

APPROVED BY
 BUREAU OF EXPLOSIVES,
A. J. Brasomuck
 MILITARY ASSISTANT
 DATE *10/30/69*

LOADING & BRACING (CL & LCL) IN BOX CARS OF CBU ITEMS PACKED IN THE CNU-81/E CONTAINER

INDEX

ITEM	PAGE(S)
GENERAL NOTES, AND MATERIAL SPECIFICATIONS-----	2
DETAIL OF THE CNU-81/E CONTAINER-----	3
LOADS FOR CONVENTIONAL BOX CARS:	
684-UNIT LOAD IN A 40'-6" LONG BY 8'-6" WIDE BOX CAR-----	4,5
681-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR-----	6,7
TYPICAL LCL (29-UNIT LOAD) IN A 9'-2" WIDE BOX CAR-----	8
TYPICAL LCL (9-UNIT LOAD) IN AN 8'-6" WIDE BOX CAR-----	9
DETAILS-----	10-13
LOADS FOR BOX CARS EQUIPPED WITH MECHANICAL BRACING DEVICES:	
684-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR-----	14,15
TYPICAL LCL (5-UNIT LOAD) IN A 9'-2" WIDE BOX CAR-----	16
TYPICAL LCL (87-UNIT LOAD) IN A 9'-2" WIDE BOX CAR-----	17

INCLUDES PROCEDURES FOR CONVENTIONAL BOX CARS AND BOX CARS EQUIPPED WITH MECHANICAL BRACING DEVICES OF VARIOUS DESIGN AND MANUFACTURE.

DRAFTER <i>LAS/68E</i>	PROJ ENG <i>GRP/100W</i>	APSA <i>11/10/69</i>	SUBMITTED
CHECKED <i>11/1/69</i>	ENG ASST <i>John Boyd</i>		<i>W. B. Harding, Col</i> COMMANDING OFFICER, SAVANNAH ARMY DEPOT
REVISIONS			EXAMINED AND APPROVED <i>William J. Martin</i> AMMUNITION PROCUREMENT & SUPPLY AGENCY
			APPROVED BY ORDER OF COMMANDING GENERAL U. S. ARMY MATERIEL COMMAND <i>Paul Klein</i>
			U. S. ARMY MATERIEL COMMAND
			JUNE 1970
			CLASS DIVISION DRAWING FILE
			19 48 7051 SP5BI

DO NOT SCALE

GENERAL NOTES

(GENERAL NOTES CONTINUED)

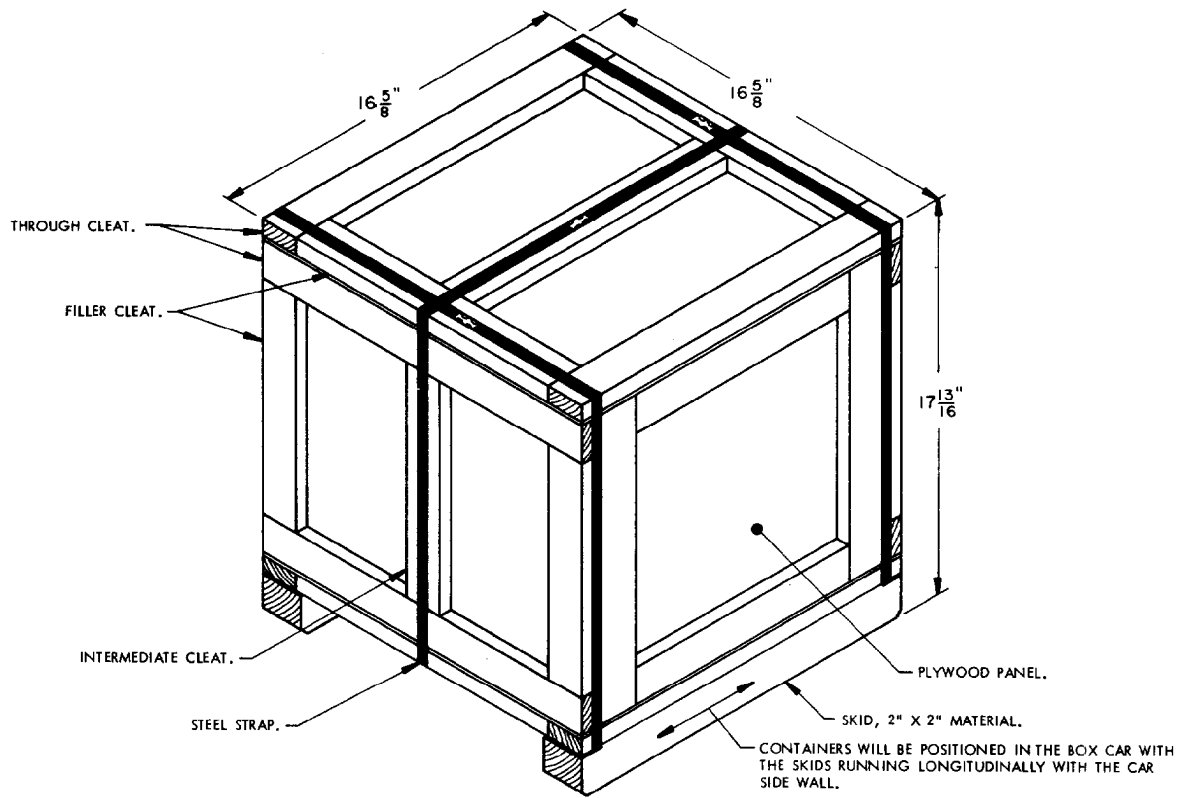
- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AMCR 740-13, AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE OUTLOADING PROCEDURES SPECIFIED HEREIN ARE APPLICABLE TO CBU ITEMS WHEN THEY ARE PACKED IN THE CNU-81/E CONTAINER. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE CNU-81/E CONTAINER WITH CONTENTS.
- C. FOR DETAILS OF THE CONTAINER, SEE DRAWING NO. 8887968 AND "CONTAINER DETAIL" VIEW ON PAGE 3.
- CONTAINER DIMENSIONS ---- 16-5/8" LONG X 16-5/8" WIDE X 17-13/16" HIGH.
GROSS WEIGHT ----- 175 POUNDS (APPROX).
- D. THE LOADS AS SHOWN HEREIN ARE BASED ON CONVENTIONAL BOX CARS, OR ARE BASED ON BOX CARS EQUIPPED WITH MECHANICAL BRACING DEVICES HAVING ADJUSTABLE AND/OR FIXED WALL MEMBERS. NOTE: ALL METAL CARS CAN BE USED FOR THE LOADS DELINEATED ON PAGES 4 THROUGH 7. THE CAR BEING USED FOR PROCEDURES SHOWN ON PAGE 9 MUST HAVE NAILABLE FLOORS. ALL METAL CARS CAN NOT BE USED FOR LOADS REQUIRING A K-BRACE TYPE OF PARTIAL LAYER BLOCKING AS DEPICTED ON PAGE 8.
- E. THE OUTLOADING PROCEDURES SPECIFIED ON PAGES 14 THROUGH 17 ARE FOR 50'-6" LONG BY 9'-2" WIDE BOX CARS WHICH ARE EQUIPPED WITH MECHANICAL BRACING DEVICES, AND THE PROCEDURES MAY BE ADAPTED AS REQUIRED TO FACILITATE THE USE OF BOX CARS EQUIPPED WITH VARIOUS TYPES OF SELF-CONTAINED MECHANICAL BRACING DEVICES. HOWEVER, FIXED OR ADJUSTABLE WALL MEMBERS AND DOORWAY MEMBERS WITHIN THESE CARS MUST PROVIDE FOR THE INSTALLATION OF LOAD BLOCKING CROSS MEMBERS AT THE HEIGHTS SPECIFIED HEREIN. CAUTION: BOX CARS EQUIPPED WITH MEMBERS WHICH DO NOT MEET THE LOCATION REQUIREMENTS MUST NOT BE USED. NARROWER OR WIDER CARS CAN BE USED.
1. A CROSS MEMBER, WHEN USED AS SPECIFIED BY ANY ONE OF THE OUTLOADING METHODS CONTAINED HEREIN, WILL NOT BE RELIED UPON TO RETAIN MORE LADING WEIGHT ON EITHER SIDE THAN AS SHOWN FOR THE SPECIFIC OUTLOADING METHOD BEING USED. 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 PERMITS. 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 CROSS 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 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 SHIPMENT.
 3. IF A CAR HAS A "BOWED END", RATHER THAN SQUARING OFF THE END BY INSTALLING DUNNAGE, ADDITIONAL CROSS MEMBERS CAN BE INSTALLED NEAR THE END OF THE CAR TO PROVIDE A "SQUARED" END. THESE CROSS MEMBERS SHOULD BE INSTALLED IN THE SAME QUANTITY AND AT THE SAME HEIGHTS AS THE CROSS MEMBERS USED THROUGHOUT THE LOAD AS LOAD BLOCKING NUMBERS.
- F. THE LOADS AS SHOWN ARE BASED ON CARS WHICH HAVE CONVENTIONAL SLIDING TYPE DOORS. THE DEPICTED OUTLOADING PROCEDURES ARE ALSO APPLICABLE TO CARS WHICH ARE EQUIPPED WITH PLUG DOORS. CAUTION: DUNNAGE MATERIAL MUST NOT BE NAILED TO ANY PLUG DOOR, WHETHER AUXILIARY OR MAIN, EXCEPT TO A NAILING STRIP IF A DOOR IS SO EQUIPPED, FOR SECURING SUCH ITEMS AS GATE HOLD DOWNS OR DOORWAY SPANNER DUNNAGE; ALSO, THE SPECIAL PROVISIONS MUST BE IMPLEMENTED AS DIRECTED WITHIN THE "SPECIAL NOTES" SECTION WHICH APPLIES TO THE BASIC LOAD INVOLVED. ALTHOUGH THE DEPICTED DOORS HAVE BEEN SHOWN AS 6'-0" WIDE "THROUGH DOORS", STAGGERED DOOR CONFIGURATIONS ARE ALSO PERMITTED IF THE SPECIAL PROVISIONS AS SPECIFIED HEREIN ARE APPLIED. 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 THROUGH THE HOLES IN THE DOOR LATCH ASSEMBLY ONE OR MORE TIMES, AND THE WIRE ENDS WILL BE TWISTED TOGETHER.
- G. 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 DESIGNATED ITEM.
- H. THE OUTLOADING PROCEDURES SPECIFIED HEREIN CAN ALSO BE UTILIZED FOR THE SHIPMENT OF THE DEPICTED CONTAINERS WHEN THEY ARE LOADED WITH EMPTY ITEMS OR WITH AN ITEM WHICH IS IDENTIFIED DIFFERENTLY BY NOMENCLATURE THAN THE ITEM DESIGNATED WITHIN THE DRAWING TITLE.
- J. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN THE CARS WHICH ARE PARTIALLY LOADED WITH THE DESIGNATED ITEM, PROVIDING THE 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.
- K. DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE, 1" X 4" MATERIAL IS ACTUALLY 3/4" THICK BY 3-5/8" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-5/8" THICK BY 5-5/8" WIDE.
- 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 VIEWS FOR CLARITY PURPOSES.
- M. NOTICE: A STAGGERED NAILING PATTERN WILL BE USED WHEREVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINT OF DUNNAGE ASSEMBLIES. ALSO, A STAGGERED NAILING PATTERN WILL BE USED WHEN DUNNAGE IS NAILED TO THE SIDE WALL OF THE TRANSPORTING VEHICLE, OR WHEN LAMINATING DUNNAGE. ADDITIONALLY, THE NAILING PATTERN FOR ONE 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 ANOTHER PIECE.
- 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 SIDE WALL 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.
- O. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO DEPICTED OUTLOADING METHODS.

