

APPROVED BY
 HAZARDOUS MATERIALS SYSTEMS
 (BOE) ASSOCIATION OF AMERICAN
 RAILROADS
J. H. Heshman
 DATE 6/2/88

LOADING AND BRACING (CL & LCL) IN BOX CARS OF BOMBS BLU-109/B IN CNU-416/E CONTAINERS

INDEX

<u>ITEM</u>	<u>PAGE (S)</u>
GENERAL NOTES, AND MATERIAL SPECIFICATIONS -----	2
UNIT DETAIL -----	3
28-UNIT LOAD IN A 5'-6" LONG X 7'-2" WIDE CONVENTIONAL BOX CAR -----	4, 5
30-UNIT LOAD IN A 5'-6" LONG X 9'-2" WIDE CONVENTIONAL BOX CAR -----	6, 7
TYPICAL LCL LOAD USING K-BRACE -----	8 - 11
TYPICAL LCL LOAD USING STRUTTED GATE METHOD OF PARTIAL-LAYER (TIER) BRACING -----	12
TYPICAL LCL LOAD (1-UNIT LOAD) -----	13
DETAILS -----	14-16

REVISIONS				DRAFTSMAN	PROJ ENG
				<i>BPK</i> / <i>SD</i>	<i>RSH</i> / <i>WJF</i>
				CHECKER <i>GKS</i>	LOG ENGR OFFICE <i>RCH</i>
				APPROVED, U.S. ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND <i>J. C. Boyd</i> AMSTP-TMS	
				APPROVED BY ORDER OF COMMANDING GENERAL, U.S. ARMY MATERIEL COMMAND (AMC) <i>William J. Ernst</i> U.S. ARMY OFFENSE AMMUNITION CENTER AND SCHOOL	
				U.S. ARMY AMC DRAWING JULY 1988	
				CLASS	DIVISION
				19	48
				DRAWING	FILE
				7080	SP5 PB1000

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 HEREIN ARE APPLICABLE TO BLU-109/B BOMBS PACKED TWO PER CNU-416/E CONTAINER. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE CONTAINER WITH CONTENTS. SEE THE UNIT DETAIL ON PAGE 3.
- C. DETAILS OF THE CONTAINER:
CONTAINER DIMENSIONS-----95" LONG X 40" WIDE X 20-3/4" HIGH,
CONTAINER WEIGHT-----4,337 POUNDS (APPROX).
- D. THIS ITEM IS A DOT CLASS "A" EXPLOSIVE. THESE PROCEDURES CAN ALSO BE UTILIZED FOR THE SHIPMENT OF THE CONTAINERS WHEN THEY CONTAIN EMPTY OR INERT-FILLED BLU-109/B BOMBS.
- E. THE SELECTION OF RAIL CARS FOR THE TRANSPORT OF THE DESIGNATED ITEM 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 RAIL CARS, EVERY EFFORT SHOULD BE MADE TO OBTAIN BOX CARS THAT DO NOT HAVE BOWED END WALLS. CARS WITH BOWED END WALLS CAN BE USED HOWEVER. IF AN END WALL IS BOWED OUTWARD MORE THAN TWO INCHES (2"), EITHER FROM SIDE TO SIDE OR FROM FLOOR TO ROOF, AN END-OF-CAR BULKHEAD MUST BE INSTALLED TO PROVIDE A "SQUARED OFF" SURFACE FOR THE LOAD AT THE END OF THE CAR. REFER TO THE "BULKHEAD GATE" DETAIL ON PAGE 16 FOR GUIDANCE.
- G. BOXCARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS HAVE BEEN SHOWN. HOWEVER, THE DEPICTED OUTLOADING PROCEDURES ARE ALSO APPLICABLE FOR CARS EQUIPPED WITH PLUG DOORS. CAUTION: DUNNAGE MATERIAL MUST NOT BE NAILED TO ANY PLUG DOOR, WHETHER AUXILIARY OR MAIN. ALSO, AFTER THE PLUG DOORS ON A CAR ARE CLOSED AND READY FOR THE INSTALLATION OF CAR SEALS, A PIECE OF WIRE OF SUITABLE SIZE WILL BE USED IN ADDITION TO, AND IN CONJUNCTION WITH EACH CAR SEAL USED TO SEAL THE CAR. THE WIRE WILL BE THREADED THRU THE HOLES IN THE DOOR LATCH ASSEMBLY ONE OR MORE TIMES, AND THE WIRE ENDS WILL BE TWISTED TOGETHER.
- H. THE NUMBER OF CONTAINERS MAY BE ADJUSTED TO FIT THE SIZE OF THE CAR BEING LOADED OR THE QUANTITY OF CONTAINERS TO BE SHIPPED. HOWEVER, THE APPROVED METHODS SPECIFIED HEREIN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING, AND STAYING OF THE DESIGNATED ITEM. NOTICE: A SHIPMENT WILL BE POSITIONED IN THE RAIL CAR IN COMPLIANCE WITH THE WEIGHT DISTRIBUTION REQUIREMENTS OF THE AAR. SEE GENERAL NOTE "J".
- J. THE LOAD LIMIT OF A CAR MUST NOT BE EXCEEDED. LIKEWISE, THE LOAD IN ONE END OF A CAR MUST NOT EXCEED ONE HALF OF THE LOAD LIMIT WHICH IS STENCILED ON THE OUTSIDE OF THE CAR. THE CENTER OF GRAVITY (CG) OF A LOAD HAVING AN EQUAL NUMBER OF UNITS IN EACH END OF THE CAR WILL BE AT THE LONGITUDINAL CENTER OF THE CAR AND THEREFORE THE TOTAL WEIGHT OF THE LADING AND DUNNAGE MAY EQUAL BUT MUST NOT EXCEED THE STENCILED LOAD LIMIT. HOWEVER, FOR A LOAD CONSTRUCTED IN AN OFFSET LOADING PATTERN, THE CG WILL BE LOCATED TOWARD THE LONG-LOAD END FROM THE LONGITUDINAL CENTER OF THE CAR SO THE LONG LOAD END WILL BE THE HEAVIEST. THE TOTAL WEIGHT OF THE LADING AND DUNNAGE MUST THEN BE SOMETHING LESS THAN THE STENCILED LOAD LIMIT.
- K. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN CARS WHICH ARE PARTIALLY LOADED WITH THE DESIGNATED ITEM, 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.
- L. THE OUTLOADING PROCEDURES SPECIFIED HEREIN CAN ALSO BE UTILIZED FOR SHIPMENT OF THE DEPICTED CONTAINERS WHEN THEY ARE EMPTY OR WHEN THEY ARE LOADED WITH AN ITEM WHICH IS IDENTIFIED DIFFERENTLY BY NOMENCLATURE THAN THE ITEM DESIGNATED WITHIN THE TITLE OF THIS DOCUMENT, PROVIDING WEIGHT AND CENTER OF GRAVITY CHARACTERISTICS OF THE CONTAINER ARE SIMILAR.
- M. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, A MINIMUM OF ONE (1) SEAL WITH TWO (2) PAIR OF NOTCHES WILL BE USED TO SEAL THE JOINT WHEN A NOTCH-TYPE SEALER IS BEING USED. A MINIMUM OF TWO (2) SEALS, BUTTED TOGETHER, WITH TWO (2) PAIR OF CRIMPS PER SEAL WILL BE USED TO SEAL THE JOINT WHEN A CRIMP-TYPE SEALER IS BEING USED. REFER TO THE "STRAP JOINT A" AND "STRAP JOINT B" DETAILS ON PAGE 7 FOR GUIDANCE.

(CONTINUED AT RIGHT)

MATERIAL SPECIFICATIONS

LUMBER -----: SEE TM 743-200-1, DUNNAGE LUMBER; FED SPEC MM-L-751.

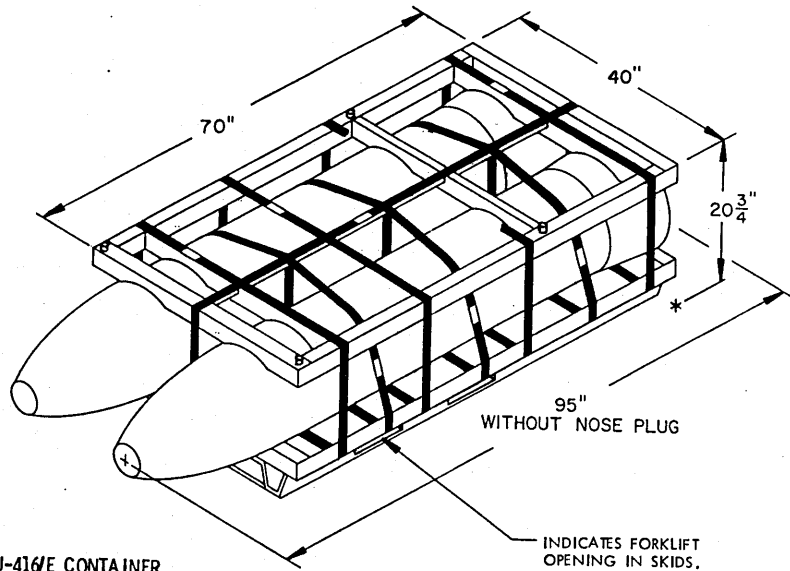
NAILS -----: COMMON, FED SPEC FF-N-105.

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

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

(GENERAL NOTES CONTINUED)

