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REVISION NO. 7 SIGNED <i>J. W. Fleckman</i> DATE <u>4/23/76</u>

# LOADING AND BRACING (CL & LCL) IN BOX CARS OF PALLETIZED SEPARATE LOADING PROJECTILES

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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 DIVIDERS.

REVISIONS		DATE	BY	APPROVED BY
5	FEB 77		<i>DC Fetter</i>	<i>Daniel C. Fetter</i>
6	SEP 80		<i>DC Fetter</i>	<i>DC Fetter</i>
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DO NOT SCALE

**GENERAL NOTES**

**(GENERAL NOTES CONTINUED)**

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1, AND AUGMENTS TM 743-200-1 (CHAPTER 9).
- B. THE OUTLOADING PROCEDURES SPECIFIED IN THIS DRAWING ARE APPLICABLE TO PALLETIZED SEPARATE LOADING PROJECTILES. SUBSEQUENT REFERENCE TO PALLET UNIT MEANS THE PALLET UNIT WITH AMMUNITION ITEMS.

C. LADING DATA (SEE THE PICTORIAL VIEWS ON PAGES 102 AND 103):

ITEM	WEIGHT	DIMENSIONS
155MM, 8/SMALL PALLET	800 LBS	13-1/2" LONG X 27" WIDE X 31-1/2" HIGH.
155MM, 8/LARGE PALLET	874 LBS	14-5/8" LONG X 29-1/8" WIDE X 40-7/8" HIGH.
175MM, 6/PALLET	934 LBS	17" LONG X 25-1/2" WIDE X 41" HIGH.
175MM, 20/PALLET	3,366 LBS	40" LONG X 51-1/4" WIDE X 46-3/8" OR 42-3/4" HIGH.
8" PROJ, 3/PALLET	633 LBS	9-1/2" LONG X 28-1/2" WIDE X 38-1/2" HIGH.
8" PROJ, 6/SMALL PALLET	1,258 LBS	19-1/2" LONG X 28-1/2" WIDE X 38-1/2" HIGH.
8" PROJ, 6/LARGE PALLET	1,288 LBS	22-5/8" LONG X 31-3/4" WIDE X 48-1/8" HIGH.
8" PROJ, 6 TALL/SMALL PALLET	1,296 LBS	19-1/2" LONG X 28-1/2" WIDE X 48-1/2" HIGH.

D. 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 3. SPECIFIC GUIDANCE FOR OUTLOADING IN BOX CARS EQUIPPED WITH MECHANICAL BRACING DEVICES IS DELINEATED BY THE GENERAL NOTES ON PAGE 73. REFER TO PAGE 93 FOR SPECIFIC GUIDANCE RELATIVE TO OUTLOADING IN LOAD DIVIDER CARS. SEE GENERAL NOTE "L" AT RIGHT.

E. THE SELECTION OF RAIL CARS FOR THE TRANSPORT OF PALLETIZED SEPARATE LOADING PROJECTILES 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. BOX CARS MUST BE SELECTED AND LOADED IN ACCORDANCE WITH THE REQUIREMENTS SET FORTH BY AAR (ASSOCIATION OF AMERICAN RAILROADS) CIRCULAR 42-F OF THE "GENERAL RULES COVERING LOADING OF CARLOAD SHIPMENTS OF COMMODITIES IN CLOSED CARS." CARS MUST MEET ONE OF THE FOLLOWING REQUIREMENTS:

1. CAR STENCILED ADJACENT TO DOOR OPENING 25K OR 50K WHICH INDICATES FLOOR LOADING CAPACITY.
2. HAVE WOOD FLOOR OF 2-1/4" THICKNESS IN SOUND CONDITION SUPPORTED BY AT LEAST THREE METAL FLOOR STRINGERS ON EACH SIDE OF CENTER SILL FULL LENGTH OF CAR.
3. IF EQUIPPED WITH SLIDING SILL UNDERFRAME, HAVE WOOD FLOOR OF 2-1/4" THICKNESS IN SOUND CONDITION SUPPORTED BY AT LEAST TWO METAL FLOOR STRINGERS ON EACH SIDE OF CENTER SILL FULL LENGTH OF CAR.
4. IF EQUIPPED WITH STEEL FLOORS OR SPECIAL TYPE WOODEN FLOORING FULL LENGTH OF CAR, PROVIDED THE OVERALL STRENGTH OF THE FLOOR IS NOT LESS THAN THAT OF A FLOOR WITH THREE STRINGERS AS SPECIFIED IN THE FOREGOING.

F. BOX CARS EQUIPPED WITH NARROW CONVENTIONAL SLIDING DOORS HAVE BEEN SHOWN; HOWEVER, THE DEPICTED OUTLOADING PROCEDURES ARE ALSO APPLICABLE FOR CARS EQUIPPED WITH WIDE "THRU" OR STAGGERED SLIDING DOORS AND FOR CARS EQUIPPED WITH "THRU" OR STAGGERED PLUG TYPE DOORS OF VARIOUS WIDTHS. 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. SEE GENERAL NOTES "P" AND "Q".

G. EXCEPT FOR PLYWOOD, DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE, 1" X 6" MATERIAL IS ACTUALLY 3/4" THICK BY 5-1/2" WIDE AND 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE.

(CONTINUED AT RIGHT)

**MATERIAL SPECIFICATIONS**

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

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

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

STRAP SEAL, STRAP STAPLE ----- : COMMERCIAL GRADE.

PLYWOOD ----- : GROUP B OR C, GRADE C-D (EXTERIOR), FED SPEC NN-P-530.

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

\* IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER EXTERIOR GRADE MAY BE SUBSTITUTED.

H. 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.

J. PORTIONS OF THE BOX CARS, SUCH AS SIDEWALLS, END WALLS, AND ROOFS, AND PORTIONS OF THE BLOCKING AND BRACING COMPONENTS, HAVE NOT BEEN SHOWN IN THE LOAD VIEWS FOR CLARITY PURPOSES.

K. 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 MUST BE USED TO SEAL THE JOINT.

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. HOWEVER, THE SPECIAL NOTES SECTION IMMEDIATELY ADJACENT TO EACH OUTLOADING PROCEDURE SHOULD PROVIDE SUFFICIENT GUIDANCE THAT ANY DESIRED QUANTITY THAT IS TO BE SHIPPED CAN BE ATTAINED.

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

N. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN CARS WHICH ARE PARTIALLY LOADED WITH PALLET 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.

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

P. WHEN ORDERING CARS FOR USE IN A SHIPMENT, CARS HAVING DOOR OPENINGS 8' OR LESS IN WIDTH SHOULD BE REQUESTED. CARS HAVING SMALL DOOR OPENINGS REQUIRE LESS DUNNAGE FOR PROPER BLOCKING AND BRACING AND THEREFORE PROVIDE FOR A MORE ECONOMICAL SHIPMENT COST. SMALL-DOOR CARS ARE ALSO BETTER THAN CARS HAVING WIDE DOORS BECAUSE THE NUMBER OF UNITS THAT CAN BE POSITIONED IN THE DOORWAY AREA (TRANSPORTATION DENSITY) IS SOMEWHAT LESS THAN CAN BE LOADED WITHIN THE END SECTIONS OF A CAR WHERE THE SIDEWALLS PROVIDE LATERAL BRACING. IF CARS HAVING WIDE DOOR OPENINGS MUST BE USED, VARIATIONS IN LOADING PATTERNS AND/OR ADDITIONAL INSTRUCTIONS FOR BLOCKING AND BRACING ARE DELINEATED IN THE SPECIAL NOTES SECTION FOR A LOAD.

Q. DOORWAY PROTECTION REQUIREMENTS WITHIN THE "DOORWAY AREA" OF A CAR ARE INCLUDED IN THE DEPICTED PROCEDURES FOR CARS HAVING EITHER CONVENTIONAL SLIDING AND/OR PLUG TYPE DOORS. THE "DOORWAY AREA" WITHIN A CAR IS DEFINED AS THE CARGO SPACE THAT IS ADJACENT TO A CONVENTIONAL TYPE AND/OR PLUG TYPE DOOR. THE LENGTH OF A "DOORWAY AREA" CAN BE AS MUCH AS 24 FEET IN SOME CARS THAT ARE EQUIPPED WITH STAGGERED DOORS.

**REVISIONS**

REVISION NO. 5, DATED FEBRUARY 1977, CONSISTS OF:

1. DELETING PROCEDURES FOR 155MM PROJECTILES PALLETIZED 12 PER PALLET, 240MM PALLETIZED 2 PER PALLET, 280MM CRATED, ALL UNCRATED PROJECTILES AND THE TABULAR DATA.
2. ADDING PROCEDURES FOR CARS EQUIPPED WITH MECHANICAL BRACING DEVICES.
3. ADDING PROCEDURES FOR CARS EQUIPPED WITH LOAD DIVIDERS.
4. ADDING PROCEDURES FOR LCL SHIPMENTS.
5. MAKING CHANGES AS NECESSARY TO UPDATE DRAWING FORMAT.

REVISION NO. 6, DATED SEPTEMBER 1980, CONSISTS OF:

1. ADDING PROCEDURES FOR SHIPPING 155MM PROJECTILES PALLETIZED 8/SMALL PALLET IN 9'-0" WIDE CONVENTIONAL BOX CARS.
2. ADDING PROCEDURES FOR 155MM PROJECTILES PALLETIZED 8/LARGE PALLET, AND 8" PROJECTILES PALLETIZED 6/LARGE PALLET IN CONVENTIONAL TYPE BOX CARS AND CARS EQUIPPED WITH MECHANICAL BRACING DEVICES.

REVISION NO. 7, DATED JANUARY 1986, CONSISTS OF:

ADDING PROCEDURES FOR 8" PROJECTILES PALLETIZED SIX TALL PROJECTILES PER SMALL PALLET.

**GENERAL NOTES**

(FOR CONVENTIONAL TYPE BOX CARS)

(GENERAL NOTES CONTINUED)

- A. THE OUTLOADING PROCEDURES SPECIFIED ON PAGES 4 THRU 47 ARE APPLICABLE FOR SHIPMENTS IN CONVENTIONAL TYPE BOX CARS WHICH ARE 40'-6" AND 50'-6" LONG AND 9'-0", 9'-2", 9'-4", AND 9'-6" WIDE, AS SPECIFIED. HOWEVER, THE PROCEDURES ARE ALSO APPLICABLE FOR CARS WHICH ARE OF OTHER WIDTHS AND ALSO MAY BE USED FOR CARS WHICH ARE 40'-6" LONG, 50'-6" LONG, 60'-8" LONG, OR OF OTHER LENGTHS. SEE GENERAL NOTE "K".
- B. REFER TO GENERAL NOTE "E" ON PAGE 2 FOR BASIC CAR SELECTION REQUIREMENTS. IN ADDITION, WHEN SELECTING RAIL CARS, EVERY EFFORT SHOULD BE MADE TO OBTAIN BOX CARS THAT DO NOT HAVE BOWED END WALLS. CARS WITH BOWED ENDS CA' 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. SEE THE "BULKHEAD A" AND "BULKHEAD B" DETAILS ON PAGE 56 FOR GUIDANCE.
- C. **NOTICE:** WHEN POSITIONING PALLET UNITS IN A CAR THEY SHOULD BE PLACED TIGHTLY AGAINST A CAR SIDEWALL, AGAINST NAILED SIDE FILL PIECES, AGAINST A CRIB FILL ASSEMBLY, OR AGAINST A LATERALLY ADJACENT UNIT, AS APPLICABLE. THE LADING PLUS THE DUNNAGE SHOULD TOTALLY FILL THE WIDTH OF A CAR AS NEARLY AS POSSIBLE. HOWEVER, A TOTAL ACCUMULATED SPACE ACROSS A CAR OF UP TO BUT NOT EXCEEDING TWO INCHES (2") IS PERMITTED. THE CRIB FILL ASSEMBLIES SPECIFIED FOR THE VARIOUS WIDTH CARS ARE DESIGNED SO AS TO PROVIDE AN EXCESS LATERAL VOID ACROSS A CAR OF APPROXIMATELY 1/2" TO 1". IF VARIATIONS IN THE WIDTH OF THE CAR BEING LOADED OR IN THE PALLET UNIT LENGTHS AND/OR WIDTHS DO NOT PERMIT INSERTION OF THE SPECIFIED CRIB FILL, OR IF THE REMAINING LATERAL SPACE AFTER A CRIB FILL IS INSERTED IS MORE THAN 2", ADJUSTMENTS MUST BE MADE TO THE CRIB FILL ASSEMBLIES. ADJUSTMENTS CAN BE ACCOMPLISHED BY VARYING THE WIDTH AND/OR THICKNESS, AS APPLICABLE, OF THE COMPONENT PARTS OF THE CRIB FILL ASSEMBLIES.
- D. WHEN POSITIONING PALLET UNITS IN A CAR THEY 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 PALLET 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 PALLET UNITS, SUCH AS THE PALLET BASE OR COVER ASSEMBLY. PADDING OF 2-INCH (2") THICK LUMBER OR ANY OTHER MATERIAL OF SIMILAR CONSISTENCY, SHOULD BE PLACED BETWEEN THE JACK AND THE LADING.
- E. 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 FIRST PIECE OF A TRIPLED STRUT WILL BE POSITIONED AT ITS BEARING AREA JUST ABOVE THE STRUT LEDGER ON ONE GATE, THEN THE OTHER END WILL BE DRIVEN DOWNWARD UNTIL IT CONTACTS THE STRUT LEDGER ON THE OTHER GATE. EACH ADDITIONAL PIECE OF A TRIPLED STRUT (ALL 3 WILL BE CUT TO THE SAME LENGTH) WILL BE LAMINATED TO THE FIRST. THE TOP PIECE 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. IF 4" X 6" STRUTS POSITIONED FLAT ARE TO BE USED, SEE THE "BEVEL CUT" DETAIL ON PAGE 69 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. IT SHOULD NOT BE NECESSARY TO BEVEL EITHER END OF THE FIRST PIECE OR THE OTHER LAMINATIONS OF A TRIPLED 2" X 6" STRUT.
- F. TRIPLED 2" X 6" LOAD-BLOCKING STRUTS (OR THE ALTERNATIVE 4" X 6" STRUTS) WHICH ARE 72" OR LONGER, OR DOUBLED 2" X 6" STRUTS WHICH ARE 48" OR LONGER, MUST BE STIFFENED BY THE APPLICATION OF HORIZONTAL AND VERTICAL STRUT BRACING. THESE PIECES ARE NOT REQUIRED IF THE STRUTS FOR THE LOAD BEING SHIPPED ARE SHORTER THAN 72" OR 48", RESPECTIVELY. 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 DOUBLED 2" X 6" 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 LOADS WHERE TRIPLED 2" X 6" STRUTS OR WHERE 4" X 6" STRUTS ARE SPECIFIED SHOULD BE PLANNED SO THAT MORE THAN ONE SET OF HORIZONTAL AND VERTICAL STRUT BRACING PIECES WILL NOT BE REQUIRED.
- G. 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 KNEE BRACE ASSEMBLIES IN THE LESS-THAN-FULL LOAD. 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 "H" ON PAGE 2.
- H. MOST OF THE LOADS SHOWN FOR 50'-6" LONG CARS ARE BASED ON THE USE OF HIGH CAPACITY CARS. THE NUMBER OF UNITS MUST BE REDUCED IF THE LOAD LIMIT OF THE CAR BEING LOADED IS NOT AT LEAST AS GREAT AS THE TOTAL WEIGHT OF THE LADING AND DUNNAGE SPECIFIED IN THE "LOAD AS SHOWN", OR WITHIN THE SPECIAL NOTES, AS APPLICABLE. THIS SAME GUIDANCE APPLIES TO LOADS IN 40'-6" LONG OR OTHER LENGTH CARS. 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.
- J. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.
- K. ALTHOUGH THE USE OF BOX CARS WHICH ARE 60 FOOT AND LONGER IS PERMITTED, SOME LONG CARS HAVING RELATIVELY LOW LOAD LIMITS WILL BE UNECONOMICAL TO USE BECAUSE OF THE EXCESSIVE AMOUNT OF LOAD-BLOCKING DUNNAGE REQUIRED. IN A 60 FOOT LONG CAR HAVING A LOAD LIMIT LARGE ENOUGH, THE FLOOR AREA MAY BE NEARLY FILLED WITH PALLET UNITS. IN CARS LONGER THAN 60 FOOT, UP TO 86'-6" IN LENGTH, THE LCL PROCEDURES SHOWN ON PAGES 48 AND 49 WILL PROBABLY PROVIDE THE BEST LOADING METHOD. THE STRUTTING SPECIFIED FOR 40 FOOT AND 50 FOOT CARS WILL PROBABLY NOT BE ADEQUATE FOR RETAINING THESE LARGER LOADS. SEE THE "LOAD CAPACITY CHART" ON PAGE 72 FOR GUIDANCE AS TO THE MAXIMUM QUANTITY OF PALLET UNITS THAT CAN BE RETAINED IN THE HEAVY END OF A CAR WITH THE LISTED NUMBER OF EITHER TRIPLED 2" X 6" STRUTS OR 4" X 6" STRUTS. NOTE THAT IT MAY BE NECESSARY TO APPLY EXTRA VERTICAL PIECES TO EACH OF THE CENTER GATES, IN ADDITION TO THOSE SPECIFIED, IN ORDER TO ACCOMMODATE THE REQUIRED NUMBER OF STRUTS.
- L. 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.
  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.

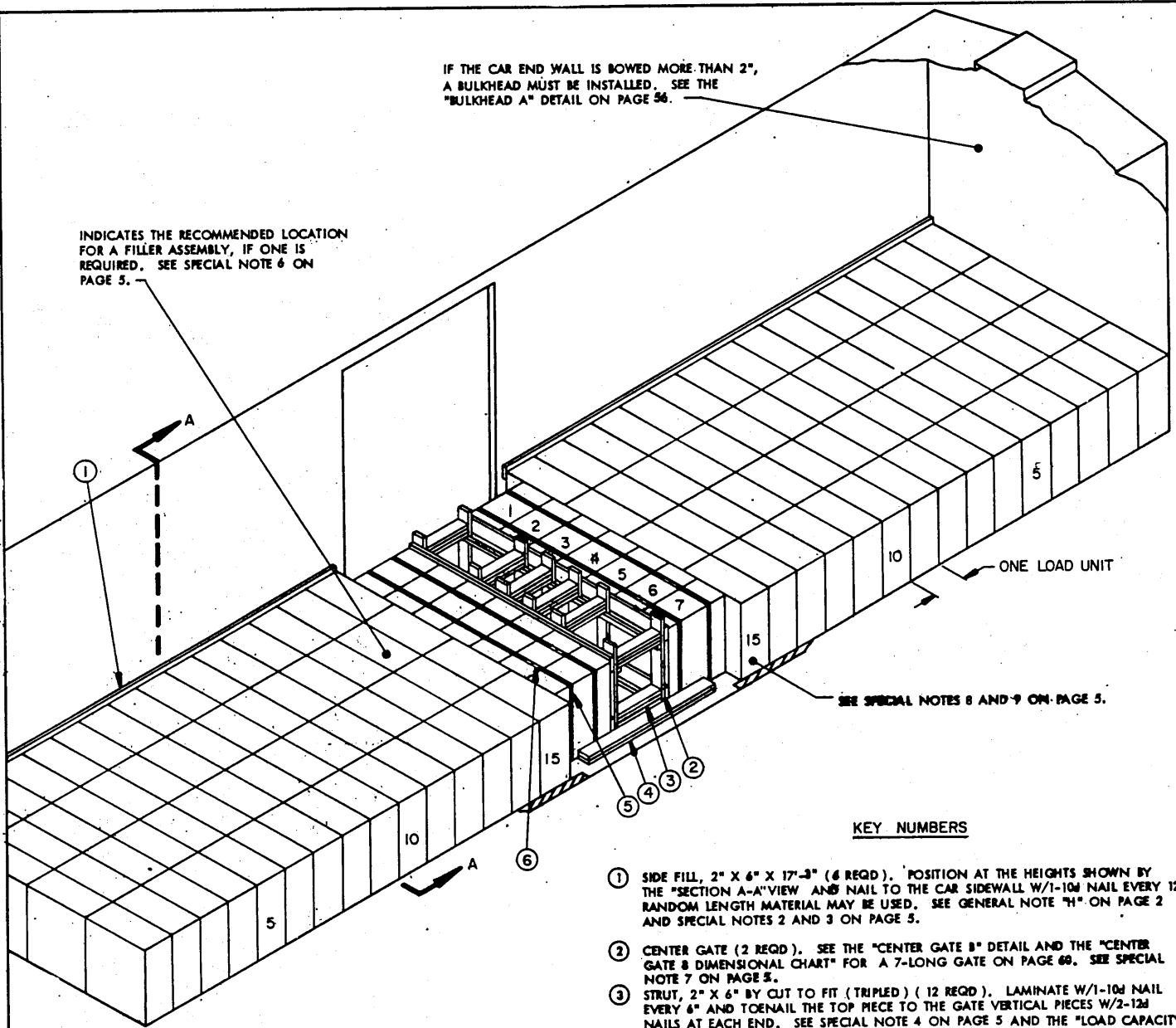
(CONTINUED AT RIGHT)

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
65	67.5	63.2	61.8
75	70.2	65.3	63.6
85	72.9	67.3	65.4
95	75.6	69.3	67.2
105	78.3	71.4	69.0
115	81.0	73.4	70.9
125	83.7	75.4	72.7
135	86.4	77.5	74.5
145	89.1	79.5	76.3
155	91.8	81.6	78.1
165	94.5	83.6	80.0
175	97.2	85.6	81.8
185	100.0	87.7	83.6
195	100.0	89.7	85.4
205	100.0	91.8	87.2
215	100.0	93.8	89.0
225	100.0	95.9	90.9
235		97.9	92.7
245		100.0	94.5
255		100.0	96.3
265		100.0	98.1
275		100.0	100.0

\* CENTER OF GRAVITY

IF THE CAR END WALL IS BOWED MORE THAN 2",  
A BULKHEAD MUST BE INSTALLED. SEE THE  
"BULKHEAD A" DETAIL ON PAGE 56.

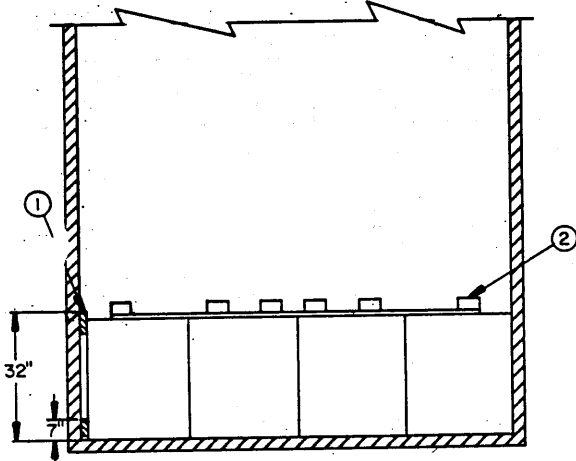
INDICATES THE RECOMMENDED LOCATION  
FOR A FILLER ASSEMBLY, IF ONE IS  
REQUIRED. SEE SPECIAL NOTE 6 ON  
PAGE 5.



ISOMETRIC VIEW

KEY NUMBERS

- ① SIDE FILL, 2" X 6" X 17'-3" (6 REQD). POSITION AT THE HEIGHTS SHOWN BY THE "SECTION A-A" VIEW AND NAIL TO THE CAR SIDEWALL W/1-10d NAIL EVERY 12". RANDOM LENGTH MATERIAL MAY BE USED. SEE GENERAL NOTE "H" ON PAGE 2 AND SPECIAL NOTES 2 AND 3 ON PAGE 5.
- ② CENTER GATE (2 REQD). SEE THE "CENTER GATE B" DETAIL AND THE "CENTER GATE B DIMENSIONAL CHART" FOR A 7-LONG GATE ON PAGE 60. SEE SPECIAL NOTE 7 ON PAGE 5.
- ③ STRUT, 2" X 6" BY CUT TO FIT (TRIPLED) (12 REQD). LAMINATE W/1-10d NAIL EVERY 6" AND TOENAIL THE TOP PIECE TO THE GATE VERTICAL PIECES W/2-12d NAILS AT EACH END. SEE SPECIAL NOTE 4 ON PAGE 5 AND THE "LOAD CAPACITY CHART" ON PAGE 78.
- ④ DOORWAY BLOCKING, 2" X 6" X 40" (DOUBLED) (2 REQD). POSITION SO AS TO BE CENTERED ON THE TWO CROSSWISE ROWS AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "G" ON PAGE 3.
- ⑤ DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 22'-0" LONG STEEL STRAPPING (4 REQD).
- ⑥ SEAL FOR 1-1/4" STRAPPING (8 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "K" ON PAGE 2.

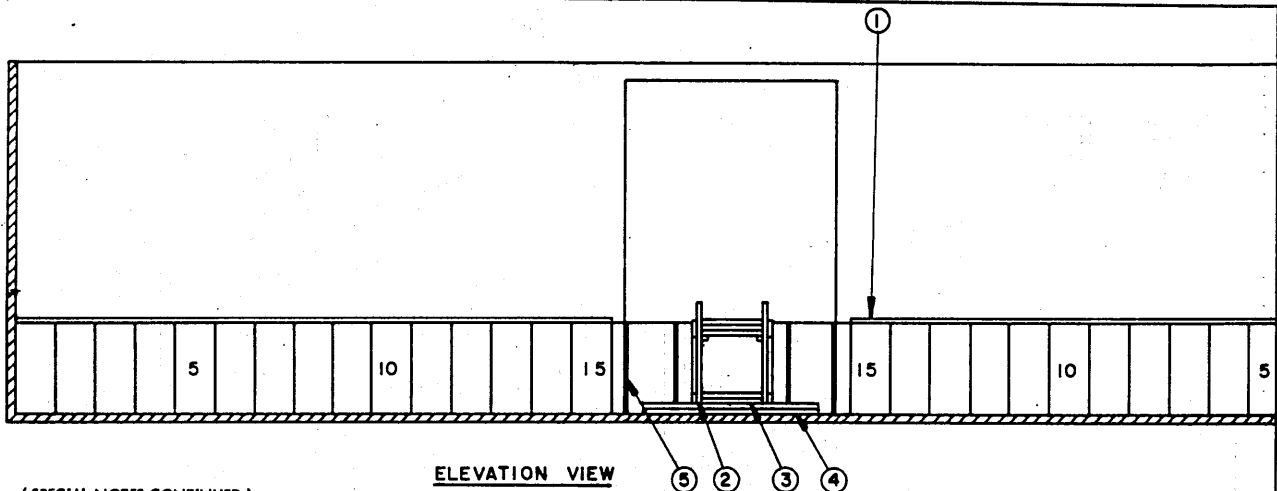


SECTION A-A

155 MM PROJECTILES (8/SMALL PALLET)

134-UNIT LOAD IN 40'-6" LONG BY 9'-2" WIDE BOX CAR (CONVENTIONAL)





ELEVATION VIEW

(SPECIAL NOTES CONTINUED)

- THE DEPICTED CENTER GATES AND STRUTS WHEN THE EXCESS SPACE IN THE CENTER OF THE CAR IS APPROXIMATELY 18" OR LESS. FURTHER REDUCTION OF A LOAD CAN BE ACCOMPLISHED BY EMPLOYING THE PROCEDURES SHOWN ON PAGES 48 AND 49 AS GUIDANCE. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53 OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55.
- IF A LOAD DOES NOT CONTAIN ANY CROSSWISE ROWS, A DIFFERENT CENTER GATE THAN SHOWN MUST BE USED. SEE THE "CENTER GATE H" DETAIL ON PAGE 63 FOR CONSTRUCTION GUIDANCE PERTAINING TO THE ALTERNATIVE GATE. TEN (10) STRUTS WILL BE USED IN LIEU OF TWELVE, AND PIECES MARKED ④, ⑤, AND ⑥ WILL NOT BE REQUIRED.
  - IN A CAR EQUIPPED WITH SINGLE "THRU" PLUG TYPE DOORS, LOAD UNITS OF FOUR PALLET WHICH ARE POSITIONED WITH THE 27" WIDTH OF THE UNIT ACROSS THE CAR MUST NOT BE LOADED SO AS TO EXTEND INTO THE DOORWAY TO SUCH AN EXTENT THAT SIX INCHES (6") OR LESS OF A PALLET IS RETAINED, BY A CAR SIDEWALL. TO SATISFY THIS REQUIREMENT, FIFTEEN (15) LOAD UNITS, AS SHOWN, CAN BE LOADED IN EACH END OF THE CAR IF THE PLUG DOORS ARE 6', 7', OR 8' WIDE. A CAR WITH 9' OR 10' WIDE PLUG TYPE DOORS WILL BE LIMITED TO FOURTEEN (14) LOAD UNITS IN EACH END WITH THREE CROSSWISE ROWS IN THE DOORWAY AREA BLOCKED WITH 7'-0" LONG DOORWAY BLOCKING, PIECE MARKED ④. A CAR WITH 10'-6" TO 12' WIDE DOORS WILL BE LIMITED TO THIRTEEN (13) LOAD UNITS IN EACH END, WITH FOUR CROSSWISE ROWS POSSIBLE, BLOCKED WITH 9'-0" LONG DOORWAY BLOCKING. IF THE CAR IS EQUIPPED WITH DOUBLE "THRU" PLUG TYPE DOORS OR WITH STAGGERED DOUBLE PLUG TYPE DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH CROSSWISE ROWS OF 7 WIDE BLOCKED WITH DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS, OR LOADED 8 WIDE AND HAVING THE SIDE FILL, PIECE MARKED ①, SPANNING THE DOOR OPENING AND EACH CROSSWISE ROW ENCLOSED WITH TWO DOORWAY PROTECTION STRAPS, PIECES MARKED ⑤. NOTE THAT THESE SPECIFIED LIMITS AS TO THE NUMBER OF LOAD UNITS IN EACH END OF A CAR ARE APPLICABLE ONLY FOR A 40'-6" LONG CAR; THE QUANTITIES WILL VARY IN CARS OF OTHER LENGTHS.
  - IF A CAR IS EQUIPPED WITH SINGLE SLIDING DOORS, THE UNITS HAVING THE 27" WIDTH ACROSS THE CAR MAY EXTEND INTO THE DOORWAY AREA, BUT LATERAL BRACING MUST BE PROVIDED BY INSTALLING DOORWAY PROTECTION GATES. SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69 OR THE "DOORWAY PROTECTION B" DETAIL ON PAGE 70. WHEN USING DOORWAY PROTECTION GATES, THE CROSSWISE ROWS MAY BE INCREASED FROM 7 TO 8 UNITS. IF THIS IS DONE, OMIT THE DOORWAY BLOCKING, DOORWAY PROTECTION STRAPS, AND THE SEALS, PIECES MARKED ④ THRU ⑥. FOR CARS EQUIPPED WITH STAGGERED DOUBLE SLIDING DOORS, DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE LATERAL BRACING FOR THE ADJACENT UNITS POSITIONED WITH THE 27" WIDTH ACROSS THE CAR. THE CENTER AREA OF THE CAR ADJACENT TO THE MAIN DOOR OPENINGS WILL BE LOADED WITH TWO OR MORE CROSSWISE ROWS, AS APPLICABLE. INSTALL BLOCKING AS SHOWN IN THE LOAD VIEW IF THE CROSSWISE ROWS ARE 7 WIDE, OR USE DOORWAY PROTECTION GATES AS SPECIFIED PREVIOUSLY IF THE CROSSWISE ROWS ARE 8 ACROSS. IF A CAR IS EQUIPPED WITH DOUBLE SLIDING "THRU" DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH THE 7-LONG CROSSWISE ROWS.
  - IF A CAR IS EQUIPPED WITH A COMBINATION OF DOOR TYPES, WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE ENTIRE DOORWAY AREA WILL BE LOADED WITH CROSSWISE ROWS OF 7 WIDE BLOCKED WITH DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS. OR, IF LOADED 8 WIDE, THE SIDE FILL, PIECE MARKED ①, WILL SPAN ONLY THE PLUG DOORS, AND DOORWAY PROTECTION GATES WILL BE INSTALLED IN THE CONVENTIONAL SLIDING DOORS. SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69.

SPECIAL NOTES:

- A 134-UNIT LOAD OF 15MM PROJECTILES, PALLETIZED 8 PER SMALL PALLET, IS SHOWN IN A 40'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTES 8 AND 9.
- THE LOADING PROCEDURE SHOWN ON PAGE 4 IS APPLICABLE FOR 9'-2" WIDE CARS WHICH HAVE NAILABLE SIDEWALLS. NOTE THAT THE SIDE FILL, PIECE MARKED ① MAY BE OMITTED IF THE TOTAL ACCUMULATED SPACE ACROSS THE CAR IS 2" OR LESS. IF A WIDER CAR IS FURNISHED FOR LOADING, ADDITIONAL MATERIAL MUST BE LAMINATED TO A PIECE MARKED ① TO ENSURE THAT THE TOTAL ACCUMULATED SPACE ACROSS THE CAR WILL NOT EXCEED TWO INCHES (2"). CRIB FILL ASSEMBLIES MAY BE USED, AS SPECIFIED IN SPECIAL NOTE 3.
- IF THE CAR FURNISHED FOR LOADING HAS METAL SIDEWALLS, CRIB FILL ASSEMBLIES MUST BE USED IN LIEU OF THE NAILABLE SIDE FILL, PIECES MARKED ①. SEE THE "CRIB FILL A" DETAIL ON PAGE 57 FOR CONSTRUCTION GUIDANCE. ALSO, IT MAY BE DESIRABLE TO USE CRIB FILL ASSEMBLIES IF NAILABLE-WALL CARS WIDER THAN 9'-2" ARE FURNISHED FOR LOADING; USE CRIB FILL B FOR TWO PALLET LONG IN 9'-4" OR 9'-6" WIDE CARS. SEE THE DETAIL AND THE "CRIB FILL B DIMENSIONAL CHART" ON PAGE 57. USE CRIB FILL C FOR THREE PALLET LONG IN 9'-4" OR 9'-6" WIDE CARS. SEE THE DETAIL AND THE "CRIB FILL C DIMENSIONAL CHART" ON PAGE 58. POSITION THE CRIB FILL BETWEEN THE CENTER ROWS. NOTE THAT THE WIDTH OF THE CRIB FILL ASSEMBLIES MUST BE SUCH THAT THE TOTAL ACCUMULATED SPACE ACROSS THE CAR WILL NOT BE MORE THAN TWO INCHES (2").
- IF AVAILABLE, 4" X 6" MATERIAL (POSITIONED FLAT) MAY BE USED IN LIEU OF THE DEPICTED TRIPLED 2" X 6" STRUTS, PROVIDED THE LOAD IN EITHER END OF THE CAR DOES NOT CONTAIN MORE THAN SEVENTY-TWO (72) PALLET UNITS. NOTE THAT STRUTS WHICH ARE 72" OR LONGER MUST BE STIFFENED BY THE APPLICATION OF STRUT BRACING. SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 69 FOR GUIDANCE.
- THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED. A 137-UNIT LOAD CAN BE ATTAINED BY POSITIONING 15 LOAD UNITS IN ONE END OF THE CAR AND 14 LOAD UNITS IN THE OPPOSITE END, WITH 3 ROWS OF 7 ACROSS THE CAR IN THE DOORWAY AREA. ADJUST THE LENGTH OF PIECES MARKED ① AND ④ TO SUIT. ALSO, 3 PALLET UNITS CAN BE ADDED TO THE 137-UNIT LOAD OR 2 PALLET UNITS CAN BE ADDED TO THE DEPICTED LOAD BY INCREASING THE ROWS IN THE DOORWAY AREA TO 8 ACROSS. USE CENTER GATES AND SOLID FILL, SIMILAR TO THE LOAD ON PAGE 6, IN LIEU OF THE DEPICTED CENTER GATES AND STRUTS. IF THE CAR IS EQUIPPED WITH PLUG DOORS, ENCIRCLE EACH CROSSWISE 8-UNIT ROW WITH TWO PIECES OF 1-1/4" STEEL STRAPPING, AND IF THE CAR IS EQUIPPED WITH SLIDING DOORS, INSTALL DOORWAY PROTECTION AS SHOWN BY THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69 OR THE "DOORWAY PROTECTION B" DETAIL ON PAGE 70 IN LIEU OF PIECES MARKED ④, ⑤, AND ⑥. IF IT IS NECESSARY TO FURTHER INCREASE THE LOAD IN ORDER TO SUIT THE QUANTITY TO BE SHIPPED, A PARTIAL SECOND LAYER MAY BE ADDED IN ONE OR BOTH ENDS OF THE CAR, PROVIDED THE CAR HAS NAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR WILL NOT BE EXCEEDED. NOTE THAT THE LOAD LIMIT OF THE CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LADING PLUS DUNNAGE IN THE HEAVY END OF THE CAR. INSTALL ADDITIONAL SIDE FILL PIECES AT 37-1/2" AND 62" ABOVE THE CAR FLOOR (OR INCREASE HEIGHT OF CRIB FILL IF USED) FOR THE PARTIAL LAYER AND INSTALL THE PROPER SIZE K-BRACE TO RETAIN THE PARTIAL LAYER. SEE THE TYPICAL INSTALLATION ON PAGE 50 AND/OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE.
- THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. ALMOST ANY QUANTITY OF PALLET UNITS WHICH IT IS DESIRED TO SHIP (FROM 106 TO A FULL LOAD) CAN BE ACHIEVED BY USING VARIOUS COMBINATIONS OF LOAD UNITS OF FOUR EACH POSITIONED WITH THE 27" WIDTH DIMENSION ACROSS THE CAR, AND ONE THRU FOUR CROSSWISE ROWS OF SEVEN PALLET UNITS POSITIONED WITH THE LENGTH DIMENSION ACROSS THE CAR. FOR THOSE QUANTITIES IN THAT RANGE WHICH CANNOT BE ATTAINED IN THIS MANNER, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS TO REACH THE DESIRED QUANTITY. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66. NOTE THAT CENTER GATES AND SOLID FILL, SIMILAR TO THE CENTER BRACING OF THE LOAD SHOWN ON PAGE 6, WILL BE USED IN LIEU OF

(CONTINUED AT LEFT)

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	32	11
2" X 3"	8	4
2" X 6"	220	220
NAILS	NO. REQD	POUNDS
10d (3")	308	5
12d (3-1/4")	48	3/4
16d (3-1/2")	32	3/4
STEEL STRAPPING, 1-1/4" X .035"(OR .031") - 88' REQD		13 LBS
SEAL FOR 1-1/4" STRAPPING		8 REQD - NIL

LOAD AS SHOWN

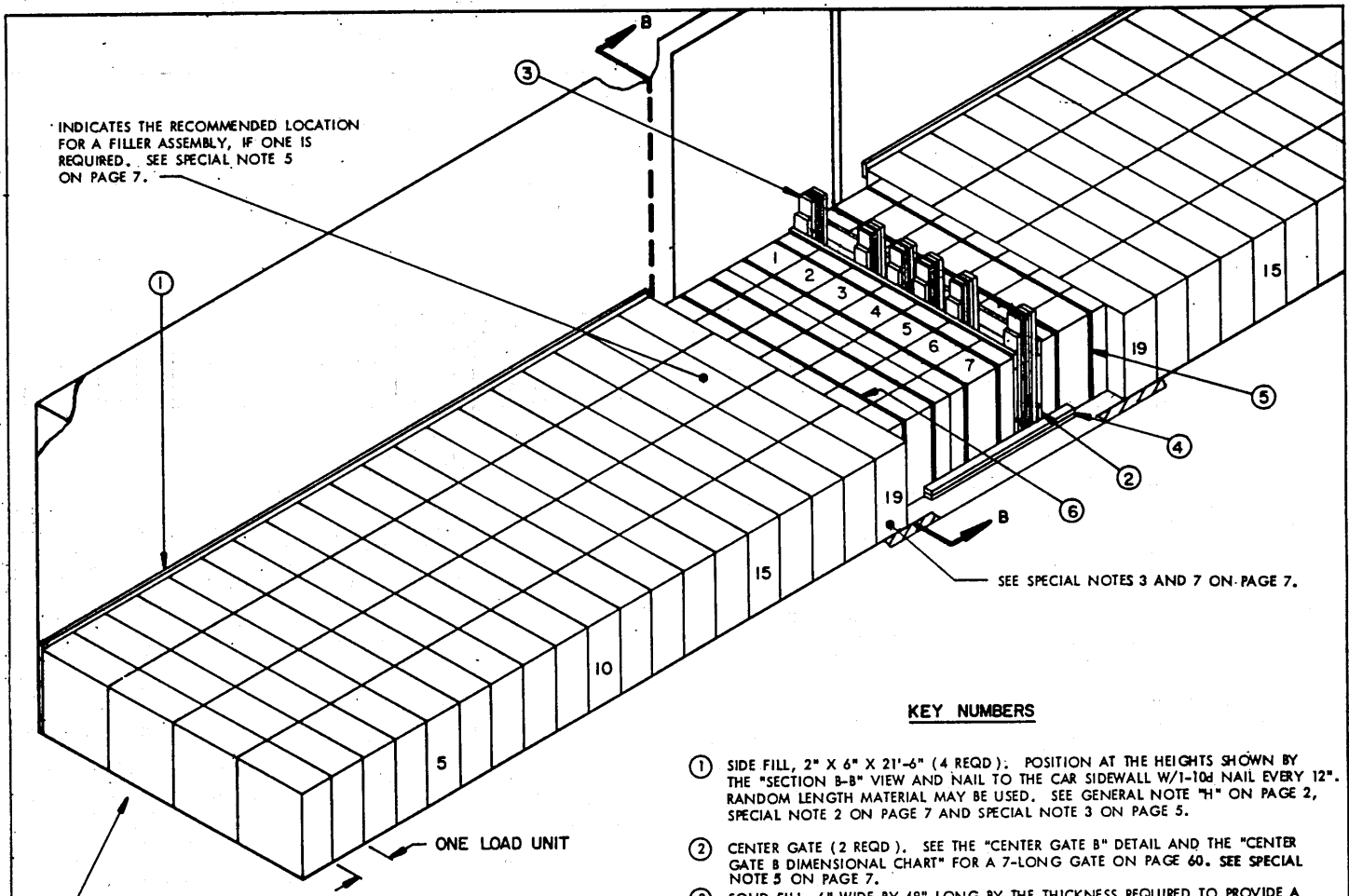
ITEM	QUANTITY	WEIGHT (APPROX)
155MM (8/PALLET)	134*	107,200 LBS
DUNNAGE		491 LBS

TOTAL WEIGHT ----- 107,691 LBS

\* SEE SPECIAL NOTE 5

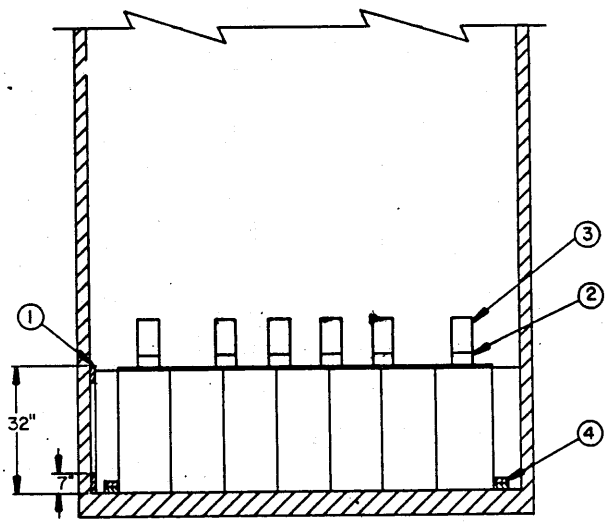
155MM PROJECTILES (8/SMALL PALLET)

134-UNIT LOAD IN A 40'-6" LONG BY 9'-2" WIDE BOX CAR (CONVENTIONAL)

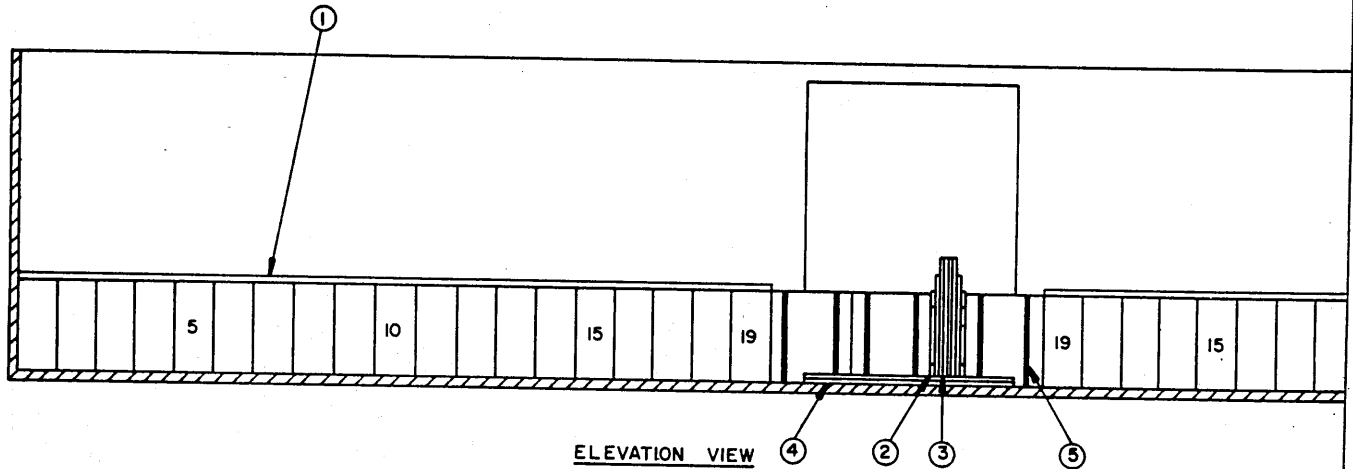


**KEY NUMBERS**

- ① SIDE FILL, 2" X 6" X 21'-6" (4 REQD). POSITION AT THE HEIGHTS SHOWN BY THE "SECTION B-B" VIEW AND NAIL TO THE CAR SIDEWALL W/1-10d NAIL EVERY 12". RANDOM LENGTH MATERIAL MAY BE USED. SEE GENERAL NOTE "H" ON PAGE 2, SPECIAL NOTE 2 ON PAGE 7 AND SPECIAL NOTE 3 ON PAGE 5.
- ② CENTER GATE (2 REQD). SEE THE "CENTER GATE B" DETAIL AND THE "CENTER GATE B DIMENSIONAL CHART" FOR A 7'-LONG GATE ON PAGE 60. SEE SPECIAL NOTE 5 ON PAGE 7.
- ③ SOLID FILL, 6" WIDE BY 48" LONG BY THE THICKNESS REQUIRED TO PROVIDE A WEDGE FIT BETWEEN THE VERTICAL PIECES OF THE LONGITUDINALLY ADJACENT CENTER GATES (REQD AT 6 PLACES). NAIL THE FIRST PIECE TO THE EXTENDED VERTICAL PIECE OF ONE CENTER GATE W/5-10d NAILS. NAIL EACH ADDITIONAL PIECE TO A PREVIOUSLY INSTALLED PIECE W/5-10d NAILS. NAIL THRU EACH VERTICAL PIECE OF THE OTHER CENTER GATE INTO THE LAST SOLID FILL PIECE W/3-10d NAILS.
- ④ DOORWAY BLOCKING, 2" X 6" X 72" (DOUBLED) (2 REQD). POSITION SO AS TO BE CENTERED ON THE OUTERMOST OF THE THREE CROSSWISE ROWS AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "G" ON PAGE 3.
- ⑤ DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 22'-0" LONG STEEL STRAPPING (6 REQD).
- ⑥ SEAL FOR 1-1/4" STRAPPING (12 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "K" ON PAGE 2.



