

LOADING AND BRACING (CL & LCL) IN BOXCARS OF EMPTY 155MM SEPARATE LOADING PROJECTILES (PALLETIZED)

INDEX

<u>ITEM</u>	<u>PAGE(S)</u>
GENERAL NOTES AND MATERIAL SPECIFICATIONS - - - - -	2,3
PALLET UNIT DETAILS - - - - -	3
273-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL BOXCAR - - - - -	4,5
266-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOXCAR EQUIPPED WITH LOAD DIVIDER BULKHEADS - - - - -	6,7
TYPICAL LCL USING SIDE GATES - - - - -	8,9
TYPICAL LCL USING K-BRACE METHOD - - - - -	10-13
TYPICAL LCL USING KNEE BRACE METHOD - - - - -	14,15
DETAILS - - - - -	16-24

● THIS OUTLOADING DRAWING INCLUDES PROCEDURES FOR CONVENTIONAL TYPE BOXCARS AND CUSHIONED BOXCARS EQUIPPED WITH LOAD DIVIDERS.

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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 TO EMPTY PALLETIZED 155MM SEPARATE LOADING PROJECTILES. SUBSEQUENT REFERENCE TO PALLET UNIT MEANS THE PALLET UNIT WITH METAL PARTS.
- C. FOR DETAILS OF THE PALLET UNIT, SEE THE PICTORIAL VIEW ON PAGE 3.
- DIMENSIONS - - - - - 14-5/8" LONG X 29-1/8" WIDE X
40-7/8" HIGH
GROSS WEIGHT - - - - - 466 POUNDS (APPROX)
- D. THE OUTLOADING PROCEDURES DEPICTED WITHIN THIS DOCUMENT ARE APPLICABLE FOR SHIPMENTS IN CONVENTIONAL TYPE BOX-CARS AND FOR SHIPMENTS IN CUSHIONED BOXCARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.
- E. THE SELECTION OF RAILCARS FOR THE TRANSPORT OF PALLET UNITS OF SEPARATE LOADING PROJECTILES 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.
- F. WHEN SELECTING RAILCARS, EVERY EFFORT SHOULD BE MADE TO OBTAIN BOXCARS THAT DO NOT HAVE BOWED ENDWALLS. CARS HAVING BOWED ENDS CAN BE USED, HOWEVER, IF AN ENDWALL IS BOWED OUTWARD MORE THAN 2" EITHER FROM SIDE TO SIDE OR FROM FLOOR TO ROOF, AN END-OF-CAR BULKHEAD MUST BE INSTALLED TO PROVIDE A "SQUARED OFF" SURFACE FOR THE LOAD AT THE END OF THE CAR. REFER TO PAGE 20 FOR GUIDANCE.
- G. CONVENTIONAL BOXCARS EQUIPPED WITH SLIDING DOORS HAVE BEEN SHOWN, HOWEVER, THE DEPICTED OUTLOADING PROCEDURES ARE ALSO APPLICABLE FOR CONVENTIONAL CARS EQUIPPED WITH PLUG DOORS. CAUTION: DUNNAGE MATERIAL MUST NOT BE NAILED TO ANY PLUG DOOR, WHETHER AUXILIARY OR MAIN. ALSO, AFTER THE PLUG DOORS ON A CAR ARE CLOSED AND READY FOR THE INSTALLATION OF CAR SEALS, A PIECE OF WIRE OF SUITABLE SIZE WILL BE USED IN ADDITION TO AND IN CONJUNCTION WITH EACH CAR SEAL USED TO SEAL THE CAR. THE WIRE WILL BE THREADED THRU THE HOLES IN THE DOOR LATCH ASSEMBLY ONE OR MORE TIMES, AND THE WIRE ENDS WILL BE TWISTED TOGETHER.
- H. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN CARS WHICH ARE PARTIALLY LOADED WITH PALLET UNITS OF SEPARATE LOADING PROJECTILES, 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.
- J. DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE, 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE. IF THOSE MEMBERS SPECIFICALLY IDENTIFIED AS "STRUTS" WITHIN THE KEY NUMBERS OF A DEPICTED LOAD ARE SPECIFIED TO BE 4" X 4" MATERIAL, IT IS PERMISSIBLE TO USE TWO LAMINATED PIECES OF 2" X 6" MATERIAL IN LIEU OF EACH 4" X 4" STRUT. DOUBLED 2" X 6" STRUTS WILL BE LAMINATED W/1-10d NAIL EVERY 6".

(CONTINUED AT RIGHT)

MATERIAL SPECIFICATIONS

- LUMBER - - - - - : SEE TM 743-200-1 (DUNNAGE LUMBER) AND FED SPEC MM-L-751.
- NAILS - - - - - : FED SPEC FF-N-105; COMMON.
- STRAPPING, STEEL - - : ASTM D3953; FLAT STRAPPING, TYPE 1, HEAVY DUTY, FINISH A, B (GRADE 2), OR C.
- SEAL, STRAP - - - - : ASTM D3953; CLASS H, FINISH A, B (GRADE 2), OR C, DOUBLE NOTCH TYPE, STYLE I, II, OR IV.
- WIRE, CARBON STEEL - : ASTM A853; ANNEALED AT FINISH, BLACK OXIDE FINISH, .0800" DIA, GRADE 1006 OR BETTER.
- STAPLE, STRAP - - - : COMMERCIAL GRADE.

(GENERAL NOTES CONTINUED)

- K. 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.
- L. POWER DRIVEN STAPLES MAY BE USED AS ALTERNATIVE FASTENERS FOR NAILS WHEN CONSTRUCTING DUNNAGE ASSEMBLIES WHICH ARE TO BE USED IN THE DELINEATED BOXCAR LOADS SHOWN THROUGHOUT THIS DRAWING. THE STAPLES TO BE USED MUST BE EQUAL IN LENGTH TO THE SPECIFIED NAIL SIZE AND MUST BE SUBSTITUTED ON A ONE STAPLE FOR ONE NAIL BASIS. STAPLES WHICH ARE 2-1/2" OR LESS IN LENGTH SHOULD BE IN ACCORDANCE WITH FEDERAL SPECIFICATION FF-N-105 AS NEARLY AS PRACTICABLE. STAPLES WHICH ARE LONGER THAN 2-1/2" WILL BE A COMMERCIAL GRADE, OF A QUALITY EQUIVALENT TO THOSE MANUFACTURED BY SENCO PRODUCTS INCORPORATED. NOTE: STAPLES WILL NOT BE SUBSTITUTED FOR NAILS IN ANY LOAD RESTRAINING FLOOR DUNNAGE APPLICATION.
- M. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, A MINIMUM OF ONE SEAL WITH TWO PAIR OF NOTCHES WILL BE USED TO SEAL THE JOINT WHEN A NOTCH-TYPE SEALER IS BEING USED. A MINIMUM OF TWO SEALS, BUTTED TOGETHER, WITH TWO PAIR OF CRIMPS PER SEAL WILL BE USED TO SEAL THE JOINT WHEN A CRIMP-TYPE SEALER IS BEING USED. REFER TO THE "STRAP JOINT A" AND "STRAP JOINT B" DETAILS ON PAGE 18 FOR GUIDANCE.
- N. THROUGHOUT THIS PROCEDURAL DRAWING, PORTIONS OF THE BLOCKING COMPONENTS AND OF THE DEPICTED CARS, SUCH AS A CAR SIDEWALL, HAVE BEEN OMITTED FROM THE LOAD VIEW FOR CLARITY PURPOSES.
- O. THE NUMBER OF LADING UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE BOXCAR BEING LOADED OR THE QUANTITY TO BE SHIPPED, HOWEVER, THE APPROVED METHODS SPECIFIED HEREIN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING, AND STAYING OF THE UNITS. NOTICE: A SHIPMENT WILL BE POSITIONED IN THE RAILCAR IN COMPLIANCE WITH THE WEIGHT DISTRIBUTION REQUIREMENTS OF THE AAR.
- P. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM AND ONE POUND EQUALS 0.454 KG.

GENERAL NOTES

(FOR CONVENTIONAL TYPE BOXCARS)

- Q. 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 "K" ABOVE.
- R. 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 PALLET BASE. PADDING, OF 2" THICK LUMBER OR ANY OTHER MATERIAL OF SIMILAR CONSISTENCY, SHOULD BE PLACED BETWEEN THE JACK AND THE LADING.

(CONTINUED ON PAGE 3)

- S. LOAD-BLOCKING STRUTS WHICH ARE 48" OR LONGER MUST BE STIFFENED BY THE APPLICATION OF HORIZONTAL AND VERTICAL STRUT BRACING AS SHOWN IN THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 21. BRACING IS NOT REQUIRED IF THE STRUTS FOR THE LOAD BEING SHIPPED ARE SHORTER THAN 48". THE LENGTH OF THE LOAD-BLOCKING STRUTS SHOULD BE KEPT AS SHORT AS POSSIBLE (APPROX 18" MINIMUM), BUT IN THE EVENT IT IS NECESSARY TO USE STRUTS WHICH ARE 8'-0" OR MORE IN LENGTH, IT WILL BE NECESSARY TO APPLY AN ADDITIONAL SET OF HORIZONTAL AND VERTICAL STRUT BRACING PIECES. STRUT BRACING SHOULD BE APPLIED SO AS TO PROVIDE NEARLY EQUAL SPACES BETWEEN THE BRACING PIECES AND THE CENTER GATES AND/OR BETWEEN ADJACENT STRUT BRACING PIECES. NOTE THAT HORIZONTAL STRUT BRACING PIECES FOR THE UPPER LEVEL OF STRUTS FOR ALL BUT THE UPPERMOST TIER OF A LOAD MAY BE DIFFICULT TO APPLY TO THE TOP SURFACES OF THE STRUT AS DEPICTED. STRUT BRACING WILL BE EQUALLY EFFECTIVE IF APPLIED TO THE UNDER SIDE OF THOSE STRUTS.
- T. TO ACHIEVE A TIGHTLY BLOCKED LOAD, A STRUT WILL BE CUT APPROXIMATELY 1/4" TO 3/8" LONGER THAN THE MEASURED DISTANCE BETWEEN THE STRUT BEARING AREAS ON THE TWO CENTER GATES. MEASUREMENTS FOR STRUT LENGTHS NEED TO BE ACCOMPLISHED AT SEVERAL PLACES DURING THE BLOCKING AND BRACING PROCESS. CARE MUST BE EXERCISED WHEN MEASURING FOR AND INSTALLING STRUTS. THE SPECIFIED APPROXIMATE DIMENSION FOR A STRUT LENGTH MAY BE ADJUSTED, AS NECESSARY, TO PROVIDE FOR A TIGHTLY BLOCKED LOAD WITHOUT DISTORTING, DENTING OR OTHERWISE DAMAGING THE PALLET UNITS. 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 21 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.
- U. WHERE 2" X 2" PIECES ARE SPECIFIED FOR STRUT LEDGERS, 2" X 4" MATERIAL MAY BE SUBSTITUTED, IF DESIRED.
- V. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.

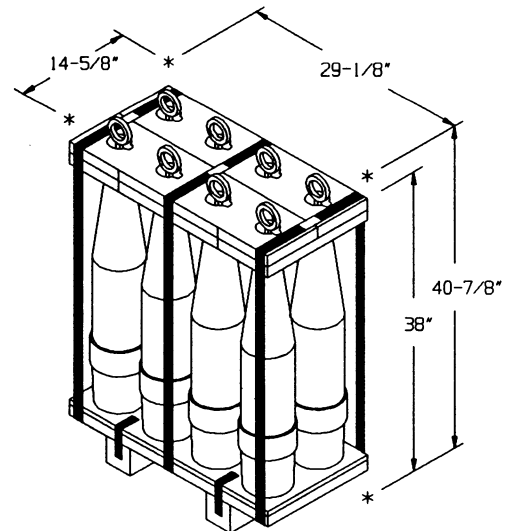
GENERAL NOTES

(FOR CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS)

- W. CAUTION: FOR CUSHIONED BOXCARS EQUIPPED WITH LOAD DIVIDER BULKHEADS, ONLY CARS EQUIPPED WITH LOAD DIVIDERS MANUFACTURED BY EVANS, EQUIPCO, OR PRECO MAY BE USED. LOAD DIVIDERS MANUFACTURED BY TRANSCO ARE NOT ACCEPTABLE WHETHER OF ALUMINUM OR STEEL CONSTRUCTION. THE DEPICTED PROCEDURES ARE APPLICABLE FOR CARS OF VARIOUS LENGTHS AND WIDTHS. THE AAR MECHANICAL DESIGNATION CLASS FOR THESE CARS, AS IDENTIFIED IN "THE OFFICIAL RAILWAY EQUIPMENT REGISTER", WILL BE RBL, XL, OR XLI.
- X. THE USE OF LOAD DIVIDER EQUIPPED CARS WILL ELIMINATE THE NEED FOR CENTER GATES AND STRUTS OR SOLID FILL WHICH ARE REQUIRED IN CONVENTIONAL BOXCAR LOADS. THIS WILL ACCOUNT FOR A CONSIDERABLE SAVING IN MATERIAL AND LABOR COSTS. THEREFORE, EVERY EFFORT SHOULD BE MADE TO ACQUIRE CUSHIONED CARS EQUIPPED WITH LOAD DIVIDERS FOR SHIPMENT OF COMPLETE ROUNDS. NOTICE: ONLY CUSHIONED CARS THAT HAVE SLIDING CENTER SILL TYPE CUSHIONED DEVICES OR END-OF-CAR TYPE DEVICES WHICH HAVE AT LEAST 15" OF TRAVEL ARE ACCEPTABLE.
- Y. IF NAILING TO A CAR SIDEWALL IS NOT REQUIRED, BOXCARS EQUIPPED WITH ADJUSTABLE SIDE FILLERS THAT HAVE 3/8" OR THICKER PANELS MAY BE USED, HOWEVER, THESE SIDE FILLERS MUST NOT BE USED FOR LATERAL BLOCKING; THEY MUST BE RETRACTED AND LOCKED AGAINST THE CAR SIDEWALL. A "FILL PIECE" MUST BE INSTALLED IN THE VOID BETWEEN THE CAR SIDEWALL AND THE SIDE FILLER PANEL. SEE THE "TYPICAL TYPE A" VIEW ON PAGE 24 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 24, THE "FILL PIECE" MATERIAL IS NOT REQUIRED.

