

APPROVED BY	
BUREAU OF EXPLOSIVES	
<i>E. P. Ralton</i>	
SUPERVISOR, MILITARY & INTERMODAL SERVICES	
DATE <i>4/22/86</i>	
REVISION NO	
SIGNED <i>[Signature]</i>	
DATE <i>7/21/89</i>	

LOADING AND BRACING (CL & LCL) IN BOX CARS OF CBU-87/B AND CBU-89/B MUNITIONS PACKED IN CNU-327/E SERIES METAL CONTAINERS

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REVISIONS				DRAFTSMAN <i>WRF/dh</i>	PROJ ENG <i>WRF</i>
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U.S. ARMY AMC DRAWING					
MAY 1986					
CLASS	DIVISION	DRAWING	FILE		
19	48	7072	SP5J2		

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 WITHIN THIS DRAWING ARE APPLICABLE TO CBU-87/B AND CBU-89/B MUNITIONS PACKED IN CNU-327/E CONTAINERS ONLY. SEE THE CONTAINER DETAIL ON PAGE 3.
- C. THE OUTLOADING PROCEDURES DEPICTED WITHIN THIS DOCUMENT ARE APPLICABLE FOR SHIPMENTS IN CONVENTIONAL BOX CARS OF ANY LENGTH, WITH A CAR WIDTH OF 9'-0" OR WIDER AND HAVING A 10'-0" DOOR OPENING. CONVENTIONAL BOX CARS WITH DOORS LESS THAN 10'-0" WIDE CAN BE USED BUT LOADING AND UNLOADING BECOMES PROGRESSIVELY MORE DIFFICULT.
- D. THE SELECTION OF THE RAIL CARS FOR TRANSPORTING CBU-87/B AND CBU-89/B MUNITIONS 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. BOX CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS HAVE BEEN SHOWN. HOWEVER, THE DEPICTED OUTLOADING PROCEDURES ARE ALSO APPLICABLE FOR CARS EQUIPPED WITH PLUG DOORS. CAUTION: DUNNAGE MATERIAL MUST NOT BE NAILED TO ANY PLUG DOOR, WHETHER AUXILIARY OR MAIN. ALSO, AFTER THE PLUG DOORS ON A CAR ARE CLOSED AND READY FOR THE INSTALLATION OF CAR SEALS, A PIECE OF WIRE OF SUITABLE SIZE WILL BE USED IN ADDITION TO, AND IN CONJUNCTION WITH EACH CAR SEAL USED TO SEAL THE CAR. THE WIRE WILL BE THREADED THRU THE HOLES IN THE DOOR LATCH ASSEMBLY ONE OR MORE TIMES, AND THE WIRE ENDS WILL BE TWISTED TOGETHER.
- F. THE USE OF AN OFFSET LOADING PATTERN WILL FACILITATE LOADING AND UNLOADING OPERATIONS IN THE DOORWAY AREA OF THE CAR. WHEN POSSIBLE TO DO SO, A FULL LOAD SHOULD BE BUILT USING AN OFFSET LOADING PATTERN. FOR INSTANCE, A LOAD CONSISTING OF AN EVEN NUMBER OF LOAD UNITS AND HAVING TWO MORE LOAD UNITS IN ONE END OF THE CAR THAN IN THE OPPOSITE END, OR A LOAD CONSISTING OF AN ODD NUMBER OF LOAD UNITS AND HAVING ONE MORE LOAD UNIT IN ONE END THAN IN THE OTHER IS CONSIDERED TO BE AN OFFSET LOAD.
- G. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN CARS WHICH ARE PARTIALLY LOADED WITH CBU-87/B OR CBU-89/B MUNITIONS PACKED IN CNU-327/E CONTAINERS 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.
- H. 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".
- J. 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.
- K. 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 9 FOR GUIDANCE.
- L. THROUGHOUT THIS PROCEDURAL DRAWING, PORTIONS OF THE BLOCKING COMPONENTS AND OF THE DEPICTED CARS, SUCH AS A CAR SIDE WALL, HAVE BEEN OMITTED FROM THE LOAD VIEW FOR CLARITY PURPOSES.

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MATERIAL SPECIFICATIONS

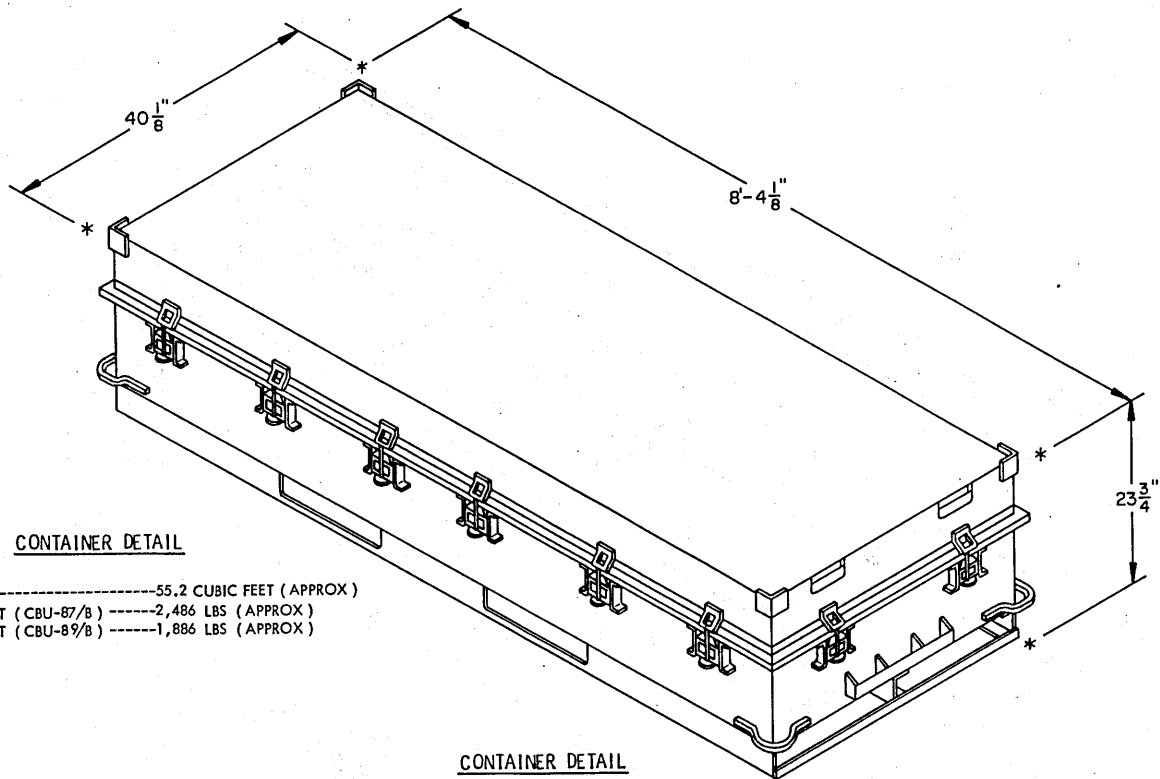
- LUMBER-----: SEE TM 743-200-1, DUNNAGE LUMBER; FED SPEC MM-L-751.
- NAILS-----: COMMON, FED SPEC FF-N-105.
- STRAPPING, STEEL---: CLASS 1, TYPE I OR IV, HEAVY DUTY, FINISH A, B (GRADE 2), OR C, FED SPEC QQ-S-781.
- STRAP SEAL-----: TYPE D, STYLE I, II, OR IV, CLASS H, FINISH A, B (GRADE 2), OR C, FED SPEC QQ-S-781.
- STRAP STAPLE-----: COMMERCIAL GRADE.
- ANTI-CHAFING MATERIAL-----: NEUTRAL BARRIER MATERIAL; MIL-B-121 (OR EQUAL).

PAGE 2

(GENERAL NOTES CONTINUED)

- M. THE NUMBER OF LADING UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE BOX CAR BEING LOADED OR THE QUANTITY TO BE SHIPPED. HOWEVER, THE APPROVED METHODS SPECIFIED HEREIN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING, AND STAYING OF THE UNITS. NOTICE: A SHIPMENT WILL BE POSITIONED IN THE RAIL CAR IN COMPLIANCE WITH THE WEIGHT DISTRIBUTION REQUIREMENTS OF THE AAR.
- N. 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.
- O. THE SPACE BETWEEN THE LOAD UNITS MUST BE KEPT TO A MINIMUM. TO ACHIEVE A TIGHT LOAD, HYDRAULIC JACKS CAN BE USED 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 JOINTS BETWEEN THE LAYERS OF CONTAINERS. PADDING, OR 2-INCH (2") THICK LUMBER OR ANY OTHER MATERIAL OF SIMILAR CONSISTENCY, SHOULD BE PLACED BETWEEN THE JACK AND THE LADING.
- P. LOAD-BLOCKING STRUTS WHICH ARE 48" OR LONGER MUST BE STIFFENED BY THE APPLICATION OF HORIZONTAL AND VERTICAL STRUT BRACING AS SHOWN BY THE "STRUT BRACING" DETAIL ON PAGE 17. 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 UPPER-MOST TIER OF A LOAD MAY BE DIFFICULT TO APPLY TO THE TOP SURFACES OF THE STRUTS AS DEPICTED. STRUT BRACING WILL BE EQUALLY EFFECTIVE IF APPLIED TO THE UNDER SIDE OF THOSE STRUTS.
- Q. TO ACHIEVE A TIGHTLY BLOCKED LOAD, A STRUT WILL BE CUT SLIGHTLY LONGER THAN THE MEASURED DISTANCE BETWEEN THE STRUT BEARING AREAS ON THE TWO CENTER GATES. ONE END OF THE STRUT WILL BE POSITIONED AT ITS BEARING AREA JUST ABOVE THE STRUT LEDGER ON ONE GATE. THE OTHER END, WHICH CAN BE BEVELED ON THE LOWER CORNER IF DESIRED, WILL THEN BE DRIVEN DOWNWARD UNTIL IT CONTACTS THE STRUT LEDGER ON THE OTHER GATE. EACH END OF THE STRUT WILL BE TOENAILED TO THE ADJACENT CENTER GATE, AS SPECIFIED WITHIN THE KEY NUMBERS FOR A LOAD, IN SUCH A MANNER SO THAT AS NEARLY AS PRACTICAL EQUAL LENGTHS OF A NAIL ARE EMBEDDED IN THE STRUT AND IN THE VERTICAL PIECE OF THE CENTER GATE. SEE THE "BEVEL CUT" DETAIL ON PAGE 17 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.
- R. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.
- S. CONVERSION TO METRIC EQUIVALENTS:
DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES, AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENTS MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM, AND ONE POUND EQUALS 0.454KG.
- T. 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.
- U. FILL PIECES AND SHIM MATERIAL MUST BE INSTALLED ON ALL END WALL GATES WHEN THE END WALLS ARE BOWED OUTWARD TWO INCHES (2") OR MORE EITHER FROM SIDE TO SIDE OR FROM FLOOR TO ROOF, TO PROVIDE FOR A UNIFORM LOAD BEARING SURFACE. NAIL HORIZONTAL 2" X 6" FILL PIECES TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT, ONE REQUIRED FOR EACH HORIZONTAL PIECE ON THE OPPOSITE SIDE. THEN INSTALL SHIM MATERIAL, 6" WIDE PLYWOOD OR DIMENSIONAL LUMBER OF A THICKNESS AND LENGTH AS REQUIRED TO FILL THE VOID BETWEEN THE CAR END WALL AND THE END WALL GATE. NAIL TO THE FILL PIECE AND/OR LAMINATE W/1 APPLICABLY SIZED NAIL EVERY 6".

