTO A DOOR OPENING BY THE APPLICATION OF THE STOP PIECES, PIECES MARKED (7). IN CARS EQUIPPED WITH STAGGERED DOORS, STOP PIECES MAY BE REQUIRED ON UP TO FOUR SEPARATOR GATES.
7. SEPARATOR GATES MAY BE FORMED FROM 3/8" OR THICKER PLYWOOD IN LIEU OF DIMENSIONAL LUMBER, IF DESIRED. SEE THE "ALTERNATIVE SEPARATOR GATE" DETAIL ON PAGE 44 FOR CONSTRUCTION GUIDANCE.
8. IF THE CAR BEING LOADED IS EQUIPPED WITH AT LEAST TWELVE (12) DOORWAY MEMBERS, AN ADDITIONAL FOUR PALLET UNITS CAN BE LOADED IN THE DOORWAY AREA.
9. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED. A LOAD MAY BE REDUCED BY MULTIPLES OF TWO (2) PALLET UNITS BY OMITTING LATERALLY ADJACENT UNITS FROM THE TOP LAYER OF ONE OR MORE LOAD UNITS OR BY MULTIPLES OF FOUR (4) PALLET UNITS BY OMITTING ONE OR MORE ENTIRE LOAD UNITS. TO REDUCE A LOAD BY ONE (1) PALLET UNIT, REFER TO THE LCL PROCEDURES ON PAGES 16 AND 17 FOR GUIDANCE.
10. FOR SHIPMENT OF ONE OR MORE LEFTOVER CONTAINERS, SEE THE "PROCEDURES FOR SHIPMENT OF LEFTOVER CONTAINERS" ON PAGE 41 FOR GUIDANCE.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	252	84
1" X 6"	564	282
2" X 4"	276	184
NAILS	NO. REQD	POUNDS
6d (2")	492	3
10d (3")	216	3-1/2
12d (3-1/4")	30	1/2
WIRE, NO. 14 GAGE ----- 72' REQD ----- 1-1/4 LBS		

LOAD AS SHOWN

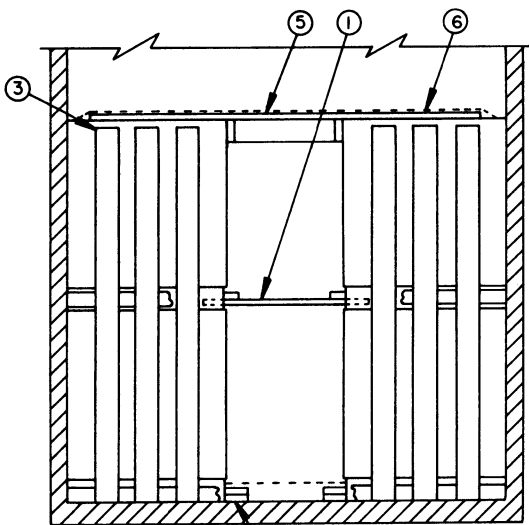
ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	36	78,696 LBS
DUNNAGE		1,109 LBS
TOTAL WEIGHT		79,805 LBS



ISOMETRIC VIEW

KEY NUMBERS

- ① ANTI-SWAY BRACE (18 REQD). SEE THE DETAIL ON PAGE 12. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLET UNITS. SEE GENERAL NOTES "M" AND "N" ON PAGE 2 AND SPECIAL NOTE 3 ON PAGE 11.
- ② TOP-OF-LOAD ANTI-SWAY BRACE (6 REQD). SEE THE DETAIL ON PAGE 12. WIRE TIE TO THE CROSS PIECES OF THE TOP DUNNAGE ASSEMBLY WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION" DETAIL ON PAGE 44. SEE SPECIAL NOTE 4 ON PAGE 11.
- ③ SEPARATOR GATE (10 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 13. POSITION WITH THE HORIZONTAL PIECES AGAINST THE ALREADY-LOADED UNITS. SEE SPECIAL NOTES 5 AND 7 ON PAGE 11.
- ④ SIDE BLOCKING, 2" X 6" X 43" (DOUBLED) (4 REQD). POSITION AGAINST PALLET IN THE DOORWAY AREA AS SHOWN IN "SECTION C-C" VIEW BELOW. NAIL THE FIRST PIECE TO THE CAR FLOOR W/5-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. OMIT ANTI-SWAY BRACES AT FLOOR LEVEL. SEE GENERAL NOTE "5" ON PAGE 2.
- ⑤ STOP PIECE, 1" X 4" X 56" (4 REQD). POSITION AGAINST PALLET UNITS IN THE DOORWAY AREA AND NAIL TO THE HORIZONTAL PIECES OF PIECE MARKED ③ W/3-6d NAILS AT EACH JOINT AND CLINCH. SEE SPECIAL NOTE 6 ON PAGE 11.
- ⑥ SPACER ASSEMBLY (3 REQD). SEE THE "SPACER ASSEMBLY A" DETAIL ON PAGE 14.
- ⑦ DOORWAY PROTECTION STRAP, 1-1/4" X .035" OR .031" X 36'-0" LONG STEEL STRAPPING (3 REQD). ENCIRCLE THE PALLET UNITS IN THE DOORWAY AREA AS SHOWN IN THE ISOMETRIC VIEW. NOTE THAT STRAPPING MUST NOT EXTEND OVER THE OUTER STOP PIECES OF A PALLET UNIT; THE STRAPPING MUST BE THREADED UNDER THE STOP PIECES. STAPLE STRAP TO SPACER ASSEMBLY, PIECE MARKED ⑥, W/3 STAPLES. SEE SPECIAL NOTE 8 ON PAGE 11.
- ⑧ SEAL FOR 1-1/4" STEEL STRAPPING (6 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "O" ON PAGE 2.
- ⑨ STRUT ASSEMBLY (1 REQD). SEE THE "STRUT ASSEMBLY FOR 1-PIECE BULKHEADS" DETAIL ON PAGE 51. INSTALL BETWEEN THE LOAD DIVIDER BULKHEADS. SEE SPECIAL NOTE 9 ON PAGE 11.



SECTION C-C

PIECES MARKED ④ DELETED FOR CLARITY PURPOSES

(SPECIAL NOTES CONTINUED)

- 11. IF PALLET UNITS WHICH DO NOT CONTAIN A FULL QUANTITY OF CONTAINERS ARE TO BE TRANSPORTED, REFER TO PAGE 40 AND/OR PAGES 39 AND 42 FOR SHIPPING GUIDANCE.
- 12. FOR SHIPMENT OF ONE OR MORE LEFTOVER CONTAINERS, SEE THE "PROCEDURES FOR SHIPMENT OF LEFTOVER CONTAINERS" ON PAGE 41 FOR GUIDANCE.
- 13. A CAR TO BE USED FOR SHIPMENT OF A 68-UNIT CROSSWISE LOAD IN A 60'-8" LONG CAR MUST HAVE A LOAD LIMIT OF AT LEAST 149,500 POUNDS. AN EVENLY DISTRIBUTED 56-UNIT LOAD IN A 50'-6" LONG CAR WILL REQUIRE A LOAD LIMIT OF AT LEAST 122,800 POUNDS. AN OFFSET 56-UNIT LOAD WILL REQUIRE A CAR HAVING A LOAD LIMIT OF 123,700 POUNDS OR GREATER. A 44-UNIT LOAD IN A 40'-6" LONG CAR REQUIRES A LOAD LIMIT OF AT LEAST 97,100 POUNDS.

SPECIAL NOTES:

- 1. A 50'-6" LONG BY 9'-2" WIDE WOOD-LINED CUSHIONED BOX CAR EQUIPPED WITH LOAD DIVIDER BULKHEADS AND WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING NARROWER OR WIDER DOOR OPENINGS CAN BE USED. SEE GENERAL NOTES "AA" THRU "EE" ON PAGE 3.
- 2. TO DETERMINE ALTERNATE CONFIGURATIONS OF MAXIMUM LOADS, REFER TO THE CHART BELOW.

CAR LENGTH	POSITION OF CONTAINERS	TOTAL NO. OF UNITS	APPROXIMATE LADING WEIGHT
60'-8"	LENGTHWISE	48	104,928
40'-6"	LENGTHWISE	32	69,952
60'-8"	CROSSWISE	68	148,648
50'-6"	CROSSWISE	56	122,416
40'-6"	CROSSWISE	44	96,184

- 3. IF THE WOODEN GATE TYPE DOORWAY PROTECTION, PIECE MARKED ⑦ ON PAGE 6 IS USED IN LIEU OF THE NAILED FLOORLINE BLOCKING AND DOORWAY PROTECTION STRAP PROCEDURE, THE LOWER ANTI-SWAY BRACES IN THE DOORWAY AREA WILL BE USED.
- 4. TOP-OF-LOAD ANTI-SWAY BRACES, SHOWN AS PIECES MARKED ② IN THE LOAD ON PAGE 10, MUST BE INSTALLED IN EACH END OF THE CAR AND WIRE TIED TO THE INNER CROSS PIECES OF THE TOP DUNNAGE ASSEMBLY WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION" DETAIL ON PAGE 44. THREE (3) BRACES ARE REQUIRED IN EACH END OF A LOAD REGARDLESS OF THE CAR LENGTH.
- 5. TO FACILITATE POSITIONING OF THE PALLET UNITS AS LOADING PROGRESSES POSITION PALLET UNIT STACKS AGAINST THE END WALL. THEN POSITION A SEPARATOR GATE, SHOWN AS PIECE MARKED ③, SO THE 1" X 4" TIE PIECES ARE LOCATED UNDER THE "OVERHANG" OF THE PALLET UNITS. REPEAT THIS PROCEDURE FOR THE REMAINING STACKS.
- 6. SEPARATOR GATES IN THE DOORWAY AREA OF A CAR EQUIPPED WITH CONVENTIONAL SLIDING DOORS, MUST BE PREVENTED FROM SHIFTING INTO A DOOR OPENING BY THE APPLICATION OF THE STOP PIECES, PIECES MARKED ⑤. IN CARS EQUIPPED WITH STAGGERED DOORS, STOP PIECES MAY BE REQUIRED ON UP TO FOUR SEPARATOR GATES.
- 7. SEPARATOR GATES MAY BE FORMED FROM 3/8" OR THICKER PLYWOOD IN LIEU OF DIMENSIONAL LUMBER, IF DESIRED. SEE THE "ALTERNATIVE SEPARATOR GATE" DETAIL ON PAGE 44 FOR CONSTRUCTION GUIDANCE.
- 8. DOORWAY PROTECTION IS REQUIRED FOR ALL PALLET UNIT STACKS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE STACK WIDTH. THE WOODEN GATE TYPE OF DOORWAY PROTECTION, SHOWN AS PIECES MARKED ⑦ IN THE LOAD ON PAGE 6, IS APPLICABLE FOR BOX CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS AND NAILABLE DOOR POSTS. REFER TO PAGES 48 THRU 50 FOR ALTERNATIVE DOORWAY PROTECTION FOR CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS. IF THE CAR BEING LOADED IS EQUIPPED WITH PLUG TYPE DOORS OR COMBINATION PLUG AND SLIDING DOORS, NAILED FLOORLINE BLOCKING AND LOAD BUNDLING STRAPS MUST BE USED. TWO (2) BUNDLING STRAPS ARE REQUIRED FOR EACH LOAD UNIT WHICH IS COMPLETELY WITHIN THE DOORWAY AREA OR WHICH IS NOT RETAINED BY AT LEAST SIX INCHES (6") OF THE CAR SIDEWALL ON BOTH SIDES OF THE CAR. ONE (1) BUNDLING STRAP IS REQUIRED FOR EACH LOAD UNIT WHICH IS RETAINED BY FROM 5" TO ONE-HALF THE LOAD UNIT LENGTH OR WIDTH. IF THE PALLET UNITS ARE POSITIONED IN A CROSSWISE LOADING PATTERN REFER TO THE "ALTERNATIVE DOORWAY PROTECTION E" DETAIL ON PAGE 50 FOR GUIDANCE. NOTE THAT NAILED FLOORLINE BLOCKING AND DOORWAY PROTECTION STRAPS MAY ALSO BE USED IN CARS EQUIPPED WITH SLIDING DOORS.
- 9. THE STRUT ASSEMBLY, SHOWN AS PIECE MARKED ⑨ IN THE LOAD ON PAGE 10, IS REQUIRED WHEN THE LOAD IN EITHER END OF A CAR IS 50,000 POUNDS OR MORE. A STRUT ASSEMBLY WILL BE REQUIRED IF ONE END OF THE LOAD CONTAINS MORE THAN FIVE (5) LOAD UNITS.
- 10. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED. A 2-TIER LOAD CAN BE REDUCED BY A MULTIPLE OF FOUR (4) PALLET UNITS OR A 1-TIER LOAD CAN BE REDUCED BY A MULTIPLE OF TWO (2) UNITS BY OMITTING ONE OR MORE LOAD UNITS FROM THE CENTER PORTION OF THE LOAD. OR, THE ENTIRE TOP TIER CAN BE OMITTED. FOR OTHER METHODS OF REDUCING A LOAD AND FOR TYPICAL LCL PROCEDURES REFER TO PAGES 20 THRU 27 AND GENERAL NOTE "FF" ON PAGE 3 FOR GUIDANCE.

(CONTINUED AT LEFT)

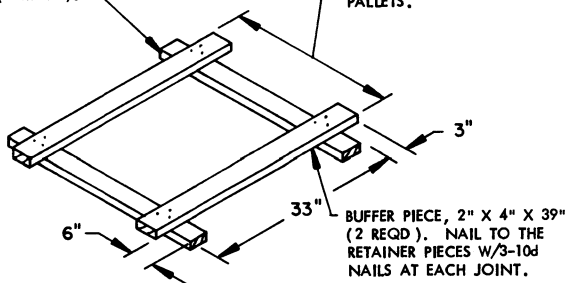
BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	202	68
1" X 6"	480	240
1" X 8"	16	11
2" X 4"	346	231
2" X 6"	72	72
4" X 4"	11	15
NAILS	NO. REQD	POUNDS
6d (2")	400	2-1/2
10d (3")	258	4
12d (3-1/4")	85	1-1/2
16d (3-1/2")	40	1
STEEL STRAPPING, 1-1/4" X .031" OR .035" ----- 108' REQD -- 16 LBS		
SEAL FOR 1-1/4" STRAPPING ----- 6 REQD -- NIL		
WIRE, NO. 14 GAGE ----- 72' REQD 1-1/4LBS		
STAPLE, STRAP ----- 9 REQD--- NIL		

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	40	87,440 LBS
DUNNAGE		1,301 LBS
TOTAL WEIGHT		88,741 LBS

RETAINER PIECE,
2" X 4" BY A
LENGTH TO
SUIT (2 REQD).

FABRICATE TO FIT
BETWEEN THE POSTS
OF LATERALLY ADJACENT
PALLET.

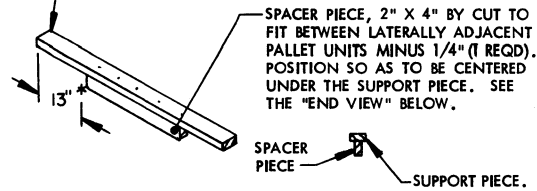


ANTI-SWAY BRACE

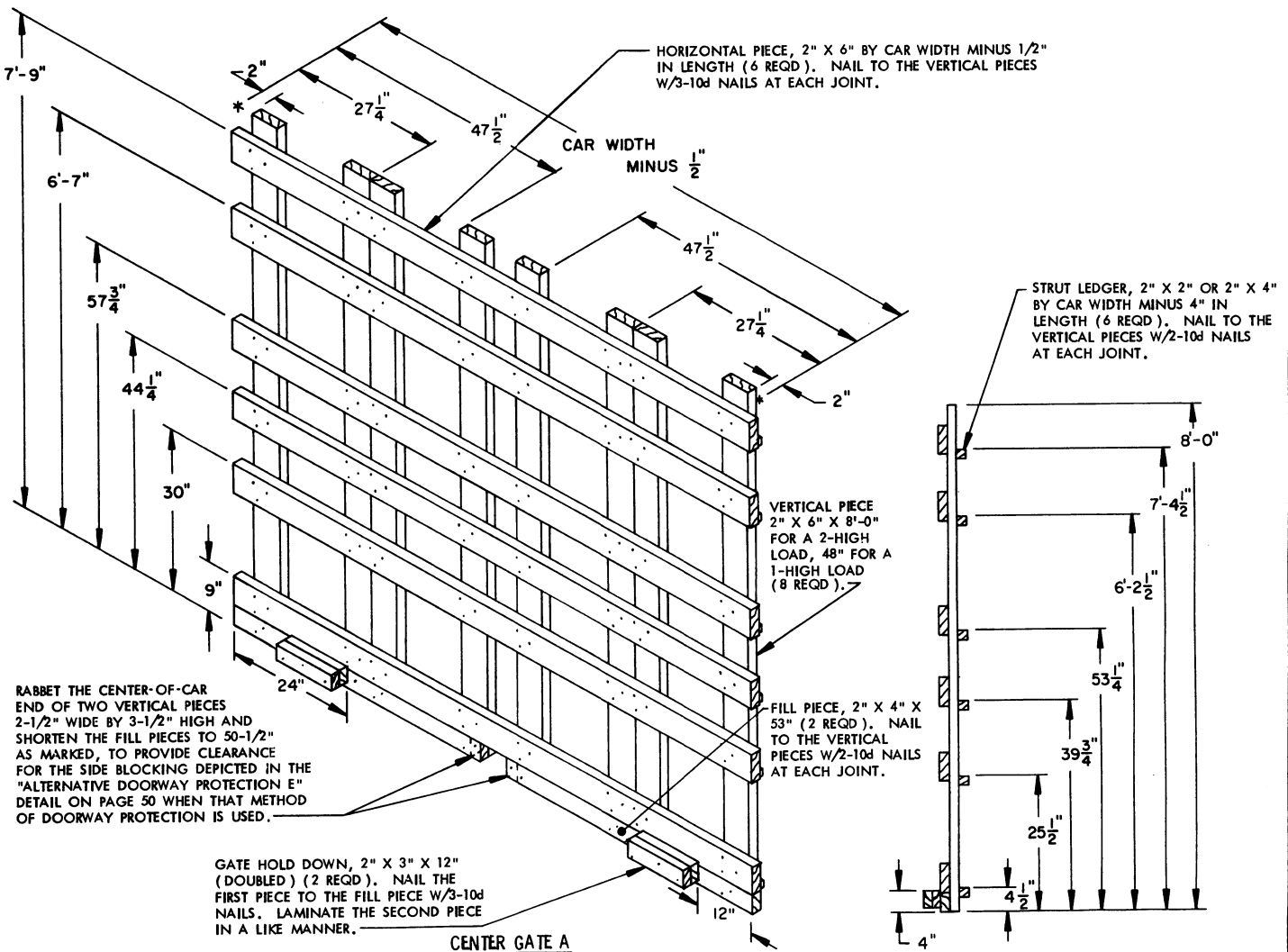
IF DESIRED, THE ANTI-SWAY BRACE CAN BE PARTIALLY PRE-ASSEMBLED. ONE BUFFER PIECE CAN BE NAILED TO BOTH RETAINER PIECES. THE LONG ENDS OF THE ASSEMBLY CAN THEN BE INSTALLED INTO THE FORKLIFT OPENINGS OF A LOADED PALLET PRIOR TO POSITIONING THE LATERALLY ADJACENT PALLET.

SUPPORT PIECE, 2" X 4" BY A
LENGTH TO SUIT (1 REQD).
NAIL TO THE SPACER PIECE
W/5-12d NAILS.

SPACER PIECE, 2" X 4" BY CUT TO
FIT BETWEEN LATERALLY ADJACENT
PALLET UNITS MINUS 1/4" (1 REQD).
POSITION SO AS TO BE CENTERED
UNDER THE SUPPORT PIECE. SEE
THE "END VIEW" BELOW.

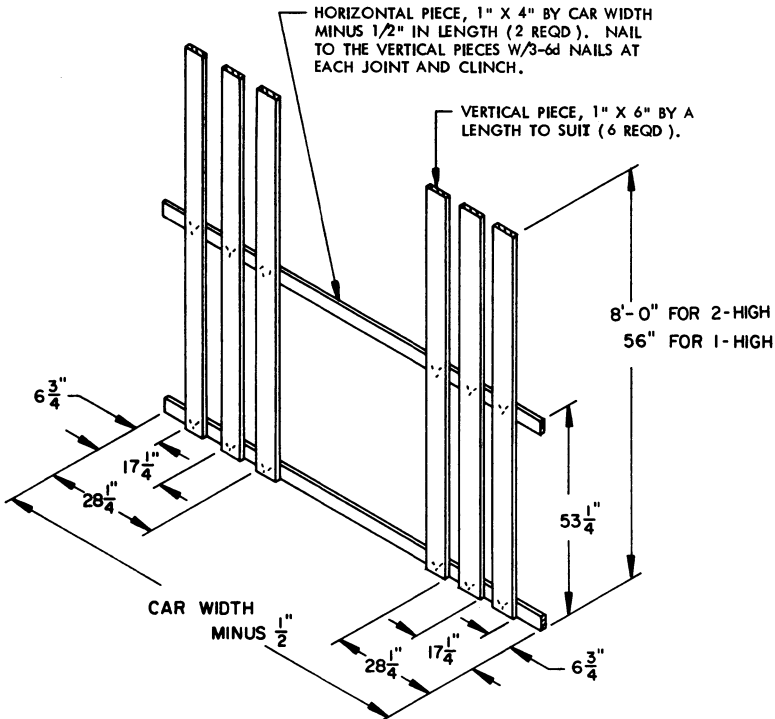


TOP-OF-LOAD ANTI-SWAY BRACE



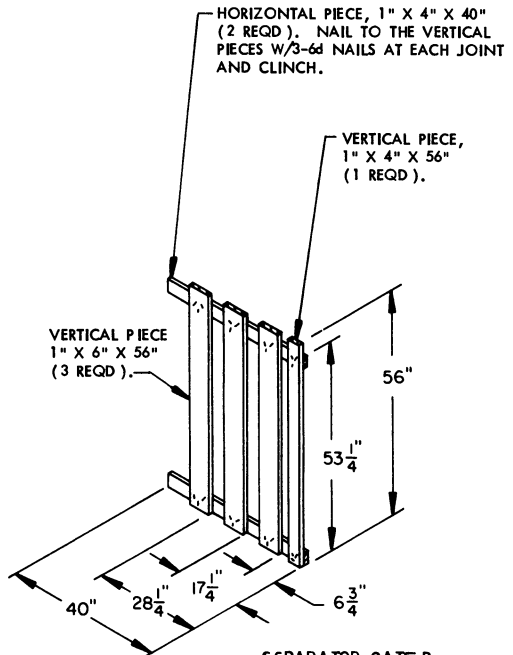
THIS GATE IS DESIGNED FOR USE IN
THE LOAD SHOWN ON PAGE 4.

DETAILS



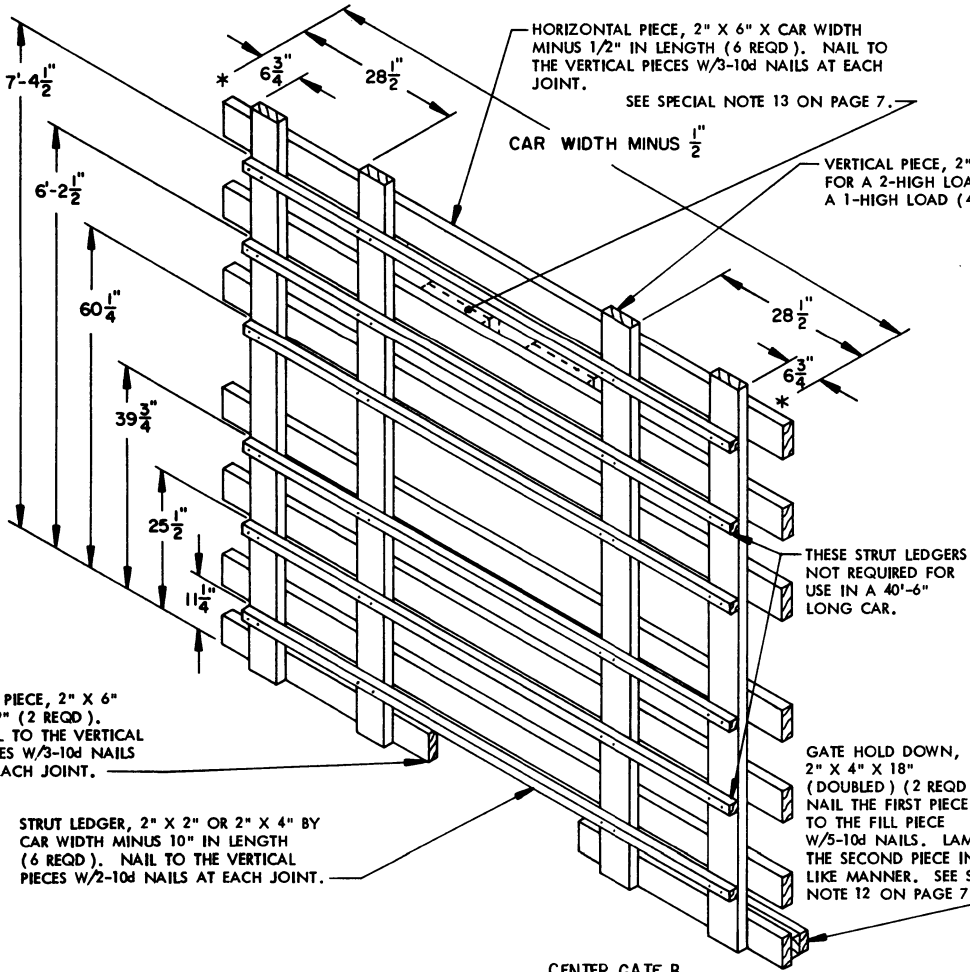
SEPARATOR GATE A

SEE SPECIAL NOTE 8 ON PAGE 7.



SEPARATOR GATE B

THIS GATE IS DESIGNED FOR USE IN THE LCL LOAD SHOWN ON PAGE 16.

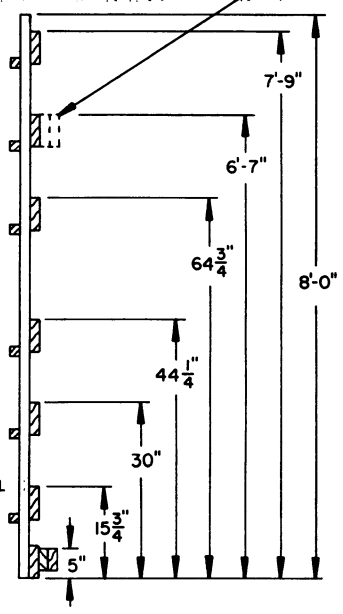


CENTER GATE B

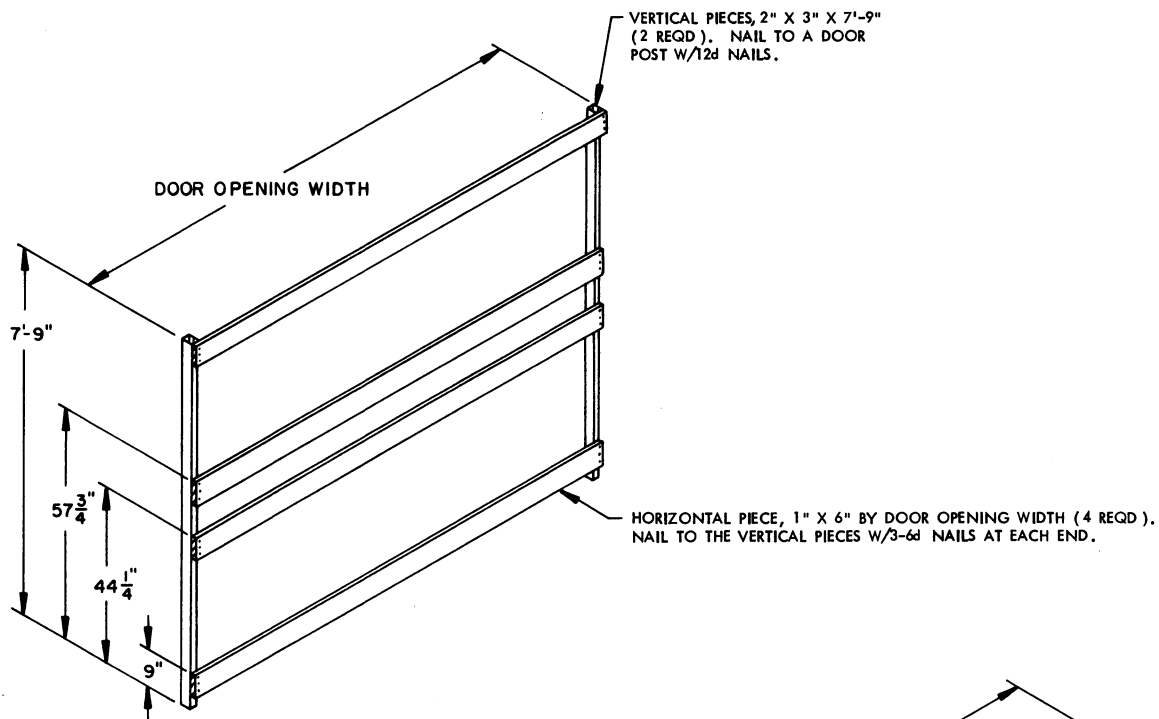
THIS GATE IS DESIGNED FOR USE IN THE LOAD SHOWN ON PAGE 6.

DETAILS

STOP PIECE, 2" X 6" X 12" (DOUBLED) (2 REQD). POSITION ONE PIECE ON EACH SIDE OF THE VOID BETWEEN TWO LATERALLY ADJACENT PALLET UNITS. NAIL THE FIRST PIECE TO THE HORIZONTAL PIECE W/3-10d NAILS. LAMINATE THE SECOND PIECE IN A LIKE MANNER. SEE SPECIAL NOTE 13 ON PAGE 7.