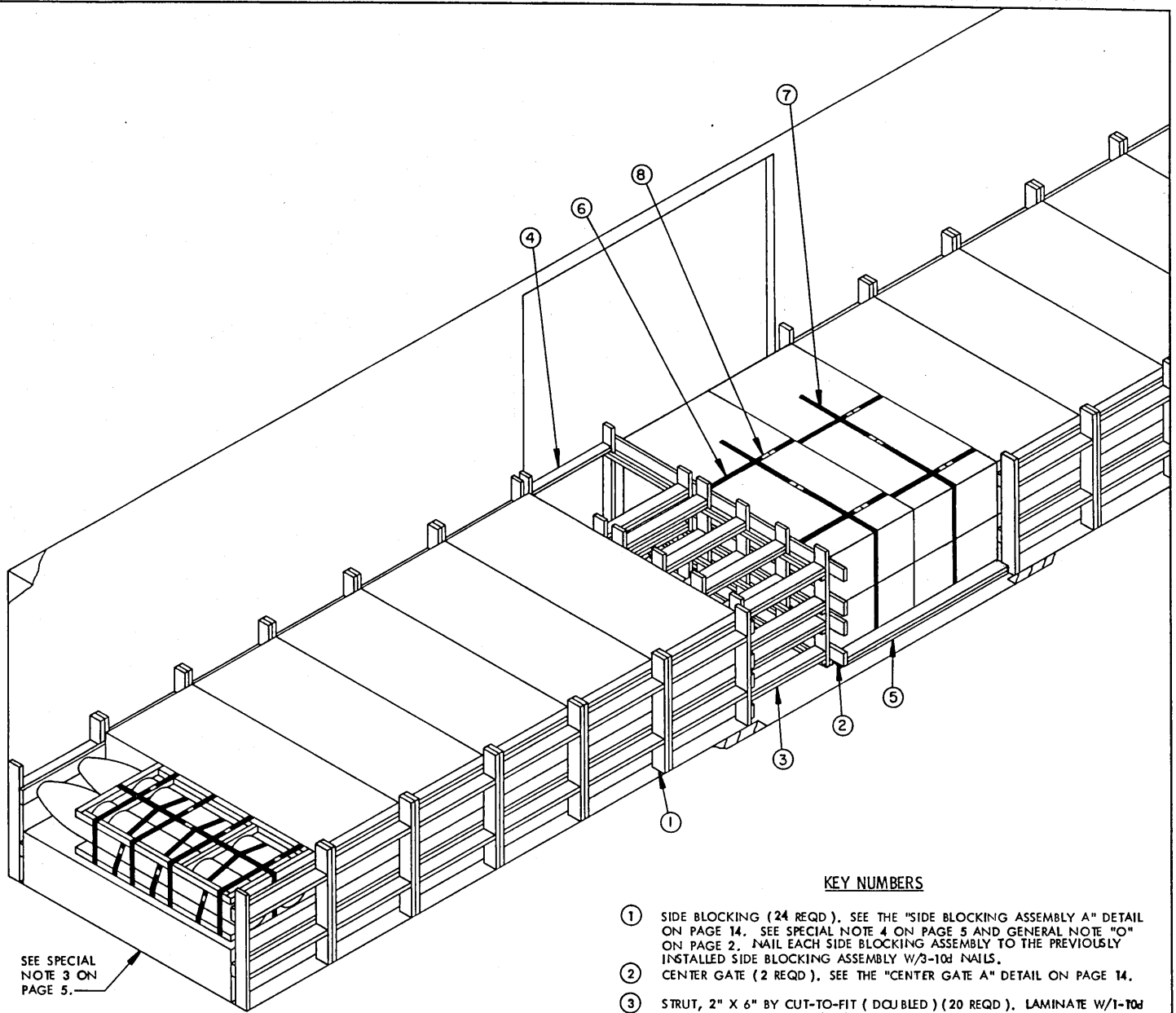
- N. DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE, 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE.
- O. NOTICE: A STAGGERED NAILING PATTERN WILL BE USED WHEREVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES. ALSO, A STAGGERED NAILING PATTERN WILL BE USED WHEN DUNNAGE IS NAILED TO THE FLOOR 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. 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 ON TO OR RIGHT BESIDE A NAIL IN A LOWER PIECE.
- P. IF THE CAR BEING USED 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 FOR THE NAILING OF THE APPLICABLE DUNNAGE PIECES. IF A NAIL SIZE IS NOT SPECIFIED, 30d NAILS SHOULD BE USED IN LIEU OF THOSE SPECIFIED IN THE KEY NUMBER.
- Q. THROUGHOUT THIS PROCEDURAL DRAWING, PORTIONS OF THE LOAD AND OF DEPICTED CARS, SUCH AS A CAR SIDEWALL, HAVE BEEN OMITTED FROM THE LOAD VIEWS FOR CLARITY PURPOSES.
- R. ONE AND ONE-QUARTER (1-1/4") INCH STEEL STRAPPING WILL BE USED TO UNITIZE STACKED CONTAINERS AS SHOWN ON PAGES 4 AND 6, AND AS SPECIFIED IN THE OUTLOADING PROCEDURES HEREIN. IF THE CAPACITY AND MANEUVERABILITY OF THE MATERIALS HANDLING EQUIPMENT USED TO LOAD THE CONTAINERS ABOARD A CAR PERMITS, CONTAINERS MAY BE UNITIZED PRIOR TO PLACEMENT WITHIN THE CAR. IN SOME INSTANCES CONTAINERS WILL ALREADY BE UNITIZED INTO STACKS WHEN OFFERED FOR LOADING. THESE UNITIZED STACKS MUST BE INSPECTED AND, AS REQUIRED, LOOSE UNITIZING STEEL STRAPPING MUST BE REPLACED OR RETENSIONED.
- S. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.
- T. 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 25.4 MM AND ONE POUND EQUALS 0.454 KG.
- U. 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 SPECIFICATIONS 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.



CNU-416E CONTAINER

UNIT WEIGHT ----- 4,337 LBS (APPROX)

CUBE ----- 45.6 CUBIC FEET



SEE SPECIAL
NOTE 3 ON
PAGE 5.

ISOMETRIC VIEW

KEY NUMBERS

- ① SIDE BLOCKING (24 REQD). SEE THE "SIDE BLOCKING ASSEMBLY A" DETAIL ON PAGE 14. SEE SPECIAL NOTE 4 ON PAGE 5 AND GENERAL NOTE "O" ON PAGE 2. NAIL EACH SIDE BLOCKING ASSEMBLY TO THE PREVIOUSLY INSTALLED SIDE BLOCKING ASSEMBLY W/3-10d NAILS.
- ② CENTER GATE (2 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 14.
- ③ STRUT, 2" X 6" BY CUT-TO-FIT (DOUBLED) (20 REQD). LAMINATE W/1-10d NAIL EVERY SIX INCHES (6"). TOENAIL TOP PIECE TO THE CENTER GATES PIECES MARKED ②, W/2-12d NAILS AT EACH END. SEE SPECIAL NOTE 5 ON PAGE 5.
- ④ STRUT, 2" X 4" BY CUT-TO-FIT (2 REQD). TOENAIL TO CENTER GATE, PIECE MARKED ②, W/2-12d NAILS AT EACH END.
- ⑤ DOORWAY PROTECTION, 2" X 6" X 6'-8" (DOUBLED) (2 REQD). PRE-POSITION THE DOORWAY PROTECTION WHICH WILL BEAR AGAINST NOSE END OF THE PALLET. NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 4". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑥ UNITIZING STRAP, 1-1/4" X .035" OR .031" X 15'-0" LONG (REF) STEEL STRAPPING (4 REQD). INSTALL SO AS TO ENCIRCLE TWO UNITS IN THE DOORWAY AREA. SEE SPECIAL NOTE 6 ON PAGE 5.
- ⑦ DOOR PROTECTION STRAP, 1-1/4" X .035" OR .031" X 17'-0" LONG (REF) STEEL STRAPPING (2 REQD). INSTALL SO AS TO ENCIRCLE TWO UNITS IN THE DOORWAY AREA AS SHOWN. SEE SPECIAL NOTE 6 ON PAGE 5.
- ⑧ SEAL FOR 1-1/4" STRAPPING (12 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTES "M" AND "R" ON PAGE 2.

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE WOOD LINED CONVENTIONAL TYPE BOXCAR EQUIPPED WITH A 10'-0" WIDE DOOR OPENING IS SHOWN. CARS OF OTHER WIDTHS, LENGTHS AND CARS HAVING OTHER DOOR WIDTHS CAN BE USED.
2. A MAXIMUM OF TWENTY-TWO (22) OF THE CNU-416/E CONTAINERS FOR AN APPROXIMATE LADING WEIGHT OF 95,414 POUNDS CAN BE PLACED IN A 40'-6" LONG BOXCAR WHEN USING THE DEPICTED PROCEDURES. IF A 60'-8" LONG BOXCAR IS AVAILABLE, THIRTY-FOUR (34) UNITS FOR AN APPROXIMATE LADING WEIGHT OF 147,458 POUNDS CAN BE LOADED, LOAD LIMIT OF CAR PERMITTING.
3. IF A BOXCAR TO BE LOADED HAS BOWED END WALLS, REFER TO GENERAL NOTE "F" ON PAGE 2 AND THE "BULKHEAD DETAIL" ON PAGE 16.
4. DEPENDING ON THE CAR WIDTH, THE VERTICAL PIECES AND FILLER PIECES OF THE SIDE BLOCKING ASSEMBLIES MAY BE MADE FROM A NARROWER OR A WIDER MATERIAL SO AS TO PROVIDE FOR A SNUG FIT ACROSS THE WIDTH OF THE BOXCAR. **NOTE:** THE SIDE WALL CLEARANCE MUST NOT EXCEED MORE THAN ONE INCH (1") FROM SIDE WALL TO SIDE WALL.
5. IF THE LOAD IN EITHER END OF THE BOXCAR HAS A WEIGHT PER LAYER OF 30,625 POUNDS OR LESS, 4" X 4" STRUTS MAY BE USED IN CONJUNCTION WITH THE CENTER GATES FOR LONGITUDINAL RETENTION OF THE LOAD. IF THE LOAD IN EITHER END HAS A WEIGHT PER LAYER BETWEEN 30,625 POUNDS AND 41,250 POUNDS, DOUBLED 2" X 6" STRUTS MUST BE USED IN LIEU OF THE 4" X 4" STRUTS. ADDITIONALLY, IF THE LOAD IN EITHER END HAS A WEIGHT PER LAYER BETWEEN 41,250 POUNDS AND 61,875 POUNDS, TRIPLED 2" X 6" STRUTS MUST BE USED.
6. DOORWAY PROTECTION STRAPPING IS REQUIRED FOR ALL UNITS WHICH EXTEND MORE THAN 32" INTO THE DOORWAY AREA.