155MM PROJECTILES (8/SMALL PALLET)  
 173-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR (CONVENTIONAL)



**(SPECIAL NOTES CONTINUED)**

**SPECIAL NOTES:**

- 9' WIDE. A CAR WITH 10' TO 11' WIDE PLUG DOORS WILL BE LIMITED TO EIGHTEEN (18) LOAD UNITS IN EACH END WITH FOUR CROSSWISE ROWS IN THE DOORWAY AREA BLOCKED WITH 8'-0" LONG DOORWAY BLOCKING, PIECE MARKED ④. A CAR WITH 12' WIDE DOORS WILL BE LIMITED TO SEVENTEEN (17) LOAD UNITS IN EACH END, WITH FIVE CROSSWISE ROWS POSSIBLE, BLOCKED WITH 10'-6" LONG DOORWAY BLOCKING. IF THE CAR IS EQUIPPED WITH DOUBLE "THRU" PLUG TYPE OR WITH STAGGERED DOUBLE PLUG TYPE DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH CROSSWISE ROWS OF 7 WIDE BLOCKED WITH DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS, OR LOADED 8 WIDE AND HAVING THE SIDE FILL, PIECE MARKED ①, SPANNING THE DOOR OPENINGS AND EACH CROSSWISE ROW ENCLOSED WITH TWO DOORWAY PROTECTION STRAPS, PIECES MARKED ③. NOTE THAT THESE SPECIFIED LIMITS AS TO THE NUMBER OF LOAD UNITS IN EACH END OF A CAR ARE APPLICABLE ONLY FOR A 50'-6" LONG CAR; THE QUANTITIES WILL VARY IN CARS OF OTHER LENGTHS.
- IF A CAR IS EQUIPPED WITH SINGLE SLIDING DOORS, THE UNITS HAVING THE 27" WIDTH ACROSS THE CAR MAY EXTEND INTO THE DOORWAY AREA, BUT LATERAL BRACING MUST BE PROVIDED BY INSTALLING DOORWAY PROTECTION GATES, SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69 OR THE "DOORWAY PROTECTION B" DETAIL ON PAGE 70. WHEN USING DOORWAY PROTECTION GATES, THE CROSSWISE ROWS MAY BE INCREASED FROM 7 TO 8 UNITS. IF THIS IS DONE, OMIT THE DOORWAY BLOCKING, DOORWAY PROTECTION STRAPS, AND THE SEALS, PIECES MARKED ④ THRU ⑥. FOR CARS EQUIPPED WITH STAGGERED DOUBLE SLIDING DOORS, DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE LATERAL BRACING FOR THE ADJACENT UNITS POSITIONED WITH THE 27" WIDTH ACROSS THE CAR. THE CENTER AREA OF THE CAR ADJACENT TO THE MAIN DOOR OPENINGS WILL BE LOADED WITH TWO OR MORE CROSSWISE ROWS, AS APPLICABLE. INSTALL BLOCKING AS SHOWN IN THE LOAD VIEW IF THE CROSSWISE ROWS ARE 7 WIDE, OR USE DOORWAY PROTECTION GATES AS SPECIFIED PREVIOUSLY IF THE CROSSWISE ROWS ARE 8 ACROSS. IF A CAR IS EQUIPPED WITH DOUBLE SLIDING "THRU" DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH THE 7-LONG CROSSWISE ROWS.
- IF A CAR IS EQUIPPED WITH A COMBINATION OF DOOR TYPES, WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE ENTIRE DOORWAY AREA WILL BE LOADED WITH CROSSWISE ROWS OF 7 WIDE BLOCKED WITH DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS. OR, IF LOADED 8 WIDE, THE SIDE FILL, PIECE MARKED ①, WILL SPAN ONLY THE PLUG DOORS, AND DOORWAY PROTECTION GATES WILL BE INSTALLED IN THE CONVENTIONAL SLIDING DOORS. SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69.

- A 173-UNIT LOAD OF 155MM PROJECTILES, PALLETIZED 8 PER SMALL PALLET, IS SHOWN IN A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS, UP TO AND INCLUDING SIXTY-FOOT CARS, AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTES 3 AND 7.
- THE LOADING PROCEDURE SHOWN ON PAGE 6 IS APPLICABLE FOR 9'-2" WIDE CARS WHICH HAVE NAILABLE SIDEWALLS. NOTE THAT THE SIDE FILL, PIECE MARKED ①, MAY BE OMITTED IF THE TOTAL ACCUMULATED SPACE ACROSS THE CAR IS 2" OR LESS. IF A WIDER CAR IS FURNISHED FOR LOADING, ADDITIONAL MATERIAL MUST BE LAMINATED TO PIECE MARKED ① TO ENSURE THAT THE TOTAL ACCUMULATED SPACE ACROSS THE CAR WILL NOT EXCEED TWO INCHES (2"). CRIB FILL ASSEMBLIES MAY BE USED, AS SPECIFIED IN SPECIAL NOTE 3 ON PAGE 5.
- THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED BY ADDING A PARTIAL SECOND LAYER IN ONE OR BOTH ENDS OF THE CAR, PROVIDED THE CAR HAS NAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR WILL NOT BE EXCEEDED. NOTE THAT THE LOAD LIMIT OF THE CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LADING PLUS DUNNAGE IN THE HEAVY END OF THE CAR. INSTALL ADDITIONAL SIDE FILL PIECES AT 37-1/2" AND 62" ABOVE THE CAR FLOOR (OR INCREASE HEIGHT OF CRIB FILL IF USED) FOR THE PARTIAL LAYER AND INSTALL THE PROPER SIZE K-BRACE TO RETAIN THE PARTIAL LAYER. SEE THE TYPICAL INSTALLATION ON PAGE 50 AND/OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE. THREE PALLET UNITS CAN BE ADDED TO THE DEPICTED 173-UNIT LOAD BY INCREASING THE ROWS IN THE DOORWAY AREA TO 8 ACROSS. IF THE CAR IS EQUIPPED WITH PLUG DOORS, ENCLOSE EACH CROSSWISE 8-UNIT ROW WITH TWO PIECES OF 1-1/4" STEEL STRAPPING, AND IF THE CAR IS EQUIPPED WITH SLIDING DOORS, INSTALL DOORWAY PROTECTION AS SHOWN BY THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69 OR THE "DOORWAY PROTECTION B" DETAIL ON PAGE 70 IN LIEU OF PIECES MARKED ④, ⑤, AND ⑥.
- THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. ALMOST ANY QUANTITY OF PALLET UNITS WHICH IT IS DESIRED TO SHIP (FROM 140 TO A FULL LOAD) CAN BE ACHIEVED BY USING VARIOUS COMBINATIONS OF LOAD UNITS OF FOUR EACH POSITIONED WITH THE 27" WIDTH DIMENSION ACROSS THE CAR, AND ONE THRU FOUR CROSSWISE ROWS OF SEVEN PALLET UNITS POSITIONED WITH THE LENGTH DIMENSION ACROSS THE CAR. FOR THOSE QUANTITIES IN THAT RANGE WHICH CANNOT BE ATTAINED IN THIS MANNER, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS TO REACH THE DESIRED QUANTITY. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66. NOTE THAT CENTER GATES AND STRUTS, SIMILAR TO THE CENTER BRACING OF THE LOAD SHOWN ON PAGE 4, WILL BE USED IN LIEU OF THE DEPICTED CENTER GATES AND SOLID FILL WHEN THE EXCESS SPACE IN THE CENTER OF THE CAR IS APPROXIMATELY 18" OR MORE. FURTHER REDUCTION OF A LOAD CAN BE ACCOMPLISHED BY EMPLOYING THE PROCEDURES SHOWN ON PAGES 48 AND 49 AS GUIDANCE. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53 OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55.
- IF A LOAD DOES NOT CONTAIN ANY CROSSWISE ROWS, A DIFFERENT CENTER GATE THAN SHOWN MUST BE USED. SEE THE "CENTER GATE H" DETAIL ON PAGE 63. FOR CONSTRUCTION GUIDANCE PERTAINING TO THE ALTERNATIVE GATE, TEN (10) STRUTS WILL BE USED IN LIEU OF THE DEPICTED SOLID FILL, PIECE MARKED ③, AND PIECES MARKED ④, ⑤, AND ⑥ WILL NOT BE REQUIRED.
- IN A CAR EQUIPPED WITH SINGLE "THRU" PLUG TYPE DOORS, LOAD UNITS OF FOUR PALLETS WHICH ARE POSITIONED WITH THE 27" WIDTH OF THE UNIT ACROSS THE CAR MUST NOT BE LOADED SO AS TO EXTEND INTO THE DOORWAY TO SUCH AN EXTENT THAT SIX INCHES (6") OR LESS OF A PALLET IS RETAINED BY A CAR SIDEWALL. TO SATISFY THIS REQUIREMENT, NINETEEN (19) LOAD UNITS, AS SHOWN CAN BE LOADED IN EACH END OF THE CAR IF THE PLUG DOORS ARE 6' THRU

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 3"	8	4
2" X 6"	280	280
NAILS	NO. REQD	POUNDS
10d (3")	320	5
16d (3-1/2")	36	3/4
STEEL STRAPPING, 1-1/4" X .035" (OR .031") - 132' REQD - 19 LBS		
SEAL FOR 1-1/4" STRAPPING ----- 12 REQD - NIL		

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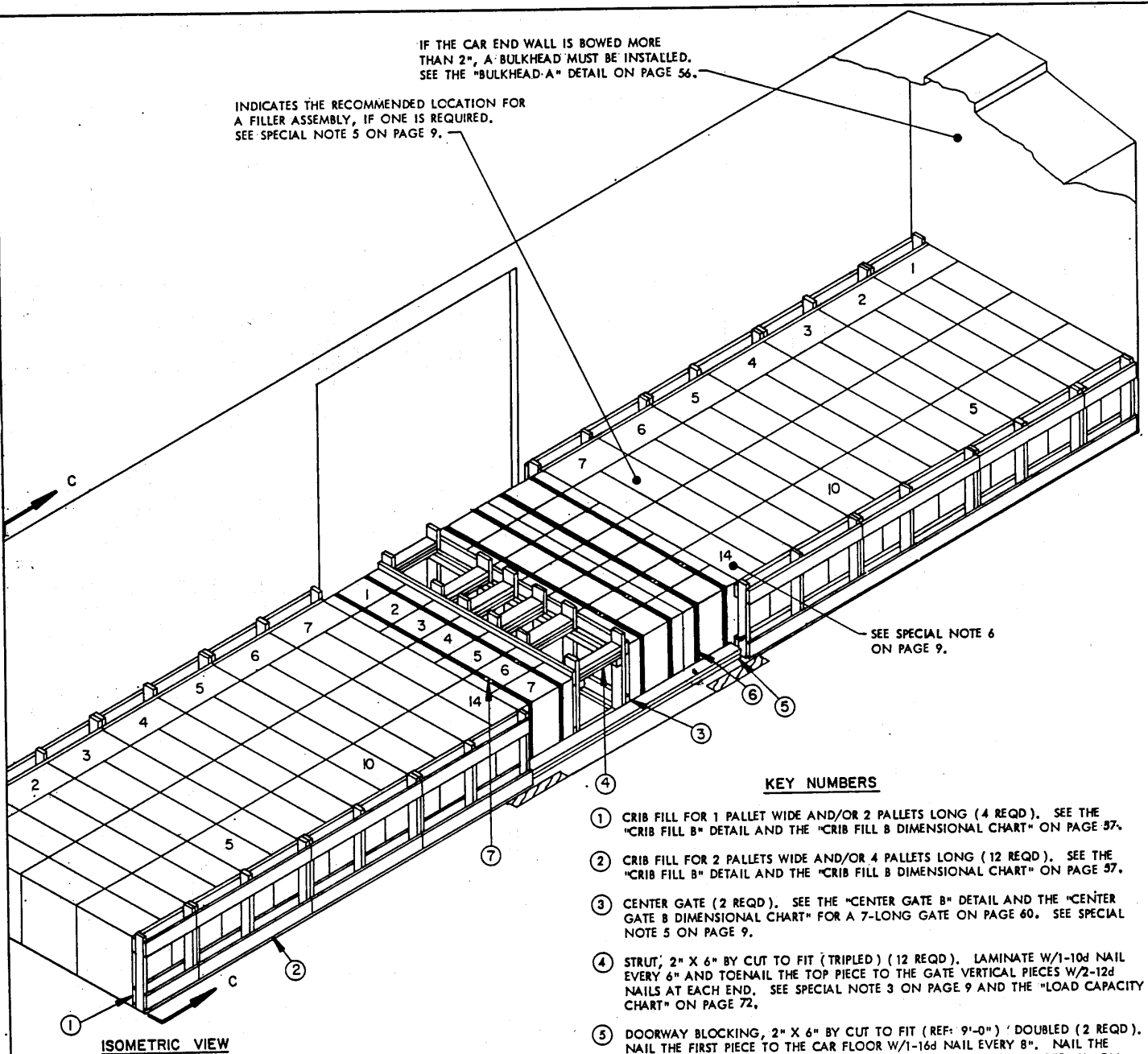
**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
155MM (8/PALLET) ---	173	138,400 LBS
DUNNAGE -----		595 LBS
TOTAL WEIGHT ----		138,995 LBS

155MM PROJECTILES (8/SMALL PALLET)  
173-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR (CONVENTIONAL)

IF THE CAR END WALL IS BOWED MORE THAN 2", A "BULKHEAD" MUST BE INSTALLED. SEE THE "BULKHEAD-A" DETAIL ON PAGE 56.

INDICATES THE RECOMMENDED LOCATION FOR A FILLER ASSEMBLY, IF ONE IS REQUIRED. SEE SPECIAL NOTE 5 ON PAGE 9.

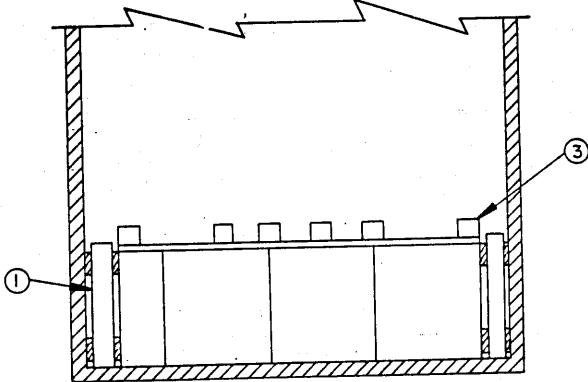


SEE SPECIAL NOTE 6 ON PAGE 9.

**KEY NUMBERS**

- ① CRIB FILL FOR 1 PALLET WIDE AND/OR 2 PALLETS LONG (4 REQD). SEE THE "CRIB FILL B" DETAIL AND THE "CRIB FILL B DIMENSIONAL CHART" ON PAGE 57.
- ② CRIB FILL FOR 2 PALLETS WIDE AND/OR 4 PALLETS LONG (12 REQD). SEE THE "CRIB FILL B" DETAIL AND THE "CRIB FILL B DIMENSIONAL CHART" ON PAGE 57.
- ③ CENTER GATE (2 REQD). SEE THE "CENTER GATE B" DETAIL AND THE "CENTER GATE B DIMENSIONAL CHART" FOR A 7-LONG GATE ON PAGE 60. SEE SPECIAL NOTE 5 ON PAGE 9.
- ④ STRUT, 2" X 6" BY CUT TO FIT (TRIPLED) (12 REQD). LAMINATE W/1-10d NAIL EVERY 6" AND TOENAIL THE TOP PIECE TO THE GATE VERTICAL PIECES W/2-12d NAILS AT EACH END. SEE SPECIAL NOTE 3 ON PAGE 9 AND THE "LOAD CAPACITY CHART" ON PAGE 72.
- ⑤ DOORWAY BLOCKING, 2" X 6" BY CUT TO FIT (REF: 9'-0") / DOUBLED (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "H" ON PAGE 2 AND GENERAL NOTE "G" ON PAGE 3.
- ⑥ DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 22'-0" LONG STEEL STRAPPING (6 REQD).
- ⑦ SEAL FOR 1-1/4" STRAPPING (12 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "K" ON PAGE 2.

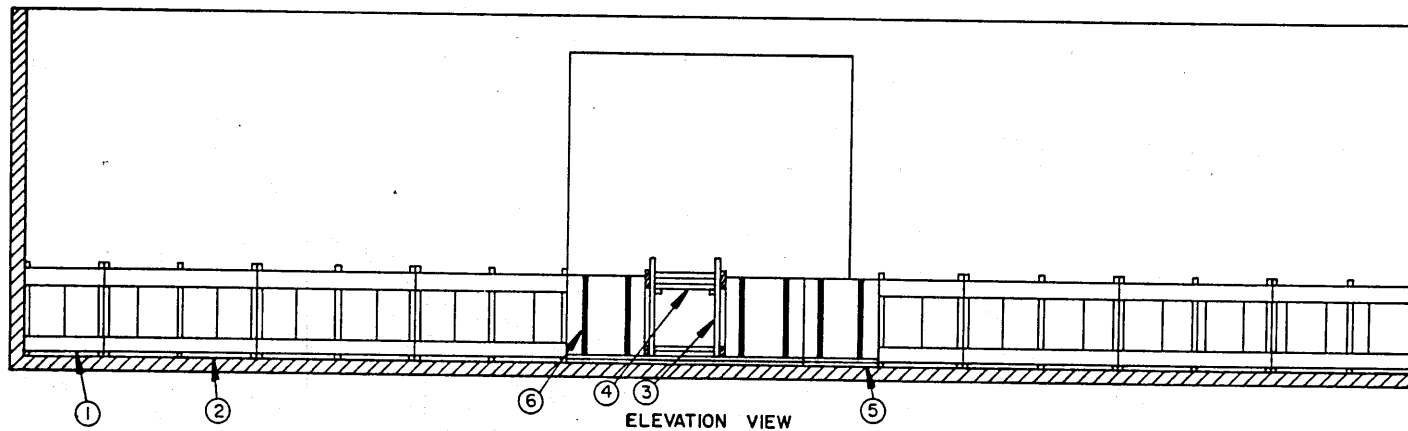
**ISOMETRIC VIEW**



**SECTION C-C**

155 MM PROJECTILES (8/SMALL PALLET)

119 - UNIT LOAD IN A 40'-6" LONG BY 9'-0" WIDE BOX CAR (CONVENTIONAL)



**(SPECIAL NOTES CONTINUED)**

6. THE DEPICTED LOADING PROCEDURES ARE APPLICABLE FOR 40'-6" LONG CARS HAVING SINGLE DOOR OPENINGS WHICH ARE FROM 6' TO 10' WIDE, EITHER CONVENTIONAL SLIDING OR PLUG DOOR TYPE. IF THE CAR IS EQUIPPED WITH 12' WIDE DOOR OPENINGS OF EITHER TYPE, THE LOAD PATTERN MUST BE CHANGED TO SIX PALLET UNITS WIDE ALONG ONE SIDE OF THE CAR AND TWELVE PALLET UNITS LONG FOR THE BALANCE OF THE LOAD. THE CENTER AREA OF THE CAR ADJACENT TO THE DOOR OPENINGS WILL BE LOADED WITH FIVE CROSSWISE ROWS OF SEVEN UNITS. OMIT PIECES MARKED ①, INCREASE THE LENGTH OF THE DOORWAY BLOCKING, PIECES MARKED ⑤, TO 13'-6" (REF), AND ADD FOUR DOORWAY PROTECTION STRAPS, PIECES MARKED ④. NOTE THAT THESE LIMITS AS TO THE NUMBER OF PALLET UNITS IN EACH END OF THE CAR ARE ONLY APPLICABLE FOR A 40'-6" LONG CAR; THE QUANTITIES WILL VARY IN CARS OF OTHER LENGTHS.
7. THE DOORWAY AREA OF CARS EQUIPPED WITH DOUBLE "THRU" PLUG TYPE OR CONVENTIONAL SLIDING DOORS WILL BE LOADED WITH ALL CROSSWISE ROWS. FOR CARS EQUIPPED WITH STAGGERED PLUG DOORS OR A COMBINATION OF DOOR TYPES, WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE DEPICTED LOADING PROCEDURE WILL APPLY. IF THE CAR TO BE LOADED IS EQUIPPED WITH STAGGERED DOUBLE SLIDING DOORS, DOORWAY PROTECTION GATES, AS DEPICTED BY THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69, WILL BE INSTALLED IN THE AUXILIARY DOOR OPENINGS. THE DOORWAY AREA ADJACENT TO THE MAIN DOORS WILL BE LOADED WITH CROSSWISE ROWS.

**SPECIAL NOTES:**

1. A 119-UNIT LOAD OF 155MM PROJECTILES PALLETIZED 8 PER SMALL PALLET IS SHOWN IN A 40'-6" LONG BY 9'-0" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 8'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTES 6 AND 7.
2. THE LOADING PROCEDURE ON PAGE 8 IS APPLICABLE FOR 9'-0" WIDE CARS WHICH HAVE EITHER NAILABLE OR METAL SIDEWALLS. NOTE THAT THE TOTAL ACCUMULATED SPACE ACROSS A CAR MUST NOT BE MORE THAN TWO INCHES (2"). TO SATISFY THIS REQUIREMENT, THE WIDTH OF THE CRIB FILL ASSEMBLIES CAN BE ADJUSTED BY INCREASING OR DECREASING THE WIDTH OF THE VERTICAL PIECES AND/OR BY CHANGING THE THICKNESS OF, OR ADDING LAMINATIONS OF MATERIAL TO, THE HORIZONTAL PIECES.
3. IF AVAILABLE, 4" X 6" MATERIAL (POSITIONED FLAT) MAY BE USED IN LIEU OF THE DEPICTED TRIPLED 2" X 6" STRUTS, PROVIDED THE LOAD IN EITHER END OF THE CAR DOES NOT CONTAIN MORE THAN SEVENTY-TWO (72) PALLET UNITS. NOTE THAT STRUTS WHICH ARE 72" OR LONGER MUST BE STIFFENED BY THE APPLICATION OF STRUT BRACING. SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 69 FOR GUIDANCE.
4. THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED BY ADDING A PARTIAL SECOND LAYER IN ONE OR BOTH ENDS OF THE CAR, PROVIDED THE CAR HAS NAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR WILL NOT BE EXCEEDED. NOTE THAT THE LOAD LIMIT OF THE CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LADING PLUS DUNNAGE IN THE HEAVY END OF THE CAR. INCREASE THE HEIGHT OF THE CRIB FILL FOR THE PARTIAL LAYER AND INSTALL THE PROPER SIZE K-BRACE TO RETAIN THE PARTIAL LAYER. SEE THE TYPICAL INSTALLATION ON PAGE 50 AND /OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE.
5. THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. THE LOAD CAN BE REDUCED BY THREE PALLET UNITS BY CHANGING THE 7-WIDE CROSSWISE ROWS TO 6-WIDE ROWS. SUBSTITUTE CENTER GATE C, AS DETAILED ON PAGE 61, FOR THE DEPICTED CENTER GATE B. THE LOAD CAN BE REDUCED BY EITHER SEVEN OR FOURTEEN PALLET UNITS BY OMITTING FROM ONE OR BOTH ENDS OF THE CAR THE PALLET HAVING THE 13-1/2" LENGTH DIMENSION ACROSS THE CAR AND THE LATERALLY ADJACENT SIX PALLETS HAVING THE 27" WIDTH ACROSS THE CAR. THE LOAD CAN BE REDUCED BY TWENTY-ONE PALLET UNITS BY OMITTING THE THREE CROSSWISE ROWS. SUBSTITUTE CENTER GATES L, AS DETAILED ON PAGE 65, FOR THE DEPICTED CENTER GATES AND INSTALL STRUTS AND STRUT BRACING. SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 69 FOR GUIDANCE. FOR OTHER QUANTITIES, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66. FURTHER REDUCTION OF A LOAD CAN BE ACCOMPLISHED BY EMPLOYING THE PROCEDURES SHOWN ON PAGES 48 AND 49 AS GUIDANCE. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53 OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55.

**BILL OF MATERIAL**

LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	117	59
2" X 2"	42	14
2" X 3"	8	4
2" X 4"	118	79
2" X 6"	518	518
NAILS	NO. REQD	POUNDS
6d (2")	240	1-1/2
10d (3")	736	11-1/2
12d (3-1/4")	48	1
16d (3-1/3")	68	1-1/2
STEEL STRAPPING, 1-1/4" X .035" (OR .031") - 132' REQD ---- 19 LBS		
SEAL FOR 1-1/4" STRAPPING ----- 12 REQD ---- NIL		

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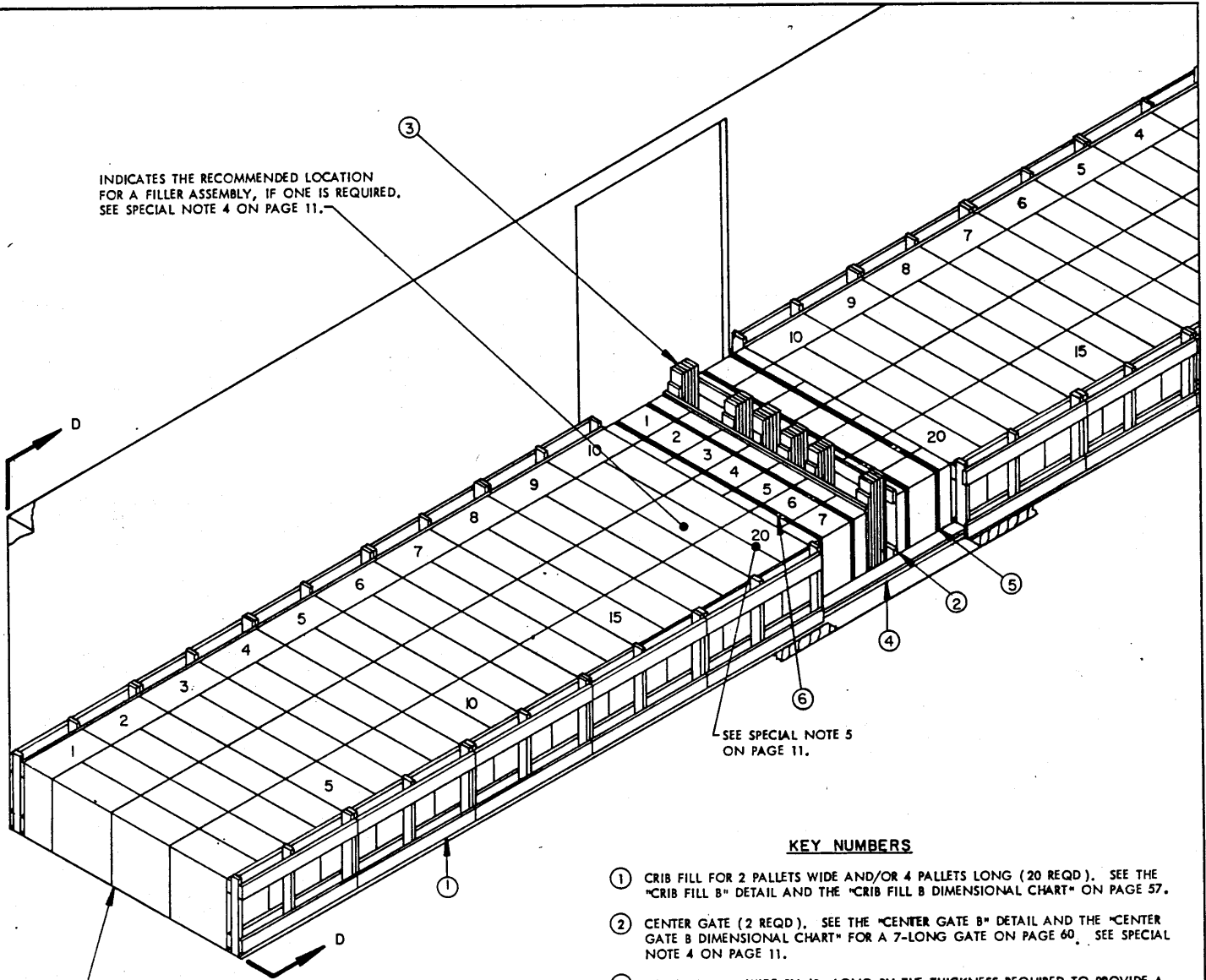
**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
155MM (8/PALLET) ----	119-----	95,200 LBS
DUNNAGE -----		1,382 LBS
<b>TOTAL WEIGHT -----</b>		<b>96,582 LBS</b>

**155 MM PROJECTILES (8/SMALL PALLET)**

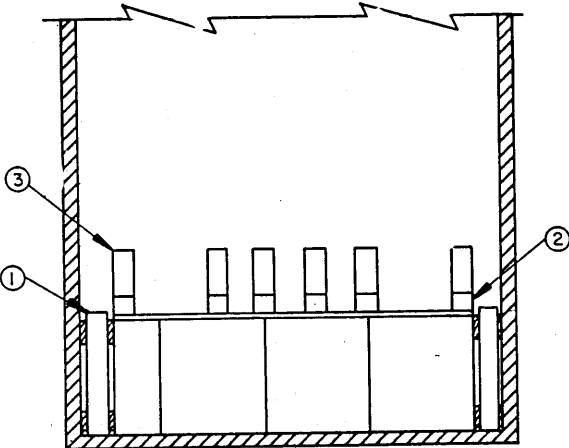
**119-UNIT LOAD IN 40'-6" LONG BY 9'-0" WIDE BOX CAR (CONVENTIONAL)**

INDICATES THE RECOMMENDED LOCATION FOR A FILLER ASSEMBLY, IF ONE IS REQUIRED. SEE SPECIAL NOTE 4 ON PAGE 11.



ISOMETRIC VIEW

IF THE CAR END WALL IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" DETAIL ON PAGE 58.



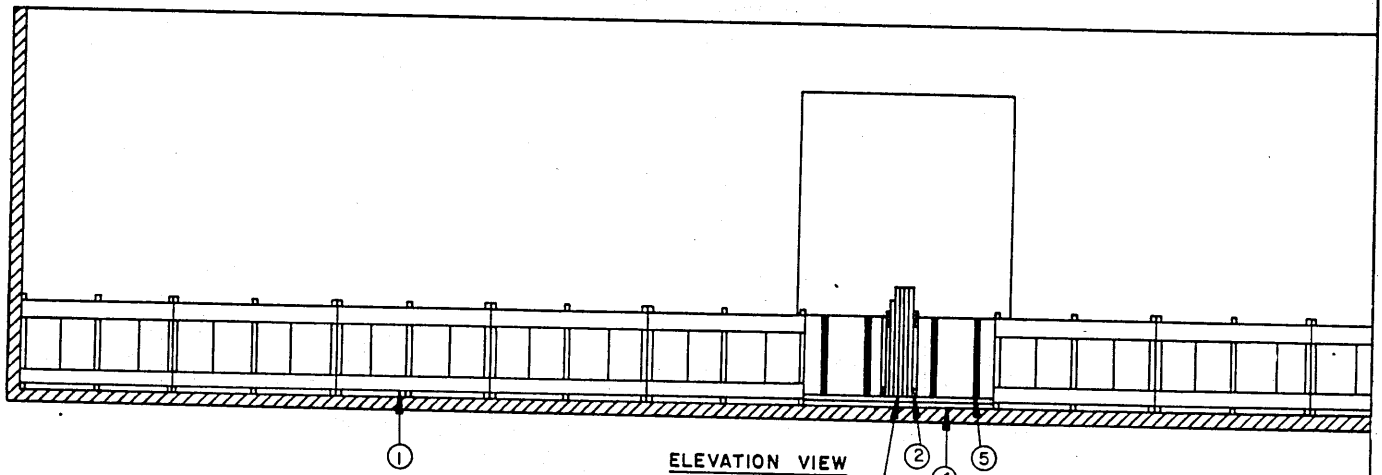
SECTION D-D

**KEY NUMBERS**

- ① CRIB FILL FOR 2 PALLETS WIDE AND/OR 4 PALLETS LONG (20 REQD). SEE THE "CRIB FILL B" DETAIL AND THE "CRIB FILL B DIMENSIONAL CHART" ON PAGE 57.
- ② CENTER GATE (2 REQD). SEE THE "CENTER GATE B" DETAIL AND THE "CENTER GATE B DIMENSIONAL CHART" FOR A 7-LONG GATE ON PAGE 60. SEE SPECIAL NOTE 4 ON PAGE 11.
- ③ SOLID FILL, 6" WIDE BY 48" LONG BY THE THICKNESS REQUIRED TO PROVIDE A WEDGE FIT BETWEEN THE VERTICAL PIECES OF THE LONGITUDINALLY ADJACENT CENTER GATES (REQD AT 6 PLACES). NAIL THE FIRST PIECE TO THE EXTENDED VERTICAL PIECE OF ONE CENTER GATE W/3-10d NAILS. NAIL EACH ADDITIONAL PIECE TO A PREVIOUSLY INSTALLED PIECE W/5-10d NAILS. NAIL THRU EACH VERTICAL PIECE OF THE OTHER CENTER GATE INTO THE LAST SOLID FILL PIECE W/3-10d NAILS.
- ④ DOORWAY BLOCKING, 2" X 6" BY CUT TO FIT (REF: .66") DOUBLED (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAILS EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "H" ON PAGE 2 AND GENERAL NOTE "G" ON PAGE 3.
- ⑤ DOORWAY PROTECTION STRAP, 1-1/4" X .025" (OR .031") X 22'-0" LONG STEEL STRAPPING (4 REQD).
- ⑥ SEAL FOR 1-1/4" STRAPPING (8 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "K" ON PAGE 2.

155MM PROJECTILES (8/SMALL PALLET)

154- UNIT LOAD IN A 50'-6" LONG BY 9'-0" WIDE BOX CAR (CONVENTIONAL)



ELEVATION VIEW

(SPECIAL NOTES CONTINUED)

- BE LOADED WITH SIX CROSSWISE ROWS OF SEVEN UNITS. SIXTEEN (16) CRIB FILL ASSEMBLIES WILL BE REQUIRED. INCREASE THE LENGTH OF THE DOORWAY BLOCKING TO 14'-6" (REF) AND INSTALL EIGHT (8) DOORWAY PROTECTION STRAPS. NOTE THESE LIMITS AS TO THE NUMBER OF PALLET UNITS IN EACH END OF THE CAR ARE ONLY APPLICABLE FOR A 50'-6" LONG CAR; THE QUANTITIES WILL VARY IN CARS OF OTHER LENGTHS.
6. THE DOORWAY AREA OF CARS EQUIPPED WITH DOUBLE "THRU" PLUG TYPE OR CONVENTIONAL SLIDING DOORS WILL BE LOADED WITH ALL CROSSWISE ROWS. FOR CARS EQUIPPED WITH STAGGERED PLUG DOORS OR A COMBINATION OF DOOR TYPES, WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE LOAD PATTERN SPECIFIED IN NOTE 5 ABOVE FOR 7' THRU 10' WIDE DOORS WILL APPLY. IF THE CAR TO BE LOADED IS EQUIPPED WITH STAGGERED DOUBLE SLIDING DOORS, DOORWAY PROTECTION GATES, AS DEPICTED BY THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69, WILL BE INSTALLED IN THE AUXILIARY DOOR OPENINGS. THE DOORWAY AREA ADJACENT TO THE MAIN DOORS WILL BE LOADED WITH CROSSWISE ROWS.

SPECIAL NOTES:

1. A 154-UNIT LOAD OF 155MM PROJECTILES PALLETIZED 8 PER SMALL PALLET IS SHOWN IN A 50'-6" LONG BY 9'-0" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTES 5 AND 6.
2. THE LOADING PROCEDURE ON PAGE 10 IS APPLICABLE FOR 9'-0" WIDE CARS WHICH HAVE EITHER NAILABLE OR METAL SIDEWALLS. NOTE THAT THE TOTAL ACCUMULATED SPACE ACROSS A CAR MUST NOT BE MORE THAN TWO INCHES (2"). TO SATISFY THIS REQUIREMENT, THE WIDTH OF THE CRIB FILL ASSEMBLIES CAN BE ADJUSTED BY INCREASING OR DECREASING THE WIDTH OF THE VERTICAL PIECES AND/OR BY CHANGING THE THICKNESS OF OR ADDING LAMINATIONS OF MATERIAL TO, THE HORIZONTAL PIECES.
3. THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED BY ADDING A PARTIAL SECOND LAYER IN ONE OR BOTH ENDS OF THE CAR, PROVIDED THE CAR HAS NAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR WILL NOT BE EXCEEDED. NOTE THAT THE LOAD LIMIT OF THE CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LADING PLUS DUNNAGE IN THE HEAVY END OF THE CAR. INCREASE THE HEIGHT OF THE CRIB FILL FOR THE PARTIAL LAYER AND INSTALL THE PROPER SIZE K-BRACE TO RETAIN THE PARTIAL LAYER. SEE THE TYPICAL INSTALLATION ON PAGE 50 AND/OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE.
4. THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. THE LOAD CAN BE REDUCED BY TWO PALLET UNITS BY CHANGING THE 7-WIDE CROSSWISE ROWS TO 6-WIDE ROWS. SUBSTITUTE CENTER GATE C, AS DETAILED ON PAGE 61, FOR THE DEPICTED CENTER GATE B. THE LOAD CAN BE REDUCED BY SEVEN OR FOURTEEN PALLET UNITS BY OMITTING FROM ONE OR BOTH ENDS OF THE CAR THE PALLET HAVING THE 13-1/2" LENGTH DIMENSION ACROSS THE CAR AND THE LATERALLY ADJACENT SIX PALLETS HAVING THE 27" WIDTH ACROSS THE CAR. OR THE LOAD CAN BE REDUCED BY FOURTEEN PALLET UNITS BY OMITTING THE TWO CROSSWISE ROWS. SUBSTITUTE CENTER GATES L, AS DETAILED ON PAGE 65, FOR THE DEPICTED CENTER GATES K, AND INSTALL STRUTS AND STRUT BRACING. SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 69 FOR GUIDANCE. FOR OTHER QUANTITIES, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66. FURTHER REDUCTION OF A LOAD CAN BE ACCOMPLISHED BY EMPLOYING THE PROCEDURES ON PAGES 48 AND 49 AS GUIDANCE. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53 OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55.
5. THE DEPICTED LOADING PROCEDURES ARE APPLICABLE FOR 50'-6" LONG CARS HAVING SINGLE DOOR OPENINGS WHICH ARE 6' WIDE, EITHER CONVENTIONAL SLIDING OR PLUG DOOR TYPE. IF THE CAR IS EQUIPPED WITH 7' THRU 10' WIDE DOORS OF EITHER TYPE, THE LOAD PATTERN IN EACH END MUST BE CHANGED TO NINE PALLET UNITS WIDE ALONG ONE SIDE OF THE CAR AND EIGHTEEN PALLET UNITS LONG FOR THE BALANCE OF THE LOAD. THE CENTER AREA OF THE CAR WILL BE LOADED WITH FOUR CROSSWISE ROWS OF SEVEN UNITS. SUBSTITUTE A CRIB FILL FOR 1 PALLET WIDE AND/OR 2 PALLETS LONG (SEE THE "CRIB FILL B" DETAIL AND THE "CRIB FILL B DIMENSIONAL CHART" ON PAGE 57) FOR EACH CRIB FILL ADJACENT TO A CAR END WALL. INCREASE THE LENGTH OF THE DOORWAY BLOCKING, PIECES MARKED (4), TO 10'-0" (REF), AND ADD FOUR DOORWAY PROTECTION STRAPS, PIECES MARKED (5). IF THE CAR IS EQUIPPED WITH 12' WIDE CONVENTIONAL SLIDING OR PLUG TYPE DOORS, LOAD EIGHT PALLET UNITS WIDE ALONG THE SIDE AND SIXTEEN PALLET UNITS LONG FOR THE BALANCE OF THE LOAD IN EACH END OF THE CAR. THE CENTER AREA OF THE CAR WILL

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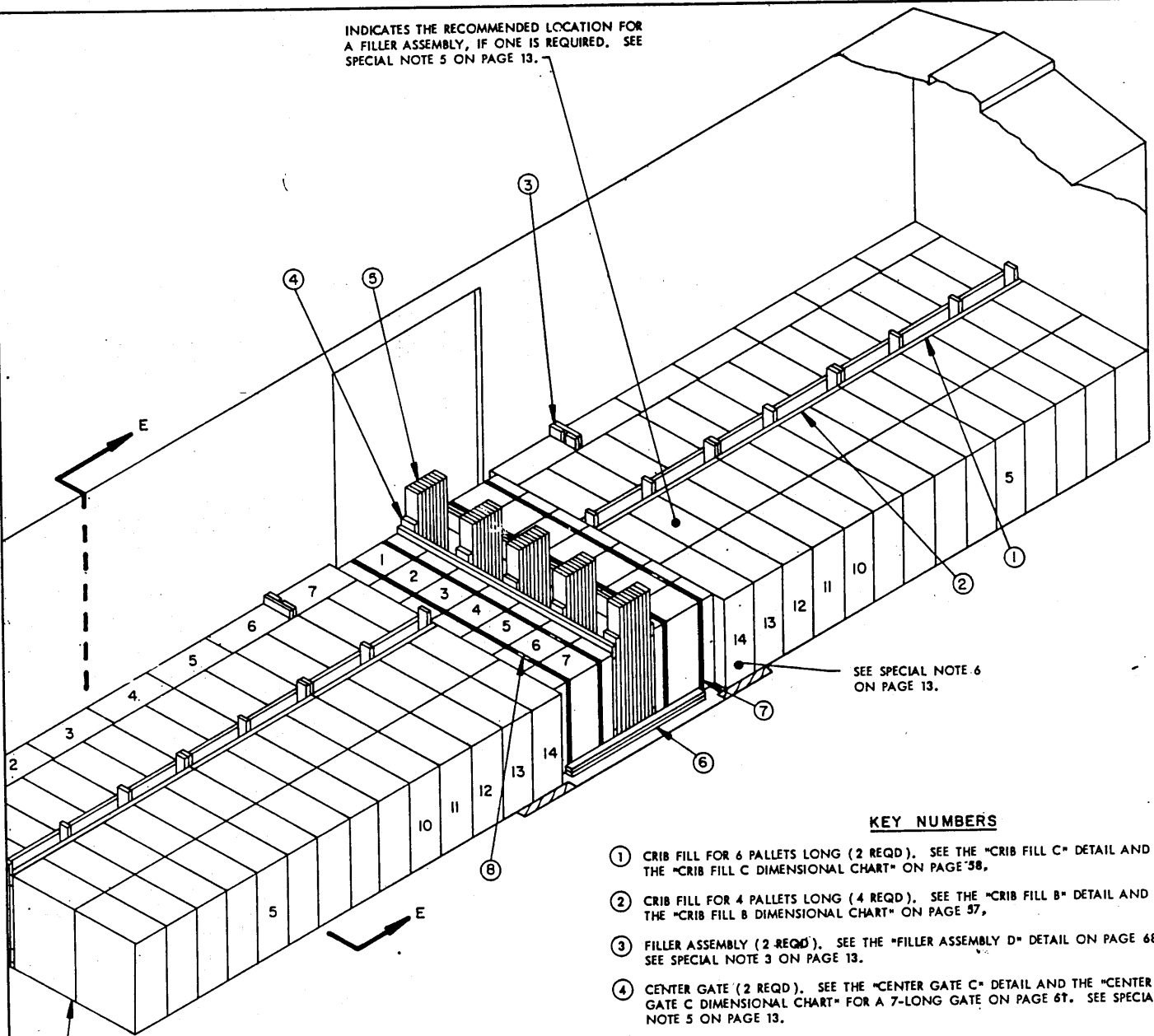
BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	90	45
2" X 2"	10	4
2" X 3"	8	4
2" X 4"	160	107
2" X 6"	462	462
NAILS	NO REQD	POUNDS
6d (2")	180	1-1/4
10d (3")	610	9-1/2
STEEL STRAPPING, 1-1/4" X .035" (OR .031")	88' REQD	13 LBS
SEAL FOR 1-1/4" STRAPPING	8 REQD	NIL

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
155MM (8/PALLET)	154	123,200 LBS
DUNNAGE		1,268 LBS
TOTAL WEIGHT		124,468 LBS

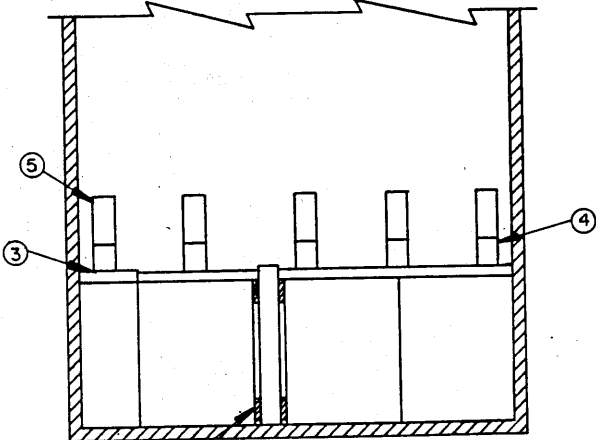
155MM PROJECTILES (8/SMALL PALLET)  
154-UNIT LOAD IN A 50'-6" LONG BY 9'-0" WIDE BOX CAR (CONVENTIONAL)

INDICATES THE RECOMMENDED LOCATION FOR A FILLER ASSEMBLY, IF ONE IS REQUIRED. SEE SPECIAL NOTE 5 ON PAGE 13.