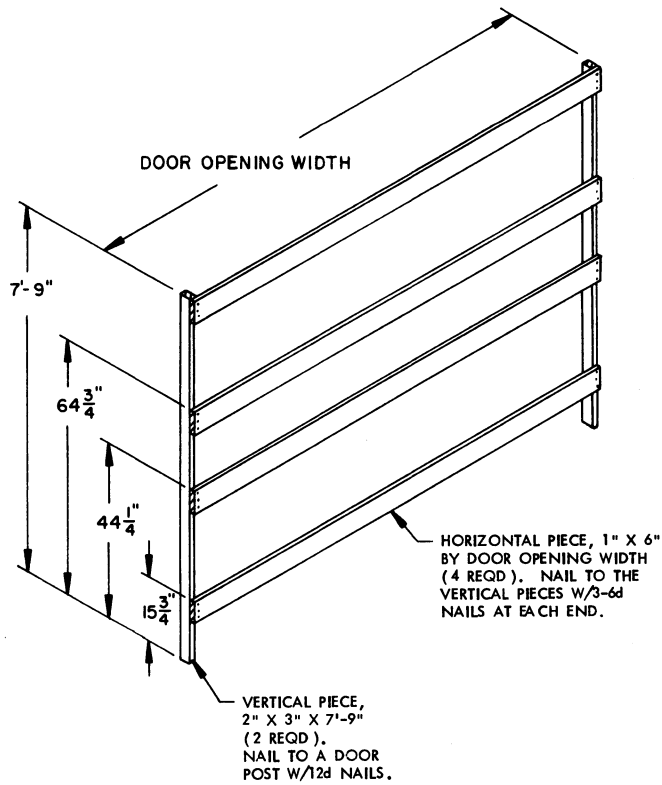


END VIEW



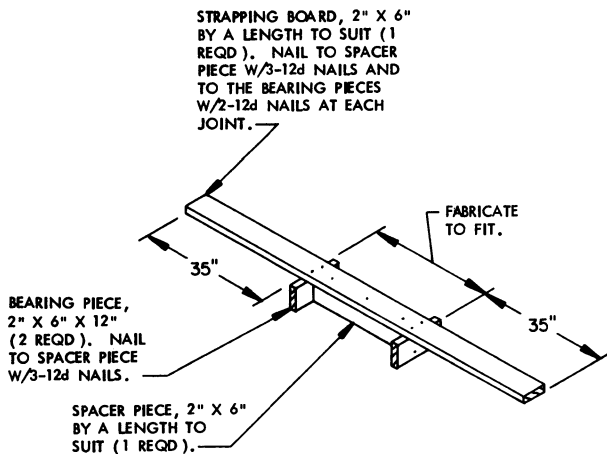
DOORWAY PROTECTION A

THIS ASSEMBLY IS DESIGNED FOR USE IN THE LOAD SHOWN ON PAGE 6.



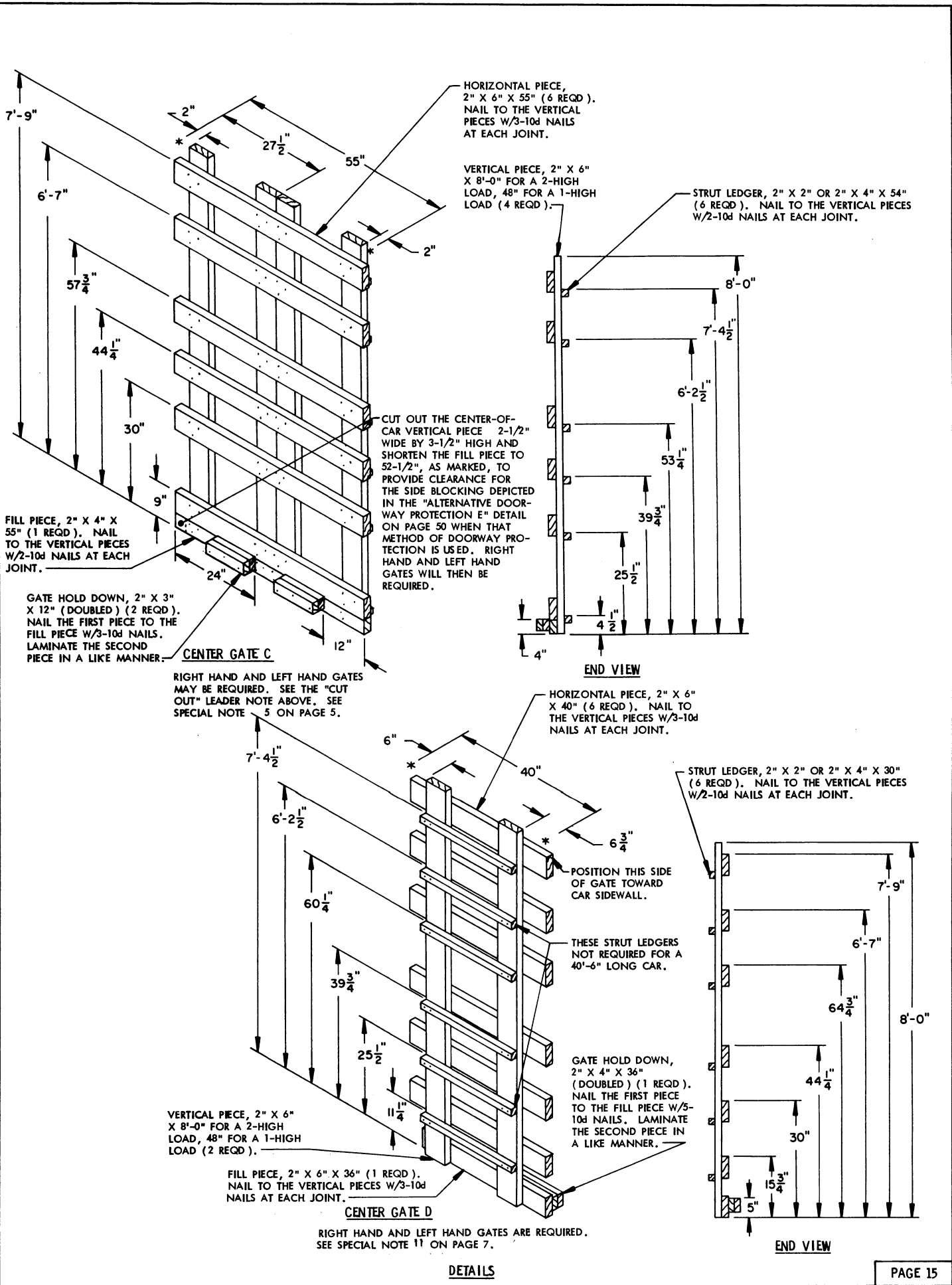
DOORWAY PROTECTION B

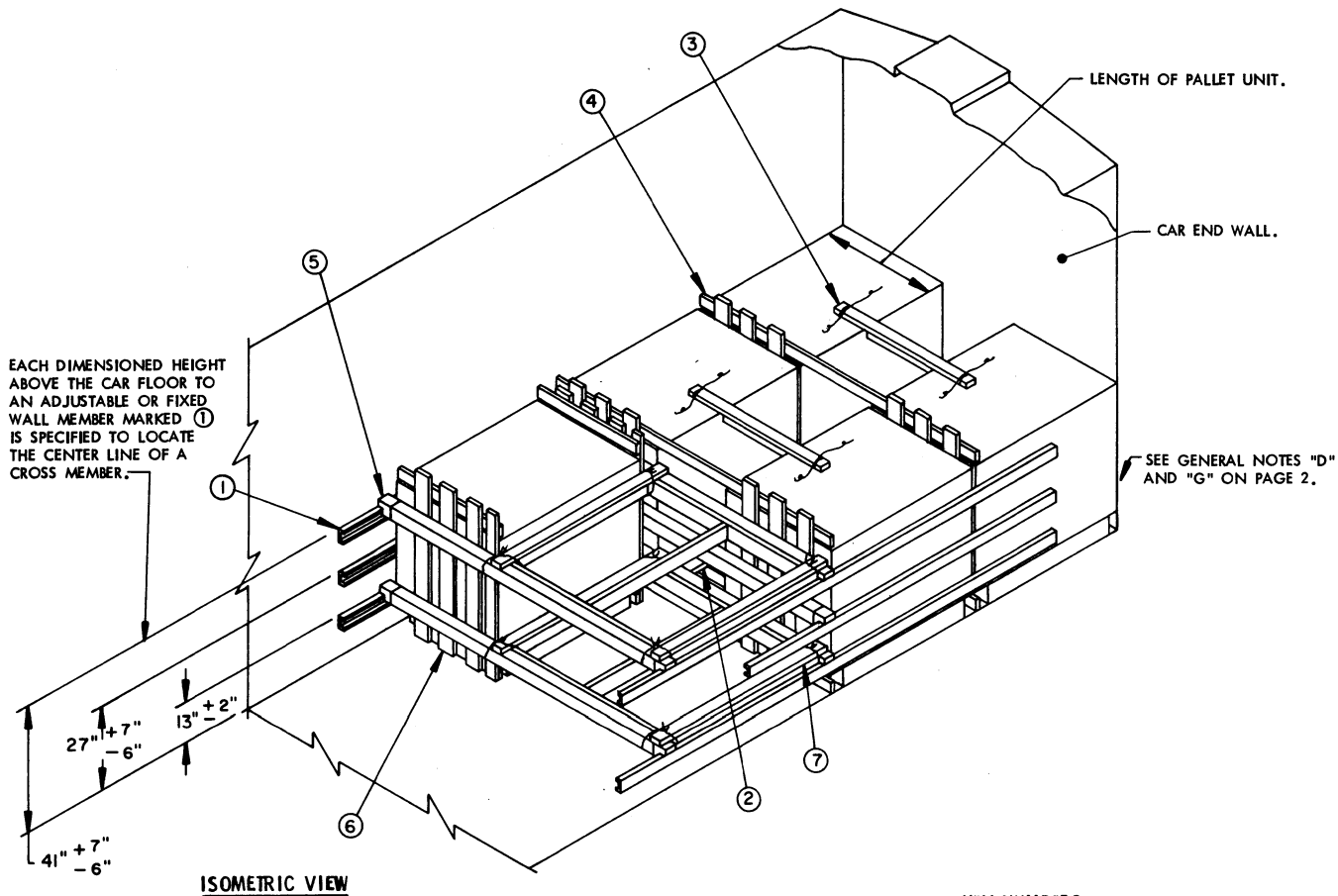
THIS ASSEMBLY IS DESIGNED FOR USE IN THE LOAD SHOWN ON PAGE 4.



SPACER ASSEMBLY A

THIS ASSEMBLY IS FOR USE IN A LOAD OF LENGTHWISE CONTAINERS, AS SHOWN ON PAGES 6 AND 10, WHEN THE NAILED FLOORLINE BLOCKING AND DOORWAY PROTECTION STRAP METHOD OF DOORWAY PROTECTION IS USED.



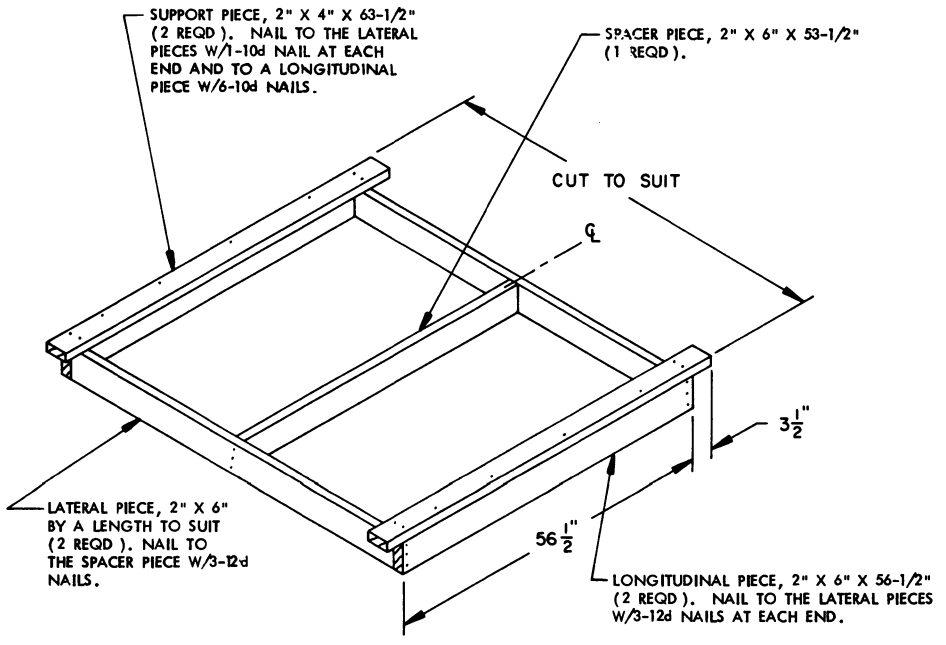


KEY NUMBERS

SPECIAL NOTES:

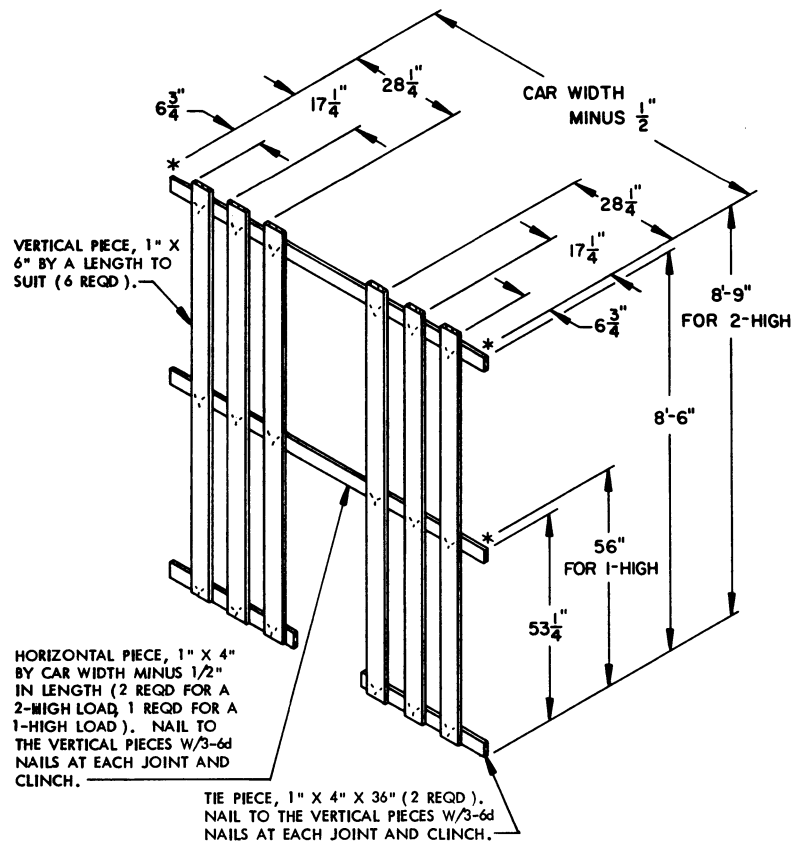
1. A 9'-0" WIDE (INSIDE CLEARANCE) WOOD-LINED BOX CAR EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED. SEE GENERAL NOTE "D" ON PAGE 2.
2. FIVE (5) UNITS ARE SHOWN AS A TYPICAL LOAD QUANTITY. THE NUMBER OF UNITS CAN BE ADJUSTED TO SUIT THE QUANTITY TO BE SHIPPED.
3. TOP-OF-LOAD ANTI-SWAY BRACES, SHOWN AS PIECES MARKED ③ , MUST BE INSTALLED IN EACH END OF THE CAR AND WIRE TIED TO A UNIT WITH NO. 14 GAGE WIRE. THREE (3) BRACES ARE REQUIRED IN EACH END OF A LOAD REGARDLESS OF THE CAR LENGTH.
4. SEPARATOR GATES MAY BE FORMED FROM 3/8" OR THICKER PLYWOOD IN LIEU OF DIMENSIONAL LUMBER, IF DESIRED. CONSTRUCT EACH GATE TO BE CAR WIDTH MINUS 1/2" IN LENGTH BY UNIT HEIGHT, OR UNIT LENGTH IN WIDTH BY UNIT HEIGHT, AS APPLICABLE.
5. THE SPACER ASSEMBLIES, SHOWN AS PIECES MARKED ⑦ , MAY 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.

- ① WALL MEMBER, ADJUSTABLE OR FIXED. MEMBERS MUST BE LOCATED AT THE SPECIFIED HEIGHTS ABOVE THE CAR FLOOR TO PROVIDE PROPER ALIGNMENT OF CROSS MEMBERS MARKED ⑤ .
- ② ANTI-SWAY BRACE (2 REQD). SEE THE DETAIL ON PAGE 12. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLET UNITS. SEE GENERAL NOTES "M" AND "N" ON PAGE 2.
- ③ TOP-OF-LOAD ANTI-SWAY BRACE (2 REQD). SEE THE DETAIL ON PAGE 12. WIRE TIE TO PALLET UNITS AS SHOWN BY THE "TIE WIRE APPLICATION" DETAIL ON PAGE 44.
- ④ SEPARATOR GATE FOR 1-HIGH AND 2-WIDE (2 REQD). SEE THE "SEPARATOR GATE A" DETAIL FOR TWO UNITS WIDE ON PAGE 13. POSITION WITH THE 1" X 4" HORIZONTAL PIECES AGAINST THE ALREADY-LOADED UNITS.
- ⑤ CROSS MEMBER (5 REQD). SEE GENERAL NOTE "X" ON PAGE 3.
- ⑥ SEPARATOR GATE FOR 1-HIGH AND 1-WIDE (2 REQD, 1 RIGHT AND 1 LEFT HAND). SEE THE "SEPARATOR GATE B" DETAIL ON PAGE 13. AS APPLICABLE, POSITION WITH THE 1" X 4" HORIZONTAL PIECES AGAINST THE ALREADY LOADED UNITS.
- ⑦ SPACER ASSEMBLY (2 REQD). SEE THE "SPACER ASSEMBLY B" DETAIL ON PAGE 17 AND SPECIAL NOTE 5 AT LEFT. WIRE TIE TO CROSS MEMBER W/2 WRAPS OF NO. 14 GAGE WIRE AT EACH CORNER.



SPACER ASSEMBLY B

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

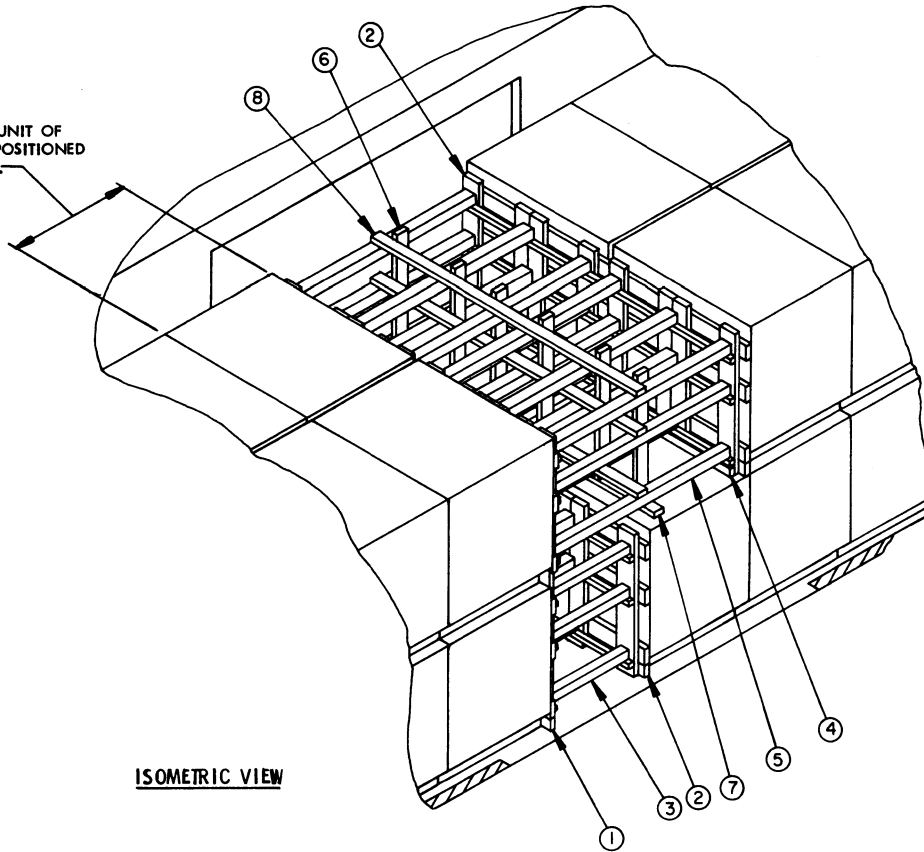


SEPARATOR GATE E

SEE SPECIAL NOTE 8 ON PAGE 7

ONE LOAD UNIT OF
CROSSWISE-POSITIONED
CONTAINERS.

ISOMETRIC VIEW

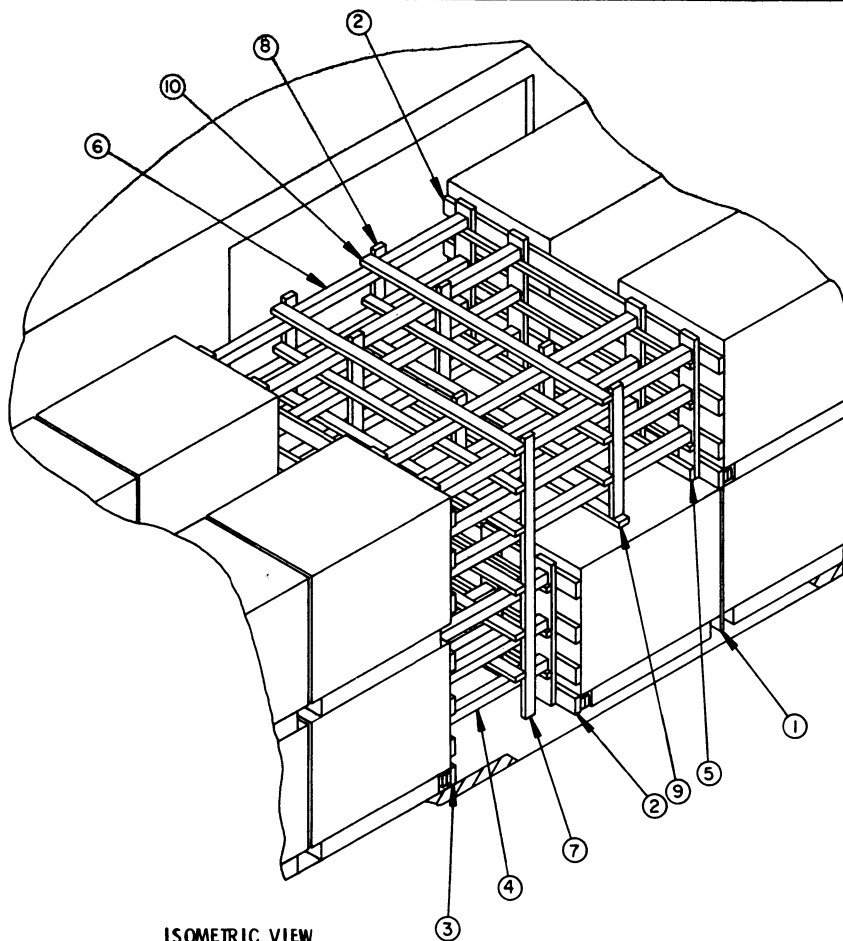


SPECIAL NOTES:

1. ONLY THE CENTER PORTION OF A 9'-4" WIDE CONVENTIONAL TYPE BOX CAR IS SHOWN TO PORTRAY THE STRUTTED GATE METHOD OF PARTIAL LAYER BRACING. WIDER CARS CAN ALSO BE USED.
2. THE PROCEDURES FOR THE ADJUSTMENT OF A LOAD QUANTITY BY THE OMISSION OF THE TOP LAYER FROM ONE (1) LOAD UNIT IS SHOWN AS TYPICAL. TO DELETE FOUR (4) PALLET UNITS, OMIT THE TOP AND BOTTOM LAYERS OF ONE (1) LOAD UNIT.
3. ONLY THE BLOCKING AND BRACING PIECES WHICH ARE NECESSARY TO PERMIT THE OMISSION OF THE UNITS FROM THE TOP LAYER ARE SHOWN.
4. USE THIS METHOD WHEN THE CONTAINERS ARE POSITIONED CROSSWISE IN THE CAR. EIGHTEEN (18) STRUTS ARE REQUIRED FOR EACH LAYER OF UNITS IN EITHER A 60'-8" OR A 50'-6" LONG BOX CAR.
5. TO PROTECT THE LADING FROM BEING PUNCTURED WHEN A SET OF VERTICAL STRUT BRACING IS INSTALLED ABOVE THE LOWER LAYER OF A LOAD, A SUITABLE LENGTH PAD OF 2" X 4" MATERIAL, SHOWN AS PIECE MARKED ⑦, MUST BE POSITIONED UNDER AND SECURED TO EACH APPLICABLE VERTICAL STRUT BRACING PIECE.

KEY NUMBERS

- ① CENTER GATE FOR 2-HIGH (1 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 12. SEE GENERAL NOTES "M" AND "N" ON PAGE 2.
- ② CENTER GATE FOR 1-HIGH (2 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 12.
- ③ STRUT, 4" X 4" BY CUT TO FIT (18 REQD). TOENAIL TO PIECES MARKED ① AND ② W/2-16d NAILS AT EACH END. SEE GENERAL NOTES "L" AND "U" ON PAGE 2 AND GENERAL NOTE "V" ON PAGE 3.
- ④ SUPPORT PIECE, 2" X 3" X 9'-2" (1 REQD). NAIL TO THE VERTICAL PIECES ON THE "CENTER GATE A" IN THE SECOND LAYER, SHOWN AS PIECE MARKED ②, W/2-10d NAILS AT EACH JOINT.
- ⑤ STRUT, 4" X 4" BY CUT TO FIT (18 REQD). TOENAIL TO PIECES MARKED ① AND ② W/2-16d NAILS AT EACH END.
- ⑥ VERTICAL STRUT BRACING, 2" X 4" X 46" (6 REQD). NAIL TO THE STRUTS MARKED ⑤ W/3-10d NAILS AT EACH JOINT. TOENAIL TO THE STRUT BRACING PAD, PIECE MARKED ⑦, W/1-10d NAIL AT EACH JOINT. SEE SPECIAL NOTE 5 AT LEFT.
- ⑦ STRUT BRACING PAD, 2" X 4" X 9'-0" (1 REQD). POSITION UNDER THE VERTICAL STRUT BRACING AS SHOWN.
- ⑧ HORIZONTAL STRUT BRACING, 2" X 4" X 9'-2" (3 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.



ISOMETRIC VIEW

SPECIAL NOTES:

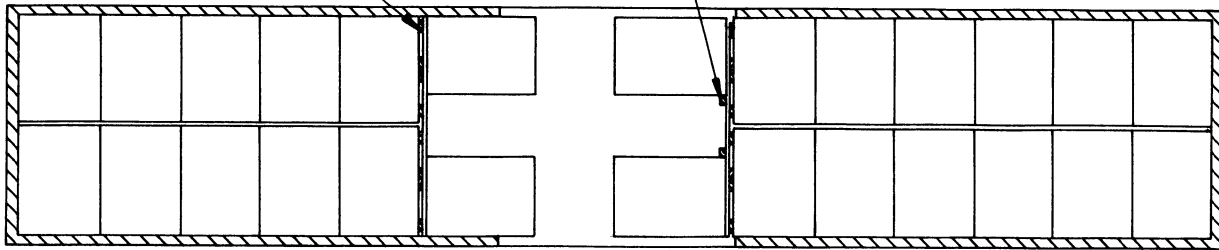
1. ONLY THE CENTER PORTION OF A 9'-2" WIDE CONVENTIONAL TYPE BOX CAR IS SHOWN TO PORTRAY THE STRUTTED GATE METHOD OF PARTIAL LAYER BRACING. CARS OF OTHER WIDTHS CAN ALSO BE USED.
2. THE PROCEDURES FOR THE ADJUSTMENT OF A LOAD QUANTITY BY THE OMISSION OF THE TOP LAYER FROM ONE LOAD UNIT ARE SHOWN AS TYPICAL.
3. ONLY THE BLOCKING AND BRACING PIECES WHICH ARE NECESSARY TO PERMIT THE OMISSION OF THE UNITS FROM THE TOP LAYER ARE SHOWN.

KEY NUMBERS

- ① SEPARATOR GATE FOR 1-HIGH (1 REQD). SEE THE "ALTERNATIVE SEPARATOR GATE" DETAIL ON PAGE 44.
- ② CENTER GATE FOR 1-HIGH (2 REQD). SEE THE "CENTER GATE B" DETAIL ON PAGE 13.
- ③ CENTER GATE FOR 2-HIGH (1 REQD). SEE THE "CENTER GATE B" DETAIL ON PAGE 13.
- ④ STRUT, 4" X 4" BY CUT TO FIT (12 REQD). POSITION BETWEEN THE CENTER GATES, PIECES MARKED ① AND ②, IN THE FIRST LAYER AND TOENAIL W/2-16d NAILS AT EACH END.
- ⑤ GATE SUPPORT PIECE, 2" X 4" BY CUT TO FIT (1 REQD). NAIL TO THE VERTICAL PIECES OF THE CENTER GATE USED IN THE SECOND LAYER W/3-10d NAILS AT EACH JOINT.
- ⑥ STRUT, 4" X 4" BY CUT TO FIT (AS REQD). POSITION BETWEEN THE CENTER GATES, PIECES MARKED ① AND ②, IN THE SECOND LAYER AND TOENAIL W/2-16d NAILS AT EACH END.
- ⑦ VERTICAL STRUT BRACING, 2" X 4" X 8'-0" (4 REQD). NAIL TO THE STRUTS MARKED ④ AND ⑥ W/3-10d NAILS AT EACH JOINT.
- ⑧ VERTICAL STRUT BRACING, 2" X 4" X 46" (4 REQD). NAIL TO THE STRUTS MARKED ⑤ W/3-10d NAILS AT EACH JOINT. TOENAIL TO THE STRUT BRACING PAD, PIECE MARKED ⑨, W/1-10d NAIL AT EACH JOINT. SEE SPECIAL NOTE 5 AT LEFT.
- ⑨ STRUT BRACING PAD, 2" X 4" BY A LENGTH TO SUIT (1 REQD). POSITION UNDER THE VERTICAL STRUT BRACING AS SHOWN.
- ⑩ HORIZONTAL STRUT BRACING, 2" X 4" BY A LENGTH TO SUIT (9 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.

SEPARATOR GATE (1 OR 2 REQD, AS APPLICABLE). SEE THE "SEPARATOR GATE C" DETAIL ON PAGE 21. POSITION AS SHOWN WITH THE VERTICAL PIECES AGAINST THE CROSSWISE POSITIONED PALLET UNITS.

STOP PIECES, 2" X 4" X 54" (2 REQD). POSITION SO AS TO BE IN CONTACT WITH THE ADJACENT CONTAINERS AND SECURE BY NAILING THRU THE HORIZONTAL PIECES OF THE SEPARATOR GATE W/3-6d NAILS AT EACH JOINT. NOTE THAT STOP PIECES ARE ONLY REQUIRED ON SEPARATOR GATES WHICH ARE IN THE DOOR OPENING OR WITHIN SIX INCHES (6") OF BEING IN THE DOOR OPENING.