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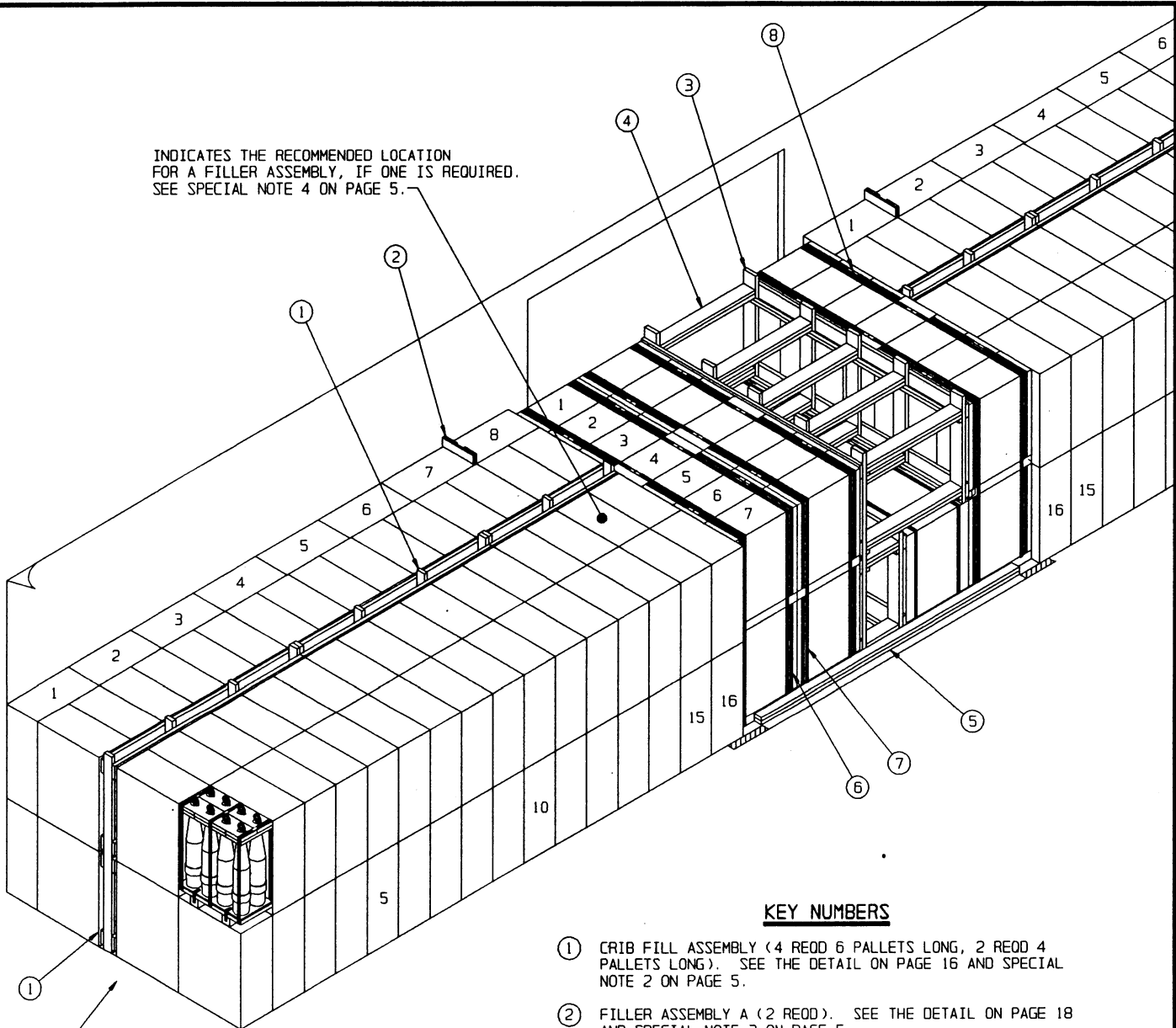
- Z. NOTICE: AFTER THE LOAD DIVIDER BULKHEADS ARE POSITIONED AGAINST THE LADING, AND THE LOCKING PINS ARE ENGAGED IN THE HOLES OF THE RAILS, THE LOWER LOCKING PINS MUST BE INSPECTED TO ENSURE THAT THE PINS ARE FULLY ENGAGED IN THE LOCKING HOLES. IF THE PINS ARE NOT FULLY SEATED IN THE LOCKING HOLES, 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.
- AA. THE NORMAL LOADING PATTERN IN CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS IS TO POSITION THE LADING BETWEEN A CAR ENDWALL AND A LOAD DIVIDER BULKHEAD IN FULL LAYERS. OBVIOUSLY, A LOAD QUANTITY MUST THEN BE A MULTIPLE OF THE NUMBER OF PALLET UNITS WHICH ARE IN ONE LOAD UNIT. A LOAD UNIT IS DEFINED AS A STACK OF CONTAINERS WHICH IS FULL CAR WIDTH BY FULL LOAD HEIGHT BY ONE UNIT IN LENGTH. IF THE QUANTITY TO BE SHIPPED CANNOT BE ATTAINED BY ADJUSTING THE NUMBER OF TIERS IN ONE OR BOTH ENDS OF A CAR, OR BY ADJUSTING THE NUMBER OF LOAD UNITS IN EITHER END OF THE CAR, ONE OF THE FOLLOWING PROCEDURES MUST BE USED IN ORDER TO OBTAIN THE DESIRED QUANTITY.
 - 1. ONE OR MORE FILLER ASSEMBLIES CAN BE USED IN PLACE OF OMITTED PALLET UNITS TO ADJUST A QUANTITY DOWNWARD BY OTHER THAN A MULTIPLE OF A FULL LOAD UNIT. SEE THE "FILLER ASSEMBLY B" DETAIL ON PAGE 18.
 - 2. AT LOCATION(S) WHERE K-BRACES MIGHT NORMALLY BE USED IN A LOAD IN A CONVENTIONAL CAR, LOAD DIVIDER BULKHEADS CAN BE POSITIONED. LOADING CAN THEN CONTINUE TOWARD THE CENTER OF THE CAR FROM EACH INSTALLED LOAD DIVIDER BULKHEAD, IN A ONE-HIGH LAYER. INSTALL CENTER GATES AND STRUTS, AS DEPICTED IN THE LOAD ON PAGE 4, TO PROVIDE FOR A TIGHT LOAD BETWEEN THE BULKHEADS.
 - 3. ONE OR MORE UNITS CAN BE POSITIONED IN CONTACT WITH A LOAD DIVIDER BULKHEAD ON THE CENTER-OF-CAR SIDE. BLOCK AND BRACE WITH KNEE BRACE ASSEMBLIES, AS SHOWN ON PAGE 14.
- BB. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTION WHICH IS IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHOD.



EMPTY 155MM SLP/LARGE PALLET

WEIGHT - - - - - 466 LBS (APPROX)
 CUBE - - - - - 10.1 CU FT (APPROX)

INDICATES THE RECOMMENDED LOCATION FOR A FILLER ASSEMBLY, IF ONE IS REQUIRED. SEE SPECIAL NOTE 4 ON PAGE 5.



IF THE CAR ENDWALL IS BOWED MORE THAN 2", AN END-OF-CAR BULKHEAD MUST BE INSTALLED. SEE THE DETAIL ON PAGE 20.

ISOMETRIC VIEW

KEY NUMBERS

- ① CRIB FILL ASSEMBLY (4 REOD 6 PALLETS LONG, 2 REOD 4 PALLETS LONG). SEE THE DETAIL ON PAGE 16 AND SPECIAL NOTE 2 ON PAGE 5.
- ② FILLER ASSEMBLY A (2 REOD). SEE THE DETAIL ON PAGE 18 AND SPECIAL NOTE 3 ON PAGE 5.
- ③ CENTER GATE A (3 REOD, 2 ONE-HIGH AND 1 TWO-HIGH). SEE THE DETAIL ON PAGE 17 AND SPECIAL NOTE 4 ON PAGE 5.
- ④ STRUT, 2" X 6" BY CUT-TO-FIT (DOUBLED) (20 REOD). LAMINATE W/1-10d NAIL EVERY 6" AND TOENAIL THE TOP PIECE TO THE GATE VERTICAL PIECES W/2-12d NAILS AT EACH END.
- ⑤ DOORWAY BLOCKING, 2" X 4" X 10'-0" (DOUBLED) (2 REOD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑥ BUNDLING STRAP, 1-1/4" X .035" OR .031" X 14'-3" LONG STEEL STRAPPING (24 REOD). INSTALL TO BUNDLE THE OUTER 12 GROUPS OF THREE PALLET UNITS IN EACH LAYER WHERE PALLET UNITS ARE LOADED TWO HIGH.
- ⑦ DOORWAY PROTECTION STRAP, 1-1/4" X .035" OR .031" X 30'-6" OR 24'-0" LONG STEEL STRAPPING (8 REOD). INSTALL AROUND ONE STACK OF PALLET UNITS LOCATED IN THE DOORWAY AREA.
- ⑧ SEAL FOR 1-1/4" STEEL STRAPPING (64 REOD, 2 PER STRAP).

(SPECIAL NOTES CONTINUED)

- 6. IF A CAR IS EQUIPPED WITH SINGLE SLIDING DOORS, THE PALLETS HAVING THE 29-1/8" WIDTH ACROSS THE CAR MAY EXTEND INTO THE DOORWAY AREA, BUT LATERAL BRACING MUST BE PROVIDED BY INSTALLING DOORWAY PROTECTION GATES. SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 22 OR THE "DOORWAY PROTECTION B" DETAIL ON PAGE 23. FOR CARS EQUIPPED WITH STAGGERED DOUBLE SLIDING DOORS, DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE LATERAL BRACING FOR THE ADJACENT UNITS. THE CENTER OF THE CAR WILL BE LOADED WITH TWO OR MORE CROSSWISE ROWS, AS APPLICABLE. INSTALL BLOCKING AS SHOWN IN THE LOAD VIEW, OR AS SPECIFIED IN SPECIAL NOTE 5. IF A CAR IS EQUIPPED WITH DOUBLE SLIDING "THRU" DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH THE SEVEN LONG CROSSWISE ROWS.
- 7. IF A CAR IS EQUIPPED WITH A COMBINATION OF DOOR TYPES, WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE ENTIRE DOORWAY AREA WILL BE LOADED WITH CROSSWISE ROWS OF SEVEN WIDE BLOCKED WITH DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS.
- 8. A MAXIMUM OF 217 PALLET UNITS (THREE LENGTHWISE ROWS WITH TWO LAYERS OF 12 PALLET UNITS, WITH A TWO LAYER LENGTHWISE ROW OF SIX PALLET UNITS AGAINST THE WALL IN EACH END OF THE CAR, AND FOUR CROSSWISE ROWS WITH TWO LAYERS IN THREE ROWS AND ONE LAYER IN ONE ROW OF SEVEN PALLET UNITS IN THE CENTER OF THE CAR), FOR A LADING WEIGHT OF APPROXIMATELY 101,122 POUNDS, CAN BE LOADED IN A 40'-6" LONG CAR BY USING THE DEPICTED PROCEDURES, AND A MAXIMUM OF 336 PALLET UNITS (THREE LENGTHWISE ROWS WITH TWO LAYERS OF 20 PALLET UNITS, WITH A TWO LAYER LENGTHWISE ROW OF 10 PALLET UNITS AGAINST THE WALL IN EACH END OF THE CAR, AND FOUR CROSSWISE ROWS WITH TWO LAYERS IN ALL FOUR ROWS OF SEVEN PALLET UNITS IN THE CENTER OF THE CAR), FOR A LADING WEIGHT OF APPROXIMATELY 156,576 POUNDS, CAN BE LOADED IN A 60'-8" LONG CAR BY USING THE DEPICTED PROCEDURES.

SPECIAL NOTES:

- 1. A 50'-6" LONG BY 9'-2" WIDE WOOD-LINED CONVENTIONAL TYPE BOXCAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.
- 2. THE DETAIL FOR THE "CRIB FILL ASSEMBLIES" SPECIFIES THE USE OF 2" X 4" VERTICAL PIECES FOR A 9'-2" WIDE CAR AND 2" X 6" AND 2" X 8" VERTICAL PIECES FOR A 9'-4" AND 9'-6" WIDE CARS, RESPECTIVELY. THE TOTAL ACCUMULATED SPACE ACROSS A CAR MUST NOT BE MORE THAN 2". TO SATISFY THIS REQUIREMENT, THE WIDTH OF THE ASSEMBLIES CAN BE ADJUSTED BY INCREASING OR DECREASING THE WIDTH OF THE VERTICAL PIECES AND/OR BY CHANGING THE THICKNESS OR ADDING LAMINATIONS OF MATERIAL TO THE HORIZONTAL PIECES.
- 3. THE THICKNESS OF EACH "FILLER ASSEMBLY" WILL BE ADJUSTED AS REQUIRED TO LOCATE THE END OF THE PALLET UNIT NUMBERED 8 IN THE ROW ALONG THE CAR SIDEWALL EVEN WITH THE ROWS MARKED 16.
- 4. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED. THE LOAD CAN BE REDUCED BY SEVEN PALLET UNITS BY OMITTING ONE PALLET UNIT HAVING THE 14-5/8" DIMENSION ACROSS THE CAR AND THE LATERALLY ADJACENT SIX PALLETS HAVING THE 29-1/8" WIDTH ACROSS THE CAR. THE LOAD CAN BE REDUCED BY MULTIPLES OF SEVEN PALLET UNITS BY OMITTING LAYERS AND CROSSWISE ROWS FROM THE CENTER OF THE CAR. IF ALL BOTH CROSSWISE ROWS ARE OMITTED AT ONE OR BOTH ENDS OF A CAR, "CENTER GATE B" MUST BE SUBSTITUTED FOR THE CENTER GATE DEPICTED ON PAGE 4. IF INSTALLED STRUTS ARE 72" OR LONGER, THEY MUST BE STIFFENED BY THE APPLICATION OF STRUT BRACING, AS DEPICTED ON PAGE 21. ONE COMPLETE LAYER OF PALLET UNITS MAY ALSO BE ELIMINATED, IF NECESSARY. FOR OTHER QUANTITIES, ONE OR MORE FILLER ASSEMBLIES MAY BE POSITIONED IN PLACE OF OMITTED PALLET UNITS. SEE THE "FILLER ASSEMBLY B" DETAIL ON PAGE 18. FOR OTHER METHODS OF REDUCING A LOAD, AND FOR TYPICAL LCL PROCEDURES, REFER TO PAGES 8 THRU 15 FOR GUIDANCE.
- 5. IN A CAR EQUIPPED WITH SINGLE "THRU" PLUG TYPE DOORS, PALLETS WHICH ARE POSITIONED WITH THE 29-1/8" WIDTH OF THE UNIT ACROSS THE CAR MUST NOT BE LOADED SO AS TO EXTEND INTO THE DOORWAY AREA TO SUCH AN EXTENT THAT 6" OR LESS OF THE PALLET IS RETAINED BY A CAR SIDEWALL. TO SATISFY THIS REQUIREMENT, PALLETS WITH THE 29-1/8" WIDTH OF THE UNITS ACROSS THE CAR CAN BE LOADED 18 LONG IN CARS HAVING PLUG DOORS 6', 7', OR 8' WIDE. A CAR HAVING 9' OR 10' WIDE PLUG DOORS WILL BE LIMITED TO 17 PALLETS LONG IN EACH END, WITH THREE CROSSWISE ROWS POSSIBLE, BLOCKED WITH 8'-0" LONG DOORWAY BLOCKING. A CAR WITH 10'-6" TO 12' WIDE PLUG DOORS IS LIMITED TO 16 PALLETS LONG IN EACH END, WITH FOUR CROSSWISE ROWS POSSIBLE, BLOCKED WITH 10'-0" LONG DOORWAY BLOCKING. IF THE CAR IS EQUIPPED WITH DOUBLE "THRU" OR STAGGERED PLUG DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH CROSSWISE ROWS OF SEVEN WIDE BLOCKED WITH DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS. NOTE THAT THESE SPECIFIED LIMITS AS TO THE NUMBER OF PALLETS IN EACH END OF A CAR WILL VARY IN CARS OF OTHER LENGTHS.

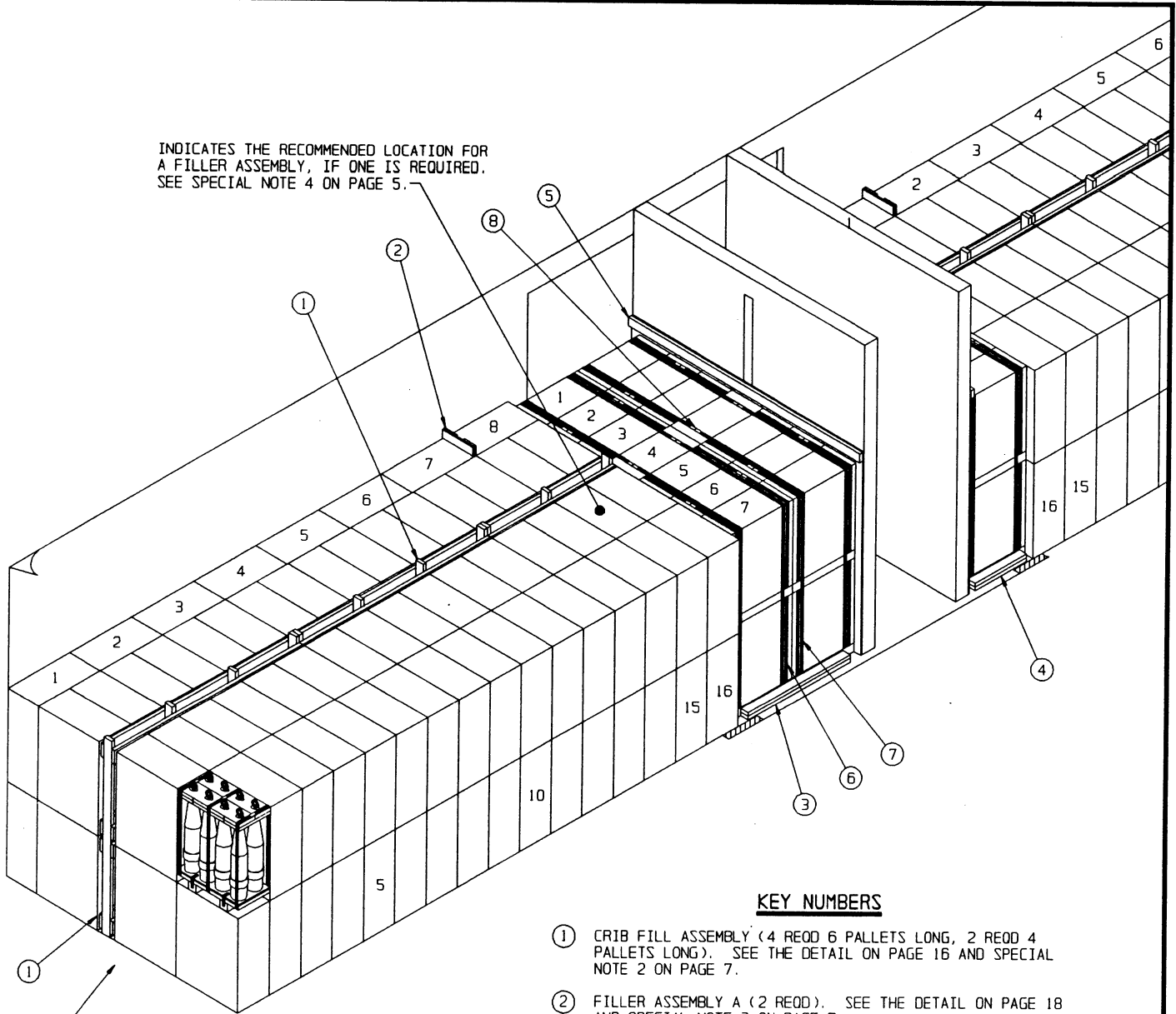
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BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	5	2
1" X 6"	14	7
2" X 2"	79	27
2" X 3"	8	4
2" X 4"	185	124
2" X 6"	548	548
NAILS	NO. REQD	POUNDS
6d (2")	24	1/4
10d (3")	858	13-3/4
12d (3-1/4")	80	1-1/2
16d (3-1/2")	56	1-1/4
STEEL STRAPPING, 1-1/4" - - 573'	REQD - - - -	82 LBS
SEAL FOR 1-1/4" STRAPPING - - 64'	REQD - - - -	3 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT - - - - -	273 - - - - -	127,218 LBS
DUNNAGE - - - - -	- - - - -	1,526 LBS
TOTAL WEIGHT - - - - -		128,744 LBS (APPROX)

INDICATES THE RECOMMENDED LOCATION FOR A FILLER ASSEMBLY, IF ONE IS REQUIRED. SEE SPECIAL NOTE 4 ON PAGE 5.