(CONTINUED ON PAGE 3)



CONTAINER DETAIL

CUBE -----55.2 CUBIC FEET (APPROX)
 GROSS WEIGHT (CBU-87/B) -----2,486 LBS (APPROX)
 GROSS WEIGHT (CBU-89/B) -----1,886 LBS (APPROX)

CONTAINER DETAIL

(GENERAL NOTES CONTINUED)

GENERAL NOTES

(FOR CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS)

- AA. **CAUTION:** FOR CUSHIONED BOX CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS, ONLY CARS EQUIPPED WITH LOAD DIVIDERS MANUFACTURED BY EVANS, EQUIPCO, OR PRECO MAY BE USED. LOAD DIVIDERS MANUFACTURED BY TRANSCO ARE NOT ACCEPTABLE, WHETHER OF ALUMINUM OR STEEL CONSTRUCTION. THE DEPICTED PROCEDURES ARE APPLICABLE FOR CARS OF VARIOUS LENGTHS AND WIDTHS. THE AAR MECHANICAL DESIGNATION CLASS FOR THESE CARS, AS IDENTIFIED IN "THE OFFICIAL RAILWAY EQUIPMENT REGISTER," WILL BE RBL, XL, OR XLI.
- BB. THE USE OF LOAD DIVIDER EQUIPPED CARS WILL ELIMINATE THE NEED FOR CENTER GATES AND STRUTS, AND GATE HOLD DOWNS (WHEN APPLICABLE) WHICH ARE REQUIRED IN CONVENTIONAL BOX CAR LOADS. THIS WILL ACCOUNT FOR A CONSIDERABLE SAVING IN MATERIAL AND LABOR COSTS. THEREFORE, EVERY EFFORT SHOULD BE MADE TO ACQUIRE CUSHIONED CARS EQUIPPED WITH LOAD DIVIDERS FOR SHIPMENT OF CNU-327/E CONTAINERS. **NOTICE:** ONLY CUSHIONED CARS THAT HAVE SLIDING CENTER SILL TYPE CUSHIONING DEVICES OR END-OF-CAR TYPE DEVICES WHICH HAVE AT LEAST FIFTEEN INCHES (15") OF TRAVEL ARE ACCEPTABLE.
- CC. IF NAILING TO A CAR SIDEWALL IS NOT REQUIRED, BOX CARS EQUIPPED WITH ADJUSTABLE SIDE FILLERS THAT HAVE 3/8" OR THICKER PANELS MAY BE USED. HOWEVER, THESE SIDE FILLERS MUST NOT BE USED FOR LATERAL BLOCKING, THEY MUST BE RETRACTED AND LOCKED AGAINST THE CAR SIDEWALL.
- DD. **NOTICE:** AFTER THE LOAD DIVIDER BULKHEADS ARE POSITIONED AGAINST THE LADING, AND THE LOCKING PINS ARE ENGAGED IN THE HOLES OF THE RAILS, THE LOWER LOCKING PINS MUST BE INSPECTED TO ENSURE THAT THE PINS ARE FULLY ENGAGED IN THE LOCKING HOLES. IF THE PINS ARE NOT FULLY SEATED IN THE LOCKING HOLES, THE LINKAGE MECHANISM WILL BE ADJUSTED AS REQUIRED SO THAT THE PINS WILL BE FULLY SEATED INTO THE LOCKING HOLES OF THE LOWER RAILS. IF PRESENT, DEBRIS MUST BE REMOVED FROM BENEATH THE LOCKING HOLES WHICH HAVE BEEN SELECTED FOR SECURING A LOAD DIVIDER BULKHEAD.
- EE. A "STRUT ASSEMBLY" MUST BE INSTALLED BETWEEN THE LOAD DIVIDER BULKHEADS IF THE CAR CONTAINS CLASS A OR CLASS B EXPLOSIVES AND THE LOAD IN EITHER END OF THE CAR WEIGHS 50,000 POUNDS OR MORE. A STRUT ASSEMBLY IS NOT REQUIRED

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(GENERAL NOTES CONTINUED)

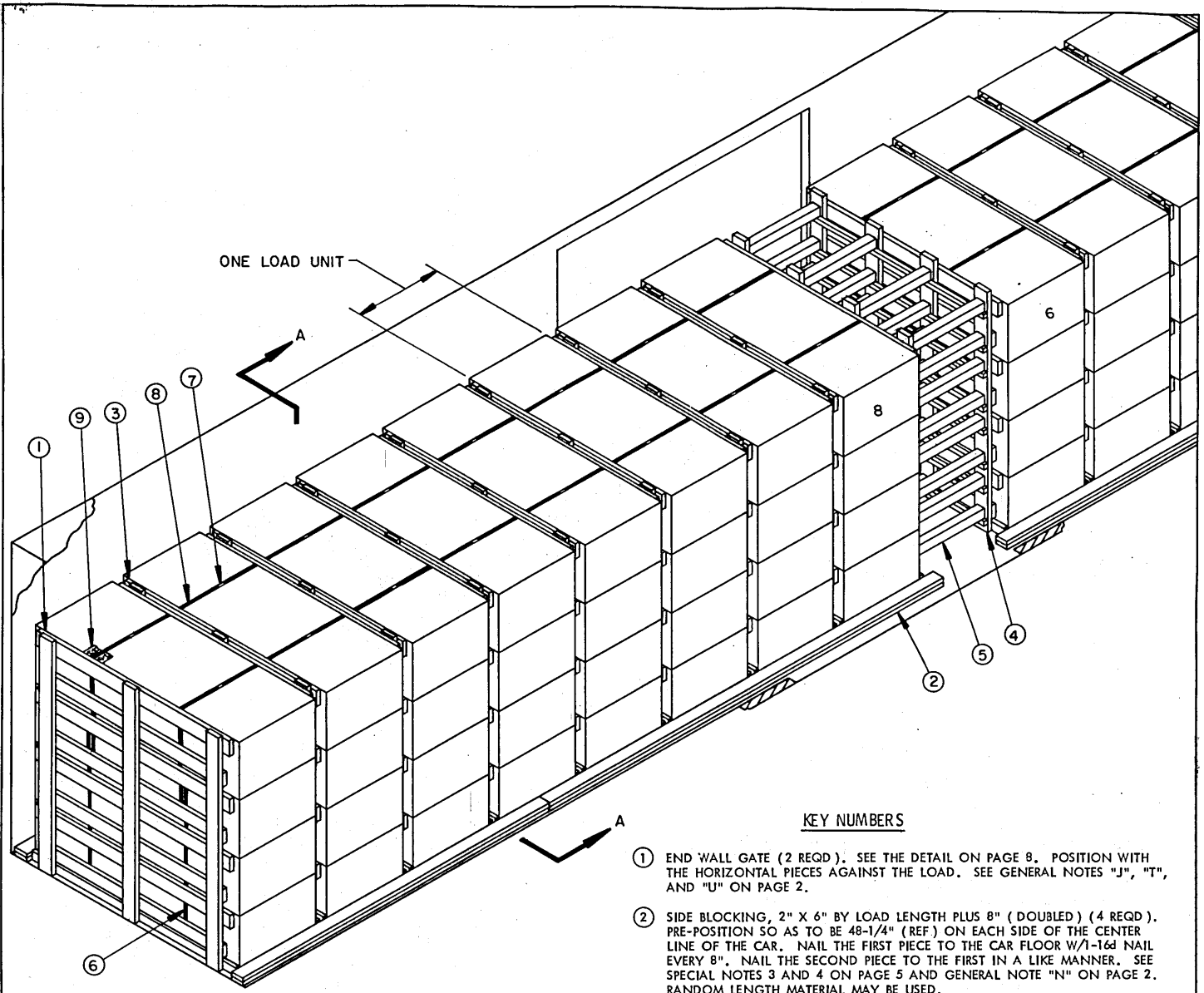
FOR LOADS OF CLASS C EXPLOSIVES REGARDLESS OF THE WEIGHT OF THE LOAD. NOTE THAT THE STRUT ASSEMBLY MAY BE OMITTED FROM LOADS OF CLASS A OR B EXPLOSIVES WEIGHING 50,000 POUNDS WHEN THE LADING AND ADEQUATE BLOCKING AND BRACING ARE POSITIONED TO COMPLETELY FILL THE SPACE BETWEEN THE INSTALLED BULKHEADS AS SPECIFIED IN GENERAL NOTE "FF-2" BELOW. DETAILS OF STRUT ASSEMBLIES FOR USE BETWEEN 1 PIECE BULKHEADS ARE SHOWN ON PAGE 18.

- FF. THE NORMAL LOADING PATTERN IN CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS IS TO POSITION THE LADING BETWEEN A CAR END WALL AND A LOAD DIVIDER BULKHEAD IN FULL LAYERS. OBVIOUSLY, A LOAD QUANTITY MUST THEN BE A MULTIPLE OF THE NUMBER OF CONTAINERS WHICH ARE IN ONE LOAD UNIT. A LOAD UNIT IS DEFINED AS A STACK OF CONTAINERS WHICH IS FULL LOAD HEIGHT ONE UNIT IN LENGTH. IF THE QUANTITY TO BE SHIPPED CANNOT BE ATTAINED BY ADJUSTING THE NUMBER OF TIERS IN ONE OR BOTH ENDS OF A CAR, ONE OF THE FOLLOWING PROCEDURES MUST BE USED IN ORDER TO OBTAIN THE DESIRED QUANTITY
 1. 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 10 FOR GUIDANCE.
 2. AT LOCATION (5) WHERE K-BRACES MIGHT NORMALLY BE USED IN A LOAD IN A CONVENTIONAL CAR, LOAD DIVIDER BULKHEADS CAN BE POSITIONED. LOADING CAN THEN CONTINUE TOWARD THE CENTER OF THE CAR FROM EACH INSTALLED LOAD DIVIDER BULKHEAD, IN EVEN LAYERS WHICH ARE ONE OR MORE LESS IN HEIGHT THAN THE LOAD IN THE ENDS OF THE CAR. INSTALL CENTER GATES, STRUTS AND GATE HOLD DOWNS AS SHOWN IN THE APPLICABLE CONVENTIONAL BOX CAR DRAWING HEREIN, TO PROVIDE FOR A TIGHT LOAD BETWEEN THE BULKHEADS.
 3. ONE OR MORE UNITS CAN BE POSITIONED IN CONTACT WITH A LOAD DIVIDER BULKHEAD ON THE CENTER-OF-CAR SIDE. BLOCK AND BRACE WITH LCL BRACES AS SHOWN ON PAGE 16, OR WITH KNEE BRACE ASSEMBLIES, AS SHOWN ON PAGES 14 AND 15.
- GG. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.

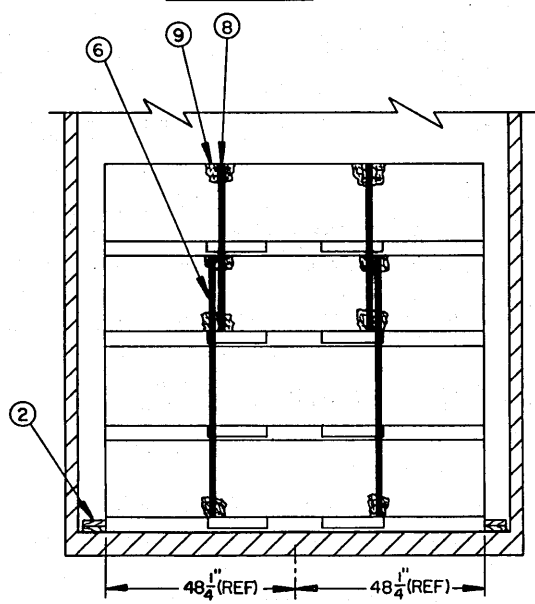
REVISIONS

REVISION NO. 1, DATED OCTOBER 1991, CONSISTS OF:

1. CHANGING METHOD OF LATERAL BRACING FOR THE LOAD ON PAGE 4.
2. ADDING PROCEDURES FOR LOAD DIVIDER CARS.



ISOMETRIC VIEW



SECTION A-A

KEY NUMBERS

- ① END WALL GATE (2 REQD). SEE THE DETAIL ON PAGE 8. POSITION WITH THE HORIZONTAL PIECES AGAINST THE LOAD. SEE GENERAL NOTES "J", "T", AND "U" ON PAGE 2.
- ② SIDE BLOCKING, 2" X 6" BY LOAD LENGTH PLUS 8" (DOUBLED) (4 REQD). PRE-POSITION SO AS TO BE 48-1/4" (REF) ON EACH SIDE OF THE CENTER LINE OF THE CAR. NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE SPECIAL NOTES 3 AND 4 ON PAGE 5 AND GENERAL NOTE "N" ON PAGE 2. RANDOM LENGTH MATERIAL MAY BE USED.
- ③ SEPARATOR GATE (12 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 8.
- ④ CENTER GATE (2 REQD). SEE THE DETAIL ON PAGE 9.
- ⑤ STRUT, 4" X 4" BY CUT-TO-FIT (REF: 36") (32 REQD). TOENAIL TO PIECES MARKED ④ W/2-16d NAILS AT EACH END. SEE GENERAL NOTES "H", "P", AND "Q" ON PAGE 2.
- ⑥ LOWER STACK UNITIZING STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT (REF: 19'-0") (28 REQD). SEE SPECIAL NOTE 5 ON PAGE 5.
- ⑦ SEAL FOR 1-1/4" STRAPPING (56 REQD, 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "K" ON PAGE 2.
- ⑧ UPPER STACK UNITIZING STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT (REF: 15'-0") (28 REQD). SEE SPECIAL NOTE 5 ON PAGE 5.
- ⑨ ANTI-CHAFING MATERIAL (AS REQD). POSITION UNDER ALL STRAPS AT POINTS OF CONTACT WITH CONTAINERS, EXCEPT THRU THE FORKLIFT TINE OPENINGS.