TYPICAL COMBINATION LOAD PATTERN PLAN VIEW

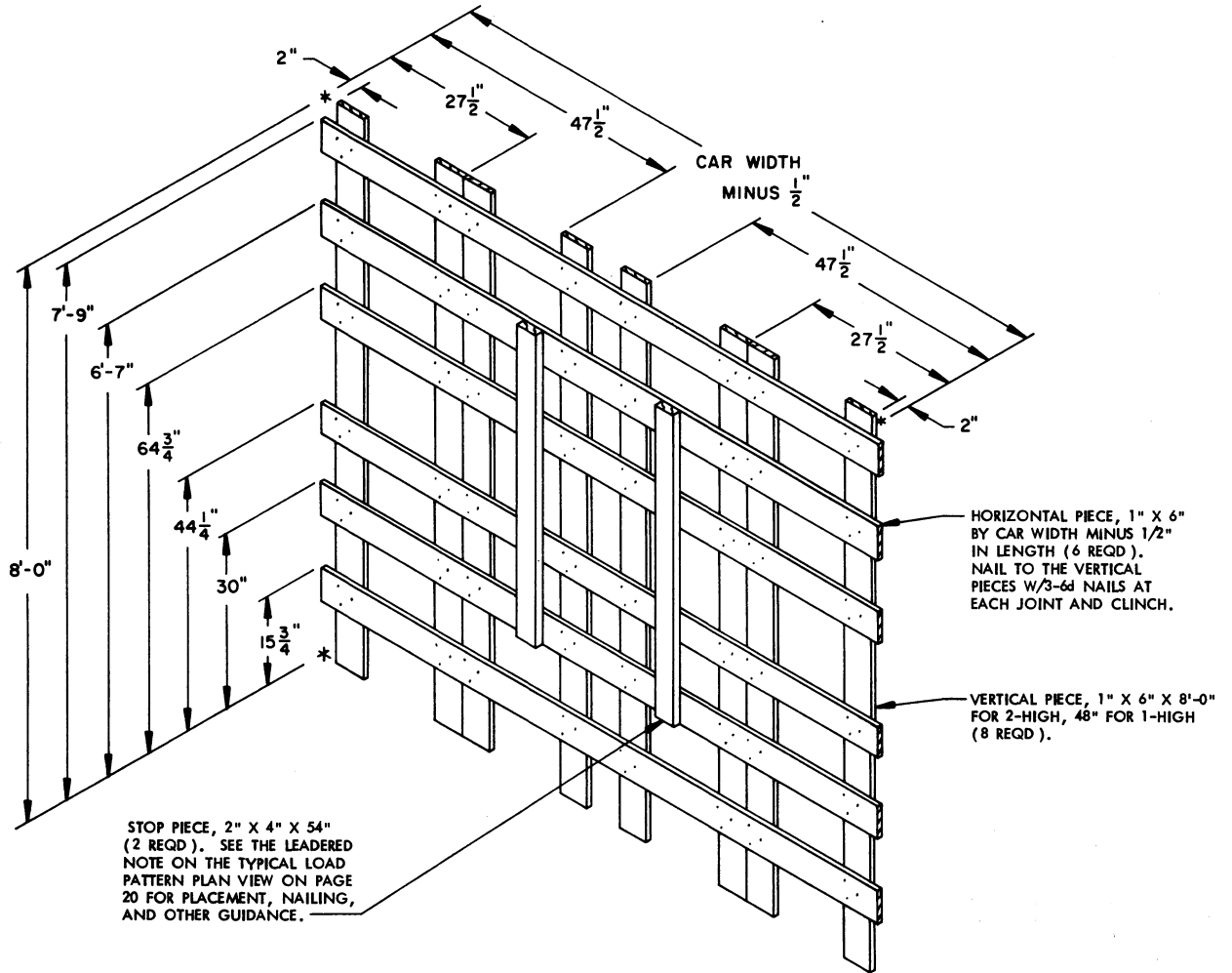
AN 11'-LONG PLUS 2 WIDE LOAD IS SHOWN

SPECIAL NOTES:

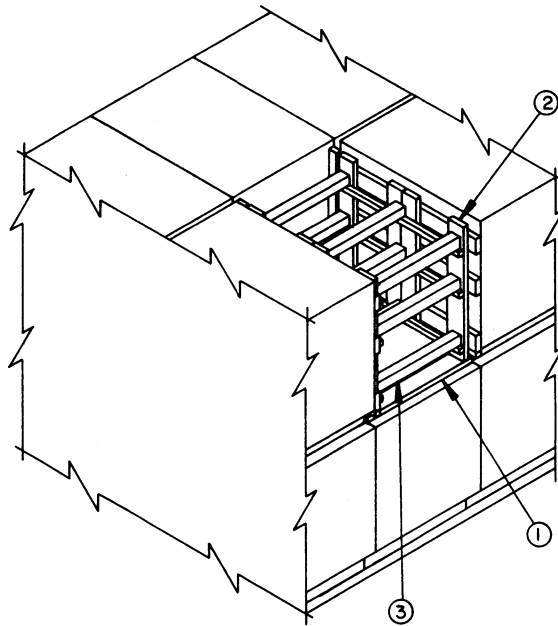
1. A 50'-6" LONG BY 9'-4" WIDE CONVENTIONAL TYPE BOX CAR IS SHOWN. WIDER CARS AND CARS OF OTHER LENGTHS CAN BE USED.
2. THE PROCEDURES ON THIS PAGE AND ON PAGE 21 ARE PRESENTED TO PROVIDE A METHOD OF OBTAINING A LOAD QUANTITY WHICH MAY NOT BE READILY ATTAINABLE BY ANY OF THE OTHER METHODS OF ADJUSTING A LOAD QUANTITY SPECIFIED HEREIN, INCLUDING THE DEPICTED LCL PROCEDURES.
3. THE BLOCKING AND BRACING FOR THE COMBINATION LOAD, OTHER THAN SEPARATOR GATE "C", HAS NOT BEEN SHOWN. REFER TO THE APPLICABLE LOAD PAGE FOR BLOCKING AND BRACING SPECIFICATIONS. A SEPARATOR GATE "C" MUST BE INSTALLED AT EVERY LOCATION WHERE THE DIRECTION OF THE UNITS CHANGES. THE GATE MUST BE POSITIONED SO THAT THE VERTICAL PIECES ARE AGAINST THE CROSSWISE UNITS OF THE LOAD.

TYPICAL LOAD PATTERN CHART

CAR LENGTH	UNITS PER LAYER	LOAD PATTERN	APPROX STRUT LENGTH
40'-6"	22	CROSSWISE LOAD ON PAGE 4	33"
	20	8 LONG AT 40-5/8" PLUS 2 WIDE AT 55"	42"
	20	7 LONG AT 40-5/8" PLUS 3 WIDE AT 55"	26"
	18	5 LONG AT 40-5/8" PLUS 4 WIDE AT 55"	50"
	18	4 LONG AT 40-5/8" PLUS 5 WIDE AT 55"	37"
	16	LENGTHWISE LOAD ON PAGE 6	35"
50'-6"	28	CROSSWISE LOAD ON PAGE 4	31"
	26	11 LONG AT 40-5/8" PLUS 2 WIDE AT 55"	40"
	26	10 LONG AT 40-5/8" PLUS 3 WIDE AT 55"	25"
	24	7 LONG AT 40-5/8" PLUS 5 WIDE AT 55"	35"
	22	3 LONG AT 40-5/8" PLUS 8 WIDE AT 55"	30"
20	LENGTHWISE LOAD ON PAGE 6	44"	
60'-8"	34	CROSSWISE LOAD ON PAGE 4	31"
	32	14 LONG AT 40-5/8" PLUS 2 WIDE AT 55"	40"
	30	10 LONG AT 40-5/8" PLUS 5 WIDE AT 55"	35"
	28	7 LONG AT 40-5/8" PLUS 7 WIDE AT 55"	45"
	28	6 LONG AT 40-5/8" PLUS 8 WIDE AT 55"	30"
	26	3 LONG AT 40-5/8" PLUS 10 WIDE AT 55"	41"
	26	2 LONG AT 40-5/8" PLUS 11 WIDE AT 55"	26"
	24	LENGTHWISE LOAD ON PAGE 6	54"



SEPARATOR GATE C



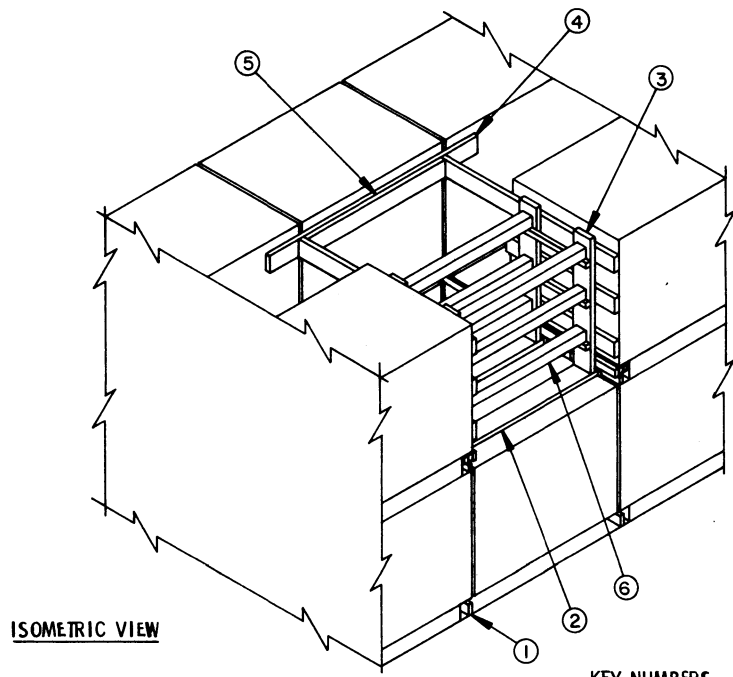
ISOMETRIC VIEW

SPECIAL NOTES:

1. A PARTIAL VIEW OF A 9'-4" WIDE CONVENTIONAL TYPE BOX CAR IS SHOWN. WIDER CARS CAN BE USED.
2. THE OMITTED-UNIT PROCEDURES SHOULD BE APPLIED NEAR THE CENTER OF THE CAR LENGTH, BUT NOT IN THE DOORWAY AREA. ALSO, THERE SHOULD BE AT LEAST ONE (1) LOAD UNIT BETWEEN THE OMITTED UNIT AND A CENTER GATE.
3. ONLY THE BLOCKING AND BRACING FOR THE OMITTED UNIT IS SHOWN. REFER TO THE APPLICABLE LOAD PAGE FOR THE BLOCKING AND BRACING REQUIREMENTS FOR THE BALANCE OF THE LOAD.

KEY NUMBERS

- ① SUPPORT PIECE, 2" X 6" X 40-5/8" (2 REQD). POSITION BENEATH THE OUTSIDE VERTICAL PIECES OF THE LOAD BEARING GATE, PIECE MARKED ②.
- ② LOAD BEARING GATE (2 REQD, 1 RIGHT HAND AND 1 LEFT HAND). SEE THE "LOAD BEARING GATE A" DETAIL ON PAGE 24. TOENAIL TO THE SUPPORT PIECE, PIECE MARKED ①, W/2-10d NAILS AT EACH JOINT. **CAUTION:** USE CARE NOT TO TOENAIL INTO A CONTAINER.
- ③ STRUT, 4" X 4" X 34-5/8" (9 REQD). TOENAIL TO PIECES MARKED ② W/2-16d NAILS AT EACH END.



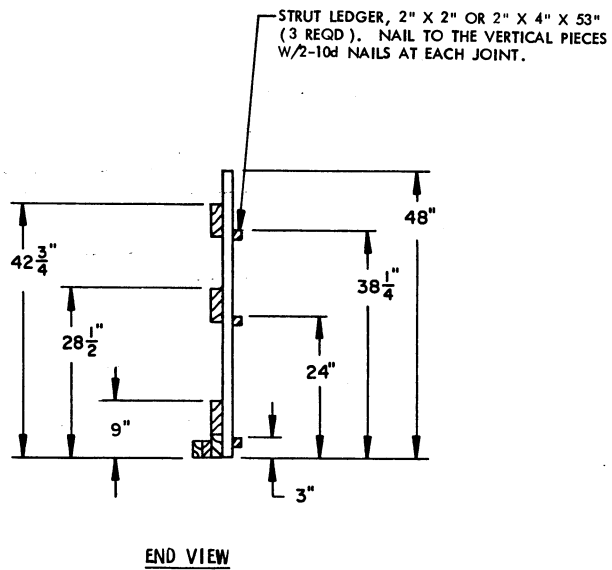
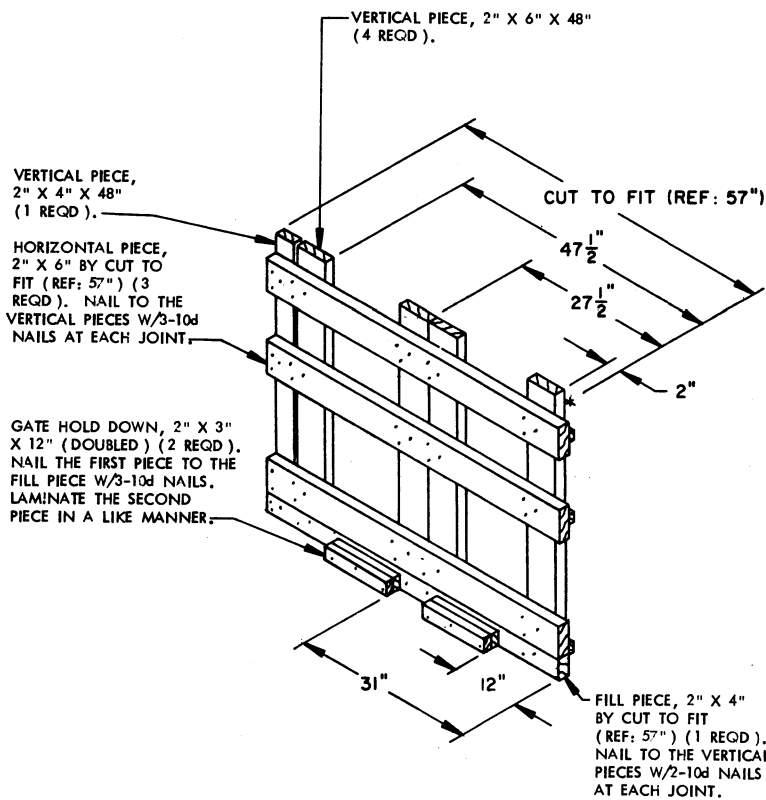
ISOMETRIC VIEW

SPECIAL NOTES:

1. A PARTIAL VIEW OF A 9'-2" WIDE CONVENTIONAL TYPE BOX CAR IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED.
2. ONLY THE BLOCKING AND BRACING FOR THE OMITTED UNIT IS SHOWN; REFER TO THE APPLICABLE LOAD PAGE FOR THE BLOCKING AND BRACING REQUIREMENTS FOR THE BALANCE OF THE LOAD.
3. NOTE THAT THE TOP HORIZONTAL PIECE OF EACH SEPARATOR GATE WHICH IS ADJACENT TO THE OMITTED UNIT AREA MUST BE 1" X 2" MATERIAL IN LIEU OF 1" X 4" AND MAY NEED TO BE ADJUSTED IN HEIGHT SO AS TO PROVIDE CLEARANCE BETWEEN IT AND THE CONTAINERS ON THE UNIT BELOW AS WELL AS CLEARANCE BETWEEN IT AND THE LOAD BEARING GATE, PIECE MARKED ③.

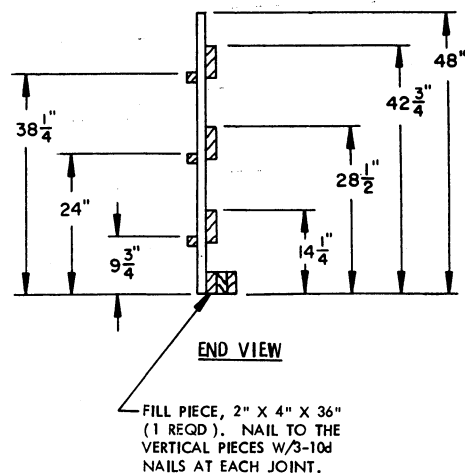
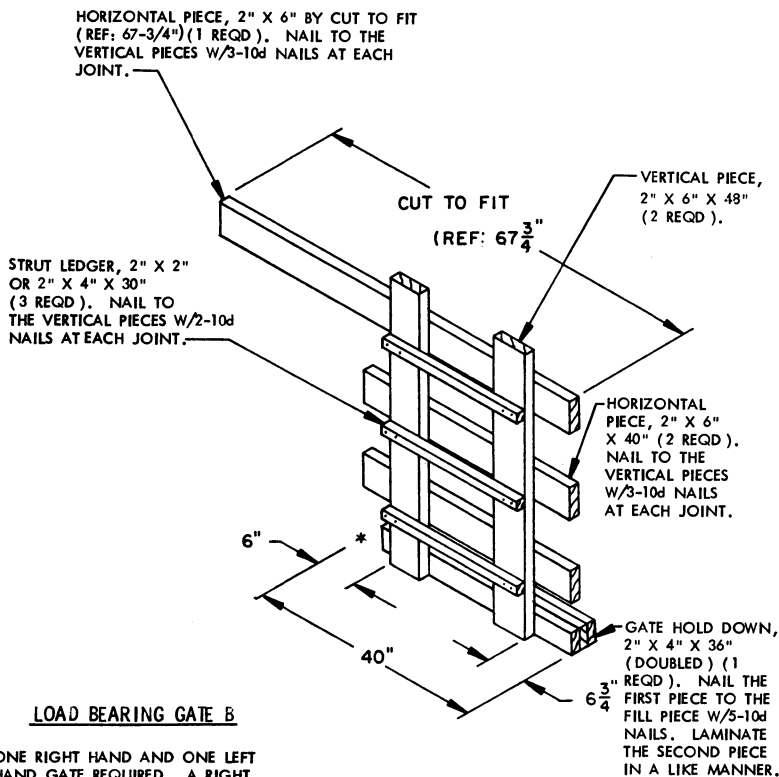
KEY NUMBERS

- ① MODIFIED SEPARATOR GATE (2 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 13. SEE SPECIAL NOTE 3 AT LEFT FOR GATE MODIFICATIONS. POSITION GATE SO THE HORIZONTAL PIECES ARE AWAY FROM THE OMITTED UNIT AREA.
- ② SUPPORT PIECES, 2" X 6" X 55" (2 REQD). POSITION SO AS TO BE UNDER THE VERTICAL PIECES OF THE LOAD BEARING GATE, PIECE MARKED ③.
- ③ LOAD BEARING GATE (2 REQD, 1 RIGHT HAND AND 1 LEFT HAND). SEE THE "LOAD BEARING GATE B" DETAIL ON PAGE 24. NAIL TO THE FILLER PIECE, PIECE MARKED ⑤, W/3-10d NAILS. TOENAIL TO THE SUPPORT PIECES, PIECE MARKED ②, W/2-10d NAILS AT EACH JOINT. CAUTION: USE CARE NOT TO TOENAIL INTO A CONTAINER.
- ④ ANTI-SWAY BEARING PIECE, 2" X 6" X 7'-0" (1 REQD).
- ⑤ FILLER PIECE, 2" X 6" X 53'-1/2" (1 REQD). NAIL TO THE ANTI-SWAY BEARING PIECE, PIECE MARKED ④, W/5-10d NAILS.
- ⑥ STRUT, 4" X 4" BY CUT TO FIT (REF: 50-1/2") (6 REQD). TOENAIL TO PIECES MARKED ③ W/2-16d NAILS AT EACH END.



LOAD BEARING GATE A

ONE RIGHT HAND AND ONE LEFT HAND GATE REQUIRED. A RIGHT HAND GATE IS SHOWN.

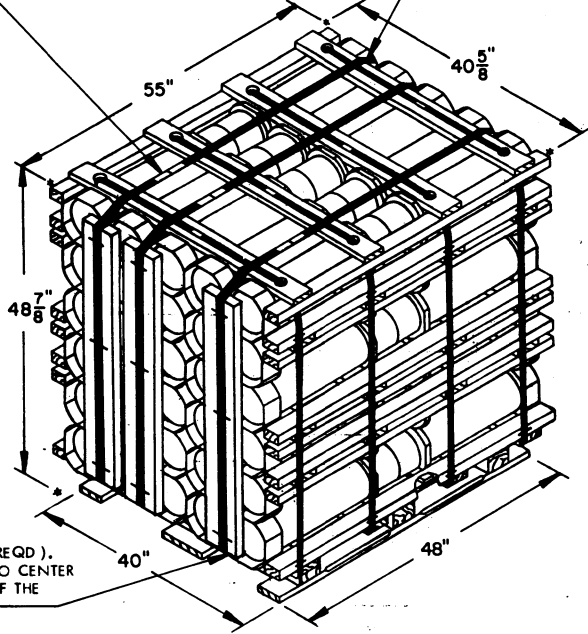


LOAD BEARING GATE B

ONE RIGHT HAND AND ONE LEFT HAND GATE REQUIRED. A RIGHT HAND GATE IS SHOWN.

SEAL FOR 1-1/4" STRAPPING
{ 4 REQD, 2 PER STRAP }.
SEE GENERAL NOTE "O"
ON PAGE 2.

REINFORCING STRAP, 1-1/4" X .035" OR .031"
X 18'-6" LONG STEEL STRAPPING (3 REQD).
INSTALL TO ENCIRCLE THE PALLET UNIT AND
THE STRAPPING BOARDS. SECURE TO EACH
STRAPPING BOARD W/3 STAPLES.

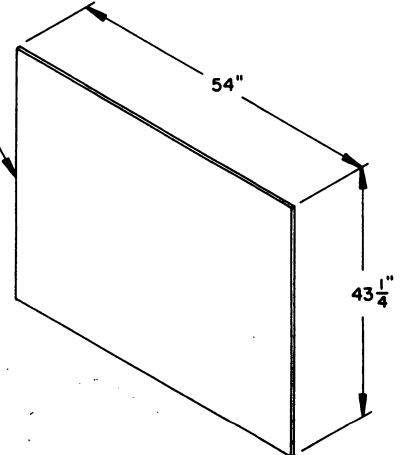


STRAPPING BOARD,
2" X 6" X 40" (6 REQD).
POSITION SO AS TO CENTER
ON THE JOINTS OF THE
CONTAINERS.

METHOD A

NOTE: THE METHOD "A" DETAIL AT LEFT SHOWS THE
MODIFICATION REQUIRED FOR PALLET UNITS WITH
THE CONTAINERS POSITIONED LENGTHWISE IN THE
CAR WHEN USING THE RISER METHOD OF PARTIAL
LAYER BRACING SHOWN ON PAGE 26. FOR PALLET
UNITS WITH THE CONTAINERS POSITIONED CROSS-
WISE IN THE CAR, SEE THE METHOD "B" DETAIL
BELOW.

PLYWOOD,
1/2" X 43-1/4"
X 54" (1 REQD).

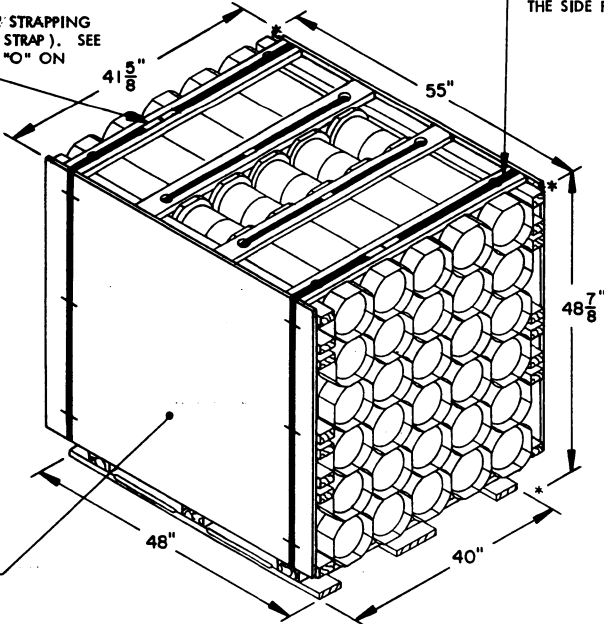


SIDE FILL ASSEMBLY

(FOR METHOD "B" BELOW)

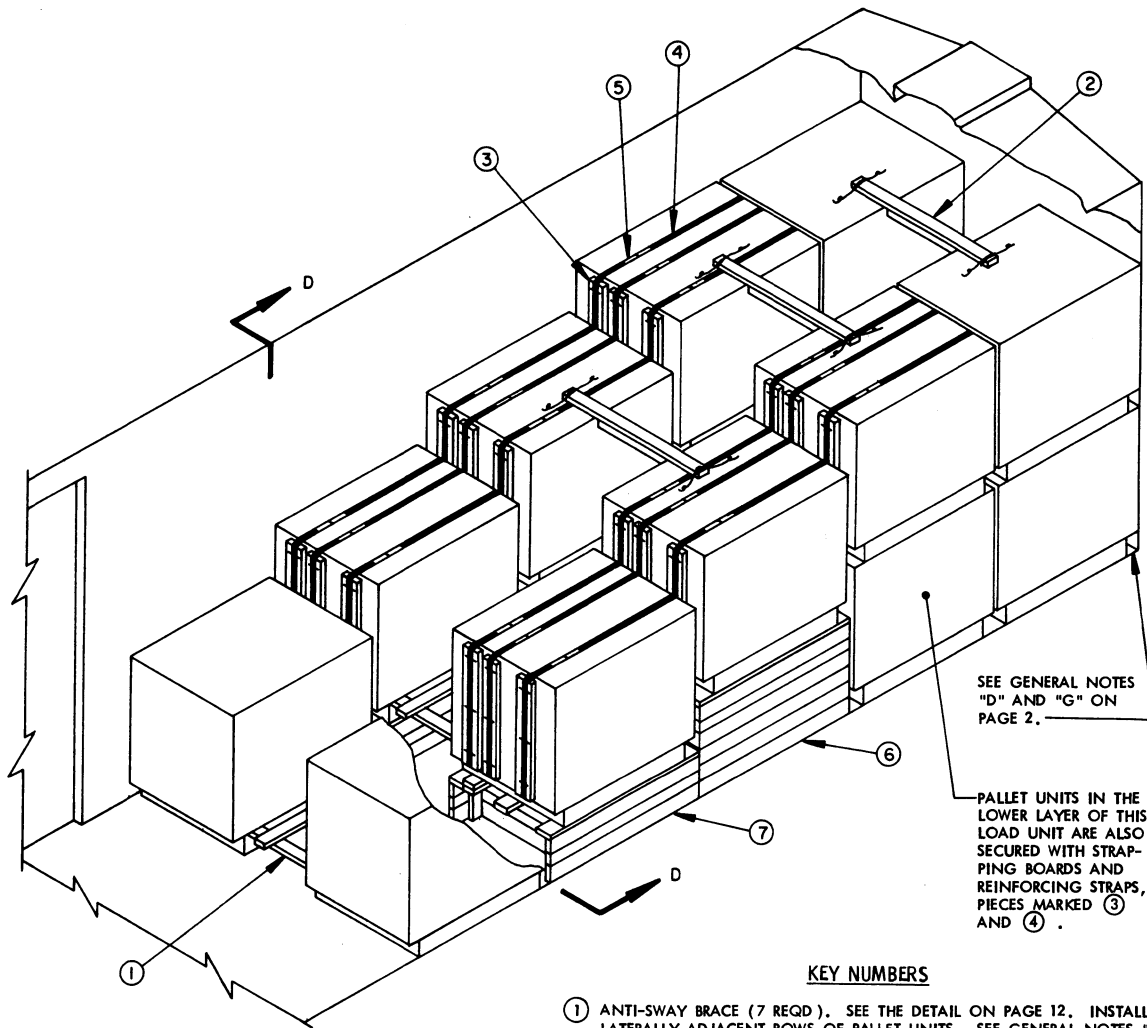
SEAL FOR 1-1/4" STRAPPING
(4 REQD, 2 PER STRAP). SEE
GENERAL NOTE "O" ON
PAGE 2.

REINFORCING STRAP, 1-1/4" X .035"
OR .031" X 16'-0" LONG STEEL
STRAPPING (2 REQD). INSTALL TO
ENCIRCLE THE PALLET UNIT AND THE
SIDE FILL ASSEMBLIES. SECURE TO
THE SIDE FILL ASSEMBLIES W/STAPLES.



SIDE FILL
ASSEMBLY
(2 REQD).
SEE THE DETAIL
ABOVE.

METHOD B



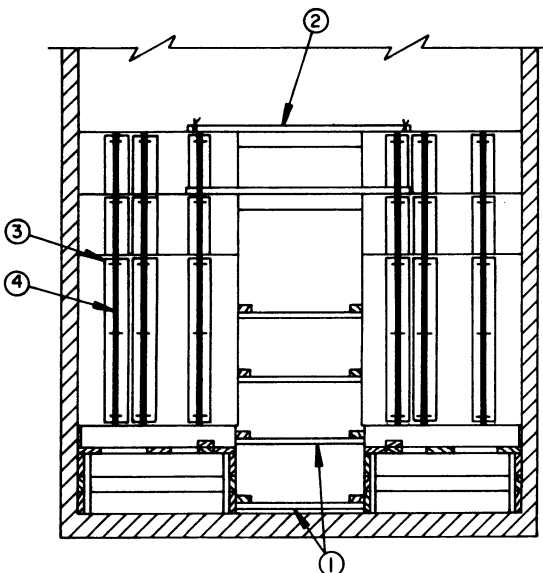
ISOMETRIC VIEW

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

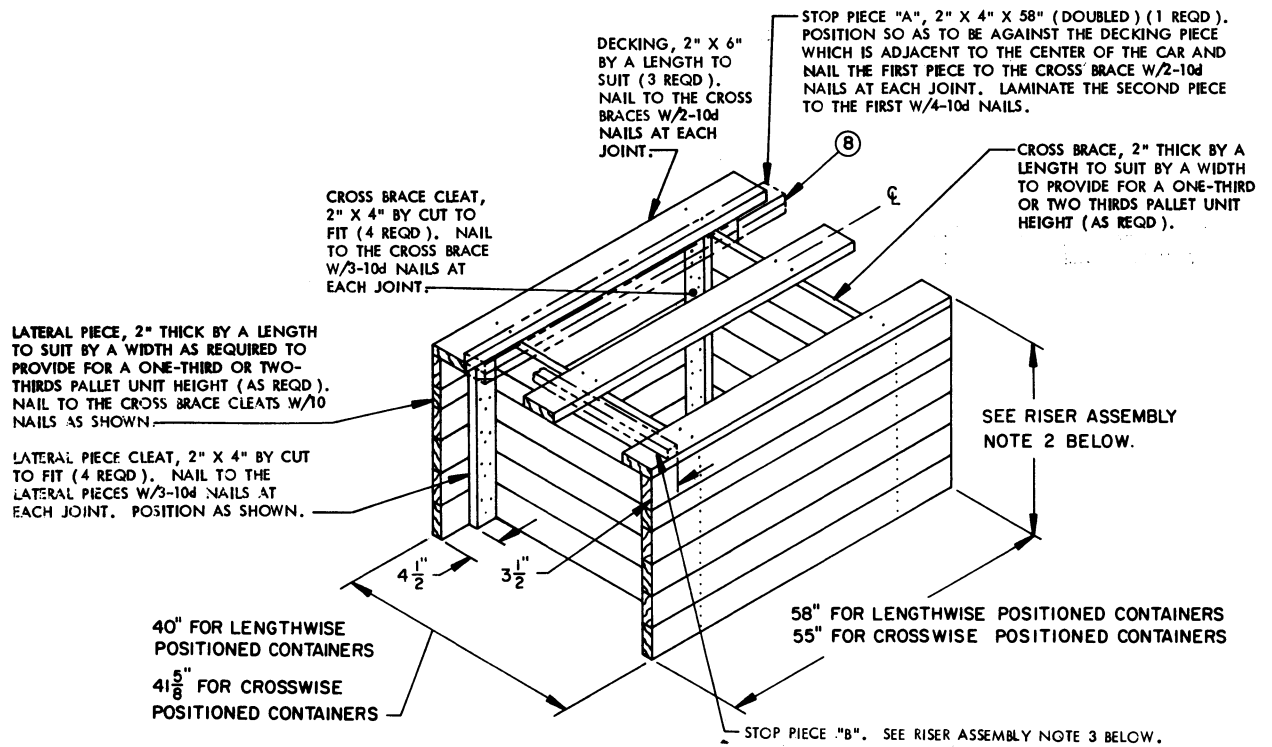
PALLET UNITS IN THE LOWER LAYER OF THIS LOAD UNIT ARE ALSO SECURED WITH STRAPPING BOARDS AND REINFORCING STRAPS, PIECES MARKED ③ AND ④.