IF THE CAR ENDWALL IS BOWED MORE THAN 2", A END-OF-CAR BULKHEAD MUST BE INSTALLED. SEE THE DETAIL ON PAGE 20.

ISOMETRIC VIEW

KEY NUMBERS

- ① CRIB FILL ASSEMBLY (4 REOD 6 PALLETS LONG, 2 REOD 4 PALLETS LONG). SEE THE DETAIL ON PAGE 16 AND SPECIAL NOTE 2 ON PAGE 7.
- ② FILLER ASSEMBLY A (2 REOD). SEE THE DETAIL ON PAGE 18 AND SPECIAL NOTE 3 ON PAGE 7.
- ③ DOORWAY BLOCKING, 2" X 4" X 48" (DOUBLED) (2 REOD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ④ DOORWAY BLOCKING, 2" X 4" X 24" (DOUBLED) (2 REOD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑤ BUFFER GATE (2 REOD). SEE THE DETAIL ON PAGE 19 AND SPECIAL NOTE 9 ON PAGE 7.
- ⑥ BUNDLING STRAP, 1-1/4" X .035" OR .031" X 14'-3" LONG STEEL STRAPPING (24 REOD). INSTALL TO BUNDLE THE OUTER 12 GROUPS OF THREE PALLET UNITS IN EACH LAYER.
- ⑦ DOORWAY PROTECTION STRAP, 1-1/4" X .035" OR .031" X 30'-6" LONG STEEL STRAPPING (6 REOD). INSTALL AROUND ONE STACK OF PALLET UNITS LOCATED IN THE DOORWAY AREA.
- ⑧ SEAL FOR 1-1/4" STEEL STRAPPING (60 REOD, 2 PER STRAP).

(SPECIAL NOTES CONTINUED)

6. IF A CAR IS EQUIPPED WITH SINGLE SLIDING DOORS, THE PALLETS HAVING THE 29-1/8" WIDTH ACROSS THE CAR MAY EXTEND INTO THE DOORWAY AREA, BUT LATERAL BRACING MUST BE PROVIDED BY INSTALLING DOORWAY PROTECTION GATES. SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 22 OR THE "DOORWAY PROTECTION B" DETAIL ON PAGE 23. FOR CARS EQUIPPED WITH STAGGERED DOUBLE SLIDING DOORS, DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE LATERAL BRACING FOR THE ADJACENT UNITS. THE CENTER OF THE CAR WILL BE LOADED WITH TWO OR MORE CROSSWISE ROWS, AS APPLICABLE. INSTALL BLOCKING AS SHOWN IN THE LOAD VIEW, OR AS SPECIFIED IN SPECIAL NOTE 5. IF A CAR IS EQUIPPED WITH DOUBLE SLIDING "THRU" DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH THE SEVEN LONG CROSSWISE ROWS.
7. IF A CAR IS EQUIPPED WITH A COMBINATION OF DOOR TYPES, WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE ENTIRE DOORWAY AREA WILL BE LOADED WITH CROSSWISE ROWS OF SEVEN WIDE BLOCKED WITH DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS.
8. A MAXIMUM OF 210 PALLET UNITS (THREE LENGTHWISE ROWS WITH TWO LAYERS OF 12 PALLET UNITS, WITH A TWO LAYER LENGTHWISE ROW OF SIX PALLET UNITS AGAINST THE WALL IN EACH END OF THE CAR, AND THREE CROSSWISE ROWS WITH TWO LAYERS IN ALL FOUR ROWS OF SEVEN PALLET UNITS IN THE CENTER OF THE CAR), FOR A LADING WEIGHT OF APPROXIMATELY 97,860 POUNDS, CAN BE LOADED IN A 40'-6" LONG CAR BY USING THE DEPICTED PROCEDURES, AND A MAXIMUM OF 322 PALLET UNITS (THREE LENGTHWISE ROWS WITH TWO LAYERS OF 20 PALLET UNITS, WITH A TWO LAYER LENGTHWISE ROW OF 10 PALLET UNITS AGAINST THE WALL IN EACH END OF THE CAR, AND THREE CROSSWISE ROWS WITH TWO LAYERS IN ALL FOUR ROWS OF SEVEN PALLET UNITS IN THE CENTER OF THE CAR), FOR A LADING WEIGHT OF APPROXIMATELY 150,052 POUNDS, CAN BE LOADED IN A 60'-8" LONG CAR BY USING THE DEPICTED PROCEDURES.
9. THE BUFFER GATE IS ONLY REQUIRED WHEN THE SMALL DIMENSION OF THE PALLET UNITS IS POSITIONED SO AS TO BE ADJACENT TO A LOAD DIVIDER BULKHEAD. THE BUFFER GATE WILL NOT BE REQUIRED WHEN THE LONG DIMENSION OF THE PALLET UNIT WILL BE ADJACENT TO THE BULKHEAD.

SPECIAL NOTES:

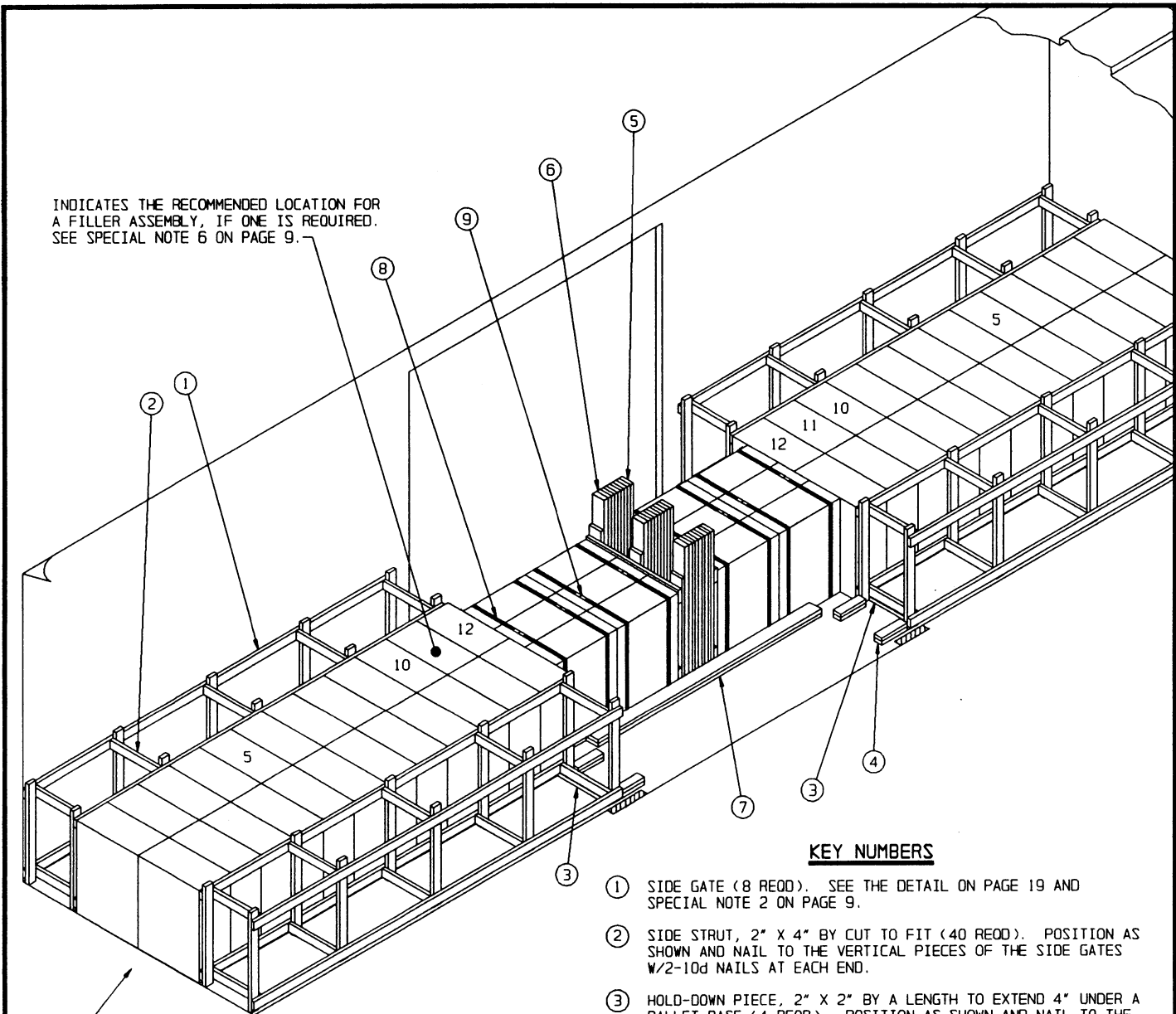
1. A 50'-6" LONG BY 9'-2" WIDE CUSHIONED BOXCAR EQUIPPED WITH LOAD DIVIDER BULKHEADS, AND WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.
2. THE DETAIL FOR THE "CRIB FILL ASSEMBLIES" SPECIFIES THE USE OF 2" X 4" VERTICAL PIECES FOR A 9'-2" WIDE CAR AND 2" X 6" AND 2" X 8" VERTICAL PIECES FOR A 9'-4" AND 9'-6" WIDE CARS, RESPECTIVELY. THE TOTAL ACCUMULATED SPACE ACROSS A CAR MUST NOT BE MORE THAN 2". TO SATISFY THIS REQUIREMENT, THE WIDTH OF THE ASSEMBLIES CAN BE ADJUSTED BY INCREASING OR DECREASING THE WIDTH OF THE VERTICAL PIECES AND/OR BY CHANGING THE THICKNESS OR ADDING LAMINATIONS OF MATERIAL TO THE HORIZONTAL PIECES.
3. THE THICKNESS OF EACH "FILLER ASSEMBLY" WILL BE ADJUSTED AS REQUIRED TO LOCATE THE END OF THE PALLET UNIT NUMBERED 8 IN THE ROW ALONG THE CAR SIDEWALL EVEN WITH THE ROWS MARKED 16.
4. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED. THE LOAD DIVIDER BULKHEADS CAN BE POSITIONED NEARER THE CAR ENDWALL, THEREBY DECREASING THE NUMBER OF PALLETS IN A LENGTHWISE ROW, OR DECREASING THE LOAD BY THE NUMBER OF PALLET UNITS IN A CROSSWISE ROW. FOR THOSE QUANTITIES WHICH CANNOT BE ATTAINED IN ANY OF THESE WAYS, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS TO REACH THE DESIRED QUANTITY. SEE THE "FILLER ASSEMBLY B" DETAIL ON PAGE 18.
5. IN A CAR EQUIPPED WITH SINGLE "THRU" PLUG TYPE DOORS, PALLETS WHICH ARE POSITIONED WITH THE 29-1/8" WIDTH OF THE UNIT ACROSS THE CAR MUST NOT BE LOADED SO AS TO EXTEND INTO THE DOORWAY AREA TO SUCH AN EXTENT THAT 6" OR LESS OF THE PALLET IS RETAINED BY A CAR SIDEWALL. TO SATISFY THIS REQUIREMENT, PALLETS WITH THE 29-1/8" WIDTH OF THE UNITS ACROSS THE CAR CAN BE LOADED 18 LONG IN CARS HAVING PLUG DOORS 6', 7', OR 8' WIDE. A CAR HAVING 9' OR 10' WIDE PLUG DOORS WILL BE LIMITED TO 17 PALLETS LONG IN EACH END, WITH THREE CROSSWISE ROWS POSSIBLE, BLOCKED WITH 8'-0" LONG DOORWAY BLOCKING. A CAR WITH 10'-6" TO 12' WIDE PLUG DOORS IS LIMITED TO 16 PALLETS LONG IN EACH END, WITH FOUR CROSSWISE ROWS POSSIBLE, BLOCKED WITH 10'-0" LONG DOORWAY BLOCKING. IF THE CAR IS EQUIPPED WITH DOUBLE "THRU" OR STAGGERED PLUG DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH CROSSWISE ROWS OF SEVEN WIDE BLOCKED WITH DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS. NOTE THAT THESE SPECIFIED LIMITS AS TO THE NUMBER OF PALLETS IN EACH END OF A CAR WILL VARY IN CARS OF OTHER LENGTHS.

(CONTINUED AT LEFT)

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	5	2
1" X 6"	14	7
2" X 4"	188	126
2" X 6"	312	312
NAILS	NO. REOD	POUNDS
6d (2")	58	1/2
10d (3")	528	8-1/4
16d (3-1/2")	32	3/4
STEEL STRAPPING, 1-1/4"	-- 525' REOD	--- 75 LBS
SEAL FOR 1-1/4" STRAPPING	-- 60 REOD	--- 3 LBS
PLYWOOD, 1/2"	--- 125 SQ FT REOD	--- 172 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	--- 266	--- 123,956 LBS
DUNNAGE	---	--- 1,154 LBS
TOTAL WEIGHT		--- 125,110 LBS (APPROX)



INDICATES THE RECOMMENDED LOCATION FOR A FILLER ASSEMBLY, IF ONE IS REQUIRED. SEE SPECIAL NOTE 6 ON PAGE 9.

IF THE CAR ENDWALL IS BOWED MORE THAN 2", A END-OF-CAR BULKHEAD MUST BE INSTALLED. SEE THE DETAIL ON PAGE 20.

ISOMETRIC VIEW

KEY NUMBERS

- ① SIDE GATE (8 REED). SEE THE DETAIL ON PAGE 19 AND SPECIAL NOTE 2 ON PAGE 9.
- ② SIDE STRUT, 2" X 4" BY CUT TO FIT (40 REED). POSITION AS SHOWN AND NAIL TO THE VERTICAL PIECES OF THE SIDE GATES W/2-10d NAILS AT EACH END.
- ③ HOLD-DOWN PIECE, 2" X 2" BY A LENGTH TO EXTEND 4" UNDER A PALLET BASE (4 REED). POSITION AS SHOWN AND NAIL TO THE VERTICAL PIECES OF THE SIDE GATES W/2-10d NAILS AT EACH JOINT.
- ④ SIDE GATE RETAINER CLEAT, 2" X 4" X 12" (DOUBLED) (8 REED). NAIL THE FIRST PIECE TO THE CAR FLOOR W/2-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑤ CENTER GATE A (2 REED). SEE THE DETAIL ON PAGE 17 AND SPECIAL NOTE 5 ON PAGE 9.
- ⑥ SOLID FILL, 6" WIDE BY 56" LONG BY THE THICKNESS REQUIRED TO PROVIDE A WEDGE FIT BETWEEN THE VERTICAL PIECES OF THE LONGITUDINALLY ADJACENT CENTER GATES (REED AT 3 PLACES). NAIL THE FIRST PIECE TO THE EXTENDED VERTICAL PIECE OF ONE CENTER GATE W/5-10d NAILS. NAIL EACH ADDITIONAL PIECE TO A PREVIOUSLY INSTALLED PIECE W/5-10d NAILS. NAIL THRU EACH VERTICAL PIECE OF THE OTHER CENTER GATE INTO THE LAST SOLID FILL PIECE W/3-10d NAILS. SEE SPECIAL NOTE 4 ON PAGE 9.
- ⑦ DOORWAY BLOCKING, 2" X 6" BY A LENGTH TO EXTEND TO THE CENTERS OF THE WIDTH OF THE OUTWARD CROSSWISE ROWS (DOUBLED) (2 REED). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑧ DOORWAY PROTECTION STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT STEEL STRAPPING (8 REED). INSTALL AROUND ONE STACK OF PALLET UNITS LOCATED IN THE DOORWAY AREA.
- ⑨ SEAL FOR 1-1/4" STEEL STRAPPING (16 REED, 2 PER STRAP).