**ISOMETRIC VIEW**

IF THE CAR END WALL IS BOWED MORE THAN 2" A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" DETAIL ON PAGE 56.



SECTION E-E

SEE SPECIAL NOTE 6 ON PAGE 13.

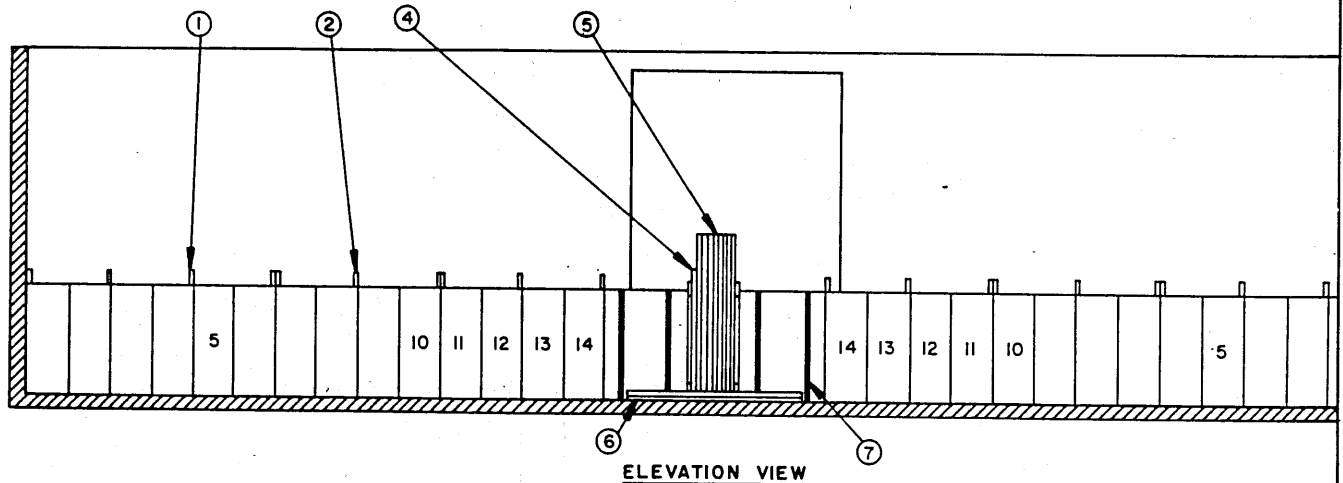
**KEY NUMBERS**

- ① CRIB FILL FOR 6 PALLET LONG (2 REQD). SEE THE "CRIB FILL C" DETAIL AND THE "CRIB FILL C DIMENSIONAL CHART" ON PAGE 58.
- ② CRIB FILL FOR 4 PALLET LONG (4 REQD). SEE THE "CRIB FILL B" DETAIL AND THE "CRIB FILL B DIMENSIONAL CHART" ON PAGE 57.
- ③ FILLER ASSEMBLY (2 REQD). SEE THE "FILLER ASSEMBLY D" DETAIL ON PAGE 68. SEE SPECIAL NOTE 3 ON PAGE 13.
- ④ CENTER GATE (2 REQD). SEE THE "CENTER GATE C" DETAIL AND THE "CENTER GATE C DIMENSIONAL CHART" FOR A 7-LONG GATE ON PAGE 67. SEE SPECIAL NOTE 5 ON PAGE 13.
- ⑤ SOLID FILL, 6" WIDE BY 56" LONG BY THE THICKNESS REQUIRED TO PROVIDE A WEDGE FIT BETWEEN THE VERTICAL PIECES OF THE LONGITUDINALLY ADJACENT CENTER GATES (REQD AT 5 PLACES). NAIL THE FIRST PIECE TO THE EXTENDED VERTICAL PIECE OF ONE CENTER GATE W/5-10d NAILS. NAIL EACH ADDITIONAL PIECE TO A PREVIOUSLY INSTALLED PIECE W/5-10d NAILS. NAIL THRU EACH VERTICAL PIECE OF THE OTHER CENTER GATE INTO THE LAST SOLID FILL PIECE W/3-10d NAILS.
- ⑥ DOORWAY BLOCKING, 2" X 4" X 64" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "H" ON PAGE 2 AND GENERAL NOTE "G" ON PAGE 3.
- ⑦ DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 25'-0" LONG STEEL STRAPPING (4 REQD).
- ⑧ SEAL FOR 1-1/4" STRAPPING (8 REQD, 2 PER STRAP JOINT), SEE GENERAL NOTE "K" ON PAGE 2.

155MM PROJECTILES (8/LARGE PALLET)

112-UNIT LOAD IN A 40'-6" LONG BY 9'-2" WIDE BOX CAR (CONVENTIONAL)





ELEVATION VIEW

(SPECIAL NOTES CONTINUED)

SPECIAL NOTES:

- CROSSWISE ROWS POSSIBLE, BLOCKED WITH 7'-0" LONG DOORWAY BLOCKING. A CAR WITH 10'-6", 11', OR 12' WIDE PLUG DOORS IS LIMITED TO TWELVE (12) PALLETS LONG IN EACH END, WITH FOUR CROSSWISE ROWS POSSIBLE, BLOCKED WITH 11'-0" LONG DOORWAY BLOCKING. IF THE CAR IS EQUIPPED WITH DOUBLE "THRU" OR STAGGERED PLUG DOORS, OR A COMBINATION OF DOOR TYPES, WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH CROSSWISE ROWS OF 7 LONG BLOCKED WITH DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS. NOTE THAT THESE SPECIFIED LIMITS AS TO THE NUMBER OF PALLETS IN EACH END OF A CAR ARE APPLICABLE ONLY FOR A 40'-6" LONG CAR; THE QUANTITIES WILL VARY IN CARS OF OTHER LENGTHS.
7. IF A CAR IS EQUIPPED WITH SINGLE SLIDING DOORS, THE PALLETS HAVING THE 29-1/8" WIDTH ACROSS THE CAR MAY EXTEND INTO THE DOORWAY AREA, BUT LATERAL BRACING MUST BE PROVIDED BY INSTALLING DOORWAY PROTECTION GATES. SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69 OR THE "DOORWAY PROTECTION B" DETAIL ON PAGE 70. FOR CARS EQUIPPED WITH STAGGERED DOUBLE SLIDING DOORS, DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE LATERAL BRACING FOR THE ADJACENT UNITS. THE CENTER AREA OF THE CAR WILL BE LOADED WITH TWO OR MORE CROSSWISE ROWS, AS APPLICABLE. INSTALL BLOCKING AS SHOWN IN THE LOAD VIEW, OR AS SPECIFIED IN SPECIAL NOTE 6. IF A CAR IS EQUIPPED WITH DOUBLE SLIDING "THRU" DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH THE 7'-LONG CROSSWISE ROWS.

- A 112-UNIT LOAD OF 155MM PROJECTILES PALLETIZED 8 PER LARGE PALLET IS SHOWN IN A 40'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTES 6 AND 7.
- THE DETAILS FOR THE "CRIB FILL C" AND "CRIB FILL B" ASSEMBLIES, PIECES MARKED ① AND ②, SPECIFY THE USE OF 2" X 4" VERTICAL PIECES FOR A 9'-2" WIDE CAR AND 2" X 6" AND 2" X 8" VERTICAL PIECES FOR 9'-4" AND 9'-6" WIDE CARS, RESPECTIVELY. THE TOTAL ACCUMULATED SPACE ACROSS A CAR MUST NOT BE MORE THAN TWO INCHES (2"). TO SATISFY THIS REQUIREMENT, THE WIDTH OF THE ASSEMBLIES CAN BE ADJUSTED BY INCREASING OR DECREASING THE WIDTH OF THE VERTICAL PIECES AND/OR BY CHANGING THE THICKNESS OF, OR ADDING LAMINATIONS OF MATERIAL TO, THE HORIZONTAL PIECES.
- THE THICKNESS OF EACH FILLER ASSEMBLY D WILL BE ADJUSTED AS REQUIRED TO LOCATE THE END OF THE PALLET UNIT NUMBERED 7 IN THE ROW ALONG THE CAR SIDEWALL EVEN WITH THE ROWS MARKED 14.
- THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED BY ADDING A PARTIAL SECOND LAYER IN ONE OR BOTH ENDS OF THE CAR, PROVIDED THE CAR HAS AVAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR WILL NOT BE EXCEEDED. NOTE THAT THE LOAD LIMIT OF A CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LADING PLUS DUNNAGE IN THE HEAVY END OF THE CAR. INCREASE THE HEIGHT OF THE CRIB FILL FOR THE PARTIAL LAYER AND INSTALL THE PROPER SIZE K-BRACE TO RETAIN THE PARTIAL LAYER. SEE THE TYPICAL INSTALLATION ON PAGE 50 AND/OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE. PROVIDE AN EVEN SURFACE FOR THE K-BRACES BY LAMINATING MATERIAL TO THE LOAD BEARING PIECES OF THE ASSEMBLY OR BY INSTALLING A FILLER ASSEMBLY D (OR C) MODIFIED AS REQUIRED.
- THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. THE LOAD CAN BE REDUCED BY SEVEN PALLET UNITS BY OMITTING ONE PALLET HAVING THE 14-5/8" LENGTH DIMENSION ACROSS THE CAR AND THE LATERALLY ADJACENT SIX PALLETS HAVING THE 29-1/8" WIDTH ACROSS THE CAR. THE LOAD CAN BE REDUCED BY FOURTEEN PALLET UNITS BY OMITTING THE TWO CROSSWISE ROWS. SUBSTITUTE CENTER GATES L, AS DETAILED ON PAGE 65, FOR THE DEPICTED CENTER GATES AND INSTALL STRUTS AS TYPICALLY SHOWN IN THE LOAD VIEW ON PAGE 4. IF THE STRUTS ARE 72" OR LONGER THEY MUST BE STIFFENED BY THE APPLICATION OF STRUT BRACING. SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 69 FOR GUIDANCE. FOR OTHER QUANTITIES, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66. FURTHER REDUCTION OF A LOAD CAN BE ACCOMPLISHED BY EMPLOYING THE PROCEDURES SHOWN ON PAGES 48 AND 49 AS GUIDANCE. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53 OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55.
- IN A CAR EQUIPPED WITH SINGLE "THRU" PLUG DOORS, PALLETS WHICH ARE POSITIONED WITH THE 29-1/8" WIDTH OF THE UNIT ACROSS THE CAR MUST NOT BE LOADED SO AS TO EXTEND INTO THE DOORWAY AREA TO SUCH AN EXTENT THAT SIX INCHES (6") OR LESS OF A PALLET IS RETAINED BY A CAR SIDEWALL. TO SATISFY THIS REQUIREMENT, PALLETS WITH THE 29-1/8" WIDTH OF THE UNIT ACROSS THE CAR CAN BE LOADED 14 LONG, AS SHOWN, IN CARS HAVING PLUG DOORS 6' OR 7' WIDE. A CAR WITH 8', 9', OR 10' WIDE PLUG DOORS WILL BE LIMITED TO THIRTEEN (13) PALLETS LONG IN EACH END, WITH THREE

BILL OF MATERIAL *		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	5	2
1" X 6"	14	7
2" X 2"	11	4
2" X 3"	8	4
2" X 4"	90	60
2" X 6"	376	376
NAILS	NO. REQD	POUNDS
6d (2")	24	1/4
10d (3")	450	7
16d (3-1/2")	32	3/4
STEEL STRAPPING, 1-1/4" X .035" (OR .031") -- 100' REQD - 15 LBS		
SEAL FOR 1-1/4" STRAPPING ----- 8 REQD - NIL		

\* BASED ON A PALLET UNIT HAVING A COVER HEIGHT OF 38".

(CONTINUED AT LEFT)

LOAD AS SHOWN

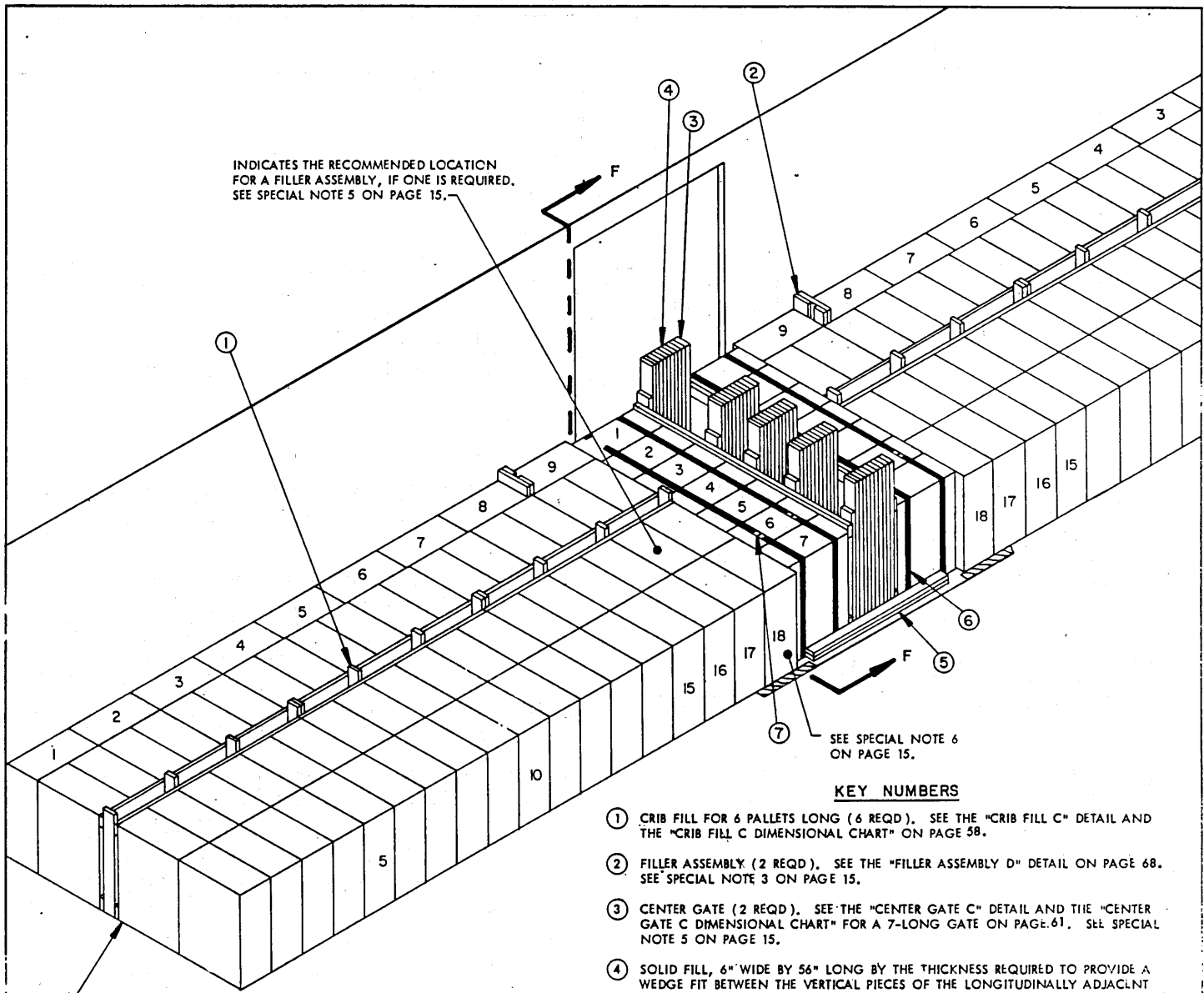
ITEM	QUANTITY	WEIGHT (APPROX)
155MM (8/PALLET) -----	112 -----	97,888 LBS
DUNNAGE -----		929 LBS
TOTAL WEIGHT -----		98,817 LBS

155 MM PROJECTILES (8/LARGE PALLET)

112-UNIT LOAD IN A 40'-6" LONG BY 9'-2" WIDE BOX CAR (CONVENTIONAL)

PAGE 13

PROJECT FSA 13-59



INDICATES THE RECOMMENDED LOCATION FOR A FILLER ASSEMBLY, IF ONE IS REQUIRED. SEE SPECIAL NOTE 5 ON PAGE 15.

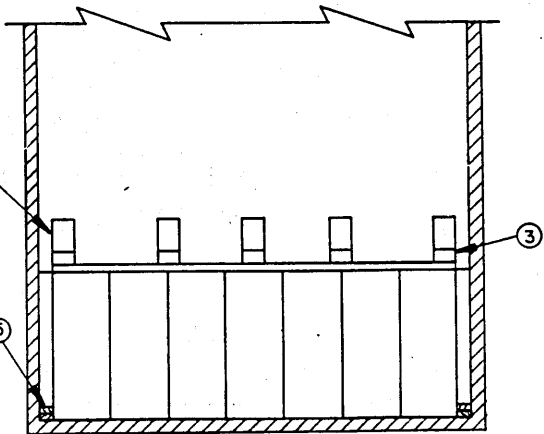
SEE SPECIAL NOTE 6 ON PAGE 15.

**ISOMETRIC VIEW**

IF THE CAR END WALL IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" DETAIL ON PAGE 56.

**KEY NUMBERS**

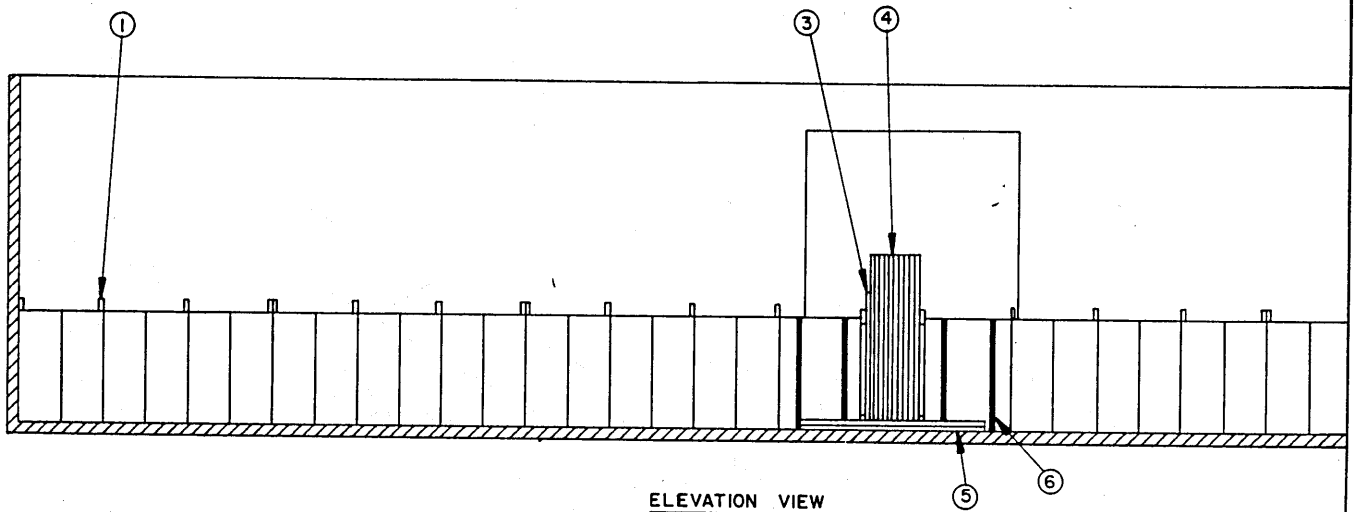
- ① CRIB FILL FOR 6 PALLET LONG (6 REQD). SEE THE "CRIB FILL C" DETAIL AND THE "CRIB FILL C DIMENSIONAL CHART" ON PAGE 58.
- ② FILLER ASSEMBLY (2 REQD). SEE THE "FILLER ASSEMBLY D" DETAIL ON PAGE 68. SEE SPECIAL NOTE 3 ON PAGE 15.
- ③ CENTER GATE (2 REQD). SEE THE "CENTER GATE C" DETAIL AND THE "CENTER GATE C DIMENSIONAL CHART" FOR A 7-LONG GATE ON PAGE 61. SEE SPECIAL NOTE 5 ON PAGE 15.
- ④ SOLID FILL, 6" WIDE BY 56" LONG BY THE THICKNESS REQUIRED TO PROVIDE A WEDGE FIT BETWEEN THE VERTICAL PIECES OF THE LONGITUDINALLY ADJACENT CENTER GATES (REQD AT 5 PLACES). NAIL THE FIRST PIECE TO THE EXTENDED VERTICAL PIECE OF ONE CENTER GATE W/5-10d NAILS. NAIL EACH ADDITIONAL PIECE TO A PREVIOUSLY INSTALLED PIECE W/5-10d NAILS. NAIL THRU EACH VERTICAL PIECE OF THE OTHER CENTER GATE INTO THE LAST SOLID FILL PIECE W/3-10d NAILS.
- ⑤ DOORWAY BLOCKING, 2" X 4" X 64" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "H" ON PAGE 2 AND GENERAL NOTE "G" ON PAGE 3.
- ⑥ DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 25'-0" LONG STEEL STRAPPING (4 REQD).
- ⑦ SEAL FOR 1-1/4" STRAPPING (8 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "K" ON PAGE 2.



**SECTION F-F**

155 MM PROJECTILES (8/LARGE PALLET)

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



ELEVATION VIEW

(SPECIAL NOTES CONTINUED)

6. IN A CAR EQUIPPED WITH SINGLE "THRU" PLUG TYPE DOORS, PALLETS WHICH ARE POSITIONED WITH THE 29-1/8" WIDTH OF THE UNIT ACROSS THE CAR MUST NOT BE LOADED SO AS TO EXTEND INTO THE DOORWAY AREA TO SUCH AN EXTENT THAT SIX INCHES (6") OR LESS OF A PALLET IS RETAINED BY A CAR SIDEWALL. TO SATISFY THIS REQUIREMENT, PALLETS WITH THE 29-1/8" WIDTH OF THE UNIT ACROSS THE CAR CAN BE LOADED 18 LONG, AS SHOWN, IN CARS HAVING PLUG DOORS 6', 7', OR 8' WIDE. A CAR WITH 9' OR 10' WIDE PLUG DOORS WILL BE LIMITED TO SEVENTEEN (17) PALLETS LONG IN EACH END, WITH THREE CROSSWISE ROWS POSSIBLE, BLOCKED WITH 8'-0" LONG DOORWAY BLOCKING. A CAR WITH 10'-6" TO 12' WIDE PLUG DOORS IS LIMITED TO SIXTEEN (16) PALLETS LONG IN EACH END, WITH FOUR CROSSWISE ROWS POSSIBLE, BLOCKED WITH 10'-0" LONG DOORWAY BLOCKING. IF THE CAR IS EQUIPPED WITH DOUBLE "THRU" OR STAGGERED PLUG DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH CROSSWISE ROWS OF 7 WIDE BLOCKED WITH DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS. NOTE THAT THESE SPECIFIED LIMITS AS TO THE NUMBER OF PALLETS IN EACH END OF A CAR ARE APPLICABLE ONLY FOR A 50'-6" LONG CAR; THE QUANTITIES WILL VARY IN CARS OF OTHER LENGTHS.
7. IF A CAR IS EQUIPPED WITH SINGLE SLIDING DOORS, THE PALLETS HAVING THE 29-1/8" WIDTH ACROSS THE CAR MAY EXTEND INTO THE DOORWAY AREA, BUT LATERAL BRACING MUST BE PROVIDED BY INSTALLING DOORWAY PROTECTION GATES. SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69 OR THE "DOORWAY PROTECTION B" DETAIL ON PAGE 70. FOR CARS EQUIPPED WITH STAGGERED DOUBLE SLIDING DOORS, DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE LATERAL BRACING FOR THE ADJACENT UNITS. THE CENTER AREA OF THE CAR WILL BE LOADED WITH TWO OR MORE CROSSWISE ROWS, AS APPLICABLE. INSTALL BLOCKING AS SHOWN IN THE LOAD VIEW, OR AS SPECIFIED IN SPECIAL NOTE 6. IF A CAR IS EQUIPPED WITH DOUBLE SLIDING "THRU" DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH THE 7-LONG CROSSWISE ROWS.
8. IF A CAR IS EQUIPPED WITH A COMBINATION OF DOOR TYPES, WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE ENTIRE DOORWAY AREA WILL BE LOADED WITH CROSSWISE ROWS OF 7 WIDE BLOCKED WITH DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS.

SPECIAL NOTES:

1. A 140-UNIT LOAD OF 155MM PROJECTILES (PALLETIZED 8 PER LARGE PALLET IS SHOWN IN A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTES 6 THRU 8.
2. THE DETAIL FOR THE "CRIB FILL C" ASSEMBLIES, PIECES MARKED ①, SPECIFIES THE USE OF 2" X 4" VERTICAL PIECES FOR A 9'-2" WIDE CAR AND 2" X 6" AND 2" X 8" VERTICAL PIECES FOR 9'-4" AND 9'-6" WIDE CARS, RESPECTIVELY. THE TOTAL ACCUMULATED SPACE ACROSS A CAR MUST NOT BE MORE THAN TWO INCHES (2"). TO SATISFY THIS REQUIREMENT, THE WIDTH OF THE ASSEMBLIES CAN BE ADJUSTED BY INCREASING OR DECREASING THE WIDTH OF THE VERTICAL PIECES AND/OR BY CHANGING THE THICKNESS OF OR ADDING LAMINATIONS OF MATERIAL TO THE HORIZONTAL PIECES.
3. THE THICKNESS OF EACH FILLER ASSEMBLY D WILL BE ADJUSTED AS REQUIRED TO LOCATE THE END OF THE PALLET UNIT NUMBERED 9 IN THE ROW ALONG THE CAR SIDEWALL EVEN WITH THE ROWS MARKED 18.
4. THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED BY ADDING A PARTIAL SECOND LAYER IN ONE OR BOTH ENDS OF THE CAR, PROVIDED THE CAR HAS AVAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR WILL NOT BE EXCEEDED. NOTE THAT THE LOAD LIMIT OF A CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LADING PLUS DUNNAGE IN THE HEAVY END OF THE CAR. INCREASE THE HEIGHT OF THE CRIB FILL FOR THE PARTIAL LAYER AND INSTALL THE PROPER SIZE K-BRACE TO RETAIN THE PARTIAL LAYER. SEE THE TYPICAL INSTALLATION ON PAGE 50 AND/OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE. PROVIDE AN EVEN SURFACE FOR THE K-BRACES BY LAMINATING MATERIAL TO THE LOAD BEARING PIECES OF THE ASSEMBLY OR BY INSTALLING A FILLER ASSEMBLY D (OR C) MODIFIED AS REQUIRED.
5. THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. THE LOAD CAN BE REDUCED BY SEVEN PALLET UNITS BY OMITTING ONE PALLET HAVING THE 14-5/8" LENGTH DIMENSION ACROSS THE CAR AND THE LATERALLY ADJACENT SIX PALLETS HAVING THE 29-1/8" WIDTH ACROSS THE CAR. THE LOAD CAN BE REDUCED BY FOURTEEN PALLET UNITS BY OMITTING THE TWO CROSSWISE ROWS. SUBSTITUTE CENTER GATE L, AS DETAILED ON PAGE 65 FOR THE DEPICTED CENTER GATES AND INSTALL STRUTS AS TYPICALLY SHOWN IN THE LOAD VIEW ON PAGE 4. IF THE STRUTS ARE 72" OR LONGER THEY MUST BE STIFFENED BY THE APPLICATION OF STRUT BRACING. SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 69 FOR GUIDANCE. FOR OTHER QUANTITIES, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66. FURTHER REDUCTION OF A LOAD CAN BE ACCOMPLISHED BY EMPLOYING THE PROCEDURES SHOWN ON PAGES 48 AND 49 AS GUIDANCE. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53 OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55.

\* BASED ON A PALLET UNIT HAVING A COVER HEIGHT OF 38".

BILL OF MATERIAL \*

LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	5	2
1" X 6"	14	7
2" X 2"	11	4
2" X 3"	8	4
2" X 4"	104	4
2" X 6"	462	70
		462
NAILS	NO. REQD	POUNDS
6d (2")	24	1/4
10d (3")	517	8
16d (3-1/2")	32	3/4
STEEL STRAPPING, 1-1/4" X .035" OR .031" — 100' REQD — 15 LBS		
SEAL FOR 1-1/4" STRAPPING — 8 REQD — NIL		

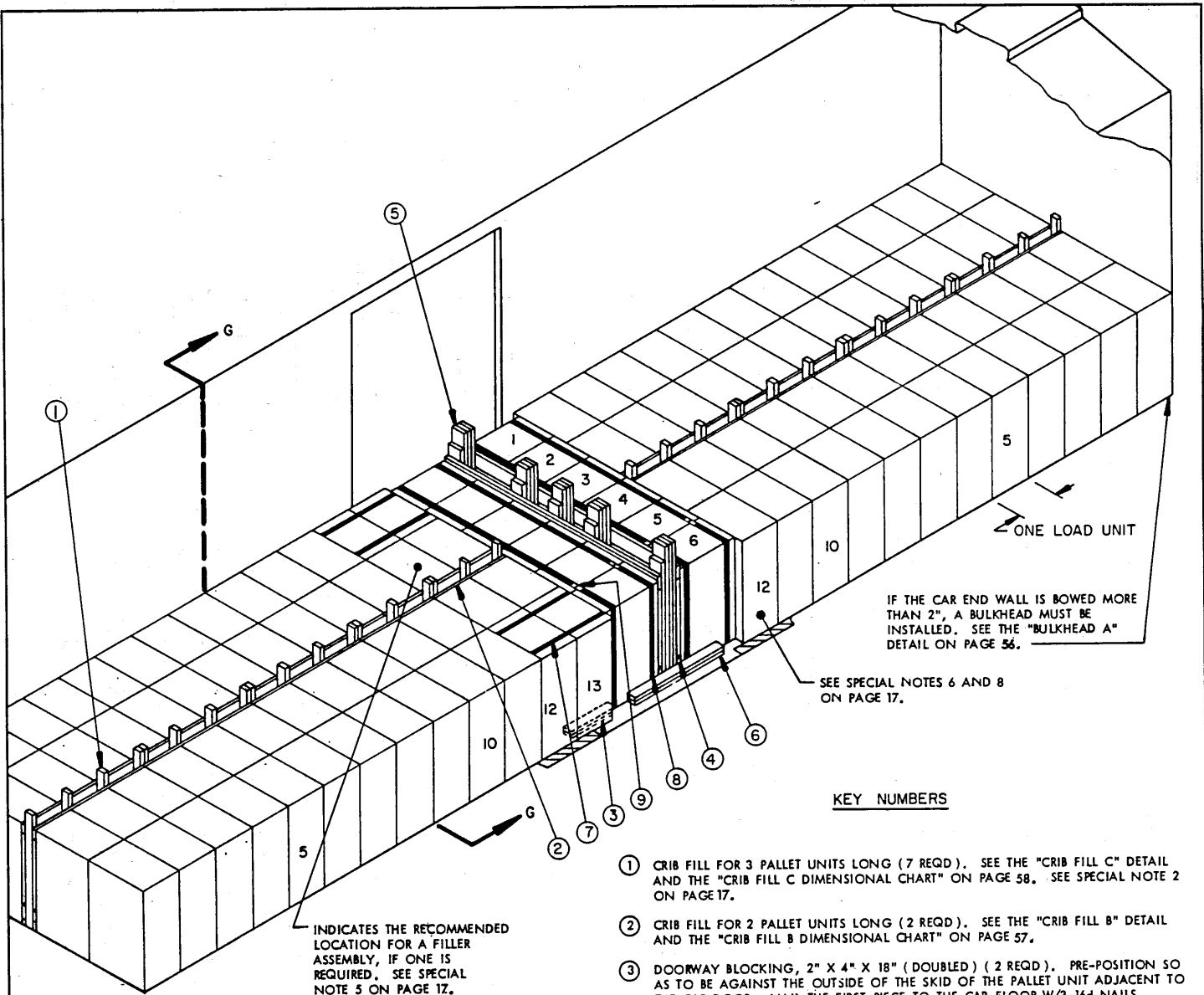
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LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
155MM (8/PALLET)	140	122,360 LBS
DUNNAGE		1,122 LBS
TOTAL WEIGHT		123,482 LBS

155MM PROJECTILES (8/LARGE PALLET)

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



INDICATES THE RECOMMENDED LOCATION FOR A FILLER ASSEMBLY, IF ONE IS REQUIRED. SEE SPECIAL NOTE 5 ON PAGE 17.

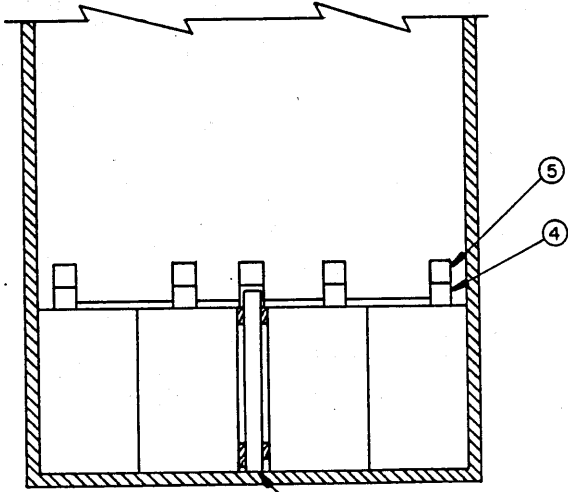
IF THE CAR END WALL IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" DETAIL ON PAGE 56.

SEE SPECIAL NOTES 6 AND 8 ON PAGE 17.

KEY NUMBERS

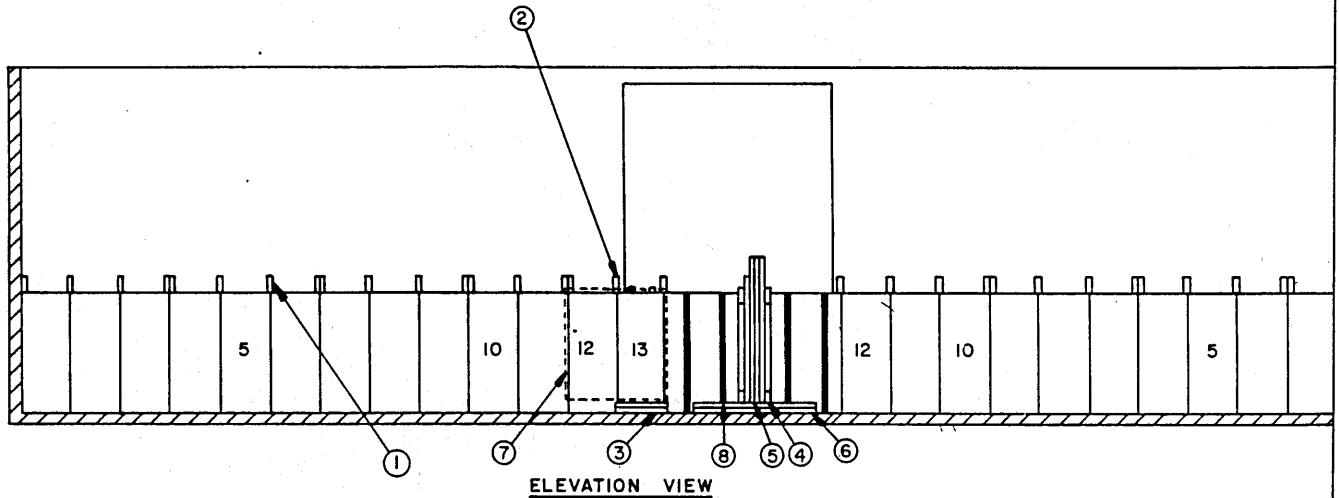
- ① CRIB FILL FOR 3 PALLET UNITS LONG (7 REQD). SEE THE "CRIB FILL C" DETAIL AND THE "CRIB FILL C DIMENSIONAL CHART" ON PAGE 58. SEE SPECIAL NOTE 2 ON PAGE 17.
- ② CRIB FILL FOR 2 PALLET UNITS LONG (2 REQD). SEE THE "CRIB FILL B" DETAIL AND THE "CRIB FILL B DIMENSIONAL CHART" ON PAGE 57.
- ③ DOORWAY BLOCKING, 2" X 4" X 18" (DOUBLED) (2 REQD). PRE-POSITION SO AS TO BE AGAINST THE OUTSIDE OF THE SKID OF THE PALLET UNIT ADJACENT TO THE CAR DOOR. NAIL THE FIRST PIECE TO THE CAR FLOOR W/3-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "H" ON PAGE 2 AND SPECIAL NOTE 3 ON PAGE 17.
- ④ CENTER GATE (2 REQD). SEE THE "CENTER GATE C" DETAIL AND THE "CENTER GATE C DIMENSIONAL CHART" FOR A 6-LONG GATE ON PAGE 61.
- ⑤ SOLID FILL, 6" WIDE BY 57" LONG BY THE THICKNESS REQUIRED TO PROVIDE A WEDGE FIT BETWEEN THE VERTICAL PIECES OF THE LONGITUDINALLY ADJACENT CENTER GATES (REQUIRED AT 5 PLACES). NAIL THE FIRST PIECE TO THE EXTENDED VERTICAL PIECE OF ONE CENTER GATE W/5-10d NAILS. NAIL EACH ADDITIONAL PIECE TO A PREVIOUSLY INSTALLED PIECE W/5-10d NAILS. NAIL THRU EACH VERTICAL PIECE OF THE OTHER CENTER GATE INTO THE LAST SOLID FILL PIECE W/3-10d NAILS.
- ⑥ DOORWAY BLOCKING, 2" X 4" X 42" (DOUBLED) (2 REQD). POSITION SO AS TO BE CENTERED ON THE TWO CROSSWISE ROWS AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "G" ON PAGE 3.
- ⑦ DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 14'-0" LONG STEEL STRAPPING (4 REQD). INSTALL SO AS TO ENCIRCLE THE PALLET UNIT IN THE DOORWAY AND THE LONGITUDINALLY ADJACENT UNIT.
- ⑧ DOOR PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 26'-0" LONG STEEL STRAPPING (4 REQD).
- ⑨ SEAL FOR 1-1/4" STRAPPING (16 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "K" ON PAGE 2.

ISOMETRIC VIEW



SECTION G-G

175MM PROJECTILES (6/PALLET)  
 112-UNIT LOAD IN A 40'-6" LONG BY 9'-2" WIDE BOX CAR (CONVENTIONAL)



**(SPECIAL NOTES CONTINUED)**

6. IF THE CAR IS EQUIPPED WITH EITHER SINGLE OR DOUBLE "THRU" PLUG TYPE DOORS, LOAD UNITS OF FOUR PALLETS WHICH ARE POSITIONED WITH THE 25-1/2" WIDTH ACROSS THE CAR MUST NOT BE LOADED SO AS TO EXTEND INTO THE DOORWAY AREA, EXCEPT AS TYPICALLY SHOWN AND BLOCKED AND BRACED IN THE LOAD VIEW, WITHOUT EXTENDING INTO THE DOORWAY AREA FAR ENOUGH THAT PIECES MARKED ③ AND ⑦ WILL BE REQUIRED, TWELVE (12) LOAD UNITS CAN BE LOADED IN EACH END OF THE CAR IF THE PLUG DOORS ARE NOT WIDER THAN 8". ONLY ELEVEN (11) LOAD UNITS CAN BE LOADED IN EACH END OF THE CAR IF THE DOORS ARE 9' THRU 11' WIDE BUT FOUR CROSSWISE ROWS OF SIX PALLETS MAY BE LOADED IN THE DOORWAY AREA AND BLOCKED WITH 7'-0" LONG DOORWAY BLOCKING, PIECE MARKED ④. A CAR HAVING 12' WIDE PLUG DOORS WILL BE LIMITED TO TEN (10) LOAD UNITS IN EACH END, WITH FIVE CROSSWISE ROWS POSSIBLE, BLOCKED WITH 10'-0" LONG DOORWAY BLOCKING. IF THE CAR IS EQUIPPED WITH DOUBLE "THRU" PLUG TYPE OR WITH STAGGERED DOUBLE PLUG TYPE DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH CROSSWISE ROWS BLOCKED WITH DOORWAY BLOCKING, PIECE MARKED ④, AND WITH TWO DOORWAY PROTECTION STRAPS, PIECES MARKED ⑧, AROUND EACH CROSSWISE ROW. NOTE THAT THESE SPECIFIED LIMITS AS TO THE NUMBER OF LOAD UNITS IN EACH END OF A CAR ARE APPLICABLE ONLY FOR A 40'-6" LONG CAR; THE QUANTITIES WILL VARY WITH CARS OF OTHER LENGTHS.
7. IF A CAR IS EQUIPPED WITH SINGLE SLIDING DOORS, THE UNITS HAVING THE 25-1/2" WIDTH ACROSS THE CAR MAY EXTEND INTO THE DOORWAY AREA, BUT LATERAL BRACING MUST BE PROVIDED BY INSTALLING DOORWAY PROTECTION GATES. SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69, OR THE "DOORWAY PROTECTION B" DETAIL ON PAGE 70. NOTE THAT PIECES MARKED ④ AND ⑧ MUST BE USED FOR BLOCKING AND BRACING THE CROSSWISE ROWS OF 6. FOR CARS EQUIPPED WITH STAGGERED DOUBLE SLIDING DOORS, DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE LATERAL BRACING FOR THE ADJACENT UNITS POSITIONED WITH THE 25-1/2" WIDTH ACROSS THE CAR. THE CENTER AREA OF THE CAR ADJACENT TO THE MAIN DOOR OPENINGS WILL BE LOADED WITH TWO OR MORE CROSSWISE ROWS OF SIX UNITS, AS APPLICABLE. IF A CAR IS EQUIPPED WITH DOUBLE SLIDING "THRU" DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH THE 6" LONG CROSSWISE ROWS. THE UNITS WITH THE 25-1/2" DIMENSION ACROSS THE CAR MUST NOT EXTEND INTO THE DOORWAY AREA TO SUCH AN EXTENT THAT SIX INCHES (6") OR LESS OF A PALLET IS RETAINED BY A CAR SIDEWALL.
8. IF A CAR IS EQUIPPED WITH A COMBINATION OF DOOR TYPES, WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE ENTIRE DOORWAY AREA WILL BE LOADED WITH CROSSWISE ROWS OF 6 WIDE BLOCKED WITH DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS.

