

APPROVED BY  
BUREAU OF EXPLOSIVES

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# LOADING AND BRACING (CL & LCL) IN BOXCARS OF MAVERICK (AGM-65) MISSILE PACKED IN CNU-445/E OR CNU-447/E SHIPPING AND STORAGE CONTAINERS

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

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JUNE 1994

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DO NOT SCALE

**GENERAL NOTES**

**(GENERAL NOTES CONTINUED)**

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1 AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE SPECIFIED OUTLOADING PROCEDURES ARE APPLICABLE TO THE MAVERICK (AGM-65) MISSILE IN A CNU-445/E OR CNU-447/E CONTAINER. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE CNU-445/E OR CNU-447/E CONTAINER WITH MISSILES INSTALLED. SEE PAGE 5 FOR DETAILS OF THE CONTAINERS.
- C. THE OUTLOADING PROCEDURES DEPICTED WITHIN THIS DOCUMENT ARE APPLICABLE FOR SHIPMENTS IN CONVENTIONAL TYPE BOX-CARS, FOR SHIPMENTS IN BOXCARS EQUIPPED WITH VARIOUS TYPES OF SELF-CONTAINED MECHANICAL BRACING DEVICES, AND FOR SHIPMENTS IN CUSHIONED BOXCARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.
- D. THE SELECTION OF RAILCARS FOR THE TRANSPORT OF MISSILES 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.
- E. 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 18 FOR GUIDANCE.
- F. 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.
- G. THE USE OF AN OFFSET LOADING PATTERN WILL FACILITATE LOADING AND UNLOADING OPERATIONS IN THE DOORWAY AREA OF THE CAR. UNLESS PROHIBITED WITHIN THE SPECIAL NOTES, A FULL LOAD SHOULD BE BUILT USING AN OFFSET LOADING PATTERN. FOR INSTANCE, A LOAD CONSISTING OF AN EVEN NUMBER OF LOAD UNITS AND HAVING TWO MORE LOAD UNITS IN ONE END OF THE CAR THAN IN THE OPPOSITE END, OR A LOAD CONSISTING OF AN ODD NUMBER OF LOAD UNITS AND HAVING ONE MORE LOAD UNIT IN ONE END THAN IN THE OTHER IS CONSIDERED TO BE AN OFFSET LOAD.

(CONTINUED AT RIGHT)

- H. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN CARS WHICH ARE PARTIALLY LOADED WITH MISSILES, 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.
- 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".
- 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 19 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. CAUTION: WHEN POWER OR PNEUMATIC NAILERS ARE BEING USED IN THE APPLICATION OF NAILED FLOORLINE BLOCKING OR BRACING, CONTAINERS BEING LOADED INTO THE CONVEYANCE MUST BE POSITIONED TO ALLOW A CLEAR PATH OF EXIT FOR THE OPERATOR AT ALL TIMES, SHOULD AN EMERGENCY EXIT BECOME NECESSARY.
- Q. 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.

(CONTINUED ON PAGE 3)

**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 OR 2, 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.
- STAPLE - - - - - : FED SPEC FF-N-105; SENCO QUALITY OR EQUAL.

## GENERAL NOTES

(FOR CONVENTIONAL TYPE BOXCARS)

- R. 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" ON PAGE 2.
- S. NOTICE: WHEN POSITIONING CONTAINERS 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 CONTAINERS 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 CONTAINERS, SUCH AS THE LOWER PORTION OF THE BASE ASSEMBLY. PADDING, OF 2" THICK LUMBER OR ANY OTHER MATERIAL OF SIMILAR CONSISTENCY, SHOULD BE PLACED BETWEEN THE JACK AND THE LADING.
- T. LOAD-BLOCKING STRUTS WHICH ARE 48" OR LONGER MUST BE STIFFENED BY THE APPLICATION OF HORIZONTAL AND VERTICAL STRUT BRACING AS SHOWN BY THE "TYPICAL STRUT BRACING" DETAILS ON PAGE 18. 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.
- U. TO ACHIEVE A TIGHTLY BLOCKED LOAD, A STRUT WILL BE CUT APPROXIMATELY 1/4" TO 3/8" LONGER THAN THE MEASURED DISTANCE BETWEEN THE STRUT BEARING AREAS ON THE TWO CENTER GATES. MEASUREMENTS FOR STRUT LENGTHS NEED TO BE ACCOMPLISHED AT SEVERAL PLACES DURING THE BLOCKING AND BRACING PROCESS. CARE MUST BE EXERCISED WHEN MEASURING FOR AND INSTALLING STRUTS. THE SPECIFIED APPROXIMATE DIMENSION FOR A STRUT LENGTH MAY BE ADJUSTED, AS NECESSARY, TO PROVIDE FOR A TIGHTLY BLOCKED LOAD WITHOUT DISTORTING, DENTING OR OTHERWISE DAMAGING THE CONTAINERS. ONE END OF THE STRUT WILL BE POSITIONED AT ITS BEARING AREA JUST ABOVE THE STRUT LEDGER ON ONE GATE. THE OTHER END, WHICH CAN BE BEVELED ON THE LOWER CORNER IF DESIRED, WILL THEN BE DRIVEN DOWNWARD UNTIL IT CONTACTS THE STRUT LEDGER ON THE OTHER GATE. EACH END OF THE STRUT WILL BE TOENAILED TO THE ADJACENT CENTER GATE, AS SPECIFIED WITHIN THE KEY NUMBERS FOR A LOAD, IN SUCH A MANNER SO THAT AS NEARLY AS PRACTICAL EQUAL LENGTHS OF A NAIL ARE EMBEDDED IN THE STRUT AND IN THE VERTICAL PIECE OF THE CENTER GATE. SEE THE "BEVEL CUT" DETAIL ON PAGE 19 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.
- V. WHERE 2" X 2" PIECES ARE SPECIFIED FOR STRUT LEDGERS, 2" X 4" MATERIAL MAY BE SUBSTITUTED, IF DESIRED.
- W. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.

## GENERAL NOTES

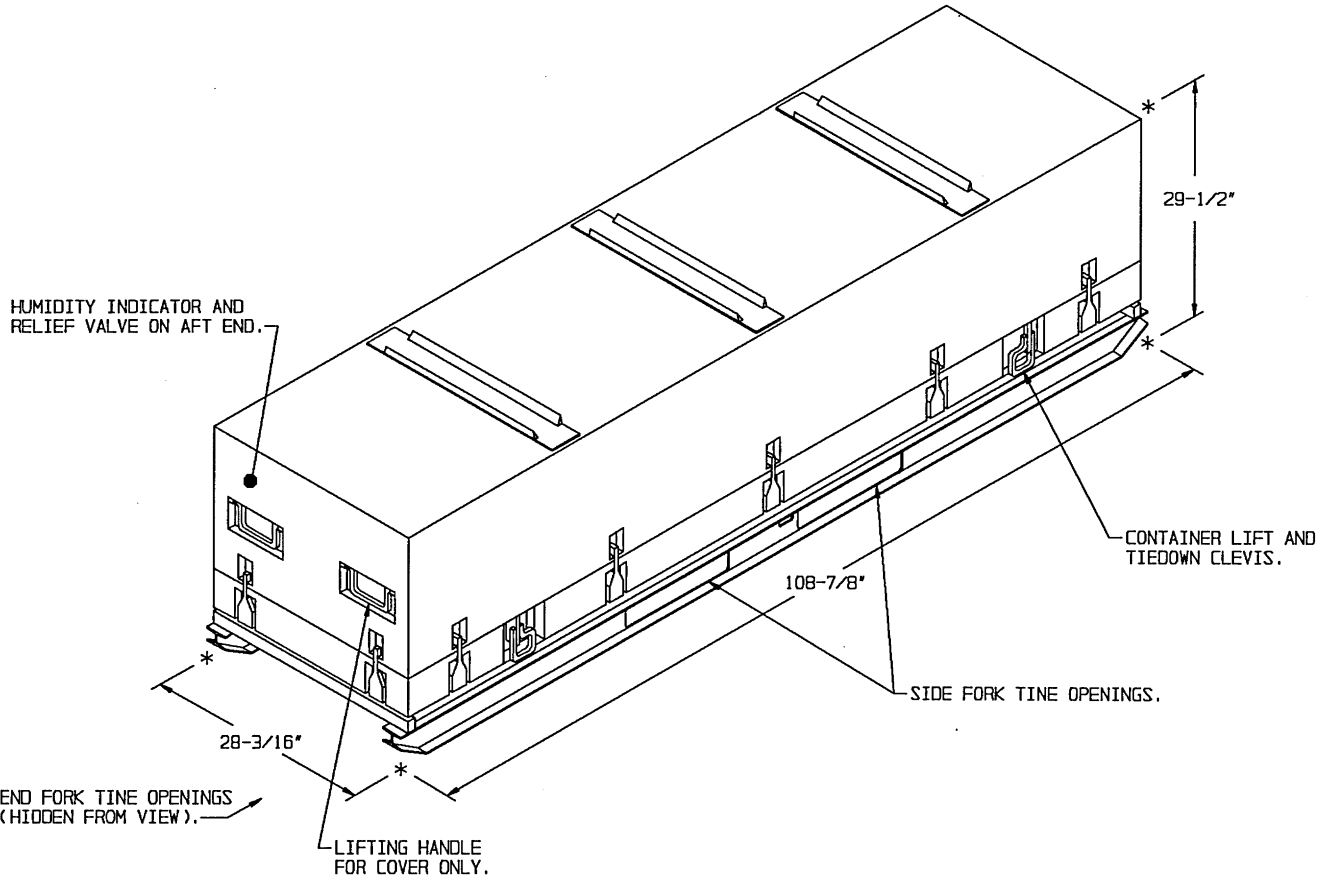
(FOR BOXCARS EQUIPPED WITH MECHANICAL BRACING DEVICES)

- X. THE OUTLOADING PROCEDURES FOR BOXCARS EQUIPPED WITH MECHANICAL BRACING DEVICES MAY BE ADAPTED AS REQUIRED TO FACILITATE THE USE OF BOXCARS EQUIPPED WITH VARIOUS TYPES OF SELF-CONTAINED MECHANICAL BRACING DEVICES, HOWEVER, FIXED OR ADJUSTABLE WALL MEMBERS AND DOORWAY MEMBERS WITHIN THESE CARS MUST PROVIDE FOR THE INSTALLATION OF LOAD BLOCKING CROSS MEMBERS AT THE HEIGHTS SPECIFIED. CAUTION: BOXCARS EQUIPPED WITH MEMBERS WHICH DO NOT MEET THE LOCATION REQUIREMENTS MUST NOT BE USED.
1. A CROSS MEMBER WILL NOT BE RELIED UPON TO RETAIN MORE THAN 4,000 POUNDS OF LADING. 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 DOORWAY 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" SECTION WHICH IS IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHOD.

## GENERAL NOTES

(FOR CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS)

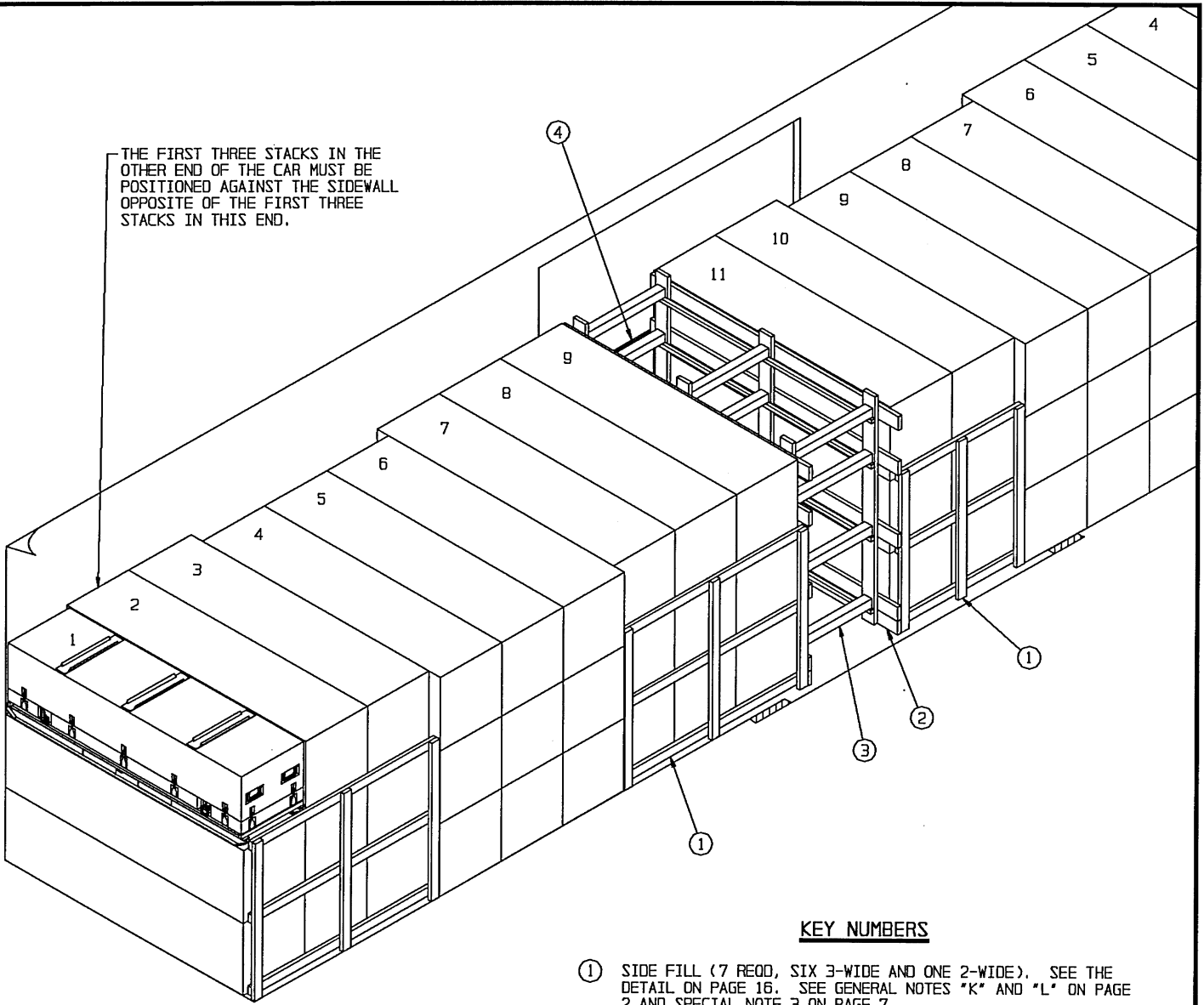
- AA. CAUTION: FOR CUSHIONED BOXCARS EQUIPPED WITH LOAD DIVIDER BULKHEADS, ONLY CARS EQUIPPED WITH LOAD DIVIDERS MANUFACTURED BY EVANS, EQUIPCO, OR PRECO MAY BE USED. LOAD DIVIDERS MANUFACTURED BY TRANSCO ARE NOT ACCEPTABLE WHETHER OF ALUMINUM OR STEEL CONSTRUCTION. THE DEPICTED PROCEDURES ARE APPLICABLE 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.
- 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 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 MISSILES. 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.
- CC. 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 27 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 27, THE "FILL PIECE" MATERIAL IS NOT REQUIRED.
- 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. 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 CONTAINERS 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. THE "GATES AND STRUTS" METHOD OF OMITTING A CONTAINER MAY BE USED TO ADJUST A LOAD QUANTITY DOWNWARD BY OTHER THAN A MULTIPLE OF A LOAD UNIT. SEE THE PROCEDURES ON PAGE 20 FOR GUIDANCE.
  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 LOADING PATTERN. INSTALL CENTER GATES AND STRUTS AS SHOWN ON PAGE 6 OR 8 OF THE CONVENTIONAL BOXCAR DRAWING HEREIN TO PROVIDE FOR A TIGHT LOAD BETWEEN THE BULKHEADS.
  3. ONE OR MORE CONTAINERS 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 21 OR WITH KNEE BRACE ASSEMBLIES, AS SHOWN ON PAGE 22.
- FF. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTION WHICH IS IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHOD.