LOAD PATTERN CHART			
LENGTHWISE ROWS		CROSSWISE ROWS	
NO. WIDE	GATE REOD*	NO. OF UNITS	GATE REOD
3-WIDE	GATE B	5 MIN-7 MAX	GATE A
2-WIDE	GATE B	3 MIN-5 MAX	GATE A
1-WIDE	GATE B	NONE PERMITTED	X

* THE CENTER GATE SPECIFIED IN THIS COLUMN IS FOR USE ONLY WHEN THERE ARE NO CROSSWISE ROWS IN THE LOAD.

SPECIAL NOTES:

1. A 60-UNIT LOAD IS SHOWN AS A TYPICAL LCL LOAD IN A 40'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOXCAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.
2. THE PALLET UNITS IN EITHER END OF THE CAR WHICH ARE POSITIONED WITH THE WIDTH (LONG DIMENSION) ACROSS THE CAR MUST NOT BE LOADED SO AS TO EXTEND INTO THE DOORWAY AREA OF A CAR EQUIPPED WITH SINGLE CONVENTIONAL SLIDING OR PLUG TYPE "THRU" DOORS. THE NUMBER OF LOAD UNITS IN EACH END POSITIONED WITH THE WIDTH ACROSS THE CAR MUST BE REDUCED (WITH AN ACCOMPANYING REDUCTION IN THE LENGTH OF THE SIDE GATE), AND THE NUMBER OF CROSSWISE ROWS IN THE DOORWAY AND/OR THE AMOUNT OF CENTER BLOCKING INCREASED TO SATISFY THIS REQUIREMENT. FOR CARS EQUIPPED WITH STAGGERED DOUBLE SLIDING DOORS, DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE LATERAL BRACING FOR THE SIDE GATES. SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 22 OR THE "DOORWAY PROTECTION B" DETAIL ON PAGE 23. CAUTION: CARS EQUIPPED WITH STAGGERED DOUBLE PLUG DOORS MUST NOT BE USED.
3. CENTER GATE A IS USED FOR BRACING OF THE DEPICTED TYPICAL LOAD. IF THE LOAD CONTAINS NO CROSSWISE ROWS, CENTER GATE B WILL BE SUBSTITUTED.
4. SOLID FILL TYPE CENTER BLOCKING AS TYPICALLY SHOWN IS APPLICABLE WHEN THE VOID SPACE AT THE CENTER OF THE CAR IS APPROXIMATELY 18" OR LESS. FOR A GREATER SPACE, STRUT TYPE CENTER BLOCKING WILL BE USED. SEE THE LOAD VIEW ON PAGE 6 FOR A TYPICAL INSTALLATION. LOADS SHOULD BE DESIGNED SO THAT THE STRUTS WILL BE AS SHORT AS POSSIBLE, HOWEVER, IF LONG STRUTS CANNOT BE AVOIDED, STRUTS WHICH ARE 72" OR LONGER MUST BE STIFFENED BY THE APPLICATION OF STRUT BRACING. SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 21 FOR GUIDANCE.
5. A LOAD WHERE THE MAIN PORTION IS TWO PALLET UNITS WIDE AND WHERE THERE ARE FOUR CROSSWISE ROWS AT THE CENTER WHICH ARE THREE PALLET UNITS IN LENGTH IS SHOWN AS A TYPICAL LOAD PATTERN. THE NUMBER OF ROWS IN THE MAIN PORTION MAY BE ADJUSTED FROM ONE THRU THREE AND THE NUMBER OF CROSSWISE ROWS MAY BE ADJUSTED FROM TWO THRU FOUR. THE NUMBER OF UNITS LONG ACROSS THE CAR IN THE CENTER PORTION IS ALSO ADJUSTABLE BUT MUST NOT VARY MORE THAN THE MINIMUM AND MAXIMUM NUMBERS SPECIFIED BY THE "LOAD PATTERN CHART" AT LEFT FOR THE NUMBER OF LENGTHWISE ROWS IN THE MAIN PORTION OF THE LOAD. THE PROPER CENTER GATES TO BE USED ARE ALSO SPECIFIED IN THE CHART, EITHER FOR BRACING BETWEEN THE CROSSWISE ROWS, OR FOR BRACING BETWEEN THE LENGTHWISE ROWS IN LOADS NOT HAVING ANY CROSSWISE ROWS.
6. FOR THOSE LOAD QUANTITIES WHICH CANNOT BE ATTAINED BY ADJUSTING THE LOAD PATTERN AS SPECIFIED IN SPECIAL NOTE 5 AND AS INDICATED IN THE "LOAD PATTERN CHART" AT LEFT, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS TO REACH THE DESIRED QUANTITY. SEE THE "FILLER ASSEMBLY B" DETAIL ON PAGE 18.

BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	18	6
2" X 3"	8	4
2" X 4"	467	312
2" X 6"	187	187
NAILS	NO. REOD	POUNDS
10d (3")	621	9-3/4
16d (3-1/2")	84	2
STEEL STRAPPING, 1-1/4" - - 114' REOD - - - - 17 LBS		
SEAL FOR 1-1/4" STRAPPING - - 16 REOD - - - - 1 LBS		

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLET UNIT	60	27,960 LBS
DUNNAGE		1,048 LBS
TOTAL WEIGHT		29,008 LBS (APPROX)

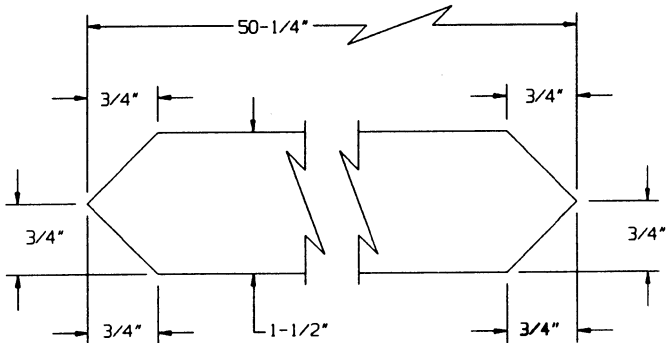
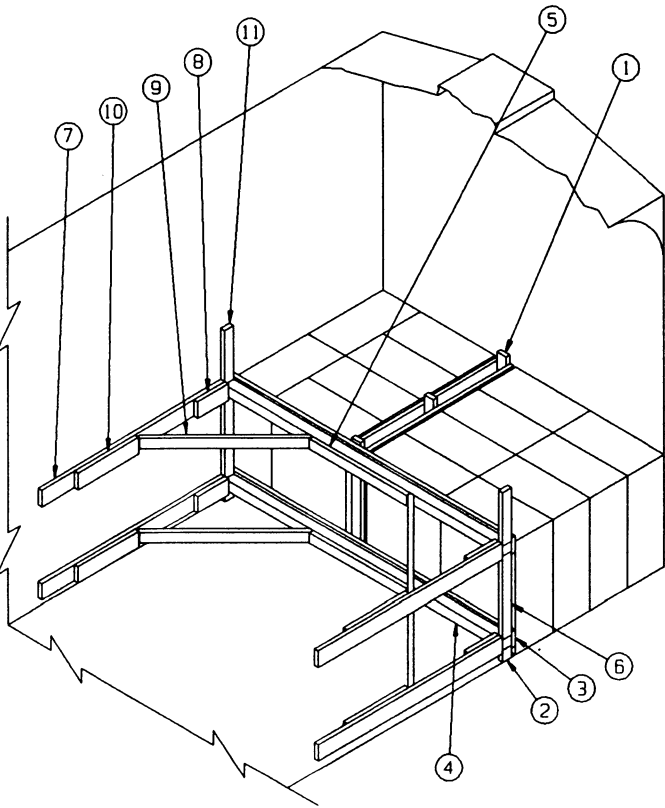
KEY NUMBERS

- ① CRIB FILL ASSEMBLY (1 REED). SEE THE DETAIL ON PAGE 16.
- ② SUPPORT CLEAT, 2" X 4" X 4" (2 REED). PRE-DRILL AND NAIL TO THE CAR SIDEWALL W/2-12d NAILS.
- ③ LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH IN LENGTH (CUT TO FIT) (2 REED). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ④, W/1-12d NAIL EVERY 6".
- ④ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH IN LENGTH (CUT TO FIT) (2 REED).
- ⑤ CENTER CLEAT, 2" X 4" X 36" (2 REED). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ④, W/7-16d NAILS. SEE SPECIAL NOTE 3 BELOW.
- ⑥ SPACER CLEAT, 2" X 4" X 28" (2 REED). NAIL TO THE CAR SIDEWALL W/16-12d NAILS.
- ⑦ HORIZONTAL WALL CLEAT, 2" X 6" X 72" (4 REED). NAIL TO THE CAR SIDEWALL W/16-12d NAILS.
- ⑧ POCKET CLEAT, 2" X 6" X 12" (4 REED). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑦, W/4-16d NAILS.
- ⑨ DIAGONAL BRACE, 2" X 4" X 50-1/4" (4 REED). SEE THE DETAIL BELOW FOR BEVEL-CUTS REQUIRED. TOENAIL TO THE CROSS CAR BRACE, PIECE MARKED ④, AND TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑦, W/2-16d NAILS AT EACH END.
- ⑩ BACK-UP CLEAT, 2" X 6" X 24" (4 REED). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑦, W/8-16d NAILS.
- ⑪ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REED). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.

SPECIAL NOTES:

- 1. A 9'-2" WIDE CONVENTIONAL WOOD-LINED (ENDWALLS AND SIDEWALLS) BOXCAR IS SHOWN WITH A TYPICAL K-BRACE. WOOD-LINED CARS OF OTHER WIDTHS CAN BE USED.
- 2. THE K-BRACE METHOD OF PARTIAL-LAYER BRACING MAY BE USED IN A WOOD-LINED CAR FOR THE SECUREMENT OF A PARTIAL TOP TIER, BE IT A FIRST, SECOND OR THIRD TIER. THE TYPE "A" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER OF NOT MORE THAN 4,000 POUNDS. IF IT IS NECESSARY TO BLOCK A HEAVIER LOAD, REFER TO THE DETAILS ON PAGES 11 THRU 13.
- 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. FILLER ASSEMBLY B WILL BE USED IN OBTAINING A QUANTITY LESS THAN THAT DEPICTED ABOVE. SEE THE DETAIL ON PAGE 18.

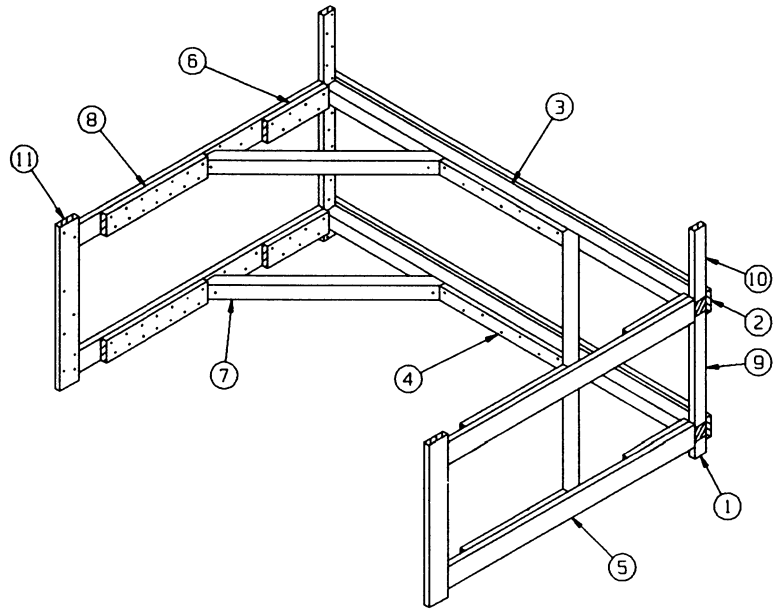
ISOMETRIC VIEW



DIAGONAL BRACE

SPECIAL NOTES:

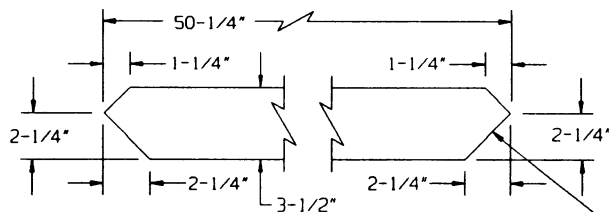
1. THE TYPE "B" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER OF NOT MORE THAN 14,000 POUNDS. THIS WILL BE NOT MORE THAN 30 PALLET UNITS. IF IT IS NECESSARY TO BLOCK MORE THAN 30 PALLET UNITS, REFER TO THE DETAILS ON PAGES 12 AND 13 FOR SELECTION OF THE APPLICABLY SIZED K-BRACE TO USE AND THE DESIGN SPECIFICATIONS FOR THE BRACE. IF LESS THAN 30 PALLET UNITS ARE TO BE SHIPPED IN THE PARTIAL LAYER, THE TYPE "A" K-BRACE DEPICTED ON PAGE 10 MAY BE USED.
2. **CAUTION:** SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL-LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL TIER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ①, ②, ③, ⑥, ⑨, ⑩, AND ⑪, MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDEWALL. IT IS ALRIGHT FOR THE ENDS OF THE DIAGONAL BRACES MARKED ⑦ TO BEAR IN FRONT OF A DOOR OPENING, HOWEVER, THE ADJACENT PIECE MARKED ⑤ MUST BE DOUBLED AND EXTENDED ACROSS AND FAR ENOUGH PAST THE DOOR OPENING (REF: 54") TO PROVIDE FOR THE SPECIFIED NAILING OF EACH PIECE. LAMINATE THE SECOND PIECE OF THE DOUBLED PIECE MARKED ⑤ TO THE FIRST W/16-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL WALL CLEAT WITHIN THE DOOR OPENING. NOTE THAT THE DIAGONAL BRACE WILL BE 49-1/8" LONG IN LIEU OF 50-1/4" WHEN PIECE MARKED ⑤ IS DOUBLED.
3. THE CENTER CLEAT, SHOWN AS PIECE MARKED ④, WILL BE 28" LONG FOR AN 8'-6" WIDE CAR, 35" 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 10 FOR A TYPICAL INSTALLATION OF A K-BRACE.



ISOMETRIC VIEW

KEY NUMBERS

- ① SUPPORT CLEAT, 2" X 4" X 4" (2 REOD). PRE-DRILL AND NAIL TO THE CAR SIDEWALL W/2-12d NAILS.
- ② LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT) (2 REOD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6".
- ③ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH (CUT TO FIT) (2 REOD).
- ④ CENTER CLEAT, 2" X 4" X 36" (2 REOD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/7-16d NAILS. SEE SPECIAL NOTE 3 AT LEFT.
- ⑤ HORIZONTAL WALL CLEAT, 2" X 6" X 72" (4 REOD). NAIL TO THE CAR SIDEWALL W/16-12d NAILS.
- ⑥ POCKET CLEAT, 2" X 6" X 18" (4 REOD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/7-16d NAILS.
- ⑦ DIAGONAL BRACE, 4" X 4" X 50-1/4" (4 REOD). 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. SEE SPECIAL NOTE 2 AT LEFT.
- ⑧ BACK-UP CLEAT, 2" X 6" X 30" (4 REOD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/14-16d NAILS.
- ⑨ SPACER CLEAT, 2" X 4" X 28" (2 REOD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ⑩ HOLD-DOWN CLEAT, 2" X 6" X 18" (2 REOD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ⑪ VERTICAL BACK-UP CLEAT, 2" X 6" X 39" (2 REOD). NAIL TO THE CAR SIDEWALL W/8-12d NAILS.