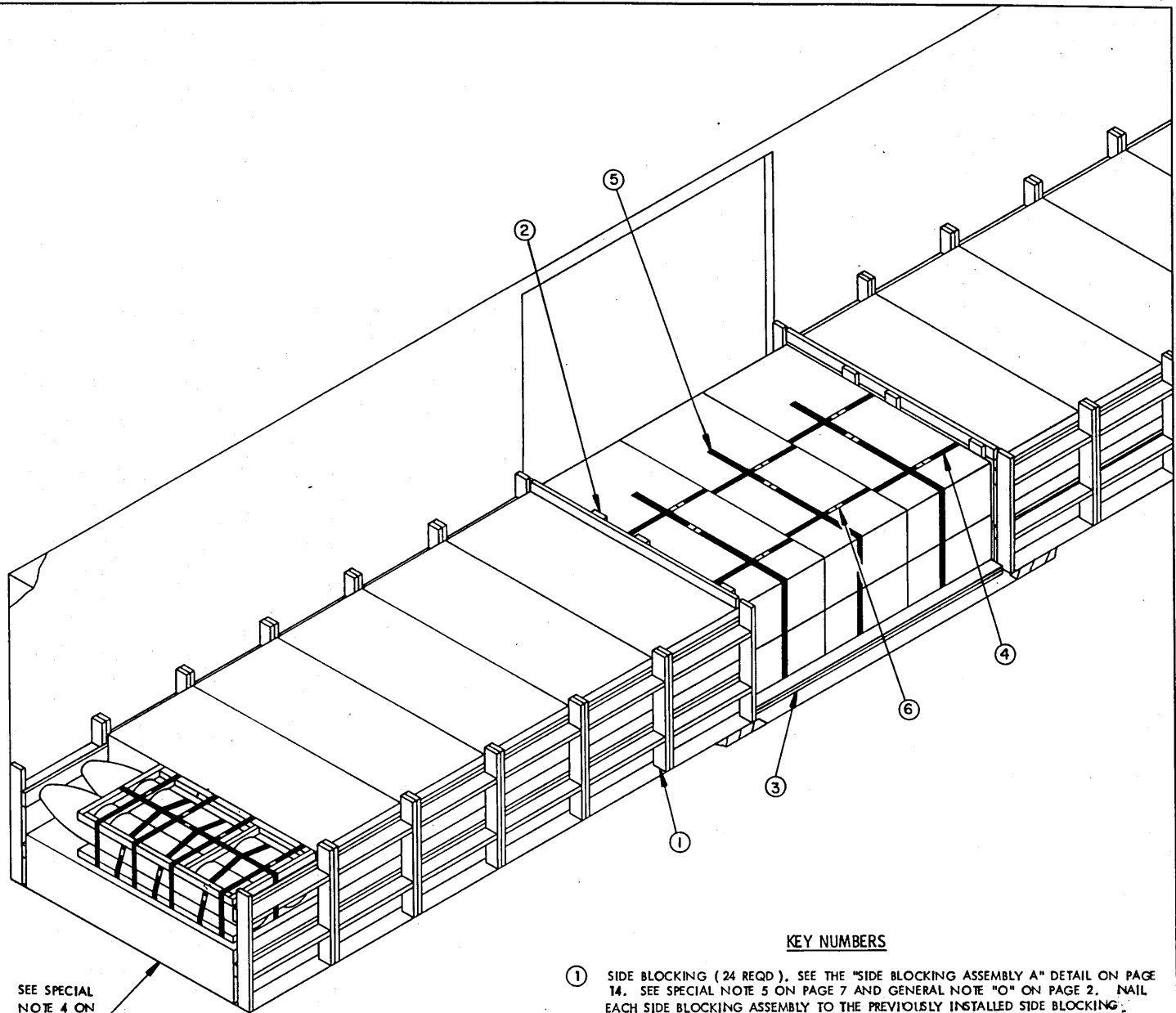
BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	59	20
2" X 4"	23	15
2" X 6"	780	780
NAILS	NO. REQD	POUNDS
10d (3")	808	12-1/2
12d (3-1/4")	32	1/2
16d (3-1/2")	160	3-1/2
STEEL STRAPPING, 1-1/4" X .035" OR .031"-----94' REQD-----13-1/2 LBS		
SEAL FOR 1-1/4" STEEL STRAPPING -----12 REQD-----1/2 LB		

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
BOMB, PALLETIZED	28	121,436 LBS
DUNNAGE		1,660 LBS
TOTAL WEIGHT		123,096 LBS

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



SEE SPECIAL
NOTE 4 ON
PAGE 7.

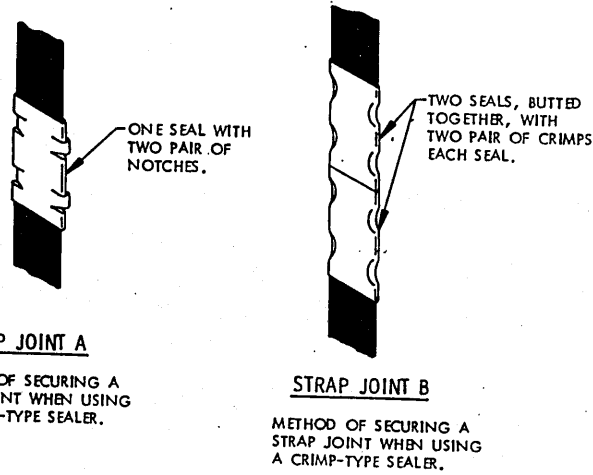
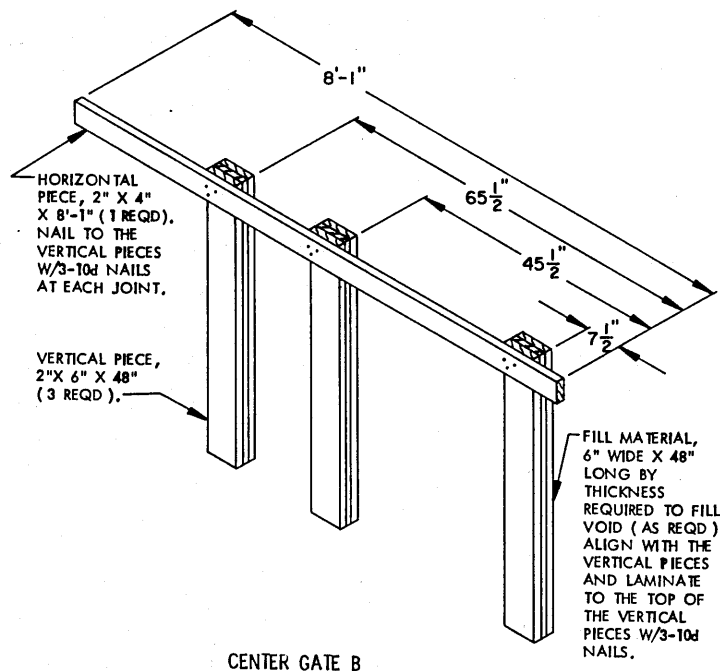
ISOMETRIC VIEW

KEY NUMBERS

- ① SIDE BLOCKING (24 REQD). SEE THE "SIDE BLOCKING ASSEMBLY A" DETAIL ON PAGE 14. SEE SPECIAL NOTE 5 ON PAGE 7 AND GENERAL NOTE "O" ON PAGE 2. NAIL EACH SIDE BLOCKING ASSEMBLY TO THE PREVIOUSLY INSTALLED SIDE BLOCKING ASSEMBLY W/3-10d NAILS.
- ② CENTER GATE (2 REQD). SEE THE "CENTER GATE B" DETAIL ON PAGE 7.
- ③ DOORWAY PROTECTION, 2" X 6" X 10'-0" (DOUBLED) (2 REQD). PRE-POSITION THE DOORWAY PROTECTION WHICH WILL BEAR AGAINST NOSE END OF THE PALLET. NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 4". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ④ UNITIZING STRAP, 1-1/4" X .035" OR .031" X 15'-0" LONG (REF) STEEL STRAPPING (6 REQD). INSTALL SO AS TO ENCIRCLE TWO UNITS IN THE DOORWAY AREA. SEE SPECIAL NOTE 7 ON PAGE 7.
- ⑤ DOOR PROTECTION STRAP, 1-1/4" X .035" OR .031" X 17'-0" LONG (REF) STEEL STRAPPING (3 REQD). INSTALL SO AS TO ENCIRCLE THE UNITS IN THE DOORWAY AREA AS SHOWN. SEE SPECIAL NOTE 7 ON PAGE 7.
- ⑥ SEAL FOR 1-1/4" STRAPPING (18 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTES "M" AND "R" ON PAGE 2 AND THE STRAP JOINT DETAILS ON PAGE 7.

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE WOOD LINED CONVENTIONAL TYPE BOXCAR EQUIPPED WITH A 12'-0" WIDE DOOR OPENING IS SHOWN. CARS OF OTHER WIDTHS, LENGTHS AND CARS HAVING OTHER DOOR WIDTHS CAN BE USED.
2. ALTHOUGH A BOXCAR WITH 12'-0" WIDE DOOR OPENINGS IS SHOWN, CARS WITH DOOR OPENINGS AS NARROW AS 10'-0" MAY BE USED FOR THE DEPICTED LOAD, PROVIDING MATERIAL HANDLING EQUIPMENT (MHE) OF PROPER TYPE AND CAPACITY IS AVAILABLE.
3. A MAXIMUM OF TWENTY-TWO (22) OF THE CNU-416/E CONTAINERS FOR AN APPROXIMATE LADING WEIGHT OF 95,414 POUNDS CAN BE PLACED IN A 40'-6" LONG BOX CAR WHEN USING THE DEPICTED PROCEDURES. IF A 60"-8" LONG BOXCAR IS AVAILABLE THIRTY-FOUR (34) UNITS FOR AN APPROXIMATE LADING WEIGHT OF 147,458 POUNDS CAN BE LOADED.
4. IF A BOXCAR TO BE LOADED HAS BOWED END WALLS, REFER TO GENERAL NOTE "F" ON PAGE 2 AND THE "BULKHEAD DETAIL" ON PAGE 16.
5. DEPENDING ON THE CAR WIDTH, THE VERTICAL PIECES AND FILLER PIECES OF THE SIDE BLOCKING ASSEMBLIES MAY BE MADE FROM A NARROWER OR A WIDER MATERIAL SO AS TO PROVIDE FOR A SNUG FIT ACROSS THE WIDTH OF THE BOXCAR. **NOTE:** THE SIDE WALL CLEARANCE MUST NOT EXCEED MORE THAN ONE INCH (1") FROM SIDE WALL TO SIDE WALL.
6. IF THE LOAD IN EITHER END OF THE BOXCAR HAS A WEIGHT PER LAYER OF 30,625 POUNDS OR LESS, 4" X 4" STRUTS MAY BE USED IN CONJUNCTION WITH THE CENTER GATES FOR LONGITUDINAL RETENSION OF THE LOAD. IF THE LOAD IN EITHER END HAS A WEIGHT PER LAYER BETWEEN 30,625 POUNDS AND 41,250 POUNDS, DOUBLED 2" X 6" STRUTS MUST BE USED IN LIEU OF THE 4" X 4" STRUTS. ADDITIONALLY, IF THE LOAD IN EITHER END HAS A WEIGHT PER LAYER BETWEEN 41,250 POUNDS AND 61,875 POUNDS, TRIPLED 2" X 6" STRUTS MUST BE USED.
7. ALL UNITS WHICH ARE IN THE DOORWAY AREA MUST BE UNITIZED WITH TWO (2) 1-1/4" STEEL STRAPS. SEE THE "STRAP JOINT A" AND "STRAP JOINT B" DETAILS AT RIGHT.



BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	117	39
2" X 4"	16	11
2" X 6"	644	644
NAILS	NO. REQD	POUNDS
10d (3")	770	12
12d (3-1/4")	40	3/4
16d (3-1/2")	280	6-1/4
STEEL STRAPPING, 1-1/4" X .035" OR .031"-----140' REQD----- 20 LBS		
SEAL FOR 1-1/4" STEEL STRAPPING----- 18 REQD----- 3/4 LB.		