CNU-445/E OR CNU-447/E CONTAINER

CONTAINER WEIGHT (MAX) - - - 1,120 LBS (APPROX)  
 CUBE - - - - - 52.4 CU FT (APPROX)

THE FIRST THREE STACKS IN THE OTHER END OF THE CAR MUST BE POSITIONED AGAINST THE SIDEWALL OPPOSITE OF THE FIRST THREE STACKS IN THIS END.



SEE GENERAL NOTE "E" ON PAGE 2.

ISOMETRIC VIEW

KEY NUMBERS

- ① SIDE FILL (7 REOD, SIX 3-WIDE AND ONE 2-WIDE). SEE THE DETAIL ON PAGE 16. SEE GENERAL NOTES "K" AND "L" ON PAGE 2 AND SPECIAL NOTE 3 ON PAGE 7.
- ② CENTER GATE (2 REOD, ONE RIGHT HAND AND ONE LEFT HAND). SEE THE DETAIL ON PAGE 16.
- ③ STRUT, 4" X 4" BY A LENGTH TO SUIT (REF: 36") (12 REOD). TOENAIL TO PIECES MARKED ② W/2-16d NAILS AT EACH END. SEE GENERAL NOTES "T" AND "U" ON PAGE 3. SEE SPECIAL NOTE 7 ON PAGE 7.
- ④ DOORWAY PROTECTION (2 REOD). SEE THE DETAIL ON PAGE 17, AND SPECIAL NOTES 4 AND 5 ON PAGE 7.

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-6" WIDE CONVENTIONAL TYPE BOXCAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE GENERAL NOTE "E" ON PAGE 2.
2. THE TYPICAL LOAD SHOWN ON PAGE 6 IS APPLICABLE FOR BOTH OF THE CONTAINERS SHOWN ON PAGE 5 OF THIS DRAWING. A MAXIMUM OF 48 CONTAINERS FOR AN APPROXIMATE LADING WEIGHT OF 53,760 POUNDS CAN BE LOADED IN A 40'-6" LONG CAR WHEN USING THE DEPICTED LOADING PROCEDURES.
3. IF THE CAR TO BE LOADED IS 9'-4" WIDE OR LESS, SIDE FILL, PIECE MARKED ① WILL NOT BE REQUIRED. ALTHOUGH CARS AS NARROW AS 9'-2" WIDE CAN BE USED, LOADING WILL BE MORE DIFFICULT.
4. DOORWAY PROTECTION IS REQUIRED FOR ALL CONTAINER 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 ④ IN THE LOAD ON PAGE 6, IS APPLICABLE FOR BOXCARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS AND NAILABLE DOOR POSTS; OR NAILABLE FLOORLINE BLOCKING AND DOORWAY PROTECTION STRAPS MAY BE USED, AS SHOWN IN THE LOAD ON PAGE 10 AND THE PARTIAL PLAN VIEW ON PAGE 11. REFER TO PAGE 26 FOR OTHER TYPES OF DOORWAY PROTECTION.
5. IF THE CAR BEING LOADED IS EQUIPPED WITH PLUG TYPE DOORS OR COMBINATION PLUG AND SLIDING DOORS, NAILABLE FLOORLINE BLOCKING AND DOORWAY PROTECTION STRAPS MUST BE USED. SEE PIECES MARKED ② THRU ④ ON PAGE 10 AND SPECIAL NOTE 5 ON PAGE 11 FOR INSTALLATION GUIDANCE.
6. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED BY OMITTING ONE OR MORE CONTAINER STACKS FROM THE CENTER PORTION OF THE LOAD, OR THE ENTIRE ONE OR TWO TOP TIERS CAN BE OMITTED. FOR OTHER METHODS OF REDUCING A LOAD REFER TO THE TYPICAL LCL PROCEDURES ON PAGES 20 THRU 25 FOR GUIDANCE.
7. THE DEPICTED CENTER GATES AND STRUTS ARE ADEQUATE FOR RETAINING NOT MORE THAN 11 STACKS. IF THE DESIRED LOAD CONFIGURATION IS SUCH THAT MORE THAN 11 STACKS ARE TO BE LOADED IN ONE END OF THE CAR, DOUBLED 2" X 6" STRUTS WILL BE INSTALLED IN LIEU OF THE DEPICTED 4" X 4" STRUTS. LAMINATE THE DOUBLED 2" X 6" STRUTS W/1-10d NAIL EVERY 6".

**BILL OF MATERIAL**

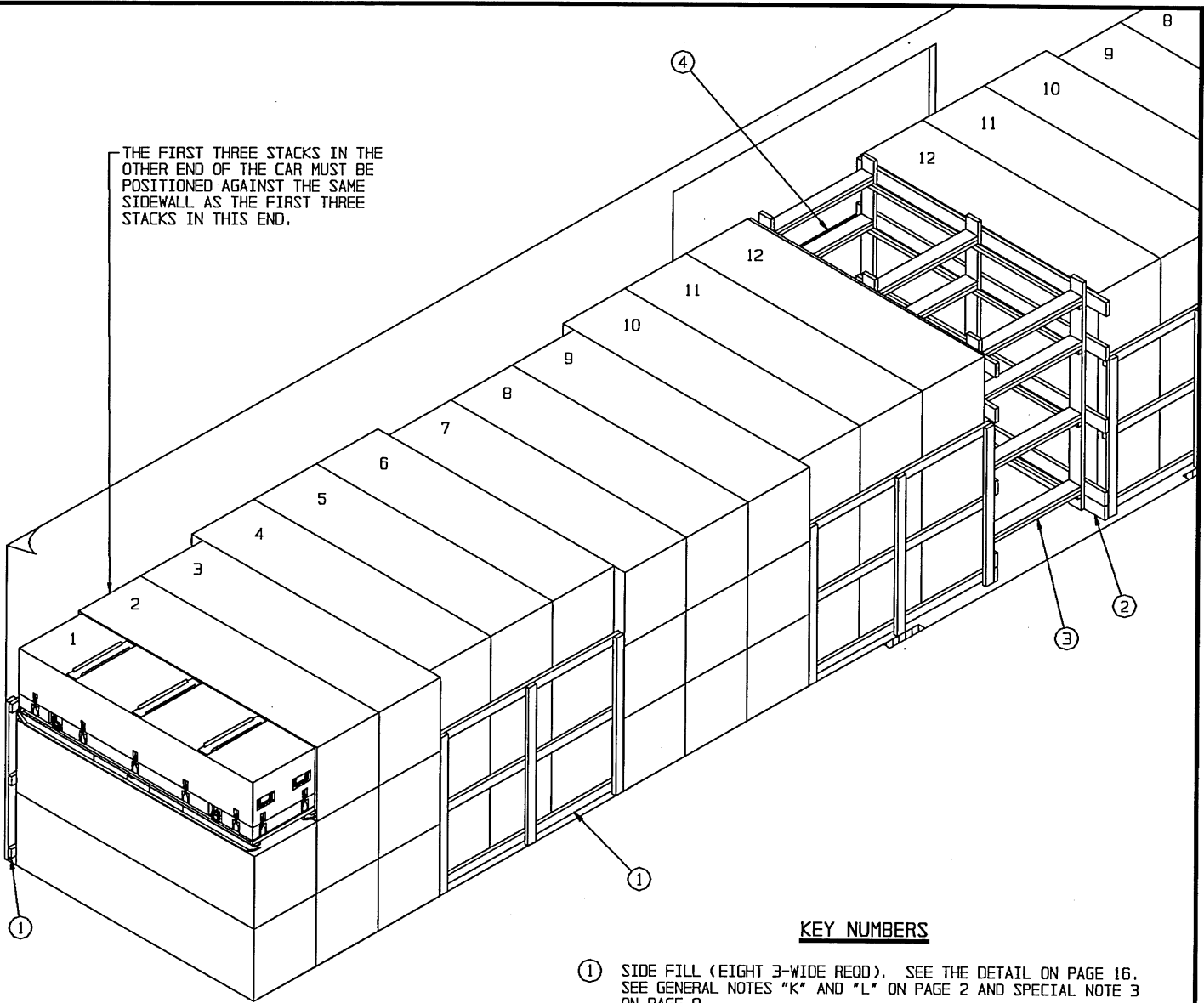
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	60	30
2" X 2"	72	24
2" X 3"	30	15
2" X 4"	251	168
2" X 6"	141	141
4" X 4"	36	48
NAILS	NO. REQD	POUNDS
6d (2")	36	1/4
10d (3")	288	4-1/2
12d (3-1/4")	20	1/2
16d (3-1/2")	48	1-1/4

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CONTAINER	60	67,200 LBS
DUNNAGE		859 LBS
TOTAL WEIGHT		68,059 LBS (APPROX)

60-CONTAINER LOAD  
IN A 50'-6" LONG BY 9'-6" WIDE CONVENTIONAL BOXCAR

THE FIRST THREE STACKS IN THE OTHER END OF THE CAR MUST BE POSITIONED AGAINST THE SAME SIDEWALL AS THE FIRST THREE STACKS IN THIS END.



SEE GENERAL NOTE "E" ON PAGE 2.

ISOMETRIC VIEW

KEY NUMBERS

- ① SIDE FILL (EIGHT 3-WIDE REQD). SEE THE DETAIL ON PAGE 16. SEE GENERAL NOTES "K" AND "L" ON PAGE 2 AND SPECIAL NOTE 3 ON PAGE 9.
- ② CENTER GATE (2 REQD, ONE RIGHT HAND AND ONE LEFT HAND). SEE THE DETAIL ON PAGE 16.
- ③ STRUT, 2" X 6" BY A LENGTH TO SUIT (REF: 45") (DOUBLED) (12 REQD). LAMINATE W/1-10d NAIL EVERY 6" AND TOENAIL THE TOP PIECE TO PIECES MARKED ② W/2-16d NAILS AT EACH END. SEE GENERAL NOTES "T" AND "U" ON PAGE 3. SEE SPECIAL NOTE 7 ON PAGE 9.
- ④ DOORWAY PROTECTION (2 REQD). SEE THE DETAIL ON PAGE 17, AND SPECIAL NOTES 4 AND 5 ON PAGE 9.



**SPECIAL NOTES:**

1. A 60'-8" LONG BY 9'-6" WIDE CONVENTIONAL TYPE BOXCAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE GENERAL NOTE "E" ON PAGE 2.
2. THE TYPICAL LOAD SHOWN ON PAGE 8 IS APPLICABLE FOR BOTH OF THE CONTAINERS SHOWN ON PAGE 5 OF THIS DRAWING. A MAXIMUM OF 48 CONTAINERS FOR AN APPROXIMATE LADING WEIGHT OF 53,760 POUNDS CAN BE LOADED IN A 40'-6" LONG CAR. REFER TO PAGES 6 AND 7 FOR LOADING PROCEDURES FOR A 50'-6" LONG CAR.
3. IF THE CAR TO BE LOADED IS 9'-4" WIDE OR LESS, SIDE FILL, PIECE MARKED ① WILL NOT BE REQUIRED. ALTHOUGH CARS AS NARROW AS 9'-2" WIDE CAN BE USED, LOADING WILL BE MORE DIFFICULT.
4. DOORWAY PROTECTION IS REQUIRED FOR ALL CONTAINER 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 ④ IN THE LOAD ON PAGE 8, IS APPLICABLE FOR BOXCARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS AND NAILABLE DOOR POSTS; OR NAILED FLOORLINE BLOCKING AND DOORWAY PROTECTION STRAPS MAY BE USED, AS SHOWN IN THE LOAD ON PAGE 10 AND THE PARTIAL PLAN VIEW ON PAGE 11. REFER TO PAGE 26 FOR OTHER TYPES OF DOORWAY PROTECTION.
5. IF THE CAR BEING LOADED IS EQUIPPED WITH PLUG TYPE DOORS OR COMBINATION PLUG AND SLIDING DOORS, NAILED FLOORLINE BLOCKING AND DOORWAY PROTECTION STRAPS MUST BE USED. SEE PIECES MARKED ② THRU ④ ON PAGE 10 AND SPECIAL NOTE 5 ON PAGE 11 FOR INSTALLATION GUIDANCE.
6. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED BY OMITTING ONE OR MORE CONTAINER STACKS FROM THE CENTER PORTION OF THE LOAD, OR THE ENTIRE ONE OR TWO TOP TIERS CAN BE OMITTED. FOR OTHER METHODS OF REDUCING A LOAD REFER TO THE TYPICAL LCL PROCEDURES ON PAGES 20 THRU 25 FOR GUIDANCE.
7. THE NUMBER OF STACKS IN THE ENDS OF THE LOAD MAY BE CHANGED IF THAT WILL FACILITATE LOADING IN THE DOORWAY AREA. DO NOT LOAD MORE THAN 14 STACKS IN ONE END OF THE CAR.