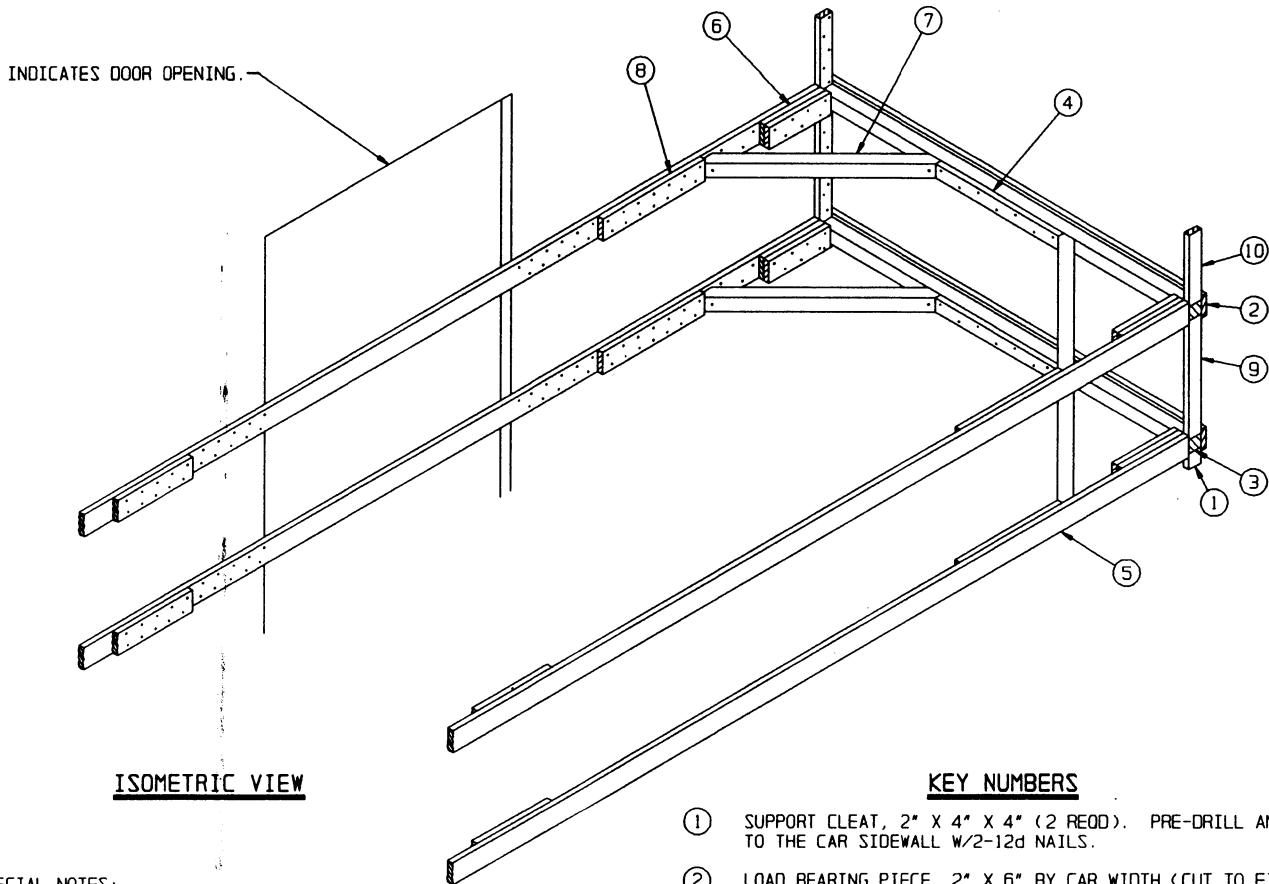


DIAGONAL BRACE

SEE SPECIAL NOTE 2 ABOVE.

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

TYPE "B" K-BRACE



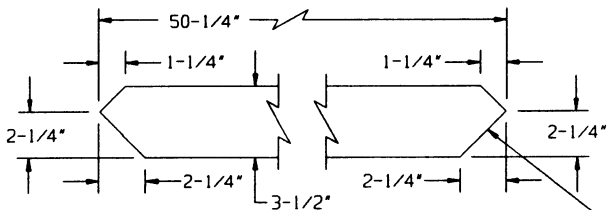
ISOMETRIC VIEW

KEY NUMBERS

- ① SUPPORT CLEAT, 2" X 4" X 4" (2 REOD). PRE-DRILL AND NAIL TO THE CAR SIDEWALL W/2-12d NAILS.
- ② LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT) (2 REOD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6".
- ③ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH (CUT TO FIT) (2 REOD).
- ④ CENTER CLEAT, 2" X 4" X 36" (2 REOD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/7-16d NAILS. SEE SPECIAL NOTE 4 AT LEFT.
- ⑤ HORIZONTAL WALL CLEAT, 2" X 6" BY CUT TO FIT (4 REOD). 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 REOD). 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 REOD). 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 REOD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/14-16d NAILS.
- ⑨ SPACER CLEAT, 2" X 4" X 28" (2 REOD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ⑩ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REOD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.

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 42 PALLET UNITS. REFER TO PAGES 10, 11 AND 13 FOR A K-BRACE WHICH WILL BE ADEQUATE FOR A LESSER OR GREATER QUANTITY OF PALLET UNITS.
- 2. **CAUTION:** SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL-LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL TIER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ①, ②, ③, ⑥, ⑨ AND ⑩ MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDEWALL. IT IS ALRIGHT FOR THE ENDS OF THE DIAGONAL BRACES MARKED ⑦ TO BEAR IN FRONT OF A DOOR OPENING, HOWEVER, THE ADJACENT PIECE MARKED ⑤ MUST BE DOUBLED. LAMINATE THE SECOND PIECE TO THE FIRST W/40-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL WALL CLEAT WITHIN THE DOOR OPENING. NOTE THAT THE DIAGONAL BRACE WILL BE 49-1/8" LONG IN LIEU OF 50-1/4" WHEN PIECE MARKED ⑤ IS DOUBLED.
- 3. **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.
- 4. 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.
- 5. REFER TO PAGE 10 FOR A TYPICAL INSTALLATION OF A K-BRACE.



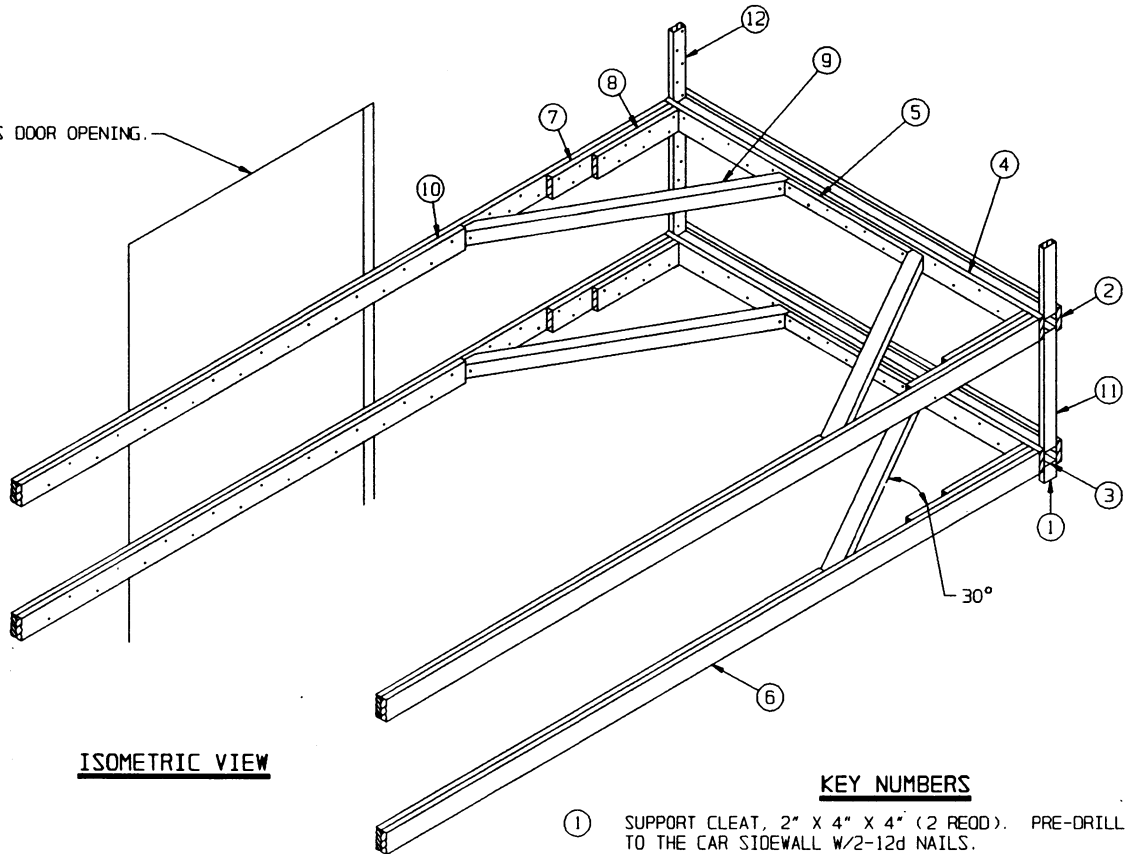
DIAGONAL BRACE

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.

SEE SPECIAL NOTE 2 ABOVE.

TYPE "C" K-BRACE

INDICATES DOOR OPENING.



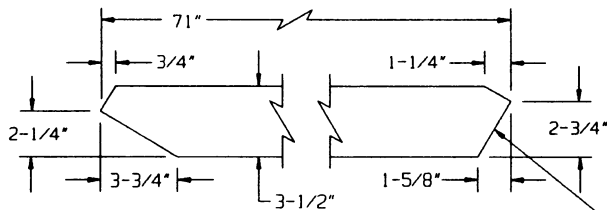
ISOMETRIC VIEW

KEY NUMBERS

SPECIAL NOTES:

1. THE TYPE "D" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER OF NOT MORE THAN 25,000 POUNDS IN EACH END OF THE CAR. THIS WILL BE NOT MORE THAN 53 PALLET UNITS. REFER TO PAGES 10 THRU 12 FOR A K-BRACE WHICH WILL BE ADEQUATE FOR A LESSER QUANTITY OF PALLET UNITS.
2. CAUTION: SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL-LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL TIER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ①, ②, ③, ④, ⑦, ⑧, ⑩, AND ⑫ MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDEWALL. IT IS ALRIGHT FOR THE ENDS OF THE DIAGONAL BRACES MARKED ⑨ TO BEAR IN FRONT OF A DOOR OPENING, HOWEVER, THE ADJACENT PIECE MARKED ⑥ MUST BE DOUBLED. LAMINATE THE SECOND PIECE TO THE FIRST W/40-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL WALL CLEAT WITHIN THE DOOR OPENING. NOTE THAT THE DIAGONAL BRACE WILL BE 70-1/4" LONG IN LIEU OF 71" LONG WHEN PIECE MARKED ⑥ IS DOUBLED.
3. THE CENTER CLEAT, SHOWN AS PIECE MARKED ⑤, WILL BE 28" LONG FOR AN 8'-6" WIDE CAR, 36" LONG FOR A 9'-2", AND 38" LONG FOR A 9'-4" WIDE CAR. ADJUST THE LENGTH PROPORTIONATELY FOR CARS OF OTHER WIDTHS.
4. CAUTION: A TYPE "D" K-BRACE MUST BE USED IN BOTH ENDS OF THE CAR; THE BRACE IS NOT DESIGNED FOR USE IN ONLY ONE END. NOTE THAT EXCEPT FOR PIECES MARKED ⑥ AND ⑩, THE QUANTITIES SPECIFIED ARE APPLICABLE ONLY FOR THE BRACE IN ONE END.
5. REFER TO PAGE 10 FOR A TYPICAL INSTALLATION OF A K-BRACE.

- ① SUPPORT CLEAT, 2" X 4" X 4" (2 REED). PRE-DRILL AND NAIL TO THE CAR SIDEWALL W/2-12d NAILS.
- ② LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT) (2 REED). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6".
- ③ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH (CUT TO FIT) (2 REED).
- ④ HORIZONTAL PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT) (2 REED). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6".
- ⑤ CENTER CLEAT, 2" X 4" X 36" (2 REED). 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 REED). A CLEAT WILL BE OF A LENGTH AS NECESSARY TO EXTEND ACROSS AND FAR ENOUGH PAST THE DOOR OPENINGS TO CONTACT PIECE MARKED ④ OF THE K-BRACE IN THE OPPOSITE END OF THE CAR. NAIL TO THE CAR SIDEWALL W/40-12d NAILS.
- ⑦ POCKET CLEAT, 2" X 6" X 36" (4 REED). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/10-16d NAILS.
- ⑧ POCKET CLEAT, 2" X 6" X 24" (4 REED). NAIL TO THE POCKET CLEAT, PIECE MARKED ⑦, W/7-16d NAILS.
- ⑨ DIAGONAL BRACE, 4" X 4" X 71" (4 REED). 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 REED). 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 28" (2 REED). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ⑫ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REED). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.

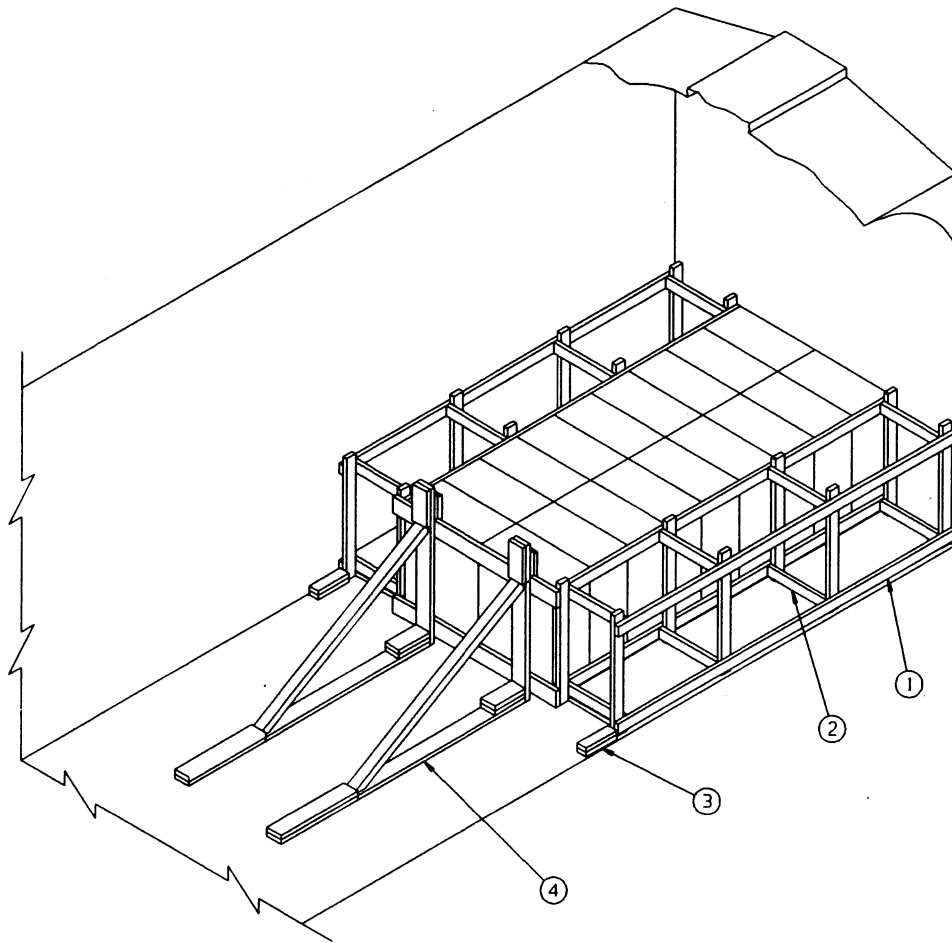


DIAGONAL BRACE

SEE SPECIAL NOTE 2 ABOVE.