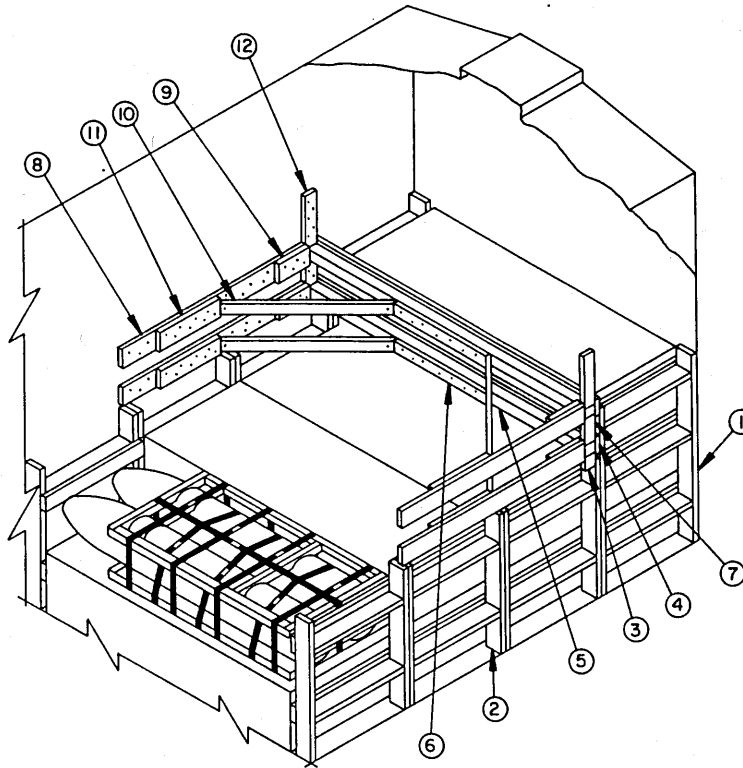
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
BOMB, PALLETIZED	30	130,110 LBS
DUNNAGE		1,427 LBS
TOTAL WEIGHT		131,537 LBS

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

(SPECIAL NOTES CONTINUED)

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



ISOMETRIC VIEW

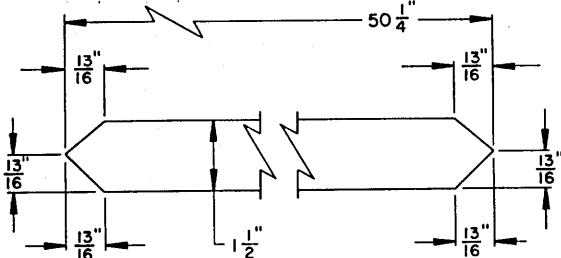
SPECIAL NOTES:

1. A 9'-2" WIDE CONVENTIONAL WOOD-LINED BOXCAR IS SHOWN. 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 A SECOND TIER, THIRD TIER, OR OTHER. THE TYPE "A" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER OF NOT MORE THAN 8,000 POUNDS. IF IT IS NECESSARY TO BLOCK A HEAVIER LOAD, REFER TO THE DETAILS ON PAGES 9, 10, AND 11 FOR SELECTION OF THE APPLICABLE SIZED K-BRACE TO USE AND THE DESIGN SPECIFICATIONS FOR THE BRACE.
3. CAUTION: SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL-LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL TIER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ③, ④, ⑤, ⑦, ⑨ AND ⑫ MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDEWALL. IT IS ALRIGHT FOR THE ENDS OF THE DIAGONAL BRACES MARKED ⑩ TO BEAR IN FRONT OF A DOOR OPENING, HOWEVER, THE ADJACENT PIECE MARKED ⑧ MUST BE DOUBLED AND EXTENDED ACROSS AND FAR ENOUGH PAST THE DOOR OPENING (REF: 60") TO PROVIDE FOR THE SPECIFIED NAILING OF EACH PIECE. LAMINATE THE SECOND PIECE OF THE DOUBLED PIECE MARKED ⑧ TO THE FIRST W/16-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL CLEAT WITHIN THE DOOR OPENING. NOTE THAT THE DIAGONAL BRACE WILL BE 49-1/8" LONG IN LIEU OF 50-1/4" WHEN PIECE MARKED ⑧ IS DOUBLED.

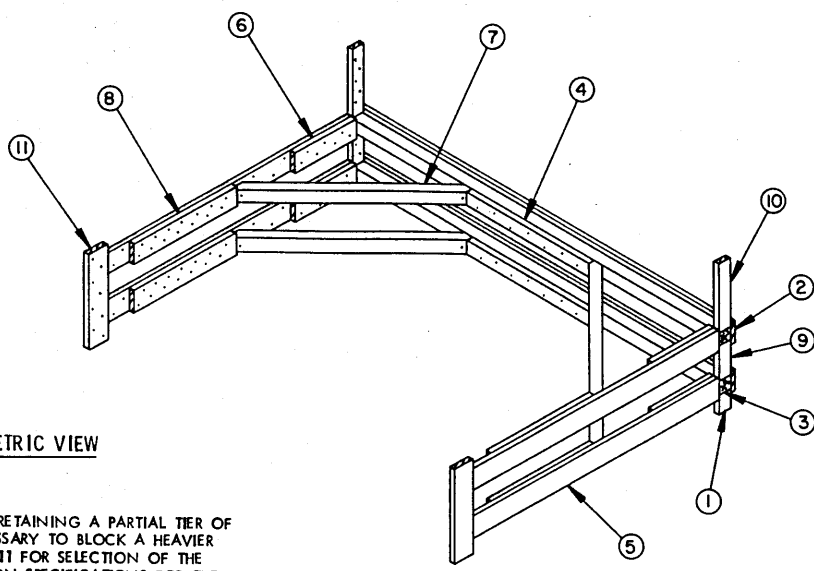
KEY NUMBERS

- ① SIDE BLOCKING (2 REQD). SEE THE "SIDE BLOCKING ASSEMBLY B" DETAIL ON PAGE 16. SEE GENERAL NOTE "O" ON PAGE 2.
- ② SIDE BLOCKING (6 REQD). SEE THE "SIDE BLOCKING ASSEMBLY A" DETAIL ON PAGE 14.
- ③ SUPPORT CLEAT, 2" X 4" X 5" (2 REQD). NAIL TO THE CAR SIDE WALL W/2-12d NAILS. SEE SPECIAL NOTE 3 AT LEFT.
- ④ HORIZONTAL PIECE, 2" X 6" BY CAR WIDTH (CUT-TO-FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ⑤, W/1-12d NAIL EVERY 6".
- ⑤ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH (CUT-TO-FIT) (2 REQD).
- ⑥ CENTER CLEAT, 2" X 4" X 36" (2 REQD). NAIL TO THE CROSS CAR BRACE PIECE MARKED ⑤, W/7-16d NAILS. SEE SPECIAL NOTE 4 AT LEFT.
- ⑦ SPACER CLEAT, 2" X 4" X 8-3/4" (2 REQD). NAIL TO THE CAR SIDEWALL W/3-12d NAILS.
- ⑧ HORIZONTAL WALL CLEAT, 2" X 6" X 72" (4 REQD). NAIL TO THE CAR SIDEWALL W/16-12d NAILS.
- ⑨ POCKET CLEAT, 2" X 6" X 12" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑧, W/4-16d NAILS.
- ⑩ DIAGONAL BRACE, 2" X 4" X 50-1/4" (4 REQD). SEE THE DETAIL AT LEFT FOR BEVEL CUTS REQUIRED. TOENAIL TO THE CROSS CAR BRACE, PIECE MARKED ⑤, AND TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑧, W/2-16d NAILS AT EACH END.
- ⑪ BACK-UP CLEAT, 2" X 6" X 24" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑧, W/8-16d NAILS.
- ⑫ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.

(CONTINUED ABOVE)



DIAGONAL BRACE



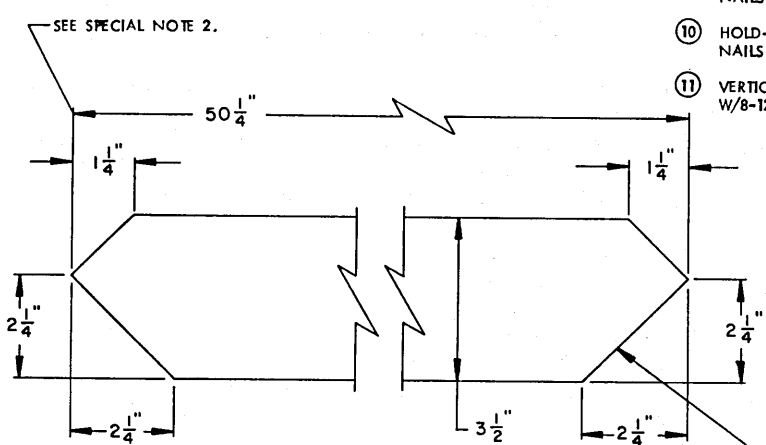
ISOMETRIC VIEW

KEY NUMBERS

SPECIAL NOTES:

1. THE TYPE "B" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER OF NOT MORE THAN 14,000 POUNDS. IF IT IS NECESSARY TO BLOCK A HEAVIER LOAD, REFER TO THE DETAILS ON PAGES 10 AND 11 FOR SELECTION OF THE APPLICABLE SIZED K-BRACE TO USE AND THE DESIGN SPECIFICATIONS FOR THE BRACE. IF THE PARTIAL TIER TO BE BRACED WEIGHS 8,000 POUNDS OR LESS, THE TYPE "A" K-BRACE DEPICTED ON PAGE 8 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, 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, 36" LONG FOR A 9'-2" AND 38" LONG FOR A 9'-4" WIDE CAR. ADJUST THE LENGTH PROPORTIONATELY FOR CARS OF OTHER WIDTHS.
4. REFER TO PAGE 8 FOR A TYPICAL INSTALLATION OF A K-BRACE.

- ① SUPPORT CLEAT, 2" X 4" X 5" (2 REQD). NAIL TO THE CAR SIDEWALL W/2-12d NAILS. SEE SPECIAL NOTE 2 AT LEFT.
- ② LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH (CUT-TO-FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③ W/1-12d NAIL EVERY 6". SEE GENERAL NOTE "O" ON PAGE 2.
- ③ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH (CUT-TO-FIT) (2 REQD).
- ④ CENTER CLEAT, 2" X 4" X 36" (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③ W/7-16d NAILS. SEE SPECIAL NOTE 3 AT LEFT.
- ⑤ HORIZONTAL WALL CLEAT, 2" X 6" X 72" (4 REQD). NAIL TO THE CAR SIDEWALL W/16-12d NAILS.
- ⑥ POCKET CLEAT, 2" X 6" X 18" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/7-16d NAILS.
- ⑦ DIAGONAL BRACE, 4" X 4" X 50-1/4" (4 REQD). SEE THE DETAIL BELOW FOR BEVEL CUTS REQUIRED. TOENAIL TO THE CROSS CAR BRACE, PIECE MARKED ③ AND TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/1-60d NAIL AT EACH END.
- ⑧ BACK-UP CLEAT, 2" X 6" X 30" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/14-16d NAILS.
- ⑨ SPACER CLEAT, 2" X 4" X 8-3/4" (2 REQD). NAIL TO THE CAR SIDEWALL W/3-12d NAILS.
- ⑩ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ⑪ VERTICAL BACK-UP CLEAT, 2" X 6" X 24" (2 REQD). NAIL TO THE CAR SIDEWALL W/8-12d NAILS.