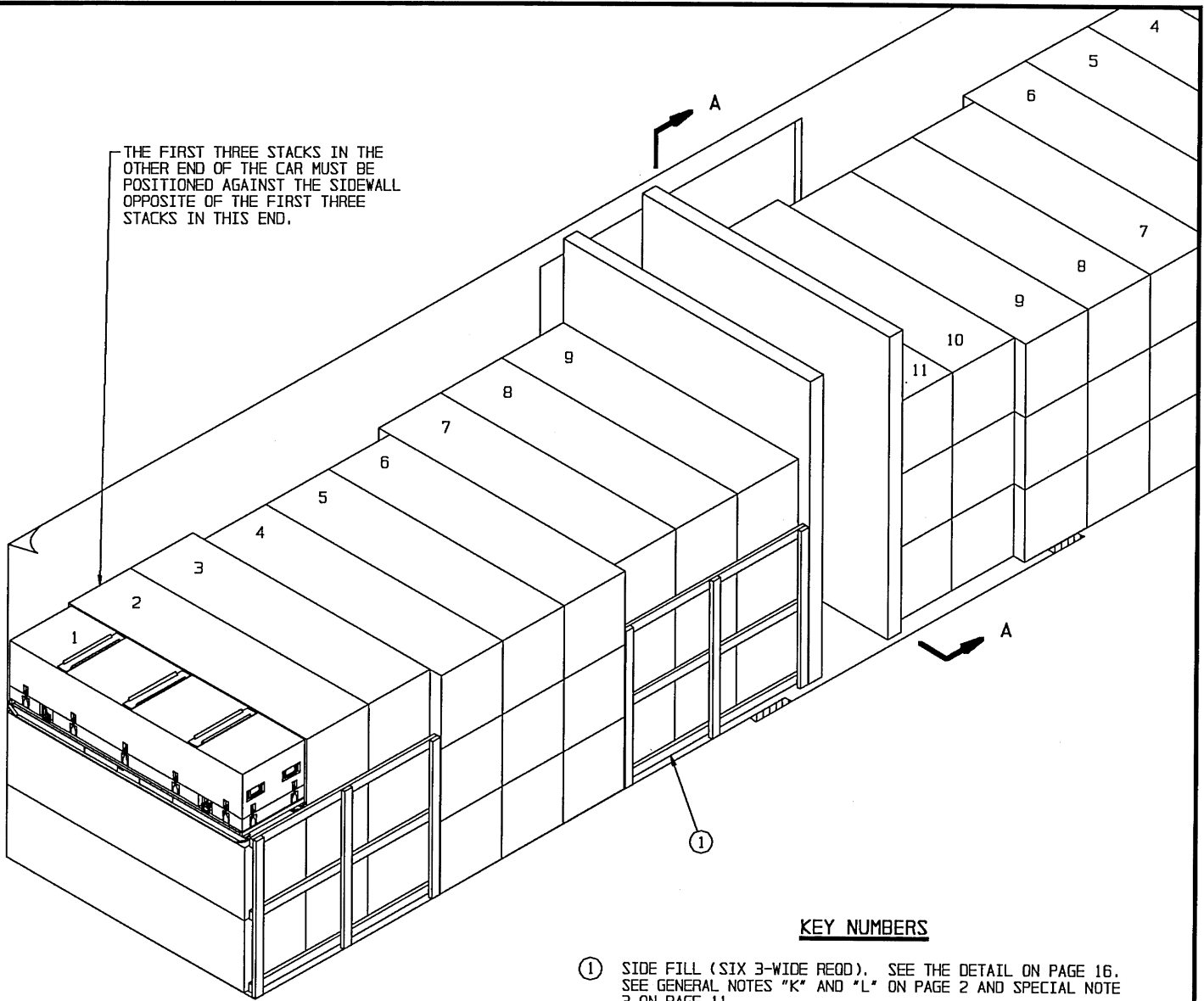
BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	60	30
2" X 2"	72	24
2" X 3"	30	15
2" X 4"	294	196
2" X 6"	231	231
NAILS	NO. REQD	POUNDS
6d (2")	36	1/4
10d (3")	396	6-1/4
12d (3-1/4")	68	1-1/4

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
CONTAINER	72	80,640 LBS
DUNNAGE		1,000 LBS
<b>TOTAL WEIGHT</b>		<b>81,640 LBS (APPROX)</b>

**72-CONTAINER LOAD  
IN A 60'-8" LONG BY 9'-6" WIDE CONVENTIONAL BOXCAR**

THE FIRST THREE STACKS IN THE OTHER END OF THE CAR MUST BE POSITIONED AGAINST THE SIDEWALL OPPOSITE OF THE FIRST THREE STACKS IN THIS END.

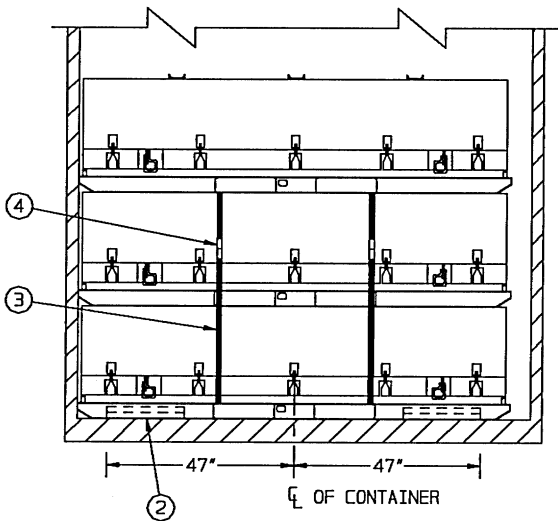


SEE GENERAL NOTE "E" ON PAGE 2.

ISOMETRIC VIEW

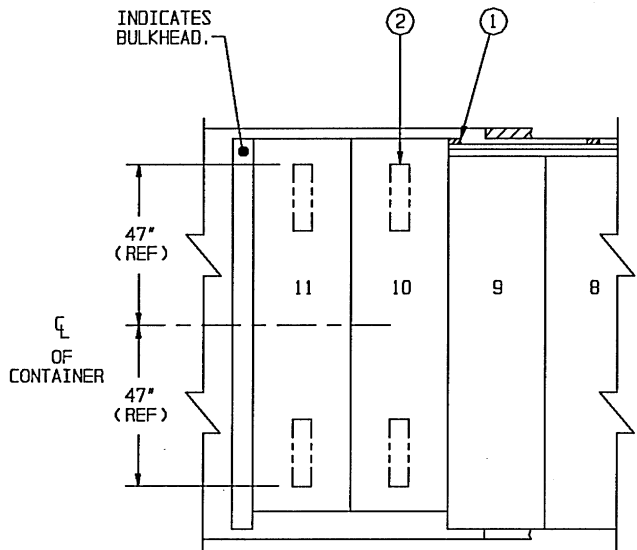
KEY NUMBERS

- ① SIDE FILL (SIX 3-WIDE REQD). SEE THE DETAIL ON PAGE 16. SEE GENERAL NOTES "K" AND "L" ON PAGE 2 AND SPECIAL NOTE 3 ON PAGE 11.
- ② FLOORLINE BLOCKING, 2" X 6" X 19-1/2" (DOUBLED) (4 REQD). PRE-POSITION AS SHOWN IN THE "PARTIAL PLAN VIEW" ON PAGE 11. NAIL THE FIRST PIECE TO THE CAR FLOOR W/4-16d NAILS. LAMINATE THE SECOND PIECE IN A LIKE MANNER. SEE GENERAL NOTES "K" ON PAGE 2 AND "R" ON PAGE 3. SEE SPECIAL NOTES 4 AND 5 ON PAGE 11.
- ③ DOORWAY PROTECTION STRAP, 1-1/4" X .031" OR .035" X 15'-6" LONG STEEL STRAPPING (4 REQD). SEE SPECIAL NOTE 5 ON PAGE 11.
- ④ SEAL FOR 1-1/4" STRAPPING (8 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "M" ON PAGE 2 AND THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 19.



SECTION A-A

60-CONTAINER LOAD  
IN A 50'-6" LONG BY 9'-6" WIDE BOXCAR EQUIPPED WITH LOAD DIVIDERS



**PARTIAL PLAN VIEW**

**SPECIAL NOTES:**

1. A 50'-6" LONG BY 9'-6" WIDE CUSHIONED BOXCAR EQUIPPED WITH LOAD DIVIDER BULKHEADS AND 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE GENERAL NOTE "E" ON PAGE 2 AND SPECIAL NOTE 3 BELOW.
2. THE TYPICAL LOAD SHOWN ON PAGE 10 IS APPLICABLE FOR BOTH OF THE CONTAINERS SHOWN ON PAGE 5 OF THIS DRAWING. A MAXIMUM OF 48 CONTAINERS FOR AN APPROXIMATE LADING WEIGHT OF 53,760 POUNDS CAN BE LOADED IN A 40'-6" LONG CAR. SEVENTY-TWO CONTAINERS CAN BE PLACED IN A 60'-8" LONG CAR FOR AN APPROXIMATE LADING WEIGHT OF 80,640 POUNDS. NOTE THAT IN A 60'-8" LONG CAR IT MAY BE POSSIBLE TO LOAD ONE ADDITIONAL STACK IF THE LOAD DIVIDER BULKHEADS ARE EQUIPPED WITH THE OPERATING MECHANISM ON THE EDGE OF THE BULKHEAD. LADING WEIGHT WILL THEN BE 84,000 POUNDS.
3. IF THE CAR TO BE LOADED IS 9'-4" WIDE OR LESS, SIDE FILL, PIECE MARKED ① WILL NOT BE REQUIRED, ALTHOUGH CARS AS NARROW AS 9'-2" WIDE CAN BE USED, LOADING WILL BE MORE DIFFICULT.
4. DOORWAY PROTECTION IS REQUIRED FOR ALL CONTAINER 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 ④ IN THE LOAD ON PAGE 6, IS APPLICABLE FOR BOXCARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS AND NAILABLE DOOR POSTS; OR NAILABLE FLOORLINE BLOCKING AND DOORWAY PROTECTION STRAPS MAY BE USED. REFER TO PAGE 26 FOR OTHER TYPES OF DOORWAY PROTECTION. NOTE: IF THE CAR BEING LOADED IS EQUIPPED WITH PLUG TYPE DOORS OR COMBINATION PLUG AND SLIDING DOORS, NAILABLE FLOORLINE BLOCKING AND DOORWAY PROTECTION STRAPS MUST BE USED.
5. NAILABLE FLOORLINE BLOCKING, SHOWN AS PIECE MARKED ② IN THE "PARTIAL PLAN VIEW" AT LEFT, MUST BE USED FOR ALL LOAD UNITS REQUIRING DOORWAY PROTECTION STRAPS. TWO DOORWAY PROTECTION STRAPS ARE REQUIRED FOR EACH CONTAINER STACK WHICH IS COMPLETELY WITHIN THE DOORWAY AREA OR WHICH IS NOT RETAINED BY AT LEAST 6" OF CAR SIDEWALL ON BOTH SIDES OF THE CAR.
6. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED BY OMITTING ONE OR MORE CONTAINER STACKS FROM THE CENTER PORTION OF THE LOAD, OR THE ENTIRE ONE OR TWO TOP TIERS CAN BE OMITTED. FOR OTHER METHODS OF REDUCING A LOAD REFER TO THE TYPICAL LCL PROCEDURES ON PAGES 20 THRU 25 FOR GUIDANCE.

**BILL OF MATERIAL**

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	221	148
2" X 6"	13	13
NAILS	NO. REQD	POUNDS
10d (3")	108	1-3/4
16d (3-1/2")	32	3/4
STEEL STRAPPING, 1-1/4" - 62' REQD - - - - -		9 LBS
SEAL FOR 1-1/4" STRAPPING - 8 REQD - - - - -		NIL

