APPROVED BY
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DATE 11/29/77
REVISION NO. 1
SIGNED E. P. Rahlen
DATE 2/9/82

LOADING AND BRACING (CL & LCL) IN BOX CARS⌖ OF BOXED AMMUNITION AND COMPONENTS ON PALLETS, UNITIZED WITH STRAPPING

INDEX

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

DO NOT SCALE

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U. S. ARMY DARCOM DRAWING

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PROJECT FSA 145-75

GENERAL NOTES

A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1, AND AUGMENTS TM 743-200-1 (CHAPTER 5).

B. THE OUTLOADING PROCEDURES SPECIFIED IN THIS DRAWING ARE APPLICABLE FOR PALLETIZED AMMUNITION AND COMPONENTS PACKED IN WOODEN OR WIREBOUND BOXES USUALLY UNDER 27" IN LENGTH.

C. REFER TO THE APPLICABLE DARCOM 19-48 SERIES DRAWING FOR UNITIZATION PROCEDURES FOR BOXED AMMUNITION AND COMPONENTS ON 4-WAY ENTRY PALLETS.

D. THE DEPICTED PROCEDURES ARE APPLICABLE FOR UNITS ASSEMBLED ON THE 40" X 48" OR THE 35" X 45-1/2" OR THE 42" X 53" 4-WAY ENTRY PALLET.

E. THE OUTLOADING PROCEDURES DEPICTED WITHIN THIS DOCUMENT ARE APPLICABLE FOR SHIPMENTS IN CONVENTIONAL TYPE BOX CARS, FOR SHIPMENTS IN BOX CARS EQUIPPED WITH VARIOUS TYPES OF SELF-CONTAINED MECHANICAL BRACING DEVICES, AND FOR SHIPMENTS IN CUSHIONED BOX CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS. FOR SPECIFIC GUIDANCE PERTAINING TO OUTLOADING IN CONVENTIONAL TYPE BOX CARS, REFER TO THE GENERAL NOTES ON PAGE 4. SPECIFIC GUIDANCE FOR OUTLOADING IN BOX CARS EQUIPPED WITH MECHANICAL BRACING DEVICES IS DELINEATED BY THE GENERAL NOTES ON PAGE 68. REFER TO PAGE 76 FOR SPECIFIC GUIDANCE RELATIVE TO OUTLOADING IN LOAD DIVIDER CARS. SEE GENERAL NOTE "L" BELOW.

F. 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 PERMISSABLE 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".

G. 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.

H. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, A MINIMUM OF TWO (2) SEALS, BUTTED TOGETHER, WITH TWO (2) PAIR OF CRIMPS PER SEAL WILL BE USED TO SEAL THE JOINT.

J. 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.

K. WHEN REFERRING TO THE PALLET UNIT LENGTH OR UNIT WIDTH THE 40" OR 35" DIMENSION OF THE PALLET BASE CONSTITUTES THE LENGTH AND THE 48" OR 45-1/2" DIMENSION CONSTITUTES THE WIDTH. SEE THE TYPICAL PALLET UNIT DETAILS ON PAGE 3.

L. ALL THE LOADS SHOWN HEREIN ARE TYPICAL. BECAUSE OF THIS FACT IT IS MOST LIKELY THAT THE ACTUAL QUANTITY THAT IS TO BE SHIPPED WILL NOT BE DEPICTED IN ANY OF THE LOADING PROCEDURES HEREIN. A LOAD PLAN SHOULD BE DEVELOPED WHICH WILL BE THE MOST EFFICIENT AS TO THE AMOUNT OF DUNNAGE REQUIRED AND THE EASE OF LOADING, FOR THE QUANTITY THAT IS TO BE SHIPPED. USING THE LOAD PLANNING GUIDANCE CHARTS IN CONJUNCTION WITH THE DEPICTED LOADING PROCEDURES, LOAD PLANNING GUIDANCE CHARTS FOR CONVENTIONAL BOX CARS ARE SHOWN ON PAGE 5, AND CHARTS 1, 3 AND 4 ON THAT PAGE CAN BE USED FOR CARS EQUIPPED WITH MECHANICAL BRACING DEVICES. CHARTS 3 AND 4 ON PAGE 5, IN CONJUNCTION WITH THE LOAD PLANNING GUIDANCE CHARTS ON PAGE 77, CAN BE USED FOR CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS. IN ORDER TO MAINTAIN SIMILARITY FROM ONE LOAD TO ANOTHER, THOSE INSTALLATIONS WHICH MAKE MULTIPLE SHIPMENTS OF THE SAME ITEM IN THE SAME LENGTH BOX CARS HAVING LIKE FEATURES SHOULD MAKE AN ACTUAL PENCILED SKETCH OF THE LOAD. USING THE VARIOUS LOAD PATTERNS AND OUTLOADING PROCEDURES SHOWN HEREIN AS GUIDANCE, THIS SKETCH WOULD DEPICT A COMBINATION WHICH WOULD BE MOST ADVANTAGEOUS AS FAR AS EASE OF LOADING AND EFFICIENT USE OF DUNNAGE IS CONCERNED FOR THE SPECIFIC ITEM THAT IS TO BE SHIPPED.

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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 OR B, GRADE 2, FED SPEC QQ-S-781.

STRAP SEAL -------- : TYPE D, STYLE I, II, OR IV, CLASS H. FED SPEC QQ-S-781.

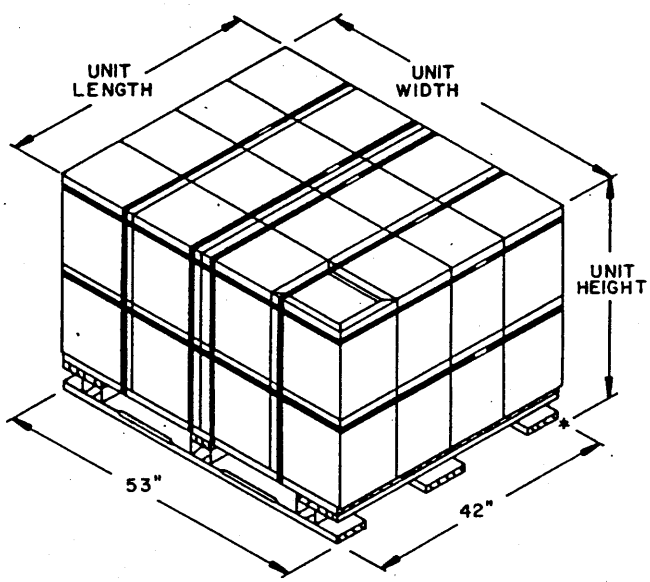
STRAP STAPLE ------ : COMMERCIAL GRADE.

PLYWOOD --------- : GROUP B OR C, GRADE C-D (EXTERIOR). FED SPEC NN-P-530. IF SPECIFIED GRADE IS NOT AVILABLE, A BETTER EXTERIOR GRADE MAY BE SUBSTITUTED.

WIRE ---------- : FED SPEC QQ-W-461.

(GENERAL NOTES CONTINUED)

M. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN CARS WHICH ARE PARTIALLY LOADED WITH PALLETIZED UNITS OF AMMUNITION ITEMS, 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. REFER TO THE "SHIPMENT OF MIXED ITEMS" PROCEDURES ON PAGES 40 THRU 44 FOR GUIDANCE IN LOADING MIXED ITEMS IN CONVENTIONAL BOX CARS AND IN CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS. MIXED ITEMS TO BE SHIPPED IN CARS EQUIPPED WITH MECHANICAL BRACING DEVICES MUST BE SEPARATELY BLOCKED, USING THE PROCEDURES SHOWN ON PAGES 70 THRU 75 AS GUIDANCE.



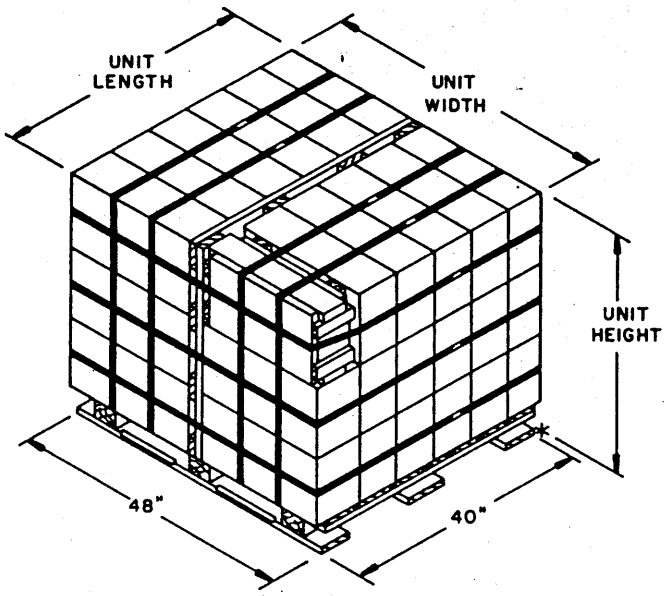
TYPICAL PALLETIZED UNIT (42" X 53" PALLET)

THE UNIT SHOWN IS 42-1/4" LONG BY 54" WIDE BY 35-3/4" HIGH.

REVISION

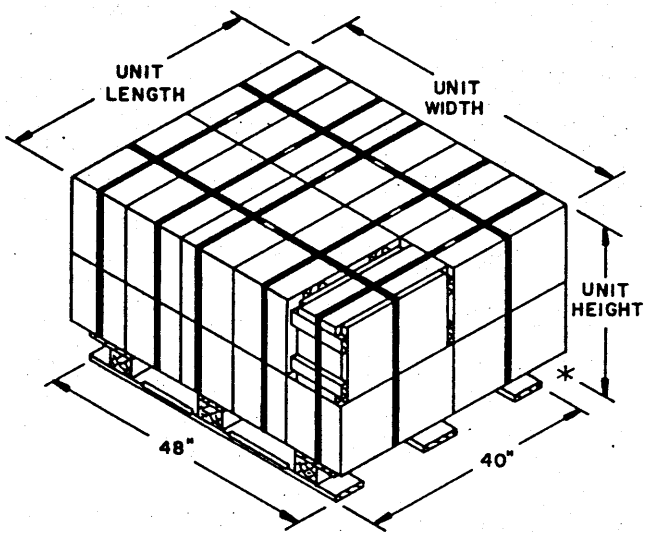
REVISION NO. 1, DATED JULY 1981, CONSISTS OF:

1. ADDING PROCEDURES FOR A TYPICAL LCL LOAD ONE PALLET UNIT WIDE BY CAR LENGTH.
2. ADDING AN OPTIONAL ANTI-SWAY BRACE.
3. ADDING THE OPTION OF USING DOUBLED OR TRIPLED 2" X 6" IN LIEU OF THE SPECIFIED 4" X 4" SINGLE, 4" X 6" ON-EDGE, OR DOUBLED 4" X 4" STRUTS.
4. ADDING CLARIFICATION ON THE USE OF LCL BRACING.
5. REMOVING HOLD-DOWN PIECES FROM THE KNEE BRACE LCL METHOD, AND REDUCING THE CAPACITY OF THE KNEE BRACE ASSEMBLY.



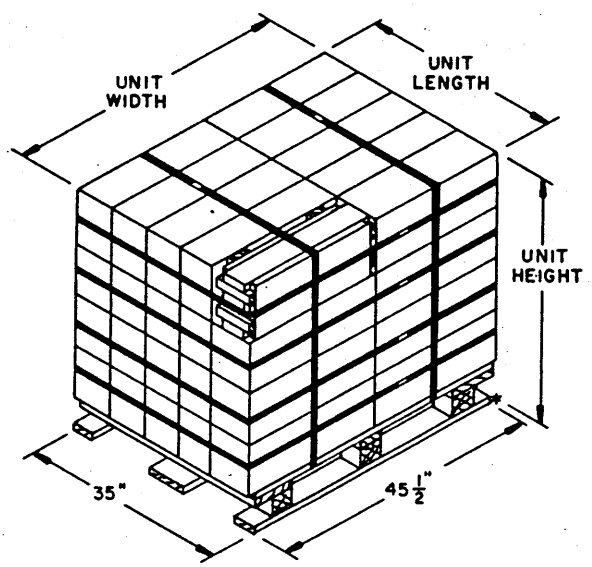
TYPICAL PALLETIZED UNIT (40' X 48' PALLET)

THE UNIT SHOWN IS 44" LONG BY 48" WIDE BY 41-1/2" HIGH.



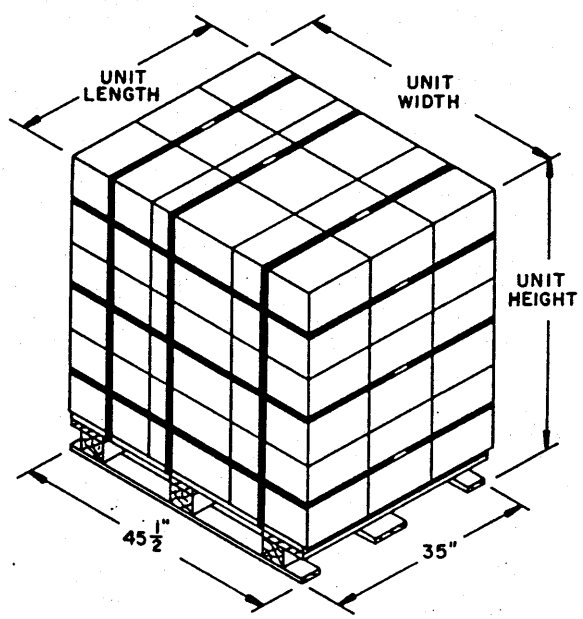
TYPICAL PALLETIZED UNIT (40' X 48' PALLET)

THE UNIT SHOWN IS 43" LONG BY 53-3/4" WIDE BY 30-1/2" HIGH.



TYPICAL PALLETIZED UNIT (35' X 45-1/2' PALLET)

THE UNIT SHOWN IS 35" LONG BY 48" WIDE BY 42-1/2" HIGH.



TYPICAL PALLETIZED UNIT (35' X 45-1/2' PALLET)

THE UNIT SHOWN IS 35" LONG BY 46" WIDE BY 50-1/2" HIGH.

GENERAL NOTES

(FOR CONVENTIONAL TYPE BOX CARS)

A. THE OUTLOADING PROCEDURES SPECIFIED ON PAGES 6 THRU 67 ARE FOR CONVENTIONAL TYPE BOX CARS. FOR THE FULL LOADS, 50'-6" LONG BY 9'-2" OR 9'-4" WIDE CARS ARE SHOWN: HOWEVER, THE PROCEDURES ARE ALSO APPLICABLE FOR CARS WHICH ARE 8'-6" THRU 9'-6" WIDE (EXCEPT AS NOTED) AND ALSO MAY BE USED FOR CARS WHICH ARE 40'-6" LONG, 60'-8" LONG, OR OF OTHER LENGTHS.

B. 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.

C. THE SELECTION OF RAIL CARS FOR THE TRANSPORT OF PALLETIZED UNITS OF AMMUNITION ITEMS 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.

D. WHEN SELECTING RAIL CARS, EVERY EFFORT SHOULD BE MADE TO OBTAIN BOX CARS THAT DO NOT HAVE BOWED END WALLS. CARS WITH BOWED ENDS 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 PAGE 65 FOR GUIDANCE.

E. NOTICE: WHEN POSITIONING PALLETIZED UNITS IN A CAR THEY SHOULD BE PLACED TIGHTLY AGAINST A CAR SIDEWALL AND/OR AGAINST A LATERALLY ADJACENT UNIT, AS APPLICABLE, AND ARE TO BE PRESSED TIGHTLY TOGETHER LENGTHWISE SO AS TO ACHIEVE A TIGHT LOAD. TO AID IN ACHIEVING TIGHTNESS LENGTHWISE IN A FULL LOAD, A LOAD-COMPRESSING JACK MAY BE EMPLOYED IN THE AREA OF THE CENTER GATES TO MOVE THE PALLETIZED UNITS INTO THEIR FINAL SHIPPING POSITION. A HYDRAULIC JACK IS RECOMMENDED FOR THIS OPERATION. CAUTION: WHEN USING A JACK TO COMPACT A LOAD, THE JACK MUST BE USED AGAINST STRONG POINTS OF THE PALLETIZED UNITS, SUCH AS THE JOINTS BETWEEN THE LAYERS OF BOXES ON THE UNIT. PADDING, OF 2-INCH (2") THICK LUMBER OR ANY OTHER MATERIAL OF SIMILAR CONSISTENCY, SHOULD BE PLACED BETWEEN THE JACK AND THE LADING.

F. 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. SEE GENERAL NOTE "M".

G. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN CARS WHICH ARE PARTIALLY LOADED WITH PALLETIZED UNITS OF AMMUNITION ITEMS, 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. IF THE CAR BEING USED FOR A SHIPMENT IS EQUIPPED WITH A NAILABLE METAL FLOOR AND A NAIL SIZE FOR FLOOR NAILING IS MARKED ON THE SIDEWALL OF THE CAR, THAT GUIDANCE SHOULD BE APPLIED TO THE NAILING OF THE "DOORWAY BLOCKING" PIECES IN THE FULL LOADS AND TO THE NAILING TO THE CAR FLOOR OF THE LCL BRACES AND KNEE BRACE ASSEMBLIES IN THE LESS-THAN-FULL LOADS. IF A NAIL SIZE IS NOT SPECIFIED IN THE CAR, 30d NAILS SHOULD BE USED IN LIEU OF THOSE SPECIFIED IN THE APPLICABLE KEY NUMBERS. SEE GENERAL NOTE "G" ON PAGE 2.

J. 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 OR THREE MORE LOAD UNITS IN ONE END THAN IN THE OTHER IS CONSIDERED TO BE AN OFFSET LOAD. SEE GENERAL NOTE "M".

K. LOAD-BLOCKING STRUTS WHICH ARE 48" OR LONGER MUST BE STIFFENED BY THE APPLICATION OF HORIZONTAL AND VERTICAL STRUT BRACING AS SHOWN BY KEY NUMBERS (8) AND (9) ON PAGE 8 (ALSO SHOWN ON OTHER PAGES). THESE PIECES ARE NOT REQUIRED IF THE STRUTS FOR THE LOAD BEING SHIPPED ARE SHORTER THAN 48". THE LENGTH OF THE LOAD-BLOCKING STRUTS SHOULD BE KEPT AS SHORT AS POSSIBLE (APPROX 18" MINIMUM), BUT IN THE EVENT IT IS NECESSARY TO USE STRUTS WHICH ARE 8'-0" OR MORE IN LENGTH, IT WILL BE NECESSARY TO APPLY AN ADDITIONAL SET OF HORIZONTAL AND VERTICAL STRUT BRACING PIECES. STRUT BRACING SHOULD BE APPLIED SO AS TO PROVIDE NEARLY EQUAL SPACES BETWEEN THE BRACING PIECES AND THE CENTER GATES AND/OR BETWEEN ADJACENT STRUT BRACING PIECES. NOTE THAT HORIZONTAL STRUT BRACING PIECES FOR THE UPPER LEVEL OF STRUTS FOR ALL BUT THE UPPERMOST TIER OF A LOAD MAY BE DIFFICULT TO APPLY TO THE TOP SURFACES OF THE STRUTS AS DEPICTED. STRUT BRACING WILL BE EQUALLY EFFECTIVE IF APPLIED TO THE UNDER SIDE OF THOSE STRUTS.

L. ALL FULL CAR LOADS SHOWN HEREIN ARE TYPICAL, HOWEVER, THE PROCEDURES ARE ADAPTABLE TO THE SIZE OF THE UNIT TO BE SHIPPED. THE NUMBER OF UNITS ACROSS THE CAR WILL BE AS SHOWN FOR A LOAD, ALTHOUGH THE SIZE MAY VARY. THE NUMBER OF UNITS IN LENGTH OF THE CAR WILL BE DEPENDENT UPON THE LENGTH OR WIDTH, AS APPLICABLE, OF THE UNIT, AND THE NUMBER OF TIERS WILL BE BASED UPON THE HEIGHT AND/OR WEIGHT OF THE UNIT BEING LOADED. THE

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QUANTITIES SHOWN IN THE LESS THAN CAR LOAD VIEWS ARE ALSO TYPICAL AND MAY BE ADJUSTED TO SUIT.

M. 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 NATURALLY 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. TO DETERMINE THE PORTION OF THE WEIGHT OF THE OFFSET SECTION OF THE LOAD WHICH WILL BE TRANSMITTED TO EACH END OF A CAR, THE FOLLOWING GUIDANCE IS PRESENTED.

1. FOR A SHIPMENT CONSISTING OF AN EVEN NUMBER OF LOAD UNITS LONG LOADED IN AN OFFSET PATTERN, THE LONG PORTION OF A LOAD WILL BE TWO (2) LOAD UNITS LONGER THAN THE SHORT PORTION. THE CG OF THE OFFSET PORTION WILL BE AT THE JOINT BETWEEN THOSE TWO UNITS. MEASURE THE DISTANCE FROM THE CENTER OF THE CAR LENGTH TO THE JOINT BETWEEN THOSE UNITS. REFER TO THE "WEIGHT DISTRIBUTION" CHART BELOW AND READ UNDER THE PROPER CAR SIZE HEADING AND OPPOSITE THE DIMENSION NEAREST TO THAT MEASURED, THE PERCENTAGE OF THE OFFSET PORTION OF THE LOAD (TWO LOAD UNITS IN THIS CASE) WHICH IS ON THE LONG-LOAD END OF THE CAR. MULTIPLY THIS PERCENTAGE FIGURE TIMES THE WEIGHT OF THE OFFSET PORTION OF THE LOAD AND ADD THE PRODUCT TO THE WEIGHT OF THE SHORT-LOAD END OF THE LOAD. DOUBLE THIS SUM TO DETERMINE THE MINIMUM LOAD LIMIT OF THE CAR TO BE USED FOR A SHIPMENT. SEE THE "EXAMPLE" ON PAGE 68.

2. FOR A SHIPMENT CONSISTING OF AN UNEVEN NUMBER OF LOAD UNITS, THE LONG PORTION OF THE LOAD WILL BE ONE (1) LOAD UNIT LONGER THAN THE SHORT PORTION. THE CG OF THE OFFSET PORTION WILL BE AT THE CENTER OF THAT LOAD UNIT. MEASURE THE DISTANCE FROM THE CENTER OF THE CAR LENGTH TO THE CENTER OF THE ONE LOAD UNIT. REFER TO THE "WEIGHT DISTRIBUTION" CHART BELOW AND READ UNDER THE PROPER CAR SIZE HEADING AND OPPOSITE THE DIMENSION NEAREST TO THAT MEASURED, THE PERCENTAGE OF THE OFFSET PORTION OF THE LOAD WHICH IS ON THE LONG-LOAD END OF THE CAR. MULTIPLY THIS PERCENTAGE FIGURE TIMES THE WEIGHT OF THE OFFSET PORTION OF THE LOAD AND ADD THE PRODUCT TO THE WEIGHT OF THE SHORT-LOAD END OF THE LOAD. DOUBLE THIS SUM TO DETERMINE THE MINIMUM LOAD LIMIT OF THE CAR TO BE USED FOR A SHIPMENT.

N. 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, OR ONE END OF THE LOWER STRUT IF DOUBLED 4" X 4" STRUTS ARE BEING USED, WILL BE POSITIONED AT ITS BEARING AREA JUST ABOVE THE STRUT LEDGER ON ONE GATE, THEN THE OTHER END, WHICH CAN BE BEVELED ON THE LOWER CORNER IF DESIRED, WILL BE DRIVEN DOWNWARD UNTIL IT CONTACTS THE STRUT LEDGER ON THE OTHER GATE. EACH END OF THE STRUT (BOTH PIECES IF DOUBLED STRUTS ARE BEING USED) 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 61 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.

O. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.

WEIGHT DISTRIBUTION

DISTANCE FROM CENTER OF CAR TO CG* OF OFFSET UNITS IN INCHES	PERCENT OF WEIGHT OF OFFSET UNITS ON HEAVY END OF CAR		
	40'-6" CAR	50'-6" CAR	60'-6" CAR
6	51.5	51.2	51.1
9	52.9	51.9	51.6
12	53.2	52.5	52.1
15	54.1	53.1	52.7
18	55.0	53.7	53.2
21	55.8	54.4	53.8
24	56.5	55.0	54.3
27	57.3	55.6	54.9
30	58.0	56.1	55.4
33	58.9	56.8	55.9
36	59.7	57.4	56.5
39	60.5	58.2	57.0
42	61.3	59.0	57.6
45	62.2	59.4	58.1
48	63.0	59.8	58.6
54	64.5	61.0	59.7
60	66.2	62.2	60.8

* CENTER OF GRAVITY.

SPECIAL NOTES:

1. THE FOLLOWING SPECIAL NOTES AND THE FOUR (4) CHARTS BELOW ARE PRESENTED AS GUIDANCE IN THE SELECTION OF A LOAD PATTERN AND IN DETERMINING THE QUANTITY OF UNITS WHICH CAN BE LOADED IN A CONVENTIONAL BOX CAR, BASED ON THE SIZE AND WEIGHT OF THE PALLETIZED UNIT TO BE LOADED.

2. CHART NO. 1 MAY BE USED IN SELECTING A LOAD PATTERN, SUCH AS 2-WIDE OR 3-WIDE. FOR THE WIDTH OF THE CAR WHICH IS TO BE LOADED. THE LOAD PATTERN WILL BE BASED EITHER ON THE UNIT LENGTH ACROSS THE CAR OR ON THE UNIT WIDTH ACROSS THE CAR, DEPENDENT UPON THE LENGTH OR WIDTH DIMENSIONS OF THE UNIT TO BE LOADED. UNIT SIZE RANGES AND LOAD PATTERNS FOR FIVE OF THE MOST POPULAR CAR WIDTHS ARE GIVEN. CARS OF OTHER WIDTHS MAY BE USED, OF COURSE, AND THE SIZE RANGE OF UNITS WHICH CAN BE LOADED IN THE VARIOUS PATTERNS CAN BE CALCULATED. THE SMALLER FIGURE SHOWN FOR UNIT SIZE RANGE IS BASED ON THE MINIMUM UNIT LENGTH OR WIDTH, AS APPLICABLE, AND THE LARGER FIGURE IS CALCULATED ON THERE BEING AT LEAST ONE INCH (1") EXCESS LATERAL SPACE REMAINING IN THE CAR AFTER THE UNITS ARE POSITIONED.

3. CHART NO. 2 MAY BE USED IN DETERMINING THE QUANTITY OF UNITS WHICH CAN BE POSITIONED WITHIN THE LENGTH OF A CAR. SEPARATE COLUMNS ARE SHOWN FOR THREE OF THE MOST POPULAR CAR LENGTHS. CARS OF OTHER INSIDE LENGTHS MAY BE USED, OF COURSE, BUT THE UNIT SIZE RANGE FOR THE NUMBER OF UNITS LONG WILL HAVE TO BE CALCULATED. THE UNIT SIZE RANGE FOR EACH OF THE SPECIFIED CAR LENGTHS IS BASED ON HAVING A 24" LONG VOID AREA NEAR THE CENTER OF THE CAR LENGTH FOR THE INSTALLATION OF CENTER GATES AND STRUTS. IT IS POSSIBLE TO INSTALL BLOCKING AND BRACING IN A SPACE WHICH IS LESS THAN 24" LONG (18" BEING ABOUT THE MINIMUM WORKABLE SPACE) AND IT IS PERMISSIBLE TO CONSTRUCT LOADS THAT HAVE MORE THAN A 24" VOID SPACE.

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(SPECIAL NOTES CONTINUED)

4. CHART NO. 3 MAY BE USED IN DETERMINING THE NUMBER OF TIERS WHICH CAN BE LOADED IN A CAR, BASED ONLY UPON THE HEIGHT OF THE UNIT. THREE DIFFERENT LOAD HEIGHTS ARE GIVEN FOR GUIDANCE. THE ACTUAL NUMBER OF TIERS WHICH CAN BE LOADED WILL BE BASED ON SEVERAL FACTORS, SUCH AS THE HEIGHT OF THE DOORS ON THE CAR, THE WEIGHT OF THE UNITS, AND THE QUANTITY THAT IS TO BE SHIPPED.

5. CHART NO. 4 MAY BE USED AS GUIDANCE IN DETERMINING THE QUANTITY OF UNITS WHICH CAN BE LOADED IN A CAR, BASED ONLY UPON THE WEIGHT OF THE UNIT. THE "UNIT WEIGHT IN LBS" COLUMN SPECIFIES WEIGHTS RANGING FROM 400 POUNDS, THE APPROXIMATE MINIMUM, TO 2,250 POUNDS, THE APPROXIMATE MAXIMUM, BY ONE HUNDRED POUND INCREMENTS. COLUMNS ARE SHOWN FOR FOUR (4) DIFFERENT CAPACITY CARS. THE MAXIMUM QUANTITY THAT CAN BE LOADED FOR A UNIT WHICH WEIGHS SOMEWHERE BETWEEN THE EVEN FIGURES GIVEN WILL HAVE TO BE INTERPOLATED. FOR EXAMPLE, APPROXIMATELY 225 PALLETIZED UNITS WEIGHING 450 POUNDS EACH CAN BE LOADED IN A CAR OF A 100,000 POUND CAPACITY. NOTE THAT THE QUANTITIES SPECIFIED FOR A GIVEN UNIT WEIGHT ARE FOR GUIDANCE ONLY. THE ACTUAL QUANTITY WHICH MAY BE LOADED WILL BE ONE OR MORE UNITS LESS THAN THE SPECIFIED QUANTITY, IF THE DUNNAGE WEIGHT FOR A LOAD IS MORE THAN THE DIFFERENCE BETWEEN THE "CAPACITY" AND THE "LOAD LIMIT" OF A CAR, WHICH IT MOST LIKELY WILL BE. THE LOAD LIMIT OF A CAR MUST NOT BE EXCEEDED, SO THE NUMBER OF UNITS WILL NEED TO BE ADJUSTED DOWNWARD ACCORDINGLY.

6. IN ADDITION TO THEIR USE IN CONNECTION WITH LOADING IN CONVENTIONAL BOX CARS, SOME OF THE CHARTS BELOW ARE APPLICABLE FOR GUIDANCE IN LOADING OTHER TYPES OF RAIL CARS. CHARTS 1, 3, AND 4 CAN BE USED FOR LOAD PLANNING IN CARS EQUIPPED WITH MECHANICAL BRACING DEVICES. CHARTS 3 AND 4, IN CONJUNCTION WITH CHARTS 1 AND 2 ON PAGE 75, CAN BE USED FOR THE PLANNING OF LOADS IN CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.

CHART NO. 1

SIZE RANGE OF UNITS PER LOAD PATTERN

CAR WIDTH	NO. OF ROWS	UNIT SIZE RANGE*			
		PALLETIZED UNITS LENGTH ACROSS CAR		PALLETIZED UNITS WIDTH ACROSS CAR	
		UNIT LENGTH	LOAD PAGES	UNIT WIDTH	LOAD PAGES
8'-6"	2-WIDE	35" TO 44"	8, 10, 12	45-1/2" TO 50-1/2"	6, 10, 12
8'-9"	2-WIDE	35" TO 44"	8, 10, 12	45-1/2" TO 52"	6, 10, 12
9'-2"	2-WIDE	35" TO 44"	8, 10, 12	45-1/2" TO 54"	6, 10, 12
	3-WIDE	35" TO 36-1/4"	14, 16	-------	-------
9'-4"	2-WIDE	35" TO 44"	8, 10, 12	45-1/2" TO 54"	6, 10, 12
	3-WIDE	35" TO 37"	14, 16	-------	-------
9'-6"	2-WIDE	35" TO 44"	8, 10, 12	45-1/2" TO 54"	6, 10, 12
	3-WIDE	35" TO 37-1/2"	14, 16	-------	-------

*BASED ON 1" MINIMUM SPACE ACROSS CAR.

CHART NO. 2

UNITS IN LENGTH OF CONVENTIONAL BOX CAR

NO. OF UNITS LONG	UNIT SIZE RANGE, LENGTH OR WIDTH		
	40'-6" BOX CAR (462" LOAD LENGTH)	50'-6" BOX CAR (582" LOAD LENGTH)	60'-8" BOX CAR (704" LOAD LENGTH)
20	---	---	35" THRU 35-1/8"
19	---	---	35-1/8" THRU 37"
18	---	---	37" THRU 39"
17	---	---	39" THRU 41-3/8"
16	---	---	41-3/8" THRU 44"
15	---	35" THRU 37-1/8"	44" THRU 46-7/8"
14	---	37-1/8" THRU 41-1/2"	46-7/8" THRU 50-1/4"
13	35" THRU 35-1/2"	41-1/2" THRU 44"	50-1/4 THRU 54"
12	35-1/2" THRU 38-1/2"	44" THRU 48-1/2"	---
11	38-1/2" THRU 42"	48-1/2" THRU 52-7/8"	---
10	42" THRU 46-1/8"	52-7/8" THRU 54"	---
9	46-1/8" THRU 51-1/4"	---	---
8	51-1/4" THRU 54"	---	---

CHART NO. 3

MAX NO. OF TIERS IN BOX CAR

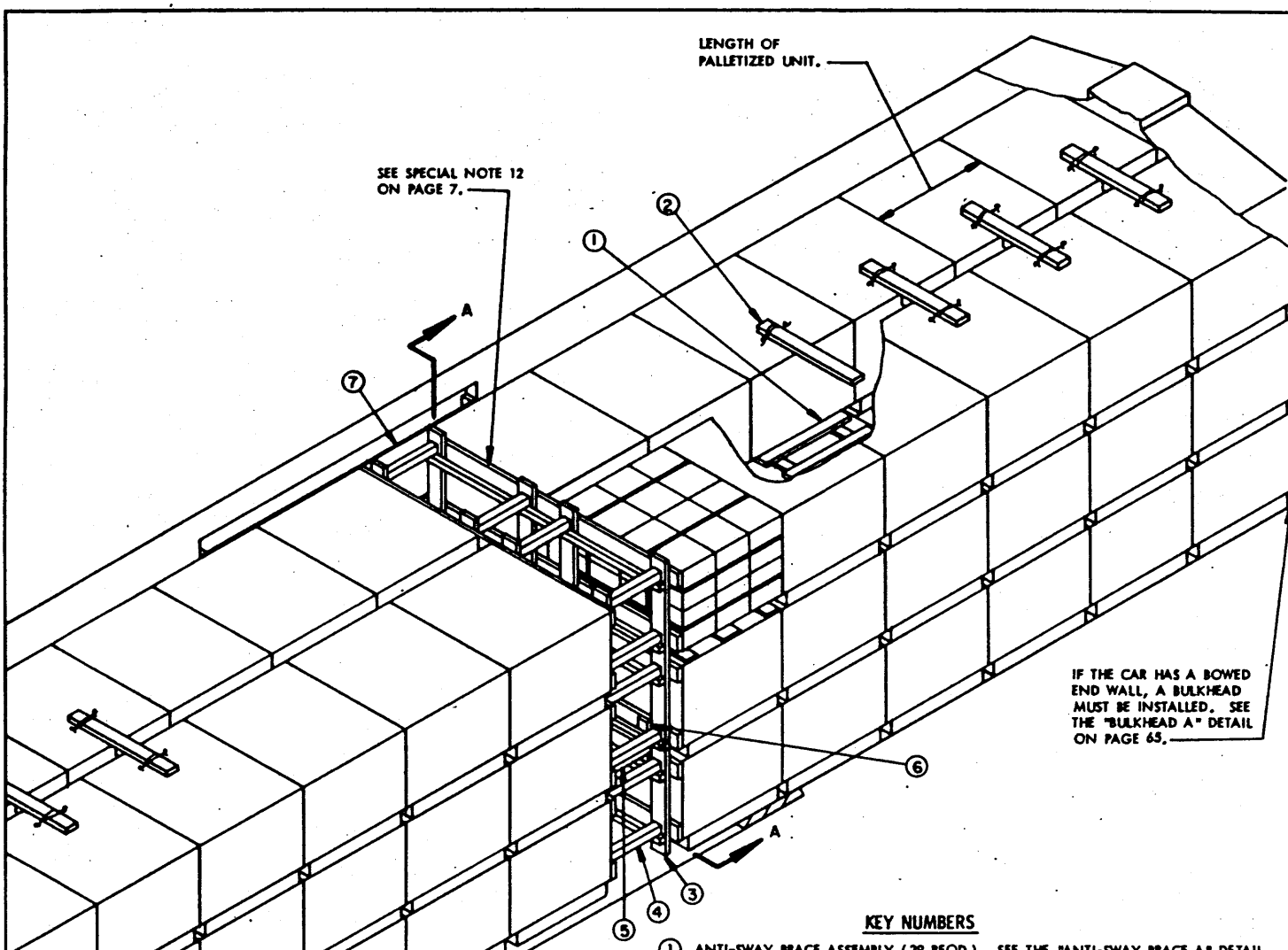
NO. OF LAYERS	UNIT HEIGHT RANGE		
	8'-6" HIGH LOAD	9'-2" HIGH LOAD	9'-8" HIGH LOAD
7	---	13-7/8" THRU 15-5/8"	14-1/2" THRU 16-3/8"
6	14-5/8" THRU 17"	15-5/8" THRU 18-1/4"	16-3/8" THRU 19-1/8"
5	17" THRU 20-3/8"	18-1/4" THRU 22"	19-1/8" THRU 23"
4	20-3/8" THRU 25-1/2"	22" THRU 27-1/2"	23" THRU 28-7/8"
3	25-1/2" THRU 34"	27-1/2" THRU 36-5/8"	28-7/8" THRU 38-1/2"
2	34" THRU 51"	36-5/8" THRU 55"	OVER 38-1/2"
1	OVER 51"	OVER 55"	---

CHART NO. 4

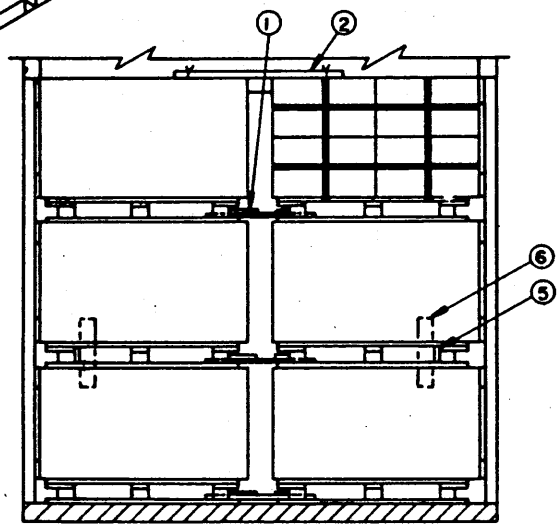
MAX NO. OF UNITS PER CAR BY WEIGHT

UNIT WEIGHT IN LBS	NO. OF UNITS			
	100,000 LB CAPACITY CAR	120,000 LB CAPACITY CAR	140,000 LB CAPACITY CAR	150,000 LB CAPACITY CAR
400	250	300	350	375
500	200	240	280	300
600	166	200	233	250
700	142	171	200	214
800	125	150	175	187
900	111	133	155	166
1,000	100	120	140	150
1,100	90	109	127	136
1,200	83	100	116	125
1,300	76	92	107	115
1,400	71	85	100	107
1,500	66	80	93	100
1,600	62	75	87	93
1,700	58	70	82	88
1,800	55	66	77	83
1,900	52	63	73	78
2,000	50	60	70	75
2,100	47	57	66	71
2,200	45	54	63	68
2,250	44	53	62	66

CAUTION: THE LOAD LIMIT OF A CAR MUST NOT BE EXCEEDED.



ISOMETRIC VIEW



SECTION A-A

KEY NUMBERS

(1) ANTI-SWAY BRACE ASSEMBLY (39 REQD). SEE THE "ANTI-SWAY BRACE A" DETAIL ON PAGE 64. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLETIZED UNITS. SEE GENERAL NOTE "G" ON PAGE 2 AND SPECIAL NOTES 3, 4 AND 14 ON PAGE 7.

(2) TOP-OF-LOAD ANTI-SWAY BRACE (8 REQD). SEE THE DETAIL ON PAGE 61. WIRE TIE TO AN INNER UNITIZING STRAP WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION B" DETAIL ON THAT PAGE. SEE SPECIAL NOTE 5 ON PAGE 7.

(3) CENTER GATE (2 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 46.

(4) STRUT, 4" X 4" BY CUT TO FIT (24 REQD). TOENAIL TO PIECES MARKED (3) W/2-16d NAILS AT EACH END. SEE GENERAL NOTE "F" ON PAGE 2 AND SPECIAL NOTE 6 ON PAGE 7.

(5) GATE HOLD DOWN, 2" X 3" BY CENTER VOID AREA PLUS 24" (2 REQD). POSITION TO EXTEND UNDER PALLET UNITS AND NAIL TO PIECES MARKED (3) W/2-10d NAILS AT EACH JOINT. SEE THE "INSTALLATION OF GATE HOLD DOWN A" DETAIL ON PAGE 55 FOR GUIDANCE.

(6) GATE HOLD DOWN RETAINER PIECE, 2" X 4" BY LENGTH TO SUIT (4 REQD). POSITION AGAINST PIECE MARKED (5) AND NAIL TO THE HORIZONTAL PIECES OF A CENTER GATE W/3-10d NAILS AT EACH END. SEE THE "INSTALLATION OF GATE HOLD DOWN A" DETAIL ON PAGE 55 FOR GUIDANCE.

(7) DOORWAY PROTECTION (2 REQD). SEE THE "ALTERNATIVE DOORWAY PROTECTION D" DETAIL ON PAGE 60. SEE SPECIAL NOTE 7 ON PAGE 7.

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

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.

2. THE PALLETIZED UNIT SHOWN IN THE TYPICAL 2-WIDE LOAD ON PAGE 6 HAS OVERALL DIMENSIONS OF 44-1/4" LONG BY 52" WIDE BY 36-1/2" HIGH. THE UNIT WEIGHT IS 1,744 POUNDS. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER LENGTHS AND WIDTHS IN A 9'-2" WIDE CAR. BASED ON A DOOR HEIGHT OF 9'-8", FULL LOADS OF UNITS WHICH ARE MORE THAN 38-1/2" IN HEIGHT WILL BE LIMITED TO NOT MORE THAN TWO (2) TIERS.

3. THE ANTI-SWAY BRACE A, SHOWN IN THE LOAD VIEW AS PIECE MARKED ①, IS DESIGNED FOR USE WITHIN LOADS HAVING THE PALLETIZED UNITS POSITIONED WITH THE LENGTH PARALLEL TO THE CAR SIDEWALLS.

4. THE ANTI-SWAY BRACING MAY BE OMITTED IF THE SPACE BETWEEN LATERALLY ADJACENT UNITS IS 6" OR LESS, AS MEASURED FROM BOX TO BOX ON LATERALLY ADJACENT UNITS, OR BETWEEN BATTENS, AS APPLICABLE. IF THE EXCESS SPACE EXCEEDS THE MAXIMUM ALLOWABLE, ANTI-SWAY BRACES MUST BE POSITIONED BETWEEN ALL LATERALLY ADJACENT PALLETIZED UNITS. IF THE CAR BEING LOADED HAS NAILABLE SIDEWALLS, A SMALL EXCESS LATERAL SPACE CAN BE FILLED BY APPLYING ONE OR MORE LAMINATIONS OF ONE INCH (1") AND/OR TWO INCH (2") LUMBER TO ONE OR TO BOTH SIDEWALLS OF THE CAR IN LIEU OF USING PIECES MARKED ①. INSTALL HORIZONTALLY SO AS TO CONTACT THE TOP AND BOTTOM LAYERS OF BOXES ON THE UNITS AND NAIL TO THE CAR SIDEWALL WITH ONE APPLICABLEY SIZED NAIL EVERY 24".

5. TOP-OF-LOAD ANTI-SWAY BRACES MUST BE INSTALLED IN EACH END OF A CAR. THE QUANTITY NEEDED IS DEPENDENT UPON THE DIMENSION OF THE UNIT WHICH IS POSITIONED LENGTHWISE IN THE CAR, AND UPON THE LENGTH OF THE CAR BEING LOADED. REFER TO THE "TOP-OF-LOAD ANTI-SWAY BRACE REQUIREMENTS" CHART ON PAGE 61 FOR GUIDANCE.

6. FOUR (4) LOAD BLOCKING 4" X 4" STRUTS FOR EACH ROW/TIER ARE ADEQUATE FOR RETAINING SEVEN (7) PALLETIZED UNITS HAVING A WEIGHT OF NOT MORE THAN 1,750 POUNDS EACH. REFER TO THE "STRUTTING REQUIREMENTS" CHART ON PAGE 57 FOR GUIDANCE AS TO THE MAXIMUM WEIGHT PER UNIT WHEN THE LOAD IN THE LONG END OF THE CAR IS MORE OR LESS THAN SEVEN UNITS IN LENGTH. THE "ALT STRUTTING VIEW A" AND "ALT STRUTTING VIEW B" AT THE TOP OF PAGE 57 DEPICT INSTALLATION GUIDANCE FOR 4" X 6" ON-EDGE STRUTS AND DOUBLED 4" X 4" STRUTS, RESPECTIVELY. THESE STRUTS MAY BE REQUIRED FOR THE BRACING OF A HEAVIER LOAD, IN LIEU OF THE SINGLE 4" X 4" STRUTS SHOWN IN THE LOAD VIEW. SEE SPECIAL NOTE 15.

7. DOORWAY PROTECTION IS REQUIRED FOR ALL THE LOAD UNITS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OF A CAR OR WHICH EXTEND INTO THE DOORWAY BY ONE-HALF OR MORE OF THE UNIT LENGTH. FOR ALTERNATIVE DOORWAY PROTECTION PROCEDURES SEE PAGES 58, 59 AND 60.

8. THE DEPICTED LOAD CAN BE ADJUSTED TO SUIT THE QUANTITY TO BE SHIPPED. A 3-TIER LOAD CAN BE REDUCED BY A MULTIPLE OF SIX (6) UNITS OR A 2-TIER LOAD CAN BE REDUCED BY A MULTIPLE OF FOUR (4) UNITS BY OMITTING ONE OR MORE LOAD UNITS FROM THE CENTER PORTION OF THE LOAD. OR, ONE OR MORE UNITS CAN BE OMITTED FROM A TIER BY INSTALLING GATES AND STRUTS IN THE PLACE OF AN OMITTED UNIT, SIMILAR TO THE METHOD SHOWN ON PAGE 81 OR, IF THE DESIRED QUANTITY CANNOT BE ATTAINED BY OMITTING AN ENTIRE TIER, UNITS CAN BE RETAINED IN BOTH ENDS OF THE CAR WITH KNEE BRACES AS SHOWN ON PAGES 28 AND 29 OR; UNITS CAN BE RETAINED IN ONE OR BOTH ENDS OF A CAR WITH RISERS AS SHOWN ON PAGE 22, OR WITH K-BRACES AS SHOWN ON PAGE 30 PROVIDING THE CAR HAS NAILABLE SIDEWALLS, OR WITH BULKHEAD GATES AND STRAPS IF THE CAR IS EQUIPPED WITH ANCHOR DEVICES AS SHOWN ON PAGE 24. ANY APPLICABLE COMBINATION OF THESE PROCEDURES FOR ADJUSTING A LOAD MAY ALSO BE USED TO ATTAIN THE DESIRED QUANTITY. THE COMBINATION LOADING PROCEDURES SHOWN ON PAGES 10 AND 12 MAY BE MORE ADVANTAGEOUS THAN ANY OF THE AFOREMENTIONED LOAD-REDUCING PROCEDURES AND SHOULD BE INVESTIGATED PRIOR TO MAKING A SELECTION DECISION. SEE SPECIAL NOTE 11 BELOW.

9. AS APPLICABLE, IT IS TO BE NOTED THAT IN A 9'-2" WIDE CAR THE UNITS WHICH HAVE A LENGTH OF 36-1/4" OR LESS, AND IN A 9'-4" WIDE CAR THE UNITS WHICH HAVE A LENGTH OF 37" OR LESS, CAN BE LOADED IN LARGER QUANTITIES IF THE 3-WIDE LOADING PROCEDURES SHOWN ON PAGES 14 AND 15 ARE EMPLOYED.

(CONTINUED AT RIGHT)

(SPECIAL NOTES CONTINUED)

10. IF UNITS WHICH DO NOT CONTAIN A FULL QUANTITY OF BOXES ARE TO BE TRANSPORTED, REFER TO PAGES 34 AND 35 FOR SHIPPING GUIDANCE.

11. IN ADDITION TO THOSE LOAD-ADJUSTING PROCEDURES SPECIFIED WITHIN SPECIAL NOTE 8 AT LEFT, THE PROCEDURES SHOWN ON PAGE 16 MAY BE APPLIED FOR INCREASING A LOAD QUANTITY. CAUTION: THE TOTAL OF THREE UNIT LENGTHS MUST BE LESS THAN THE WIDTH OF THE CAR BY 1" OR MORE. ANOTHER LOAD-ADJUSTING PROCEDURE, WHICH IS SHOWN ON PAGES 20 AND 21 CAN BE USED AS GUIDANCE FOR OMITTING PALLETIZED UNITS FROM A LOAD UNIT ADJACENT TO THE CENTER BLOCKING.

12. CONSTRUCTION OF THE CENTER GATE A, SHOWN IN THE LOAD VIEW AS PIECE MARKED ③, IS BASED ON THE WIDTH AND HEIGHT OF THE PALLETIZED UNIT TO BE SHIPPED AND UPON THE INSIDE WIDTH OF THE CAR TO BE LOADED. FOR EASE OF HANDLING, SPLIT CENTER GATES, WHICH ARE NOT DEPENDENT UPON THE WIDTH OF THE CAR, MAY BE USED AS AN ALTERNATIVE. IN LIEU OF EACH CENTER GATE A, INSTALL TWO (2) GATES SHOWN AS CENTER GATE G ON PAGE 52. AFTER THE GATES AND THE STRUTS HAVE BEEN INSTALLED, THE SPLIT GATES MUST BE TIED TOGETHER AS DEPICTED BY THE "TIE PIECE APPLICATION A" DETAIL ON PAGE 54.

13. DOOR SPANNER TYPE GATE HOLD DOWN MAY BE USED IN LIEU OF PIECES MARKED ⑤ AND ⑥ SHOWN IN THE LOAD VIEW ON PAGE 6, PROVIDING THE CAR BEING LOADED HAS NAILABLE SIDE WALLS. SEE THE PROCEDURES SHOWN ON PAGE 56 FOR GUIDANCE.

14. IF DESIRED, THE ANTI-SWAY BRACE ASSEMBLY C, AS DETAILED ON PAGE 65, MAY BE USED IN LIEU OF THE ANTI-SWAY BRACE ASSEMBLY A SHOWN IN THE LOAD VIEW. THE ANTI-SWAY BRACE ASSEMBLY A IS THE PREFERRED METHOD IF THE SPACE BETWEEN LATERALLY ADJACENT PALLET UNITS IS SUCH THAT IT CAN BE EASILY INSTALLED. NOTE THAT IF ANTI-SWAY BRACE ASSEMBLY C IS USED, RETAINER PIECES MUST BE ADDED TO THE CENTER GATES. SEE THE "TYPICAL INSTALLATION OF ANTI-SWAY BRACE RETAINER" DETAIL ON PAGE 65.

15. IF DESIRED, DOUBLE 2" X 6" STRUTS MAY BE USED IN LIEU OF THE DEPICTED 4" X 4" STRUTS, PIECES MARKED ④. OR, TRIPLE 2" X 6" STRUTS MAY BE USED IN LIEU OF THE 4" X 6" ON-EDGE STRUTS SPECIFIED BY THE "ALTERNATIVE STRUTTING VIEW A" ON PAGE 57. LAMINATE THE 2" X 6" PIECES W/1-10d NAIL EVERY 6" AND TOENAIL THE TOP STRUT PIECE TO THE VERTICAL PIECES OF THE CENTER GATES, PIECES MARKED ③, W/2-12d NAILS AT EACH END.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	120	60
2" X 2"	102	34
2" X 3"	45	23
2" X 4"	336	224
2" X 6"	185	185
2" X 8"	114	152
4" X 4"	50	67
NAILS	**NO. REQD**	**POUNDS**
6d (2")	72	1/2
10d (3")	740	11-1/2
12d (3-1/4")	16	1/4
16d (3-1/2")	96	2-1/4
WIRE, NO. 14 GAGE ---------- 28' REQD ---------- NIL		

LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLETIZED UNIT	78	136,032 LBS
DUNNAGE		1,505 LBS
TOTAL WEIGHT		137,537 LBS

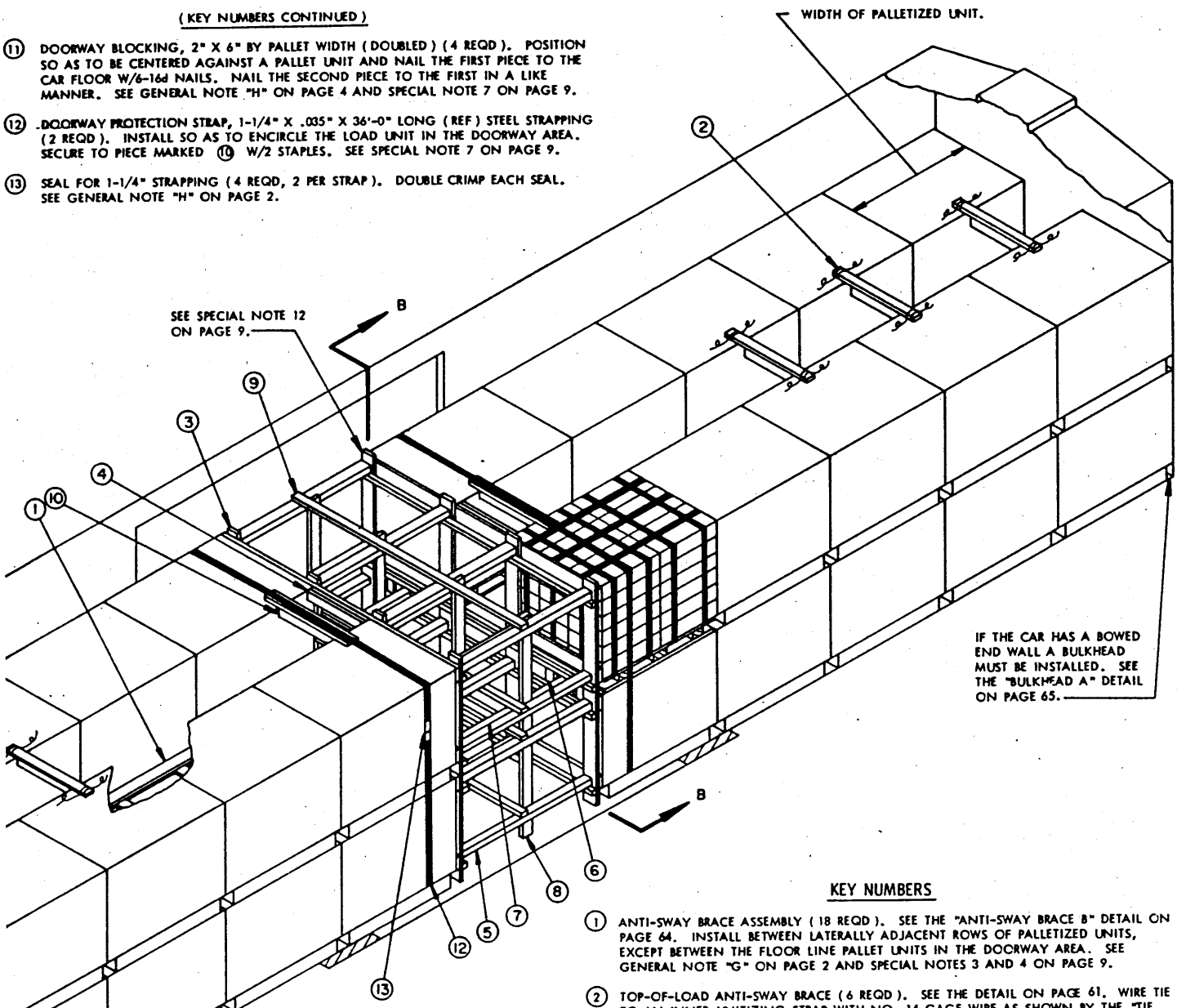
TYPICAL 2-WIDE LOAD IN A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL BOX CAR

(KEY NUMBERS CONTINUED)

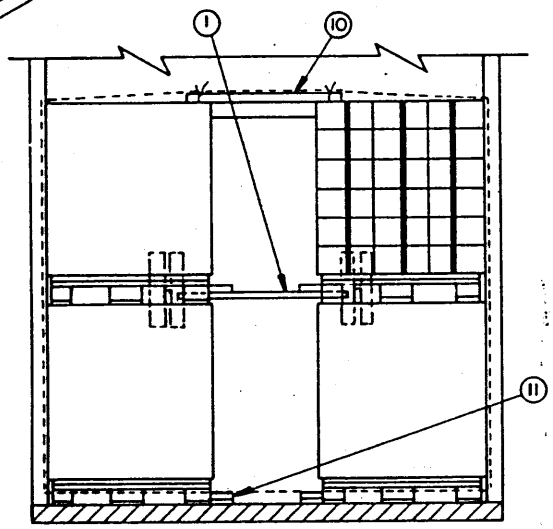
(11) DOORWAY BLOCKING, 2" X 6" BY PALLET WIDTH (DOUBLED) (4 REQD). POSITION SO AS TO BE CENTERED AGAINST A PALLET UNIT AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/6-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "H" ON PAGE 4 AND SPECIAL NOTE 7 ON PAGE 9.

(12) DOORWAY PROTECTION STRAP, 1-1/4" X .035" X 36'-0" LONG (REF) STEEL STRAPPING (2 REQD). INSTALL SO AS TO ENCIRCLE THE LOAD UNIT IN THE DOORWAY AREA. SECURE TO PIECE MARKED (10) W/2 STAPLES. SEE SPECIAL NOTE 7 ON PAGE 9.

(13) SEAL FOR 1-1/4" STRAPPING (4 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "H" ON PAGE 2.



ISOMETRIC VIEW



SECTION B-B

KEY NUMBERS

(1) ANTI-SWAY BRACE ASSEMBLY (18 REQD). SEE THE "ANTI-SWAY BRACE B" DETAIL ON PAGE 64. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLETIZED UNITS, EXCEPT BETWEEN THE FLOOR LINE PALLET UNITS IN THE DOORWAY AREA. SEE GENERAL NOTE "G" ON PAGE 2 AND SPECIAL NOTES 3 AND 4 ON PAGE 9.

(2) TOP-OF-LOAD ANTI-SWAY BRACE (6 REQD). SEE THE DETAIL ON PAGE 61. WIRE TIE TO AN INNER UNITIZING STRAP WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION A" DETAIL ON THAT PAGE. SEE SPECIAL NOTE 5 ON PAGE 9.

(3) CENTER GATE (2 REQD). SEE THE "CENTER GATE B" DETAIL ON PAGE 47.

(4) CENTER GATE RETAINER, 2" X 4" BY CUT-TO-FIT BETWEEN LATERALLY ADJACENT PALLET UNITS (DOUBLED) (4 REQD). POSITION ON TOP AND BOTTOM HORIZONTAL PIECES OF CENTER GATE AND NAIL THE FIRST PIECE TO THE CENTER GATE W/3-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.

(5) STRUT, 4" X 4" BY CUT TO FIT (16 REQD). TOENAIL TO PIECES MARKED (3) W/2-16d NAILS AT EACH END. SEE GENERAL NOTE "F" ON PAGE 2, AND SPECIAL NOTE 6 ON PAGE 9.

(6) GATE HOLD DOWN RETAINER PIECE, 2" X 4" BY LENGTH TO SUIT (8 REQD). POSITION AGAINST PIECE MARKED (3) AND NAIL TO THE HORIZONTAL PIECES OF A CENTER GATE W/3-10d NAILS AT EACH END. SEE SPECIAL NOTE 15 ON PAGE 9.

(7) GATE HOLD DOWN, 2" X 3" BY CENTER DISTANCE PLUS 24" (2 REQD). POSITION TO EXTEND UNDER PALLET UNITS AND NAIL TO PIECES MARKED (6) W/2-10d NAILS AT EACH JOINT. SEE THE "INSTALLATION OF GATE HOLD DOWN B" DETAIL ON PAGE 55 FOR GUIDANCE. SEE SPECIAL NOTE 15 ON PAGE 9.

(8) VERTICAL STRUT BRACING, 2" X 4" BY CUT TO EXTEND 2" ABOVE TOP STRUT (4 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT. SEE GENERAL NOTE "K" ON PAGE 4.

(9) HORIZONTAL STRUT BRACING, 2" X 4" BY CAR WIDTH MINUS 1/2" (4 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.

(10) SPACER (2 REQD). SEE THE DETAIL ON PAGE 61.

(CONTINUED AT LEFT)

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

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 12'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.

2. THE PALLETIZED UNIT SHOWN IN THE TYPICAL 2-WIDE LOAD ON PAGE 8 HAS OVERALL DIMENSIONS OF 42" LONG BY 53-3/4" WIDE BY 45-1/4" HIGH. THE UNIT WEIGHT IS 2,008 POUNDS. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER LENGTHS AND WIDTHS IN A 9'-2" WIDE CAR. BASED ON A DOOR HEIGHT OF 9'-8", FULL LOADS OF UNITS WHICH ARE MORE THAN 38-1/2" IN HEIGHT WILL BE LIMITED TO NOT MORE THAN TWO (2) TIERS.

3. THE ANTI-SWAY BRACE B, SHOWN IN THE LOAD VIEW AS PIECE MARKED ①, IS DESIGNED FOR USE WITHIN LOADS HAVING THE PALLETIZED UNITS POSITIONED WITH THE WIDTH PARALLEL TO THE CAR SIDE WALLS.

4. THE ANTI-SWAY BRACING MAY BE OMITTED IF THE SPACE BETWEEN LATERALLY ADJACENT UNITS IS 6" OR LESS, AS MEASURED FROM BOX TO BOX ON LATERALLY ADJACENT UNITS, OR BETWEEN BATTENS, AS APPLICABLE. IF THE EXCESS SPACE EXCEEDS THE MAXIMUM ALLOWABLE, ANTI-SWAY BRACES MUST BE POSITIONED BETWEEN ALL LATERALLY ADJACENT PALLETIZED UNITS, EXCEPT THE FLOOR LINE UNITS WHICH ARE COMPLETELY IN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE UNIT LENGTH. IF THE CAR BEING LOADED HAS NAILABLE SIDEWALLS, A SMALL EXCESS LATERAL SPACE CAN BE FILLED BY APPLYING ONE OR MORE LAMINATIONS OF ONE INCH (1") AND/OR TWO INCH (2") LUMBER TO ONE OR TO BOTH SIDEWALLS OF THE CAR IN LIEU OF USING PIECES MARKED ①. INSTALL HORIZONTALLY SO AS TO CONTACT THE TOP AND BOTTOM LAYERS OF BOXES ON THE UNITS AND NAIL TO THE CAR SIDEWALL WITH ONE APPLICABLY SIZED NAIL EVERY 24".

5. TOP-OF-LOAD ANTI-SWAY BRACES MUST BE INSTALLED IN EACH END OF A CAR. THE QUANTITY NEEDED IS DEPENDENT UPON THE DIMENSION OF THE UNIT WHICH IS POSITIONED LENGTHWISE IN THE CAR, AND UPON THE LENGTH OF THE CAR BEING LOADED. REFER TO THE "TOP-OF-LOAD ANTI-SWAY BRACE REQUIREMENTS" CHART ON PAGE 61 FOR GUIDANCE.

6. FOUR (4) LOAD BLOCKING 4" X 4" STRUTS FOR EACH ROW/TIER ARE ADEQUATE FOR RETAINING FIVE (5) PALLETIZED UNITS HAVING A WEIGHT OF NOT MORE THAN 2,450 POUNDS EACH. REFER TO THE "STRUTTING REQUIREMENTS" CHART ON PAGE 57 FOR GUIDANCE AS TO THE MAXIMUM WEIGHT PER UNIT WHEN THE LOAD IN THE LONG END OF THE CAR IS MORE OR LESS THAN FIVE UNITS IN LENGTH. THE "ALT STRUTTING VIEW A" AND "ALT STRUTTING VIEW B" ON PAGE 57 DEPICT INSTALLATION GUIDANCE FOR 4" X 6" ON-EDGE STRUTS AND DOUBLED 4" X 4" STRUTS, RESPECTIVELY. THESE STRUTS MAY BE REQUIRED FOR THE BRACING OF A HEAVIER LOAD, IN LIEU OF THE SINGLE 4" X 4" STRUTS SHOWN IN THE LOAD VIEW. SEE SPECIAL NOTE 16.

7. DOORWAY PROTECTION IS REQUIRED FOR ALL THE LOAD UNITS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OF A CAR OR WHICH EXTEND INTO THE DOORWAY BY ONE-HALF OR MORE OF THE UNIT LENGTH. DOORWAY PROTECTION WILL CONSIST OF NAILED-DOWN BLOCKING BETWEEN THE STACKS, AND STEEL STRAPPING ENCIRCLING THE LOAD UNIT. TWO (2) STRAPS ARE REQUIRED AROUND A LOAD UNIT WHICH IS NOT RETAINED BY AT LEAST SIX INCHES (6") OF THE CAR SIDEWALL ON BOTH SIDES OF THE LOAD, AND ONE (1) STRAP IS REQUIRED AROUND A LOAD UNIT WHICH IS RETAINED BY AT LEAST SIX INCHES (6") BUT LESS THAN HALF OF THE UNIT LENGTH. FOR ALTERNATIVE DOORWAY PROTECTION PROCEDURES SEE PAGES 58, 59 AND 60.

8. THE DEPICTED LOAD CAN BE ADJUSTED TO SUIT THE QUANTITY TO BE SHIPPED. A 2-TIER LOAD CAN BE REDUCED BY A MULTIPLE OF FOUR (4) UNITS BY OMITTING ONE OR MORE LOAD UNITS FROM THE CENTER PORTION OF THE LOAD. OR, ONE OR MORE UNITS CAN BE OMITTED FROM A TIER BY INSTALLING GATES AND STRUTS IN THE PLACE OF AN OMITTED UNIT, SIMILAR TO THE METHOD SHOWN ON PAGE 81 OR, IF THE DESIRED QUANTITY CANNOT BE ATTAINED BY OMITTING AN ENTIRE TIER, UNITS CAN BE RETAINED IN BOTH ENDS OF THE CAR WITH KNEE BRACES AS SHOWN ON PAGES 28 AND 29 OR; UNITS CAN BE RETAINED IN ONE OR BOTH ENDS OF A CAR WITH RISERS AS SHOWN ON PAGE 22; OR WITH K-BRACES AS SHOWN ON PAGE 30 PROVIDING THE CAR HAS NAILABLE SIDEWALLS, OR WITH BULKHEAD GATES AND STRAPS IF THE CAR IS EQUIPPED WITH ANCHOR DEVICES AS SHOWN ON PAGE 24. ANY APPLICABLE COMBINATION OF THESE PROCEDURES FOR ADJUSTING A LOAD MAY ALSO BE USED TO ATTAIN THE DESIRED QUANTITY. THE COMBINATION LOADING PROCEDURES SHOWN ON PAGES 10 AND 12 MAY BE MORE ADVANTAGEOUS THAN ANY OF THE AFOREMENTIONED LOAD-REDUCING PROCEDURES AND SHOULD BE INVESTIGATED PRIOR TO MAKING A SELECTION DECISION. SEE SPECIAL NOTE 11 AT RIGHT.

(CONTINUED AT RIGHT)

(SPECIAL NOTES CONTINUED)

9. AS APPLICABLE, IT IS TO BE NOTED THAT IN A 9'-2" WIDE CAR THE UNITS WHICH HAVE A LENGTH OF 36-1/4" OR LESS, AND IN A 9'-4" WIDE CAR THE UNITS WHICH HAVE A LENGTH OF 37" OR LESS, CAN BE LOADED IN LARGER QUANTITIES IF THE 3-WIDE LOADING PROCEDURES SHOWN ON PAGES 14 AND 15 ARE EMPLOYED.

10. IF UNITS WHICH DO NOT CONTAIN A FULL QUANTITY OF BOXES ARE TO BE TRANSPORTED, REFER TO PAGES 34 AND 35 FOR SHIPPING GUIDANCE.

11. IN ADDITION TO THOSE LOAD-ADJUSTING PROCEDURES SPECIFIED WITHIN SPECIAL NOTE 8 AT LEFT, THE PROCEDURES SHOWN ON PAGE 16 MAY BE APPLIED FOR INCREASING A LOAD QUANTITY. CAUTION: THE TOTAL OF THREE UNIT LENGTHS MUST BE LESS THAN THE WIDTH OF THE CAR BY 1" OR MORE. ANOTHER LOAD-ADJUSTING PROCEDURE, WHICH IS SHOWN ON PAGES 20 AND 21 CAN BE USED AS GUIDANCE FOR OMITTING PALLETIZED UNITS FROM A LOAD UNIT ADJACENT TO THE CENTER BLOCKING.

12. CONSTRUCTION OF THE CENTER GATE B, SHOWN IN THE LOAD VIEW AS PIECE MARKED ③, IS BASED ON THE WIDTH AND HEIGHT OF THE PALLETIZED UNIT TO BE SHIPPED AND UPON THE INSIDE WIDTH OF THE CAR TO BE LOADED. FOR EASE OF HANDLING, SPLIT CENTER GATES, WHICH ARE NOT DEPENDENT UPON THE WIDTH OF THE CAR, MAY BE USED AS AN ALTERNATIVE. IN LIEU OF EACH CENTER GATE B, INSTALL TWO (2) GATES SHOWN AS CENTER GATE F ON PAGE 51. AFTER THE GATES AND THE STRUTS HAVE BEEN INSTALLED, THE SPLIT GATES MUST BE TIED TOGETHER AS DEPICTED BY THE "TIE PIECE APPLICATION A" DETAIL ON PAGE 54.

13. IF THE BOX CAR IS EQUIPPED WITH DOOR OPENINGS LESS THAN 12'-0" WIDE AN OFFSET LOADING PATTERN, SUCH AS SHOWN ON PAGE 6, MUST BE USED. SEE GENERAL NOTES "J" AND "M" ON PAGE 4.

14. THE PURPOSE OF LOADING THE PALLETIZED UNITS WITH THE WIDTH PARALLEL TO THE CAR SIDE WALLS IS TO REDUCE THE QUANTITY OF UNITS IN A LOAD AND/OR TO SHORTEN THE LENGTH OF THE LOAD-BLOCKING STRUTS. ALSO, IT MAY BE NECESSARY TO LOAD LIKE THIS IN A CAR HAVING AN INSIDE WIDTH OF 9'-0" OR LESS.

15. DOOR SPANNER TYPE GATE HOLD DOWNS MAY BE USED IN LIEU OF PIECES MARKED ⑥ AND ⑦ SHOWN IN THE LOAD VIEW ON PAGE 8, PROVIDING THE CAR BEING LOADED HAS NAILABLE SIDEWALLS. SEE THE PROCEDURES SHOWN ON PAGE 56 FOR GUIDANCE.

16. IF DESIRED, DOUBLE 2" X 6" STRUTS MAY BE USED IN LIEU OF THE DEPICTED 4" X 4" STRUTS, PIECES MARKED ⑤. OR, TRIPLE 2" X 6" STRUTS MAY BE USED IN LIEU OF THE 4" X 6" ON-EDGE STRUTS SPECIFIED BY THE "ALTERNATIVE STRUTTING VIEW A" ON PAGE 57. LAMINATE THE 2" X 6" PIECES W/1-10d NAIL EVERY 6" AND TOENAIL THE TOP STRUT PIECE TO THE VERTICAL PIECES OF THE CENTER GATES, PIECES MARKED ③, W/2-12d NAILS AT EACH END.

BILL OF MATERIAL

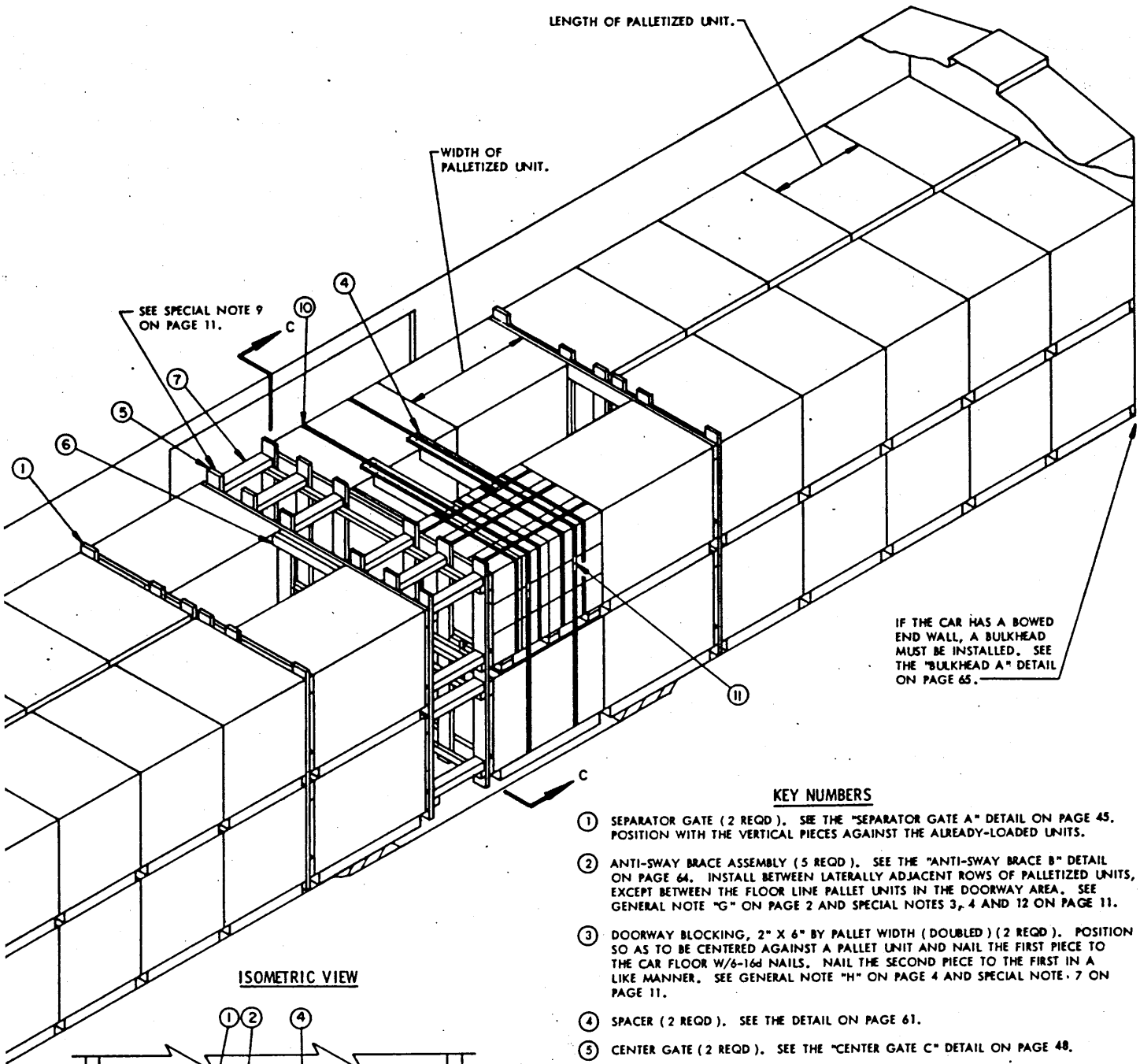
LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	74	25
2" X 3"	15	8
2" X 4"	250	167
2" X 6"	285	285
4" X 4"	85	114
NAILS	**NO. REQD**	**POUNDS**
10d (3")	552	8-1/2
12d (3-1/4")	40	3/4
16d (3-1/2")	112	2-1/2

STEEL STRAPPING, 1-1/4" X .035"—72' REQD ---------- 11 LBS
SEAL FOR 1-1/4" STRAPPING ------- 4 REQD ---------- NIL
STAPLE FOR 1-1/4" STRAPPING ----- 4 REQD ---------- NIL
WIRE, NO. 14 GAGE ---------- 24' REQD ---------- NIL

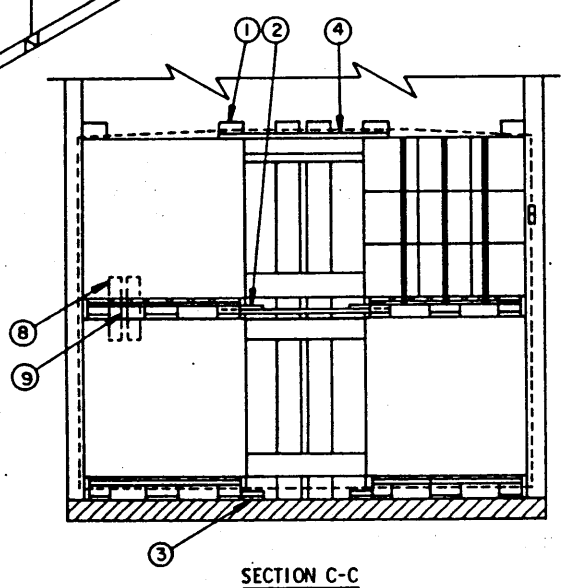
LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLETIZED UNIT	40	80,320 LBS
DUNNAGE		1,221 LBS
TOTAL WEIGHT		81,541 LBS

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



ISOMETRIC VIEW



SECTION C-C

KEY NUMBERS

(1) SEPARATOR GATE (2 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 45. POSITION WITH THE VERTICAL PIECES AGAINST THE ALREADY-LOADED UNITS.