KEY NUMBERS

- ① ANTI-SWAY BRACE (7 REQD). SEE THE DETAIL ON PAGE 12. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLET UNITS. SEE GENERAL NOTES "M" AND "N" ON PAGE 2 AND SPECIAL NOTE 4 ON PAGE 27.
- ② TOP-OF-LOAD ANTI-SWAY BRACE (3 REQD). SEE THE DETAIL ON PAGE 12. WIRE TIE TO PALLET UNITS AS SHOWN BY THE "TIE WIRE APPLICATION" DETAIL ON PAGE 44.
- ③ STRAPPING BOARD, 2" X 6" X 40" (48 REQD/6 PER PALLET UNIT). POSITION AS SHOWN IN THE "METHOD A" DETAIL ON PAGE 25.
- ④ REINFORCING STRAP, 1-1/4" X .035" X 18'-6" LONG (REF) STEEL STRAPPING (24 REQD). INSTALL TO ENCIRCLE THE PALLET UNIT AND THE STRAPPING BOARDS. SECURE TO A STRAPPING BOARD W/3 STAPLES. SEE THE "METHOD A" DETAIL ON PAGE 25.
- ⑤ SEAL FOR 1-1/4" STRAPPING (48 REQD, 12 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "O" ON PAGE 2.
- ⑥ RISER ASSEMBLY (2 REQD). THE HEIGHT OF THE RISER ASSEMBLY WILL BE TWO-THIRDS OF THE PALLET UNIT HEIGHT. SEE THE "RISER ASSEMBLY" DETAIL ON PAGE 27.
- ⑦ RISER ASSEMBLY (2 REQD). THE HEIGHT OF THE RISER ASSEMBLY WILL BE ONE-THIRD OF THE PALLET UNIT HEIGHT. SEE THE "RISER ASSEMBLY" DETAIL ON PAGE 27.
- ⑧ STOP PIECE "A" (4 REQD). SEE THE "RISER ASSEMBLY" DETAIL ON PAGE 27 FOR LOCATION AND NAILING GUIDANCE.



SECTION D-D



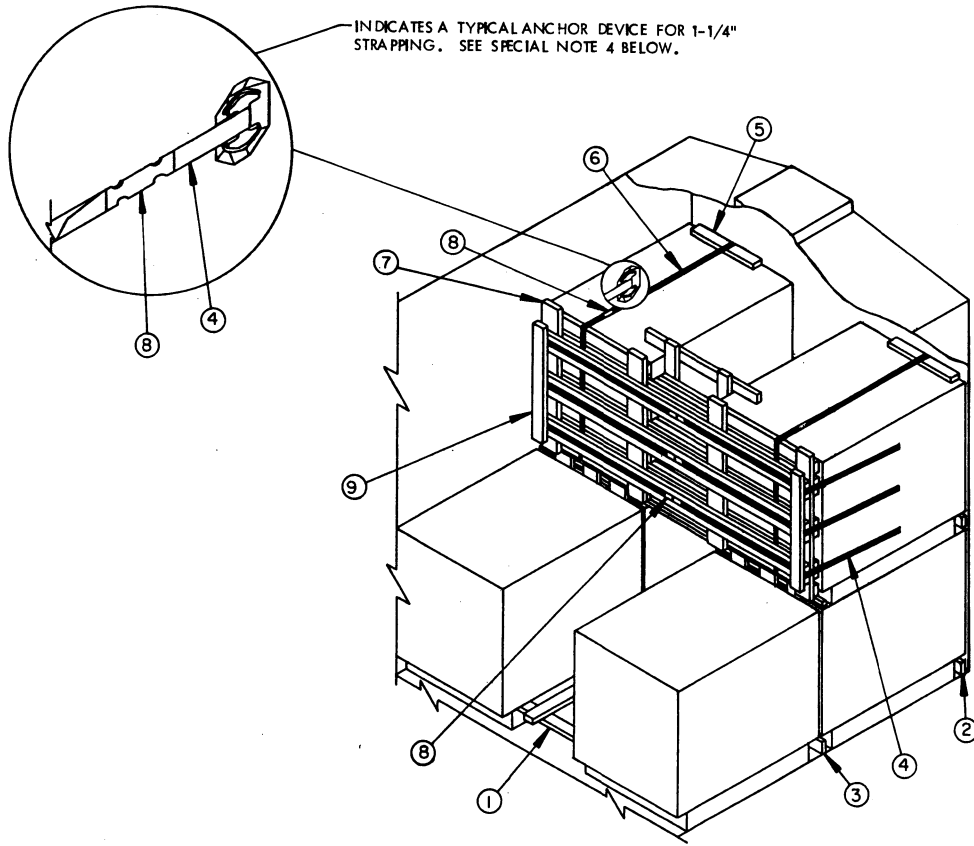
RISER ASSEMBLY

SPECIAL NOTES FOR LOADS:

1. A 9'-2" WIDE CONVENTIONAL TYPE WOOD-LINED BOX CAR IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED FOR THE DEPICTED LOAD. A 9'-4" OR WIDER CAR IS REQUIRED FOR LOADS OF CROSSWISE CONTAINERS.
2. THE RISER METHOD OF PARTIAL LAYER BRACING IS TYPICALLY SHOWN WITH THE PALLET UNITS POSITIONED LENGTHWISE IN THE CAR. WITH MODIFICATIONS, THE PROCEDURES ARE ALSO APPLICABLE FOR CROSSWISE POSITIONED UNITS. SEE SPECIAL NOTES 4 AND 5.
3. ONLY THE BLOCKING AND BRACING FOR THE RISER METHOD OF PARTIAL LAYER BRACING IS SHOWN. REFER TO THE LOAD ON PAGE 6 FOR THE BLOCKING AND BRACING REQUIREMENTS FOR THE BALANCE OF THE LOAD.
4. ANTI-SWAY BRACING IS REQUIRED WHEN THE CONTAINERS ARE POSITIONED LENGTHWISE IN THE CAR. ANTI-SWAY BRACING IS NOT REQUIRED WHEN THE CONTAINERS ARE POSITIONED CROSSWISE IN THE CAR.
5. STRAPPING BOARDS, PIECES MARKED ③, WILL NOT BE REQUIRED WHEN THE CONTAINERS ARE POSITIONED CROSSWISE. SEE THE "METHOD B" DETAIL ON PAGE 35 FOR MODIFICATIONS TO BE ACCOMPLISHED IN LIEU OF USING STRAPPING BOARDS. ALSO, STOP PIECE "B", AS SHOWN ON THE RISER DETAIL ABOVE, WILL BE USED IN LIEU OF STOP PIECE "A", WHEN THE CONTAINERS ARE POSITIONED CROSSWISE IN THE CAR.

SPECIAL NOTES FOR RISER ASSEMBLY:

1. A TYPICAL RISER ASSEMBLY IS SHOWN ABOVE. THE HEIGHT OF THE PALLET UNIT IS 48-7/8". A TWO-THIRDS UNIT HEIGHT RISER IS SHOWN ABOVE AND AS KEY NUMBER ⑥ IN THE LOAD ON PAGE 26. EACH CROSS BRACE AND EACH LATERAL PIECE OF THE RISER IS FABRICATED FROM FIVE (5) PIECES OF 2" X 6" MATERIAL AND ONE (1) PIECE OF 2" X 4" MATERIAL TO PROVIDE FOR A TOTAL HEIGHT OF 32-1/2" AFTER THE DECKING IS IN PLACE. A ONE-THIRD HEIGHT RISER, SHOWN AS KEY NUMBER ⑦ IN THE LOAD ON PAGE 26, WILL BE FABRICATED FROM TWO (2) PIECES OF 2" X 6" AND ONE PIECE OF 2" X 4" MATERIAL FOR EACH CROSS BRACE AND EACH LATERAL PIECE, TO PROVIDE FOR A TOTAL HEIGHT OF 16" AFTER THE DECKING IS IN PLACE.
2. SELECT THE PROPER WIDTH COMBINATIONS FOR THE LATERAL/CROSS BRACE PIECES PRIOR TO CONSTRUCTING A RISER ASSEMBLY, TO ASSURE THAT THE TOTAL HEIGHT OF THE RISER ASSEMBLY IS ONE-THIRD OR TWO-THIRDS OF THE PALLET UNIT HEIGHT, DEPENDING ON THE LOCATION OF THE RISER ASSEMBLY WITHIN THE LOAD. NOTE: A PLUS OR MINUS 1" TOLERANCE IS PERMISSIBLE ON THE RISER HEIGHT.
3. THE STOP PIECE "A" SHOWN ON THE RISER ASSEMBLY DETAIL ABOVE IS ONLY FOR USE WHEN THE PALLET UNITS ARE POSITIONED LENGTHWISE IN THE CAR, AS SHOWN IN THE LCL LOAD ON PAGE 26. IF PALLET UNITS ARE POSITIONED CROSSWISE IN THE CAR, POSITION A 2" X 2" X 41" PIECE ACROSS THE DECKING, ON THE END WHICH IS AGAINST THE CAR SIDEWALL, AND NAIL TO THE DECKING W/2-10d NAILS AT EACH JOINT. SEE STOP PIECE "B" ON THE RISER ASSEMBLY ABOVE FOR LOCATION GUIDANCE.



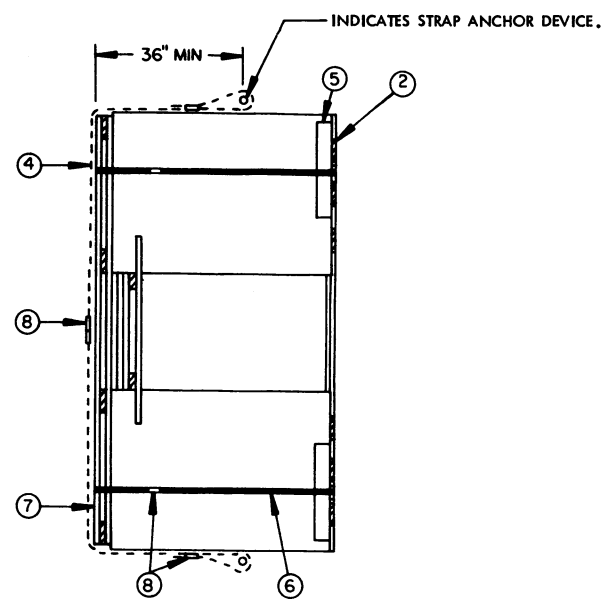
ISOMETRIC VIEW

SPECIAL NOTES:

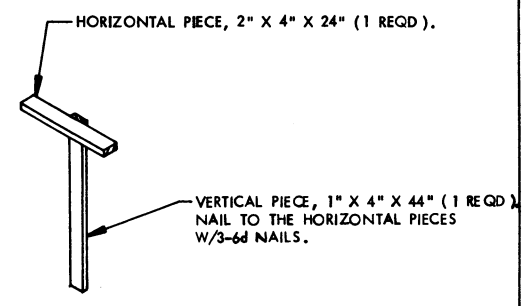
1. A 9'-2" WIDE ALL-METAL BOX CAR EQUIPPED WITH STRAP ANCHOR DEVICES AND HAVING AN AAR MECHANICAL DESIGNATION CLASS OF XL IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED.
2. THE BULKHEAD GATE METHOD OF PARTIAL-LAYER BRACING IS ONLY APPLICABLE FOR USE IN LOADS OF LENGTHWISE POSITIONED PALLET UNITS AS SHOWN IN THE VIEW ABOVE. PARTIAL LAYERS OF CROSSWISE POSITIONED PALLET UNITS WILL NOT BE RETAINED BY THE BULKHEAD GATE METHOD.
3. A BULKHEAD GATE USED IN CONJUNCTION WITH THREE (3) BULKHEAD STRAPS WILL RETAIN UP TO 7,500 POUNDS OF LADING; A BULKHEAD GATE WITH TWO (2) STRAPS WILL RETAIN NOT MORE THAN 5,000 POUNDS. IF ONLY TWO STRAPS ARE USED, THEY MUST BE APPLIED OVER THE UPPER AND LOWER STRAPPING BOARDS. A BULKHEAD GATE WITH 2 STRAPS WILL RETAIN 2 PALLET UNITS; A BULKHEAD GATE WITH 3 STRAPS WILL RETAIN 3 PALLET UNITS.
4. THE ANCHOR DEVICES TO BE USED FOR THE ATTACHMENT OF THE BULKHEAD STRAPS MUST BE LOCATED AT LEAST THIRTY-SIX INCHES (36") TOWARD THE CAR END WALL FROM THE OPPOSITE-THE-LOAD SIDE OF THE BULKHEAD GATE. IF THE ANCHOR DEVICES IN THE CAR BEING LOADED ARE NOT LOCATED NEAR ENOUGH TO THE END OF THE CAR SO THAT THE 36" REQUIREMENT CAN BE SATISFIED, IT WILL BE NECESSARY TO INSTALL GATES AND STRUTS AT THE END OF THE CAR. THESE WILL BE 1-HIGH GATES FOR THE ITEM BEING LOADED AND WILL BE INSTALLED SIMILAR TO THE STRUTTED GATE METHOD SHOWN ON PAGE 19 FOR AN EVEN QUANTITY OF UNITS, OR THE PALLET UNIT OMITTED PROCEDURES ON PAGE 23 FOR A SINGLE UNIT.
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. TOLERANCES ARE SPECIFIED ON THE END VIEW OF THE BULKHEAD GATE ON PAGE 29 FOR THE LOCATION OF THE STRAPPING BOARDS IN RELATION TO THE LOCATION OF THE HORIZONTAL PIECES. THE STRAPPING BOARDS SHOULD BE LOCATED WITHIN THESE TOLERANCES. IF THIS IS NOT POSSIBLE, ADDITIONAL HORIZONTAL PIECES MUST BE APPLIED, AS NECESSARY TO PROVIDE PROPER BEARING AGAINST THE CONTAINERS.
6. NOTE THAT THE TOP HORIZONTAL PIECE OF THE 1-HIGH SEPARATOR GATE MAY BE 1" X 2" MATERIAL IN LIEU OF 1" X 4" AND MAY NEED TO BE ADJUSTED IN HEIGHT TO ALLOW THE BUNDLING STRAP TO PASS BETWEEN IT AND THE BULKHEAD GATE. THE ALTERNATIVE SEPARATOR GATE, AS DETAILED ON PAGE 44, MAY ALSO BE USED.

KEY NUMBERS

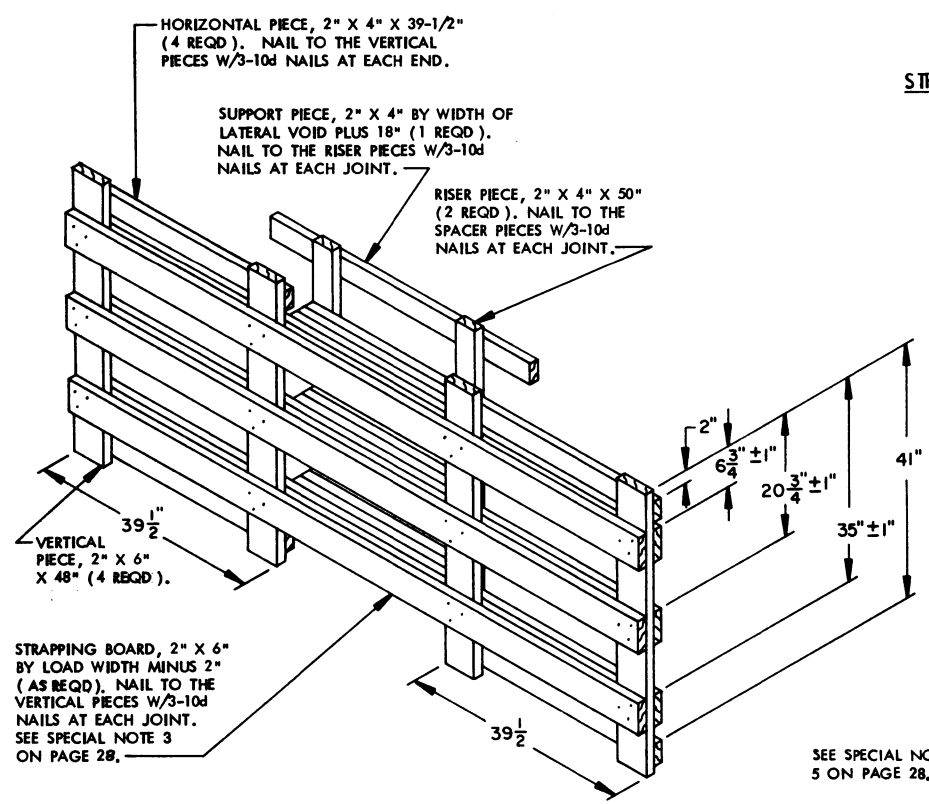
- ① ANTI-SWAY BRACE (3 REQD). SEE THE DETAIL ON PAGE 12. INSTALL BETWEEN THE LATERALLY ADJACENT ROWS OF PALLET UNITS. SEE GENERAL NOTES "M" AND "N" ON PAGE 2.
- ② SEPARATOR GATE FOR 2-HIGH LOAD (1 REQD). SEE THE DETAIL ON PAGE 13. POSITION WITH THE VERTICAL PIECES AGAINST THE CAR END WALL.
- ③ SEPARATOR GATE FOR 1-HIGH LOAD (1 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 13 OR THE "ALTERNATIVE SEPARATOR GATE" DETAIL ON PAGE 44. SEE SPECIAL NOTE 6 AT LEFT.
- ④ BULKHEAD STRAP, 1-1/4" X .031" OR .035" BY A LENGTH TO SUIT STEEL STRAPPING (3 REQD). INSTALL FROM 2 EQUAL LENGTH PIECES. SEE THE "STRAP APPLICATION PLAN VIEW" ON PAGE 29 FOR INSTALLATION GUIDANCE. SEE SPECIAL NOTES 3 AND 4 AT LEFT.
- ⑤ STRAPPING BOARD (2 REQD). SEE THE DETAIL ON PAGE 29.
- ⑥ BUNDLING STRAP, 1-1/4" X .035" OR .031" X 19'-0" LONG (REF) STEEL STRAPPING (2 REQD). ENCIRCLE THE PALLET UNIT, THE HORIZONTAL PIECES OF THE BULKHEAD GATE, AND A STRAPPING BOARD, PIECE MARKED ⑤. TENSION AND SEAL AFTER TENSIONING THE BULKHEAD STRAPS, PIECE MARKED ④.
- ⑦ BULKHEAD GATE (1 REQD). SEE THE DETAIL ON PAGE 29. SEE SPECIAL NOTE 2 AT LEFT.
- ⑧ SEAL FOR 1-1/4" STRAPPING (14 REQD, 4 PER BULKHEAD STRAP, PIECE MARKED ④, AND 1 PER BUNDLING STRAP, PIECE MARKED ⑥). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "O" ON PAGE 2.
- ⑨ STRAP RETAINER, 2" X 4" X 42" (2 REQD). NAIL TO THE BULKHEAD GATE W/2-12d NAILS ABOVE AND BELOW EACH BULKHEAD STRAP.



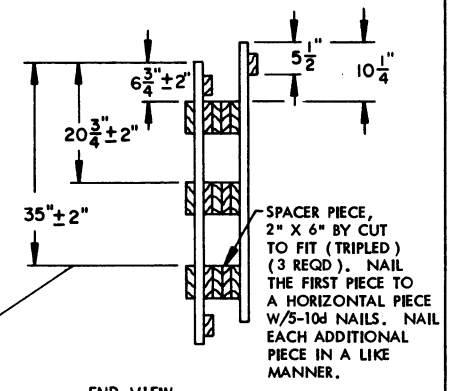
STRAP APPLICATION PLAN VIEW



STRAPPING BOARD



BULKHEAD GATE

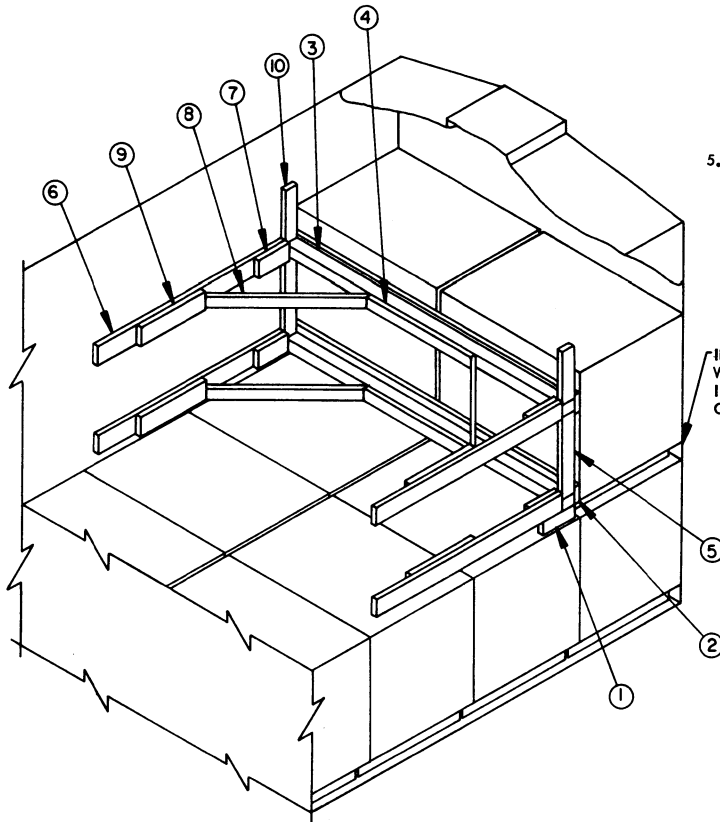


END VIEW

(SPECIAL NOTES CONTINUED)

HOWEVER, THE ADJACENT PIECE MARKED ⑥ 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 ⑥ 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 ⑥ IS DOUBLED.

- 5. 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.



IF THE CAR HAS A BOWED END WALL, A BULKHEAD MUST BE INSTALLED. SEE THE "END-OF-CAR BULKHEAD" DETAIL ON PAGE 44.

ISOMETRIC VIEW

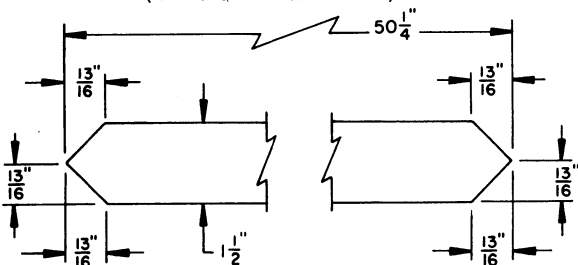
KEY NUMBERS

SPECIAL NOTES:

- 1. A 9'-4" WIDE CONVENTIONAL WOOD-LINED BOX CAR IS SHOWN. WIDER WOOD-LINED CARS CAN BE USED; NARROWER CARS CAN BE USED FOR UNITS POSITIONED LENGTHWISE.
- 2. PARTIAL-LAYER BRACING MAY BE APPLIED FOR ANY OF THE CONVENTIONAL CARLOADS DEPICTED HEREIN. A CROSS WISE LOAD IS SHOWN AS TYPICAL. THE BLOCKING AND BRACING WILL VARY FOR LENGTHWISE LOADS. NOTE THAT FOR A LENGTHWISE PARTIAL TIER, THE LOWER PIECE MARKED ② SHOULD BE LOCATED SO AS TO BEAR AGAINST THE PALLET UNITS IN THE SAME LOCATION AS THE LOWER HORIZONTAL PIECE OF A CENTER GATE, AND "LOAD BEARING GATE C", SHOWN AS PIECE MARKED ④ ON PAGE 31, MUST BE USED. ALSO, PIECE MARKED ① SHOULD BE POSITIONED VERTICALLY AS SHOWN ON PAGE 31.
- 3. 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, BE IT A SECOND TIER OR A FIRST. THE TYPE "A" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER OF NOT MORE THAN 8,000 POUNDS. IF IT IS NECESSARY TO BLOCK A HEAVIER LOAD, REFER TO THE DETAILS ON PAGES 31, 32, AND 33 FOR SELECTION OF THE APPLICABLY SIZED K-BRACE TO USE AND THE DESIGN SPECIFICATIONS FOR THE BRACE.
- 4. 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, ⑤, ⑦, AND ⑩ MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDEWALL. IT IS ALRIGHT FOR THE ENDS OF THE DIAGONAL BRACES MARKED ⑧ TO BEAR IN FRONT OF A DOOR OPENING,

- ① SUPPORT CLEAT, 2" X 4" X 12" (2 REQD). POSITION AS SHOWN, 1" ABOVE THE FIRST LAYER PALLET UNIT. NAIL TO THE CAR SIDEWALL W/4-12d NAILS. SEE GENERAL NOTE "M" ON PAGE 2 AND SPECIAL NOTE 2 AT LEFT. POSITION VERTICALLY FOR LENGTHWISE UNITS.
- ② HORIZONTAL PIECE, 2" X 6" BY CAR WIDTH IN LENGTH (CUT TO FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6". SEE SPECIAL NOTE 2 AT LEFT.
- ③ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH IN LENGTH (CUT TO FIT) (2 REQD).
- ④ CENTER CLEAT, 2" X 4" X 38" (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/7-16d NAILS. SEE SPECIAL NOTE 5 ABOVE.
- ⑤ SPACER CLEAT, 2" X 4" X 31-3/4" FOR CROSSWISE UNITS, 2" X 4" X 25" FOR LENGTHWISE UNITS (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ⑥ HORIZONTAL WALL CLEAT, 2" X 6" X 72" (4 REQD). NAIL TO THE CAR SIDEWALL W/16-12d NAILS.
- ⑦ POCKET CLEAT, 2" X 6" X 12" (2 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/4-16d NAILS.
- ⑧ DIAGONAL BRACE, 2" X 4" X 50-1/4" (4 REQD). SEE THE DETAIL AT LEFT FOR BEVEL CUTS REQUIRED. TOENAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, AND TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/2-16d NAILS AT EACH END.
- ⑨ BACK-UP CLEAT, 2" X 6" X 24" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/8-16d NAILS.
- ⑩ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.

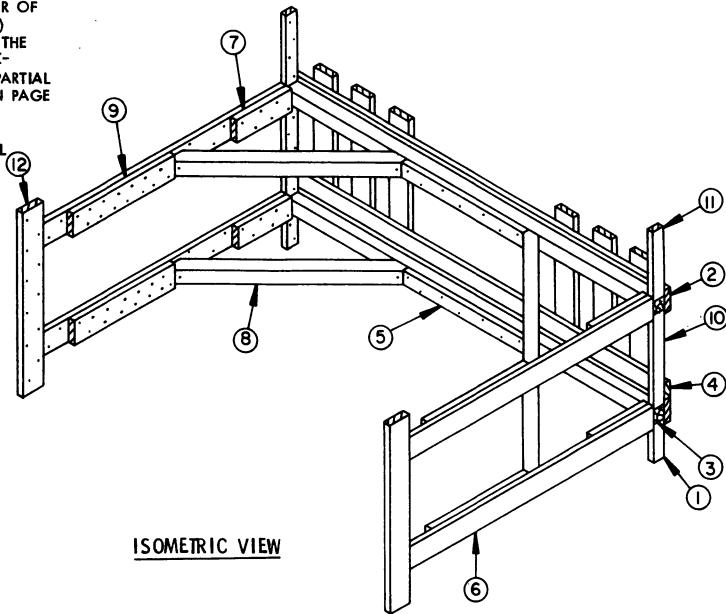
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DIAGONAL BRACE

SPECIAL NOTES:

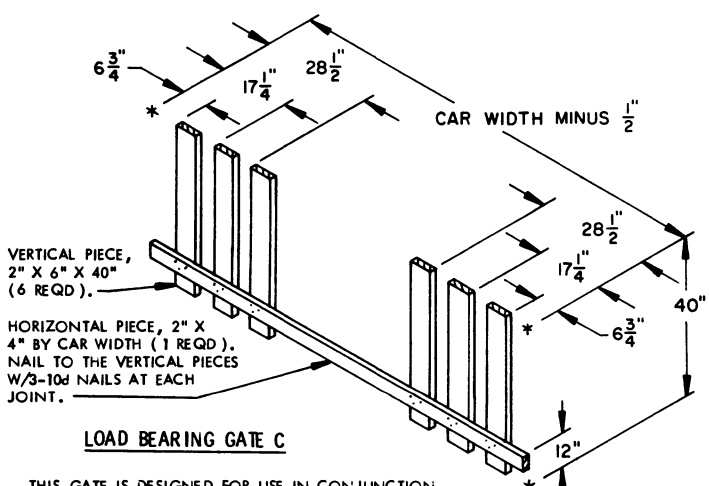
1. THE TYPE "B" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER OF NOT MORE THAN 14,000 POUNDS. THIS WILL BE NOT MORE THAN SIX (6) PALLET UNITS. IF IT IS NECESSARY TO BLOCK A HEAVIER LOAD, REFER TO THE DETAILS ON PAGES 32 AND 33 FOR SELECTION OF THE APPLICABLY SIZED K-BRACE TO USE AND THE DESIGN SPECIFICATIONS FOR THE BRACE. IF THE PARTIAL TIER IS ONLY TWO (2) PALLET UNITS, THE TYPE "A" K-BRACE DEPICTED ON PAGE 30 MAY BE USED.
2. CAUTION: SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL TIER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ①, ②, ③, ⑦, ⑩, ⑪, AND ⑫ MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDEWALL. IT IS ALRIGHT FOR THE ENDS OF THE DIAGONAL BRACES MARKED ⑧ TO BEAR IN FRONT OF A DOOR OPENING, HOWEVER, THE ADJACENT PIECE MARKED ⑥ 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 ⑥ 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 ⑥ 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 30 FOR A TYPICAL INSTALLATION OF A K-BRACE.