**LOAD AS SHOWN**

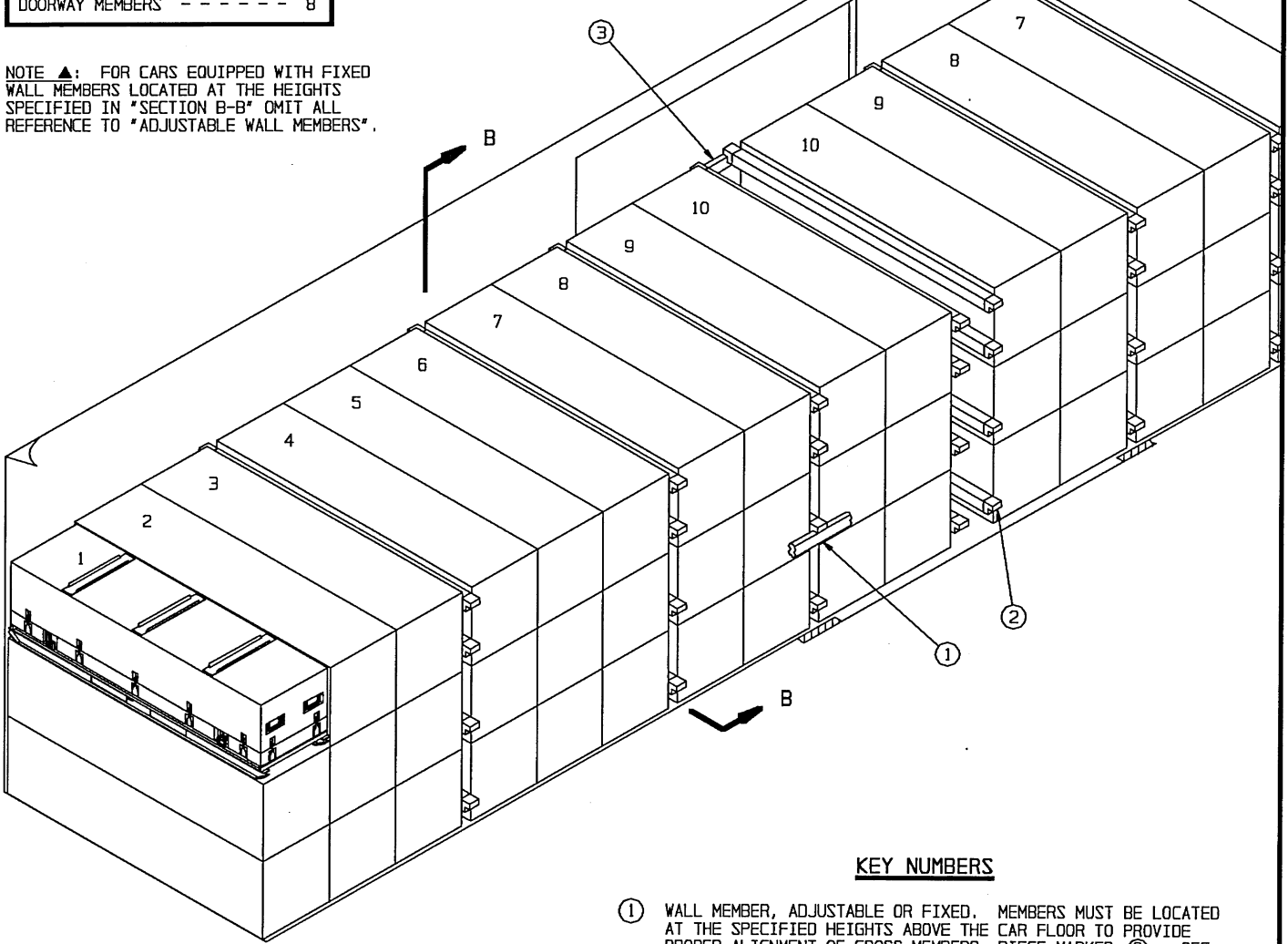
ITEM	QUANTITY	WEIGHT (APPROX)
CONTAINER	60	67,200 LBS
TUNNAGE		334 LBS
<b>TOTAL WEIGHT</b>		<b>67,534 LBS (APPROX)</b>

**60-CONTAINER LOAD  
IN A 50'-6" LONG BY 9'-6" WIDE BOXCAR EQUIPPED WITH LOAD DIVIDERS**

**CAR EQUIPMENT REQUIRED**

ADJUSTABLE WALL MEMBER - - -	48
(SEE "NOTE ▲" BELOW)	
CROSS MEMBERS - - - - -	32
DOORWAY MEMBERS - - - - -	8

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

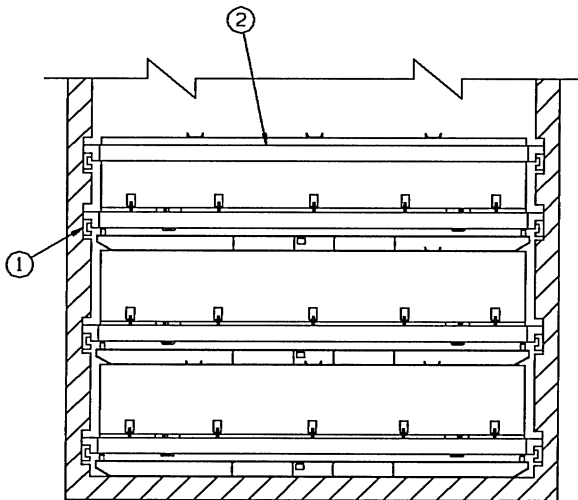


**ISOMETRIC VIEW**

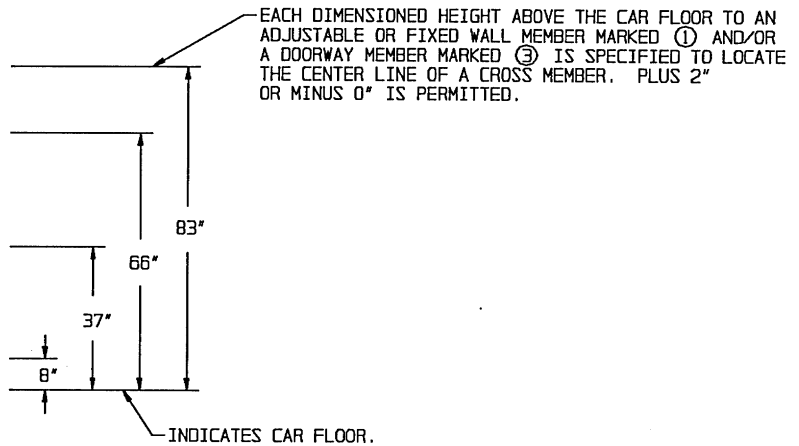
SEE SPECIAL NOTE 3 ON PAGE 13.

**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, PIECE MARKED ②. SEE "SECTION B-B" BELOW FOR LOCATION GUIDANCE.
- ② CROSS MEMBER (32 REQD). SEE GENERAL NOTE "W" ON PAGE 3.
- ③ DOORWAY MEMBER (8 REQD). SEE "SECTION B-B" BELOW FOR LOCATION GUIDANCE.



**SECTION B-B**



60-CONTAINER LOAD

IN A 50'-6" LONG BY 9'-4" WIDE BOXCAR EQUIPPED WITH MECHANICAL BRACING DEVICES

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-4" WIDE (INSIDE DIMENSION) BOXCAR EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS, AND 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTE 3 BELOW.
2. THE TYPICAL LOAD SHOWN ON PAGE 12 IS APPLICABLE FOR BOTH OF THE CONTAINERS SHOWN ON PAGE 5 OF THIS DRAWING. A MAXIMUM OF 48 CONTAINERS FOR AN APPROXIMATE LADING WEIGHT OF 53,760 POUNDS CAN BE LOADED IN A 40'-6" LONG CAR.
3. IF THE CAR HAS BOWED ENDWALLS WHICH ARE BOWED OUTWARD 2" OR MORE EITHER FROM SIDE-TO-SIDE OR FROM FLOOR-TO-ROOF, CROSS MEMBERS CAN BE INSTALLED NEAR THE ENDWALL OF THE CAR TO PROVIDE A "SQUARED END" RATHER THAN INSTALLING DUNNAGE AS SPECIFIED IN GENERAL NOTE "E" ON PAGE 2. THESE CROSS MEMBERS SHOULD BE INSTALLED AT THE SAME HEIGHTS AS THE CROSS MEMBERS USED THROUGHOUT THE LOAD AS BLOCKING MEMBERS.
4. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED. A LOAD MAY BE REDUCED BY OMITTING ONE OR MORE CONTAINERS FROM A STACK OR BY OMITTING ONE OR MORE COMPLETE STACKS.

LOAD AS SHOWN

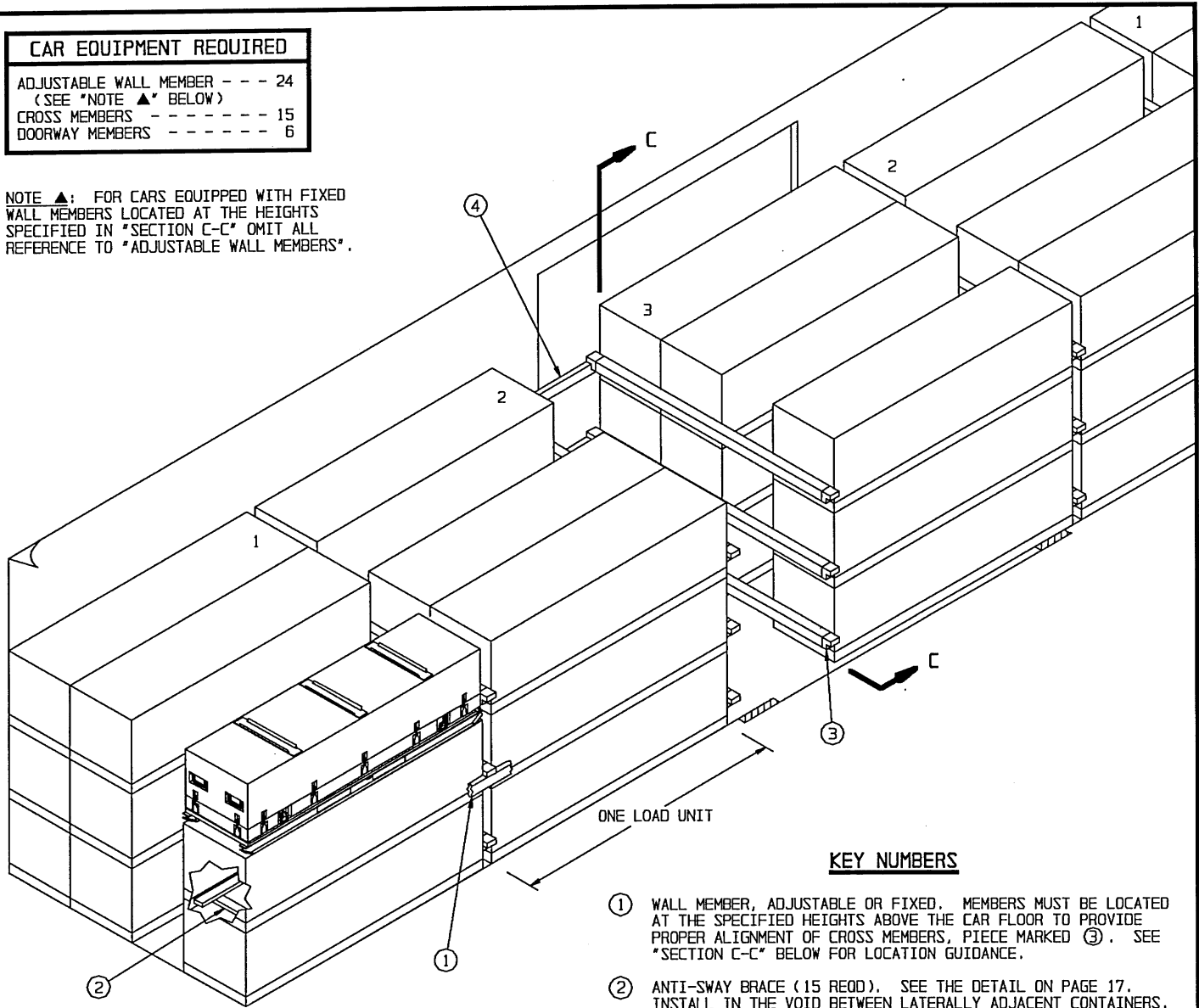
<u>ITEM</u>	<u>QUANTITY</u>	<u>WEIGHT (APPROX)</u>
CONTAINER - - - - -	60 - - - - -	67,200 LBS
TOTAL WEIGHT - - - - -		67,200 LBS (APPROX)

60-CONTAINER LOAD  
IN A 50'-6" LONG BY 9'-4" WIDE BOXCAR EQUIPPED WITH MECHANICAL BRACING DEVICES

**CAR EQUIPMENT REQUIRED**

ADJUSTABLE WALL MEMBER - - - -	24
(SEE "NOTE ▲" BELOW)	
CROSS MEMBERS - - - - -	15
DOORWAY MEMBERS - - - - -	6

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

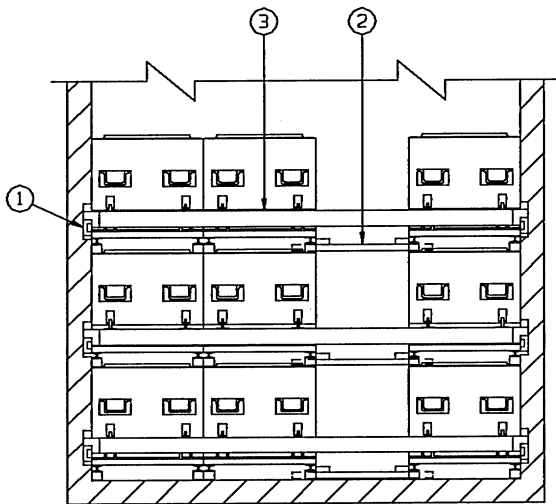


SEE SPECIAL NOTE 3 ON PAGE 15.

**ISOMETRIC VIEW**

**KEY NUMBERS**

- ① WALL MEMBER, ADJUSTABLE OR FIXED. MEMBERS MUST BE LOCATED AT THE SPECIFIED HEIGHTS ABOVE THE CAR FLOOR TO PROVIDE PROPER ALIGNMENT OF CROSS MEMBERS, PIECE MARKED ③. SEE "SECTION C-C" BELOW FOR LOCATION GUIDANCE.
- ② ANTI-SWAY BRACE (15 REQD). SEE THE DETAIL ON PAGE 17. INSTALL IN THE VOID BETWEEN LATERALLY ADJACENT CONTAINERS. SEE GENERAL NOTES "K" AND "L" ON PAGE 2 AND SPECIAL NOTE 3 ON PAGE 15.
- ③ CROSS MEMBER (15 REQD). SEE GENERAL NOTE "W" ON PAGE 3.
- ④ DOORWAY MEMBER (6 REQD). SEE "SECTION C-C" BELOW FOR LOCATION GUIDANCE.



EACH DIMENSIONED HEIGHT ABOVE THE CAR FLOOR TO AN ADJUSTABLE OR FIXED WALL MEMBER MARKED ① AND/OR A DOORWAY MEMBER MARKED ④ IS SPECIFIED TO LOCATE THE CENTER LINE OF A CROSS MEMBER. PLUS OR MINUS 2" IS PERMITTED.

67"  
37"  
9"  
INDICATES CAR FLOOR.