(2) ANTI-SWAY BRACE ASSEMBLY (5 REQD). SEE THE "ANTI-SWAY BRACE B" DETAIL ON PAGE 64. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLETIZED UNITS, EXCEPT BETWEEN THE FLOOR LINE PALLET UNITS IN THE DOORWAY AREA. SEE GENERAL NOTE "G" ON PAGE 2 AND SPECIAL NOTES 3, 4 AND 12 ON PAGE 11.

(3) DOORWAY BLOCKING, 2" X 6" BY PALLET WIDTH (DOUBLED) (2 REQD). POSITION SO AS TO BE CENTERED AGAINST A PALLET UNIT AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/6-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "H" ON PAGE 4 AND SPECIAL NOTE 7 ON PAGE 11.

(4) SPACER (2 REQD). SEE THE DETAIL ON PAGE 61.

(5) CENTER GATE (2 REQD). SEE THE "CENTER GATE C" DETAIL ON PAGE 48.

(6) CENTER GATE RETAINER, 2" X 4" BY CUT-TO-FIT BETWEEN LATERALLY ADJACENT PALLET UNITS (DOUBLED)(4 REQD). POSITION ON TOP AND BOTTOM HORIZONTAL PIECES OF CENTER GATE AND NAIL THE FIRST PIECE TO THE CENTER GATE W/3-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.

(7) STRUT, 4" X 4" BY CUT TO FIT (24 REQD). TOENAIL TO PIECES MARKED (5) W/2-16d NAILS AT EACH END. SEE GENERAL NOTE "F" ON PAGE 2 AND SPECIAL NOTE 6 ON PAGE 11.

(8) GATE HOLD DOWN RETAINER PIECE, 2" X 4" BY LENGTH TO SUIT (8 REQD). POSITION AGAINST PIECE MARKED (9) AND NAIL TO THE HORIZONTAL PIECES OF A CENTER GATE W/3-10d NAILS AT EACH END. SEE SPECIAL NOTE 8 ON PAGE 11.

(9) GATE HOLD DOWN, 2" X 3" BY CENTER DISTANCE PLUS 24" (2 REQD). POSITION TO EXTEND UNDER PALLET UNITS AND NAIL TO A PIECE MARKED (8) W/2-10d NAILS AT EACH JOINT. SEE THE "INSTALLATION OF GATE HOLD DOWN B" DETAIL ON PAGE 55 FOR GUIDANCE. SEE SPECIAL NOTE 8 ON PAGE 11.

(10) DOORWAY PROTECTION STRAP, 1-1/4" X .035" X 36'-0" LONG (REF) STEEL STRAPPING (2 REQD). INSTALL SO AS TO ENCIRCLE THE LOAD UNITS IN THE DOORWAY AREA. SECURE TO PIECE MARKED (4) W/2 STAPLES. SEE SPECIAL NOTE 7 ON PAGE 11.

(11) SEAL FOR 1-1/4" STRAPPING (4 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "H" ON PAGE 2.

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

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.

2. THE PALLETIZED UNIT SHOWN IN THE TYPICAL COMBINATION LOAD ON PAGE 10 HAS OVERALL DIMENSIONS OF 40-1/2" LONG BY 54" WIDE BY 46" HIGH. THE UNIT WEIGHT IS 2,116 POUNDS. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER SIZES. HOWEVER, THE PURPOSE OF THIS TYPE OF COMBINATION LOADING IS TO INCREASE OR REDUCE THE QUANTITY OF UNITS IN A LOAD AND/OR TO SHORTEN THE LENGTH OF THE LOAD-BLOCKING STRUTS, AND THERE IS NO ADVANTAGE UNLESS THE WIDTH OF THE UNIT MEASURES MORE THAN THE LENGTH BY AN APPRECIABLE AMOUNT.

3. THE ANTI-SWAY BRACE B, SHOWN IN THE LOAD VIEW AS PIECE MARKED ②, IS DESIGNED FOR USE WITHIN LOADS HAVING THE PALLETIZED UNITS POSITIONED WITH THE WIDTH PARALLEL TO THE CAR SIDE WALLS.

4. THE ANTI-SWAY BRACING MAY BE OMITTED IF THE SPACE BETWEEN LATERALLY ADJACENT UNITS IS 6" OR LESS, AS MEASURED FROM BOX TO BOX ON LATERALLY ADJACENT UNITS, OR BETWEEN BATTENS AS APPLICABLE. IF THE EXCESS SPACE EXCEEDS THE MAXIMUM ALLOWABLE, ANTI-SWAY BRACES MUST BE POSITIONED BETWEEN ALL LATERALLY ADJACENT PALLETIZED UNITS, EXCEPT THE FLOOR LINE UNITS WHICH ARE COMPLETELY IN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE UNIT LENGTH. IF THE CAR BEING LOADED HAS NAILABLE SIDEWALLS, A SMALL EXCESS LATERAL SPACE CAN BE FILLED BY APPLYING ONE OR MORE LAMINATIONS OF ONE INCH (1") AND/OR TWO INCH (2") LUMBER TO ONE OR TO BOTH SIDEWALLS OF THE CAR IN LIEU OF USING PIECES MARKED ②. INSTALL HORIZONTALLY SO AS TO CONTACT THE TOP AND BOTTOM LAYERS OF BOXES ON THE UNITS AND NAIL TO THE CAR SIDEWALL WITH ONE APPLICABLY SIZED NAIL EVERY 24".

5. IF THE SPACE BETWEEN LATERALLY ADJACENT PALLETIZED UNITS IS 6" OR GREATER TOP-OF-LOAD ANTI-SWAY BRACES ARE REQUIRED. REFER TO THE "TOP-OF-LOAD ANTI-SWAY BRACE REQUIREMENT" CHART ON PAGE 61 FOR GUIDANCE AS TO THE QUANTITY OF BRACES WHICH MUST BE INSTALLED IN EACH END OF THE CAR.

6. SIX (6) LOAD BLOCKING 4" X 4" STRUTS FOR EACH ROW/TIER ARE ADEQUATE FOR RETAINING SEVEN (7) UNITS HAVING A WEIGHT OF NOT MORE THAN 2,625 POUNDS EACH. REFER TO THE "STRUTTING REQUIREMENTS" CHART ON PAGE 57 FOR GUIDANCE AS TO THE MAXIMUM WEIGHT PER UNIT WHEN THE LOAD IN THE LONG END OF THE CAR IS MORE OR LESS THAN SEVEN UNITS IN LENGTH. THE "ALT STRUTTING VIEW A" AND "ALT STRUTTING VIEW B" ON PAGE 57 DEPICT INSTALLATION GUIDANCE FOR 4" X 6" ON-EDGE STRUTS AND DOUBLED 4" X 4" STRUTS, RESPECTIVELY. THESE STRUTS MAY BE REQUIRED FOR THE BRACING OF A HEAVIER LOAD, IN LIEU OF THE SINGLE 4" X 4" STRUTS SHOWN IN THE LOAD VIEW. SEE SPECIAL NOTE 13.

7. DOORWAY PROTECTION IS REQUIRED FOR ALL THE LOAD UNITS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE UNIT WIDTH. DOORWAY PROTECTION WILL CONSIST OF NAILED-DOWN BLOCKING BETWEEN THE STACKS AND STEEL STRAPPING ENCIRCLING THE LOAD UNIT. TWO (2) STRAPS ARE REQUIRED AROUND A LOAD UNIT WHICH IS NOT RETAINED BY AT LEAST 6" OF THE CAR SIDEWALL ON BOTH SIDES OF THE LOAD, AND ONE (1) STRAP IS REQUIRED AROUND A LOAD UNIT WHICH IS RETAINED BY AT LEAST SIX INCHES (6") BUT LESS THAN HALF OF THE UNIT WIDTH. FOR ALTERNATIVE DOORWAY PROTECTION PROCEDURES SEE PAGES 58, 59 AND 60.

8. DOOR SPANNER TYPE GATE HOLD DOWN MAY BE USED IN LIEU OF PIECES MARKED ⑧ AND ⑨ SHOWN IN THE LOAD VIEW ON PAGE 10 PROVIDING THE CAR BEING LOADED HAS NAILABLE SIDEWALLS. SEE THE PROCEDURES SHOWN ON PAGE 56 FOR GUIDANCE.

9. CONSTRUCTION OF THE CENTER GATE C SHOWN IN THE LOAD VIEW AS PIECE MARKED ⑤, IS BASED ON THE LENGTH AND HEIGHT OF THE PALLETIZED UNIT TO BE SHIPPED AND UPON THE INSIDE WIDTH OF THE CAR TO BE LOADED. FOR EASE OF HANDLING, SPLIT CENTER GATES, WHICH ARE NOT DEPENDENT UPON THE WIDTH OF THE CAR, MAY BE USED AS AN ALTERNATIVE. IN LIEU OF EACH CENTER GATE C, INSTALL TWO (2) GATES SHOWN AS CENTER GATE F ON PAGE 51. AFTER THE GATES AND STRUTS HAVE BEEN INSTALLED, THE SPLIT GATES MUST BE TIED TOGETHER AS DEPICTED BY THE "TIE PIECE APPLICATION A" DETAIL ON PAGE 54.

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(SPECIAL NOTES CONTINUED)

10. THE DEPICTED LOAD CAN BE REDUCED BY POSITIONING MORE UNITS SO THAT THE WIDTH OF THE UNITS ARE LENGTHWISE IN THE CAR, AS SHOWN ON PAGE 12, OR INCREASED BY POSITIONING MORE UNITS SO THAT THE LENGTH OF THE UNITS ARE LENGTHWISE IN THE CAR.

11. IF UNITS WHICH DO NOT CONTAIN A FULL QUANTITY OF BOXES ARE TO BE TRANSPORTED, REFER TO PAGES 34 AND 35 FOR SHIPPING GUIDANCE.

12. IF DESIRED, THE ANTI-SWAY BRACE ASSEMBLY C, AS DETAILED ON PAGE 65, MAY BE USED IN LIEU OF THE ANTI-SWAY BRACE ASSEMBLY A SHOWN IN THE LOAD VIEW. THE ANTI-SWAY BRACE ASSEMBLY A IS THE PREFERRED METHOD IF THE SPACE BETWEEN LATERALLY ADJACENT PALLET UNITS IS SUCH THAT IT CAN BE EASILY INSTALLED. NOTE THAT IF ANTI-SWAY BRACE ASSEMBLY C IS USED, RETAINER PIECES MUST BE ADDED TO THE CENTER GATES. SEE THE "TYPICAL INSTALLATION OF ANTI-SWAY BRACE RETAINER" DETAIL ON PAGE 65.

13. IF DESIRED, DOUBLE 2" X 6" STRUTS MAY BE USED IN LIEU OF THE DEPICTED 4" X 4" STRUTS, PIECES MARKED ⑦. OR, TRIPLE 2" X 6" STRUTS MAY BE USED IN LIEU OF THE 4" X 6" ON-EDGE STRUTS SPECIFIED BY THE "ALTERNATIVE STRUTTING VIEW A" ON PAGE 57. LAMINATE THE 2" X 6" PIECES W/1-10d NAIL EVERY 6" AND TOENAIL THE TOP STRUT PIECE TO THE VERTICAL PIECES OF THE CENTER GATES, PIECES MARKED ⑤, W/2-12d NAILS AT EACH END.

BILL OF MATERIAL

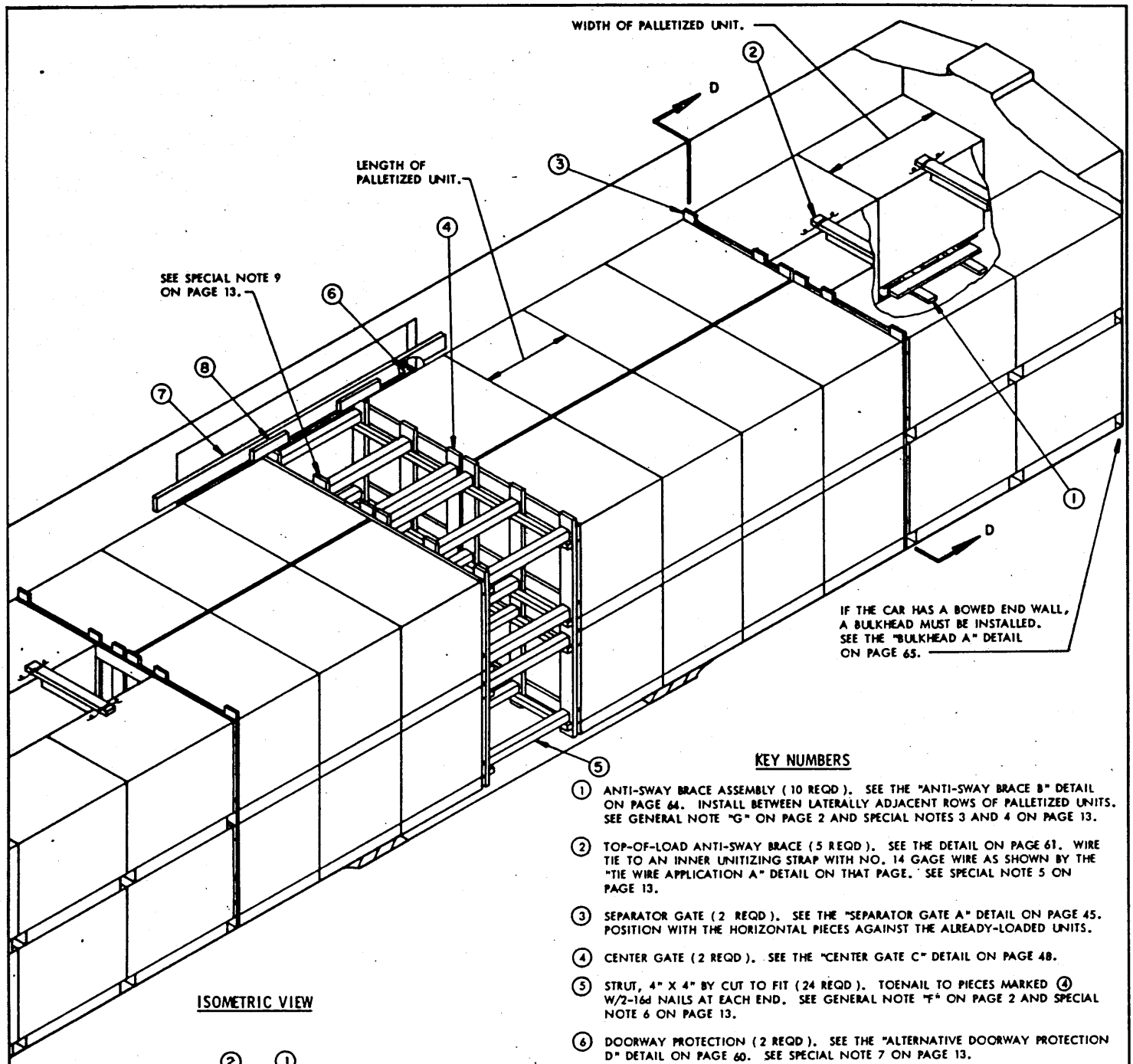
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	169	85
2" X 2"	74	25
2" X 3"	10	5
2" X 4"	73	49
2" X 6"	218	218
4" X 4"	65	87
NAILS	**NO. REQD**	**POUNDS**
6d (2")	144	1
10d (3")	396	6
12d (3-1/4")	10	1/4
16d (3-1/2")	120	2-3/4

STEEL STRAPPING, 1-1/4" X .035" - 72' REQD ---------- 11 LBS
SEAL FOR 1-1/4" STRAPPING ------ 4 REQD ---------- NIL
STAPLE FOR 1-1/4" STRAPPING ----- 4 REQD ---------- NIL

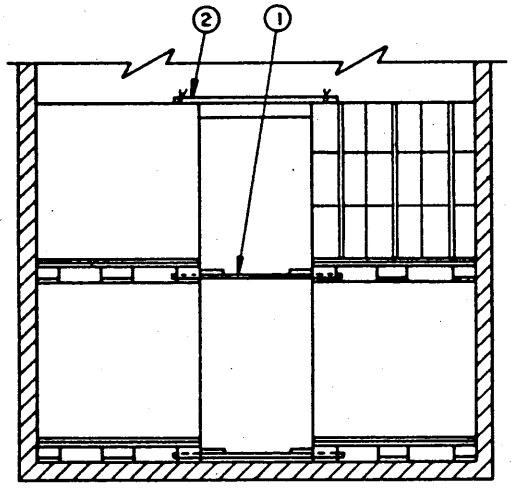
LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLETIZED UNIT	52	110,032 LBS
DUNNAGE		959 LBS
TOTAL WEIGHT		110,991 LBS

TYPICAL COMBINATION LOAD IN A 50'-6' LONG BY 9'-2' WIDE CONVENTIONAL BOX CAR



ISOMETRIC VIEW



SECTION D-D

KEY NUMBERS

1. ANTI-SWAY BRACE ASSEMBLY (10 REQD). SEE THE "ANTI-SWAY BRACE B" DETAIL ON PAGE 64. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLETIZED UNITS. SEE GENERAL NOTE "G" ON PAGE 2 AND SPECIAL NOTES 3 AND 4 ON PAGE 13.
2. TOP-OF-LOAD ANTI-SWAY BRACE (5 REQD). SEE THE DETAIL ON PAGE 61. WIRE TIE TO AN INNER UNITIZING STRAP WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION A" DETAIL ON THAT PAGE. SEE SPECIAL NOTE 5 ON PAGE 13.
3. SEPARATOR GATE (2 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 45. POSITION WITH THE HORIZONTAL PIECES AGAINST THE ALREADY-LOADED UNITS.
4. CENTER GATE (2 REQD). SEE THE "CENTER GATE C" DETAIL ON PAGE 48.
5. STRUT, 4" X 4" BY CUT TO FIT (24 REQD). TOENAIL TO PIECES MARKED ④ W/2-16d NAILS AT EACH END. SEE GENERAL NOTE "F" ON PAGE 2 AND SPECIAL NOTE 6 ON PAGE 13.
6. DOORWAY PROTECTION (2 REQD). SEE THE "ALTERNATIVE DOORWAY PROTECTION D" DETAIL ON PAGE 60. SEE SPECIAL NOTE 7 ON PAGE 13.
7. CENTER GATE HOLD-DOWN, 2" X 6" BY DOOR OPENING WIDTH PLUS 24" (2 REQD). NAIL TO THE CAR SIDE WALL W/5-12d NAILS AT EACH END. SEE SPECIAL NOTE 8 ON PAGE 13.
8. CENTER GATE HOLD-DOWN CLEAT, 2" X 4" X 18" (4 REQD). CENTER THE CLEATS ABOVE THE VERTICAL PIECES ON THE CENTER GATE AND NAIL TO THE CENTER GATE HOLD DOWN W/5-10d NAILS.

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

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.

2. THE PALLETIZED UNIT SHOWN IN THE TYPICAL COMBINATION LOAD ON PAGE 12 HAS OVERALL DIMENSIONS OF 40-1/2" LONG BY 54" WIDE BY 46" HIGH. THE UNIT WEIGHT IS 2,116 POUNDS. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER SIZES. HOWEVER, THE PURPOSE OF THIS TYPE OF COMBINATION LOADING IS TO INCREASE OR REDUCE THE QUANTITY OF UNITS IN A LOAD AND/OR TO SHORTEN THE LENGTH OF THE LOAD-BLOCKING STRUTS, AND THERE IS NO ADVANTAGE UNLESS THE WIDTH OF THE UNIT MEASURES MORE THAN THE LENGTH BY AN APPRECIABLE AMOUNT.

3. THE ANTI-SWAY BRACE B, SHOWN IN THE LOAD VIEW AS PIECE MARKED ①, IS DESIGNED FOR USE WITHIN LOADS HAVING THE PALLETIZED UNITS POSITIONED WITH THE WIDTH PARALLEL TO THE CAR SIDE WALLS.

4. THE ANTI-SWAY BRACING MAY BE OMITTED IF THE SPACE BETWEEN LATERALLY ADJACENT UNITS IS 6" OR LESS, AS MEASURED FROM BOX TO BOX ON LATERALLY ADJACENT UNITS, OR BETWEEN BATTENS AS APPLICABLE. IF THE EXCESS SPACE EXCEEDS THE MAXIMUM ALLOWABLE, ANTI-SWAY BRACES MUST BE POSITIONED BETWEEN ALL LATERALLY ADJACENT PALLETIZED UNITS. IF THE CAR BEING LOADED HAS NAILABLE SIDEWALLS, A SMALL EXCESS LATERAL SPACE CAN BE FILLED BY APPLYING ONE OR MORE LAMINATIONS OF ONE INCH (1") AND/OR TWO INCH (2") LUMBER TO ONE OR TO BOTH SIDEWALLS OF THE CAR IN LIEU OF USING PIECES MARKED ①. INSTALL HORIZONTALLY SO AS TO CONTACT THE TOP AND BOTTOM LAYERS OF BOXES ON THE UNITS AND NAIL TO THE CAR SIDEWALL WITH ONE APPLICABLY SIZED NAIL EVERY 24".

5. IF THE SPACE BETWEEN LATERALLY ADJACENT PALLETIZED UNITS IS 6" OR GREATER TOP-OF-LOAD ANTI-SWAY BRACES ARE REQUIRED. REFER TO "TOP-OF-LOAD ANTI-SWAY BRACE REQUIREMENT" CHART ON PAGE 61 FOR GUIDANCE AS TO THE QUANTITY OF BRACES WHICH MUST BE INSTALLED IN EACH END OF THE CAR.

6. SIX (6) LOAD BLOCKING 4" X 4" STRUTS FOR EACH ROW/TIER ARE ADEQUATE FOR RETAINING SIX (6) PALLETIZED UNITS HAVING A WEIGHT OF NOT MORE THAN 3,062 POUNDS EACH. REFER TO THE "STRUTTING REQUIREMENTS" CHART ON PAGE 57 FOR GUIDANCE AS TO THE MAXIMUM WEIGHT PER UNIT WHEN THE LOAD IN THE LONG END OF THE CAR IS MORE OR LESS THAN SIX UNITS IN LENGTH. THE "ALT STRUTTING VIEW A" AND "ALT STRUTTING VIEW B" ON PAGE 57 DEPICT INSTALLATION GUIDANCE FOR 4" X 6" ON-EDGE STRUTS AND DOUBLED 4" X 4" STRUTS, RESPECTIVELY. THESE STRUTS MAY BE REQUIRED FOR THE BRACING OF A HEAVIER LOAD, IN LIEU OF THE SINGLE 4" X 4" STRUTS SHOWN IN THE LOAD VIEW. SEE SPECIAL NOTE 12.

7. DOORWAY PROTECTION IS REQUIRED FOR ALL THE LOAD UNITS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OF A CAR OR WHICH EXTEND INTO THE DOORWAY BY ONE-HALF OR MORE OF THE UNIT LENGTH. FOR ALTERNATIVE DOORWAY PROTECTION PROCEDURES SEE PAGES 58, 59 AND 60.

8. DOOR SPANNER TYPE GATE HOLD DOWN IS USED IN THE LOAD SHOWN ON PAGE 12. FOR ALTERNATIVE GATE HOLD DOWN SEE PAGE 54.

9. CONSTRUCTION OF THE CENTER GATE C, SHOWN IN THE LOAD VIEW AS PIECE MARKED ④, IS BASED ON THE WIDTH AND HEIGHT OF THE PALLETIZED UNIT TO BE SHIPPED AND UPON THE INSIDE WIDTH OF THE CAR TO BE LOADED. FOR EASE OF HANDLING, SPLIT CENTER GATES, WHICH ARE NOT DEPENDENT UPON THE WIDTH OF THE CAR, MAY BE USED AS AN ALTERNATIVE. IN LIEU OF EACH CENTER GATE C, INSTALL TWO (2) GATES SHOWN AS CENTER GATE F ON PAGE 51. AFTER THE GATES AND THE STRUTS HAVE BEEN INSTALLED, THE SPLIT GATES MUST BE TIED TOGETHER AS DEPICTED BY THE "TIE PIECE APPLICATION A" DETAIL ON PAGE 54.

10. THE DEPICTED LOAD CAN BE REDUCED BY POSITIONING MORE UNITS SO THAT THE WIDTH OF THE UNITS ARE LENGTHWISE IN THE CAR OR INCREASED BY POSITIONING MORE UNITS SO THAT THE LENGTH OF THE UNITS ARE LENGTHWISE IN THE CAR, AS SHOWN ON PAGE 10.

11. IF UNITS WHICH DO NOT CONTAIN A FULL QUANTITY OF BOXES ARE TO BE TRANSPORTED, REFER TO PAGES 34 AND 35 FOR SHIPPING GUIDANCE.

(CONTINUED AT RIGHT)

(SPECIAL NOTES CONTINUED)

12. IF DESIRED, DOUBLE 2" X 6" STRUTS MAY BE USED IN LIEU OF THE DEPICTED 4" X 4" STRUTS, PIECES MARKED ⑤. OR, TRIPLE 2" X 6" STRUTS MAY BE USED IN LIEU OF THE 4" X 6" ON-EDGE STRUTS SPECIFIED BY THE "ALTERNATIVE STRUTTING VIEW A" ON PAGE 57. LAMINATE THE 2" X 6" PIECES W/1-10d NAIL EVERY 6" AND TOENAIL THE TOP STRUT PIECE TO THE VERTICAL PIECES OF THE CENTER GATES, PIECES MARKED ④, W/2-12d NAILS AT EACH END.

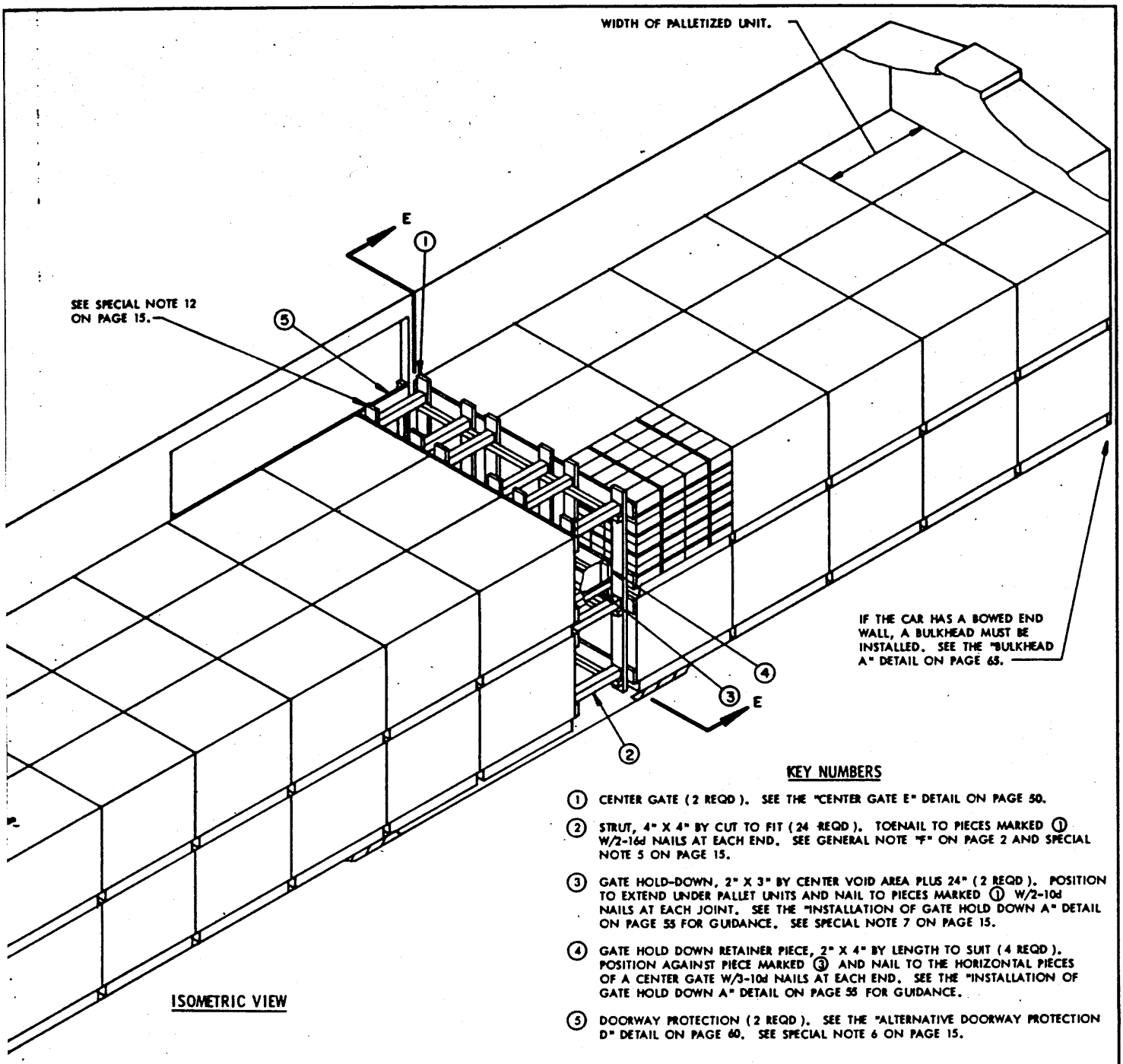
BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	250	125
2" X 2"	74	25
2" X 3"	31	16
2" X 4"	106	71
2" X 6"	258	258
4" X 4"	87	116
NAILS	**NO. REQD**	**POUNDS**
6d (2")	192	1-1/4
10d (3")	380	6
12d (3-1/4")	73	1-1/4
16d (3-1/2")	96	2-1/4
WIRE, NO. 14 GAGE ---------- 25' REQD ---------- NIL		

LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLETIZED UNIT	48	101,568 LBS
DUNNAGE		1,233 LBS
TOTAL WEIGHT		102,801 LBS

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



ISOMETRIC VIEW

KEY NUMBERS

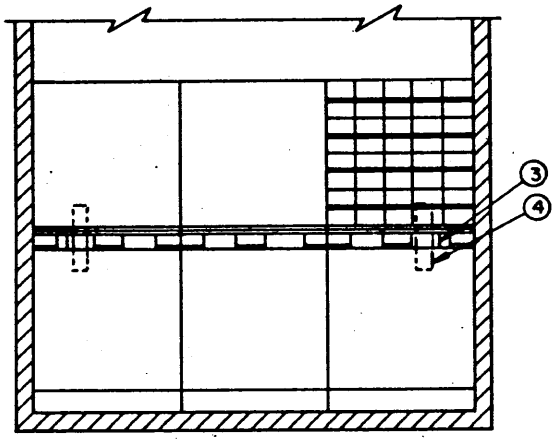
(1) CENTER GATE (2 REQD). SEE THE "CENTER GATE E" DETAIL ON PAGE 50.

(2) STRUT, 4" X 4" BY CUT TO FIT (24 REQD). TOENAIL TO PIECES MARKED (1) W/2-16d NAILS AT EACH END. SEE GENERAL NOTE "F" ON PAGE 2 AND SPECIAL NOTE 5 ON PAGE 15.

(3) GATE HOLD-DOWN, 2" X 3" BY CENTER VOID AREA PLUS 24" (2 REQD). POSITION TO EXTEND UNDER PALLET UNITS AND NAIL TO PIECES MARKED (1) W/2-10d NAILS AT EACH JOINT. SEE THE "INSTALLATION OF GATE HOLD DOWN A" DETAIL ON PAGE 55 FOR GUIDANCE. SEE SPECIAL NOTE 7 ON PAGE 15.

(4) GATE HOLD DOWN RETAINER PIECE, 2" X 4" BY LENGTH TO SUIT (4 REQD). POSITION AGAINST PIECE MARKED (3) AND NAIL TO THE HORIZONTAL PIECES OF A CENTER GATE W/3-10d NAILS AT EACH END. SEE THE "INSTALLATION OF GATE HOLD DOWN A" DETAIL ON PAGE 55 FOR GUIDANCE.

(5) DOORWAY PROTECTION (2 REQD). SEE THE "ALTERNATIVE DOORWAY PROTECTION D" DETAIL ON PAGE 60. SEE SPECIAL NOTE 6 ON PAGE 15.



SECTION E-E

TYPICAL 3-WIDE LOAD IN A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL BOX CAR

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.

2. THE PALLETIZED UNIT SHOWN IN THE TYPICAL 3-WIDE LOAD ON PAGE 14 HAS OVERALL DIMENSIONS OF 35" LONG BY 48" WIDE BY 42-1/2" HIGH. THE UNIT WEIGHT IS 1,935 POUNDS. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER LENGTHS AND WIDTHS IN A 9'-2" WIDE CAR. BASED ON A DOOR HEIGHT OF 9'-8", FULL LOADS OF UNITS WHICH ARE MORE THAN 38-1/2" IN HEIGHT WILL BE LIMITED TO NOT MORE THAN TWO (2) TIERS.

3. ANTI-SWAY BRACING IS NOT REQUIRED WHEN THE SPACE BETWEEN LATERALLY ADJACENT UNITS IS 6" OR LESS, AS MEASURED FROM BOX TO BOX ON LATERALLY ADJACENT UNITS, OR BETWEEN BATTENS AS APPLICABLE. IF THE EXCESS SPACE EXCEEDS THE MAXIMUM ALLOWABLE, ANTI-SWAY BRACES MUST BE POSITIONED BETWEEN ALL LATERALLY ADJACENT PALLETIZED UNITS. IF THE CAR BEING LOADED HAS NAILABLE SIDEWALLS, A SMALL EXCESS LATERAL SPACE CAN BE FILLED BY APPLYING ONE OR MORE LAMINATIONS OF ONE INCH (1") AND/ OR TWO INCH (2") LUMBER TO ONE OR TO BOTH SIDEWALLS OF THE CAR IN LIEU OF USING ANTI-SWAY BRACING. INSTALL HORIZONTALLY SO AS TO CONTACT THE TOP AND BOTTOM LAYERS OF BOXES ON THE UNITS AND NAIL TO THE CAR SIDEWALL WITH ONE APPLICABLY SIZED NAIL EVERY 24".

4. IF THE SPACE BETWEEN LATERALLY ADJACENT PALLETIZED UNITS IS 6" OR GREATER TOP-OF-LOAD ANTI-SWAY BRACES ARE REQUIRED. REFER TO THE "TOP-OF-LOAD ANTI-SWAY BRACE REQUIREMENT" CHART ON PAGE 61 FOR GUIDANCE AS TO THE QUANTITY OF BRACES WHICH MUST BE INSTALLED IN EACH END OF THE CAR.

5. FOUR (4) LOAD BLOCKING 4" X 4" STRUTS FOR EACH ROW/TIER ARE ADEQUATE FOR RETAINING SEVEN (7) PALLETIZED UNITS HAVING A WEIGHT OF NOT MORE THAN 1,750 POUNDS EACH. REFER TO THE "STRUTTING REQUIREMENTS" CHART ON PAGE 57 FOR GUIDANCE AS TO THE MAXIMUM WEIGHT PER UNIT WHEN THE LOAD IN THE LONG END OF THE CAR IS MORE OR LESS THAN SEVEN UNITS IN LENGTH. THE "ALT STRUTTING VIEW A" AND "ALT STRUTTING VIEW B" ON PAGE 57 DEPICT INSTALLATION GUIDANCE FOR 4" X 6" ON-EDGE STRUTS AND DOUBLED 4" X 4" STRUTS, RESPECTIVELY. THESE STRUTS MAY BE REQUIRED FOR THE BRACING OF A HEAVIER LOAD, IN LIEU OF THE SINGLE 4" X 4" STRUTS SHOWN IN THE LOAD VIEW. SEE SPECIAL NOTE 13.

6. DOORWAY PROTECTION IS REQUIRED FOR ALL THE LOAD UNITS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OF A CAR OR WHICH EXTEND INTO THE DOORWAY BY ONE-HALF OR MORE OF THE UNIT LENGTH. FOR ALTERNATIVE DOORWAY PROTECTION PROCEDURES SEE PAGES 58, 59 AND 60.

7. DOOR SPANNER TYPE GATE HOLD DOWN MAY BE USED IN LIEU OF PIECES MARKED ③ AND ④ SHOWN IN THE LOAD VIEW ON PAGE 14, PROVIDING THE CAR BEING LOADED HAS NAILABLE SIDEWALLS. SEE THE PROCEDURES SHOWN ON PAGE 56 FOR GUIDANCE.

8. THE DEPICTED LOAD CAN BE ADJUSTED TO SUIT THE QUANTITY TO BE SHIPPED. A 2-TIER LOAD CAN BE REDUCED BY A MULTIPLE OF SIX (6) UNITS BY OMITTING ONE OR MORE LOAD UNITS FROM THE CENTER PORTION OF THE LOAD. OR, ONE OR MORE UNITS CAN BE OMITTED FROM A TIER BY INSTALLING GATES AND STRUTS IN THE PLACE OF AN OMITTED UNIT, SIMILAR TO THE METHOD SHOWN ON PAGE 81 OR, IF THE DESIRED QUANTITY CANNOT BE ATTAINED BY OMITTING AN ENTIRE TIER, UNITS CAN BE RETAINED IN BOTH ENDS OF THE CAR WITH KNEE BRACES AS SHOWN ON PAGES 28 AND 29 OR; UNITS CAN BE RETAINED IN ONE OR BOTH ENDS OF A CAR WITH RISERS AS SHOWN ON PAGE 22; OR WITH K-BRACES AS SHOWN ON PAGE 30 PROVIDING THE CAR HAS NAILABLE SIDEWALLS, OR WITH BULKHEAD GATES AND STRAPS IF THE CAR IS EQUIPPED WITH ANCHOR DEVICES AS SHOWN ON PAGE 24. ANY APPLICABLE COMBINATION OF THESE PROCEDURES FOR ADJUSTING A LOAD MAY ALSO BE USED TO ATTAIN THE DESIRED QUANTITY. THE COMBINATION LOADING PROCEDURES SHOWN ON PAGES 10 AND 12 MAY BE MORE ADVANTAGEOUS THAN ANY OF THE AFOREMENTIONED LOAD-REDUCING PROCEDURES AND SHOULD BE INVESTIGATED PRIOR TO MAKING A SELECTION DECISION. SEE SPECIAL NOTE 11 BELOW.

(CONTINUED AT RIGHT)

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	80	40
2" X 2"	69	23
2" X 3"	38	19
2" X 4"	6	4
2" X 6"	163	163
4" X 4"	48	64
NAILS	NO. REQD	POUNDS
6d (2")	48	1/2
10d (3")	272	4-1/4
12d (3-1/4")	28	1/2
16d (3-1/2")	96	2-1/4

(SPECIAL NOTES CONTINUED)

9. AS APPLICABLE, IT IS TO BE NOTED THAT IN A 9'-2" WIDE CAR THE UNITS WHICH HAVE A LENGTH GREATER THAN 36-1/4" CAN NOT BE LOADED THREE (3) WIDE. IN A 9'-4" WIDE CAR THE UNITS WHICH HAVE A LENGTH GREATER THAN 37" CAN NOT BE LOADED THREE (3) WIDE. PROCEDURES SIMILAR TO THOSE SHOWN ON PAGES 6 AND 8 MUST BE USED.

10. IF UNITS WHICH DO NOT CONTAIN A FULL QUANTITY OF BOXES ARE TO BE TRANSPORTED, REFER TO PAGES 34 AND 35 FOR SHIPPING GUIDANCE.

11. IN ADDITION TO THOSE LOAD-ADJUSTING PROCEDURES SPECIFIED WITHIN SPECIAL NOTE 8 ABOVE, THE PROCEDURES SHOWN ON PAGE 16 MAY BE APPLIED FOR DECREASING A LOAD QUANTITY. CAUTION: THE TOTAL OF THREE UNIT LENGTHS MUST BE LESS THAN THE WIDTH OF THE CAR BY 1" OR MORE. ANOTHER LOAD-ADJUSTING PROCEDURE, WHICH IS SHOWN ON PAGES 20 AND 21 CAN BE USED AS GUIDANCE FOR OMITTING PALLETIZED UNITS FROM A LOAD UNIT ADJACENT TO THE CENTER BLOCKING.

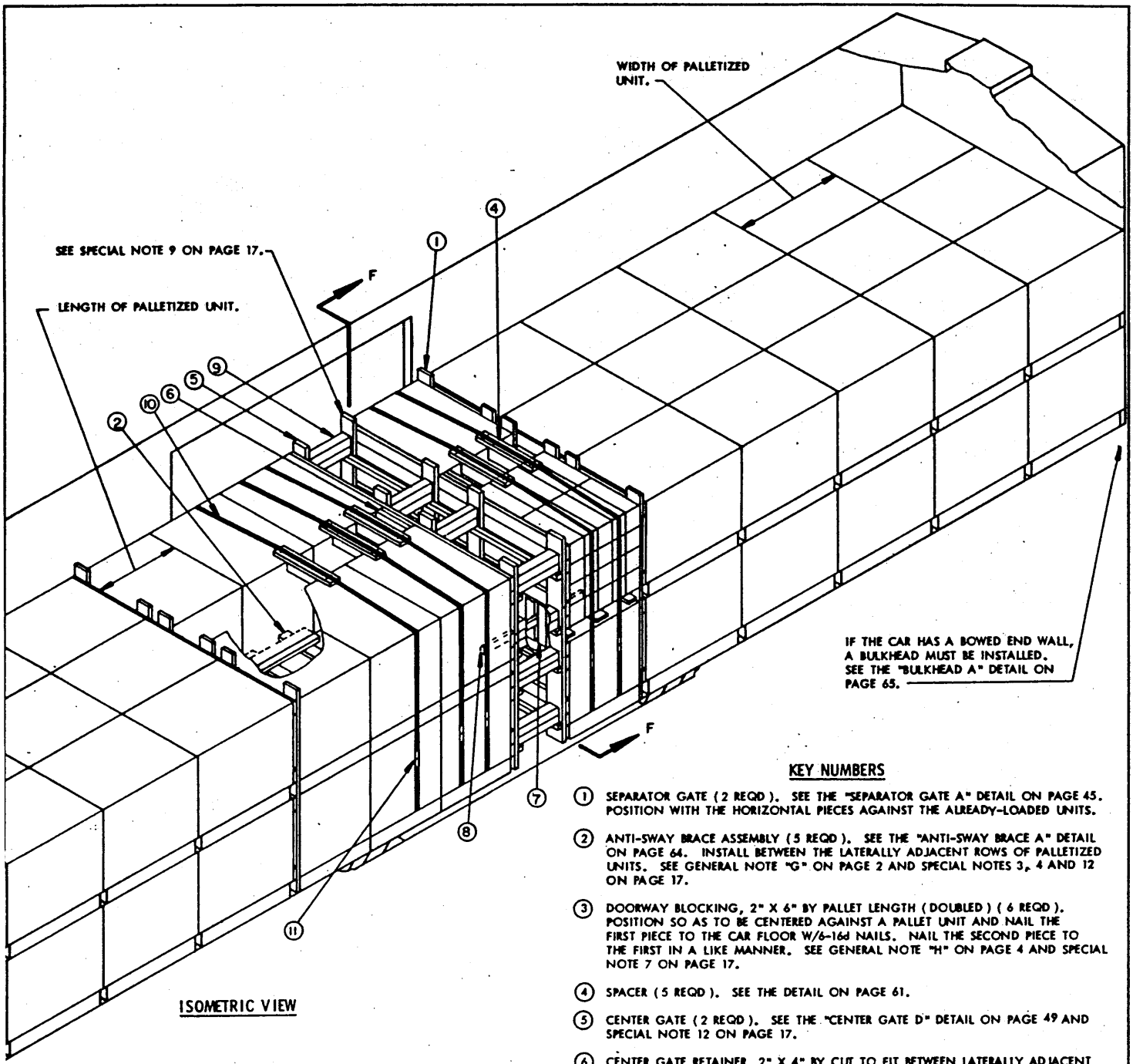
12. CONSTRUCTION OF THE CENTER GATE E SHOWN IN THE LOAD VIEW AS PIECE MARKED ①, IS BASED ON THE WIDTH AND HEIGHT OF THE PALLETIZED UNIT TO BE SHIPPED AND UPON THE INSIDE WIDTH OF THE CAR TO BE LOADED. FOR EASE OF HANDLING, SPLIT CENTER GATES, WHICH ARE NOT DEPENDENT UPON THE WIDTH OF THE CAR, MAY BE USED AS AN ALTERNATIVE. IN LIEU OF EACH CENTER GATE E, INSTALL TWO (2) GATES SHOWN AS CENTER GATE F ON PAGE 51. AFTER THE GATES AND THE STRUTS HAVE BEEN INSTALLED, THE SPLIT GATES MUST BE TIED TOGETHER AS DEPICTED BY THE "TIE PIECE APPLICATION B" DETAIL ON PAGE 54.

13. IF DESIRED, DOUBLE 2" X 6" STRUTS MAY BE USED IN LIEU OF THE DEPICTED 4" X 4" STRUTS, PIECES MARKED ②. OR, TRIPLE 2" X 6" STRUTS MAY BE USED IN LIEU OF THE 4" X 6" ON-EDGE STRUTS SPECIFIED BY THE "ALTERNATIVE STRUTTING VIEW A" ON PAGE 57. LAMINATE THE 2" X 6" PIECES W/1-10d NAIL EVERY 6" AND TOENAIL THE TOP STRUT PIECE TO THE VERTICAL PIECES OF THE CENTER GATES, PIECES MARKED ①, W/2-12d NAILS AT EACH END.

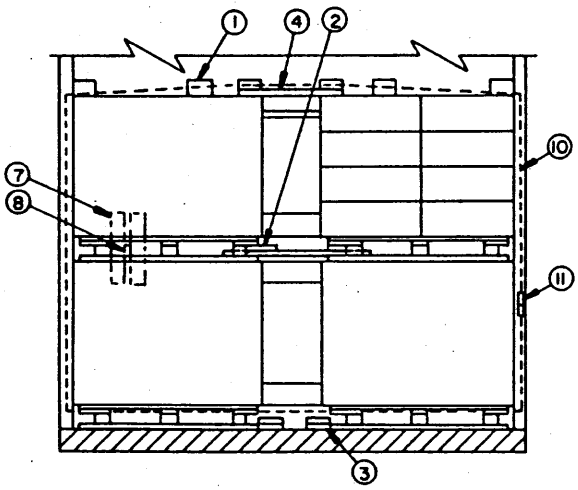
LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLETIZED UNIT	72	139,320 LBS
DUNNAGE		634 LBS
TOTAL WEIGHT		139,954 LBS

TYPICAL 3-WIDE LOAD IN A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL BOX CAR



ISOMETRIC VIEW



SECTION F-F

KEY NUMBERS

(1) SEPARATOR GATE (2 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 45. POSITION WITH THE HORIZONTAL PIECES AGAINST THE ALREADY-LOADED UNITS.

(2) ANTI-SWAY BRACE ASSEMBLY (5 REQD). SEE THE "ANTI-SWAY BRACE A" DETAIL ON PAGE 64. INSTALL BETWEEN THE LATERALLY ADJACENT ROWS OF PALLETIZED UNITS. SEE GENERAL NOTE "G" ON PAGE 2 AND SPECIAL NOTES 3, 4 AND 12 ON PAGE 17.

(3) DOORWAY BLOCKING, 2" X 6" BY PALLET LENGTH (DOUBLED) (6 REQD). POSITION SO AS TO BE CENTERED AGAINST A PALLET UNIT AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/6-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "H" ON PAGE 4 AND SPECIAL NOTE 7 ON PAGE 17.

(4) SPACER (5 REQD). SEE THE DETAIL ON PAGE 61.

(5) CENTER GATE (2 REQD). SEE THE "CENTER GATE D" DETAIL ON PAGE 49 AND SPECIAL NOTE 12 ON PAGE 17.

(6) CENTER GATE RETAINER, 2" X 4" BY CUT TO FIT BETWEEN LATERALLY ADJACENT PALLETIZED UNITS (DOUBLED) (4 REQD). POSITION ON TOP AND BOTTOM HORIZONTAL PIECES OF CENTER GATE AND NAIL THE FIRST PIECE TO THE CENTER GATE W/3-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.

(7) GATE HOLD-DOWN RETAINER PIECE, 2" X 4" BY LENGTH TO SUIT (8 REQD). POSITION AGAINST PIECE MARKED (8) AND NAIL TO THE HORIZONTAL PIECES OF A CENTER GATE W/3-10d NAILS AT EACH END. SEE THE "INSTALLATION OF GATE HOLD DOWN B" DETAIL ON PAGE 55 FOR GUIDANCE.

(8) GATE HOLD-DOWN, 2" X 3" BY CENTER VOID AREA PLUS 24" (2 REQD). POSITION TO EXTEND UNDER PALLET UNITS AND NAIL TO A PIECE MARKED (7) W/2-10d NAILS AT EACH JOINT. SEE THE "INSTALLATION OF GATE HOLD DOWN B" DETAIL ON PAGE 55 FOR GUIDANCE. SEE SPECIAL NOTE 8 ON PAGE 17.

(9) STRUT, 4" X 4" BY CUT-TO-FIT (DOUBLED) (16 REQD). TOENAIL TO PIECES MARKED (5) W/2-16d NAILS AT EACH END. SEE GENERAL NOTE "F" ON PAGE 2 AND SPECIAL NOTE 6 ON PAGE 17.

(10) DOORWAY PROTECTION STRAP, 1-1/4" X .035" X 34'-0" LONG (REF) STEEL STRAPPING (5 REQD). INSTALL SO AS TO ENCIRCLE THE LOAD UNITS IN THE DOORWAY AREA. SECURE TO PIECE MARKED (4) W/2 STAPLES. SEE SPECIAL NOTE 7 ON PAGE 17.

(11) SEAL FOR 1-1/4" STRAPPING (10 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "H" ON PAGE 2.

TYPICAL 3-WIDE LOAD IN A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL BOX CAR

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.

2. THE PALLETIZED UNIT SHOWN IN THE TYPICAL COMBINATION LOAD ON PAGE 16 HAS OVERALL DIMENSIONS OF 35" LONG BY 48" WIDE BY 42-1/2" HIGH. THE UNIT WEIGHT IS 2,040 POUNDS. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER SIZES. HOWEVER, THE PURPOSE OF THIS TYPE OF COMBINATION LOADING IS TO INCREASE OR REDUCE THE QUANTITY OF UNITS IN A LOAD AND/OR TO SHORTEN THE LENGTH OF THE LOAD-BLOCKING STRUTS, AND THERE IS NO ADVANTAGE UNLESS THE WIDTH OF THE UNIT MEASURES MORE THAN THE LENGTH BY AN APPRECIABLE AMOUNT.

3. THE ANTI-SWAY BRACE A, SHOWN IN THE LOAD VIEW AS PIECE MARKED ②, IS DESIGNED FOR USE WITHIN LOADS HAVING THE PALLETIZED UNITS POSITIONED WITH THE WIDTH PARALLEL TO THE CAR SIDEWALLS.

4. THE ANTI-SWAY BRACING MAY BE OMITTED IF THE SPACE BETWEEN LATERALLY ADJACENT UNITS IS 6" OR LESS, AS MEASURED FROM BOX TO BOX ON LATERALLY ADJACENT UNITS, OR BETWEEN BATTENS AS APPLICABLE. IF THE EXCESS SPACE EXCEEDS THE MAXIMUM ALLOWABLE, ANTI-SWAY BRACES MUST BE POSITIONED BETWEEN ALL LATERALLY ADJACENT PALLETIZED UNITS, EXCEPT THE FLOOR LINE UNITS WHICH ARE COMPLETELY IN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE UNIT LENGTH. IF THE CAR BEING LOADED HAS NAILABLE SIDEWALLS, A SMALL EXCESS LATERAL SPACE CAN BE FILLED BY APPLYING ONE OR MORE LAMINATIONS OF ONE INCH (1") AND/OR TWO INCH (2") LUMBER TO ONE OR TO BOTH SIDEWALLS OF THE CAR IN LIEU OF USING PIECES MARKED ②. INSTALL HORIZONTALLY SO AS TO CONTACT THE TOP AND BOTTOM LAYERS OF BOXES ON THE UNITS AND NAIL TO THE CAR SIDEWALL WITH ONE APPLICABLY SIZED NAIL EVERY 24".

5. IF THE SPACE BETWEEN LATERALLY ADJACENT PALLET UNITS IS 6" OR GREATER TOP-OF-LOAD ANTI-SWAY BRACES ARE REQUIRED. REFER TO "TOP-OF-LOAD ANTI-SWAY BRACE REQUIREMENT" CHART ON PAGE 61 FOR GUIDANCE AS TO THE QUANTITY OF BRACES WHICH MUST BE INSTALLED IN EACH END OF THE CAR.

6. FOUR (4) LOAD BLOCKING 4" X 4" STRUTS (DOUBLED) FOR EACH ROW/TIER ARE ADEQUATE FOR RETAINING SEVEN (7) UNITS HAVING A WEIGHT OF NOT MORE THAN 3,500 POUNDS EACH. REFER TO THE "STRUTTING REQUIREMENTS" CHART ON PAGE 57. FOR GUIDANCE AS TO THE MAXIMUM WEIGHT PER UNIT WHEN THE LOAD IN THE LONG END OF THE CAR IS MORE OR LESS THAN SEVEN UNITS IN LENGTH. THE "ALT STRUTTING VIEW A" AND "ALT STRUTTING VIEW B" ON PAGE 57 DEPIC[illegible]ISTALLATION GUIDANCE FOR 4" X 6" ON-EDGE STRUTS AND DOUBLED 4" X 4" STRUTS, RESPECTIVELY. SEE SPECIAL NOTE 13.

7. DOORWAY PROTECTION IS REQUIRED FOR ALL THE LOAD UNITS WHICH ARE COMPLETELY WITHIN THE DOORWAY AREA OR WHICH EXTEND INTO THE DOORWAY AREA BY ONE-HALF OR MORE OF THE UNIT WIDTH. DOORWAY PROTECTION WILL CONSIST OF NAILED-DOWN BLOCKING BETWEEN THE STACKS AND STEEL STRAPPING ENCIRCLING THE LOAD UNIT. TWO (2) STRAPS ARE REQUIRED AROUND A LOAD UNIT WHICH IS NOT RETAINED BY AT LEAST 6" OF THE CAR SIDEWALL ON BOTH SIDES OF THE LOAD, AND ONE (1) STRAP IS REQUIRED AROUND A LOAD UNIT WHICH IS RETAINED BY AT LEAST SIX INCHES (6") BUT LESS THAN HALF OF THE UNIT WIDTH. FOR ALTERNATIVE DOORWAY PROTECTION PROCEDURES SEE PAGES 58, 59 AND 60.

8. DOOR SPANNER TYPE GATE HOLD DOWN MAY BE USED IN LIEU OF PIECES MARKED ⑦ AND ⑧ SHOWN IN THE LOAD VIEW ON PAGE 16. PROVIDING THE CAR BEING LOADED HAS NAILABLE SIDEWALLS. SEE THE PROCEDURES SHOWN ON PAGE 56 FOR GUIDANCE.

(CONTINUED AT RIGHT)

(SPECIAL NOTES CONTINUED)

9. CONSTRUCTION OF THE CENTER GATE D, SHOWN IN THE LOAD VIEW AS PIECE MARKED ⑤, IS BASED ON THE WIDTH AND HEIGHT OF THE PALLETIZED UNIT TO BE SHIPPED AND UPON THE INSIDE WIDTH OF THE CAR TO BE LOADED. FOR EASE OF HANDLING, SPLIT CENTER GATES, WHICH ARE NOT DEPENDENT UPON THE WIDTH OF THE CAR, MAY BE USED AS AN ALTERNATIVE. IN LIEU OF EACH CENTER GATE D, INSTALL TWO (2) GATES SHOWN AS CENTER GATE F ON PAGE 51. AFTER THE GATES AND THE STRUTS HAVE BEEN INSTALLED, THE SPLIT GATES MUST BE TIED TOGETHER AS DEPICTED BY THE "TIE PIECE APPLICATION A" DETAIL ON PAGE 54.

10. THE DEPICTED LOAD CAN BE REDUCED BY POSITIONING MORE UNITS SO THAT THE WIDTH OF THE UNITS ARE LENGTHWISE IN THE CAR OR INCREASED BY POSITIONING MORE UNITS SO THAT THE LENGTH OF THE UNITS ARE LENGTHWISE IN THE CAR.

11. IF UNITS WHICH DO NOT CONTAIN A FULL QUANTITY OF BOXES ARE TO BE TRANSPORTED, REFER TO PAGES 34 AND 35 FOR SHIPPING GUIDANCE.

12. IF DESIRED, THE ANTI-SWAY BRACE ASSEMBLY C, AS DETAILED ON PAGE 65, MAY BE USED IN LIEU OF THE ANTI-SWAY BRACE ASSEMBLY A SHOWN IN THE LOAD VIEW. THE ANTI-SWAY BRACE ASSEMBLY A IS THE PREFERRED METHOD IF THE SPACE BETWEEN LATERALLY ADJACENT PALLET UNITS IS SUCH THAT IT CAN BE EASILY INSTALLED. NOTE THAT IF ANTI-SWAY BRACE ASSEMBLY C IS USED, RETAINER PIECES MUST BE ADDED TO THE CENTER GATES. SEE THE "TYPICAL INSTALLATION OF ANTI-SWAY BRACE RETAINER" DETAIL ON PAGE 65.

13. IF DESIRED, TRIPLE 2" X 6" STRUTS MAY BE USED IN LIEU OF THE DEPICTED DOUBLED 4" X 4" STRUTS, PIECES MARKED ⑨. LAMINATE THE 2" X 6" PIECES W/1-10d NAIL EVERY 6" AND TOENAIL THE TOP STRUT PIECE TO THE VERTICAL PIECES OF THE CENTER GATES, PIECES MARKED ⑤, W/2-12d NAILS AT EACH END. NOTE THE CHANGE IN STRUT LEDGER HEIGHTS DESCRIBED WITHIN SPECIAL NOTE 10 ON PAGE 49 WHICH IS REQUIRED WHEN TRIPLED 2" X 6" STRUTS ARE USED.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	163	82
2" X 2"	74	25
2" X 3"	9	5
2" X 4"	79	53
2" X 6"	229	229
2" X 8"	17	23
4" X 4"	70	94
NAILS	**NO. REQD**	**POUNDS**
6d (2")	144	1
10d (3")	384	6
12d (3-1/4")	15	1/4
16d (3-1/2")	176	4

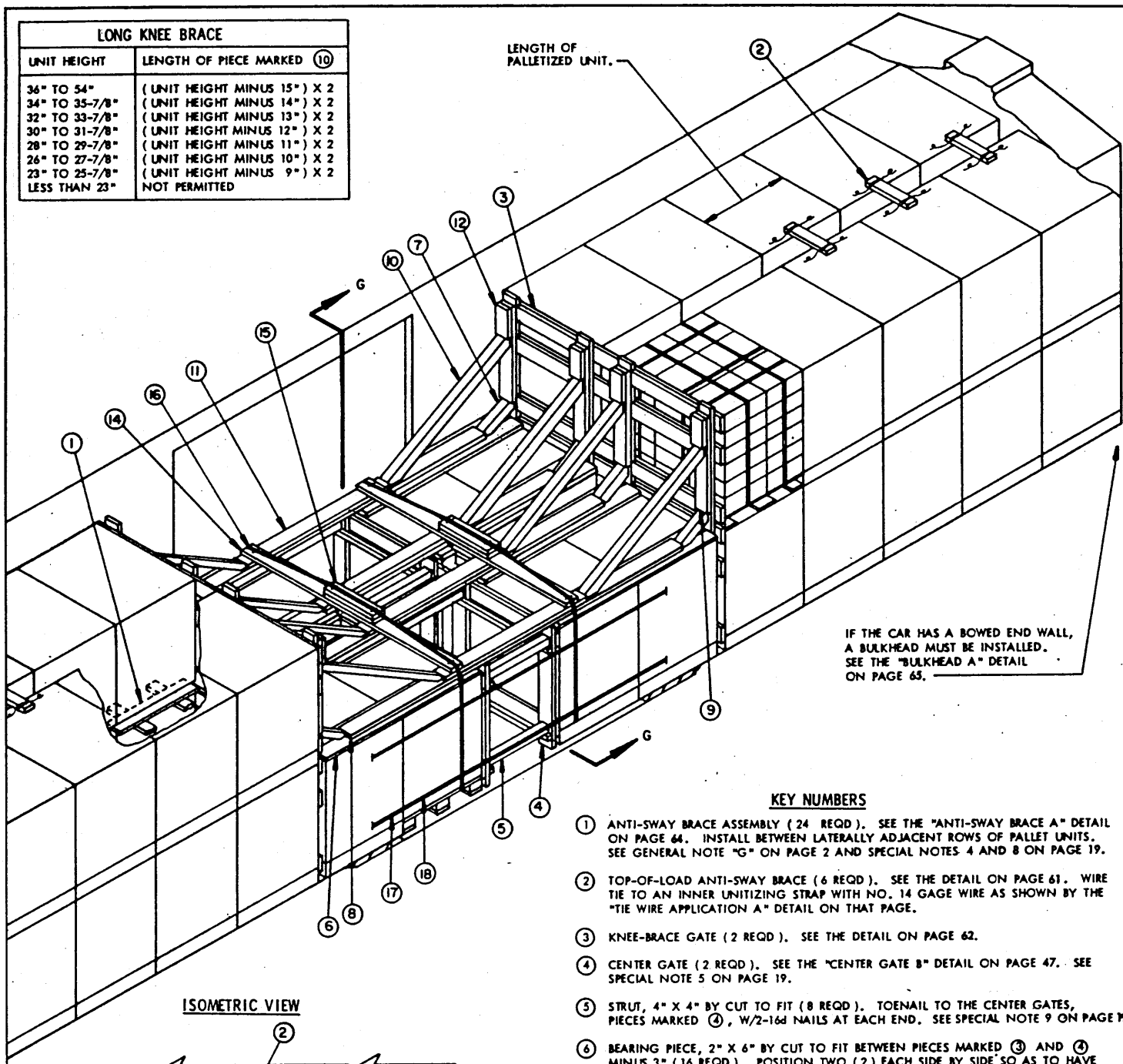
STEEL STRAPPING, 1-1/4" X .035"- 170' REQD ---------- 25 LBS
SEAL FOR 1-1/4" STRAPPING ----- 10 REQD ---------- 1/2 LB
STAPLE FOR 1-1/4" STRAPPING ---- 10 REQD ---------- NIL

LOAD AS SHOWN (TYPICAL)

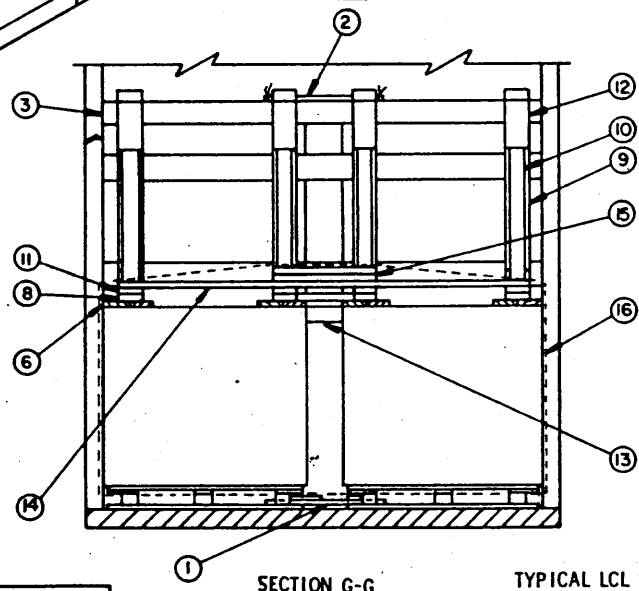
ITEM	QUANTITY	WEIGHT (APPROX)
PALLETIZED UNIT	70	142,800 LBS
DUNNAGE		1,059 LBS
TOTAL WEIGHT		143,859 LBS

TYPICAL 3-WIDE LOAD IN A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL BOX CAR

LONG KNEE BRACE	
UNIT HEIGHT	LENGTH OF PIECE MARKED ⑩
36" TO 54"	(UNIT HEIGHT MINUS 15") X 2
34" TO 35-7/8"	(UNIT HEIGHT MINUS 14") X 2
32" TO 33-7/8"	(UNIT HEIGHT MINUS 13") X 2
30" TO 31-7/8"	(UNIT HEIGHT MINUS 12") X 2
28" TO 29-7/8"	(UNIT HEIGHT MINUS 11") X 2
26" TO 27-7/8"	(UNIT HEIGHT MINUS 10") X 2
23" TO 25-7/8"	(UNIT HEIGHT MINUS 9") X 2
LESS THAN 23"	NOT PERMITTED



ISOMETRIC VIEW



SECTION G-G

KEY NUMBERS

① ANTI-SWAY BRACE ASSEMBLY (24 REQD). SEE THE "ANTI-SWAY BRACE A" DETAIL ON PAGE 64. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLET UNITS. SEE GENERAL NOTE "G" ON PAGE 2 AND SPECIAL NOTES 4 AND 8 ON PAGE 19.

② TOP-OF-LOAD ANTI-SWAY BRACE (6 REQD). SEE THE DETAIL ON PAGE 61. WIRE TIE TO AN INNER UNITIZING STRAP WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION A" DETAIL ON THAT PAGE.

③ KNEE-BRACE GATE (2 REQD). SEE THE DETAIL ON PAGE 62.

④ CENTER GATE (2 REQD). SEE THE "CENTER GATE B" DETAIL ON PAGE 47. SEE SPECIAL NOTE 5 ON PAGE 19.

⑤ STRUT, 4" X 4" BY CUT TO FIT (8 REQD). TOENAIL TO THE CENTER GATES, PIECES MARKED ④ , W/2-16d NAILS AT EACH END. SEE SPECIAL NOTE 9 ON PAGE 19.

⑥ BEARING PIECE, 2" X 6" BY CUT TO FIT BETWEEN PIECES MARKED ③ AND ④ MINUS 3" (16 REQD). POSITION TWO (2) EACH SIDE BY SIDE SO AS TO HAVE THE ENDS CENTERED AGAINST A VERTICAL PIECE OF THE KNEE-BRACE GATE, PIECE MARKED ③ . TOENAIL TO THE VERTICAL PIECE W/1-12d NAIL.

⑦ SHORT KNEE BRACE, 4" X 4" X 20" (8 REQD). SEE THE "KNEE BRACE" DETAIL ON PAGE 62. TOENAIL TO PIECES MARKED ③ AND ⑥ W/2-16d NAILS AT EACH END.

⑧ BACK-UP CLEAT, 2" X 6" BY CUT TO FIT BETWEEN PIECES MARKED ⑦ (4 REQD). NAIL TO EACH PIECE MARKED ⑥ W/1-10d NAIL EVERY 12".

⑨ HOLD-DOWN CLEAT, 2" X 6" BY UNIT HEIGHT MINUS 9" (8 REQD). NAIL TO PIECE MARKED ③ W/12-10d NAILS.

⑩ LONG KNEE BRACE, 4" X 4" BY CUT TO FIT (8 REQD). SEE THE "KNEE BRACE" DETAIL ON PAGE 62 FOR DIMENSIONS OF BEVEL CUTS. SEE THE "LONG KNEE BRACE" CHART ABOVE FOR LENGTH OF BRACE. TOENAIL TO PIECES MARKED ⑧ AND ⑨ W/2-16d NAILS AT EACH END.

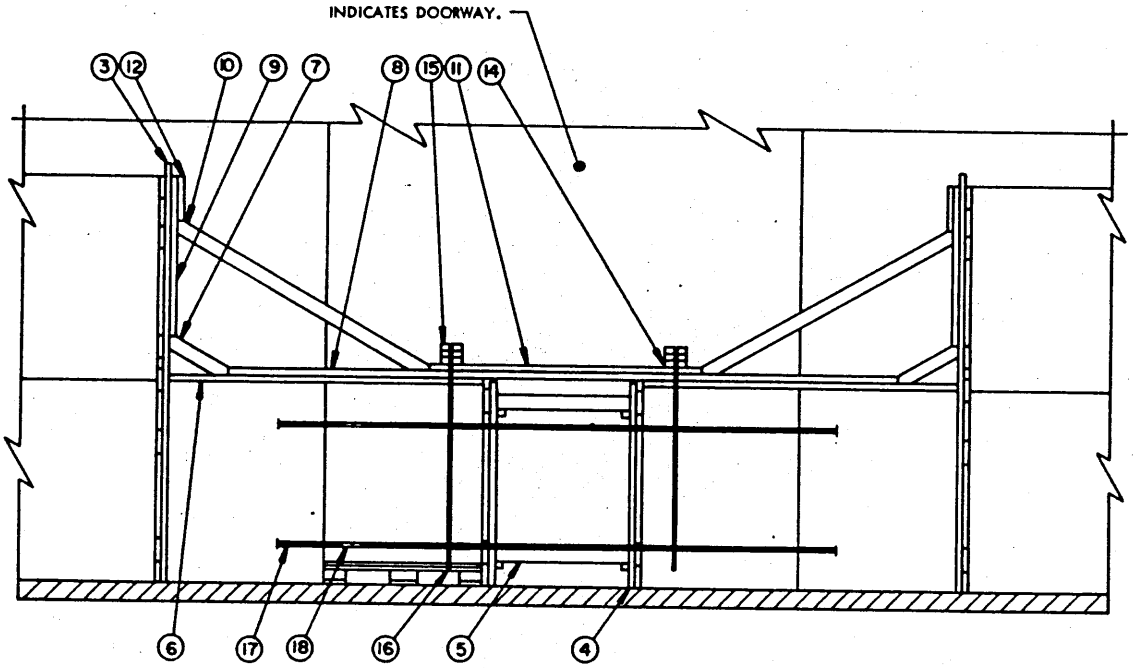
⑪ BACK-UP CLEAT, 2" X 6" BY CUT TO FIT BETWEEN PIECES MARKED ⑩ (4 REQD). NAIL TO PIECE MARKED ⑧ W/1-10d NAIL EVERY 6".

⑫ HOLD-DOWN CLEAT, 2" X 6" X 12" (8 REQD). NAIL TO PIECE MARKED ⑨ W/5-16d NAILS.

⑬ SPACER ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 62. NAIL TO PIECES MARKED ⑥ W/2-10d NAILS AT EACH END.

(CONTINUED ON PAGE 19)

TYPICAL LCL LOAD USING UPPER-LAYER
KNEE BRACE METHOD OF PARTIAL-LAYER (TIER) BRACING



PARTIAL ELEVATION VIEW

(KEY NUMBERS CONTINUED FROM PAGE 18)

⑭ CROSS BRACE, 2" X 6" BY CAR WIDTH MINUS 6" (2 REQD). NAIL TO PIECES MARKED ⑪ W/3-16d NAILS AT EACH JOINT. SEE SPECIAL NOTE 6 AT THE RIGHT.

⑮ STRAPPING BOARD, 2" X 6" BY WIDTH OF LATERAL VOID PLUS 16" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO PIECE MARKED ⑭ W/1-10d NAIL EVERY 12" (2 MIN). NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.

⑯ HOLD-DOWN STRAP, 1-1/4" X .035" X 31'-0" LONG (REF) STEEL STRAPPING (2 REQD). INSTALL SO AS TO ENCIRCLE THE PALLETIZED UNITS, CROSS BRACE, AND STRAPPING BOARD. STAPLE TO STRAPPING BOARD W/2 STAPLES AND TO THE CROSS BRACE W/1 STAPLE AT EACH END.

⑰ DOORWAY STRAP, 1-1/4" X .035" X 14'-0" LONG STEEL STRAPPING (4 REQD). INSTALL FROM TWO (2) 7'-0" LONG PIECES. SEE SPECIAL NOTE 7 AT RIGHT.

⑱ SEAL FOR 1-1/4" STEEL STRAPPING (20 REQD, 4 PER DOORWAY STRAP, 2 PER HOLD-DOWN STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "H" ON PAGE 2.

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE ALL-METAL BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. ALL-METAL OR WOOD-LINED CARS OF OTHER DIMENSIONS AND CARS HAVING OTHER WIDTH DOOR OPENINGS CAN BE USED.

2. THE KNEE BRACE METHOD OF PARTIAL-LAYER BRACING MAY BE USED IN ALL-METAL CARS OR IN WOOD-LINED CARS FOR THE SECUREMENT OF A PARTIAL TOP TIER OF NOT MORE THAN 22,000 POUNDS IN EACH END OF A CAR. THE TOP TIER CAN BE A SECOND TIER, THIRD TIER, OR OTHER, AS LONG AS ALL THE LOWER TIERS ARE FULL TIERS BLOCKED AND BRACED USING CENTER GATES AND STRUTS. KNEE BRACING IS LIMITED TO LOADS HAVING TWO ROWS OF PALLETIZED UNITS, ONE ALONG EACH CAR SIDEWALL.

(CONTINUED AT RIGHT)

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	37	13
2" X 4"	209	140
2" X 6"	568	568
2" X 8"	70	94
4" X 4"	88	118
NAILS	**NO. REQD**	**POUNDS**
10d (3")	812	12-1/2
12d (3-1/4")	34	3/4
16d (3-1/2")	160	3-1/2

STEEL STRAPPING, 1-1/4" X .035"	118' REQD	17 LBS
SEAL FOR 1-1/4" STRAPPING	20 REQD	1 LB
STAPLE FOR 1-1/4" STRAPPING	8 REQD	NIL
WIRE, NO. 14 GAGE	24' REQD	NIL

(SPECIAL NOTES CONTINUED)

3. THE PALLETIZED UNIT SHOWN IN THE TYPICAL LCL LOAD ON PAGE 18 HAS OVERALL DIMENSIONS OF 40" LONG BY 50-1/4" WIDE BY 52" HIGH. THE UNIT WEIGHT IS 1,342 POUNDS. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER LENGTHS AND WIDTHS. WITH MINOR ADJUSTMENTS, THE PROCEDURES ARE APPLICABLE FOR ANY LENGTH OR WIDTH UNIT TURNED 90° TO THAT SHOWN. CAUTION: THE KNEE BRACE METHOD CANNOT BE USED FOR PALLETIZED UNITS WHICH ARE LESS THAN 23" IN HEIGHT.