DIAGONAL BRACE

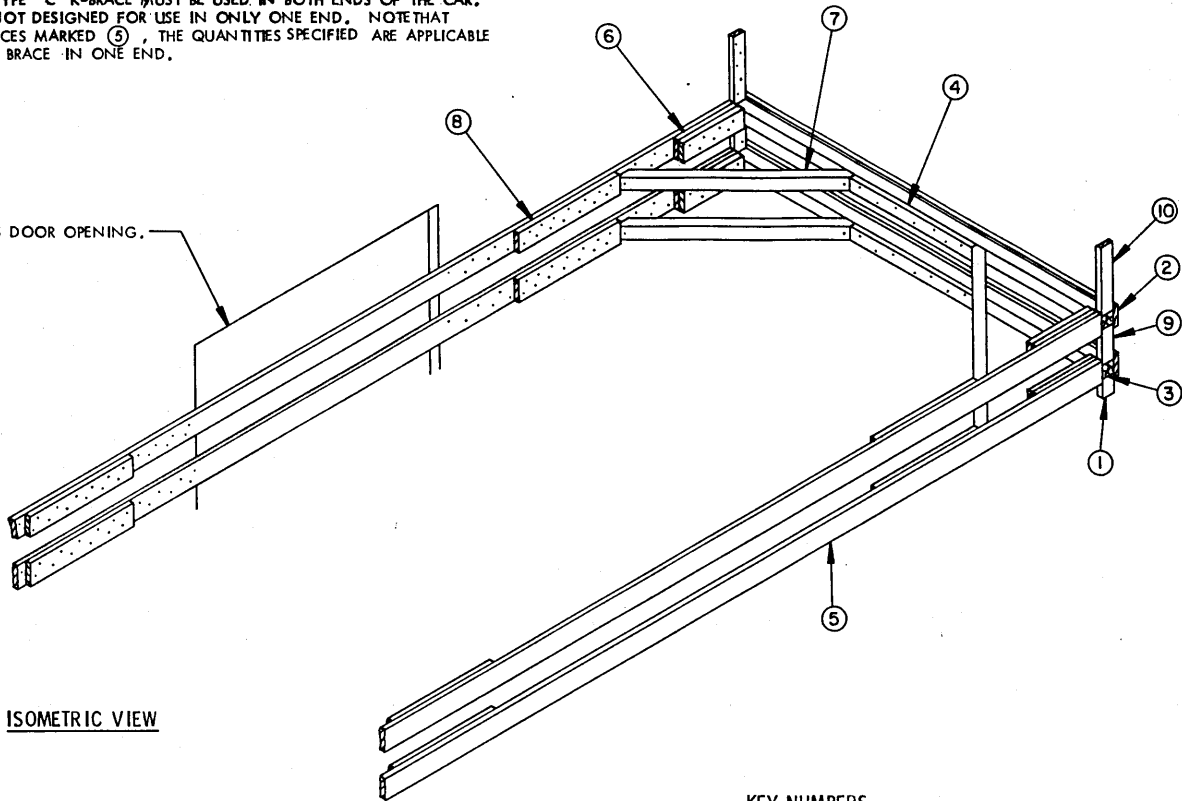
THIS BEARING SURFACE MUST BE POSITIONED SO AS TO BE IN CONTACT WITH A CROSS CAR BRACE, PIECE MARKED ③, OR A HORIZONTAL WALL CLEAT, PIECE MARKED ⑤.

TYPE "B" K-BRACE

(SPECIAL NOTES CONTINUED)

4. **CAUTION:** A TYPE "C" K-BRACE MUST BE USED IN BOTH ENDS OF THE CAR. THE BRACE IS NOT DESIGNED FOR USE IN ONLY ONE END. NOTE THAT EXCEPT FOR PIECES MARKED ⑤, THE QUANTITIES SPECIFIED ARE APPLICABLE ONLY FOR THE BRACE IN ONE END.

INDICATES DOOR OPENING.



ISOMETRIC VIEW

SPECIAL NOTES:

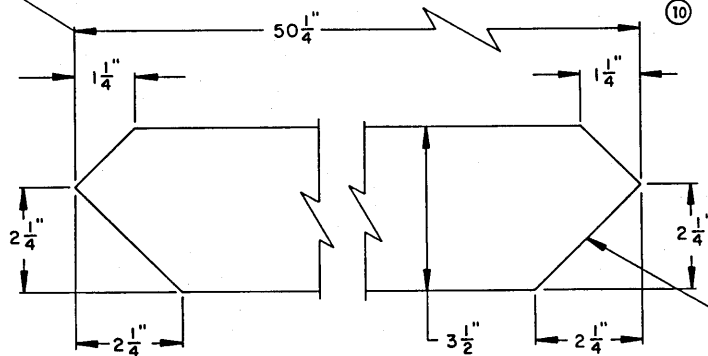
1. THE "TYPE C" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER OF NOT MORE THAN 20,000 POUNDS. IF IT IS NECESSARY TO BLOCK A HEAVIER LOAD, REFER TO THE DETAIL ON PAGE 11 FOR THE APPLICABLY SIZED K-BRACE TO USE AND THE DESIGN SPECIFICATIONS FOR THE BRACE. IF THE PARTIAL TIER TO BE BRACED WEIGHS BETWEEN 8,000 POUNDS AND 14,000 POUNDS, THE TYPE "B" K-BRACE DEPICTED ON PAGE 9 MAY BE USED. IF THE PARTIAL TIER TO BE BRACED WEIGHS 8,000 POUNDS OR LESS, THE TYPE "A" K-BRACE DEPICTED ON PAGE 8 WILL BE ADEQUATE.
2. **CAUTION:** SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL-LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL TIER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ①, ②, ③, ④, 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. TYPE "C" K-BRACE WILL RESTRAIN 4 UNITS.
3. THE CENTER CLEAT, SHOWN AS PIECE MARKED ④, WILL BE 28" LONG FOR AN 8'-6" WIDE CAR, 36" LONG FOR A 9'-2" AND 38" LONG FOR A 9'-4" WIDE CAR. ADJUST THE LENGTH PROPORTIONATELY FOR CARS OF OTHER WIDTHS.

(CONTINUED ABOVE)

KEY NUMBERS

- ① SUPPORT CLEAT, 2" X 4" X 5" (2 REQD). NAIL TO THE CAR SIDEWALL W/2-12d NAILS. SEE SPECIAL NOTE 2 AT LEFT.
- ② LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH (CUT-TO-FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③ W/1-12d NAIL EVERY 6". SEE GENERAL NOTE "O" ON PAGE 2.
- ③ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH (CUT-TO-FIT) (2 REQD).
- ④ CENTER CLEAT, 2" X 4" X 36" (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/7-16d NAILS. SEE SPECIAL NOTE 3 AT LEFT.
- ⑤ HORIZONTAL WALL CLEAT, 2" X 6" BY CUT-TO-FIT (4 REQD). A CLEAT WILL BE OF A LENGTH AS NECESSARY TO EXTEND ACROSS AND FAR ENOUGH PAST THE DOOR OPENING TO CONTACT PIECE MARKED ③ OF THE K-BRACE IN THE OPPOSITE END OF THE CAR. NAIL TO THE CAR SIDEWALL W/40-12d NAILS.
- ⑥ POCKET CLEAT, 2" X 6" X 18" (DOUBLED) (4 REQD). NAIL THE FIRST PIECE TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/7-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑦ DIAGONAL BRACE, 4" X 4" X 50-1/4" (4 REQD). SEE THE DETAIL BELOW FOR BEVEL CUTS REQUIRED. TOENAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, AND TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/1-80d NAIL AT EACH END.
- ⑧ BACK-UP CLEAT, 2" X 6" X 30" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT PIECE MARKED ⑤, W/14-16d NAILS.
- ⑨ SPACER CLEAT, 2" X 4" X 8-3/4" (2 REQD). NAIL TO THE CAR SIDEWALL W/3-12d NAILS.
- ⑩ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.

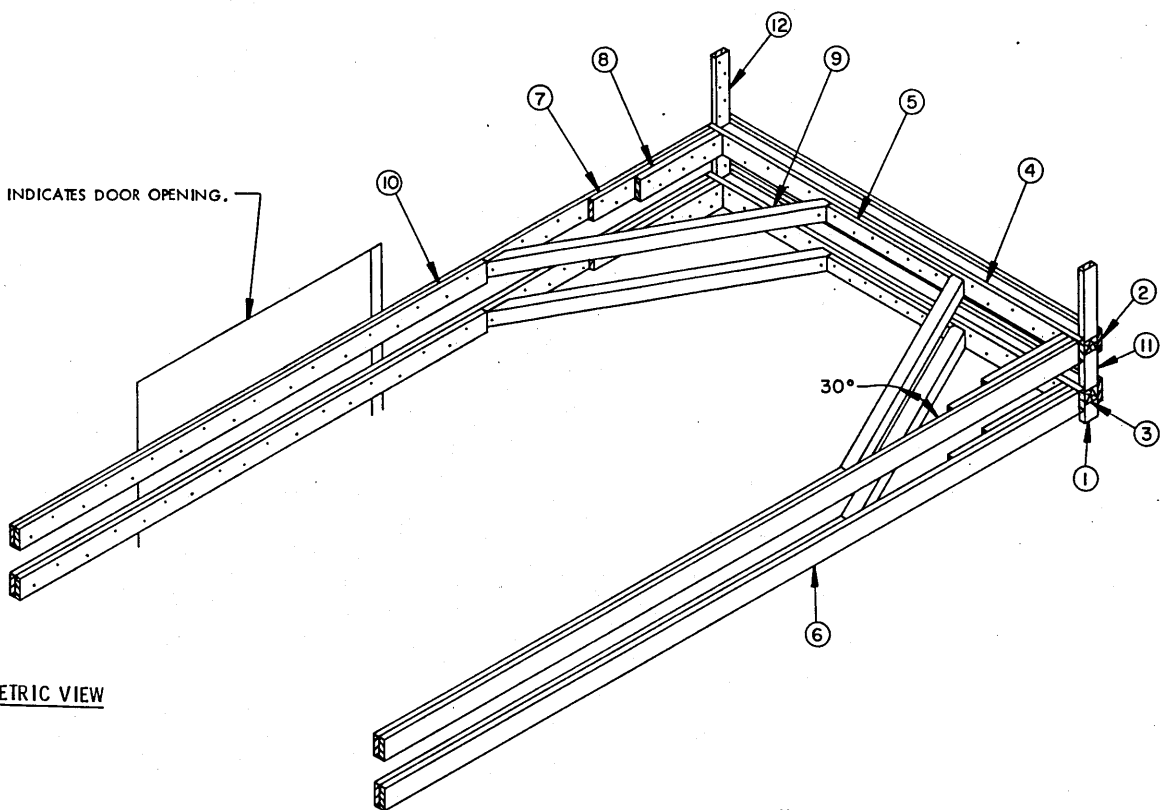
SEE SPECIAL NOTE 2.



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.