**SECTION C-C**

45-CONTAINER LOAD

IN A 50'-6" LONG BY 9'-0" WIDE BOXCAR EQUIPPED WITH MECHANICAL BRACING DEVICES

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-0" WIDE (INSIDE DIMENSION) BOXCAR EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS, AND 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTE 3 BELOW.
2. THE TYPICAL LOAD SHOWN ON PAGE 14 IS APPLICABLE FOR BOTH OF THE CONTAINERS SHOWN ON PAGE 5 OF THIS DRAWING. A MAXIMUM OF 36 CONTAINERS FOR AN APPROXIMATE LADING WEIGHT OF 40,320 POUNDS CAN BE LOADED IN A 40'-6" LONG CAR.
3. IF THE CAR HAS BOWED ENDWALLS WHICH ARE BOWED OUTWARD 2" OR MORE EITHER FROM SIDE-TO-SIDE OR FROM FLOOR-TO-ROOF, CROSS MEMBERS CAN BE INSTALLED NEAR THE ENDWALL OF THE CAR TO PROVIDE A "SQUARED END" RATHER THAN INSTALLING DUNNAGE AS SPECIFIED IN GENERAL NOTE "E" ON PAGE 2. THESE CROSS MEMBERS SHOULD BE INSTALLED AT THE SAME HEIGHTS AS THE CROSS MEMBERS USED THROUGHOUT THE LOAD AS BLOCKING MEMBERS.
4. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY TO BE SHIPPED. A LOAD MAY BE REDUCED BY MULTIPLES OF THREE CONTAINERS BY OMITTING LATERALLY ADJACENT CONTAINERS FROM THE TOP LAYER OF ONE OR MORE LOAD UNITS OR BY MULTIPLES OF NINE BY OMITTING ONE OR TWO ENTIRE LOAD UNITS.

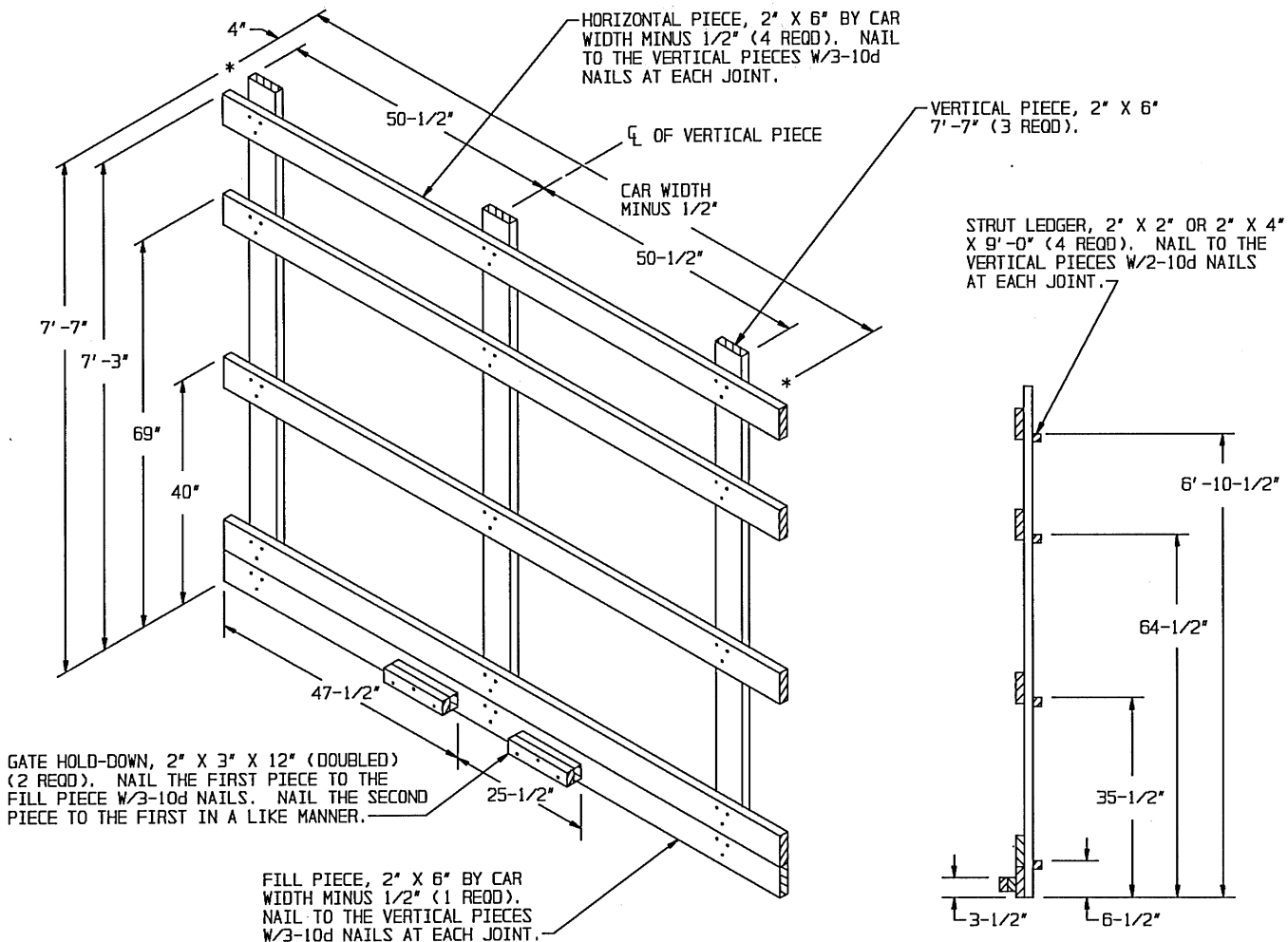
**BILL OF MATERIAL**

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	220	147
NAILS	NO. REQD	POUNDS
10d (3")	180	3

**LOAD AS SHOWN**

<u>ITEM</u>	<u>QUANTITY</u>	<u>WEIGHT (APPROX)</u>
CONTAINER	45	50,400 LBS
DUNNAGE		297 LBS
TOTAL WEIGHT		50,697 LBS (APPROX)

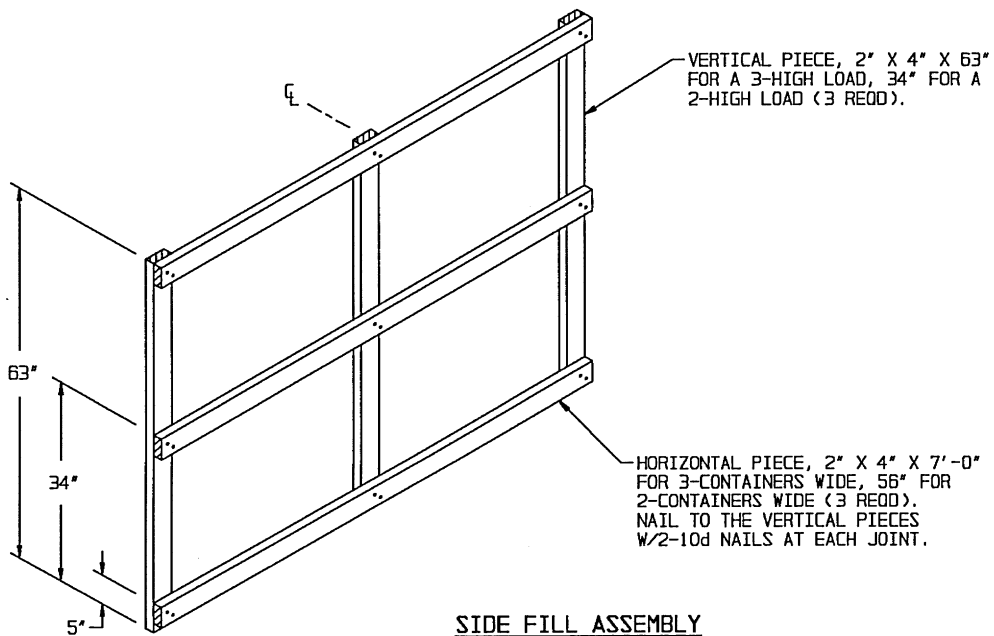
45-CONTAINER LOAD  
IN A 50'-6" LONG BY 9'-0" WIDE BOXCAR EQUIPPED WITH MECHANICAL BRACING DEVICES



**CENTER GATE**

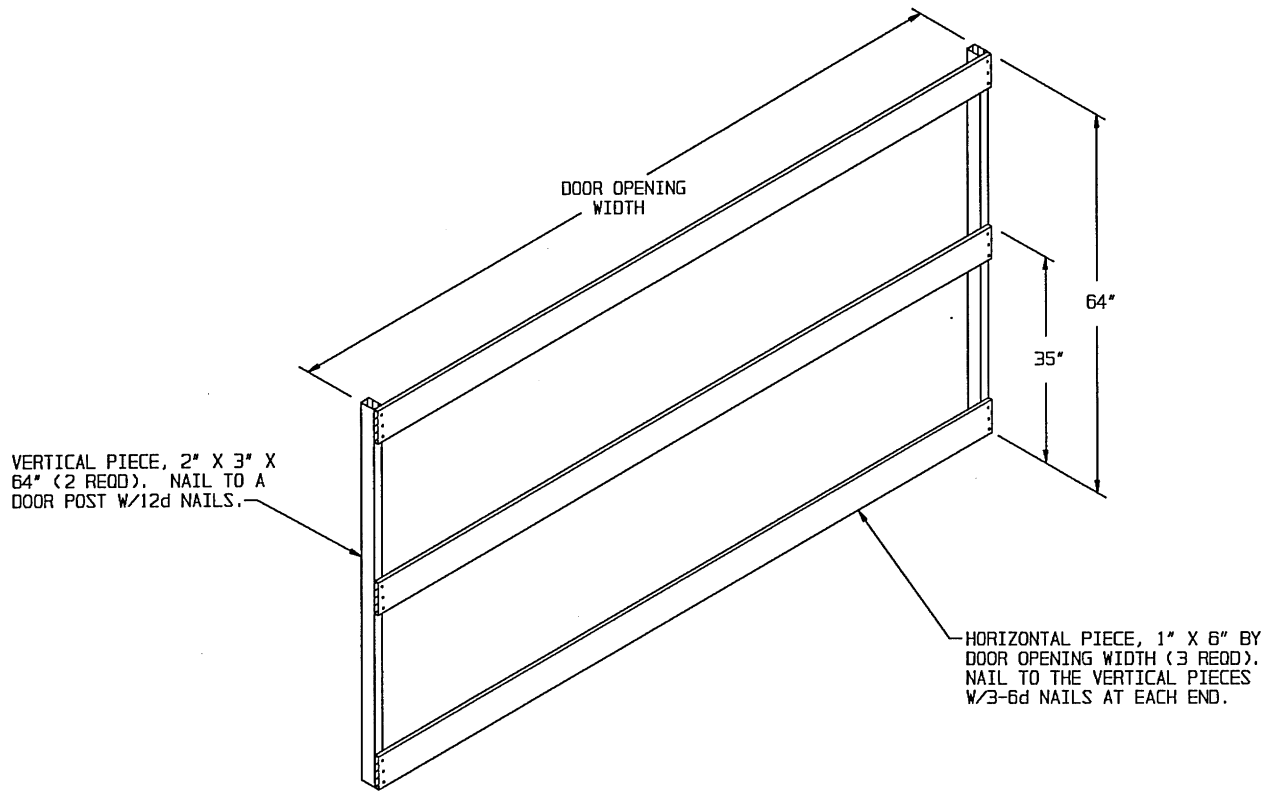
**END VIEW**

ONE RIGHT HAND AND ONE LEFT HAND GATE REQUIRED.

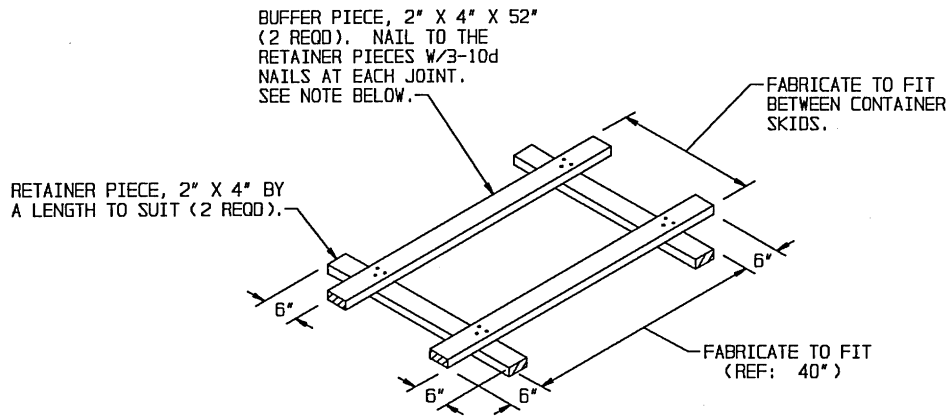


**DETAILS**





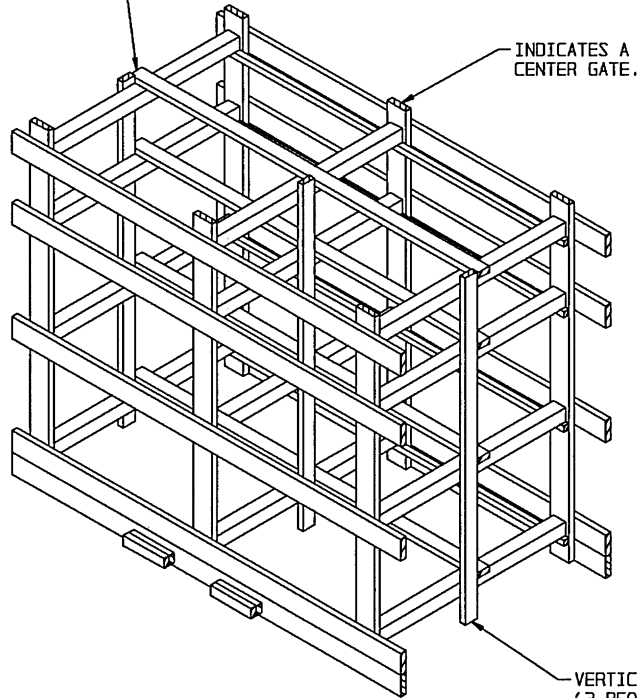
**DOORWAY PROTECTION**



**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 CONTAINER, PRIOR TO POSITIONING THE LATERALLY ADJACENT CONTAINER. TO FACILITATE NAILING, IT MAY BE NECESSARY FOR ONE BUFFER PIECE TO BE 2" X 6" MATERIAL (APPLY LAST).

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



INDICATES A CENTER GATE.