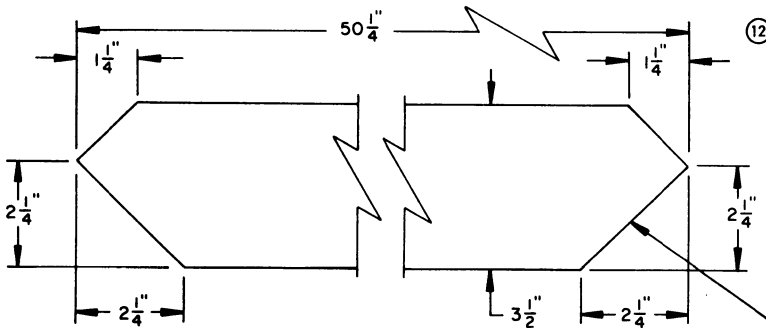
ISOMETRIC VIEW

KEY NUMBERS

- ① SUPPORT CLEAT, 2" X 4" X 10" (2 REQD). POSITION AS SHOWN, 1" ABOVE THE FIRST LAYER PALLET UNIT. NAIL TO THE CAR SIDEWALL W/4-12d NAILS. POSITION HORIZONTALLY FOR CROSSWISE UNITS.
- ② LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6". SEE GENERAL NOTE "M" ON PAGE 2.
- ③ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH (CUT TO FIT) (2 REQD).
- ④ GATE (1 REQD). SEE THE "LOAD BEARING GATE C" DETAIL AT LEFT. POSITION THE HORIZONTAL PIECE OF THE GATE ON TOP OF THE LOWER PIECE MARKED ②. GATE IS ONLY REQUIRED FOR LENGTHWISE UNITS.
- ⑤ 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.
- ⑥ HORIZONTAL WALL CLEAT, 2" X 6" X 72" (4 REQD). NAIL TO THE CAR SIDEWALL W/16-12d NAILS.
- ⑦ POCKET CLEAT, 2" X 6" X 18" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/7-16d NAILS.
- ⑧ 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 ⑥, W/1-60d NAIL AT EACH END.
- ⑨ BACK-UP CLEAT, 2" X 6" X 30" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/14-16d NAILS.
- ⑩ SPACER CLEAT, 2" X 4" X 25" FOR LENGTHWISE UNITS, 2" X 4" X 31-3/4" FOR CROSSWISE UNITS (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ⑪ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ⑫ VERTICAL BACK-UP CLEAT, 2" X 6" X 48" (2 REQD). NAIL TO THE CAR SIDEWALL W/8-12d NAILS.



THIS GATE IS DESIGNED FOR USE IN CONJUNCTION WITH A K-BRACE ASSEMBLY WHEN THE CONTAINERS ARE LOADED LENGTHWISE IN THE CAR.

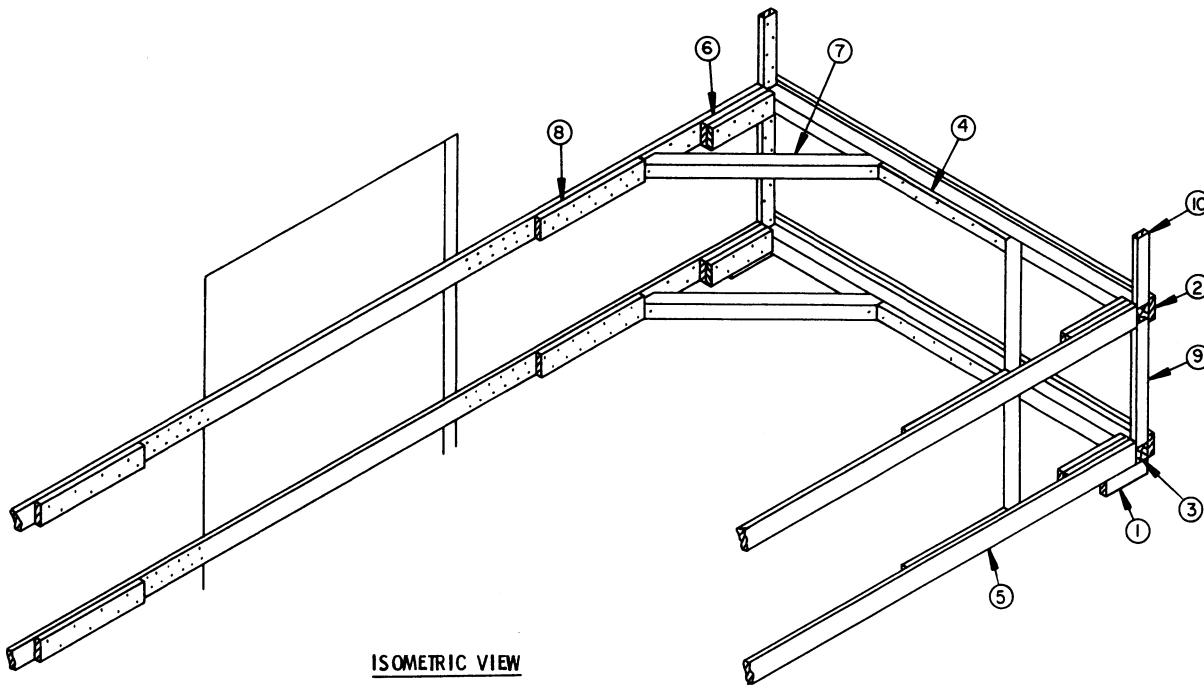


DIAGONAL BRACE

SEE SPECIAL NOTE 2 ABOVE.

THIS BEARING SURFACE MUST BE POSITIONED SO AS TO BE IN CONTACT WITH A CROSS CAR BRACE, PIECE MARKED ③, OR A HORIZONTAL WALL CLEAT, PIECE MARKED ⑥.

TYPE "B" K-BRACE



ISOMETRIC VIEW

SPECIAL NOTES:

1. THE TYPE "C" K BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER OF NOT MORE THAN 20,000 POUNDS. THIS WILL BE NOT MORE THAN EIGHT (8) UNITS. IF IT IS NECESSARY TO BLOCK TEN (10) PALLET UNITS, REFER TO THE DETAIL ON PAGE 33 FOR THE APPLICABLY SIZED K-BRACE TO USE AND THE DESIGN SPECIFICATIONS FOR THE BRACE. IF THE PARTIAL TIER TO BE BRACED IS FOUR (4) OR SIX (6) PALLET UNITS, THE TYPE "B" K-BRACE DEPICTED ON PAGE 31 MAY BE USED. IF THE PARTIAL TIER TO BE BRACED IS ONLY TWO (2) PALLET UNITS, THE TYPE "A" K-BRACE DEPICTED ON PAGE 30 WILL BE ADEQUATE.
2. **CAUTION:** SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL-LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL TIER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ①, ②, ③, ④, ⑤, ⑥, ⑧, ⑨, AND ⑩ MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDEWALL. IT IS ALRIGHT FOR THE ENDS OF THE DIAGONAL BRACES MARKED ⑦ TO BEAR IN FRONT OF A DOOR OPENING, HOWEVER, THE ADJACENT PIECE MARKED ⑤ MUST BE DOUBLED. LAMINATE THE SECOND PIECE TO THE FIRST W/40-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL WALL CLEAT WITHIN THE DOOR OPENING. NOTE THAT THE DIAGONAL BRACE WILL BE 49-1/8" LONG IN LIEU OF 50-1/4" WHEN PIECE MARKED ⑤ IS DOUBLED.

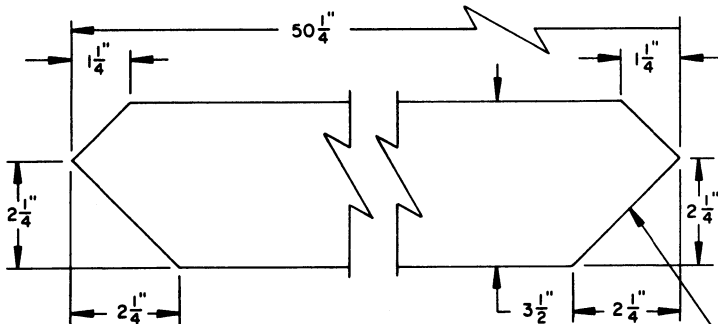
(CONTINUED AT RIGHT)

KEY NUMBERS

- ① SUPPORT CLEAT, 2" X 4" X 12" (2 REQD). POSITION AS SHOWN 1", ABOVE THE FIRST LAYER PALLET UNIT. NAIL TO THE CAR SIDEWALL W/4-12d NAILS. SEE SPECIAL NOTE 2 AT LEFT. POSITION VERTICALLY FOR LENGTHWISE UNITS (10" LONG).
- ② LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6". SEE GENERAL NOTE "M" ON PAGE 2.
- ③ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH (CUT TO FIT) (2 REQD).
- ④ CENTER CLEAT, 2" X 4" X 38" (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/7-16d NAILS. SEE SPECIAL NOTE 3 BELOW.
- ⑤ HORIZONTAL WALL CLEAT, 2" X 6" BY CUT TO FIT (4 REQD). A CLEAT WILL BE OF A LENGTH AS NECESSARY TO EXTEND ACROSS AND FAR ENOUGH PAST THE DOOR OPENINGS TO CONTACT PIECE MARKED ③ OF THE K-BRACE IN THE OPPOSITE END OF THE CAR. NAIL TO THE CAR SIDEWALL W/40-12d NAILS.
- ⑥ POCKET CLEAT, 2" X 6" X 18" (DOUBLED) (4 REQD). NAIL THE FIRST PIECE TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/7-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑦ DIAGONAL BRACE, 4" X 4" X 50-1/4" (4 REQD). SEE THE DETAIL BELOW FOR BEVEL CUTS REQUIRED. TOENAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, AND TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/1-60d NAIL AT EACH END.
- ⑧ BACK-UP CLEAT, 2" X 6" X 30" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/14-16d NAILS.
- ⑨ SPACER CLEAT, 2" X 4" X 31-3/4" FOR CROSSWISE UNITS, 2" X 4" X 25" FOR LENGTHWISE UNITS (2 REQD). NAIL TO THE CAR SIDEWALL W/4-12d NAILS.
- ⑩ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.

(SPECIAL NOTES CONTINUED)

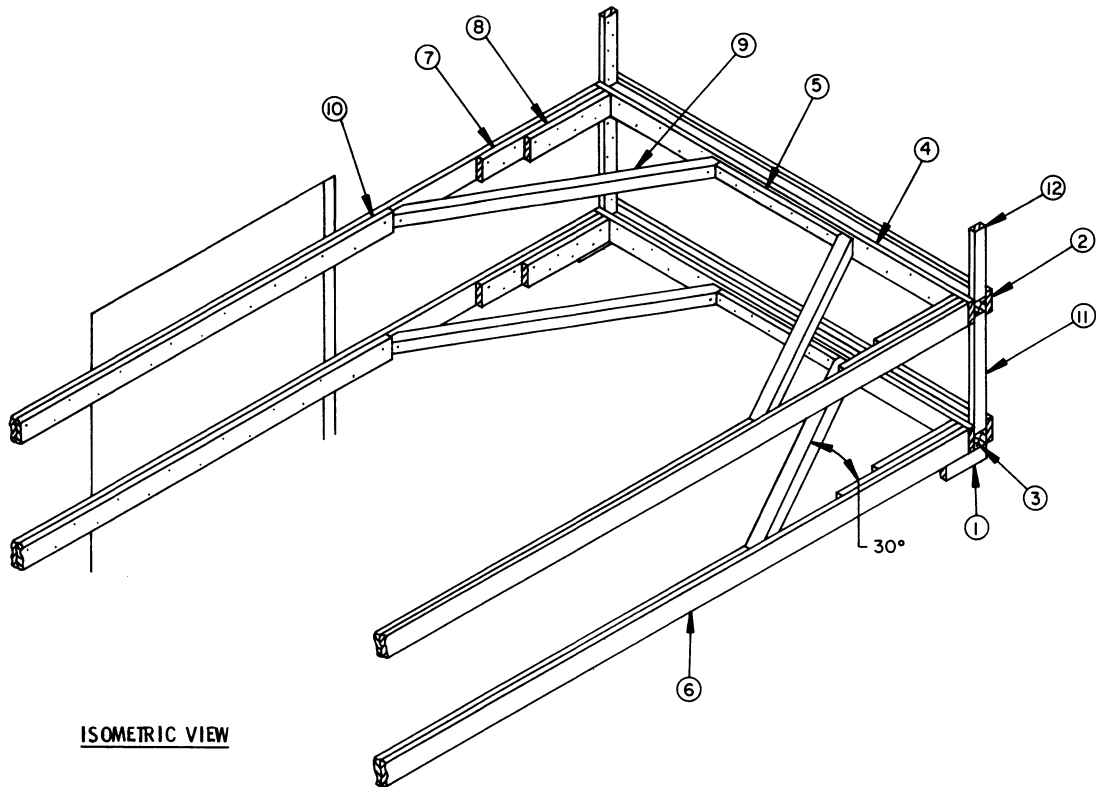
3. THE CENTER CLEAT, SHOWN AS PIECE MARKED ④, WILL BE 28" LONG FOR AN 8'-6" WIDE CAR, 36" LONG FOR A 9'-2", AND 38" LONG FOR A 9'-4" WIDE CAR. ADJUST THE LENGTH PROPORTIONATELY FOR CARS OF OTHER WIDTHS.
4. **CAUTION:** A TYPE "C" K-BRACE MUST BE USED IN BOTH ENDS OF THE CAR; THE BRACE IS NOT DESIGNED FOR USE IN ONLY ONE END. NOTE THAT EXCEPT FOR PIECES MARKED ⑤, THE QUANTITIES SPECIFIED ARE APPLICABLE ONLY FOR THE BRACE IN ONE END.



DIAGONAL BRACE

SEE SPECIAL NOTE 2 ABOVE.

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



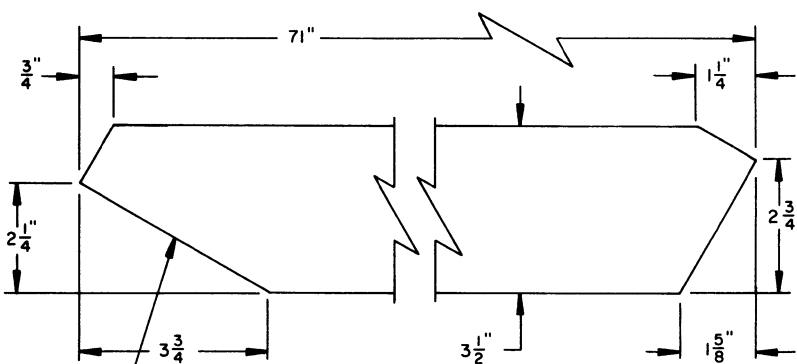
ISOMETRIC VIEW

SPECIAL NOTES:

1. THE TYPE "D" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER OF NOT MORE THAN 25,000 POUNDS. THIS WILL BE NOT MORE THAN TEN (10) UNITS. IF THE PARTIAL TIER TO BE BRACED IS ONLY EIGHT (8) UNITS, THE TYPE "C" K-BRACE DEPICTED ON PAGE 32 MAY BE USED. FOR A PARTIAL TIER OF FOUR (4) OR SIX (6) UNITS, THE TYPE "B" K-BRACE DEPICTED ON PAGE 31 MAY BE USED. IF THE PARTIAL TIER TO BE BRACED IS ONLY TWO (2) PALLET UNITS, THE TYPE "A" K-BRACE DEPICTED ON PAGE 30 WILL BE ADEQUATE.
2. CAUTION: SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL-LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL TIER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ①, ②, ③, ④, ⑦, ⑧, ⑪ AND ⑫ MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDEWALL. IT IS ALRIGHT FOR THE ENDS OF THE DIAGONAL BRACES MARKED ⑨ TO BEAR IN FRONT OF A DOOR OPENING, HOWEVER, THE ADJACENT PIECE MARKED ⑥ MUST BE DOUBLED. LAMINATE THE SECOND PIECE TO THE FIRST W/40-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL WALL CLEAT WITHIN THE DOOR OPENING. NOTE THAT THE DIAGONAL BRACE WILL BE 70-1/4" LONG IN LIEU OF 71" LONG WHEN PIECE MARKED ⑥ IS DOUBLED.
3. THE CENTER CLEAT, SHOWN AS PIECE MARKED ⑤, WILL BE 28" LONG FOR AN 8'-6" WIDE CAR, 36" LONG FOR A 9'-2", AND 38" LONG FOR A 9'-4" WIDE CAR. ADJUST THE LENGTH PROPORTIONATELY FOR CARS OF OTHER WIDTHS.
4. CAUTION: A TYPE "D" K-BRACE MUST BE USED IN BOTH ENDS OF THE CAR; THE BRACE IS NOT DESIGNED FOR USE IN ONLY ONE END. NOTE THAT EXCEPT FOR PIECES MARKED ⑥ AND ⑩, THE QUANTITIES SPECIFIED ARE APPLICABLE ONLY FOR THE BRACE IN ONE END.

KEY NUMBERS

- ① SUPPORT PIECE, 2" X 4" X 12" (2 REQD). POSITION AS SHOWN, 1" ABOVE THE FIRST LAYER PALLET UNIT. NAIL TO THE CAR SIDEWALL W/4-12d NAILS. SEE SPECIAL NOTE 2 AT LEFT. POSITION VERTICALLY FOR LENGTHWISE UNITS (10" LONG PIECE REQD).
- ② LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6". SEE GENERAL NOTE "M" ON PAGE 2.
- ③ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH (CUT TO FIT) (2 REQD).
- ④ HORIZONTAL PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT) (2 REQD) NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6"
- ⑤ CENTER CLEAT, 2" X 4" X 38" (2 REQD). NAIL TO THE HORIZONTAL PIECE, PIECE MARKED ④, W/7-16d NAILS. SEE SPECIAL NOTE 3 AT LEFT.
- ⑥ HORIZONTAL WALL CLEAT, 2" X 6" BY CUT TO FIT (4 REQD). A CLEAT WILL BE OF A LENGTH AS NECESSARY TO EXTEND ACROSS AND FAR ENOUGH PAST THE DOOR OPENING TO CONTACT PIECE MARKED ④ OF THE K-BRACE IN THE OPPOSITE END OF THE CAR. NAIL TO THE CAR SIDEWALL W/40-12d NAILS.
- ⑦ POCKET CLEAT, 2" X 6" X 36" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/10-16d NAILS.
- ⑧ POCKET CLEAT, 2" X 6" X 24" (4 REQD). NAIL TO THE POCKET CLEAT, PIECE MARKED ⑦, W/7-16d NAILS.
- ⑨ DIAGONAL BRACE, 4" X 4" X 71" (4 REQD). SEE THE DETAIL BELOW FOR BEVEL CUTS REQUIRED. TOENAIL TO THE HORIZONTAL PIECE, PIECE MARKED ④, AND TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/1-60d NAIL AT EACH END.
- ⑩ BACK-UP CLEAT, 2" X 6" BY CUT TO FIT (4 REQD). A CLEAT WILL BE OF A LENGTH AS NECESSARY TO EXTEND TO CONTACT THE DIAGONAL BRACE, PIECE MARKED ⑨, IN THE OPPOSITE END OF THE CAR. NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/18-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL WALL CLEAT WITHIN THE DOOR OPENING, IF APPLICABLE.
- ⑪ SPACER CLEAT, 2" X 4" X 31-3/4" FOR CROSSWISE UNITS, 2" X 4" X 25" FOR LENGTHWISE UNITS (2 REQD). NAIL TO THE CAR SIDEWALL W/4-12d NAILS.
- ⑫ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.

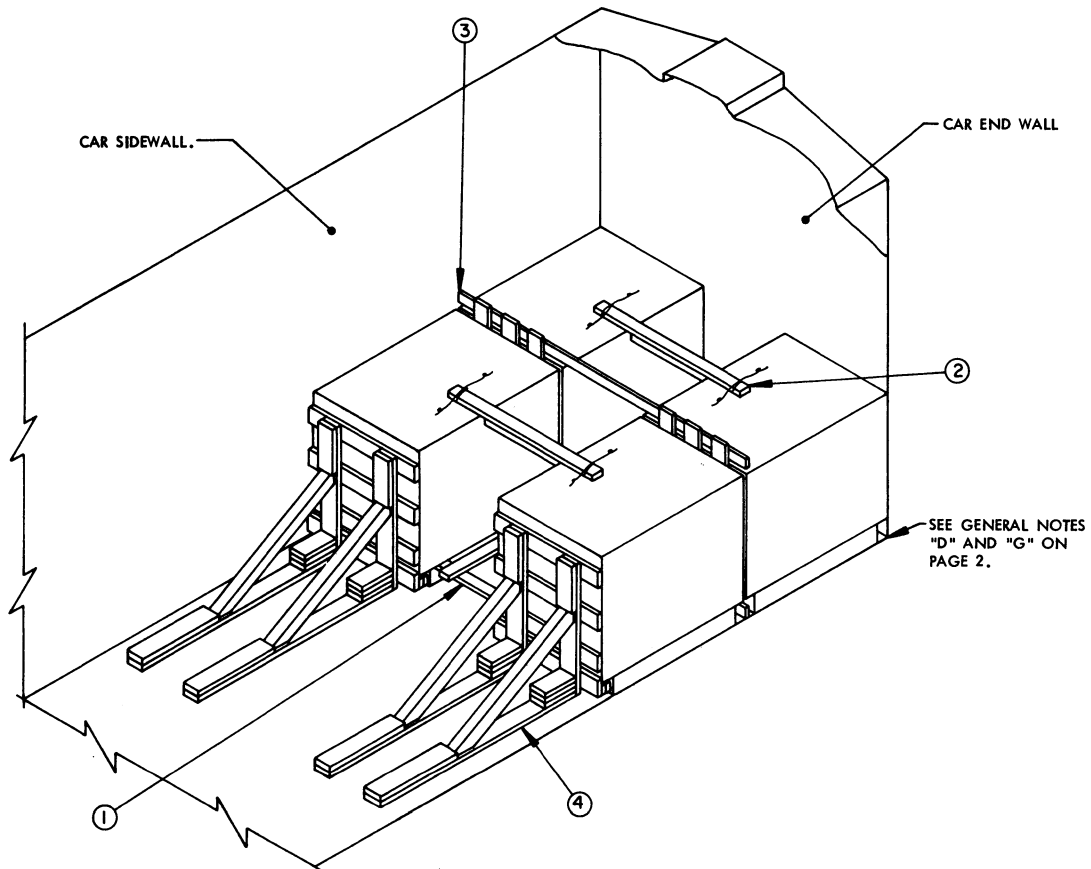


DIAGONAL BRACE

SEE SPECIAL NOTE 2 ABOVE.

THIS BEARING SURFACE MUST BE POSITIONED SO AS TO BE IN CONTACT WITH A HORIZONTAL WALL CLEAT, PIECE MARKED ⑥.

TYPE "D" K-BRACE



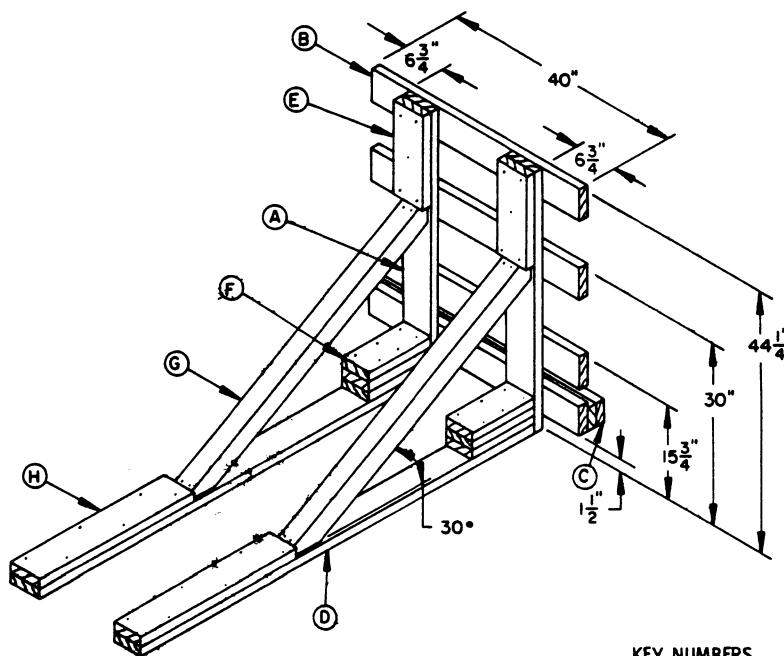
SPECIAL NOTES:

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

ISOMETRIC VIEW

KEY NUMBERS

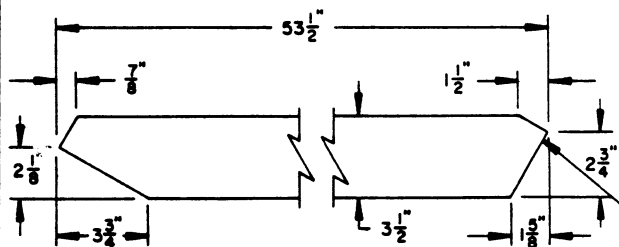
- ① ANTI-SWAY BRACE (2 REQD). SEE THE DETAIL ON PAGE 12. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLET UNITS. SEE GENERAL NOTES "M" AND "N" ON PAGE 2.
- ② TOP-OF-LOAD ANTI-SWAY BRACE (2 REQD). SEE THE DETAIL ON PAGE 12. WIRE TIE TO THE CROSS PIECES OF THE TOP DUNNAGE ASSEMBLY WITH NO. 14 GAGE WIRE AS SHOWN BY THE TIE WIRE APPLICATION DETAIL ON PAGE 44.
- ③ SEPARATOR GATE (2 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 13. POSITION WITH THE HORIZONTAL PIECES AGAINST THE ALREADY LOADED UNITS.
- ④ KNEE BRACE ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 35 FOR CONSTRUCTION SPECIFICATIONS AND NAILING REQUIREMENTS.



KNEE BRACE ASSEMBLY

KEY NUMBERS

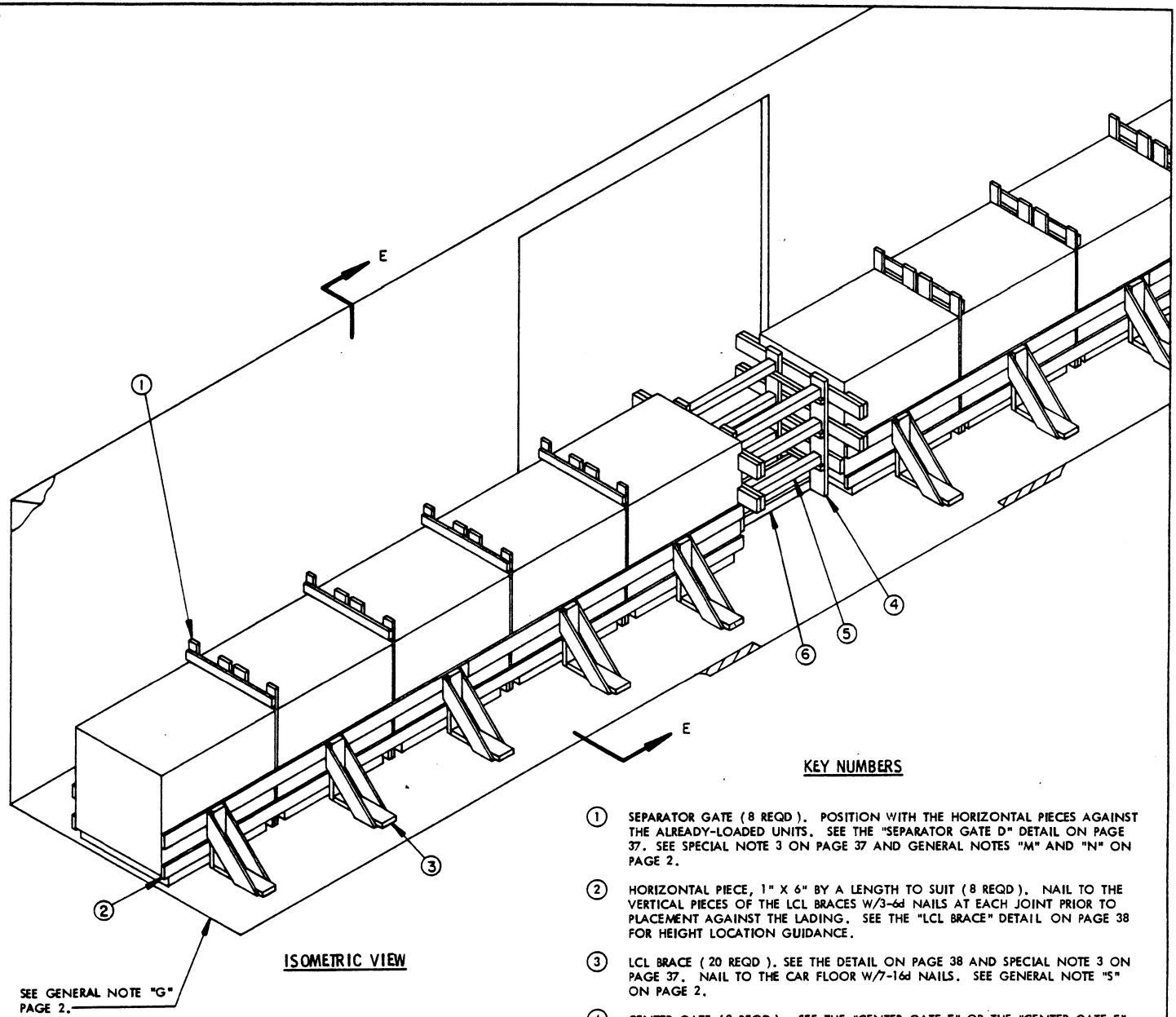
- (A) VERTICAL PIECE, 2" X 6" X 44-1/4" (2 REQD).
- (B) HORIZONTAL PIECE, 2" X 6" X 40" (4 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT. SEE GENERAL NOTE "M" ON PAGE 2.
- (C) HOLD DOWN CLEAT, 2" X 4" X 40" (DOUBLED) (1 REQD). NAIL THE FIRST PIECE TO THE HORIZONTAL PIECE W/5-10d NAILS. LAMINATE THE SECOND PIECE TO THE FIRST W/5-10d NAILS.
- (D) FLOOR CLEAT, 2" X 6" X 6'-5" (2 REQD). ALIGN WITH A VERTICAL PIECE AND NAIL TO THE CAR FLOOR W/1-16d NAIL EVERY 8" . SEE GENERAL NOTE "S" ON PAGE 2.
- (E) HOLD DOWN CLEAT, 2" X 6" X 16" (2 REQD). NAIL TO A VERTICAL PIECE W/5-10d NAILS.
- (F) POCKET CLEAT, 2" X 6" X 12" (TRIPLED) (2 REQD). NAIL THE FIRST PIECE TO THE FLOOR CLEAT, PIECE MARKED (D), W/4-16d NAILS. NAIL THE SECOND AND THIRD PIECES IN A LIKE MANNER AND TOENAIL THE THIRD PIECE TO THE VERTICAL PIECE, PIECE MARKED (A), W/2-16d NAILS.
- (G) BRACE, 4" X 4" X 53-1/2" (2 REQD). SEE THE DETAIL AT LEFT FOR BEVEL CUTS REQUIRED. TOENAIL TO THE VERTICAL PIECE AND TO THE FLOOR CLEAT, PIECES MARKED (A) AND (D), W/2-16d NAILS AT EACH END.
- (H) BACK UP CLEAT, 2" X 6" X 30" (2 REQD). NAIL TO THE FLOOR CLEAT, PIECE MARKED (D), W/6-40d NAILS.