**SPECIAL NOTES:**

1. A 112-UNIT LOAD OF 175 MM PROJECTILES PALLETIZED 6 PER PALLET IS SHOWN IN A 40'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTES 6 THRU 8.
2. THE DETAILS FOR THE "CRIB FILL C" AND "CRIB FILL B" ASSEMBLIES, PIECES MARKED ① AND ②, SPECIFY THE USE OF 2" X 6" VERTICAL PIECES FOR A 9'-2" WIDE CAR. THE CRIB FILL FOR A 9'-0" WIDE CAR WILL REQUIRE 2" X 4" VERTICALS, A 9'-4" WIDE CAR WILL REQUIRE 2" X 8" MATERIAL FOR VERTICAL PIECES, AND 2" X 10" MATERIAL WILL BE NEEDED FOR A 9'-6" WIDE CAR. NOTE THAT THE TOTAL ACCUMULATED SPACE ACROSS A CAR MUST NOT BE MORE THAN TWO INCHES (2"). THE WIDTH OF THE ASSEMBLIES CAN BE ADJUSTED BY INCREASING OR DECREASING THE WIDTH OF THE VERTICAL PIECES AND/OR BY CHANGING THE THICKNESS OF OR ADDING LAMINATIONS OF MATERIAL TO THE HORIZONTAL PIECES. A REDUCED AMOUNT OF MATERIAL WILL BE REQUIRED FOR CARS 9'-4" AND WIDER IF THE LOADING PATTERN SHOWN ON PAGE 20 OR 22 IS USED.
3. DOORWAY BLOCKING, PIECES MARKED ③, AND DOORWAY PROTECTION STRAPS, PIECES MARKED ⑦, MUST BE INSTALLED FOR ALL THOSE PALLET UNITS IN THE OUTER ROWS WHICH EXTEND INTO THE DOORWAY AREA TO SUCH AN EXTENT THAT SIX INCHES (6") OR LESS OF A PALLET IS RETAINED BY A CAR SIDEWALL. THE PALLET UNIT (5) IN THE DOORWAY MUST BE SECURED TO A LONGITUDINALLY ADJACENT PALLET WHICH CONTACTS THE CAR SIDEWALL WITH TWO (2) PIECES OF STEEL STRAPPING. AS AN ALTERNATIVE TO USING PIECES MARKED ③ AND ⑦, DOORWAY PROTECTION GATES MAY BE USED PROVIDING THE CAR IS EQUIPPED WITH SLIDING DOORS. SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69 OR THE "DOORWAY PROTECTION B" DETAIL ON PAGE 70. SEE SPECIAL NOTES 6 THRU 9.
4. THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED BY ADDING A PARTIAL SECOND LAYER IN ONE OR BOTH ENDS OF THE CAR PROVIDED THE CAR HAS NAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR IS NOT EXCEEDED. NOTE THAT THE LOAD LIMIT OF THE CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LADING PLUS DUNNAGE IN THE HEAVY END OF THE CAR. INCREASE THE HEIGHT OF THE CRIB FILL ASSEMBLIES FOR THE PARTIAL LAYER AND INSTALL THE PROPER SIZE K-BRACE TO RETAIN THE PARTIAL LAYER. SEE THE TYPICAL INSTALLATION ON PAGE 50 AND/OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE.
5. THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. ALMOST ANY QUANTITY OF PALLET UNITS WHICH IT IS DESIRED TO SHIP (FROM 88 TO A FULL LOAD) CAN BE ACHIEVED BY USING VARIOUS COMBINATIONS OF LOAD UNITS OF FOUR EACH POSITIONED WITH THE 25-1/2" WIDTH DIMENSION ACROSS THE CAR, AND ONE THRU FOUR CROSSWISE ROWS OF SIX PALLET UNITS POSITIONED WITH THE LENGTH DIMENSION ACROSS THE CAR. FOR THOSE QUANTITIES IN THAT RANGE WHICH CANNOT BE OBTAINED IN THIS MANNER, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS TO REACH THE DESIRED QUANTITY. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66. NOTE THAT CENTER GATES AND STRUTS, SIMILAR TO THE LOAD SHOWN ON PAGE 4, WILL BE USED IN LIEU OF THE DEPICTED CENTER GATES AND SOLID FILL WHEN THE EXCESS SPACE IN THE CENTER OF THE CAR IS APPROXIMATELY 18" OR MORE. FURTHER REDUCTION OF A LOAD CAN BE ACCOMPLISHED BY EMPLOYING THE PROCEDURES SHOWN ON PAGES 48 AND 49 AS GUIDANCE. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53 OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55.

(CONTINUED AT LEFT)

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	166	83
2" X 3"	8	4
2" X 4"	20	14
2" X 6"	225	225
NAILS	NO. REQD	POUNDS
6d (2")	408	2-1/2
10d (3")	149	2-1/2
16d (3-1/2")	32	3/4
STEEL STRAPPING, 1-1/4" X .085" (OR .031") --- 160' REQD --- 23 LBS		
SEAL FOR 1-1/4" STRAPPING --- 16 REQD --- 3/4 LB		

**LOAD AS SHOWN**

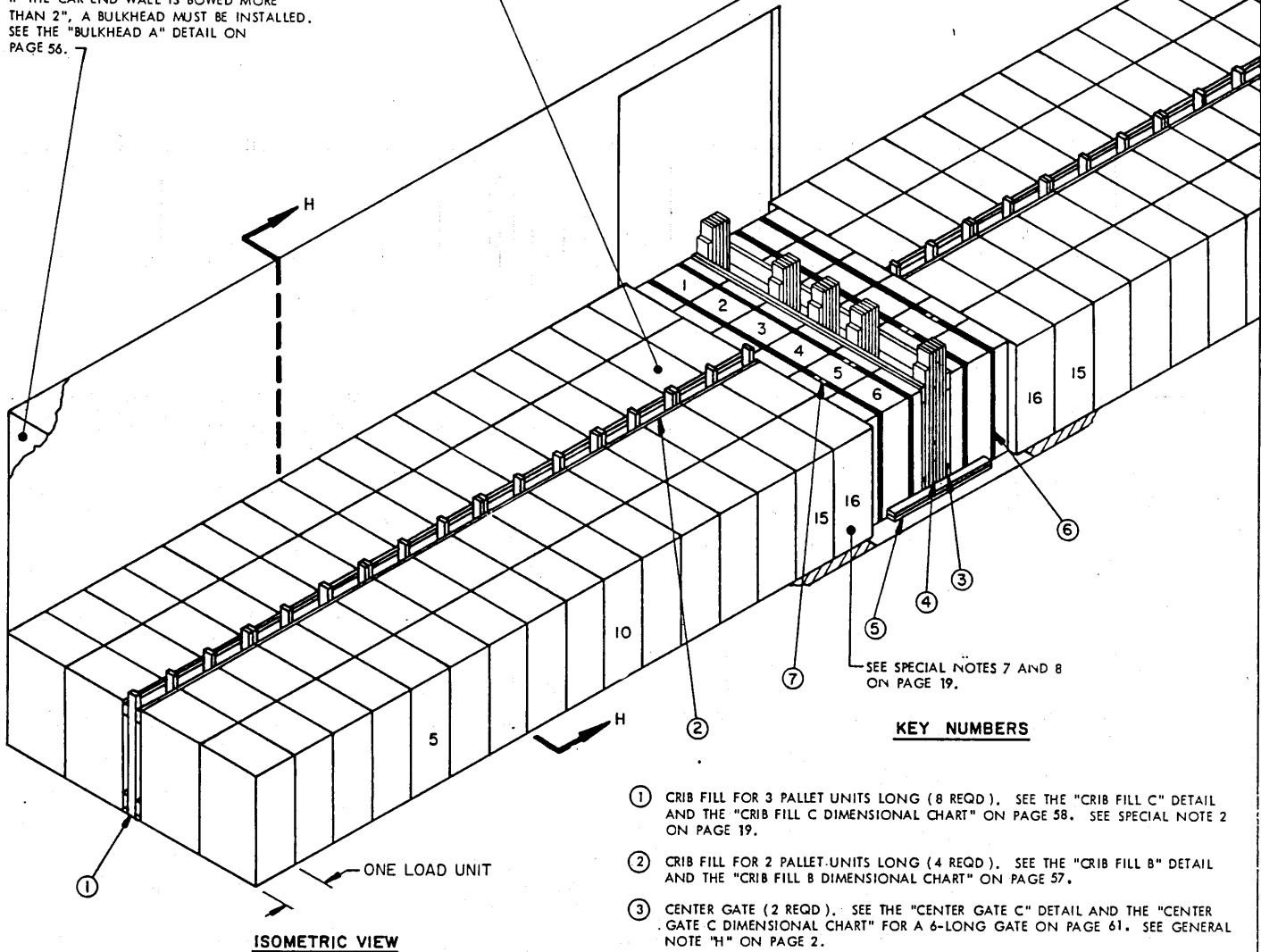
ITEM	QUANTITY	WEIGHT (APPROX)
175MM (6/PALLET) ---	112	104,608 LBS
DUNNAGE		682 LBS
TOTAL WEIGHT		105,290 LBS

175 MM PROJECTILES (6/PALLET)

112-UNIT LOAD IN A 40'-6" LONG BY 9'-2" WIDE BOX CAR (CONVENTIONAL)

INDICATES THE RECOMMENDED LOCATION FOR A FILLER ASSEMBLY, IF ONE IS REQUIRED. SEE SPECIAL NOTE 5 ON PAGE 19.

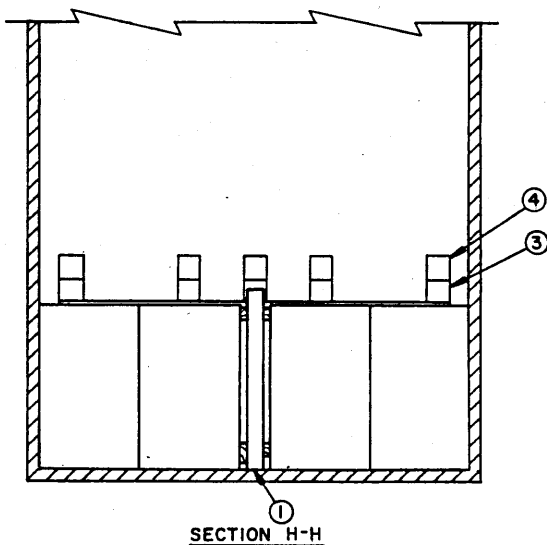
IF THE CAR END WALL IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" DETAIL ON PAGE 56.



ISOMETRIC VIEW

KEY NUMBERS

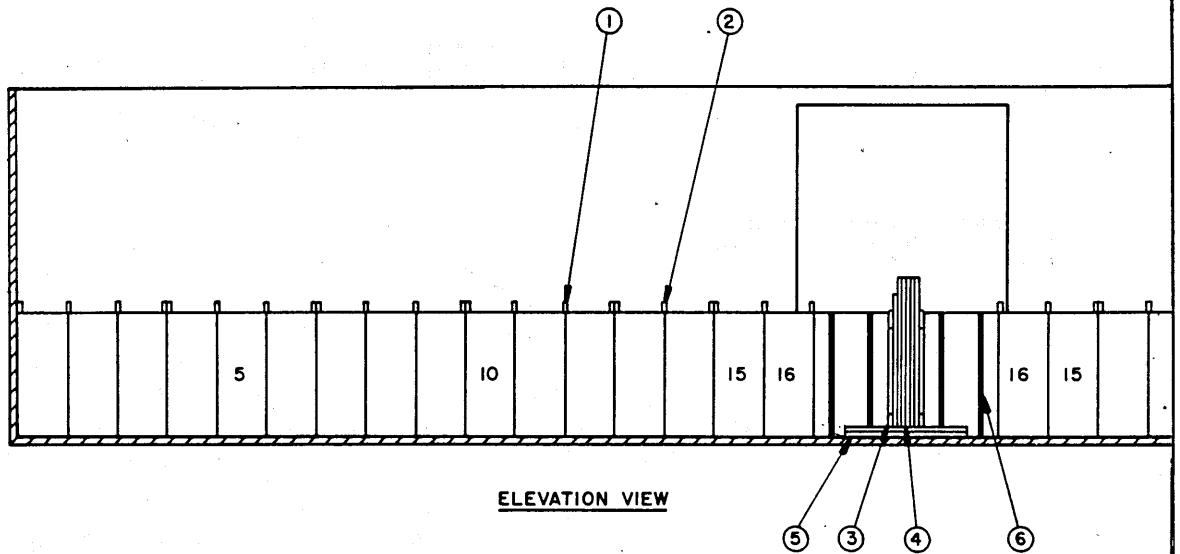
- ① CRIB FILL FOR 3 PALLET UNITS LONG (8 REQD). SEE THE "CRIB FILL C" DETAIL AND THE "CRIB FILL C DIMENSIONAL CHART" ON PAGE 58. SEE SPECIAL NOTE 2 ON PAGE 19.
- ② CRIB FILL FOR 2 PALLET UNITS LONG (4 REQD). SEE THE "CRIB FILL B" DETAIL AND THE "CRIB FILL B DIMENSIONAL CHART" ON PAGE 57.
- ③ CENTER GATE (2 REQD). SEE THE "CENTER GATE C" DETAIL AND THE "CENTER GATE C DIMENSIONAL CHART" FOR A 6-LONG GATE ON PAGE 61. SEE GENERAL NOTE "H" ON PAGE 2.
- ④ SOLID FILL, 6" WIDE BY 57" LONG BY THE THICKNESS REQUIRED TO PROVIDE A WEDGE FIT BETWEEN THE VERTICAL PIECES OF THE LONGITUDINALLY ADJACENT CENTER GATES (REQD AT 5 PLACES). NAIL THE FIRST PIECE TO THE EXTENDED VERTICAL PIECE OF ONE CENTER GATE W/5-10d NAILS. NAIL EACH ADDITIONAL PIECE TO A PREVIOUSLY INSTALLED PIECE W/5-10d NAILS. NAIL THRU EACH VERTICAL PIECE OF THE OTHER CENTER GATE INTO THE LAST SOLID FILL PIECE W/3-10d NAILS.
- ⑤ DOORWAY BLOCKING, 2" X 4" X 42" (DOUBLED) (2 REQD). POSITION SO AS TO BE CENTERED ON THE TWO CROSSWISE ROWS AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "G" ON PAGE 3. SEE SPECIAL NOTES 7 AND 8 ON PAGE 19.
- ⑥ DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 26'-0" LONG STEEL STRAPPING (4 REQD).
- ⑦ SEAL FOR 1-1/4" STEEL STRAPPING (8 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "K" ON PAGE 2.



SECTION H-H

175 MM PROJECTILES (6/PALLET)

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



ELEVATION VIEW

(SPECIAL NOTES CONTINUED)

SPECIAL NOTES:

- LOAD UNITS OF FOUR PALLET WHICH ARE POSITIONED WITH THE 25-1/2" WIDTH OF THE UNIT ACROSS THE CAR MUST NOT BE LOADED SO AS TO EXTEND INTO THE DOORWAY AREA OF A CAR EQUIPPED WITH EITHER SINGLE OR DOUBLE "THRU" PLUG TYPE DOORS, EXCEPT AS TYPICALLY SHOWN AND BLOCKED AND BRACED IN THE ISOMETRIC VIEW ON PAGE 16. WITHOUT EXTENDING INTO THE DOORWAY AREA FAR ENOUGH THAT PIECES MARKED ① AND ② ON PAGE 16 ARE REQUIRED, SIXTEEN (16) LOAD UNITS CAN BE LOADED IN EACH END OF THE CAR IF THE PLUG DOORS ARE NOT WIDER THAN 7'. ONLY FIFTEEN (15) LOAD UNITS CAN BE LOADED IN EACH END OF THE CAR IF THE DOORS ARE 8' OR 9' WIDE, BUT THREE CROSSWISE ROWS OF SIX PALLET MAY BE LOADED IN THE DOORWAY AREA AND BLOCKED WITH 72" LONG DOORWAY BLOCKING, PIECE MARKED ⑤. A CAR WITH 10' OR 12' WIDE PLUG DOORS WILL BE LIMITED TO FOURTEEN (14) LOAD UNITS IN EACH END, WITH FOUR CROSSWISE ROWS POSSIBLE, BLOCKED WITH 10'-0" LONG DOORWAY BLOCKING. IF THE CAR IS EQUIPPED WITH DOUBLE "THRU" PLUG TYPE OR WITH STAGGERED DOUBLE PLUG TYPE DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH CROSSWISE ROWS BLOCKED WITH DOORWAY BLOCKING, PIECE MARKED ⑤, AND WITH TWO DOORWAY PROTECTION STRAPS, PIECES MARKED ⑥, AROUND EACH CROSSWISE ROW. NOTE THAT THESE SPECIFIED LIMITS AS TO THE NUMBER OF LOAD UNITS IN EACH END OF A CAR ARE APPLICABLE ONLY FOR A 50'-6" LONG CAR; THE QUANTITIES WILL VARY IN CARS OF OTHER LENGTHS.
- IF A CAR IS EQUIPPED WITH SINGLE SLIDING DOORS, THE UNITS HAVING THE 25-1/2" WIDTH ACROSS THE CAR MAY EXTEND INTO THE DOORWAY AREA, BUT LATERAL BRACING MUST BE PROVIDED BY INSTALLING DOORWAY PROTECTION GATES. SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69 OR THE "DOORWAY PROTECTION B" DETAIL ON PAGE 70. NOTE THAT PIECES ⑤ AND ⑥ MUST BE USED FOR BLOCKING AND BRACING THE CROSSWISE ROWS OF 6. FOR CARS EQUIPPED WITH STAGGERED DOUBLE SLIDING DOORS, DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE LATERAL BRACING FOR THE ADJACENT UNITS POSITIONED WITH THE 25-1/2" WIDTH ACROSS THE CAR. THE CENTER AREA OF THE CAR ADJACENT TO THE MAIN DOOR OPENINGS WILL BE LOADED WITH TWO OR MORE CROSSWISE ROWS OF SIX UNITS, AS APPLICABLE. IF A CAR IS EQUIPPED WITH DOUBLE SLIDING "THRU" DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH THE 6" LONG CROSSWISE ROWS; THE UNITS WITH THE 25-1/2" DIMENSION ACROSS THE CAR MUST NOT EXTEND INTO THE DOORWAY AREA.
- IF A CAR IS EQUIPPED WITH A COMBINATION OF DOOR TYPES, WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE ENTIRE DOORWAY AREA WILL BE LOADED WITH CROSSWISE ROWS OF 6 WIDE BLOCKED WITH DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS.

- A 140-UNIT LOAD OF 175MM PROJECTILES PALLETIZED 6 PER PALLET IS SHOWN IN A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTES 6 THRU 9.
- THE DETAILS FOR THE "CRIB FILL C" AND "CRIB FILL B" ASSEMBLIES, PIECES MARKED ① AND ②, SPECIFY THE USE OF 2" X 6" VERTICAL PIECES FOR A 9'-2" WIDE CAR. THE CRIB FILL FOR A 9'-0" WIDE CAR WILL REQUIRE 2" X 4" VERTICALS, A 9'-4" WIDE CAR WILL REQUIRE 2" X 8" MATERIAL FOR VERTICAL PIECES, AND 2" X 10" MATERIAL WILL BE NEEDED FOR A 9'-6" WIDE CAR. NOTE THAT THE TOTAL ACCUMULATED SPACE ACROSS A CAR MUST NOT BE MORE THAN TWO INCHES (2"). THE WIDTH OF THE ASSEMBLIES CAN BE ADJUSTED BY INCREASING OR DECREASING THE WIDTH OF THE VERTICAL PIECES AND/OR BY CHANGING THE THICKNESS OF, OR ADDING LAMINATIONS OF MATERIAL TO, THE HORIZONTAL PIECES. A REDUCED AMOUNT OF MATERIAL WILL BE REQUIRED FOR CARS 9'-4" AND WIDER IF THE LOADING PATTERN SHOWN ON PAGE 20 OR 22 IS USED.
- REFER TO SPECIAL NOTE 3 ON PAGE 17 FOR GUIDANCE IF A CAR HAVING DOORS WIDER THAN 6'-0" IS USED AND THE PALLET UNITS WHICH ARE POSITIONED WITH THE 25-1/2" WIDTH DIMENSION ACROSS THE CAR EXTEND INTO THE DOOR OPENING TO SUCH AN EXTENT THAT SIX INCHES (6") OR LESS OF A PALLET IS RETAINED BY A CAR SIDEWALL. SEE SPECIAL NOTES 7 AND 8.
- THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED BY ADDING A PARTIAL SECOND LAYER IN ONE OR BOTH ENDS OF THE CAR, PROVIDED THE CAR HAS NAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR IS NOT EXCEEDED. NOTE THAT THE LOAD LIMIT OF THE CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LADING PLUS DUNNAGE IN THE HEAVY END OF THE CAR. INCREASE THE HEIGHT OF THE CRIB FILL ASSEMBLIES FOR THE PARTIAL LAYER AND INSTALL THE PROPER SIZE K-BRACE TO RETAIN THE PARTIAL LAYER. SEE THE TYPICAL INSTALLATION ON PAGE 50 AND/OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE.
- THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. ALMOST ANY QUANTITY OF PALLET UNITS WHICH IT IS DESIRED TO SHIP (FROM 116 TO A FULL LOAD) CAN BE ACHIEVED BY USING VARIOUS COMBINATIONS OF LOAD UNITS OF FOUR EACH POSITIONED WITH THE 25-1/2" WIDTH DIMENSION ACROSS THE CAR, AND ONE THRU FOUR CROSSWISE ROWS OF SIX PALLET UNITS POSITIONED WITH THE LENGTH DIMENSION ACROSS THE CAR. FOR THOSE QUANTITIES IN THAT RANGE WHICH CANNOT BE ATTAINED IN THIS MANNER, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS TO REACH THE DESIRED QUANTITY. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 64. NOTE THAT CENTER GATES AND STRUTS, SIMILAR TO THE LOAD SHOWN ON PAGE 4, WILL BE USED IN LIEU OF THE DEPICTED CENTER GATES AND SOLID FILL WHEN THE EXCESS SPACE IN THE CENTER OF THE CAR IS APPROXIMATELY 18" OR MORE. FURTHER REDUCTION OF A LOAD CAN BE ACCOMPLISHED BY EMPLOYING THE PROCEDURES SHOWN ON PAGES 48 AND 49 AS GUIDANCE. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53 OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55.
- WHEN LOADING A 60-FOOT LONG CAR, CENTER GATE B MUST BE SUBSTITUTED FOR THE DEPICTED CENTER GATE C IF THE SPACE AT THE MIDDLE OF THE CAR IS GREAT ENOUGH TO REQUIRE THE USE OF STRUTS. TWELVE (12) TRIPLED 2" X 6" STRUTS WILL BE USED. THE USE OF CENTER GATE C IS PERMISSIBLE IF SOLID TYPE BLOCKING IS TO BE USED.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	182	91
2" X 3"	8	4
2" X 4"	14	10
2" X 6"	321	321
NAILS	NO. REQD	POUNDS
6d (2")	528	3-1/4
10d (3")	192	3
16d (3-1/2")	20	1/2
STEEL STRAPPING, 1-1/4" X .035" (OR .031") -- 104' REQD -- 15 LBS		
SEAL FOR 1-1/4" STRAPPING ----- 8 REQD -- NIL		

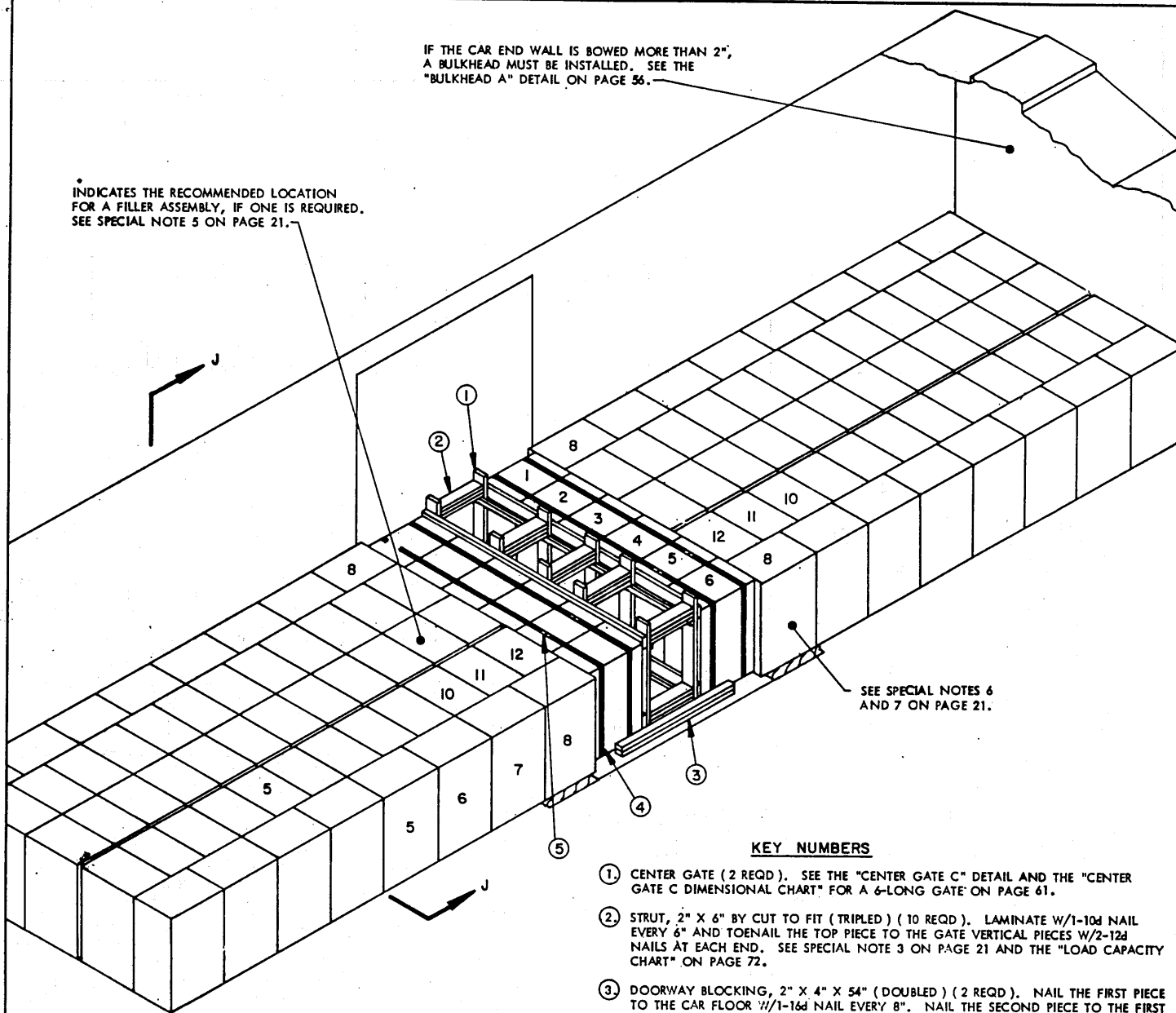
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LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
175MM (6/PALLET) -----	140	130,760 LBS
DUNNAGE -----		874 LBS
TOTAL WEIGHT -----		131,634 LBS

IF THE CAR END WALL IS BOWED MORE THAN 2",  
A BULKHEAD MUST BE INSTALLED. SEE THE  
"BULKHEAD A" DETAIL ON PAGE 56.

INDICATES THE RECOMMENDED LOCATION  
FOR A FILLER ASSEMBLY, IF ONE IS REQUIRED.  
SEE SPECIAL NOTE 5 ON PAGE 21.

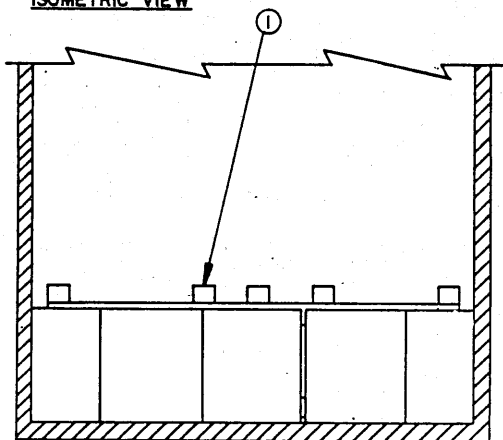


SEE SPECIAL NOTES 6  
AND 7 ON PAGE 21.

**KEY NUMBERS**

1. CENTER GATE (2 REQD). SEE THE "CENTER GATE C" DETAIL AND THE "CENTER GATE C DIMENSIONAL CHART" FOR A 6'-LONG GATE ON PAGE 61.
2. STRUT, 2" X 6" BY CUT TO FIT (TRIPLED) (10 REQD). LAMINATE W/1-10d NAIL EVERY 6" AND TOENAIL THE TOP PIECE TO THE GATE VERTICAL PIECES W/2-12d NAILS AT EACH END. SEE SPECIAL NOTE 3 ON PAGE 21 AND THE "LOAD CAPACITY CHART" ON PAGE 72.
3. DOORWAY BLOCKING, 2" X 4" X 54" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "G" ON PAGE 3.
4. DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 26'-0" LONG STEEL STRAPPING (4 REQD).
5. SEAL FOR 1-1/4" STRAPPING (8 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "K" ON PAGE 2.

**ISOMETRIC VIEW**

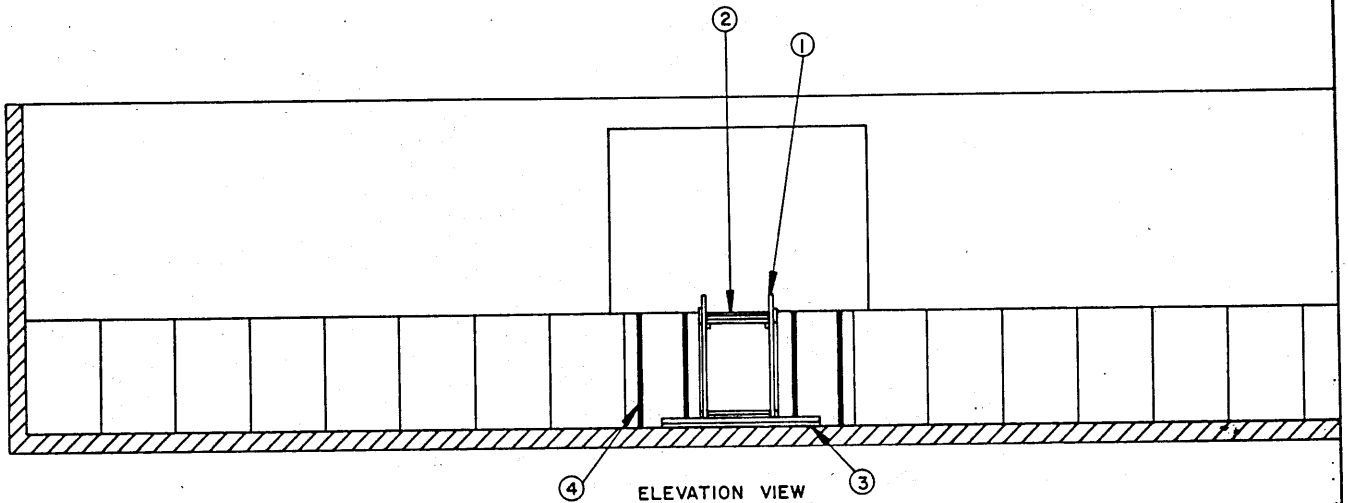


**SECTION J-J**

175 MM PROJECTILES (6/PALLET)

104-UNIT LOAD IN A 40'-6" LONG BY 9'-4" WIDE BOX CAR (CONVENTIONAL)





(SPECIAL NOTES CONTINUED)

6. IN A CAR EQUIPPED WITH SINGLE "THRU" PLUG TYPE DOORS, PALLETS WHICH ARE POSITIONED WITH THE 17" LENGTH ACROSS THE CAR MUST NOT EXTEND INTO THE DOORWAY AREA TO SUCH AN EXTENT THAT SIX INCHES (6") OR LESS OF A PALLET IS RETAINED BY A CAR SIDEWALL. TO SATISFY THIS REQUIREMENT, PALLETS WITH THE 17" LENGTH OF THE UNIT ACROSS THE CAR CAN BE LOADED 8 LONG, AS SHOWN, IN CARS HAVING PLUG DOORS 6' THRU 9' WIDE. IN CARS HAVING WIDER PLUG DOORS IT WILL BE NECESSARY TO OMIT PALLET UNITS MARKED 8 ALONG EACH SIDEWALL AND THE TWELFTH PALLET STACKS IN EACH END OF THE CENTER AREA. INSTALL A "FILLER ASSEMBLY C" IN EACH OUTSIDE ROW. THREE (3) ROWS CAN BE POSITIONED CROSSWISE IN THE CENTER OF THE LOAD AND BLOCKED WITH 8'-0" LONG DOORWAY BLOCKING. IF THE CAR IS EQUIPPED WITH DOUBLE "THRU" OR STAGGERED PLUG DOORS, OR A COMBINATION OF DOOR TYPES, WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE LOAD MUST BE SUCH THAT ALL PALLET UNITS ALONG THE WALL WILL BE RETAINED BY AT LEAST SIX INCHES (6") OF CAR WALL ON BOTH SIDES OF THE CAR. THE ENTIRE DOORWAY AREA WILL THEN BE LOADED WITH CROSSWISE ROWS OF 6 LONG BLOCKED WITH DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS. NOTE THAT THESE SPECIFIED LIMITS AS TO THE NUMBER OF PALLETS IN EACH END OF A CAR ARE APPLICABLE ONLY FOR A 40'-6" LONG CAR; THE QUANTITIES WILL VARY IN CARS OF OTHER LENGTHS.
7. IF A CAR IS EQUIPPED WITH SINGLE SLIDING DOORS, THE PALLETS HAVING THE 17" WIDTH ACROSS THE CAR MAY EXTEND COMPLETELY INTO THE DOORWAY AREA, BUT LATERAL BRACING MUST BE PROVIDED BY INSTALLING DOORWAY PROTECTION GATES. SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69 OR THE "DOORWAY PROTECTION B" DETAIL ON PAGE 70. FOR CARS EQUIPPED WITH STAGGERED SLIDING DOORS, DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE LATERAL BRACING FOR THE ADJACENT UNITS. THE CENTER AREA OF THE CAR WILL BE LOADED WITH TWO OR MORE CROSSWISE ROWS, AS APPLICABLE. INSTALL BLOCKING AS SHOWN IN THE LOAD VIEW. IF A CAR IS EQUIPPED WITH DOUBLE SLIDING "THRU" DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH THE 6-LONG CROSSWISE ROWS.

SPECIAL NOTES:

1. A 104-UNIT LOAD OF 175MM PROJECTILES PALLETIZED 6 PER PALLET IS SHOWN IN A 40'-6" LONG BY 9'-4" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 7'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING NARROWER OR WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTES 2, 6, AND 7.
2. THE LOADING PROCEDURE ON PAGE 20 IS APPLICABLE FOR 9'-4" WIDE CARS HAVING EITHER NAILABLE OR NON-NAILABLE SIDEWALLS. IF A WIDER 40'-6" LONG CAR IS FURNISHED FOR LOADING, REFER TO THE PROCEDURES ON PAGES 22 AND 23 FOR THE TYPICAL USE OF CRIB FILL ASSEMBLIES. NOTE THAT THE TOTAL ACCUMULATED SPACE ACROSS THE CAR MUST NOT EXCEED TWO INCHES (2").
3. IF AVAILABLE, 4" X 6" MATERIAL (POSITIONED FLAT) MAY BE USED IN LIFO OF THE DEPICTED TRIPLED 2" X 6" STRUTS, PROVIDED THE LOAD IN EITHER END OF THE CAR DOES NOT CONTAIN MORE THAN FIFTY-ONE (51) PALLET UNITS. IF 51 OR MORE UNITS ARE TO BE SHIPPED, SUBSTITUTE CENTER GATES B FOR THE DEPICTED CENTER GATES. NOTE THAT STRUTS WHICH ARE 72" OR LONGER MUST BE STIFFENED BY THE APPLICATION OF STRUT BRACING. SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 69 FOR GUIDANCE.
4. THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED BY ADDING A PARTIAL SECOND LAYER IN ONE OR BOTH ENDS OF THE CAR, PROVIDED THE CAR HAS NAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR WILL NOT BE EXCEEDED. NOTE THAT THE LOAD LIMIT OF THE CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LADING PLUS DUNNAGE IN THE HEAVY END OF THE CAR. IN ORDER TO PROVIDE A FLAT BEARING SURFACE FOR THE K-BRACE, MATERIAL MAY NEED TO BE LAMINATED TO THE LOAD BEARING PIECES OF THE K-BRACE, OR FILLER ASSEMBLIES MAY NEED TO BE INSTALLED, AS APPLICABLE. SEE THE TYPICAL INSTALLATION OF A K-BRACE ON PAGE 50 AND/OR THE DETAILS ON PAGES 51 THRU 53 AND THE TYPICAL INSTALLATION OF A FILLER ASSEMBLY ON PAGE 36.
5. THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. THE LOAD CAN BE REDUCED BY TWELVE PALLET UNITS BY OMITTING THE TWO CROSSWISE ROWS. SUBSTITUTE CENTER GATES B, AS DETAILED ON PAGE 60, FOR THE DEPICTED CENTER GATES. THE LOAD CAN BE REDUCED BY FIVE OR TEN PALLET UNITS BY OMITTING FROM ONE OR BOTH ENDS OF THE CAR THE THREE PALLETS HAVING THE 25-1/2" WIDTH ACROSS THE CAR AND THE LATERALLY ADJACENT PALLET UNITS HAVING THE 17" LENGTH ACROSS THE CAR. FILLER ASSEMBLIES MUST BE INSTALLED IN THE OUTER ROWS OF PALLETS TO PROVIDE AN EVEN LOAD SURFACE. SEE THE "FILLER ASSEMBLY C" DETAIL ON PAGE 67 AND A TYPICAL INSTALLATION ON PAGE 36. FOR OTHER QUANTITIES, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66. FURTHER REDUCTION OF A LOAD CAN BE ACCOMPLISHED BY EMPLOYING THE PROCEDURES ON PAGES 48 AND 49 FOR GUIDANCE. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53 OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55. (FILLER ASSEMBLIES MAY BE REQUIRED TO PROVIDE AN EVEN BEARING SURFACE).

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	47	16
2" X 3"	8	4
2" X 4"	18	12
2" X 6"	124	124
NAILS	NO. REQD	POUNDS
10d (3")	220	3-1/2
12d (3-1/4")	40	3/4
16d (3-1/2")	28	3/4
STEEL STRAPPING, 1-1/4" X .035"(OR .031") 104' REQD ----- 15 LBS		
SEAL FOR 1-1/4" STRAPPING 8 REQD ----- NIL		

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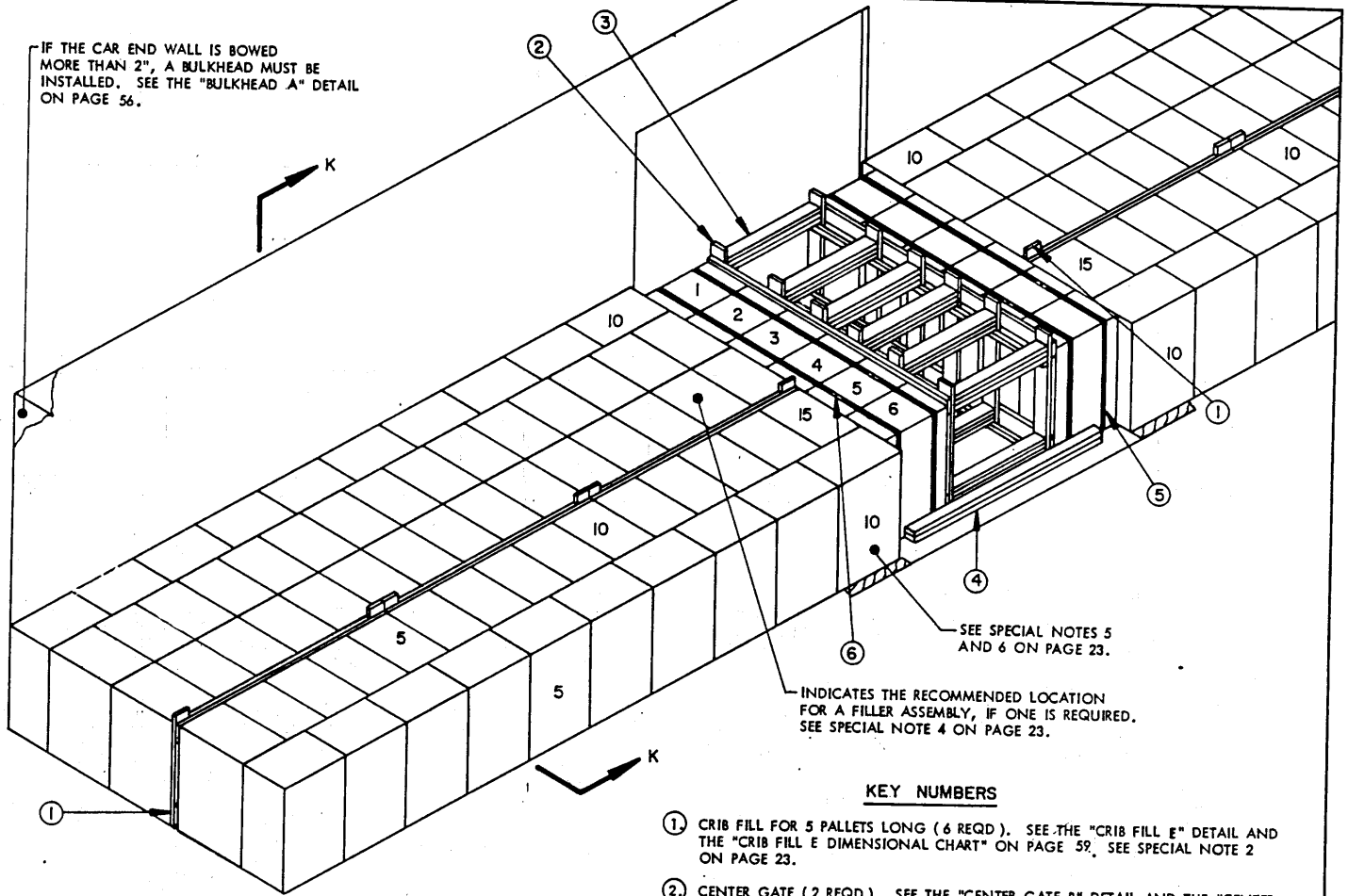
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
175MM (6/PALLET)	104	97,136 LBS
DUNNAGE		357 LBS
TOTAL WEIGHT		97,493 LBS

175MM PROJECTILES (6/PALLET)

104 - UNIT LOAD IN A 40'-6" LONG BY 9'-4" WIDE BOX CAR (CONVENTIONAL)

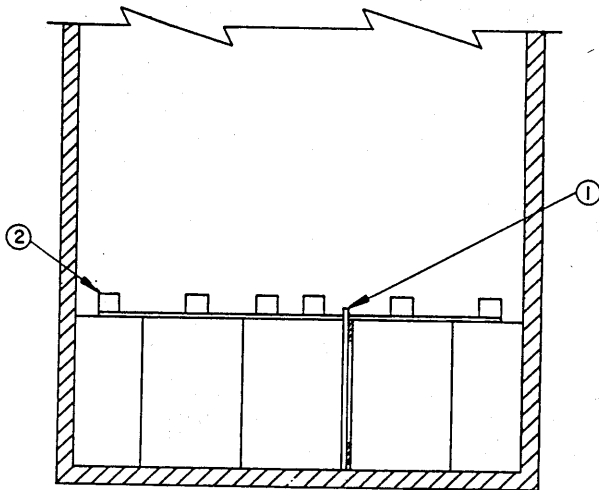
IF THE CAR END WALL IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" DETAIL ON PAGE 56.



ISOMETRIC VIEW

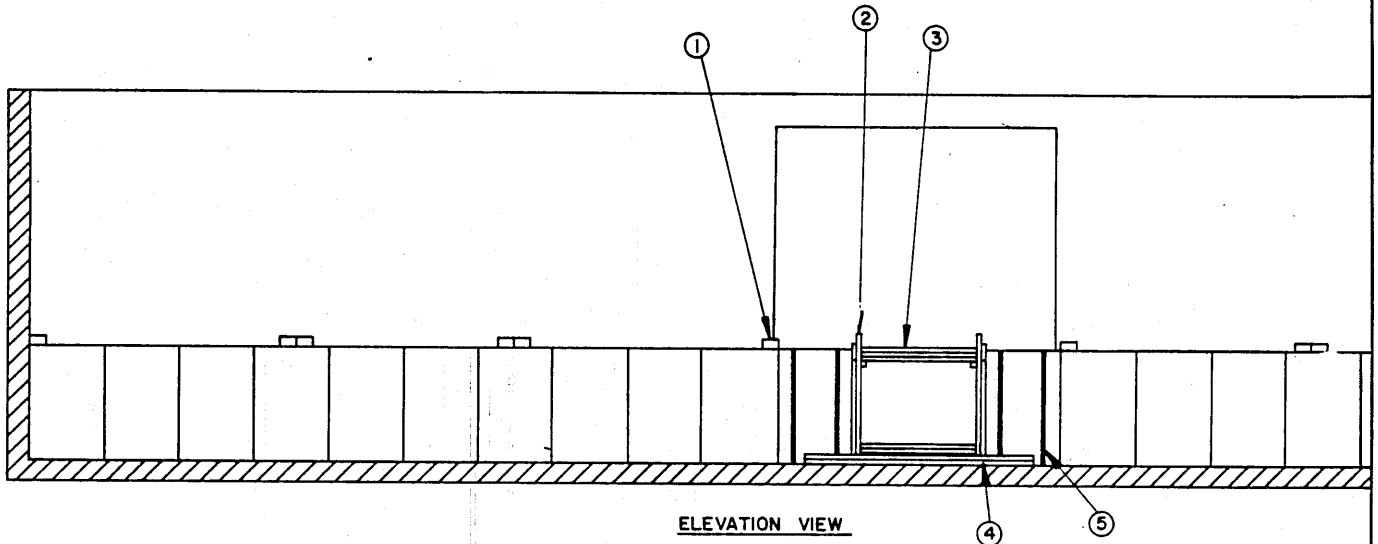
**KEY NUMBERS**

- ① CRIB FILL FOR 5 PALLETS LONG (6 REQD). SEE THE "CRIB FILL E" DETAIL AND THE "CRIB FILL E DIMENSIONAL CHART" ON PAGE 59. SEE SPECIAL NOTE 2 ON PAGE 23.
- ② CENTER GATE (2 REQD). SEE THE "CENTER GATE B" DETAIL AND THE "CENTER GATE B DIMENSIONAL CHART" FOR A 6-LONG GATE ON PAGE 60.
- ③ STRUT, 2" X 6" BY CUT TO FIT (TRIPLED) (12 REQD). LAMINATE W/1-10d NAIL EVERY 6" AND TOENAIL THE TOP PIECE TO THE GATE VERTICAL PIECES W/2-12d NAILS AT EACH END. SEE THE "LOAD CAPACITY CHART" ON PAGE 72 AND GENERAL NOTE "F" ON PAGE 3.
- ④ DOORWAY BLOCKING, 2" X 6" X 6'-6" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "G" ON PAGE 3.
- ⑤ DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 26'-0" LONG STEEL STRAPPING (4 REQD).
- ⑥ SEAL FOR 1-1/4" STRAPPING (8 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "K" ON PAGE 2.