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

TYPE "D" K-BRACE



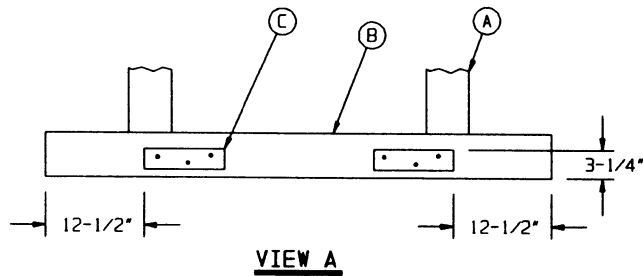
ISOMETRIC VIEW

SPECIAL NOTES:

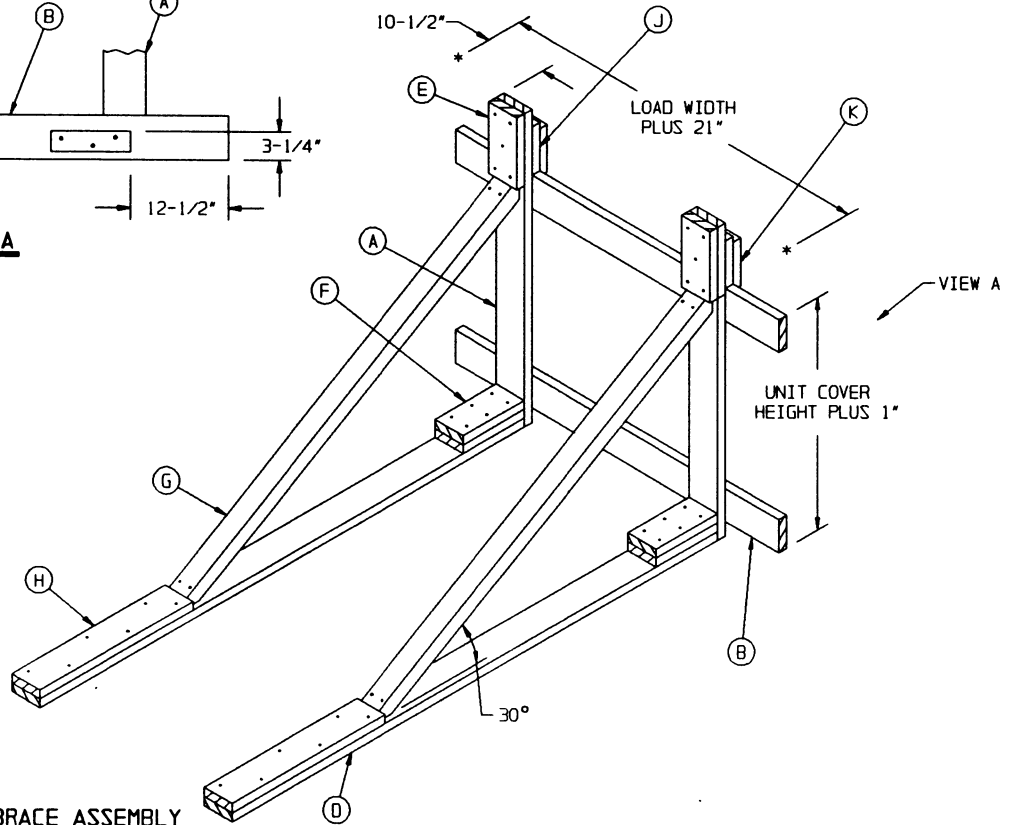
1. AN 18-UNIT LOAD IS SHOWN IN A 9'-2" WIDE CONVENTIONAL BOXCAR. CARS OF OTHER WIDTHS CAN ALSO BE USED.
2. THE KNEE BRACE ASSEMBLY IS ADEQUATE FOR RETAINING A MAXIMUM LCL LOAD OF NOT MORE THAN 8,500 POUNDS. THIS WILL BE NOT MORE THAN 18 PALLET UNITS.
3. WHEN LOADING MORE THAN ONE ROW OF PALLET UNITS, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS TO PROVIDE FOR EVEN ROWS AND TO ATTAIN THE QUANTITY IT IS DESIRED TO SHIP. SEE THE "FILLER ASSEMBLY B" DETAIL ON PAGE 18.
4. ADDITIONAL PALLET UNITS CAN BE RETAINED BY ADDING AN EXTRA "KNEE", PIECES MARKED (A) AND (D) THRU (K) ON PAGE 15, SO AS TO BE CENTERED BETWEEN THE BRACES OF THE ASSEMBLY. THE ASSEMBLY WILL THEN BE ADEQUATE FOR RETAINING A MAXIMUM LCL LOAD OF 12,750 POUNDS. THIS ADDITIONAL "KNEE" IS REQUIRED IF LOADING PALLET UNITS THREE WIDE ACROSS THE WIDTH OF THE CAR.

KEY NUMBERS

- (1) SIDE GATE (4 REOD). SEE THE DETAIL ON PAGE 19.
- (2) SIDE STRUT, 2" X 4" BY CUT TO FIT (16 REOD). POSITION AS SHOWN AND NAIL TO THE VERTICAL PIECES OF THE SIDE GATES W/2-10d NAILS AT EACH END.
- (3) SIDE GATE RETAINER CLEAT, 2" X 4" X 12" (DOUBLED) (2 REOD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/2-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- (4) KNEE BRACE ASSEMBLY (1 REOD). SEE THE DETAIL ON PAGE 15 AND SPECIAL NOTE 2 AT LEFT.



VIEW A



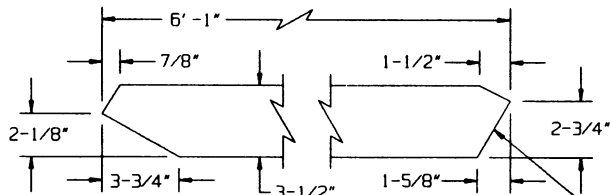
KNEE BRACE ASSEMBLY

KEY LETTERS

SPECIAL NOTE:

ONE KNEE BRACE ASSEMBLY WITH TWO KNEES IS SHOWN. ADDITIONAL KNEES MUST BE USED WHEN SHIPPING MORE THAN 18 PALLET UNITS, OR WHEN SHIPPING MORE THAN TWO ROWS OF PALLETS. SEE SPECIAL NOTE 4 ON PAGE 14.

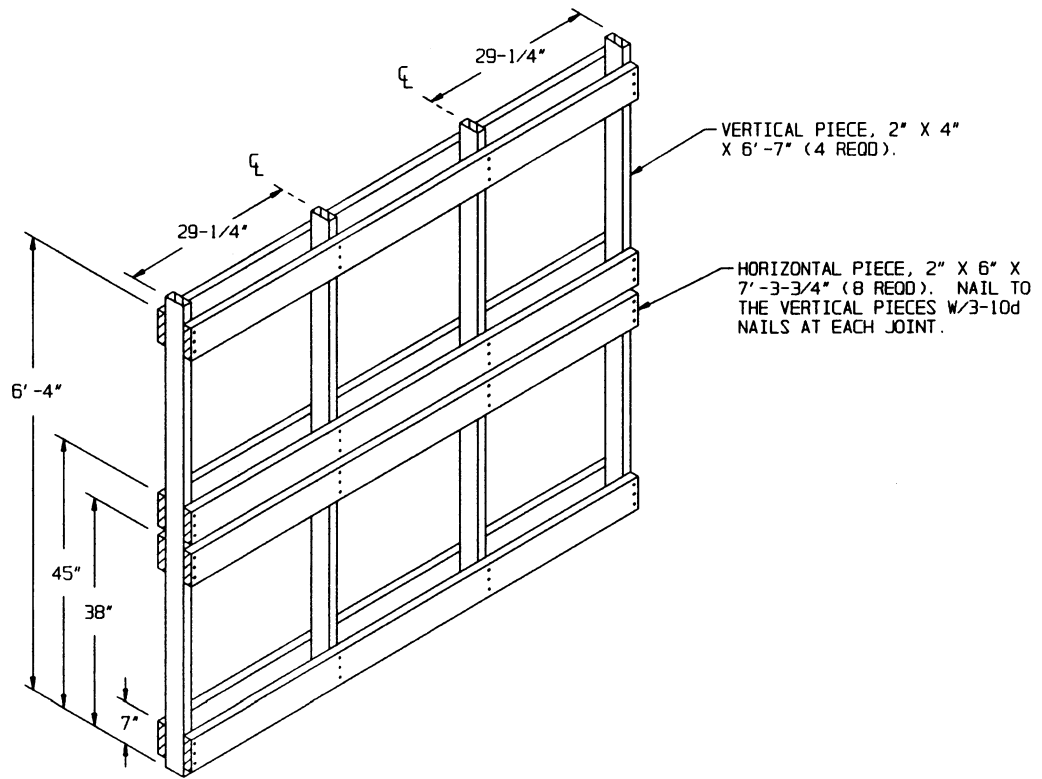
- (A) VERTICAL PIECE, 2" X 6" BY PALLET UNIT COVER HEIGHT PLUS 12" (REF: 50") (2 REOD). NAIL TO A FLOOR CLEAT, PIECE MARKED (D), W/3-16d NAILS.
- (B) HORIZONTAL PIECE, 2" X 6" BY LOAD WIDTH PLUS 6" (2 REOD). NAIL TO THE VERTICAL PIECES, PIECE MARKED (A), W/3-10d NAILS AT EACH JOINT.
- (C) HOLD-DOWN CLEAT, 2" X 3" X 10" (2 REOD). LOCATE AS SHOWN IN "VIEW A" ABOVE. PRE-DRILL AS NECESSARY AND NAIL TO A HORIZONTAL PIECE, PIECE MARKED (B), W/3-10d NAILS.
- (D) FLOOR CLEAT, 2" X 6" X 7'-10" (2 REOD). ALIGN WITH A VERTICAL PIECE AND NAIL TO THE CAR FLOOR W/1-16d NAIL EVERY 8".
- (E) HOLD-DOWN CLEAT, 2" X 4" X 12" (2 REOD). NAIL TO A VERTICAL PIECE W/3-10d NAILS.
- (F) POCKET CLEAT, 2" X 6" X 12" (DOUBLED) (2 REOD). NAIL THE FIRST PIECE TO THE FLOOR CLEAT, PIECE MARKED (D), W/4-16d NAILS. NAIL THE SECOND PIECE IN A LIKE MANNER AND TOENAIL TO THE VERTICAL PIECE, PIECE MARKED (A), W/2-16d NAILS.
- (G) BRACE, 4" X 4" X 6'-1" (2 REOD). 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.
- (H) BACK-UP CLEAT, 2" X 6" X 30" (2 REOD). NAIL TO THE FLOOR CLEAT, PIECE MARKED (D), W/6-40d NAILS.
- (J) FILLER PIECE, 2" X 6" X 8" (2 REOD). NAIL TO A VERTICAL PIECE W/3-10d NAILS.
- (K) REINFORCING PIECE, 2" X 6" X 8" (2 REOD). POSITION TO CONTACT PALLET COVER AND NAIL TO A FILLER PIECE MARKED (J), W/3-10d NAILS.



BRACE

4" X 4" MATERIAL

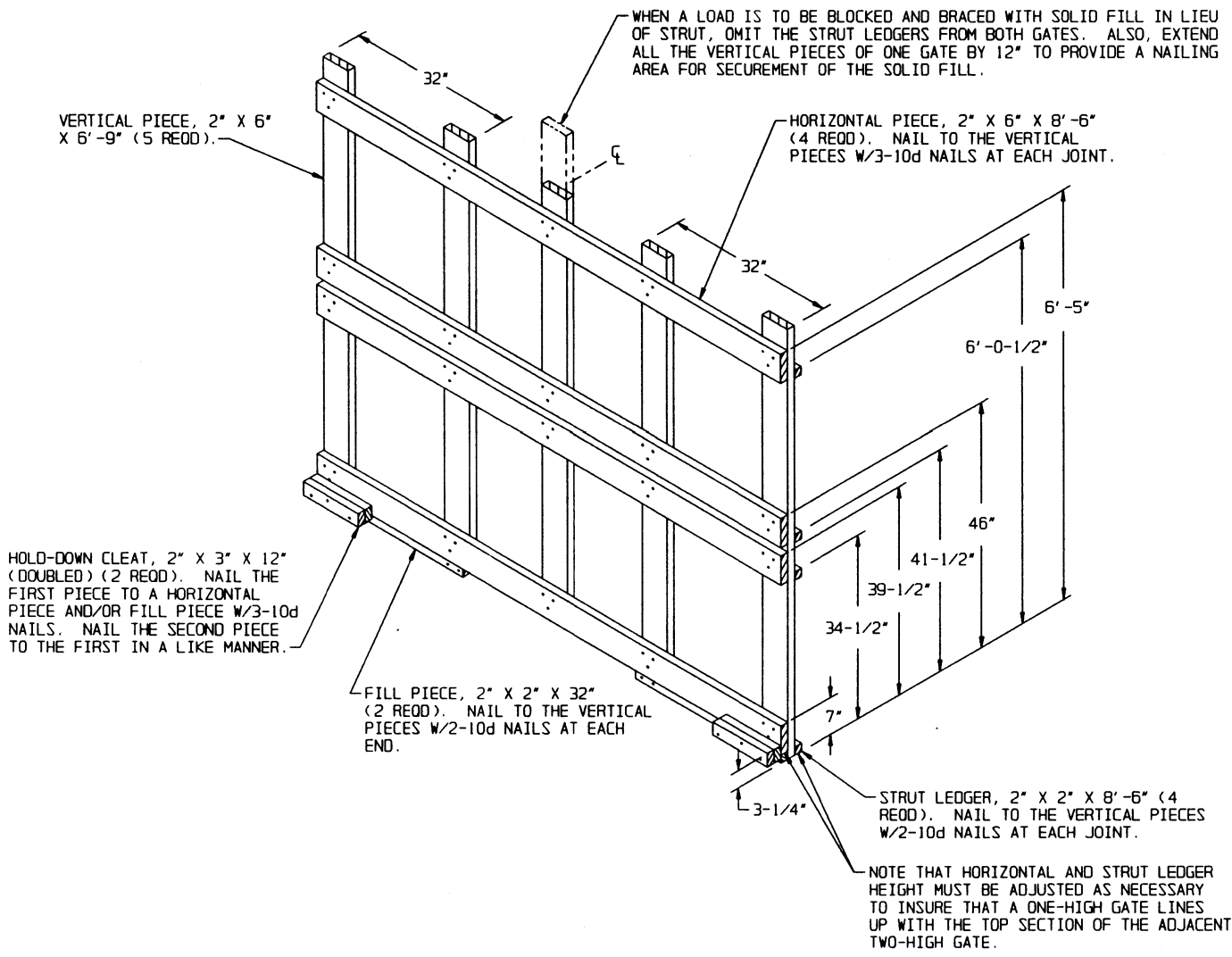
THE BRACE MUST BE INSTALLED SO THAT THIS BEARING SURFACE WILL BE IN CONTACT WITH THE VERTICAL PIECE MARKED (A).



CRIB FILL ASSEMBLY

THE ASSEMBLY DEPICTED ABOVE IS FOR USE LATERALLY BRACING A LOAD OF SIX PALLET UNITS LONG AND TWO PALLET UNITS HIGH IN A 9'-2" WIDE CAR. FOR OTHER WIDTH CARS AND ONE HIGH LOADS, SEE THE CHART BELOW.