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. WIDER CARS OF OTHER LENGTHS AND CARS HAVING OTHER DOOR WIDTHS CAN BE USED. SEE GENERAL NOTE "C" ON PAGE 2. METAL LINED CARS MAY BE USED.
2. A MAXIMUM OF FORTY-FOUR (44) OF THE CNU-327/E CONTAINERS FOR AN APPROXIMATE LADING WEIGHT OF 109,384 POUNDS WHEN SHIPPING THE CNU-87/B MUNITIONS OR 82,984 POUNDS WHEN SHIPPING THE CNU-89/B MUNITIONS CAN BE PLACED IN A 40'-6" LONG BOX CAR WHEN USING THE DEPICTED PROCEDURES. IF A 60'-8" LONG BOX CAR IS AVAILABLE, SIXTY-EIGHT (68) UNITS FOR AN APPROXIMATE LADING WEIGHT OF 159,048 POUNDS WHEN SHIPPING THE CNU-87/B MUNITIONS OR 128,248 POUNDS WHEN SHIPPING THE CNU-89/B MUNITIONS CAN BE LOADED, LOAD LIMIT OF THE CAR PERMITTING.
3. SIDE BLOCKING, PIECE MARKED (2), MUST EXTEND AT LEAST EIGHT INCHES (8") PAST THE CONTAINER SKIDS IN THE DOORWAY AREA OF THE CAR.
4. PRE-POSITION THE SIDE BLOCKING, PIECE MARKED (2), LONGITUDINALLY DOWN BOTH SIDES OF THE CAR AND FASTEN TO THE FLOOR PRIOR TO LOADING. THE DISTANCE BETWEEN THE SIDE BLOCKING MAY BE INCREASED OR DECREASED AS REQUIRED TO ALLOW NO MORE THAN ONE HALF INCH (1/2") OF LATERAL VOID BETWEEN THE CONTAINER SKIDS AND SIDE BLOCKING.
5. THE STACK UNITIZING STRAPS, PIECES MARKED (6) AND (8), WILL BE THREADED THROUGH THE FORKLIFT POCKETS OF THE LOWER CONTAINER IN THE GROUP BEING UNITIZED. PIECE MARKED (6) WILL BE INSTALLED TO ENCIRCLE THE BOTTOM 3 CONTAINERS OF A STACK. PIECE MARKED (8) WILL BE INSTALLED TO ENCIRCLE THE TOP TWO CONTAINERS OF A STACK. NOTE: THE STRAPS ARE TO BE POSITIONED AS FAR APART AS THE FORKLIFT POCKETS PERMIT.
6. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY BEING SHIPPED BY OMITTING ONE OR MORE LOAD UNITS FROM THE CENTER PORTION OF THE LOAD. AN ENTIRE TOP TIER CAN ALSO BE OMITTED. FOR OTHER METHODS OF REDUCING THE LOAD REFER TO THE TYPICAL LCL PROCEDURES ON PAGES 10 THROUGH 16 FOR GUIDANCE.
7. IF ONE (1) CNU-327/E CONTAINER IS TO BE OMITTED FROM A LOAD UNIT REFER TO PAGE 10 FOR GUIDANCE.

BILL OF MATERIAL

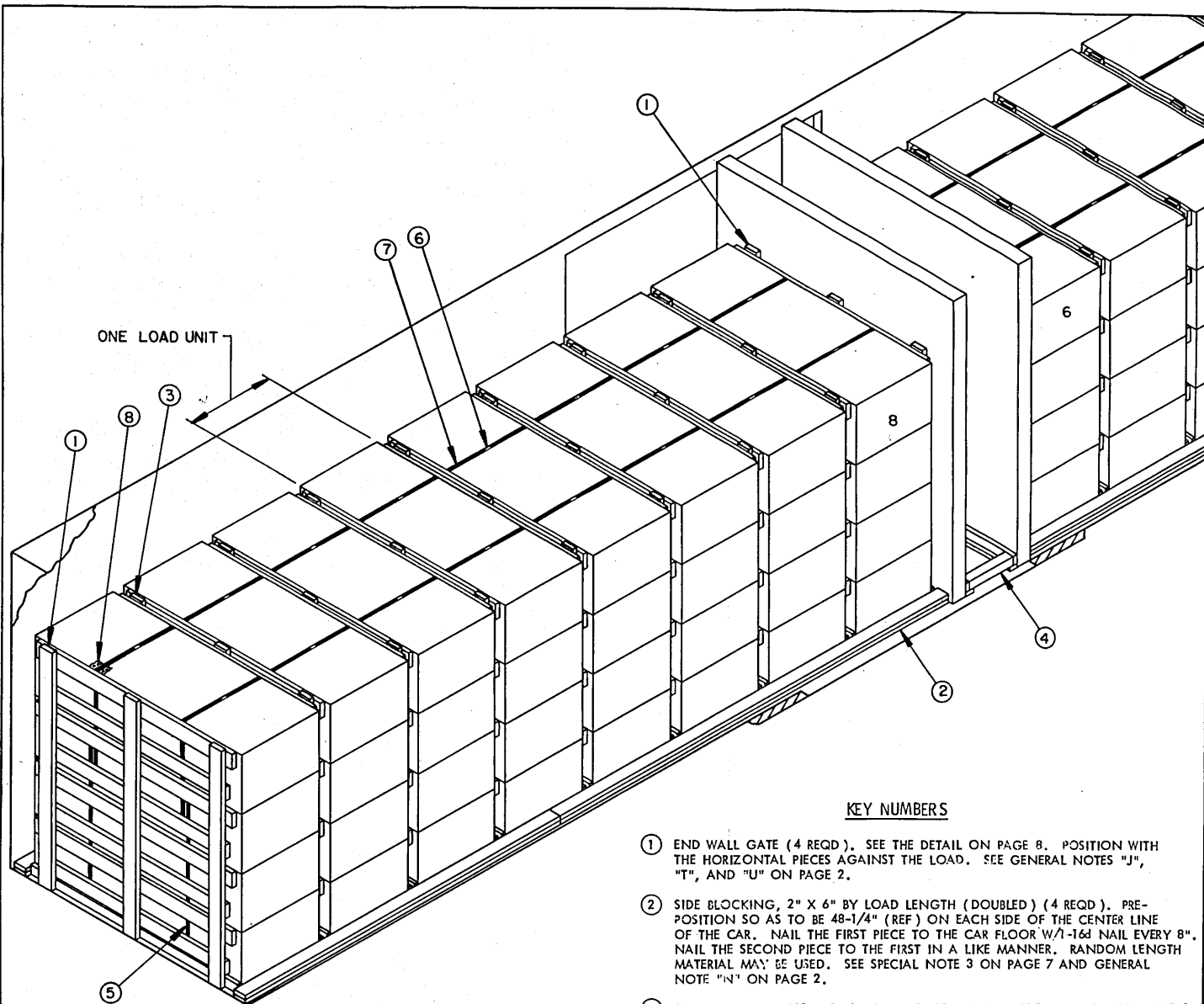
LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	112	38
2" X 4"	224	150
2" X 6"	2,216	2,216
4" X 4"	96	128
NAILS	NO. REQD	POUNDS
10d (3")	2,450	37-3/4
16d (3-1/2")	416	9-1/4
STEEL STRAPPING, 1-1/4" X .035" OR .031" --- 952' REQD ---136 LBS		
SEAL FOR 1-1/4" STRAPPING ----- 56 REQD ---2-1/2 LBS		
ANTI-CHAFING MATERIAL ----- AS REQD ---NIL		

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
UNIT	56	139,216 LBS *
DUNNAGE		5,250 LBS

TOTAL WEIGHT ----- 144,466 LBS
 * WEIGHT IS FOR THE CBU-87/B;
 WEIGHT WITH CBU-89/B IS 105,616 LBS.

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



ISOMETRIC VIEW

KEY NUMBERS

- ① END WALL GATE (4 REQD). SEE THE DETAIL ON PAGE 8. POSITION WITH THE HORIZONTAL PIECES AGAINST THE LOAD. SEE GENERAL NOTES "J", "T", AND "U" ON PAGE 2.
- ② SIDE BLOCKING, 2" X 6" BY LOAD LENGTH (DOUBLED) (4 REQD). PRE-POSITION SO AS TO BE 48-1/4" (REF) ON EACH SIDE OF THE CENTER LINE OF THE CAR. NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. RANDOM LENGTH MATERIAL MAY BE USED. SEE SPECIAL NOTE 3 ON PAGE 7 AND GENERAL NOTE "N" ON PAGE 2.
- ③ SEPARATOR GATE (12 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 8.
- ④ STRUT ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 18 AND GENERAL NOTE "EE" ON PAGE 3.
- ⑤ LOWER STACK UNITIZING STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT (REF: 19'-0") (28 REQD). SEE SPECIAL NOTE 4 ON PAGE 7.
- ⑥ SEAL FOR 1-1/4" STRAPPING (56 REQD, 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "K" ON PAGE 2.
- ⑦ UPPER STACK UNITIZING STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT (REF: 15'-0") (28 REQD). SEE SPECIAL NOTE 4 ON PAGE 7.
- ⑧ ANTI-CHAFING MATERIAL (AS REQD). POSITION UNDER STRAPS AT ALL POINTS OF CONTACT WITH THE CONTAINER, EXCEPT THRU THE FORKLIFT TINE OPENINGS.

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE WOOD-LINED CUSHIONED BOX CAR EQUIPPED WITH LOAD DIVIDER BULKHEADS AND WITH 10'-0" WIDE DOOR OPENING IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING NARROWER OR WIDER DOOR OPENINGS CAN BE USED. SEE GENERAL NOTES "C" AND "AA" THRU "GG" ON PAGES 2 AND 3. METAL LINED CARS MAY BE USED.
2. A MAXIMUM OF FORTY-FOUR (44) OF THE CNU 327/E CONTAINERS FOR AN APPROXIMATE LADING WEIGHT OF 109,384 POUNDS WHEN SHIPPING THE CNU 87/B MUNITIONS OR 82,984 POUNDS WHEN SHIPPING THE CNU-89/B MUNITIONS CAN BE PLACED IN A 40'-6" LONG BOX CAR WHEN USING THE DEPICTED PROCEDURES. IF A 60'-8" LONG BOX CAR IS AVAILABLE, SIXTY-EIGHT (68) UNITS FOR AN APPROXIMATE LADING WEIGHT OF 169,048 POUNDS WHEN SHIPPING THE CNU 87/B MUNITIONS OR 128,248 POUNDS WHEN SHIPPING THE CNU 89/B MUNITIONS CAN BE LOADED, LOAD LIMIT OF THE CAR PERMITTING.
3. PRE-POSITION THE SIDE BLOCKING PIECE MARKED (2) LONGITUDINALLY DOWN BOTH SIDES OF THE CAR AND FASTEN TO THE FLOOR PRIOR TO LOADING. THE DISTANCE BETWEEN THE SIDE BLOCKING MAY BE INCREASED OR DECREASED AS REQUIRED TO ALLOW NO MORE THAN ONE HALF INCH (1/2") OF LATERAL VOID BETWEEN THE CONTAINER SKIDS AND THE SIDE BLOCKING.
4. THE STACK UNITIZING STRAPS, PIECES MARKED (5) AND (7), WILL BE THREADED THROUGH THE FORKLIFT POCKETS OF THE LOWER CONTAINER IN THE GROUP BEING UNITIZED. PIECES MARKED (5) WILL BE INSTALLED TO ENCIRCLE THE BOTTOM THREE CONTAINERS OF A STACK. PIECES MARKED (7) WILL BE INSTALLED TO ENCIRCLE THE TOP TWO CONTAINERS OF A STACK. NOTE: THE STRAPS ARE TO BE POSITIONED AS FAR APART AS THE FORKLIFT POCKETS PERMIT.
5. IT IS A POSSIBILITY THERE WILL NOT BE ROOM ENOUGH BETWEEN THE LOAD DIVIDER BULKHEADS TO PERMIT INSTALLATION OF THE STRUTS OF THE STRUT ASSEMBLY, PIECE MARKED (4), WHEN LOADING 14 LOAD UNITS. IF SUCH IS THE CASE IT WILL BE NECESSARY TO OMIT 1 LOAD UNIT FROM ONE END OF THE LOAD.
6. THE DEPICTED LOAD CAN BE REDUCED TO SUIT THE QUANTITY BEING SHIPPED BY OMITTING ONE OR MORE LOAD UNITS FROM THE CENTER PORTION OF THE LOAD. AN ENTIRE TOP TIER CAN ALSO BE OMITTED. IF ONE (1) CNU-327/E CONTAINER IS TO BE OMITTED FROM A LOAD UNIT REFER TO PAGE 10 FOR GUIDANCE.