4. THE ANTI-SWAY BRACES, PIECES MARKED ①, MAY BE OMITTED IF THE SPACE BETWEEN LATERALLY ADJACENT UNITS IS 6" OR LESS, AS MEASURED FROM BOX TO BOX ON LATERALLY ADJACENT UNITS, OR BETWEEN BATTENS AS APPLICABLE. IF THE EXCESS SPACE EXCEEDS THE MAXIMUM ALLOWABLE, ANTI-SWAY BRACES MUST BE POSITIONED BETWEEN ALL LATERALLY ADJACENT PALLETIZED UNITS.

5. THE CENTER GATE B SHOWN IN THE LOAD VIEW IS APPLICABLE FOR THE 2-WIDE LOAD SHOWN. NOTE THAT THE VERTICAL PIECES OF "CENTER GATE B" MUST BE CUT OFF APPROXIMATELY 1" ABOVE THE TOP OF THE TIER (AFTER THE STRUTS HAVE BEEN INSTALLED) TO PROVIDE CLEARANCE FOR INSTALLATION OF THE KNEE BRACE PIECES.

6. A MINIMUM OF TWO (2) SETS OF SPACER ASSEMBLIES, CROSS BRACES, STRAPPING BOARDS, AND HOLD-DOWN STRAPS, PIECES MARKED ⑬ THRU ⑯, ARE REQUIRED. FOR THOSE LOADS IN WHICH THE TOP TIER IS MORE THAN TWO UNITS SHORTER IN EACH END THAN THE NEXT LOWER TIER, AN ADDITIONAL SET OF THOSE PIECES MUST BE INSTALLED FOR EACH LOAD UNIT BETWEEN A CENTER GATE AND THE LOAD UNIT WHICH IS UNDER THE LOWER END OF THE LONG KNEE BRACES (48" MAX SPACING). NOTE THAT THE STRAPPING MUST BE THREADED THRU THE BASE PRIOR TO FINAL POSITIONING OF THOSE UNITS WHICH ARE NOT IN THE DOORWAY.

7. DOORWAY PROTECTION IS PROVIDED BY THE DOORWAY STRAPS, PIECES MARKED ⑰ (FOR PLUG DOORS ONLY), SECURED TO SPECIAL ANCHOR RODS IN THE CAR DOOR POSTS. IF THE CAR HAS SLIDING DOORS, OR HAS NO ANCHOR RODS, DOORWAY PROTECTION MUST BE PROVIDED BY SOME OTHER MEANS. SEE PIECES MARKED ⑪ AND ⑫ ON PAGE 8 AND SPECIAL NOTE 7 ON PAGE 9. NOTE THAT THE HOLD-DOWN STRAPS, PIECES MARKED ⑯, WILL ALSO PROVIDE FOR DOORWAY PROTECTION IF DOORWAY BLOCKING, PIECES MARKED ⑪ ON PAGE 8 IS SUBSTITUTED FOR THE ANTI-SWAY BRACES, PIECES MARKED ①, BETWEEN THOSE UNITS IN THE DOORWAY. THE SPACER ASSEMBLY, PIECE MARKED ⑬, WILL BE USED UNDER ALL DOORWAY PROTECTION STRAPS IN LIEU OF THE SPACER SHOWN ON PAGE 8.

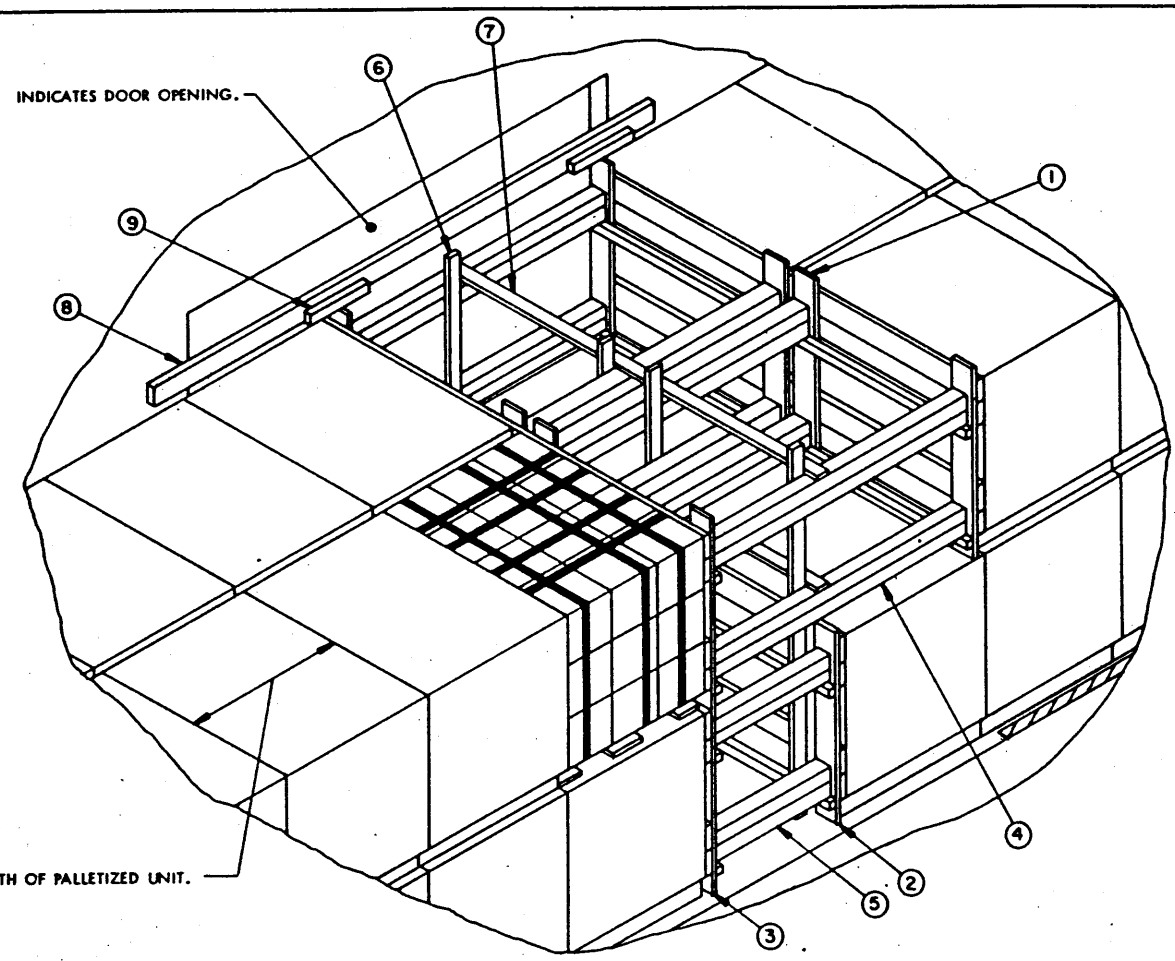
8. IF DESIRED, THE ANTI-SWAY BRACE ASSEMBLY C, AS DETAILED ON PAGE 65, MAY BE USED IN LIEU OF THE ANTI-SWAY BRACE ASSEMBLY A SHOWN IN THE LOAD VIEW. THE ANTI-SWAY BRACE ASSEMBLY A IS THE PREFERRED METHOD IF THE SPACE BETWEEN LATERALLY ADJACENT PALLET UNITS IS SUCH THAT IT CAN BE EASILY INSTALLED. NOTE THAT IF ANTI-SWAY BRACE ASSEMBLY C IS USED, RETAINER PIECES MUST BE ADDED TO THE CENTER GATES. SEE THE "TYPICAL INSTALLATION OF ANTI-SWAY BRACE RETAINER" DETAIL ON PAGE 65.

9. IF DESIRED, DOUBLE 2" X 6" STRUTS MAY BE USED IN LIEU OF THE DEPICTED 4" X 4" STRUTS, PIECES MARKED ⑤. LAMINATE W/1-10d NAIL EVERY 6". TOENAIL TOP PIECE TO GATES W/2-12d NAILS AT EACH END.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLETIZED UNIT	48	64,416 LBS
DUNNAGE		1,901 LBS
TOTAL WEIGHT		66,317 LBS

TYPICAL LCL LOAD USING UPPER-LAYER KNEE BRACE METHOD OF PARTIAL-LAYER (TIER) BRACING



ISOMETRIC VIEW

SPECIAL NOTES:

1. THE CENTER PORTION OF A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.
2. THE PALLETIZED UNIT SHOWN IN THE TYPICAL 2-WIDE LOAD HAS OVERALL DIMENSIONS OF 40-1/2" LONG BY 54" WIDE BY 46" HIGH. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER LENGTHS AND WIDTHS. BASED ON A DOOR HEIGHT OF 9'-8" FULL LOADS OF UNITS WHICH ARE MORE THAN 38-1/2" IN HEIGHT WILL BE LIMITED TO NOT MORE THAN TWO (2) TIERS.
3. THE PROCEDURES FOR THE ADJUSTMENT OF A LOAD QUANTITY BY THE OMISSION OF THE TOP TIER FROM A 2-WIDE LOAD UNIT ARE SHOWN AS TYPICAL. THE PRINCIPLES MAY ALSO BE APPLIED FOR THE OMISSION OF THE TOP TIER FROM A 3-WIDE LOAD UNIT.
4. ONLY THE BLOCKING AND BRACING PIECES WHICH ARE NECESSARY TO PERMIT THE OMISSION OF THE UNITS FROM THE TOP TIER ARE SHOWN.
5. THE CENTER GATE D USED IS ONLY APPLICABLE FOR THE PARTICULAR LOAD DEPICTED. THE PROPER CENTER GATE TO BE USED WILL DEPEND UPON THE LOAD PATTERN OF THE LOAD IN WHICH THE QUANTITY IS BEING ADJUSTED.
6. THE LENGTH OF THE STRUTS AND/OR WIDTH OR LENGTH OF THE OMITTED UNITS MAY REQUIRE THAT MORE THAN ONE SET OF VERTICAL STRUT BRACING BE INSTALLED. TO PROTECT THE LADING FROM BEING PUNCTURED WHEN A SET OF VERTICAL STRUT BRACING IS INSTALLED ABOVE THE LOWER TIERS OF A LOAD, A SUITABLE LENGTH PAD OF 2" X 4" OR 2" X 6" MATERIAL AS SHOWN BY PIECE MARKED (8) ON PAGE 21, MUST BE POSITIONED UNDER AND SECURED TO EACH APPLICABLE VERTICAL STRUT BRACING PIECE.
7. FOUR (4) (DOUBLED) LOAD BLOCKING 4" X 4" STRUTS FOR EACH ROW/TIER ARE ADEQUATE FOR RETAINING A WEIGHT OF 24,500 POUNDS. REFER TO THE "STRUTTING REQUIREMENTS" CHART ON PAGE 57 FOR GUIDANCE AS TO THE MAXIMUM WEIGHT PER UNIT. THE "ALT STRUTTING VIEW A" AND "ALT STRUTTING VIEW B" AT THE TOP OF PAGE 57 DEPICT INSTALLATION GUIDANCE FOR 4" X 6" ON-EDGE STRUTS AND DOUBLED 4" X 4" STRUTS, RESPECTIVELY. SEE SPECIAL NOTE 8.
8. IF DESIRED, TRIPLE 2" X 6" STRUTS MAY BE USED IN LIEU OF THE DOUBLED 4" X 4" STRUTS, PIECES MARKED (5). LAMINATE THE 2" X 6" PIECES W/1-10d NAIL EVERY 6" AND TOENAIL THE TOP STRUT PIECE TO THE VERTICAL PIECES OF THE CENTER GATES, PIECES MARKED (1) THRU (3).
9. ALTERNATIVE GATE HOLD DOWN PROCEDURES ARE SHOWN ON PAGES 66 AND 67.

(CONTINUED AT RIGHT)

KEY NUMBERS

(1) CENTER GATE FOR UPPER TIER (1 REQD). SEE THE "CENTER GATE D" DETAIL ON PAGE 49 FOR CONSTRUCTION DIMENSIONS. SEE SPECIAL NOTE 5 ON THIS PAGE.

(2) CENTER GATE FOR BOTTOM TIER (1 REQD). SEE "CENTER GATE D" DETAIL ON PAGE 49 FOR CONSTRUCTION DIMENSIONS.

(3) CENTER GATE FOR TWO TIERS HIGH (1 REQD). SEE THE "CENTER GATE D" DETAIL ON PAGE 49.

(4) STRUT, 4" X 4" BY CUT TO FIT (DOUBLED) (3 REQD). TOENAIL TO PIECES MARKED (1) AND (3) W/2-16d NAILS AT EACH END. SEE SPECIAL NOTE 7 ON THIS PAGE.

(5) STRUT, 4" X 4" BY CUT TO FIT (DOUBLED) (8 REQD). TOENAIL TO PIECES MARKED (2) AND (3) W/2-16d NAILS AT EACH END. SEE SPECIAL NOTE 7 ON THIS PAGE.

(6) VERTICAL STRUT BRACING, 2" X 4" BY CUT TO EXTEND 3" ABOVE THE TOP STRUT (4 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT. SEE SPECIAL NOTE 6 ON THIS PAGE.

(7) HORIZONTAL STRUT BRACING, 2" X 4" BY CAR WIDTH MINUS 1/2" IN LENGTH (2 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.

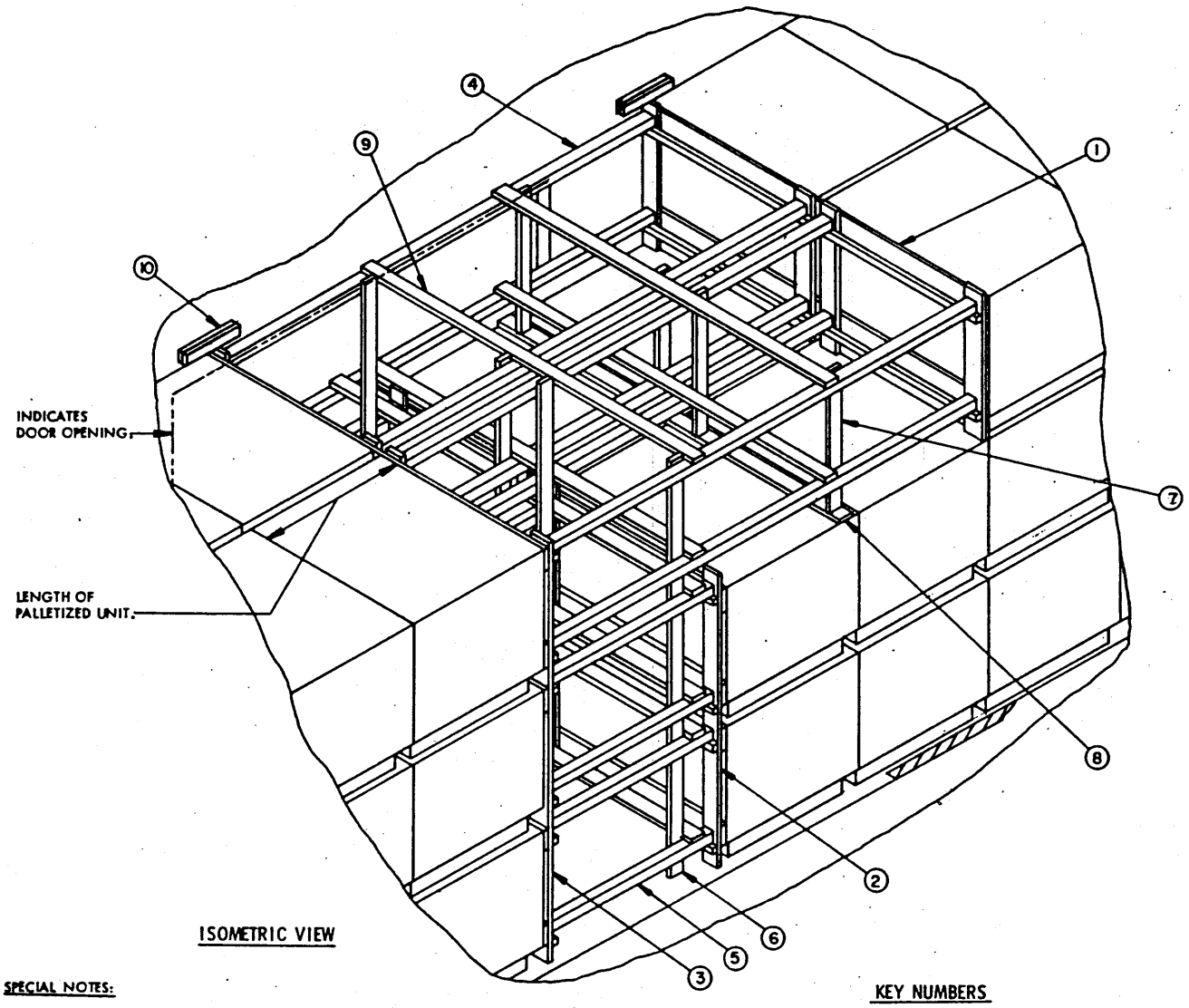
(8) CENTER GATE HOLD DOWN, 2" X 6" BY DOOR OPENING WIDTH PLUS 24" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS AT EACH END.

(9) CENTER GATE HOLD DOWN CLEAT, 2" X 4" X 18" (4 REQD). CENTER THE CLEATS ABOVE THE VERTICAL PIECES ON THE CENTER GATE AND NAIL TO THE CENTER GATE HOLD-DOWN W/5-10d NAILS.

(SPECIAL NOTES CONTINUED)

THE ALTERNATIVE PROCEDURES MAY BE USED IN LIEU OF PIECES MARKED (8) AND (9) ABOVE AND/OR PIECES MARKED (10) ON PAGE 21, IF DESIRED, AND MUST BE USED IF THE CAR SIDEWALL IS NOT NAILABLE OR IF THE LOAD HEIGHT DOES NOT PERMIT USE OF THE SPECIFIED PIECES. FOR PALLET UNITS WITH THE LENGTH PARALLEL TO THE CAR SIDEWALL, REFER TO "METHOD I" ON PAGE 66; REFER TO "METHOD II" ON PAGE 66 AND/OR "METHOD III" OR "METHOD IV" ON PAGE 67 FOR UNITS WITH THE WIDTH PARALLEL TO THE SIDEWALL OF THE CAR.

TYPICAL LCL LOAD USING STRUTTED GATE METHOD OF PARTIAL-LAYER (TIER) BRACING



ISOMETRIC VIEW

SPECIAL NOTES:

1. THE CENTER PORTION OF A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.

2. THE PALLETIZED UNIT SHOWN IN THE TYPICAL 2-WIDE LOAD HAS OVERALL DIMENSIONS OF 42-3/8" LONG BY 53-1/4" WIDE BY 38-1/2" HIGH. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER LENGTHS AND WIDTHS. BASED ON A DOOR HEIGHT OF 9'-8" FULL LOADS OF UNITS WHICH ARE MORE THAN 38-1/2" IN HEIGHT WILL BE LIMITED TO NOT MORE THAN TWO (2) TIERS.

3. THE PROCEDURES FOR THE ADJUSTMENT OF A LOAD QUANTITY BY THE OMISSION OF THE TOP TIER FROM A 2-WIDE LOAD UNIT ARE SHOWN AS TYPICAL. THE PRINCIPLES MAY ALSO BE APPLIED FOR THE OMISSION OF THE TOP TIER FROM A 3-WIDE LOAD UNIT.

4. ONLY THE BLOCKING AND BRACING PIECES WHICH ARE NECESSARY TO PERMIT THE OMISSION OF THE UNITS FROM THE TOP TIER ARE SHOWN.

5. THE CENTER GATE B USED IS ONLY APPLICABLE FOR THE PARTICULAR LOAD DEPICTED. THE PROPER CENTER GATE TO BE USED WILL DEPEND UPON THE LOAD PATTERN OF THE LOAD IN WHICH THE QUANTITY IS BEING ADJUSTED.

6. THE LENGTH OF THE STRUTS AND/OR WIDTH OR LENGTH OF THE OMITTED UNITS MAY REQUIRE THAT MORE THAN ONE SET OF VERTICAL STRUT BRACING BE INSTALLED. TO PROTECT THE LADING FROM BEING PUNCTURED WHEN A SET OF VERTICAL STRUT BRACING IS INSTALLED ABOVE THE LOWER TIERS OF A LOAD, A SUITABLE LENGTH PAD OF 2" X 4" OR 2" X 6" MATERIAL, SHOWN AS PIECE MARKED ⑧, MUST BE POSITIONED UNDER AND SECURED TO EACH APPLICABLE VERTICAL STRUT BRACING PIECE.

7. FOUR (4) LOAD BLOCKING 4" X 4" STRUTS FOR EACH ROW/TIER ARE ADEQUATE FOR RETAINING A WEIGHT OF 12,250 POUNDS. REFER TO THE "STRUTTING REQUIREMENTS" CHART ON PAGE 57 FOR GUIDANCE AS TO THE MAXIMUM WEIGHT PER UNIT. THE "ALT STRUTTING VIEW A" AND "ALT STRUTTING VIEW B" AT THE TOP OF PAGE 57 DEPICT INSTALLATION GUIDANCE FOR 4" X 6" ON-EDGE STRUTS AND DOUBLED 4" X 4" STRUTS, RESPECTIVELY. SEE SPECIAL NOTE 8.

8. IF DESIRED, DOUBLE 2" X 6" STRUTS MAY BE USED IN LIEU OF THE DEPICTED 4" X 4"

(CONTINUED AT RIGHT)

KEY NUMBERS

① CENTER GATE FOR UPPER TIER (1 REQD). SEE THE "CENTER GATE B" DETAIL ON PAGE 47 FOR CONSTRUCTION DIMENSIONS. SEE SPECIAL NOTE 5 ON THIS PAGE.

② CENTER GATE FOR TWO BOTTOM TIERS (1 REQD). SEE THE "CENTER GATE B" DETAIL ON PAGE 47 FOR CONSTRUCTION DIMENSIONS.

③ CENTER GATE FOR THREE TIERS HIGH (1 REQD). SEE THE "CENTER GATE B" DETAIL ON PAGE 47.

④ STRUT, 4" X 4" BY CUT TO FIT (8 REQD). TOENAIL TO PIECES MARKED ① AND ③ W/2-16d NAILS AT EACH END. SEE SPECIAL NOTE 7 ON THIS PAGE.

⑤ STRUT, 4" X 4" BY CUT TO FIT (16 REQD). TOENAIL TO PIECES MARKED ② AND ③ W/2-16d NAILS AT EACH END. SEE SPECIAL NOTE 7 ON THIS PAGE.

⑥ VERTICAL STRUT BRACING, 2" X 4" BY CUT TO EXTEND 3" ABOVE THE TOP STRUT (4 REQD). NAIL TO THE STRUTS MARKED ④ AND ⑤ W/3-10d NAILS AT EACH JOINT.

⑦ VERTICAL STRUT BRACING, 2" X 4" BY CUT TO EXTEND 3" ABOVE THE TOP STRUT (4 REQD). NAIL TO THE STRUTS MARKED ④ W/3-10d NAILS AT EACH JOINT. TOENAIL TO THE STRUT BRACING PAD W/1-10d NAIL AT EACH JOINT.

⑧ STRUT BRACING PAD, 2" X 4" BY LENGTH TO SUIT (1 REQD). POSITION UNDER THE VERTICAL STRUT BRACING AS SHOWN.

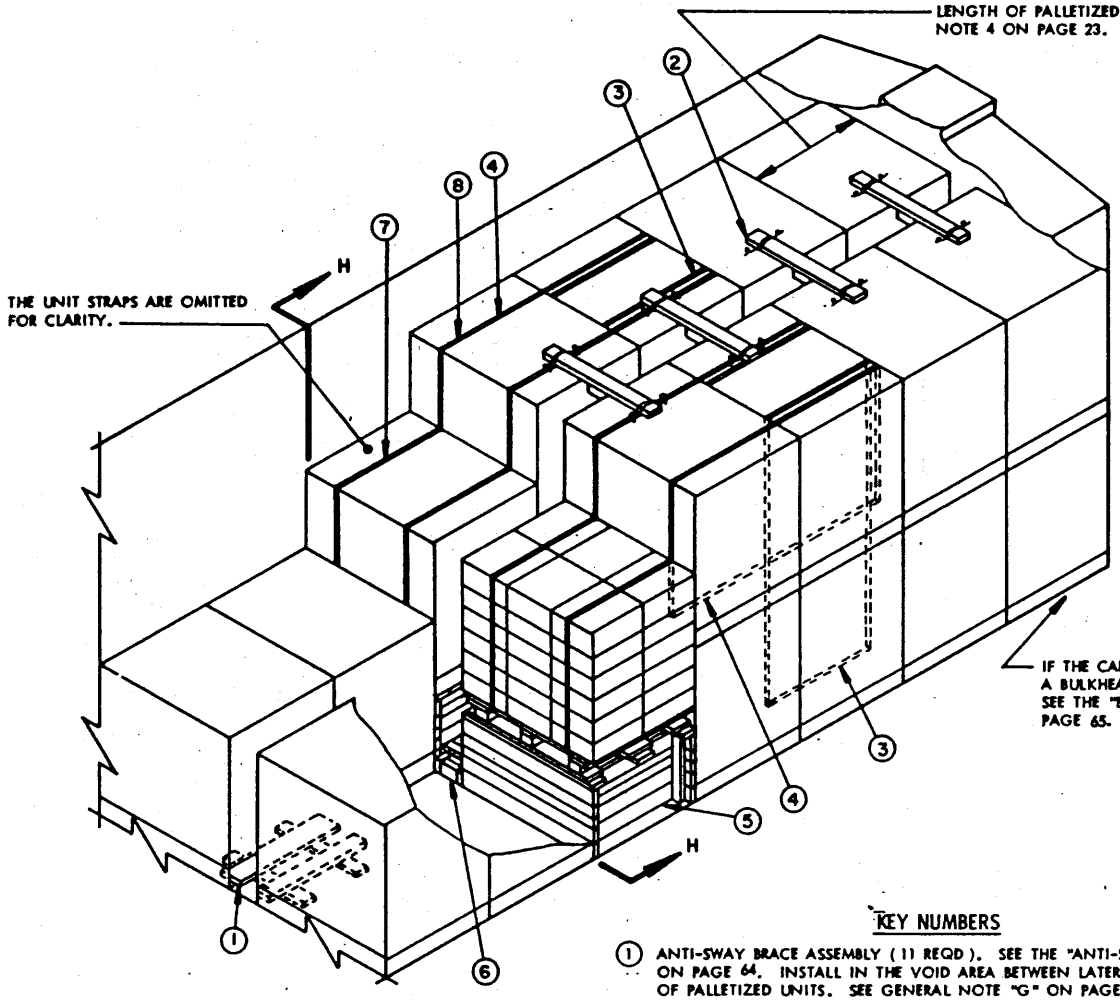
⑨ HORIZONTAL STRUT BRACING, 2" X 4" BY CAR WIDTH MINUS 1/2" IN LENGTH (8 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.

⑩ CENTER GATE HOLD-DOWN CLEAT, 2" X 4" X 18" (DOUBLED) (4 REQD). CENTER THE CLEATS ABOVE THE VERTICAL PIECES ON THE CENTER GATE, SHOWN AS PIECES MARKED ① AND ②, AND NAIL THE FIRST PIECE TO THE CAR SIDEWALL W/5-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE SPECIAL NOTE 9 ON PAGE 20.

(SPECIAL NOTES CONTINUED)

STRUTS, PIECES MARKED ④ AND ⑤. OR, TRIPLE 2" X 6" STRUTS MAY BE USED IN LIEU OF THE 4" X 6" ON-EDGE STRUTS SPECIFIED BY THE "ALTERNATIVE STRUTTING VIEW A" ON PAGE 57. LAMINATE THE 2" X 6" PIECES W/1-10d NAIL EVERY 6" AND TOENAIL THE TOP STRUT PIECE TO THE VERTICAL PIECES OF THE CENTER GATES, PIECES MARKED ① .THRU ③ W/2-12d NAILS AT EACH END.

TYPICAL LCL LOAD USING STRUTTED GATE METHOD OF PARTIAL-LAYER (TIER) BRACING



ISOMETRIC VIEW

KEY NUMBERS

(1) ANTI-SWAY BRACE ASSEMBLY (11 REQD). SEE THE "ANTI-SWAY BRACE A" DETAIL ON PAGE 64. INSTALL IN THE VOID AREA BETWEEN LATERALLY ADJACENT ROWS OF PALLETIZED UNITS. SEE GENERAL NOTE "G" ON PAGE 2 AND SPECIAL NOTES 5 AND 8 ON PAGE 23.

(2) TOP-OF-LOAD ANTI-SWAY BRACE (4 REQD). SEE THE DETAIL ON PAGE 61. WIRE TIE TO AN INNER UNITIZING STRAP WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION B" DETAIL ON THAT PAGE.

(3) VERTICAL UNITIZING STRAP, 1-1/4" X .035" X 25'-0" LONG (REF) STEEL STRAPPING (4 REQD, 2 PER STACK). INSTALL SO AS TO ENCIRCLE THE TWO PALLETIZED UNITS, AND SEAL THE JOINT W/2 SEALS, PRIOR TO FINAL POSITIONING OF THE STACK IN THE CAR. SEE SPECIAL NOTE 7 ON PAGE 23.

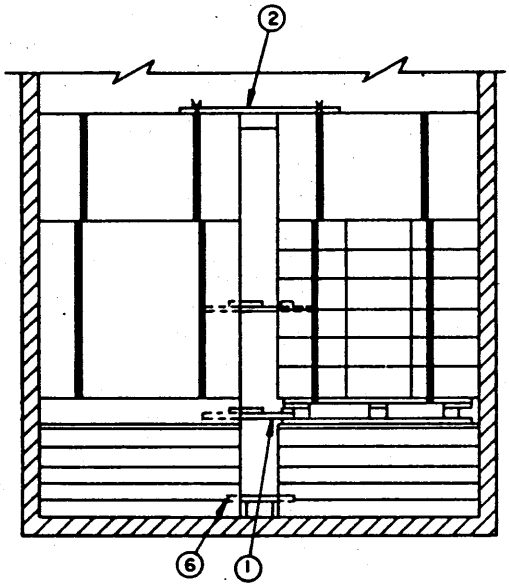
(4) HORIZONTAL UNITIZING STRAP, 1-1/4" X .035" X 23'-0" LONG (REF) STEEL STRAPPING (4 REQD). PRE-POSITION AROUND THE TOP UNIT OF THE UNITIZED 2-HIGH STACK. INSTALL SO AS TO ENCIRCLE THE TWO LONGITUDINALLY ADJACENT PALLETIZED UNITS, AND SEAL THE JOINT W/2 SEALS.

(5) RISER (2 REQD). SEE THE "RISER A" DETAIL ON PAGE 63. SEE SPECIAL NOTE 2 ON PAGE 23.

(6) RISER RETAINER ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 63.

(7) REINFORCING STRAP, 1-1/4" X .035" X 16'-0" LONG (REF) STEEL STRAPPING (4 REQD). INSTALL NEAR POSTS OF PALLETIZED UNIT AND SO AS TO ENCIRCLE THE PALLETIZED UNIT. SEAL THE JOINT W/2 SEALS.

(8) SEAL FOR 1-1/4" STRAPPING (24 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "H" ON PAGE 2.



SECTION H - H

TYPICAL LCL LOAD USING RISER METHOD OF PARTIAL-LAYER (TIER) BRACING

SPECIAL NOTES:

1. A 9'-2" WIDE CONVENTIONAL TYPE ALL-METAL BOX CAR IS SHOWN. ALL-METAL OR WOOD-LINED CARS OF OTHER WIDTHS CAN BE USED.

2. THE RISER METHOD OF PARTIAL-LAYER BRACING MAY BE USED IN ALL-METAL CARS OR IN WOOD-LINED CARS FOR THE SECUREMENT OF A PARTIAL TOP TIER OF NOT MORE THAN 16,000 POUNDS (8,000 POUNDS IN EACH ROW WHICH IS RETAINED BY A RISER). THE TOP TIER CAN BE A SECOND OR THIRD TIER, HOWEVER, THE RISERS MUST ALWAYS BE POSITIONED ON THE CAR FLOOR.

3. THE PALLETIZED UNIT SHOWN IN THE TYPICAL LCL LOAD ON PAGE 22 HAS OVERALL DIMENSIONS OF 40" LONG BY 50-1/4" WIDE BY 52" HIGH. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER SIZES.

4. THE LOAD PATTERN FOR A LOAD, SUCH AS 2-WIDE, OR 3-WIDE, WILL DEPEND UPON THE DIMENSION OF THE UNIT WHICH IS POSITIONED ACROSS THE CAR. A 2-WIDE LOAD IS SHOWN AS TYPICAL. THE LOADING PRINCIPLES CAN BE ADAPTED FOR PARTIAL-LAYER BRACING FOR ANY OF THE LOADS SHOWN ON PAGES 6 THRU 22.

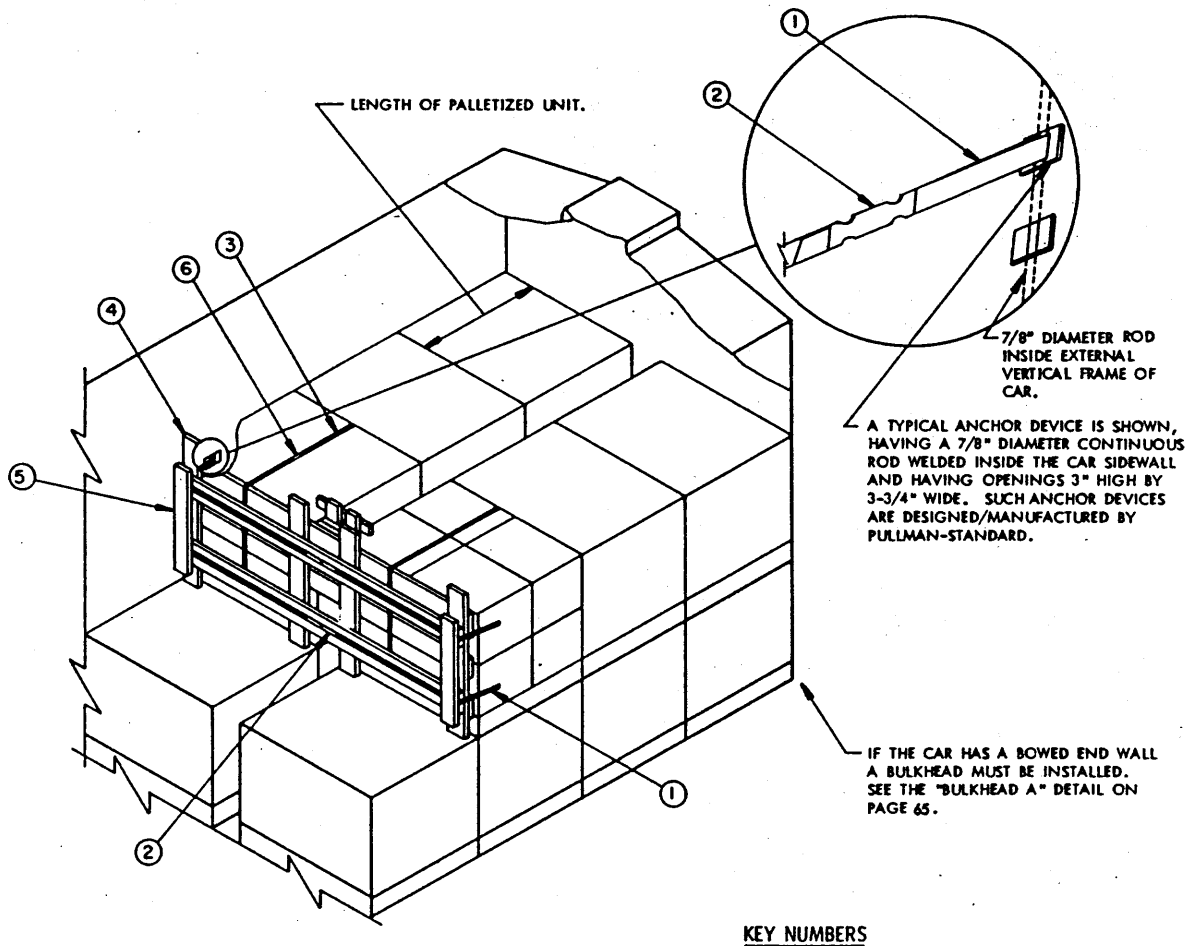
5. ANTI-SWAY BRACING FOR A LOAD MAY BE OMITTED IF THE SPACE BETWEEN LATERALLY ADJACENT UNITS IS 6" OR LESS, AS MEASURED FROM BOX TO BOX ON LATERALLY ADJACENT UNITS, OR BETWEEN BATTENS, AS APPLICABLE.

6. IN LIEU OF CONSTRUCTING RISER ASSEMBLIES TO BE USED FOR THE BRACING OF AN LCL LOAD AS SHOWN ON PAGE 22, PARTIAL-HEIGHT PALLETIZED UNITS MAY BE USED AS RISER UNITS. A PALLETIZED UNIT TO BE USED IN LIEU OF A RISER MUST HAVE THE EXACT NUMBER OF LAYERS OF BOXES AS SPECIFIED IN THE "RISER UNITS" CHART BELOW, BASED ON THE NUMBER OF LAYERS IN THE BASIC UNIT (THE UNITS IN THE BALANCE OF THE LOAD). IF ALREADY-ASSEMBLED UNITS ARE BROKEN DOWN TO FORM RISER UNITS, THE SEALS ON THE PALLETIZED UNIT STRAPS AND ON THE UNITIZING STRAPS OF THE PARENT UNIT SHOULD BE CUT OFF AND THE STRAPS RE-TENSIONED AND SEALED AFTER REMOVING THE REQUIRED NUMBER OF LAYERS OF BOXES. PALLETIZED UNITS CONSISTING OF AN EVEN NUMBER OF LAYERS OF BOXES CAN BE DIVIDED EQUALLY TO FORM TWO RISER UNITS. PALLETIZED UNITS CONSISTING OF AN ODD NUMBER OF LAYERS CAN BE BROKEN DOWN TO FORM TWO RISER UNITS WITH ONE LAYER REMAINING. THIS REMAINING LAYER CAN BE COMBINED WITH OTHER REMAINING LAYERS TO FORM A RISER UNIT, OR CAN BE ASSEMBLED ON A PALLET BASE AND SECURED ON TOP OF THE UPPER LAYER IN A LOAD AS SHOWN BY THE "SECUREMENT OF PARTIAL UNIT ON TOP" DETAIL ON PAGE 34. IF ONE OR MORE TOP LAYERS ARE ROBBED FROM A FULL UNIT OF BOXES IN MAKING UP RISER UNITS, THE REMAINING LESS-THAN-FULL UNIT CAN BE PLACED WITHIN THE LOAD, FOLLOWING THE PROCEDURES SHOWN BY THE "POSITIONING OF PARTIAL UNIT WITHIN A TIER" DETAIL ON PAGE 35, PROVIDING THE NUMBER OF LAYERS OF BOXES ON A UNIT IS NOT LESS THAN THE MINIMUM SPECIFIED IN THE "PARTIAL UNIT WITHIN A TIER (LAYER)" CHART ON THAT PAGE. NOTE THAT THE SHIPPING PAPERS FOR A LOAD MUST BE PROPERLY ANNOTATED TO DENOTE THE PRESENCE OF THESE PARTIAL LAYERS.

7. THE POSITIONING OF THE VERTICAL UNITIZING STRAPS AND THE HORIZONTAL UNITIZING STRAPS, PIECES MARKED ③ AND ④, RESPECTIVELY, IS APPLICABLE FOR LCL LOADS WHICH ARE AT LEAST TWO LOAD UNITS LONG IN THE UPPERMOST TIER. IF THE UPPERMOST TIER IS ONLY ONE LOAD UNIT IN LENGTH, PIECE MARKED ③ WILL BE INSTALLED SO AS TO ENCIRCLE A STACK IN THAT LOAD UNIT, AND PIECES MARKED ④ WILL NOT BE REQUIRED.

8. IF DESIRED, THE ANTI-SWAY BRACE ASSEMBLY C, AS DETAILED ON PAGE 65, MAY BE USED IN LIEU OF THE ANTI-SWAY BRACE ASSEMBLY A SHOWN IN THE LOAD VIEW. THE ANTI-SWAY BRACE ASSEMBLY A IS THE PREFERRED METHOD IF THE SPACE BETWEEN LATERALLY ADJACENT PALLET UNITS IS SUCH THAT IT CAN BE EASILY INSTALLED. NOTE THAT IF ANTI-SWAY BRACE ASSEMBLY C IS USED, RETAINER PIECES MUST BE ADDED TO THE CENTER GATES WHICH ARE TO BE USED. SEE THE "TYPICAL INSTALLATION OF ANTI-SWAY BRACE RETAINER" DETAIL ON PAGE 65.

RISER UNITS	
NO. OF LAYERS IN BASIC UNIT	NO. OF LAYERS TO BE USED FOR A RISER UNIT
2	1
3	1
4	2
5	2
6	3
7	3
8	4



ISOMETRIC VIEW

SPECIAL NOTES:

1. A 9'-6" WIDE ALL-METAL BOX CAR EQUIPPED WITH STRAP ANCHOR DEVICES AND HAVING AN AAR MECHANICAL DESIGNATION CLASS OF XL IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED.

2. THE LOAD SHOWN DEPICTING THE BULKHEAD GATE METHOD OF PARTIAL-LAYER (TIER) BRACING IS TYPICAL. THE PROCEDURES ARE APPLICABLE FOR VARIOUS LOAD PATTERNS. REFER TO PAGE 25 FOR LOAD PATTERN VIEWS, THEIR APPLICATION, AND ANY LIMITATIONS WHICH MUST BE OBSERVED. THE PALLETIZED UNIT SHOWN HAS OVERALL DIMENSIONS OF 40-1/2" LONG BY 50" WIDE BY 41-1/2" HIGH. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER LENGTHS AND WIDTHS.

3. A BULKHEAD GATE USED IN CONJUNCTION WITH THREE (3) BULKHEAD STRAPS WILL RETAIN UP TO 18,000 POUNDS OF LADING; A BULKHEAD GATE WITH TWO (2) STRAPS WILL RETAIN NOT MORE THAN 12,000 POUNDS.

4. THE ANCHOR DEVICES TO BE USED FOR THE ATTACHMENT OF THE BULKHEAD STRAPS FOR THE SECUREMENT OF A 2-WIDE PORTION OF A 3-WIDE LOAD MUST BE LOCATED AT LEAST 24" TOWARD THE CAR END WALL FROM THE OPPOSITE-THE-LOAD SIDE OF THE BULKHEAD GATE. THE ANCHOR DEVICES FOR ALL THE OTHER LOAD PATTERNS MUST BE LOCATED AT LEAST 6" TOWARD THE CAR END WALL FROM THE OPPOSITE-THE-LOAD SIDE OF THE BULKHEAD GATE.

5. BULKHEAD STRAPS WILL BE TWO INCH (2") WIDE STEEL STRAPPING; 1-1/4" STRAPPING MUST NOT BE USED. A BULKHEAD STRAP WILL BE OF A LENGTH TO SUIT AND WILL BE THREADED THRU THE ANCHOR DEVICE (PRIOR TO POSITIONING THE ADJACENT UNITS) FAR ENOUGH TO PROVIDE FOR ONE LEG BEING APPROXIMATELY 48" LONGER THAN THE OTHER. THE STRAP ATTACHED TO THE MATING ANCHOR DEVICE WILL HAVE THE OPPOSITE LEG EXTENDING 48". THE TWO LEGS OF EACH HALF OF A STRAP WILL BE SECURED NEAR THE ANCHOR DEVICE WITH ONE DOUBLE CRIMPED SEAL. NOTE THAT THIS SEAL MUST BE POSITIONED EITHER CLOSE ENOUGH TO OR FAR ENOUGH AWAY FROM THE ANCHOR DEVICE SO AS NOT TO BE AT THE POINT WHERE THE STRAP BENDS AROUND THE END OF THE BULKHEAD GATE OR AROUND THE CORNER OF THE ADJACENT UNITS. THE STRAP ENDS OF EACH PAIR OF LONG AND SHORT LEGS WILL BE SECURED WITH TWO (2) SEALS BUTTED TOGETHER AND DOUBLE CRIMPED.

6. THE PROPER BULKHEAD GATE TO BE USED FOR A LOAD WILL BE DEPENDENT UPON THE CONFIGURATION OF THE LOAD. BULKHEAD GATE A IS FOR USE AGAINST A 2-WIDE PORTION OF A LOAD WHEN THERE IS A LATERAL VOID. BULKHEAD GATE B SHOWN ON PAGE 27 IS FOR USE AGAINST A 2-WIDE PORTION OF A LOAD WHEN THERE IS NO LATERAL VOID. BULKHEAD GATE C IS FOR USE AGAINST LOADS WHICH ARE THREE UNITS WIDE. IF THE LADING WEIGHT TO BE RETAINED REQUIRES THE ADDITION OF A STRAPPING BOARD AT HEIGHT "J" TO EITHER OF THE GATES ONLY SHOWING TWO STRAPPING BOARDS, A HORIZONTAL PIECE MUST BE PRESENT (OR ADDED) AT HEIGHT "F" TO PROVIDE PROPER BEARING ON UNIT.

(CONTINUED AT RIGHT)

KEY NUMBERS

(1) BULKHEAD STRAP, 2" X .050" X 34'-0" LONG (REF) STEEL STRAPPING (2 REQD). INSTALL FROM TWO EQUAL LENGTH PIECES. SEE THE "LOAD PATTERN/STRAP APPLICATION PLAN C" ON PAGE 25 FOR INSTALLATION GUIDANCE. SEE SPECIAL NOTES 3 THRU 5 AT LEFT.

(2) SEAL FOR 2" STRAPPING (12 REQD, 6 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "H" ON PAGE 2.

(3) BUNDLING STRAP, 1-1/4" X .035" X 15'-0" LONG (REF) STEEL STRAPPING (2 REQD). ENCIRCLE PALLETIZED UNIT AND HORIZONTAL PIECES OF THE BULKHEAD GATE. SEAL THE STRAP JOINT W/1 SEAL.

(4) BULKHEAD GATE (1 REQD). SEE THE "BULKHEAD GATE A" DETAIL ON PAGE 26. SEE SPECIAL NOTE 6 AT LEFT.

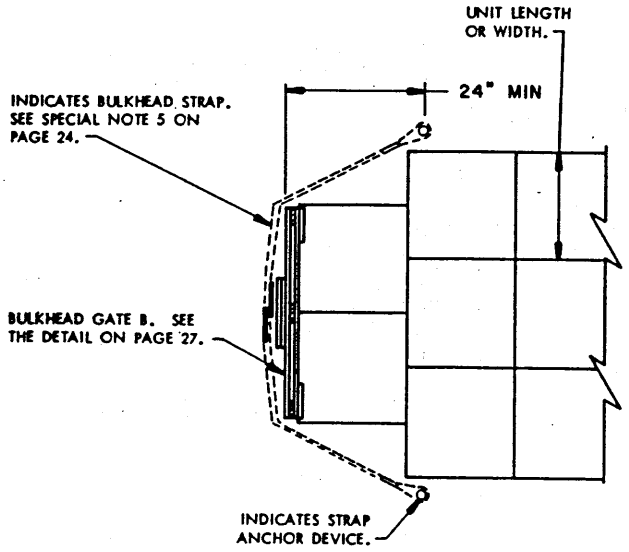
(5) STRAP RETAINER, 2" X 4" BY A LENGTH TO SUIT (2 REQD). NAIL TO THE BULKHEAD GATE W/2-12d NAILS ABOVE AND BELOW EACH BULKHEAD STRAP.

(6) SEAL FOR 1-1/4" STEEL STRAPPING (2 REQD, 1 PER STRAP). DOUBLE CRIMP EACH SEAL.

(SPECIAL NOTES CONTINUED)

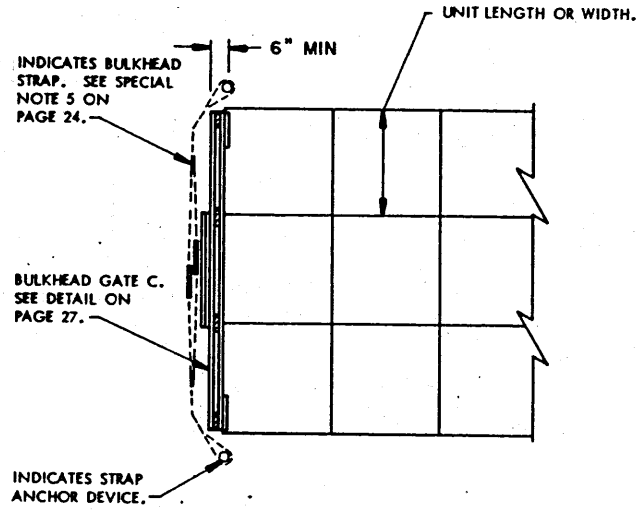
7. THE STRAPPING BOARDS ON A BULKHEAD GATE ARE TO BE ALIGNED AS NEARLY AS POSSIBLE WITH THE ANCHOR DEVICES IN THE CAR TO WHICH THE BULKHEAD STRAPS ARE ATTACHED. A TOLERANCE IS ALLOWED ON DIMENSIONS "G", "H", AND "J" TO PROVIDE FOR THIS ALIGNMENT.

TYPICAL LCL LOAD USING BULKHEAD GATE METHOD OF PARTIAL-LAYER (TIER) BRACING



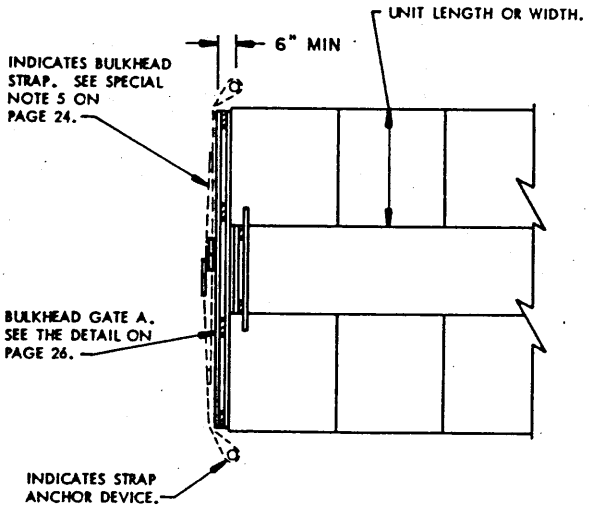
LOAD PATTERN/STRAP INSTALLATION PLAN A

THIS LOAD PATTERN IS APPLICABLE FOR A PARTIAL TIER OF PALLETIZED UNITS WHEN THE UNITS ARE LOADED IN THREE ROWS AND THE QUANTITY REQUIRED IS TWO MORE THAN A MULTIPLE OF THREE. THE UNITS ADJACENT TO THE BULKHEAD GATE WILL BE CENTERED IN THE WIDTH OF THE CAR AS SHOWN. SEE SPECIAL NOTE 5 ON PAGE 24 FOR BULKHEAD STRAP INSTALLATION GUIDANCE.



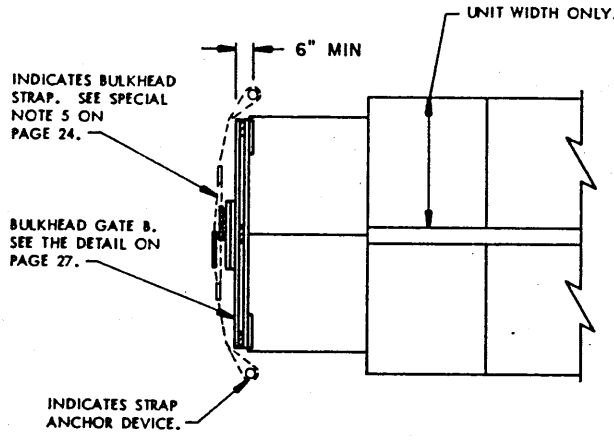
LOAD PATTERN/STRAP INSTALLATION PLAN B

THIS LOAD PATTERN IS APPLICABLE FOR A PARTIAL TIER OF PALLETIZED UNITS WHEN THE UNITS ARE LOADED IN THREE ROWS AND THE QUANTITY REQUIRED IS A MULTIPLE OF THREE. THE UNITS ADJACENT TO THE BULKHEAD GATE WILL BE CENTERED IN THE WIDTH OF THE CAR. SEE SPECIAL NOTE 5 ON PAGE 24 FOR BULKHEAD STRAP INSTALLATION GUIDANCE.



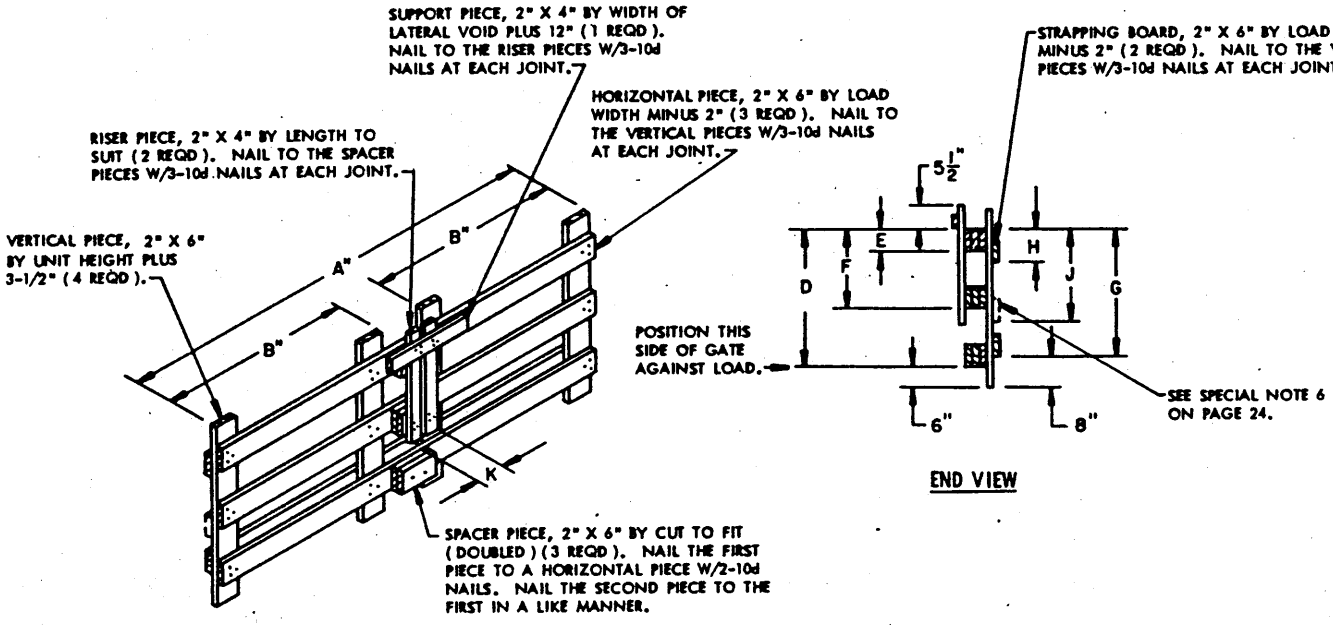
LOAD PATTERN/STRAP INSTALLATION PLAN C

THIS LOAD PATTERN IS APPLICABLE FOR A PARTIAL TIER OF PALLETIZED UNITS LOADED IN TWO ROWS, ONE AGAINST EACH CAR SIDEWALL, WHEN THERE IS A VOID SPACE BETWEEN THE ROWS WHICH IS LARGE ENOUGH TO REQUIRE ANTI-SWAY BRACING. THE TIER OR TIERS BELOW THE ONE BEING RETAINED BY THE STRAPPED BULKHEAD MAY ALSO BE TWO UNITS WIDE, OR MAY BE THREE UNITS WIDE, SIZE PERMITTING. SEE SPECIAL NOTE 5 ON PAGE 24 FOR BULKHEAD STRAP INSTALLATION GUIDANCE.



LOAD PATTERN/STRAP INSTALLATION PLAN D

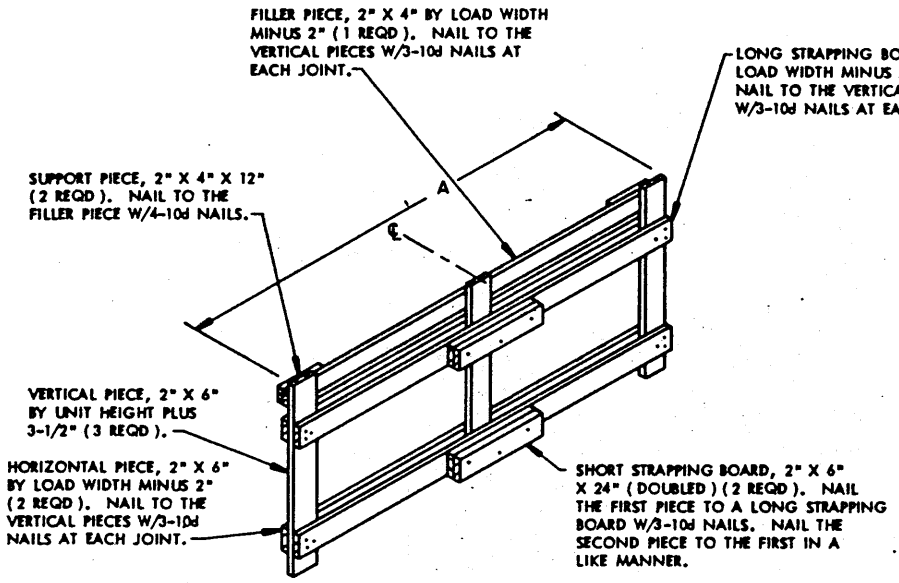
THIS LOAD PATTERN IS APPLICABLE FOR A PARTIAL TIER OF PALLETIZED UNITS WHEN THE UNITS ARE LOADED IN TWO ROWS, ONE AGAINST EACH CAR SIDEWALL, AND WHEN THE VOID SPACE BETWEEN THE ROWS IS NOT WIDE ENOUGH TO REQUIRE ANTI-SWAY BRACING. SEE "CHART NO. 1" ON PAGE 5 FOR THE MAXIMUM WIDTH UNIT WHICH CAN BE LOADED. SEE SPECIAL NOTE 5 ON PAGE 24 FOR BULKHEAD STRAP INSTALLATION GUIDANCE.

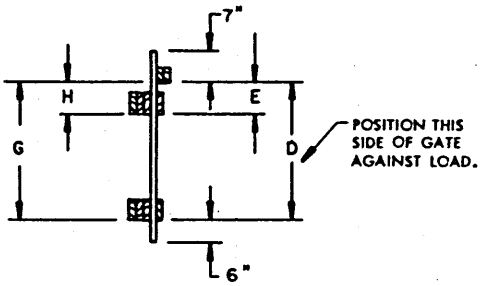


BULKHEAD GATE A

FOR USE WITH A PARTIAL TIER OF PALLETIZED UNITS LOADED ONE ROW AGAINST EACH CAR SIDEWALL WITH A LATERAL VOID AREA BETWEEN ROWS, AND USING 2 BULKHEAD STRAPS. SEE THE "LOAD PATTERN/STRAP INSTALLATION PLAN C" ON PAGE 25.

GATE CONSTRUCTION DIMENSIONAL CHART	
LOCATION IDENTITY	DESCRIPTION FOR POSITIONING LUMBER IN ASSEMBLY
A	LOAD WIDTH MINUS 2"
B	UNIT LENGTH OR WIDTH MINUS 1"
C	UNIT LENGTH OR WIDTH PLUS 1-3/4"
D	UNIT HEIGHT MINUS 6"
E	5-1/2"
F	1/2 UNIT HEIGHT PLUS 3"
G	DIMENSION "D" (PLUS 2" OR MINUS 4" TOLERANCE)
H	DIMENSION "E" (PLUS 4" OR MINUS 2" TOLERANCE)
J	DIMENSION "F" (PLUS OR MINUS 4" TOLERANCE)
K	WIDTH OF LATERAL VOID MINUS 4"

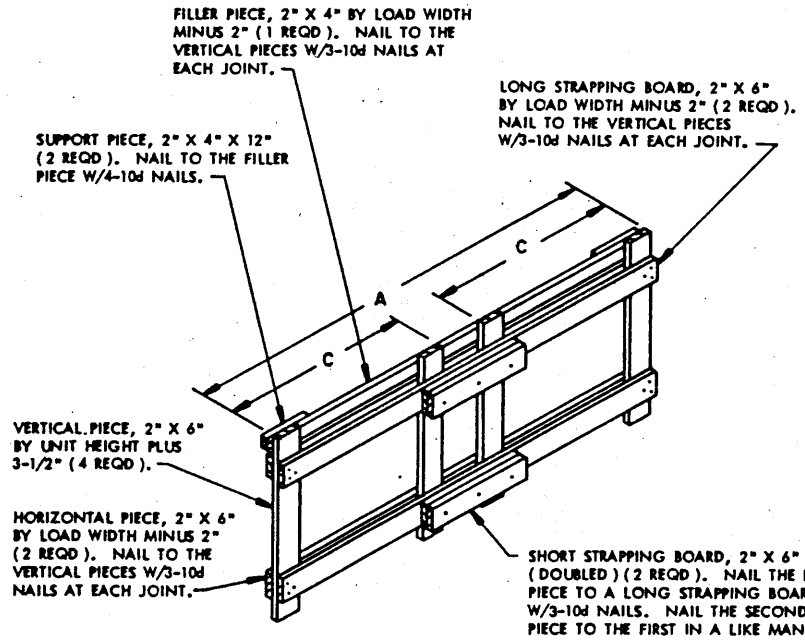


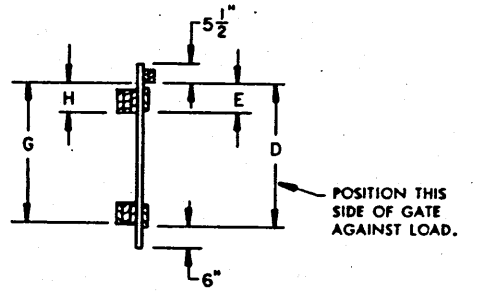


END VIEW

BULKHEAD GATE B

FOR USE WITH A PARTIAL TIER OF PALLETIZED UNITS LOADED 2-WIDE NEXT TO THE GATE AND EITHER 2 OR 3 WIDE FOR THE BALANCE, AND USING 2 BULKHEAD STRAPS. SEE THE "LOAD PATTERN/STRAP INSTALLATION PLAN A" ON PAGE 25.

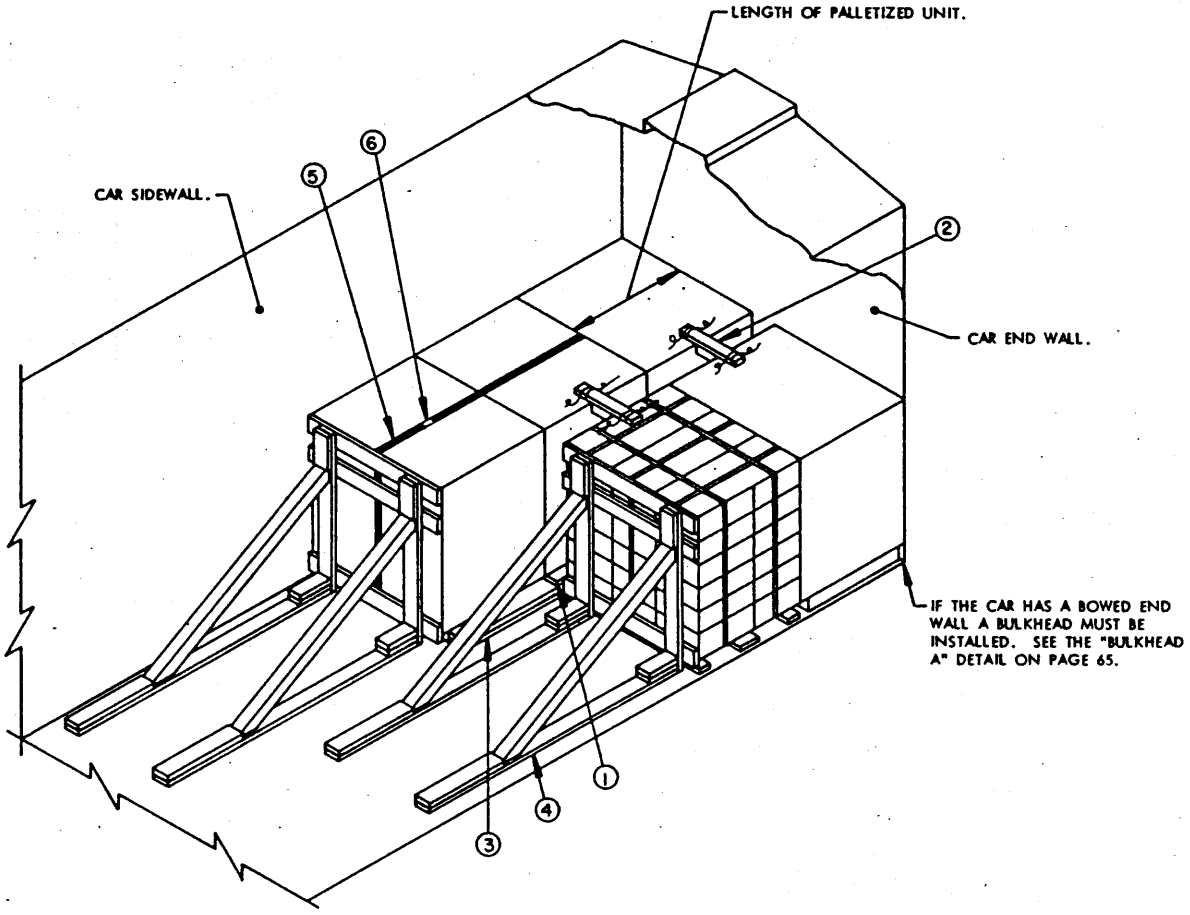




END VIEW

BULKHEAD GATE C

FOR USE WITH A PARTIAL TIER OF PALLETIZED UNITS LOADED 3-WIDE AND USING 2 BULKHEAD STRAPS. SEE THE "LOAD PATTERN/STRAP INSTALLATION PLAN B" ON PAGE 25.



ISOMETRIC VIEW

SPECIAL NOTES:

1. A 9'-2" WIDE CONVENTIONAL TYPE BOX CAR HAVING NAILABLE SIDEWALLS AND A WOOD OR NAILABLE METAL FLOOR IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED. SEE GENERAL NOTE "H" ON PAGE 4.

2. THE PALLETIZED UNIT SHOWN IN THE TYPICAL LCL LOAD HAS OVERALL DIMENSIONS OF 40" LONG BY 50-1/4" WIDE BY 52" HIGH. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER SIZES, EXCEPT AS SPECIFIED IN SPECIAL NOTE 5 BELOW.

3. THE LOAD SHOWN DEPICTING THE KNEE BRACE METHOD OF PARTIAL-LAYER BRACING (BOTTOM TIER ONLY) IS TYPICAL. THE PROCEDURES ARE ALSO APPLICABLE FOR OTHER QUANTITIES. THE UNITS MAY BE POSITIONED WITH THE UNIT LENGTH OR UNIT WIDTH ACROSS THE CAR.

4. A KNEE BRACE ASSEMBLY WILL BE USED FOR EACH ROW OF PALLETIZED UNITS. ONE (1) KNEE BRACE ASSEMBLY IS ADEQUATE FOR RETAINING A MAXIMUM LCL LOAD OF 7,500 POUNDS. ADDITIONAL "KNEES", PIECES MARKED Ⓐ AND PIECES MARKED Ⓒ THRU Ⓖ ON PAGE 29 MAY BE INSTALLED IN A KNEE BRACE ASSEMBLY, ONE (1) FOR EACH 3,750 POUNDS THAT A ROW EXCEEDS THE 7,500 POUNDS TOTAL WEIGHT. FOR BRACING OF AN LCL LOAD WHICH EXCEEDS THE CAPACITY OF THE KNEE BRACES, EITHER THE K-BRACE BLOCKING AS SHOWN ON PAGES 31 THRU 33, PROVIDED THE CAR HAS NAILABLE SIDEWALLS, OR THE 1-WIDE LOADING METHOD SHOWN ON PAGES 38 AND 39 SHOULD BE EMPLOYED.

5. KNEE BRACE ASSEMBLIES MAY BE USED FOR BRACING ANY PALLETIZED UNITS WHICH ARE 30" OR GREATER IN HEIGHT. FOR UNITS LESS THAN 30" HIGH, USE THE PROCEDURES SHOWN ON PAGE 37.

6. IF DESIRED, THE ANTI-SWAY BRACE ASSEMBLY C, AS DETAILED ON PAGE 65, MAY BE USED IN LIEU OF THE ANTI-SWAY BRACE ASSEMBLY A SHOWN IN THE LOAD VIEW. THE ANTI-SWAY BRACE ASSEMBLY A IS THE PREFERRED METHOD IF THE SPACE BETWEEN LATERALLY ADJACENT PALLET UNITS IS SUCH THAT IT CAN BE EASILY INSTALLED.

KEY NUMBERS

(1) ANTI-SWAY BRACE ASSEMBLY (2 REQD). SEE THE "ANTI-SWAY BRACE A" DETAIL ON PAGE 64. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLETIZED UNITS. SEE GENERAL NOTE "G" ON PAGE 2. SPECIAL NOTE 6 AT LEFT AND SPECIAL NOTE 5 ON PAGE 23.

(2) TOP-OF-LOAD ANTI-SWAY BRACE (2 REQD). SEE THE DETAIL AND THE "TOP-OF-LOAD ANTI-SWAY BRACE REQUIREMENTS" CHART ON PAGE 61. WIRE TIE TO AN INNER UNITIZING STRAP WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION B" DETAIL ON THAT PAGE.

(3) SIDE BLOCKING, 2" X 6" BY PALLET LENGTH OR WIDTH, AS APPLICABLE (DOUBLED) (1 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/4-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.

(4) KNEE BRACE ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 29 FOR CONSTRUCTION SPECIFICATIONS AND NAILING REQUIREMENTS.

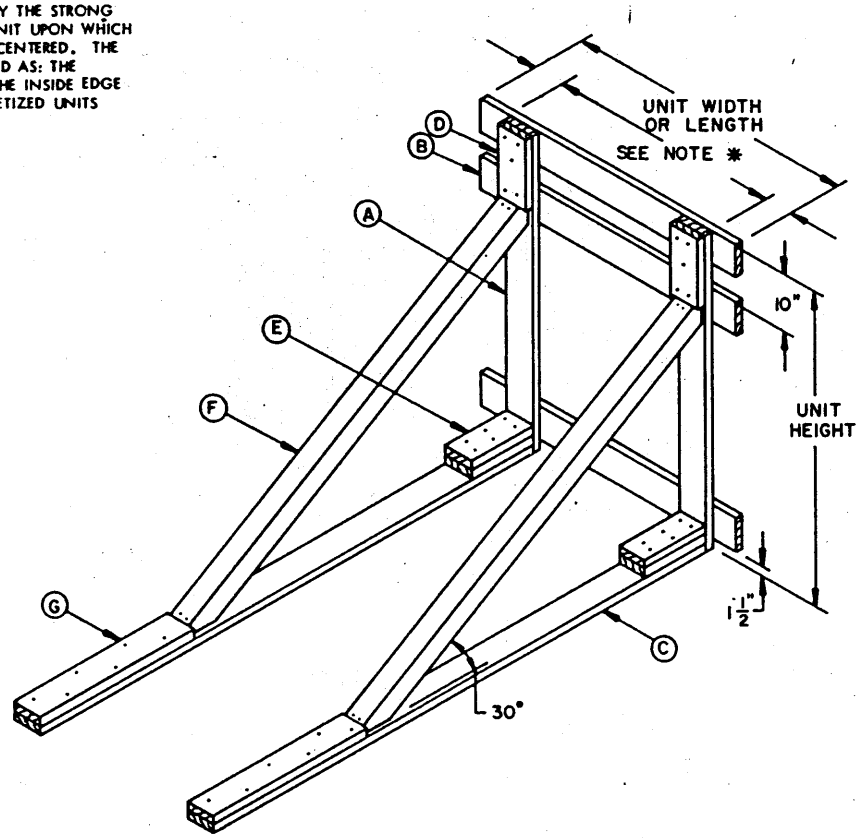
(5) BUNDLING STRAP, 1-1/4" X .035" BY A LENGTH TO SUIT STEEL STRAPPING (1 REQD). PRE-POSITION SO AS TO PASS BETWEEN THE TOP AND BOTTOM DECK BOARDS OF THE PALLETS AND TO ENCIRCLE TWO PALLET UNITS AS SHOWN.

(6) SEAL FOR 1-1/4" STRAPPING (1 REQD). DOUBLE CRIMP.

TYPICAL LCL LOAD USING FIRST LAYER KNEE BRACE METHOD OF PARTIAL-LAYER (TIER) BRACING

NOTE ✱ :

THIS DIMENSION WILL BE DETERMINED BY THE STRONG BEARING POINTS ON THE PALLETIZED UNIT UPON WHICH THE VERTICAL PIECES MARKED Ⓐ ARE CENTERED. THE STRONG BEARING POINTS ARE IDENTIFIED AS: THE OUTERMOST BATTENS, IF PRESENT, OR THE INSIDE EDGE OF THE OUTSIDE PALLET POST FOR PALLETIZED UNITS NOT HAVING BATTENS.



KNEE BRACE ASSEMBLY

KEY LETTERS

Ⓐ VERTICAL PIECE, 2" X 6" BY LOAD HEIGHT (2 REQD).

Ⓑ HORIZONTAL PIECE, 2" X 6" BY PALLETIZED UNIT WIDTH OR LENGTH (3 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.

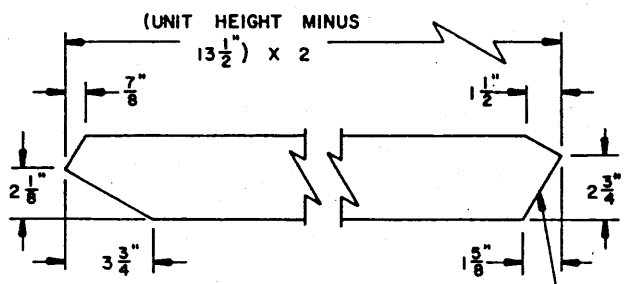
Ⓒ FLOOR CLEAT, 2" X 6" BY LENGTH TO SUIT (.87 OR 7/8 TIMES LENGTH OF PIECE MARKED Ⓕ, PLUS 30") (2 REQD). ALIGN WITH A VERTICAL PIECE AND NAIL TO THE CAR FLOOR W/1-16d NAIL EVERY 8".

Ⓓ HOLD-DOWN CLEAT, 2" X 6" X 12" (2 REQD). NAIL TO A VERTICAL PIECE W/5-10d NAILS.

Ⓔ POCKET CLEAT, 2" X 6" X 12" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE FLOOR CLEAT, PIECE MARKED Ⓒ, W/4-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER AND TOENAIL IT TO THE VERTICAL PIECE, PIECE MARKED Ⓐ, W/2-16d NAILS.

Ⓕ BRACE, 4" X 4" BY CUT TO FIT (UNIT HEIGHT MINUS 13-1/2", TIMES 2) (2 REQD). SEE THE DETAIL AT LEFT FOR BEVEL CUTS REQUIRED. TOENAIL TO THE VERTICAL PIECE AND TO THE FLOOR CLEAT, PIECES MARKED Ⓐ AND Ⓒ, W/2-16d NAILS AT EACH END.