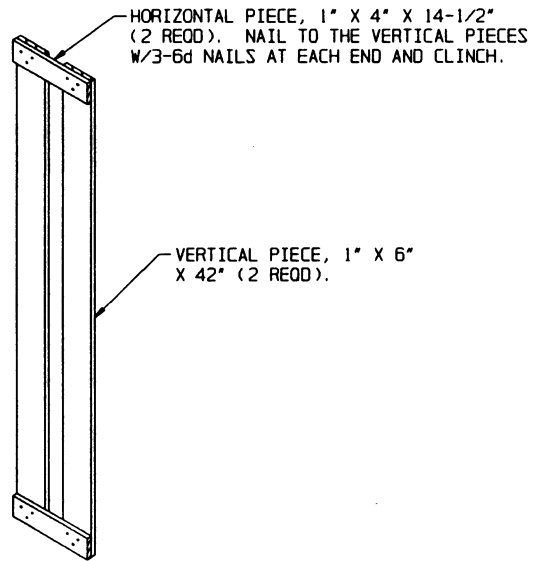
CRIB FILL CHART						
NUMBER LAYERS	PALLETS LONG	WIDTH OF CAR	SIZE OF VERTICALS	SIZE OF HORIZONTALS	NO. OF VERTICALS	NO. OF HORIZONTALS
2	6	9'-0"	2" X 4" X 6'-7"	1" X 6" X 7'-3-3/4"	4	8
2	6	9'-2"	2" X 4" X 6'-7"	2" X 6" X 7'-3-3/4"	4	8
2	6	9'-4"	2" X 6" X 6'-7"	2" X 6" X 7'-3-3/4"	4	8
2	6	9'-6"	2" X 8" X 6'-7"	2" X 6" X 7'-3-3/4"	4	8
2	4	9'-0"	2" X 4" X 6'-7"	1" X 6" X 58-1/2"	3	8
2	4	9'-2"	2" X 4" X 6'-7"	2" X 6" X 58-1/2"	3	8
2	4	9'-4"	2" X 6" X 6'-7"	2" X 6" X 58-1/2"	3	8
2	4	9'-6"	2" X 8" X 6'-7"	2" X 6" X 58-1/2"	3	8
2	2	9'-0"	2" X 4" X 6'-7"	1" X 6" X 29"	2	8
2	2	9'-2"	2" X 4" X 6'-7"	2" X 6" X 29"	2	8
2	2	9'-4"	2" X 6" X 6'-7"	2" X 6" X 29"	2	8
2	2	9'-6"	2" X 8" X 6'-7"	2" X 6" X 29"	2	8
1	6	9'-0"	2" X 4" X 41"	1" X 6" X 7'-3-3/4"	4	4
1	6	9'-2"	2" X 4" X 41"	2" X 6" X 7'-3-3/4"	4	4
1	6	9'-4"	2" X 6" X 41"	2" X 6" X 7'-3-3/4"	4	4
1	6	9'-6"	2" X 8" X 41"	2" X 6" X 7'-3-3/4"	4	4
1	4	9'-0"	2" X 4" X 41"	1" X 6" X 58-1/2"	3	4
1	4	9'-2"	2" X 4" X 41"	2" X 6" X 58-1/2"	3	4
1	4	9'-4"	2" X 6" X 41"	2" X 6" X 58-1/2"	3	4
1	4	9'-6"	2" X 8" X 41"	2" X 6" X 58-1/2"	3	4
1	2	9'-0"	2" X 4" X 41"	1" X 6" X 29"	2	4
1	2	9'-2"	2" X 4" X 41"	2" X 6" X 29"	2	4
1	2	9'-4"	2" X 6" X 41"	2" X 6" X 29"	2	4
1	2	9'-6"	2" X 8" X 41"	2" X 6" X 29"	2	4



CENTER GATE A

THE ASSEMBLY DEPICTED ABOVE IS FOR USE WHEN BRACING SEVEN CROSSWISE PALLET UNITS, TWO PALLET UNITS HIGH. FOR OTHER LOAD CONFIGURAGIONS, SEE THE CHART BELOW. THE NUMBER OF STRUT LEDGERS WILL BE EQUAL TO THE NUMBER OF HORIZONTALS, EXCEPT WHEN USING SOLID FILL. ONE 58" FILL PIECE WILL BE USED FOR A FOUR LONG GATE, AND ONE 44" LONG FILL PIECE WILL BE USED FOR A THREE LONG GATE.

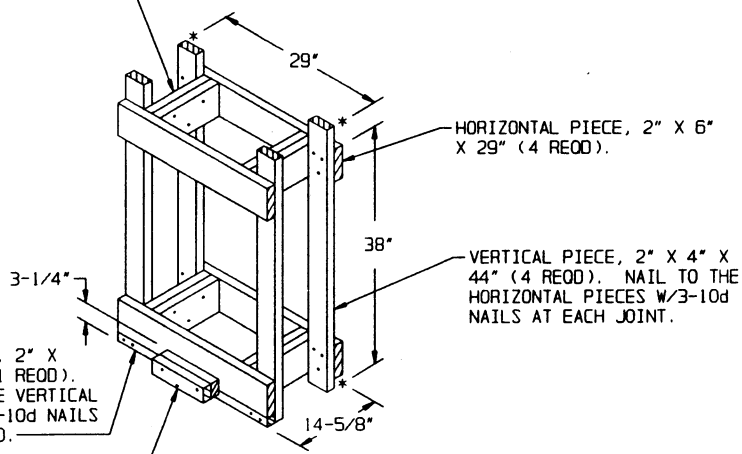
CENTER GATE A CHART					
NUMBER LAYERS	PALLETS LONG	LENGTH OF VERTICALS	LENGTH OF HORIZONTALS	NO. OF VERTICALS	NO. OF HORIZONTALS
2	7	6'-7"	8'-6"	5	4
2	6	6'-7"	7'-3"	4	4
2	5	6'-7"	6'-1"	4	4
2	4	6'-7"	58"	3	4
1	7	44"	8'-6"	5	2
1	6	44"	7'-3"	4	2
1	5	44"	6'-1"	4	2
1	4	44"	58"	3	2
1	3	44"	44"	3	2



FILLER ASSEMBLY A

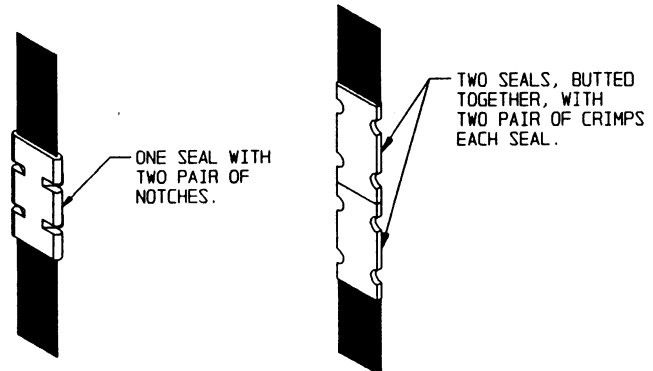
THE HEIGHT OF THIS ASSEMBLY IS BASED ON A PALLET UNIT COVER HEIGHT OF 38"; INCREASE THE HEIGHT OF THE ASSEMBLY AS NECESSARY FOR TALLER PALLET.

STRUT, 2" X 6" BY CUT TO SUIT (DOUBLED) (4 REOD). NAIL THE FIRST PIECE TO THE VERTICAL PIECES W/3-10d NAILS AT EACH END. LAMINATE THE SECOND PIECE TO THE FIRST PIECE W/3-10d NAILS.



FILLER ASSEMBLY B

THE HEIGHT OF THE TOP HORIZONTAL PIECES ARE BASED ON A PALLET UNIT COVER HEIGHT OF 38"; INCREASE OR DECREASE THE HEIGHT OF THE ASSEMBLY AS NECESSARY FOR PALLET OF OTHER HEIGHTS. THIS ASSEMBLY IS FOR PALLET THAT ARE LOADED WITH THE 14-5/8" DIMENSION LENGTHWISE IN THE CAR. IF THE FILLER IS USED TO REPLACE A PALLET LOADED WITH THE 14-5/8" DIMENSION CROSSWISE IN THE CAR, THE OVERALL LENGTH AND WIDTH DIMENSIONS OF THE ASSEMBLY MUST BE REVERSED. THE ASSEMBLY IS TO BE POSITIONED ONLY WITH THE STRUTS LONGITUDINALLY IN A CAR.



STRAP JOINT A

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

STRAP JOINT B

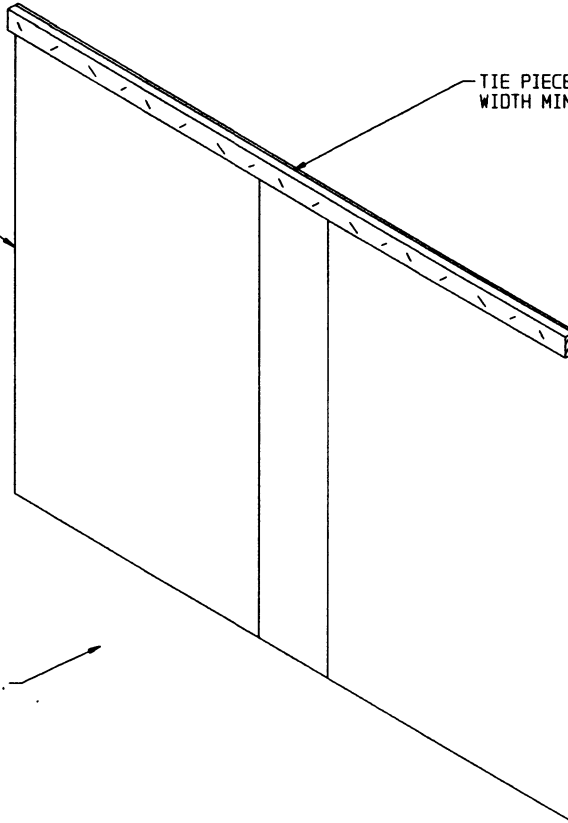
METHOD OF SECURING A STRAP JOINT WHEN USING A CRIMP-TYPE SEALER.

END-OVER-END LAP JOINT DETAILS

PLYWOOD, 1/2" THICK BY CAR WIDTH MINUS 1/2" BY 6'-10". NAIL TO THE TIE PIECE W/1-6d NAIL EVERY 6" AND CLINCH.

TIE PIECE, 2" X 4" BY CAR WIDTH MINUS 1/2" (1 REQD).

LOAD SIDE OF GATE.

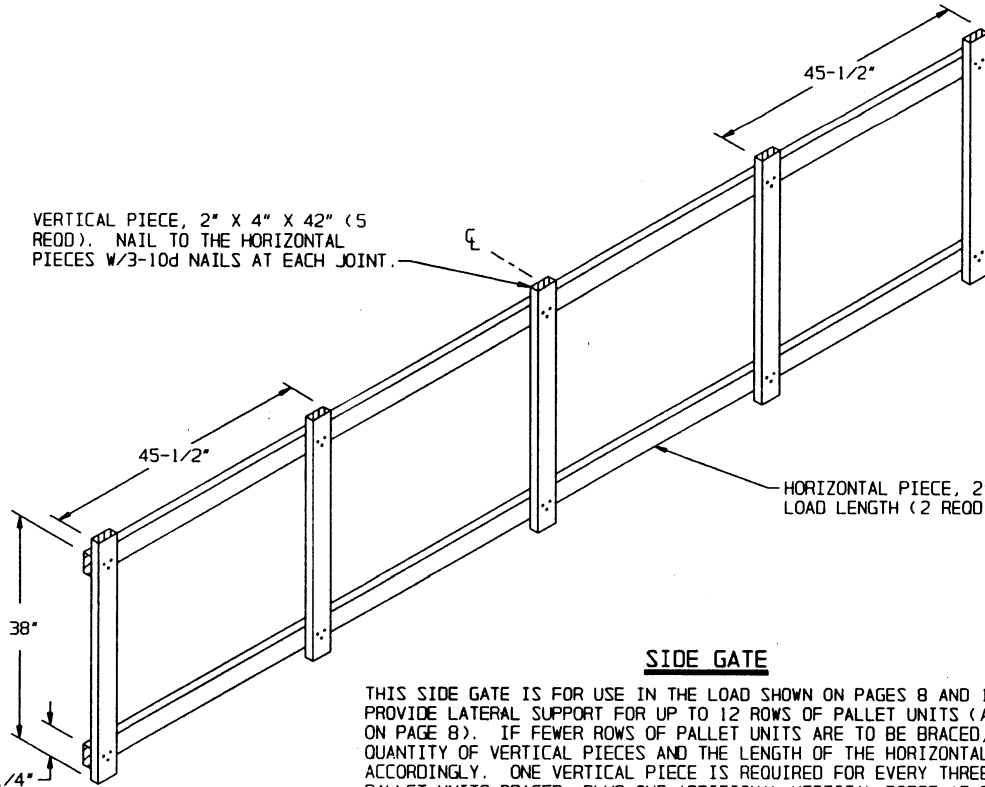


BUFFER GATE

THIS BUFFER GATE IS FOR USE IN THE LOAD SHOWN ON PAGE 6. THE GATE IS TO BE POSITIONED BETWEEN THE LADING AND A LOAD DIVIDER BULKHEAD WHEN THE LENGTH OF THE PALLET UNITS (THE SHORT DIMENSION) IS ADJACENT TO THE BULKHEAD. AN ALTERNATIVE BULKHEAD GATE MAY BE CONSTRUCTED USING THE "CENTER GATE A" DETAIL ON PAGE 17, IF PLYWOOD IS NOT AVAILABLE, OR IF THE USE OF DIMENSIONAL LUMBER IS MORE ADVANTAGEOUS. CONSTRUCT THE ALTERNATIVE BULKHEAD GATE USING THE PROCEDURE DEPICTED ON PAGE 17 FOR THE "CENTER GATE A", EXCEPT OMIT THE FILL PIECES, STRUT LEDGERS AND HOLD-DOWN CLEATS.

VERTICAL PIECE, 2" X 4" X 42" (5 REQD). NAIL TO THE HORIZONTAL PIECES W/3-10d NAILS AT EACH JOINT.

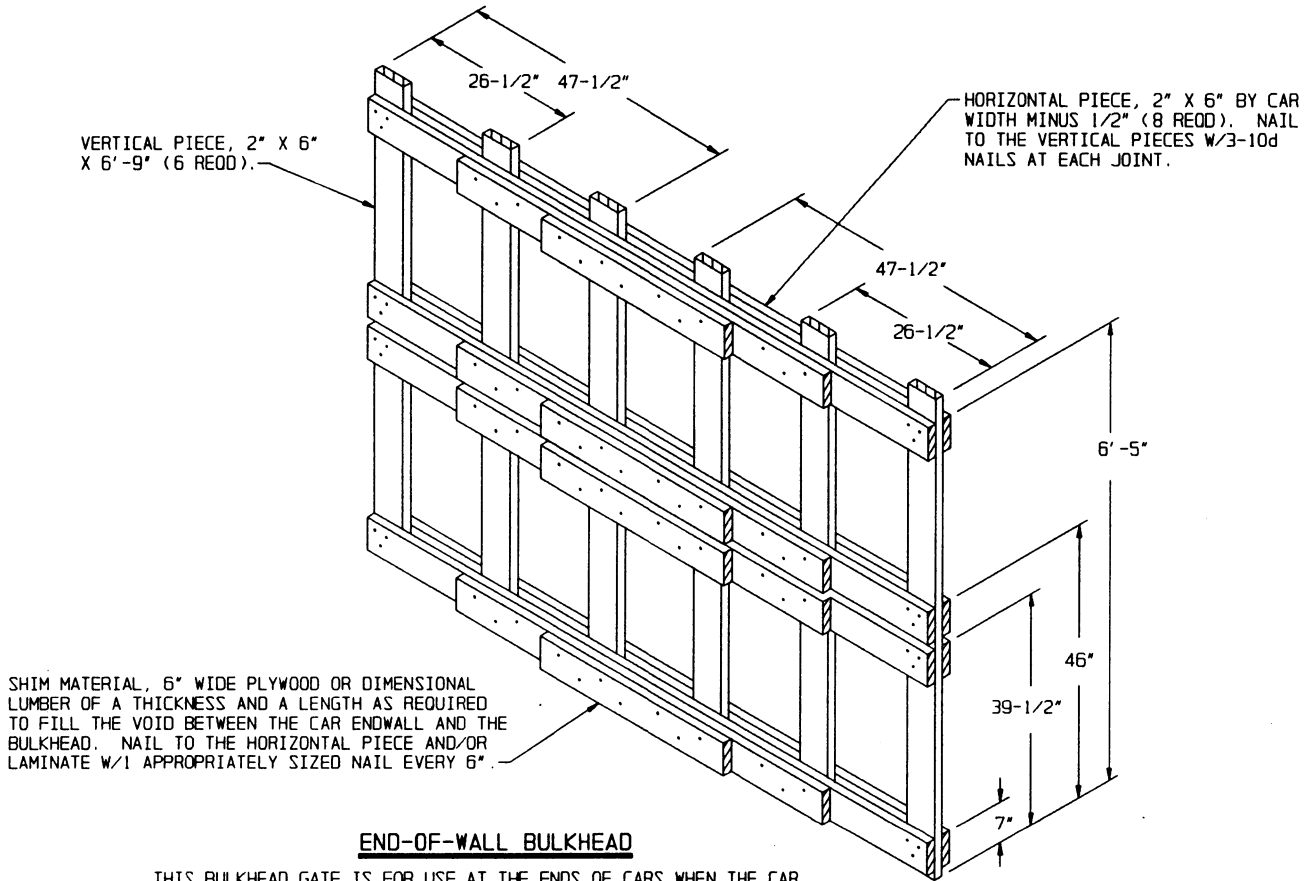
45-1/2"



HORIZONTAL PIECE, 2" X 4" BY LOAD LENGTH (2 REQD).