BILL OF MATERIAL

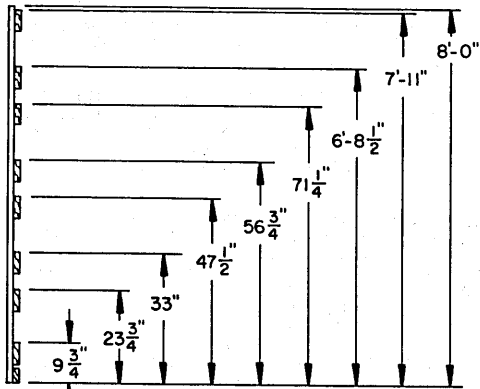
LUMBER	LINEAR FEET	BOARD FEET
1" X 8"	16	11
2" X 4"	260	174
2" X 6"	2,198	2,198
4" X 4"	7	10
NAILS	NO. REQD	POUNDS
6d (2")	15	1/4
10d (3")	2,268	35
12d (3-1/4")	16	1/2
16d (3-1/2")	288	6-1/4
STEEL STRAPPING, 1-1/4" X .035" OR .031" -- 952' REQD ---- 136 LBS		
SEAL FOR 1-1/4" STRAPPING ----- 56 REQD -- 2-1/2 LBS		
ANTI-CHAFING MATERIAL ----- AS REQD ----- NIL		

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
UNIT	56	139,216 LBS *
DUNNAGE		4,967 LBS

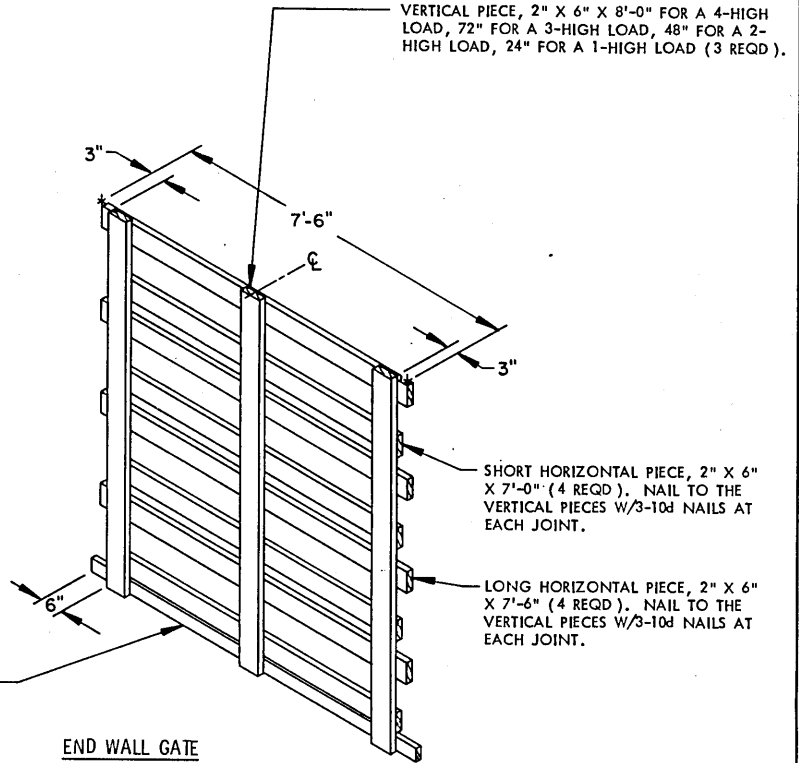
TOTAL WEIGHT ----- 144,183 LBS
 * WEIGHT IS FOR THE CBU-87/B;
 WEIGHT WITH CBU-89/B IS 105,616 LBS.

56-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR EQUIPPED WITH LOAD DIVIDER BULKHEADS

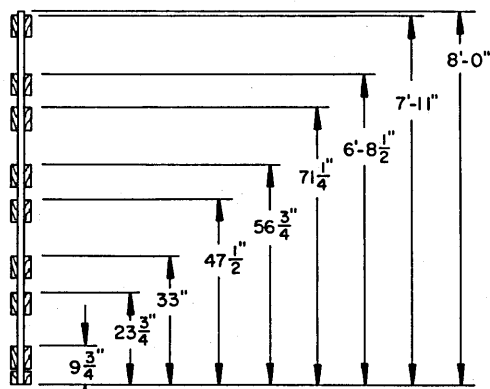


END VIEW

HOLD-DOWN PIECE, 2" X 4" X 8'-0" (1 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.

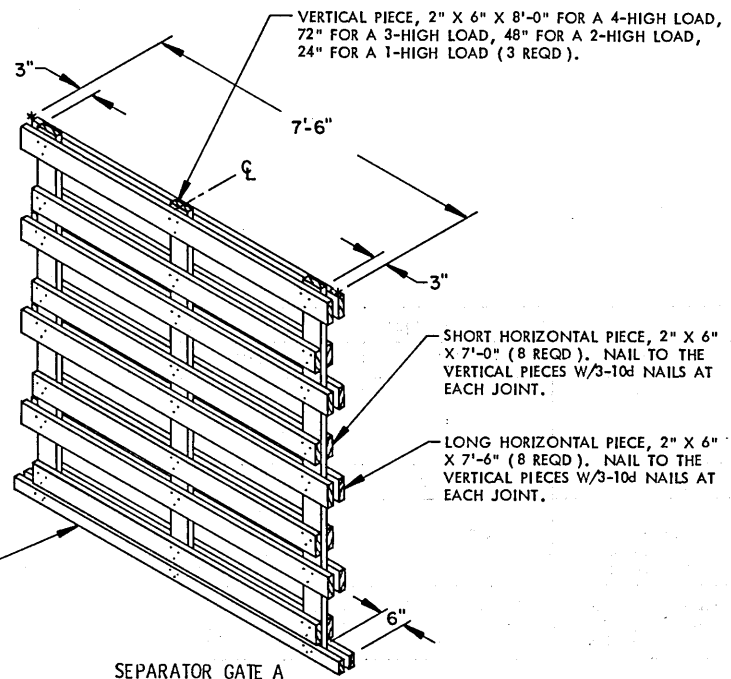


END WALL GATE



END VIEW

HOLD DOWN PIECE, 2" X 4" X 8'-0" (2 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.

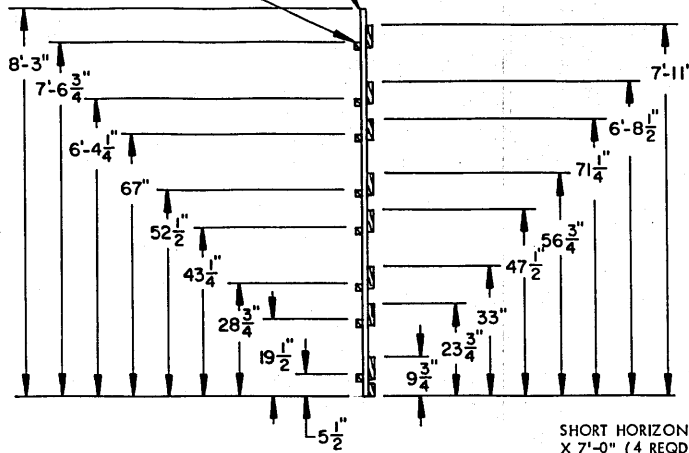


SEPARATOR GATE A

STRUT LEDGER, 2" X 2" OR 2" X 4" X 7'-0" (8 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.

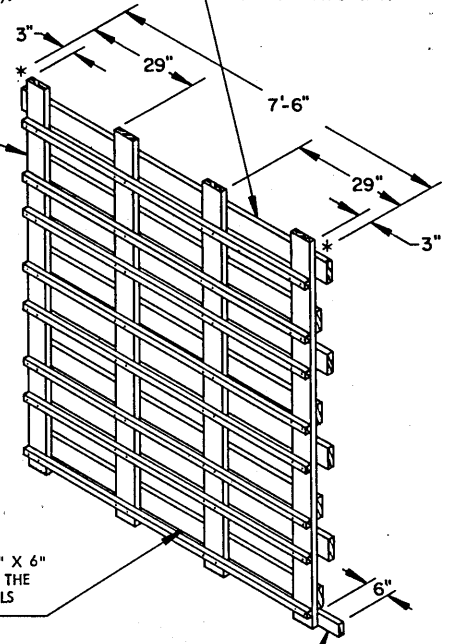
VERTICAL PIECE, 2" X 6" X 8'-3" FOR A 4-HIGH LOAD, 6'-4" FOR A 3-HIGH LOAD, 5'2" FOR A 2-HIGH LOAD, 28" FOR A 1-HIGH LOAD (4 REQD).

LONG HORIZONTAL PIECE, 2" X 6" X 7'-6" (4 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.



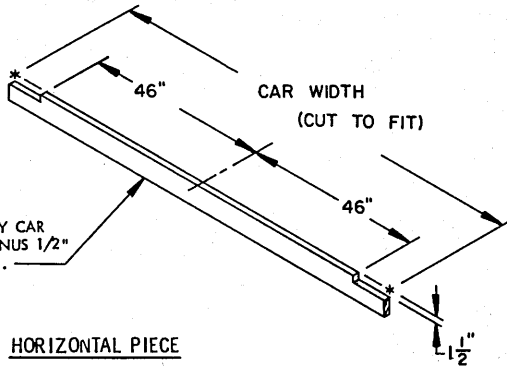
END VIEW

SHORT HORIZONTAL PIECE, 2" X 6" X 7'-0" (4 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.



CENTER GATE

HOLD-DOWN PIECE, 2" X 4" X 8'-0" (1 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.



2" X 6" BY CAR WIDTH MINUS 1/2" (1 REQD).

HORIZONTAL PIECE

THIS PIECE IS FOR USE AS THE TOP HORIZONTAL PIECE OF A K-BRACE ASSEMBLY. SEE PIECE MARKED (11) ON PAGES 11 AND 13 AND PIECE MARKED (12) ON PAGE 12.



ONE SEAL WITH TWO PAIR OF NOTCHES.

STRAP JOINT A

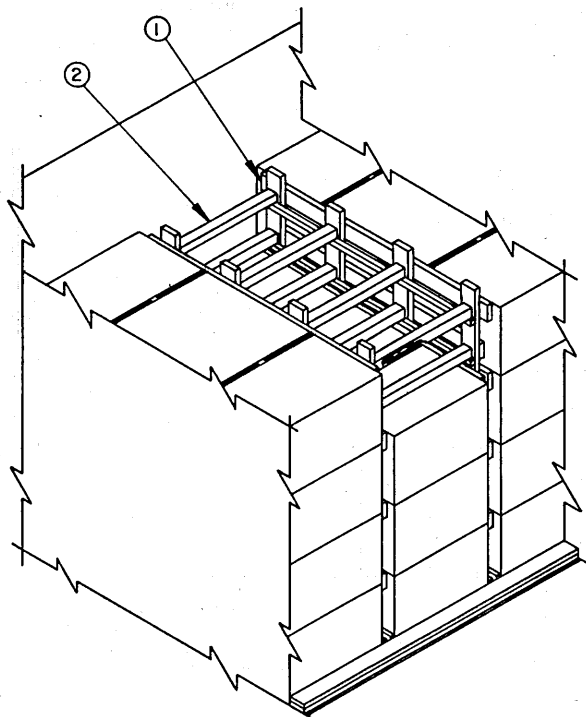
METHOD OF SECURING A STRAP JOINT WHEN USING A NOTCH-TYPE SEALER.