(CONTINUED AT RIGHT)

MATERIAL SPECIFICATIONS

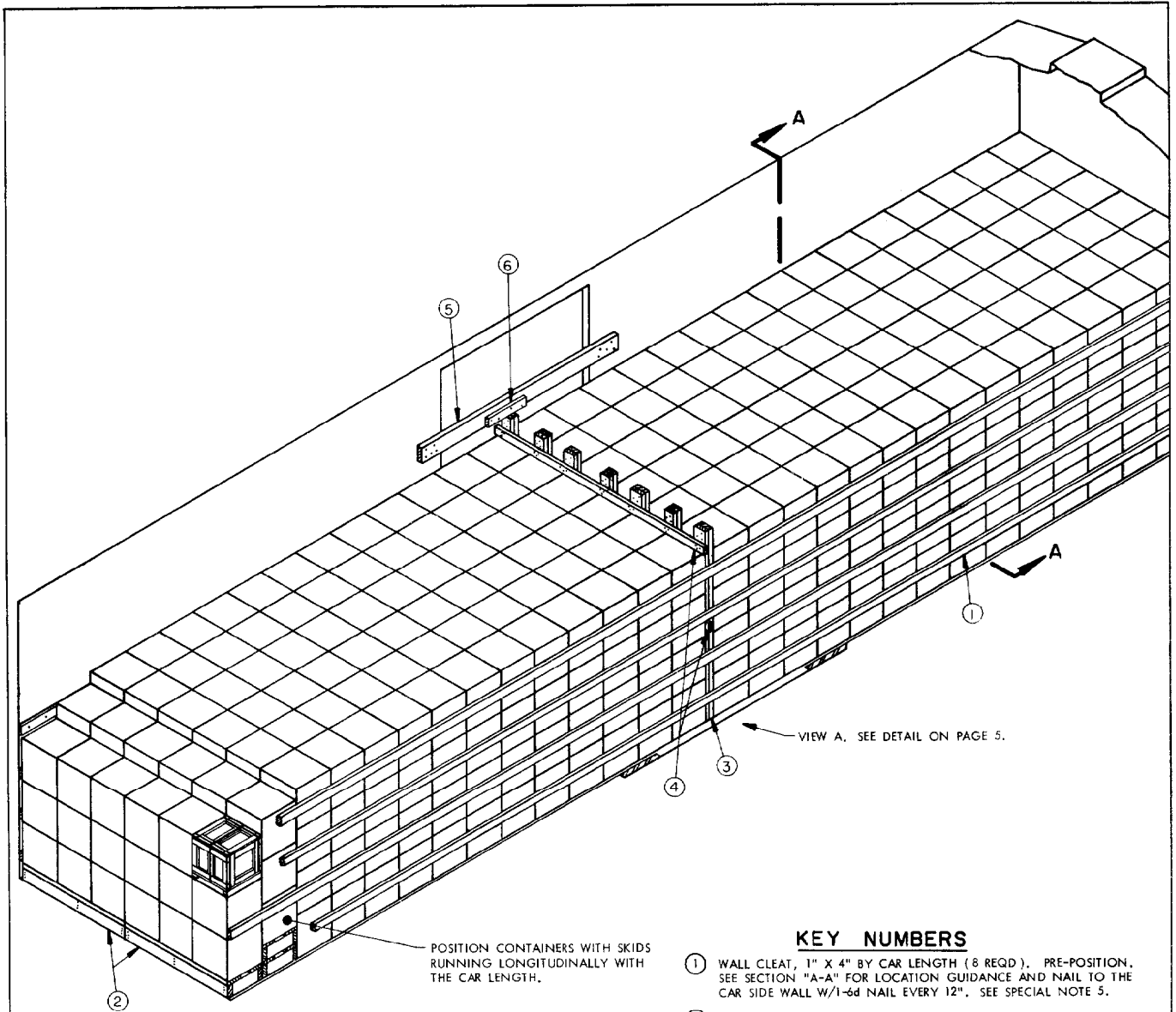
LUMBER: SEE TM 743-200-1, DUNNAGE LUMBER; FED SPEC MM-L-751.

NAILS: COMMON, CEMENT COATED OR CHEMICALLY ETCHED,
FED SPEC FF-N-105.
ALT: ANNULAR-RING TYPE NAIL OF THE SAME SIZE.



CONTAINER DETAIL

GROSS WEIGHT ----- 175 POUNDS (APPROX)
 CUBE ----- 2.85 CUBIC FEET.



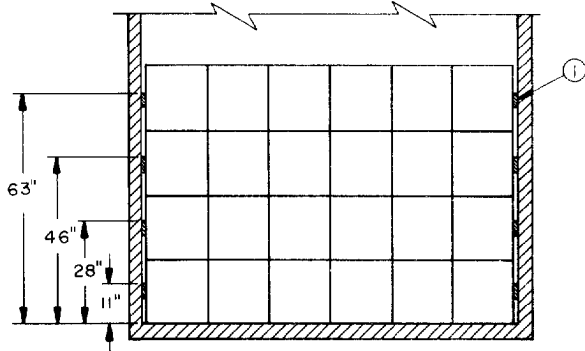
POSITION CONTAINERS WITH SKIDS
RUNNING LONGITUDINALLY WITH
THE CAR LENGTH.

VIEW A. SEE DETAIL ON PAGE 5.

ISOMETRIC VIEW

KEY NUMBERS

- ① WALL CLEAT, 1" X 4" BY CAR LENGTH (8 REQD). PRE-POSITION. SEE SECTION "A-A" FOR LOCATION GUIDANCE AND NAIL TO THE CAR SIDE WALL W/1-6d NAIL EVERY 12". SEE SPECIAL NOTE 5.
- ② FILLER/RISER ASSEMBLY (6 REQD). SEE "FILLER/RISER ASSEMBLY" DETAIL AND "NOTE * " ON PAGE 11.
- ③ SOLID FILL, 4" WIDE MATERIAL BY LENGTH TO EXTEND 9" ABOVE THE LADING BY THICKNESS REQUIRED (REQUIRED AT 7 LOCATIONS). LAMINATE W/6-10d NAILS. SEE GENERAL NOTE "M" ON PAGE 2 AND SPECIAL NOTE 4 ON PAGE 5.
- ④ SOLID FILL RETAINER, 2" X 4" BY CAR WIDTH (2 REQD). NAIL TO SOLID FILL, PIECE MARKED ③, W/3-10d NAILS AT EACH JOINT.
- ⑤ GATE HOLD DOWN, 2" X 6" BY DOOR OPENING PLUS 24" (2 REQD). NAIL TO THE CAR SIDE WALL W/5-10d NAILS AT EACH END.
- ⑥ HOLD-DOWN BLOCK, 2" X 4" X 18" (2 REQD). CENTER ABOVE SOLID FILL, PIECE MARKED ③ AND NAIL TO THE GATE HOLD DOWN, PIECE MARKED ⑤, W/4-10d NAILS.

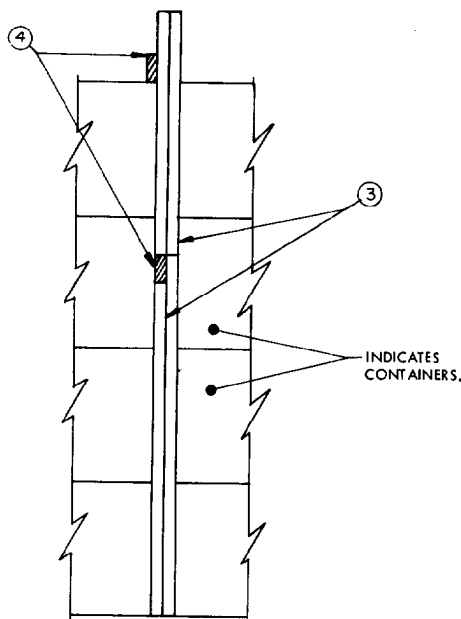


SECTION A-A

684-UNIT LOAD IN A 40'-6" LONG BY 8'-6" WIDE BOX CAR

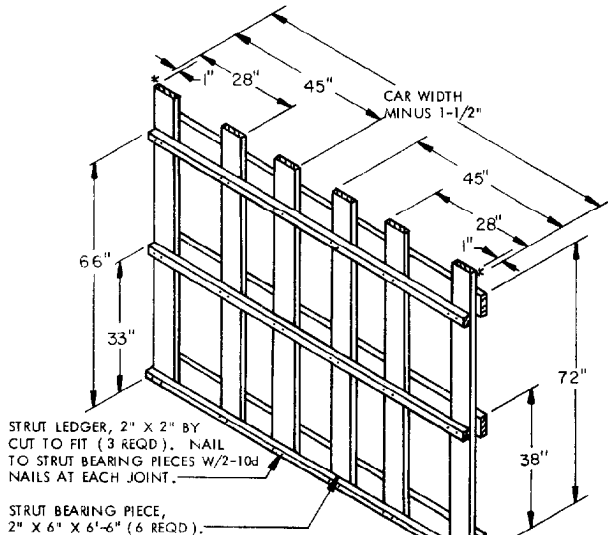
SPECIAL NOTES:

1. A 684-UNIT LOAD IS SHOWN IN A 40'-6" LONG BY 8'-6" WIDE CONVENTIONAL BOX CAR EQUIPPED WITH 6'-0" DOOR OPENINGS. OTHER SIZE CARS WITH DOOR OPENINGS GREATER THAN 6'-0" MAY BE USED. THIS LOADING PROCEDURE IS ALSO APPLICABLE TO CARS EQUIPPED WITH PLUG DOORS. SEE GENERAL NOTE "F" ON PAGE 2.
2. IF THE CAR BEING USED FOR THE SHIPMENT OF THE DEPICTED LOAD HAS ALL-METAL SIDE WALLS, AN ASSEMBLY MUST BE INSTALLED BETWEEN ROWS OF CONTAINERS TO FILL THE EXCESS LATERAL SPACE, AS IS DONE IN THE LOAD ON PAGE 6. SEE THE "ALT SIDE BLOCKING ASSEMBLY" DETAIL ON PAGE 13. ADDITIONALLY, DOORWAY PROTECTION AS DETAILED ON PAGE 13 WILL BE REQUIRED.
3. THE "FILLER/RISER ASSEMBLIES" SPECIFIED FOR THE DEPICTED LOAD SHOWS A TYPICAL APPLICATION. TO ADJUST A LOAD QUANTITY, THE LENGTH OF THE "FILLER/RISER ASSEMBLIES" MAY BE ADJUSTED, AND/OR THE ASSEMBLIES MAY BE RELOCATED AS THE SIZE OF THE BOX CAR AND/OR THE NUMBER OF CONTAINERS TO BE SHIPPED VARIES.
4. IF IT IS DESIRED, A CENTER GATE-STRUT TYPE OF BLOCKING CAN BE USED AT THE CENTER OF THE CAR IN LIEU OF THE SOLID FILL TYPE OF BLOCKING AS SHOWN IN THE ISOMETRIC VIEW ON PAGE 4. SEE THE "CENTER GATE" AND "ALTERNATIVE CENTER BLOCKING" DETAILS BELOW FOR APPLICABLE SPECIFICATIONS. ADDITIONALLY, DELETE SOLID FILL AND SOLID FILL RETAINER, PIECES MARKED (3) AND (4). HOLD-DOWN BLOCK, PIECE MARKED (6), MUST BE DOUBLED AND THE QUANTITY MUST BE INCREASED TO FOUR (4) REQUIRED. CENTER A DOUBLED HOLD-DOWN BLOCK OVER EACH OF THE OUTSIDE VERTICAL STRUT BEARING PIECES OF EACH CENTER GATE. AN EIGHTEEN (18) TRIPLED 2" X 6" STRUT CONFIGURATION AS SHOWN IS ADEQUATE FOR RETAINING A LOAD NOT GREATER THAN 123,000 POUNDS. THE CENTER GATE IS DESIGNED FOR A FOUR (4) CONTAINER HIGH LOAD. SEE GENERAL NOTE "M" ON PAGE 2.
5. THE CAR LENGTH WALL CLEATS ON THE SIDE OPPOSITE THE LOADING SIDE OF THE CAR, AND THE WALL CLEATS ON THE LOADING SIDE WITH THE EXCEPTION OF THOSE WHICH SPAN THE DOOR OPENING, MAY BE APPLIED BEFORE LOADING COMMENCES. THE WALL CLEATS WHICH SPAN THE DOOR OPENING ON THE LOADING SIDE OF THE CAR SHOULD BE APPLIED FOR EACH LAYER JUST PRIOR TO PLACEMENT OF THE CONTAINERS IN THAT LAYER WITHIN THE DOORWAY AREA.



VIEW A

THIS VIEW SHOWS THE PROCEDURES FOR INSTALLING THE CENTER BLOCKING IN TWO SECTIONS WHEN A SHIPMENT OF FOUR (4) LAYERS OF CONTAINERS IS DESIRED. LOAD THE CAR EXCEPT FOR 12 CONTAINERS THAT ARE TO BE LOADED INTO THE THIRD AND FOURTH LAYERS ON ONE SIDE OF THE BLOCKING LOCATION. INSTALL THE LOWER SECTION OF THE CENTER BLOCKING (SOLID FILL). LOAD THE LAST 12 CONTAINERS INTO PLACE. INSTALL THE TOP SECTION OF THE CENTER BLOCKING. WHEN SHIPPING A TWO (2) OR THREE (3) LAYER LOAD, THE LOWER "SOLID FILL RETAINER" PIECE MARKED (4) MAY BE DELETED AND THE "SOLID FILL" PIECE MARKED (3) WILL BE INSTALLED IN ONE PIECE.



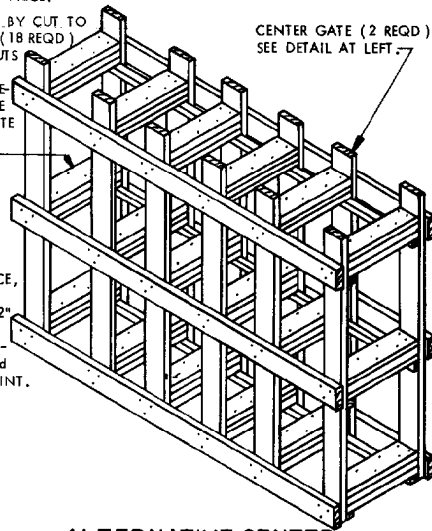
STRUT LEDGER, 2" X 2" BY CUT TO FIT (3 REQD). NAIL TO STRUT BEARING PIECES W/2-10d NAILS AT EACH JOINT.

STRUT BEARING PIECE, 2" X 6" X 6'-6" (6 REQD).

CENTER GATE
SEE SPECIAL NOTE 4 ABOVE.

STRUT, 2" X 6" BY CUT TO FIT (TRIPLED) (18 REQD)
LAMINATE STRUTS
W/1-10d NAIL EVERY 6". TOE NAIL TOP PIECE TO CENTER GATE W/2-12d NAILS AT EACH END.

CENTER GATE (2 REQD). SEE DETAIL AT LEFT.



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

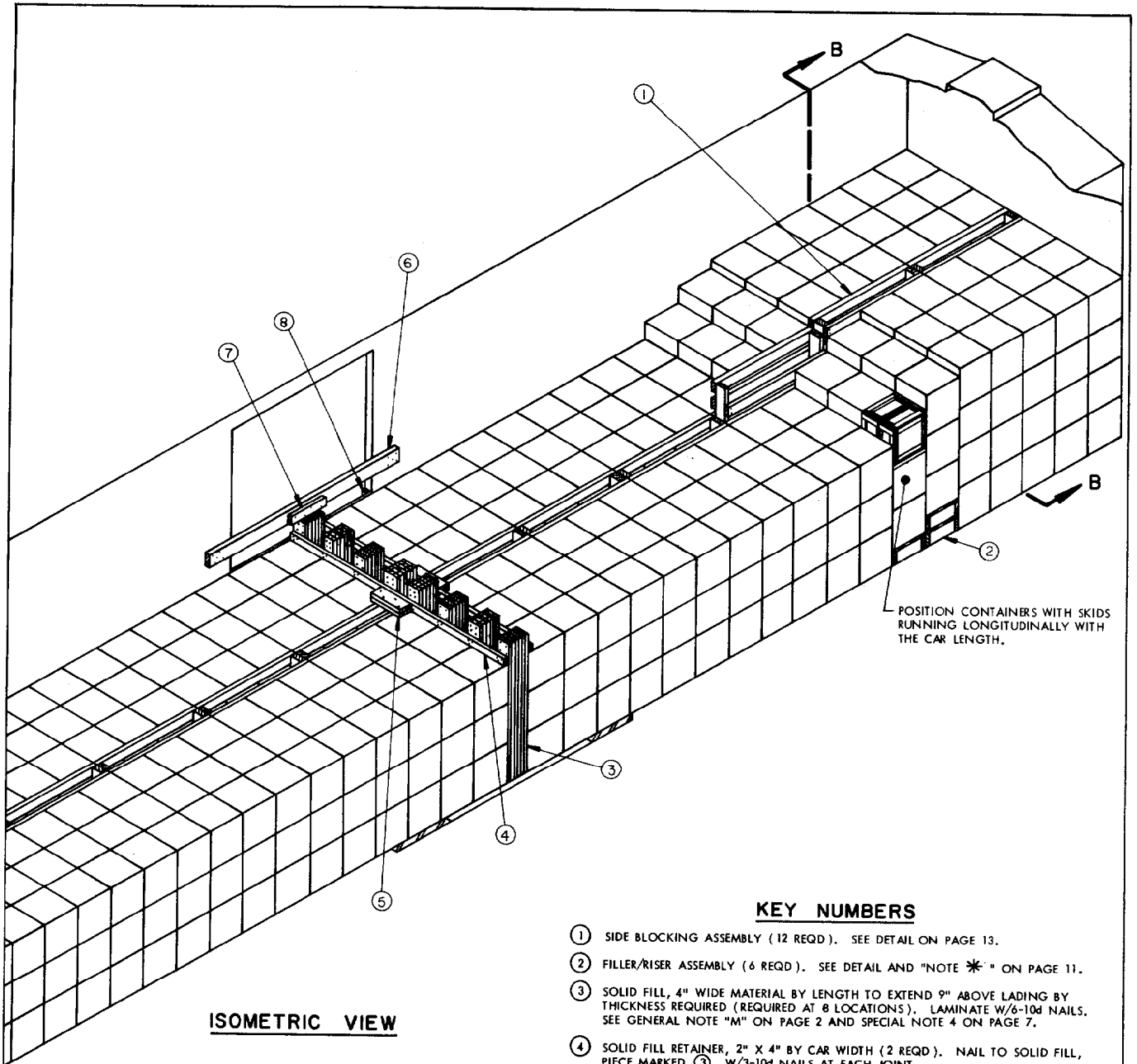
ALTERNATIVE CENTER BLOCKING

SEE SPECIAL NOTE 4 ABOVE.

LOAD AS SHOWN

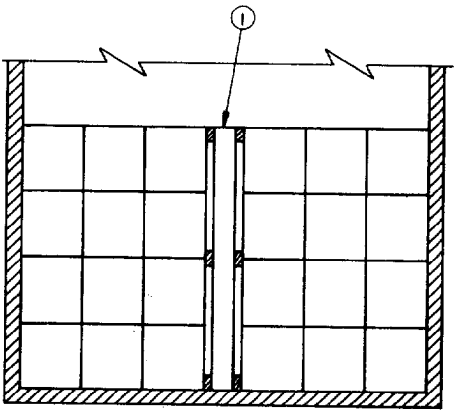
ITEM	QUANTITY	WEIGHT (APPROX)
CONTAINER	684	119,700 LBS
DUNNAGE	756	LBS
TOTAL WEIGHT		120,456 LBS

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	324	108
1" X 6"	50	25
2" X 4"	112	74
2" X 6"	93	93
NAILS	NO. REQD	POUNDS
6d (2")	420	2-1/2
10d (3")	256	4



POSITION CONTAINERS WITH SKIDS RUNNING LONGITUDINALLY WITH THE CAR LENGTH.