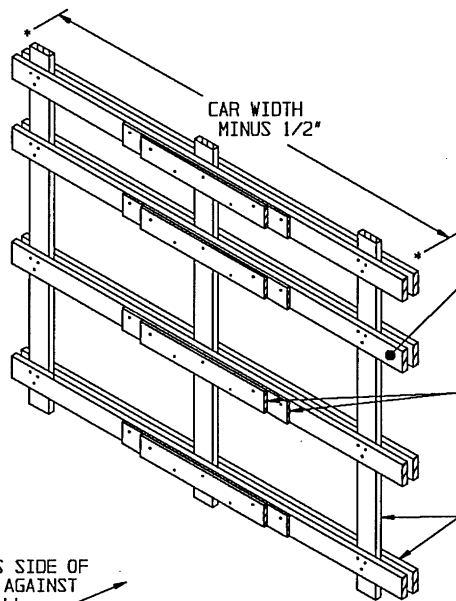
VERTICAL PIECE, 2" X 4" X 7'-4" (3 RECD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.

**TYPICAL STRUT BRACING**

SEE GENERAL NOTE "T" ON PAGE 3.

**NOTE:**

IF A BOXCAR TO BE LOADED HAS BOWED ENDWALLS WHICH ARE BOWED OUTWARD MORE THAN TWO INCHES, 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 BOXCAR 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 OR SIMILAR TO A CENTER GATE. NOTE THAT THE GATE MUST BE MODIFIED BY OMITTING THE 2" X 2" STRUT LEDGERS AND THE GATE HOLD-DOWN PIECES.



CAR WIDTH MINUS 1/2"

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.

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

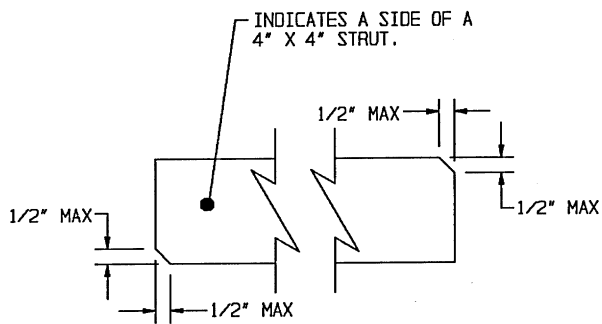
THESE 2" X 6" HORIZONTAL AND VERTICAL PIECE ARE PART OF THE MODIFIED CENTER GATE. SEE THE NOTE ABOVE.

POSITION THIS SIDE OF THE BULKHEAD AGAINST THE CAR ENDWALL.

**END-OF-CAR-BULKHEAD**

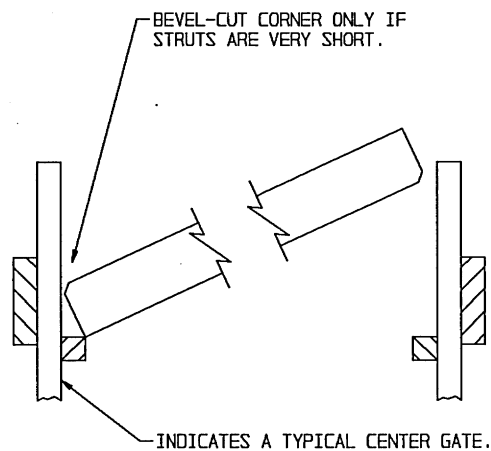
NOTE THAT THE "SHORT" END OF THE BULKHEAD MAY NEED TO BE ON THE OPPOSITE END TO FIT THE LOAD POSITION AT THE END OF THE CAR.

**DETAILS**



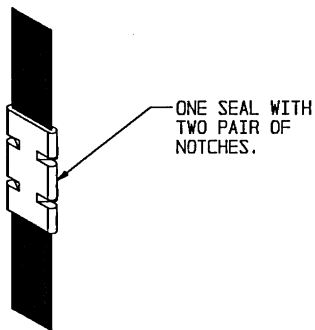
**BEVEL-CUT**

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



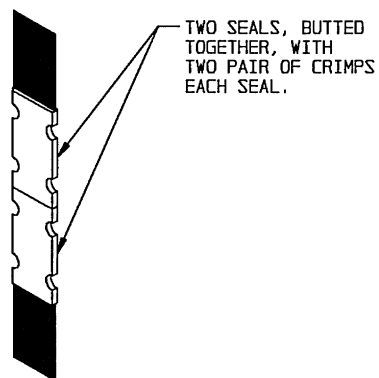
**STRUT INSTALLATION**

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



**STRAP JOINT A**

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



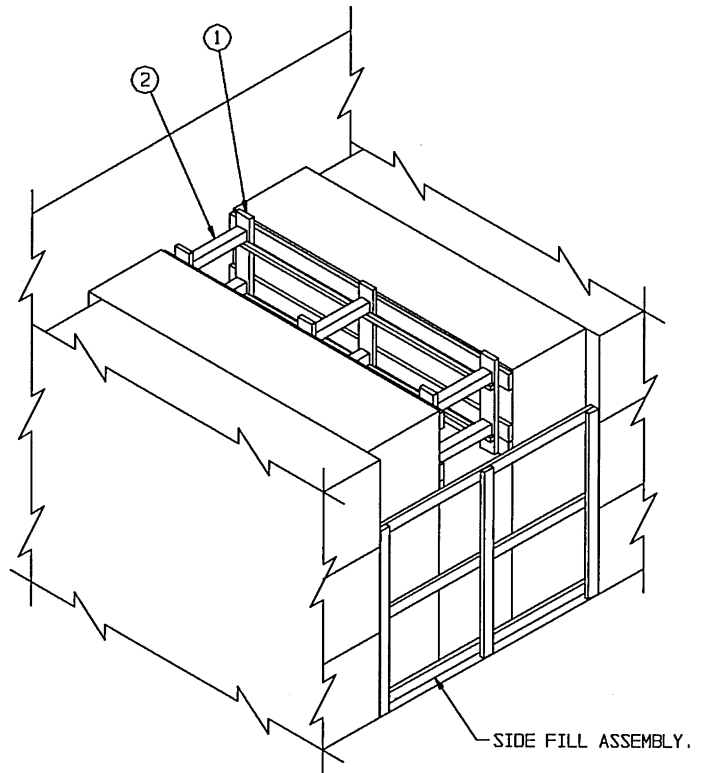
**STRAP JOINT B**

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

**END-OVER-END LAP JOINT DETAILS**

**SPECIAL NOTES:**

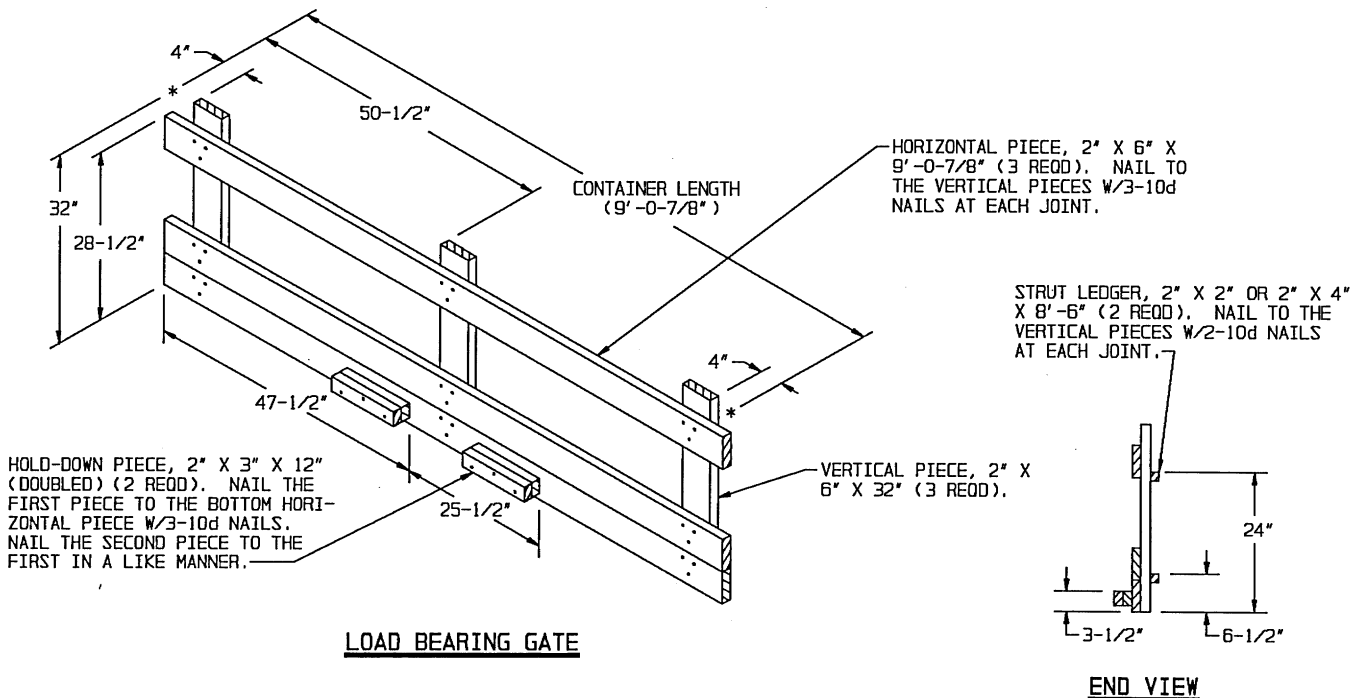
1. A PARTIAL VIEW OF A 9'-6" WIDE CONVENTIONAL TYPE BOXCAR IS SHOWN. CARS OF OTHER WIDTHS CAN ALSO BE USED.
2. A CONTAINER OMITTED FROM THE TOP LAYER OF A 3-LAYER LOAD IS SHOWN AS TYPICAL. THE PROCEDURES ARE ALSO APPLICABLE FOR THE OMISSION OF A TOP-LAYER CONTAINER FROM A 2-LAYER LOAD.
3. THE OMITTED CONTAINER PROCEDURES SHOULD BE APPLIED NEAR THE CENTER OF THE CAR LENGTH. ALSO, THERE SHOULD BE AT LEAST ONE LOAD UNIT BETWEEN THE OMITTED CONTAINER AND THE CENTER GATE.
4. ONLY THE BLOCKING AND BRACING FOR THE OMITTED CONTAINER AND THE SIDE FILL ASSEMBLY ARE SHOWN. REFER TO PAGES 6 AND 7 OR PAGES 8 AND 9 FOR THE BLOCKING AND BRACING REQUIREMENTS FOR THE BALANCE OF THE LOAD.

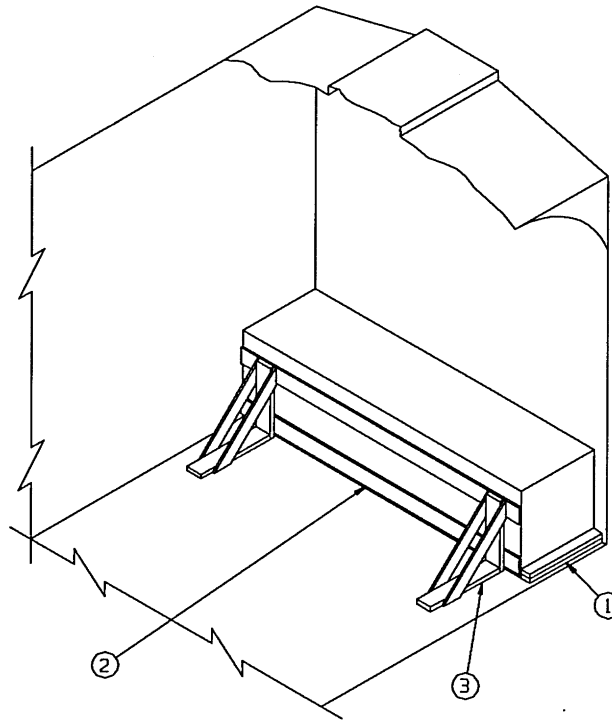


**ISOMETRIC VIEW**

**KEY NUMBERS**

- ① LOAD BEARING GATE (2 REOD). SEE THE DETAIL BELOW.
- ② STRUT, 4" X 4" BY CUT TO FIT (6 REOD). TOENAIL TO THE LOAD BEARING GATE, PIECE MARKED ①, W/2-16d NAILS AT EACH END. SEE THE "STRUT INSTALLATION" DETAIL ON PAGE 19. SEE GENERAL NOTES "T" AND "U" ON PAGE 3.