TYPE "C" K-BRACE



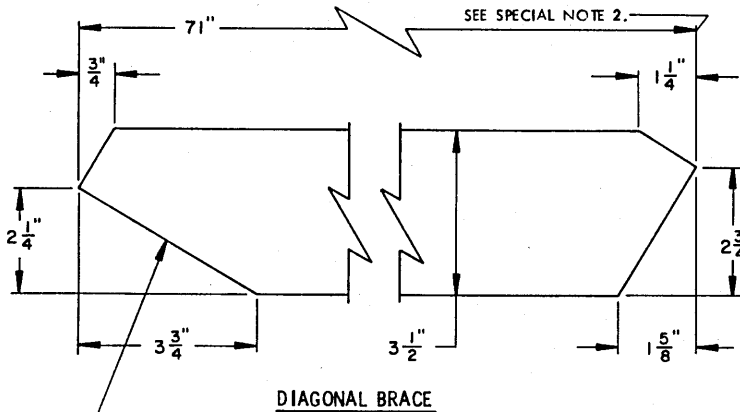
ISOMETRIC VIEW

SPECIAL NOTES:

1. THE TYPE "D" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL-TIER OF NOT MORE THAN 25,000 POUNDS. IF THE PARTIAL TIER TO BE BRACED WEIGHS BETWEEN 14,000 POUNDS AND 20,000 POUNDS, THE TYPE "C" K-BRACE DEPICTED ON PAGE 10 MAY BE USED. FOR A PARTIAL TIER OF 8,000 POUNDS TO 14,000 POUNDS, THE TYPE "B" K-BRACE DEPICTED ON PAGE 9 MAY BE USED. IF THE PARTIAL TIER TO BE BRACED WEIGHS 8,000 POUNDS OR LESS, THE TYPE "A" K-BRACE DEPICTED ON PAGE 8 WILL BE ADEQUATE.
2. **CAUTION:** SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL-LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL TIER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ①, ②, ③, ④, ⑦, ⑧, ⑪ AND ⑫ MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDEWALL. IT IS ALRIGHT FOR THE ENDS OF THE DIAGONAL BRACES MARKED ⑨ TO BEAR IN FRONT OF A DOOR OPENING, HOWEVER, THE ADJACENT PIECE MARKED ⑥ MUST BE DOUBLED. LAMINATE THE SECOND PIECE TO THE FIRST W/40-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL WALL CLEAT WITHIN THE DOOR OPENING. NOTE THAT THE DIAGONAL BRACE WILL BE 70-1/4" LONG IN LIEU OF 71" LONG WHEN PIECE MARKED ⑥ IS DOUBLED.
3. THE CENTER CLEAT, SHOWN AS PIECE MARKED ⑤, WILL BE 28" LONG FOR AN 8'-6" WIDE CAR, 36" LONG FOR A 9'-2" AND 38" LONG FOR A 9'-4" WIDE CAR. ADJUST THE LENGTH PROPORTIONATELY FOR CARS OF OTHER WIDTHS.
4. **CAUTION:** A TYPE "D" K-BRACE MUST BE USED IN BOTH ENDS OF THE CAR. THE BRACE IS NOT DESIGNED FOR USE IN ONLY ONE END. NOTE THAT EXCEPT FOR PIECES MARKED ⑥ AND ⑩, THE QUANTITIES SPECIFIED ARE APPLICABLE ONLY FOR THE BRACE IN ONE END.

KEY NUMBERS

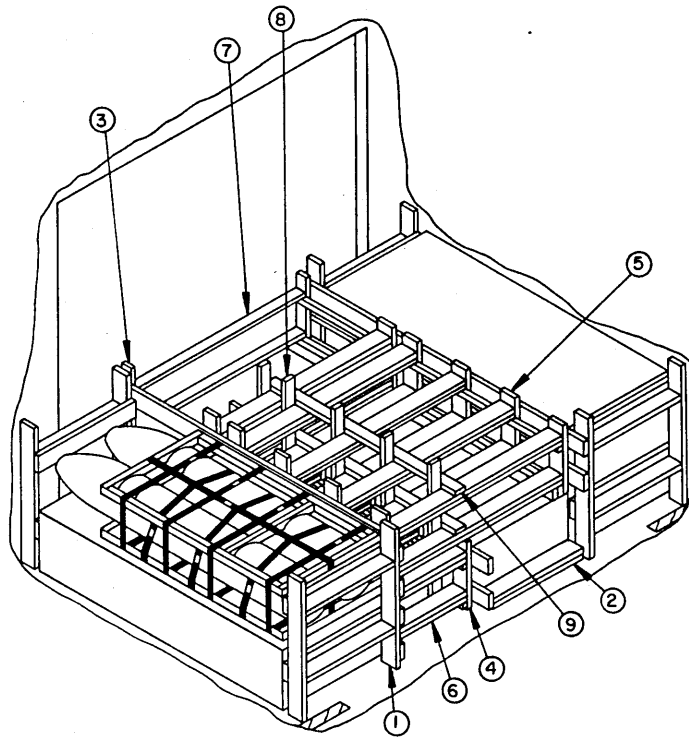
- ① SUPPORT CLEAT, 2" X 4" X 5" (2 REQD). NAIL TO THE CAR SIDEWALL W/2-12d NAILS. SEE SPECIAL NOTE 2 AT LEFT.
- ② LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH (CUT-TO-FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6". SEE GENERAL NOTE "O" ON PAGE 2.
- ③ CROSS CAR BRACE, 4"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



DIAGONAL BRACE

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

TYPE "D" K-BRACE



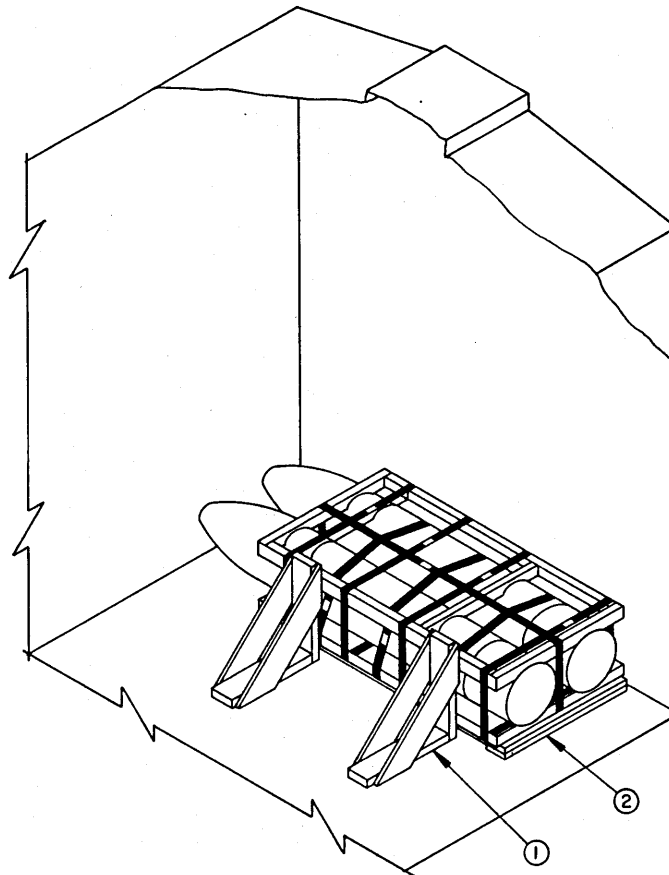
ISOMETRIC VIEW

SPECIAL NOTES:

1. THE PROCEDURES FOR THE ADJUSTMENT OF A LOAD QUANTITY BY THE OMISSION OF ONE UNIT IN THE TOP TIER IN A TWO LAYER LOAD ARE SHOWN AS TYPICAL.
2. DEPENDING ON THE CAR WIDTH, THE VERTICAL PIECES AND FILLER PIECES OF THE SIDE BLOCKING ASSEMBLIES MAY BE MADE FROM A NARROWER OR A WIDER MATERIAL SO AS TO PROVIDE FOR A SNUG FIT ACROSS THE WIDTH OF THE BOXCAR. NOTE: THE SIDE WALL CLEARANCE MUST NOT EXCEED MORE THAN ONE INCH (1") FROM SIDE WALL TO SIDE WALL.
3. THE LENGTH OF THE STRUTS AND/OR WIDTH OF THE OMITTED UNITS MAY REQUIRE THAT MORE THAN ONE SET OF VERTICAL AND HORIZONTAL STRUT BRACING BE INSTALLED.
4. IF THE LOAD IN EITHER END OF THE BOXCAR HAS A WEIGHT PER LAYER OF 30,625 POUNDS OR LESS, 4" X 4" STRUTS MAY BE USED IN CONJUNCTION WITH THE CENTER GATES FOR LONGITUDINAL RETENTION OF THE LOAD. IF THE LOAD IN EITHER END HAS A WEIGHT PER LAYER BETWEEN 30,625 POUNDS AND 41,250 POUNDS, DOUBLED 2" X 6" STRUTS MUST BE USED IN LIEU OF THE 4" X 4" STRUTS. ADDITIONALLY, IF THE LOAD IN EITHER END HAS A WEIGHT PER LAYER BETWEEN 41,250 POUNDS AND 61,875 POUNDS, TRIPLED 2" X 6" STRUTS MUST BE USED.

KEY NUMBERS

- ① SIDE BLOCKING FOR TWO LAYER LOAD (4 REQD). SEE THE "SIDE BLOCKING ASSEMBLY A" DETAIL ON PAGE 14. SEE GENERAL NOTE "O" ON PAGE 2 AND SPECIAL NOTE 2 AT LEFT.
- ② DOORWAY PROTECTION, 2" X 6" X 40" (DOUBLED) (2 REQD). PRE-POSITION THE DOORWAY PROTECTION WHICH WILL BEAR AGAINST THE NOSE END OF THE PALLET. NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 4". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ③ CENTER GATE (1 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 14.
- ④ CENTER GATE (1 REQD). SEE THE "CENTER GATE C" DETAIL ON PAGE 15.
- ⑤ CENTER GATE (1 REQD). SEE THE "CENTER GATE D" DETAIL ON PAGE 15.
- ⑥ STRUT, 2" X 6" BY CUT-TO-FIT (DOUBLED) (20 REQD). TOENAIL TO PIECES MARKED ③, ④, AND ⑤ W/2-16d NAILS AT EACH END.
- ⑦ STRUT, 2" X 4" BY CUT-TO-FIT (4 REQD). TOENAIL TO PIECES MARKED ③, ④, AND ⑤ W/2-16d NAILS AT EACH END.
- ⑧ VERTICAL STRUT BRACING, 2" X 4" X 48" (5 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT. SEE SPECIAL NOTE 3 AT LEFT.
- ⑨ HORIZONTAL STRUT BRACING, 2" X 4" X 67-1/2" (2 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.