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

STRAP JOINT B

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



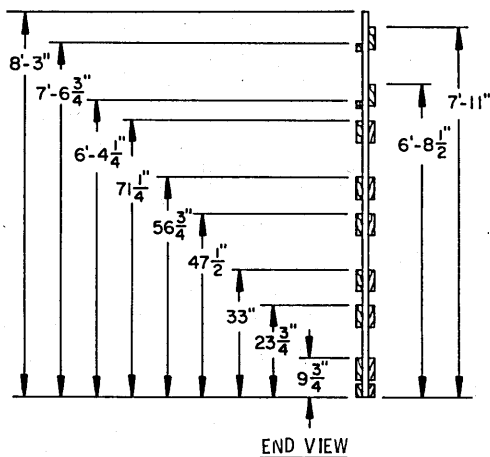
ISOMETRIC VIEW

SPECIAL NOTES:

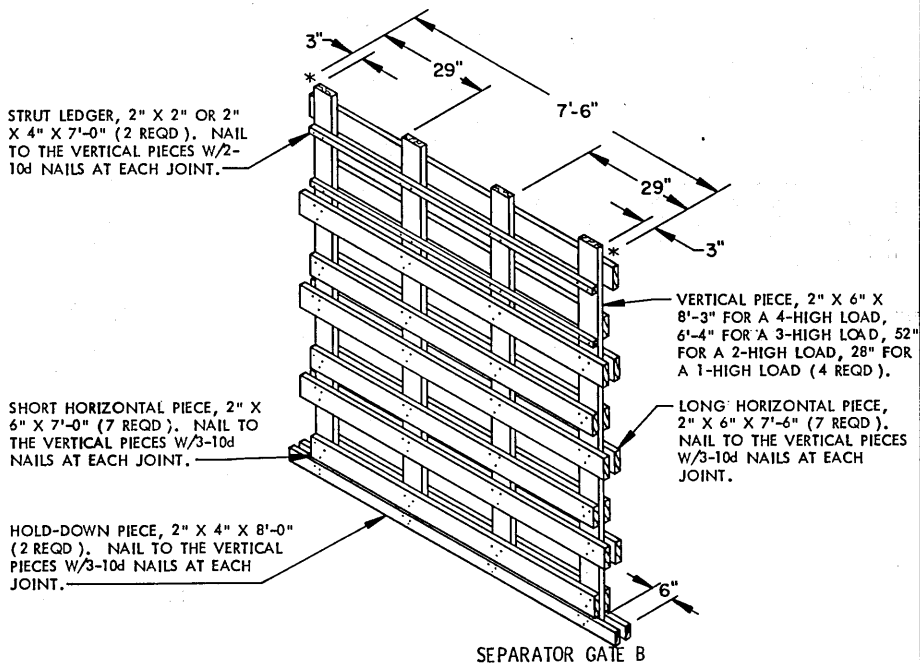
1. A PARTIAL VIEW OF A 9'-2" WIDE CONVENTIONAL TYPE BOX CAR IS SHOWN. OTHER CAR WIDTHS CAN ALSO BE USED.
2. A UNIT OMITTED FROM THE TOP LAYER OF A 4-LAYER LOAD IS SHOWN AS TYPICAL. THE PROCEDURES ARE ALSO APPLICABLE FOR THE OMISSION OF A TOP-LAYER CONTAINER FROM A 3-LAYER OR 2-LAYER LOAD.
3. THE OMITTED UNIT PROCEDURES SHOULD BE APPLIED NEAR THE CENTER OF THE CAR LENGTH. ALSO, THERE SHOULD BE AT LEAST ONE (1) LOAD UNIT BETWEEN THE OMITTED UNIT AND THE CENTER GATE.
4. ONLY THE BLOCKING AND BRACING FOR THE OMITTED UNIT IS SHOWN. REFER TO PAGES 4 AND 5 FOR THE BLOCKING AND BRACING REQUIREMENTS FOR THE BALANCE OF THE LOAD WHEN SHIPPING IN A CONVENTIONAL BOX CAR OR TO PAGES 6 AND 7 IF SHIPPING IN A CAR EQUIPPED WITH LOAD DIVIDER BULKHEADS.

KEY NUMBERS

- ① SEPARATOR GATE (2 REQD). SEE THE "SEPARATOR GATE B" DETAIL BELOW. SEE GENERAL NOTES "J" AND "T" ON PAGE 2.
- ② STRUT, 4" X 4" BY CUT TO FIT (REF: 39") (8 REQD). TOENAIL TO THE SEPARATOR GATES, PIECES MARKED ①, W/2-10d NAILS AT EACH END. SEE THE "STRUT INSTALLATION" DETAIL ON PAGE 17. SEE SPECIAL NOTES 2 AND 3 AT LEFT.



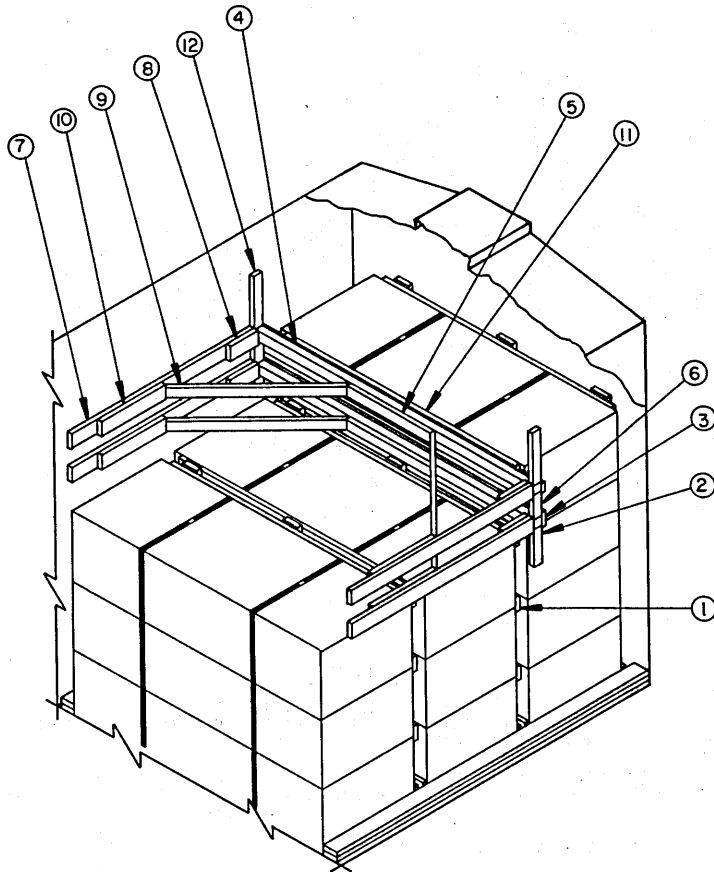
END VIEW



SEPARATOR GATE B

THIS GATE IS FOR USE WITH THE OMITTED UNIT PROCEDURES ABOVE.

KEY NUMBERS



ISOMETRIC VIEW

- ① SEPARATOR GATE (2 REQD). SEE "SEPARATOR GATE A" DETAIL ON PAGE 8 AND SPECIAL NOTE 2 BELOW.
- ② SUPPORT CLEAT, 2" X 4" X 12" (2 REQD). NAIL TO THE CAR SIDEWALL W/4-12d NAILS. POSITION SO AS TO CENTER PIECES MARKED ③ AND ④ BETWEEN THE CONTAINER LATCHES AND TIEDOWN RINGS.
- ③ BOTTOM HORIZONTAL PIECE, 2" X 6" X CAR WIDTH (CUT-TO-FIT) (1 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ④, W/1-12d NAIL EVERY 6". NOTCH TO FIT. SEE GENERAL NOTE "J" ON PAGE 2.
- ④ CROSS CAR BRACE, 4" X 4" X CAR WIDTH (CUT-TO-FIT) (2 REQD).
- ⑤ CENTER CLEAT, 2" X 4" X 36" (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ④, W/7-16d NAILS. SEE SPECIAL NOTE 5 BELOW.
- ⑥ SPACER CLEAT, 2" X 4" X CUT-TO-FIT (REF: 11-3/4") (2 REQD). NAIL TO THE CAR SIDEWALL W/3-10d NAILS. SEE SPECIAL NOTE 6 BELOW.
- ⑦ HORIZONTAL WALL CLEAT, 2" X 6" X 72" (4 REQD). NAIL TO THE CAR SIDEWALL W/16-12d NAILS.
- ⑧ POCKET CLEAT, 2" X 6" X 12" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑦, W/4-16d NAILS.
- ⑨ DIAGONAL BRACE, 2" X 4" X 50-1/4" (4 REQD). SEE THE DETAIL BELOW FOR BEVEL CUTS REQUIRED. TOENAIL TO THE CROSS BAR BRACE, PIECE MARKED ④, AND TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑦, W/2-16d NAILS AT EACH END.
- ⑩ BACK UP CLEAT, 2" X 6" X 24" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑦, W/8-16d NAILS.
- ⑪ TOP HORIZONTAL PIECE, 2" X 6" X CAR WIDTH (CUT-TO-FIT) (1 REQD). SEE THE "HORIZONTAL PIECE" DETAIL ON PAGE 9. NAIL TO THE CROSS CAR BRACE, PIECE MARKED ④, W/1-12d NAIL EVERY 6".
- ⑫ HOLD DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDE WALL W/5-10d NAILS.

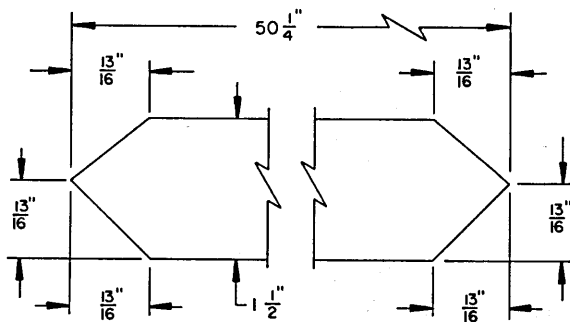
SPECIAL NOTES:

- 1. A 9'-2" WIDE CONVENTIONAL BOX CAR IS SHOWN WITH TYPE "A" K-BRACE. OTHER WOOD LINED BOX CARS OF OTHER WIDTHS CAN BE USED.
- 2. WHEN USING TYPE "A", "B", OR "C" K-BRACES AS TYPICALLY DEPICTED ABOVE, A THREE HIGH SEPARATOR GATE "A" WILL BE USED WHERE NECESSARY. UPPER AND LOWER UNITIZING STRAPS, SEALS, SIDE BLOCKING, AND ANTI-CHAFFING MATERIAL ARE REQUIRED. REFER TO PAGES 4 AND 5 FOR THESE REQUIREMENTS.
- 3. THE K BRACE METHOD OF PARTIAL LAYER (TIER) BRACING SHOWN MAY BE USED IN WOOD LINED CARS FOR THE SECUREMENT OF A PARTIAL TOP TIER, BE IT A SECOND TIER, THIRD TIER, OR FIRST. THE TYPE "A" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER OF NOT MORE THAN 8,000 POUNDS. IF IT IS NECESSARY TO BLOCK A HEAVIER LOAD, REFER TO THE DETAILS ON PAGES 12 AND 13 FOR SELECTION OF THE APPLICABLY SIZED K BRACE TO USE AND THE DESIGN SPECIFICATIONS FOR THE BRACE.