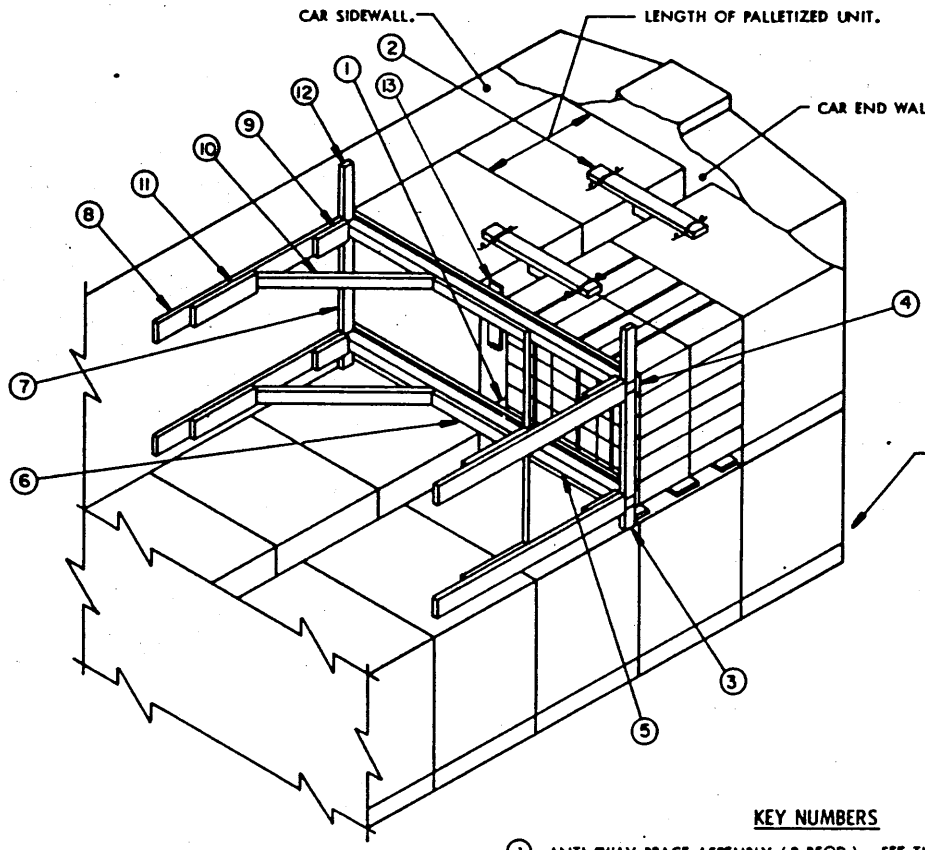
Ⓖ BACK-UP CLEAT, 2" X 6" X 30" (2 REQD). NAIL TO THE FLOOR CLEAT, PIECE MARKED Ⓒ, W/6-40d NAILS.



BRACE

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

TYPICAL LCL LOAD USING FIRST LAYER KNEE BRACE METHOD OF PARTIAL-LAYER (TIER) BRACING



ISOMETRIC VIEW

SPECIAL NOTES:

1. A 9'-2" WIDE CONVENTIONAL WOOD-LINED BOX CAR IS SHOWN. WOOD-LINED CARS OF OTHER WIDTHS CAN BE USED.

2. THE PALLETIZED UNIT SHOWN IN THE TYPICAL LCL LOAD HAS OVERALL DIMENSIONS OF 40" LONG BY 50-1/4" WIDE BY 52" HIGH. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER SIZES.

3. THE LOAD PATTERN FOR A LOAD, SUCH AS 2-WIDE OR 3-WIDE, WILL DEPEND UPON THE DIMENSION OF THE UNIT WHICH IS POSITIONED ACROSS THE CAR. A 2-WIDE LOAD IS SHOWN AS TYPICAL. THE LOADING PRINCIPLES CAN BE ADAPTED FOR PARTIAL-LAYER BRACING FOR ANY OF THE LOADS SHOWN ON PAGES 6 THRU 16.

4. 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 31, 32 AND 33 FOR SELECTION OF THE APPLICABLY SIZED K-BRACE TO USE AND THE DESIGN SPECIFICATIONS FOR THE BRACE.

5. 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

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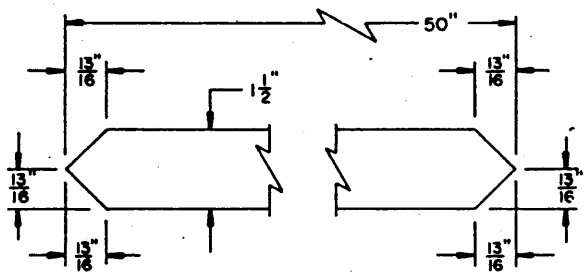


DIAGONAL BRACE

KEY NUMBERS

① ANTI-SWAY BRACE ASSEMBLY (2 REQD). SEE THE "ANTI-SWAY BRACE A" DETAIL ON PAGE 64. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLETIZED UNITS. SEE GENERAL NOTE "G" ON PAGE 2 AND SPECIAL NOTE 5 ON PAGE 23.

② TOP-OF-LOAD ANTI-SWAY BRACE (2 REQD). SEE THE DETAIL AND THE "TOP-OF-LOAD ANTI-SWAY BRACE REQUIREMENTS" CHART ON PAGE 61. WIRE TIE TO AN INNER UNITIZING STRAP WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION B" DETAIL ON THAT PAGE. NOTE THAT THE QUANTITY IS ONLY FOR THE PARTIAL-TIER UNITS.

③ SUPPORT CLEAT, 2" X 4" X 7" (2 REQD). NAIL TO THE CAR SIDEWALL W/2-12d NAILS. SEE SPECIAL NOTE 5 AT LEFT.

④ HORIZONTAL PIECE, 2" X 6" BY CAR WIDTH IN LENGTH (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 IN LENGTH (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 6 BELOW.

⑦ SPACER CLEAT, 2" X 4" BY UNIT HEIGHT MINUS 15" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d 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" (2 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.

⑬ ANTI-SWAY BRACE RETAINER, 2" X 4" BY A LENGTH TO SUIT (1 REQD). NAIL TO PIECES MARKED ④ W/2-10d NAILS AT EACH JOINT. SEE SPECIAL NOTE 5 ON PAGE 31.

(SPECIAL NOTES CONTINUED)

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 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 ⑧ IS DOUBLED.

6. THE CENTER CLEAT, SHOWN AS PIECE MARKED ⑥, 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.

TYPICAL LCL LOAD USING K-BRACE METHOD OF PARTIAL-LAYER (TIER) BRACING

SPECIAL NOTES:

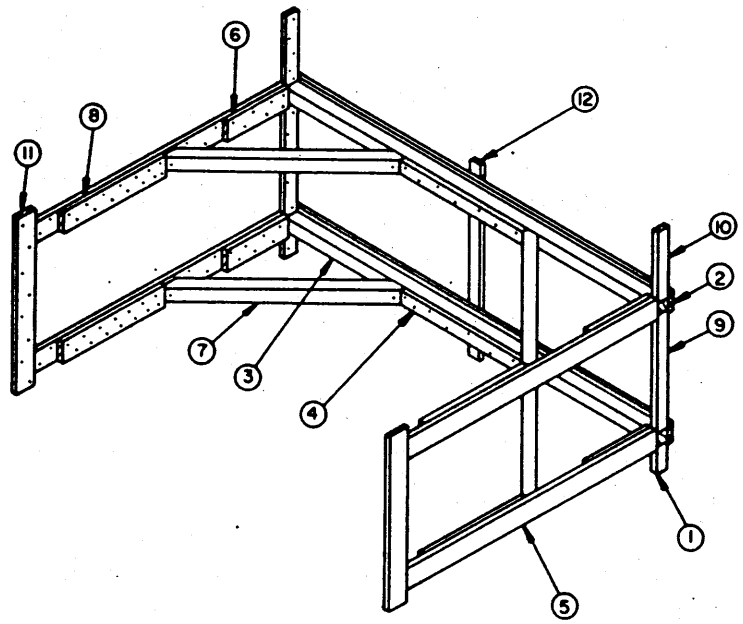
1. THE TYPE "B" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER OF NOT MORE THAN 14,000 POUNDS. IF IT IS NECESSARY TO BLOCK A HEAVIER LOAD, REFER TO THE DETAILS ON PAGES 32 AND 33 FOR SELECTION OF THE APPLICABLY SIZED K-BRACE TO USE AND THE DESIGN SPECIFICATIONS FOR THE BRACE. IF THE PARTIAL TIER TO BE BRACED WEIGHS 8,000 POUNDS OR LESS, THE TYPE "A" K-BRACE DEPICTED ON PAGE 30 MAY BE USED.

2. CAUTION: SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL-LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL TIER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ①, ②, ③, ⑥, ⑨, ⑩, AND ⑪ MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDEWALL. IT IS ALRIGHT FOR THE ENDS OF THE DIAGONAL BRACES MARKED ⑦ TO BEAR IN FRONT OF A DOOR OPENING, HOWEVER, THE ADJACENT PIECE MARKED ⑤ MUST BE DOUBLED AND EXTENDED ACROSS AND FAR ENOUGH PAST THE DOOR OPENING (REF 54") TO PROVIDE FOR THE SPECIFIED NAILING OF EACH PIECE. LAMINATE THE SECOND PIECE OF THE DOUBLED PIECE MARKED ⑤ TO THE FIRST W/16-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL WALL CLEAT WITHIN THE DOOR OPENING. NOTE THAT THE DIAGONAL BRACE WILL BE 49-1/8" LONG IN LIEU OF 50-1/4" WHEN PIECE MARKED ⑤ IS DOUBLED.

3. THE CENTER CLEAT, SHOWN AS PIECE MARKED ④, WILL BE 28" LONG FOR AN 8'-6" WIDE CAR, 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 30 FOR A TYPICAL INSTALLATION OF A K-BRACE.

5. THE ANTI-SWAY BRACE RETAINER IS ONLY REQUIRED WHEN USING THE ANTI-SWAY BRACE ASSEMBLY C, AS DETAILED ON PAGE 65. IT MUST BE EXTENDED AT LEAST 5" BELOW THE LOWER HORIZONTAL PIECE (LOAD BEARING PIECE) TO KEEP THE ANTI-SWAY BRACE ASSEMBLY C IN POSITION.



ISOMETRIC VIEW

KEY NUMBERS

① SUPPORT CLEAT, 2" X 4" X 7" (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 "G" 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.

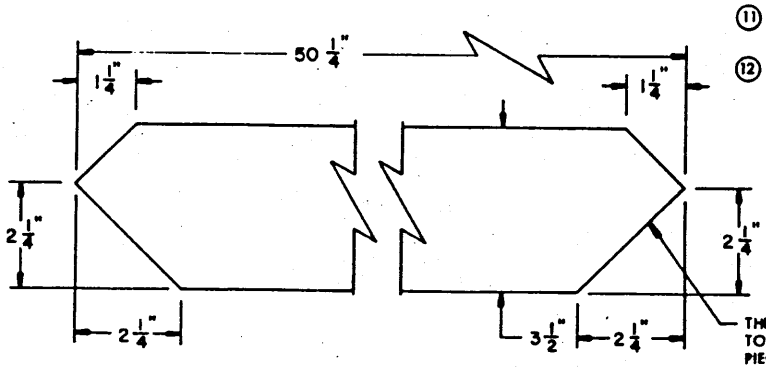
⑧ BACK-UP CLEAT, 2" X 6" X 30" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/14-16d NAILS.

⑨ SPACER CLEAT, 2" X 4" BY UNIT HEIGHT MINUS 15" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.

⑩ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/3-12d NAILS.

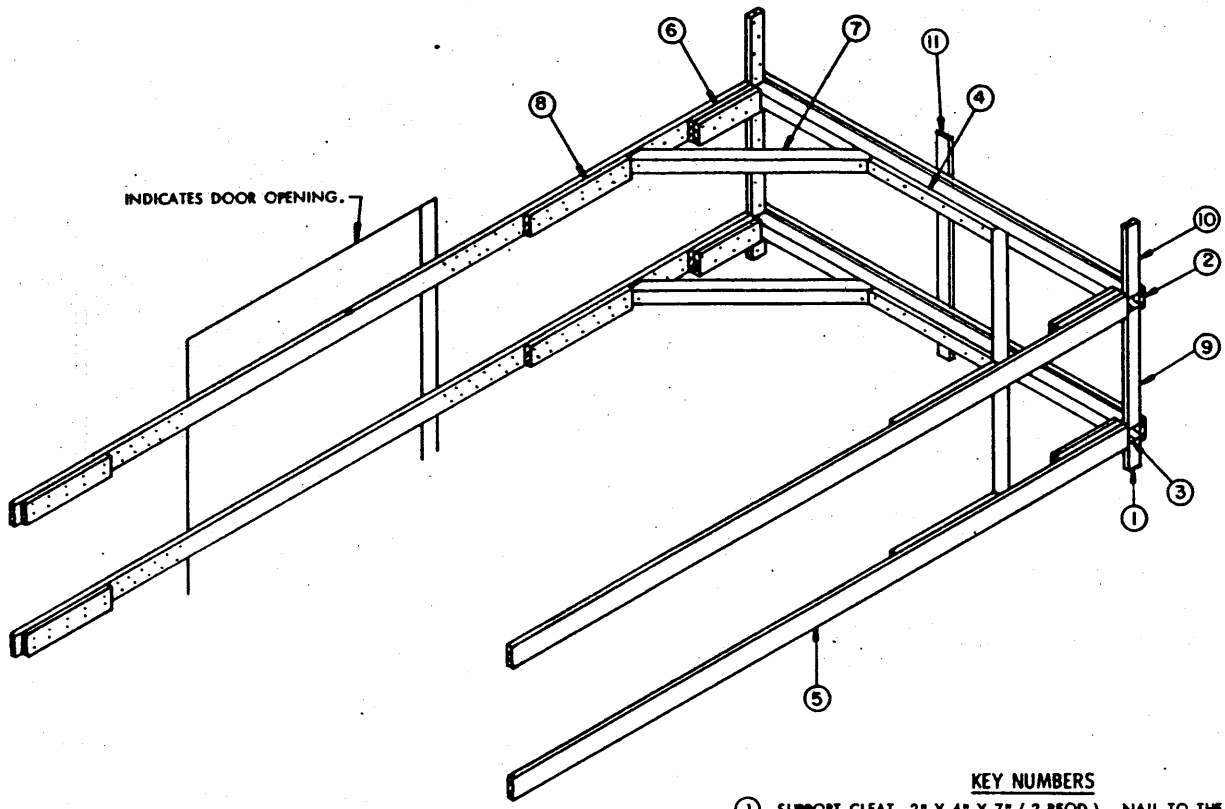
⑪ VERTICAL BACK-UP CLEAT, 2" X 6" BY UNIT HEIGHT (2 REQD). NAIL TO THE CAR SIDEWALL W/8-12d NAILS.

⑫ ANTI-SWAY BRACE RETAINER, 2" X 4" BY A LENGTH TO SUIT (1 REQD). NAIL TO PIECES MARKED ② WITH 2-10d NAILS AT EACH JOINT. SEE SPECIAL NOTE 5 ABOVE.



DIAGONAL BRACE

SEE SPECIAL NOTE 2 ABOVE.



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 33 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 31 MAY BE USED. IF THE PARTIAL TIER TO BE BRACED WEIGHS 8,000 POUNDS OR LESS, THE TYPE "A" K-BRACE DEPICTED ON PAGE 30 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, ⑥, ⑨ AND ⑩ MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDEWALL. IT IS ALRIGHT FOR THE ENDS OF THE DIAGONAL BRACES MARKED ⑦ TO BEAR IN FRONT OF A DOOR OPENING, HOWEVER, THE ADJACENT PIECE MARKED ⑤ MUST BE DOUBLED. LAMINATE THE SECOND PIECE TO THE FIRST W/40-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL WALL CLEAT WITHIN THE DOOR OPENING. NOTE THAT THE DIAGONAL BRACE WILL BE 49-1/8" LONG IN LIEU OF 50-1/4" WHEN PIECE MARKED ⑤ IS DOUBLED.

3. 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.

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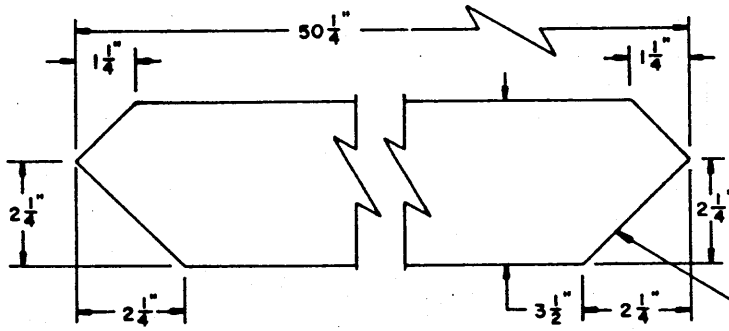


DIAGONAL BRACE

SEE SPECIAL NOTE 2 ABOVE.

KEY NUMBERS

① SUPPORT CLEAT, 2" X 4" X 7" (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 "G" 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 BELOW.

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 ENOUGHT 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/1-60d 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" BY UNIT HEIGHT MINUS 15" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.

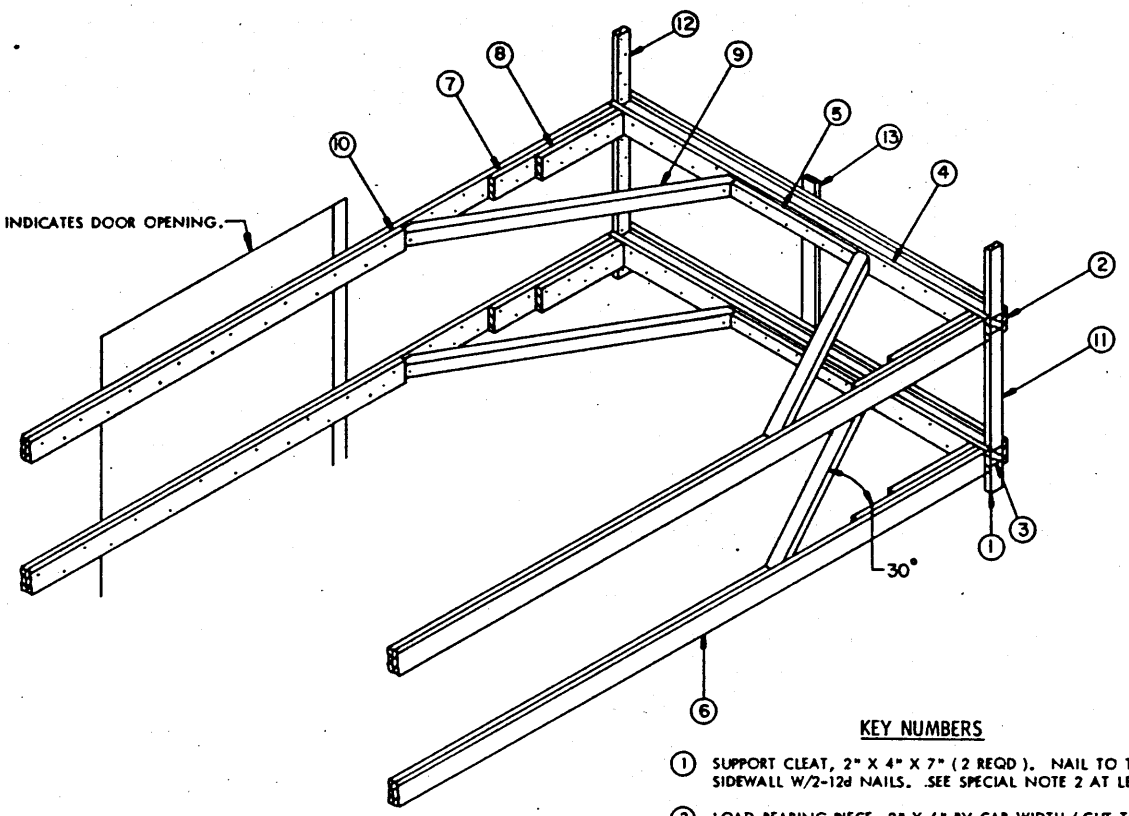
⑩ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.

⑪ ANTI-SWAY BRACE RETAINER, 2" X 4" BY A LENGTH TO SUIT (1 REQD). NAIL TO PIECES MARKED ② W/2-10d NAILS AT EACH JOINT. SEE SPECIAL NOTE 5 ON PAGE 31.

(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.

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.



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 32 MAY BE USED. FOR A PARTIAL TIER OF 8,000 POUNDS TO 14,000 POUNDS, THE TYPE "B" K-BRACE DEPICTED ON PAGE 31 MAY BE USED. IF THE PARTIAL TIER TO BE BRACED WEIGHTS 8,000 POUNDS OR LESS, THE TYPE "A" K-BRACE DEPICTED ON PAGE 30 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, 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.

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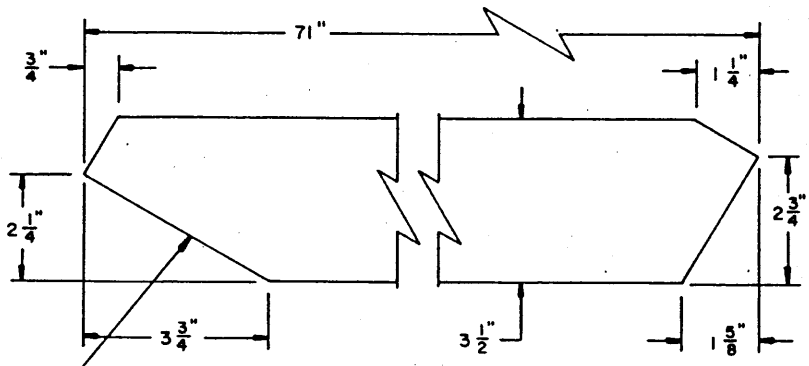


DIAGONAL BRACE

SEE SPECIAL NOTE 2 ABOVE.

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

KEY NUMBERS

① SUPPORT CLEAT, 2" X 4" X 7" (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 "G" 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.

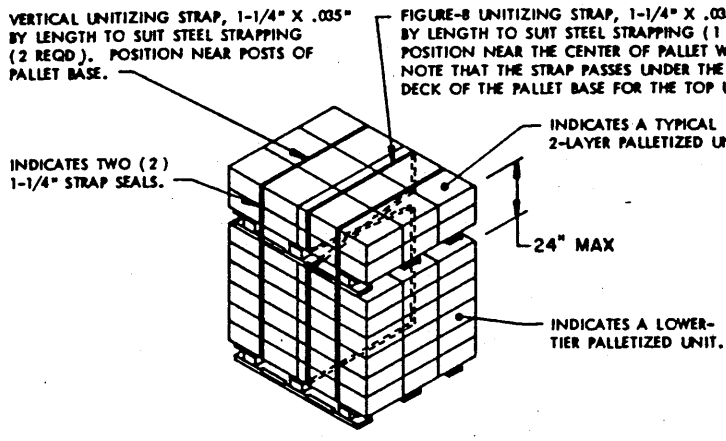
⑪ SPACER CLEAT, 2" X 4" BY UNIT HEIGHT MINUS 15" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.

⑫ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.

⑬ ANTI-SWAY BRACE RETAINER, 2" X 4" BY A LENGTH TO SUIT (1 REQD). NAIL TO PIECES MARKED ② W/2-10d NAILS AT EACH JOINT. SEE SPECIAL NOTE 5 ON PAGE 31.

(SPECIAL NOTES CONTINUED)

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.



SECUREMENT OF PARTIAL PALLETIZED UNIT ON TOP

THE PALLETIZED UNITS SHOWN IN THE VIEW ABOVE ARE TYPICAL. THE PROCEDURES ARE ALSO APPLICABLE FOR OTHER PALLETIZED UNITS. NOTE THAT THE FIGURE-8 UNITIZING STRAP WILL BE LOCATED ADJACENT TO THE CENTER POST OF THE PALLET BASE.

PARTIAL UNIT ON TOP OF LOAD	
NO. OF LAYERS IN UNIT BELOW	MAXIMUM NUMBER OF LAYERS WHICH CAN BE STRAPPED ON TOP OF LOAD
1	NOT APPLICABLE.
2	1 LAYER OF BOXES IF 18" OR LESS IN HEIGHT.
3	2 LAYERS OF BOXES IF 9" OR LESS IN HEIGHT. 1 LAYER OF BOXES IF OVER 9" HIGH.
4 THRU 8	3 LAYERS OF BOXES IF 6" OR LESS IN HEIGHT. 2 LAYERS OF BOXES IF OVER 6" BUT NOT MORE THAN 9" 1 LAYER OF BOXES IF OVER 9" HIGH.
	NOTE: FOR 4 LAYERS OF BOXES, SHIP IN TWO (2) 2-LAYER UNITS ON TOP OF LOAD. FOR 3 LAYERS OF BOXES OVER 6" HIGH, SHIP IN ONE (1) EACH 1-LAYER AND 2-LAYER UNITS ON TOP OF LOAD. FOR 2 LAYERS OF BOXES OVER 9" HIGH, SHIP IN TWO (2) 1-LAYER UNITS ON TOP OF LOAD.

SPECIAL NOTES:

1. SHIPMENTS OF PALLETIZED UNITS OF AMMUNITION AND OR COMPONENTS SHOULD CONSIST OF FULL-HEIGHT AND FULL-LAYER UNITS TO THE MAXIMUM EXTENT POSSIBLE. HOWEVER, THE END OF A LOT, OR THE QUANTITY OF ITEMS NEEDED TO FILL A REQUISITION MAY NECESSITATE THE SHIPMENT OF ONE OR MORE LESS-THAN-FULL PALLETIZED UNITS WITHIN A LOAD. THE PROCEDURES ON THIS PAGE AND ON PAGES 35 AND 36 ARE PRESENTED AS GUIDANCE IN THE SHIPMENT OF THESE PARTIAL UNITS.

2. A LESS-THAN-FULL-HEIGHT PALLETIZED UNIT, WHICH IS TO BE SHIPPED ON TOP OF A LOAD (CAR HEIGHT PERMITTING) IN ACCORDANCE WITH THE PROCEDURES DELINEATED ON THIS PAGE, MUST NOT BE MORE THAN 24" IN HEIGHT. REFER TO THE "PARTIAL UNIT ON TOP OF LOAD" CHART AT THE UPPER RIGHT FOR GUIDANCE AS TO THE MAXIMUM PERMISSIBLE NUMBER OF LAYERS IN A UNIT WHICH IS TO BE STRAPPED ON TOP OF THE LOAD, BASED ON THE HEIGHT OF THE BOXES AND THE NUMBER OF LAYERS IN THE UNIT TO WHICH THE PARTIAL UNIT IS TO BE SECURED.

3. IF THE PARTIAL UNIT TO BE SHIPPED IS GREATER THAN 24" IN HEIGHT, THE PROCEDURES SHOWN ON PAGE 35 WILL APPLY.

4. A LOW-HEIGHT (24" MAX) LESS-THAN-FULL-HEIGHT PALLETIZED UNIT CAN BE SHIPPED BY POSITIONING IT EITHER ON THE TOP TIER OF A LOAD (CAR HEIGHT PERMITTING) OR ON THE TOP OF THE LOWER PORTION OF A LOAD WHEN THE LOAD CONTAINS A PARTIAL TIER IN THE END OF THE CAR. THE PARTIAL UNIT WILL BE STRAPPED TO THE PALLETIZED UNIT DIRECTLY BELOW WITH TWO (2) VERTICAL UNITIZING STRAPS AND A FIGURE-8 UNITIZING STRAP. SEE THE "SECUREMENT OF PARTIAL UNIT ON TOP" VIEW ABOVE FOR GUIDANCE. PLACEMENT WITHIN THE LENGTH OF THE CAR IS OPTIONAL, ALTHOUGH NEAR THE DOORWAY AREA IS RECOMMENDED AS LONG AS IT IS NOT WITHIN A LOAD UNIT WHICH IS TO BE ENCIRCLED WITH DOORWAY PROTECTION STRAPS.

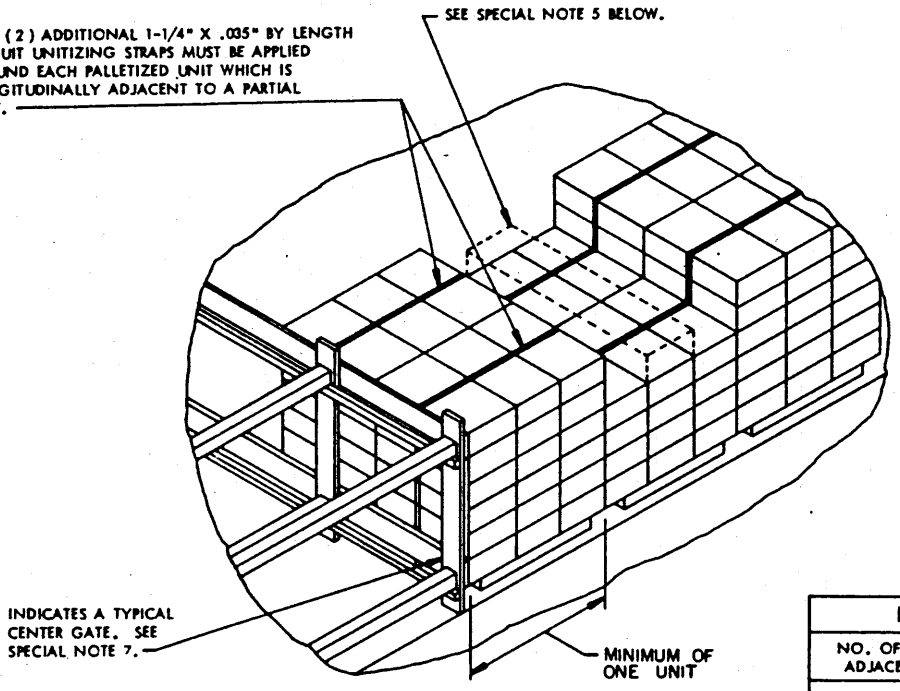
5. LEFTOVER BOXES, IN AN AMOUNT WHICH IS LESS THAN THE QUANTITY IN ONE LAYER OF A UNIT, CAN BE SECURED TO THE TOP OF A PARTIAL UNIT FOR SECUREMENT ON TOP OF A LOAD, WITH THESE LIMITATIONS:

   A. THE HEIGHT OF THE PARTIAL UNIT, WITH THE LEFTOVER BOXES ADDED, MUST NOT EXCEED 24" IN HEIGHT.

   B. LEFTOVER BOXES ON TOP OF A PARTIAL UNIT ARE APPLICABLE FOR CONUS AND OCONUS RAILROAD SHIPMENTS FROM DEPOT TO DEPOT OR FROM DEPOTS TO POSTS, CAMPS, AND STATIONS, OR UPON APPROVAL FROM HIGHER HEADQUARTERS, FOR SHIPMENTS FROM LOAD, ASSEMBLE, AND PACK PLANTS TO DEPOTS. CAUTION: A LOAD CONTAINING LEFTOVER BOXES IN AN AMOUNT WHICH IS LESS THAN A FULL LAYER, AND SECURED TO THE TOP OF A PARTIAL UNIT, MUST NOT BE DESTINED FOR SHIPMENT OVERSEAS BY WATER CARRIER.

   C. THE LEFTOVER BOXES MUST BE SECURED TO THE PARTIAL UNIT WITH THEIR OWN STRAPPING, SEPARATE FROM THE STRAPS FOR THE PARTIAL UNIT. SEE THE DETAILS ON PAGE 36 FOR GUIDANCE IN STRAP APPLICATION.

6. THE "SHIPMENT OF PARTIAL UNITS" PROCEDURES ON THIS PAGE ARE APPLICABLE FOR LOADS IN CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS AS WELL AS FOR LOADS IN CONVENTIONAL BOX CARS. THE DEPICTED PROCEDURES WILL NOT BE USED FOR SHIPMENTS OF PARTIAL UNITS IN CARS EQUIPPED WITH MECHANICAL BRACING DEVICES. PARTIAL UNITS ON TOP OF A TIER MUST BE BLOCKED AND BRACED IN ACCORDANCE WITH THE PROCEDURES DEPICTED WITHIN THAT PORTION OF THIS DRAWING.



POSITIONING OF PARTIAL PALLETIZED UNIT WITHIN A TIER

THE PALLETIZED UNITS SHOWN IN THE VIEW ABOVE ARE TYPICAL. THE PROCEDURES ARE ALSO APPLICABLE FOR OTHER PALLETIZED UNIT CONFIGURATIONS.

PARTIAL UNIT WITHIN A TIER (LAYER)	
NO. OF LAYERS IN ADJACENT UNITS	MINIMUM NO. OF LAYERS WHICH CAN BE SHIPPED WITHIN A TIER
1	NOT APPLICABLE
2	CANNOT BE USED (SEE NOTE 4)
3	2 LAYERS
4	3 LAYERS
5	3 LAYERS
6	4 LAYERS
7	5 LAYERS
8	5 LAYERS

SPECIAL NOTES:

1. SHIPMENTS OF PALLETIZED UNITS OF AMMUNITION AND/OR COMPONENTS SHOULD CONSIST OF FULL-HEIGHT AND FULL-LAYER UNITS TO THE MAXIMUM EXTENT POSSIBLE. HOWEVER, THE END OF A LOT, OR THE QUANTITY OF ITEMS NEEDED TO FILL A REQUISITION MAY NECESSITATE THE SHIPMENT OF ONE OR MORE LESS-THAN-FULL PALLETIZED UNITS WITHIN A LOAD. THE PROCEDURES SHOWN ON THIS PAGE AND ON PAGE 34 ARE PRESENTED AS GUIDANCE IN THE SHIPMENT OF THESE PARTIAL UNITS.

2. A LESS-THAN-FULL HEIGHT PALLETIZED UNIT WHICH IS TO BE SHIPPED WITHIN A TIER HAS A LIMITATION AS TO THE MINIMUM NUMBER OF FULL LAYERS OF BOXES. THE HEIGHT OF THE PARTIAL UNIT MUST BE AT LEAST 66 PERCENT (2/3) OF THE HEIGHT OF THE LONGITUDINALLY ADJACENT UNITS. REFER TO THE "PARTIAL UNIT WITHIN A TIER (LAYER)" CHART ABOVE FOR GUIDANCE AS TO THE MINIMUM NUMBER OF LAYERS OF BOXES PERMISSIBLE IN THE PARTIAL UNIT, BASED ON THE NUMBER OF LAYERS IN THE LONGITUDINALLY ADJACENT UNITS.

3. IF THE PARTIAL UNIT TO BE SHIPPED CONSISTS OF LESS FULL LAYERS OF BOXES THAN THE MINIMUM NUMBER PERMISSIBLE WHICH IS SPECIFIED WITHIN THE CHART ABOVE, THAT PARTIAL UNIT MAY BE SECURED ON TOP OF THE LOAD AS SHOWN ON PAGE 34 (CAR HEIGHT PERMITTING). NOTE THAT IF THE HEIGHT OF THE PARTIAL UNIT EXCEEDS THE 24" MAXIMUM SPECIFIED FOR THAT PROCEDURE, THE PARTIAL UNIT MUST BE BROKEN DOWN INTO TWO (2) UNITS AND SECURED SEPARATELY.

4. ALL LESS-THAN-FULL HEIGHT PALLETIZED UNITS WHICH ARE TO BE SHIPPED WITHIN A TIER AS SHOWN ABOVE MUST CONSIST OF FULL LAYERS OF BOXES TO A HEIGHT AT LEAST 2/3 THE HEIGHT OF THE LONGITUDINALLY ADJACENT UNITS.

5. LEFTOVER BOXES, IN AN AMOUNT WHICH IS NOT MORE THAN THE QUANTITY IN ONE LAYER OF A UNIT, CAN BE SECURED TO THE TOP OF A PARTIAL UNIT FOR PLACEMENT WITHIN A TIER, WITH THESE LIMITATIONS:

   A. LEFTOVER BOXES ON TOP OF A PARTIAL UNIT ARE APPLICABLE FOR CONUS AND OCONUS RAILROAD SHIPMENTS FROM DEPOT TO DEPOT OR FROM DEPOTS TO POSTS, CAMPS, AND STATIONS, OR, UPON APPROVAL FROM HIGHER HEADQUARTERS, FOR SHIPMENTS FROM LOAD, ASSEMBLE, AND PACK PLANTS TO DEPOTS. CAUTION: A LOAD CONTAINING LEFTOVER BOXES IN AN AMOUNT WHICH IS LESS THAN A FULL LAYER, AND SECURED TO THE TOP OF A PARTIAL UNIT, MUST NOT BE DESTINED FOR SHIPMENT OVERSEAS BY WATER CARRIER.

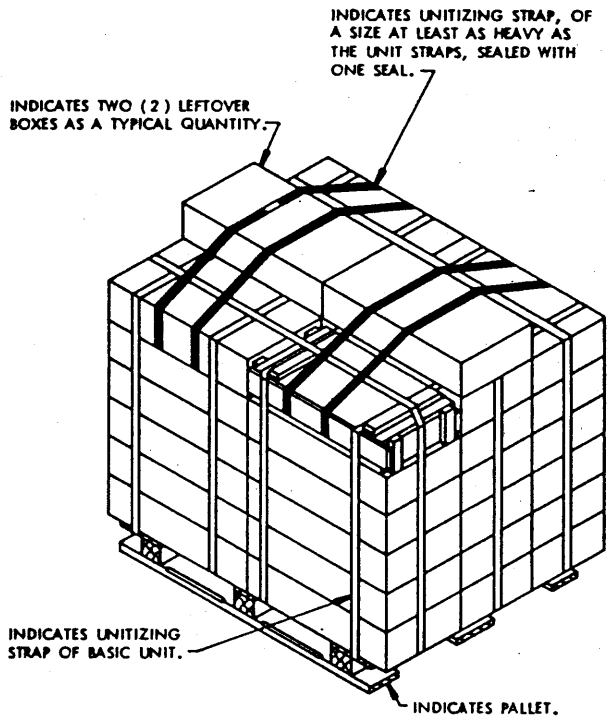
   B. THE LEFTOVER BOXES MUST BE SECURED TO THE PARTIAL UNIT WITH THEIR OWN STRAPPING, SEPARATE FROM THE STRAPS FOR THE PARTIAL UNIT. SEE THE DETAILS ON PAGE 36 FOR GUIDANCE IN STRAP APPLICATION.

(CONTINUED AT RIGHT)

(SPECIAL NOTES CONTINUED)

6. A NEARLY-FULL-HEIGHT LESS-THAN-FULL-SIZE UNIT, OR A FULL HEIGHT UNIT HAVING LESS THAN A COMPLETE QUANTITY OF BOXES IN THE TOP LAYER, CAN BE SHIPPED WITHIN A TIER OF A LOAD. CAUTION: THE PARTIAL UNIT MUST BE LOCATED IN THE TOP TIER OF A LOAD; OTHER UNITS MUST NOT BE PLACED ON TOP OF THE PARTIAL UNIT. THE PARTIAL UNIT SHOULD BE PLACED IN THE LOAD SO THAT THERE IS AT LEAST ONE (1) FULL-HEIGHT UNIT BETWEEN IT AND THE CENTER GATE; HOWEVER, THE PARTIAL UNIT IS NOT TO BE WITHIN A LOAD UNIT WHICH IS TO BE ENCIRCLED WITH DOORWAY PROTECTION STRAPS. THE ONLY ADDITIONAL DUNNAGE NEEDED IS THE FOUR (4) 1-1/4" X .035" UNITIZING STRAPS WHICH MUST BE APPLIED, TWO (2) TO EACH OF THE UNITS LONGITUDINALLY ADJACENT TO THE PARTIAL UNIT. SEE THE "POSITIONING OF PARTIAL PALLETIZED UNIT WITHIN A TIER" VIEW ABOVE FOR GUIDANCE.

7. THE "POSITIONING OF A PARTIAL PALLETIZED UNIT WITHIN A TIER" VIEW ABOVE DEPICTS A PORTION OF A CONVENTIONAL BOX CAR LOAD. HOWEVER, THE "SHIPMENT OF PARTIAL UNITS" PROCEDURES ON THIS PAGE ARE ALSO APPLICABLE FOR LOADS IN CARS EQUIPPED WITH MECHANICAL BRACING DEVICES AS WELL AS FOR LOADS IN CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.



SECUREMENT OF TOP-CLEATED BOXES

SPECIAL NOTES:

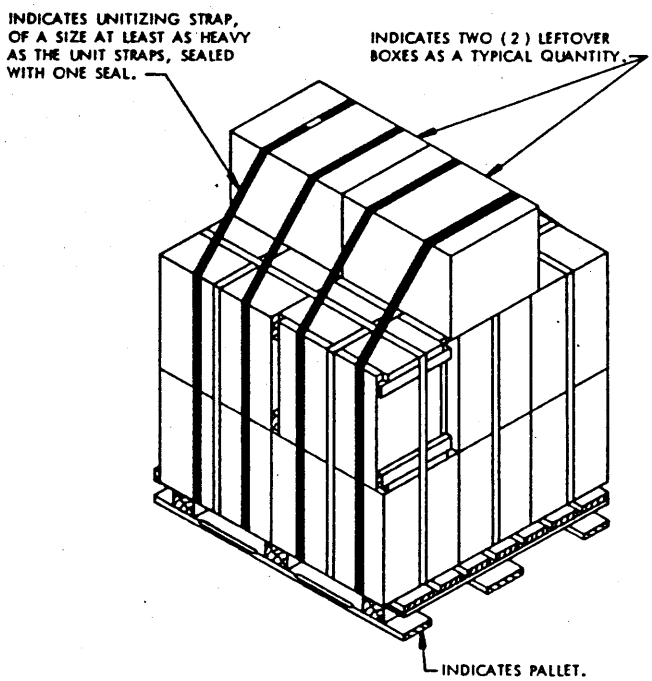
1. SHIPMENTS OF PALLETIZED UNITS OF AMMUNITION AND/OR COMPONENTS SHOULD CONSIST OF FULL-HEIGHT UNITS TO THE MAXIMUM EXTENT POSSIBLE. HOWEVER, THE END OF A LOT OR THE QUANTITY OF ITEMS NEEDED TO FILL A REQUISITION, MAY NECESSITATE THE SHIPMENT OF ONE OR MORE LEFTOVER BOXES. LEFTOVER BOXES ARE DESCRIBED AS A QUANTITY OF BOXES WHICH IS INSUFFICIENT TO FORM A FULL-LAYERED PARTIAL UNIT FOR SHIPMENT EITHER ON TOP OF A LOAD AS SHOWN ON PAGE 34 OR WITHIN A TIER AS SHOWN ON PAGE 35. THEY ARE USUALLY BOXES OF THE SAME AMMUNITION ITEM AS THE BALANCE OF THE LOAD ALTHOUGH THEY MAY BE ANY OTHER COMPATIBLE ITEM.

2. SHIPMENT OF LEFTOVER BOXES IS APPLICABLE FOR CONUS AND OCONUS RAILROAD SHIPMENTS FROM DEPOT TO DEPOT OR FROM DEPOTS TO POSTS, CAMPS, AND STATIONS, OR, UPON APPROVAL FROM HIGHER HEADQUARTERS, FOR SHIPMENTS FROM LOAD, ASSEMBLE, AND PACK PLANTS TO DEPOTS. CAUTION: A LOAD CONTAINING LEFTOVER BOXES IN AN AMOUNT WHICH IS LESS THAN A FULL LAYER, AND SECURED TO THE TOP OF A FULL OR PARTIAL UNIT, MUST NOT BE DESTINED FOR SHIPMENT OVERSEAS BY WATER CARRIER.

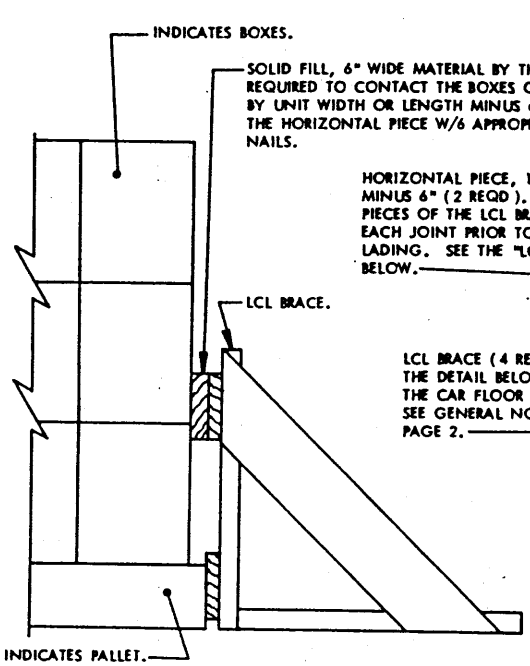
3. THE PROCEDURES ON THIS PAGE ARE PRESENTED AS GUIDANCE IN THE SECUREMENT OF LEFTOVER BOXES FOR SHIPMENT. THE VIEW AT TOP LEFT DEPICTS TWO LEFTOVER BOXES SECURED TO A FULL-HEIGHT UNIT WHEN THE BOXES ON THE UNIT HAVE TOP CLEATS. THE VIEW AT LEFT BELOW DEPICTS TWO LEFTOVER BOXES SECURED TO A FULL-HEIGHT UNIT WHEN THE BOXES ON THE UNIT DO NOT HAVE TOP CLEATS. THE QUANTITIES SHOWN ARE TYPICAL. THE PROCEDURES ARE ALSO APPLICABLE FOR SECUREMENT OF LEFTOVER BOXES TO PARTIAL UNITS FOR SHIPMENT ON TOP OF A LOAD. SEE SPECIAL NOTE 5 ON PAGE 34 FOR LIMITATIONS. IN ADDITION, THE PROCEDURES ARE APPLICABLE FOR SECURING LEFTOVER BOXES TO A PARTIAL UNIT FOR SHIPMENT WITHIN A TIER. SEE SPECIAL NOTE 5 ON PAGE 35 FOR LIMITATIONS.

4. THE QUANTITY OF LEFTOVER BOXES WHICH CAN BE SECURED TO FULL OR PARTIAL UNITS MAY VARY FROM ONE TO NOT MORE THAN THE QUANTITY IN ONE LAYER ON THE UNIT. IN OTHER WORDS, NOT MORE THAN THREE BOXES CAN BE STRAPPED TO A 3-BOX LONG UNIT. LEFTOVER BOXES MUST NOT BE STACKED. IF THE QUANTITY OF LEFTOVER BOXES TO BE SHIPPED IS MORE THAN THE QUANTITY IN ONE FULL LAYER, BOXES MUST BE STRAPPED TO MORE THAN ONE UNIT.

5. LEFTOVER BOXES MUST BE SECURED TO A FULL OR PARTIAL UNIT WITH A MINIMUM OF TWO (2) PIECES OF STEEL STRAPPING (SEPARATE FROM UNIT STRAPS) OF A SIZE AT LEAST AS HEAVY AS THE STRAPPING USED TO SECURE THE BOXES ON THE PALLETIZED UNIT UNDERNEATH THE LEFTOVER BOXES TO THE PALLET BASE. THE "SECUREMENT OF TOP-CLEATED BOXES" DETAIL ABOVE DEPICTS A TYPICAL STRAP APPLICATION FOR BOXES HAVING TOP CLEATS. THREAD A STRAP UNDER THE TOP LAYER OF BOXES, AS NEAR AS PRACTICAL TO THE ADJACENT UNIT STRAP, ENCIRCLE THE LEFTOVER BOXES, TENSION, AND SEAL THE JOINT WITH ONE DOUBLE CRIMPED SEAL. THE "SECUREMENT OF NON-TOP-CLEATED BOXES" DETAIL AT LEFT DEPICTS A TYPICAL STRAP APPLICATION FOR BOXES WHICH DO NOT HAVE TOP CLEATS. THREAD A STRAP UNDER THE TOP DECK BOARDS (AS APPLICABLE) AS NEAR AS PRACTICAL TO A PALLET POST, COMPLETELY ENCIRCLE THE PALLETIZED UNIT AND THE LEFTOVER BOXES, TENSION, AND SEAL THE JOINT WITH ONE DOUBLE CRIMPED SEAL.



SECUREMENT OF NON-TOP-CLEATED BOXES

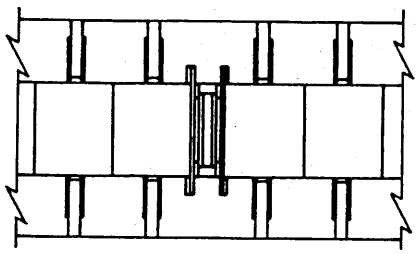


ALTERNATIVE METHOD I

REQUIRED ONLY FOR PALLETIZED UNITS WHERE THE BOXES ARE INSET FROM THE EDGE OF THE PALLET DECK.

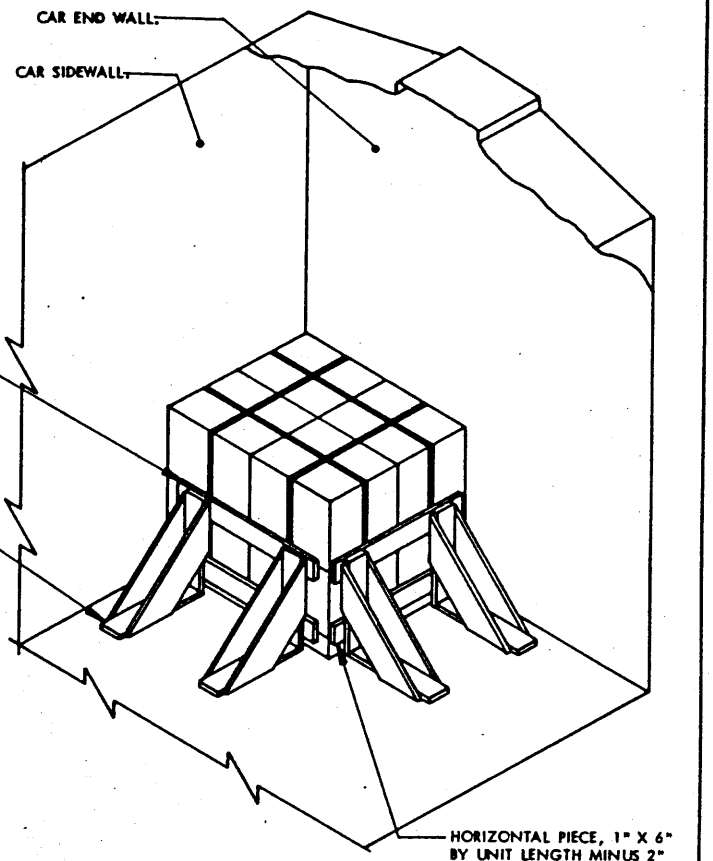
SPECIAL NOTES:

1. A 9'-2" WIDE CONVENTIONAL TYPE BOX CAR HAVING A WOOD OR NAILABLE METAL FLOOR IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED. SEE GENERAL NOTE "H" ON PAGE 4.
2. THE PALLETIZED UNIT SHOWN IN THE TYPICAL LCL LOAD HAS OVERALL DIMENSIONS OF 48-1/2" LONG BY 50" WIDE BY 41'-1/2" HIGH. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER SIZES, EXCEPT AS SPECIFIED IN SPECIAL NOTE 5 BELOW.
3. THE LOAD SHOWN DEPICTING THE LCL BRACE METHOD OF PARTIAL-LAYER BRACING (BOTTOM TIER ONLY) IS TYPICAL. SEE SPECIAL NOTE 4.
4. 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. EACH LCL BRACE AS APPLIED FOR LATERAL BRACING WILL SUPPORT 8,000 POUNDS OF LADING. ADDITIONAL LCL BRACES MAY BE INSTALLED AS REQUIRED FOR THE LONGITUDINAL RETENTION OF A LOAD OF MORE THAN 4,000 POUNDS.
5. LCL BRACES MAY BE USED FOR BRACING ANY PALLETIZED UNITS WHICH ARE NOT MORE THAN 44" IN HEIGHT. FOR UNITS OVER 44" HIGH, USE THE PROCEDURES SHOWN ON PAGES 28 AND 29.
6. WHEN BRACING PALLETIZED UNITS THAT HAVE THE BOXES INSET FROM THE EDGE OF THE PALLET DECK SEE "ALTERNATIVE METHOD I" ABOVE.
7. IF BATTENS ARE PRESENT ON SIDES AND/OR END OF THE PALLETIZED UNIT THE ANGLE BRACE OF THE LTL BRACE WILL BE CENTERED ON THE OUTERMOST BATTENS.



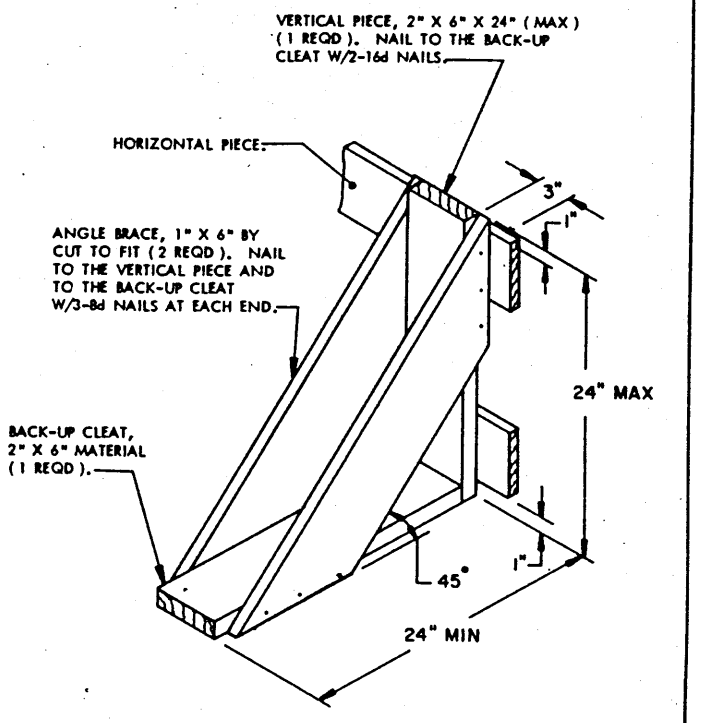
PARTIAL PLAN VIEW

AN LCL LOAD MAY CONSIST OF ONE (1) ROW OF PALLETIZED UNITS POSITIONED DOWN THRU THE CENTER OF THE CAR AS SHOWN IN THE PARTIAL PLAN VIEW ABOVE. USE ONE (1) LCL BRACE AGAINST EACH SIDE OF A PALLETIZED UNIT, AS NEAR TO CENTER AS POSSIBLE AND WITH THE BACK-UP CLEAT CUT-TO-FIT BETWEEN THE UNIT AND THE CAR SIDE WALL. FABRICATE TWO LCL CENTER GATES AS SHOWN ON PAGE 53. USE 4" X 4" BY CUT-TO-FIT STRUTS.



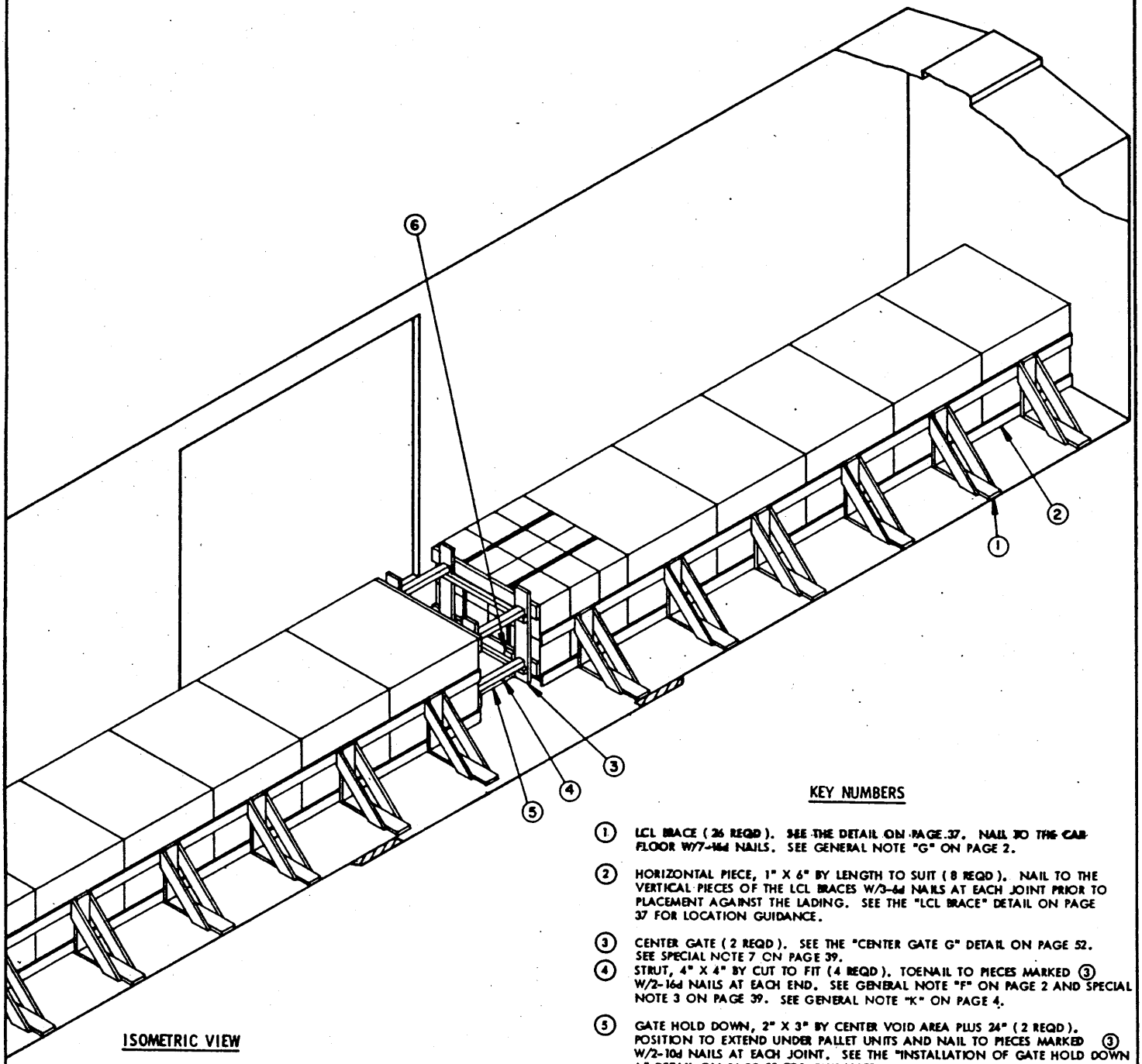
ISOMETRIC VIEW

SEE THE SPECIAL NOTES ON THIS PAGE.



LCL BRACE

TYPICAL LCL LOAD USING LCL BRACE METHOD OF PARTIAL-LAYER (TIER) BRACING



ISOMETRIC VIEW

KEY NUMBERS

(1) LCL BRACE (26 REQD). SEE THE DETAIL ON PAGE 37. NAIL TO THE CAR FLOOR W/7-16d NAILS. SEE GENERAL NOTE "G" ON PAGE 2.

(2) HORIZONTAL PIECE, 1" X 6" BY LENGTH TO SUIT (8 REQD). NAIL TO THE VERTICAL PIECES OF THE LCL BRACES W/3-6d NAILS AT EACH JOINT PRIOR TO PLACEMENT AGAINST THE LADING. SEE THE "LCL BRACE" DETAIL ON PAGE 37 FOR LOCATION GUIDANCE.

(3) CENTER GATE (2 REQD). SEE THE "CENTER GATE G" DETAIL ON PAGE 52. SEE SPECIAL NOTE 7 ON PAGE 39.

(4) STRUT, 4" X 4" BY CUT TO FIT (4 REQD). TOENAIL TO PIECES MARKED (3) W/2-16d NAILS AT EACH END. SEE GENERAL NOTE "F" ON PAGE 2 AND SPECIAL NOTE 3 ON PAGE 39. SEE GENERAL NOTE "K" ON PAGE 4.

(5) GATE HOLD DOWN, 2" X 3" BY CENTER VOID AREA PLUS 24" (2 REQD). POSITION TO EXTEND UNDER PALLET UNITS AND NAIL TO PIECES MARKED (3) W/2-10d NAILS AT EACH JOINT. SEE THE "INSTALLATION OF GATE HOLD DOWN A" DETAIL ON PAGE 55 FOR GUIDANCE.

(6) GATE HOLD DOWN RETAINER PIECE, 2" X 4" BY LENGTH TO SUIT (4 REQD). POSITION AGAINST PIECE MARKED (5) AND NAIL TO A HORIZONTAL PIECE OF A CENTER GATE W/3-10d NAILS. SEE THE "INSTALLATION OF GATE HOLD DOWN A" DETAIL ON PAGE 55 FOR GUIDANCE.

TYPICAL LCL LOAD USING 1-WIDE LOADING METHOD

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.

2. THE PALLETIZED UNIT SHOWN IN THE TYPICAL 1-WIDE LOAD ON PAGE 38 HAS OVERALL DIMENSIONS OF 44-1/4" LONG BY 52" WIDE BY 36-1/2" HIGH. THE UNIT WEIGHT IS 1,744 POUNDS. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER LENGTHS AND WIDTHS.

3. FOUR (4) LOAD BLOCKING 4" X 4" STRUTS ARE ADEQUATE FOR RETAINING SEVEN (7) PALLETIZED UNITS HAVING A WEIGHT OF NOT MORE THAN 1,750 POUNDS EACH. REFER TO THE "STRUTTING REQUIREMENTS" CHART ON PAGE 57 FOR GUIDANCE AS TO THE MAXIMUM WEIGHT PER UNIT WHEN THE LOAD IN THE LONG END OF THE CAR IS MORE OR LESS THAN SEVEN UNITS IN LENGTH. THE "ALT STRUTTING VIEW A" AND "ALT STRUTTING VIEW B" AT THE TOP OF PAGE 57 DEPICT INSTALLATION GUIDANCE FOR 4" X 6" ON-EDGE STRUTS AND DOUBLED 4" X 4" STRUTS, RESPECTIVELY. THESE STRUTS MAY BE REQUIRED FOR THE BRACING OF A HEAVIER LOAD, IN LIEU OF THE SINGLE 4" X 4" STRUTS SHOWN IN THE LOAD VIEW. SEE SPECIAL NOTE 8.

4. IF UNITS WHICH DO NOT CONTAIN A FULL QUANTITY OF BOXES ARE TO BE TRANSPORTED, REFER TO PAGES 34 AND 35 FOR SHIPPING GUIDANCE.

5. EACH LCL BRACE AS APPLIED FOR LATERAL BRACING WILL SUPPORT 8,000 LBS OF LADING.

6. WHEN BRACING PALLETIZED UNITS THAT HAVE THE BOXES INSET FROM THE EDGE OF THE PALLET DECK, SEE THE "ALTERNATIVE METHOD I" ON PAGE 37. FOR ADDITIONAL DUNNAGE (SOLID FILL) THAT MAY BE REQUIRED.

7. PALLET UNITS IN THE LOAD VIEW ON PAGE 38 ARE POSITIONED WITH THE LENGTH OF THE UNIT PARALLEL WITH THE CAR SIDEWALL. A LESSER QUANTITY OF UNITS MAY BE ATTAINED BY TURNING THE UNITS SO THE WIDTH OF THE UNIT IS PARALLEL WITH THE CAR SIDEWALL. CENTER GATE "F", AS DETAILED ON PAGE 51, MUST THEN BE USED IN LIEU OF CENTER GATE "G".

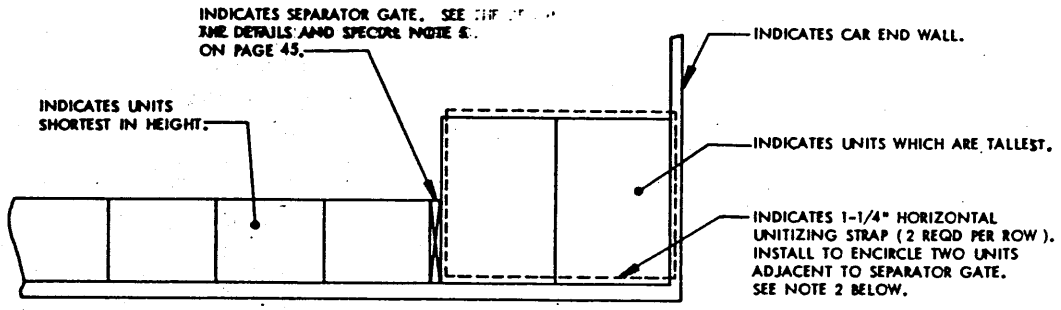
8. IF DESIRED, DOUBLE 2" X 6" STRUTS MAY BE USED IN LIEU OF THE DEPICTED 4" X 4" STRUTS, PIECES MARKED ④. OR, TRIPLE 2" X 6" STRUTS MAY BE USED IN LIEU OF THE 4" X 6" ON-EDGE STRUTS SPECIFIED BY THE "ALTERNATIVE STRUTTING VIEW A" ON PAGE 57. LAMINATE THE 2" X 6" PIECES W/1-10d NAIL EVERY 6" AND TOENAIL THE TOP STRUT PIECE TO THE VERTICAL PIECES OF THE CENTER GATES, PIECES MARKED ③, W/2-12d NAILS AT EACH END.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	344	172
2" X 2"	17	6
2" X 3"	8	4
2" X 4"	4	3
2" X 6"	144	144
4" X 4"	8	11
NAILS	NO. REQD	POUNDS
6d (2")	468	3
10d (3")	53	1
16d (3-1/2")	250	5-1/2

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
PALLETIZED UNIT	13	22,672 LBS
DUNNAGE		690 LBS
TOTAL WEIGHT		23,362 LBS

TYPICAL LCL LOAD USING 1-WIDE LOADING METHOD

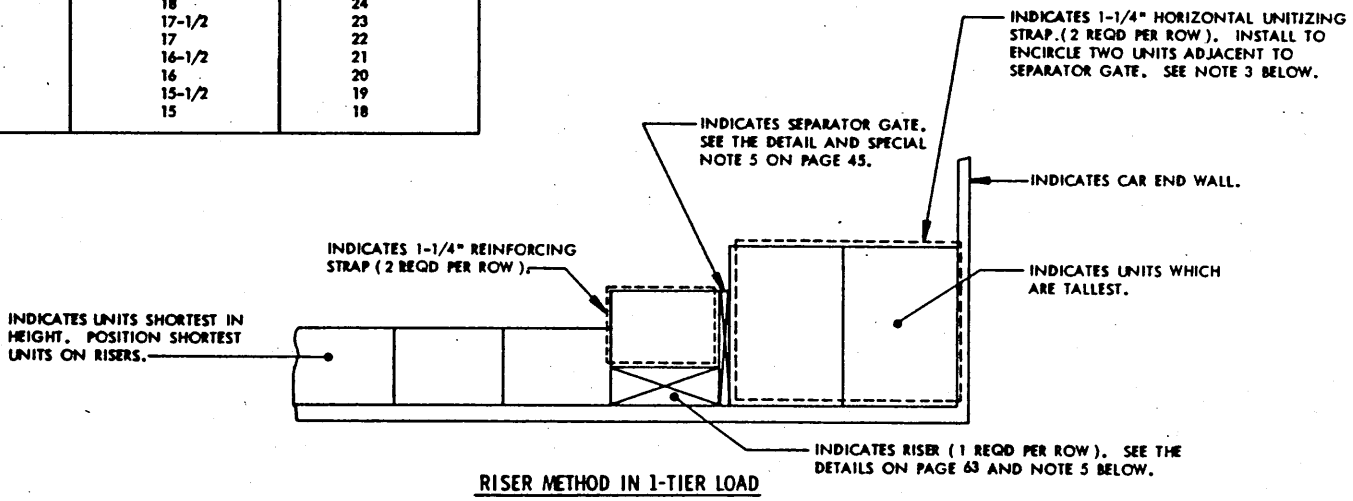


NO-RISER METHOD IN 1-TIER LOAD

MAXIMUM HEIGHT OF TALL UNIT	MIN HEIGHT OF SHORT UNIT (ALL DIM INCHES)	
	WITH TALL UNITS STRAPPED	WITH TALL UNITS NOT STRAPPED
54	27	42
53	26-1/2	41
52	26	40
51	25-1/2	39
50	25	38
49	24-1/2	37
48	24	36
47	23-1/2	35
46	23	34
45	22-1/2	33
44	22	32
43	21-1/2	31
42	21	30
41	20-1/2	29
40	20	28
39	19-1/2	27
38	19	26
37	18-1/2	25
36	18	24
35	17-1/2	23
34	17	22
33	16-1/2	21
32	16	20
31	15-1/2	19
30	15	18

REQUIREMENTS AND LIMITATIONS:

1. THE TALLEST UNITS WILL BE POSITIONED IN THE END OF THE CAR. THEY MUST NEVER EXTEND OVER ONE-HALF OF THEIR HEIGHT ABOVE THE SHORT UNITS.
2. THE HORIZONTAL UNITIZING STRAPS SHOWN ARE REQUIRED WHEN THE TALLEST UNITS IN THE END OF THE CAR EXTEND MORE THAN 12" ABOVE THE SHORTER UNITS. EACH ROW OF TALLER UNITS IS THEN LIMITED TO NO MORE THAN 8,000 POUNDS. IF THE TALLER UNITS EXTEND ABOVE THE SHORTER UNITS BY 12" OR LESS, THE STRAPPING IS NOT REQUIRED AND THERE IS NO WEIGHT LIMITATION. SEE THE CHART AT LEFT FOR GUIDANCE.
3. A SEPARATOR GATE WILL BE POSITIONED BETWEEN THE UNLIKE ITEMS. THE GATE WILL BE CONSTRUCTED WITH 2" X 6" VERTICAL PIECES AND HORIZONTAL PIECES. SEE SPECIAL NOTE 5 ON PAGE 45 FOR CONSTRUCTION GUIDANCE.



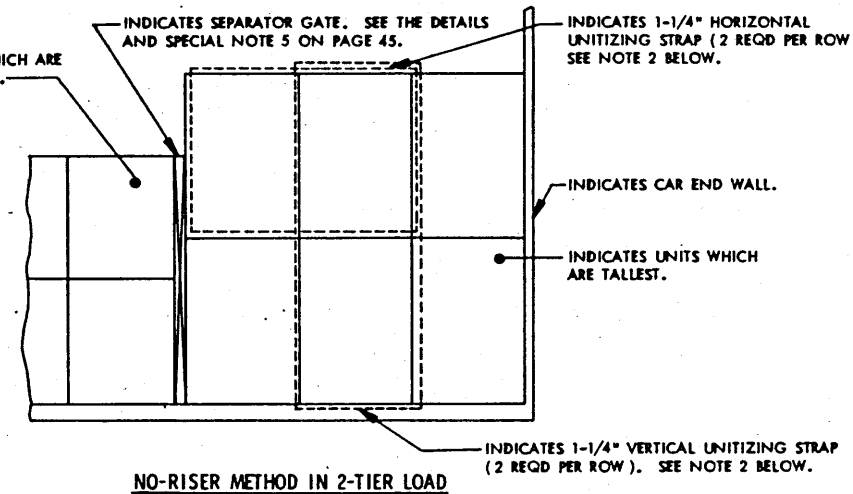
RISER METHOD IN 1-TIER LOAD

MAXIMUM HEIGHT OF TALL UNIT	MIN HEIGHT OF SHORT UNIT (ALL DIM INCHES)	
	WITH TALL UNITS STRAPPED	WITH TALL UNITS NOT STRAPPED
54	18	28
53	17-3/4	27-3/8
52	17-3/8	26-3/4
51	17	26
50	16-3/4	25-3/8
49	16-3/8	24-3/4
48	16	24
47	15-3/4	23-3/4
46	15-3/8	23
45	15	22-1/2

REQUIREMENTS AND LIMITATIONS:

1. THE TALLEST UNITS WILL BE POSITIONED IN THE END OF THE CAR. THEY MUST NEVER EXTEND OVER ONE-HALF OF THEIR HEIGHT ABOVE THE SHORT UNITS ON RISERS.
2. EACH ROW OF TALLER UNITS IS LIMITED TO NOT MORE THAN 8,000 POUNDS.
3. THE HORIZONTAL UNITIZING STRAPS SHOWN ARE REQUIRED WHEN THE TALLEST UNITS IN THE END OF THE CAR EXTEND MORE THAN 12" ABOVE THE SHORTER UNITS ON THE RISERS. IF THE TALLER UNITS EXTEND ABOVE THE UNITS ON THE RISERS BY 12" OR LESS, THE HORIZONTAL UNITIZING STRAPS ARE NOT REQUIRED. SEE THE CHART AT LEFT FOR GUIDANCE.
4. A SEPARATOR GATE WILL BE POSITIONED BETWEEN THE UNLIKE ITEMS. THE GATE WILL BE CONSTRUCTED WITH 2" X 6" VERTICAL PIECES AND HORIZONTAL PIECES. SEE SPECIAL NOTE 5 ON PAGE 45 FOR CONSTRUCTION GUIDANCE.
5. A RISER, WHICH IS ONE-HALF OF THE SHORTEST UNIT HEIGHT, WILL BE POSITIONED UNDER EACH SHORT UNIT WHICH IS TO BE ADJACENT TO THE SEPARATOR GATE, AND TWO (2) REINFORCING STRAPS WILL BE INSTALLED SO AS TO ENCIRCLE EACH UNIT WHICH IS ON A RISER.

MAXIMUM HEIGHT OF TALL UNIT	MIN HEIGHT OF SHORT UNIT (ALL DIM INCHES)	
	WITH TALL UNITS STRAPPED	WITH TALL UNITS NOT STRAPPED
54	40-1/2	48
53	39-3/4	47
52	39	46
51	38-1/4	45
50	37-1/2	44
49	36-3/4	43
48	36	42
47	35-1/4	41
46	34-1/2	40
45	33-3/4	39
44	33	38
43	32-1/4	37
42	31-1/2	36
41	30-3/4	35
40	30	34
39	29-1/4	33
38	28-1/2	32
37	27-3/4	31
36	27	30
35	26-1/4	29
34	25-1/2	28
33	24-3/4	27
32	24	26
31	23-1/4	25
30	22-1/2	24
29	21-3/4	23
28	21	22
27	20-1/4	21
26	19-1/2	20
25	18-3/4	19

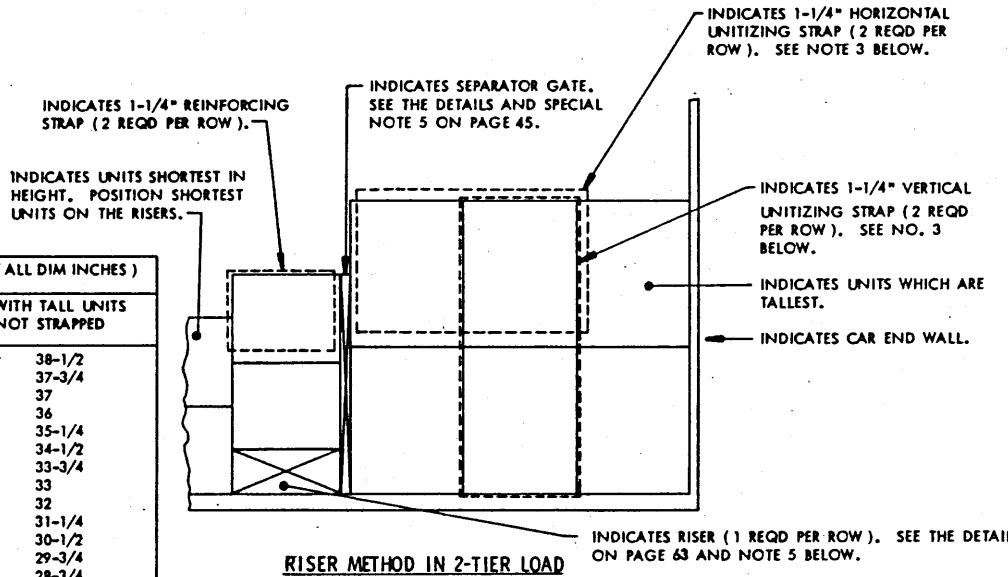


NO-RISER METHOD IN 2-TIER LOAD

REQUIREMENTS AND LIMITATIONS:

1. THE TALLEST UNITS WILL BE POSITIONED IN THE END OF THE CAR. THE TALL UNITS IN THE SECOND TIER MUST NEVER EXTEND OVER ONE-HALF OF ONE UNIT HEIGHT ABOVE THE SHORT UNITS IN THE SECOND TIER.
2. THE HORIZONTAL UNITIZING STRAPS AND VERTICAL UNITIZING STRAPS SHOWN ARE REQUIRED WHEN THE STACKS OF TALLEST UNITS IN THE END OF THE CAR EXTEND MORE THAN 12" ABOVE THE STACKS OF SHORTER UNITS. EACH ROW OF TALLER UNITS IS THEN LIMITED TO NOT MORE THAN 8,000 POUNDS IN THE TOP TIER. IF THE TALLER UNITS EXTEND ABOVE THE SHORTER UNITS BY 12" OR LESS, THE HORIZONTAL AND VERTICAL UNITIZING STRAPS ARE NOT REQUIRED AND THERE IS NO WEIGHT LIMITATION. SEE THE CHART AT LEFT FOR GUIDANCE.
3. A SEPARATOR GATE WILL BE POSITIONED BETWEEN THE UNLIKE ITEMS. THE GATE WILL BE CONSTRUCTED WITH 2" X 6" VERTICAL PIECES AND HORIZONTAL PIECES. SEE SPECIAL NOTE 5 ON PAGE 45 FOR CONSTRUCTION GUIDANCE.