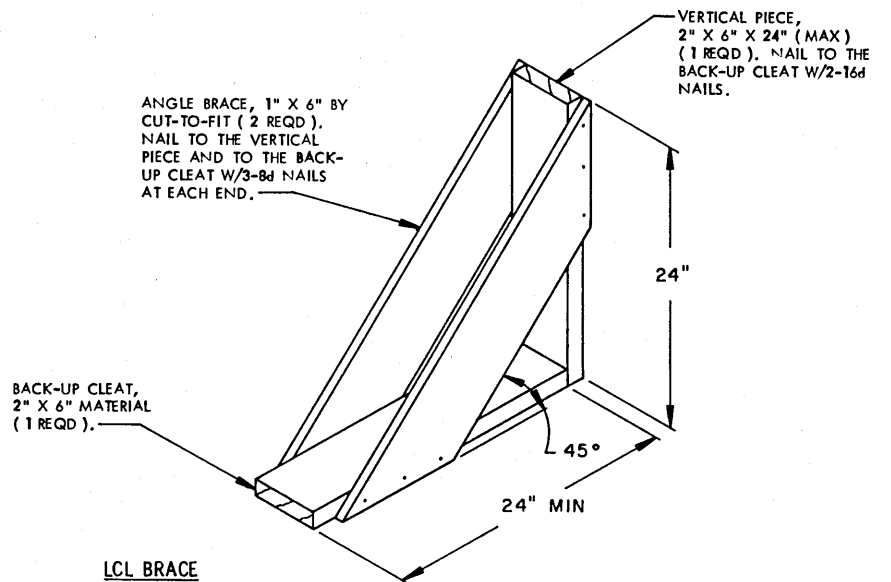
ISOMETRIC VIEW

SPECIAL NOTES:

1. A 9'-2" WIDE CONVENTIONAL TYPE BOXCAR HAVING A WOOD OR NAILABLE METAL FLOOR IS SHOWN. CARS OF OTHER WIDTHS MAY BE USED. SEE GENERAL NOTE "F" ON PAGE 2.
2. EACH LCL BRACE AS APPLIED FOR LONGITUDINAL BRACING WILL RETAIN 2,000 POUNDS OF LADING.
3. SIDE BLOCKING, PIECES MARKED ② MUST BE PRE-POSITIONED PRIOR TO LOADING THE UNIT. THEY SHALL BE POSITIONED SO AS TO CONTACT THE SKIDS OF THE METAL PALLET AS SHOWN.

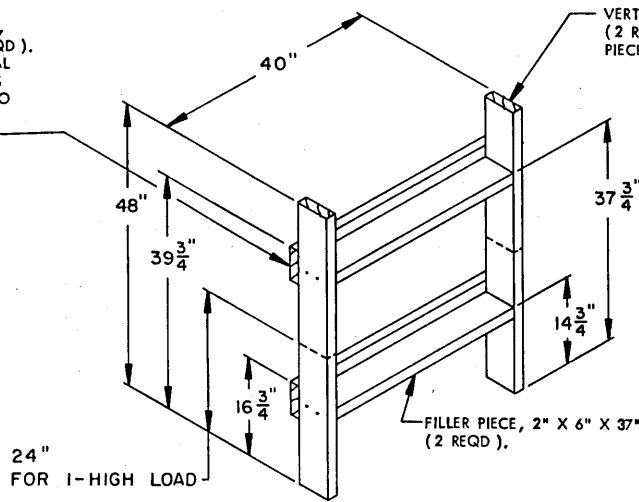
KEY NUMBERS

- ① LCL BRACE (2 REQD), POSITION AS SHOWN AND NAIL TO THE CAR FLOOR W/7-16d NAILS. SEE THE "LCL BRACE" DETAIL BELOW.
- ② SIDE BLOCKING, 2" X 6" X 36" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/8-16d NAILS. LAMINATE THE SECOND PIECE TO THE FIRST PIECE IN A LIKE MANNER.



TYPICAL LCL (1-UNIT LOAD)

LOAD BEARING PIECE,
2" X 6" X 40" (2 REQD).
NAIL TO THE VERTICAL
PIECES W/3-10d NAILS
AT EACH END AND TO
THE FILLER PIECES
W/3-10d NAILS.

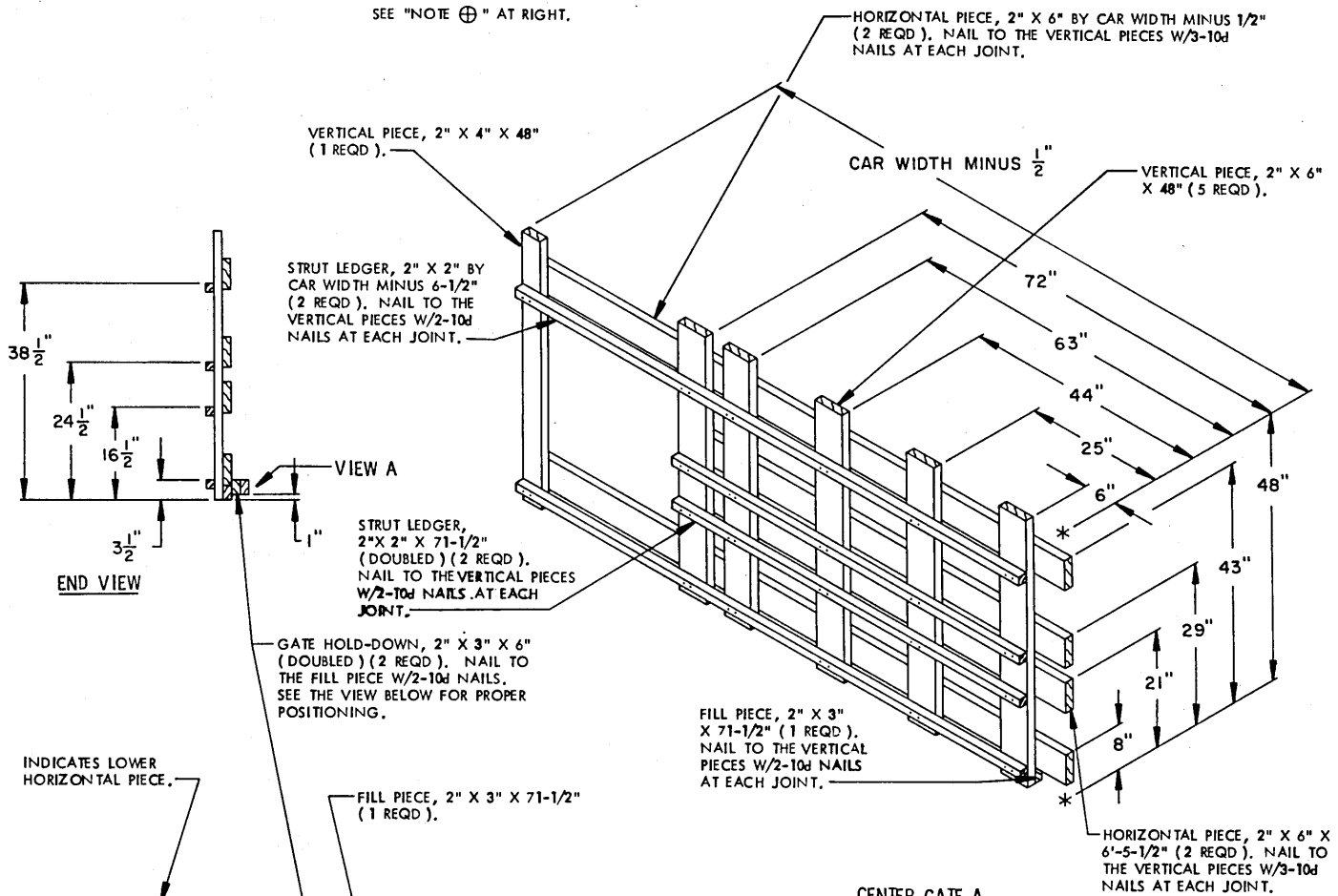


VERTICAL PIECE, 2" X 6" X 48"
(2 REQD). NAIL TO THE FILLER
PIECES W/2-10d NAILS AT EACH JOINT.

NOTE ⊕ : THE SIDE BLOCKING ASSEMBLY AS SHOWN IS DESIGNED FOR A TWO-LAYER LOAD IN A 9'-2" WIDE BOXCAR. THE WIDTH OF THE ASSEMBLY MAY BE INCREASED OR DECREASED BY USING MATERIAL OF A DIFFERENT THICKNESS OR WIDTH. THE ASSEMBLY MAY ALSO BE USED IN A ONE-LAYER LOAD BY REDUCING THE HEIGHT AS SHOWN.

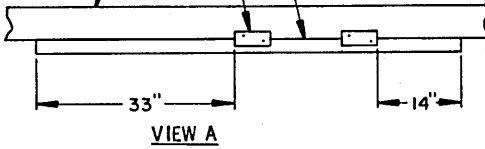
SIDE BLOCKING ASSEMBLY A

SEE "NOTE ⊕" AT RIGHT.



CENTER GATE A

THE ABOVE GATE IS FOR USE WITH A TWO-LAYER LOAD. FOR A ONE-LAYER LOAD, SEE THE APPLICABLE CENTER GATE SHOWN ON PAGE 15.



VIEW A

THE ABOVE VIEW DEPICTS THE PLACEMENT AND NAILING OF THE GATE HOLD-DOWN PIECES TO THE FILL PIECE. OTHER PORTIONS OF THE CENTER GATE HAVE NOT BEEN SHOWN. THE DIMENSIONS MUST BE FIELD CHECKED TO ASSURE THAT THE HOLD-DOWN PIECES FIT INTO THE FORKLIFT OPENINGS OF THE SKIDS.

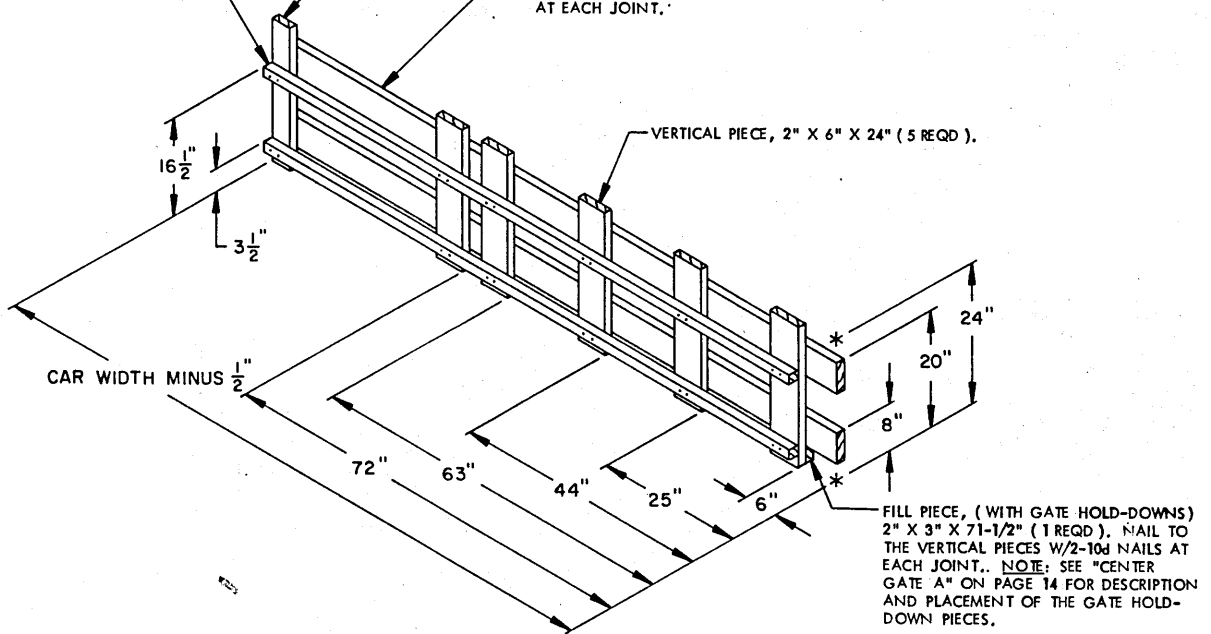
DETAILS

STRUT LEDGER, 2" X 2" BY CAR WIDTH MINUS 6-1/2" (2 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.