SECTION K-K

175 MM PROJECTILES (6/PALLET)



ELEVATION VIEW

(SPECIAL NOTES CONTINUED)

SPECIAL NOTES:

5. IN A CAR EQUIPPED WITH SINGLE "THRU" PLUG TYPE DOORS, PALLETS WHICH ARE POSITIONED WITH THE 17" LENGTH ACROSS THE CAR MUST NOT EXTEND INTO THE DOORWAY AREA TO SUCH AN EXTENT THAT SIX INCHES (6") OR LESS OF A PALLET IS RETAINED BY A CAR SIDEWALL. TO SATISFY THIS REQUIREMENT, PALLETS WITH THE 17" LENGTH OF THE UNIT ACROSS THE CAR CAN BE LOADED 10 LONG, AS SHOWN, IN CARS HAVING PLUG DOORS 6' THRU 10'-6" WIDE. IN CARS HAVING WIDER PLUG DOORS IT WILL BE NECESSARY TO OMIT PALLET UNITS MARKED TO ALONG EACH SIDEWALL AND THE FIFTEENTH PALLET STACKS IN EACH END. INSTALL A "FILLER ASSEMBLY C" IN EACH OUTSIDE ROW. FOUR (4) ROWS CAN BE POSITIONED CROSSWISE IN THE CENTER OF THE LOAD AND BLOCKED WITH 9'-0" LONG DOORWAY BLOCKING. IF THE CAR IS EQUIPPED WITH DOUBLE "THRU" OR STAGGERED PLUG DOORS, OR A COMBINATION OF DOOR TYPES, WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE LOAD MUST BE SUCH THAT ALL PALLET UNITS WILL BE RETAINED BY AT LEAST SIX INCHES (6") OF THE CAR WALL ON BOTH SIDES OF THE CAR. THE ENTIRE DOORWAY AREA WILL THEN BE LOADED WITH CROSSWISE ROWS OF 6 LONG BLOCKED WITH DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS. NOTE THAT THESE SPECIFIED LIMITS AS TO THE NUMBER OF PALLETS IN EACH END OF A CAR ARE APPLICABLE ONLY FOR A 50'-6" LONG CAR; THE QUANTITIES WILL VARY IN CARS OF OTHER LENGTHS.
6. IF A CAR IS EQUIPPED WITH SINGLE SLIDING DOORS, THE PALLETS HAVING THE 17" WIDTH ACROSS THE CAR MAY EXTEND COMPLETELY INTO THE DOORWAY AREA, BUT LATERAL BRACING MUST BE PROVIDED BY INSTALLING DOORWAY PROTECTION GATES. SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69 OR THE "DOORWAY PROTECTION B" DETAIL ON PAGE 70. FOR CARS EQUIPPED WITH STAGGERED SLIDING DOORS, DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE LATERAL BRACING FOR THE ADJACENT UNITS. THE CENTER AREA OF THE CAR WILL BE LOADED WITH TWO OR MORE CROSSWISE ROWS, AS APPLICABLE. INSTALL BLOCKING AS SHOWN IN THE LOAD VIEW. IF A CAR IS EQUIPPED WITH DOUBLE SLIDING "THRU" DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH THE 6-LONG CROSSWISE ROWS.
1. A 142-UNIT LOAD OF 175MM PROJECTILES PALLETIZED 6 PER PALLET IS SHOWN IN A 50'-6" LONG BY 9'-6" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 8'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING NARROWER OR WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTES 2, 5, AND 6.
2. IF A 9'-4" WIDE CAR IS FURNISHED FOR LOADING, THE CRIB FILL, PIECES MARKED ①, WILL NOT BE REQUIRED. CARS NARROWER THAN 9'-3" IN WIDTH CANNOT BE USED FOR THIS LOADING PATTERN. NOTE THAT THE TOTAL ACCUMULATED SPACE ACROSS THE CAR MUST NOT EXCEED TWO INCHES (2").
3. THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED. AN ADDITIONAL 6-LONG CROSSWISE ROW CAN BE POSITIONED AT THE CENTER OF THE CAR TO PROVIDE A LADING WEIGHT OF 138,232 POUNDS. SOLID FILL MUST THEN BE INSTALLED IN LIEU OF THE DEPICTED STRUTS. SEE THE LOAD VIEW ON PAGE 18 FOR A TYPICAL INSTALLATION. IF ADDITIONAL UNITS ARE REQUIRED, A PARTIAL SECOND LAYER CAN BE ADDED IN ONE OR BOTH ENDS OF THE CAR, PROVIDED THE CAR HAS NAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR WILL NOT BE EXCEEDED. NOTE THAT THE LOAD LIMIT OF THE CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LADING PLUS DUNNAGE IN THE HEAVY END OF THE CAR. IN ORDER TO PROVIDE A FLAT BEARING SURFACE FOR THE K-BRACE, MATERIAL MAY NEED TO BE LAMINATED TO THE LOAD BEARING PIECES OF THE K-BRACE, OR FILLER ASSEMBLIES MAY NEED TO BE INSTALLED, AS APPLICABLE. INSTALL THE PROPER SIZE K-BRACE TO RETAIN THE PARTIAL LAYER. SEE THE TYPICAL INSTALLATION ON PAGE 50 AND/OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE. SEE THE TYPICAL INSTALLATION OF A FILLER ASSEMBLY ON PAGE 36.
4. THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. THE LOAD CAN BE REDUCED BY TWELVE PALLET UNITS BY OMITTING THE TWO CROSSWISE ROWS. SUBSTITUTE CENTER GATES B, AS DETAILED ON PAGE 60, FOR THE DEPICTED CENTER GATES. THE LOAD CAN BE REDUCED BY FIVE OR TEN PALLET UNITS BY OMITTING FROM ONE OR BOTH ENDS OF THE CAR THE THREE PALLETS HAVING THE 25-1/2" WIDTH ACROSS THE CAR AND THE LATERALLY ADJACENT PALLET UNITS HAVING THE 17" LENGTH ACROSS THE CAR. FILLER ASSEMBLIES MUST BE INSTALLED IN THE OUTER ROWS OF PALLETS TO PROVIDE AN EVEN LOAD SURFACE. SEE THE "FILLER ASSEMBLY C" DETAIL ON PAGE 67 AND A TYPICAL INSTALLATION ON PAGE 28. FOR OTHER QUANTITIES, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66. FURTHER REDUCTION OF A LOAD CAN BE ACCOMPLISHED BY EMPLOYING THE PROCEDURES ON PAGES 48 AND 49 FOR GUIDANCE. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53 OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55. (FILLER ASSEMBLIES MAY BE REQUIRED TO PROVIDE AN EVEN BEARING SURFACE).

BILL OF MATERIAL

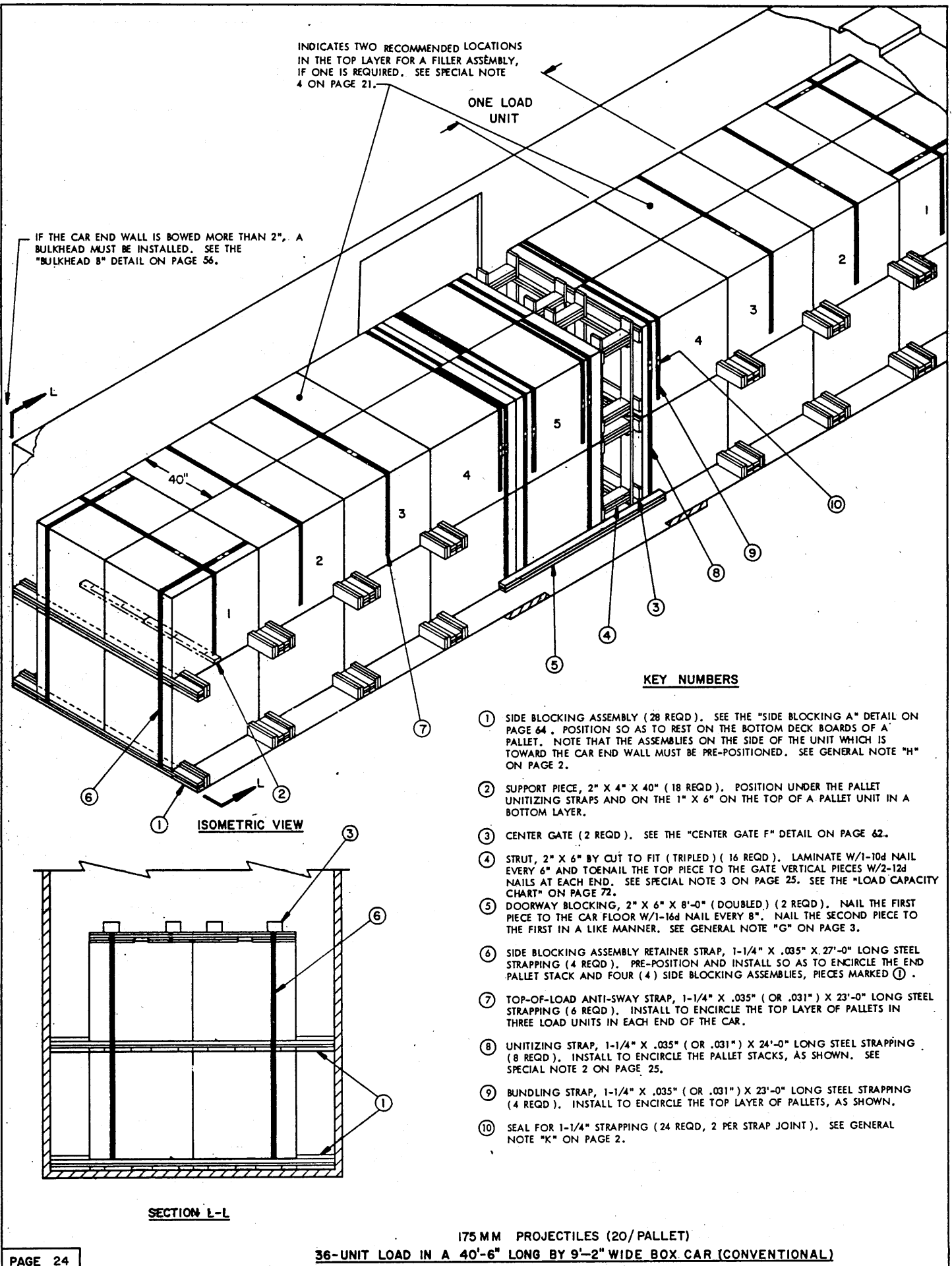
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	199	100
2" X 2"	44	15
2" X 3"	8	4
2" X 6"	222	222
NAILS	NO. REQD	POUNDS
6d (2")	144	1
10d (3")	328	5-1/4
12d (3-1/4")	48	1
16d (3-1/2")	40	1
STEEL STRAPPING, 1-1/4" X .035" (OR .037)	104' REQD	15 LBS
SEAL FOR 1-1/4" STRAPPING	8 REQD	NIL

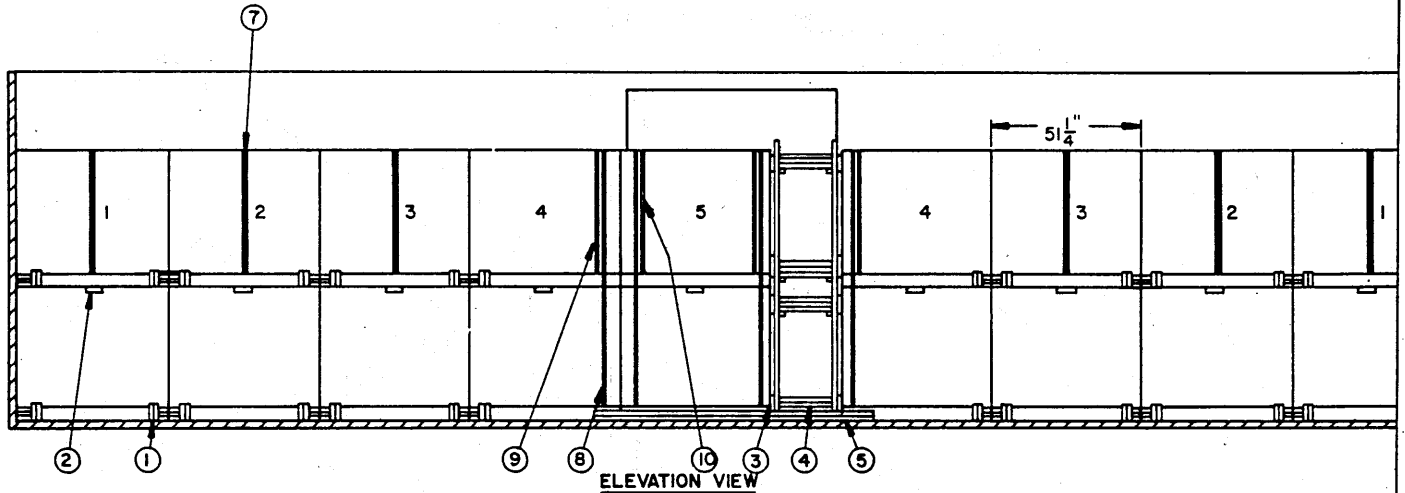
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
175MM (6/PALLET)	142	132,628 LBS
DUNNAGE	5-1/4	706 LBS
<b>TOTAL WEIGHT</b>		<b>134,040 LBS</b>

175MM PROJECTILES (6/PALLET)

142-UNIT LOAD IN A 50'-6" LONG BY 9'-6" WIDE BOX CAR (CONVENTIONAL)





( SPECIAL NOTES CONTINUED )

5. **CAUTION:** THE CAR TO BE USED FOR THE SHIPMENT OF THE DEPICTED 36-UNIT LOAD MUST HAVE A LOAD LIMIT OF AT LEAST 129,000 POUNDS. THE NUMBER OF UNITS MUST BE REDUCED IF CARS HAVING LESSER LOAD LIMITS ARE TO BE USED. FOR INSTANCE, THIRTY-FOUR (34) PALLET UNITS CAN BE LOADED IN CARS HAVING LOAD LIMITS OF 122,000 POUNDS OR MORE, OR THIRTY-TWO (32) UNITS CAN BE LOADED IN CARS HAVING AT LEAST 108,500-POUND LOAD LIMITS.
6. THE DEPICTED PROCEDURES FOR A 40'-6" LONG CAR MAY ALSO BE USED IN 50'-6" LONG CARS. FORTY-FOUR (44) PALLET UNITS CAN BE LOADED IN A 50'-6" LONG CAR WHICH HAS A LOAD LIMIT OF AT LEAST 161,500 POUNDS. THE NUMBER OF UNITS MUST BE REDUCED IN CARS HAVING LESSER LOAD LIMITS. FOR INSTANCE, FORTY (40) PALLET UNITS CAN BE LOADED IN CARS HAVING LOAD LIMITS OF 135,500 POUNDS OR MORE. SEE THE "LOAD CAPACITY CHART" ON PAGE 72 IF LONGER CARS ARE TO BE USED.
7. EIGHT OR NINE PALLET UNITS CAN BE LOADED ONE WIDE DOWN THE CENTER OF THE CAR, POSITIONED WITH THE 40" DIMENSION OF THE UNIT ACROSS THE CAR AS SHOWN. SIDE BLOCKING WILL BE PROVIDED BY NAILING DOUBLED 2" X 6" BY LOAD LENGTH MATERIAL TO THE CAR FLOOR ALONG EACH SIDE OF THE ROW. MODIFY THE CENTER GATE F FOR THE 1-WIDE BY 1-HIGH LOAD. ELEVEN PALLET UNITS CAN BE LOADED IN A 50'-6" LONG CAR BY EMPLOYING THESE PROCEDURES.

SPECIAL NOTES:

1. A 36-UNIT LOAD OF 175MM PROJECTILES PALLETIZED 20 PER PALLET IS SHOWN IN A 40'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTE 6.
2. THE SPECIFIED LENGTH OF THE DOORWAY BLOCKING, PIECES MARKED (5), AND THE SPECIFIED QUANTITY OF UNITIZING AND BUNDLING STRAPS, PIECES MARKED (8) AND (9), IS ADEQUATE FOR CARS HAVING THRU DOORS UP TO 12'-0" WIDE. IF THE CAR IS EQUIPPED WITH STAGGERED DOOR OPENINGS AND THE SIDE BLOCKING ASSEMBLIES, PIECES MARKED (1), DO NOT CONTACT THE CAR SIDEWALL ON BOTH SIDES OF THE CAR, THE DOORWAY BLOCKING, PIECES MARKED (5), MUST BE EXTENDED SUFFICIENTLY TO PROVIDE THE LATERAL BRACING. ALSO, FOUR (4) ADDITIONAL UNITIZING AND BUNDLING STRAPS, PIECES MARKED (8) AND (9) MUST BE INSTALLED. OMIT PIECES MARKED (1) AS APPLICABLE.
3. IF AVAILABLE, 4" X 6" MATERIAL ( POSITIONED FLAT ) MAY BE USED IN LIEU OF THE DEPICTED TRIPLED 2" X 6" STRUTS, PROVIDED THE LOAD IN EITHER END OF THE CAR DOES NOT CONTAIN MORE THAN TWENTY (20) PALLET UNITS.
4. THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. A LOAD CAN BE REDUCED BY A MULTIPLE OF 4 PALLET UNITS BY OMITTING ONE OR MORE LOAD UNITS. NOTE THAT STRUTS WHICH ARE LONGER THAN 72" MUST BE STIFFENED EVERY 72" BY THE APPLICATION OF STRUT BRACING. SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 69. A LOAD CAN BE REDUCED BY 2 PALLET UNITS BY OMITTING THE TOP PALLETS IN LOAD UNIT NUMBER 5. THE LOAD IN ONE END OF THE CAR WILL THEN BE BRACED WITH A 2-HIGH GATE AND THE OPPOSITE END WILL BE BRACED WITH TWO (2) 1-HIGH GATES. THIS SAME GUIDANCE CAN BE EMPLOYED TO ATTAIN A LOAD OF 6 UNITS LESS THAN SHOWN. FOR A LOAD REDUCTION OF MORE THAN 8 PALLET UNITS IT WILL BE NECESSARY TO BRACE THE PARTIAL LAYERS WITH K-BRACE ASSEMBLIES. SEE THE TYPICAL INSTALLATION ON PAGE 50 AND/OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE. NOTE THAT THE CAR MUST HAVE AVAILABLE SIDEWALLS FOR THE INSTALLATION OF K-BRACE TYPE BLOCKING. IF AN ODD NUMBER OF PALLET UNITS IS TO BE SHIPPED, IT WILL BE NECESSARY TO INSTALL A FILLER ASSEMBLY IN THE PLACE OF AN OMITTED PALLET UNIT. SEE THE "FILLER ASSEMBLY B" DETAIL ON PAGE 62. NOTE THAT THE FILLER ASSEMBLY MUST BE SECURED TO THE LATERALLY ADJACENT PALLET UNIT WITH A TOP-OF-LOAD ANTI-SWAY STRAP, PIECE MARKED (7). DO NOT OVER-TENSION. SEE SPECIAL NOTE 7 FOR GUIDANCE IN THE SHIPMENT OF 8 OR 9 PALLET UNITS.

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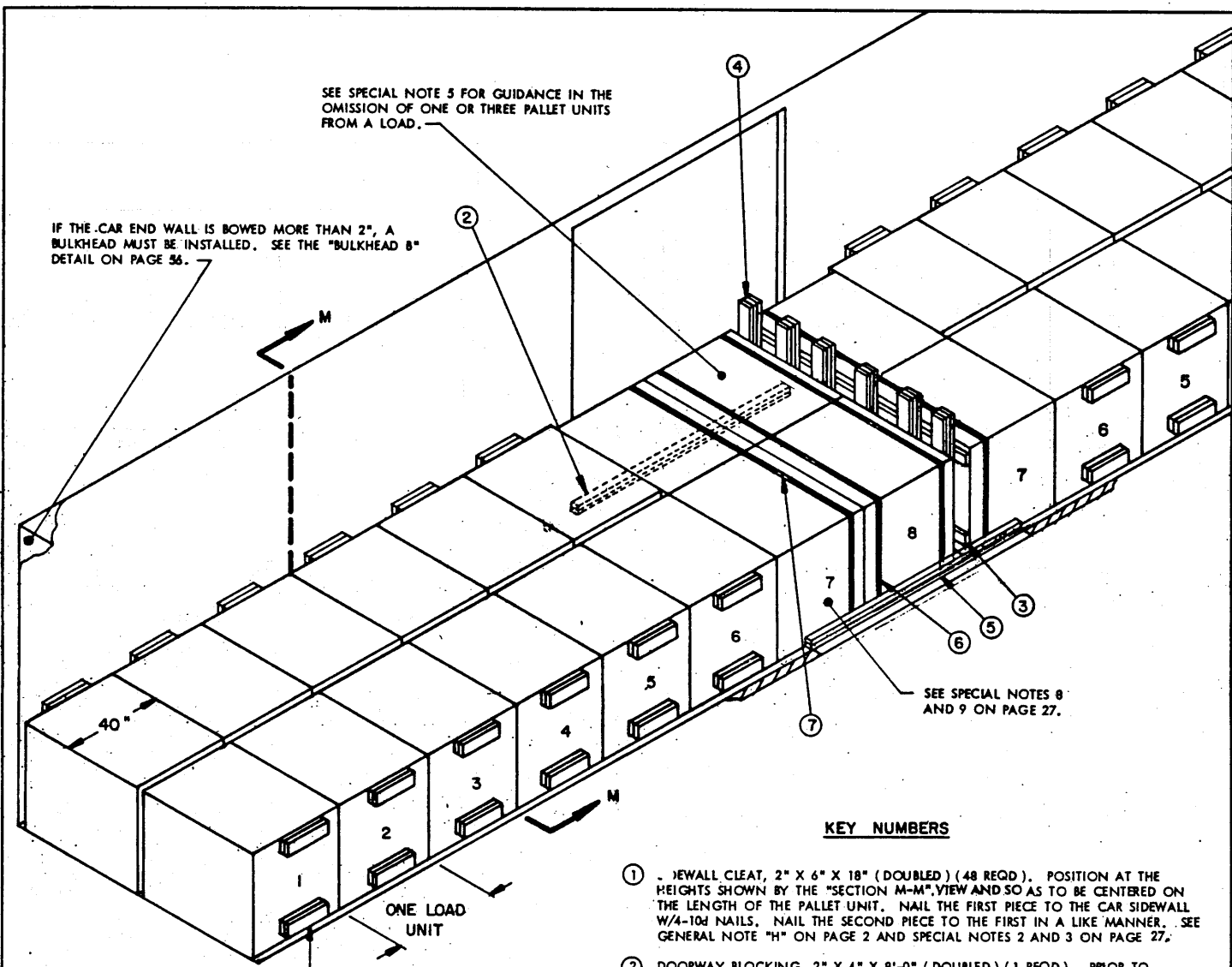
BILL OF MATERIAL *		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	257	86
2" X 2"	48	16
2" X 3"	8	4
2" X 4"	398	266
2" X 6"	294	294
NAILS	NO. REQD	POUNDS
6d (2")	392	2-1/2
10d (3")	808	12-1/2
12d (3-1/4")	64	1-1/4
16d (3-1/2")	48	1-1/4
STEEL STRAPPING, 1-1/4" X .035" ( OR .031" ) -- 422' REQD -- 61 LBS		
SEAL FOR 1-1/4" STRAPPING ----- 24 REQD -- 1-1/4 LBS		

\* BASED ON A 20/PALLET UNIT WHICH HAS THE SKIDS OF THE 6-PROJECTILE PALLETS INTACT.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT ( APPROX )
175MM ( 20/PALLET )	36	121,176 LBS
DUNNAGE		1,412 LBS
TOTAL WEIGHT		122,588 LBS

175 MM PROJECTILES (20/PALLET)  
36-UNIT LOAD IN A 40'-6" LONG BY 9'-2" WIDE BOX CAR (CONVENTIONAL)

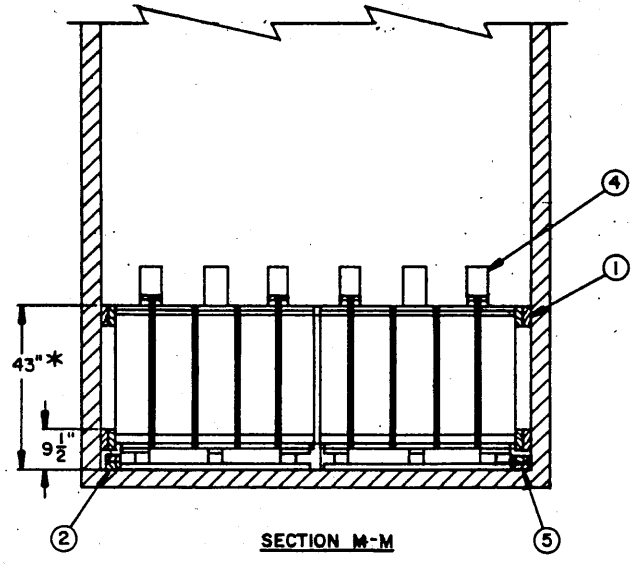


ISOMETRIC VIEW

**KEY NUMBERS**

- ① JEWELL CLEAT, 2" X 6" X 18" (DOUBLED) (48 REQD). POSITION AT THE HEIGHTS SHOWN BY THE "SECTION M-M" VIEW AND SO AS TO BE CENTERED ON THE LENGTH OF THE PALLET UNIT. NAIL THE FIRST PIECE TO THE CAR SIDEWALL W/4-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "H" ON PAGE 2 AND SPECIAL NOTES 2 AND 3 ON PAGE 27.
- ② DOORWAY BLOCKING, 2" X 4" X 8'-0" (DOUBLED) (1 REQD). PRIOR TO PLACEMENT OF THE PALLET UNITS IN THE DOORWAY AREA ON THE SIDE OPPOSITE THE LOADING SIDE OF THE CAR, POSITION THE DOORWAY BLOCKING APPROXIMATELY 50" FROM THE LATERAL CENTER LINE AND SO AS TO BE CENTERED ON LOAD UNITS NUMBERED 7. NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE SPECIAL NOTES 8 AND 9 ON PAGE 27.
- ③ CENTER GATE (1 REQD). SEE THE "CENTER GATE G" DETAIL ON PAGE 63. SEE SPECIAL NOTE 5 ON PAGE 27.
- ④ SOLID FILL, 6" WIDE BY 58" LONG BY THE THICKNESS REQUIRED TO PROVIDE A WEDGE FIT BETWEEN THE VERTICAL PIECE OF THE CENTER GATE AND THE LONGITUDINALLY ADJACENT PALLET UNIT (REQUIRED AT 6 PLACES). NAIL THE FIRST PIECE TO A VERTICAL PIECE OF THE GATE W/5-10d NAILS. NAIL EACH ADDITIONAL PIECE TO A PREVIOUSLY INSTALLED PIECE W/5-10d NAILS.
- ⑤ DOORWAY BLOCKING, 2" X 6" X 8'-0" (DOUBLED) (1 REQD). POSITION AGAINST THE PALLETS OF THE UNITS AND SO AS TO BE CENTERED ON LOAD UNITS NUMBERED 7. NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "G" ON PAGE 3. SEE SPECIAL NOTES 8 AND 9 ON PAGE 27.
- ⑥ DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 27'-0" LONG STEEL STRAPPING (4 REQD).
- ⑦ SEAL FOR 1-1/4" STRAPPING (8 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "K" ON PAGE 2.

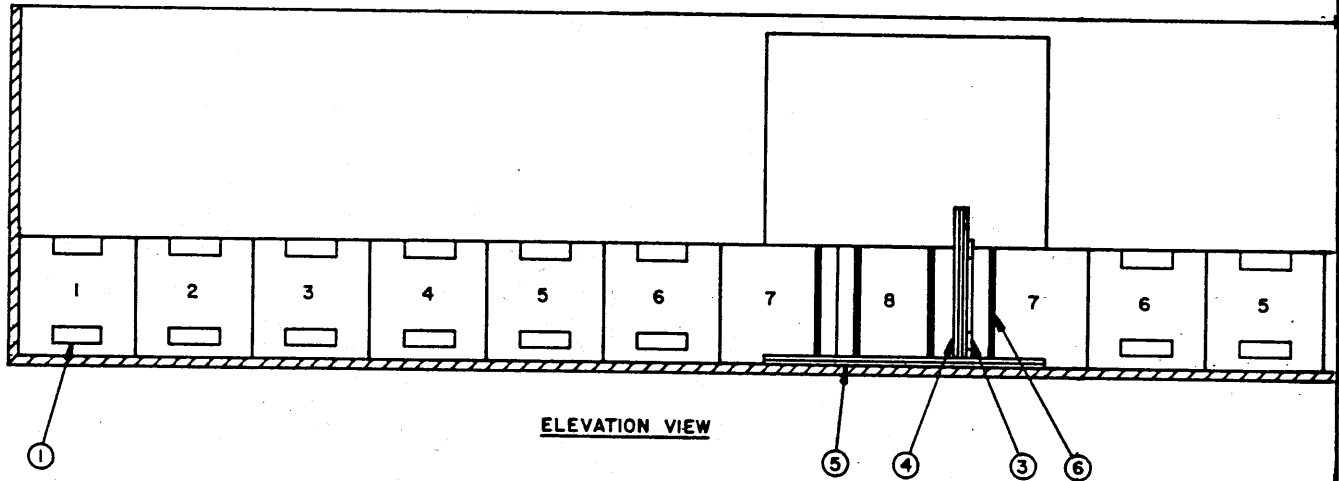
\*THE 9-1/2" AND 43" HEIGHT DIMENSIONS ARE APPLICABLE WHEN THE SKIDS OF THE 5-PROJECTILE PALLET HAVE BEEN REMOVED. THESE DIMENSIONS WILL BE 12-1/2" AND 46-1/2" WHEN THE SKIDS ARE INTACT.



SECTION M-M

175 MM PROJECTILES (20/PALLET)

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



ELEVATION VIEW

(SPECIAL NOTES CONTINUED)

- SIMILAR PROCEDURES TO THOSE JUST LISTED CAN BE APPLIED FOR THE OMISSION OF THREE PALLET UNITS. NOTE THAT STRUT BRACING MUST BE APPLIED TO STRUTS WHICH ARE 48" OR LONGER. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53, PROVIDED THE CAR HAS NAILABLE SIDEWALLS, OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55.
- THE DEPICTED PROCEDURES MAY BE USED TO SHIP TWENTY (20) OR TWENTY-TWO (22) PALLET UNITS IN A 40'-6" LONG CAR, OR THIRTY-FOUR (34) OR THIRTY-SIX (36) PALLET UNITS IN A 60'-8" LONG CAR. NOTE THAT TWO (2) CENTER GATES AND STRUTS MAY BE REQUIRED IN LIEU OF THE DEPICTED CENTER BLOCKING.
  - FROM TWELVE TO FIFTEEN PALLET UNITS CAN BE LOADED ONE WIDE DOWN THE CENTER OF THE CAR, POSITIONED WITH THE 40" DIMENSION ALONG THE LENGTH OF THE CAR AS SHOWN. SIDE BLOCKING WILL BE PROVIDED BY NAILING DOUBLED 2" X 6" BY LOAD LENGTH MATERIAL TO THE CAR FLOOR ALONG EACH SIDE OF THE ROW. MODIFY THE CENTER GATE G FOR THE 1-WIDE LOAD. ONE (1) GATE AND SOLID FILL WILL BE USED FOR A 15-UNIT LOAD; TWO (2) GATES AND STRUTS WILL BE USED FOR THE LESSER LOADS. ELEVEN OR POSSIBLY TWELVE PALLET UNITS CAN BE LOADED IN A 40'-6" LONG CAR BY EMPLOYING THESE PROCEDURES.
  - FOR CARS EQUIPPED WITH SINGLE "THRU" DOORS, EITHER CONVENTIONAL SLIDING OR PLUG TYPE, THE DEPICTED DOORWAY PROTECTION, PIECES MARKED ②, ③, AND ④ ARE ADEQUATE FOR DOOR OPENINGS FROM 6' TO 12' IN WIDTH. IF THE CAR IS EQUIPPED WITH DOUBLE "THRU" SLIDING OR PLUG DOORS, THE DOORWAY BLOCKING, PIECES MARKED ② AND ③, MUST BE INCREASED TO 15'-0" IN LENGTH AND POSITIONED SO AS TO SPAN BOTH DOOR OPENINGS AND EXTEND PAST THE MID-POINTS OF THE LOAD UNITS MARKED ⑥. INSTALL TWO (2) DOORWAY PROTECTION STRAPS, PIECES MARKED ④, AROUND EACH LOAD UNIT MARKED ⑥, AND AN ADDITIONAL DOORWAY PROTECTION STRAP AROUND THE CENTER-OF-CAR END OF EACH LOAD UNIT MARKED 7. NOTE THAT EIGHT LESS PIECES MARKED ① WILL BE REQUIRED.
  - FOR CARS EQUIPPED WITH STAGGERED DOUBLE SLIDING DOORS, A DOORWAY PROTECTION GATE SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENING ON THE SIDE OPPOSITE THE LOADING SIDE TO PROVIDE A NAILING SURFACE FOR THE APPLICATION OF THE SIDEWALL CLEATS, PIECES MARKED ①. PIECE MARKED ② WILL BE USED, AS SHOWN. ON THE LOADING SIDE, APPLY A 15'-0" LONG DOORWAY BLOCKING PIECE TO BE CENTERED FROM LOAD UNITS NUMBER 5 TO NUMBER 7. (THIS WILL BE WITHIN THE DOOR OPENING) IN LIEU OF THE 8'-0" LONG PIECE MARKED ③ SHOWN. IN ADDITION TO THE DOORWAY PROTECTION STRAPS SHOWN, ENIRCLE LOAD UNITS 5 AND 6 WHICH ARE IN THE DOOR OPENING ON THE LOADING SIDE WITH TWO STRAPS AND APPLY AN ADDITIONAL STRAP AROUND LOAD UNIT 7 IN THE DOOR OPENING. FOR CARS EQUIPPED WITH STAGGERED DOUBLE PLUG TYPE DOORS OR A COMBINATION OF DOOR TYPES, WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, PIECES MARKED ② AND ③ WILL BOTH BE 15'-0" LONG AND ALL LOAD UNITS FROM NUMBER 5 IN ONE END TO NUMBER 5 IN THE OPPOSITE END WILL BE ENCIRCLED WITH TWO DOORWAY PROTECTION STRAPS.

\*BASED ON A 20/PALLET UNIT WHICH HAS THE SKIDS OF THE 6-PROJECTILE PALLETS INTACT.

BILL OF MATERIAL *		
LUMBER	LINEAR FEET	BOARD FEET
2" X 3"	4	2
2" X 4"	25	9
2" X 6"	268	268
NAILS	NO. REQD	POUNDS
10d (3")	510	8
16d (3-1/2")	48	1-1/4
STEEL STRAPPING, 1-1/4" X .035" (OR .031") --- 108' REQD - 16 LBS		
SEAL FOR 1-1/4" STRAPPING --- 8 REQD - NIL		

175 MM PROJECTILES (20/PALLET)

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

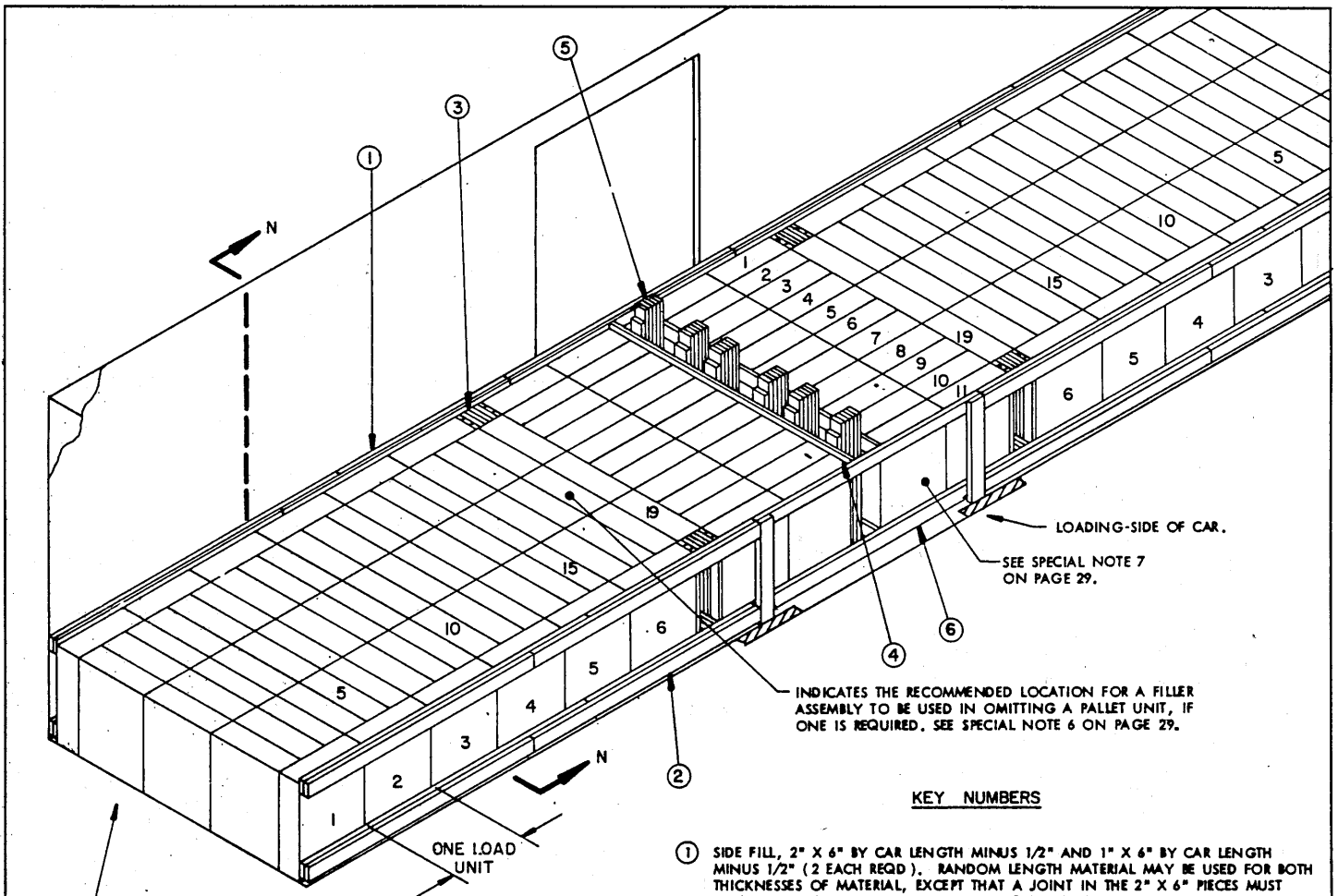
SPECIAL NOTES:

- A 30-UNIT LOAD OF 175MM PROJECTILES PALLETIZED 20 PER PALLET IS SHOWN IN A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 8'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER OR NARROWER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTES 8 AND 9.
- THE LOADING PROCEDURE ON PAGE 26 IS APPLICABLE FOR 9'-2" WIDE CARS WHICH HAVE NAILABLE SIDEWALLS. IN LIEU OF USING 18" LONG PIECES FOR SIDEWALL CLEATS, RANDOM LENGTH MATERIAL MAY BE USED TO FORM A CONTINUOUS LENGTH FROM THE CAR END WALL TO THE END OF LOAD UNIT NUMBER 6. NAIL THE FIRST PIECE TO THE CAR SIDEWALL W/1-10d NAIL EVERY 12". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. IF A CAR WHICH IS WIDER THAN 9'-2" IS FURNISHED FOR LOADING, ADDITIONAL MATERIAL MUST BE LAMINATED TO PIECE MARKED ① TO ENSURE THAT THE TOTAL ACCUMULATED SPACE ACROSS THE CAR WILL NOT EXCEED TWO INCHES (2").
- IF THE CAR FURNISHED FOR LOADING HAS METAL SIDEWALLS, CRIB FILL ASSEMBLIES MUST BE USED IN LIEU OF THE NAILED SIDEWALL CLEATS, PIECES MARKED ①, TO PROVIDE LATERAL BRACING. SEE THE "CRIB FILL D" DETAIL ON PAGE 58 FOR CONSTRUCTION GUIDANCE. ALSO, IT MAY BE DESIRABLE TO USE CRIB FILL ASSEMBLIES IF NAILABLE-WALL CARS 9'-2" OR WIDER ARE FURNISHED FOR LOADING. POSITION THE CRIB FILL BETWEEN A CAR SIDEWALL AND A PALLET ROW. TO PREVENT LONGITUDINAL DISPLACEMENT TOWARD THE CENTER OF THE CAR, A DOUBLED 2" X 4" (12" MIN LENGTH) MUST BE NAILED TO THE CAR FLOOR ADJACENT TO THE LAST CRIB FILL POSITIONED. NOTE THAT THE WIDTH OF THE CRIB FILL ASSEMBLIES MUST BE ADJUSTED AS NECESSARY TO ENSURE THAT THE TOTAL ACCUMULATED SPACE ACROSS THE CAR WILL NOT BE MORE THAN TWO INCHES (2").
- THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED BY ADDING A PARTIAL SECOND LAYER IN ONE OR BOTH ENDS OF THE CAR, PROVIDED THE CAR HAS NAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR IS NOT EXCEEDED. NOTE THAT THE LOAD LIMIT OF THE CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LADING PLUS DUNNAGE IN THE HEAVY END OF THE CAR. INSTALL ADDITIONAL SIDEWALL CLEATS TO BEAR AT THE SAME LOCATIONS ON THE UNITS IN THE PARTIAL LAYER AND INSTALL THE PROPER SIZE K-BRACE TO RETAIN THE PARTIAL LAYER. SEE THE TYPICAL INSTALLATION ON PAGE 50 AND/OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE.
- THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. A LOAD CAN BE REDUCED BY A MULTIPLE OF 2 PALLET UNITS BY OMITTING ONE OR MORE LOAD UNITS. NOTE THAT TWO (2) CENTER GATES AND TWELVE (12) DOUBLED 2" X 6" STRUTS MUST THEN BE USED IN LIEU OF THE DEPICTED SINGLE GATE AND SOLID FILL. IF MORE THAN ONE LOAD UNIT IS OMITTED, THE STRUTS MUST BE STIFFENED EVERY 48" BY THE APPLICATION OF STRUT BRACING. SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 69. IF TWENTY-NINE (29) PALLET UNITS ARE TO BE SHIPPED, IT WILL BE NECESSARY TO DO SEVERAL THINGS TO PROVIDE FOR PROPER BLOCKING AND BRACING.
  - OMIT THE SOLID FILL FROM THREE LOCATIONS AND APPLY 42" LONG STRUT LEDGERS TO THAT PORTION OF THE CENTER GATE.
  - APPLY 40" LONG DOORWAY BLOCKING, SIMILAR TO PIECE MARKED ⑤ AGAINST THE CENTER-OF-CAR SIDE OF THE PALLET UNIT IN THE 1-WIDE PORTION.
  - POSITION A HALF-WIDE "CENTER GATE G", HAVING STRUT LEDGERS AND ALSO HAVING TWO (2) HOLDDOWN PIECES, AGAINST THE END OF THE SHORT ROW. INSTALL SIX (6) DOUBLED 2" X 6" STRUTS.
  - IN LIEU OF THE TWO LATERALLY APPLIED DOORWAY PROTECTION STRAPS, PIECES MARKED ④, WHICH ENIRCLE THE LOAD UNIT IN THE DOORWAY AREA, INSTALL TWO (2) STRAPS SO AS TO ENIRCLE THE PALLET UNIT IN THE 1-WIDE PORTION AND THE LONGITUDINALLY ADJACENT PALLET UNIT.
 

(CONTINUED AT LEFT)

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
175MM (20/PALLET)	30	100,980 LBS
DUNNAGE		584 LBS
TOTAL WEIGHT		101,564 LBS

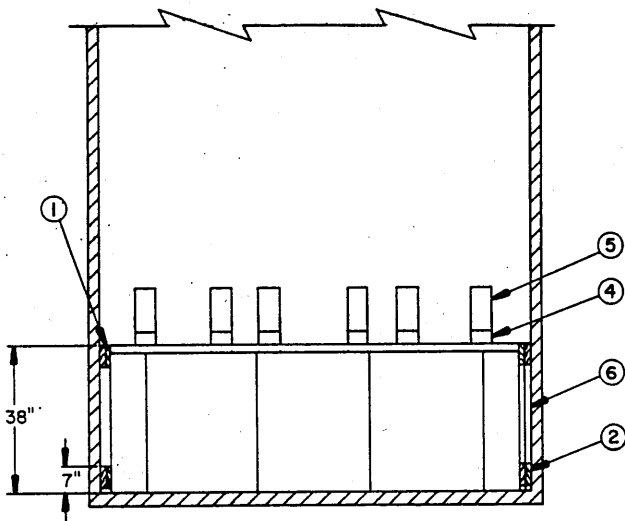


**ISOMETRIC VIEW**

IF THE CAR END WALL IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" DETAIL ON PAGE 38.