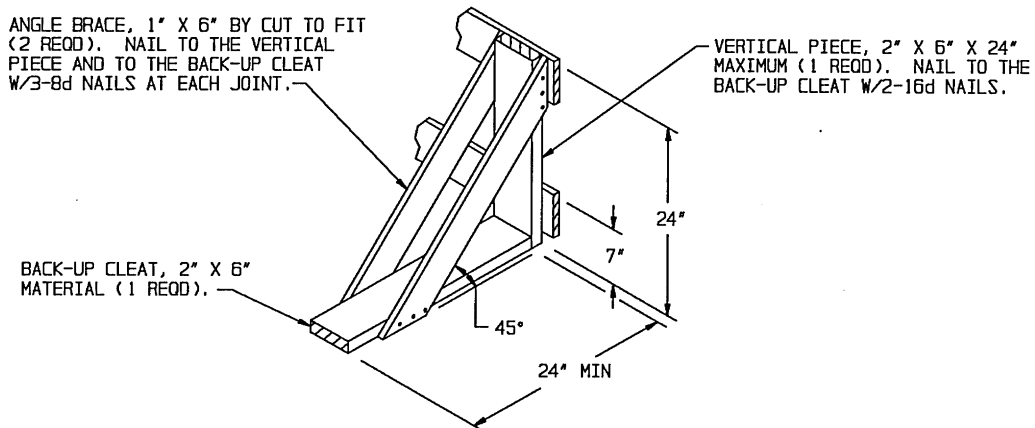
**ISOMETRIC VIEW**

**SPECIAL NOTES:**

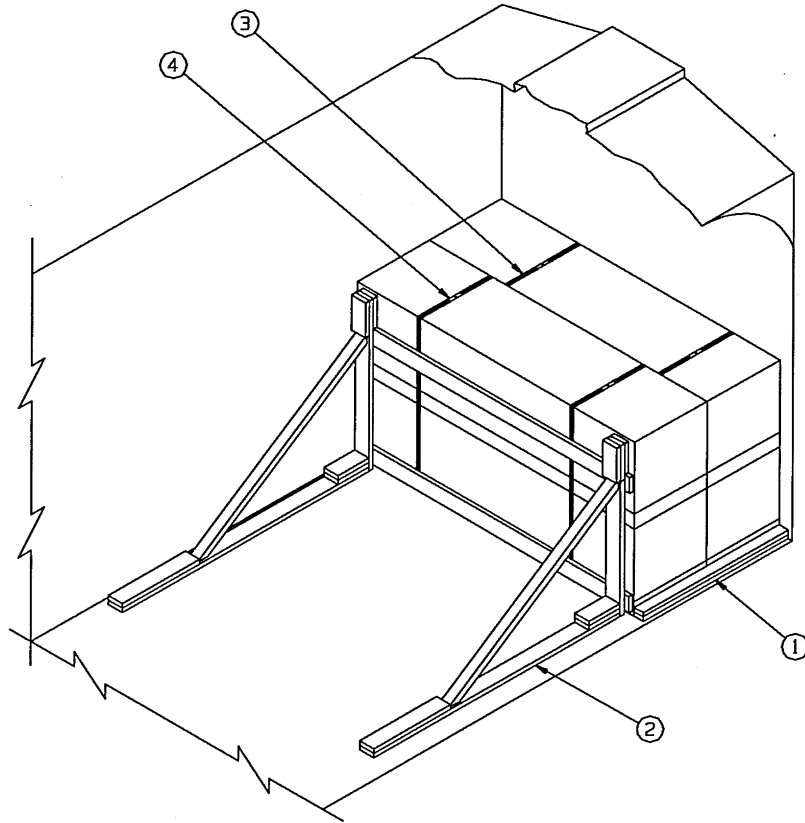
1. A 9'-6" WIDE CONVENTIONAL TYPE BOXCAR HAVING A WOOD OR NAILABLE METAL FLOOR IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED.
2. EACH LCL BRACE AS APPLIED FOR LONGITUDINAL BRACING WILL RETAIN 2,000 POUNDS OF LADING. A MINIMUM OF TWO BRACES MUST BE USED.
3. IF THE CAR TO BE LOADED IS 9'-4" WIDE OR LESS, SIDE BLOCKING, PIECE MARKED ①, WILL NOT BE REQUIRED.

**KEY NUMBERS**

- ① SIDE BLOCKING, 2" X 4" BY LOAD LENGTH (DOUBLED) (1 REQD). PRE-POSITION. NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". LAMINATE THE SECOND PIECE IN A LIKE MANNER. SEE GENERAL NOTE "K" ON PAGE 2 AND SPECIAL NOTE 3 AT LEFT.
- ② HORIZONTAL PIECE, 1" X 6" X 9'-0" (2 REQD). NAIL TO THE LCL BRACE W/3-8d NAILS AT EACH JOINT.
- ③ LCL BRACE (2 REQD). SEE THE "LCL BRACE" DETAIL BELOW. NAIL TO THE CAR FLOOR W/7-16d NAILS. SEE GENERAL NOTE "R" ON PAGE 3 AND SPECIAL NOTE 2 AT LEFT.



**LCL BRACE**



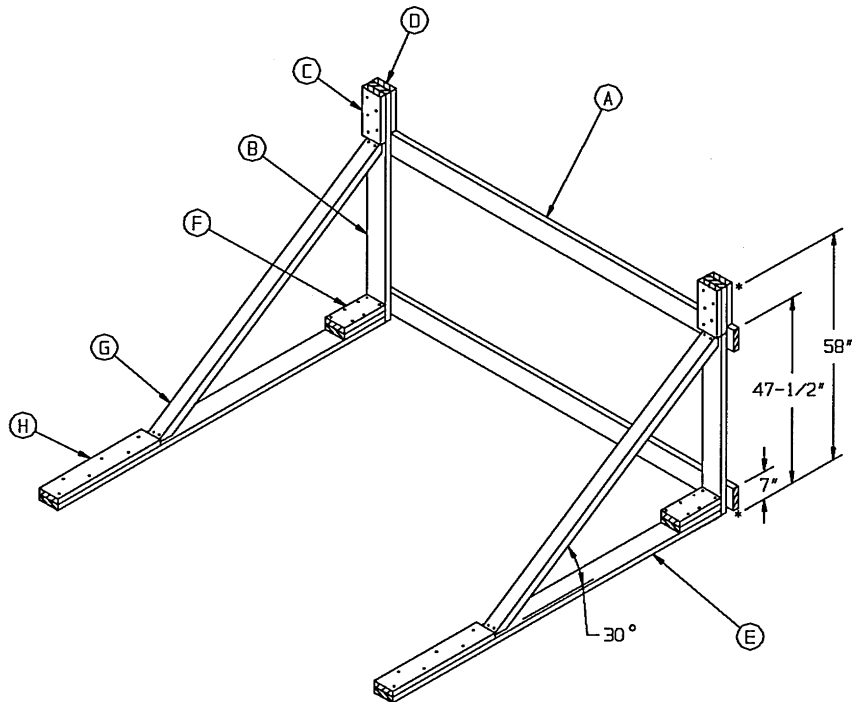
ISOMETRIC VIEW

SPECIAL NOTES:

1. A FOUR-CONTAINER LOAD IS SHOWN IN A 9'-6" WIDE CONVENTIONAL BOXCAR. CARS OF OTHER WIDTHS CAN BE USED.
2. IF THE CAR TO BE LOADED IS 9'-4" WIDE OR LESS, SIDE FILL, PIECE MARKED ①, WILL NOT BE REQUIRED.
3. THE TOTAL KNEE BRACE ASSEMBLY IS ADEQUATE FOR RETAINING A MAXIMUM LCL LOAD OF NOT MORE THAN 8,500 LBS.

KEY NUMBERS

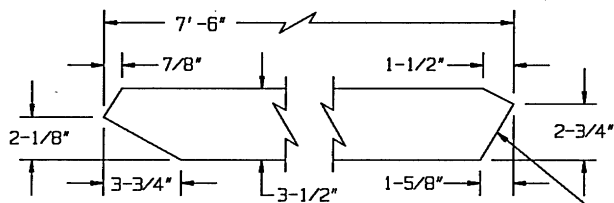
- ① SIDE BLOCKING, 2" X 4" BY LOAD LENGTH (DOUBLED) (1 REQD). PRE-POSITION. NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". LAMINATE THE SECOND PIECE IN A LIKE MANNER. SEE GENERAL NOTE "K" ON PAGE 2 AND SPECIAL NOTE 2 AT LEFT.
- ② KNEE BRACE ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 23 AND SPECIAL NOTE 3 AT LEFT.
- ③ UNITIZING STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT (REF: 15'-6") (4 REQD). THREAD THRU THE FORK TINE OPENINGS OF THE LOWER CONTAINER.
- ④ SEAL FOR 1-1/4" STRAPPING (8 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "M" ON PAGE 2 AND THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 19.



**KNEE BRACE ASSEMBLY**

**KEY LETTERS**

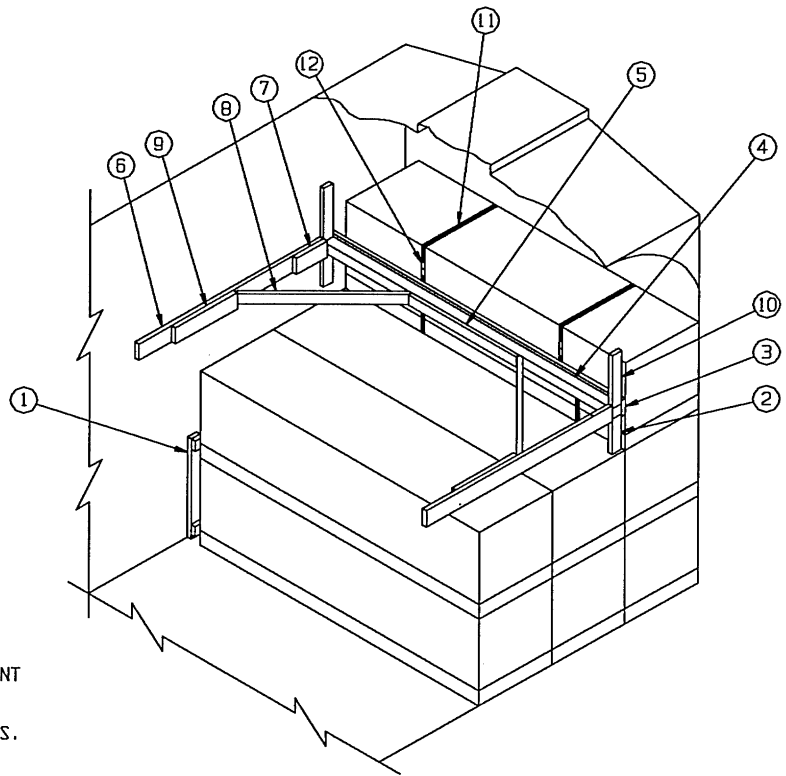
- (A) LOAD BEARING PIECE, 2" X 6" X 9'-0" (2 REQD). NAIL TO THE VERTICAL PIECES, PIECE MARKED (B), W/3-10d NAILS AT EACH JOINT.
- (B) VERTICAL PIECE, 2" X 6" X 58" (2 REQD). LOCATE ONE INCH FROM END OF LOAD BEARING PIECE, PIECE MARKED (A).
- (C) HOLD-DOWN CLEAT, 2" X 6" X 12" (2 REQD). NAIL TO THE VERTICAL PIECE, PIECE MARKED (B), W/5-10d NAILS.
- (D) REINFORCING PIECE, 2" X 6" X 10-1/2" (2 REQD). POSITION IN CONTACT WITH PIECE MARKED (A) AND NAIL TO THE VERTICAL PIECE, PIECE MARKED (B), W/5-10d NAILS.
- (E) FLOOR CLEAT, 2" X 6" X 8'-0" (2 REQD). NAIL TO THE CAR FLOOR W/1-16d NAIL EVERY 8". SEE GENERAL NOTE "K" ON PAGE 2.
- (F) POCKET CLEAT, 2" X 6" X 12" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE FLOOR CLEAT, PIECE MARKED (E), W/5-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. TOENAIL THE TOP PIECE TO THE VERTICAL PIECE W/2-10d NAILS.
- (G) BRACE, 4" X 4" X 7'-6" (2 REQD). SEE THE DETAIL AT LEFT FOR BEVEL CUTS REQUIRED. TOENAIL TO THE VERTICAL PIECE AND FLOOR CLEAT, PIECES MARKED (B) AND (E), W/2-16d NAILS AT EACH JOINT.
- (H) BACK-UP CLEAT, 2" X 6" X 30" (2 REQD). NAIL TO THE FLOOR CLEAT, PIECE MARKED (E), W/6-40d 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 (B).



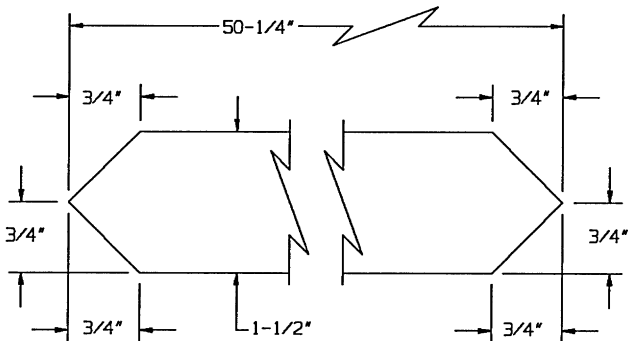
**ISOMETRIC VIEW**

**SPECIAL NOTES:**

1. A 9'-6" WIDE CONVENTIONAL WOOD-LINED 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 (TIER) BRACING SHOWN MAY BE USED IN WOOD-LINED CARS FOR THE SECUREMENT OF A PARTIAL TOP TIER, BE IT 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 DETAIL ON PAGE 25.
3. **CAUTION:** SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL-LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL TIER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ②, ③, ④, 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, 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.
4. THE CENTER CLEAT, SHOWN AS PIECE MARKED ⑤, WILL BE 36" LONG FOR AN 9'-2" WIDE CAR, AND 38" LONG FOR A 9'-4" WIDE CAR. ADJUST THE LENGTH PROPORTIONATELY FOR CARS OF OTHER WIDTHS.

**KEY NUMBERS**

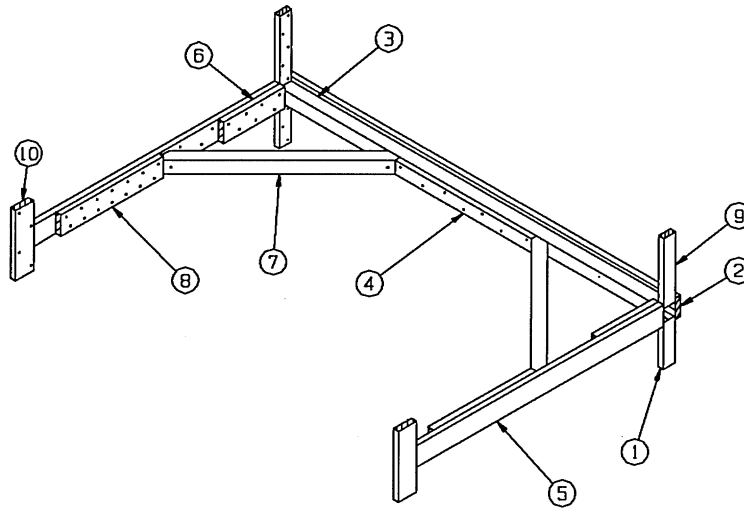
- ① SIDE FILL ASSEMBLY (1 REOD, 3-WIDE BY 2-HIGH). SEE THE DETAIL ON PAGE 16. SEE GENERAL NOTE "K" ON PAGE 2.
- ② SUPPORT CLEAT, 2" X 4" X 12" (2 REOD). POSITION VERTICALLY AS SHOWN 1-1/2" ABOVE THE CONTAINER. NAIL TO THE CAR SIDEWALL W/4-12d NAILS.
- ③ LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH IN LENGTH (CUT TO FIT) (1 REOD). 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) (1 REOD).
- ⑤ CENTER CLEAT, 2" X 4" X 40" (1 REOD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ④, W/7-16d NAILS. SEE SPECIAL NOTE 4 AT LEFT.
- ⑥ HORIZONTAL WALL CLEAT, 2" X 6" X 72" (2 REOD). NAIL TO THE CAR SIDEWALL W/16-12d NAILS.
- ⑦ POCKET CLEAT, 2" X 6" X 12" (2 REOD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/4-16d NAILS.
- ⑧ DIAGONAL BRACE, 4" X 4" X 50-1/4" (2 REOD). 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 ⑥, W/2-16d NAILS AT EACH END.
- ⑨ BACK-UP CLEAT, 2" X 6" X 24" (2 REOD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/8-16d NAILS.
- ⑩ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REOD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ⑪ UNITIZING STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT (REF: 15'-6") (2 REOD). INSTALL THRU THE FORK TINE OPENINGS OF THE SECOND LAYER CONTAINER TO ENCIRCLE THE TOP LAYER CONTAINER AS SHOWN.
- ⑫ SEAL FOR 1-1/4" STRAPPING (4 REOD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "M" ON PAGE 2 AND THE "END-OVER-END LAP JOINT DETAILS" ON PAGE 19.