(CONTINUED AT RIGHT)

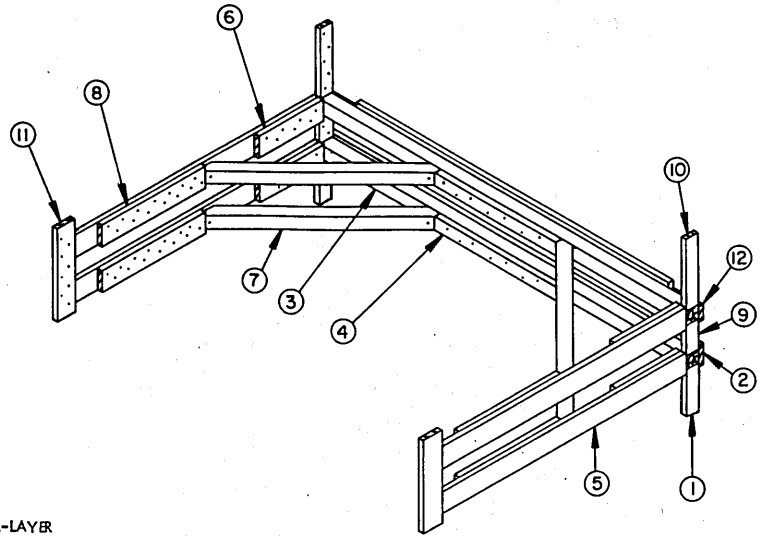
(SPECIAL NOTES CONTINUED)

- 4. CAUTION: SOME CARS ARE NOT LISTED 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, ⑥, 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 POCKET CLEATS MARKED ⑧ MUST BE DOUBLED, WITH THE DELETION OF THE POCKET CLEATS, PIECE MARKED ⑧, AND EXTENDED FROM THE CROSS CAR BRACE, PIECE MARKED ④, ACROSS THE DOORWAY AREA FAR ENOUGH TO ALLOW A MINIMUM OF 60" OF NAILABLE SURFACE AREA. NAIL WITH 16d NAILS EVERY 6" CLINCHING NAILS WHICH ARE EXPOSED IN THE DOORWAY AREA. NOTE THE DIAGONAL BRACE WILL BE 49-1/8" IN LIEU OF 50-1/4" WHEN PIECE MARKED ⑦ IS DOUBLED. SEE GENERAL NOTE "J" ON PAGE 2.
- 5. 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.
- 6. ADJUST LENGTH OF SPACER CLEAT, PIECE MARKED ⑥, SO AS TO ALLOW UPPER EDGE OF PIECE MARKED ⑪ TO BE IN LINE WITH THE TOP OF THE CONTAINER.



DIAGONAL BRACE

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



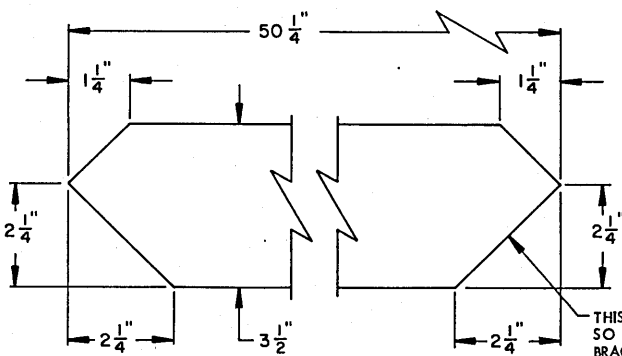
ISOMETRIC VIEW

SPECIAL NOTES:

1. THE TYPE "B" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL-LAYER (TIER) OF NOT MORE THAN 14,000 POUNDS. IF IT IS NECESSARY TO BLOCK A HEAVIER LOAD, REFER TO TYPE "C" K-BRACE ON PAGE 13. IF THE PARTIAL TIER TO BE BRACED WEIGHS 8,000 POUNDS OR LESS, THE TYPE "A" K-BRACE DEPICTED ON PAGE 11 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, ④, ⑤, ⑥, ⑦, ⑧, ⑨, ⑩, ⑪, AND ⑫ MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDEWALL. IT IS ALRIGHT FOR THE ENDS OF THE DIAGONAL BRACES MARKED ⑦ TO BEAR IN FRONT OF A DOOR OPENING, HOWEVER, THE ADJACENT PIECE MARKED ⑤ MUST BE DOUBLED, WITH THE DELETION OF THE POCKET CLEATS, PIECE MARKED ⑥, AND EXTENDED FROM THE CROSS CAR BRACE, PIECE MARKED ③, ACROSS THE DOORWAY AREA FAR ENOUGH TO ALLOW A MINIMUM OF 54" OF NAILABLE SURFACE AREA. NAIL WITH 16d NAILS EVERY 6" CLINCHING NAILS WHICH ARE EXPOSED IN THE DOORWAY AREA. NOTE THE DIAGONAL BRACE WILL BE 49-1/8" LONG IN LIEU OF 50-1/4" WHEN PIECE MARKED ⑤ IS DOUBLED. SEE GENERAL NOTE "J" ON PAGE 2.
3. THE CENTER CLEAT SHOWN AS PIECE MARKED ④ WILL BE 28" LONG FOR AN 8'-6" WIDE CAR, 36" LONG FOR A 9'-2" AND 38" LONG FOR A 9'-4" WIDE CAR. ADJUST THE LENGTH PROPORTIONATELY FOR CARS OF OTHER WIDTHS.
4. REFER TO PAGE 11 FOR A TYPICAL INSTALLATION OF THE K-BRACES.
5. ADJUST LENGTH OF SPACER CLEAT, PIECE MARKED ⑨, SO AS TO ALLOW UPPER EDGE OF PIECE MARKED ⑫ TO BE IN LINE WITH THE TOP OF THE CONTAINER.

KEY NUMBERS

- ① SUPPORT CLEAT, 2" X 4" X 12" (2 REQD). NAIL TO THE CAR SIDEWALL W/4-12d NAILS. POSITION SO AS TO CENTER PIECES MARKED ② AND ③ BETWEEN THE CONTAINER LATCHES AND TIEDOWN RINGS.
- ② BOTTOM HORIZONTAL PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT) (1 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6". NOTCH TO FIT. SEE GENERAL NOTE "J" ON PAGE 2.
- ③ CROSS CAR BRACE, 4" X 4" X 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 CUT-TO-FIT (REF: 11-3/4") (2 REQD). NAIL TO THE CAR SIDEWALL W/3-12d NAILS. SEE SPECIAL NOTE 5 AT LEFT.
- ⑩ HOLD DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ⑪ VERTICAL BACK-UP CLEAT, 2" X 6" BY UNIT HEIGHT (2 REQD). NAIL TO THE CAR SIDEWALL W/8-12d NAILS.
- ⑫ TOP HORIZONTAL PIECE, 2" X 6" X CAR WIDTH (CUT TO FIT) (1 REQD). SEE "HORIZONTAL PIECE" DETAIL ON PAGE 9. NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6". SEE GENERAL NOTE "J" ON PAGE 2.

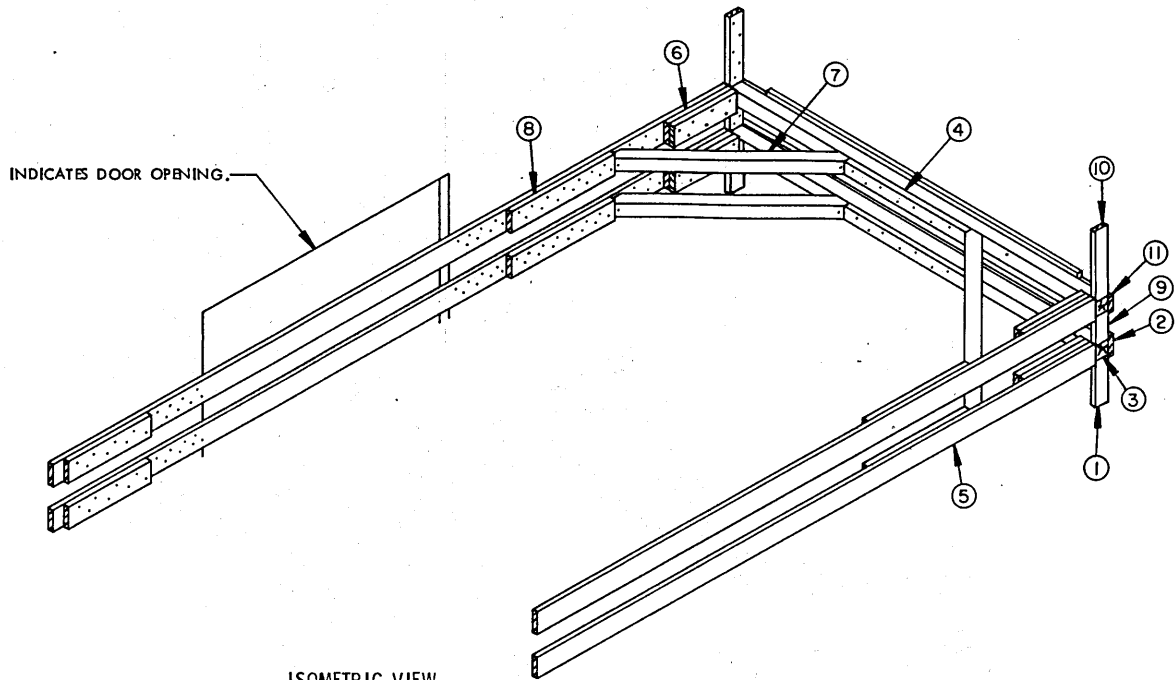


DIAGONAL BRACE

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 THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤.

TYPE "B" K-BRACE



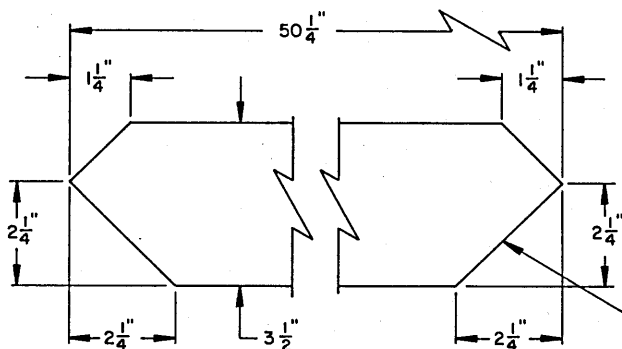
ISOMETRIC VIEW

SPECIAL NOTES:

1. THE TYPE "C" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL LAYER (TIER) OF NOT MORE THAN 20,000 POUNDS. IF THE PARTIAL LAYER IS NO MORE THAN 14,000 POUNDS USE TYPE "B" K-BRACE ON PAGE 12. LIKEWISE IF THE TOTAL WEIGHT OF THE PARTIAL LAYER DOES NOT EXCEED 8,000 POUNDS TYPE "A" K-BRACE SHOULD BE USED WHICH IS DEPICTED ON PAGE 11.
2. **CAUTION:** SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL-LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL TIER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ①, ②, ③, ④, ⑤, ⑥, ⑦, ⑧, ⑨, ⑩, AND ⑪ MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDEWALL. IT IS ALRIGHT FOR THE ENDS OF THE DIAGONAL BRACES MARKED ⑦ TO BEAR IN FRONT OF A DOOR OPENING. HOWEVER, THE ADJACENT PIECE MARKED ⑤ MUST BE DOUBLED WITH THE DELETION OF THE POCKET CLEATS, PIECE MARKED ⑥, AND LAMINATED TOGETHER W/16d NAILS EVERY 6", WITH THE NAILS IN THE DOORWAY AREA BEING CLINCHED. NOTE THAT THE DIAGONAL BRACE WILL BE 49-1/8" LONG IN LIEU OF 50-1/4" WHEN PIECE MARKED ⑤ IS DOUBLED. SEE GENERAL NOTE "J" ON PAGE 2.
3. THE CENTER CLEAT, SHOWN AS PIECE MARKED ④, WILL BE 28" LONG FOR AN 8'-6" WIDE CAR, 36" LONG FOR A 9'-2", AND 38" LONG FOR A 9'-4" WIDE CAR. ADJUST THE LENGTH PROPORTIONATELY FOR CARS OF OTHER WIDTHS.
4. **CAUTION:** A TYPE "C" K-BRACE MUST BE USED IN BOTH ENDS OF THE CAR, THE BRACE IS NOT DESIGNED FOR USE IN ONLY ONE END. NOTE THAT EXCEPT FOR PIECES MARKED ⑤, THE QUANTITIES SPECIFIED ARE APPLICABLE ONLY FOR THE BRACE IN ONE END.
5. ADJUST LENGTH OF SPACER CLEAT, PIECE MARKED ⑨, SO AS TO ALLOW THE UPPER EDGE OF PIECE MARKED ⑪ TO BE IN LINE WITH THE TOP OF THE CONTAINER.