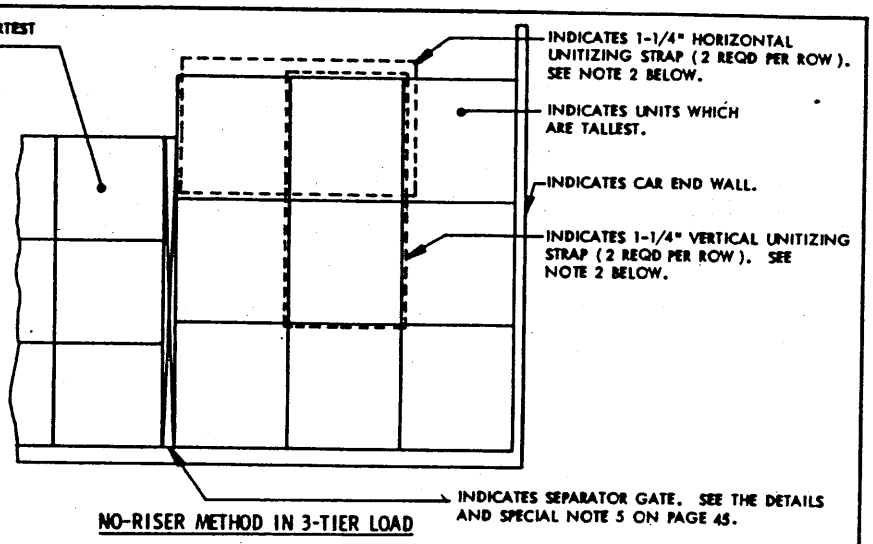
MAXIMUM HEIGHT OF TALL UNIT	MIN HEIGHT OF SHORT UNIT (ALL DIM INCHES)	
	WITH TALL UNITS STRAPPED	WITH TALL UNITS NOT STRAPPED
54	32-1/4	38-1/2
53	32	37-3/4
52	31-1/4	37
51	30-3/4	36
50	30	35-1/4
49	29-1/2	34-1/2
48	29	33-3/4
47	28-1/4	33
46	27-1/2	32
45	27	31-1/4
44	26-1/2	30-1/2
43	25-3/4	29-3/4
42	25-1/4	28-3/4
41	24-1/2	28
40	24	27-1/4
39	23-1/4	26-1/2
38	22-3/4	25-3/4
37	22-1/4	24-3/4
36	21-1/2	24
35	21	23-1/4
34	20-1/2	22-1/2
33	19-3/4	21-3/4
32	19-1/4	21
31	18-1/2	20
30	18	19-1/4
29	17-1/2	18-1/2
28	16-3/4	17-3/4
27	16-1/4	16-3/4
26	15-1/2	16
25	15	15-1/4



RISER METHOD IN 2-TIER LOAD

REQUIREMENTS AND LIMITATIONS:

1. THE TALLEST UNITS WILL BE POSITIONED IN THE END OF THE CAR. THE TALL UNITS IN THE SECOND TIER MUST NEVER EXTEND OVER ONE-HALF OF ONE UNIT HEIGHT ABOVE THE SHORT UNITS ON RISERS.
2. EACH ROW OF TALLER UNITS IS LIMITED TO NOT MORE THAN 8,000 POUNDS IN THE TOP TIER.
3. THE HORIZONTAL UNITIZING STRAPS AND VERTICAL UNITIZING STRAPS SHOWN ARE REQUIRED WHEN THE STACKS OF TALLEST UNITS IN THE END OF THE CAR EXTEND MORE THAN 12" ABOVE THE STACKS OF SHORTER UNITS ON THE RISERS. IF THE TALLER UNITS EXTEND ABOVE THE UNITS ON THE RISERS BY 12" OR LESS, THE HORIZONTAL AND VERTICAL UNITIZING STRAPS ARE NOT REQUIRED. SEE THE CHART AT LEFT FOR GUIDANCE.
4. A SEPARATOR GATE WILL BE POSITIONED BETWEEN THE UNLIKE ITEMS. THE GATE WILL BE CONSTRUCTED WITH 2" X 6" VERTICAL PIECES AND HORIZONTAL PIECES. SEE SPECIAL NOTE 5 ON PAGE 45 FOR CONSTRUCTION GUIDANCE.



MAXIMUM HEIGHT OF TALL UNIT	MIN HEIGHT OF SHORT UNIT (ALL DIM INCHES)	
	WITH TALL UNITS STRAPPED	WITH TALL UNITS NOT STRAPPED
44	36-5/8	40
43	35-3/4	39
42	35	38
41	34-1/8	37
40	33-1/4	36
39	32-1/2	35
38	31-5/8	34
37	30-3/4	33
36	30	32
35	29-1/4	31
34	28-1/4	30
33	27-1/2	29
32	26-3/4	28
31	25-7/8	27
30	25	26
29	24-1/4	25
28	23-1/2	24
27	22-1/2	23
26	21-3/4	22
25	20-7/8	21

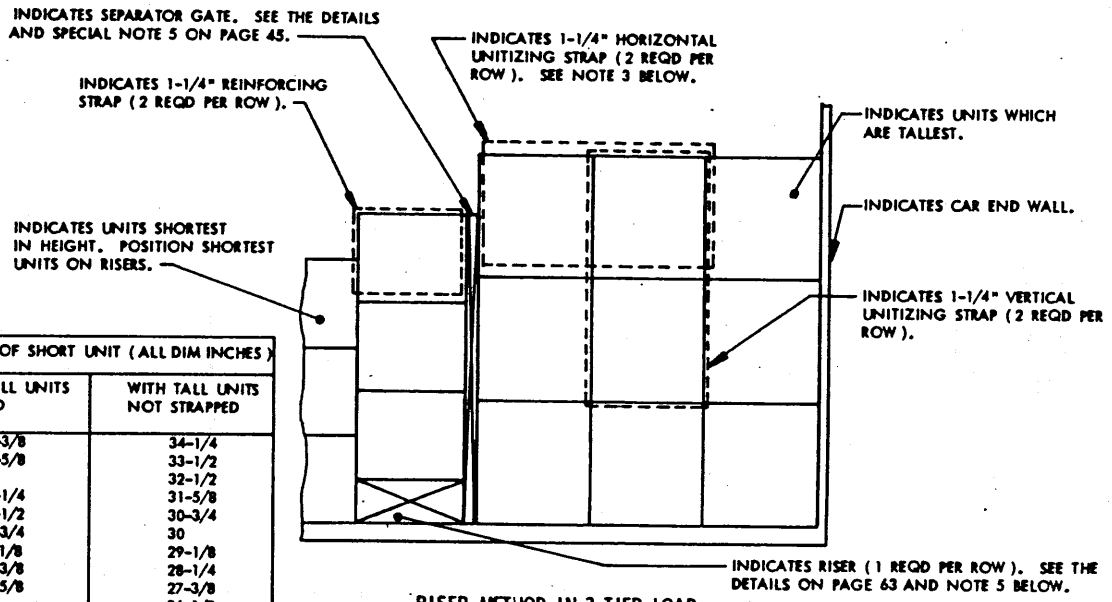
NO-RISER METHOD IN 3-TIER LOAD

REQUIREMENTS AND LIMITATIONS:

1. THE TALLEST UNITS WILL BE POSITIONED IN THE END OF THE CAR. THE TALL UNITS IN THE THIRD TIER MUST NEVER EXTEND OVER ONE-HALF OF ONE UNIT HEIGHT ABOVE THE SHORT UNITS IN THE THIRD TIER.

2. THE HORIZONTAL UNITIZING STRAPS AND VERTICAL UNITIZING STRAPS SHOWN ARE REQUIRED WHEN THE STACKS OF TALLEST UNITS IN THE END OF THE CAR EXTEND MORE THAN 12" ABOVE THE STACKS OF SHORTER UNITS. EACH ROW OF TALLER UNITS IS THEN LIMITED TO NOT MORE THAN 8,000 POUNDS IN THE TOP TIER. IF THE TALLER UNITS EXTEND ABOVE THE SHORTER UNITS BY 12" OR LESS, THE HORIZONTAL AND VERTICAL UNITIZING STRAPS ARE NOT REQUIRED AND THERE IS NO WEIGHT LIMITATION. SEE THE CHART AT LEFT FOR GUIDANCE.

3. A SEPARATOR GATE WILL BE POSITIONED BETWEEN THE UNLIKE ITEMS. THE GATE WILL BE CONSTRUCTED WITH 2" X 6" VERTICAL PIECES AND HORIZONTAL PIECES. SEE SPECIAL NOTE 5 ON PAGE 45 FOR CONSTRUCTION GUIDANCE.



MAXIMUM HEIGHT OF TALL UNIT	MIN HEIGHT OF SHORT UNIT (ALL DIM INCHES)	
	WITH TALL UNITS STRAPPED	WITH TALL UNITS NOT STRAPPED
44	31-3/8	34-1/4
43	30-5/8	33-1/2
42	30	32-1/2
41	29-1/4	31-5/8
40	28-1/2	30-3/4
39	27-3/4	30
38	27-1/8	29-1/8
37	26-3/8	28-1/4
36	25-5/8	27-3/8
35	25	26-1/2
34	24-1/4	25-5/8
33	23-1/2	24-3/4
32	22-7/8	24
31	22-1/4	23-1/8
30	21-1/2	22-1/4
29	20-3/4	21-1/2
28	20	20-3/4
27	19-1/4	19-3/4
26	18-1/2	18-7/8
25	17-7/8	18

RISER METHOD IN 3-TIER LOAD

REQUIREMENTS AND LIMITATIONS:

1. THE TALLEST UNITS WILL BE POSITIONED IN THE END OF THE CAR. THE TALL UNITS IN THE THIRD TIER MUST NEVER EXTEND OVER ONE-HALF OF ONE UNIT HEIGHT ABOVE THE SHORT UNITS ON RISERS.

2. EACH ROW OF TALLER UNITS IS LIMITED TO NOT MORE THAN 8,000 POUNDS IN THE TOP TIER.

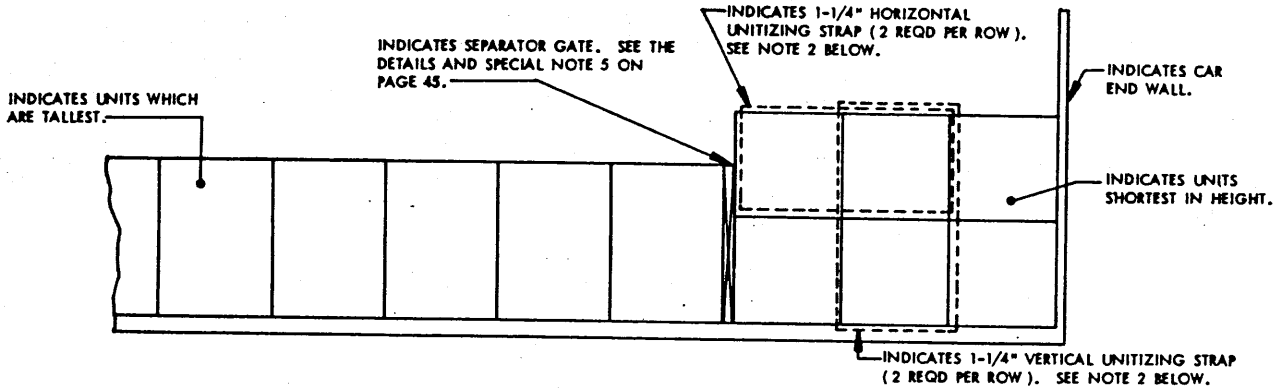
3. THE HORIZONTAL UNITIZING STRAPS AND VERTICAL UNITIZING STRAPS SHOWN ARE REQUIRED WHEN THE STACKS OF TALLEST UNITS IN THE END OF THE CAR EXTEND MORE THAN 12" ABOVE THE STACKS OF SHORTER UNITS ON THE RISERS. IF THE TALLER UNITS EXTEND ABOVE THE UNITS ON THE RISERS BY 12" OR LESS, THE HORIZONTAL AND VERTICAL UNITIZING STRAPS ARE NOT REQUIRED. SEE THE CHART AT LEFT FOR GUIDANCE.

4. A SEPARATOR GATE WILL BE POSITIONED BETWEEN THE UNLIKE ITEMS. THE GATE WILL BE CONSTRUCTED WITH 2" X 6" VERTICAL PIECES AND HORIZONTAL PIECES. SEE SPECIAL NOTE 5 ON PAGE 45 FOR CONSTRUCTION GUIDANCE.

(CONTINUED AT LEFT)

(REQUIREMENTS AND LIMITATIONS CONTINUED)

5. A RISER, WHICH IS ONE-HALF OF THE SHORTEST UNIT IN HEIGHT, WILL BE POSITIONED UNDER EACH SHORT UNIT STACK WHICH IS TO BE ADJACENT TO THE SEPARATOR GATE, AND TWO (2) REINFORCING STRAPS WILL BE INSTALLED SO AS TO ENCIRCLE EACH TOP UNIT OF EACH STACK WHICH IS ON A RISER.



NO-RISER METHOD IN 2 TO 1-TIER LOAD

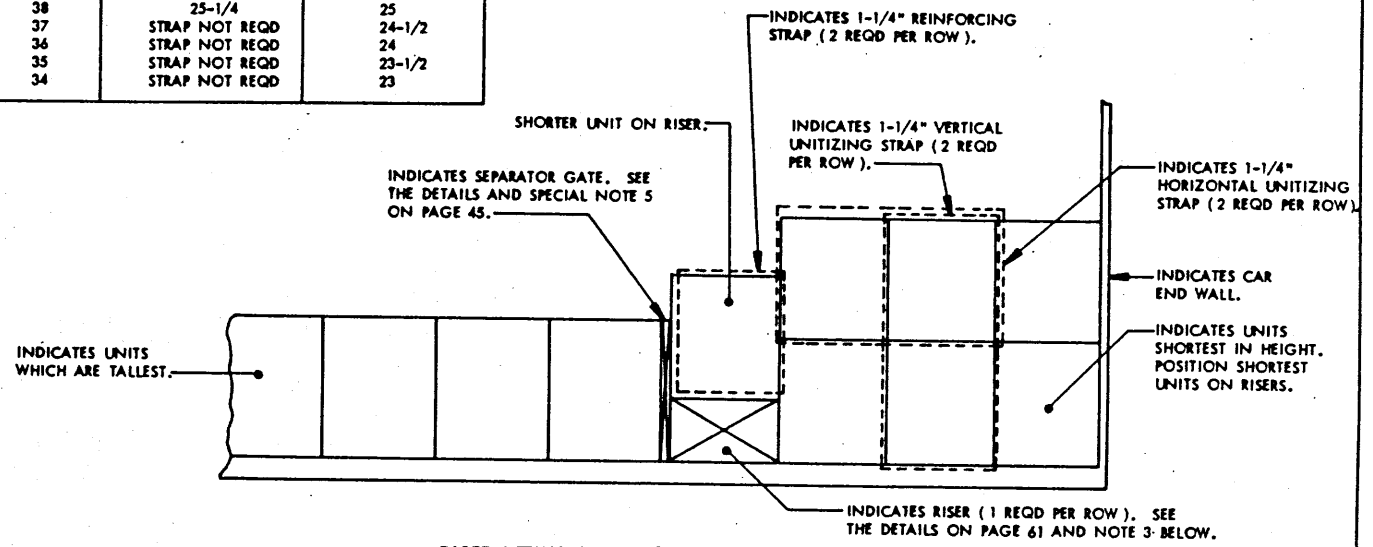
MINIMUM HEIGHT OF TALL UNIT	MAX HEIGHT OF SHORT UNIT (ALL DIM INCHES)	
	WITH TALL UNITS STRAPPED	WITH TALL UNITS NOT STRAPPED
54	36	33
53	35-1/4	32-1/2
52	34-5/8	32
51	34	31-1/2
50	33-1/4	31
49	32-5/8	30-1/2
48	32	30
47	31-1/4	29-1/2
46	30-5/8	29
45	30	28-1/2
44	29-1/4	28
43	28-5/8	27-1/2
42	28	27
41	27-1/4	26-1/2
40	26-5/8	26
39	26	25-1/2
38	25-1/4	25
37	STRAP NOT REQD	24-1/2
36	STRAP NOT REQD	24
35	STRAP NOT REQD	23-1/2
34	STRAP NOT REQD	23

REQUIREMENTS AND LIMITATIONS:

1. THE UNITS WHICH ARE SHORTEST IN HEIGHT WILL BE POSITIONED IN THE END OF THE CAR. THE UNITS IN THE SECOND TIER MUST NEVER EXTEND OVER ONE-HALF OF ONE UNIT HEIGHT ABOVE THE TALL UNITS.

2. THE HORIZONTAL UNITIZING STRAPS AND VERTICAL UNITIZING STRAPS SHOWN ARE REQUIRED WHEN THE STACKS OF SHORTEST UNITS IN THE END OF THE CAR EXTEND MORE THAN 12" ABOVE THE ONE TIER OF TALLER UNITS. EACH ROW OF SHORTER UNITS IS THEN LIMITED TO NOT MORE THAN 8,000 POUNDS IN THE TOP TIER. IF THE STACKS OF SHORTER UNITS EXTEND ABOVE THE TALLER UNITS BY 12" OR LESS, THE HORIZONTAL AND VERTICAL UNITIZING STRAPS ARE NOT REQUIRED AND THERE IS NO WEIGHT LIMITATION. SEE THE CHART AT LEFT FOR GUIDANCE.

3. A SEPARATOR GATE WILL BE POSITIONED BETWEEN THE UNLIKE ITEMS. THE GATE WILL BE CONSTRUCTED WITH 2" X 6" VERTICAL PIECES AND HORIZONTAL PIECES. SEE SPECIAL NOTE 5 ON PAGE 45 FOR CONSTRUCTION GUIDANCE.



RISER METHOD IN 2 TO 1-TIER LOAD

REQUIREMENTS AND LIMITATIONS:

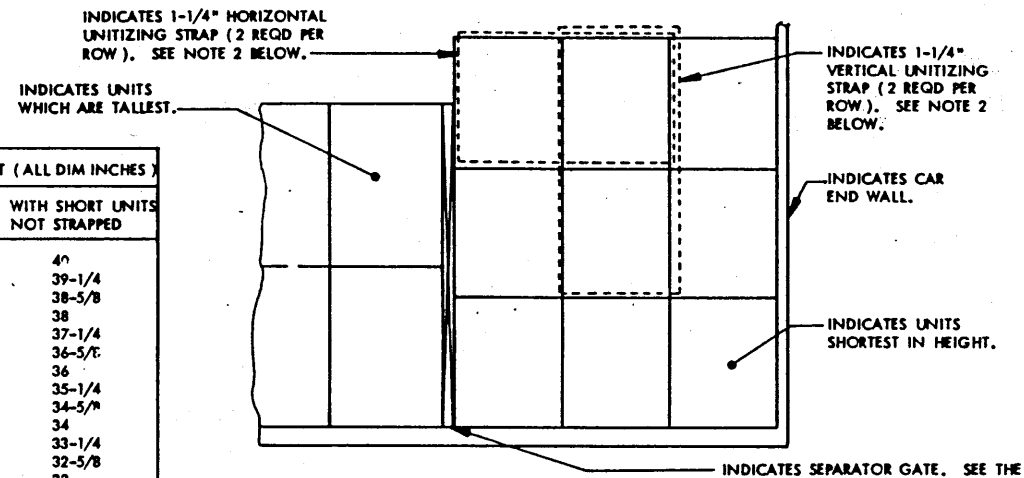
1. THE UNITS WHICH ARE SHORTEST IN HEIGHT WILL BE POSITIONED IN THE END OF THE CAR. THE SHORT UNITS IN THE SECOND TIER MUST NEVER EXTEND OVER ONE-HALF OF ONE UNIT HEIGHT ABOVE THE SHORT UNITS ON RISERS.

2. EACH ROW OF SHORTER UNITS IS LIMITED TO NOT MORE THAN 8,000 POUNDS IN THE TOP TIER.

3. A RISER, WHICH IS ONE-HALF OF THE SHORTEST UNIT HEIGHT, WILL BE POSITIONED UNDER EACH SHORT UNIT WHICH IS TO BE ADJACENT TO THE SEPARATOR GATE, AND TWO (2) REINFORCING STRAPS WILL BE INSTALLED SO AS TO ENCIRCLE EACH UNIT WHICH IS ON A RISER.

4. A SEPARATOR GATE WILL BE POSITIONED BETWEEN THE UNLIKE ITEMS. THE GATE WILL BE CONSTRUCED WITH 2" X 6" VERTICAL PIECES AND HORIZONTAL PIECES. SEE SPECIAL NOTE 5 ON PAGE 45 FOR CONSTRUCTION GUIDANCE.

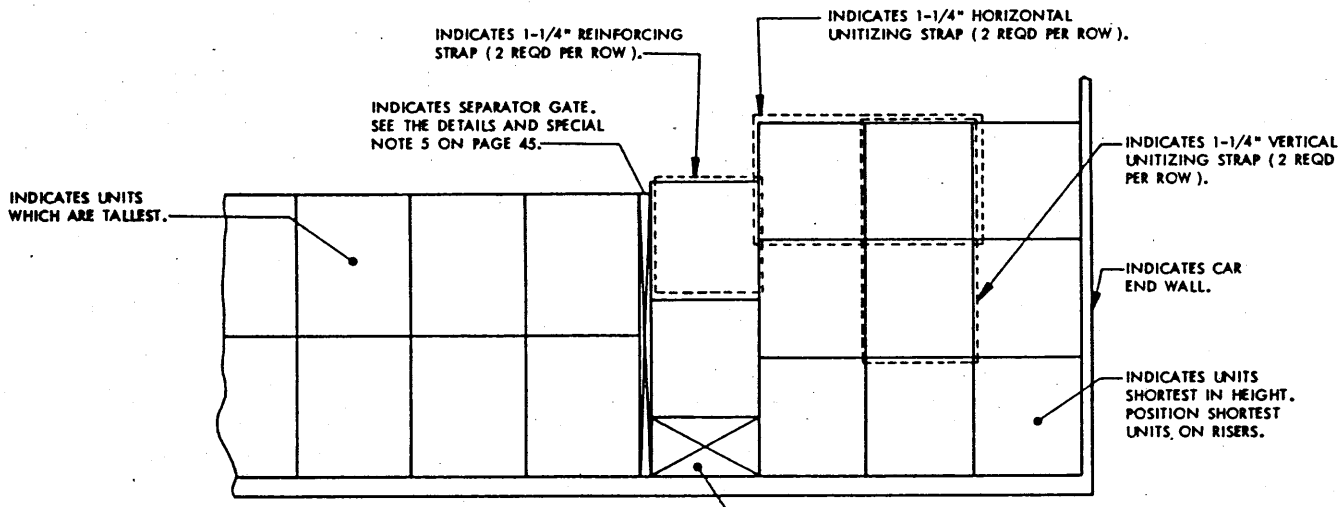
MINIMUM HEIGHT OF TALL UNIT	MAX HIEGHT OF SHORT UNIT (ALL DIM INCHES)	
	WITH SHORT UNITS STRAPPED	WITH SHORT UNITS NOT STRAPPED
54	43-3/8	40
53	42-3/8	39-1/4
52	41-1/2	38-5/8
51	40-3/4	38
50	40	37-1/4
49	39-1/8	36-5/8
48	38-3/8	36
47	37-1/2	35-1/4
46	36-3/4	34-5/8
45	36	34
44	35-1/8	33-1/4
43	34-3/8	32-5/8
42	33-1/2	32
41	32-3/4	31-1/4
40	32	30-5/8
39	31-1/8	30
38	30-3/8	29-1/4
37	29-1/2	28-5/8
36	28-3/4	28
35	28	27-1/4
34	27-1/8	STRAP REQUIRED
33	26-3/8	STRAP REQUIRED
32	25-1/2	STRAP REQUIRED
31	24-3/4	STRAP REQUIRED
30	24	STRAP REQUIRED



NO-RISER METHOD IN 3 TO 2-TIER LOAD

REQUIREMENTS AND LIMITATIONS:

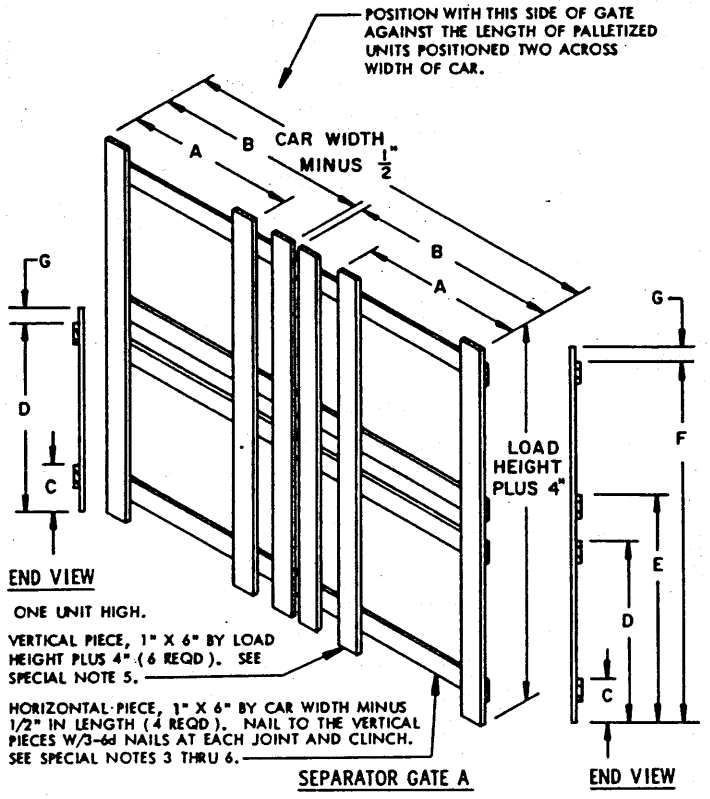
1. THE UNITS WHICH ARE SHORTEST IN HEIGHT WILL BE POSITIONED IN THE END OF THE CAR. THE UNITS IN THE THIRD TIER MUST NEVER EXTEND OVER ONE-HALF OF ONE UNIT HEIGHT ABOVE THE TALL UNITS.
2. THE HORIZONTAL UNITIZING STRAPS AND VERTICAL UNITIZING STRAPS SHOWN ARE REQUIRED WHEN THE STACKS OF SHORTEST UNITS IN THE END OF THE CAR EXTEND MORE THAN 12" ABOVE THE STACKS OF TALLER UNITS. EACH ROW OF SHORTER UNITS IS THEN LIMITED TO NOT MORE THAN 8,000 POUNDS IN THE TOP TIER. IF THE STACKS OF SHORTER UNITS EXTEND ABOVE THE STACKS OF TALLER UNITS BY 12" OR LESS, THE HORIZONTAL AND VERTICAL UNITIZING STRAPS ARE NOT REQUIRED AND THERE IS NO WEIGHT LIMITATION. SEE THE CHART AT LEFT FOR GUIDANCE.
3. A SEPARATOR GATE WILL BE POSITIONED BETWEEN THE UNLIKE ITEMS. THE GATE WILL BE CONSTRUCTED WITH 2" X 6" VERTICAL PIECES AND HORIZONTAL PIECES. SEE SPECIAL NOTE 5 ON PAGE 45 FOR CONSTRUCTION GUIDANCE.



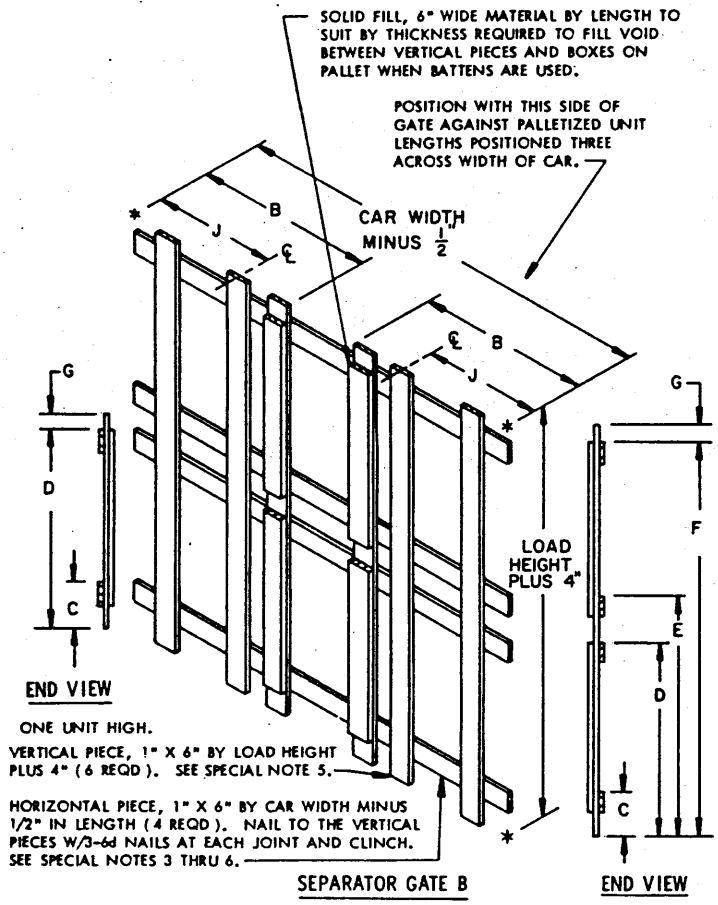
RISER METHOD IN 3 TO 2-TIER LOAD

REQUIREMENTS AND LIMITATIONS:

1. THE UNITS WHICH ARE SHORTEST IN HEIGHT WILL BE POSITIONED IN THE END OF THE CAR. THE SHORT UNITS IN THE THIRD TIER MUST NEVER EXTEND OVER ONE-HALF OF ONE UNIT HEIGHT ABOVE THE SHORT UNITS ON RISERS.
2. EACH ROW OF SHORTER UNITS IS LIMITED TO NOT MORE THAN 8,000 POUNDS IN THE TOP TIER.
3. A RISER, WHICH IS ONE-HALF OF THE SHORTEST UNIT HEIGHT, WILL BE POSITIONED UNDER EACH SHORTER UNIT STACK WHICH IS TO BE ADJACENT TO THE SEPARATOR GATE, AND TWO (2) REINFORCING STRAPS WILL BE INSTALLED SO AS TO ENCIRCLE EACH TOP UNIT OF EACH STACK WHICH IS ON A RISER.
4. A SEPARATOR GATE WILL BE POSITIONED BETWEEN THE UNLIKE ITEMS. THE GATE WILL BE CONSTRUCTED WITH 2" X 6" VERTICAL PIECES AND HORIZONTAL PIECES. SEE SPECIAL NOTE 5 ON PAGE 45 FOR CONSTRUCTION GUIDANCE.



AN ISOMETRIC VIEW OF A GATE FOR A 2-TIER LOAD IS SHOWN AS TYPICAL. IF THE PALLETIZED UNIT HAS BATTENS, SIMILAR TO THE UNIT SHOWN IN THE LOWER RIGHT CORNER OF PAGE 3, USE "SEPARATOR GATE B" BELOW.



AN ISOMETRIC VIEW OF A GATE FOR A 2-TIER LOAD IS SHOWN AS TYPICAL.

GATE CONSTRUCTION DIMENSIONAL CHART	
LOCATION IDENTITY	DESCRIPTION FOR POSITIONING LUMBER IN ASSEMBLY
A	LENGTH OF PALLETIZED UNIT.
B	WIDTH OF PALLETIZED UNIT.
C	11-1/2". SEE SPECIAL NOTE 3.
D	TOP OF FIRST TIER.
E	11-1/2" ABOVE TOP OF FIRST TIER.
F	TOP OF SECOND TIER.
G	4"
H	DISTANCE BETWEEN CAR SIDEWALL AND CENTER OF OUTSIDE PALLET POST OR BATTENS.
J	DISTANCE FROM CENTER TO CENTER OF OUTSIDE PALLET POST OR BATTENS.

SPECIAL NOTES:

1. THE SEPARATOR GATES SHOWN ARE APPLICABLE FOR USE IN BOX CAR LOADS WHEN THE UNITS ARE LOADED IN A "COMBINATION LOAD" PATTERN. SEE THE TYPICAL LOAD VIEWS ON PAGES 10, 12, AND 16. THE ISOMETRIC VIEWS DEPICT GATES FOR TYPICAL 2-TIER LOADS. THE "END VIEW" SKETCHES REPRESENT GATES FOR ONE AND TWO TIERS.

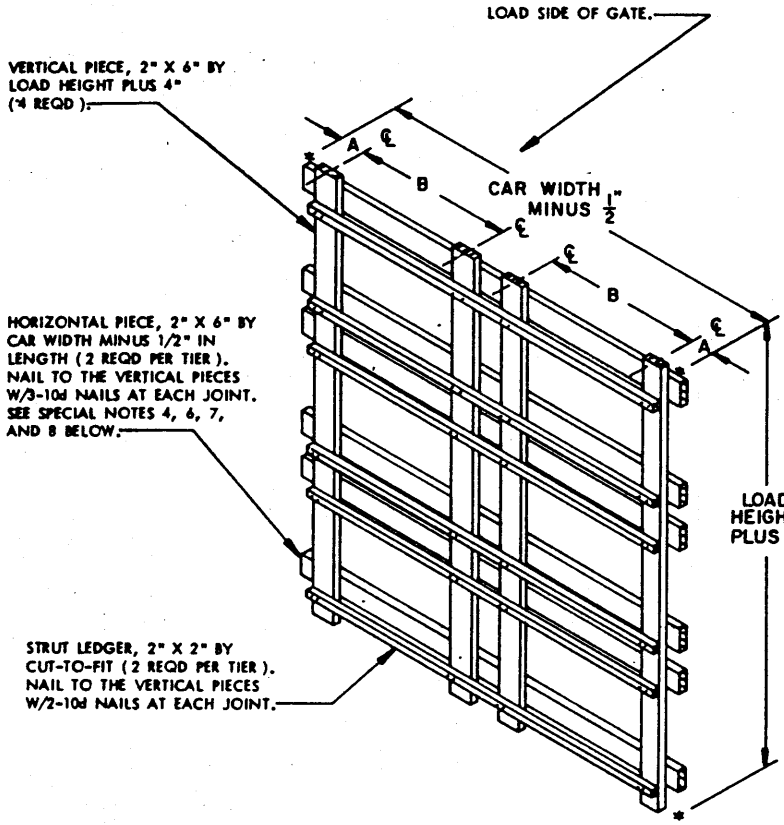
2. THE GATE DIMENSIONS REPRESENTED BY LETTERS ON THE VIEWS ARE SPECIFIED IN THE "GATE CONSTRUCTION DIMENSIONAL CHART" ABOVE, EITHER AS A FIXED FIGURE OR AS A FIGURE BASED UPON THE LENGTH, WIDTH, OR HEIGHT OF THE PALLETIZED UNIT BEING LOADED.

3. AS A MINIMUM, HORIZONTAL PIECES ARE REQUIRED AT OR NEAR THE TOP AND BOTTOM OF EACH TIER OF UNITS.

4. A SEPARATOR GATE IS TO BE USED BETWEEN LONGITUDINALLY ADJACENT LOAD UNITS WHEN THE UNITS ARE POSITIONED IN OPPOSITE DIRECTIONS (PALLETIZED UNIT LENGTH AGAINST ONE SIDE OF THE SEPARATOR GATE AND PALLETIZED UNIT WIDTH AGAINST THE OPPOSITE SIDE). THE GATE CAN BE CONSTRUCTED FROM 1" X 6" MATERIAL, UNLESS THE DIFFERENCE BETWEEN THE LENGTH AND WIDTH OF THE UNIT IS 12" OR GREATER, IN WHICH CASE THE HORIZONTAL PIECES MUST BE 2" X 6" MATERIAL IN LIEU OF THE SPECIFIED 1" X 6" MATERIAL. NAIL THE VERTICAL PIECES TO THE 2" X 6" HORIZONTAL PIECES W/5-6d NAILS AT EACH JOINT IN LIEU OF THE SPECIFIED NAILING.

5. A SEPARATOR GATE IS ALSO TO BE USED BETWEEN LONGITUDINALLY ADJACENT LOAD UNITS OF UNLIKE ITEMS, AS SHOWN IN THE VIEWS ON PAGES 40 THRU 44. THE GATE WILL BE CONSTRUCTED WITH BOTH THE VERTICAL PIECES AND HORIZONTAL PIECES (SEE SPECIAL NOTE 3 ABOVE) BEING 2" X 6" MATERIAL AND WILL BE NAILED W/3-10d NAILS AT EACH JOINT, IN LIEU OF USING THE SPECIFIED 1" X 6" MATERIAL AND NAILING. WHEN THE UNITS ON OPPOSITE SIDES OF THE SEPARATOR GATE ARE POSITIONED IN OPPOSITE DIRECTIONS, THE DIMENSIONS SHOWN BY THE ISOMETRIC VIEWS ARE APPLICABLE. IF THE UNITS ON OPPOSITE SIDES ARE BOTH POSITIONED WITH THE UNIT WIDTH ACROSS THE CAR, THE VERTICAL PIECES AT LOCATION MARKED "A" ON "SEPARATOR GATE A" AND THE VERTICAL PIECES AT LOCATIONS MARKED "B" ON "SEPARATORGATE B" ARE NOT REQUIRED AND MAY BE OMITTED. IF THE UNITS ON OPPOSITE SIDES ARE BOTH POSITIONED WITH THE UNIT LENGTH ACROSS THE CAR, THE VERTICAL PIECES AT LOCATIONS MARKED "B" ON "SEPARATOR GATE A" ARE NOT REQUIRED AND MAY BE OMITTED. "SEPARATOR GATE B" WOULD NOT BE USED FOR UNITS POSITIONED ON OPPOSITE SIDES WITH THE UNIT LENGTH ACROSS THE CAR.

6. FOR EASE OF HANDLING, A SEPARATOR GATE CAN BE MADE IN TWO PIECES IN LIEU OF CONSTRUCTING IT TO BE ONE-HALF INCH (1/2") LESS IN WIDTH THAN THE INSIDE WIDTH OF THE CAR TO BE LOADED. EACH SECTION SHOULD BE CONSTRUCTED AS WIDE AS THE WIDTH OF THE PALLETIZED UNIT TO BE LOADED (DIMENSION B), WHEN IT IS FOR USE IN LOADS HAVING ONLY TWO ROWS OF UNITS WHICH ARE POSITIONED WITH THE UNIT WIDTH ACROSS THE CAR. EACH SECTION SHOULD BE CONSTRUCTED AS WIDE AS THE LENGTH OF THE PALLETIZED UNIT TO BE LOADED (DIMENSION A), WHEN IT IS FOR USE IN LOADS HAVING ONLY TWO ROWS OF UNITS WHICH ARE POSITIONED WITH THE UNIT LENGTH ACROSS THE CAR. WHEN A PORTION OF THE LOAD CONSISTS OF THREE ROWS OF UNITS IN THE CAR, EACH SECTION OF THE GATE SHOULD BE CONSTRUCTED AT LEAST FOUR INCHES (4") WIDER THAN DIMENSION B. PRIOR TO FINAL POSITIONING IN THE CAR, THE TWO SECTIONS MUST BE TIED TOGETHER AT TOP AND BOTTOM WITH A PROPER LENGTH TIE PIECE OF 1" X 6" MATERIAL. NAIL THE TIE PIECE TO THE HORIZONTAL PIECES OF THE GATES W/4-6d NAILS AT EACH END AND CLINCH. NOTE THAT IF A LOAD HAS THREE ROWS WITH THE LENGTH OF THE UNIT ACROSS THE WIDTH OF THE CAR ON ONE SIDE OF THE SEPARATOR GATE AND TWO ROWS WITH THE WIDTH OF THE UNIT ACROSS THE WIDTH OF THE CAR ON THE OPPOSITE SIDE AND THERE IS LESS THAN EIGHT INCHES (8") LATERAL VOID BETWEEN THE ROWS IN THE TWO WIDE PORTION, A ONE-PIECE SEPARATOR GATE MUST BE USED.



CENTER GATE A

AN ISOMETRIC VIEW OF A GATE FOR A 3-TIER LOAD IS SHOWN AS TYPICAL.

GATE CONSTRUCTION DIMENSIONAL CHART	
LOCATION IDENTITY	DESCRIPTION FOR POSITIONING LUMBER IN ASSEMBLY
A	DISTANCE BETWEEN CAR SIDEWALL AND CENTER OF OUTSIDE PALLET POST OR BATTENS.
B	DISTANCE FROM CENTER TO CENTER OF OUTSIDE PALLET POSTS OR BATTENS.
C	11-1/4"
D, F, H	TOP OF TIER.
E, G	11-1/4" ABOVE TOP OF NEXT LOWER TIER.
J	4"
K	7"
L, N, P	4-1/2" BELOW TOP OF TIER.
M, O	7" ABOVE TOP OF NEXT LOWER TIER.

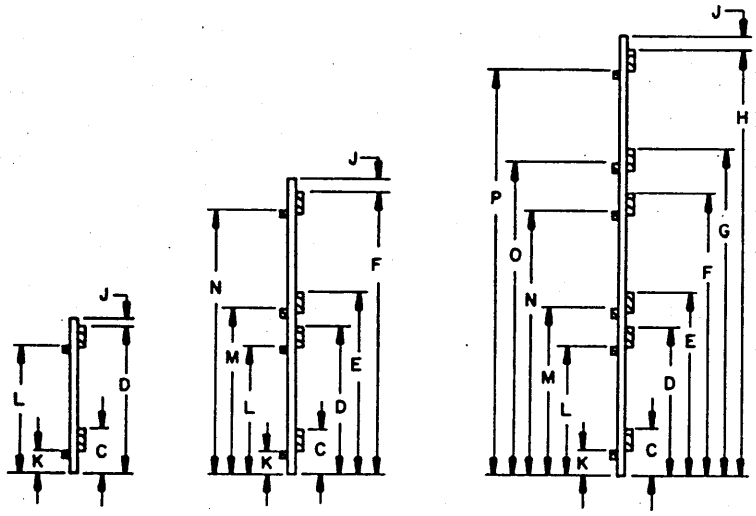
SPECIAL NOTES:

1. THE CENTER GATES SHOWN ON THIS PAGE ARE APPLICABLE FOR USE IN BOX CAR LOADS WHERE THE LENGTH OF THE UNIT IS PARALLEL WITH THE SIDEWALLS OF A CAR. THE GATES ARE DESIGNED FOR THE BRACING OF TWO (2) ROWS OF UNITS, ONE AGAINST EACH SIDEWALL. SEE THE TYPICAL LOAD VIEW ON PAGE 6. THE "ISOMETRIC VIEW" ABOVE DEPICTS A GATE FOR A TYPICAL 3-TIER LOAD. THE "END VIEW" SKETCHES BELOW REPRESENT GATES FOR LOADS OF ONE THRU THREE TIERS.
2. THE GATE DIMENSIONS REPRESENTED BY LETTERS ON THE VIEWS ARE SPECIFIED IN THE "GATE CONSTRUCTION DIMENSIONAL CHART" ABOVE, EITHER AS A FIXED FIGURE OR AS A FIGURE BASED UPON THE WIDTH OR HEIGHT OF THE PALLETIZED UNIT BEING LOADED.

(CONTINUED AT RIGHT)

(SPECIAL NOTES CONTINUED)

3. WHEN MAKING A SET OF TWO GATES FOR A LOAD CONSISTING OF TWO OR THREE TIERS OF UNITS, IT WILL BE NECESSARY TO LEAVE THE THIRD AND/OR FIFTH LEVELS OF STRUT LEDGERS OFF OF ONE GATE UNTIL THE SECOND AND/OR FOURTH LEVELS, RESPECTIVELY, OF LOAD BLOCKING STRUTS HAVE BEEN INSTALLED. WHEN MAKING GATES FOR A LOAD OF LOW-HEIGHT UNITS, IT MAY BE NECESSARY TO LEAVE ALL BUT THE BOTTOM STRUT LEDGER OFF OF ONE GATE UNTIL THE NEXT LOWER LEVEL OF STRUTS HAS BEEN INSTALLED.
4. AS A MINIMUM, HORIZONTAL PIECES ARE REQUIRED AT OR NEAR THE TOP AND THE BOTTOM OF EACH TIER OF UNITS.
5. ALL STRUT LEDGER HEIGHTS MUST BE LOWERED BY 1-1/4" WHEN 4" X 6" ON-EDGE STRUTS ARE TO BE USED. SEE THE "ALTERNATIVE STRUTTING VIEW A" ON PAGE 57. IF DOUBLED 4" X 4" STRUTS ARE TO BE USED SEE THE "ALTERNATIVE STRUTTING VIEW B" ON PAGE 57.
6. THE CENTER GATES MUST BE CONSTRUCTED ONE-HALF INCH (1/2") LESS IN WIDTH THAN THE MEASURED DISTANCE BETWEEN THE DOOR SPANNER PIECES IF THE DOORWAY PROTECTION PROCEDURES DEPICTED ON PAGE 58 ARE USED IN LIEU OF THE DOORWAY PROTECTION SHOWN IN THE LOAD VIEW ON PAGE 16 AS PIECES MARKED (3), (10) AND (11), OR IN LIEU OF ANY OF THE ALTERNATIVE METHODS SHOWN ON PAGES 59 AND 60.
7. FOR EASE OF HANDLING, SPLIT GATES, CONSTRUCTED IN ACCORDANCE WITH THE "CENTER GATE G" DETAIL ON PAGE 52, MAY BE USED AS AN ALTERNATIVE TO CENTER GATE A. USE TWO (2) GATES, TIED TOGETHER AS SHOWN BY THE "TIE PIECE APPLICATION A" DETAIL ON PAGE 54.
8. FOR AN ALTERNATIVE METHOD OF CONSTRUCTING THIS GATE SEE THE "PLYWOOD GATE ALTERNATIVE" DETAIL ON PAGE 53.
9. IF THE ANTI-SWAY BRACE C ASSEMBLIES, AS DETAILED ON PAGE 65, ARE USED FOR LATERAL BRACING OF A LOAD IN LIEU OF THE ANTI-SWAY BRACE A ASSEMBLIES SPECIFIED, RETAINER PIECES MUST BE ADDED TO EACH CENTER GATE TO PREVENT DISPLACEMENT OF THE BRACES. SEE THE "TYPICAL INSTALLATION OF ANTI-SWAY BRACE RETAINER" DETAIL ON PAGE 65. NOTE THAT RETAINER PIECES ARE NOT REQUIRED WHEN PLYWOOD-FACED CENTER GATES ARE USED.

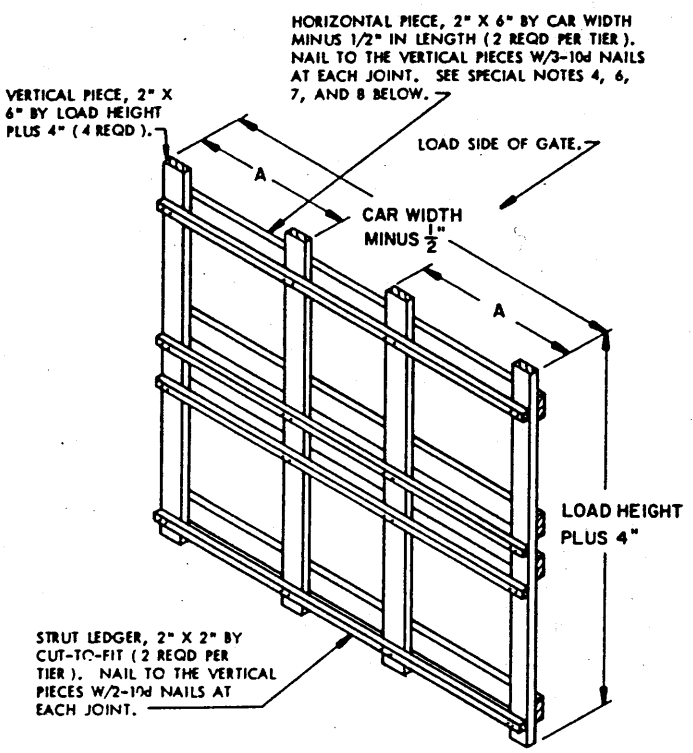


END VIEW
THIS GATE IS FOR LOADS WHICH ARE ONE (1) UNIT HIGH.

END VIEW
THIS GATE IS FOR LOADS WHICH ARE TWO (2) UNITS HIGH.

END VIEW
THIS GATE IS FOR LOADS WHICH ARE THREE (3) UNITS HIGH.

CENTER GATE A



CENTER GATE B

AN ISOMETRIC VIEW OF A GATE FOR A 2-TIER LOAD IS SHOWN AS TYPICAL.

GATE CONSTRUCTION DIMENSIONAL CHART	
LOCATION IDENTITY	DESCRIPTION FOR POSITIONING LUMBER IN ASSEMBLY
A	LENGTH OF PALLETIZED UNIT.
B	11-1/4"
C, E, G	TOP OF TIER.
D, F	11-1/4" ABOVE TOP OF NEXT LOWER TIER.
H	4"
J	7"
K, M, O	4-1/2" BELOW TOP OF TIER.
L, N	7" ABOVE TOP OF NEXT LOWER TIER.

SPECIAL NOTES:

1. THE CENTER GATES SHOWN ON THIS PAGE ARE APPLICABLE FOR USE IN BOX CAR LOADS WHERE THE WIDTH OF THE UNIT IS PARALLEL WITH THE SIDEWALLS OF A CAR. THE GATES ARE DESIGNED FOR THE BRACING OF TWO (2) ROWS OF UNITS, ONE AGAINST EACH SIDEWALL. SEE THE TYPICAL LOAD VIEW ON PAGE 8. THE "ISOMETRIC VIEW" ABOVE DEPICTS A GATE FOR A TYPICAL 2-TIER LOAD. THE "END VIEW" SKETCHES BELOW REPRESENT GATES FOR LOADS OF ONE THRU THREE TIERS.
2. THE GATE DIMENSIONS REPRESENTED BY LETTERS ON THE VIEWS ARE SPECIFIED IN THE "GATE CONSTRUCTION DIMENSIONAL CHART" ABOVE, EITHER AS A FIXED FIGURE OR AS A FIGURE BASED UPON THE LENGTH OR HEIGHT OF THE PALLETIZED UNIT BEING LOADED.

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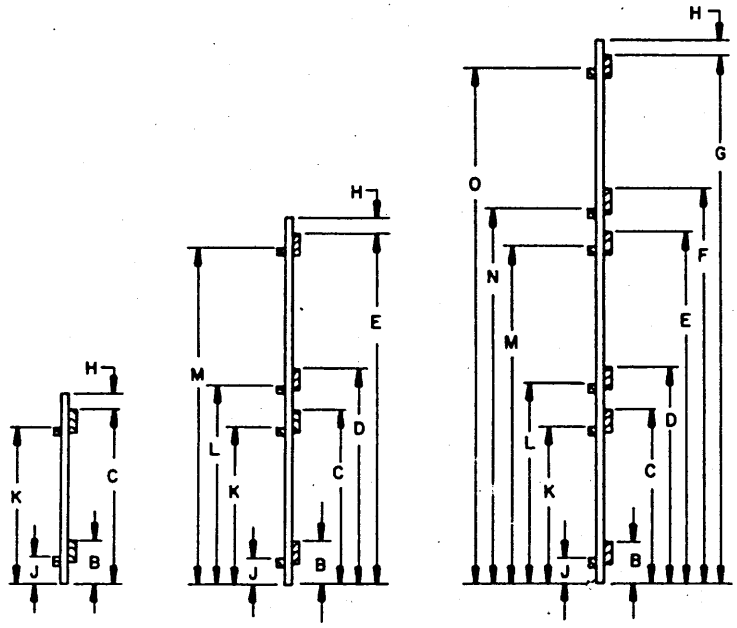
(SPECIAL NOTES CONTINUED)

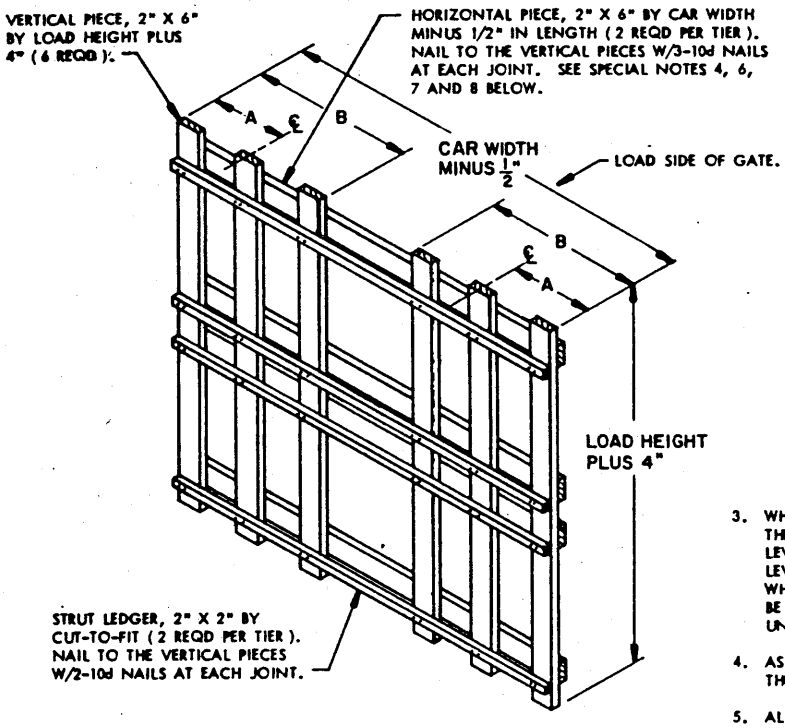
3. WHEN MAKING A SET OF TWO GATES FOR A LOAD CONSISTING OF TWO OR THREE TIERS OF UNITS, IT WILL BE NECESSARY TO LEAVE THE THIRD AND FIFTH LEVELS OF STRUT LEDGERS OFF OF ONE GATE UNTIL THE SECOND AND FOURTH LEVELS, RESPECTIVELY, OF LOAD BLOCKING STRUTS HAVE BEEN INSTALLED. WHEN MAKING GATES FOR A LOAD OF LOW-HEIGHT PALLETIZED UNITS, IT MAY BE NECESSARY TO LEAVE ALL BUT THE BOTTOM STRUT LEDGER OFF OF ONE GATE UNTIL THE NEXT LOWER LEVEL OF STRUTS HAS BEEN INSTALLED.
4. AS A MINIMUM, HORIZONTAL PIECES ARE REQUIRED AT OR NEAR THE TOP AND THE BOTTOM OF EACH TIER OF UNITS.
5. ALL STRUT LEDGER HEIGHTS MUST BE LOWERED BY 1-1/4" WHEN 4" X 6" ON-EDGE STRUTS ARE TO BE USED. SEE THE "ALTERNATIVE STRUTTING VIEW A" ON PAGE 57. IF DOUBLED 4" X 4" STRUTS ARE TO BE USED SEE THE "ALTERNATIVE STRUTTING VIEW B" ON PAGE 57.
6. THE CENTER GATES MUST BE CONSTRUCTED ONE-HALF INCH (1/2") LESS IN WIDTH THAN THE MEASURED DISTANCE BETWEEN THE DOOR SPANNER PIECES IF THE DOORWAY PROTECTION PROCEDURES DEPICTED ON PAGE 58 ARE USED IN LIEU OF THE DOORWAY PROTECTION SHOWN IN THE LOAD VIEW ON PAGE 8 AS PIECES MARKED ①, ⑫, AND ⑬, OR IN LIEU OF ANY OF THE ALTERNATIVE METHODS SHOWN ON PAGES 59 AND 60.
7. FOR EASE OF HANDLING, SPLIT GATES, CONSTRUCTED IN ACCORDANCE WITH THE "CENTER GATE F" DETAIL ON PAGE 51, MAY BE USED AS AN ALTERNATIVE TO CENTER GATE B. USE TWO (2) GATES, TIED TOGETHER AS SHOWN BY THE "TIE PIECE APPLICATION A" DETAIL ON PAGE 54.
8. FOR AN ALTERNATIVE METHOD OF CONSTRUCTING THIS GATE SEE THE "PLYWOOD GATE ALTERNATIVE" DETAIL ON PAGE 53.



END VIEW
THIS GATE IS FOR LOADS WHICH ARE ONE (1) UNIT HIGH.

END VIEW
THIS GATE IS FOR LOADS WHICH ARE TWO (2) UNITS HIGH.

END VIEW
THIS GATE IS FOR LOADS WHICH ARE THREE (3) UNITS HIGH.



CENTER GATE C

AN ISOMETRIC VIEW OF A GATE FOR A 2-TIER LOAD IS SHOWN AS TYPICAL.

GATE CONSTRUCTION DIMENSIONAL CHART	
LOCATION IDENTITY	DESCRIPTION FOR POSITIONING LUMBER IN ASSEMBLY
A	DISTANCE BETWEEN CAR SIDEWALL AND CENTER OF PALLET UNIT LENGTH OR WIDTH.
B	PALLET UNIT LENGTH OR WIDTH.
C	11-1/4"
D, F, H	TOP OF TIER.
E, G	11-1/4" ABOVE TOP OF NEXT LOWER TIER.
J	4"
K	7"
L, N, P	4-1/2" BELOW TOP OF TIER.
M, O	7" ABOVE TOP OF NEXT LOWER TIER.

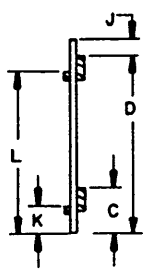
SPECIAL NOTES:

1. THE CENTER GATES SHOWN ON THIS PAGE ARE APPLICABLE FOR USE IN BOX CAR LOADS WHERE THE WIDTH OR LENGTH OF THE UNIT IS PARALLEL WITH THE SIDEWALLS OF A CAR, THE BOXES OVERHANG THE PALLET, AND NO BATTENS ARE USED. THE GATES ARE DESIGNED FOR THE BRACING OF TWO (2) ROWS OF UNITS, ONE AGAINST EACH SIDEWALL. SEE THE TYPICAL LOAD VIEWS ON PAGES 10 AND 12. THE "ISOMETRIC VIEW" ABOVE DEPICTS A GATE FOR A TYPICAL 2-TIER LOAD. THE "END VIEW" SKETCHES BELOW REPRESENT GATES FOR LOADS OF ONE THRU THREE TIERS.
2. THE GATE DIMENSIONS REPRESENTED BY LETTERS ON THE VIEWS ARE SPECIFIED IN THE "GATE CONSTRUCTION DIMENSIONAL CHART" ABOVE, EITHER AS A FIXED FIGURE OR AS A FIGURE BASED UPON THE LENGTH OR HEIGHT OF THE PALLETIZED UNIT BEING LOADED.

(CONTINUED AT RIGHT)

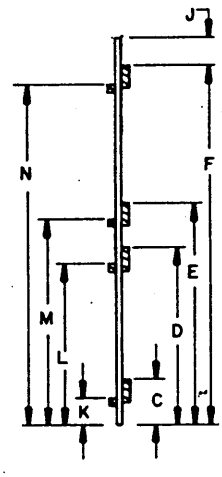
(SPECIAL NOTES CONTINUED)

3. WHEN MAKING A SET OF TWO GATES FOR A LOAD CONSISTING OF TWO OR THREE TIERS OF UNITS, IT WILL BE NECESSARY TO LEAVE THE THIRD AND/OR FIFTH LEVELS OF STRUT LEDGERS OFF OF ONE GATE UNTIL THE SECOND AND/OR FOURTH LEVELS , RESPECTIVELY, OF LOAD BLOCKING STRUTS HAVE BEEN INSTALLED. WHEN MAKING GATES FOR A LOAD OF LOW-HEIGHT PALLETIZED UNITS, IT MAY BE NECESSARY TO LEAVE ALL BUT THE BOTTOM STRUT LEDGER OFF OF ONE GATE UNTIL THE NEXT LOWER LEVEL OF STRUTS HAS BEEN INSTALLED.
4. AS A MINIMUM, HORIZONTAL PIECES ARE REQUIRED AT OR NEAR THE TOP AND THE BOTTOM OF EACH TIER OF UNITS.
5. ALL STRUT LEDGER HEIGHTS MUST BE LOWERED BY 1-1/4" WHEN 4" X 6" ON-EDGE STRUTS ARE TO BE USED. SEE "ALTERNATIVE STRUTTING VIEW A" ON PAGE 57. IF DOUBLED 4" X 4" STRUTS ARE TO BE USED SEE THE "ALTERNATIVE STRUTTING VIEW B" ON PAGE 57.
6. THE CENTER GATES MUST BE CONSTRUCTED ONE-HALF INCH (1/2") LESS IN WIDTH THAN THE MEASURED DISTANCE BETWEEN THE DOOR SPANNER PIECES IF THE DOORWAY PROTECTION PROCEDURES DEPICTED ON PAGE 58 ARE USED IN LIEU OF THE DOORWAY PROTECTION SHOWN IN THE LOAD VIEW ON PAGE 10 AS PIECES MARKED ③ , ⑩ , AND ⑪ , OR IN LIEU OF ANY OF THE ALTERNATIVE METHODS SHOWN ON PAGES 59 AND 60.
7. FOR EASE OF HANDLING, SPLIT GATES, CONSTRUCTED IN ACCORDANCE WITH THE "CENTER GATE F" DETAIL ON PAGE 51 MAY BE USED AS AN ALTERNATIVE TO CENTER GATE C. USE TWO (2) GATES, TIED TOGETHER AS SHOWN BY THE "TIE PIECE APPLICATION A" DETAIL ON PAGE 54.
8. FOR AN ALTERNATIVE METHOD OF CONSTRUCTING THIS GATE SEE THE "PLYWOOD GATE ALTERNATIVE" DETAIL ON PAGE 53.



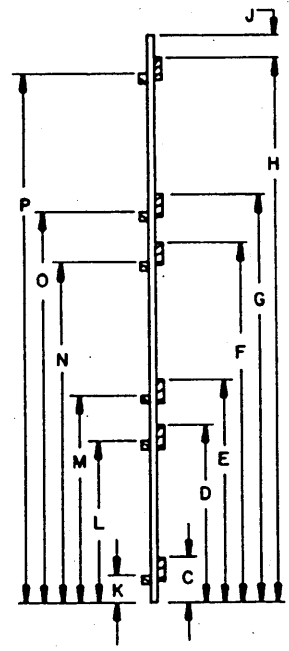
END VIEW

THIS GATE IS FOR LOADS WHICH ARE ONE (1) UNIT HIGH.



END VIEW

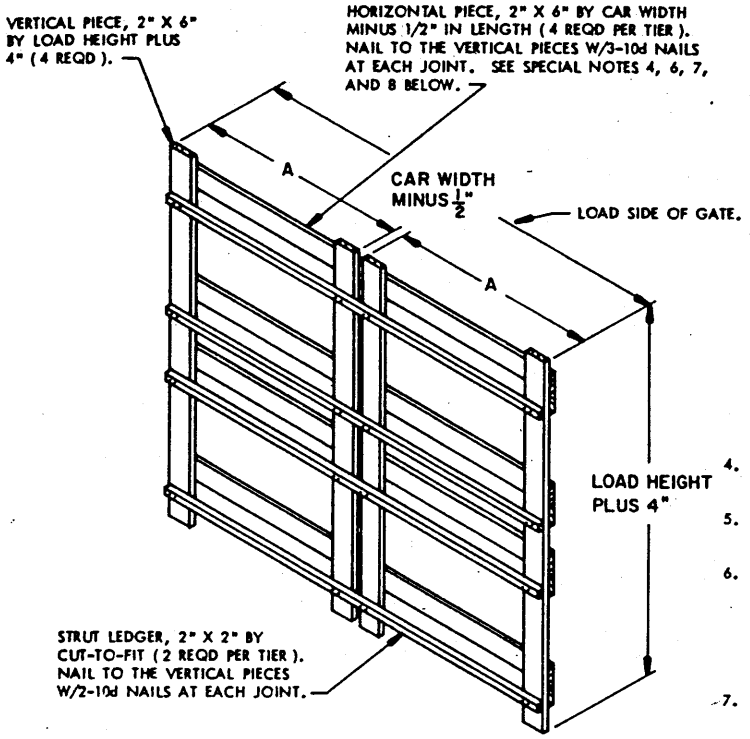
THIS GATE IS FOR LOADS WHICH ARE TWO (2) UNITS HIGH.



END VIEW

THIS GATE IS FOR LOADS WHICH ARE THREE (3) UNITS HIGH.

CENTER GATE C



CENTER GATE D

AN ISOMETRIC VIEW OF A GATE FOR A 3-TIER LOAD IS SHOWN AS TYPICAL.

GATE CONSTRUCTION DIMENSIONAL CHART	
LOCATION IDENTITY	DESCRIPTION FOR POSITIONING LUMBER IN ASSEMBLY
A	PALLET UNIT WIDTH OR LENGTH.
B	17"
C, E, G	TOP OF TIER.
D, F	17" ABOVE TOP OF NEXT LOWER TIER.
H	4"
J	8"
K, M, O	9" BELOW TOP OF TIER.
L, N	17" ABOVE TOP OF NEXT LOWER TIER.

SPECIAL NOTES:

1. THE CENTER GATES SHOWN ON THIS PAGE ARE APPLICABLE FOR USE IN BOX CAR LOADS WHERE THE WIDTH OR LENGTH OF THE UNIT IS PARALLEL WITH THE SIDEWALLS OF A CAR. THE GATES ARE DESIGNED FOR THE BRACING OF TWO (2) ROWS OF UNITS, ONE AGAINST EACH SIDEWALL. SEE THE TYPICAL LOAD VIEW ON PAGE 20. THE "ISOMETRIC VIEW" ABOVE DEPICTS A GATE FOR A TYPICAL 2-TIER LOAD. THE "END VIEW" SKETCHES BELOW REPRESENT GATES FOR LOADS OF ONE THRU THREE TIERS.
2. THE GATE DIMENSIONS REPRESENTED BY LETTERS ON THE VIEWS ARE SPECIFIED IN THE "GATE CONSTRUCTION DIMENSIONAL CHART" ABOVE, EITHER AS A FIXED FIGURE OR AS A FIGURE BASED UPON THE LENGTH, WIDTH OR HEIGHT OF THE PALLETIZED UNIT BEING LOADED.
3. WHEN MAKING A SET OF TWO GATES FOR A LOAD CONSISTING OF TWO OR THREE TIERS OF UNITS, IT WILL BE NECESSARY TO LEAVE THE THIRD AND/OR FIFTH LEVEL OF STRUT LEDGERS OFF OF ONE GATE UNTIL THE SECOND AND/OR FOURTH LEVELS, RESPECTIVELY, OF LOAD BLOCKING STRUTS HAVE BEEN INSTALLED. WHEN MAKING GATES FOR A LOAD OF LOW-HEIGHT PALLETIZED UNITS, IT MAY BE NECESSARY TO LEAVE ALL BUT THE BOTTOM STRUT LEDGER OFF OF ONE GATE UNTIL THE NEXT LOWER LEVEL OF STRUTS HAS BEEN INSTALLED.

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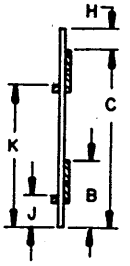
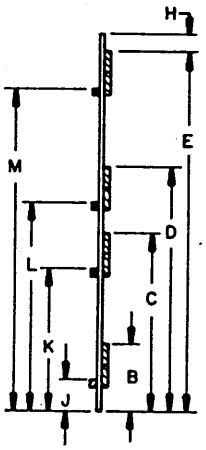
(SPECIAL NOTES CONTINUED)

4. AS A MINIMUM, HORIZONTAL PIECES ARE REQUIRED AT OR NEAR THE TOP AND THE BOTTOM OF EACH TIER OF UNITS.
5. THIS GATE IS FOR HEAVY LOADS REQUIRING THE USE OF DOUBLED 4" X 4" STRUTS. SEE THE "ALTERNATIVE STRUTTING VIEW B" ON PAGE 57.
6. THE CENTER GATES MUST BE CONSTRUCTED ONE-HALF INCH (1/2") LESS IN WIDTH THAN THE MEASURED DISTANCE BETWEEN THE DOOR SPANNER PIECES IF THE DOORWAY PROTECTION PROCEDURES DEPICTED ON PAGE 58 ARE USED IN LIEU OF THE DOORWAY PROTECTION SHOWN IN THE LOAD VIEW ON PAGE 20 AS PIECES MARKED ⑧ AND ⑨, OR IN LIEU OF ANY OF THE ALTERNATIVE METHODS SHOWN ON PAGES 59 AND 60.
7. FOR EASE OF HANDLING, SPLIT GATES, CONSTRUCTED IN ACCORDANCE WITH THE "CENTER GATE F" DETAIL ON PAGE 51, MAY BE USED AS AN ALTERNATIVE TO CENTER GATE D. USE TWO (2) GATES, TIED TOGETHER SIMILAR TO THE PROCEDURES SHOWN BY THE "TIE PIECE APPLICATION A" DETAIL ON PAGE 54.
8. FOR AN ALTERNATIVE METHOD OF CONSTRUCTING THIS GATE SEE THE "PLYWOOD GATE ALTERNATIVE" DETAIL ON PAGE 53.
9. IF THE ANTI-SWAY BRACE C ASSEMBLIES AS DETAILED ON PAGE 65, ARE USED FOR LATERAL BRACING OF A LOAD IN LIEU OF THE ANTI-SWAY BRACE A ASSEMBLIES SPECIFIED, RETAINER PIECES MUST BE ADDED TO EACH CENTER GATE TO PREVENT DISPLACEMENT OF THE BRACES. SEE THE "TYPICAL INSTALLATION OF ANTI-SWAY BRACE RETAINER" DETAIL ON PAGE 65. NOTE THAT RETAINER PIECES ARE NOT REQUIRED WHEN PLYWOOD-FACED CENTER GATES ARE USED.
10. IF TRIPLED 2" X 6" STRUTS ARE TO BE USED IN LIEU OF THE SPECIFIED DOUBLED 4" X 4" MATERIAL, ALL THE STRUT LEDGERS MUST BE RAISED BY 1-1/4".



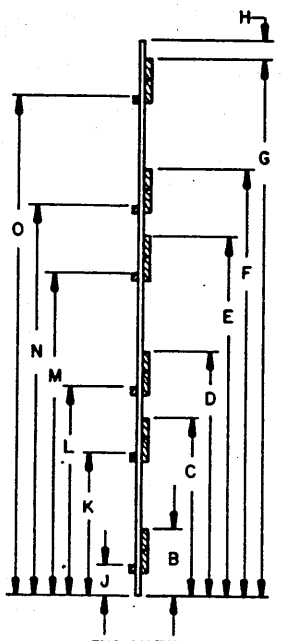
END VIEW

THIS GATE IS FOR LOADS WHICH ARE ONE (1) UNIT HIGH.



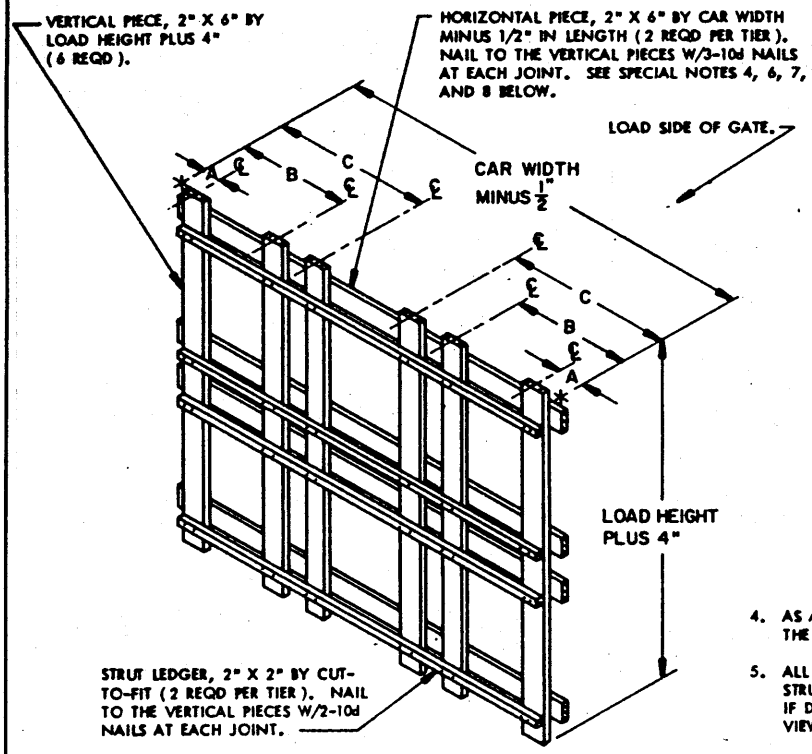
END VIEW

THIS GATE IS FOR LOADS WHICH ARE TWO (2) UNITS HIGH.



END VIEW

THIS GATE IS FOR LOADS WHICH ARE THREE (3) UNITS HIGH.



CENTER GATE E

AN ISOMETRIC VIEW OF A GATE FOR A 2-TIER LOAD IS SHOWN AS TYPICAL.

GATE CONSTRUCTION DIMENSIONAL CHART	
LOCATION IDENTITY	DESCRIPTION FOR POSITIONING LUMBER IN ASSEMBLY
A	6"
B	PALLET UNIT LENGTH MINUS 6".
C	PALLET UNIT LENGTH PLUS 6".
D	11-1/4"
E, G, J	TOP OF TIER.
F, H	11-1/4" ABOVE TOP OF NEXT LOWER TIER.
K	4"
L	7"
M, O, Q	4-1/2" BELOW TOP OF TIER.
N, P	7" ABOVE TOP OF NEXT LOWER TIER.