**KEY NUMBERS**

- ① SIDE FILL, 2" X 6" BY CAR LENGTH MINUS 1/2" AND 1" X 6" BY CAR LENGTH MINUS 1/2" (2 EACH REQD). RANDOM LENGTH MATERIAL MAY BE USED FOR BOTH THICKNESSES OF MATERIAL, EXCEPT THAT A JOINT IN THE 2" X 6" PIECES MUST NOT FALL IN THE DOOR OPENING OR WITHIN 12" THEREOF. NAIL THE 2" X 6" TO THE CAR SIDEWALL W/1-10d NAIL EVERY 12". NAIL THE 1" X 6" TO THE 2" X 6" W/1-6d NAIL EVERY 12". SEE GENERAL NOTE "H" ON PAGE 2 AND SPECIAL NOTES 2 AND 3 ON PAGE 29. SEE "SECTION N-N" FOR HEIGHT LOCATIONS.
- ② SIDE FILL, 2" X 6" BY A LENGTH TO EXTEND TO THE DOOR OPENING MINUS 12" (REF: 16'-3") DOUBLED (4 REQD). NAIL THE FIRST PIECE TO THE CAR SIDEWALL W/1-10d NAIL EVERY 12". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE "SECTION N-N" FOR HEIGHT LOCATIONS.
- ③ FILLER ASSEMBLY (4 REQD). SEE THE "FILLER ASSEMBLY-C" DETAIL ON PAGE 67. SEE SPECIAL NOTE 8 ON PAGE 29.
- ④ CENTER GATE (2 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 68.
- ⑤ SOLID FILL, 6" WIDE BY 54" LONG BY THE THICKNESS REQUIRED TO PROVIDE A WEDGE FIT BETWEEN THE VERTICAL PIECES OF THE LONGITUDINALLY ADJACENT CENTER GATES (REQD AT 6 PLACES). NAIL THE FIRST PIECE TO THE EXTENDED VERTICAL PIECE OF ONE CENTER GATE W/3-10d NAILS. NAIL EACH ADDITIONAL PIECE TO A PREVIOUSLY INSTALLED PIECE W/3-10d NAILS. NAIL THRU EACH VERTICAL PIECE OF THE OTHER CENTER GATE INTO THE SOLID FILL PIECES W/3-10d NAILS.
- ⑥ DOORWAY PROTECTION (1 REQD). SEE THE "DOORWAY PROTECTION C" DETAIL ON PAGE 70.

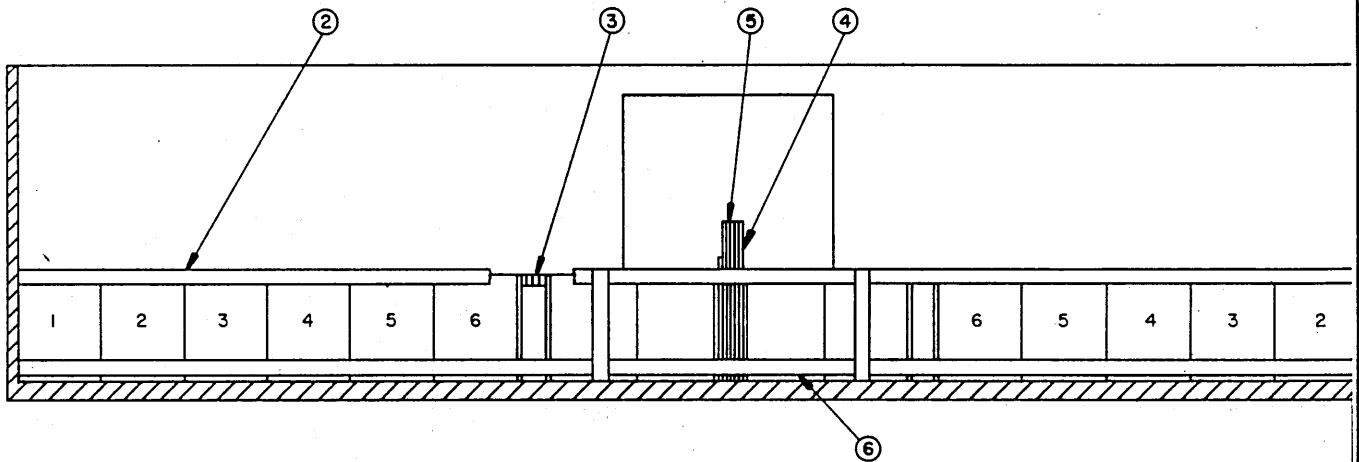


**SECTION N-N**

8" PROJECTILES (3/PALLET)

182-UNIT LOAD IN A 40'-6" LONG BY 9'-2" WIDE BOX CAR (CONVENTIONAL)





ELEVATION VIEW

(SPECIAL NOTES CONTINUED)

SPECIAL NOTES:

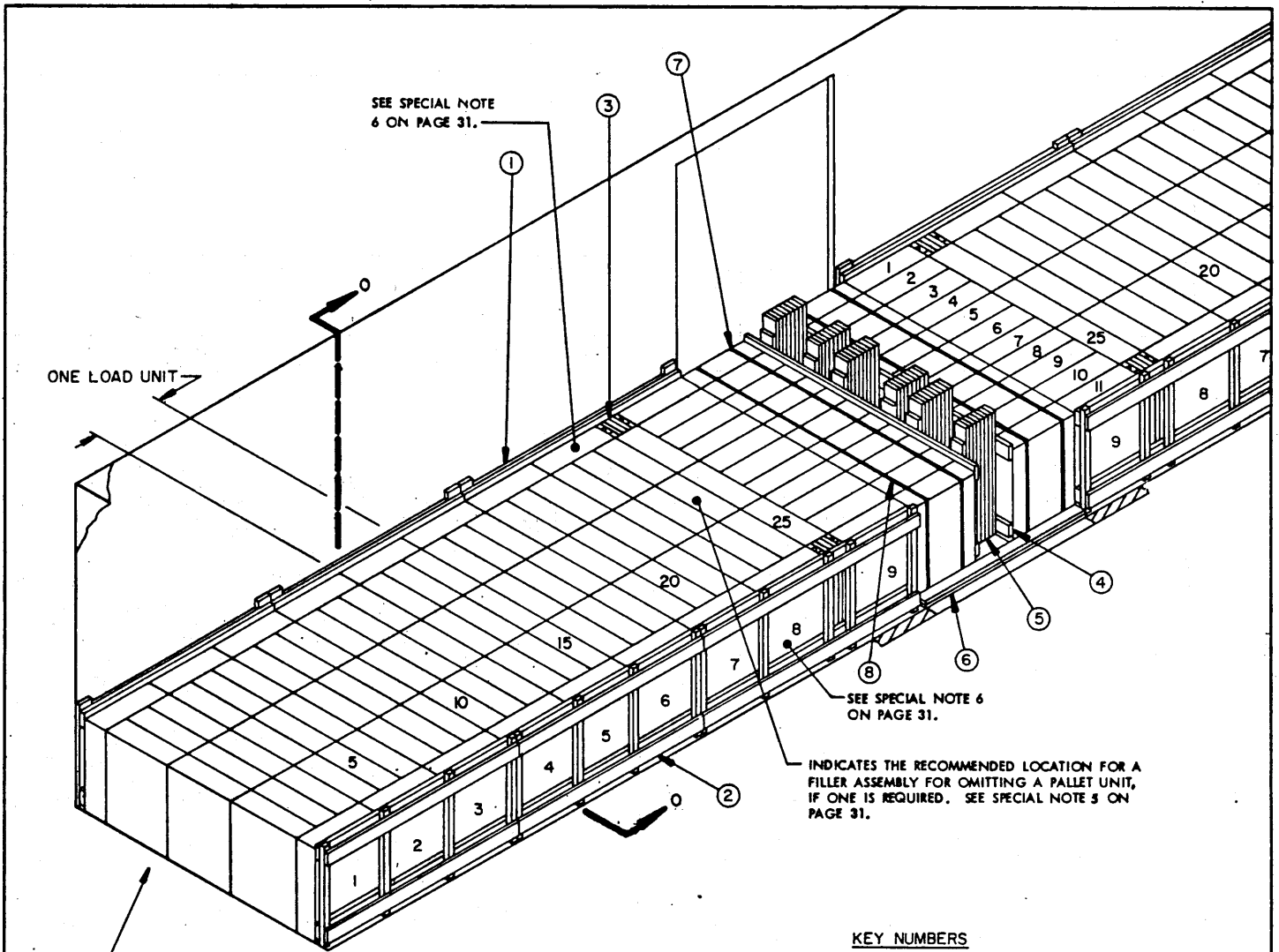
- THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. THE LOAD CAN BE REDUCED BY THREE OR SIX PALLET UNITS BY OMITTING THE UNITS IMMEDIATELY ADJACENT TO THE 9'-WIDE CROSSWISE ROW IN ONE OR BOTH ENDS OF THE CAR. EITHER TWO (2) OR FOUR (4) FILLER ASSEMBLIES, PIECES MARKED ③, WILL THEN NOT BE REQUIRED. A LOAD CAN BE REDUCED BY A MULTIPLE OF ELEVEN PALLETS BY OMITTING ONE OR MORE LOAD UNITS FROM EITHER END OF THE CAR AND/OR BY OMITTING ONE OR MORE 11-UNIT CROSSWISE ROWS FROM THE CENTER OF THE CAR. FOR THOSE QUANTITIES WHICH CANNOT BE ATTAINED BY ANY OF THE PREVIOUS METHODS, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS TO REACH THE DESIRED QUANTITY. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66. NOTE THAT CENTER GATES AND STRUTS, SIMILAR TO THE LOAD SHOWN ON PAGE 4, WILL BE USED IN LIEU OF THE DEPICTED CENTER GATES AND SOLID FILL WHEN THE EXCESS SPACE IN THE CENTER OF THE CAR IS APPROXIMATELY 18" OR MORE. FURTHER REDUCTION OF A LOAD CAN BE ACCOMPLISHED BY EMPLOYING THE PROCEDURES SHOWN ON PAGES 48 AND 49 AS GUIDANCE. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53 OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55.
- THE DEPICTED PROCEDURES ARE APPLICABLE FOR CARS EQUIPPED WITH SINGLE "THRU" DOOR OPENINGS FROM 6' THRU 12' IN WIDTH, FOR EITHER CONVENTIONAL SLIDING OR PLUG TYPE DOORS. FOR CARS EQUIPPED WITH STAGGERED DOUBLE SLIDING DOORS, PIECE MARKED ① SHOULD BE INSTALLED TO SPAN BOTH THE MAIN AND AUXILIARY DOOR OPENINGS ON THE SIDE OPPOSITE THE LOADING SIDE. A DOORWAY PROTECTION GATE SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENING ON THE LOADING SIDE OF THE CAR. SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69 OR THE "DOORWAY PROTECTION B" DETAIL ON PAGE 70. NOTE THAT THE SIDE FILL, PIECE MARKED ②, WILL EXTEND TO 12" FROM THE MAIN DOOR OPENING AND WILL BE NAILED TO THE DOORWAY PROTECTION GATE WHICH IS INSTALLED IN THE AUXILIARY DOOR OPENING. ONE END OF THE DOORWAY PROTECTION, PIECE MARKED ④, WILL THEN BEAR AGAINST THE GATE IN THE AUXILIARY DOOR OPENING. FOR CARS EQUIPPED WITH "THRU" OR STAGGERED DOUBLE PLUG TYPE DOORS, OR A COMBINATION OF DOOR TYPES WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE ENTIRE DOORWAY AREA (APPROX 22 OR 24 FEET) MUST BE LOADED WITH CROSSWISE ROWS. ENCIRCLE EACH CROSSWISE ROW WITH TWO DOORWAY PROTECTION STRAPS. THE SIDE FILL, PIECE MARKED ②, WILL EXTEND TO 12" FROM THE AUXILIARY AND/OR THE MAIN DOOR OPENING, AND THE DOORWAY PROTECTION, PIECE MARKED ④, WILL BE OF SUCH A LENGTH TO EXTEND 12" EACH END BEYOND THE TOTAL DOOR OPENING.
- THE LENGTH OF FILLER ASSEMBLY C WILL BE ADJUSTED AS REQUIRED TO PROVIDE AN EVEN LOAD SURFACE WITH THE PALLETS IN THE STACK NUMBERED 19.
- A 182-UNIT LOAD OF 8" PROJECTILES PALLETIZED 3 PER PALLET IS SHOWN IN A 40'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTE 7.
- THE LOADING PROCEDURE ON PAGE 28 IS APPLICABLE FOR 9'-2" WIDE CARS WHICH HAVE NAILABLE SIDEWALLS. IF WHEN USING THE DEPICTED SIDE FILL, PIECES MARKED ① AND ②, VARIATIONS IN PALLET DIMENSIONS OR IN THE CAR WIDTH WILL NOT PERMIT LOADING AS SHOWN, THE 1" X 6" LAMINATION MAY BE OMITTED FROM PIECE MARKED ①. IF A CAR WHICH IS WIDER THAN 9'-2" IS FURNISHED FOR LOADING, ADDITIONAL MATERIAL MUST BE LAMINATED TO PIECES MARKED ① AND/OR ②, OR ELSE CRIB FILL ASSEMBLIES MAY BE USED. SEE SPECIAL NOTE 3. NOTE THAT THE TOTAL ACCUMULATED SPACE ACROSS THE CAR MUST NOT EXCEED TWO INCHES (2").
- IF THE CAR FURNISHED FOR LOADING HAS METAL SIDEWALLS, CRIB FILL ASSEMBLIES MUST BE USED IN LIEU OF THE NAILED SIDE FILL, PIECES MARKED ① AND ②, TO PROVIDE LATERAL BRACING. CRIB FILL MAY ALSO BE USED IN NAILABLE-WALL CARS IF DESIRED. CRIB FILL E WILL BE USED ON ONE SIDE OF THE CAR, AND CRIB FILL F WILL BE USED ON THE OPPOSITE SIDE IF LOADING 9'-2" WIDE CARS AND IF SPACE PERMITS. IF SPACE DOES NOT PERMIT, CRIB FILL E CAN BE USED ON BOTH SIDES OF THE CAR. SEE THE DETAILS ON PAGE 59 FOR CONSTRUCTION GUIDANCE. IF A 9'-4" WIDE CAR IS FURNISHED FOR LOADING, REFER TO PIECES MARKED ① AND ② OF THE PROCEDURES SHOWN ON PAGES 30 AND 31 WHICH PERTAIN TO CARS HAVING METAL SIDEWALLS. IF A 9'-6" WIDE CAR IS TO BE LOADED, REFER TO SPECIAL NOTE 2 ON PAGE 31 FOR GUIDANCE. POSITION THE CRIB FILL ASSEMBLIES ADJACENT TO THE CAR SIDEWALLS. NOTE THAT THE WIDTH OF THE CRIB FILL ASSEMBLIES MUST BE SUCH THAT THE TOTAL ACCUMULATED SPACE ACROSS THE CAR WILL NOT BE MORE THAN TWO INCHES (2"). SEE SPECIAL NOTE 4 FOR DOORWAY PROTECTION GUIDANCE.
- IF THE 9'-2" WIDE CAR BEING LOADED HAS METAL SIDEWALLS, DOOR PROTECTION LIKE OR SIMILAR TO THE PIECE MARKED ⑥ USED ON THE LOADING SIDE OF THE DEPICTED LOAD MUST ALSO BE USED ON THE OPPOSITE SIDE. IF DESIRED, LATERAL BRACING IN THE DOORWAY AREA OF CARS 9'-4" AND WIDER CAN BE PROVIDED BY USING PROCEDURES SIMILAR TO THOSE SHOWN ON PAGE 30 BY PIECES MARKED ④ THRU ⑥. THIS WOULD BE IN LIEU OF USING DOORWAY PROTECTION, PIECE MARKED ④, AND PIECE MARKED ① SPANNING THE DOOR IN THE LOAD SHOWN ON PAGE 28. SEE SPECIAL NOTE 7.
- THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED BY ADDING A PARTIAL SECOND LAYER IN ONE OR BOTH ENDS OF THE CAR, PROVIDED THE CAR HAS NAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR WILL NOT BE EXCEEDED. NOTE THAT THE LOAD LIMIT OF THE CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LADING PLUS DUNNAGE IN THE HEAVY END OF THE CAR. INSTALL ADDITIONAL SIDE FILL PIECES AT 43-1/2" AND 6'-2" ABOVE THE CAR FLOOR (OR INCREASE HEIGHT OF CRIB FILL IF USED) FOR THE PARTIAL LAYER AND INSTALL THE PROPER SIZE K-BRACE TO RETAIN THE PARTIAL LAYER. SEE THE TYPICAL INSTALLATION ON PAGE 50 AND/OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE.

(CONTINUED AT LEFT)

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	4	2
1" X 6"	44	22
2" X 2"	8	3
2" X 3"	14	7
2" X 4"	61	41
2" X 6"	399	399
NAILS	NO. REQD	POUNDS
6d (2")	40	1/4
10d (3")	656	10-1/4

LOAD AS SHOWN		
ITEM	QUANTITY	WEIGHT (APPROX)
8" (3/PALLET)	182	115,206 LBS
DUNNAGE		959 LBS
TOTAL WEIGHT		116,165 LBS

8" PROJECTILES (3/PALLET)  
182-UNIT LOAD IN A 40'-6" LONG BY 9'-2" WIDE BOX CAR (CONVENTIONAL)

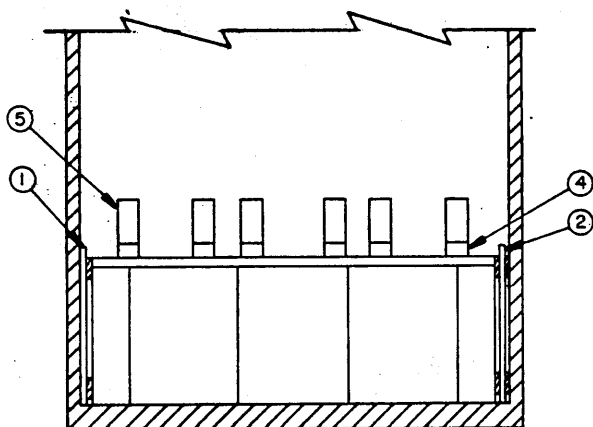


ISOMETRIC VIEW

IF THE CAR END WALL IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" DETAIL ON PAGE 86.

KEY NUMBERS

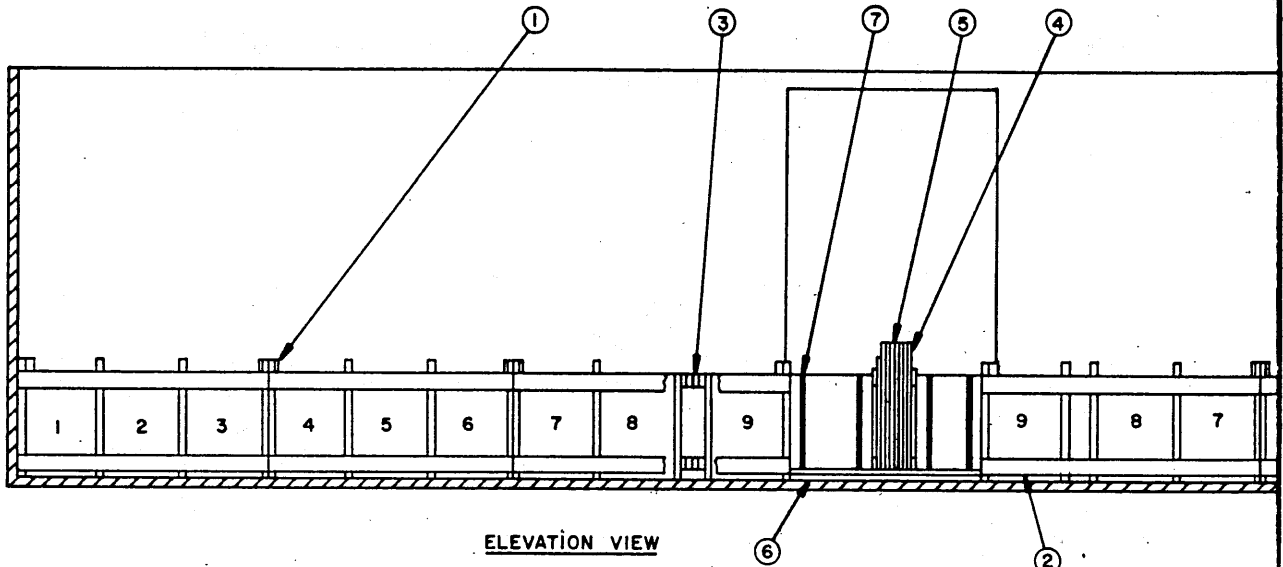
- ① CRIB FILL (6 REQD, 4 EACH 7'-1-1/2" LONG AND 2 EACH 7'-11" LONG). SEE THE "CRIB FILL E" DETAIL ON PAGE 59. SEE GENERAL NOTE "H" ON PAGE 2 AND SPECIAL NOTE 2 ON PAGE 31.
- ② CRIB FILL (6 REQD, 4 EACH 7'-1-1/2" LONG AND 2 EACH 7'-11" LONG). SEE THE "CRIB FILL C" DETAIL AND THE "CRIB FILL C DIMENSIONAL CHART" ON PAGE 58. NOTE THE ADDITIONAL VERTICAL PIECE REQUIRED FOR THE CRIB FILL WHICH IS ADJACENT TO THE FILLER ASSEMBLY, PIECE MARKED ③.
- ③ FILLER ASSEMBLY (4 REQD). SEE THE "FILLER ASSEMBLY C" DETAIL ON PAGE 47. SEE SPECIAL NOTE 7 ON PAGE 31.
- ④ CENTER GATE (2 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 60.
- ⑤ SOLID FILL, 6" WIDE BY 54" LONG BY THE THICKNESS REQUIRED TO PROVIDE A WEDGE FIT BETWEEN THE VERTICAL PIECES OF THE LONGITUDINALLY ADJACENT CENTER GATES (REQD AT 6 PLACES). NAIL THE FIRST PIECE TO THE EXTENDED VERTICAL PIECE OF ONE CENTER GATE W/5-10d NAILS. NAIL EACH ADDITIONAL PIECE TO A PREVIOUSLY INSTALLED PIECE W/5-10d NAILS. NAIL THRU EACH VERTICAL PIECE OF THE OTHER CENTER GATE INTO THE SOLID FILL PIECES W/3-10d NAILS.
- ⑥ DOORWAY BLOCKING, 2" X 4" X 7'-8" (REF) DOUBLED (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE SPECIAL NOTE 3 ON PAGE 31. SEE GENERAL NOTE "G" ON PAGE 3.
- ⑦ DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 26'-0" LONG STEEL STRAPPING (4 REQD).
- ⑧ SEAL FOR 1-1/4" STRAPPING (8 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "K" ON PAGE 2.



SECTION Q-Q

8" PROJECTILES (3/PALLET)

226-UNIT LOAD IN A 50'-6" LONG BY 9'-4" WIDE BOX CAR (CONVENTIONAL)



ELEVATION VIEW

(SPECIAL NOTES CONTINUED)

SPECIAL NOTES:

- LOAD SHOWN ON PAGE 4, WILL BE USED IN LIEU OF THE DEPICTED CENTER GATES AND SOLID FILL WHEN THE EXCESS SPACE IN THE CENTER OF THE CAR IS APPROXIMATELY 18" OR MORE. FURTHER REDUCTION OF A LOAD CAN BE ACCOMPLISHED BY EMPLOYING THE PROCEDURES SHOWN ON PAGES 48 AND 49 AS GUIDANCE. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53 OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55.
- LOAD UNITS OF 11 PALLET UNITS POSITIONED IN TWO DIFFERENT DIRECTIONS, AS IN EACH END OF THE DEPICTED LOAD, MUST NOT EXTEND INTO THE DOOR OPENING MORE THAN A FEW INCHES. ALSO, THE CRIB FILL, PIECES MARKED ① AND ②, MUST BE CUT OFF AT THE DOOR EDGE SO AS NOT TO EXTEND INTO THE MAIN DOOR OPENING. THE DOORWAY BLOCKING, PIECES MARKED ④, MUST BE CUT TO FIT BETWEEN THESE CRIB FILL ASSEMBLIES. THE DEPICTED LOAD PATTERN AND BLOCKING ARE APPROPRIATE FOR CARS HAVING "THRU" DOORS, EITHER CONVENTIONAL SLIDING OR PLUG TYPE, WHICH ARE 6' OR 7' WIDE. IF THE "THRU" DOORS ARE 8' OR 9' WIDE, ONE ADDITIONAL DOORWAY PROTECTION STRAP, PIECE MARKED ⑦, MUST BE INSTALLED TO ENCIRCLE EACH CROSSWISE ROW OF 11 UNITS THAT EXTENDS INTO THE DOORWAY. THOSE CROSSWISE ROWS MUST BE ENCIRCLED WITH TWO STRAPS IF THE CAR IS EQUIPPED WITH 10' WIDE "THRU" DOORS. IF THE CAR HAS 12' WIDE "THRU" DOORS, OMIT THE FILLER ASSEMBLIES, PIECES MARKED ③, AND THE THREE LATERALLY ADJACENT PALLET UNITS (GROUP MARKED 25) IN EACH END OF THE CAR. ENCIRCLE EACH OF THE FOUR CROSSWISE ROWS WITH TWO STRAPS. FOR CARS EQUIPPED WITH DOUBLE "THRU" SLIDING OR PLUG TYPE DOORS APPROXIMATELY 16' WIDE, POSITION SEVEN (7) LOAD UNITS IN EACH END AND SIX CROSSWISE ROWS OF 11 PALLETS IN THE DOORWAY AREA. CENTER GATES WITH STRUTS WILL BE REQUIRED. FOR CARS EQUIPPED WITH STAGGERED DOUBLE SLIDING DOORS DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE SUPPORT FOR THE CRIB FILL ASSEMBLIES. LOAD AND BRACE THE DOORWAY AREA AS SHOWN OR AS PREVIOUSLY SPECIFIED. FOR CARS EQUIPPED WITH STAGGERED DOUBLE PLUG TYPE DOORS, OR WITH A COMBINATION OF DOOR TYPES, WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE ENTIRE DOORWAY AREA (APPROXIMATELY 22 OR 24 FEET) MUST BE LOADED WITH CROSSWISE ROWS, WITH EACH ROW ENCIRCLED WITH TWO DOORWAY PROTECTION STRAPS, AND WITH THE DOORWAY BLOCKING, PIECE MARKED ④, EXTENDING THE ENTIRE LENGTH OF THE CROSSWISE ROWS.
  - THE LENGTH OF FILLER ASSEMBLY C WILL BE ADJUSTED AS REQUIRED TO PROVIDE AN EVEN LOAD SURFACE WITH THE PALLETS IN THE STACK NUMBERED 25.

- A 226-UNIT LOAD OF 8" PROJECTILES PALLETIZED 3 PER PALLET IS SHOWN IN A 50'-6" LONG BY 9'-4" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER WIDTHS, CARS OF OTHER LENGTHS, UP TO AND INCLUDING SIXTY-FOOT CARS, AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTE 6.
- THE LOADING PROCEDURE ON PAGE 30 IS APPLICABLE FOR 9'-4" WIDE CARS HAVING EITHER NAILABLE OR NON-NAILABLE SIDEWALLS. IF A 9'-2" WIDE CAR IS FURNISHED FOR LOADING, REFER TO SPECIAL NOTE 3 ON PAGE 29 FOR GUIDANCE. IF A 9'-6" WIDE CAR IS TO BE LOADED, USE CRIB FILL B AND/OR CRIB FILL C, CONSTRUCTED USING 2" X 3" VERTICAL PIECES, WITH 1" X 6" HORIZONTALS FOR THE ASSEMBLIES ON ONE SIDE OF THE CAR AND WITH 1" X 6" AND 2" X 6" HORIZONTALS FOR THE ASSEMBLIES ON THE OPPOSITE SIDE, IF SPACE PERMITS. IF SPACE DOES NOT PERMIT, THE CRIB FILL-HAVING 1" X 6" HORIZONTALS ON BOTH SIDES OF THE ASSEMBLIES CAN BE USED ON BOTH SIDES OF THE LOAD. SEE THE "CRIB FILL B" DETAIL AND THE "CRIB FILL B DIMENSIONAL CHART" ON PAGE 57 AND/OR THE "CRIB FILL C" DETAIL AND THE "CRIB FILL C DIMENSIONAL CHART" ON PAGE 58 FOR GUIDANCE. IF A 9'-0" WIDE CAR IS FURNISHED FOR LOADING, USE CRIB FILL A, AS DETAILED ON PAGE 57, ON ONE SIDE OF THE CAR. NOTE THAT IN A 9'-0" WIDE CAR THE DOORWAY BLOCKING (IF DOORWAY PROTECTION GATES ARE NOT USED) MUST BE 2" X 2" MATERIAL IN LIEU OF 2" X 4". NOTE THAT THE WIDTH OF THE CRIB FILL ASSEMBLIES IN ANY WIDTH CAR MUST BE SUCH THAT THE TOTAL ACCUMULATED SPACE ACROSS THE CAR WILL NOT BE MORE THAN TWO INCHES (2") IF THE CAR TO BE LOADED HAS NAILABLE SIDEWALLS, PIECES MARKED ① AND/OR ② ON PAGE 28 MAY BE USED IN LIEU OF THE SPECIFIED CRIB FILL ASSEMBLIES. ADJUST THE THICKNESSES SO AS TO COMPLY WITH THE MAXIMUM OF 2" SPACE CRITERIA.
- DOORWAY PROTECTION FOR THOSE PALLET UNITS IN THE DOORWAY AREA OF A CAR EQUIPPED WITH SLIDING DOORS CAN BE PROVIDED BY INSTALLING "DOORWAY PROTECTION A" AS DETAILED ON PAGE 69, OR "DOORWAY PROTECTION B" AS DETAILED ON PAGE 70 IN LIEU OF USING PIECES MARKED ④, ⑦, AND ⑧. INCREASE THE WIDTH OF THE VERTICAL PIECES OF THE ASSEMBLIES AS NECESSARY TO PERMIT THE HORIZONTAL PIECES TO CONTACT THE LADING. SEE SPECIAL NOTE 6.
- THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED BY ADDING A PARTIAL SECOND LAYER IN ONE OR BOTH ENDS OF THE CAR, PROVIDED THE CAR HAS NAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR WILL NOT BE EXCEEDED. NOTE THAT THE LOAD LIMIT OF THE CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LADING PLUS DUNNAGE IN THE HEAVY END OF THE CAR. INCREASE THE HEIGHT AND ADJUST THE LENGTH OF THE CRIB FILL ASSEMBLIES TO PROVIDE LATERAL BRACING FOR THE PARTIAL LAYER. IF SIDE FILL PIECES, PIECES MARKED ① AND ② ON PAGE 28, ARE USED, INSTALL ADDITIONAL PIECES AT 43-1/2" AND 6'-2" ABOVE THE CAR FLOOR. INSTALL THE PROPER SIZE K-BRACE TO RETAIN THE PARTIAL LAYER. SEE THE TYPICAL INSTALLATION ON PAGE 30 AND/OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE.
- THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED; THE LOAD CAN BE REDUCED BY THREE OR SIX PALLET UNITS BY OMITTING THE UNITS IMMEDIATELY ADJACENT TO THE SECOND 11-WIDE CROSSWISE ROW FROM THE CENTER GATE IN ONE OR BOTH ENDS OF THE CAR. EITHER TWO (2) OR FOUR (4) FILLER ASSEMBLIES, PIECES MARKED ③, WILL THEN NOT BE REQUIRED. A LOAD CAN BE REDUCED BY A MULTIPLE OF ELEVEN PALLETS BY OMITTING ONE OR MORE 11-UNIT CROSSWISE ROWS FROM THE CENTER OF THE CAR. FOR THOSE QUANTITIES WHICH CANNOT BE ATTAINED BY ANY OF THE PREVIOUS METHODS, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS TO REACH THE DESIRED QUANTITY. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 86. NOTE THAT CENTER GATES AND STRUTS, SIMILAR TO THE

(CONTINUED AT LEFT)

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	4	2
1" X 6"	191	96
2" X 2"	91	31
2" X 3"	14	7
2" X 4"	92	62
2" X 6"	448	448
NAILS	NO. REQD	POUNDS
6d (2")	304	2
10d (3")	736	11-1/2
16d (3-1/2")	30	3/4
STEEL STRAPPING, 1-1/4" X .035"(OR .031")	104' REQD	15 LBS
SEAL FOR 1-1/4" STRAPPING	8 REQD	NIL

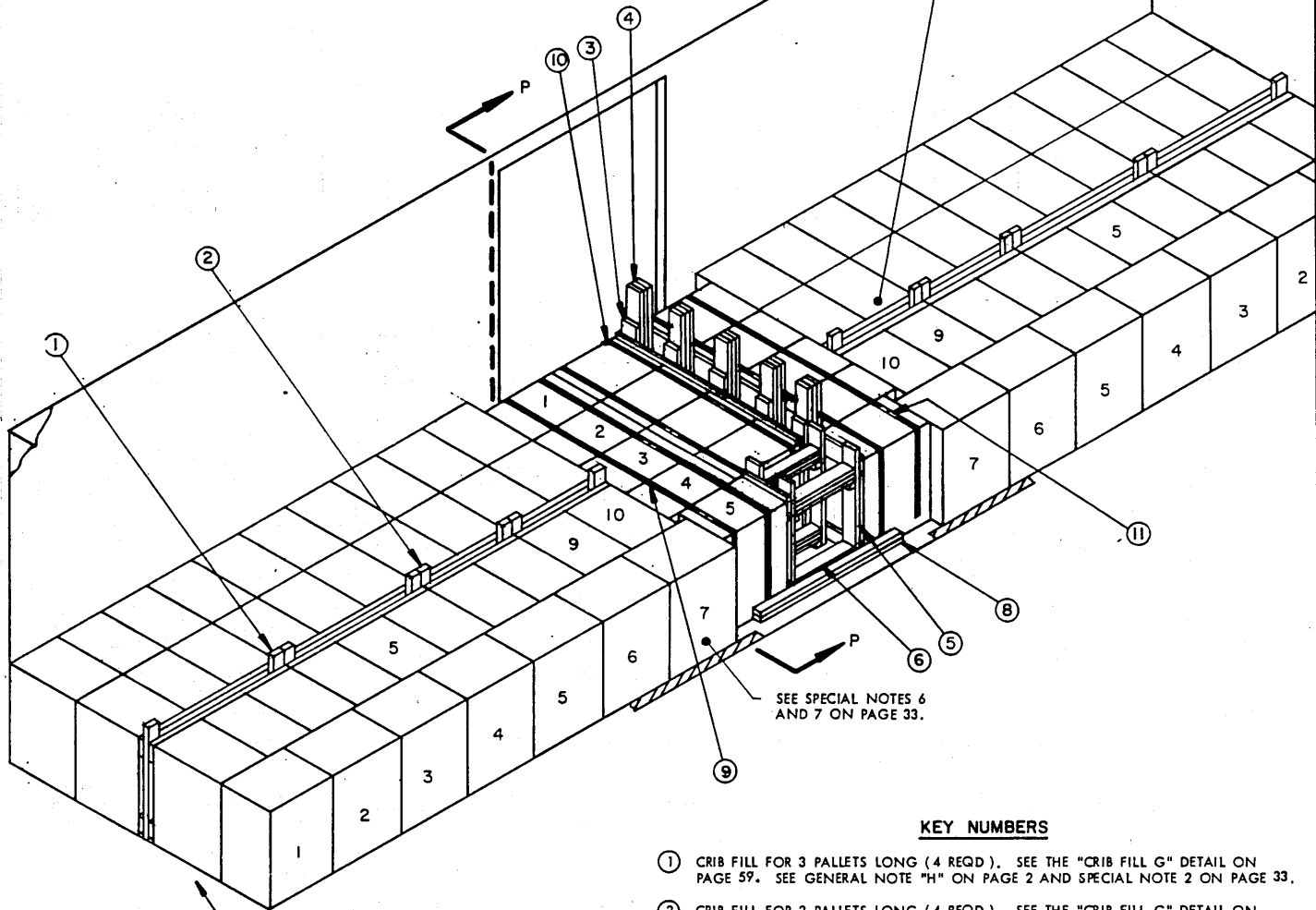
LOAD AS SHOWN		
ITEM	QUANTITY	WEIGHT (APPROX)
8" (3/PALLET) -----	226	143,058 LBS
DUNNAGE -----		1,322 LBS
TOTAL WEIGHT -----		144,380 LBS

8" PROJECTILES (3/PALLET)  
226-UNIT LOAD IN A 50'-6" LONG BY 9'-4" WIDE BOX CAR (CONVENTIONAL)

(KEY NUMBERS CONTINUED FROM RIGHT)

INDICATES THE RECOMMENDED LOCATION FOR A FILLER ASSEMBLY IF ONE IS REQUIRED. SEE SPECIAL NOTE 5 ON PAGE 33.

- ⑩ DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 22'-0" LONG STEEL STRAPPING (2 REQD). INSTALL SO AS TO ENCIRCLE FOUR (4) PALLET UNITS.
- ⑪ SEAL FOR 1-1/4" STRAPPING (12 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "K" ON PAGE 2.



ISOMETRIC VIEW

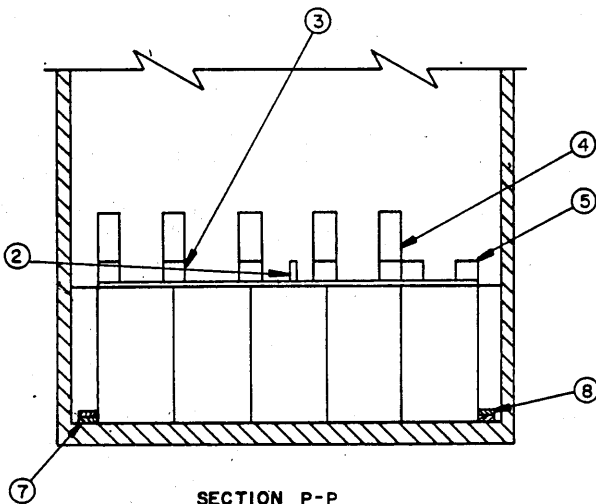
IF THE CAR END WALL IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" DETAIL ON PAGE 56.

SEE SPECIAL NOTES 6 AND 7 ON PAGE 33.

**KEY NUMBERS**

- ① CRIB FILL FOR 3 PALLET LONG (4 REQD). SEE THE "CRIB FILL G" DETAIL ON PAGE 59. SEE GENERAL NOTE "H" ON PAGE 2 AND SPECIAL NOTE 2 ON PAGE 33.
- ② CRIB FILL FOR 2 PALLET LONG (4 REQD). SEE THE "CRIB FILL G" DETAIL ON PAGE 59. SEE SPECIAL NOTES 6 AND 7 ON PAGE 33.
- ③ CENTER GATE (2 REQD). SEE THE "CENTER GATE C" DETAIL AND THE "CENTER GATE C DIMENSIONAL CHART" FOR A 4-LONG GATE ON PAGE 61.
- ④ SOLID FILL, 6" WIDE BY 54" LONG BY THE THICKNESS REQUIRED TO PROVIDE A WEDGE FIT BETWEEN THE VERTICAL PIECES OF THE LONGITUDINALLY ADJACENT CENTER GATES, PIECES MARKED ③ (REQD AT 5 PLACES). NAIL THE FIRST PIECE TO THE EXTENDED VERTICAL PIECE OF ONE CENTER GATE W/5-10d NAILS. NAIL EACH ADDITIONAL PIECE TO A PREVIOUSLY INSTALLED PIECE W/5-10d NAILS. NAIL THRU EACH VERTICAL PIECE OF THE OTHER CENTER GATE INTO THE SOLID FILL PIECES W/3-10d NAILS.
- ⑤ CENTER GATE (2 REQD). SEE THE "CENTER GATE E" DETAIL AND THE "CENTER GATE E DIMENSIONAL CHART" FOR A 1-LONG GATE ON PAGE 62.
- ⑥ STRUT, 2" X 6" BY CUT TO FIT (TRIPLED) (4 REQD). LAMINATE W/1-10d NAIL EVERY 6" AND TOENAIL THE TOP PIECE TO THE GATE VERTICAL PIECES W/2-12d NAILS AT EACH END. SEE SPECIAL NOTE 3 ON PAGE 33.
- ⑦ DOORWAY BLOCKING, 2" X 6" BY CUT TO FIT (REF: 8'-0") DOUBLED (1 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE THE "SECTION P-P" VIEW AT LEFT. SEE GENERAL NOTE "G" ON PAGE 3.
- ⑧ DOORWAY BLOCKING, 2" X 6" X 60" (DOUBLED) (1 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑨ DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 25'-0" LONG STEEL STRAPPING (4 REQD). INSTALL SO AS TO ENCIRCLE FIVE (5) PALLET UNITS.

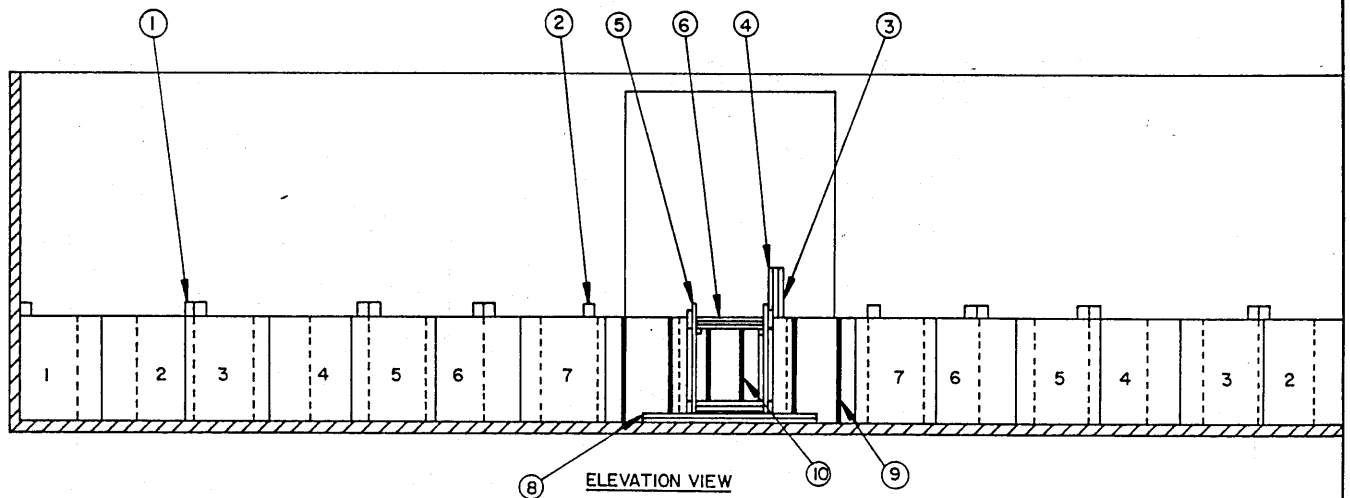
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SECTION P-P

8" PROJECTILES (6/SMALL PALLET)

88-UNIT LOAD IN A 40'-6" LONG BY 9'-2" WIDE BOX CAR (CONVENTIONAL)



(SPECIAL NOTES CONTINUED)

SPECIAL NOTES:

6. THE DEPICTED LOADING PATTERN IS ADEQUATE FOR 40'-6" LONG CARS HAVING SINGLE DOOR OPENINGS WHICH ARE FROM 6' TO 9' WIDE, EITHER CONVENTIONAL SLIDING OR PLUG DOOR TYPE. IF THE CAR IS EQUIPPED WITH DOOR OPENINGS WHICH ARE 10' OR 12' WIDE, THE LOAD WILL BE LIMITED TO 86 PALLET UNITS, OMIT THE THREE PALLET UNITS IN THE GROUP IN WHICH ONE IS MARKED WITH THE FIGURE 10. MODIFY A "FILLER ASSEMBLY A" WHICH IS DETAILED ON PAGE 66, AS NECESSARY TO PROVIDE FOR A SQUARED OFF LOAD AT THE END OF THE SIXTH PALLET ALONG THE NEAR SIDEWALL AND THE NINTH GROUP OF THREE IN THE CENTER ROWS. NOTE THAT SIX (6) PIECES MARKED ① WILL BE REQUIRED IN LIEU OF FOUR AND PIECES MARKED ② WILL NOT BE REQUIRED. FOUR (4) CROSSWISE ROWS OF FIVE PALLETS, CENTERED IN THE WIDTH OF THE CAR, CAN BE LOADED. ENCIRCLE EACH ROW WITH TWO DOORWAY PROTECTION STRAPS, PIECES MARKED ⑨. THE DOORWAY BLOCKING, PIECE MARKED ⑦, WILL BE 11'-3" (REF) IN LENGTH, AND THE DOORWAY BLOCKING, PIECE MARKED ⑧, WILL BE 9'-0" LONG. INSTALL CENTER GATES C FOR 5-LONG, AND STRUTS OR SOLID FILL, AS APPLICABLE.
7. IF THE CAR IS EQUIPPED WITH DOUBLE "THRU" PLUG TYPE DOORS, LOAD EIGHT GROUPS OF 3 WIDE DOWN THE CENTER AND FIVE PALLET UNITS ALONG THE SIDEWALL IN EACH END OF THE CAR AND FIVE CROSSWISE ROWS OF 5 ACROSS IN THE DOORWAY AREA FOR A TOTAL LOAD OF 83 PALLET UNITS. MODIFY A "FILLER ASSEMBLY A" TO BE POSITIONED AT THE END OF THE FIFTH PALLET UNIT ALONG THE CAR SIDEWALL TO PROVIDE A SQUARED OFF LOAD. PIECES MARKED ② WILL NOT BE REQUIRED, PIECE MARKED ⑦ WILL BE 14'-6" LONG (REF), AND PIECE MARKED ⑧ WILL BE 12'-0" LONG. INSTALL CENTER GATE C FOR 5-LONG AND STRUTS. FOR CARS EQUIPPED WITH DOUBLE STAGGERED PLUG TYPE DOORS, OR A COMBINATION OF DOOR TYPES WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE ENTIRE DOORWAY AREA (APPROX 22 OR 24 FEET) MUST BE LOADED WITH CROSSWISE ROWS. ENCIRCLE EACH CROSSWISE ROW WITH TWO DOORWAY PROTECTION STRAPS AND INSTALL DOORWAY BLOCKING, PIECE MARKED ⑧, OF APPROPRIATE LENGTH. NOTE THAT A MODIFIED FILLER ASSEMBLY "A" OR "C" MAY BE INSTALLED IN EACH END OF THE CAR, OR FILL MATERIAL MAY BE ADDED TO EACH GATE, IN ORDER TO PROVIDE EVEN BEARING SURFACES.
8. FOR CARS EQUIPPED WITH DOUBLE STAGGERED SLIDING DOORS, DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE LATERAL BRACING FOR THE ADJACENT UNITS. THE CENTER AREA OF THE CAR ADJACENT TO THE MAIN DOOR OPENINGS WILL BE LOADED AS SHOWN FOR THE DEPICTED LOAD.