ISOMETRIC VIEW



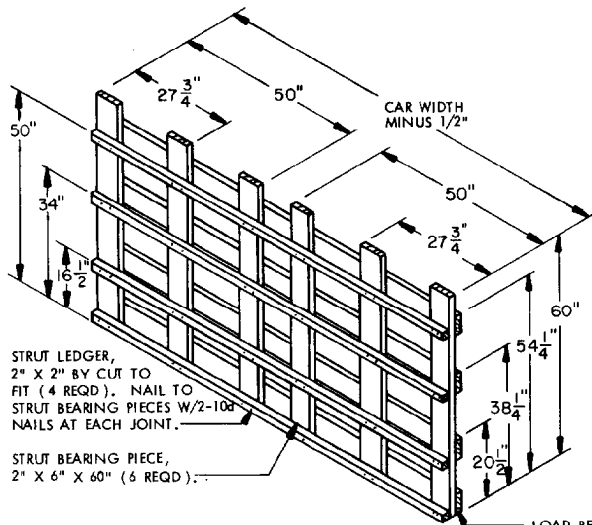
SECTION B-B

KEY NUMBERS

- ① SIDE BLOCKING ASSEMBLY (12 REQD). SEE DETAIL ON PAGE 13.
- ② FILLER/RISER ASSEMBLY (6 REQD). SEE DETAIL AND "NOTE *" ON PAGE 11.
- ③ SOLID FILL, 4" WIDE MATERIAL BY LENGTH TO EXTEND 9" ABOVE LADING BY THICKNESS REQUIRED (REQUIRED AT 8 LOCATIONS). LAMINATE W/6-10d NAILS. SEE GENERAL NOTE "M" ON PAGE 2 AND SPECIAL NOTE 4 ON PAGE 7.
- ④ SOLID FILL RETAINER, 2" X 4" BY CAR WIDTH (2 REQD). NAIL TO SOLID FILL, PIECE MARKED ③, W/3-10d NAILS AT EACH JOINT.
- ⑤ STOP BLOCK, 2" X 6" X 15" (DOUBLED) (2 REQD). NAIL FIRST PIECE TO SIDE BLOCKING, PIECE MARKED ①, W/4-10d NAILS. NAIL SECOND PIECE TO FIRST PIECE IN A LIKE MANNER.
- ⑥ GATE HOLD DOWN, 2" X 6" BY DOOR OPENING PLUS 24" (2 REQD). NAIL TO CAR SIDE WALL W/5-10d NAILS AT EACH END.
- ⑦ HOLD-DOWN BLOCK, 2" X 4" X 18" (2 REQD). CENTER ABOVE SOLID FILL, PIECE MARKED ④, AND NAIL TO THE GATE HOLD DOWN, PIECE MARKED ⑥, W/4-10d NAILS.
- ⑧ DOORWAY PROTECTION (2 REQD). SEE DETAIL ON PAGE 13.

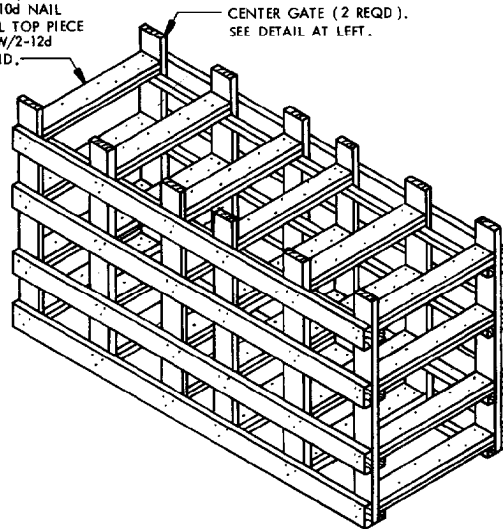
SPECIAL NOTES:

1. A 681-UNIT LOAD IS SHOWN IN A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL BOX CAR EQUIPPED WITH A 6'-0" DOOR OPENING. OTHER SIZE CARS OR CARS WITH DOOR OPENINGS GREATER THAN 6'-0" MAY BE USED.
2. THE "FILLER/RISER ASSEMBLIES" SPECIFIED FOR THE DEPICTED LOAD SHOWS A TYPICAL APPLICATION. TO ADJUST A LOAD QUANTITY, THE LENGTH OF THE "FILLER/RISER ASSEMBLIES" MAY BE ADJUSTED, AND/OR THE ASSEMBLIES MAY BE RELOCATED AS THE SIZE OF THE BOX CAR AND/OR THE NUMBER OF CONTAINERS TO BE SHIPPED VARIES.
3. IF THE CAR BEING LOADED IS EQUIPPED WITH PLUG DOORS, THE ONLY CHANGE REQUIRED IS TO INSTALL WALL CLEATS, PIECE MARKED (1) ON PAGE 4, THROUGHOUT THE LENGTH OF THE CAR. POSITION AT THE 11", 28", AND 46" HEIGHT DIMENSIONS AS DEPICTED IN "SECTION A-A" VIEW ON PAGE 4. DELETE THE "DOORWAY PROTECTION GATE" AND ADJUST THE WIDTH OF THE "SIDE BLOCKING ASSEMBLY" AS REQUIRED. NOTE THAT THE WALL CLEATS WHICH SPAN THE DOOR OPENING ON THE LOADING SIDE OF THE CAR SHOULD BE APPLIED FOR EACH LAYER JUST PRIOR TO PLACEMENT OF THE CONTAINERS IN THAT LAYER. SEE GENERAL NOTE "F" ON PAGE 2, AND SPECIAL NOTE 5 ON PAGE 5.
4. IF IT IS DESIRED, A CENTER GATE-STRUT TYPE OF BLOCKING CAN BE USED AT THE CENTER OF THE CAR IN LIEU OF THE SOLID FILL TYPE OF BLOCKING AS SHOWN IN THE ISOMETRIC VIEW ON PAGE 6. SEE THE "CENTER GATE" AND "ALTERNATIVE CENTER BLOCKING" DETAILS BELOW FOR APPLICABLE SPECIFICATIONS. ADDITIONALLY, DELETE THE SOLID FILL, SOLID FILL RETAINER, AND STOP BLOCK, PIECES MARKED (3), (4), AND (5). HOLD-DOWN BLOCK, PIECE MARKED (7), MUST BE INCREASED TO FOUR (4) REQUIRED. CENTER A HOLD-DOWN BLOCK OVER EACH OF THE OUTSIDE VERTICAL STRUT BEARING PIECES OF EACH CENTER GATE. A TWENTY-FOUR (24) DOUBLED 2" X 6" STRUT CONFIGURATION AS SHOWN IS ADEQUATE FOR RETAINING A LOAD NOT GREATER THAN 109,000 POUNDS. FOR LOADS OVER 109,000 POUNDS THE STRUTS MUST BE TRIPLED AND THE STRUT LEDGERS LOWERED TO 15-3/4", 33-1/4" AND 49-1/4" RESPECTIVELY. THE CENTER GATE IS DESIGNED FOR A THREE (3) CONTAINER HIGH LOAD. SEE GENERAL NOTE "M" ON PAGE 2.



CENTER GATE
SEE SPECIAL NOTE 4 ABOVE.

STRUT, 2" X 6" BY CUT TO FIT (DOUBLED) (24 REQD). LAMINATE STRUTS W/1-10d NAIL EVERY 6". TOENAIL TOP PIECE TO CENTER GATE W/2-12d NAILS AT EACH END.

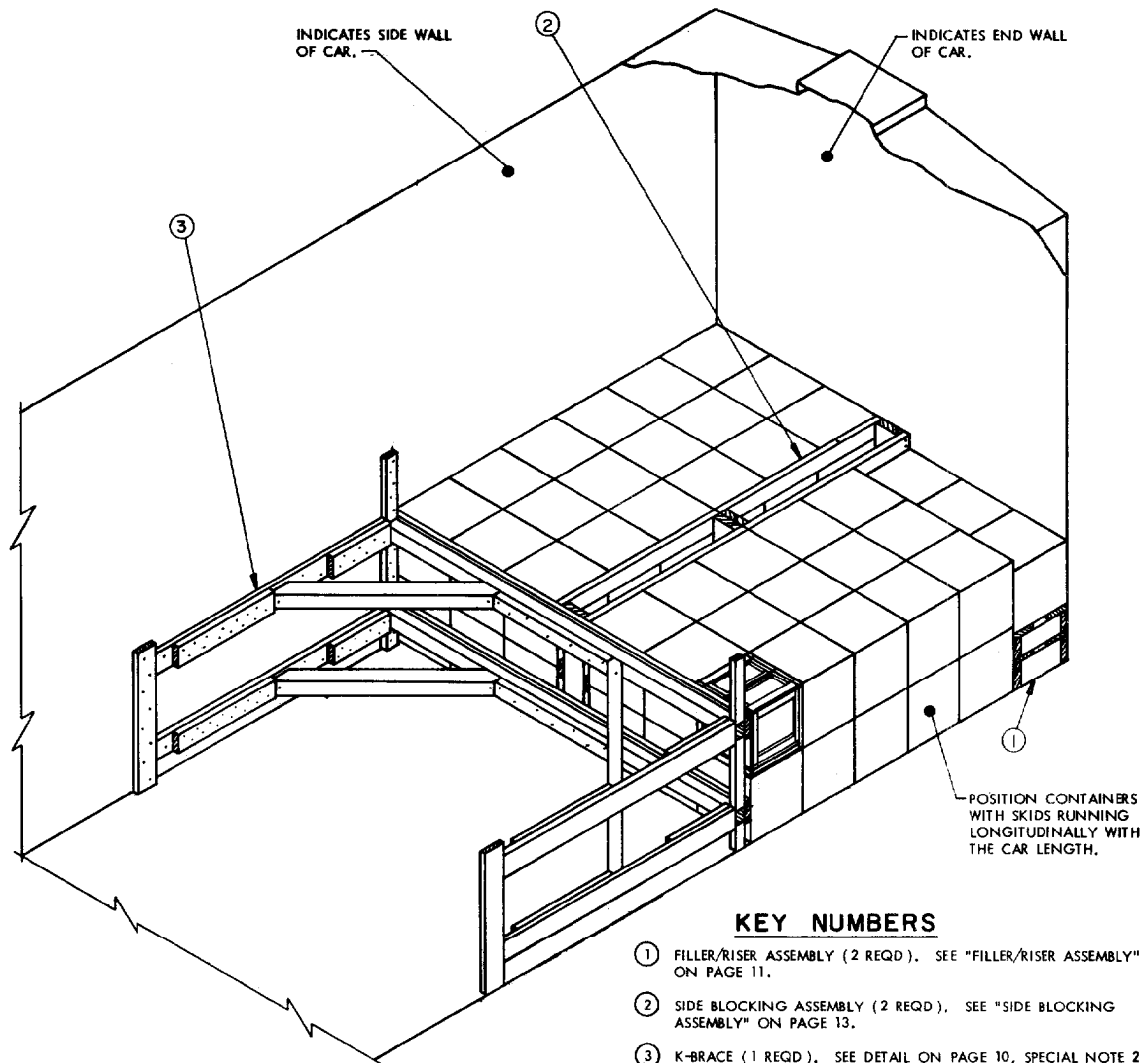


ALTERNATIVE CENTER BLOCKING
SEE SPECIAL NOTE 4 ABOVE.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	90	45
2" X 3"	18	9
2" X 4"	541	358
2" X 6"	239	239
NAILS	NO. REQD	POUNDS
6d (2")	36	1/4
10d (3")	548	8-1/2
12d (3-1/4")	376	6-1/2

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CONTAINER	681	119,175 LBS
DUNNAGE		1,643 LBS
TOTAL WEIGHT		120,818 LBS