KEY NUMBERS

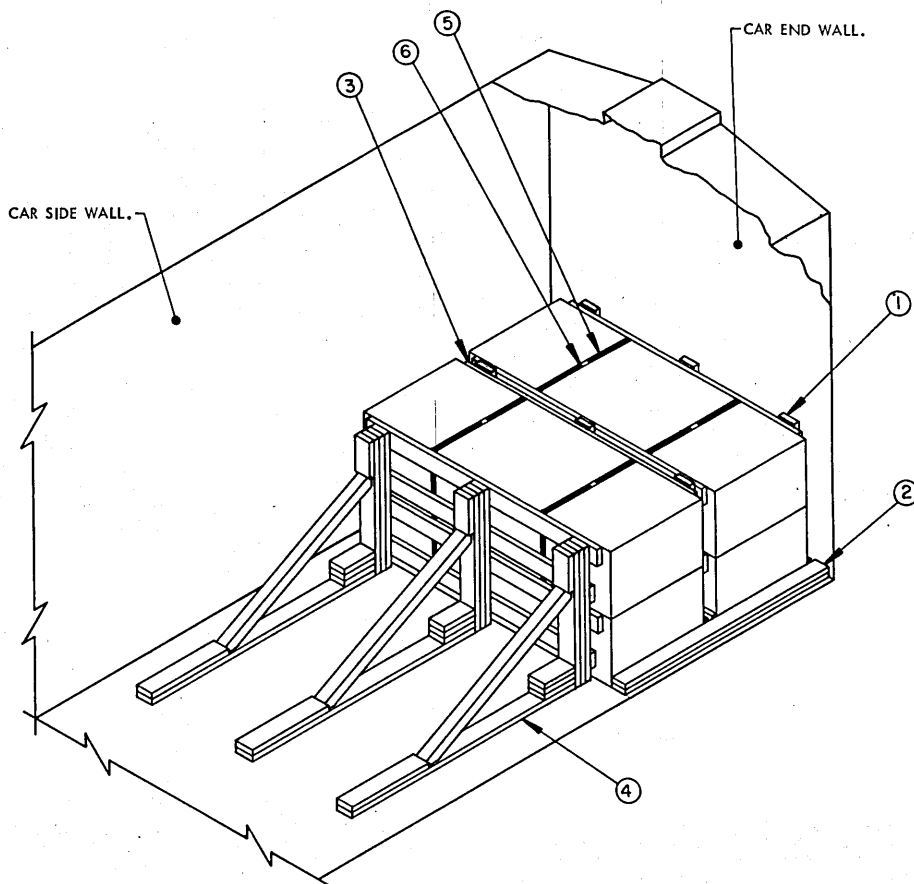
- ① SUPPORT CLEAT, 2" X 4" X 12" (2 REQD). NAIL TO THE CAR SIDEWALL W/4-12d NAILS. POSITION SO AS TO CENTER PIECES MARKED ② AND ③ BETWEEN THE CONTAINER LATCHES AND TIEDOWN RINGS.
- ② BOTTOM HORIZONTAL PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT) (1 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6". NOTCH TO FIT. SEE GENERAL NOTE "J" ON PAGE 2.
- ③ CROSS CAR BRACE, 4" X 4" X 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 OPENINGS TO CONTACT PIECE MARKED ③ OF THE K-BRACE IN THE OPPOSITE END OF THE CAR. NAIL TO THE CAR SIDEWALL W/40-12d NAILS.
- ⑥ POCKET CLEAT, 2" X 6" X 18" (DOUBLED) (4 REQD). NAIL THE FIRST PIECE TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/7-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑦ DIAGONAL BRACE, 4" X 4" X 50-1/4" (4 REQD). SEE THE DETAIL BELOW FOR BEVEL CUTS REQUIRED. TOENAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, AND TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/1-60d NAIL AT EACH END.
- ⑧ BACK-UP CLEAT, 2" X 6" X 30" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/14-16d NAILS.
- ⑨ SPACER CLEAT, 2" X 4" X CUT-TO-FIT (REF: 11-3/4") (2 REQD). NAIL TO THE CAR SIDEWALL W/3-12d NAILS. SEE SPECIAL NOTE 5 AT LEFT.
- ⑩ HOLD DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ⑪ TOP HORIZONTAL PIECE, 2" X 6" X CAR WIDTH (CUT TO FIT) (1 REQD). SEE "HORIZONTAL PIECE" DETAIL ON PAGE 9. NAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, W/1-12d NAIL EVERY 6". SEE GENERAL NOTE "J" ON PAGE 2.



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 "C" K-BRACE



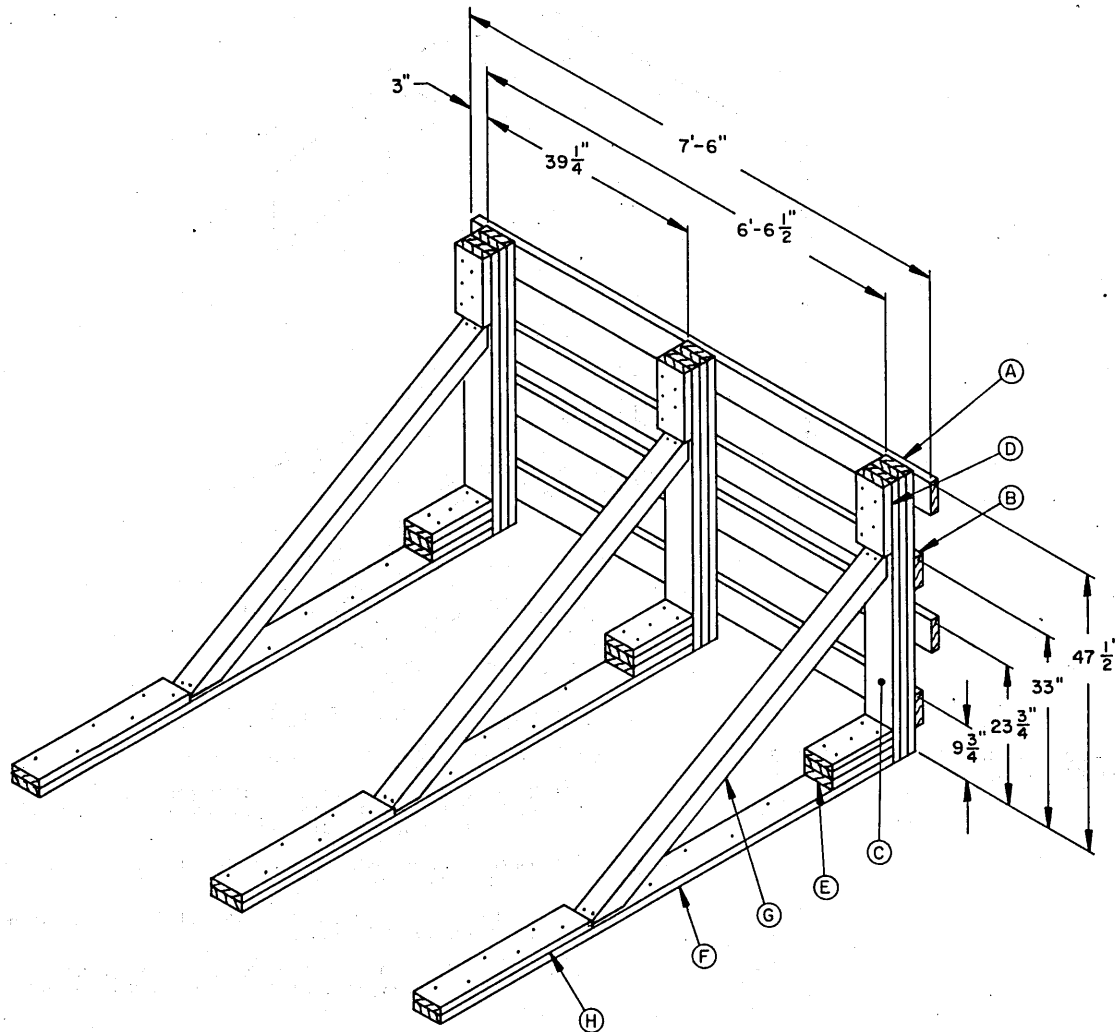
ISOMETRIC VIEW

KEY NUMBERS

SPECIAL NOTES:

1. A FOUR (4) CONTAINER LOAD IS SHOWN IN A 9'-4" WIDE CONVENTIONAL BOX CAR USING THE KNEE BRACE METHOD OF RESTRAINT. OTHER BOX CARS 9'-2" OR WIDER CAN ALSO BE USED.
2. THE TOTAL BRACE ASSEMBLY IS ADEQUATE FOR RETAINING A MAXIMUM LCL OF NOT MORE THAN 12,750 POUNDS.

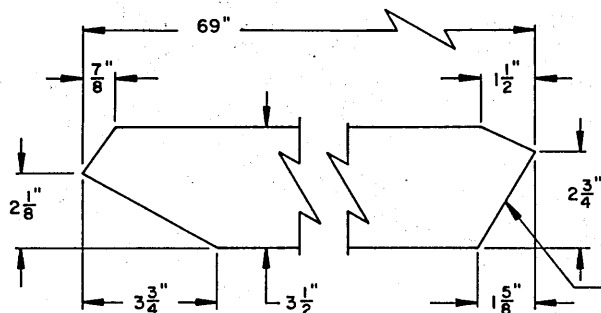
- ① END WALL GATE (1 REQD). SEE THE "END WALL GATE" DETAIL ON PAGE 8. SEE GENERAL NOTES "J" AND "T" ON PAGE 2.
- ② SIDE BLOCKING, 2" X 6" BY LOAD LENGTH (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-1/4" NAIL EVERY 8". LAMINATE THE SECOND PIECE IN A LIKE MANNER.
- ③ SEPARATOR GATE (1 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 8.
- ④ KNEE BRACE ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 15 AND SPECIAL NOTE 2 AT LEFT.
- ⑤ UNITIZING STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT (REF: 15'-0") (4 REQD).
- ⑥ SEAL FOR 1-1/4" STRAPPING (4 REQD, 1 PER STRAP). CRIMP EACH SEAL WITH TWO PAIR OF NOTCHES. SEE GENERAL NOTE "K" ON PAGE 2.



ISOMETRIC VIEW

KEY LETTERS

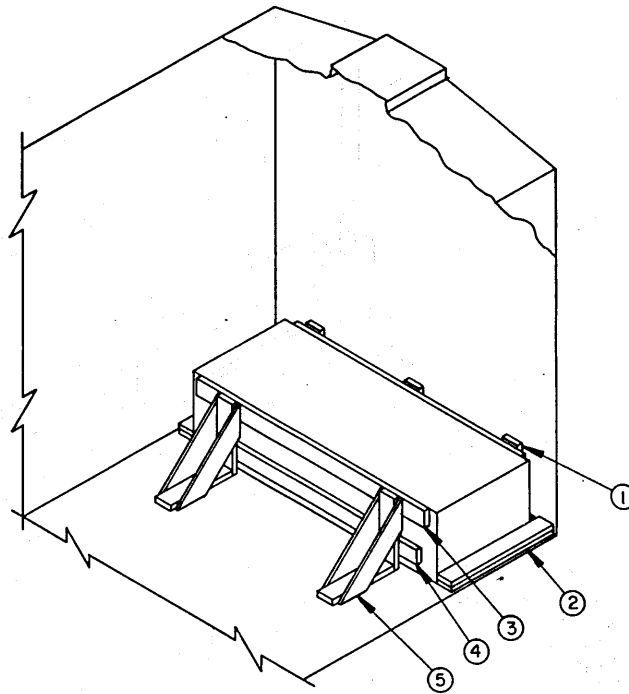
- (A) LONG HORIZONTAL PIECE, 2" X 6" X 7'-6" (2 REQD). NAIL TO PIECE MARKED (C) W/4-10d NAILS AT EACH JOINT.
- (B) SHORT HORIZONTAL PIECE, 2" X 6" X 7'-0" (2 REQD). NAIL TO PIECE MARKED (C) W/4-10d NAILS AT EACH JOINT.
- (C) VERTICAL PIECE, 2" X 6" X 48" (TRIPLED) (3 REQD). LAMINATE TWO PIECES W/1-10d NAIL EVERY 6". LAMINATE THE THIRD PIECE IN A LIKE MANNER.
- (D) HOLD DOWN CLEAT, 2" X 6" X 12" (3 REQD). NAIL TO THE VERTICAL PIECES W/5-16d NAILS.
- (E) POCKET CLEAT, 2" X 6" X 12" (TRIPLED) (3 REQD). NAIL THE FIRST PIECE TO THE FLOOR CLEAT, PIECE MARKED (F), W/5-16d NAILS. NAIL THE SECOND AND THIRD PIECES IN A LIKE MANNER AND TO NAIL THE THIRD PIECE TO THE VERTICAL PIECE MARKED (C) W/2-16d NAILS.
- (F) FLOOR CLEAT, 2" X 6" X 7'-7" (3 REQD). ALIGN WITH THE VERTICAL PIECES MARKED (C) AND NAIL TO THE CAR FLOOR W/1-16d NAIL EVERY 8". SEE GENERAL NOTE "N" ON PAGE 2.
- (G) BRACE, 4" X 4" X 69" (3 REQD). SEE THE DETAIL AT LEFT FOR BEVEL CUTS REQUIRED. TO NAIL TO THE VERTICAL PIECE AND TO THE FLOOR CLEAT, PIECES MARKED (C) AND (F) W/2-16d NAILS AT EACH END.
- (H) BACK UP CLEAT, 2" X 6" X 30" (3 REQD). NAIL TO THE FLOOR CLEAT, PIECE MARKED (F) W/6-40d NAILS.