SPECIAL NOTES:

1. THE CENTER GATES SHOWN ON THIS PAGE ARE APPLICABLE FOR USE IN BOX CAR LOADS WHERE THE WIDTH OF THE UNIT IS PARALLEL WITH THE SIDEWALLS OF A CAR. THE GATES ARE DESIGNED FOR THE BRACING OF THREE (3) ROWS OF UNITS. SEE THE TYPICAL LOAD VIEW ON PAGE 14. THE "ISOMETRIC VIEW" ABOVE DEPICTS A GATE FOR A TYPICAL 2-TIER LOAD. THE "END VIEW" SKETCHES BELOW REPRESENT GATES FOR LOADS OF ONE THRU THREE TIERS.
2. THE GATE DIMENSIONS REPRESENTED BY LETTERS ON THE VEWS ARE SPECIFIED IN THE "GATE CONSTRUCTION DIMENSIONAL CHART" ABOVE, EITHER AS A FIXED FIGURE OR AS A FIGURE BASED UPON THE WIDTH OR HEIGHT OF THE PALLETIZED UNIT BEING LOADED.
3. WHEN MAKING A SET OF TWO GATES FOR A LOAD CONSISTING OF TWO OR THREE TIERS OF UNITS, IT WILL BE NECESSARY TO LEAVE THE THIRD AND/OR FIFTH LEVELS OF STRUT LEDGERS OFF OF ONE GATE UNTIL THE SECOND AND/OR FOURTH LEVELS, RESPECTIVELY, OF LOAD BLOCKING STRUTS HAVE BEEN INSTALLED. WHEN MAKING GATES FOR A LOAD OF LOW-HEIGHT PALLETIZED UNITS, IT MAY BE NECESSARY TO LEAVE ALL BUT THE BOTTOM STRUT LEDGER OFF OF ONE GATE UNTIL THE NEXT LOWER LEVEL OF STRUTS HAS BEEN INSTALLED.

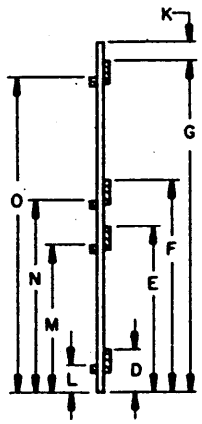
(CONTINUED AT RIGHT)

(SPECIAL NOTES CONTINUED)

4. AS A MINIMUM, HORIZONTAL PIECES ARE REQUIRED AT OR NEAR THE TOP AND THE BOTTOM OF EACH TIER OF UNITS.
5. ALL STRUT LEDGER HEIGHTS MUST BE LOWERED BY 1-1/4" WHEN 4" X 6" ON-EDGE STRUTS ARE TO BE USED. SEE THE "ALTERNATIVE STRUTTING VIEW A" ON PAGE 57. IF DOUBLED 4" X 4" STRUTS ARE TO BE USED SEE THE "ALTERNATIVE STRUTTING VIEW B" ON PAGE 57.
6. THE CENTER GATES MUST BE CONSTRUCTED ONE-HALF INCH (1/2") LESS IN WIDTH THAN THE MEASURED DISTANCE BETWEEN THE DOOR SPANNER PIECES IF THE DOORWAY PROTECTION PROCEDURES DEPICTED ON PAGE 58 ARE USED IN LIEU OF THE DOORWAY PROTECTION SHOWN IN THE LOAD VIEW ON PAGE 12 AS PIECES MARKED ⑥, ⑦, AND ⑧, OR IN LIEU OF ANY OF THE ALTERNATIVE METHODS SHOWN ON PAGES 59 AND 60.
7. FOR EASE OF HANDLING, SPLIT GATES, CONSTRUCTED IN ACCORDANCE WITH THE "CENTER GATE F" DETAIL ON PAGE 51 MAY BE USED AS AN ALTERNATIVE TO CENTER GATE E. USE TWO (2) GATES, TIED TOGETHER SIMILAR TO THE PROCEDURES SHOWN BY THE "TIE PIECE APPLICATION A" DETAIL ON PAGE 54.
8. FOR AN ALTERNATIVE METHOD OF CONSTRUCTING THIS GATE SEE THE "PLYWOOD GATE ALTERNATIVE" DETAIL ON PAGE 53.

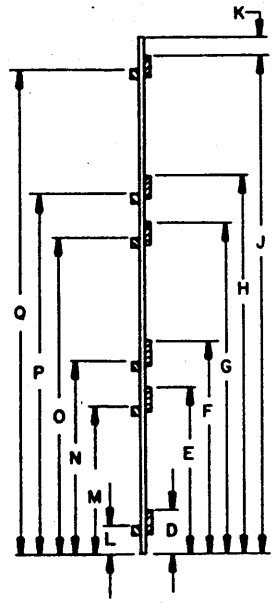
END VIEW

THIS GATE IS FOR LOADS WHICH ARE ONE (1) UNIT HIGH.



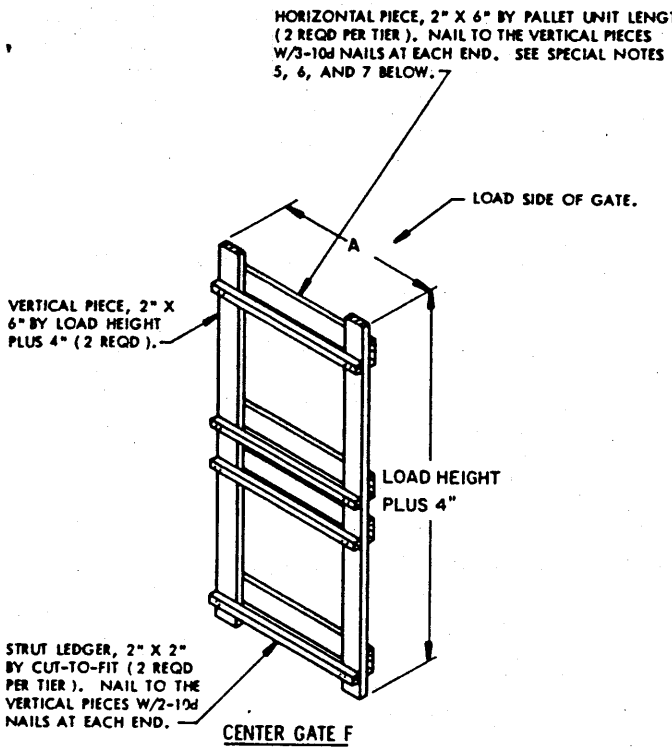
END VIEW

THIS GATE IS FOR LOADS WHICH ARE TWO (2) UNITS HIGH.



END VIEW

THIS GATE IS FOR LOADS WHICH ARE THREE (3) UNITS HIGH.



CENTER GATE F

AN ISOMETRIC VIEW OF A GATE FOR A 2-TIER LOAD IS SHOWN AS TYPICAL.

GATE CONSTRUCTION DIMENSIONAL CHART	
LOCATION IDENTITY	DESCRIPTION FOR POSITIONING LUMBER IN ASSEMBLY
A	LENGTH OF PALLET UNIT.
B	11-1/4"
C, E, G	TOP OF TIER.
D, F	11-1/4" ABOVE TOP OF NEXT LOWER TIER.
H	4"
J	7"
K, M, O	4-1/2" BELOW TOP OF TIER.
L, N	7" ABOVE TOP OF NEXT LOWER TIER.

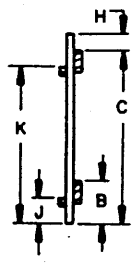
SPECIAL NOTES:

1. THE CENTER GATES SHOWN ON THIS PAGE ARE APPLICABLE FOR USE IN BOX CAR LOADS WHERE THE WIDTH OF A UNIT IS PARALLEL WITH THE SIDEWALLS OF A CAR. THE "ISOMETRIC VIEW" ABOVE DEPICTS A GATE FOR A TYPICAL 2-TIER LOAD. THE "END VIEW" SKETCHES BELOW REPRESENT GATES FOR LOADS OF ONE THRU THREE TIERS.
2. CENTER GATE F IS A "SPLIT" GATE AND IS DESIGNED FOR THE BRACING OF ONE (1) ROW OF UNITS. TWO (2) GATES MAY BE USED AS AN ALTERNATIVE TO EACH CENTER GATE. TIE THE GATES TOGETHER AS SHOWN BY THE "TIE PIECE APPLICATION A" DETAIL ON PAGE 54. THREE (3) GATES MAY BE USED AS AN ALTERNATIVE TO EACH CENTER GATE E WHICH IS DETAILED ON PAGE 50. TIE THE GATES TOGETHER AS SHOWN BY THE "TIE PIECE APPLICATION B" DETAIL ON PAGE 54.
3. THE GATE DIMENSIONS REPRESENTED BY LETTERS ON THE VIEWS ARE SPECIFIED IN THE "GATE CONSTRUCTION DIMENSIONAL CHART" ABOVE, EITHER AS A FIXED FIGURE OR AS A FIGURE BASED UPON THE LENGTH OR HEIGHT OF THE PALLETIZED UNIT BEING LOADED.

(CONTINUED AT RIGHT)

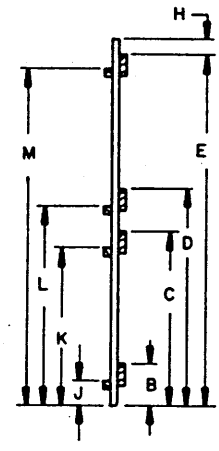
(SPECIAL NOTES CONTINUED)

4. WHEN MAKING A SET OF TWO GATES FOR A LOAD CONSISTING OF TWO OR MORE TIERS, IT WILL BE NECESSARY TO LEAVE THE THIRD, AND/OR FIFTH LEVELS OF STRUT LEDGERS OFF OF ONE GATE UNTIL THE SECOND AND/OR FOURTH LEVELS, RESPECTIVELY, OF LOAD BLOCKING STRUTS HAVE BEEN INSTALLED. WHEN MAKING GATES FOR A LOAD OF LOW-HEIGHT PALLETIZED UNITS, IT MAY BE NECESSARY TO LEAVE ALL BUT THE BOTTOM STRUT LEDGER OFF OF ONE GATE UNTIL THE NEXT LOWER LEVEL OF STRUTS HAS BEEN INSTALLED.
5. AS A MINIMUM, HORIZONTAL PIECES ARE REQUIRED AT OR NEAR THE TOP AND THE BOTTOM OF EACH TIER OF UNITS.
6. ALL STRUT LEDGER HEIGHTS MUST BE LOWERED BY 1-1/4" WHEN 4" X 6" ON-EDGE STRUTS ARE TO BE USED. SEE THE "ALTERNATIVE STRUTTING VIEW A" DETAIL ON PAGE 57. IF DOUBLED 4" X 4" STRUTS ARE TO BE USED SEE THE "ALTERNATIVE STRUTTING VIEW B" DETAIL ON PAGE 57.
7. FOR AN ALTERNATIVE METHOD OF CONSTRUCTING THIS GATE SEE THE "PLYWOOD GATE ALTERNATIVE" DETAIL ON PAGE 53.



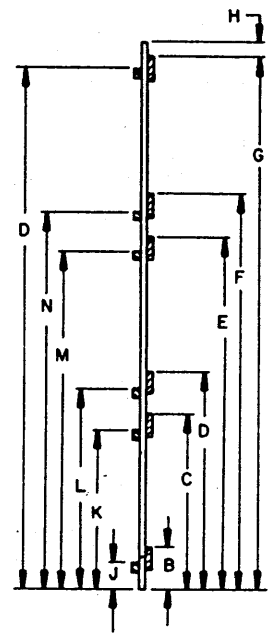
END VIEW

THIS GATE IS FOR LOADS WHICH ARE ONE (1) UNIT HIGH.



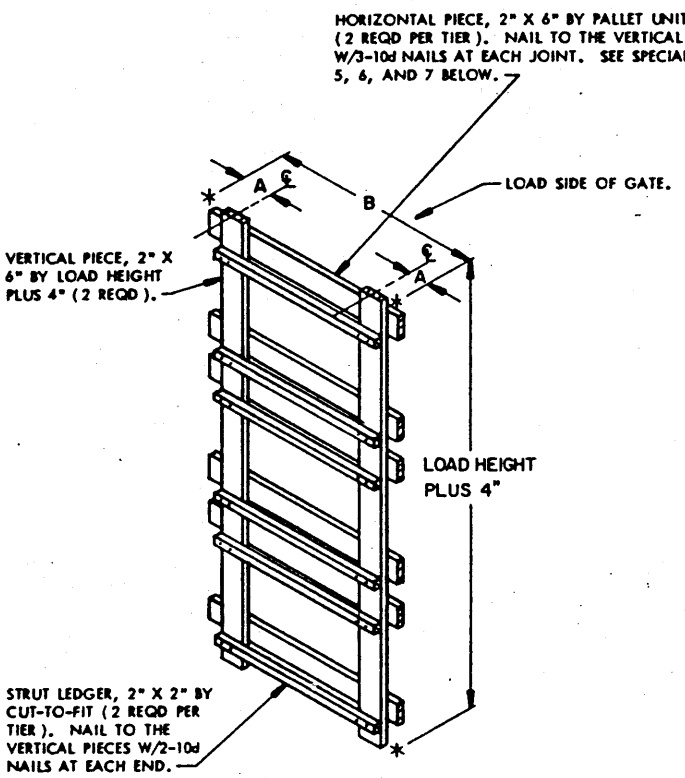
END VIEW

THIS GATE IS FOR LOADS WHICH ARE TWO (2) UNITS HIGH.



END VIEW

THIS GATE IS FOR LOADS WHICH ARE THREE (3) UNITS HIGH.



CENTER GATE G

AN ISOMETRIC VIEW OF A GATE FOR A 3-TIER LOAD IS SHOWN AS TYPICAL.

GATE CONSTRUCTION DIMENSIONAL CHART	
LOCATION IDENTITY	DESCRIPTION FOR POSITIONING LUMBER IN ASSEMBLY
A	DISTANCE BETWEEN CAR SIDEWALL AND CENTER OF OUTSIDE PALLET POST OR BATTENS.
B	WIDTH OF PALLET UNIT.
C	11-1/4"
D, F, H	TOP OF TIER.
E, G	11-1/4" ABOVE TOP OF NEXT LOWER TIER.
J	4"
K	7"
L, N, P	4-1/2" BELOW TOP OF TIER.
M, O	7" ABOVE TOP OF NEXT LOWER TIER.

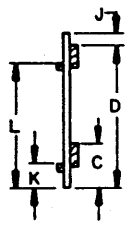
SPECIAL NOTES:

1. THE CENTER GATES SHOWN ON THIS PAGE ARE APPLICABLE FOR USE IN BOX CAR LOADS WHERE THE LENGTH OF THE UNIT IS PARALLEL WITH THE SIDEWALLS OF A CAR. THE "ISOMETRIC VIEW" ABOVE DEPICTS A GATE FOR A TYPICAL 3-TIER LOAD. THE "END VIEW" SKETCHES BELOW REPRESENT GATES FOR LOADS OF ONE THRU THREE TIERS.
2. CENTER GATE G IS A "SPLIT" GATE AND IS DESIGNED FOR THE BRACING OF ONE (1) ROW OF UNITS. TWO (2) GATES MAY BE USED AS AN ALTERNATIVE TO EACH CENTER GATE. TIE THE GATES TOGETHER AS SHOWN BY THE "TIE PIECE APPLICATION A" DETAIL ON PAGE 54. THREE (3) GATES MAY BE USED AS AN ALTERNATIVE TO EACH CENTER GATE E WHICH IS DETAILED ON PAGE 50. TIE THE GATES TOGETHER AS SHOWN BY THE "TIE PIECE APPLICATION B" DETAIL ON PAGE 54.
3. THE GATE DIMENSIONS REPRESENTED BY LETTERS ON THE VIEWS ARE SPECIFIED IN THE "GATE CONSTRUCTION DIMENSIONAL CHART" ABOVE, EITHER AS A FIXED FIGURE OR AS A FIGURE BASED UPON THE LENGTH OR HEIGHT OF THE PALLETIZED UNIT BEING LOADED.
4. WHEN MAKING A SET OF TWO GATES FOR A LOAD CONSISTING OF TWO OR MORE TIERS, IT WILL BE NECESSARY TO LEAVE THE THIRD AND/OR FIFTH LEVELS OF STRUT LEDGERS OFF OF ONE GATE UNTIL THE SECOND AND/OR FOURTH LEVELS, RESPECTIVELY, OF LOAD BLOCKING STRUTS HAVE BEEN INSTALLED. WHEN MAKING GATES FOR A LOAD OF LOW-HEIGHT PALLETIZED UNITS, IT MAY BE NECESSARY TO LEAVE ALL BUT THE BOTTOM STRUT LEDGER OFF OF ONE GATE UNTIL THE NEXT LOWER LEVEL OF STRUTS HAS BEEN INSTALLED.

(CONTINUED AT RIGHT)

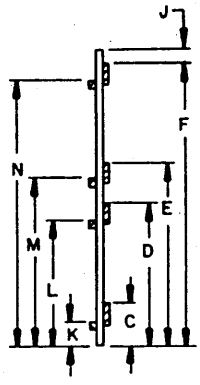
(SPECIAL NOTES CONTINUED)

5. AS A MINIMUM, HORIZONTAL PIECES ARE REQUIRED AT OR NEAR THE TOP AND THE BOTTOM OF EACH TIER OF UNITS.
6. ALL STRUT LEDGER HEIGHTS MUST BE LOWERED BY 1-1/4" WHEN 4" X 6" ON-EDGE STRUTS ARE TO BE USED. SEE "ALTERNATIVE STRUTTING VIEW A" ON PAGE 57. IF DOUBLED 4" X 4" STRUTS ARE TO BE USED SEE THE "ALTERNATIVE STRUTTING VIEW B" ON PAGE 57.
7. FOR AN ALTERNATIVE METHOD OF CONSTRUCTING THIS GATE SEE THE "PLYWOOD GATE ALTERNATIVE" DETAIL ON PAGE 53.



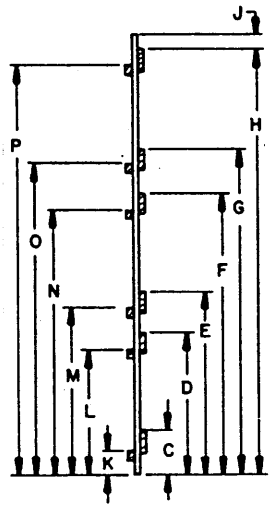
END VIEW

THIS GATE IS FOR LOADS WHICH ARE ONE (1) UNIT HIGH.



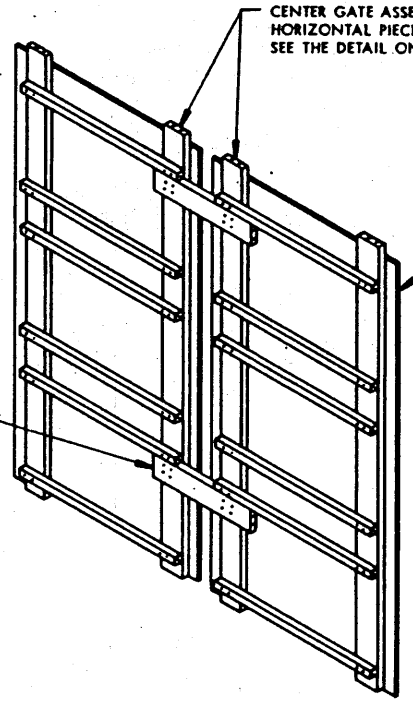
END VIEW

THIS GATE IS FOR LOADS WHICH ARE TWO (2) UNITS HIGH.



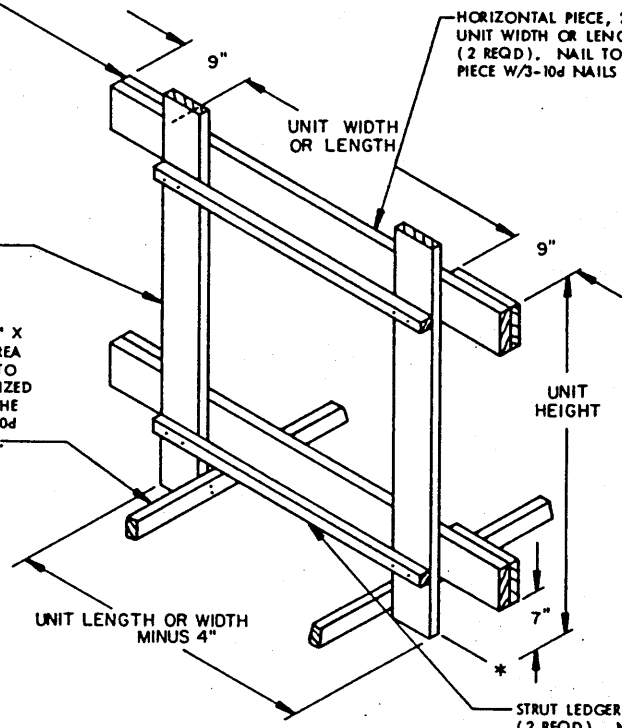
END VIEW

THIS GATE IS FOR LOADS WHICH ARE THREE (3) UNITS HIGH.



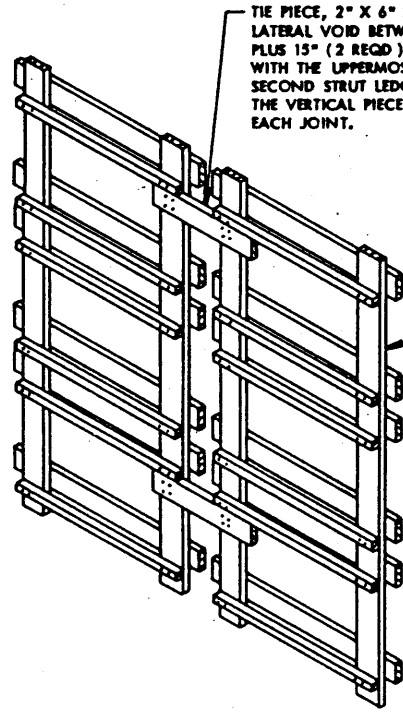
PLYWOOD GATE ALTERNATIVE

CENTER GATE ASSEMBLY G IS SHOWN AS TYPICAL. PLYWOOD MAY BE USED IN LIEU OF THE HORIZONTAL PIECES ON ANY CENTER GATE OR SEPARATOR GATE. FOR EASE OF HANDLING, SPLIT GATES, CONSTRUCTED SIMILAR TO THE ONE SHOWN ABOVE WILL BE USED.



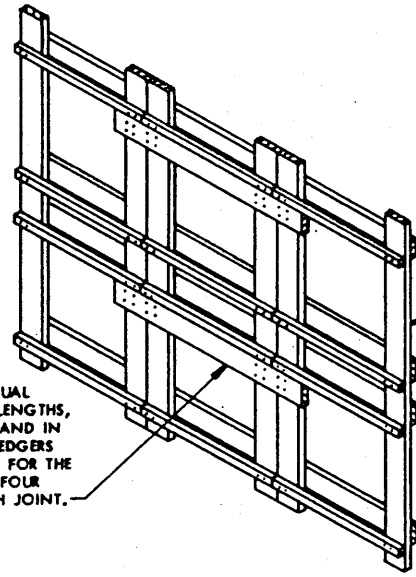
LCL CENTER GATE

SEE THE "PARTIAL PLAN VIEW" ON PAGE 37. IF MORE THAN FOUR (4) STRUTS ARE REQUIRED DUE TO THE WEIGHT OF THE UNIT, A THIRD VERTICAL PIECE MAY BE ADDED.



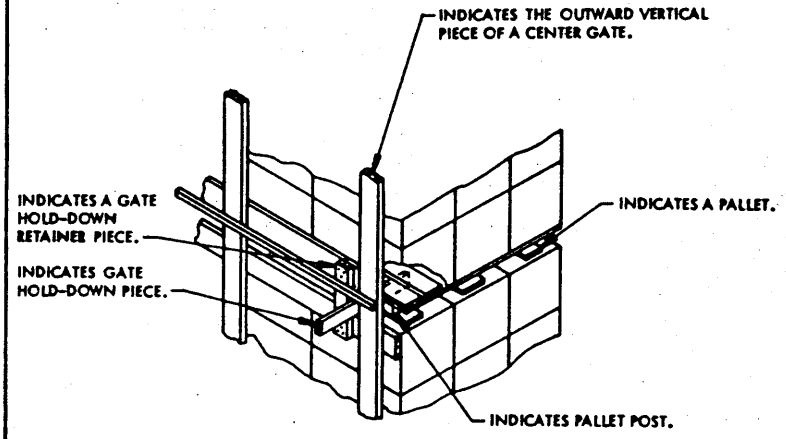
TIE PIECE APPLICATION A

THIS PROCEDURE IS APPLICABLE FOR USE WITH TWO CENTER GATES F OR WITH TWO CENTER GATES G. NOTE THAT THE TIE PIECES SHOULD BE APPLIED AFTER THE GATES AND STRUTS HAVE BEEN INSTALLED.



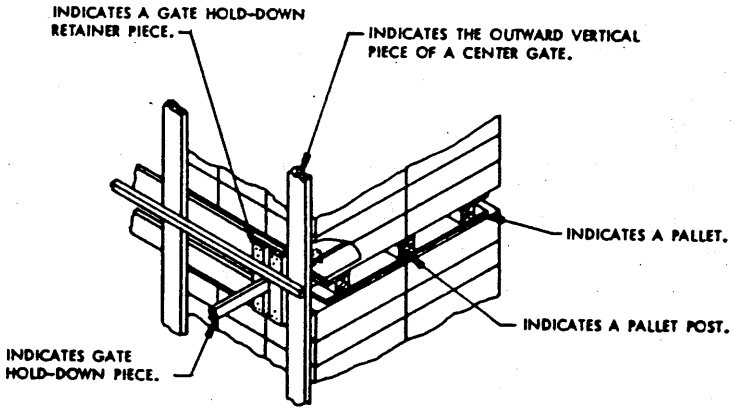
TIE PIECE APPLICATION B

THIS PROCEDURE IS APPLICABLE FOR USE WITH THREE CENTER GATES F. NOTE THAT THE TIE PIECES SHOULD BE APPLIED AFTER THE GATES AND STRUTS HAVE BEEN INSTALLED.



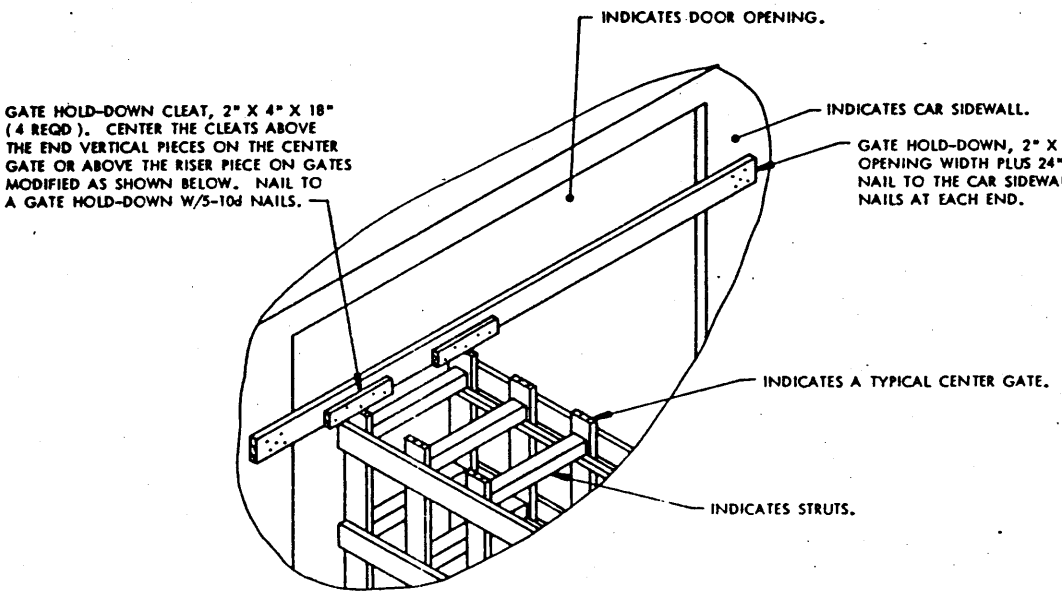
INSTALLATION OF GATE HOLD-DOWN A

THIS VIEW DEPICTS A GATE HOLD-DOWN INSTALLED UNDER A PALLETIZED UNIT AND UTILIZING THE VERTICAL PIECE OF A CENTER GATE AND A RETAINER PIECE TO HOLD THE HORIZONTAL PIECE IN POSITION. IF THE OUTWARD VERTICAL PIECE ON THE CENTER GATE IS LOCATED IN SUCH A MANNER THAT THE PALLET POST INTERFERES WITH THE PLACEMENT OF THE GATE HOLD-DOWN PIECE SEE THE "INSTALLATION OF GATE HOLD-DOWN B" BELOW. FOR AN ALTERNATIVE METHOD SEE THE "ALTERNATIVE GATE HOLD-DOWN" DETAIL ON PAGE 56.



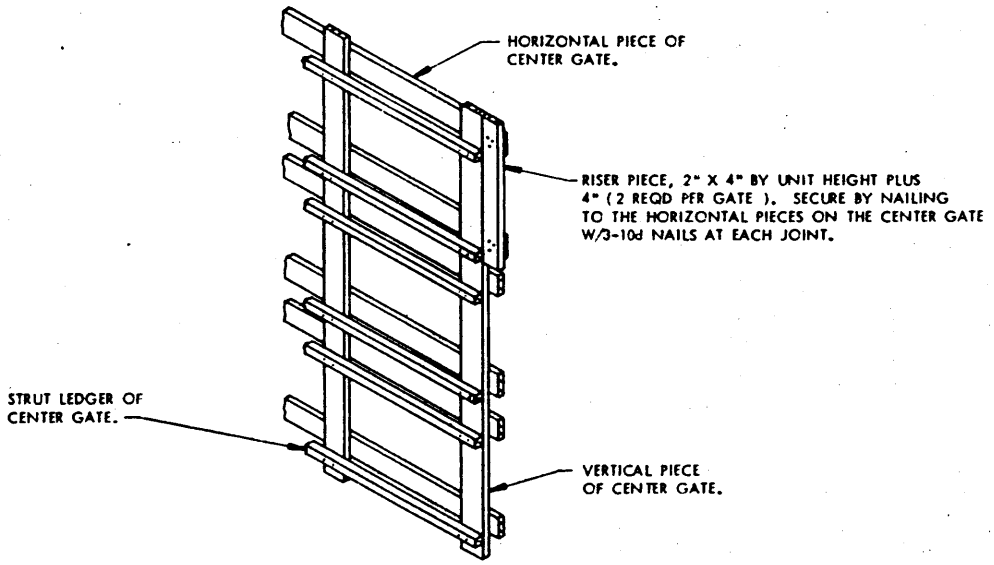
INSTALLATION OF GATE HOLD-DOWN B

THIS VIEW DEPICTS A GATE HOLD-DOWN INSTALLED UNDER A PALLETIZED UNIT AND UTILIZING TWO RETAINER PIECES TO HOLD THE HORIZONTAL PIECE IN POSITION. THIS PROCEDURE IS USED WHEN THE OUTWARD VERTICAL PIECE ON THE CENTER GATE IS LOCATED IN SUCH A MANNER THAT THE PALLET POST INTERFERES WITH THE PLACEMENT OF THE GATE HOLD-DOWN PIECE. FOR AN ALTERNATIVE METHOD SEE THE "ALTERNATIVE GATE HOLD-DOWN" DETAIL ON PAGE 56.



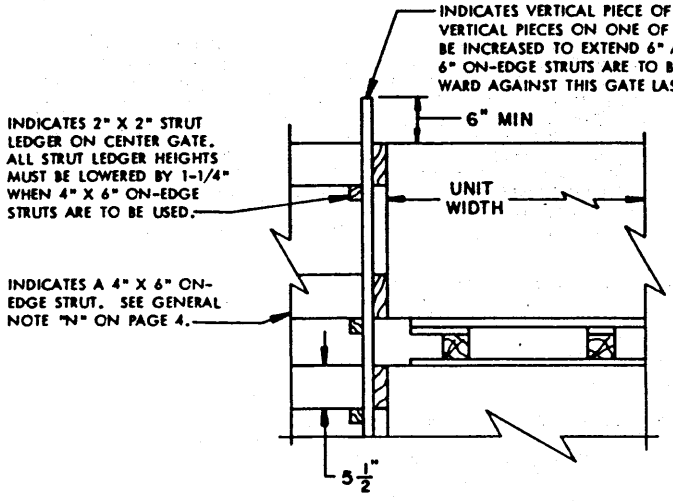
ALTERNATIVE GATE HOLD-DOWN

THIS VIEW DEPICTS AN ALTERNATIVE METHOD OF CENTER GATE HOLD-DOWN WHICH CAN BE USED IF DESIRED. THIS METHOD MAY BE APPLIED IN LIEU OF USING THE GATE HOLD-DOWN ASSEMBLIES DETAILED ON PAGE 55. NOTE: FOR GATES NOT LOCATED IN THE DOORWAY AREA THE GATE HOLD-DOWN CLEAT MAY BE DOUBLED AND NAILED TO THE CAR SIDEWALL AS SHOWN BY PIECE MARKED (10) ON PAGE 21.



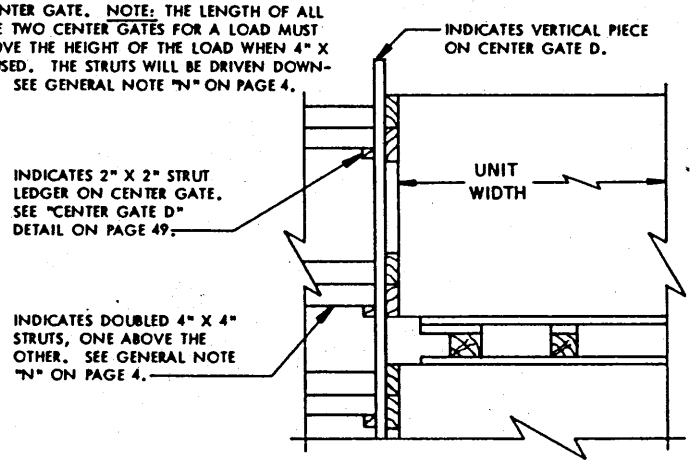
CENTER GATE MODIFICATION

THE MODIFICATION PROCEDURES SHOWN IN THIS VIEW ARE APPLICABLE FOR THE CENTER GATES WHICH HAVE THE VERTICAL PIECES INSET FROM THE END OF THE HORIZONTAL PIECES AS SHOWN ABOVE. THE RISER PIECE WILL PROVIDE A MEANS FOR CONTACTING THE GATE WITH THE GATE HOLD-DOWN AS SHOWN IN THE "ALTERNATIVE GATE HOLD-DOWN" DETAIL AT THE TOP OF THIS PAGE.



ALTERNATIVE STRUTTING VIEW A

APPLICABLE FOR ALL CENTER GATES EXCEPT D. IN THE VIEW ABOVE THE CENTER GATE IS POSITIONED AGAINST THE UNIT LENGTH, HOWEVER, THE SAME METHODS WILL BE USED WHEN THE CENTER GATE IS POSITIONED AGAINST THE UNIT WIDTH.



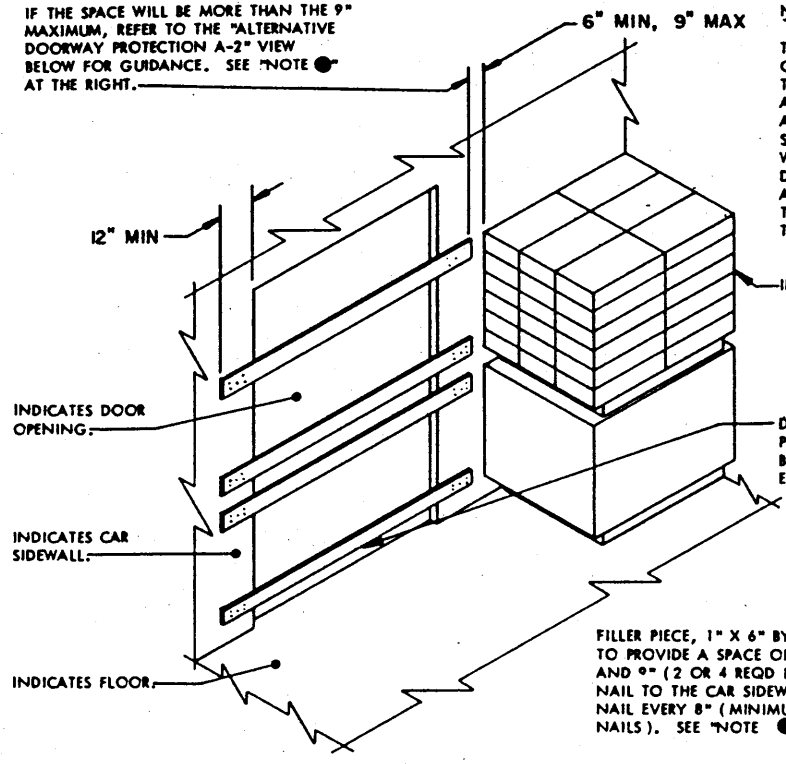
ALTERNATIVE STRUTTING VIEW B

APPLICABLE FOR CENTER GATE D ONLY. IN THE VIEW ABOVE THE CENTER GATE IS POSITIONED AGAINST THE UNIT LENGTH, HOWEVER, THE SAME METHODS WILL BE USED WHEN THE CENTER GATE IS POSITIONED AGAINST THE UNIT WIDTH.

STRUTTING REQUIREMENTS BASED ON FOUR (4) STRUTS PER EACH ROW			
NUMBER OF LOAD UNITS IN THE LONG END OF THE ROW	MAXIMUM WEIGHT PER PALLETIZED UNIT USING FOUR SINGLE 4" X 4" STRUTS	MAXIMUM WEIGHT PER PALLETIZED UNIT USING FOUR 4" X 6" ON-EDGE STRUTS	MAXIMUM WEIGHT PER PALLETIZED UNIT USING FOUR DOUBLED 4" X 4" STRUTS
9	1,361 LBS	2,139 LBS	2,722 LBS
8	1,513 LBS	2,406 LBS	3,026 LBS
7	1,750 LBS	2,750 LBS	3,500 LBS
6	2,042 LBS	3,208 LBS	4,084 LBS
5	2,450 LBS	3,850 LBS	4,900 LBS
4	3,062 LBS	4,812 LBS	6,126 LBS

NUMBER OF LOAD UNITS IN THE LONG END OF THE ROW	MAXIMUM WEIGHT PER PALLETIZED UNIT USING FOUR DOUBLED 2" X 6" STRUTS	MAXIMUM WEIGHT PER PALLETIZED UNIT USING FOUR TRIPLED 2" X 6" STRUTS
9	1,833 LBS	2,750 LBS
8	2,062 LBS	3,093 LBS
7	2,357 LBS	3,535 LBS
6	2,750 LBS	4,125 LBS
5	3,300 LBS	4,950 LBS
4	4,125 LBS	6,187 LBS

IF THE SPACE WILL BE MORE THAN THE 9" MAXIMUM, REFER TO THE "ALTERNATIVE DOORWAY PROTECTION A-2" VIEW BELOW FOR GUIDANCE. SEE "NOTE ●" AT THE RIGHT.

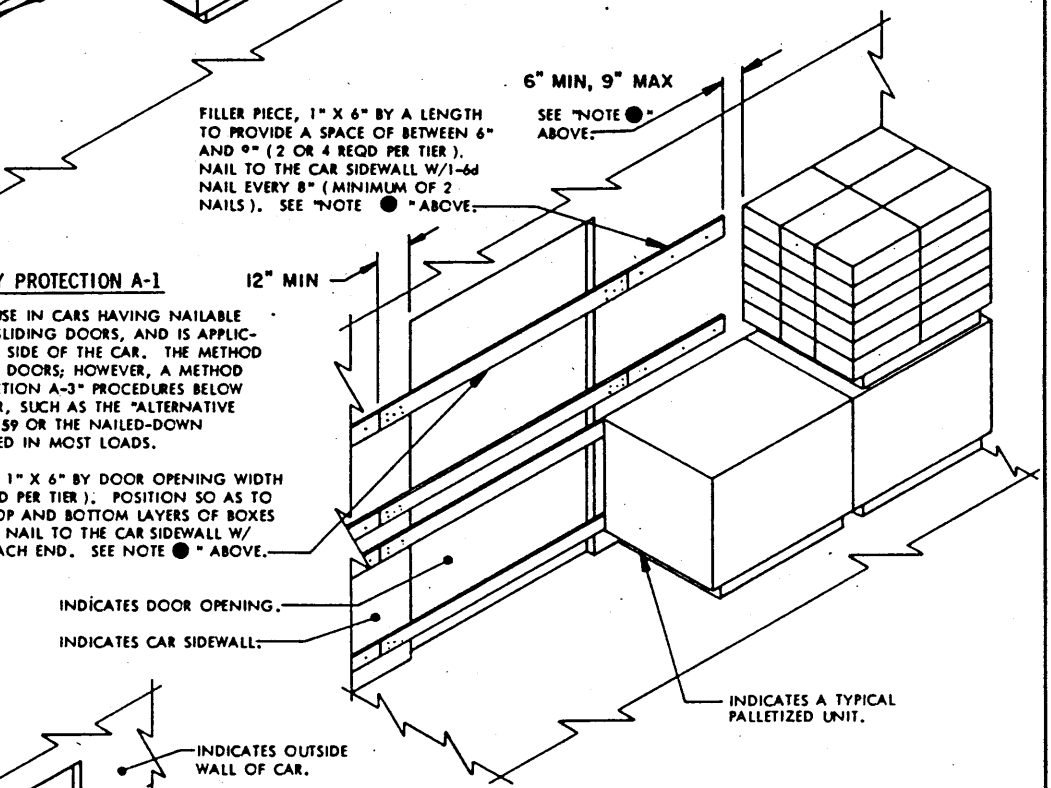


NOTE ●:

THE TOLERANCE DIMENSION (6" MIN, 9" MAX) IS ALLOWED TO PROVIDE FOR CLEARANCE DURING THE NORMAL LONGITUDINAL SHIFTING OF A LOAD IN TRANSIT, AND IS APPLICABLE WHEN ANTI-SWAY BRACING IS USED FOR A LOAD AND ALSO WHEN THE EXCESS SPACE ACROSS THE CAR IS SMALL ENOUGHT THAT ANTI-SWAY BRACING OF ANY KIND IS NOT REQUIRED. IF AN EXCESS LATERAL SPACE IS FILLED BY NAILING LUMBER TO THE CAR SIDEWALL, THE DOOR SPANNERS WILL BE POSITIONED TO BUTT AGAINST THE FILL MATERIAL AND THE TOLERANCE DIMENSION WILL NOT APPLY. ALSO, THE FILLER PIECES SHOWN IN THE ALTERNATIVE DOORWAY PROTECTION A-2 VIEW WILL NOT BE USED. NOTE THAT THE THICKNESS OF THE DOOR SPANNER PIECES MUST EQUAL THE THICKNESS OF THE LUMBER FILL MATERIAL THAT IS NAILED TO THE CAR SIDEWALL.

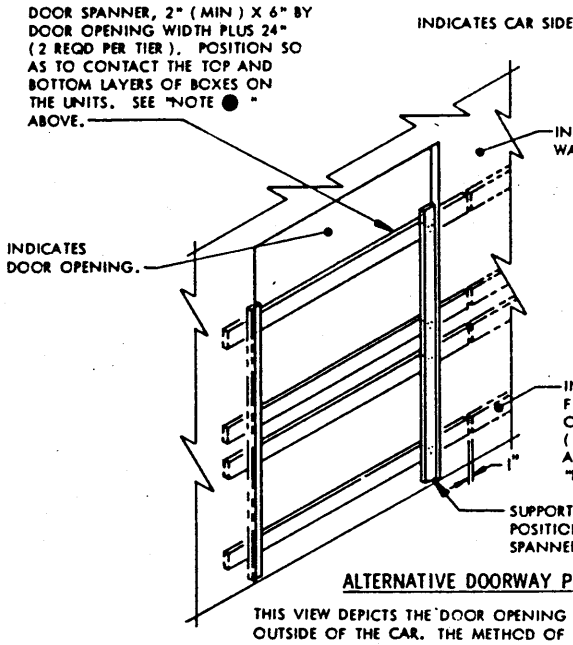
ALTERNATIVE DOORWAY PROTECTION A-1

THIS METHOD OF DOORWAY PROTECTION IS FOR USE IN CARS HAVING NAILABLE SIDEWALLS AND EQUIPPED WITH CONVENTIONAL SLIDING DOORS, AND IS APPLICABLE ONLY FOR THE SIDE OPPOSITE THE LOADING SIDE OF THE CAR. THE METHOD CAN ALSO BE USED IN CARS EQUIPPED WITH PLUG DOORS; HOWEVER, A METHOD OTHER THAN THE "ALTERNATIVE DOORWAY PROTECTION A-3" PROCEDURES BELOW MUST BE USED ON THE LOADING SIDE OF THE CAR, SUCH AS THE "ALTERNATIVE DOORWAY PROTECTION B" PROCEDURES ON PAGE 59 OR THE NAILED-DOWN BLOCKING AND STEEL STRAPPING METHOD DEPICTED IN MOST LOADS.



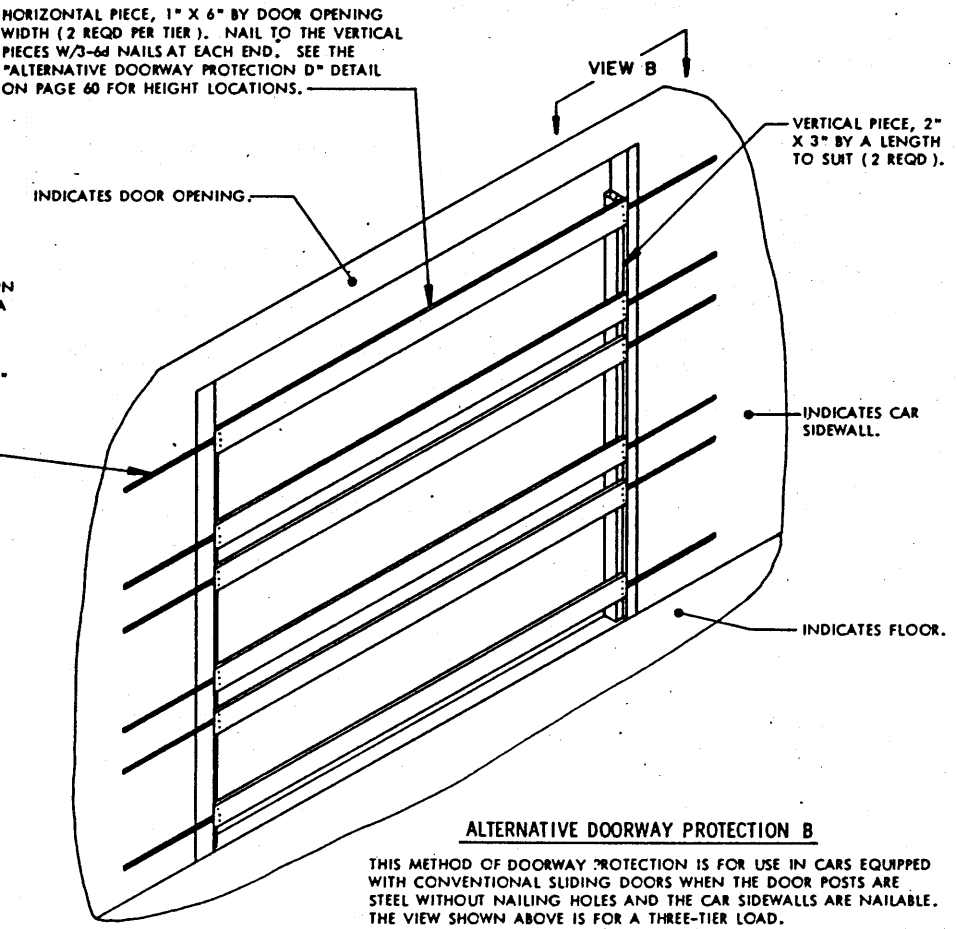
ALTERNATIVE DOORWAY PROTECTION A-2

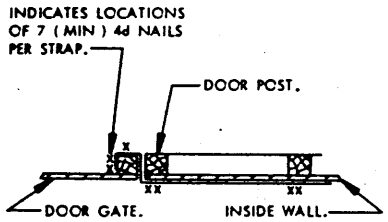
THIS METHOD OF DOORWAY PROTECTION IS FOR USE IN CARS HAVING NAILABLE SIDEWALLS AND EQUIPPED WITH CONVENTIONAL SLIDING DOORS, AND IS APPLICABLE ONLY FOR THE SIDE OPPOSITE THE LOADING SIDE OF THE CAR. SEE THE NOTE UNDER THE "A-1" PROCEDURES.



ALTERNATIVE DOORWAY PROTECTION A-3

THIS VIEW DEPICTS THE DOOR OPENING OF A CAR AS IT APPERAS WHEN LOOKING AT IF FROM OUTSIDE OF THE CAR. THE METHOD OF DOORWAY PROTECTION IS FOR USE IN CARS HAVING NAILABLE SIDEWALLS AND EQUIPPED WITH CONVENTIONAL SLIDING DOORS, AND IS APPLICABLE FOR THE LOADING SIDE OF THE CAR. NOTE THAT THE ADJACENT PALLETIZED UNITS MUST BE POSITIONED APPROXIMATELY 1-3/4" (REF) FROM THE CAR SIDEWALL (1/4" MORE THAN THE THICKNESS OF THE DOOR SPANNER PIECES) TO FACILITATE THE INSTALLATION OF THOSE DOOR SPANNER PIECES. THE VIEW SHOWN ABOVE IS FOR A TWO-TIER LOAD.



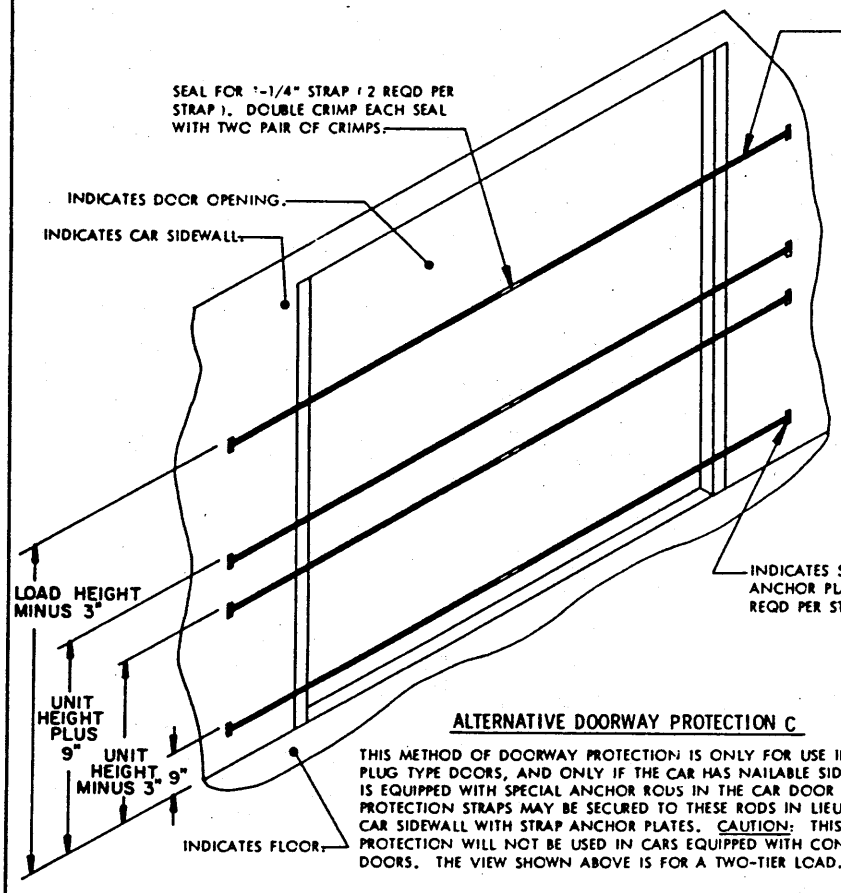


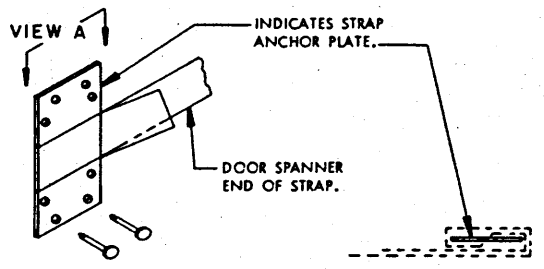
VIEW B

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

ALTERNATIVE DOORWAY PROTECTION B

THIS METHOD OF DOORWAY PROTECTION IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS WHEN THE DOOR POSTS ARE STEEL WITHOUT NAILING HOLES AND THE CAR SIDEWALLS ARE NAILABLE. THE VIEW SHOWN ABOVE IS FOR A THREE-TIER LOAD.





ISOMETRIC VIEW

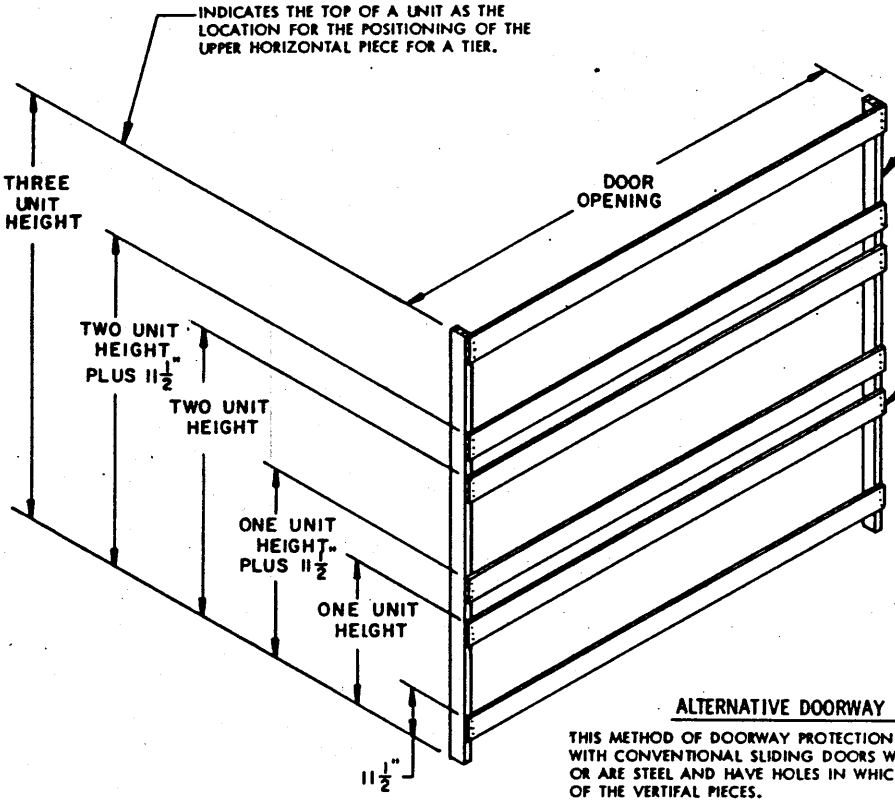
VIEW A

APPLICATION OF STRAPPING TO STRAP ANCHOR PLATE

THESE VIEWS DEPICT THE PROPER THREADING OF A DOORWAY PROTECTION STRAP THRU AN ANCHOR PLATE.

ALTERNATIVE DOORWAY PROTECTION C

THIS METHOD OF DOORWAY PROTECTION IS ONLY FOR USE IN CARS EQUIPPED WITH PLUG TYPE DOORS, AND ONLY IF THE CAR HAS NAILABLE SIDEWALLS. IF THE CAR IS EQUIPPED WITH SPECIAL ANCHOR RODS IN THE CAR DOOR POSTS, THE DOORWAY PROTECTION STRAPS MAY BE SECURED TO THESE RODS IN LIEU OF ATTACHING TO THE CAR SIDEWALL WITH STRAP ANCHOR PLATES. CAUTION: THIS METHOD OF DOORWAY PROTECTION WILL NOT BE USED IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS. THE VIEW SHOWN ABOVE IS FOR A TWO-TIER LOAD.



VERTICAL PIECE, 2" X 3" BY A LENGTH TO SUIT (2 REQD). NAIL TO A DOOR POST W/12d NAILS. NOTE THAT IF THE EXCESS SPACE ACROSS A CAR IS FILLED BY NAILING LUMBER TO THE CAR SIDEWALL, IT MAY BE NECESSARY TO INCREASE THE VERTICAL PIECES TO 2" X 4" OR 2" X 6" MATERIAL. THIS WILL PROVIDE AN AREA TO NAIL TO THE DOOR POSTS WHEN THE GATE IS MOVED INWARD TO CONTACT THE LADING.

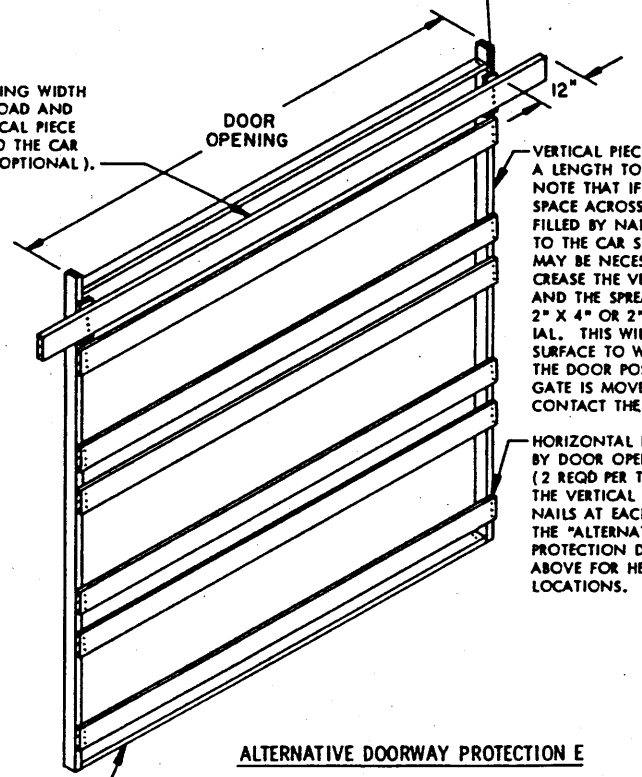
HORIZONTAL PIECE, 1" X 6" BY DOOR OPENING WIDTH (2 REQD PER TIER). NAIL TO THE VERTICAL PIECES W/3-6d NAILS AT EACH END.

ALTERNATIVE DOORWAY PROTECTION D

THIS METHOD OF DOORWAY PROTECTION IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS WHEN THE DOOR POSTS ARE WOODEN, OR ARE STEEL AND HAVE HOLES IN WHICH TO ACCOMPLISH THE NAILING OF THE VERTIFAL PIECES.

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

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



VERTICAL PIECE, 2" X 3" BY A LENGTH TO SUIT (2 REQD). NOTE THAT IF THE EXCESS SPACE ACROSS A CAR IS FILLED BY NAILING LUMBER TO THE CAR SIDEWALL, IT MAY BE NECESSARY TO INCREASE THE VERTICAL PIECES AND THE SPREADER PIECES TO 2" X 4" OR 2" X 6" MATERIAL. THIS WILL PROVIDE A SURFACE TO WEDGE BETWEEN THE DOOR POSTS WHEN THE GATE IS MOVED INWARD TO CONTACT THE LADING.

HORIZONTAL PIECE, 1" X 6" BY DOOR OPENING WIDTH (2 REQD PER TIER). NAIL TO THE VERTICAL PIECES W/3-6d NAILS AT EACH END. SEE THE "ALTERNATIVE DOORWAY PROTECTION D" DETAIL ABOVE FOR HEIGHT LOCATIONS.

DOORWAY PROTECTION SELECTION GUIDANCE

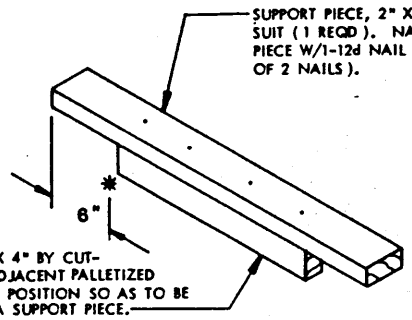
APPLICATION/REQUIREMENTS	ALTERNATIVE DOORWAY PROTECTION						
	A-1	A-2	A-3	B	C	D	E
NAILABLE DOOR POSTS REQUIRED	NO	NO	NO	NO	NO	YES	NO
NAILABLE SIDEWALLS REQUIRED	YES	YES	YES	YES	YES	NO	NO
USE IN CARS EQUIPPED WITH SLIDING DOORS	YES	YES	YES	YES	NO	YES	YES
USE IN CARS EQUIPPED WITH PLUG DOORS	YES	YES	NO	NO	YES	NO	NO
USE ON LOADING SIDE OF CAR	NO	NO	YES	YES	YES	YES	YES
USE ON SIDE OPPOSITE LOADING SIDE OF CAR	YES	YES	NO	YES	YES	YES	YES
USE IN LOADS CONTAINING ANTI-SWAY BRACING	YES	YES	YES	YES	YES	YES	YES
USE IN LOADS HAVING FILL MATERIAL NAILED TO WALL	YES	NO	YES	NO	NO	YES	YES
USE IN LOADS IN WHICH NO LATERAL BLOCKING IS REQD	IF ROOM	IF ROOM	IF ROOM	YES	YES	YES	YES

SPREADER PIECE, 2" X 3" MATERIAL CUT SLIGHTLY LONGER THAN MEASURED DISTANCE (2 REQD). DRIVE INTO POSITION TO PROVIDE FOR A WEDGE FIT. TOENAIL TO THE VERTICAL PIECES W/2-12d NAILS AT EACH END.

ALTERNATIVE DOORWAY PROTECTION E

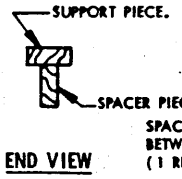
THIS METHOD OF DOORWAY PROTECTION IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS WHEN THE DOOR POSTS ARE NOT NAILABLE. IF THE CAR HAS NAILABLE SIDEWALLS, NAIL-ON TYPE STRAPPING MAY BE USED TO SECURE THE GATE IN LIEU OF USING THE SPREADER PIECES. SEE THE "ALTERNATIVE DOORWAY PROTECTION B" VIEW ON PAGE 59 FOR GUIDANCE. NOTE THAT THE DOOR SPANNER IN THIS DETAIL MAY BE USED AS A GATE HOLD-DOWN PIECE FOR THE "ALT GATE HOLD-DOWN" METHOD SHOWN ON PAGE 56.

* THIS DIMENSION WILL BE 6", AS SHOWN, FOR BRACES TO BE USED IN "TIE WIRE APPLICATION A" AND LENGTH TO SUIT FOR BRACES TO BE USED IN "TIE WIRE APPLICATION B".

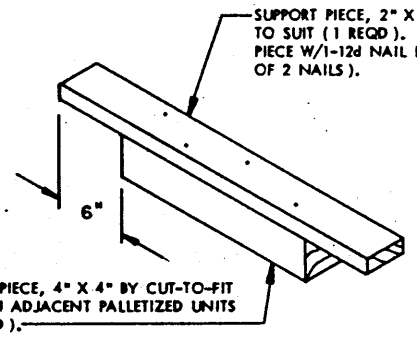


TOP-OF-LOAD ANTI-SWAY BRACE ASSEMBLY

THIS ASSEMBLY IS DESIGNED FOR USE BETWEEN THE TOPS OF LATERALLY ADJACENT PALLETIZED UNIT STACKS IN EACH END OF A CAR TO PREVENT UNITS FROM TOPPLING INTO THE VOID AREA. THE ASSEMBLY WILL BE WIRE TIED TO THE UNITIZING STRAPS TO PREVENT DISPLACEMENT.



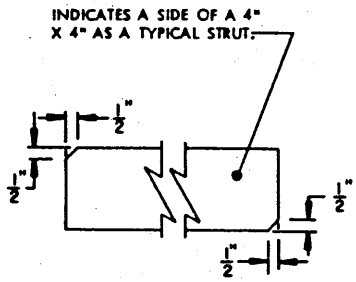
END VIEW



SPACER

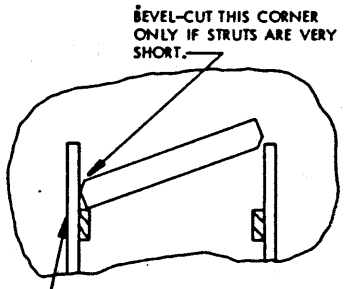
THIS ASSEMBLY IS DESIGNED FOR USE BETWEEN THE TOPS OF LATERALLY ADJACENT PALLETIZED UNIT STACKS IN THE DOORWAY AREA OF A CAR IN CONJUNCTION WITH DOORWAY PROTECTION STRAPS. THE STRAPPING WILL BE STAPLED TO THE SPACER TO PREVENT DISPLACEMENT.

TOP-OF-LOAD ANTI-SWAY BRACE REQUIREMENTS		
NO. OF LOAD UNITS IN EACH END OF CAR THAT REQUIRE BRACING	LENGTH OR WIDTH DIMENSION OF UNIT LENGTHWISE IN CAR	
	40' AND 50' CARS	60' CARS
5		35" TO 40"
4	35" TO 44"	OVER 40" TO 52"
3	OVER 44" TO 54"	OVER 52" TO 54"



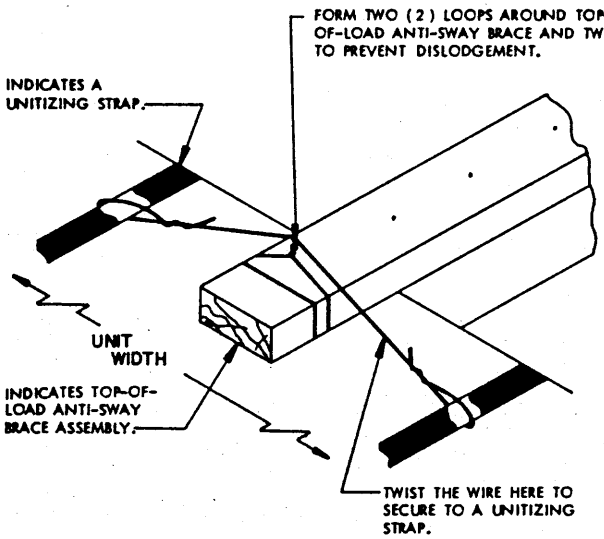
BEVEL CUT

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



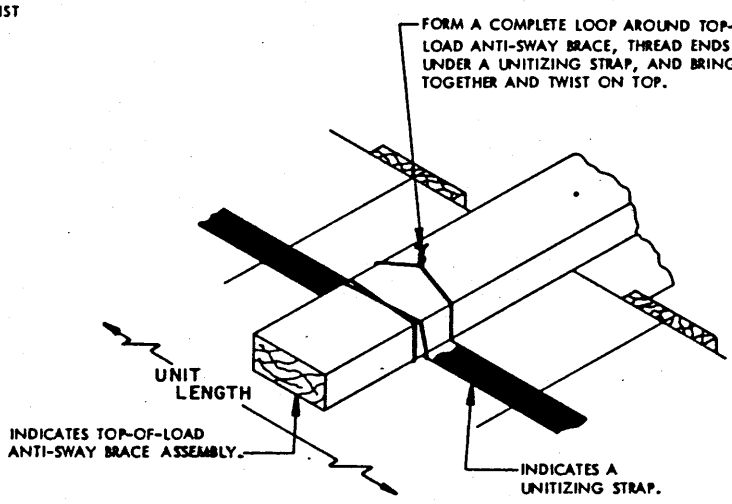
STRUT INSTALLATION

SEE GENERAL NOTE "N" ON PAGE 4 FOR ADDITIONAL STRUT INSTLLATION GUIDANCE.



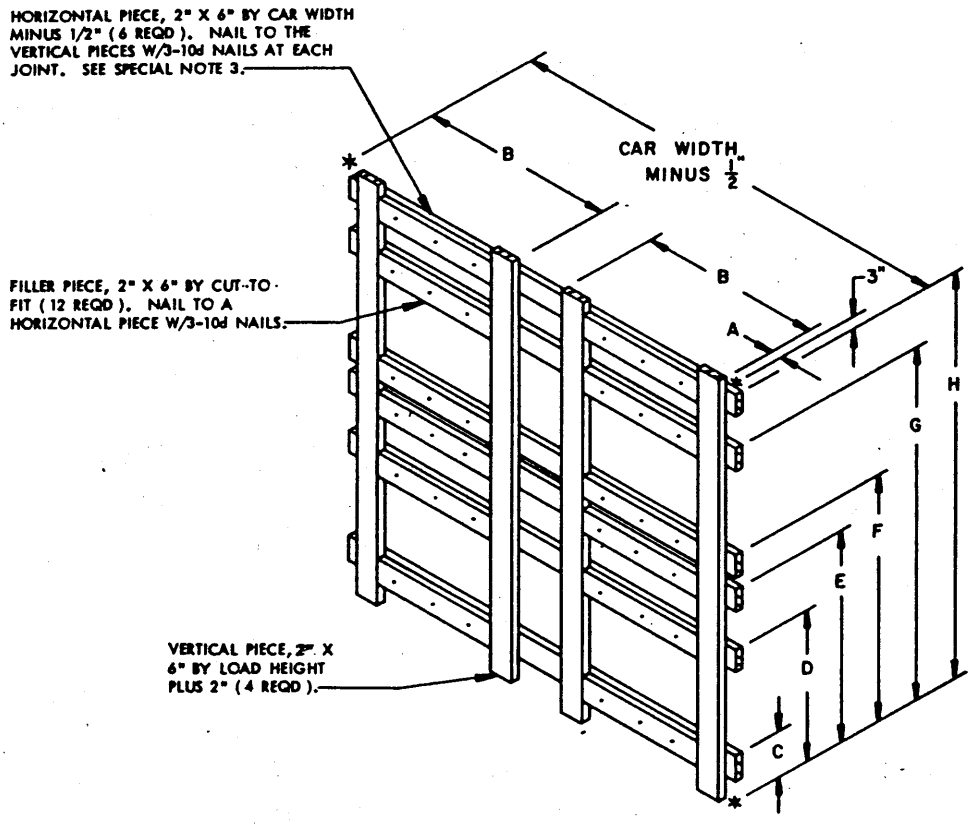
TIE WIRE APPLICATION A

THIS VIEW DEPICTS THE SECUREMENT OF A TOP-OF-LOAD ANTI-SWAY BRACE TO THE TOP OF A PALLETIZED UNIT BY WIRE TYING TO THE UNITIZING STRAPS WITH NO. 14 GAGE WIRE.



TIE WIRE APPLICATION B

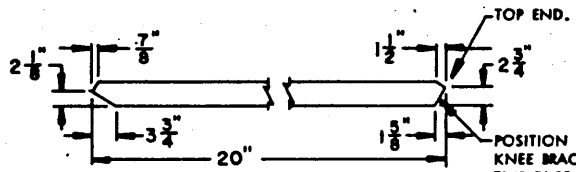
THIS VIEW DEPICTS THE SECUREMENT OF A TOP-OF-LOAD ANTI-SWAY BRACE TO THE TOP OF A PALLETIZED UNIT BY WIRE TYING TO THE UNITIZING STRAPS WITH NO. 14 GAGE WIRE.



KNEE-BRACE GATE

THIS GATE IS DESIGNED FOR USE IN THE LOAD SHOWN ON PAGE 18 AND IS IDENTIFIED THEREIN AS PIECE MARKED (3).

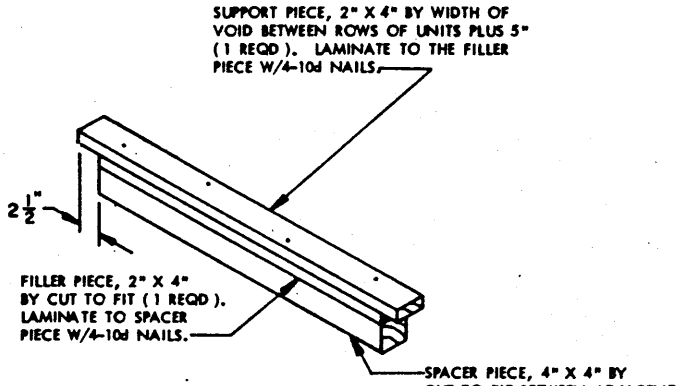
GATE CONSTRUCTION DIMENSIONAL CHART	
LOCATION IDENTITY	DESCRIPTION FOR POSITIONING LUMBER IN ASSEMBLY
A	2-1/2"
B	LENGTH OR WIDTH OF UNIT MINUS 5-1/2".
C	11-1/4". SEE SPECIAL NOTE 3.
D	ONE-HALF THE UNIT HEIGHT PLUS 3".
E	UNIT HEIGHT PLUS 2-3/4". SEE SPECIAL NOTE 3.
F	UNIT HEIGHT PLUS 11-1/4".
G	LOAD HEIGHT MINUS 10" FOR UNITS 36" TO 56" HIGH, LOAD HEIGHT MINUS 8" FOR UNITS 32" TO 35-7/8" HIGH, OR LOAD HEIGHT MINUS 6" FOR UNITS LESS THAN 32" IN HEIGHT.
H	LOAD HEIGHT.



POSITION THE SHORT KNEE BRACE WITH THIS FACE AGAINST THE VERTICAL PIECE OF THE KNEE BRACE GATE. POSITION THE LONG KNEE BRACE WITH THIS FACE AGAINST THE HOLD-DOWN CLEAT SHOWN AS PIECE MARKED (9) ON PAGE 18.

KNEE BRACE

THIS DETAIL IS FOR A SHORT AND/OR A LONG KNEE BRACE. THE SHORT KNEE BRACE, PIECE MARKED (7) ON PAGE 18, IS 20" LONG. SEE THE "LONG KNEE BRACE" CHART ON PAGE 18 FOR LENGTH OF PIECE MARKED (10).

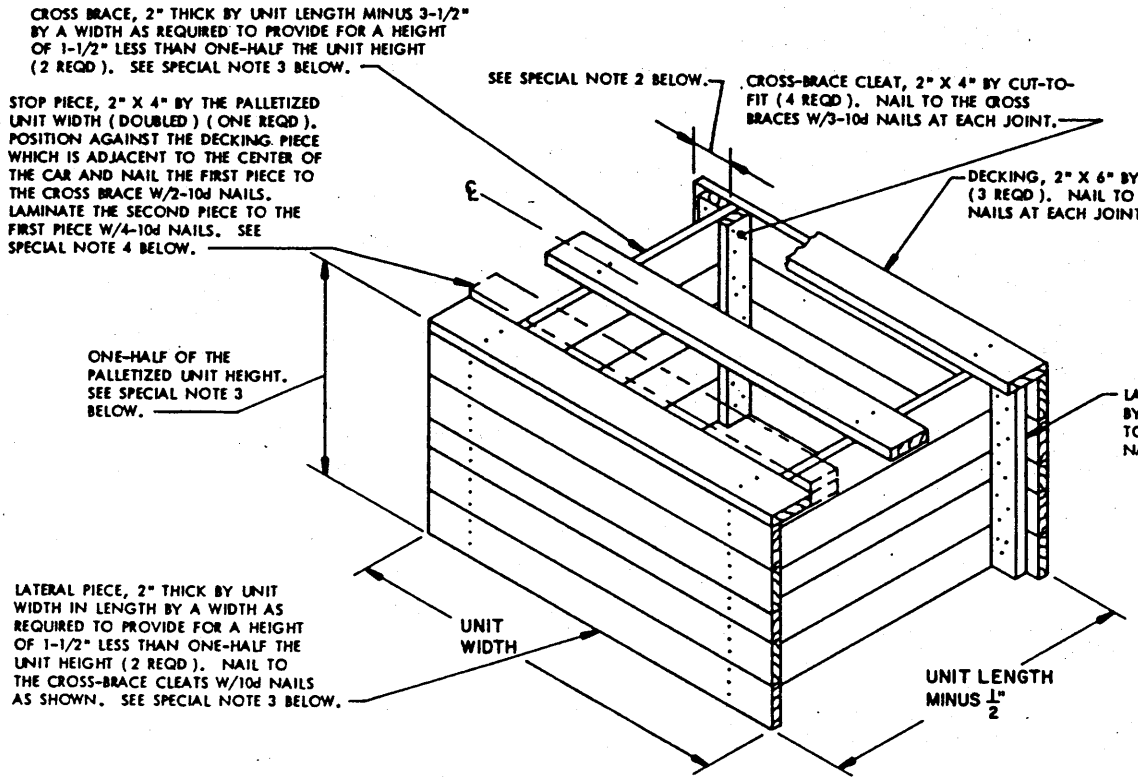


SPACER ASSEMBLY

THIS ASSEMBLY IS DESIGNED FOR USE IN THE LOAD ON PAGE 18 AND IS IDENTIFIED THEREIN AS PIECE MARKED (13).