**DIAGONAL BRACE**

SEE SPECIAL NOTE 3 ABOVE.





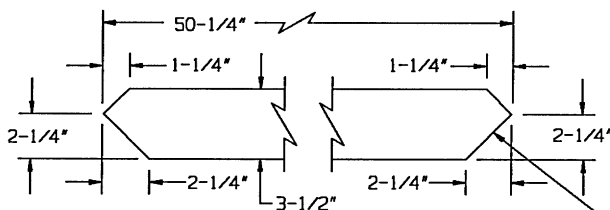
**ISOMETRIC VIEW**

**SPECIAL NOTES:**

1. THE TYPE "B" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER OF NOT MORE THAN 7,000 POUNDS. THIS WILL BE NOT MORE THAN SIX CONTAINERS. IF THE PARTIAL TIER TO BE BRACED WEIGHS LESS THAN 4,000 POUNDS, THE TYPE "A" K-BRACE DEPICTED ON PAGE 24 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, 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 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 36" LONG FOR AN 9'-2" WIDE CAR, AND 38" LONG FOR A 9'-4" WIDE CAR. ADJUST THE LENGTH PROPORTIONATELY FOR CARS OF OTHER WIDTHS.
4. REFER TO PAGE 24 FOR A TYPICAL INSTALLATION OF A K-BRACE.

**KEY NUMBERS**

- ① SUPPORT CLEAT, 2" X 4" X 12" (2 REOD), POSITION VERTICALLY AS SHOWN 1-1/2" ABOVE THE CONTAINER. NAIL TO THE CAR SIDEWALL W/4-12d NAILS. SEE SPECIAL NOTE 2 AT LEFT.
- ② LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH IN LENGTH (CUT TO FIT) (1 REOD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6". SEE GENERAL NOTE "K" ON PAGE 2.
- ③ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH IN LENGTH (CUT TO FIT) (1 REOD).
- ④ CENTER CLEAT, 2" X 4" X 40" (1 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" (2 REOD). NAIL TO THE CAR SIDEWALL W/16-12d NAILS.
- ⑥ POCKET CLEAT, 2" X 6" X 18" (2 REOD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/7-16d NAILS.
- ⑦ DIAGONAL BRACE, 4" X 4" X 50-1/4" (2 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" (2 REOD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/14-16d NAILS.
- ⑨ HOLD-DOWN CLEAT, 2" X 6" X 18" (2 REOD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ⑩ VERTICAL BACK-UP CLEAT, 2" X 6" X 18" (2 REOD). NAIL TO THE CAR SIDEWALL W/4-12d 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**

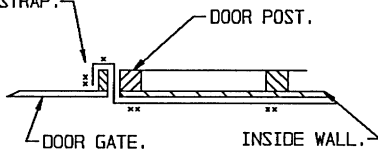
HORIZONTAL PIECE, 1" X 6" BY DOOR OPENING WIDTH (3 REQD). NAIL TO THE VERTICAL PIECES W/3-6d NAILS AT EACH END. SEE THE "DOORWAY PROTECTION" DETAIL ON PAGE 17 FOR HEIGHT LOCATIONS.

DOORWAY PROTECTION-GATE STRAP, 1-1/4" X .035" OR .031" X 3'-0" (REF) NAIL-ON TYPE STEEL STRAPPING (2 REQD PER LAYER OF LOAD). NAIL TO GATE AND CAR SIDEWALL AS SHOWN BY THE "VIEW B" SKETCH BELOW. NOTE THAT TYPE I STRAPPING MAY BE PUNCHED FOR NAILING IF TYPE 3 STRAPPING IS NOT AVAILABLE.

INDICATES DOOR OPENING.

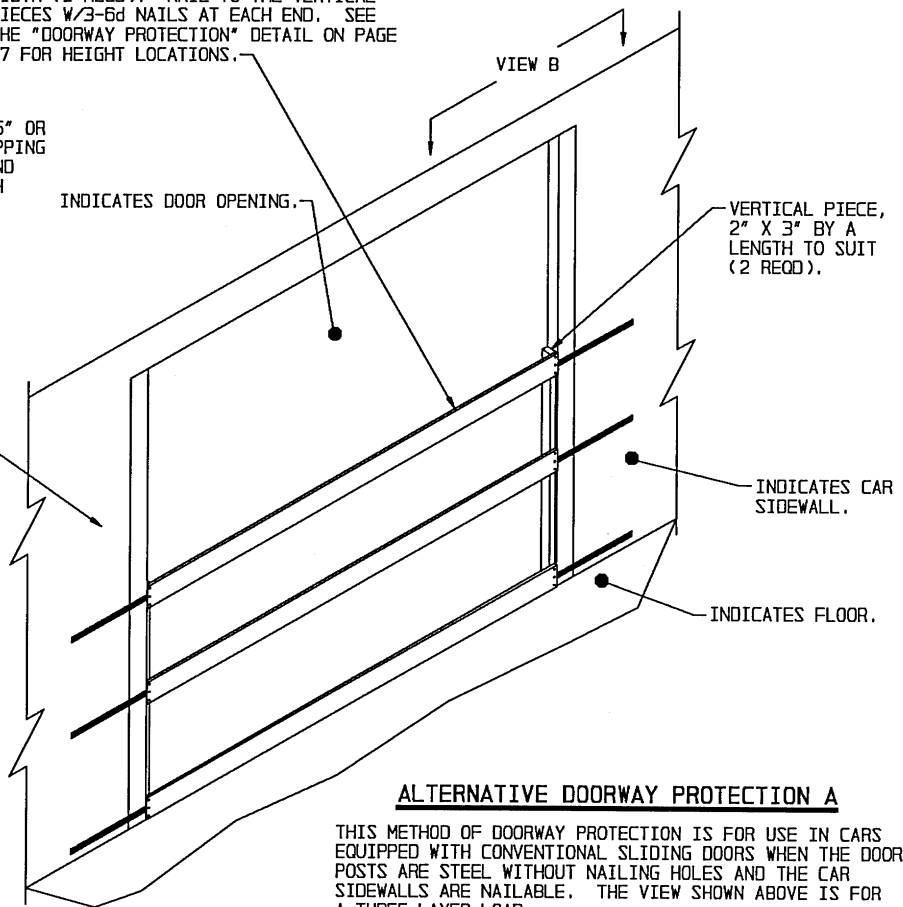
VERTICAL PIECE, 2" X 3" BY A LENGTH TO SUIT (2 REQD).

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



**VIEW B**

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

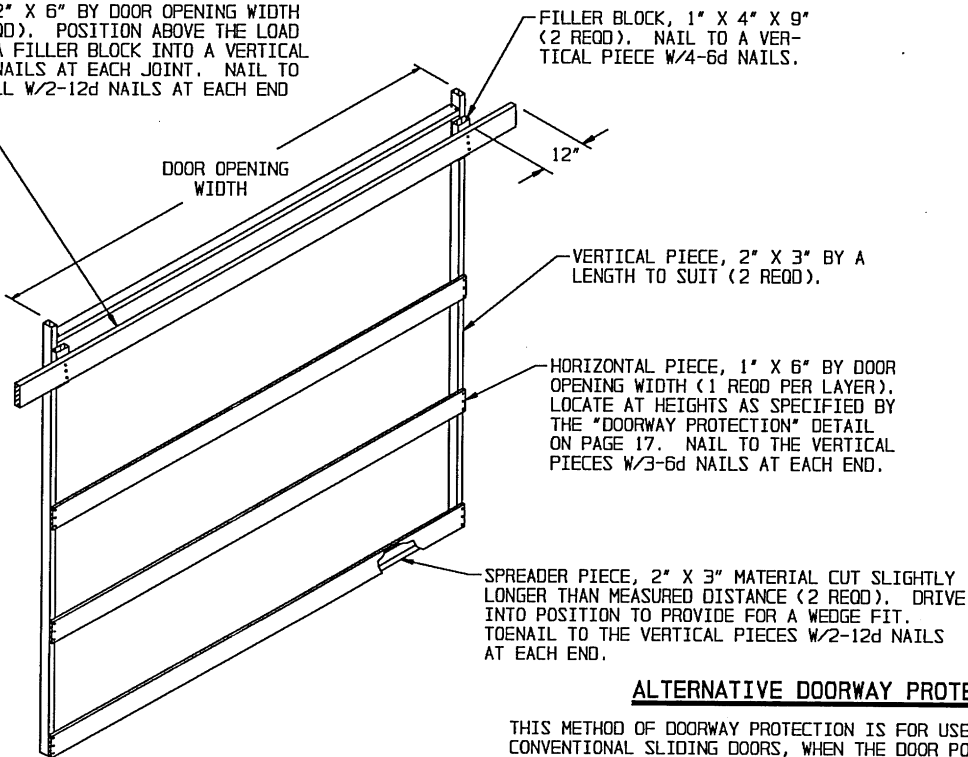


**ALTERNATIVE DOORWAY PROTECTION A**

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 AVAILABLE. THE VIEW SHOWN ABOVE IS FOR A THREE-LAYER LOAD.

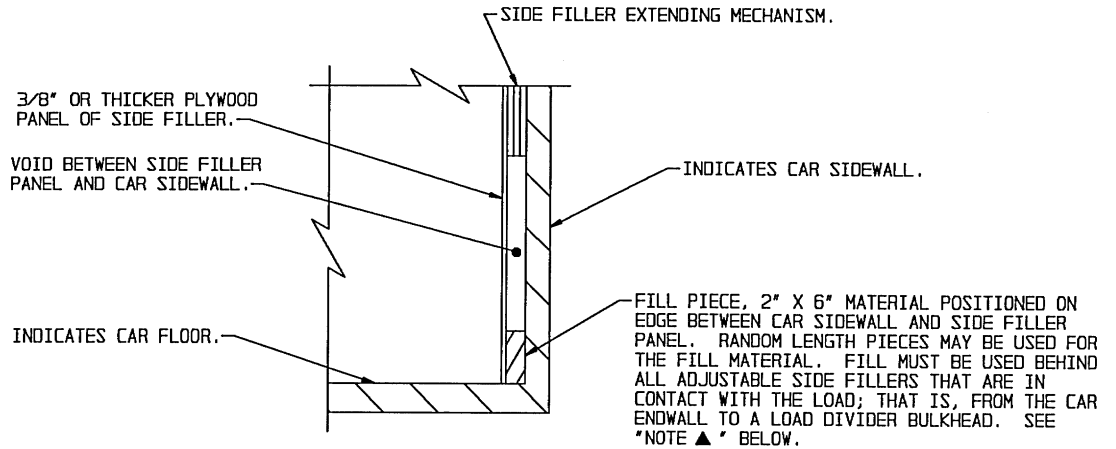
DOOR SPANNER, 2" X 6" BY DOOR OPENING WIDTH PLUS 24" (1 REQD). POSITION ABOVE THE LOAD AND NAIL THRU A FILLER BLOCK INTO A VERTICAL PIECE W/3-12d NAILS AT EACH JOINT. NAIL TO THE CAR SIDEWALL W/2-12d NAILS AT EACH END (OPTIONAL).

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



**ALTERNATIVE 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. IF THE CAR HAS NAILABLE SIDEWALLS, NAIL-ON TYPE STRAPPING MAY BE USED TO SECURE THE GATE IN LIEU OF USING THE SPREADER PIECES. SEE THE "ALTERNATIVE DOORWAY PROTECTION A" DETAIL ABOVE FOR GUIDANCE.

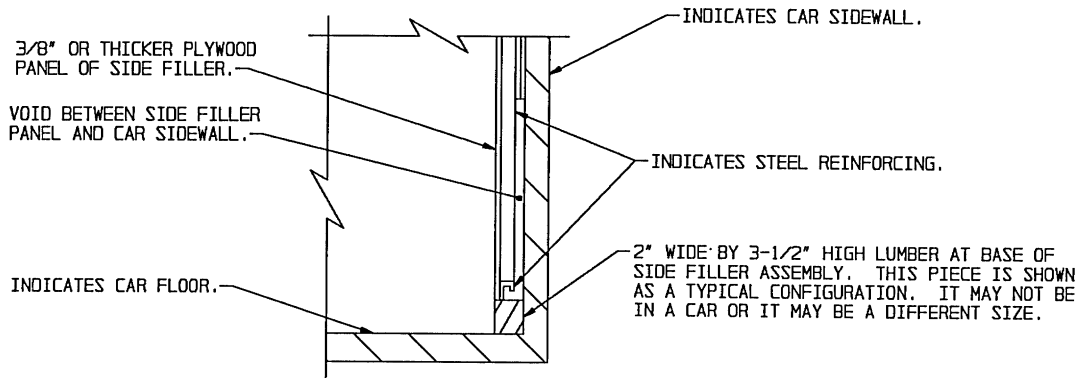


**TYPICAL TYPE A**

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.