DIAGONAL BRACE

4" X 4" MATERIAL

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



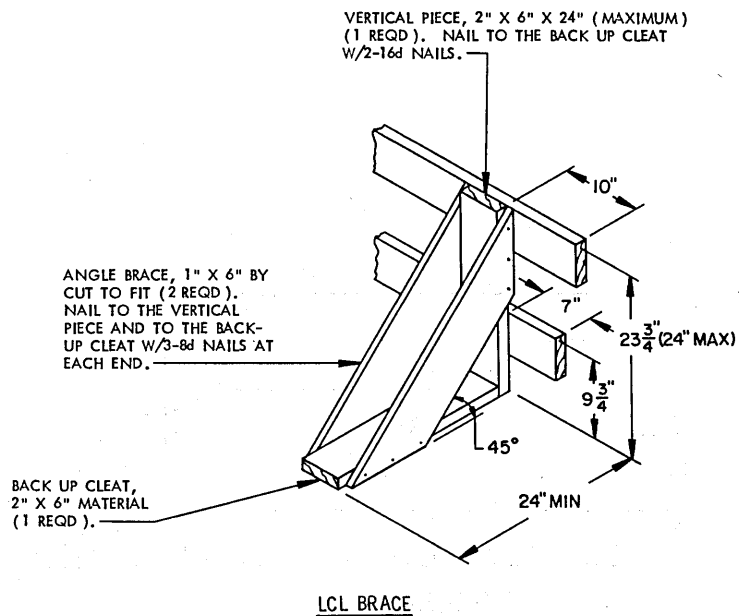
ISOMETRIC VIEW

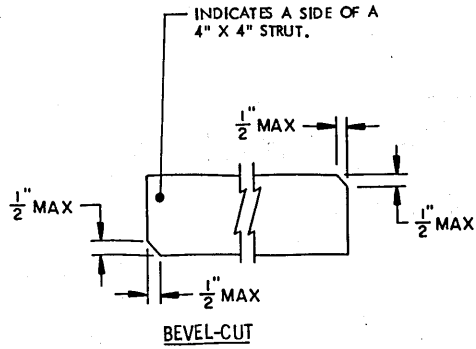
KEY NUMBERS

SPECIAL NOTES:

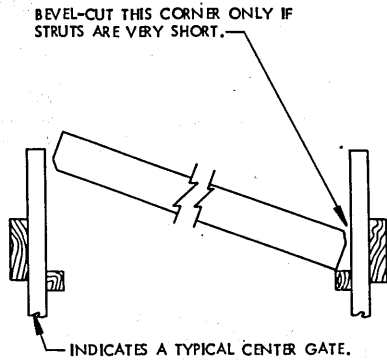
1. EACH LCL BRACE AS APPLIED FOR LONGITUDINAL BRACING WILL RETAIN 2,000 POUNDS OF LADING. A MINIMUM OF TWO (2) BRACES MUST BE USED FOR LONGITUDINAL BRACING.

1. END WALL GATE (1 REQD). SEE THE "END WALL GATE" DETAIL ON PAGE 8.
2. SIDE BLOCKING, 2" X 6" BY LOAD LENGTH (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
3. LONG HORIZONTAL PIECE, 2" X 6" X 7'-6" (1 REQD). NAIL TO THE LCL BRACE W/4-10d NAILS AT EACH JOINT.
4. SHORT HORIZONTAL PIECE, 2" X 6" X 7'-0" (1 REQD). NAIL TO THE LCL BRACE W/4-10d NAILS AT EACH JOINT.
5. LCL BRACE (2 REQD). SEE THE DETAIL BELOW. NAIL TO THE CAR FLOOR W/7-16d NAILS. SEE GENERAL NOTES "J" AND "N" ON PAGE 2 AND SPECIAL NOTE 1 AT LEFT.





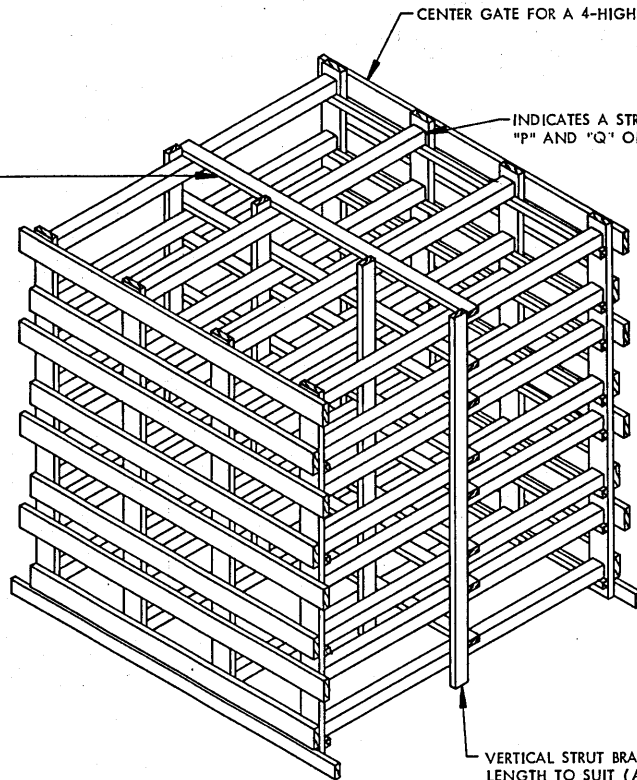
BEVEL-CUT
 BEVEL CUTTING THE STRUTS AS SPECIFIED WILL FACILITATE INSTALLING THE STRUTS WITH A "DRIVE-FIT". **CAUTION:** DO NOT BEVEL A CORNER MORE THAN 1/2".



STRUT INSTALLATION

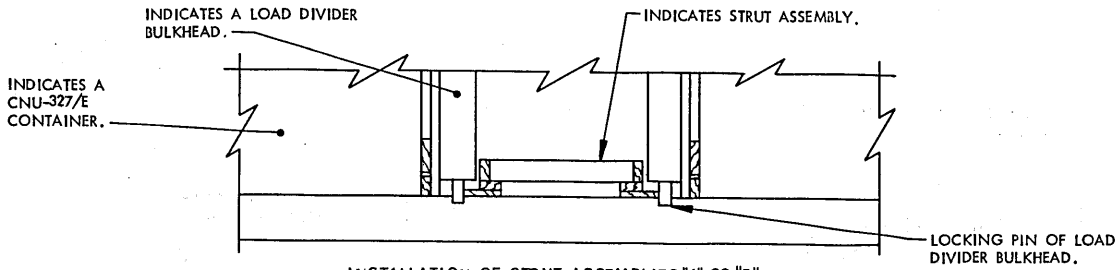
SEE GENERAL NOTE "Q" ON PAGE 2 FOR ADDITIONAL STRUT INSTALLATION GUIDANCE.

HORIZONTAL STRUT BRACING, 2" X 4" X 7'-0" (AS REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.



STRUT BRACING

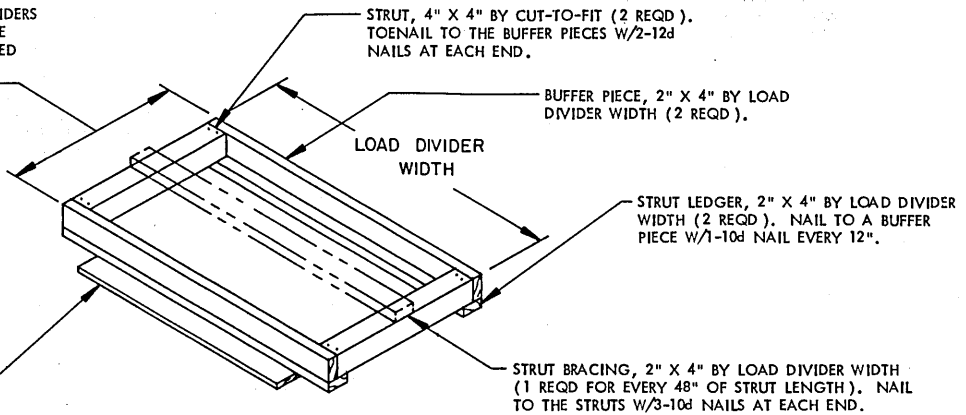
VERTICAL STRUT BRACING, 2" X 4" BY A LENGTH TO SUIT (AS REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.



INSTALLATION OF STRUT ASSEMBLIES "A" OR "B"

THIS VIEW SHOWS THE STRUT ASSEMBLY INSTALLED BETWEEN THE LOAD DIVIDER BULKHEADS. NOTE THE 1/2" TO 3/4" (TOTAL) SPACE INTENTIONALLY PROVIDED BETWEEN THE ASSEMBLY AND THE BULKHEADS.

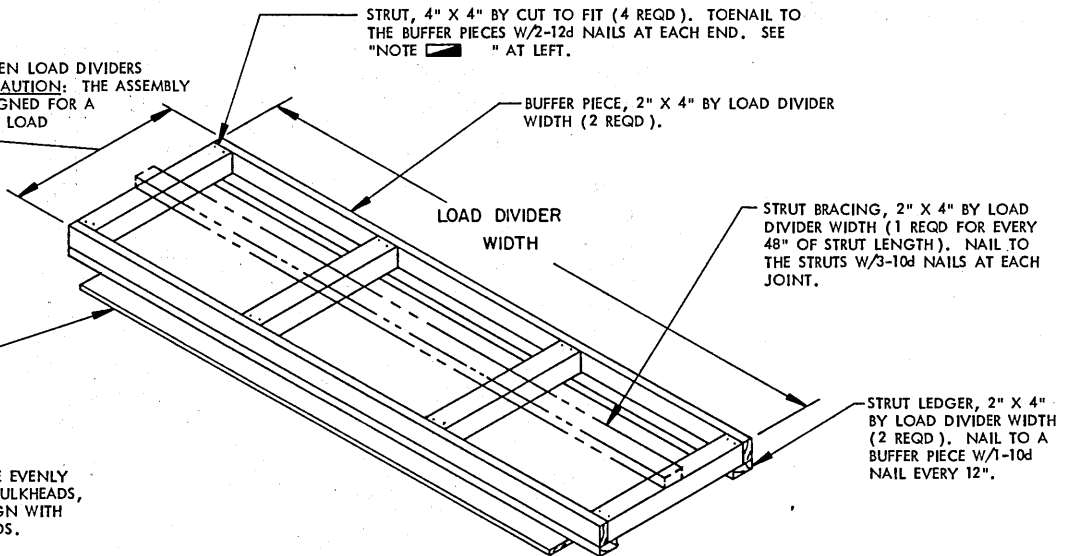
FABRICATE TO FIT BETWEEN LOAD DIVIDERS MINUS 1/2" TO 3/4". CAUTION: THE ASSEMBLY IS INTENTIONALLY DESIGNED FOR A LOOSE FIT BETWEEN THE LOAD DIVIDER BULKHEADS.



STRUT ASSEMBLY "A"

STRUT ASSEMBLY "A" IS DESIGNED FOR USE WITH 2-PIECE BULKHEADS, WITH TWO (2) ASSEMBLIES BEING REQUIRED PER LOAD. SEE GENERAL NOTE "EE" ON PAGE 3.

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



NOTE []:

THE TWO INTERMEDIATE STRUTS ARE TO BE EVENLY SPACED ON THE WIDTH OF THE DIVIDER BULKHEADS, WITH ADJUSTMENTS MADE SO AS TO ALIGN WITH VERTICAL FRAMING WITHIN THE BULKHEADS.

STRUT ASSEMBLY "B"

STRUT ASSEMBLY "B" IS DESIGNED FOR USE WITH 1-PIECE BULKHEADS. SEE GENERAL NOTE "EE" ON PAGE 3.