SPECIAL NOTES:

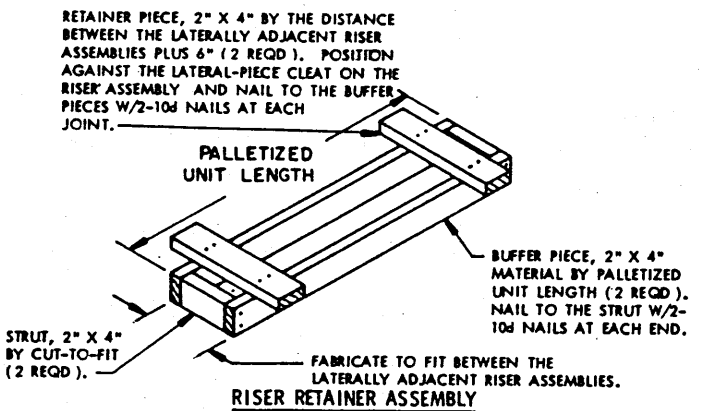
1. KNEE-BRACE GATES ARE FOR USE IN THE LOAD SHOWN ON PAGES 18 AND 19 FOR THE BRACING OF A PARTIAL TIER OF PALLETIZED UNITS WHICH ARE 23" OR MORE IN HEIGHT.
2. THE KNEE-BRACE GATE SHOWN IS DESIGNED FOR BRACING A PARTIAL SECOND TIER OF A LOAD WHEN THE FIRST TIER IS COMPLETELY OR ALMOST COMPLETELY FILLED, AS TYPICALLY SHOWN IN THE LOAD ON PAGE 18. THE PRINCIPLES OF THE GATE DESIGN ARE ALSO APPLICABLE FOR THE CONSTRUCTION OF GATES FOR THE BRACING OF ANY PARTIAL TOP TIER.
3. FOR A KNEE-BRACE GATE FOR USE IN A LOAD CONSISTING OF MORE THAN TWO TIERS, THE LOWER PORTION OF THE GATE SHOWN SHOULD BE EXTENDED SO THAT THE DIMENSIONS MARKED "C" AND "D" FOR EACH ADDED TIER WILL BE THE SAME DISTANCE ABOVE THE NEXT LOWER TIER AS THEY ARE ABOVE THE CAR FLOOR FOR THE GATE SHOWN. DIMENSION "E" WILL BE UNIT HEIGHT FOR ALL TIERS EXCEPT THE TIER IMMEDIATELY BELOW THE PARTIAL TOP TIER. DIMENSION "F" WILL BE 11-1/4" ABOVE THE TOP OF THE NEXT LOWER TIER. ALL THE OTHER DIMENSIONS WILL BE AS INDICATED IN THE CHART ABOVE. POSITION GATE SO THAT THE HORIZONTAL PIECES WILL BE AGAINST THE PORTION OF THE LOAD CONTAINING THE PARTIAL LAYER.



RISER ASSEMBLY

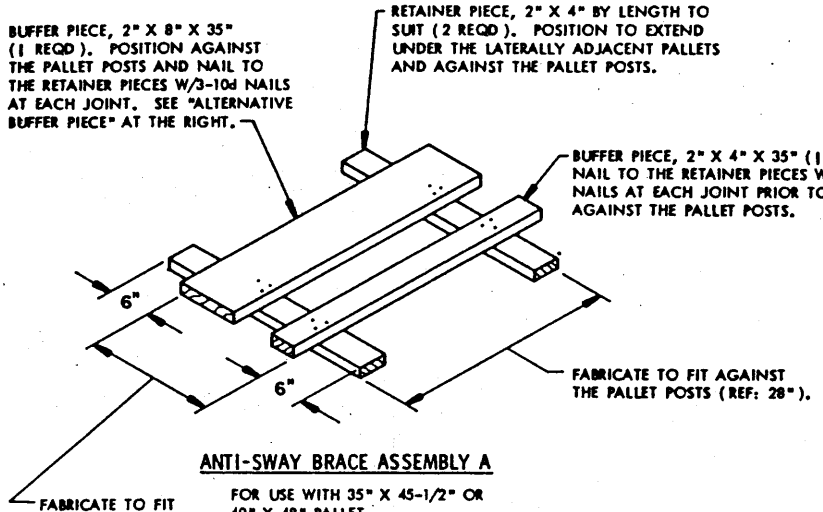
SPECIAL NOTES:

1. THIS RISER IS DESIGNED FOR USE WITHIN LOADS OF BOXED AMMUNITION ON 40" X 48" PALLETS AND/OR 35" X 45-1/2" PALLETS POSITIONED WITH THE PALLET WIDTH OR PALLET LENGTH PARALLEL TO THE CAR SIDEWALL. SEE THE LOAD ON PAGE 22 AND SPECIAL NOTES 2, 4, AND 6 ON PAGE 23.
2. IF THE BOXES OVERHANG THE PALLET WIDTH THIS DIMENSION WILL BE THE AMOUNT OF OVERHANG PLUS 3-1/2". IF THE BOXES ARE FLUSH WITH THE EDGE OF THE PALLET THIS DIMENSION WILL BE 3-1/2". THIS WILL ALIGN THE STRONG POINTS OF THE PALLET WITH THE STRONG POINTS OF THE RISER ASSEMBLY.
3. SELECT THE LATERAL PIECES AND THE CROSS BRACE PIECES PRIOR TO CONSTRUCTING THE RISER ASSEMBLY, TO ASSURE THAT THE TOTAL HEIGHT OF THE ASSEMBLY IS ONE-HALF OF THE PALLETIZED UNIT HEIGHT. NOTE: A PLUS OR MINUS 2" TOLERANCE IS PERMISSIBLE ON THE RISER HEIGHT.
4. THE STOP PIECE SHOWN ON THE RISER ASSEMBLY ABOVE IS ONLY FOR USE WHEN THE PALLETIZED UNITS ARE POSITIONED IN THE CAR WITH THE UNIT WIDTH PARALLEL TO THE CAR SIDEWALLS. IF THE UNIT LENGTH IS PARALLEL TO THE CAR SIDEWALL SEE THE "RISER RETAINER ASSEMBLY" DETAIL AT THE LEFT.



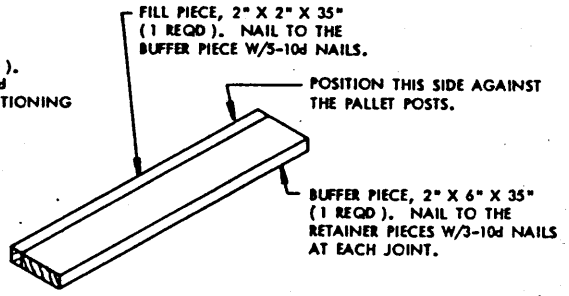
RISER RETAINER ASSEMBLY

THIS RETAINER IS ONLY FOR USE BETWEEN RISER ASSEMBLIES WHEN THE PALLETIZED UNITS ARE POSITIONED WITH THE UNIT LENGTH PARALLEL TO THE CAR SIDEWALL. IF THE UNIT WIDTH IS PARALLEL TO THE CAR SIDEWALL SEE SPECIAL NOTE 4 AT THE RIGHT.



ANTI-SWAY BRACE ASSEMBLY A

FOR USE WITH 35" X 45-1/2" OR 40" X 48" PALLET.

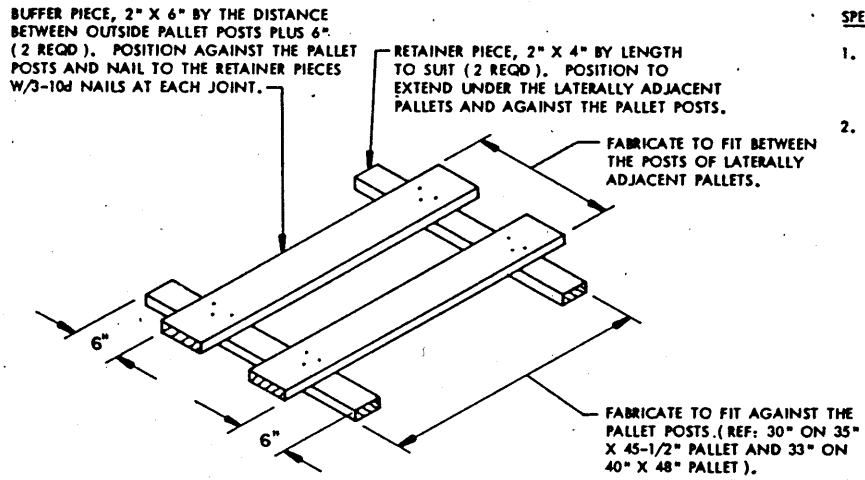


ALTERNATIVE BUFFER PIECE

SEE SPECIAL NOTE F BELOW.

SPECIAL NOTES:

1. THE ANTI-SWAY BRACE ASSEMBLY A SHOWN ABOVE IS FOR USE BETWEEN PALLETIZED UNITS THAT ARE POSITIONED WITH THE PALLET LENGTH PARALLEL TO THE CAR SIDEWALL.
2. THE ASSEMBLY MUST BE FABRICATED IN PLACE BETWEEN PALLETS.
   - A. POSITION THE FIRST RETAINER PIECE BETWEEN THE CENTER PALLET POST AND THE PALLET POST WHICH IS FURTHEST AWAY. THE RETAINER PIECE IS TO SPAN THE VOID BETWEEN LATERALLY ADJACENT PALLETS.
   - B. POSITION THE SECOND RETAINER PIECE AGAINST THE INSIDE OF THE NEAREST PALLET POST SO AS TO SPAN THE VOID BETWEEN LATERALLY ADJACENT PALLETS.
   - C. POSITION THE 2" X 4" X 35" BUFFER PIECE 6" FROM THE END OF THE FIRST RETAINER PIECE AND EXTENDING BEYOND THE RETAINER PIECE. NAIL TO THE RETAINER PIECE W/3-10d NAILS.
   - D. PUSH THE PARTIAL ASSEMBLY FORWARD UNTIL THE FIRST RETAINER PIECE CONTACTS THE PALLET POST ON THE FAR SIDE OF THE PALLET. NAIL THE BUFFER PIECE TO THE SECOND RETAINER PIECE W/3-10d NAILS.
   - E. PUSH THE PARTIAL ASSEMBLY SIDEWAYS UNTIL THE 2" X 4" X 35" BUFFER PIECE IS AGAINST THE PALLET POSTS AND RESTING ON THE BOTTOM SUPPORT BOARDS OF THE PALLET.
   - F. POSITION THE 2" X 8" X 35" BUFFER PIECE AGAINST THE PALLET POSTS ON THE OPPOSITE SIDE OF THE VOID AND NAIL TO THE RETAINER PIECES W/3-10d NAILS AT EACH JOINT. NOTE: IF 2" X 8" MATERIAL IS NOT AVAILABLE, USE THE "ALTERNATIVE BUFFER PIECE" WHICH IS DETAILED ABOVE.

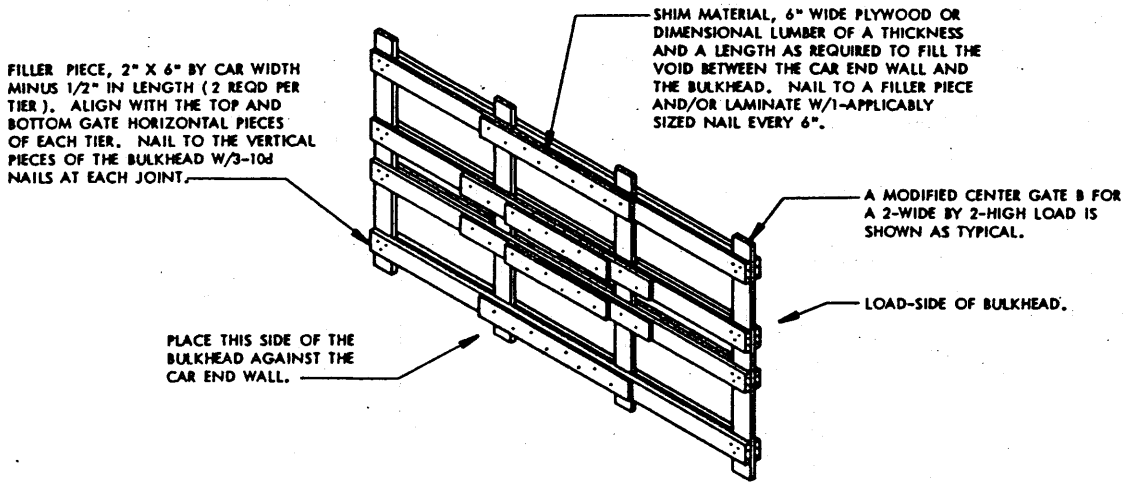


ANTI-SWAY BRACE ASSEMBLY B

FOR USE WITH 35" X 45-1/2" OR 40" X 48" PALLETS.

SPECIAL NOTES:

1. THE ANTI-SWAY BRACE ASSEMBLY B IS FOR USE BETWEEN PALLET UNITS THAT ARE POSITIONED WITH THE PALLET WIDTH PARALLEL TO THE CAR SIDEWALL.
2. THE ASSEMBLY MUST BE FABRICATED IN PLACE BETWEEN PALLETS.
   - A. POSITION THE FIRST RETAINER PIECE BETWEEN THE CENTER PALLET POST AND THE PALLET POST WHICH IS FURTHEST AWAY. THE RETAINER PIECE IS TO SPAN THE VOID BETWEEN LATERALLY ADJACENT PALLETS.
   - B. POSITION THE SECOND RETAINER PIECE AGAINST THE INSIDE OF THE NEAREST PALLET POST SO AS TO SPAN THE VOID BETWEEN LATERALLY ADJACENT PALLETS.
   - C. POSITION THE FIRST BUFFER PIECE AGAINST THE PALLET POSTS AND EXTENDING 3" BEYOND THE FURTHEST RETAINER PIECE. NAIL TO THE RETAINER PIECE W/3-10d NAILS. POSITION THE SECOND BUFFER PIECE AGAINST THE PALLET POSTS ON THE OPPOSITE SIDE AND EXTENDING 3" BEYOND THE FURTHEST RETAINER PIECE. NAIL TO THE RETAINER PIECE W/3-10d NAILS
   - D. PUSH THE PARTIAL ASSEMBLY FORWARD UNTIL THE FIRST RETAINER PIECE CONTACTS THE PALLET POST ON THE FAR SIDE OF THE PALLET. NAIL THE BUFFER PIECES TO THE SECOND RETAINER PIECE W/3-10d NAILS.



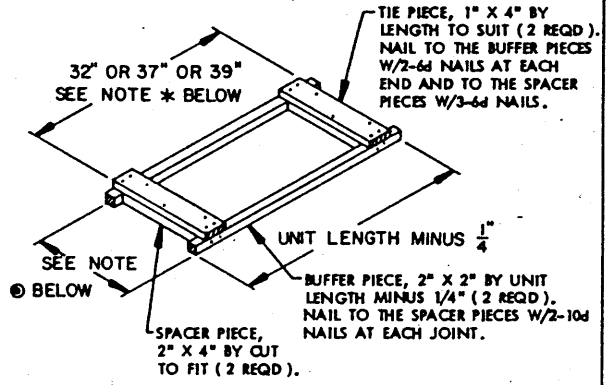
BULKHEAD A

THIS BULKHEAD IS APPLICABLE FOR USE AT THE END OF A CAR WHEN THE PALLETIZED UNITS ARE POSITIONED WITH THE WIDTH OR THE LENGTH OF THE UNIT PARALLEL TO THE SIDEWALLS OF THE CAR.

SPECIAL NOTES:

1. IF A BOX CAR TO BE LOADED HAS BOWED END WALLS WHICH ARE 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. THE BULKHEAD IS APPLICABLE FOR USE AT THE END OF A LOAD IN A CONVENTIONAL BOX CAR OR IN A CAR EQUIPPED WITH LOAD DIVIDER BULKHEADS. IF DESIRED, A BULKHEAD MAY BE USED IN A CAR EQUIPPED WITH MECHANICAL BRACING DEVICES (CROSS MEMBERS) IN LIEU OF USING THE CROSS MEMBERS FOR "SQUARING OFF" A CAR END WALL.

2. IF THE END WALL OF A CAR MUST BE "SQUARED OFF" FOR A LOAD OF PALLETIZED UNITS WHICH ARE TO BE POSITIONED WITH THE WIDTH OR LENGTH OF THE UNIT PARALLEL TO THE SIDEWALLS OF THE CAR THE PROCEDURES DEPICTED BY THE "BULKHEAD A" DETAIL AT THE TOP OF THE PAGE WILL BE APPLIED. THE BULKHEAD CONSISTS OF THE CENTER GATE WHICH WILL BE USED FOR BLOCKING AND BRACING THE COMPLETED LOAD, MODIFIED FOR USE AT THE END OF THE CAR BY OMITTING THE STRUT LEDGERS AND ADDING FILLER PIECES AND SHIM MATERIAL AS SHOWN. A MODIFIED CENTER GATE B, AS SHOWN ON PAGE 47, FOR A 2-WIDE BY 2-HIGH LOAD IS SHOWN AS TYPICAL.



ANTI-SWAY BRACE ASSEMBLY C

NOTE *: THE 32" DIMENSION IS APPLICABLE FOR THE 35" X 45-1/2" PALLET AND THE 37" DIMENSION IS APPLICABLE FOR THE 40" X 48" PALLET. THE 39" IS APPLICABLE FOR THE 42" X 53" PALLET.

NOTE ●: FABRICATE WIDTH OF ASSEMBLY TO FIT BETWEEN THE POSTS OF LATERALLY ADJACENT PALLET UNITS MINUS 1/2".

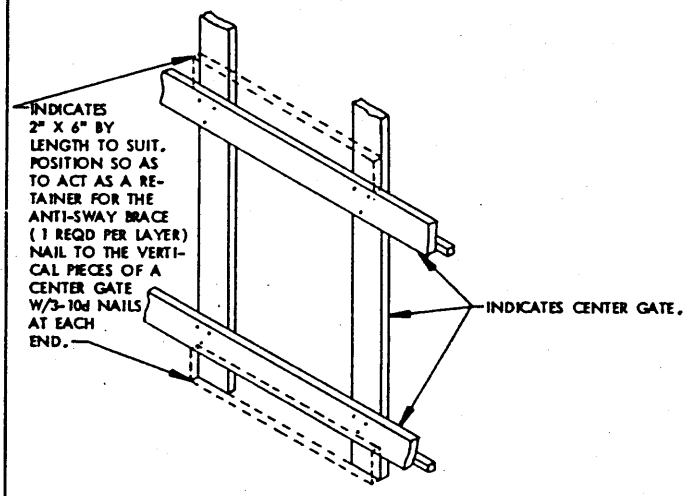
SPECIAL NOTES:

1. THE ANTI-SWAY BRACE ASSEMBLY C SHOWN ABOVE IS AN ALTERNATIVE FOR USE BETWEEN PALLET UNITS THAT ARE POSITIONED WITH THE PALLET LENGTH PARALLEL TO THE CAR SIDEWALL. THIS ANTI-SWAY BRACE CANNOT BE USED WHEN THE PALLETS ARE TURNED THE OTHER DIRECTION.

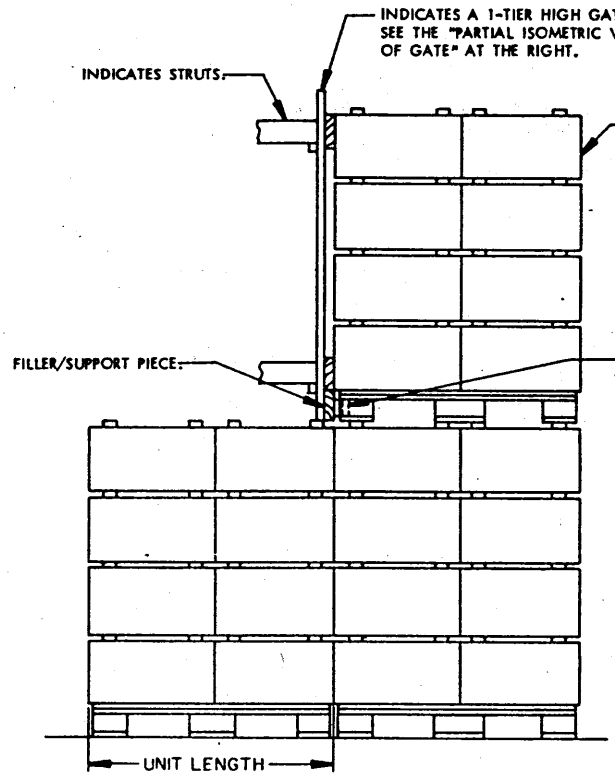
2. INITIALLY AND DURING LOADING, IT IS RECOMMENDED THAT THE WIDTH BETWEEN PALLET POSTS BE CHECKED, AND THE WIDTH OF THE ANTI-SWAY BRACES ADJUSTED AS NECESSARY SO THERE WILL NOT BE MORE THAN APPROXIMATELY ONE-HALF INCH (1/2") OF EXCESS LATERAL SPACE.

3. WHEN USING THE ANTI-SWAY BRACE C SHOWN ABOVE IN A CONVENTIONAL TYPE CAR, IT IS ESSENTIAL THAT AN ANTI-SWAY BRACE RETAINER BE APPLIED TO THE CENTER GATES TO PREVENT THE POSSIBILITY OF THE BRACES SLIDING TOWARDS THE CENTER OF THE CAR. SEE THE "TYPICAL INSTALLATION OF ANTI-SWAY BRACE RETAINER" DETAIL AT THE LEFT FOR FURTHER GUIDANCE.

4. WHEN USING THE ANTI-SWAY BRACE C IN A MECHANICAL TYPE CAR, REFER TO THE PROCEDURES DEPICTED ON PAGES 70 AND 74.

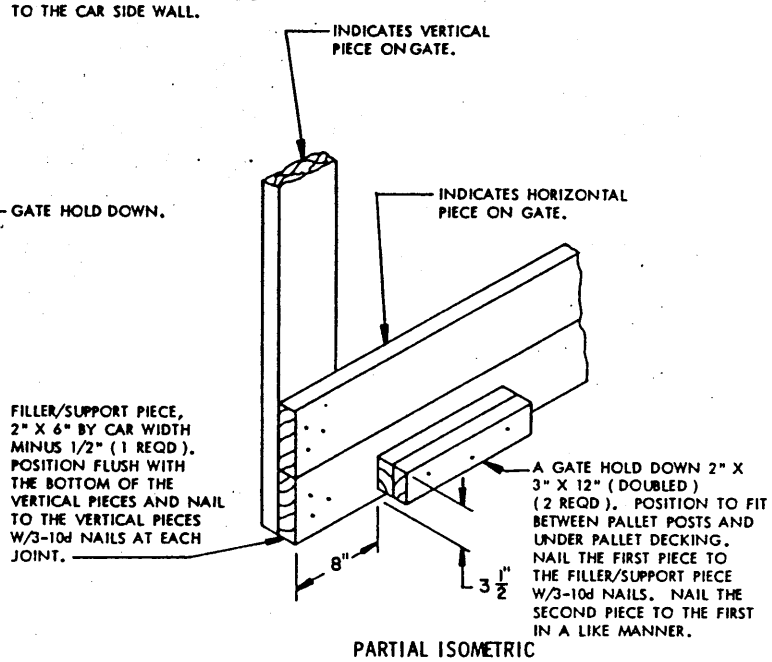


TYPICAL INSTALLATION OF ANTI-SWAY BRACE RETAINER

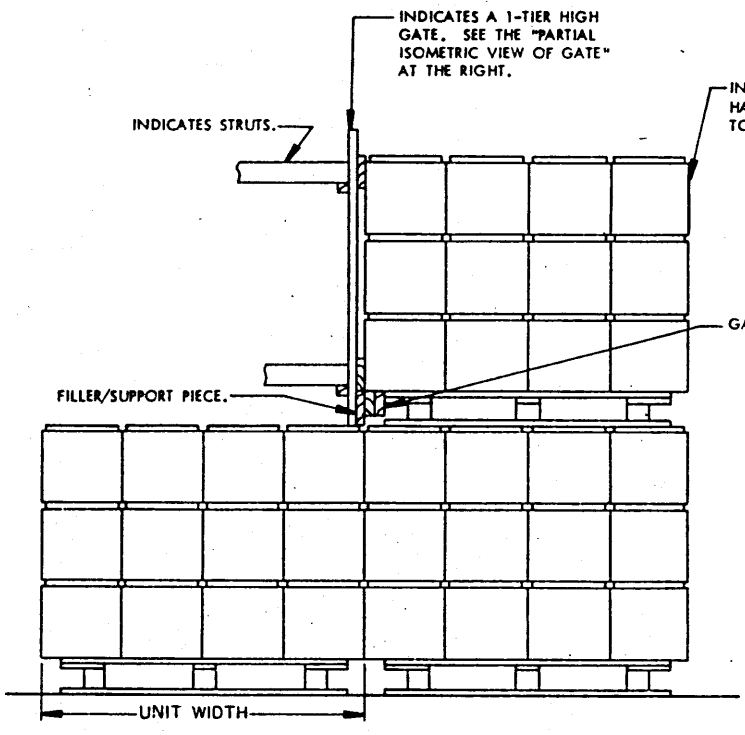


METHOD I

FOR PALLETIZED UNITS POSITIONED WITH THE UNIT LENGTH PARALLEL TO THE SIDEWALLS OF THE CAR. THE ABOVE METHOD IS FOR USE WHEN THE LOAD IS TOO HIGH TO USE "GATE HOLD-DOWN CLEATS", AS SHOWN BY PIECES MARKED (10) ON PAGE 21, OR WHEN THE CAR HAS METAL SIDEWALLS.

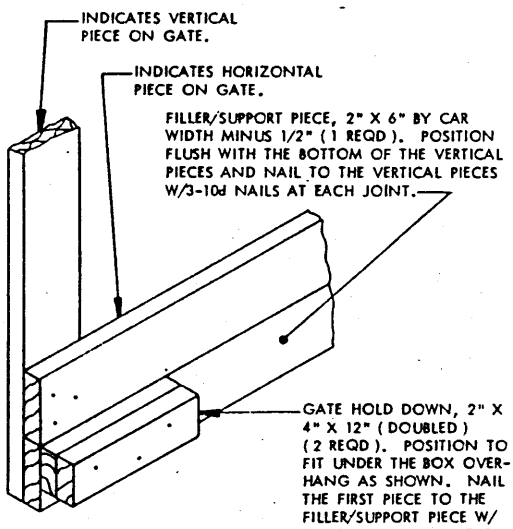


PARTIAL ISOMETRIC VIEW OF GATE



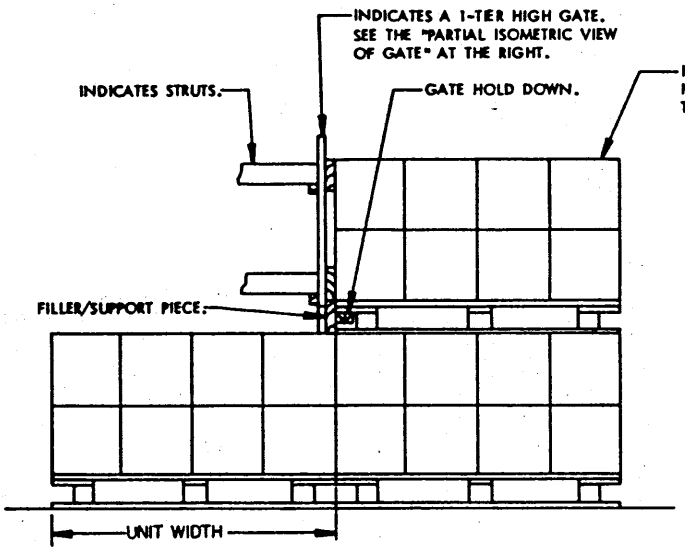
METHOD II

FOR PALLETIZED UNITS POSITIONED WITH THE UNIT WIDTH PARALLEL TO THE SIDE WALLS OF THE CAR AND HAVING THE BOXES OVERHANG THE PALLET BY A MINIMUM OF 3". IF THE OVERHANG IS LESS THAN 3", SEE METHODS III AND IV. THE ABOVE METHOD IS FOR USE WHEN THE LOAD IS TOO HIGH TO USE "GATE HOLD-DOWN CLEATS", AS SHOWN BY PIECES MARKED (10) ON PAGE 21, OR WHEN THE CAR HAS METAL SIDE WALLS.



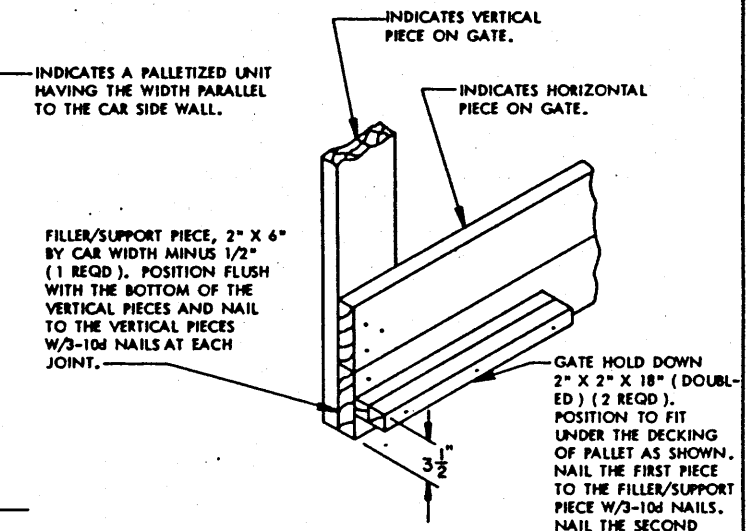
PARTIAL ISOMETRIC VIEW OF GATE

HOLD DOWN AND SUPPORT FOR 1-TIER GATE IN TOP TIER

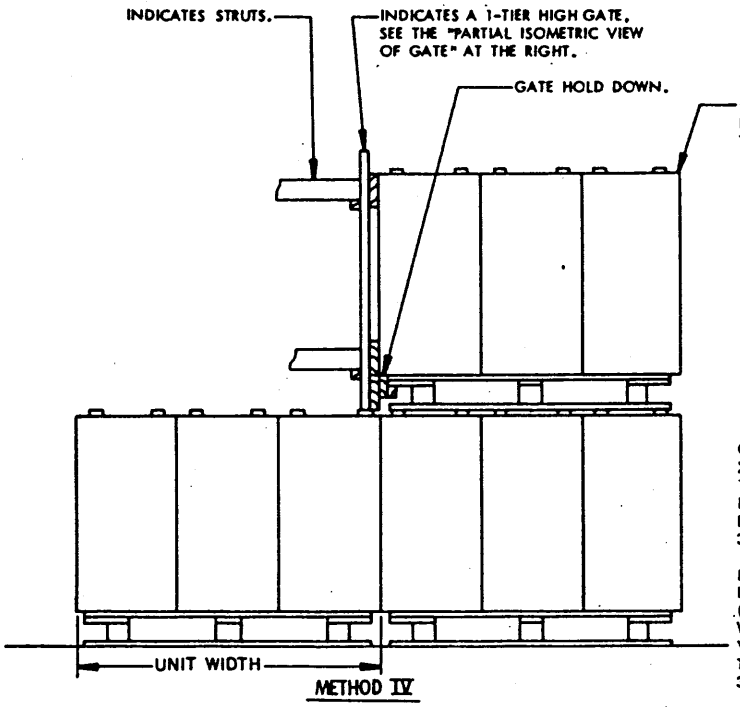


METHOD III

FOR PALLETIZED UNITS POSITIONED WITH THE UNIT WIDTH PARALLEL TO THE SIDEWALLS OF THE CAR AND HAVING THE BOXES FLUSH WITH THE END OF THE PALLET SEE METHODS II AND IV. THE ABOVE METHOD IS FOR USE WHEN THE LOAD IS TOO HIGH TO USE "GATE HOLD-DOWN CLEATS", AS SHOWN BY PIECES MARKED (10) ON PAGE 21, OR WHEN THE CAR HAS METAL SIDEWALLS.

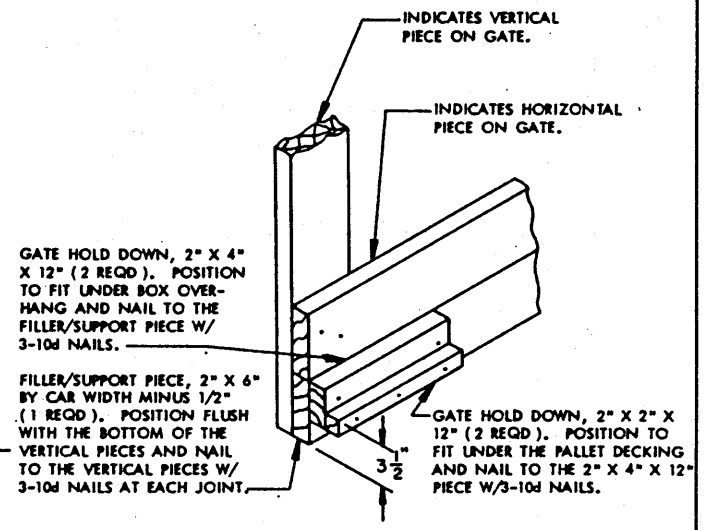


PARTIAL ISOMETRIC VIEW OF GATE



METHOD IV

FOR PALLETIZED UNITS POSITIONED WITH THE UNIT WIDTH PARALLEL TO THE SIDEWALLS OF THE CAR AND HAVING THE BOXES OVERHANG THE PALLETS BY A MINIMUM OF 1-1/2" AND A MAXIMUM OF 3". IF THE OVERHANG IS 3" OR MORE USE METHOD II. THE ABOVE METHOD IS FOR USE WHEN THE LOAD IS TOO HIGH TO USE "GATE HOLD-DOWN CLEATS", AS SHOWN BY PIECES MARKED (10) ON PAGE 21, OR WHEN THE CAR HAS METAL SIDEWALLS.



PARTIAL ISOMETRIC VIEW OF GATE

HOLD DOWN AND SUPPORT FOR 1-TIER GATE IN TOP TIER

GENERAL NOTES

(FOR BOX CARS EQUIPPED WITH MECHANICAL BRACING DEVICES)

A. THE OUTLOADING PROCEDURES SPECIFIED ON PAGES 70 THRU 75 ARE FOR BOX CARS EQUIPPED WITH MECHANICAL BRACING DEVICES, AND 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. CAUTION: BOX CARS EQUIPPED WITH MEMBERS WHICH DO NOT MEET THE LOCATION REQUIREMENTS MUST NOT BE USED.

1. FOR BLOCKING THE LOADS WHICH ARE DEPICTED, A CROSS MEMBER WILL NOT BE RELIED UPON TO RETAIN MORE LADING ON EITHER SIDE THAN AS SPECIFIED BY THE "MAXIMUM WEIGHT OF UNITS PER TIER/BAY" CHART ON PAGE 69. VOIDS LENGTHWISE WITHIN THE LOAD MUST BE HELD TO A MINIMUM AND CROSS MEMBERS MUST BE PLACED AGAINST THE LADING AS TIGHTLY AS THE SPACING OF THE LOCKING HOLES IN THE WALL MEMBERS PERMIT. LOCKING BARS (LEVER JACKS) SHOULD BE USED FOR THIS PURPOSE. AN ADDITIONAL 1/2" OF ADJUSTMENT CAN BE MADE BY TURNING A CROSS MEMBER END-FOR-END WHEN LOCKING PINS ON THE MEMBER ARE OFF-CENTER. NOTE: IT IS RECOMMENDED THAT EACH CROSS MEMBER BE INSTALLED WITH THE ENDS ATTACHED AS NEARLY AS POSSIBLE IN "MATED" POSITIONS (AT EQUAL HEIGHTS AND AT EQUAL DISTANCES FROM THE END OF THE CAR).

2. CAUTION: ALL BLOCKING AND BRACING COMPONENTS IN EMPTY CARS AND ALL UNUSED COMPONENTS IN LOADED CARS MUST BE "SECURED" FOR SHIPMENT—ADJUSTABLE WALL MEMBERS TO VERTICAL WALL ATTACHMENT RAILS, AND CROSS MEMBERS TO ADJUSTABLE WALL MEMBERS OR TO FIXED HORIZONTAL WALL MEMBERS OR TO DOORWAY MEMBERS, AND DOORWAY MEMBERS TO DOOR POSTS. COMPONENTS ASSIGNED TO EACH CAR MUST REMAIN THEREWITH EVEN THOUGH UNUSED DURING SOME SHIPMENTS.

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 WALL OF THE CAR TO PROVIDE A "SQUARED END. THESE CROSS MEMBERS SHOULD BE INSTALLED AT THE SAME HEIGHTS AS THE CROSS MEMBERS USED THROUGHOUT THE LOAD AS BLOCKING MEMBERS.

B. IN A CAR EQUIPPED WITH ADJUSTABLE WALL MEMBERS, PROVIDING THE FIXED WALL MEMBERS WHICH ARE PRESENT IN SOME "ADJUSTABLE" CARS ARE NOT PROPERLY POSITIONED TO PROVIDE SIDE BEARING SURFACES BETWEEN THE UNITS AND THE CAR SIDEWALLS, ADJUSTABLE WALL MEMBERS (AS REQUIRED) MUST BE INSTALLED TO PROVIDE A MINIMUM OF ONE SURFACE AREA FOR SIDE BEARING AT SOME LOCATION WITHIN THE UPPER HALF OF EACH UNIT.

C. THE SELECTION OF RAIL CARS FOR THE TRANSPORT OF PALLETIZED UNITS OF AMMUNITION ITEMS 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.

D. NOTICE: A SHIPMENT WILL BE POSITIONED IN THE RAIL CAR IN COMPLIANCE WITH THE WEIGHT DISTRIBUTION REQUIREMENTS OF THE AAR. THE NUMBER OF UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE BOX CAR BEING LOADED OR THE QUANTITY TO BE SHIPPED; HOWEVER, THE APPROVED METHODS CONTAINED IN THIS DRAWING FOR BLOCKING, BRACING, AND STAYING OF THE DESIGNATED ITEM MUST BE FOLLOWED AS CLOSELY AS POSSIBLE.

E. 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 NATURALLY 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. TO DETERMINE THE PORTION OF THE WEIGHT OF THE OFFSET SECTION OF THE LOAD WHICH WILL BE TRANSMITTED TO EACH END OF A CAR, THE FOLLOWING GUIDANCE IS PRESENTED.

1. FOR A SHIPMENT CONSISTING OF AN EVEN NUMBER OF LOAD UNITS LONG LOADED IN AN OFFSET PATTERN, THE LONG PORTION OF A LOAD WILL BE TWO (2) LOAD UNITS LONGER THAN THE SHORT PORTION. THE CG OF THE OFFSET PORTION WILL BE AT THE JOINT BETWEEN THOSE TWO UNITS. MEASURE THE DISTANCE FROM THE CENTER OF THE CAR LENGTH TO THE JOINT BETWEEN THOSE UNITS. REFER TO THE WEIGHT DISTRIBUTION CHART ON PAGE 69 AND READ UNDER THE PROPER CAR SIZE HEADING AND OPPOSITE THE DIMENSION NEAREST TO THAT MEASURED, THE PERCENTAGE OF THE OFFSET PORTION OF THE LOAD (TWO LOAD UNITS IN THIS CASE) WHICH IS ON THE LONG-LOAD END OF THE CAR. MULTIPLY THIS PERCENTAGE FIGURE TIMES THE WEIGHT OF THE OFFSET PORTION OF THE LOAD AND ADD THE PRODUCT TO THE WEIGHT OF THE SHORT-LOAD END OF THE LOAD. DOUBLE THIS SUM TO DETERMINE THE MINIMUM LOAD LIMIT OF THE CAR TO BE USED FOR A SHIPMENT. SEE THE "EXAMPLE" BELOW.

2. FOR A SHIPMENT CONSISTING OF AN UNEVEN NUMBER OF LOAD UNITS OVER 35" LONG (LENGTH OR WIDTH OF A PALLETIZED UNIT), THE LONG PORTION OF THE LOAD WILL BE ONE (1) LOAD UNIT LONGER THAN THE SHORT PORTION. THE CG OF THE OFFSET PORTION WILL BE AT THE CENTER OF THAT LOAD UNIT. REFER TO THE "WEIGHT DISTRIBUTION" CHART ON PAGE 69 AND READ UNDER THE PROPER CAR SIZE HEADING AND OPPOSITE THE DIMENSION NEAREST TO THAT MEASURED, THE PERCENTAGE OF THE OFFSET PORTION OF THE LOAD WHICH IS ON THE LONG-LOAD END OF

(CONTINUED AT RIGHT)

(GENERAL NOTES CONTINUED)

THE CAR. MULTIPLY THIS PERCENTAGE FIGURE TIMES THE WEIGHT OF THE OFFSET PORTION OF THE LOAD AND ADD THE PRODUCT TO THE WEIGHT OF THE SHORT-LOAD END OF THE LOAD. DOUBLE THIS SUM TO DETERMINE THE MINIMUM LOAD LIMIT OF THE CAR TO BE USED FOR A SHIPMENT.

F. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN A CAR WHICH IS 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.

G. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.

EXAMPLE:

SEE THE LOAD SHOWN ON PAGE 72, WHICH CONSISTS OF 40 PALLETIZED UNITS LOADED IN A 50'-6" LONG BOX CAR. THE UNITS ARE 40-1/2" LONG BY 54" WIDE BY 46" HIGH AND WEIGHT 2,116 POUNDS EACH. THE LONG PORTION OF THE LOAD IS TWO (2) LOAD UNITS LONGER THAN THE SHORT PORTION. THE CG OF THE OFFSET PORTION WILL BE AT THE JOINT BETWEEN THESE TWO UNITS. THE DISTANCE FROM THE JOINT OF THESE TWO UNITS TO THE CENTER OF THE CAR IS 27". REFER TO THE WEIGHT DISTRIBUTION CHART ON PAGE 69 AND IN THE LEFT COLUMN FIND 27", THEN UNDER THE HEADING FOR A 50'-6" CAR READ THE PERCENTAGE OF THE OFFSET PORTION OF THE LOAD, WHICH IS 55.6. MULTIPLY 55.6 TIMES THE WEIGHT OF THE OFFSET PORTION OF THE LOAD, WHICH IS 16,928 POUNDS. 55.6 TIMES 16,928 EQUALS 9,412 POUNDS. ADD 9,412 POUNDS TO THE WEIGHT OF THE SMALL PORTION OF THE LOAD (33,856 POUNDS) AND THE TOTAL IS 43,268 POUNDS. DOUBLE THIS SUM TO DETERMINE THE MINIMUM LOAD LIMIT OF THE CAR TO BE USED. IN THE LOAD SHOWN ON PAGE 72 THE MINIMUM LOAD LIMIT OF THE CAR TO BE USED IS 86,536 POUNDS.

MAXIMUM WEIGHT OF UNITS PER TIER / BAY				
NO. OF UNITS	LOAD PATTERN	WEIGHT RANGE OF UNITS USING 1 CROSS MEMBER	WEIGHT RANGE OF UNITS USING 2 CROSS MEMBERS	WEIGHT RANGE OF UNITS USING 3 CROSS MEMBERS
12	2 WIDE BY 6 LONG	333 LBS OR LESS	666 LBS OR LESS	1,000 LBS OR LESS
12	3 WIDE BY 4 LONG	333 LBS OR LESS	666 LBS OR LESS	1,000 LBS OR LESS
10	2 WIDE BY 5 LONG	334 LBS TO 400 LBS	667 LBS TO 800 LBS	1,001 LBS TO 1,200 LBS
9	3 WIDE BY 3 LONG	401 LBS TO 444 LBS	801 LBS TO 888 LBS	1,201 LBS TO 1,333 LBS
8	2 WIDE BY 4 LONG	445 LBS TO 500 LBS	889 LBS TO 1,000 LBS	1,334 LBS TO 1,500 LBS
6	2 WIDE BY 3 LONG	501 LBS TO 666 LBS	1,001 LBS TO 1,333 LBS	1,501 LBS TO 2,000 LBS
6	3 WIDE BY 2 LONG	501 LBS TO 666 LBS	1,001 LBS TO 1,333 LBS	1,501 LBS TO 2,000 LBS
3	3 WIDE BY 1 LONG	1,001 LBS TO 1,333 LBS	2,001 LBS TO 2,666 LBS	3,001 LBS TO 4,000 LBS
2	2 WIDE BY 1 LONG	1,334 LBS TO 2,000 LBS	2,667 LBS TO 4,000 LBS	———

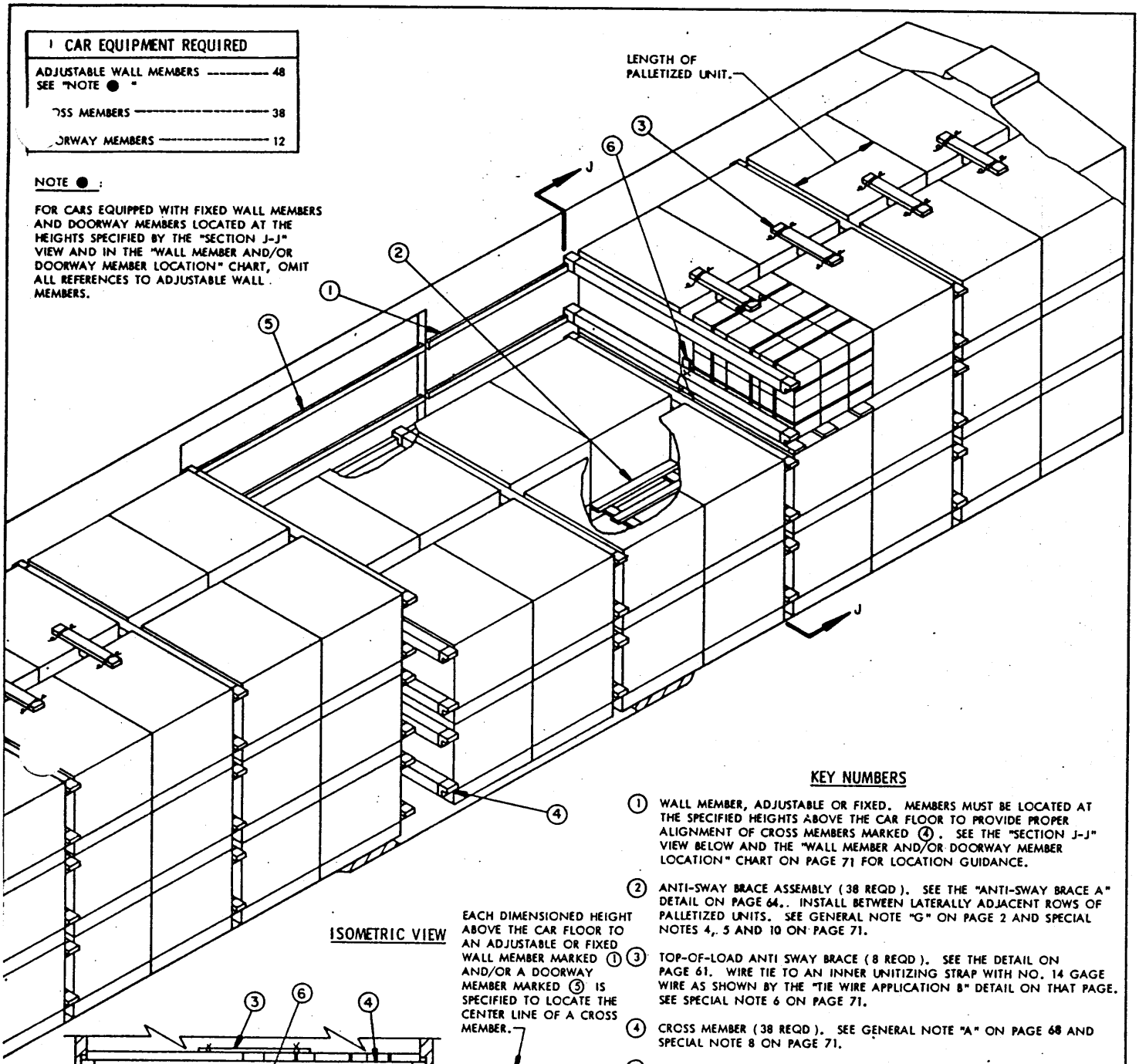
WEIGHT DISTRIBUTION			
DISTANCE FROM CENTER OF CAR TO CG * OF OFFSET UNITS IN INCHES	PERCENT OF WEIGHT OF OFFSET UNITS ON HEAVY END OF CAR		
	40'-6" CAR	50'-6" CAR	60'-8" CAR
6	51.5	51.2	51.1
9	52.9	51.9	51.6
12	53.2	52.5	52.1
15	54.1	53.1	52.7
18	55.0	53.7	53.2
21	55.8	54.4	53.8
24	56.5	55.0	54.3
27	57.3	55.6	54.9
30	58.0	56.1	55.4
33	58.9	56.8	55.9
36	59.7	57.4	56.5
39	60.5	58.2	57.0
42	61.3	59.0	57.6
45	62.2	59.4	58.1
48	63.0	59.8	58.6
54	64.5	61.0	59.7
60	66.2	62.2	60.8

* CENTER OF GRAVITY.

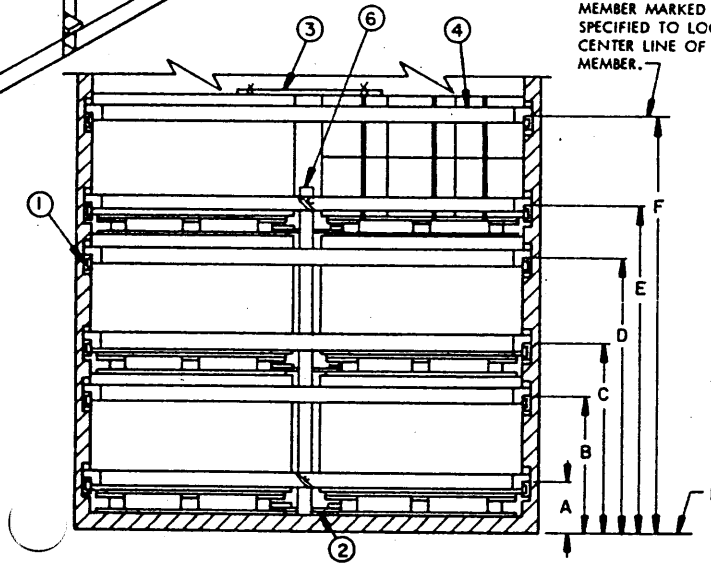
CAR EQUIPMENT REQUIRED	
ADJUSTABLE WALL MEMBERS SEE "NOTE ● "	48
CROSS MEMBERS	38
DOORWAY MEMBERS	12

NOTE ● :

FOR CARS EQUIPPED WITH FIXED WALL MEMBERS AND DOORWAY MEMBERS LOCATED AT THE HEIGHTS SPECIFIED BY THE "SECTION J-J" VIEW AND IN THE "WALL MEMBER AND/OR DOORWAY MEMBER LOCATION" CHART, OMIT ALL REFERENCES TO ADJUSTABLE WALL MEMBERS.



ISOMETRIC VIEW



SECTION J-J

EACH DIMENSIONED HEIGHT ABOVE THE CAR FLOOR TO AN ADJUSTABLE OR FIXED WALL MEMBER MARKED (1) AND/OR A DOORWAY MEMBER MARKED (5) IS SPECIFIED TO LOCATE THE CENTER LINE OF A CROSS MEMBER.

KEY NUMBERS

(1) WALL MEMBER, ADJUSTABLE OR FIXED. MEMBERS MUST BE LOCATED AT THE SPECIFIED HEIGHTS ABOVE THE CAR FLOOR TO PROVIDE PROPER ALIGNMENT OF CROSS MEMBERS MARKED (4). SEE THE "SECTION J-J" VIEW BELOW AND THE "WALL MEMBER AND/OR DOORWAY MEMBER LOCATION" CHART ON PAGE 71 FOR LOCATION GUIDANCE.

(2) ANTI-SWAY BRACE ASSEMBLY (38 REQD). SEE THE "ANTI-SWAY BRACE A" DETAIL ON PAGE 64. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLETIZED UNITS. SEE GENERAL NOTE "G" ON PAGE 2 AND SPECIAL NOTES 4, 5 AND 10 ON PAGE 71.

(3) TOP-OF-LOAD ANTI SWAY BRACE (8 REQD). SEE THE DETAIL ON PAGE 61. WIRE TIE TO AN INNER UNITIZING STRAP WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION B" DETAIL ON THAT PAGE. SEE SPECIAL NOTE 6 ON PAGE 71.

(4) CROSS MEMBER (38 REQD). SEE GENERAL NOTE "A" ON PAGE 68 AND SPECIAL NOTE 8 ON PAGE 71.

(5) DOORWAY MEMBER (12 REQD). SEE THE "SECTION J-J" VIEW BELOW AND THE "WALL MEMBER AND/OR DOORWAY MEMBER LOCATION" CHART ON PAGE 71 FOR LOCATION GUIDANCE. SEE SPECIAL NOTE 9 ON PAGE 71.

(6) ANTI-SWAY BRACE RETAINER, 2" X 4" BY A LENGTH TO EXTEND APPROXIMATELY 3" ABOVE THE LOWER CROSS MEMBER WHICH IS USED FOR THE BRACING OF THE TOPLAYER OF THE LOAD (12 REQD). POSITION SO AS TO STAND ON END AGAINST THE CROSS MEMBERS AND WIRE TIE TO THE TOP AND BOTTOM CROSS MEMBER W/2 WRAPS OF NO. 14 GAGE WIRE AT EACH LOCATION. SEE SPECIAL NOTE 10 ON PAGE 71.

TYPICAL 2-WIDE LOAD IN A 50'-6" LONG BOX CAR
EQUIPPED WITH MECHANICAL BRACING DEVICES HAVING ADJUSTABLE OR FIXED WALL MEMBERS

WALL MEMBER AND / OR DOORWAY MEMBER LOCATION	
LOCATION IDENTITY	DESCRIPTION OF LOCATION
A	8" MIN AND NOT MORE THAN 1/2 THE HEIGHT OF THE PALLETIZED UNIT.
B	2" DOWN FROM THE TOP OF THE FIRST-TIER PALLETIZED UNIT AND NOT LOWER THAN 2/3 OF THE PALLETIZED UNIT HEIGHT.
C	8" ABOVE THE BOTTOM OF THE SECOND-TIER PALLETIZED UNIT TO NOT MORE THAN 1/2 OF THE PALLETIZED UNIT HEIGHT IN THE SECOND TIER.
D	2" DOWN FROM THE TOP OF THE SECOND-TIER PALLETIZED UNIT AND NOT LOWER THAN 2/3 THE HEIGHT OF THE PALLETIZED UNIT HEIGHT IN THE SECOND TIER.
E	8" ABOVE THE BOTTOM OF THE THIRD-TIER PALLETIZED UNIT TO NOT MORE THAN 1/2 OF THE PALLETIZED UNIT HEIGHT IN THE THIRD TIER.
F	2" DOWN FROM THE TOP OF THE THIRD-TIER PALLETIZED UNIT AND NOT LOWER THAN 2/3 THE HEIGHT OF THE PALLETIZED UNIT IN THE THIRD TIER.

NOTE: IF THE LOAD IS MORE THAN THREE (3) TIERS HIGH, FOLLOW SIMILAR PROCEDURES FOR THE ADDED TIER(S). SEE SPECIAL NOTE 8 AT RIGHT.

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-0" WIDE (INSIDE CLEARANCE) BOX CAR EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS, AND WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.

2 THE PALLETIZED UNIT SHOWN IN THE TYPICAL 2-WIDE LOAD ON PAGE 70 HAS OVERALL DIMENSIONS OF 40" LONG BY 51" WIDE BY 35-1/2" HIGH. THE UNIT WEIGHT IS 1,970 POUNDS. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER LENGTHS AND WIDTHS BASED ON A DOOR HEIGHT OF 9'-8", FULL LOADS OF UNITS WHICH ARE MORE THAN 38-1/2" IN HEIGHT WILL BE LIMITED TO NOT MORE THAN TWO (2) TIERS. SEE SPECIAL NOTE 3.

3. A 2-WIDE LOAD IS SHOWN AS TYPICAL. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR 3-WIDE LOADS. DEPENDING UPON THE INSIDE WIDTH OF THE CAR TO BE LOADED, IT MAY BE POSSIBLE TO FORM THREE ROWS IF UNITS ARE APPROXIMATELY 36" LONG OR LESS. SEE THE LOAD SHOWN ON PAGE 14.

4. THE ANTI-SWAY BRACE A, SHOWN IN THE LOAD VIEW AS PIECE MARKED ②, IS DESIGNED FOR USE WITHIN LOADS HAVING THE PALLETIZED UNITS POSITIONED WITH THE LENGTH PARALLEL TO THE CAR SIDE WALLS.

5. THE ANTI-SWAY BRACING MAY BE OMITTED IF THE SPACE BETWEEN LATERALLY ADJACENT UNITS IS 6" OR LESS, AS MEASURED FROM BOX TO BOX ON LATERALLY ADJACENT UNITS, OR BETWEEN BATTENS, AS APPLICABLE. IF THE EXCESS SPACE EXCEEDS THE MAXIMUM ALLOWABLE, ANTI-SWAY BRACES MUST BE POSITIONED BETWEEN ALL LATERALLY ADJACENT PALLETIZED UNITS.

6. TOP-OF-LOAD ANTI-SWAY BRACES MUST BE INSTALLED IN EACH END OF A CAR. THE QUANTITY NEEDED IS DEPENDENT UPON THE DIMENSION OF THE UNIT WHICH IS POSITIONED LENGTHWISE IN THE CAR, AND UPON THE LENGTH OF THE CAR BEING LOADED. REFER TO THE "TOP-OF-LOAD ANTI-SWAY BRACE REQUIREMENTS" CHART ON PAGE 61 FOR GUIDANCE.

7. THE DEPICTED LOAD CAN BE ADJUSTED TO SUIT THE QUANTITY TO BE SHIPPED. A LOAD MAY BE REDUCED BY ONE LOAD UNIT OR BY ONE TIER OF A LOAD UNIT BY OBVIOUS MEANS. FOR GUIDANCE IN OMITTING A SINGLE UNIT FROM A LOAD, REFER TO PAGE 74.

8. PALLETIZED UNITS CAN BE POSITIONED IN CONFIGURATIONS OTHER THAN THE TYPICAL TWO LONG AND THREE HIGH WITHIN A BAY AS SHOWN ON PAGE 70 DEPENDING UPON THE WEIGHT OF THE UNIT BEING LOADED. THE CONFIGURATION SHOWN IS ADEQUATE FOR UNITS WHICH WEIGHT NOT MORE THAN 2,000 POUNDS. UNITS WHICH ARE HEAVIER WILL EITHER BE LIMITED TO ONE UNIT IN LENGTH IN A BAY OR ELSE AN ADDITIONAL CROSS MEMBER MUST BE INSTALLED FOR EACH TIER/BAY. PALLETIZED UNITS WEIGHING 1,350 POUNDS OR LESS CAN BE POSITIONED WITH MORE UNITS LONG IN EACH BAY. SEE THE "MAXIMUM WEIGHT OF UNITS PER TIER/BAY" CHART ON PAGE 69 FOR GUIDANCE. GUIDANCE IS ALSO PRESENTED IN THAT CHART FOR THE MAXIMUM WEIGHTS AND NUMBER LONG PER BAY OF PALLETIZED UNITS WHICH CAN BE LOADED 3-WIDE. FOR THOSE FEW UNITS WHICH ARE ONLY ONE BOX IN HEIGHT, EACH TIER/BAY MAY BE BRACED USING 1 CROSS MEMBER. THIS CROSS MEMBER MUST BE POSITIONED AGAINST THE UPPER THIRD OF THE UNIT HEIGHT AS INDICATED BY LOCATION IDENTITY "B", "D", AND/OR "F" IN THE "WALL MEMBER AND/OR DOORWAY MEMBER LOCATION" CHART AT LEFT.

9. IF THE CAR BEING OUTLOADED DOES NOT HAVE A SUFFICIENT QUANTITY OF DOORWAY MEMBERS THE TWO PALLETIZED UNITS IN THE THIRD LAYER WHICH EXTEND INTO THE DOORWAY AREA MAY BE OMITTED.

10. IF DESIRED, THE ANTI-SWAY BRACE ASSEMBLY C, AS DETAILED ON PAGE 65, MAY BE USED IN LIEU OF THE ANTI-SWAY BRACE ASSEMBLY A SHOWN IN THE LOAD VIEW. THE ANTI-SWAY BRACE ASSEMBLY A IS THE PREFERRED METHOD IF THE SPACE BETWEEN LATERALLY ADJACENT PALLET UNITS IS SUCH THAT IT CAN BE EASILY INSTALLED. NOTE THAT IF ANTI-SWAY BRACE ASSEMBLY C IS USED, RETAINER PIECES MUST BE WIRE TIED TO THE CROSS MEMBERS AS SHOWN BY KEY NUMBER ⑥ IN THE LOAD ON PAGE 70, AND/OR BY KEY NUMBER ⑦ IN THE LOAD ON PAGE 74.

BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4" 2" X 8"	313 111	209 148
NAILS	NO. REQD	POUNDS
10d (3") 12d (3-1/4")	456 16	7 1/2
WIRE, NO. 14 GAGE ---------- 40' REQD ---------- 1 LB		

LOAD AS SHOWN (TYPICAL)

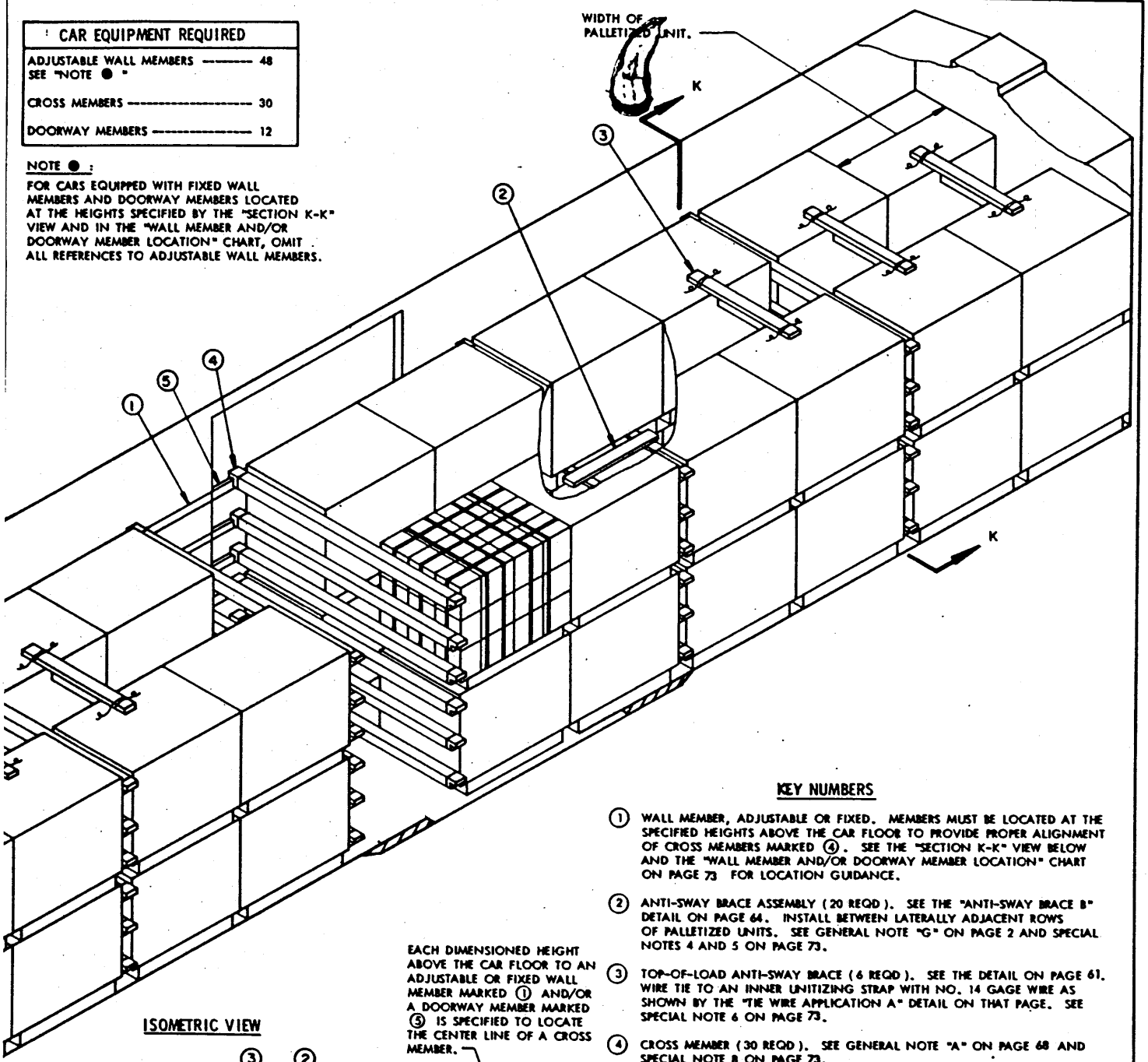
ITEM	QUANTITY	WEIGHT (APPROX)
PALLETIZED UNIT	76	149,720 LBS
DUNNAGE		723 LBS
TOTAL WEIGHT		150,443 LBS

TYPICAL 2-WIDE LOAD IN A 50'-6" LONG BOX CAR
EQUIPPED WITH MECHANICAL BRACING DEVICES HAVING ADJUSTABLE OR FIXED WALL MEMBERS

CAR EQUIPMENT REQUIRED	
ADJUSTABLE WALL MEMBERS SEE "NOTE ● "	48
CROSS MEMBERS	30
DOORWAY MEMBERS	12

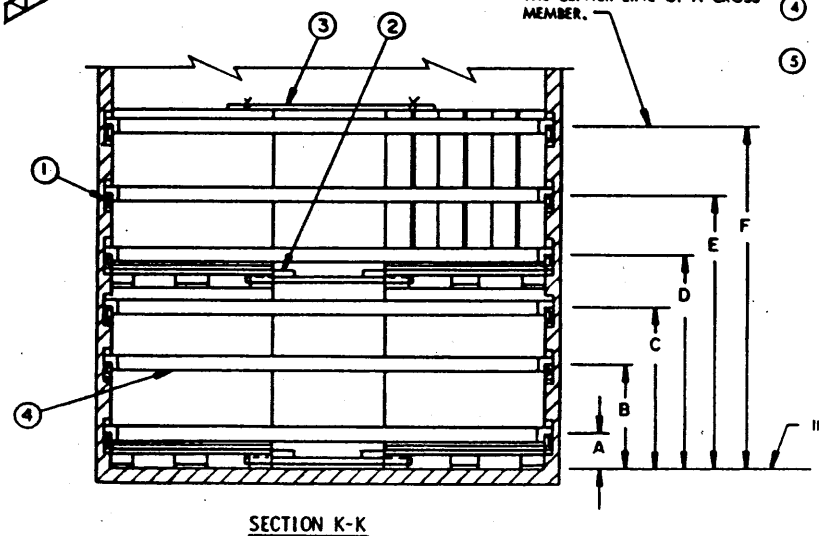
NOTE ● :

FOR CARS EQUIPPED WITH FIXED WALL MEMBERS AND DOORWAY MEMBERS LOCATED AT THE HEIGHTS SPECIFIED BY THE "SECTION K-K" VIEW AND IN THE "WALL MEMBER AND/OR DOORWAY MEMBER LOCATION" CHART, OMIT ALL REFERENCES TO ADJUSTABLE WALL MEMBERS.



ISOMETRIC VIEW

EACH DIMENSIONED HEIGHT ABOVE THE CAR FLOOR TO AN ADJUSTABLE OR FIXED WALL MEMBER MARKED ① AND/OR A DOORWAY MEMBER MARKED ⑤ IS SPECIFIED TO LOCATE THE CENTER LINE OF A CROSS MEMBER.



SECTION K-K

KEY NUMBERS

① WALL MEMBER, ADJUSTABLE OR FIXED. MEMBERS MUST BE LOCATED AT THE SPECIFIED HEIGHTS ABOVE THE CAR FLOOR TO PROVIDE PROPER ALIGNMENT OF CROSS MEMBERS MARKED ④. SEE THE "SECTION K-K" VIEW BELOW AND THE "WALL MEMBER AND/OR DOORWAY MEMBER LOCATION" CHART ON PAGE 73 FOR LOCATION GUIDANCE.

② ANTI-SWAY BRACE ASSEMBLY (20 REQD). SEE THE "ANTI-SWAY BRACE B" DETAIL ON PAGE 64. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLETIZED UNITS. SEE GENERAL NOTE "G" ON PAGE 2 AND SPECIAL NOTES 4 AND 5 ON PAGE 73.

③ TOP-OF-LOAD ANTI-SWAY BRACE (6 REQD). SEE THE DETAIL ON PAGE 61. WIRE TIE TO AN INNER UNITIZING STRAP WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION A" DETAIL ON THAT PAGE. SEE SPECIAL NOTE 6 ON PAGE 73.

④ CROSS MEMBER (30 REQD). SEE GENERAL NOTE "A" ON PAGE 68 AND SPECIAL NOTE 8 ON PAGE 73.

⑤ DOORWAY MEMBER (12 REQD). SEE THE "SECTION K-K" VIEW BELOW AND THE "WALL MEMBER AND/OR DOORWAY MEMBER LOCATION" CHART ON PAGE 73 FOR LOCATION GUIDANCE. SEE SPECIAL NOTE 9 ON PAGE 73.

TYPICAL 2-WIDE LOAD IN A 50'-6" LONG BOX CAR EQUIPPED WITH MECHANICAL BRACING DEVICES HAVING ADJUSTABLE OR FIXED WALL MEMBERS

WALL MEMBER AND / OR DOORWAY MEMBER LOCATION	
LOCATION IDENTITY	DESCRIPTION OF LOCATION
A	8" MIN AND NOT MORE THAN 1/2 THE HEIGHT OF THE PALLETIZED UNIT.
B	POSITION BETWEEN A AND C.
C	2" DOWN FROM THE TOP OF THE FIRST-TIER PALLETIZED UNIT AND NOT LOWER THAN 2/3 OF THE PALLETIZED UNIT HEIGHT.
D	8" ABOVE THE BOTTOM OF THE SECOND-TIER PALLETIZED UNIT TO NOT MORE THAN 1/2 OF THE PALLETIZED UNIT HEIGHT IN THE SECOND TIER.
E	POSITION BETWEEN D AND F.
F	2" DOWN FROM THE TOP OF THE SECOND-TIER PALLETIZED UNIT AND NOT LOWER THAN 2/3 THE HEIGHT OF THE PALLETIZED UNIT HEIGHT IN THE SECOND TIER.
NOTE: IF THE LOAD IS MORE THAN TWO (2) TIERS HIGH, FOLLOW SIMILAR PROCEDURES FOR THE ADDED TIER(S). SEE SPECIAL NOTE 8 AT RIGHT.	

SPECIAL NOTES:

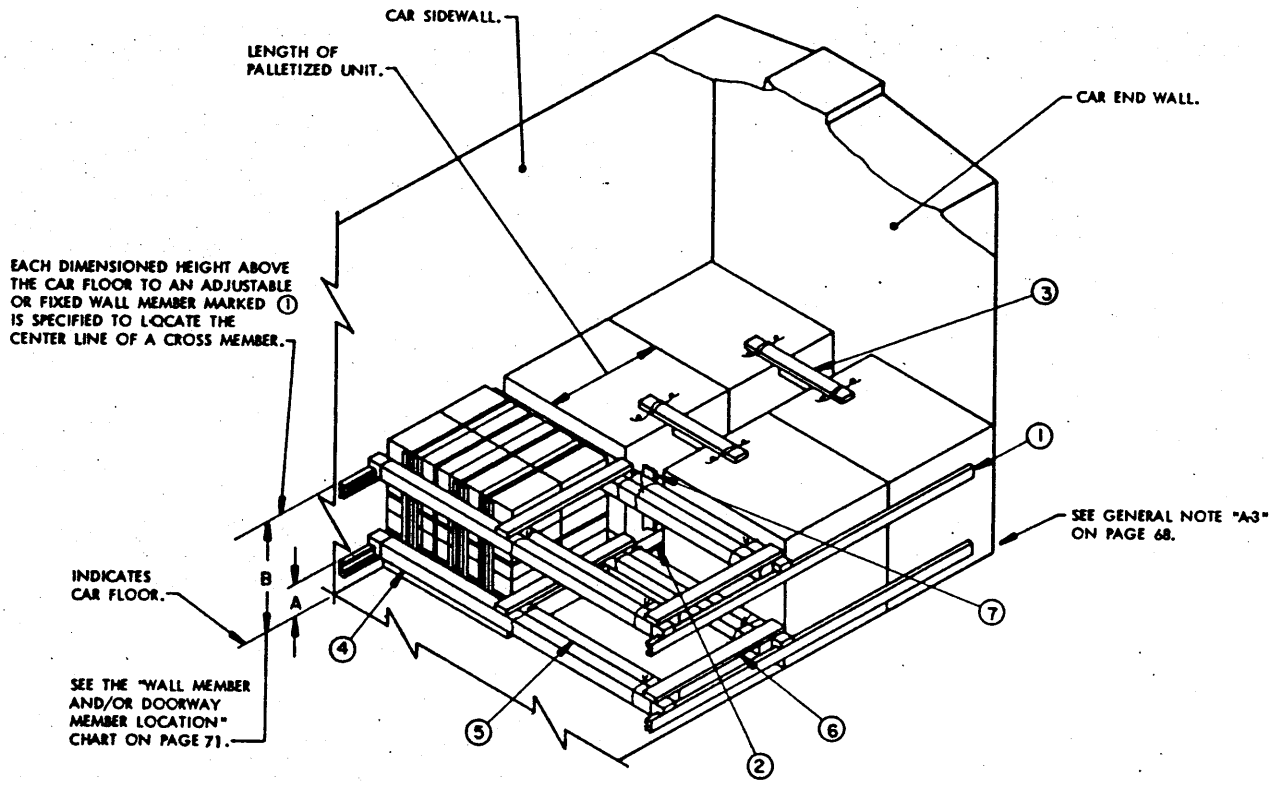
1. A 50'-6" LONG BY 9'-0" WIDE (INSIDE CLEARANCE) BOX CAR EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS, AND WITH 8'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED.
2. THE PALLETIZED UNIT SHOWN IN THE TYPICAL 2-WIDE LOAD ON PAGE 72 HAS OVERALL DIMENSIONS OF 40-1/2" LONG BY 54" WIDE BY 46" HIGH. THE UNIT WEIGHT IS 2,116 POUNDS. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER LENGTHS AND WIDTHS. BASED ON A DOOR HEIGHT OF 9'-8", FULL LOADS OF UNITS WHICH ARE MORE THAN 38-1/2" IN HEIGHT WILL BE LIMITED TO NOT MORE THAN TWO (2) TIERS. SEE SPECIAL NOTE 3.
3. A 2-WIDE LOAD IS SHOWN AS TYPICAL. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR 3-WIDE LOADS. DEPENDING UPON THE INSIDE WIDTH OF THE CAR TO BE LOADED, IT MAY BE POSSIBLE TO FORM THREE ROWS IF UNITS ARE APPROXIMATELY 36" LONG OR LESS. SEE THE LOAD SHOWN ON PAGE 14.
4. THE ANTI-SWAY BRACE B, SHOWN IN THE LOAD VIEW AS PIECE MARKED (2), IS DESIGNED FOR USE WITHIN LOADS HAVING THE PALLETIZED UNITS POSITIONED WITH THE WIDTH PARALLEL TO THE CAR SIDE WALLS.
5. THE ANTI-SWAY BRACING MAY BE OMITTED IF THE SPACE BETWEEN LATERALLY ADJACENT UNITS IS 6" OR LESS, AS MEASURED FROM BOX TO BOX ON LATERALLY ADJACENT UNITS, OR BETWEEN BATTENS, AS APPLICABLE. IF THE EXCESS SPACE EXCEEDS THE MAXIMUM ALLOWABLE, ANTI-SWAY BRACES MUST BE POSITIONED BETWEEN ALL LATERALLY ADJACENT PALLETIZED UNITS.
6. TOP-OF-LOAD ANTI-SWAY BRACES MUST BE INSTALLED IN EACH END OF A CAR. THE QUANTITY NEEDED IS DEPENDENT UPON THE DIMENSION OF THE UNIT WHICH IS POSITIONED LENGTHWISE IN THE CAR, AND UPON THE LENGTH OF THE CAR BEING LOADED. REFER TO THE "TOP-OF-LOAD ANTI-SWAY BRACE REQUIREMENTS" CHART ON PAGE 61 FOR GUIDANCE.
7. THE DEPICTED LOAD CAN BE ADJUSTED TO SUIT THE QUANTITY TO BE SHIPPED. A LOAD MAY BE REDUCED BY ONE LOAD UNIT OR BY ONE TIER OF A LOAD UNIT BY OBVIOUS MEANS. FOR GUIDANCE IN OMITTING A SINGLE UNIT FROM A LOAD, REFER TO PAGE 74.
8. PALLETIZED UNITS CAN BE POSITIONED IN CONFIGURATIONS OTHER THAN THE TYPICAL TWO LONG AND TWO HIGH WITHIN A BAY AS SHOWN ON PAGE 72 DEPENDING UPON THE WEIGHT OF THE UNIT BEING LOADED. THE CONFIGURATION SHOWN IS ADEQUATE FOR UNITS WHICH WEIGH NOT MORE THAN 3,000 POUNDS. UNITS WHICH ARE HEAVIER WILL EITHER BE LIMITED TO ONE UNIT IN LENGTH IN A BAY OR ELSE AN ADDITIONAL CROSS MEMBER MUST BE INSTALLED FOR EACH TIER/BAY. PALLETIZED UNITS WEIGHING 1,350 POUNDS OR LESS CAN BE POSITIONED WITH MORE UNITS LONG IN EACH BAY. SEE THE "MAXIMUM WEIGHT OF UNITS PER TIER/BAY" CHART ON PAGE 69 FOR GUIDANCE. GUIDANCE IS ALSO PRESENTED IN THAT CHART FOR THE MAXIMUM WEIGHTS AND NUMBER LONG PER BAY OF PALLETIZED UNITS WHICH CAN BE LOADED 3-WIDE FOR THOSE FEW UNITS WHICH ARE ONLY ONE BOX IN HEIGHT. EACH TIER/BAY MAY BE BRACED USING 1 CROSS MEMBER. THIS CROSS MEMBER MUST BE POSITIONED AGAINST THE UPPER THIRD OF THE UNIT HEIGHT AS INDICATED BY LOCATION IDENTITY "C" AND/OR "F" IN THE "WALL MEMBER AND/OR DOORWAY MEMBER LOCATION" CHART AT LEFT.
9. IF THE CAR BEING OUTLOADED DOES NOT HAVE A SUFFICIENT QUANTITY OF DOORWAY MEMBERS THE FOUR PALLETIZED UNITS IN THE SECOND LAYER WHICH EXTEND INTO THE DOORWAY AREA MAY BE OMITTED.

BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4" 2" X 6"	163 130	109 130
NAILS	NO REQD	POUNDS
10d (3") 12d (3-1/4")	240 30	3-3/4 1/2
WIRE, NO. 14 GAGE ---------- 24' REQD ---------- NIL		

LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLETIZED UNIT	40	84,640 LBS
DUNNAGE		483 LBS
TOTAL WEIGHT		85,123 LBS

TYPICAL 2-WIDE LOAD IN A 50'-6' LONG BOX CAR EQUIPPED
WITH MECHANICAL BRACING DEVICES HAVING ADJUSTABLE OR FIXED WALL MEMBERS



ISOMETRIC VIEW

SPECIAL NOTES:

1. THE PALLETIZED UNIT SHOWN HAS OVERALL DIMENSIONS OF 40-1/8" LONG BY 48" WIDE BY 42-5/8" HIGH. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER LENGTHS AND WIDTHS.
2. A 2-WIDE LCL LOAD IS SHOWN AS TYPICAL. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR 3-WIDE LOADS IF THE UNITS ARE APPROXIMATELY 36" LONG OR LESS. SEE THE LOAD SHOWN ON PAGE 14.
3. FIVE (5) UNITS ARE SHOWN AS A TYPICAL LOAD QUANTITY. THE NUMBER OF UNITS CAN BE ADJUSTED TO SUIT THE QUANTITY TO BE SHIPPED.
4. PALLETIZED UNITS CAN BE POSITIONED IN CONFIGURATIONS OTHER THAN THE TWO LONG PER BAY AS SHOWN, DEPENDING UPON THE WEIGHT OF THE UNIT BEING LOADED. SEE THE "MAXIMUM WEIGHT OF UNITS PER TIER/BAY" CHART ON PAGE 69 FOR GUIDANCE.

KEY NUMBERS

① WALL MEMBER, ADJUSTABLE OR FIXED. MEMBERS MUST BE LOCATED AT THE SPECIFIED HEIGHTS ABOVE THE CAR FLOOR TO PROVIDE PROPER ALIGNMENT OF CROSS MEMBERS MARKED ④.

② ANTI-SWAY BRACE ASSEMBLY (2 REQD). SEE THE "ANTI-SWAY BRACE A" DETAIL ON PAGE 64. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLETIZED UNITS. SEE GENERAL NOTE "G" ON PAGE 2 AND SPECIAL NOTES 4, 5 AND 10 ON PAGE 71.

③ TOP-OF-LOAD ANTI-SWAY BRACE (2 REQD). SEE THE DETAIL ON PAGE 61. WIRE TIE TO AN INNER UNITIZING STRAP WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION B" DETAIL ON THAT PAGE. SEE SPECIAL NOTE 6 ON PAGE 71.

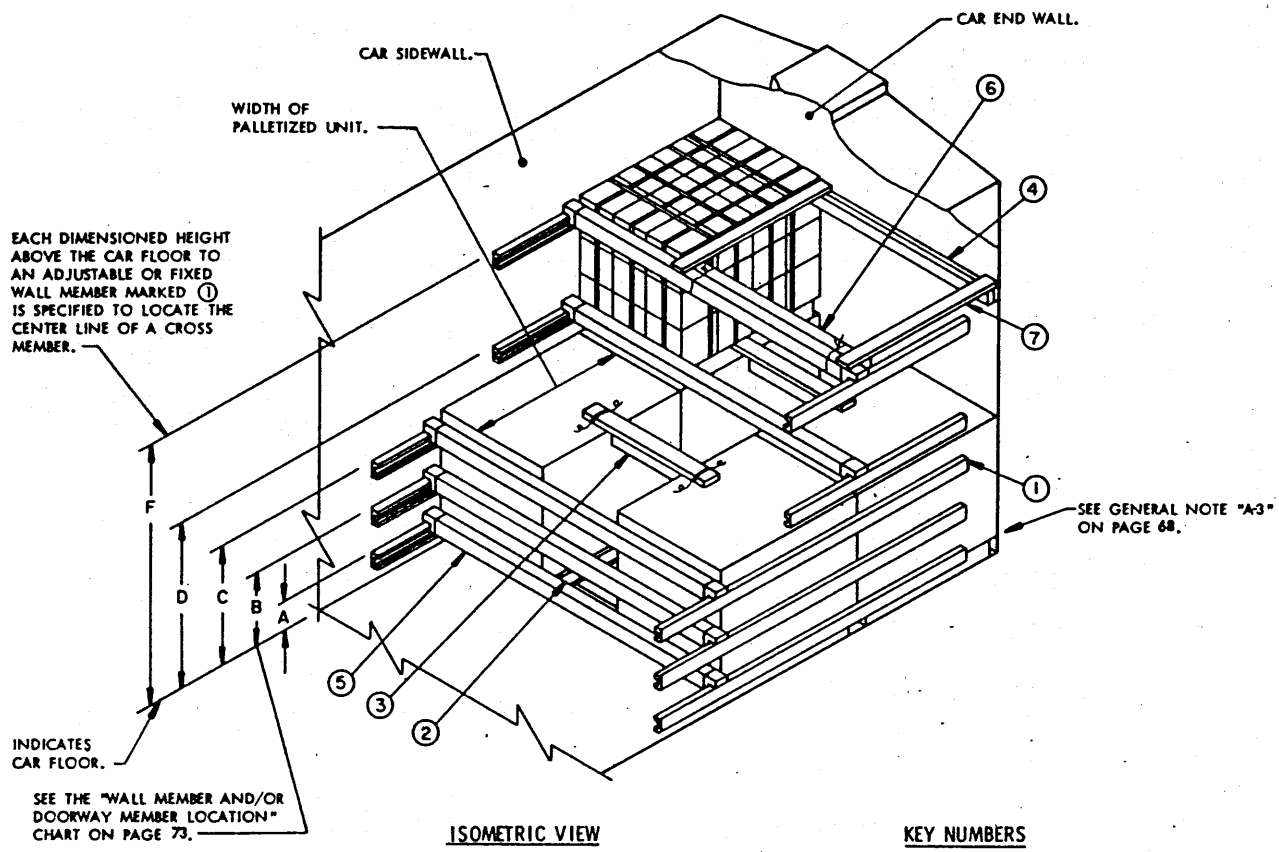
④ CROSS MEMBER (4 REQD). SEE GENERAL NOTE "A" ON PAGE 68 AND SPECIAL NOTE 4 AT LEFT.

⑤ SIDE BLOCKING, 4" X 4" BY CUT TO FIT BETWEEN PALLETIZED UNIT AND CAR SIDEWALL (4 REQD). WIRE TIE TO CROSS MEMBER W/2 WRAPS OF NO. 14 GAGE WIRE AT EACH END.

⑥ SUPPORT PIECE, 2" X 4" BY CUT TO FIT (REF UNIT LENGTH PLUS 7") (4 REQD). NAIL TO PIECES MARKED ⑤ W/3-12d NAILS AT EACH JOINT.

⑦ ANTI-SWAY BRACE RETAINER, 2" X 4" BY A LENGTH TO EXTEND APPROXIMATELY 3" ABOVE THE UPPER LEVEL CROSS MEMBER (1 REQD). POSITION SO AS TO STAND ON END AGAINST THE CROSS MEMBERS AND WIRE TIE TO THE CROSS MEMBERS W/2 WRAPS OF NO. 14 GAGE WIRE AT EACH LOCATION. SEE SPECIAL NOTE 10 ON PAGE 71.

TYPICAL LCL (5-UNIT LOAD) IN A BOX CAR EQUIPPED WITH MECHANICAL BRACING DEVICES HAVING ADJUSTABLE OR FIXED WALL MEMBERS



ISOMETRIC VIEW

SPECIAL NOTES:

1. THE PALLETIZED UNIT SHOWN HAS OVERALL DIMENSIONS OF 40-1/2" LONG BY 54" WIDE BY 46" HIGH. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER DIMENSIONS. NOTE THAT THESE PROCEDURES SHOULD ONLY BE USED WHEN THE UNITS TO BE SHIPPED ARE TOO WIDE TO BE LOADED IN TWO ROWS AS SHOWN IN THE LCL LOAD ON PAGE 74.

2. A 2-WIDE LOAD IS SHOWN AS TYPICAL. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR 3-WIDE LOADS IF THE UNITS ARE APPROXIMATELY 36" LONG OR LESS. SEE THE LOAD SHOWN ON PAGE 14.

3. FIVE (5) UNITS ARE SHOWN AS A TYPICAL LOAD QUANTITY. THE NUMBER OF UNITS CAN BE ADJUSTED TO SUIT THE QUANTITY TO BE SHIPPED. NOTE THAT THE METHOD OF OMITTING A SECOND-LAYER UNIT AS SHOWN IS ONLY APPLICABLE FOR USE AT THE END OF A CAR AND ONLY WHEN THE END WALLS ARE NAILABLE.

4. PALLETIZED UNITS CAN BE POSITIONED IN CONFIGURATIONS OTHER THAN THE TWO LONG PER BAY AS SHOWN, DEPENDING UPON THE WEIGHT OF THE UNIT BEING LOADED. SEE THE "MAXIMUM WEIGHT OF UNITS PER TIER/BAY" CHART ON PAGE 69 FOR GUIDANCE.

KEY NUMBERS

① WALL MEMBER, ADJUSTABLE OR FIXED. MEMBERS MUST BE LOCATED AT THE SPECIFIED HEIGHTS ABOVE THE CAR FLOOR TO PROVIDE PROPER ALIGNMENT OF CROSS MEMBERS MARKED ⑤.

② ANTI-SWAY BRACE ASSEMBLY (2 REQD). SEE THE "ANTI-SWAY BRACE B" DETAIL ON PAGE 64. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLETIZED UNITS. SEE GENERAL NOTE "G" ON PAGE 2 AND SPECIAL NOTES 4 AND 5 ON PAGE 73.

③ TOP-OF-LOAD ANTI-SWAY BRACE (2 REQD). SEE THE DETAIL ON PAGE 61. WIRE TIE TO AN INNER UNITIZING STRAP WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION A" DETAIL ON THAT PAGE. SEE SPECIAL NOTE 6 ON PAGE 73.

④ SIDE BLOCKING, 2" X 4" BY CUT TO FIT BETWEEN PALLETIZED UNIT AND CAR SIDEWALL (DOUBLED) (1 REQD). NAIL THE FIRST PIECE TO THE CAR END WALL W/7-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.

⑤ CROSS MEMBER (5 REQD). SEE GENERAL NOTE "A" ON PAGE 68. SEE SPECIAL NOTE 4 AT LEFT.

⑥ SIDE BLOCKING, 4" X 4" BY CUT TO FIT BETWEEN PALLETIZED UNIT AND CAR SIDEWALL (1 REQD). WIRE TIE TO CROSS MEMBER W/2 WRAPS OF NO. 14 GAGE WIRE AT EACH END.

⑦ SUPPORT PIECE, 2" X 4" BY CUT TO FIT (REF UNIT WIDTH PLUS 7") (2 REQD). NAIL TO PIECES MARKED ④ AND ⑥ W/3-12d NAILS AT EACH JOINT.

TYPICAL LCL (5-UNIT LOAD) IN A BOX CAR EQUIPPED WITH MECHANICAL BRACING DEVICES HAVING ADJUSTABLE OR FIXED WALL MEMBERS

GENERAL NOTES

(FOR CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS)

A. THE OUTLOADING PROCEDURES SPECIFIED ON PAGES 78 THRU 84 ARE FOR CUSHIONED BOX CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS. CAUTION: 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.

B. 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 AMMUNITION ITEMS.

C. LOAD DIVIDER CARS MAY BE EQUIPPED EITHER WITH CONVENTIONAL SLIDING DOORS OR 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.

D. THE SELECTION OF RAIL CARS FOR THE TRANSPORT OF PALLETIZED UNITS OF AMMUNITION ITEMS 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. 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.

E. WHEN SELECTING RAILCARS, EVERY EFFORT SHOULD BE MADE TO OBTAIN BOX CARS THAT DO NOT HAVE BOWED END WALLS. CARS WITH BOWED ENDS CAN BE USED, HOWEVER, IF AN END WALL IS BOWED OUTWARD MORE THAN ONE AND ONE-HALF INCHES (1-1/2"), EITHER FROM SIDE TO SIDE OR FROM FLOOR TO ROOF, AN END-OF-CAR BULKHEAD MUST BE INSTALLED TO PROVIDE A "SQUARED OFF" SURFACE FOR THE LOAD AT THE END OF THE CAR. REFER TO PAGE 65 FOR GUIDANCE.

F. 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. A "FILL PIECE" MUST BE INSTALLED IN THE VOID BETWEEN THE CAR SIDEWALL AND THE SIDE FILLER PANEL. SEE THE "TYPICAL TYPE A" VIEW ON PAGE 84 FOR GUIDANCE. IF THE BACK OF THE SIDE FILLER PANELS ARE REINFORCED WITH VERTICAL AND HORIZONTAL STEEL MEMBERS AS SHOWN IN THE "TYPICAL TYPE B" VIEW ON PAGE 84, THE "FILL PIECE" MATERIAL IS NOT REQUIRED.

G. 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.

H. 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 FOR LOADS OF CLASS C EXPLOSIVES. 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 "J-3" AT RIGHT. DETAILS OF STRUT ASSEMBLIES FOR USE BETWEEN 2-PIECE BULKHEADS AND BETWEEN 1-PIECE BULKHEADS ARE SHOWN ON PAGE 82. IN THE EVENT THAT A STRUT ASSEMBLY IS OF SUCH A LENGTH THAT THE 4" X 4" STRUTS OF THE ASSEMBLY ARE LONGER THAN 12'-0", A SPECIAL HOLD-DOWN ASSEMBLY MUST BE USED. SEE THE "STRUT ASSEMBLY HOLD-DOWN" DETAILS ON PAGE 83 FOR GUIDANCE.

J. 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 PALLETIZED UNITS WHICH ARE IN ONE LOAD UNIT. A LOAD UNIT IS DEFINED AS A STACK OF CONTAINERS WHICH IS FULL CAR WIDTH BY FULL LOAD HEIGHT BY ONE UNIT IN LENGTH. IF THE QUANTITY TO BE SHIPPED CANNOT BE ATTAINED BY ADJUSTING THE NUMBER OF TIERS IN ONE OR BOTH ENDS OF A CAR, OR BY ADJUSTING THE NUMBER OF LOAD UNITS IN EITHER END OF THE CAR, ONE OF THE FOLLOWING PROCEDURES MUST BE USED IN ORDER TO OBTAIN THE DESIRED QUANTITY.

1. ONE OR MORE RISERS CAN BE POSITIONED WITHIN A LOAD TO INCREASE OR DECREASE A LOAD QUANTITY. SEE THE RISER DETAIL ON PAGE 63 AND THE PROCEDURES ON PAGE 22 DEPICTING THE TYPICAL INSTALLATION OF RISERS.

2. THE "GATES AND STRUTS" METHOD OF OMITTING A PALLETIZED UNIT MAY BE USED TO ADJUST A LOAD QUANTITY DOWNWARD BY OTHER THAN A MULTIPLE OF A LOAD UNIT. SEE THE PROCEDURES ON PAGE 81 FOR GUIDANCE.

(CONTINUED AT RIGHT)

(GENERAL NOTES CONTINUED)

3. AT LOCATION (S) WHERE K-BRACES MIGHT NORMALLY BE USED IN A LOAD IN A CONVENTIONAL CAR, LOAD DIVIDER BULKHEADS CAN BE POSITIONED. LOADING CAN THEN CONTINUE TOWARD THE CENTER OF THE CAR FROM EACH INSTALLED LOAD DIVIDER BULKHEAD, IN 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.

4. 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 37, OR WITH KNEE BRACE ASSEMBLIES, AS SHOWN ON PAGES 28 AND 29.

5. IF THE CAR HEIGHT PERMITS, AND IF SUFFICIENT SPACE IS NOT AVAILABLE BETWEEN THE LOAD DIVIDER BULKHEADS FOR THE PLACEMENT OF A UNIT, ONE (1) TOP-LAYER UNIT MAY BE ADDED IN EACH CORNER OF THE CAR, AS NECESSARY TO OBTAIN A DESIRED QUANTITY. EACH OF THESE ADDED UNITS MUST BE SECURED TO THE UNIT (S) DIRECTLY BENEATH WITH TWO (2) VERTICAL UNITIZING STRAPS AND ONE (1) FIGURE-8 UNITIZING STRAP. IF TWO UNITS ARE LOADED IN ONE END OF A CAR, AN ANTI-SWAY BRACE, AS DETAILED ON PAGE 64, WILL BE INSTALLED BETWEEN THEM. IF ONLY ONE UNIT IS LOADED IN AN END OF A CAR, LATERAL BRACING WILL BE PROVIDED BY INSTALLING TOP-OF-LOAD ANTI-SWAY BRACES AS SHOWN BY THE PROCEDURES ON PAGE 80.

K. CAUTION: CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS MUST NOT BE USED FOR SHIPMENT OF EXPLOSIVES SUCH AS DYNAMITE, TNT, BLACK POWDER, SMOKELESS POWDER (PROPELLANT EXPLOSIVES), TETRYL AND SIMILAR EXPLOSIVES (EXCEPT AS A COMPONENT PART OF AMMUNITION OR PROPELLING CHARGES) WHICH ARE LIABLE TO SIFT OR BECOME LODGED IN THE MECHANISM OF THE LOADING AND BRACING DEVICE IN THE EVENT OF A CONTAINER FAILURE.

L. 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. SEE GENERAL NOTE "P".

M. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN CARS WHICH ARE PARTIALLY LOADED WITH PALLETIZED UNITS OF AMMUNITION ITEMS, 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.

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 A FULL LOAD AND TO THE NAILING TO THE CAR FLOOR OF LCL BRACES AND/OR KNEE BRACE ASSEMBLIES IF USED. IF A NAIL SIZE IS NOT SPECIFIED IN THE CAR, 30d NAILS SHOULD BE USED IN LIEU OF THOSE SPECIFIED IN THE APPLICABLE KEY NUMBERS. SEE GENERAL NOTE "G" ON PAGE 2.

O. 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 OR THREE MORE LOAD UNITS IN ONE END THAN IN THE OTHER, IS CONSIDERED TO BE AN OFFSET LOAD. SEE GENERAL NOTE "P".

P. CAUTION: THE TOTAL WEIGHT OF A LOAD IN A CAR MUST NOT EXCEED THE LOAD LIMIT WHICH IS STENCILED ON THE SIDE OF THE CAR. ALSO, THE LOAD WEIGHT ON ONE TRUCK MUST NOT EXCEED ONE-HALF OF THE STENCILED LOAD LIMIT. 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 NATURALLY 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. TO DETERMINE THE PORTION OF THE WEIGHT OF THE OFFSET SECTION OF THE LOAD WHICH WILL BE TRANSMITTED TO EACH END OF A CAR, THE FOLLOWING GUIDANCE IS PRESENTED.

1. FOR A SHIPMENT CONSISTING OF AN EVEN NUMBER OF LOAD UNITS LONG LOADED IN AN OFFSET PATTERN, THE LONG PORTION OF A LOAD WILL BE TWO (2) LOAD UNITS LONGER THAN THE SHORT PORTION. THE CG OF THE OFFSET PORTION WILL BE AT THE JOINT BETWEEN THOSE TWO UNITS. MEASURE THE DISTANCE FROM THE CENTER OF THE CAR LENGTH TO THE JOINT BETWEEN THOSE UNITS. REFER TO THE WEIGHT DISTRIBUTION CHART ON PAGE 77. READ UNDER THE PROPER CAR SIZE HEADING AND OPPOSITE THE DIMENSION NEAREST TO THAT MEASURED, THE PERCENTAGE OF THE OFFSET PORTION OF THE LOAD (TWO LOAD UNITS IN THIS CASE) WHICH IS ON THE LONG-LOAD END OF THE CAR. MULTIPLY THIS PERCENTAGE FIGURE TIMES THE WEIGHT OF THE OFFSET PORTION OF THE LOAD AND ADD THE PRODUCT TO THE WEIGHT OF THE SHORT-LOAD END OF THE LOAD. DOUBLE THIS SUM TO DETERMINE THE MINIMUM LOAD LIMIT OF THE CAR TO BE USED FOR A SHIPMENT. SEE THE "EXAMPLE" ON PAGE 68 AND THE REFERENCED LOAD ON PAGE 72.

(CONTINUED ON PAGE 77)

(GENERAL NOTES CONTINUED FROM PAGE 76)

2. FOR A SHIPMENT CONSISTING OF AN UNEVEN NUMBER OF LOAD UNITS THE LONG PORTION OF THE LOAD WILL BE ONE (1) LOAD UNIT LONGER THAN THE SHORT PORTION. THE CG OF THE OFFSET PORTION WILL BE AT THE CENTER OF THAT LOAD UNIT. MEASURE THE DISTANCE FROM THE CENTER OF THE CAR LENGTH TO THE CENTER OF THE ONE LOAD UNIT. REFER TO THE "WEIGHT DISTRIBUTION" CHART BELOW AND READ UNDER THE PROPER CAR SIZE HEADING AND OPPOSITE THE DIMENSION NEAREST TO THAT MEASURED. THE PERCENTAGE OF THE OFFSET PORTION OF THE LOAD WHICH IS ON THE LONG-LOAD END OF THE CAR. MULTIPLY THIS PERCENTAGE FIGURE TIMES THE WEIGHT OF THE OFFSET PORTION OF THE LOAD AND ADD THE PRODUCT TO THE WEIGHT OF THE SHORT-LOAD END OF THE LOAD. DOUBLE THIS SUM TO DETERMINE THE MINIMUM LOAD LIMIT OF THE CAR TO BE USED FOR A SHIPMENT.

WEIGHT DISTRIBUTION			
DISTANCE FROM CENTER OF CAR TO CG * OF OFFSET UNITS IN INCHES	PERCENT OF WEIGHT OF OFFSET UNITS ON HEAVY END OF CAR		
	40'-6" CAR	50'-6" CAR	60'-8" CAR
6	51.5	51.2	51.1
9	52.9	51.9	51.6
12	53.2	52.5	52.1
15	54.1	53.1	52.7
18	55.0	53.7	53.2
21	55.8	54.4	53.8
24	56.5	55.0	54.3
27	57.3	55.6	54.9
30	58.0	56.1	55.4
33	58.9	56.8	55.9
36	59.7	57.4	56.5
39	60.5	58.2	57.0
42	61.3	58.0	57.6
45	62.2	58.4	58.1
48	63.0	60.8	58.6
54	64.6	61.6	59.7
60	66.2	62.2	60.8

*CENTER OF GRAVITY.

SPECIAL NOTES:

1. THE FOLLOWING SPECIAL NOTES AND THE TWO (2) CHARTS BELOW, IN CONJUNCTION WITH TWO SPECIAL NOTES AND CHARTS ON PAGE 5, ARE PRESENTED AS GUIDANCE IN THE SELECTION OF A LOAD PATTERN, AND IN DETERMINING THE QUANTITY OF UNITS WHICH CAN BE LOADED IN A CAR EQUIPPED WITH LOAD DIVIDER BULKHEADS, BASED ON THE SIZE AND WEIGHT OF THE PALLETIZED UNIT TO BE LOADED.

2. CHART NO. 1 MAY BE USED IN SELECTING A LOAD PATTERN, SUCH AS 2-WIDE OR 3-WIDE, FOR THE WIDTH OF THE CAR WHICH IS TO BE LOADED. THE LOAD PATTERN WILL BE BASED EITHER ON THE UNIT LENGTH ACROSS THE CAR OR ON THE UNIT WIDTH ACROSS THE CAR DEPENDENT UPON THE LENGTH OR WIDTH DIMENSIONS OF THE UNIT TO BE LOADED. UNIT SIZE RANGES AND LOAD PATTERNS FOR FIVE OF THE MOST POPULAR CAR WIDTHS ARE GIVEN. CARS OF OTHER WIDTHS MAY BE USED, OF COURSE, AND THE SIZE RANGE OF UNITS WHICH CAN BE LOADED IN THE VARIOUS PATTERNS CAN BE CALCULATED. THE SMALLER FIGURE SHOWN FOR UNIT SIZE RANGE IS BASED ON THE MINIMUM UNIT LENGTH OR WIDTH, AS APPLICABLE, AND THE LARGER FIGURE IS CALCULATED ON THERE BEING AT LEAST ONE INCH (1") EXCESS LATERAL SPACE REMAINING IN THE CAR AFTER THE UNITS ARE POSITIONED.

3. CHART NO. 2 MAY BE USED IN DETERMINING THE QUANTITY OF UNITS WHICH CAN BE POSITIONED WITHIN THE LENGTH OF A CAR. SEPARATE COLUMNS ARE SHOWN FOR THREE OF THE MOST POPULAR CAR LENGTHS. CARS OF OTHER INSIDE LENGTHS MAY BE USED, OF COURSE, BUT THE UNIT SIZE RANGE FOR THE NUMBER OF UNITS LONG WILL HAVE TO BE CALCULATED. THE UNIT SIZE RANGE FOR EACH OF THE SPECIFIED CAR LENGTHS IS BASED ON HAVING A SPACE APPROXIMATELY 38" LONG NEAR THE CENTER OF THE CAR LENGTH, WHICH ALLOWS 6" EACH FOR THE THICKNESS OF THE TWO BULKHEADS AND A 26" SPACE FOR MANIPULATION OF THE BULKHEAD OPERATING LEVER. THIS 26" ALLOWANCE MAY BE REDUCED TO JUST A FEW INCHES IF THE BULKHEADS ARE OPERABLE FROM THE EDGE OF THE BULKHEAD.

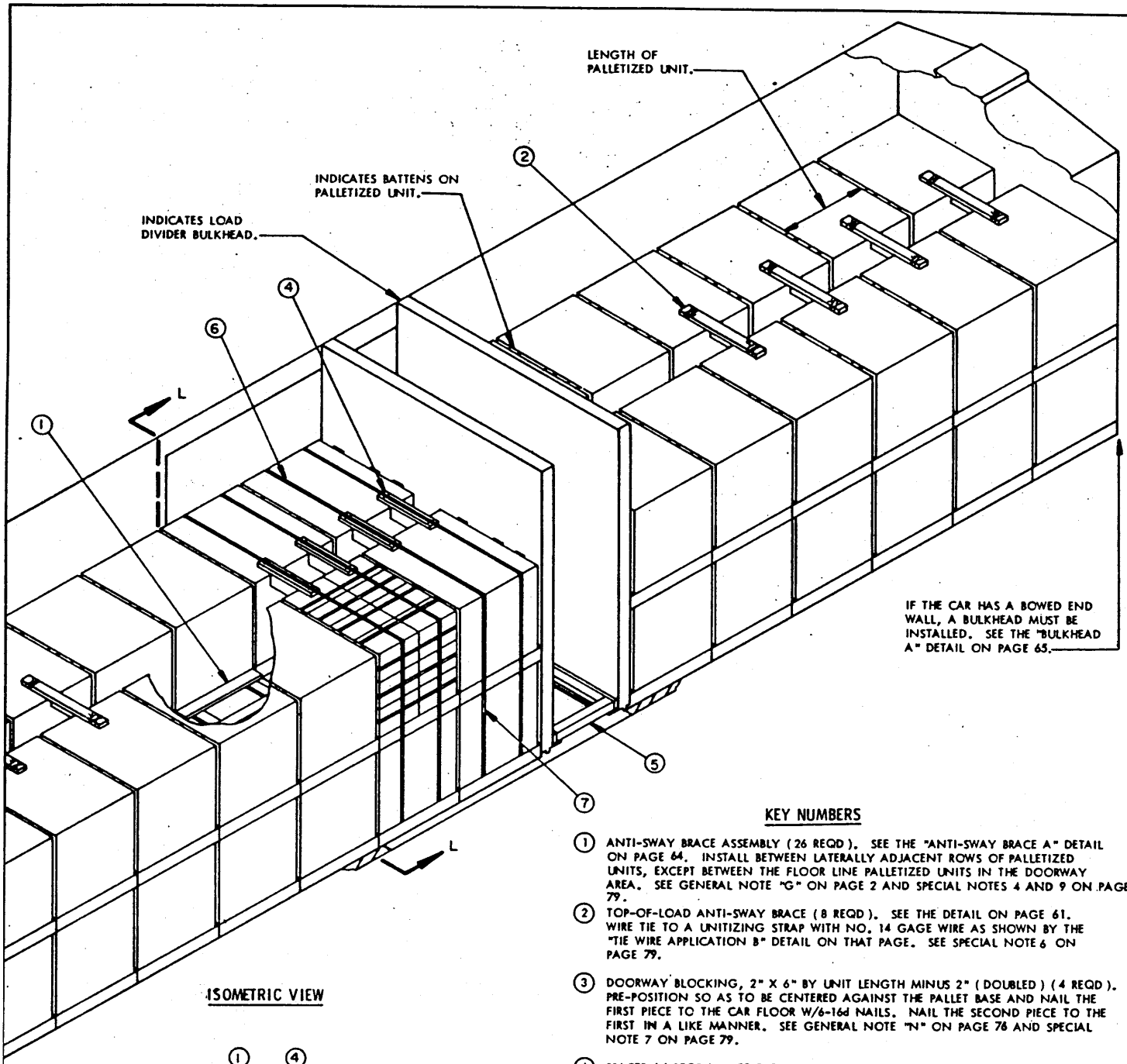
4. REFER TO SPECIAL NOTE 4 AND "CHART NO. 3" ON PAGE 5 FOR GUIDANCE IN DETERMINING THE NUMBER OF TIERS WHICH CAN BE LOADED IN A CAR.

5. REFER TO SPECIAL NOTE 5 AND "CHART NO. 4" ON PAGE 5 FOR GUIDANCE IN DETERMINING THE QUANTITY OF UNITS WHICH CAN BE LOADED IN A CAR, BASED ONLY UPON THE WEIGHT OF THE UNIT.

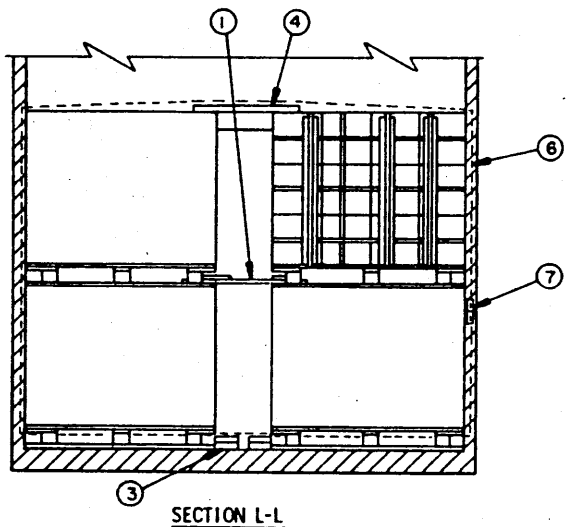
CHART NO. 1					
SIZE RANGE OF UNITS PER LOAD PATTERN					
CAR WIDTH	NO. OF ROWS	UNIT SIZE RANGE *			
		PALLETIZED UNITS LENGTH ACROSS CAR		PALLETIZED UNITS WIDTH ACROSS CAR	
		UNIT LENGTH	LOAD PAGES	UNIT WIDTH	LOAD PAGES
9'-0"	2-WIDE	35" TO 44"	8 AND 12	45-1/2" TO 53-1/2"	6 AND 78
	3-WIDE	35" TO 35-5/8"	14 AND 16	-------	----------
9'-2"	2-WIDE	35" TO 44"	8 AND 12	45-1/2" TO 54"	6 AND 78
	3-WIDE	35" TO 36-1/4"	14 AND 16	-------	----------
9'-3"	2-WIDE	35" TO 44"	8 AND 12	45-1/2" TO 54"	6 AND 78
	3-WIDE	35" TO 36-5/8"	14 AND 16	-------	----------
9'-4"	2-WIDE	35" TO 44"	8 AND 12	45-1/2" TO 54"	6 AND 78
	3-WIDE	35" TO 37"	14 AND 16	-------	----------
9'-6"	2-WIDE	35" TO 44"	8 AND 12	45-1/2" TO 54"	6 AND 78
	3-WIDE	35" TO 37-1/2"	14 AND 16	-------	----------

* BASED ON 1" MINIMUM SPACE ACROSS CAR.

CHART NO. 2			
UNITS IN LENGTH OF CONVENTIONAL BOX CAR			
NO. OF UNITS LONG	UNIT SIZE RANGE, LENGTH OR WIDTH		
	40'-6" BOX CAR (462" LOAD LENGTH)	50'-6" BOX CAR (582" LOAD LENGTH)	60'-8" BOX CAR (704" LOAD LENGTH)
20	---	---	35" THRU 35-1/8"
19	---	---	35-1/8" THRU 37"
18	---	---	37" THRU 39"
17	---	---	39" THRU 41-3/8"
16	---	---	41-3/8" THRU 44"
15	---	35" THRU 37-1/8"	44" THRU 46-7/8"
14	---	37-1/8" THRU 41-1/2"	46-7/8" THRU 50-1/4"
13	35" THRU 36-1/2"	41-1/2" THRU 44"	50-1/4" THRU 54"
12	35-1/2" THRU 38-1/2"	44" THRU 48-1/2"	---
11	38-1/2" THRU 42"	48-1/2" THRU 53"	---
10	42" THRU 46-1/8"	53" THRU 54"	---
9	46-1/8" THRU 51-1/4"	---	---
8	51-1/4" THRU 54"	---	---



ISOMETRIC VIEW



SECTION L-L

KEY NUMBERS

(1) ANTI-SWAY BRACE ASSEMBLY (26 REQD). SEE THE "ANTI-SWAY BRACE A" DETAIL ON PAGE 64. INSTALL BETWEEN LATERALLY ADJACENT ROWS OF PALLETIZED UNITS, EXCEPT BETWEEN THE FLOOR LINE PALLETIZED UNITS IN THE DOORWAY AREA. SEE GENERAL NOTE "G" ON PAGE 2 AND SPECIAL NOTES 4 AND 9 ON PAGE 79.

(2) TOP-OF-LOAD ANTI-SWAY BRACE (8 REQD). SEE THE DETAIL ON PAGE 61. WIRE TIE TO A UNITIZING STRAP WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE WIRE APPLICATION B" DETAIL ON THAT PAGE. SEE SPECIAL NOTE 6 ON PAGE 79.

(3) DOORWAY BLOCKING, 2" X 6" BY UNIT LENGTH MINUS 2" (DOUBLED) (4 REQD). PRE-POSITION SO AS TO BE CENTERED AGAINST THE PALLET BASE AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/6-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "N" ON PAGE 76 AND SPECIAL NOTE 7 ON PAGE 79.

(4) SPACER (4 REQD). SEE THE DETAIL ON PAGE 61.

(5) STRUT ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 82. SEE GENERAL NOTE "H" ON PAGE 76.

(6) DOORWAY PROTECTION STRAP, 1-1/4" X .035" X 34'-0" LONG (REF) STEEL STRAPPING (4 REQD). INSTALL SO AS TO ENCIRCLE THE LOAD UNIT IN THE DOORWAY AREA. SECURE TO PIECE MARKED (4) W/2 STAPLES. SEE SPECIAL NOTE 6 ON PAGE 79.

(7) SEAL FOR 1-1/4" STRAPPING (8 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "J" ON PAGE 2.

TYPICAL 2-WIDE LOAD IN A 50'-6" LONG BOX CAR EQUIPPED WITH LOAD DIVIDERS

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CUSHIONED BOX CAR EQUIPPED WITH LOAD DIVIDER BULKHEADS, AND WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING NARROWER OR WIDER DOOR OPENINGS CAN BE USED.

2. THE PALLETIZED UNIT SHOWN IN THE TYPICAL 2-WIDE LOAD ON PAGE 76 HAS OVERALL DIMENSIONS OF 40-1/8" LONG BY 48" WIDE BY 42-5/8" HIGH. THE UNIT WEIGHT IS 1,660 POUNDS. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR UNITS OF OTHER LENGTHS AND WIDTHS. BASED ON A DOOR HEIGHT OF 9'-8", FULL LOADS OF UNITS WHICH ARE MORE THAN 38-1/2" IN HEIGHT WILL BE LIMITED TO NOT MORE THAN TWO (2) TIERS. SEE SPECIAL NOTE 3.

3. A 2-WIDE LOAD IS SHOWN AS TYPICAL. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR 3-WIDE LOADS. IN OTHER WORDS, ANY OF THE TYPICAL CONVENTIONAL BOX CAR LOADS SHOWN ON THE EVEN NUMBERED PAGES 6 THRU 16 AND OTHER LOADS USING THOSE PROCEDURES, MAY BE SHIPPED IN CARS EQUIPPED WITH LOAD DIVIDERS.

4. THE ANTI-SWAY BRACE A, SHOWN IN THE LOAD VIEW AS PIECE MARKED (1), IS DESIGNED FOR USE WITHIN LOADS HAVING THE PALLETIZED UNIT POSITIONED WITH THE LENGTH PARALLEL TO THE CAR SIDEWALL.

5. THE ANTI-SWAY BRACING MAY BE OMITTED IF THE SPACE BETWEEN LATERALLY ADJACENT UNITS IS 6" OR LESS, AS MEASURED FROM BOX TO BOX ON LATERALLY ADJACENT UNITS, OR BETWEEN BATTENS, AS APPLICABLE. IF THE EXCESS SPACE EXCEEDS THE MAXIMUM ALLOWABLE, ANTI-SWAY BRACES MUST BE POSITIONED BETWEEN ALL LATERALLY ADJACENT PALLETIZED UNITS.

6. TOP-OF-LOAD ANTI-SWAY BRACES MUST BE INSTALLED IN EACH END OF A CAR. THE QUANTITY NEEDED IS DEPENDENT UPON THE DIMENSION OF THE UNIT WHICH IS POSITIONED LENGTHWISE IN THE CAR, AND UPON THE LENGTH OF THE CAR BEING LOADED. REFER TO THE "TOP-OF-LOAD ANTI-SWAY BRACE REQUIREMENTS" CHART ON PAGE 61 FOR GUIDANCE.

7. FOR LOADS HAVING THE PALLETIZED UNIT POSITIONED WITH THE WIDTH PARALLEL TO THE CAR SIDEWALL, THE DOORWAY BLOCKING, PIECE MARKED (3), WILL BE 2" X 4" BY WIDTH OF PALLET BASE. DOORWAY PROTECTION GATES WILL BE USED FOR A COMBINATION LOAD IF THE CAR IS EQUIPPED WITH CONVENTIONAL SLIDING DOORS. FOR A COMBINATION LOAD IN A CAR EQUIPPED WITH PLUG DOORS, INSTALL NAILED-DOWN BLOCKING BETWEEN LATERALLY ADJACENT UNITS AND ENCIRCLE THE UNITS WITH STRAPS, SIMILAR TO THE INSTALLATION OF PIECES MARKED (3) AND (6) ON PAGE 78.

8. FOR LOADS HAVING THE PALLETIZED UNIT POSITIONED WITH THE WIDTH PARALLEL TO THE CAR SIDEWALL USE THE "ANTI-SWAY BRACE B" DETAIL SHOWN ON PAGE 64.

9. IF DESIRED, THE ANTI-SWAY BRACE ASSEMBLY C, AS DETAILED ON PAGE 65, MAY BE USED IN LIEU OF THE ANTI-SWAY BRACE ASSEMBLY A SHOWN IN THE LOAD VIEW. THE ANTI-SWAY BRACE ASSEMBLY A IS THE PREFERRED METHOD IF THE SPACE BETWEEN LATERALLY ADJACENT PALLET UNITS IS SUCH THAT IT CAN BE EASILY INSTALLED.

BILL OF MATERIAL (TYPICAL)

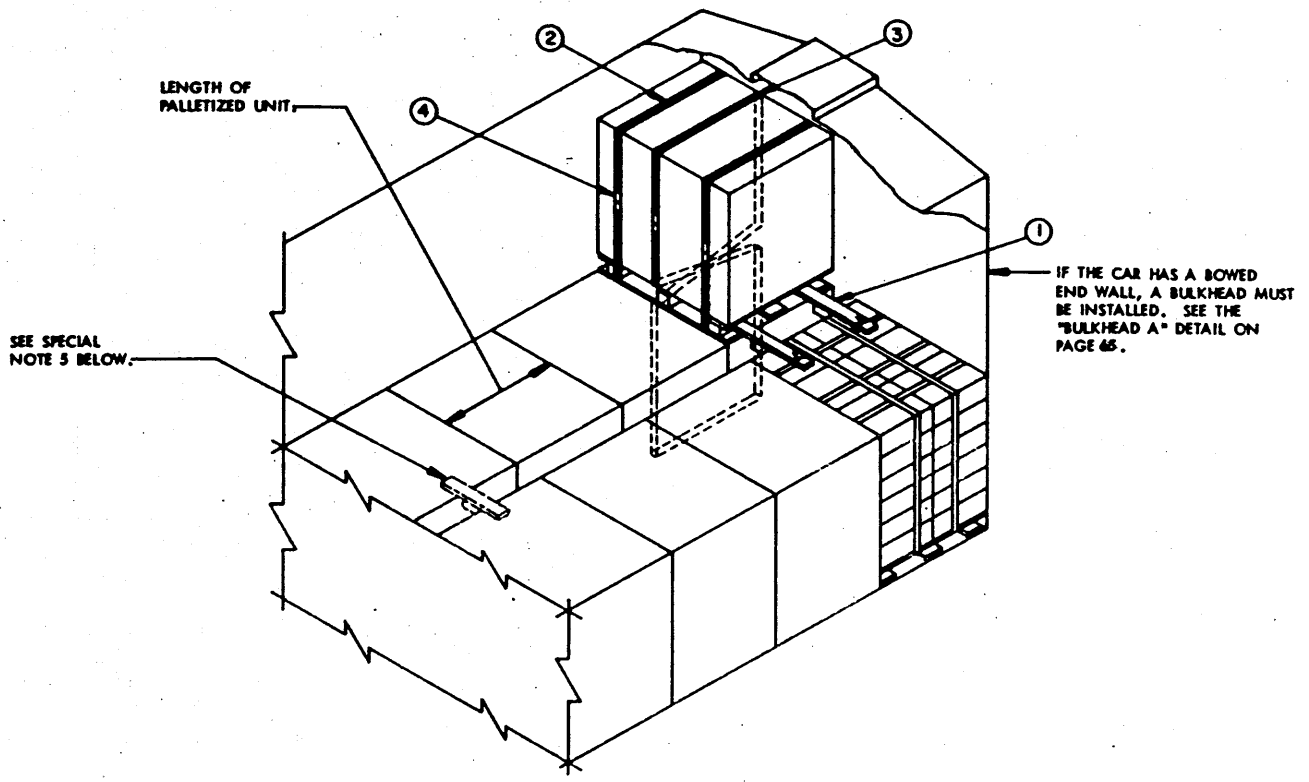
LUMBER	LINEAR FEET	BOARD FEET
1" X 8"	16	11
2" X 4"	299	200
2" X 6"	27	27
2" X 8"	76	102
4" X 4"	15	20
NAILS	**NO. REQD**	**POUNDS**
6d (2")	20	1/4
10d (3")	328	5-1/4
12d (3-1/4")	52	1
16d (3-1/2")	24	1/2

STEEL STRAPPING, 1-1/4" X .035" --- 136' REQD ---------- 20 LBS
SEAL FOR 1-1/4" STEEL STRAPPING --- 8 REQD ---------- NIL
STAPLE FOR 1-1/4" STEEL STRAPPING - 8 REQD ---------- NIL

LOAD AS SHOWN (TYPICAL)

ITEM	QUANTITY	WEIGHT (APPROX)
PALLETIZED UNIT	56	92,960 LBS
DUNNAGE		747 LBS
TOTAL WEIGHT		93,707 LBS

TYPICAL 2-WIDE LOAD IN A 50'-6' LONG BOX CAR EQUIPPED WITH LOAD DIVIDERS



ISOMETRIC VIEW

SPECIAL NOTES:

1. A 9'-2" WIDE CUSHIONED BOX CAR WHICH IS EQUIPPED WITH LOAD DIVIDER BULKHEADS IS SHOWN. CUSHIONED CARS OF OTHER WIDTHS CAN BE USED.
2. THE PALLETIZED UNIT SHOWN IN THE TYPICAL LCL LOAD HAS OVERALL DIMENSIONS OF 40-1/8" LONG BY 48" WIDE BY 42-5/8" HIGH. THE PROCEDURES ARE ALSO APPLICABLE FOR OTHER SIZE UNITS.
3. THIS METHOD OF PARTIAL-LAYER (TIER) BRACING (ADDING A UNIT IN THE TOP TIER) IS ONLY APPLICABLE FOR USE IN CUSHIONED BOX CARS.
4. A SECOND-LAYER UNIT IS SHOWN AS TYPICAL, ALTHOUGH THE PROCEDURES ARE APPLICABLE FOR ANY TOP TIER, BE IT A THIRD, FOURTH, OR OTHER. THE QUANTITY OF UNITS IS LIMITED TO ONE (1) IN EACH CORNER OF A CAR. IF TWO UNITS ARE LOADED, ONE EACH IN LATERALLY OPPOSITE CORNERS, THE PROPER ANTI-SWAY BRACING WILL BE INSTALLED BETWEEN THE PALLET BASES AND ONE (1) TOP-OF-LOAD ANTI-SWAY BRACE WILL BE POSITIONED BETWEEN THE TOPS OF THE UNITS IN LIEU OF THE TWO AT THE LOCATION SHOWN.
5. ONLY THE BLOCKING AND BRACING FOR THE PARTIAL TIER IS SHOWN; REFER TO PAGE 78, OR TO THE APPLICABLE PAGE IN THE CONVENTIONAL BOX CAR PORTION OF THIS DRAWING, FOR THE BLOCKING AND BRACING REQUIREMENTS FOR THE BALANCE OF THE LOAD.

KEY NUMBERS

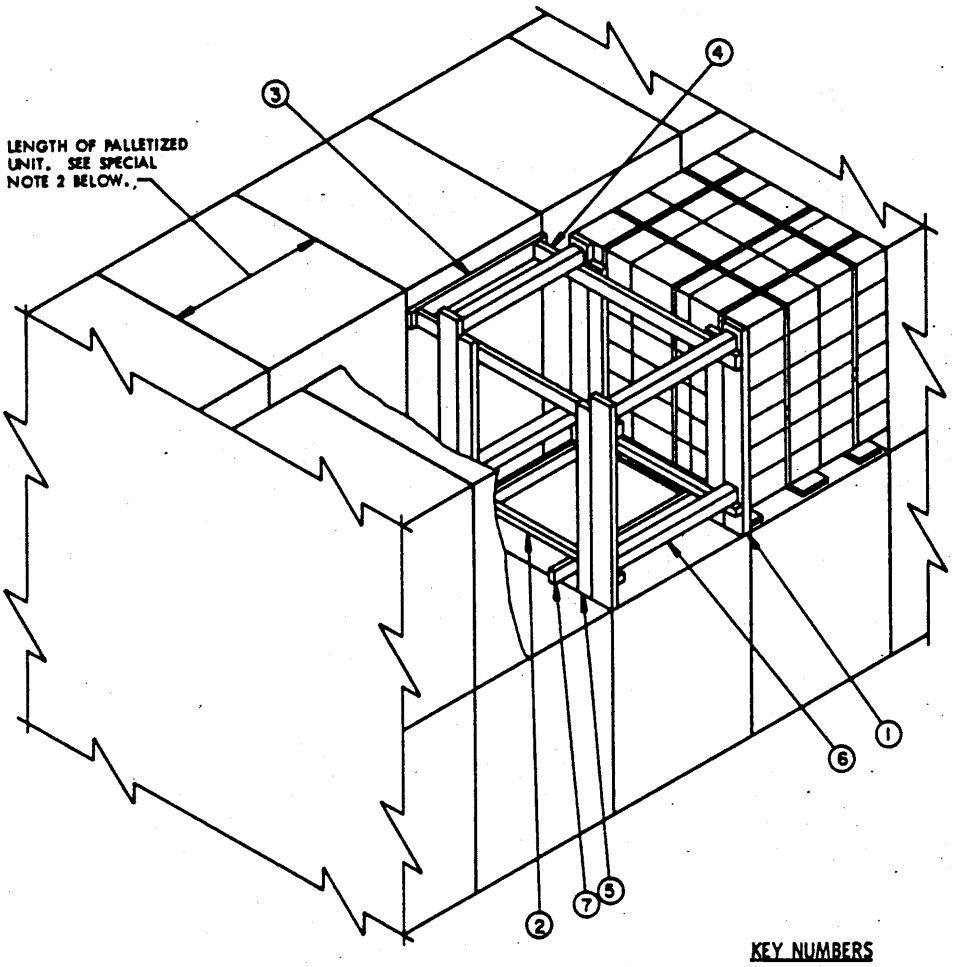
(1) TOP-OF-LOAD ANTI-SWAY BRACE (2 REQD). SEE THE DETAIL ON PAGE 61. POSITION BETWEEN THE TOPS OF LATERALLY ADJACENT UNITS, TO INCLUDE THE ONE WHICH IS DIRECTLY BELOW THE LONE UNIT IN THE TOP TIER. POSITION ONE END OF THE ASSEMBLY IN CONTACT WITH, AND WIRE TO A CORNER POST WITH NO. 14 GAGE WIRE. WIRE TIE THE OPPOSITE END TO A UNITIZING STRAP WITH NO. 14 GAGE WIRE AS SHOWN BY THE "TIE-WIRE APPLICATION B" DETAIL ON PAGE 61.

(2) VERTICAL UNITIZING STRAP, 1-1/4" X .035" X 24'-0" LONG (REF) STEEL STRAPPING (2 REQD). INSTALL SO AS TO ENCIRCLE THE TOP-TIER UNIT AND THE UNIT DIRECTLY BENEATH.

(3) FIGURE-8 UNITIZING STRAP, 1-1/4" X .035" X 25'-0" LONG (REF) STEEL STRAPPING (1 REQD). POSITION NEAR THE CENTER OF THE UNIT WIDTH (OR LENGTH, IF APPLICABLE). NOTE THAT THE STRAP PASSES UNDER THE UPPER PALLET DECK OF THE TOP UNIT, WHEN THE PALLETIZED UNITS ARE POSITIONED AS SHOWN. SEE THE "SECUREMENT OF PARTIAL UNIT ON TOP" DETAIL ON PAGE 34 FOR ADDITIONAL GUIDANCE.

(4) SEAL FOR 1-1/4" STRAPPING (6 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "J" ON PAGE 2.

TYPICAL LCL (ADDED-UNIT IN THE TOP TIER) IN A BOX CAR EQUIPPED WITH LOAD DIVIDERS



ISOMETRIC VIEW

SPECIAL NOTES:

1. A PARTIAL VIEW OF A 9'-2" WIDE BOX CAR WHICH IS EQUIPPED WITH LOAD DIVIDER BULKHEADS IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED.
2. THE PALLETIZED UNIT SHOWN HAS OVERALL DIMENSIONS OF 40" LONG BY 50-1/4" WIDE BY 52" HIGH. THE PROCEDURES ARE ALSO APPLICABLE FOR OTHER SIZE UNITS.
3. THIS METHOD OF PARTIAL-LAYER (TIER) BRACING (OMITTING A UNIT FROM THE TOP TIER) IS APPLICABLE FOR USE IN CONVENTIONAL BOX CARS AS WELL AS IN CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS.
4. THE OMISSION OF A SECOND-TIER UNIT OF A 2-WIDE LOAD IS SHOWN AS TYPICAL. THE PROCEDURES ARE APPLICABLE FOR ANY TOP TIER, BE IT A THIRD, FOURTH, OR OTHER, AND MAY ALSO BE ADAPTED FOR USE IN 3-WIDE LOADS.
5. THE OMITTED-UNIT PROCEDURE SHOULD BE APPLIED NEAR THE CENTER OF THE CAR LENGTH, BUT NOT IN THE DOORWAY AREA OF THE CAR. ALSO, THERE SHOULD BE AT LEAST ONE (1) LOAD UNIT BETWEEN THE OMITTED UNIT AND A LOAD DIVIDER BULKHEAD, OR BETWEEN THE OMITTED UNIT AND A CENTER GATE FOR A LOAD IN A CONVENTIONAL BOX CAR. WHEN THE PROCEDURES ARE USED IN A CAR WHICH IS EQUIPPED WITH LOAD DIVIDER BULKHEADS REFER TO THE "STRUTTING REQUIREMENTS" CHART ON PAGE 57.
6. WHEN THE PROCEDURES ARE USED IN A CONVENTIONAL BOX CAR LOAD, THE STRUTS SHOULD BE THE SAME AS ARE USED BETWEEN THE CENTER GATES. FOR EXAMPLE, IF 4" X 6" ON-EDGE STRUTS ARE USED AS CENTER BLOCKING, 4" X 6" ON-EDGE STRUTS SHOULD ALSO BE USED FOR THE OMITTED UNIT BLOCKING. NOTE THAT THE HEIGHT OF THE SIDE BLOCKING/STRUT LEDGER, PIECE MARKED ④, WILL NEED TO BE ADJUSTED TO SUIT.
7. ONLY THE BLOCKING AND BRACING FOR THE OMITTED UNIT IS SHOWN; REFER TO THE APPLICABLE LOAD PAGE FOR THE BLOCKING AND BRACING REQUIREMENTS FOR THE BALANCE OF THE LOAD.

KEY NUMBERS

① VERTICAL PIECE, 2" X 6" BY UNIT HEIGHT (4 REQD).

② STRUT LEDGER, 2" X 2" BY UNIT WIDTH OR LENGTH, AS APPLICABLE (2 REQD). POSITION SO THE TOP IS 6" ABOVE THE BOTTOM OF THE VERTICAL PIECES, PIECES MARKED ①, AND NAIL W/2-10d NAILS AT EACH END.

③ BEARING PIECE, 2" X 4" BY UNIT LENGTH OR WIDTH, AS APPLICABLE (1 REQD). NAIL TO THE SIDE BLOCKING/ STRUT LEDGERS, PIECES MARKED ④, W/2-10d NAILS AT EACH JOINT.

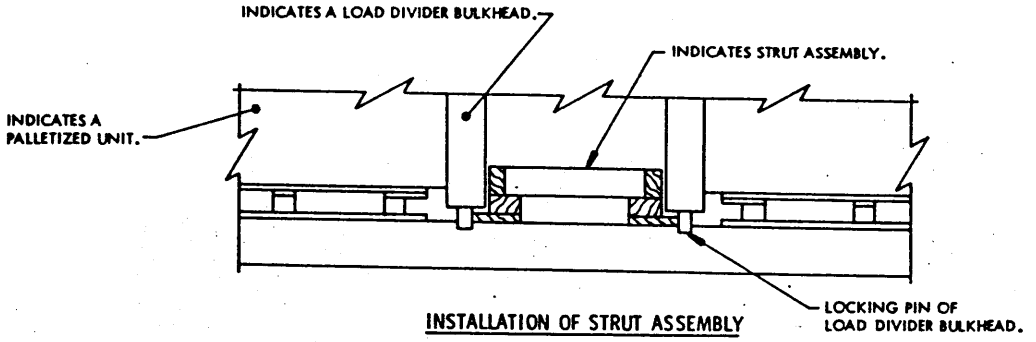
④ SIDE BLOCKING/STRUT LEDGER, 2" X 4" BY CUT-TO-FIT BETWEEN THE BEARING PIECE; PIECE MARKED ③, AND THE CAR SIDEWALL (2 REQD). POSITION SO THE TOP IS 4-1/2" BELOW THE TOP OF THE VERTICAL PIECES, PIECES MARKED ①, AND NAIL W/3-10d NAILS AT EACH JOINT. SEE SPECIAL NOTE 6 AT LEFT.

⑤ GATE HOLD DOWN RETAINER PIECE, 2" X 4" BY A LENGTH TO SUIT (4 REQD). POSITION AGAINST PIECE MARKED ① AND NAIL TO PIECES MARKED ② AND ④ W/2-10d NAILS AT EACH END.

⑥ STRUT, 4" X 4" BY UNIT LENGTH MINUS 3" OR UNIT WIDTH MINUS 3", AS APPLICABLE (4 REQD). TOENAIL THE TOP PIECE TO THE VERTICAL PIECES, PIECES MARKED ①, W/2-12d NAILS AT EACH END. SEE SPECIAL NOTE 6 AT LEFT.

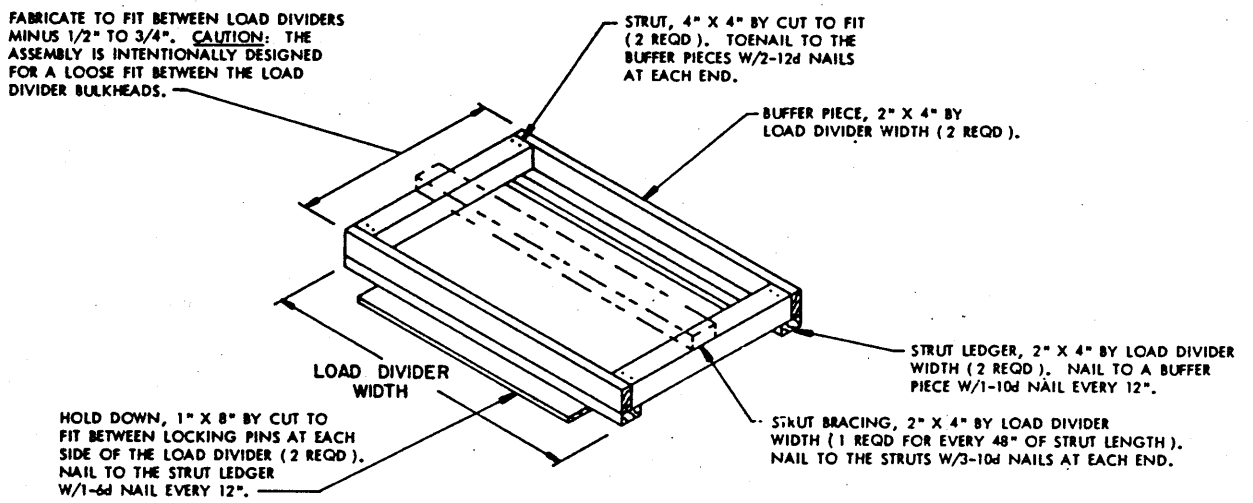
⑦ GATE HOLD DOWN, 2" X 3" BY PALLETIZED UNIT WIDTH OR LENGTH PLUS 24" (2 REQD). POSITION TO EXTEND UNDER PALLET UNITS AND NAIL TO PIECES MARKED ⑤ W/2-10d NAILS AT EACH JOINT. SEE THE "INSTALLATION OF GATE HOLD DOWN A" DETAIL ON PAGE 55 FOR GUIDANCE.

TYPICAL LCL (OMITTED UNIT FROM THE TOP TIER) IN A BOX CAR EQUIPPED WITH LOAD DIVIDERS



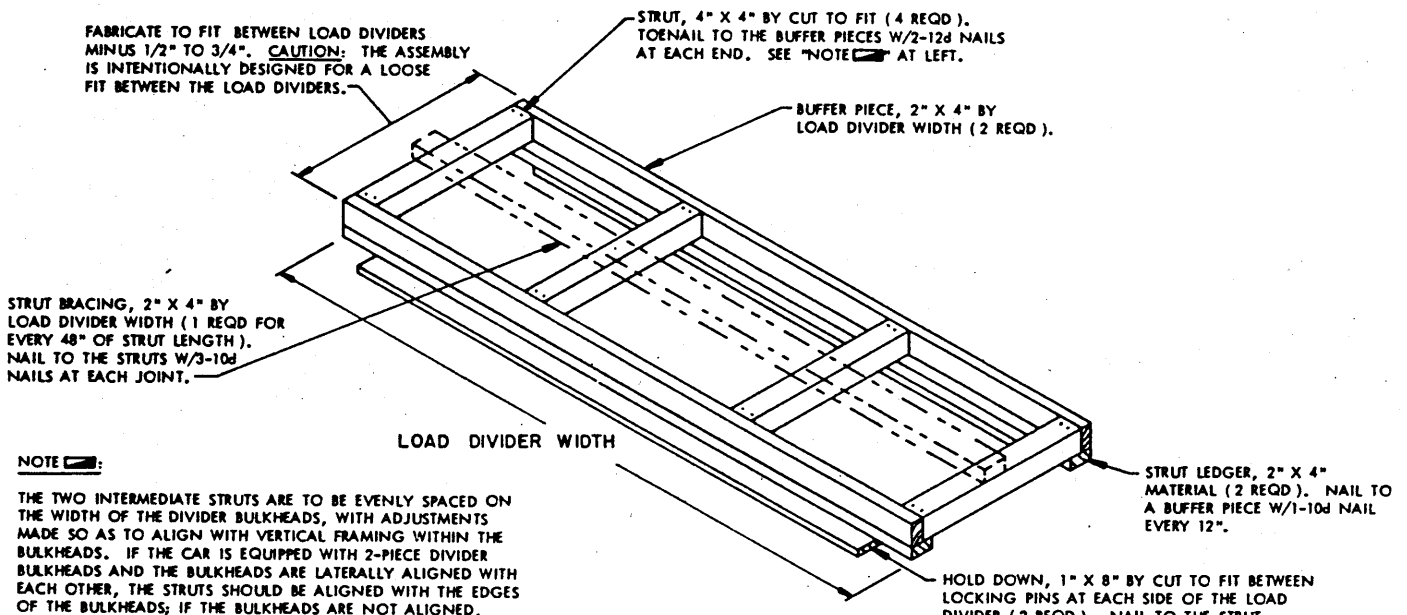
INSTALLATION OF STRUT ASSEMBLY

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.



STRUT ASSEMBLY FOR 2-PIECE BULKHEADS

A STRUT ASSEMBLY IS REQUIRED WHEN THE LOAD BEHIND EITHER LOAD DIVIDER BULKHEAD EXCEEDS 50,000 POUNDS OF CLASS A OR CLASS B EXPLOSIVES. A STRUT ASSEMBLY IS NOT REQUIRED FOR LOADS OF CLASS C EXPLOSIVES, REGARDLESS OF THE WEIGHT OF THE LOAD. IF A STRUT ASSEMBLY IS LONGER THAN 12'-0", THE ASSEMBLY MUST BE HELD DOWN IN THE CENTER. SEE THE DETAILS ON PAGE 83 FOR GUIDANCE. NOTE: TWO (2) ASSEMBLIES AS SHOWN ARE REQUIRED FOR A 2-PIECE BULKHEAD IF NOT LATERALLY ALIGNED.

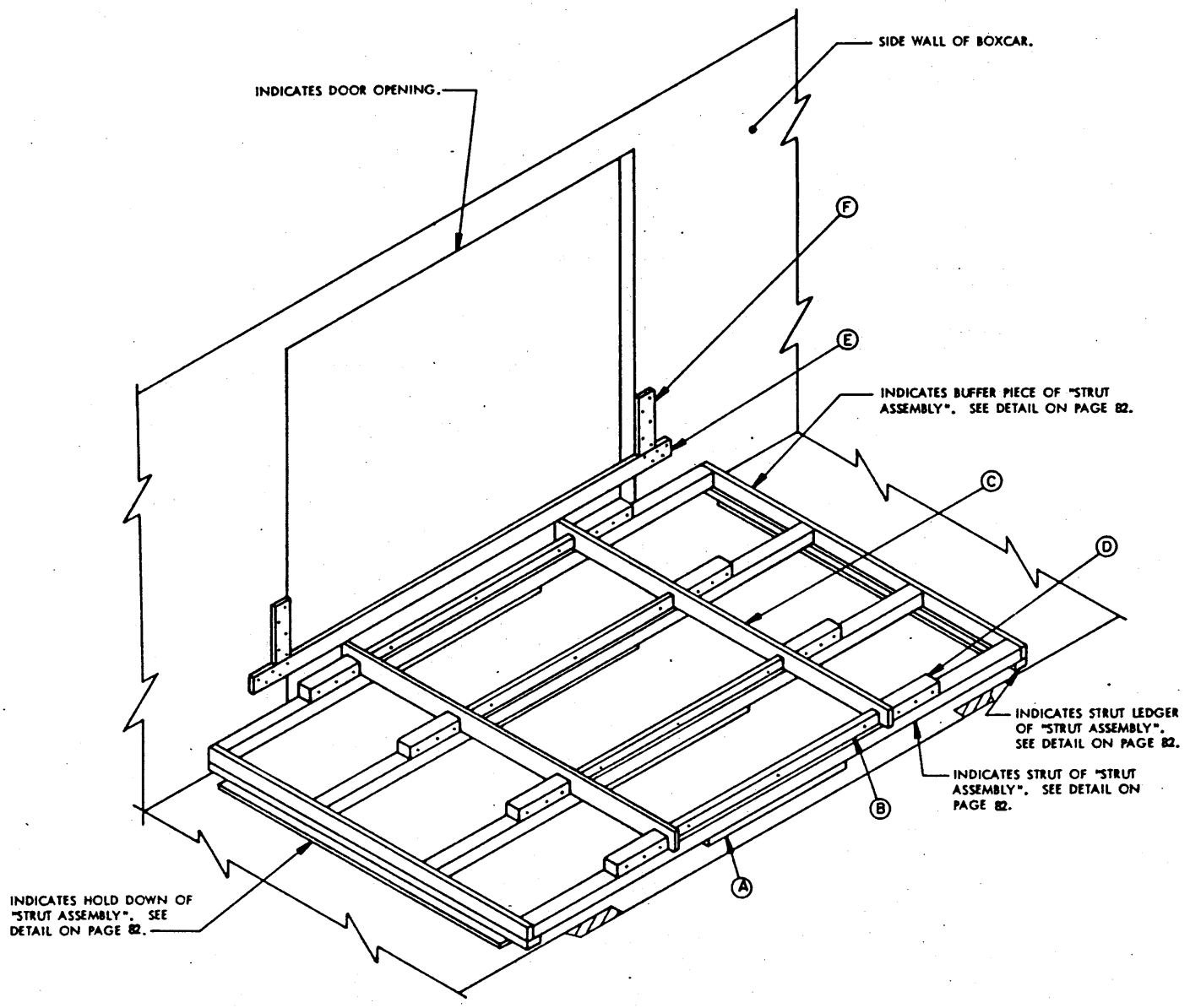


NOTE:

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. IF THE CAR IS EQUIPPED WITH 2-PIECE DIVIDER BULKHEADS AND THE BULKHEADS ARE LATERALLY ALIGNED WITH EACH OTHER, THE STRUTS SHOULD BE ALIGNED WITH THE EDGES OF THE BULKHEADS; IF THE BULKHEADS ARE NOT ALIGNED, THE "STRUT ASSEMBLY FOR 2-PIECE BULKHEADS" MUST BE USED. SEE THE DETAIL ABOVE.

STRUT ASSEMBLY FOR 1-PIECE BULKHEADS

A STRUT ASSEMBLY IS REQUIRED WHEN THE LOAD BEHIND EITHER LOAD DIVIDER BULKHEAD EXCEEDS 50,000 POUNDS OF CLASS A OR CLASS B EXPLOSIVES. A STRUT ASSEMBLY IS NOT REQUIRED FOR LOADS OF CLASS C EXPLOSIVES, REGARDLESS OF THE WEIGHT OF THE LOAD. IF A STRUT ASSEMBLY IS LONGER THAN 12'-0", THE ASSEMBLY MUST BE HELD DOWN IN THE CENTER. SEE THE DETAILS ON PAGE 83 FOR GUIDANCE.



STRUT ASSEMBLY HOLD-DOWN

THIS ISOMETRIC VIEW DEPICTS THE HOLD-DOWN BLOCKING WHICH IS REQUIRED WHEN THE STRUTS OF THE "STRUT ASSEMBLY" USED IN A LOAD DIVIDER CAR ARE LONGER THAN 12'-0". NOTE THAT THE SPECIAL STRUT HOLD-DOWN AND THE STRUT ASSEMBLY ARE ONLY REQUIRED IF THE LOAD BEHIND EITHER BULKHEAD IS MORE THAN 50,000 POUNDS.

KEY LETTERS

(A) FILLER PIECE, 2" X 4" X 48" (4 REQD). POSITION SO AS TO BE CENTERED ON THE DOORWAY AREA AND NAIL TO THE BOTTOM SURFACE OF A STRUT W/4-10d NAILS.

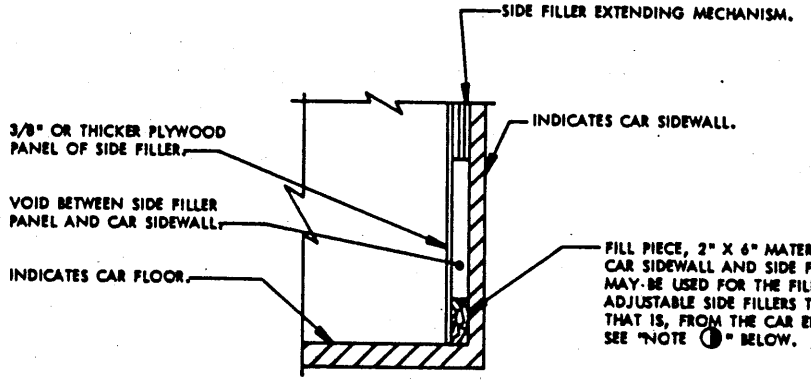
(B) SPACER PIECE, 2" X 4" X 72" (4 REQD). POSITION ON EDGE AND SO AS TO BE CENTERED IN THE DOORWAY AREA AND TOENAIL TO A STRUT W/3-12d NAILS ON EACH SIDE.

(C) HOLD-DOWN PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT IF THE CAR HAS PLUG DOORS, OR 2" X 6" BY CAR WIDTH PLUS 4" IF THE CAR HAS CONVENTIONAL SLIDING DOORS) (2 REQD). NAIL TO PIECE MARKED (B) W/2-12d NAILS AND TOENAIL TO THE STRUTS W/2-12d NAILS AT EACH JOINT.

(D) BRACE PIECE, 4" X 4" X 18" (8 REQD). POSITION AGAINST A PIECE MARKED (C) AND TOENAIL TO A STRUT W/3-12d NAILS ON EACH SIDE.

(E) DOOR SPANNER PIECE, 2" X 6" BY DOOR OPENING WIDTH PLUS 24" (2 REQD). NAIL TO A CAR DOOR POST/SIDE WALL OR TO A NAILING STRIP W/5-12d NAILS AT EACH END. NOTE: PRIOR TO NAILING THESE PIECES IN PLACE, THE STRUTS OF THE STRUT ASSEMBLY ARE TO BE PRESSED DOWNWARD UNTIL THE PIECES MARKED (A) ARE TOUCHING OR ARE ALMOST TOUCHING THE FLOOR OF THE CAR.

(F) HOLD-DOWN CLEAT, 2" X 6" X 18" (4 REQD). NAIL TO A CAR DOOR POST/SIDEWALL OR TO A NAILING STRIP W/5-12d NAILS.

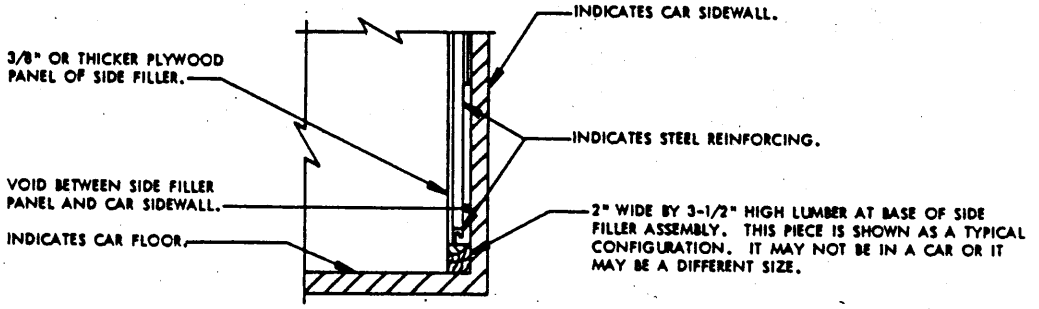


TYPICAL TYPE A

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

NOTE ◑:

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



TYPICAL TYPE B

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

ITEMIZED INDEX