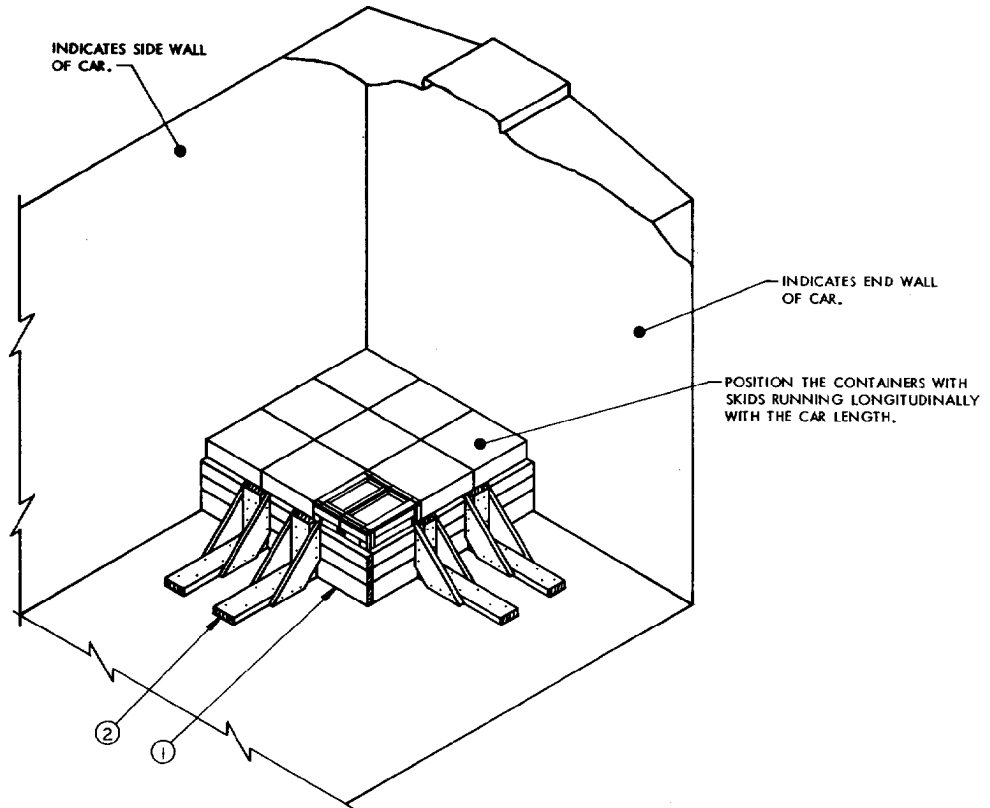
KEY NUMBERS

- ① FILLER/RISER ASSEMBLY (2 REQD). SEE "FILLER/RISER ASSEMBLY" ON PAGE 11.
- ② SIDE BLOCKING ASSEMBLY (2 REQD). SEE "SIDE BLOCKING ASSEMBLY" ON PAGE 13.
- ③ K-BRACE (1 REQD). SEE DETAIL ON PAGE 10, SPECIAL NOTE 2 BELOW, AND GENERAL NOTE "M" ON PAGE 2.

ISOMETRIC VIEW

SPECIAL NOTES:

1. A 9'-2" WIDE BOX CAR IS SHOWN. A NARROWER OR WIDER CAR CAN BE USED FOR THE SHIPMENT OF THE DEPICTED LOAD BY ADJUSTING THE THICKNESS OF THE SIDE BLOCKING ASSEMBLIES MARKED ②.
2. A 29-UNIT LOAD IS SHOWN. IF A TWO (2) HIGH STACK IS MAINTAINED ADJACENT TO THE HORIZONTAL PIECE OF THE K-BRACE, THE SPECIFIED PROCEDURES CAN BE ADAPTED FOR THE BLOCKING OF LCL LOADS OF VARIOUS QUANTITIES, PROVIDING NOT MORE THAN 7,000 POUNDS OF LADING IS LOADED WITHIN EACH OF THE TWO (2) LAYERS.
3. THE USE OF THE "FILLER/RISER ASSEMBLIES" IS SPECIFIED FOR THE LOAD ONLY TO SHOW A TYPICAL APPLICATION. "FILLER/RISER ASSEMBLIES" MAY BE USED IN THE LOAD AS REQUIRED TO ADJUST THE LOADING PATTERN FOR THE NUMBER OF CONTAINERS TO BE SHIPPED.



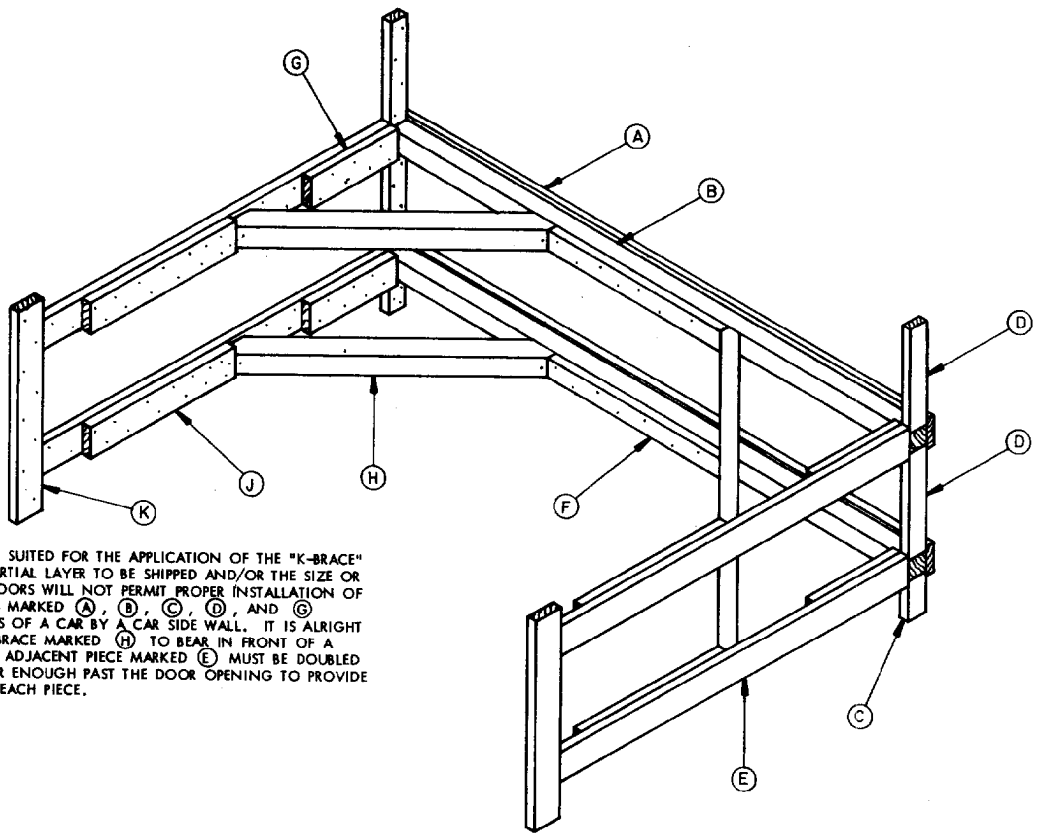
ISOMETRIC VIEW

KEY NUMBERS

- ① LOAD BEARING MATERIAL, 2" THICK MATERIAL (AS REQD).
- ② LCL BRACE (4 REQD). SEE "LCL BRACE" DETAIL ON PAGE 12. NAIL TO THE LOAD BEARING MATERIAL, PIECE MARKED ①, W/2-10d NAILS AT EACH JOINT. NAIL TO CAR FLOOR W/7-16d NAILS. SEE GENERAL NOTES "M" AND "N" ON PAGE 2.

SPECIAL NOTES:

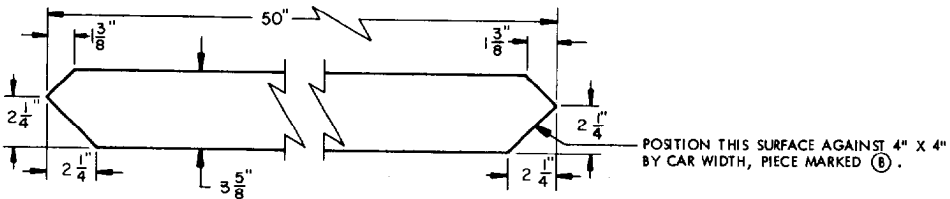
- 1. A NINE (9) UNIT LOAD IS SHOWN. THE SPECIFIED PROCEDURES CAN BE ADAPTED FOR THE BLOCKING OF LCL LOADS OF VARIOUS QUANTITIES.
- 2. IF DESIRED, LCL BRACES MAY BE INSTALLED AT EACH END OF A ONE-CONTAINER HIGH LOAD.



CAUTION: SOME CARS ARE NOT SUITED FOR THE APPLICATION OF THE "K-BRACE" BECAUSE THE LENGTH OF THE PARTIAL LAYER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE K-BRACE DUNNAGE. PIECES MARKED (A), (B), (C), (D), AND (G) MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDE WALL. IT IS ALRIGHT FOR THE END OF A DIAGONAL BRACE MARKED (H) TO BEAR IN FRONT OF A DOOR OPENING; HOWEVER, THE ADJACENT PIECE MARKED (E) MUST BE DOUBLED AND EXTENDED ACROSS AND FAR ENOUGH PAST THE DOOR OPENING TO PROVIDE FOR THE SPECIFIED NAILING OF EACH PIECE.

PARTIAL LAYER BRACE

K-BRACE ASSEMBLY AS SHOWN ABOVE IS ADEQUATE FOR RETAINING A MAXIMUM LCL OR PARTIAL-LAYER LOAD OF 14,000 POUNDS.



BRACE DETAIL

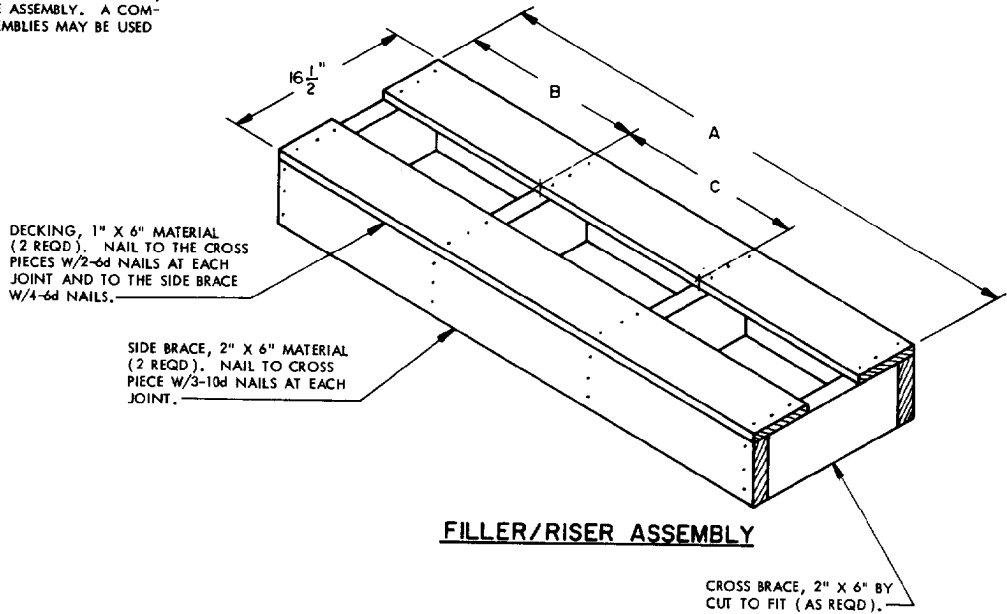
K-BRACE LUMBER AND NAILING CHART				
PIECE	MATERIAL	NO. REQD	NAIL TO	NAILS
(A)	2" X 6" BY CAR WIDTH	2	(B)	1-10d EVERY 12"
(B)	4" X 4" BY CAR WIDTH	2	-	-
(C)	2" X 4" X 7"	2	CAR SIDE WALL	3-12d
(D)	2" X 4" X 19"	4	CAR SIDE WALL	4-12d
(E)	2" X 6" X 72"	4	CAR SIDE WALL	16-12d
(F)	2" X 4" X 28" FOR A 8'-6" WIDE CAR OR 2" X 4" X 36" FOR A 9'-2" WIDE CAR	2	(B)	7-12d
(G)	2" X 6" X 18"	4	(E)	7-16d
(H)	4" X 4" X 50"	4	(B) AND (E)	1-40d AT EACH END
(J)	2" X 6" X 30"	4	(E)	14-16d
(K)	2" X 6" X 38"	2	CAR SIDE WALL	8-12d