VERTICAL PIECE, 2" X 4" X 24" (1 REQD).

HORIZONTAL PIECE, 2" X 6" BY CAR WIDTH MINUS 1/2" (2 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.

VERTICAL PIECE, 2" X 6" X 24" (5 REQD).



FILL PIECE, (WITH GATE HOLD-DOWNS) 2" X 3" X 71-1/2" (1 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.. NOTE: SEE "CENTER GATE A" ON PAGE 14 FOR DESCRIPTION AND PLACEMENT OF THE GATE HOLD-DOWN PIECES.

CENTER GATE C

THE ABOVE GATE IS FOR USE WITH A ONE-LAYER LOAD.

HORIZONTAL PIECE, 2" X 6" BY CAR WIDTH MINUS 1/2" (2 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.

VERTICAL PIECE, 2" X 4" X 24" (1 REQD).

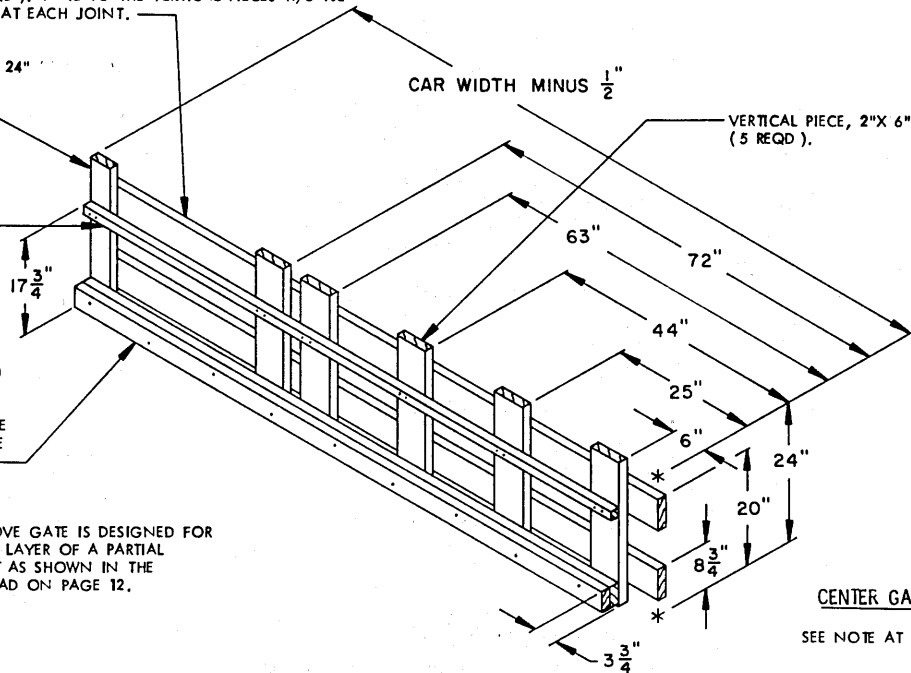
STRUT LEDGER, 2" X 2" BY CAR WIDTH MINUS 6-1/2" (1 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.

SUPPORT PIECE, 2" X 4" BY CAR WIDTH MINUS 6-1/2" (DOUBLED) (1 REQD). NAIL THE FIRST PIECE TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT. NAIL THE SECOND PIECE TO THE FIRST PIECE W/1-10d NAIL EVERY 12".

CAR WIDTH MINUS 1/2"

VERTICAL PIECE, 2" X 6" X 24" (5 REQD).

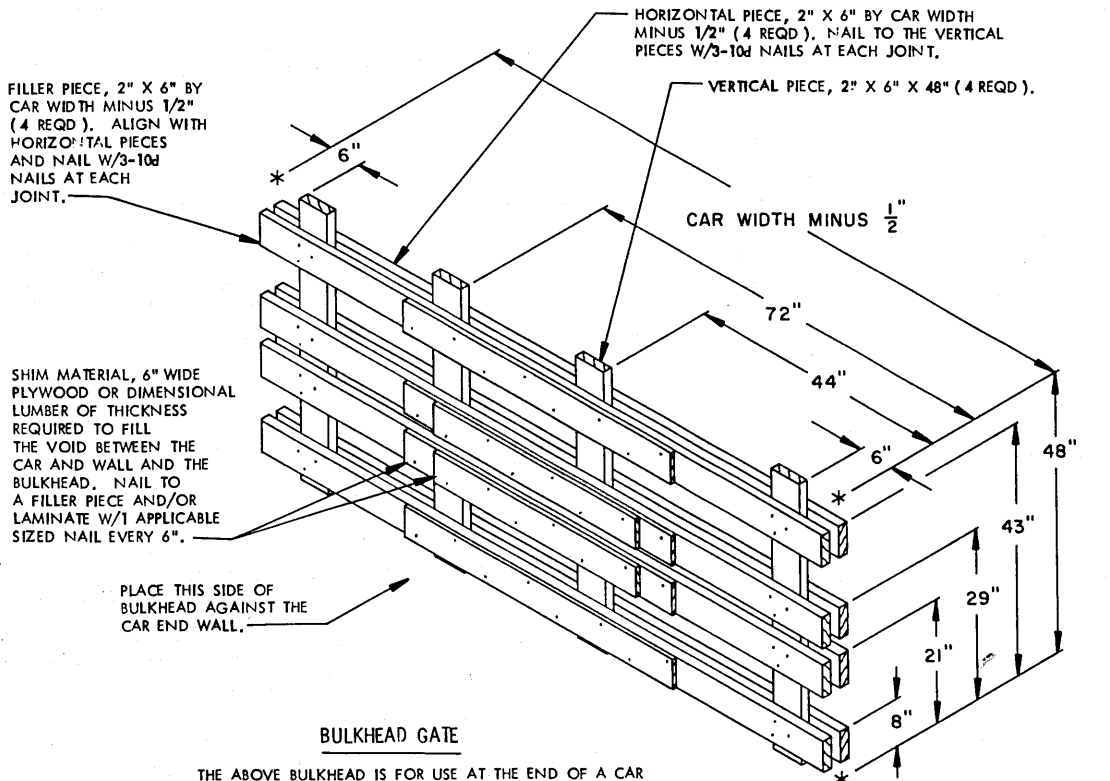
NOTE: THE ABOVE GATE IS DESIGNED FOR USE IN THE TOP LAYER OF A PARTIAL LAYER SHIPMENT AS SHOWN IN THE TYPICAL LCL LOAD ON PAGE 12.



CENTER GATE D

SEE NOTE AT LEFT.

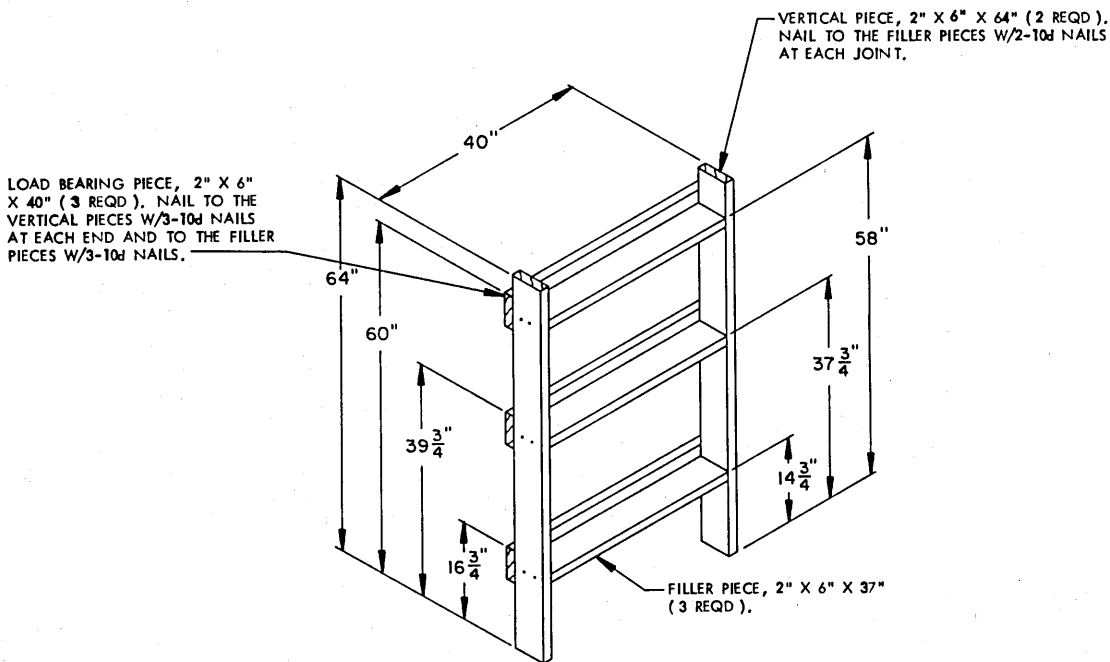
DETAILS



BULKHEAD GATE

THE ABOVE BULKHEAD IS FOR USE AT THE END OF A CAR WHEN THE END WALL IS BOWED OUTWARD MORE THAN TWO INCHES (2") EITHER FROM SIDE TO SIDE OF FROM FLOOR TO CEILING. ONE RIGHT HAND AND ONE LEFT HAND GATE REQUIRED. A LEFT HAND GATE IS SHOWN. MODIFY CENTER GATE BY OMITTING TWO VERTICAL PIECES AND THE STRUT LEDGERS. SEE GENERAL NOTE "F" ON PAGE 2.

A MODIFIED CENTER GATE A. SEE THE DETAIL ON PAGE 14.



SIDE BLOCKING ASSEMBLY B

THE SIDE BLOCKING ASSEMBLY AS SHOWN ABOVE IS DESIGNED FOR A THREE-LAYER LOAD, SUCH AS SHOWN ON PAGE 8. SEE "NOTE ⊕" ON PAGE 14 FOR GUIDANCE.

DETAILS