THE BRACE MUST BE INSTALLED SO THAT THIS BEARING SURFACE WILL BE IN CONTACT WITH THE VERTICAL PIECE MARKED (A) .

BRACE

4" X 4" MATERIAL

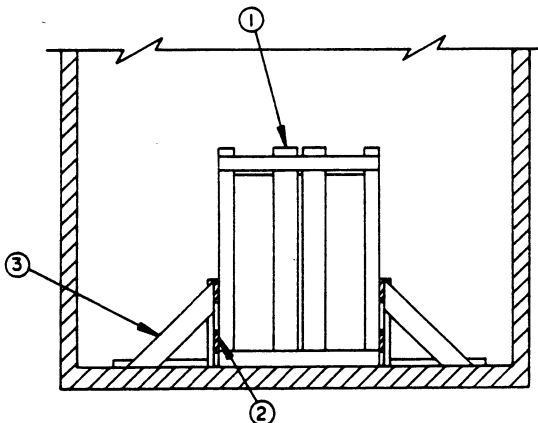


ISOMETRIC VIEW

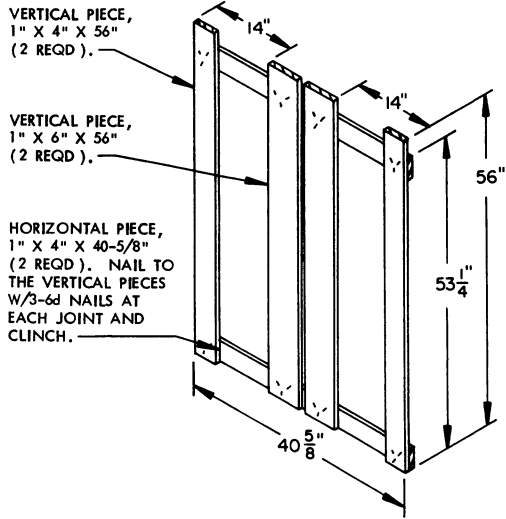
SEE GENERAL NOTE "G"
PAGE 2.

KEY NUMBERS

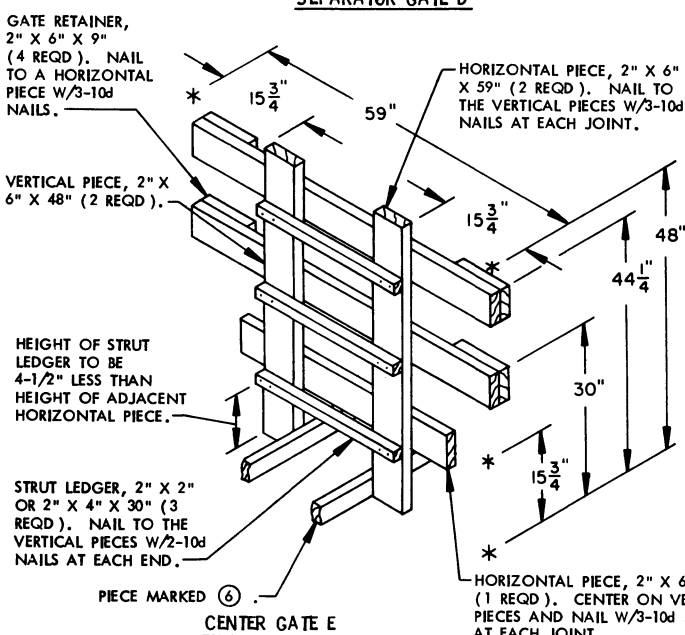
- ① SEPARATOR GATE (8 REQD). POSITION WITH THE HORIZONTAL PIECES AGAINST THE ALREADY-LOADED UNITS. SEE THE "SEPARATOR GATE D" DETAIL ON PAGE 37. SEE SPECIAL NOTE 3 ON PAGE 37 AND GENERAL NOTES "M" AND "N" ON PAGE 2.
- ② HORIZONTAL PIECE, 1" X 6" BY A LENGTH TO SUIT (8 REQD). NAIL TO THE VERTICAL PIECES OF THE LCL BRACES W/3-6d NAILS AT EACH JOINT PRIOR TO PLACEMENT AGAINST THE LADING. SEE THE "LCL BRACE" DETAIL ON PAGE 38 FOR HEIGHT LOCATION GUIDANCE.
- ③ LCL BRACE (20 REQD). SEE THE DETAIL ON PAGE 38 AND SPECIAL NOTE 3 ON PAGE 37. NAIL TO THE CAR FLOOR W/7-16d NAILS. SEE GENERAL NOTE "5" ON PAGE 2.
- ④ CENTER GATE (2 REQD). SEE THE "CENTER GATE E" OR THE "CENTER GATE F" DETAIL ON PAGE 37 FOR LENGTHWISE OR CROSSWISE UNITS, RESPECTIVELY.
- ⑤ STRUT, 4" X 4" BY CUT TO FIT 6 REQD FOR LENGTHWISE, 9 REQD FOR CROSSWISE). TOENAIL TO PIECES MARKED ④ W/2-16d NAILS AT EACH END. SEE GENERAL NOTE "U" ON PAGE 2 AND GENERAL NOTE "V" ON PAGE 3.
- ⑥ GATE HOLD DOWN, 2" X 3" BY LENGTH OF CENTER VOID PLUS 24" (2 REQD). NAIL TO THE VERTICAL PIECES OF THE CENTER GATES W/2-10d NAILS AT EACH JOINT. SEE THE "CENTER GATE E" DETAIL ON PAGE 37 FOR LOCATION GUIDANCE. NOTE THAT FOR THE CROSSWISE UNITS, THE GATE HOLD DOWN PIECES WILL BE POSITIONED ON THE OUTWARD SIDE OF THE MIDDLE CENTER GATE VERTICAL PIECES. SEE SPECIAL NOTE 6 ON PAGE 37.



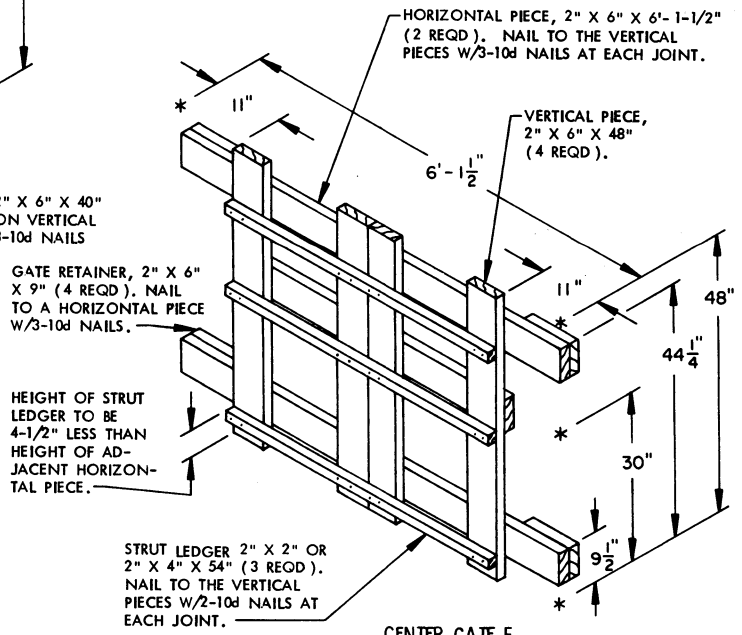
SECTION E-E



SEPARATOR GATE D



THIS GATE IS FOR USE WITH LENGTHWISE CONTAINERS.



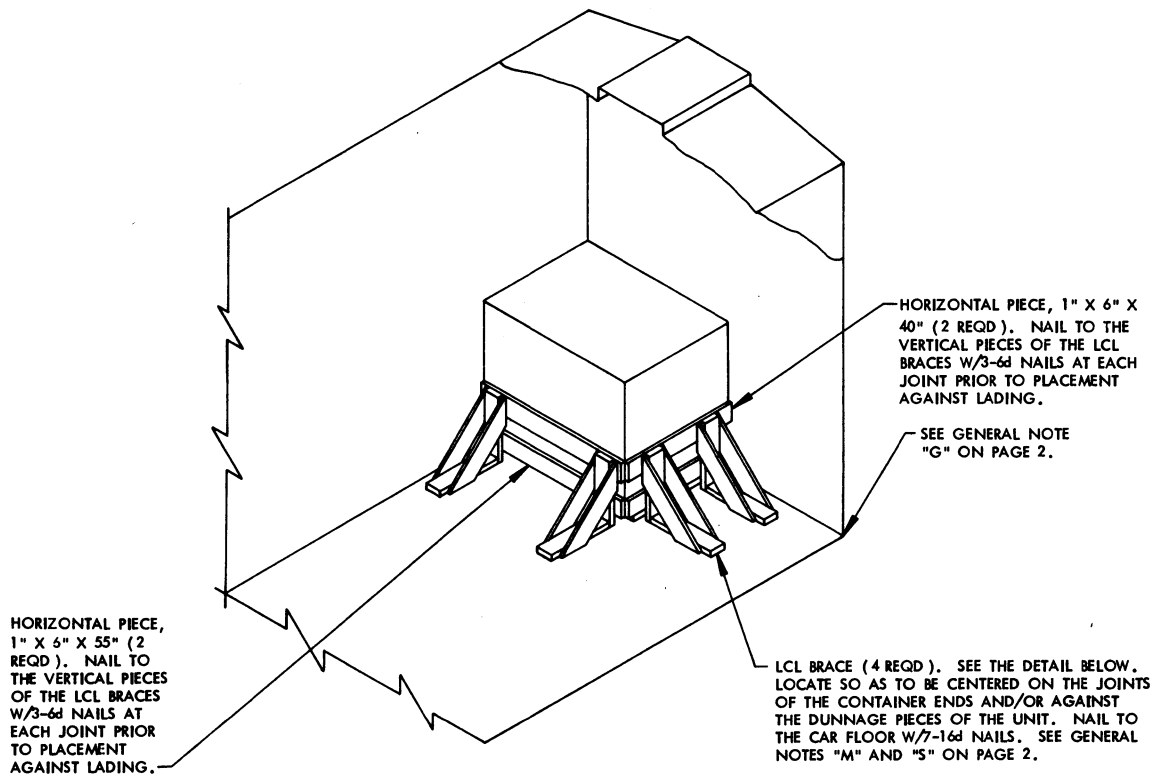
THIS GATE IS FOR USE WITH CROSSWISE CONTAINERS.

BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	129	43
1" X 6"	375	188
2" X 2"	15	5
2" X 3"	12	6
2" X 6"	126	126
4" X 4"	22	30
NAILS	NO. REQD	POUNDS
6d (2")	312	2
8d (2-1/2")	240	2-3/4
10d (3")	92	1-1/2
16d (3-1/2")	204	4-1/2

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED, AND SHORTER BUT NOT LONGER CARS WILL BE USED. NOTE THAT A CAR AT LEAST 9'-4" WIDE IS REQUIRED FOR A CROSSWISE LOAD.
2. A 1-WIDE LENGTHWISE LOAD IS SHOWN AS TYPICAL. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR 1-WIDE CROSSWISE LOADS. NOTE THAT THE SEPARATOR GATES, PIECES MARKED ①, ARE NOT REQUIRED, AND THE QUANTITY OF LCL BRACES, PIECES MARKED ③, IS NOT CORRECT FOR CROSSWISE LOADS.
3. ONE (1) LCL BRACE WILL BE USED AT EACH SIDE OF EACH PALLET UNIT. FOR CROSSWISE PALLET UNITS, THE BRACES WILL BE CENTERED ON THE LENGTH OF THE UNIT. FOR LENGTHWISE UNITS, THE BRACES WILL BE LOCATED NEAR THE CENTER OF THE UNIT WIDTH.
4. THE BILL OF MATERIAL AND LOAD AS SHOWN ARE BASED ON THE DEPICTED LENGTHWISE UNIT AND THEREFORE ARE ONLY TYPICAL.
5. IF DESIRED, GATE HOLD DOWN PIECES WITH THE ASSOCIATED FILL PIECES AS SHOWN ON CENTER GATES "C" AND "D" ON PAGE 15, MAY BE USED IN LIEU OF PIECE MARKED ⑥.

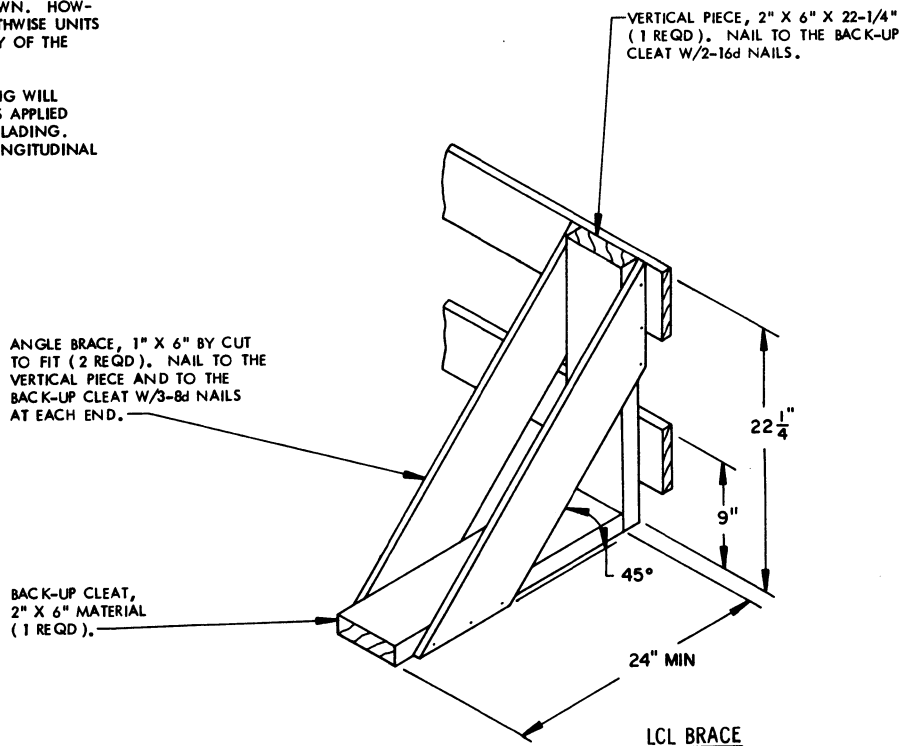
ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	10	21,860 LBS
DUNNAGE		807 LBS
TOTAL WEIGHT		22,667 LBS

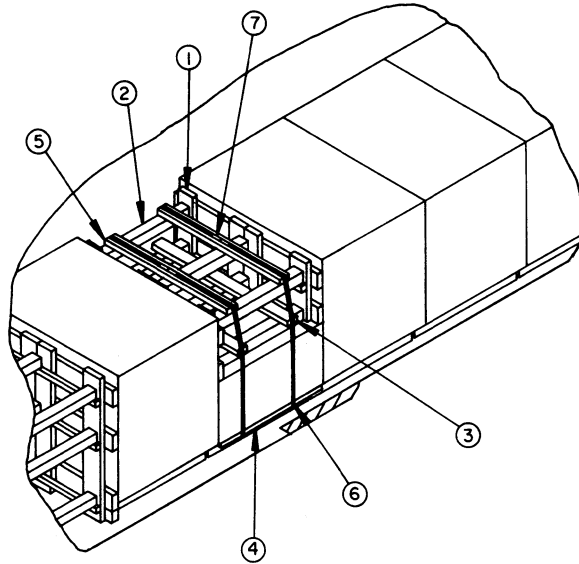


ISOMETRIC VIEW

SPECIAL NOTES:

1. AN 8'-6" WIDE WOOD-LINED CONVENTIONAL TYPE BOX CAR HAVING A WOOD OR NAILABLE METAL FLOOR IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED. SEE GENERAL NOTES "S" AND "D" ON PAGE 2.
2. THE LOAD SHOWN DEPICTING THE LCL BRACE METHOD OF PARTIAL-LAYER BRACING IS TYPICAL. A CROSSWISE UNIT IS SHOWN. HOWEVER, THE PROCEDURES ARE ALSO APPLICABLE FOR LENGTHWISE UNITS AND FOR OTHER QUANTITIES AS LONG AS THE CAPACITY OF THE BRACES IS NOT EXCEEDED. SEE SPECIAL NOTE 3.
3. EACH LCL BRACE AS APPLIED FOR LONGITUDINAL BRACING WILL RETAIN 2,000 POUNDS OF LADING. EACH LCL BRACE AS APPLIED FOR LATERAL BRACING WILL SUPPORT 8,000 POUNDS OF LADING. A MINIMUM OF TWO (2) BRACES MUST BE USED FOR LONGITUDINAL BRACING.





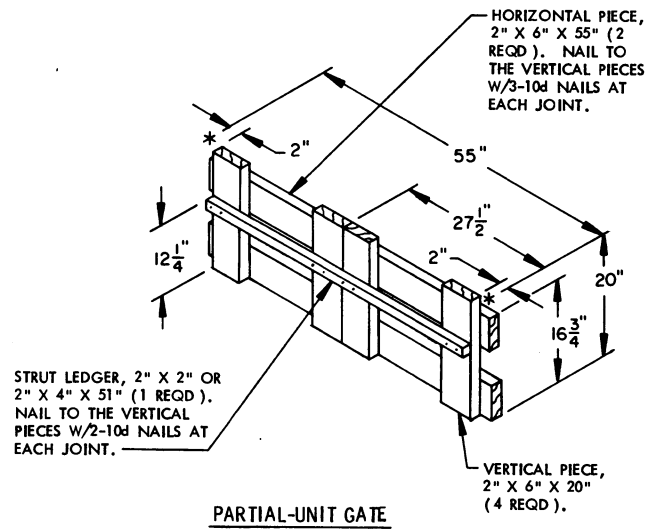
POSITIONING OF PARTIAL CROSSWISE UNIT IN A LAYER

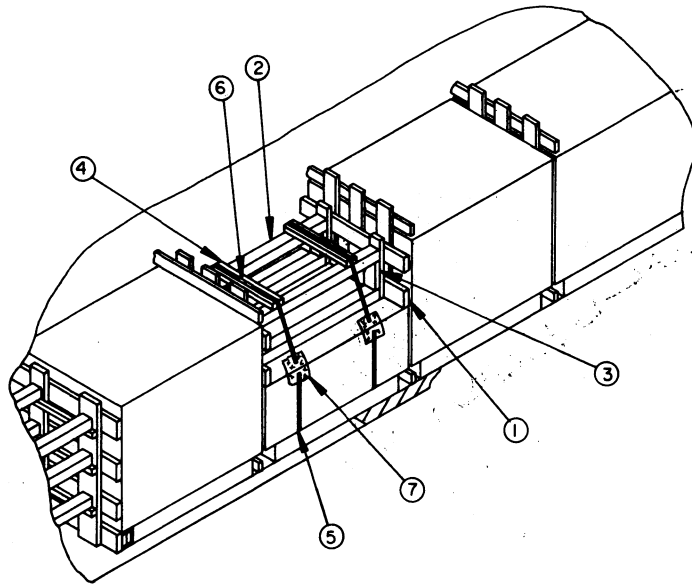
SPECIAL NOTES:

1. SHIPMENTS OF PROPELLING CHARGES SHOULD CONSIST OF FULL-HEIGHT AND FULL-LAYER UNITS TO THE MAXIMUM EXTENT POSSIBLE. HOWEVER THE END OF A LOT, OR THE QUANTITY OF ITEMS NEEDED TO FILL A REQUISITION, MAY NECESSITATE THE SHIPMENT OF ONE OR MORE LESS-THAN-FULL PALLET UNITS WITHIN A LOAD. THE PROCEDURES ON THIS PAGE ARE PRESENTED AS GUIDANCE IN THE SHIPMENT OF A PARTIAL UNIT WITHIN A CROSSWISE LOAD.
2. A LESS-THAN-FULL HEIGHT PALLET UNIT OF CROSSWISE-POSITIONED PROPELLING CHARGES WHICH IS TO BE SHIPPED WITHIN A LAYER OF A LOAD HAS NO LIMITATIONS AS TO THE NUMBER OF LAYERS ON THE PARTIAL UNIT. THE DEPICTED PROCEDURES SHOW THE BRACING OF A 3-LAYER UNIT WITHIN A 6-LAYER LOAD. THE PRINCIPLES CAN BE ADAPTED TO SUIT OTHER SIZE PARTIAL UNITS.
3. A PARTIAL UNIT MUST CONSIST OF FULL LAYERS OF FIVE (5) CONTAINERS. OR AN APPROVED FILLER ASSEMBLY, AS DETAILED BY DRAWING 19-48-4042A/23-20PM1001 MUST BE INSTALLED IN THE PLACE OF OMITTED CONTAINERS.
4. THE FILLERS AS REFERENCED IN SPECIAL NOTE 3 AND THE DUNNAGE DEPICTED ABOVE FOR THE SHIPMENT OF THE PARTIAL UNIT MAY BE REMOVED WHEN A SHIPMENT REACHES DESTINATION. OR IF DESIRED, THE FILLERS MAY REMAIN WITH THE UNIT DURING STORAGE (IF APPLICABLE) FOR POSSIBLE USE IN A FUTURE SHIPMENT.
5. THE "POSITIONING OF PARTIAL CROSSWISE UNIT IN A LAYER" VIEW ABOVE DEPICTS A PORTION OF A CONVENTIONAL BOX CAR LOAD HOWEVER, THE PROCEDURES ARE ALSO APPLICABLE FOR LOADS IN CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.
6. FOR THE SHIPMENT OF A PARTIAL UNIT CONSISTING OF ONE OR TWO LAYERS, THE PROCEDURES SHOWN ON PAGE 42 MAY BE MORE ECONOMICAL.
7. THE PARTIAL UNIT PROCEDURES SHOULD BE APPLIED NEAR THE CENTER OF THE CAR LENGTH, BUT NOT IN THE DOORWAY AREA. ALSO, THERE SHOULD BE AT LEAST ONE (1) LOAD UNIT BETWEEN THE PARTIAL UNIT AND A CENTER GATE.

KEY NUMBERS

- ① PARTIAL-UNIT GATE (2 REQD). SEE THE "PARTIAL-UNIT GATE A" DETAIL BELOW. SEE GENERAL NOTES "M" AND "N" ON PAGE 2 AND SPECIAL NOTE 2 AT LEFT.
- ② STRUT, 4" X 4" X 34-5/8" (6 REQD). TOENAIL TO THE PARTIAL-UNIT GATE, PIECE MARKED ①, W/2-16d NAILS AT EACH END.
- ③ RETAINER PIECE, 2" X 4" X 55" (2 REQD). NAIL TO THE LOWER STRUTS, PIECE MARKED ②, W/2-10d NAILS AT EACH JOINT.
- ④ BATTEN, 2" X 4" X 40" (2 REQD). POSITION UNDER CONTAINER ENDS TO PROTECT FROM STRAPPING. SEE THE "BATTEN PLACEMENT DETAIL" ON PAGE 50.
- ⑤ STRAPPING BOARD, 2" X 4" X 49" (2 REQD). NAIL TO THE UPPER STRUTS, PIECE MARKED ②, W/2-10d NAILS AT EACH JOINT.
- ⑥ UNITIZING STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT (2 REQD). PRE-POSITION.
- ⑦ SEAL FOR 1-1/4" STRAPPING (4 REQD; 2 PER JOINT). SEE GENERAL NOTE "O" ON PAGE 2.





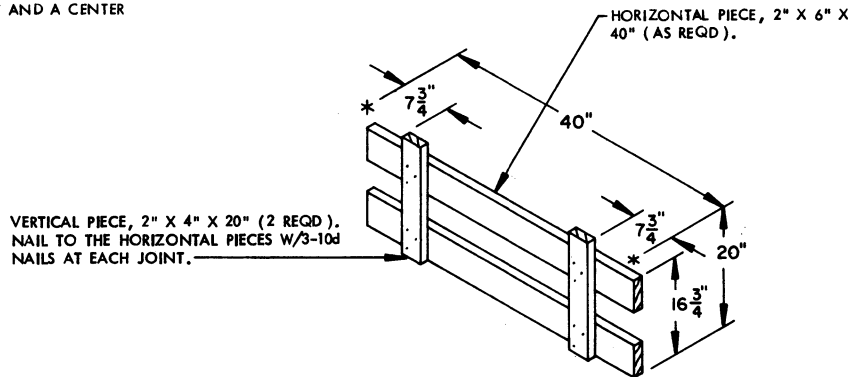
POSITIONING OF PARTIAL LENGTHWISE UNIT WITHIN A LAYER

KEY NUMBERS

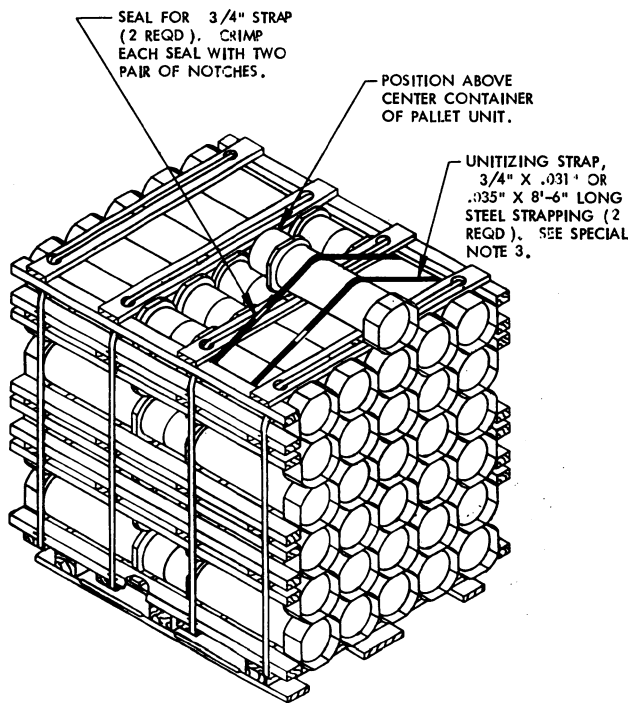
SPECIAL NOTES:

1. SHIPMENTS OF PROPELLING CHARGES SHOULD CONSIST OF FULL-HEIGHT AND FULL-LAYER UNITS TO THE MAXIMUM EXTENT POSSIBLE. HOWEVER, THE END OF A LOT, OR THE QUANTITY OF ITEMS NEEDED TO FILL A REQUISITION, MAY NECESSITATE THE SHIPMENT OF ONE OR MORE LESS-THAN-FULL PALLET UNITS WITHIN A LOAD. THE PROCEDURES ON THIS PAGE ARE PRESENTED AS GUIDANCE IN THE SHIPMENT OF A PARTIAL UNIT WITHIN A LENGTHWISE LOAD.
2. A LESS-THAN-FULL HEIGHT PALLET UNIT OF LENGTHWISE-POSITIONED PROPELLING CHARGES WHICH IS TO BE SHIPPED WITHIN A LAYER OF A LOAD HAS NO LIMITATIONS AS TO THE NUMBER OF LAYERS OF CONTAINERS ON THE PARTIAL UNIT. THE DEPICTED PROCEDURES SHOW THE BRACING OF A 3 LAYER UNIT WITHIN A 6-LAYER LOAD. THE PRINCIPLES CAN BE ADAPTED TO SUIT OTHER SIZE PARTIAL UNITS.
3. A PARTIAL UNIT MUST CONSIST OF FULL LAYERS OF FIVE (5) CONTAINERS, OR AN APPROVED FILLER ASSEMBLY, AS DETAILED BY DRAWING 19-48-4042A/23-20PM1001, MUST BE INSTALLED IN THE PLACE OF OMITTED CONTAINERS.
4. THE FILLERS AS REFERENCED IN SPECIAL NOTE 3 AND THE DUNNAGE DEPICTED ABOVE FOR THE SHIPMENT OF THE PARTIAL UNIT MAY BE REMOVED WHEN A SHIPMENT REACHES DESTINATION. OR IF DESIRED, THE FILLERS MAY REMAIN WITH THE UNIT DURING STORAGE (IF APPLICABLE) FOR POSSIBLE USE IN A FUTURE SHIPMENT.
5. THE "POSITIONING OF PARTIAL LENGTHWISE UNIT WITHIN A LAYER" VIEW ABOVE DEPICTS A PORTION OF A CONVENTIONAL BOX CAR LOAD, HOWEVER, THE PROCEDURES ARE ALSO APPLICABLE FOR LOADS IN CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.
6. THE PARTIAL UNIT PROCEDURES SHOULD BE APPLIED NEAR THE CENTER OF THE CAR LENGTH, BUT NOT IN THE DOORWAY AREA. ALSO, THERE SHOULD BE AT LEAST ONE (1) LOAD UNIT BETWEEN THE PARTIAL UNIT AND A CENTER GATE.

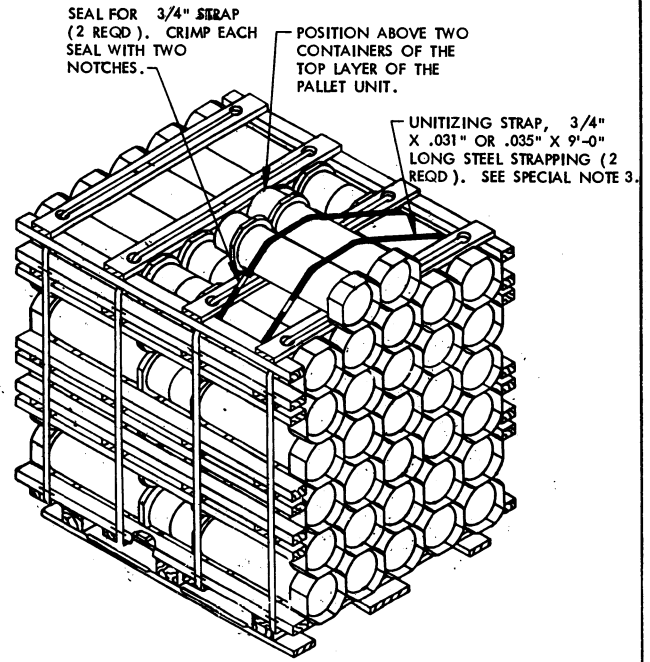
- ① PARTIAL UNIT GATE (2 REQD). SEE THE "PARTIAL UNIT GATE B" DETAIL BELOW. SEE GENERAL NOTES "M" AND "N" ON PAGE 2 AND SPECIAL NOTE 2 AT LEFT.
- ② STRUT, 4" X 4" X 49" (4 REQD). TOENAIL TO THE VERTICAL PIECES OF THE PARTIAL UNIT GATE, PIECE MARKED ①, W/2-16d NAILS AT EACH END.
- ③ STRUT SUPPORT PIECE, 2" X 4" X 8-3/4" (4 REQD). NAIL TO A VERTICAL PIECE OF THE PARTIAL UNIT GATE W/3-10d NAILS.
- ④ STRAPPING BOARD, 2" X 4" X 24-1/2" (2 REQD). NAIL TO THE STRUTS PIECES MARKED ②, W/3-10d NAILS AT EACH END.
- ⑤ UNITIZING STRAP, 1-1/4" X .031" X .035" BY A LENGTH TO SUIT STEEL STRAPPING (2 REQD). PRE-POSITION THRU THE FORKLIFT OPENINGS OF THE PALLET. THREAD STRAPPING BEHIND THE STOP PIECES ON THE TOP DUNNAGE ASSEMBLY OF THE PALLET UNIT.
- ⑥ SEAL FOR 1-1/4" STEEL STRAPPING (4 REQD, 2 PER JOINT). SEE GENERAL NOTE "O" ON PAGE 2.
- ⑦ ANTI-CHAFING NEUTRAL BARRIER MATERIAL. POSITION BETWEEN CONTAINERS AND STRAPPING AT POINTS OF CONTACT.