FILLER/RISER ASSEMBLY DIMENSION CHART

SEE "NOTE *" BELOW	DIM A	DIM B	DIM C	NO. OF CROSS BRACES REQD
3-BOX WIDTH	50"	16-3/4"	16-3/4"	4
2-BOX WIDTH	33-1/4"	16-3/4"		3
1-BOX WIDTH	16-1/2"			2

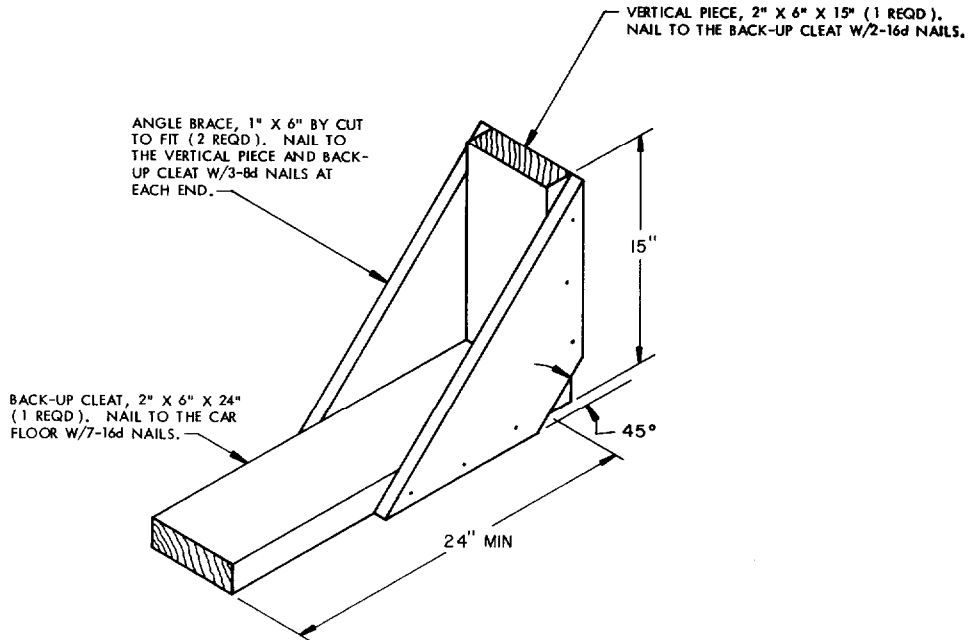
NOTE * :

THE RISER/FILLER ASSEMBLY IS DEPICTED FOR A 3-CONTAINER WIDE ASSEMBLY. THE CHART ABOVE GIVES DIMENSIONS AND THE NUMBER OF CROSS BRACES REQUIRED FOR A ONE, TWO, AND A THREE CONTAINER WIDE ASSEMBLY. A COMBINATION OF ANY TWO OF THE ASSEMBLIES MAY BE USED IN THE SAME LOAD.



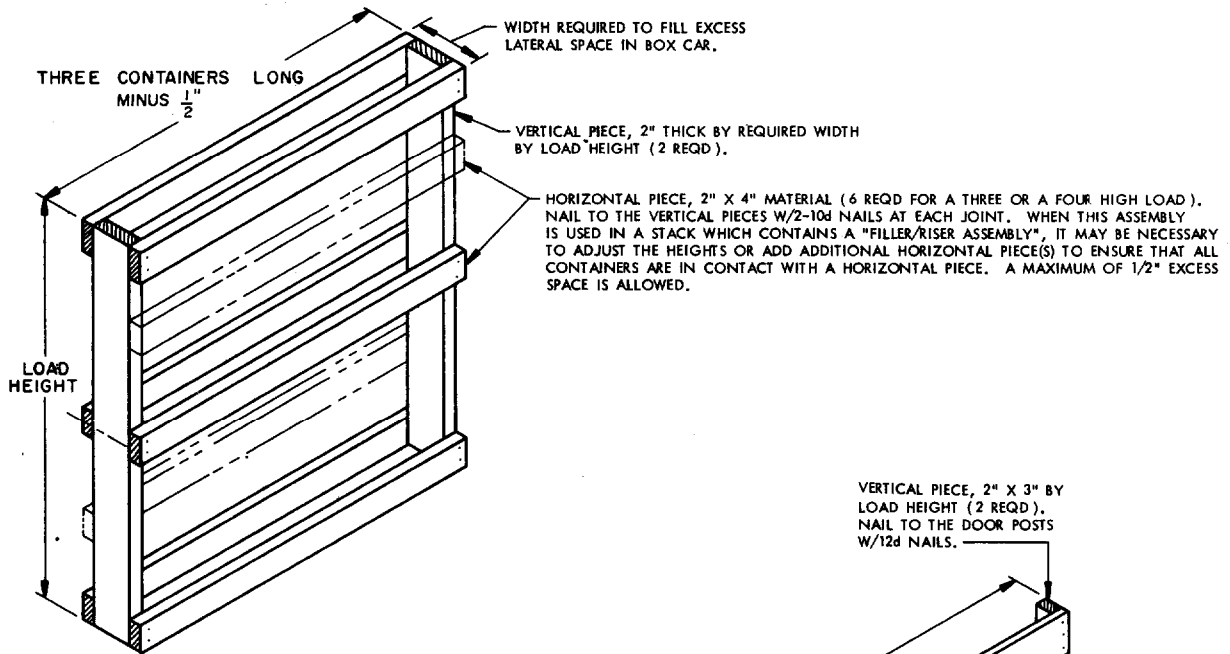
NOTE:

WHEN USED AS A FILLER ASSEMBLY, THE ASSEMBLIES MUST BE STACKED TWO (2) HIGH AT EACH INSTALLATION LOCATION. WHEN USED AS A RISER ASSEMBLY, THREE (3) ASSEMBLIES MUST BE USED TO FORM STEP-DOWN CONFIGURATION, TWO (2) ASSEMBLIES STACKED TWO (2) HIGH AND ONE (1) ASSEMBLY PLACED ADJACENT THERTO. FOR USE AS A RISER ASSEMBLY, SEE METHOD USED ON PAGES 4 AND 6. FOR USE AS A FILLER ASSEMBLY, SEE METHOD USED ON PAGE 8.

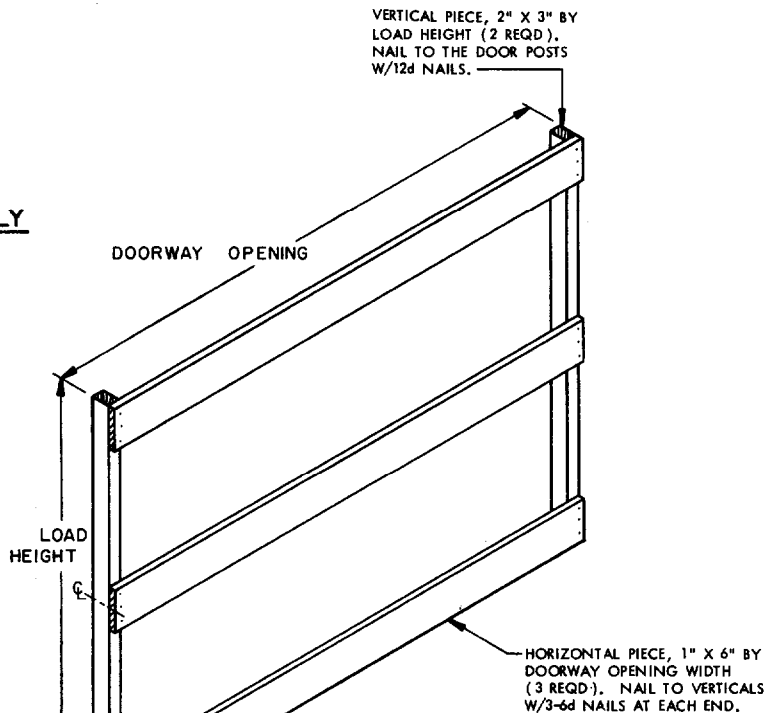


LCL BRACE

EACH BRACE AS APPLIED FOR LONGITUDINAL OR LATERAL BRACING WILL SUPPORT 2,000 OR 8,000 POUNDS OF LADING, RESPECTIVELY. ALSO RESPECTIVELY, A BRACE MUST BE USED FOR EACH 30" OR 48" INCREMENT OF LOAD DIMENSION; ADDITIONALLY, A MINIMUM OF TWO (2) BRACES MUST BE USED IN THEIR RESPECTIVE DIRECTIONS IF THE LOAD IS MORE THAN TWO (2) CONTAINERS LONG OR WIDE.



SIDE BLOCKING ASSEMBLY

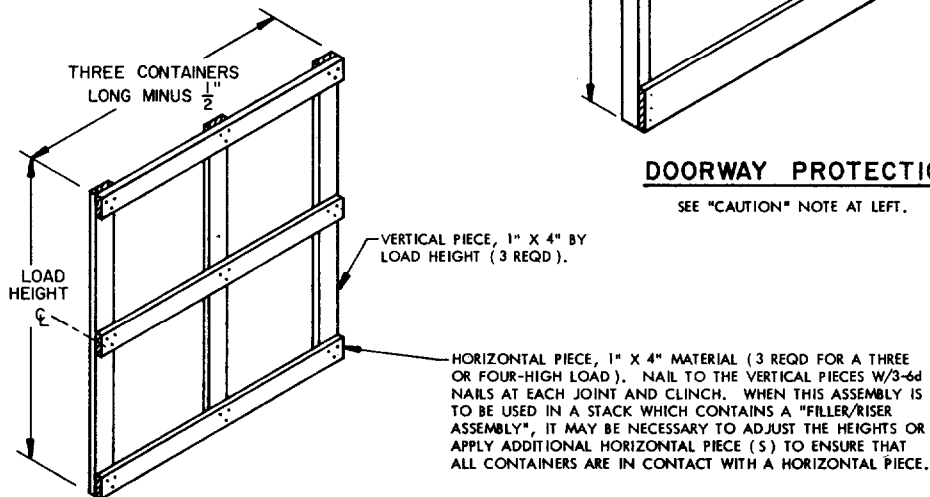


DOORWAY PROTECTION

SEE "CAUTION" NOTE AT LEFT.