1. AN 88-UNIT LOAD OF 8" PROJECTILES, PALLETIZED 6 PER SMALL PALLET, IS SHOWN IN A 40'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTES 6 THRU 8.
2. THE LOADING PROCEDURE ON PAGE 32 IS APPLICABLE FOR 9'-2" WIDE CARS HAVING EITHER NAILABLE OR NON-NAILABLE SIDEWALLS. IF A 9'-4" OR 9'-6" WIDE CAR IS FURNISHED FOR LOADING, USE CRIB FILL B FOR TWO PALLETS LONG IN LIEU OF USING PIECE MARKED ②. SEE THE DETAIL AND THE "CRIB FILL B DIMENSIONAL CHART" ON PAGE 57. USE CRIB FILL C FOR THREE PALLETS LONG IN LIEU OF USING PIECE MARKED ①. SEE THE DETAIL AND THE "CRIB FILL C DIMENSIONAL CHART" ON PAGE 58. IF A 9'-0" WIDE CAR IS FURNISHED FOR LOADING, USE CRIB FILL A IN LIEU OF PIECES MARKED ① AND ②. NOTE THAT IN A 9'-0" WIDE CAR THE DOORWAY BLOCKING MUST BE 2" X 4" IN LIEU OF 2" X 6". IF THE CAR FURNISHED HAS NAILABLE SIDEWALLS, SIDE FILL MATERIAL SIMILAR TO PIECE MARKED ① ON PAGE 28 MAY BE LAMINATED TO THE CAR SIDEWALL. SEE THE "SECTION N-N" VIEW ON PAGE 28 FOR HEIGHT LOCATION GUIDANCE. NOTE THAT WHETHER USING CRIB FILL ASSEMBLIES OR NAILABLE SIDE FILL, THE TOTAL ACCUMULATED SPACE ACROSS THE CAR MUST NOT EXCEED TWO INCHES (2").
3. IF AVAILABLE, 4" X 6" MATERIAL (POSITIONED FLAT) MAY BE USED IN LIEU OF THE DEPICTED TRIPLED 2" X 6" STRUTS, PROVIDED THE ROW BEING RETAINED DOES NOT CONTAIN MORE THAN THIRTEEN (13) PALLET UNITS. SEE THE "LOAD CAPACITY CHART" ON PAGE 72.
4. THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED BY ADDING A PARTIAL SECOND LAYER IN ONE OR BOTH ENDS OF THE CAR, PROVIDED THE CAR HAS NAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR WILL NOT BE EXCEEDED. NOTE THAT THE LOAD LIMIT OF THE CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LADING PLUS DUNNAGE IN THE HEAVY END OF THE CAR. INCREASE THE HEIGHT AND ADJUST THE LENGTH OF THE CRIB FILL ASSEMBLIES TO PROVIDE LATERAL BRACING FOR THE PARTIAL LAYER. IF SIDE FILL PIECES SIMILAR TO PIECE MARKED ① ON PAGE 28 ARE USED, INSTALL ADDITIONAL PIECES AT 43-1/2" AND 6'-2" ABOVE THE CAR FLOOR. INSTALL THE PROPER SIZE K-BRACE TO RETAIN THE PARTIAL LAYER. SEE THE TYPICAL INSTALLATION ON PAGE 50 AND/OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE.
5. THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. THE LOAD CAN BE REDUCED BY FOUR PALLET UNITS BY OMITTING ONE CROSSWISE ROW FROM THE CENTER OF THE CAR. A REDUCTION OF THREE OR FOUR PALLET UNITS OR MULTIPLES THEREOF CAN BE ACCOMPLISHED BY OMITTING ONE OR MORE GROUPS OF THREE HAVING THE 28-1/2" DIMENSION ACROSS THE CAR AND THE LATERALLY ADJACENT UNIT (5) HAVING THE 19-1/2" DIMENSION ACROSS THE CAR. FOR THOSE QUANTITIES WHICH CANNOT BE ATTAINED BY ANY OF THE PREVIOUS METHODS, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS TO REACH THE DESIRED QUANTITY. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66. NOTE THAT CENTER GATES AND STRUTS, SIMILAR TO THE LOAD SHOWN ON PAGE 4, WILL BE USED IN LIEU OF THE DEPICTED CENTER GATES AND SOLID FILL WHEN THE EXCESS SPACE IN THE CENTER OF THE CAR IS APPROXIMATELY 18" OR MORE. FURTHER REDUCTION OF A LOAD CAN BE ACCOMPLISHED BY EMPLOYING THE PROCEDURES SHOWN ON PAGES 48 AND 49 AS GUIDANCE. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53 OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	7	3
2" X 3"	12	6
2" X 4"	51	34
2" X 6"	312	312
NAILS	NO. REQD	POUNDS
10d (3")	465	7-1/4
12d (3-1/4")	16	1/2
16d (3-1/2")	38	1
STEEL STRAPPING, 1-1/4" X .035" (OR .031")	144' REQD	21 LBS
SEAL FOR 1-1/4" STRAPPING	12 REQD	NIL

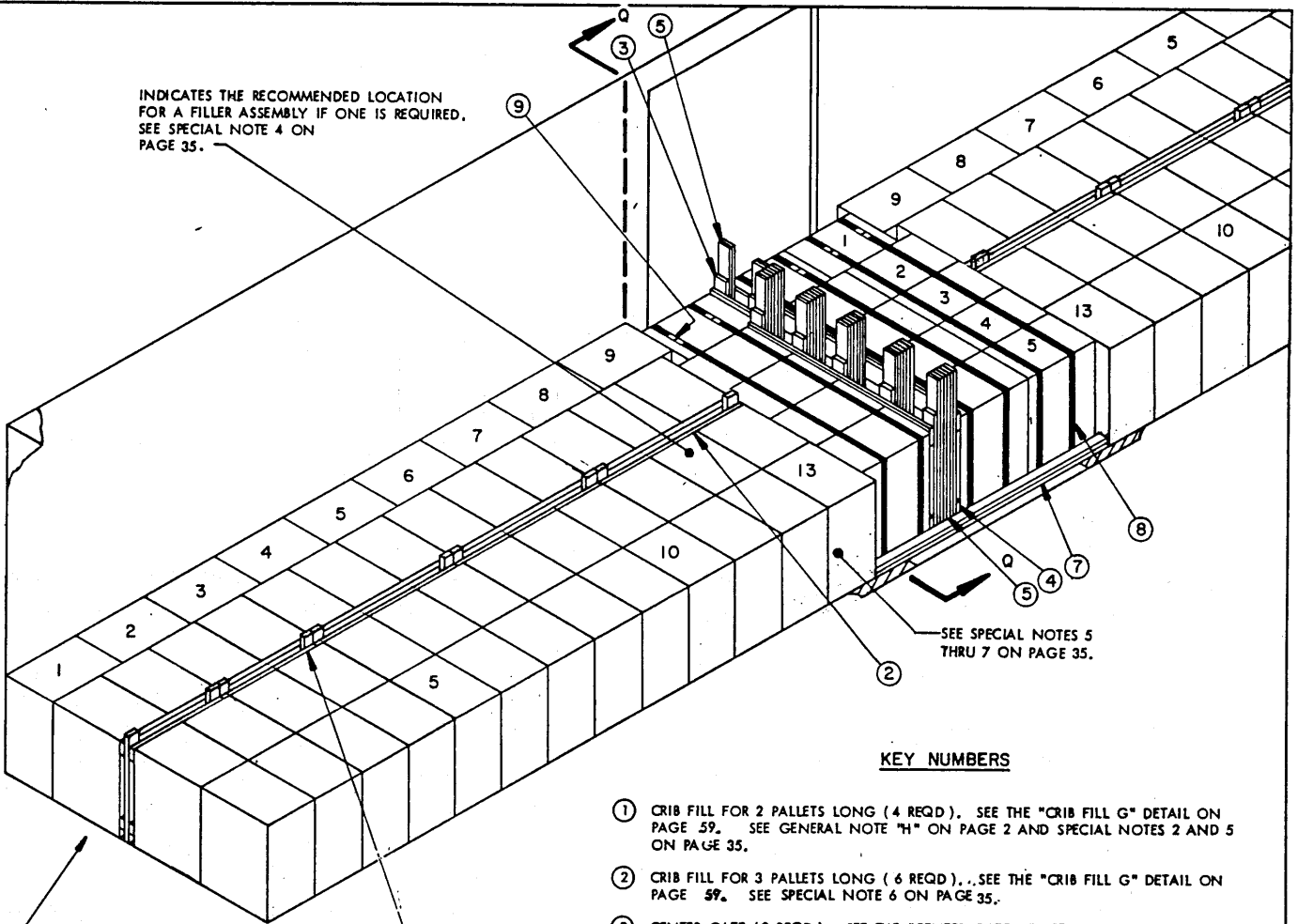
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LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
8" (6) SMALL PALLET	88	110,528 LBS
DUNNAGE		740 LBS
TOTAL WEIGHT		111,268 LBS

8" PROJECTILES (6/SMALL PALLET)  
88-UNIT LOAD IN A 40'-6" LONG BY 9'-2" WIDE BOX CAR (CONVENTIONAL)

INDICATES THE RECOMMENDED LOCATION FOR A FILLER ASSEMBLY IF ONE IS REQUIRED. SEE SPECIAL NOTE 4 ON PAGE 35.

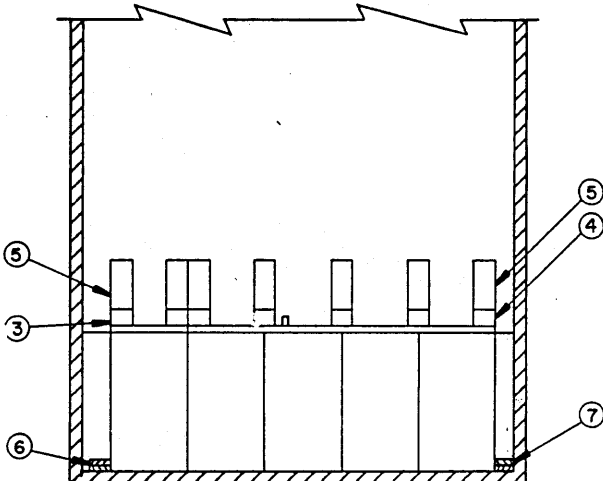


ISOMETRIC VIEW

**KEY NUMBERS**

- ① CRIB FILL FOR 2 PALLET LONG (4 REQD). SEE THE "CRIB FILL G" DETAIL ON PAGE 59. SEE GENERAL NOTE "H" ON PAGE 2 AND SPECIAL NOTES 2 AND 5 ON PAGE 35.
- ② CRIB FILL FOR 3 PALLET LONG (6 REQD). SEE THE "CRIB FILL G" DETAIL ON PAGE 59. SEE SPECIAL NOTE 6 ON PAGE 35.
- ③ CENTER GATE (2 REQD). SEE THE "CENTER GATE E" DETAIL AND THE "CENTER GATE E DIMENSIONAL CHART" FOR A 1-LONG GATE ON PAGE 62.
- ④ CENTER GATE (2 REQD). SEE THE "CENTER GATE C" DETAIL AND THE "CENTER GATE C DIMENSIONAL CHART" FOR A 4-LONG GATE ON PAGE 61.
- ⑤ SOLID FILL, 6" WIDE BY 54" LONG BY THE THICKNESS REQUIRED TO PROVIDE A WEDGE FIT BETWEEN THE VERTICAL PIECES OF THE LONGITUDINALLY ADJACENT CENTER GATES (REQD AT 2 PLACES BETWEEN PIECES MARKED ③, AND REQD AT 5 PLACES BETWEEN PIECES MARKED ④). NAIL THE FIRST PIECE TO THE EXTENDED VERTICAL PIECE OF ONE CENTER GATE W/5-10d NAILS. NAIL EACH ADDITIONAL PIECE TO A PREVIOUSLY INSTALLED PIECE W/5-10d NAILS. NAIL THRU EACH VERTICAL PIECE OF THE OTHER CENTER GATE INTO THE SOLID FILL PIECES W/3-10d NAILS.
- ⑥ DOORWAY BLOCKING, 2" X 6" X 66" (DOUBLED) (1 REQD). POSITION SO AS TO BE CENTERED ON THE THREE CROSSWISE ROWS AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE THE "SECTION Q-Q" VIEW AT LEFT.
- ⑦ DOORWAY BLOCKING, 2" X 6" BY CUT TO FIT (REF: 8'-3") DOUBLED (1 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "G" ON PAGE 3.
- ⑧ DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 25'-0" LONG STEEL STRAPPING (6 REQD). INSTALL SO AS TO ENCIRCLE FIVE (5) PALLET UNITS.
- ⑨ SEAL FOR 1-1/4" STRAPPING (12 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "K" ON PAGE 2.

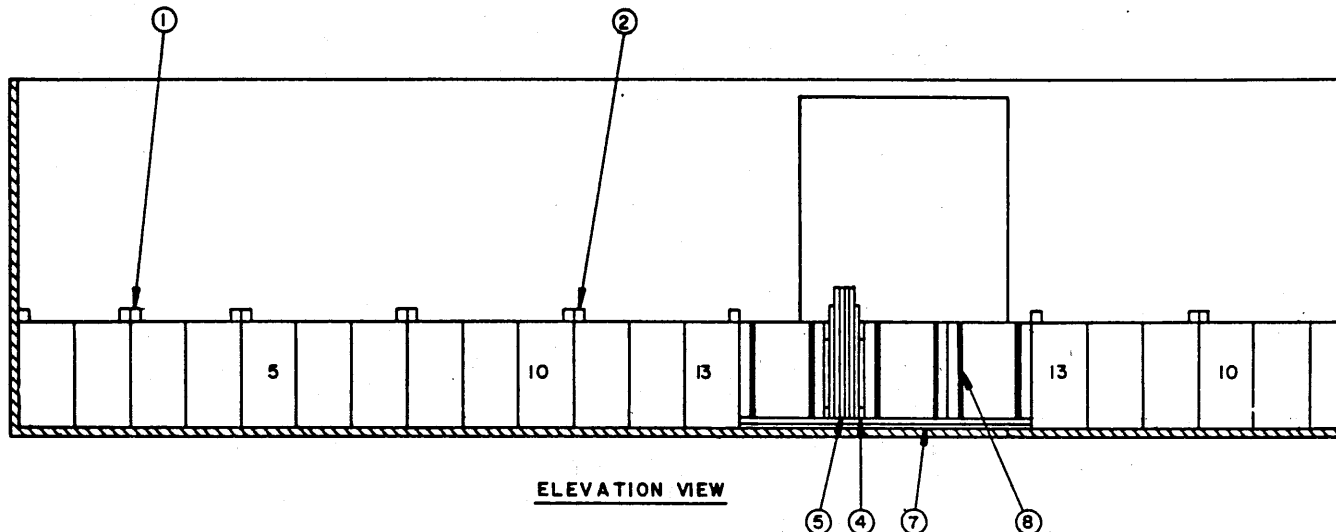
IF THE CAR END WALL IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" DETAIL ON PAGE 56.



SECTION Q-Q

8" PROJECTILES (6/SMALL PALLET)

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



**(SPECIAL NOTES CONTINUED)**

WHICH ONE IS MARKED WITH THE FIGURE 13. MODIFY A "FILLER ASSEMBLY A", WHICH IS DETAILED ON PAGE 66. AS NECESSARY TO PROVIDE FOR A SQUARED OFF LOAD AT THE END OF THE EIGHTH PALLET ALONG THE FAR SIDEWALL AND THE TWELFTH GROUP OF THREE IN THE CENTER ROWS. NOTE THAT EIGHT (8) PIECES MARKED ② WILL BE REQUIRED IN LIEU OF SIX, AND PIECES MARKED ① WILL NOT BE REQUIRED. FOUR (4) CROSSWISE ROWS OF FIVE PALLETS, CENTERED IN THE WIDTH OF THE CAR, CAN BE LOADED. ENCIRCLE EACH ROW WITH TWO DOORWAY PROTECTION STRAPS, PIECES MARKED ⑧. THE DOORWAY BLOCKING, PIECE MARKED ⑥ WILL BE 10'-0" LONG, AND THE DOORWAY BLOCKING, PIECE MARKED ⑦, WILL BE 11'-6" LONG (REF). INSTALL CENTER GATES C FOR 5-LONG, AND STRUTS.

- IF THE CAR IS EQUIPPED WITH DOUBLE "THRU" PLUG DOORS, LOAD TEN GROUPS OF 3 WIDE DOWN THE CENTER AND SEVEN PALLET UNITS ALONG THE SIDEWALL IN EACH END OF THE CAR AND SEVEN CROSSWISE ROWS OF 5 ACROSS IN THE DOORWAY AREA FOR A TOTAL LOAD OF 109 PALLET UNITS. INSTALL TWO (2) EACH DOORWAY PROTECTION STRAPS, PIECES MARKED ⑧, AROUND THE SEVEN CROSSWISE ROWS IN THE DOORWAY AREA. ONLY FOUR (4) PIECES MARKED ② WILL BE REQUIRED IN LIEU OF SIX, PIECES MARKED ⑥ WILL BE 16'-0" LONG, AND PIECE MARKED ⑦ WILL BE 18'-0" LONG (REF). INSTALL CENTER GATE C, CENTER GATE E, AND SOLID FILL. FOR CARS EQUIPPED WITH DOUBLE STAGGERED PLUG TYPE DOORS, OR A COMBINATION OF DOOR TYPES WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE ENTIRE DOORWAY AREA (APPROX 22 OR 24 FEET) MUST BE LOADED WITH CROSSWISE ROWS. ENCIRCLE EACH CROSSWISE ROW WITH TWO DOORWAY PROTECTION STRAPS AND INSTALL DOORWAY BLOCKING, PIECE MARKED ⑥, OF APPROPRIATE LENGTH. NOTE THAT A MODIFIED FILLER ASSEMBLY "A" OR "C" MAY BE INSTALLED IN EACH END OF THE CAR, OR FILL MATERIAL MAY BE ADDED TO EACH GATE, IN ORDER TO PROVIDE EVEN BEARING SURFACES.
- FOR CARS EQUIPPED WITH DOUBLE STAGGERED SLIDING DOORS, DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE LATERAL BRACING FOR THE ADJACENT UNITS. THE CENTER AREA OF THE CAR ADJACENT TO THE MAIN DOOR OPENINGS WILL BE LOADED AS SHOWN FOR THE DEPICTED LOAD.

**SPECIAL NOTES:**

- A 111-UNIT LOAD OF 8" PROJECTILES, 6 PER SMALL PALLET, IS SHOWN IN A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS, UP TO AND INCLUDING 60-FOOT LONG CARS, AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTES 5 THRU 7.
- THE LOADING PROCEDURE ON PAGE 34 IS APPLICABLE FOR 9'-2" WIDE CARS HAVING EITHER NAILABLE OR NON-NAILABLE SIDEWALLS. IF A 9'-4" OR 9'-6" WIDE CAR IS FURNISHED FOR LOADING, USE CRIB FILL B FOR TWO PALLETS LONG IN LIEU OF USING PIECE MARKED ①. SEE THE DETAIL AND THE "CRIB FILL B DIMENSIONAL CHART" ON PAGE 57. USE CRIB FILL C FOR THREE PALLETS LONG IN LIEU OF USING PIECE MARKED ②. SEE THE DETAIL AND THE "CRIB FILL C DIMENSIONAL CHART" ON PAGE 58. IF A 9'-0" WIDE CAR IS FURNISHED FOR LOADING, USE CRIB FILL A IN LIEU OF PIECES MARKED ① AND ②. NOTE THAT IN A 9'-0" WIDE CAR THE DOORWAY BLOCKING MUST BE 2" X 4" IN LIEU OF 2" X 6". IF THE CAR FURNISHED HAS NAILABLE SIDEWALLS, SIDE FILL MATERIAL SIMILAR TO PIECE MARKED ① ON PAGE 28 MAY BE LAMINATED TO THE CAR SIDEWALL. SEE THE "SECTION N-N" VIEW ON PAGE 28 FOR HEIGHT LOCATION GUIDANCE. NOTE THAT WHETHER USING CRIB FILL ASSEMBLIES OR NAILABLE SIDE FILL, THE TOTAL ACCUMULATED SPACE ACROSS THE CAR MUST NOT EXCEED TWO INCHES (2").
- THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED BY ADDING A PARTIAL SECOND LAYER IN ONE OR BOTH ENDS OF THE CAR, PROVIDED THE CAR HAS NAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR WILL NOT BE EXCEEDED. NOTE THAT THE LOAD LIMIT OF THE CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LADING PLUS DUNNAGE IN THE HEAVY END OF THE CAR. INCREASE THE HEIGHT AND ADJUST THE LENGTH OF THE CRIB FILL ASSEMBLIES TO PROVIDE LATERAL BRACING FOR THE PARTIAL LAYER. IF SIDE FILL PIECES SIMILAR TO PIECE MARKED ① ON PAGE 28 ARE USED, INSTALL ADDITIONAL PIECES AT 43-1/2" AND 6'-2" ABOVE THE CAR FLOOR. INSTALL THE PROPER SIZE K-BRACE TO RETAIN THE PARTIAL LAYER. SEE THE TYPICAL INSTALLATION ON PAGE 50 AND/OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE.
- THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. THE LOAD CAN BE REDUCED BY FIVE PALLET UNITS BY OMITTING ONE CROSSWISE ROW FROM THE CENTER OF THE CAR. A REDUCTION OF THREE OR FOUR PALLET UNITS OR MULTIPLES THEREOF CAN BE ACCOMPLISHED BY OMITTING ONE OR MORE GROUPS OF THREE HAVING THE 28-1/2" DIMENSION ACROSS THE CAR AND THE LATERALLY ADJACENT UNITS (5) HAVING THE 19-1/2" DIMENSION ACROSS THE CAR. FOR THOSE QUANTITIES WHICH CANNOT BE ATTAINED BY ANY OF THE PREVIOUS METHODS, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS TO REACH THE DESIRED QUANTITY. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66. NOTE THAT CENTER GATES AND STRUTS, SIMILAR TO THE LOAD SHOWN ON PAGE 4, WILL BE USED IN LIEU OF THE DEPICTED CENTER GATES AND SOLID FILL WHEN THE EXCESS SPACE IN THE CENTER OF THE CAR IS APPROXIMATELY 18" OR MORE. FURTHER REDUCTION OF A LOAD CAN BE ACCOMPLISHED BY EMPLOYING THE PROCEDURES SHOWN ON PAGES 48 AND 49 AS GUIDANCE. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53 OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55.
- THE DEPICTED LOADING PATTERN IS ADEQUATE FOR 50'-6" LONG CARS HAVING SINGLE DOOR OPENINGS WHICH ARE FROM 6' TO 9' WIDE, EITHER CONVENTIONAL SLIDING OR PLUG DOOR TYPE. IF THE CAR IS EQUIPPED WITH DOOR OPENINGS WHICH ARE 10' OR 12' WIDE, THE LOAD WILL BE LIMITED TO 108 PALLET UNITS. OMIT FROM EACH END OF THE LOAD THE THREE PALLET UNITS IN THE GROUP IN

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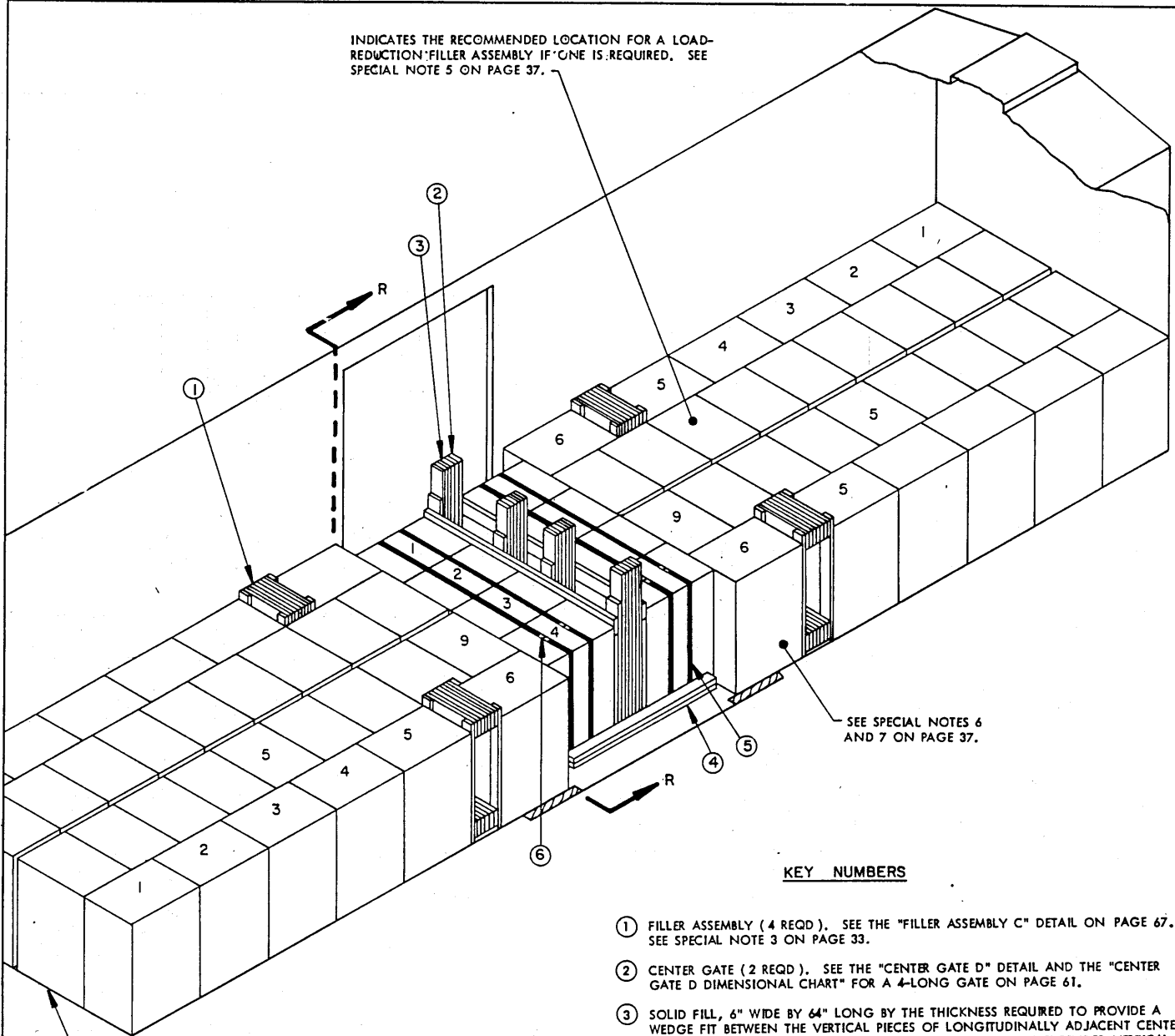
BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 3"	12	6
2" X 4"	64	43
2" X 6"	407	407
NAILS	NO. REQD	POUNDS
10d (3")	556	8-3/4
16d (3-1/2")	40	1
STEEL STRAPPING, 1-1/4" X .035 (OR .031) -		150' REQD --- 22 LBS
SEAL FOR 1-1/4" STRAPPING		12 REQD --- NIL

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
8" (6/SMALL PALLET) DUNNAGE	111	139,416 LBS
		944 LBS
<b>TOTAL WEIGHT</b>		<b>140,360 LBS</b>

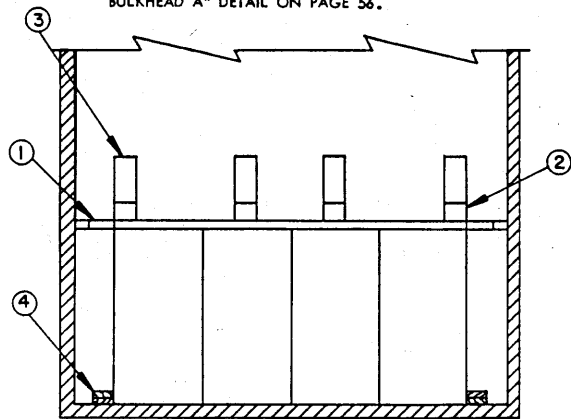
8" PROJECTILES (6/SMALL PALLET)  
111-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR (CONVENTIONAL)

INDICATES THE RECOMMENDED LOCATION FOR A LOAD-REDUCTION FILLER ASSEMBLY IF ONE IS REQUIRED. SEE SPECIAL NOTE 5 ON PAGE 37.



**ISOMETRIC VIEW**

IF THE CAR END WALL IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" DETAIL ON PAGE 56.



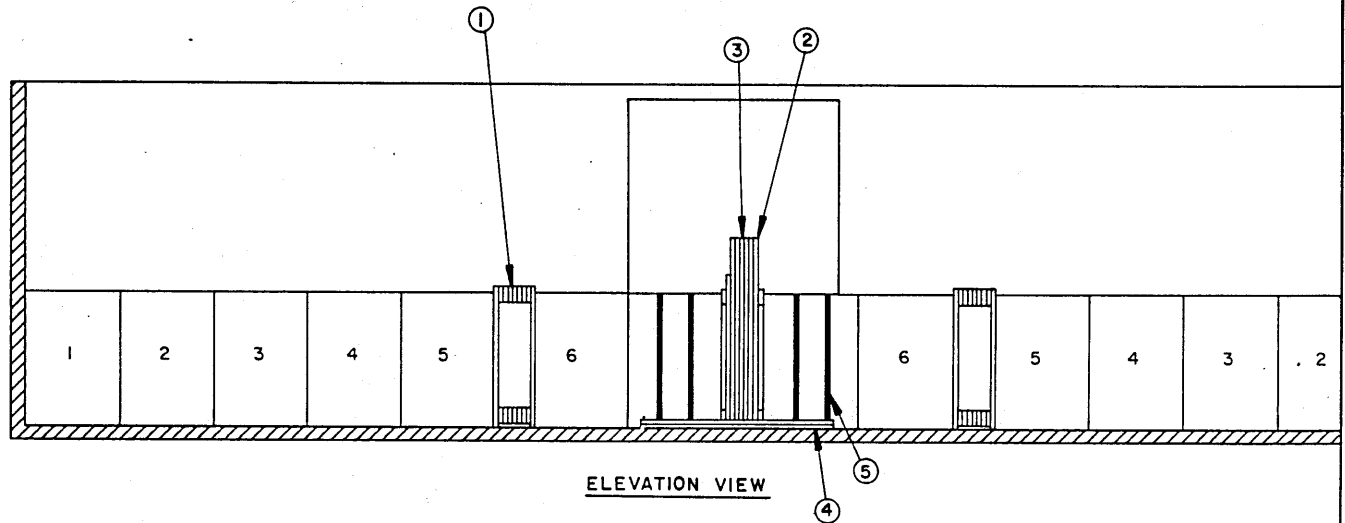
**SECTION R-R**

8" PROJECTILES (6/LARGE PALLET)

**KEY NUMBERS**

- ① FILLER ASSEMBLY (4 REQD). SEE THE "FILLER ASSEMBLY C" DETAIL ON PAGE 67. SEE SPECIAL NOTE 3 ON PAGE 33.
- ② CENTER GATE (2 REQD). SEE THE "CENTER GATE D" DETAIL AND THE "CENTER GATE D DIMENSIONAL CHART" FOR A 4-LONG GATE ON PAGE 61.
- ③ SOLID FILL, 6" WIDE BY 64" LONG BY THE THICKNESS REQUIRED TO PROVIDE A WEDGE FIT BETWEEN THE VERTICAL PIECES OF LONGITUDINALLY ADJACENT CENTER GATES (REQD AT 4 PLACES). NAIL THE FIRST PIECE TO THE EXTENDED VERTICAL PIECE OF ONE CENTER GATE W/5-10d NAILS. NAIL EACH ADDITIONAL PIECE TO A PREVIOUSLY INSTALLED PIECE W/5-10d NAILS. NAIL THRU EACH VERTICAL PIECE OF THE OTHER CENTER GATE INTO THE LAST SOLID FILL PIECE W/3-10d NAILS.
- ④ DOORWAY BLOCKING, 2" X 6" X 66" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "H" ON PAGE 2 AND GENERAL NOTE "G" ON PAGE 3.
- ⑤ DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 24'-0" LONG STEEL STRAPPING (4 REQD).
- ⑥ SEAL FOR 1-1/4" STRAPPING (8 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "K" ON PAGE 2.





ELEVATION VIEW

(SPECIAL NOTES CONTINUED)

SPECIAL NOTES:

6. IN A CAR EQUIPPED WITH SINGLE "THRU" PLUG TYPE DOORS, PALLETS WHICH ARE POSITIONED ALONG THE CAR SIDEWALL WITH THE 22-5/8" LENGTH ACROSS THE CAR MUST NOT EXTEND INTO THE DOORWAY AREA TO SUCH AN EXTENT THAT SIX INCHES (6") OR LESS OF A PALLET IS RETAINED BY A CAR SIDEWALL. TO SATISFY THIS REQUIREMENT, PALLETS WITH THE 22-5/8" LENGTH OF THE UNIT ACROSS THE CAR CAN BE LOADED 6 LONG, AS SHOWN, IN CARS HAVING PLUG DOORS 6' THRU 10'-6" WIDE. IN CARS HAVING WIDER PLUG DOORS IT WILL BE NECESSARY TO OMIT PALLET UNITS MARKED 6 ALONG EACH SIDEWALL AND THE NINTH PALLET STACKS IN EACH END OF THE CENTER AREA. INSTALL A "FILLER ASSEMBLY C" IN EACH CENTER ROW (NOT ADJACENT TO THE CROSSWISE ROWS). THREE (3) ROWS CAN BE POSITIONED CROSSWISE IN THE CENTER OF THE LOAD AND BLOCKED WITH 7'-6" LONG DOORWAY BLOCKING. IF THE CAR IS EQUIPPED WITH DOUBLE "THRU" OR STAGGERED PLUG DOORS, OR A COMBINATION OF DOOR TYPES, WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE LOAD MUST BE SUCH THAT PALLET UNITS ALONG THE WALL WILL BE RETAINED BY AT LEAST SIX INCHES (6") OF CAR WALL ON BOTH SIDES OF THE CAR. THE ENTIRE DOORWAY AREA WILL THEN BE LOADED WITH CROSSWISE ROWS OF 4 LONG BLOCKED WITH DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS. NOTE THAT THESE SPECIFIED LIMITS AS TO THE NUMBER OF PALLETS IN EACH END OF A CAR ARE APPLICABLE ONLY FOR A 40'-6" LONG CAR; THE QUANTITIES WILL VARY IN CARS OF OTHER LENGTHS.
7. IF A CAR IS EQUIPPED WITH SINGLE SLIDING DOORS, THE ROWS OF PALLET UNITS ALONG THE CAR SIDEWALL MAY EXTEND INTO THE DOORWAY AREA, BUT IF THEY EXTEND MORE THAN TEN INCHES (10") LATERAL BRACING MUST BE PROVIDED BY INSTALLING DOORWAY PROTECTION GATES. SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69 OR THE "DOORWAY PROTECTION B" DETAIL ON PAGE 70. FOR CARS EQUIPPED WITH STAGGERED DOUBLE SLIDING DOORS, DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE LATERAL BRACING FOR THE ADJACENT UNITS. THE CENTER AREA OF THE CAR WILL BE LOADED WITH TWO CROSSWISE ROWS, AS SHOWN. IF A CAR IS EQUIPPED WITH DOUBLE SLIDING "THRU" DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH THE 4-LONG CROSSWISE ROWS. THE 10" MAXIMUM INTO THE DOORWAY AREA IS APPLICABLE FOR THE ROWS ALONG THE CAR SIDEWALL.
1. A 68-UNIT LOAD OF 8" PROJECTILES PALLETIZED 6 PER LARGE PALLET IS SHOWN IN A 40'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTES 2, 6, AND 7.
2. THE TOTAL ACCUMULATED SPACE ACROSS THE CAR MUST NOT BE MORE THAN TWO INCHES (2"). LATERAL BRACING WILL NOT BE REQUIRED FOR SHIPMENTS IN 9'-2" WIDE CARS. IN WIDER CARS, CRIB FILL WILL BE POSITIONED BETWEEN THE TWO CENTER ROWS; USE CRIB FILL A IN A 9'-4" WIDE CAR OR CRIB FILL F IN A 9'-6" WIDE CAR. SEE THE DETAILS ON PAGES 57 AND 59 RESPECTIVELY. NOTE THAT IF THE CAR TO BE LOADED HAS NAILABLE SIDEWALLS, SUITABLE THICKNESS MATERIAL MAY BE NAILED TO ONE OR BOTH SIDEWALLS IN LIEU OF USING CRIB FILL. POSITION THE TOP OF THE LOWER PIECE (5) 7" ABOVE THE CAR FLOOR AND THE UPPER PIECE (5) WITH THE TOP 2" ABOVE THE HEIGHT OF THE COVER OF THE PALLET UNIT. NAIL TO THE CAR SIDEWALL W/1 APPLICABLY SIZED NAIL EVERY 12".
3. THE LENGTH OF EACH FILLER ASSEMBLY C WILL BE ADJUSTED AS REQUIRED TO LOCATE THE END OF THE PALLET UNIT NUMBERED 6 IN THE ROWS ALONG THE CAR SIDEWALLS EVEN WITH THE CENTER ROWS MARKED 9.
4. THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED BY ADDING A PARTIAL SECOND LAYER IN ONE OR BOTH ENDS OF THE CAR, PROVIDED THE CAR HAS NAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR WILL NOT BE EXCEEDED. NOTE THAT THE LOAD LIMIT OF A CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LADING PLUS DUNNAGE IN THE HEAVY END OF THE CAR. INCREASE THE HEIGHT OF THE CRIB FILL IF USED OR INSTALL ADDITIONAL SIDE FILL PIECES AT 7" ABOVE THE FIRST-LAYER PALLET COVER AND AT 2" ABOVE THE SECOND-LAYER PALLET COVER. INSTALL THE PROPER SIZE K-BRACE TO RETAIN THE PARTIAL LAYER. SEE THE TYPICAL INSTALLATION ON PAGE 50 AND/OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE. PROVIDE AN EVEN SURFACE FOR THE K-BRACES BY LAMINATING MATERIAL TO THE LOAD BEARING PIECES OF THE ASSEMBLY OR BY INSTALLING TWO (2) FILLER C ASSEMBLIES OF A PROPER THICKNESS.
5. THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. THE LOAD CAN BE REDUCED BY EIGHT PALLET UNITS BY OMITTING THE TWO CROSSWISE ROWS. SUBSTITUTE CENTER GATES C FOR THE DEPICTED CENTER GATES AND INSTALL STRUTS AS TYPICALLY SHOWN IN THE LOAD VIEW ON PAGE 20. IF THE STRUTS ARE 72" OR LONGER THEY MUST BE STIFFENED BY THE APPLICATION OF STRUT BRACING. SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 69 FOR GUIDANCE. ADDITIONAL PALLET UNITS, BY MULTIPLES OF TWO, CAN BE OMITTED FROM ONE OR BOTH ENDS OF THE LOAD. PROVIDE AN EVEN SURFACE FOR THE CENTER GATES BY LAMINATING MATERIAL TO THE HORIZONTAL PIECES OF THE GATES OR BY INSTALLING FILLER C ASSEMBLIES OF A PROPER THICKNESS. FOR OTHER QUANTITIES, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66. FURTHER REDUCTION OF A LOAD CAN BE ACCOMPLISHED BY EMPLOYING THE PROCEDURES SHOWN ON PAGES 48 AND 49 AS GUIDANCE. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53 OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55.

BILL OF MATERIAL *		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	13	5
2" X 3"	8	4
2" X 4"	60	40
2" X 6"	334	334
NAILS	NO. REQD	POUNDS
10d (3")	688	10-3/4
16d (3-1/2")	32	3/4
STEEL STRAPPING, 1-1/4" X .035" (OR .031") -- 96' REQD		14 LBS
SEAL FOR 1-1/4" STRAPPING	8 REQD	NIL

\*BASED ON XM605E5 PROJECTILE.

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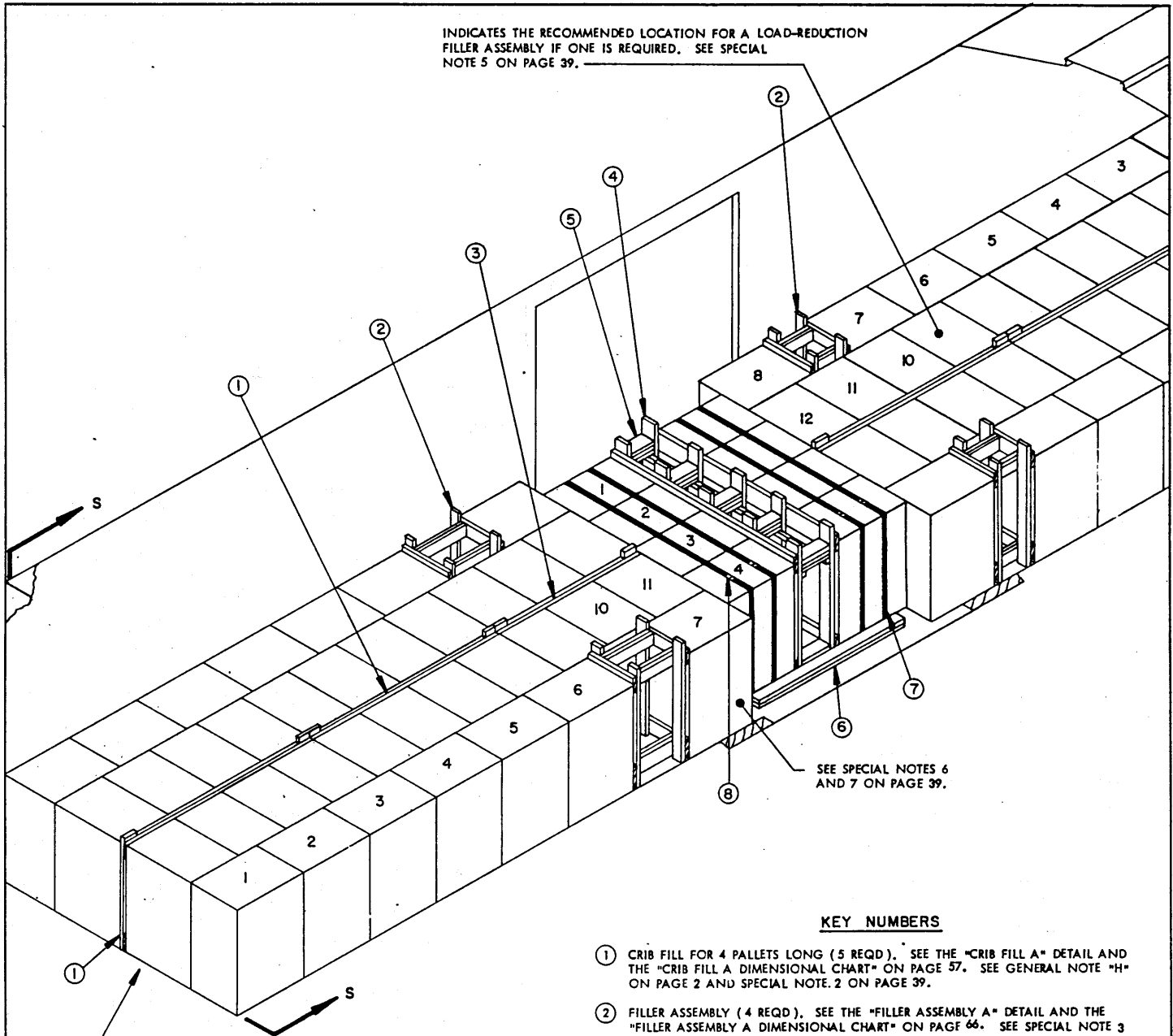
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
8" (6/LARGE PALLET)	68	87,584 LBS
DUNNAGE		792 LBS
TOTAL WEIGHT		88,376 LBS

8" PROJECTILES (6/LARGE PALLET)

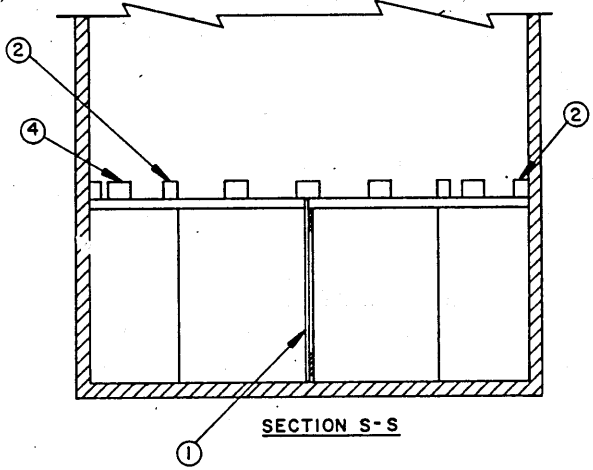
68-UNIT LOAD IN A 40'-6" LONG BY 9'-2" WIDE BOX CAR (CONVENTIONAL)

INDICATES THE RECOMMENDED LOCATION FOR A LOAD-REDUCTION FILLER ASSEMBLY IF ONE IS REQUIRED. SEE SPECIAL NOTE 5 ON PAGE 39.



ISOMETRIC VIEW

IF THE CAR END WALL IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" DETAIL ON PAGE 56.