PARTIAL-UNIT GATE B



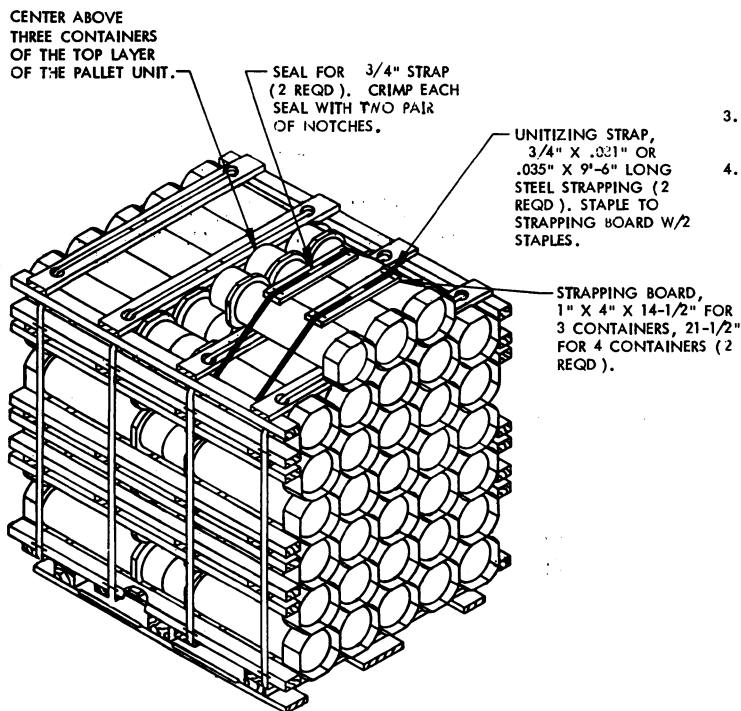
SECUREMENT OF ONE CONTAINER



SECUREMENT OF TWO CONTAINERS

SPECIAL NOTES:

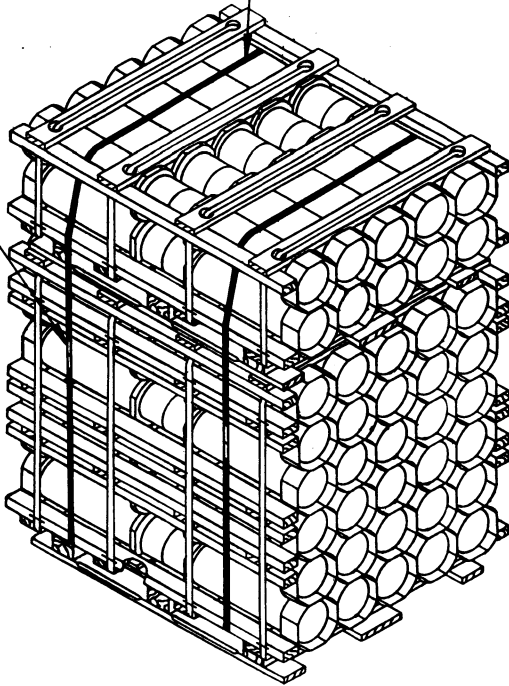
1. SHIPMENTS OF PROPELLING CHARGES SHOULD CONSIST OF FULL-HEIGHT AND FULL-LAYER UNITS TO THE MAXIMUM EXTENT POSSIBLE. HOWEVER, THE END OF A LOT, OR THE QUANTITY OF ITEMS NEEDED TO FILL A REQUISITION, MAY NECESSITATE THE SHIPMENT OF ONE OR MORE LEFTOVER CONTAINERS. LEFTOVER CONTAINERS ARE DESCRIBED AS A QUANTITY OF CONTAINERS WHICH IS INSUFFICIENT TO FORM A FULL-LAYERED PARTIAL UNIT FOR SHIPMENT EITHER ON TOP OF A LOAD AS SHOWN ON PAGE 42 OR WITHIN A LAYER AS SHOWN ON PAGES 39 AND 40.
2. SHIPMENT OF LEFTOVER CONTAINERS IS APPLICABLE FOR CONUS AND OCONUS RAILROAD SHIPMENTS FROM DEPOT TO DEPOT OR FROM DEPOT TO POSTS, CAMPS, AND STATIONS, OR, UPON APPROVAL FROM HIGHER HEADQUARTERS, FOR SHIPMENTS FROM LOAD, ASSEMBLY, AND PACK PLANTS TO DEPOTS. **CAUTION:** A LOAD CONTAINING LEFTOVER CONTAINERS IN AN AMOUNT WHICH IS LESS THAN A FULL LAYER, AND SECURED TO THE TOP OF A FULL OR PARTIAL UNIT, MUST NOT BE DESTINED FOR SHIPMENT OVERSEAS BY WATER CARRIER.
3. THE UNITIZING STRAP SHOULD NOT GO OVER THE TOP DUNNAGE ASSEMBLY; THREAD THE STRAP BEHIND THE STOP PIECES OF THE TOP DUNNAGE ASSEMBLY.
4. OBVIOUSLY, A PALLET UNIT WITH ONE OR MORE CONTAINERS STRAPPED TO THE TOP MUST BE POSITIONED IN THE TOP LAYER OF A LOAD. THE PREFERRED LOCATION WOULD BE NEAR THE CENTER AREA OF A CAR IF A FULL LOAD IS BEING SHIPPED.



SECUREMENT OF THREE CONTAINERS

VERTICAL UNITIZING STRAP,
1-1/4" X .031" OR .035" BY
A LENGTH TO SUIT (2 REQD).
THREAD THE STRAP BEHIND THE
STOP PIECES OF THE TOP DUN-
NAGE ASSEMBLY.

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



SECUREMENT OF A PARTIAL UNIT ON TOP

THIS PROCEDURE IS APPLICABLE ONLY FOR USE IN A CROSSWISE LOAD.
CAUTION: THE PARTIAL UNIT ON TOP IS LIMITED TO NOT MORE THAN
TWO (2) LAYERS OF CONTAINERS. FOR SHIPMENT OF MORE THAN
TWO LAYERS OF CONTAINERS, OR AN ALTERNATIVE METHOD FOR ONE
OR TWO LAYERS, REFER TO THE PROCEDURES ON PAGE 39.



ONE SEAL WITH
TWO PAIR OF
NOTCHES.

STRAP JOINT A

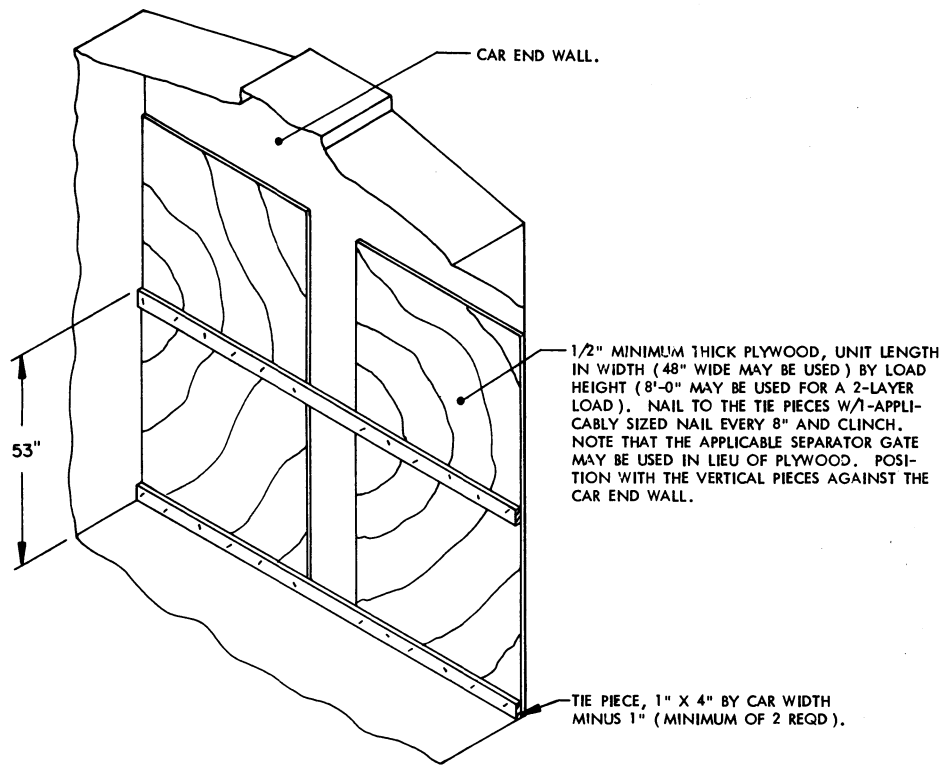
METHOD OF SECURING A
STRAP JOINT WHEN USING
A NOTCH-TYPE SEALER.



TWO SEALS, BUTTED
TOGETHER, WITH
TWO PAIR OF CRIMPS
EACH SEAL.

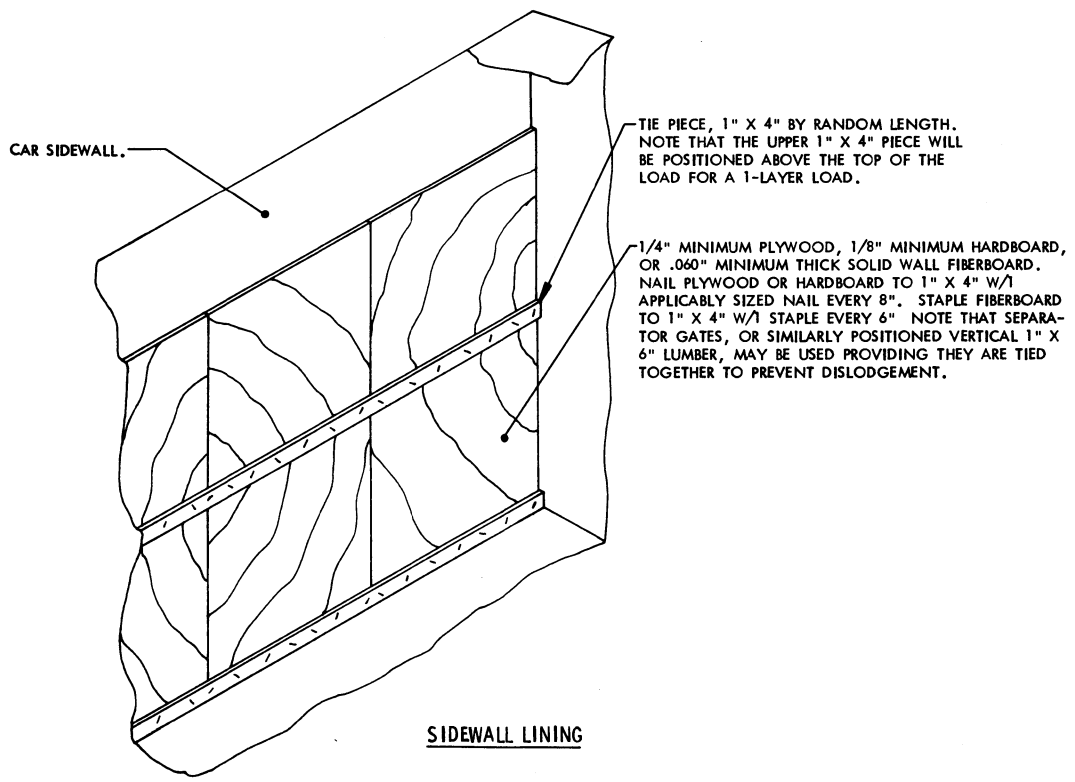
STRAP JOINT B

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



END-WALL LINING

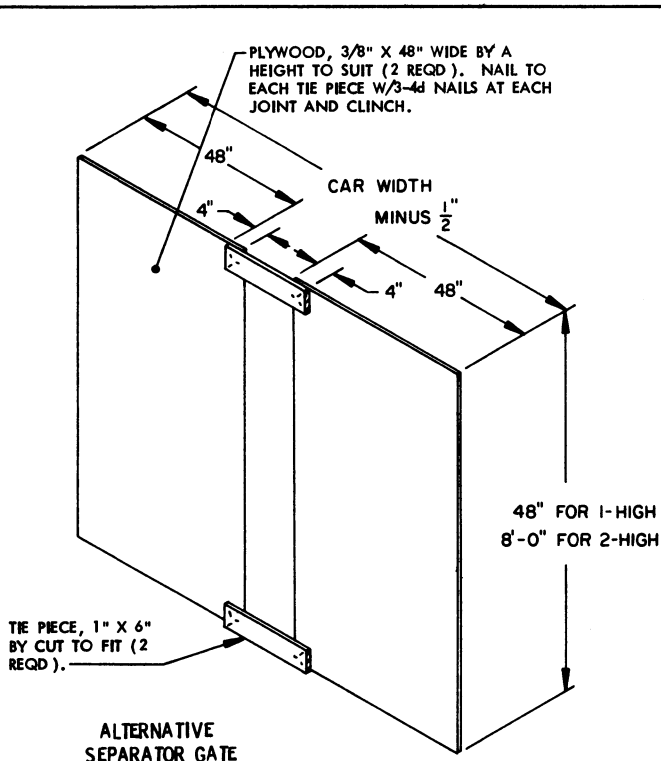
THIS VIEW DEPICTS LINING REQUIRED FOR A LENGTHWISE LOAD IN A CAR EQUIPPED WITH A STEEL END WALL.



SIDEWALL LINING

THIS VIEW DEPICTS LINING REQUIRED FOR A CROSSWISE SHIPMENT IN A CAR EQUIPPED WITH A STEEL SIDEWALL. NOTE THAT IF THE CAR IS EQUIPPED WITH A STEEL-FACED PLUG DOOR, THE SPECIAL LINING WILL ALSO BE REQUIRED IN THE DOORWAY AREA IF THE SPECIFIED DOORWAY PROTECTION DOES NOT SUFFICE.

DETAILS



ALTERNATIVE SEPARATOR GATE

SEE "NOTE ▲" AT RIGHT.

NOTE ▲:

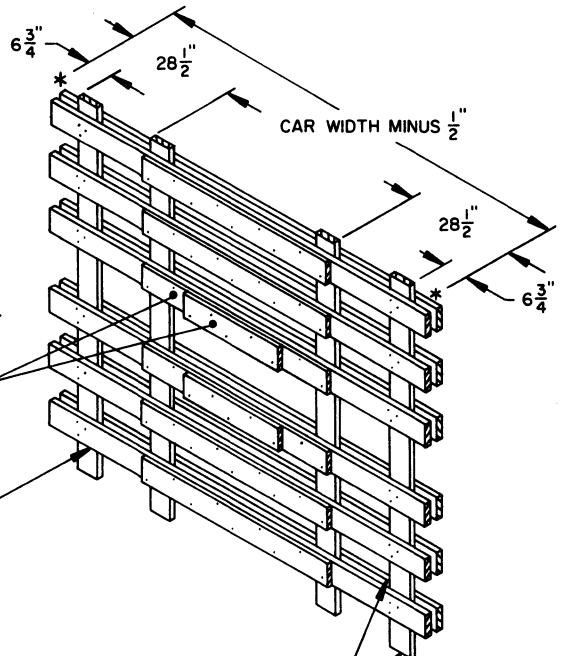
THE ALTERNATIVE SEPARATOR GATE MAY BE USED IN LIEU OF THE SEPARATOR GATE SHOWN WITHIN A LOAD, WHICH IS FABRICATED FROM 1" X 4" AND 1" X 6" MATERIAL. WHEN NAILED FLOORLINE BLOCKING IS USED FOR DOORWAY PROTECTION, THE ALTERNATIVE SEPARATOR GATES ADJACENT TO THE NAILED BLOCKING MUST BE MODIFIED. THE LOWER TIE PIECE MUST BE POSITIONED AT LEAST 3-1/2" OFF THE FLOOR. ALSO, THE LOWER INSIDE CORNER OF EACH PLYWOOD SHEET MUST BE CUT OUT 3-1/2" HIGH BY 9" WIDE. THE USE OF THIS MODIFIED GATE WILL ALLOW THE SEPARATOR GATE TO CLEAR THE NAILED FLOORLINE BLOCKING DURING THE NORMAL SHIFTING OF THE LOAD.

NOTE O:

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, OR AT THE END OF A CAR EQUIPPED WITH MECHANICAL BRACING DEVICES, IF DESIRED, IN LIEU OF USING CROSS MEMBERS. THE BULKHEAD MAY BE FABRICATED FROM A CENTER GATE FOR THE UNIT THAT IS TO BE LOADED AND FOR THE UNIT POSITIONING (LENGTHWISE OR CROSSWISE). NOTE THAT THE GATE MUST BE MODIFIED BY OMITTING THE 2" X 2" STRUT LEDGERS AND THE GATE HOLD DOWN PIECES. A MODIFIED CENTER GATE "B", AS DETAILED ON PAGE 13 IS SHOWN AS TYPICAL.

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 THE FILLER PIECE AND/OR LAMINATE W/1 APPLICABLY SIZED NAIL EVERY 6".

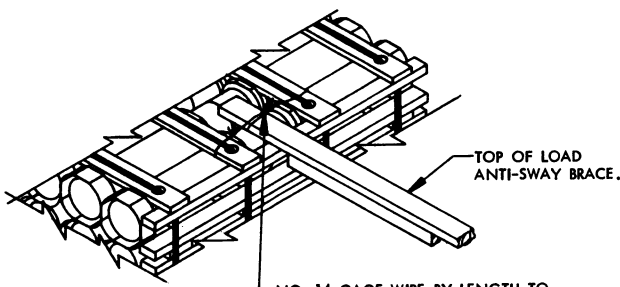
FILLER PIECE, 2" X 6" BY CAR WIDTH MINUS 1/2" IN LENGTH (ONE REQUIRED FOR EACH HORIZONTAL PIECE ON THE CENTER GATE). ALIGN WITH THE HORIZONTAL PIECES AND NAIL TO THE VERTICAL PIECES OF THE CENTER GATE W/3-10d NAILS AT EACH JOINT.



THESE 2" X 6" HORIZONTAL PIECES AND 2" X 6" VERTICAL PIECES ARE PART OF THE MODIFIED CENTER GATE. SEE NOTE "O" ABOVE.

END-OF-CAR BULKHEAD

SEE NOTE "O" ABOVE.

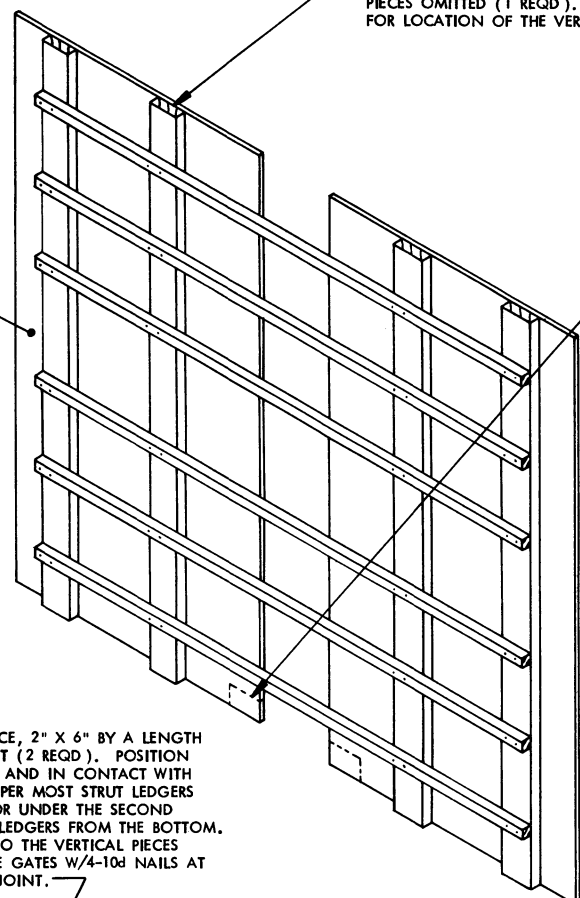


TIE WIRE APPLICATION

NO. 14 GAGE WIRE BY LENGTH TO SUIT. FORM TWO LOOPS AROUND TOP-OF-LOAD ANTI-SWAY BRACE AND TWIST TO PREVENT DISLODGEEMENT. THREAD EACH END OF WIRE UNDER AND AROUND AN INNER CROSS PIECE OF THE TOP DUNNAGE ASSEMBLY AND TWIST WIRE TO SELF AS SHOWN.

PLYWOOD, 1/2" THICK BY THE UNIT WIDTH OR LENGTH BY 8'-0" (2 REQD). NAIL TO THE VERTICAL PIECES W/1-6d NAIL EVERY 6". NOTE THAT THE WIDTH OF THE PLYWOOD WILL BE UNIT WIDTH IF THE LENGTH OF THE UNIT IS PARALLEL WITH THE SIDEWALL OF A CAR, AS TYPICALLY SHOWN IN THE LOAD ON PAGE 4, OR UNIT LENGTH IF THE WIDTH OF THE UNIT IS PARALLEL WITH THE SIDEWALL OF A CAR, AS TYPICALLY SHOWN IN THE LOAD ON PAGE 6. PLYWOOD MAY BE ALLOWED TO EXTEND BEYOND THE UNIT LENGTH OR WIDTH, IF DESIRED.

INDICATES A TYPICAL CAR WIDTH CENTER GATE, WITH THE HORIZONTAL PIECES OMITTED (1 REQD). SEE THE APPLICABLE CENTER GATE DETAIL FOR LOCATION OF THE VERTICAL PIECES AND THE STRUT LEDGERS.



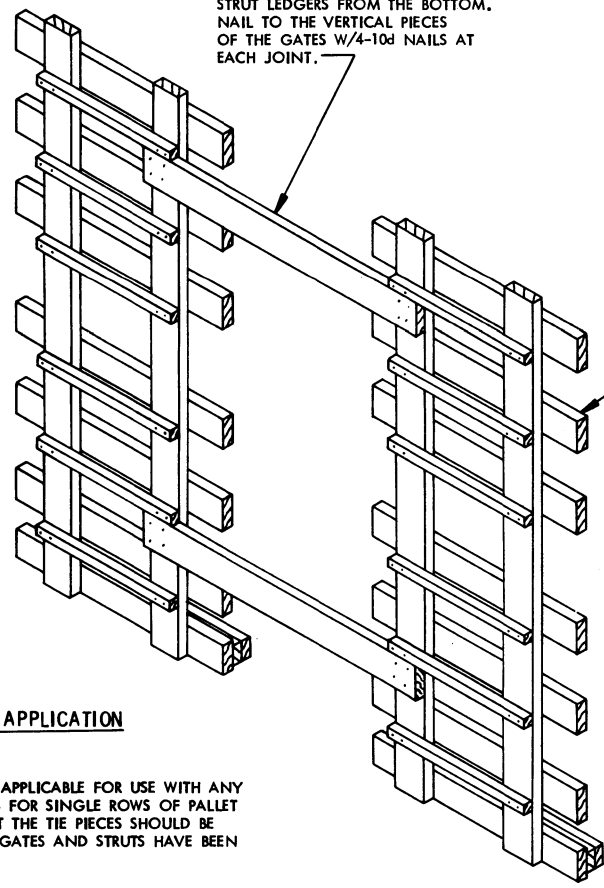
WHEN NAILED FLOORLINE BLOCKING IS USED FOR DOORWAY PROTECTION, EACH PLYWOOD SHEET MUST HAVE A CUTOUT AT THE LOWER INSIDE CORNER TO PROVIDE CLEARANCE FOR THE NAILED FLOORLINE BLOCKING DURING THE NORMAL SHIFTING OF THE LOAD. THE CUTOUT MUST BE 3-1/2" HIGH AND OF SUFFICIENT WIDTH SO THAT THE REMAINING PLYWOOD AT THE FLOOR IS 39-1/2" FOR LENGTHWISE UNITS OR 50-1/2" FOR CROSSWISE UNITS.

TIE PIECE, 2" X 6" BY A LENGTH TO SUIT (2 REQD). POSITION UNDER AND IN CONTACT WITH THE UPPER MOST STRUT LEDGERS AND/OR UNDER THE SECOND STRUT LEDGERS FROM THE BOTTOM. NAIL TO THE VERTICAL PIECES OF THE GATES W/4-10d NAILS AT EACH JOINT.

GATE HOLD DOWN PIECES MUST BE SECURED TO THE PLYWOOD.

PLYWOOD CENTER GATE ALTERNATIVE

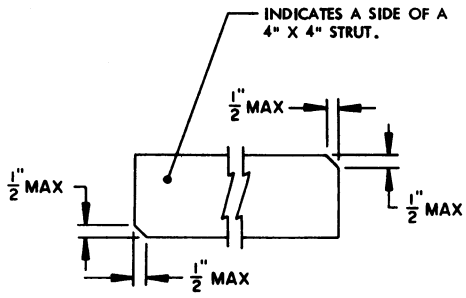
CENTER GATE "B" IS SHOWN AS TYPICAL. PLYWOOD MAY BE USED IN LIEU OF THE HORIZONTAL PIECES ON ANY CENTER GATE DEPICTED HEREIN, INCLUDING THOSE WHICH ARE FOR THE BRACING OF A SINGLE ROW.



INDICATES A CENTER GATE "D" FOR A SINGLE ROW (2 REQD). CENTER GATE "D" IS APPLICABLE FOR CAR LOADS WITH THE CONTAINERS POSITIONED LENGTHWISE. CENTER GATE "C" APPLIES WHEN THE CONTAINERS ARE POSITIONED CROSSWISE IN THE CAR.

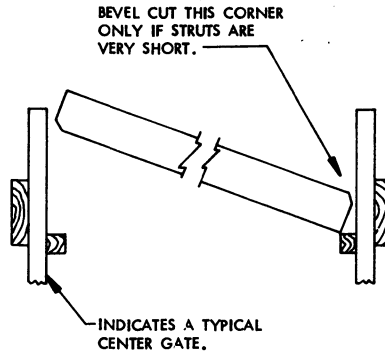
TIE PIECE APPLICATION

THIS PROCEDURE IS APPLICABLE FOR USE WITH ANY TWO CENTER GATES FOR SINGLE ROWS OF PALLET UNITS. NOTE THAT THE TIE PIECES SHOULD BE APPLIED AFTER THE GATES AND STRUTS HAVE BEEN INSTALLED.



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").

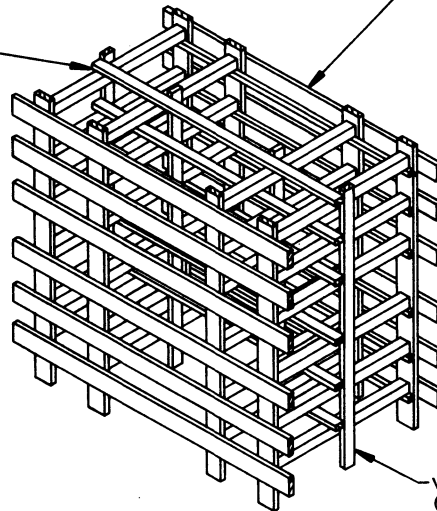


STRUT INSTALLATION

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

HORIZONTAL STRUT BRACING, 2" X 4" BY A LENGTH TO SUIT (AS REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.

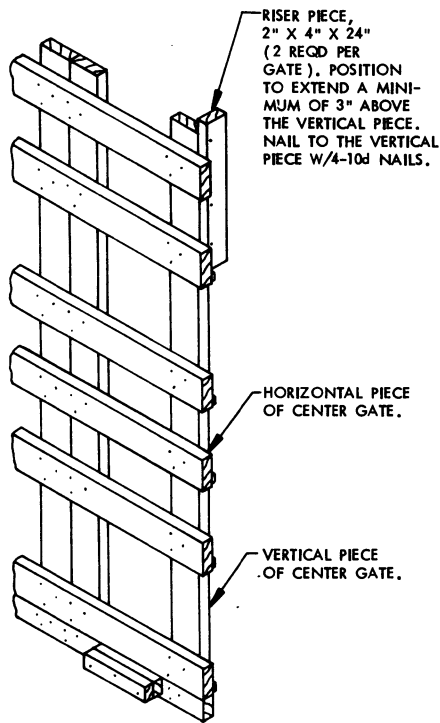
A CENTER GATE FOR A 2-LAYER LOAD OF PALLET UNITS WITH LENGTHWISE POSITIONED CONTAINERS IS SHOWN AS TYPICAL.



VERTICAL PIECE, 2" X 4" X 7'-8" (AS REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.

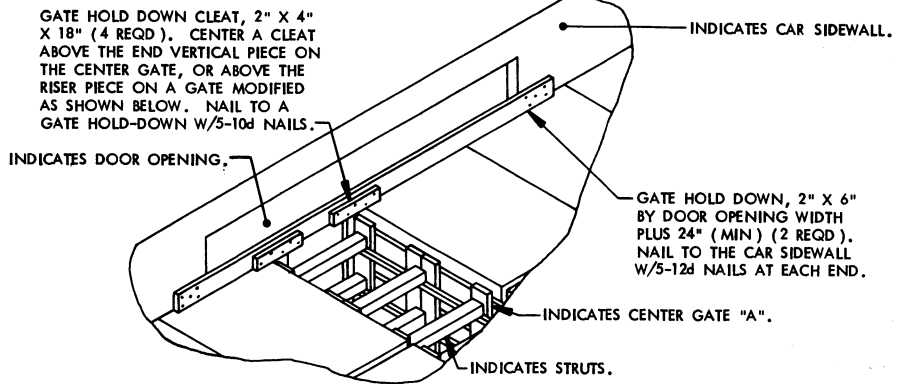
TYPICAL STRUT BRACING

SEE GENERAL NOTE "U" ON PAGE 2.