CAUTION:

WHEN A CAR HAS DOOR POSTS WHICH DO NOT PROVIDE FOR ADEQUATE SECUREMENT OF THE GATE BY THE SPECIFIED NAILING METHOD, REFER TO DRAWING 17-48-1634-5A29 OR "BUREAU OF EXPLOSIVES PAMPHLET NO. 6A" FOR ALTERNATIVE GATE SECURING METHODS OR DOORWAY PROTECTION SPECIFICATIONS. DOORWAY PROTECTION DUNNAGE AS SHOWN IS NOT REQUIRED IF ALL OF THE DOORS IN A CAR ARE OF THE PLUG TYPE. REFER TO SPECIAL NOTE 3 ON PAGE 7 FOR SPECIAL DOOR PROTECTION PROVISIONS WHICH MUST BE IMPLEMENTED.



ALTERNATE SIDE BLOCKING ASSEMBLY

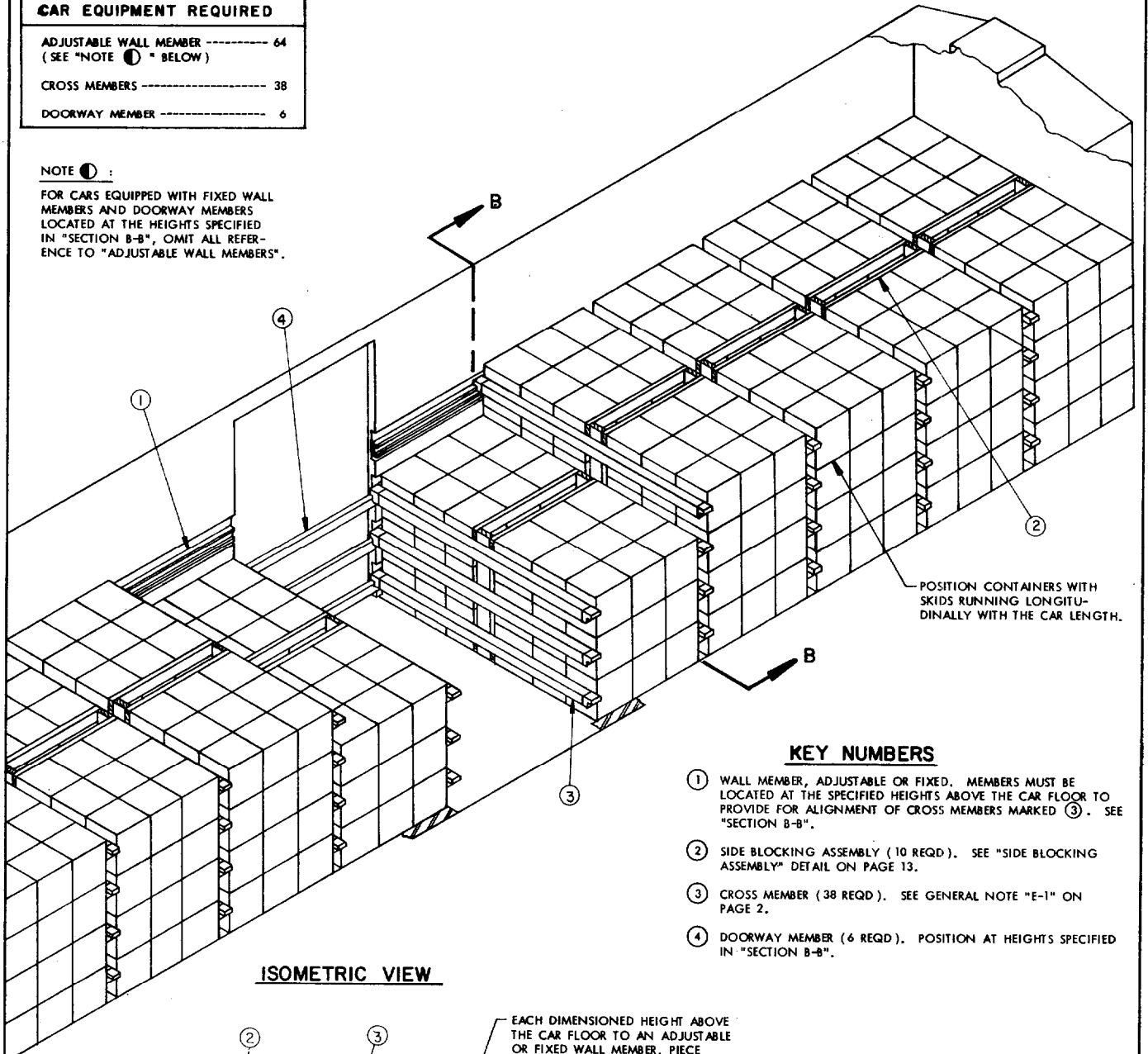
A MAXIMUM OF 1/2" EXCESS SPACE IS PERMISSABLE ACROSS THE WIDTH OF A CAR. ADDITIONAL MATERIAL OF A REQUIRED THICKNESS MAY BE LAMINATED TO THE VERTICAL OR HORIZONTAL PIECES IN ORDER TO COMPLY WITH THIS REQUIREMENT.

CAR EQUIPMENT REQUIRED

ADJUSTABLE WALL MEMBER -----	64
(SEE "NOTE 1" BELOW)	
CROSS MEMBERS -----	38
DOORWAY MEMBER -----	6

NOTE 1 :

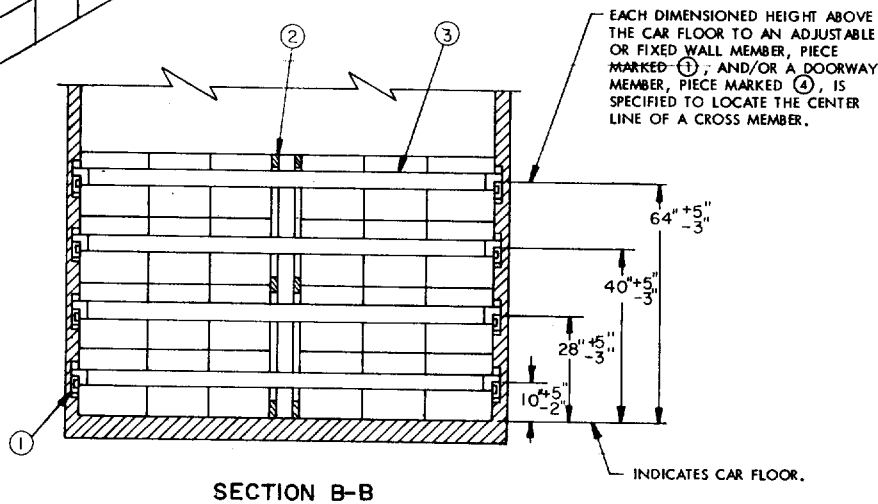
FOR CARS EQUIPPED WITH FIXED WALL MEMBERS AND DOORWAY MEMBERS LOCATED AT THE HEIGHTS SPECIFIED IN "SECTION B-B", OMIT ALL REFERENCE TO "ADJUSTABLE WALL MEMBERS".



KEY NUMBERS

- ① WALL MEMBER, ADJUSTABLE OR FIXED. MEMBERS MUST BE LOCATED AT THE SPECIFIED HEIGHTS ABOVE THE CAR FLOOR TO PROVIDE FOR ALIGNMENT OF CROSS MEMBERS MARKED ③. SEE "SECTION B-B".
- ② SIDE BLOCKING ASSEMBLY (10 REQD). SEE "SIDE BLOCKING ASSEMBLY" DETAIL ON PAGE 13.
- ③ CROSS MEMBER (38 REQD). SEE GENERAL NOTE "E-1" ON PAGE 2.
- ④ DOORWAY MEMBER (6 REQD). POSITION AT HEIGHTS SPECIFIED IN "SECTION B-B".

ISOMETRIC VIEW



SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE (INSIDE CLEARANCE) BOX CAR EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS, AND WITH 6'-0" DOOR OPENINGS IS SHOWN. CARS WITH LARGER DOORWAY OPENINGS MAY BE USED.
2. A NARROWER OR WIDER CAR CAN BE USED FOR THE SHIPMENT OF THE DEPICTED LOAD BY ADJUSTING THE WIDTH OF THE "SIDE BLOCKING ASSEMBLY".
3. TO SATISFY A LESS-THAN-FULL-LOAD QUANTITY, ONE OR TWO CONTAINERS MAY BE OMITTED BY USING THE LCL PROCEDURES SHOWN ON PAGE 17. ALSO, A LAYER MAY BE OMITTED FROM A BAY, OR A STACK OF 18 OR 24 CONTAINERS MAY BE OMITTED FROM A BAY TO SATISFY A LOAD QUANTITY TO BE SHIPPED.

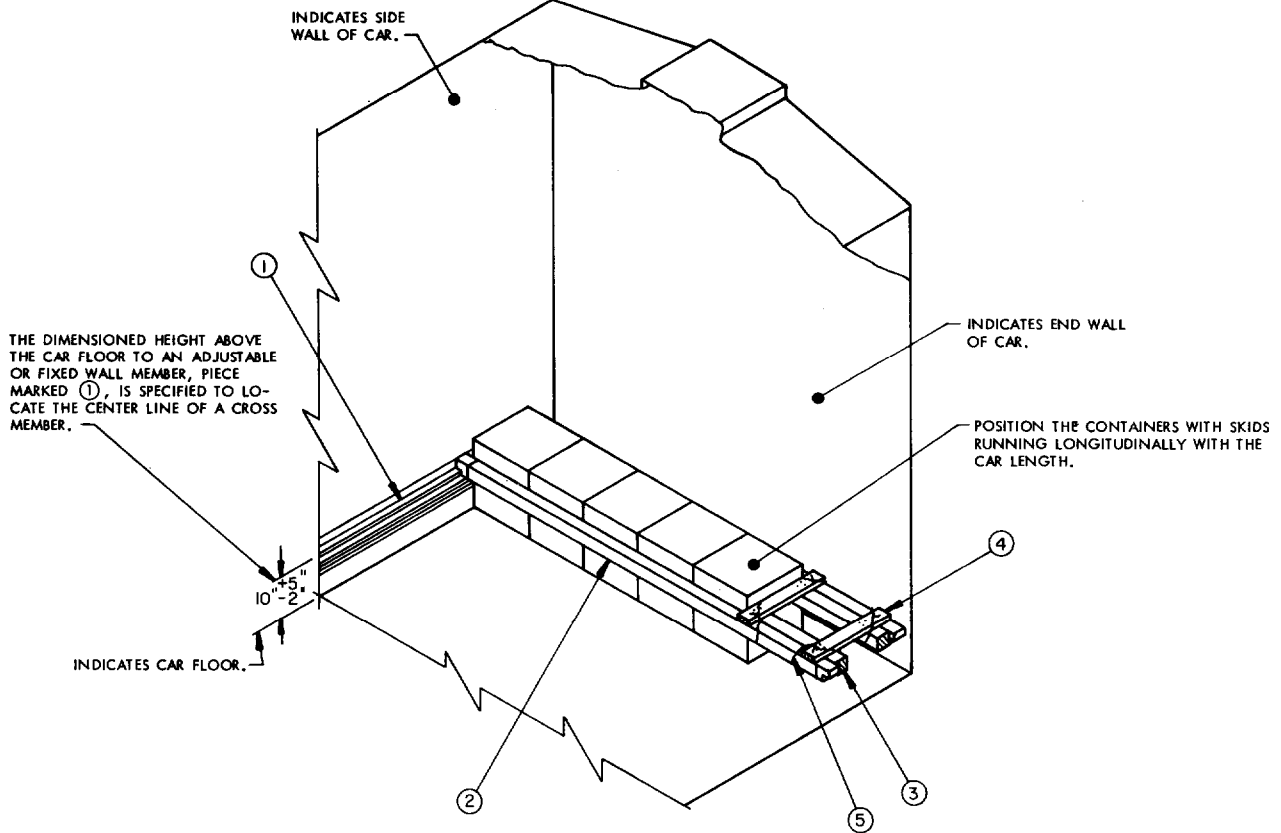
BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	250	165
2" X 6"	114	114
NAILS	NO. REQD	POUNDS
10d (3")	240	3-3/4