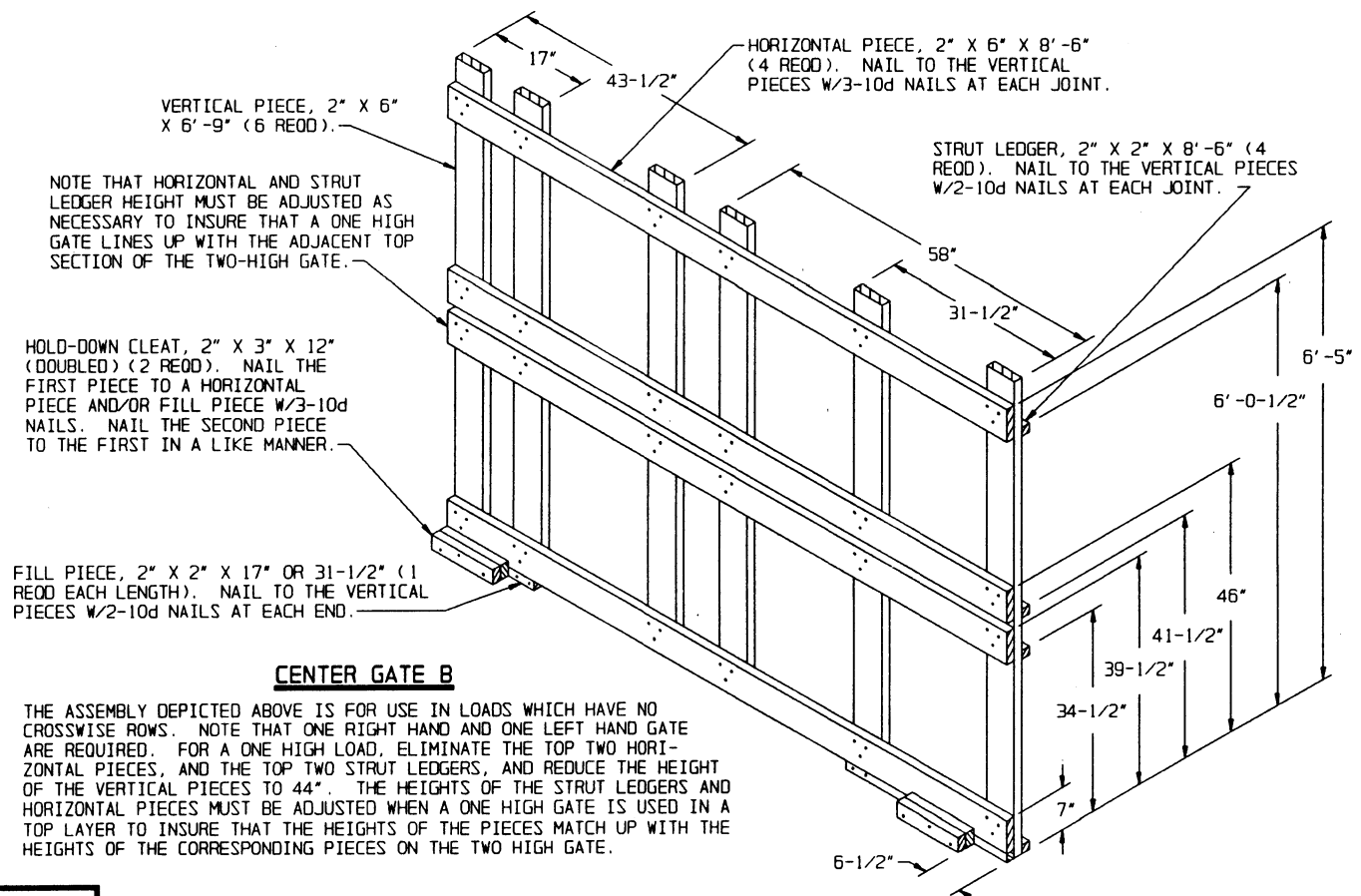
SIDE GATE

THIS SIDE GATE IS FOR USE IN THE LOAD SHOWN ON PAGES 8 AND 14, AND WILL PROVIDE LATERAL SUPPORT FOR UP TO 12 ROWS OF PALLET UNITS (AS DEPICTED ON PAGE 8). IF FEWER ROWS OF PALLET UNITS ARE TO BE BRACED, REDUCE THE QUANTITY OF VERTICAL PIECES AND THE LENGTH OF THE HORIZONTAL PIECES ACCORDINGLY. ONE VERTICAL PIECE IS REQUIRED FOR EVERY THREE ROWS OF PALLET UNITS BRACED, PLUS ONE ADDITIONAL VERTICAL PIECE AT THE END OF THE ASSEMBLY (MINIMUM OF TWO VERTICAL PIECES).



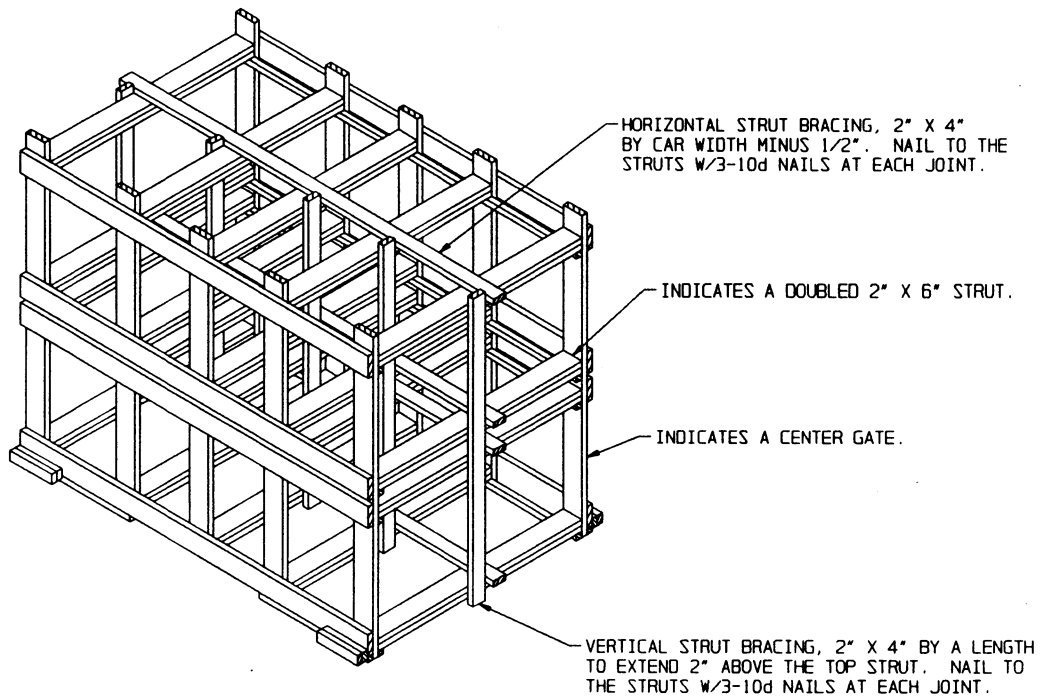
END-OF-WALL BULKHEAD

THIS BULKHEAD GATE IS FOR USE AT THE ENDS OF CARS WHEN THE CAR ENDWALL IS BOWED MORE THAN 2". FOR A ONE-HIGH LOAD, REDUCE THE LENGTH OF THE VERTICAL PIECES TO 44", AND ELIMINATE THE TOP FOUR HORIZONTAL PIECES AND CORRESPONDING SHIM MATERIAL.



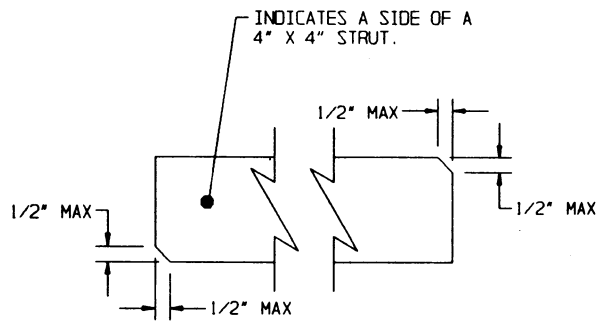
CENTER GATE B

THE ASSEMBLY DEPICTED ABOVE IS FOR USE IN LOADS WHICH HAVE NO CROSSWISE ROWS. NOTE THAT ONE RIGHT HAND AND ONE LEFT HAND GATE ARE REQUIRED. FOR A ONE HIGH LOAD, ELIMINATE THE TOP TWO HORIZONTAL PIECES, AND THE TOP TWO STRUT LEDGERS, AND REDUCE THE HEIGHT OF THE VERTICAL PIECES TO 44". THE HEIGHTS OF THE STRUT LEDGERS AND HORIZONTAL PIECES MUST BE ADJUSTED WHEN A ONE HIGH GATE IS USED IN A TOP LAYER TO INSURE THAT THE HEIGHTS OF THE PIECES MATCH UP WITH THE HEIGHTS OF THE CORRESPONDING PIECES ON THE TWO HIGH GATE.



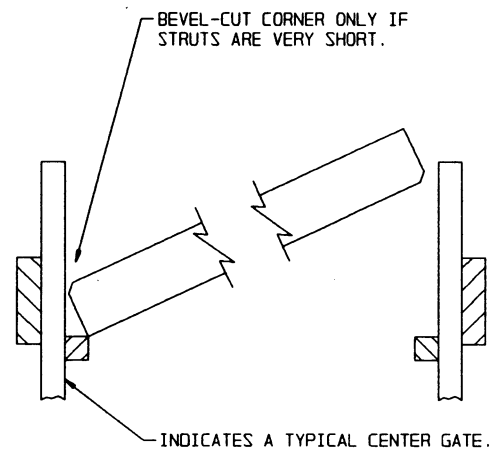
TYPICAL STRUT BRACING

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



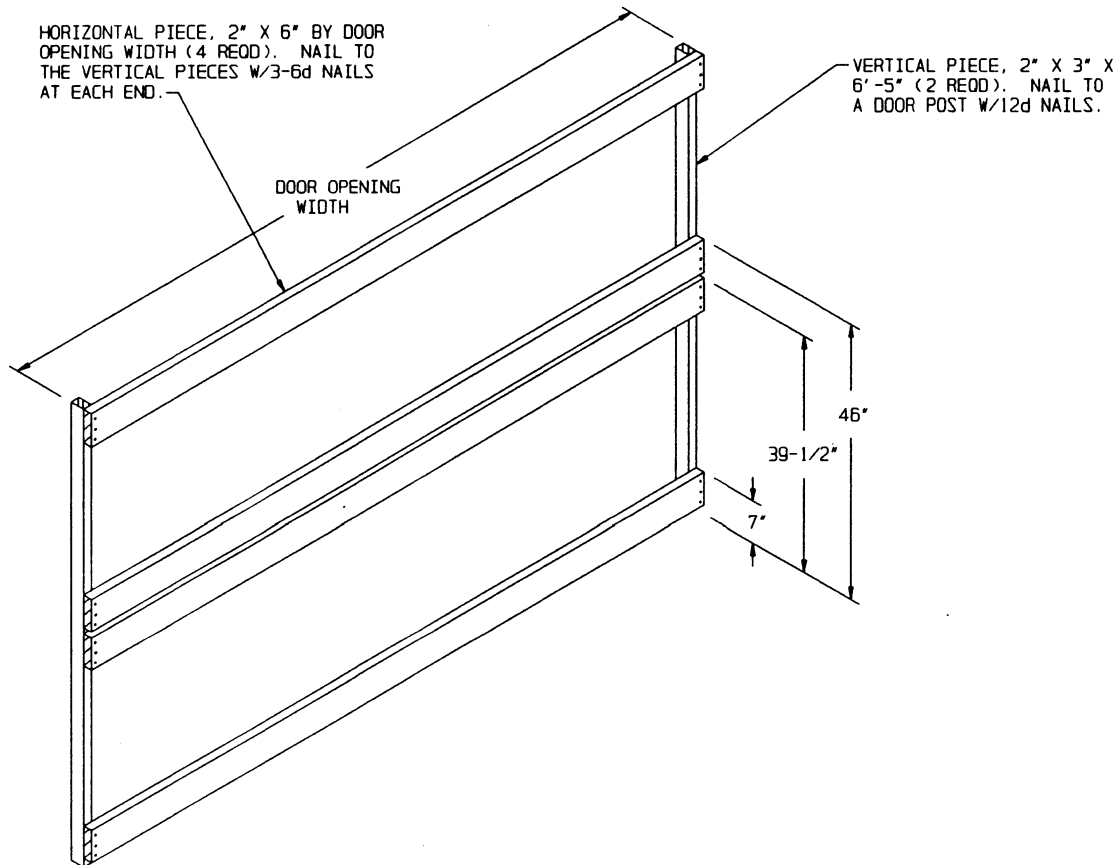
BEVEL-CUT

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 "S" ON PAGE 3 FOR ADDITIONAL STRUT INSTALLATION GUIDANCE.



DOORWAY PROTECTION A

THIS DOORWAY PROTECTION IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING
 DOORS WHEN THE DOOR POSTS OR WOODEN, OR ARE STEEL AND HAVE HOLES IN WHICH TO
 ACCOMPLISH THE NAILING OF THE CERTICAL PIECES. SEE THE "DOORWAY PROTECTION B"
 DETAIL ON PAGE 23 FOR GUIDANCE IF THE DOOR POSTS ARE NOT NAILABLE.

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

DOOR OPENING WIDTH

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

12"

VERTICAL PIECE, 2" X 3" BY DOOR OPENING HEIGHT (2 REOD).

6'-5"

46"

39-1/2"

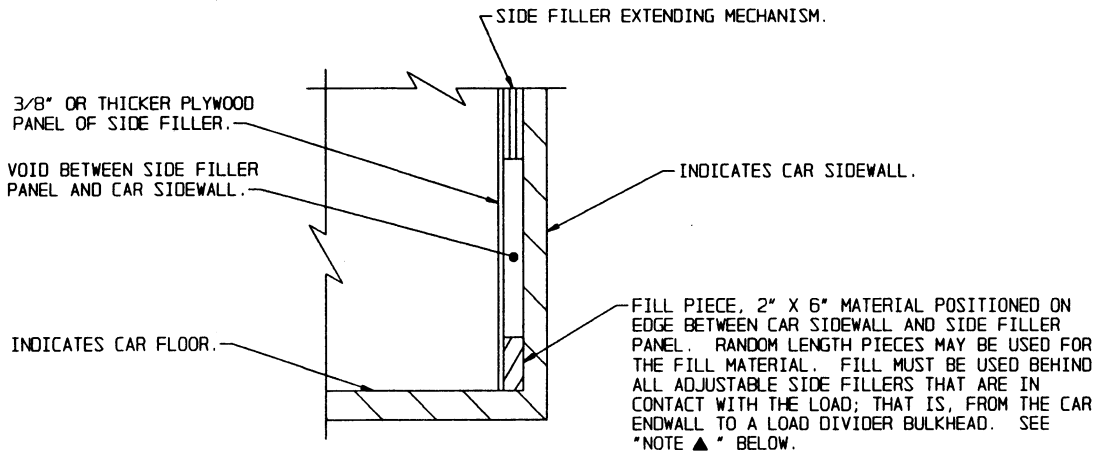
7"

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

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

DOORWAY PROTECTION B

THIS METHOD OF DOORWAY PROTECTION IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS, WHEN THE DOOR POSTS ARE NOT AVAILABLE.

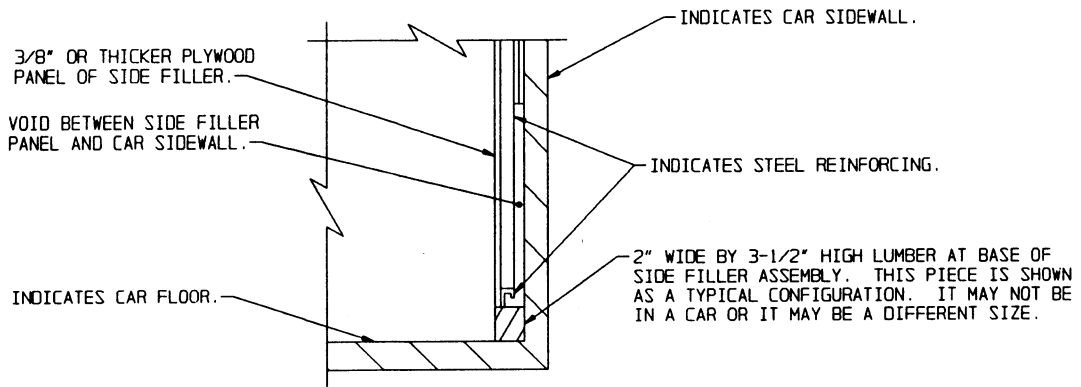


TYPICAL TYPE A

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

NOTE ▲:

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



TYPICAL TYPE B

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