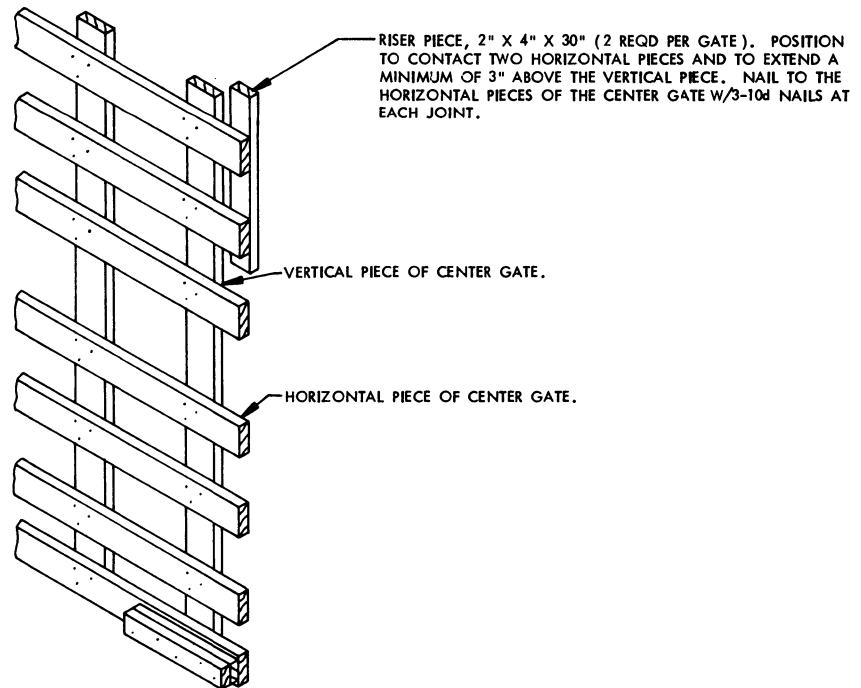
CENTER GATE "A" MODIFICATION

THE MODIFICATION PROCEDURE SHOWN IN THIS VIEW IS APPLICABLE FOR "CENTER GATE A" WHICH HAS THE VERTICAL PIECES INSET FROM THE END OF THE HORIZONTAL PIECES AS SHOWN ABOVE. THE RISER PIECE WILL PROVIDE A MEANS FOR CONTACTING THE GATE WITH THE GATE HOLD-DOWN AS SHOWN IN THE "ALTERNATIVE GATE HOLD-DOWN" DETAIL AT THE RIGHT.



ALTERNATIVE GATE HOLD-DOWN

THIS VIEW DEPICTS AN ALTERNATIVE METHOD OF CENTER GATE HOLD DOWN WHICH CAN BE USED IF DESIRED, PROVIDING THE CAR HAS NAILABLE SIDEWALLS. THIS METHOD MAY BE APPLIED IN LIEU OF USING THE GATE HOLD DOWN PIECES WHICH ARE PART OF A CENTER GATE. NOTE: FOR A GATE NOT LOCATED IN OR NEAR THE DOORWAY AREA, THE GATE HOLD-DOWN CLEAT MAY BE DOUBLED AND NAILED TO THE CAR SIDEWALL TO PROVIDE A HOLD-DOWN.



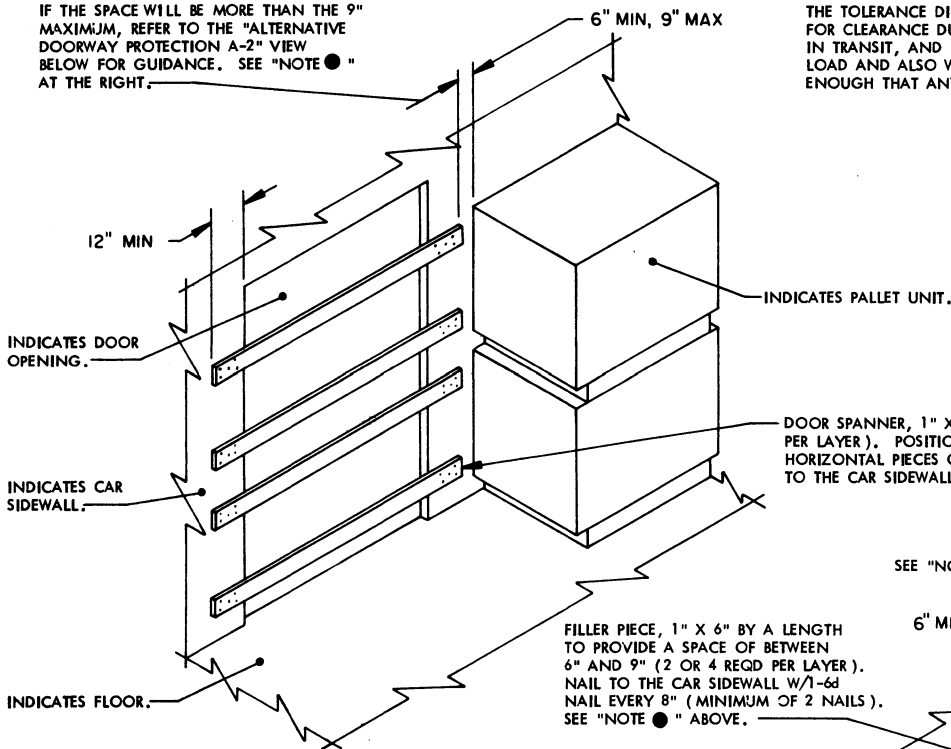
CENTER GATE "B" MODIFICATION

THE MODIFICATION PROCEDURES SHOWN IN THIS VIEW ARE APPLICABLE FOR CENTER GATE "B" WHICH HAS THE VERTICAL PIECES INSET FROM THE END OF THE HORIZONTAL PIECES AS SHOWN ABOVE. THE RISER PIECE WILL PROVIDE A MEANS FOR CONTACTING THE GATE WITH THE GATE HOLD DOWN.

IF THE SPACE WILL BE MORE THAN THE 9" MAXIMUM, REFER TO THE "ALTERNATIVE DOORWAY PROTECTION A-2" VIEW BELOW FOR GUIDANCE. SEE "NOTE ●" AT THE RIGHT.

NOTE ●:

THE TOLERANCE DIMENSION (6" MIN, 9" MAX) IS ALLOWED TO PROVIDE FOR CLEARANCE DURING THE NORMAL LONGITUDINAL SHIFTING OF A LOAD IN TRANSIT, AND IS APPLICABLE WHEN ANTI-SWAY BRACING IS USED FOR A LOAD AND ALSO WHEN THE EXCESS SPACE ACROSS THE CAR IS SMALL ENOUGH THAT ANTI-SWAY BRACING OF ANY KIND IS NOT REQUIRED.



DOOR SPANNER, 1" X 6" BY DOOR OPENING WIDTH PLUS 24" (2 REQD PER LAYER). POSITION SO AS TO MATCH THE HEIGHTS SPECIFIED FOR THE HORIZONTAL PIECES OF THE APPLICABLE DOORWAY PROTECTION DETAIL. NAIL TO THE CAR SIDEWALL W/5-6d NAILS AT EACH END. SEE "NOTE ●" ABOVE.

FILLER PIECE, 1" X 6" BY A LENGTH TO PROVIDE A SPACE OF BETWEEN 6" AND 9" (2 OR 4 REQD PER LAYER). NAIL TO THE CAR SIDEWALL W/1-6d NAIL EVERY 8" (MINIMUM OF 2 NAILS). SEE "NOTE ●" ABOVE.

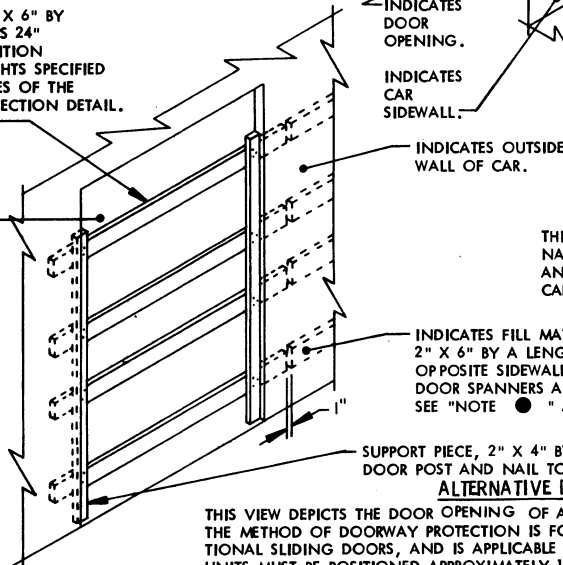
ALTERNATIVE DOORWAY PROTECTION A-1

THIS METHOD OF DOORWAY PROTECTION IS FOR USE IN CARS HAVING NAILABLE SIDEWALLS AND EQUIPPED WITH CONVENTIONAL SLIDING DOORS, AND IS APPLICABLE ONLY FOR THE SIDE OPPOSITE THE LOADING SIDE OF THE CAR. THE METHOD CAN ALSO BE USED IN CARS EQUIPPED WITH PLUG DOORS; HOWEVER, A METHOD OTHER THAN THE "ALTERNATIVE DOORWAY PROTECTION A-3" PROCEDURES BELOW MUST BE USED ON THE LOADING SIDE OF THE CAR, SUCH AS THE "ALTERNATIVE DOORWAY PROTECTION C" PROCEDURES ON PAGE 49 OR THE NAILED-DOWN BLOCKING AND STEEL STRAPPING METHOD DEPICTED BY THE "ALTERNATIVE DOORWAY PROTECTION E" DETAIL ON PAGE 50.

DOOR SPANNER, 1" X 6" BY DOOR OPENING WIDTH PLUS 24" (2 REQD PER LAYER). POSITION SO AS TO MATCH THE HEIGHTS SPECIFIED FOR THE HORIZONTAL PIECES OF THE APPLICABLE DOORWAY PROTECTION DETAIL. NAIL TO THE CAR SIDEWALL W/5-6d NAILS AT EACH END. SEE "NOTE ●" ABOVE.

DOOR SPANNER, 2" (MIN) X 6" BY DOOR OPENING WIDTH PLUS 24" (2 REQD PER LAYER). POSITION SO AS TO MATCH THE HEIGHTS SPECIFIED FOR THE HORIZONTAL PIECES OF THE APPLICABLE DOORWAY PROTECTION DETAIL. SEE "NOTE ●" ABOVE.

INDICATES DOOR OPENING.



ALTERNATIVE DOORWAY PROTECTION A-2

THIS METHOD OF DOORWAY PROTECTION IS FOR USE IN CARS HAVING NAILABLE SIDEWALLS AND EQUIPPED WITH CONVENTIONAL SLIDING DOORS, AND IS APPLICABLE ONLY FOR THE SIDE OPPOSITE THE LOADING SIDE OF THE CAR. SEE THE NOTE UNDER THE "A-1" PROCEDURES.

INDICATES FILL MATERIAL NAILED TO THE SIDEWALL, OR A FILLER PIECE, 2" X 6" BY A LENGTH TO EQUAL THE LENGTH OF THE FILLER PIECE ON THE OPPOSITE SIDEWALL MINUS 1" (QUANTITY TO BE THE SAME AS FOR THE DOOR SPANNERS AND/OR FILLER PIECES ON THE OPPOSITE SIDEWALL). SEE "NOTE ●" ABOVE.

SUPPORT PIECE, 2" X 4" BY A LENGTH TO SUIT (2 REQD). POSITION AGAINST DOOR POST AND NAIL TO THE DOOR SPANNER PIECES W/3-10d NAILS AT EACH JOINT.

ALTERNATIVE DOORWAY PROTECTION A-3

THIS VIEW DEPICTS THE DOOR OPENING OF A CAR AS IT APPEARS WHEN LOOKING AT IT FROM OUTSIDE OF THE CAR. THE METHOD OF DOORWAY PROTECTION IS FOR USE IN CARS HAVING NAILABLE SIDEWALLS AND EQUIPPED WITH CONVENTIONAL SLIDING DOORS, AND IS APPLICABLE FOR THE LOADING SIDE OF THE CAR. NOTE THAT THE ADJACENT PALLET UNITS MUST BE POSITIONED APPROXIMATELY 1-3/4" (REF) FROM THE CAR SIDEWALL (1/4" MORE THAN THE THICKNESS OF THE DOOR SPANNER PIECES) TO FACILITATE THE INSTALLATION OF THESE DOOR SPANNER PIECES. THE VIEW SHOWN ABOVE IS FOR A TWO LAYER LOAD.

HORIZONTAL PIECE, 1" X 6" BY DOOR OPENING WIDTH (2 REQD PER LAYER). NAIL TO THE VERTICAL PIECES W/3-61 NAILS AT EACH END. SEE THE APPLICABLE DOORWAY PROTECTION DETAIL FOR HEIGHT LOCATION.

VIEW B

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

INDICATES DOOR OPENING.

INDICATES CAR SIDEWALL.

INDICATES FLOOR.

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

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

DOOR POST.



VIEW B

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

ALTERNATIVE DOORWAY PROTECTION B

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

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

INDICATES DOOR OPENING.

INDICATES CAR SIDEWALL.

DOORWAY PROTECTION STRAP, 1-1/4" X .035" STEEL STRAPPING BY DOOR OPENING WIDTH PLUS 8'-0" IN LENGTH (2 REQD PER LAYER). INSTALL FROM TWO (2) PIECES. THREAD ONE END THRU A STRAP ANCHOR PLATE AS SHOWN BY THE "APPLICATION OF STRAPPING TO STRAP ANCHOR PLATE" DETAILS BELOW. NAIL STRAP ANCHOR PLATE TO CAR SIDEWALL W/4-SIGNODE NUMBER 27 RING-LOCK NAILS.

VIEW A

INDICATES STRAP ANCHOR PLATE.

DOOR SPANNER END OF STRAP.

ISOMETRIC VIEW

VIEW A

APPLICATION OF STRAPPING TO STRAP ANCHOR PLATE

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

INDICATES STRAP ANCHOR PLATE (2 REQD PER STRAP).

ALTERNATIVE DOORWAY PROTECTION C

THIS METHOD OF DOORWAY PROTECTION IS ONLY FOR USE WITH THOSE LOADS IN WHICH THE PALLET UNITS ARE POSITIONED CROSSWISE. THE METHOD MAY BE USED IN CARS EQUIPPED WITH EITHER PLUG TYPE DOORS OR CONVENTIONAL SLIDING DOORS, BUT ONLY IF THE CAR IS EQUIPPED WITH NAILABLE SIDEWALLS. IF THE CAR IS EQUIPPED WITH SPECIAL ANCHOR RODS IN THE CAR DOOR POSTS, THE DOORWAY PROTECTION STRAPS MAY BE SECURED TO THESE RODS IN LIEU OF ATTACHING TO THE CAR SIDEWALL WITH STRAP ANCHOR PLATES. CAUTION: A VERTICAL PIECE MUST BE ADDED TO EACH END OF A CENTER GATE WHICH IS IN OR WITHIN SIX INCHES (6") OF BEING IN THE DOOR OPENING, TO PREVENT THE GATE FROM SHIFTING Laterally, UNLESS PLYWOOD IS BEING USED IN LIEU OF THE 2" X 6" HORIZONTAL PIECES IN WHICH CASE THE ADDED VERTICAL PIECES WILL NOT BE REQUIRED.

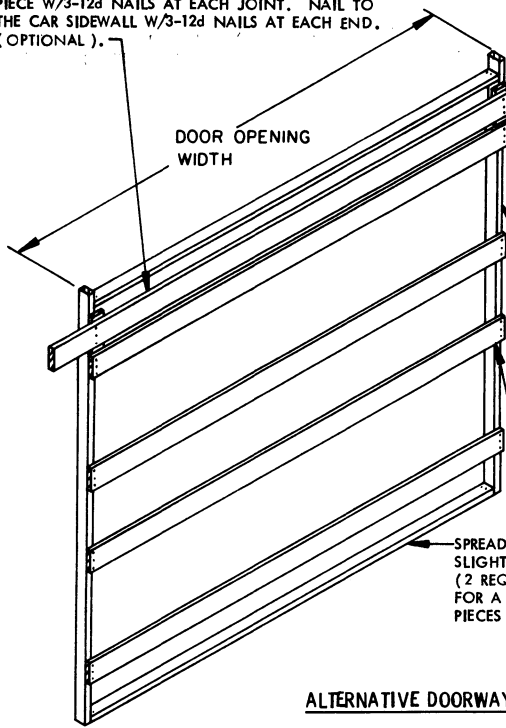


A TOLERANCE OF PLUS OR MINUS 2" IS PERMISSIBLE.

INDICATES FLOOR.

DOORWAY PROTECTION

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



SPACER PIECE, 2" X 6" AND 1" X 6" X 12" MATERIAL (AS REQD TO FILL THE VOID BETWEEN PALLET UNITS). LAMINATE W/4 APPLICABLY SIZED NAILS EACH LAYER.

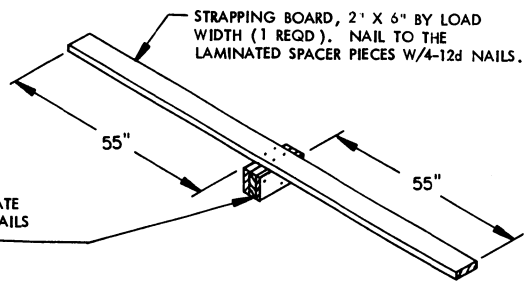
VERTICAL PIECE, 2" X 3" BY A LENGTH TO SUIT (2 REQD). NOTE THAT IF THE EXCESS SPACE ACROSS A CAR IS FILLED BY NAILING LUMBER TO THE CAR SIDEWALL, IT MAY BE NECESSARY TO INCREASE THE VERTICAL PIECES AND THE SPREADER PIECES TO 2" X 4" OR 2" X 6" MATERIAL. THIS WILL PROVIDE A SURFACE TO WEDGE BETWEEN THE DOOR POSTS WHEN THE GATE IS MOVED INWARD TO CONTACT THE LADING.

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

SPREADER PIECE, 2" X 3" MATERIAL CUT SLIGHTLY LONGER THAN MEASURED DISTANCE (2 REQD). DRIVE INTO POSITION TO PROVIDE FOR A WEDGE FIT. TOENAIL TO THE VERTICAL PIECES W/2-12d NAILS AT EACH END.

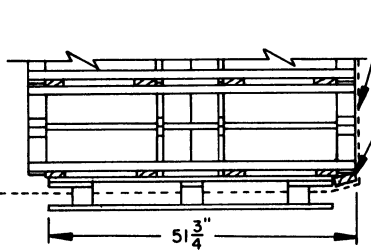
ALTERNATIVE DOORWAY PROTECTION D

THIS METHOD OF DOORWAY PROTECTION IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS WHEN THE DOOR POSTS ARE NOT AVAILABLE. IF THE CAR HAS AVAILABLE SIDEWALLS, NAIL-ON TYPE STRAPPING MAY BE USED TO SECURE THE GATE IN LIEU OF USING THE SPREADER PIECES. SEE THE "ALTERNATIVE DOORWAY PROTECTION B" DETAIL ON PAGE 49 FOR GUIDANCE. NOTE THAT THE DOOR SPANNER IN THIS DETAIL MAY BE USED AS A GATE HOLD-DOWN PIECE FOR THE "ALTERNATIVE GATE HOLD-DOWN" METHOD SHOWN ON PAGE 47.



SPACER ASSEMBLY B

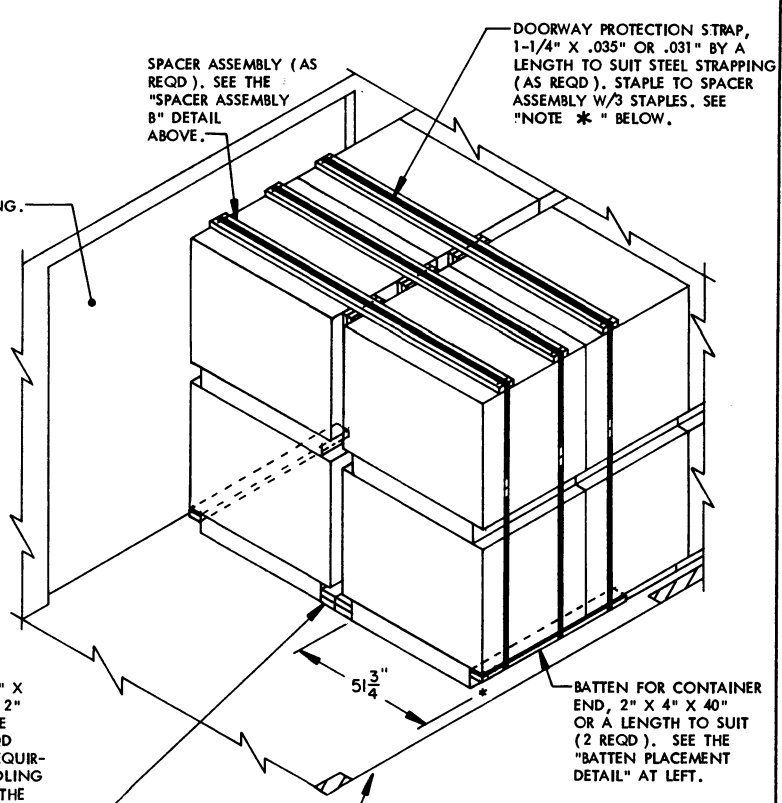
THIS ASSEMBLY IS FOR USE IN THE "ALTERNATIVE DOORWAY PROTECTION E" PROCEDURES BELOW.



BATTEN PLACEMENT DETAIL

THIS VIEW SHOWS THE PLACEMENT OF A 2" X 4" BATTEN UNDER THE END OF THE PALLET UNIT TO PROTECT THE BELL END OF THE CONTAINERS WHEN ENCIRCLING THE UNITS WITH DOORWAY PROTECTION STRAPS AND/OR UNITIZING STRAPS.

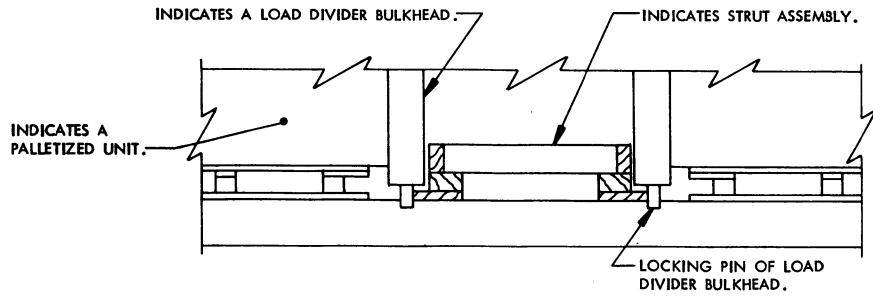
NOTE * TWO (2) BUNDLING STRAPS ARE REQUIRED FOR EACH PALLET STACK AND/OR LOAD UNIT WHICH IS COMPLETELY WITHIN THE DOORWAY AREA OR WHICH IS NOT RETAINED BY AT LEAST SIX INCHES (6") OF CAR SIDEWALL ON BOTH SIDES OF THE CAR. ONE (1) BUNDLING STRAP IS REQUIRED FOR EACH PALLET STACK AND/OR LOAD UNIT WHICH IS RETAINED BY FROM 6" TO ONE-HALF THE PALLET UNIT LENGTH OR WIDTH.



ALTERNATIVE DOORWAY PROTECTION E

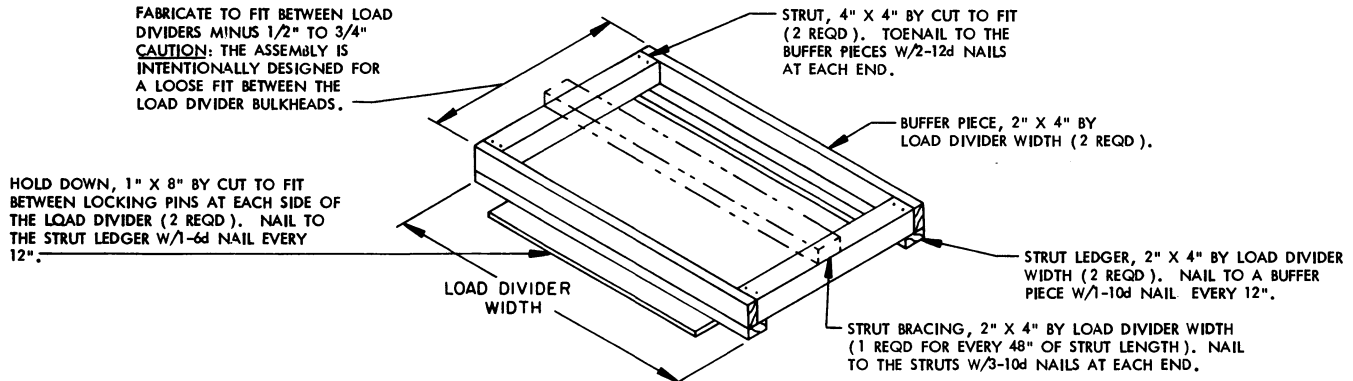
SIDE BLOCKING, 2" X 4" X 40" ON LOADING SIDE, 2" X 6" X 40" ON OPPOSITE SIDE (DOUBLED) (2 REQD FOR EACH LOAD UNIT REQUIRING ONE OR TWO BUNDLING STRAPS). PRE-POSITION THE LOADING SIDE PIECE. NAIL THE FIRST PIECE TO THE CAR FLOOR W/5-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.

DETAILS



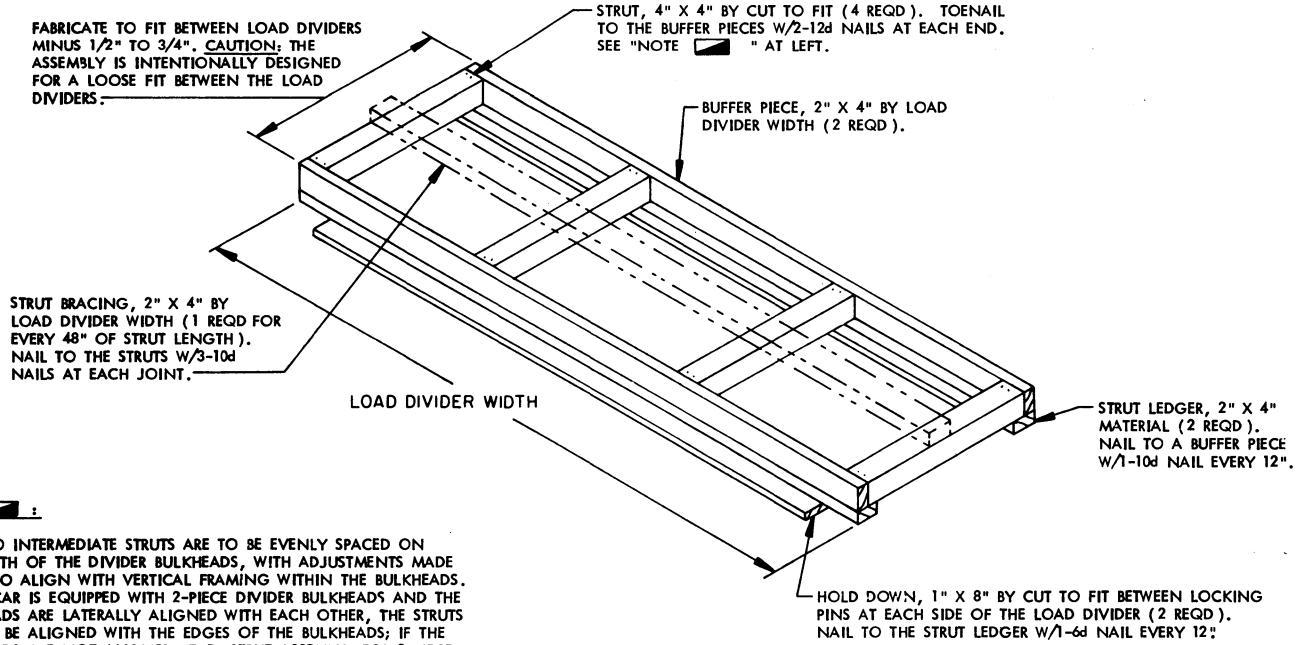
INSTALLATION OF STRUT ASSEMBLY

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.



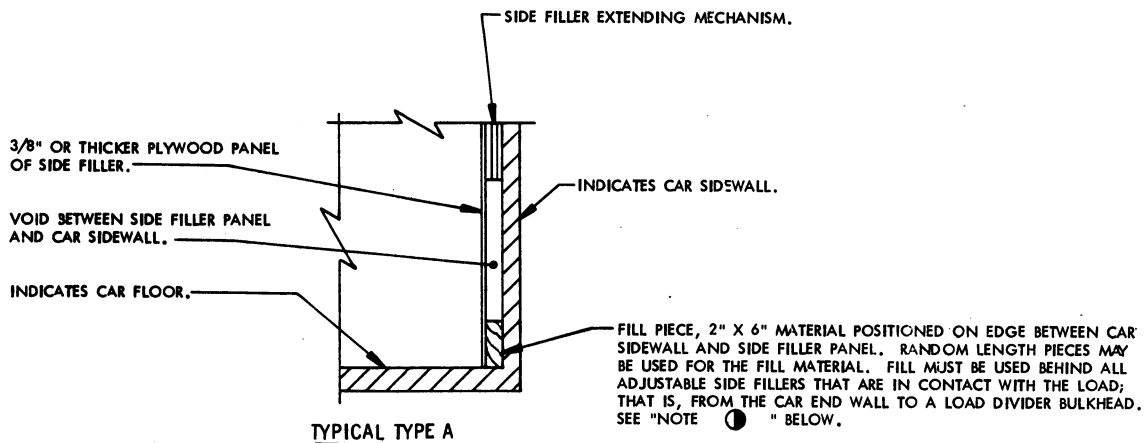
STRUT ASSEMBLY FOR 2-PIECE BULKHEADS

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 EXPLOSIVES, REGARDLESS OF THE WEIGHT OF THE LOAD. NOTE: TWO (2) ASSEMBLIES AS SHOWN ARE REQUIRED FOR A 2-PIECE BULKHEAD IF NOT LATERALLY ALIGNED. SEE "NOTE" BELOW.



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.

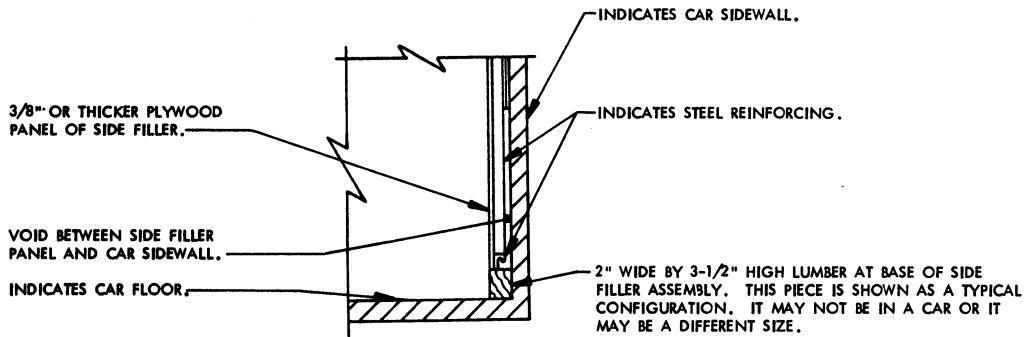


TYPICAL TYPE A

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

NOTE 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.