LOAD AS SHOWN

<u>ITEM</u>	<u>QUANTITY</u>	<u>WEIGHT (APPROX)</u>
CONTAINER -----	684 -----	119,700 LBS
DUNNAGE -----		702 LBS
TOTAL WEIGHT -----		120,402 LBS

684-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR (MECHANICAL)



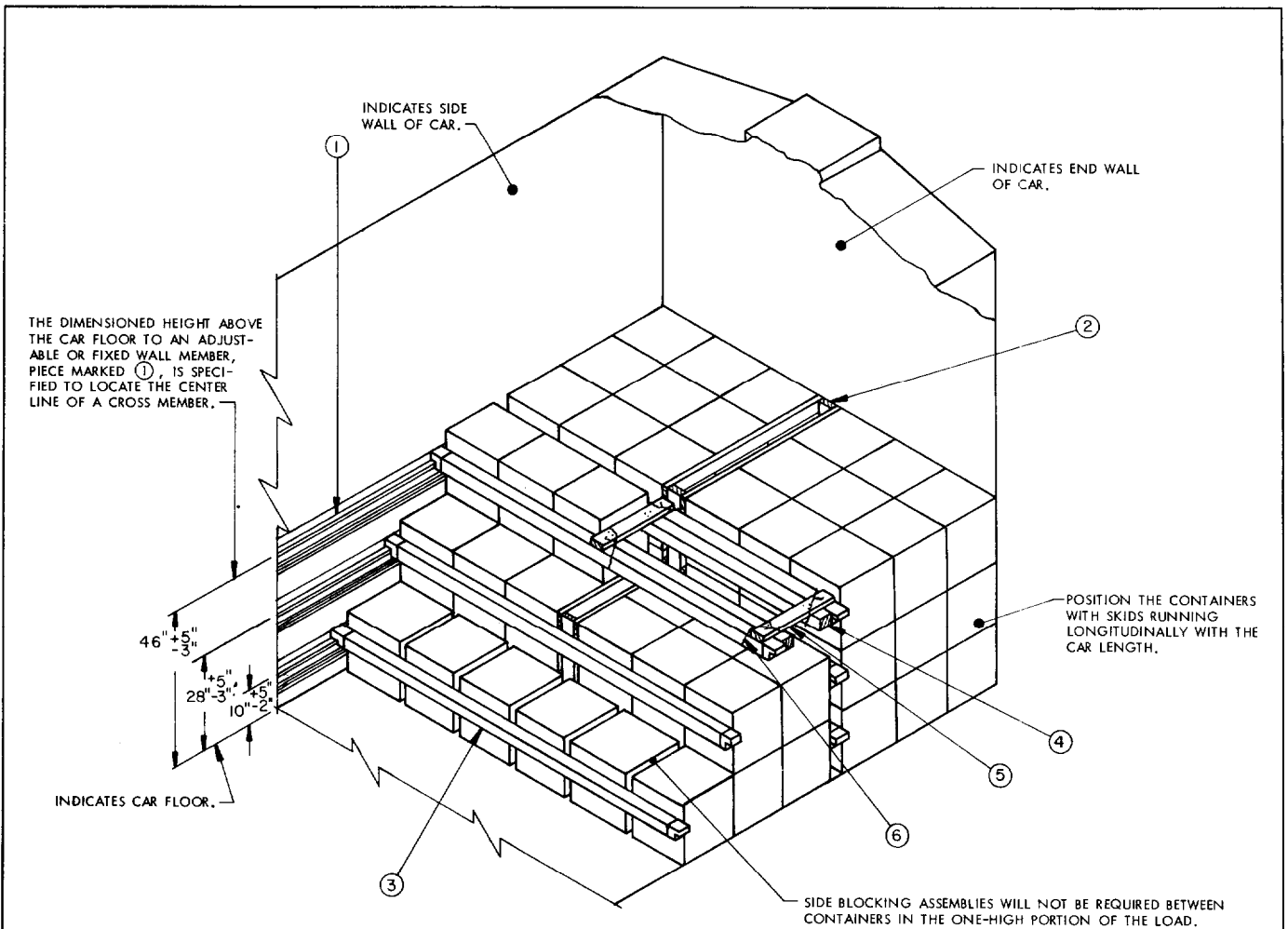
ISOMETRIC VIEW

SPECIAL NOTES:

1. A 5-UNIT LOAD IS SHOWN IN A 9'-2" WIDE BOX CAR EQUIPPED WITH MECHANICAL BRACING DEVICES. A NARROWER OR WIDER CAR CAN BE USED FOR THE SHIPMENT OF THE DEPICTED LOAD.
2. A 2, 3 OR 4-UNIT LOAD MAY BE SHIPPED BY ADJUSTING THE LENGTH OF "CROSS BRACE," PIECE MARKED ③.
3. FOUR (4) PIECES OF NO. 14 GAGE WIRE MAY BE USED IN LIEU OF NO. 8 GAGE WIRE. WHEN USING NO. 14 GAGE WIRE, INSTALL TWO (2) COMPLETE LOOPS AROUND THE CROSS MEMBER AND PIECES MARKED ③ AND ④ AT EACH LOCATION.
4. THE USE OF THE "CROSS BRACE," PIECE MARKED ③, AND THE "TIE PIECE," PIECE MARKED ④, IS SPECIFIED FOR THE LOAD ONLY TO SHOW A TYPICAL APPLICATION. THESE PIECES MAY BE ADJUSTED AS REQUIRED TO ADJUST THE LOAD PATTERN FOR THE NUMBER OF CONTAINERS TO BE SHIPPED.

KEY NUMBERS

- ① WALL MEMBER, ADJUSTABLE OR FIXED. MEMBER MUST BE LOCATED AT THE SPECIFIED HEIGHT ABOVE THE CAR FLOOR TO PROVIDE FOR INSTALLATION OF CROSS MEMBERS, PIECE MARKED ②.
- ② CROSS MEMBER (2 REQD). SEE GENERAL NOTE "E-1" ON PAGE 2.
- ③ CROSS BRACE, 4" X 4" BY CUT TO FIT BETWEEN CONTAINER AND CAR SIDE WALL (2 REQD).
- ④ TIE PIECE, 2" X 4" X 24-1/2" (2 REQD). NAIL TO "CROSS BRACE," PIECE MARKED ③, W/3-10d NAILS AT EACH JOINT.
- ⑤ TIE WIRE, NO. 8 GAGE BLACK ANNEALED WIRE 24" LONG (4 REQD). INSTALL TO FORM A COMPLETE LOOP AROUND THE "CROSS BRACE," PIECE MARKED ③, AND TIE PIECE, PIECE MARKED ④, OF THE ASSEMBLY, AND THE ADJACENT CROSS MEMBER, PIECE MARKED ②. BRING THE ENDS TOGETHER AND TWIST TAUT. SEE SPECIAL NOTE 8.



ISOMETRIC VIEW

SPECIAL NOTES:

1. A 87-UNIT LOAD IS SHOWN IN A 9'-2" WIDE BOX CAR EQUIPPED WITH MECHANICAL BRACING DEVICES. A NARROWER OR WIDER CAR CAN BE USED FOR THE SHIPMENT OF THE DEPICTED LOAD.
2. AN 85, 86, OR 88-UNIT LOAD MAY BE SHIPPED BY ADJUSTING THE LENGTH OF CROSS BRACE, PIECE MARKED ④.
3. FOUR (4) PIECES OF NO. 14 GAGE WIRE MAY BE USED IN LIEU OF THE NO. 8 GAGE WIRE. WHEN USING NO. 14 GAGE WIRE, INSTALL TWO (2) COMPLETE LOOPS AROUND THE CROSS MEMBER AND PIECES MARKED ④ AND ⑤ AT EACH LOCATION.
4. THE USE OF THE "CROSS BRACE", PIECE MARKED ④, AND THE "TIE PIECE", PIECE MARKED ⑤, IS SPECIFIED FOR THE LOAD ONLY TO SHOW A TYPICAL APPLICATION. THESE PIECES MAY BE ADJUSTED AS REQUIRED TO ADJUST THE LOADING PATTERN FOR THE NUMBER OF CONTAINERS TO BE SHIPPED.

KEY NUMBERS

- ① WALL MEMBER, ADJUSTABLE OR FIXED. MEMBER MUST BE LOCATED AT THE SPECIFIED HEIGHTS ABOVE THE CAR FLOOR TO PROVIDE FOR INSTALLATION OF CROSS MEMBERS, PIECES MARKED ③.
- ② SIDE BLOCKING ASSEMBLY (2 REQD). SEE "SIDE BLOCKING ASSEMBLY" DETAIL ON PAGE 13.
- ③ CROSS MEMBER (6 REQD). SEE GENERAL NOTE "E-1" ON PAGE 2.
- ④ CROSS BRACE, 4" X 4" BY CUT TO FIT BETWEEN CONTAINER AND CAR SIDE WALL (2 REQD).
- ⑤ TIE PIECE, 2" X 4" X 24-1/2" (2 REQD). NAIL TO CROSS BRACE, PIECE MARKED ④, W/3-10d NAILS AT EACH JOINT.
- ⑥ TIE WIRE, NO. 8 GAGE BLACK ANNEALED WIRE 24" LONG (4 REQD). INSTALL TO FORM A COMPLETE LOOP AROUND THE CROSS BRACE, PIECE MARKED ④, AND TIE PIECE, PIECE MARKED ⑤, OF THE ASSEMBLY, AND THE ADJACENT CROSS MEMBER, PIECE MARKED ③. BRING THE ENDS TOGETHER AND TWIST TAUT.