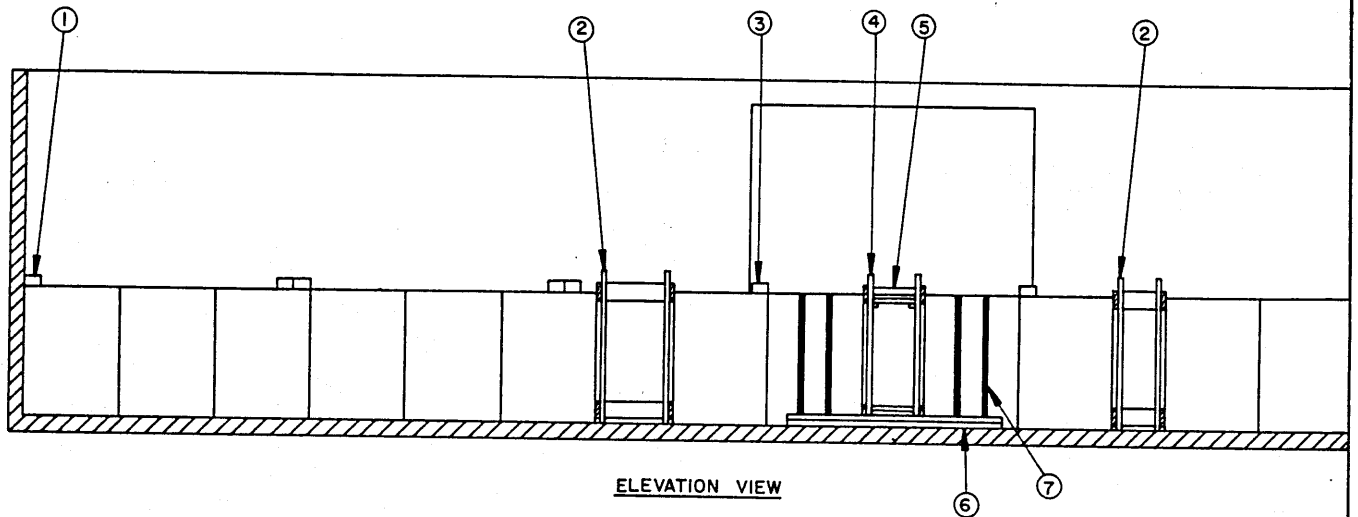
SECTION S-S

**KEY NUMBERS**

- ① CRIB FILL FOR 4 PALLET LONG (5 REQD). SEE THE "CRIB FILL A" DETAIL AND THE "CRIB FILL A DIMENSIONAL CHART" ON PAGE 57. SEE GENERAL NOTE "H" ON PAGE 2 AND SPECIAL NOTE 2 ON PAGE 39.
- ② FILLER ASSEMBLY (4 REQD). SEE THE "FILLER ASSEMBLY A" DETAIL AND THE "FILLER ASSEMBLY A DIMENSIONAL CHART" ON PAGE 66. SEE SPECIAL NOTE 3 ON PAGE 39.
- ③ CRIB FILL FOR 3 PALLET LONG (1 REQD). SEE THE "CRIB FILL A" DETAIL AND THE "CRIB FILL A DIMENSIONAL CHART" ON PAGE 57.
- ④ CENTER GATE (2 REQD). SEE THE "CENTER GATE C" DETAIL AND THE "CENTER GATE C DIMENSIONAL CHART" FOR A 4-LONG GATE ON PAGE 61.
- ⑤ STRUT, 2" X 6" BY CUT TO FIT (TRIPLED) (10 REQD). LAMINATE W/1-10d NAIL EVERY 6" AND TOENAIL THE TOP PIECE TO THE GATE VERTICAL PIECES W/2-12d NAILS AT EACH END. SEE THE "LOAD CAPACITY CHART" ON PAGE 72.
- ⑥ DOORWAY BLOCKING, 2" X 6" X 72" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "G" ON PAGE 3.
- ⑦ DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 24'-0" LONG STEEL STRAPPING (4 REQD).
- ⑧ SEAL FOR 1-1/4" STRAPPING (8 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "K" ON PAGE 2.

8' PROJECTILE (6 / LARGE PALLET)

84-UNIT LOAD IN A 50'-6" LONG BY 9'-4" WIDE BOX CAR (CONVENTIONAL)



ELEVATION VIEW

(SPECIAL NOTES CONTINUED)

6. IN A CAR EQUIPPED WITH SINGLE "THRU" PLUG TYPE DOORS, THE ROWS OF PALLET UNITS ALONG THE CAR SIDEWALLS WITH THE 22-5/8" LENGTH ACROSS THE CAR MUST NOT EXTEND INTO THE DOORWAY AREA TO SUCH AN EXTENT THAT SIX INCHES (6") OR LESS OF A PALLET IS RETAINED BY A CAR SIDEWALL. THE DEPICTED LOADING PATTERN IS APPLICABLE FOR PLUG DOORS FROM 6' THRU 12' WIDE. IF THE CAR IS EQUIPPED WITH DOUBLE "THRU" OR STAGGERED PLUG DOORS, OR A COMBINATION OF DOOR TYPES, WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE LOAD MUST BE SUCH THAT PALLET UNITS ALONG THE WALL WILL BE RETAINED BY AT LEAST SIX INCHES (6") OF CAR WALL ON BOTH SIDES OF THE CAR. THE ENTIRE DOORWAY AREA WILL THEN BE LOADED WITH CROSSWISE ROWS OF 4 LONG BLOCKED WITH DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS. NOTE THAT THESE SPECIFIED LIMITS AS TO THE NUMBER OF PALLET UNITS IN EACH END OF A CAR ARE APPLICABLE ONLY FOR A 50'-6" LONG CAR; THE QUANTITY WILL VARY IN CARS OF OTHER LENGTH.
7. IF A CAR IS EQUIPPED WITH SINGLE SLIDING DOORS, THE ROWS OF PALLET UNITS ALONG THE CAR SIDEWALL MAY EXTEND INTO THE DOORWAY AREA, BUT IF THEY EXTEND MORE THAN TEN INCHES (10") LATERAL BRACING MUST BE PROVIDED BY INSTALLING DOORWAY PROTECTION GATES. SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69 OR THE "DOORWAY PROTECTION B" DETAIL ON PAGE 70. FOR CARS EQUIPPED WITH STAGGERED DOUBLE SLIDING DOORS, DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE LATERAL BRACING FOR THE ADJACENT UNITS. THE CENTER AREA OF THE CAR WILL BE LOADED WITH TWO CROSSWISE ROWS, AS SHOWN. IF A CAR IS EQUIPPED WITH DOUBLE SLIDING "THRU" DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH THE 4-LONG CROSSWISE ROWS. THE 10" MAXIMUM INTO THE DOORWAY AREA IS APPLICABLE FOR THE ROWS ALONG THE CAR SIDEWALL.

SPECIAL NOTES:

1. AN 84-UNIT LOAD OF 8" PROJECTILES PALLETIZED 6 PER LARGE PALLET IS SHOWN IN A 50'-6" LONG BY 9'-4" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 8'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS (9'-2" MIN WIDTH) AND CARS HAVING NARROWER OR WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTES 2, 6 AND 7.
2. THE TOTAL ACCUMULATED SPACE ACROSS THE CAR MUST NOT BE MORE THAN TWO INCHES (2"). LATERAL BRACING WILL NOT BE REQUIRED FOR SHIPMENTS IN 9'-2" WIDE CARS. IF A 9'-6" WIDE CAR IS FURNISHED FOR LOADING, CRIB FILL F, OR G, AS APPLICABLE, WILL BE USED IN LIEU OF THE DEPICTED CRIB FILL A. SEE THE DETAILS ON PAGE 59. NOTE THAT IF THE CAR TO BE LOADED HAS NAILABLE SIDEWALLS, SUITABLE THICKNESS MATERIAL MAY BE NAILED TO ONE OR BOTH SIDEWALLS IN LIEU OF USING CRIB FILL. POSITION THE TOP OF THE LOWER PIECE (5) 7" ABOVE THE CAR FLOOR AND THE UPPER PIECE(S) WITH THE TOP 2" ABOVE THE HEIGHT OF THE COVER OF THE PALLET UNIT. NAIL TO THE CAR SIDEWALL W/1 APPLICABLY SIZED NAIL EVERY 12".
3. THE LENGTH OF EACH FILLER ASSEMBLY A WILL BE ADJUSTED AS REQUIRED TO LOCATE THE END OF THE PALLET UNITS NUMBERED 7 AND 8 IN THE ROWS ALONG THE CAR SIDEWALLS EVEN WITH THE CENTER ROWS MARKED 11 AND 12, RESPECTIVELY.
4. THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED BY ADDING A PARTIAL SECOND LAYER IN ONE OR BOTH ENDS OF THE CAR, PROVIDED THE CAR HAS NAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR WILL NOT BE EXCEEDED. NOTE THAT THE LOAD LIMIT OF A CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LADING PLUS DUNNAGE IN THE HEAVY END OF THE CAR. INCREASE THE HEIGHT OF THE CRIB FILL IF USED OR INSTALL ADDITIONAL SIDE FILL PIECES AT 7" ABOVE THE FIRST-LAYER PALLET COVER AND AT 2" ABOVE THE SECOND-LAYER PALLET COVER. INSTALL THE PROPER SIZE K-BRACE TO RETAIN THE PARTIAL LAYER. SEE THE TYPICAL INSTALLATION ON PAGE 50 AND/OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE. PROVIDE AN EVEN SURFACE FOR THE K-BRACES BY LAMINATING MATERIAL TO THE LOAD BEARING PIECES OF THE ASSEMBLY OR BY INSTALLING TWO (2) FILLER C ASSEMBLIES OF A PROPER THICKNESS.
5. THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. THE LOAD CAN BE REDUCED BY EIGHT PALLET UNITS BY OMITTING THE TWO CROSSWISE ROWS. SUBSTITUTE CENTER GATES C FOR THE DEPICTED CENTER GATES AND INSTALL STRUTS AS TYPICALLY SHOWN IN THE LOAD VIEW ON PAGE 20. IF THE STRUTS ARE 72" OR LONGER THEY MUST BE STIFFENED BY THE APPLICATION OF STRUT BRACING. SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 69 FOR GUIDANCE. ADDITIONAL PALLET UNITS, BY MULTIPLES OR TWO, CAN BE OMITTED FROM ONE OR BOTH ENDS OF THE LOAD. PROVIDE AN EVEN SURFACE FOR THE CENTER GATES BY LAMINATING MATERIAL TO THE HORIZONTAL PIECES OF THE GATES OR BY INSTALLING FILLER C ASSEMBLIES OF A PROPER THICKNESS. FOR OTHER QUANTITIES, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66. FURTHER REDUCTION OF A LOAD CAN BE ACCOMPLISHED BY EMPLOYING THE PROCEDURES SHOWN ON PAGES 48 AND 49 AS GUIDANCE. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53 OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55.

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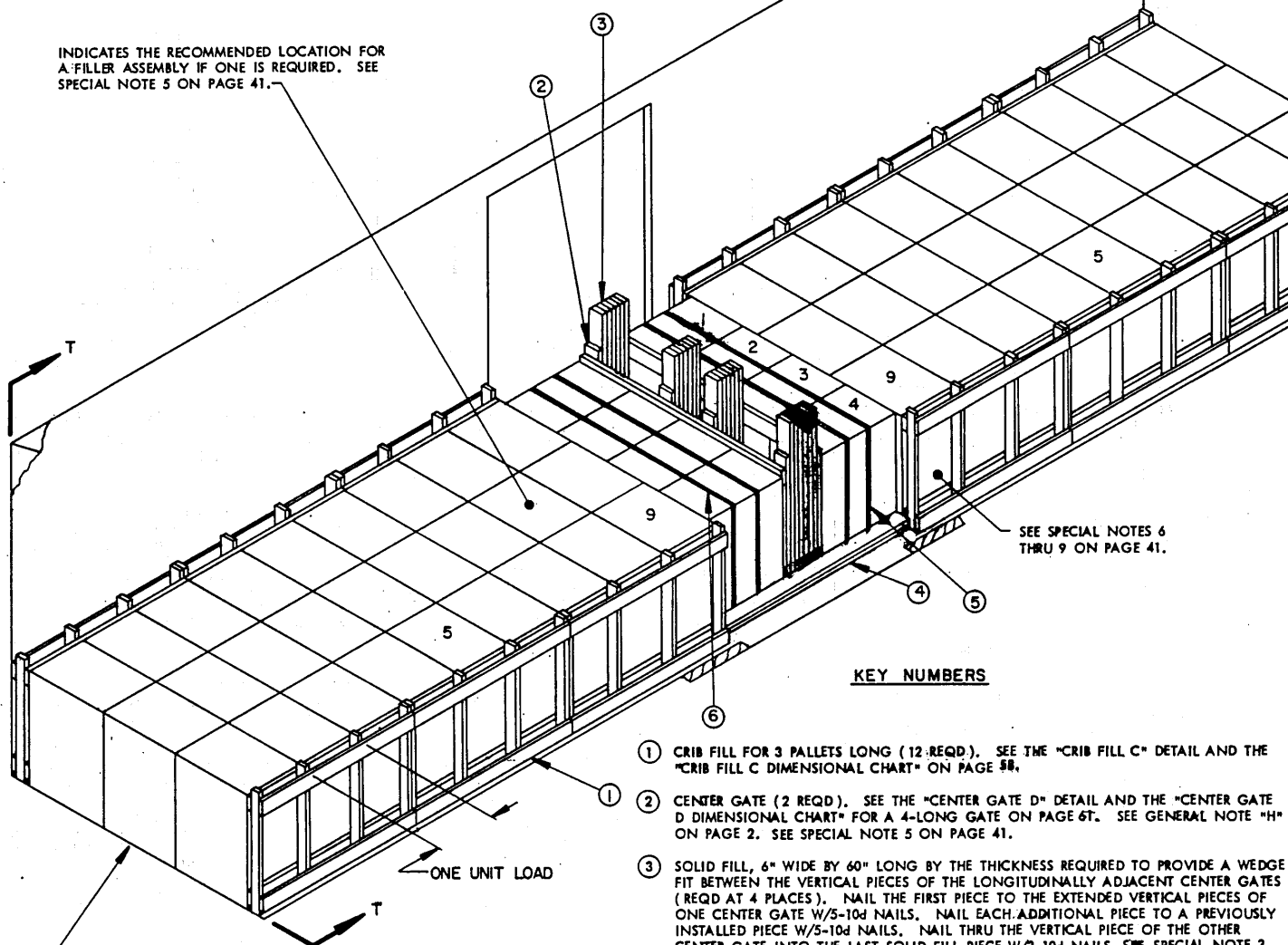
BILL OF MATERIAL *		
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	211	106
2" X 2"	47	16
2" X 3"	15	8
2" X 4"	70	47
2" X 6"	231	231
NAILS	NO. REQD	POUNDS
6d (2")	152	1
10d (3")	480	7-1/2
12d (3-1/4")	40	3/4
16d (3-1/2")	36	1
STEEL STRAPPING, 1-1/4" X .035" (OR .031")	96' REQD	14 LBS
SEAL FOR 1-1/4" STRAPPING	8 REQD	NIL

\* BASED ON XM605E5 PROJECTILE.

8" PROJECTILE (6/LARGE PALLET)  
84-UNIT LOAD IN A 50'-6" LONG BY 9'-4" WIDE BOX CAR (CONVENTIONAL)

LOAD AS SHOWN		
ITEM	QUANTITY	WEIGHT (APPROX)
8" (6/LARGE PALLET)	84	108,192 LBS
DUNNAGE		841 LBS
TOTAL WEIGHT		109,033 LBS

INDICATES THE RECOMMENDED LOCATION FOR A FILLER ASSEMBLY IF ONE IS REQUIRED. SEE SPECIAL NOTE 5 ON PAGE 41.



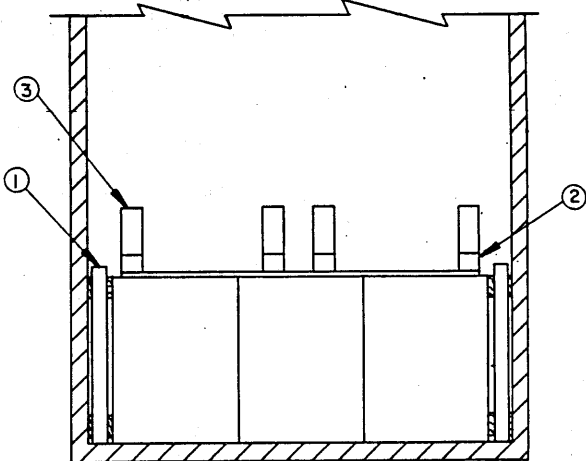
SEE SPECIAL NOTES 6 THRU 9 ON PAGE 41.

**KEY NUMBERS**

- ① CRIB FILL FOR 3 PALLET LONG (12 REQD). SEE THE "CRIB FILL C" DETAIL AND THE "CRIB FILL C DIMENSIONAL CHART" ON PAGE 58.
- ② CENTER GATE (2 REQD). SEE THE "CENTER GATE D" DETAIL AND THE "CENTER GATE D DIMENSIONAL CHART" FOR A 4-LONG GATE ON PAGE 6T. SEE GENERAL NOTE "H" ON PAGE 2. SEE SPECIAL NOTE 5 ON PAGE 41.
- ③ SOLID FILL, 6" WIDE BY 60" LONG BY THE THICKNESS REQUIRED TO PROVIDE A WEDGE FIT BETWEEN THE VERTICAL PIECES OF THE LONGITUDINALLY ADJACENT CENTER GATES (REQD AT 4 PLACES). NAIL THE FIRST PIECE TO THE EXTENDED VERTICAL PIECES OF ONE CENTER GATE W/5-10d NAILS. NAIL EACH ADDITIONAL PIECE TO A PREVIOUSLY INSTALLED PIECE W/5-10d NAILS. NAIL THRU THE VERTICAL PIECE OF THE OTHER CENTER GATE INTO THE LAST SOLID FILL PIECE W/3-10d NAILS. SEE SPECIAL NOTE 3 ON PAGE 41.
- ④ DOORWAY BLOCKING, 2" X 6" X CUT TO FIT (REF: 6'-6") (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "G" ON PAGE 3.
- ⑤ DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 24'-0" STEEL STRAPPING (4 REQD).
- ⑥ SEAL FOR 1-1/4" STRAPPING (8 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "K" ON PAGE 2.

**ISOMETRIC VIEW**

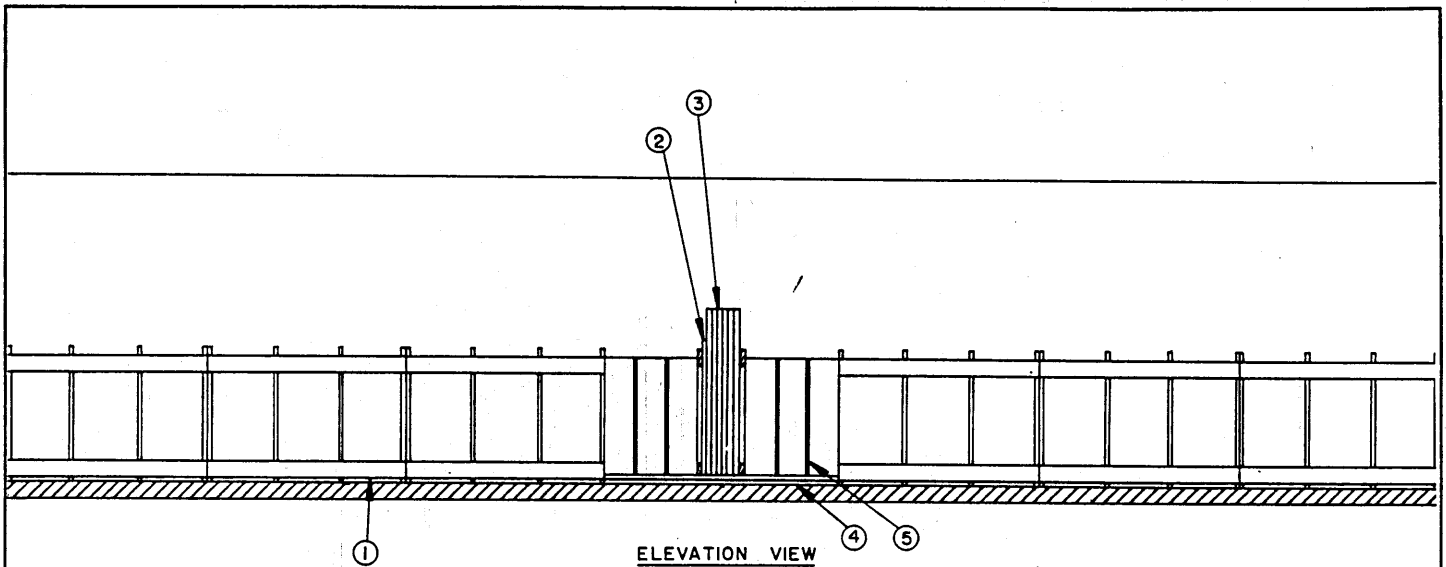
IF THE CAR END WALL IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" DETAIL ON PAGE 54.



**SECTION T-T**

8" PROJECTILE (6/LARGE PALLET)

62-UNIT LOAD IN A 40'-6" LONG BY 9'-0" WIDE BOX CAR (CONVENTIONAL)



**(SPECIAL NOTES CONTINUED)**

6. IN A CAR EQUIPPED WITH SINGLE "THRU" PLUG TYPE DOORS, LOAD UNITS OF THREE PALLETES WHICH ARE POSITIONED WITH THE 31-3/4" WIDTH OF THE UNIT ACROSS THE CAR MUST NOT BE LOADED SO AS TO EXTEND INTO THE DOORWAY TO SUCH AN EXTENT THAT SIX INCHES (6") OR LESS OF A PALLET IS RETAINED BY A CAR SIDEWALL. TO SATISFY THIS REQUIREMENT, NINE (9) LOAD UNITS, AS SHOWN, CAN BE LOADED IN EACH END OF THE CAR IF THE PLUG DOORS ARE 6' THRU 9' WIDE. A CAR WITH WIDER PLUG DOORS WILL BE LIMITED TO EIGHT (8) LOAD UNITS IN EACH END WITH THREE CROSSWISE ROWS IN THE DOORWAY AREA BLOCKED WITH 10'-4" (REF) DOORWAY BLOCKING, PIECE MARKED (4). IF THE CAR IS EQUIPPED WITH DOUBLE "THRU" PLUG TYPE OR WITH STAGGERED DOUBLE PLUG TYPE DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH CROSSWISE ROWS OF 4 LONG BLOCKED WITH DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS. NOTE THAT THESE SPECIFIED LIMITS AS TO THE NUMBER OF LOAD UNITS IN EACH END OF A CAR ARE APPLICABLE ONLY FOR A 40'-6" LONG CAR; THE QUANTITIES WILL VARY IN CARS OF OTHER LENGTHS.
7. IN A CAR EQUIPPED WITH SINGLE SLIDING DOORS, THE UNITS HAVING THE 31-3/4" WIDTH ACROSS THE CAR MAY EXTEND INTO THE DOORWAY AREA, BUT LATERAL BRACING MUST BE PROVIDED BY INSTALLING DOORWAY PROTECTION GATES. SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69 OR THE "DOORWAY PROTECTION B" DETAIL ON PAGE 70. PIECES MARKED (4) AND (5) WILL STILL BE REQUIRED. FOR CARS EQUIPPED WITH STAGGERED DOUBLE SLIDING DOORS, DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE LATERAL BRACING FOR THE ADJACENT UNITS POSITIONED WITH THE 31-3/4" WIDTH ACROSS THE CAR. THE CENTER AREA OF THE CAR ADJACENT TO THE MAIN DOOR OPENINGS. WILL BE LOADED WITH TWO OR MORE CROSSWISE ROWS, AS APPLICABLE. INSTALL BLOCKING AS SHOWN IN THE LOAD VIEW FOR THE CROSSWISE ROWS.
8. IF A CAR IS EQUIPPED WITH DOUBLE "THRU" SLIDING DOORS, OR A COMBINATION OF DOOR TYPES WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE LOAD MUST BE SUCH THAT PALLET UNITS WITH THE 31-3/4" WIDTH ACROSS THE CAR WILL BE RETAINED BY AT LEAST SIX INCHES (6") OF CAR WALL ON BOTH SIDES OF THE CAR. THE ENTIRE DOORWAY AREA WILL THEN BE LOADED WITH CROSSWISE ROWS OF 4 LONG BLOCKED WITH DOORWAY BLOCKING (CUT TO FIT) AND DOORWAY PROTECTION STRAPS.

**SPECIAL NOTES:**

1. A 62-UNIT LOAD OF 8" PROJECTILES PALLETIZED 6 PER LARGE PALLET IS SHOWN IN A 40'-6" LONG BY 9'-0" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTES 2, 6, 7, AND 8.
2. THE LOADING PROCEDURE ON PAGE 40 IS APPLICABLE FOR 9'-0" WIDE CARS HAVING EITHER NAILABLE OR NON-NAILABLE SIDEWALLS. IF A WIDER CAR IS FURNISHED FOR LOADING, REFER TO THE PROCEDURES ON PAGES 36 THRU 39. IF THE CAR TO BE LOADED HAS NAILABLE SIDEWALLS, SIDE FILL MATERIAL SIMILAR TO PIECE MARKED (1) ON PAGE 28 MAY BE LAMINATED TO THE CAR SIDEWALL, IF DESIRED, ALTHOUGH PERHAPS NOT PRACTICAL. LOCATE THE LOWER LEVEL OF SIDE FILL WITH THE TOP OF THE MATERIAL AT 7" ABOVE THE CAR FLOOR; LOCATE THE UPPER LEVEL WITH THE TOP AT 2" ABOVE THE TOP OF THE PALLET COVER. NOTE THAT WHETHER USING CRIB FILL ASSEMBLIES OR NAILED SIDE FILL, THE TOTAL ACCUMULATED SPACE ACROSS THE CAR MUST NOT EXCEED TWO INCHES (2"). TO SATISFY THIS REQUIREMENT, THE WIDTH OF THE CRIB FILL ASSEMBLIES CAN BE ADJUSTED BY INCREASING OR DECREASING THE WIDTH OF THE VERTICAL PIECES AND/OR BY CHANGING THE THICKNESS OF, OR ADDING LAMINATIONS OF MATERIAL TO, THE HORIZONTAL PIECES.
3. SOLID FILL MATERIAL, IF USED, WILL BE 60" LONG WHEN LOADING THE XM650E5 PROJECTILE OR WILL BE 64" LONG WHEN LOADING THE M509E1 PROJECTILE.
4. THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED BY ADDING A PARTIAL SECOND LAYER IN ONE OR BOTH ENDS OF THE CAR, PROVIDED THE CAR HAS NAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR WILL NOT BE EXCEEDED. NOTE THAT THE LOAD LIMIT OF A CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LOAD PLUS DUNNAGE IN THE HEAVY END OF THE CAR. INCREASE THE HEIGHT OF THE CRIB FILL IF USED, OR INSTALL ADDITIONAL SIDE FILL PIECES AT 7" ABOVE THE FIRST-LAYER PALLET COVER AND AT 2" ABOVE THE SECOND-LAYER PALLET COVER. INSTALL THE PROPER SIZE K-BRACE TO RETAIN THE PARTIAL LAYER. SEE THE TYPICAL INSTALLATION ON PAGE 50 AND/OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE.
5. THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. THE LOAD CAN BE REDUCED BY EIGHT PALLET UNITS BY OMITTING THE TWO CROSSWISE ROWS. SUBSTITUTE CENTER GATES D FOR THE DEPICTED CENTER GATES AND INSTALL STRUTS AS TYPICALLY SHOWN IN THE LOAD VIEW ON PAGE 20. IF THE STRUTS ARE 72" OR LONGER THEY MUST BE STIFFENED BY THE APPLICATION OF STRUT BRACING. SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 69 FOR GUIDANCE. MULTIPLES OF THREE PALLET UNITS CAN BE OMITTED FROM ONE OR BOTH ENDS OF THE LOAD. FOR OTHER QUANTITIES, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66. FURTHER REDUCTION OF A LOAD CAN BE ACCOMPLISHED BY EMPLOYING THE PROCEDURES SHOWN ON PAGES 48 AND 49 AS GUIDANCE. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53 OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55.

\* BASED ON XM650E5 PROJECTILE.

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BILL OF MATERIAL *		
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	136	68
2" X 2"	13	5
2" X 3"	8	4
2" X 4"	184	123
2" X 6"	329	329
NAILS	NO. REQD	POUNDS
6d (2")	288	1-3/4
10d (3")	392	6-1/4
16d (3-1/2")	40	1
STEEL STRAPPING, 1-1/4" X .035" (OR .031")--96' REQD ----14 LBS		
SEAL FOR 1-1/4" STRAPPING ----- 8 REQD ----NIL		

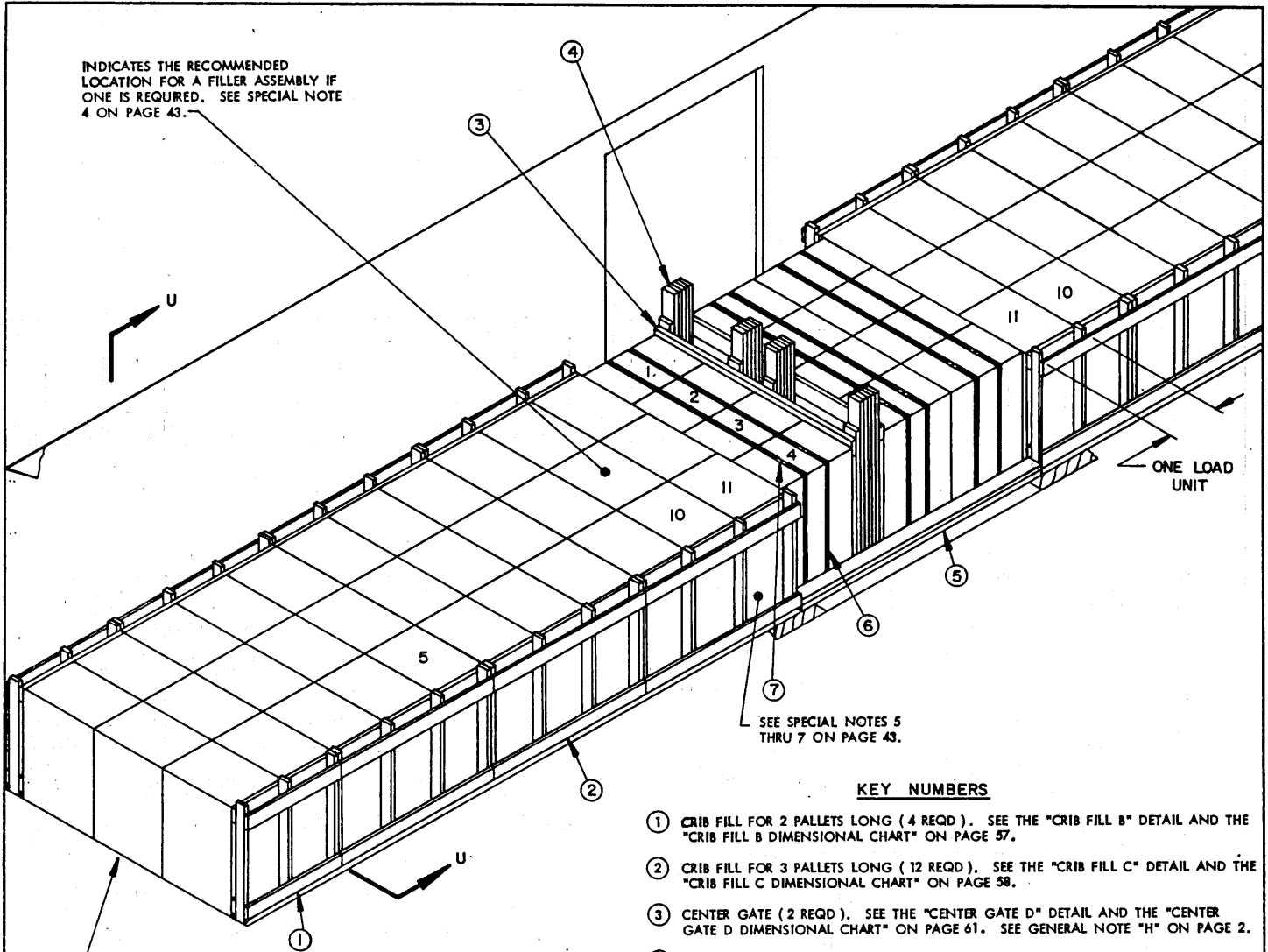
**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
8" PROJECTILE (6/LARGE PALLET) ---	62	79,856 LBS
DUNNAGE -----		1,235 LBS
<b>TOTAL WEIGHT</b> -----		<b>81,091 LBS</b>

8" PROJECTILE (6/LARGE PALLET)

62-UNIT LOAD IN A 40'-6" LONG BY 9'-0" WIDE BOX CAR (CONVENTIONAL)

INDICATES THE RECOMMENDED LOCATION FOR A FILLER ASSEMBLY IF ONE IS REQUIRED. SEE SPECIAL NOTE 4 ON PAGE 43.

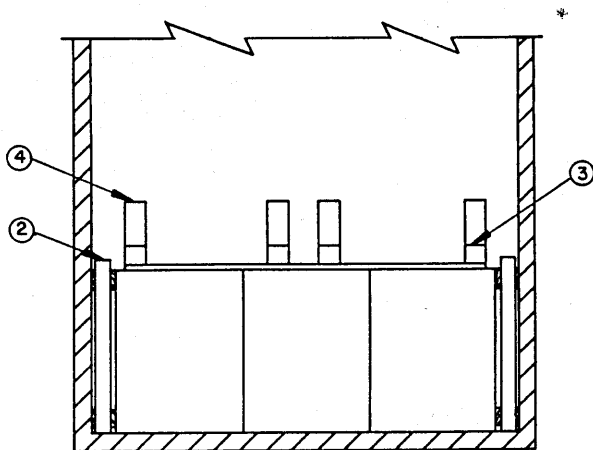


**ISOMETRIC VIEW**

IF THE CAR END WALL IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" DETAIL ON PAGE 56.

**KEY NUMBERS**

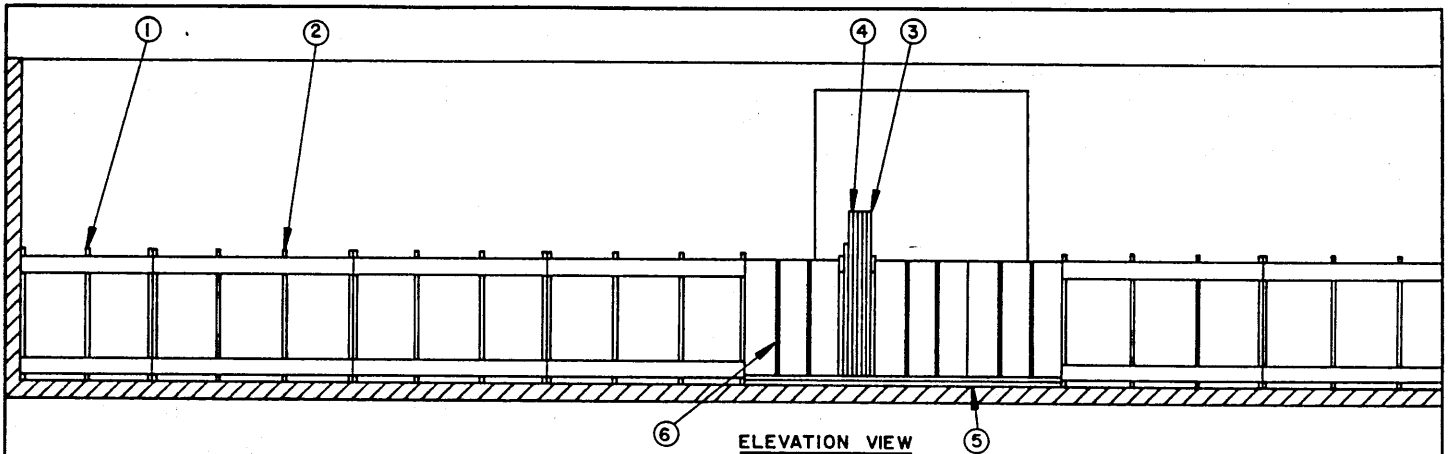
- ① CRIB FILL FOR 2 PALLET LONG ( 4 REQD ). SEE THE "CRIB FILL B" DETAIL AND THE "CRIB FILL B DIMENSIONAL CHART" ON PAGE 57.
- ② CRIB FILL FOR 3 PALLET LONG ( 12 REQD ). SEE THE "CRIB FILL C" DETAIL AND THE "CRIB FILL C DIMENSIONAL CHART" ON PAGE 58.
- ③ CENTER GATE ( 2 REQD ). SEE THE "CENTER GATE D" DETAIL AND THE "CENTER GATE D DIMENSIONAL CHART" ON PAGE 61. SEE GENERAL NOTE "H" ON PAGE 2.
- ④ SOLID FILL, 6" WIDE BY 60" LONG FOR THE XM 650E5 PROJECTILE OR 64" LONG FOR THE M509E1 BY THE THICKNESS REQUIRED TO PROVIDE A WEDGE FIT BETWEEN THE VERTICAL PIECES OF THE LONGITUDINALLY ADJACENT CENTER GATES ( REQD AT 4 PLACES ). NAIL THE FIRST PIECE TO THE EXTENDED VERTICAL PIECE OF ONE CENTER GATE W/5-10d NAILS. NAIL EACH ADDITIONAL PIECE TO A PREVIOUSLY INSTALLED PIECE W/5-10d NAILS. NAIL THRU EACH VERTICAL PIECE OF THE OTHER CENTER GATE INTO THE LAST SOLID FILL PIECE W/3-10d NAILS.
- ⑤ DOORWAY BLOCKING, 2" X 6" BY CUT TO FIT ( REF: 9'-0" ) DOUBLED ( 2 REQD ). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "G" ON PAGE 3.
- ⑥ DOORWAY PROTECTION STRAP, 1-1/4" X .035" ( OR .031" ) X 24'-0" LONG STEEL STRAPPING ( 6 REQD ).
- ⑦ SEAL FOR 1-1/4" STRAPPING ( 12 REQD, 2 PER STRAP JOINT ). SEE GENERAL NOTE "K" ON PAGE 2.



**SECTION U-U**

8" PROJECTILE (6/LARGE PALLET)

78 - UNIT LOAD IN A 50'-6" LONG BY 9'-0" WIDE BOX CAR (CONVENTIONAL)



**ELEVATION VIEW**

**(SPECIAL NOTES CONTINUED)**

**SPECIAL NOTES:**

6. IN A CAR EQUIPPED WITH SINGLE SLIDING DOORS, THE UNITS HAVING THE 31-3/4" WIDTH ACROSS THE CAR MAY EXTEND INTO THE DOORWAY AREA, BUT LATERAL BRACING MUST BE PROVIDED BY INSTALLING DOORWAY PROTECTION GATES. SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69 OR THE "DOORWAY PROTECTION B" DETAIL ON PAGE 70. PIECES MARKED ⑤ AND ⑥ WILL STILL BE REQUIRED. FOR CARS EQUIPPED WITH STAGGERED DOUBLE SLIDING DOORS, DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE LATERAL BRACING FOR THE ADJACENT UNITS POSITIONED WITH THE 31-3/4" WIDTH ACROSS THE CAR. THE CENTER AREA OF THE CAR ADJACENT TO THE MAIN DOOR OPENINGS WILL BE LOADED WITH TWO OR MORE CROSSWISE ROWS.
7. IF A CAR IS EQUIPPED WITH DOUBLE "THRU" SLIDING DOORS, OR A COMBINATION OF DOOR TYPES WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE LOAD MUST BE SUCH THAT PALLET UNITS WITH THE 31-3/4" WIDTH ACROSS THE CAR WILL BE RETAINED BY AT LEAST SIX INCHES (6") OF CAR WALL ON BOTH SIDES OF THE CAR. THE ENTIRE DOORWAY AREA WILL THEN BE LOADED WITH CROSSWISE ROWS OF 4 LONG BLOCKED WITH DOORWAY BLOCKING (CUT TO FIT) AND DOORWAY PROTECTION STRAPS.

1. A 78-UNIT LOAD OF 8" PROJECTILES PALLETIZED 6 PER LARGE PALLET IS SHOWN IN A 50'-6" LONG BY 9'-0" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTES 2, 5, 6, AND 7.
2. THE LOADING PROCEDURE ON PAGE 42 IS APPLICABLE FOR 9'-0" WIDE CARS HAVING EITHER NAILABLE OR NON-NAILABLE SIDEWALLS. IF A WIDER CAR IS FURNISHED FOR LOADING, REFER TO THE PROCEDURES ON PAGES 36 THRU 39. IF THE CAR TO BE LOADED HAS NAILABLE SIDEWALLS, SIDE FILL MATERIAL SIMILAR TO PIECE MARKED ① ON PAGE 28 MAY BE LAMINATED TO THE CAR SIDEWALL IF DESIRED, ALTHOUGH PERHAPS NOT PRACTICAL. LOCATE THE LOWER LEVEL OF SIDE FILL WITH THE TOP OF THE MATERIAL AT 7" ABOVE THE CAR FLOOR; LOCATE THE UPPER LEVEL WITH THE TOP AT 2" ABOVE THE TOP OF THE PALLET COVER. NOTE THAT WHETHER USING CRIB FILL ASSEMBLIES OR NAILED SIDE FILL, THE TOTAL ACCUMULATED SPACE ACROSS THE CAR MUST NOT EXCEED TWO INCHES (2"). TO SATISFY THIS REQUIREMENT, THE WIDTH OF THE CRIB FILL ASSEMBLIES CAN BE ADJUSTED BY INCREASING OR DECREASING THE WIDTH OF THE VERTICAL PIECES AND/OR BY CHANGING THE THICKNESS OF, OR ADDING LAMINATIONS OF MATERIAL TO, THE HORIZONTAL PIECES.
3. THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED BY ADDING A PARTIAL SECOND LAYER IN ONE OR BOTH ENDS OF THE CAR, PROVIDED THE CAR HAS NAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR WILL NOT BE EXCEEDED. NOTE THAT THE LOAD LIMIT OF A CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LADING PLUS DUNNAGE IN THE HEAVY END OF THE CAR. INCREASE THE HEIGHT OF THE CRIB FILL IF USED, OR INSTALL ADDITIONAL SIDE FILL PIECES AT 7" ABOVE THE FIRST-LAYER PALLET COVER AND AT 2" ABOVE THE SECOND-LAYER PALLET COVER. INSTALL THE PROPER SIZE K-BRACE TO RETAIN THE PARTIAL LAYER. SEE THE TYPICAL INSTALLATION ON PAGE 50 AND/OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE.
4. THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. THE LOAD CAN BE REDUCED BY FOUR PALLET UNITS BY OMITTING ONE CROSSWISE ROW. INSTALL STRUTS AS TYPICALLY SHOWN IN THE LOAD VIEW ON PAGE 20. THE LOAD CAN BE DECREASED BY TWELVE PALLET UNITS BY OMITTING ALL THREE CROSSWISE ROWS. SUBSTITUTE CENTER GATES C FOR THE DEPICTED CENTER GATES AND INSTALL STRUTS. IF THE STRUTS ARE 72" OR LONGER THEY MUST BE STIFFENED BY THE APPLICATION OF STRUT BRACING. SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 69 FOR GUIDANCE. MULTIPLES OF THREE PALLET UNITS CAN BE OMITTED FROM ONE OR BOTH ENDS OF THE LOAD. FOR OTHER QUANTITIES, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 46. FURTHER REDUCTION OF A LOAD CAN BE ACCOMPLISHED BY EMPLOYING THE PROCEDURES SHOWN ON PAGES 48 AND 49 AS GUIDANCE. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53 OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55.
5. IN A CAR EQUIPPED WITH SINGLE "THRU" PLUG TYPE DOORS, LOAD UNITS OF THREE PALLETS WHICH ARE POSITIONED WITH THE 31-3/4" WIDTH OF THE UNIT ACROSS THE CAR MUST NOT BE LOADED SO AS TO EXTEND INTO THE DOORWAY TO SUCH AN EXTENT THAT SIX INCHES (6") OR LESS OF A PALLET IS RETAINED BY A CAR SIDEWALL. TO SATISFY THIS REQUIREMENT, ELEVEN (11) LOAD UNITS, AS SHOWN, CAN BE LOADED IN EACH END OF THE CAR IF THE PLUG DOORS ARE 6' THRU 12' WIDE. IF THE CAR IS EQUIPPED WITH DOUBLE "THRU" PLUG TYPE OR WITH STAGGERED DOUBLE PLUG TYPE DOORS, THE ENTIRE DOORWAY AREA MUST BE LOADED WITH CROSSWISE ROWS OF 4 LONG BLOCKED WITH DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS. NOTE THAT THESE SPECIFIED LIMITS AS TO THE NUMBER OF LOAD UNITS IN EACH END OF A CAR ARE APPLICABLE ONLY FOR A 50'-6" LONG CAR; THE QUANTITIES WILL VARY IN CARS OF OTHER LENGTHS.

(CONTINUED AT LEFT)

BILL OF MATERIAL *		
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	167	84
2" X 2"	13	5
2" X 3"	8	4
2" X 4"	230	154
2" X 6"	345	345
NAILS	NO. REQD	POUNDS
6d (2")	360	2-1/4
10d (3")	420	6-1/2
16d (3-1/2")	56	1-1/4
STEEL STRAPPING, 1-1/4" X .035" (OR .031") — 144' REQD — 2T LBS		
SEAL FOR 1-1/4" STRAPPING — 12 REQD — NIL		

\* BASED ON XM6055 PROJECTILE.

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
8" PROJECTILE (6 LARGE PALLET)	78	100,464 LBS
DUNNAGE		1,215 LBS
<b>TOTAL WEIGHT</b>		<b>101,679 LBS</b>

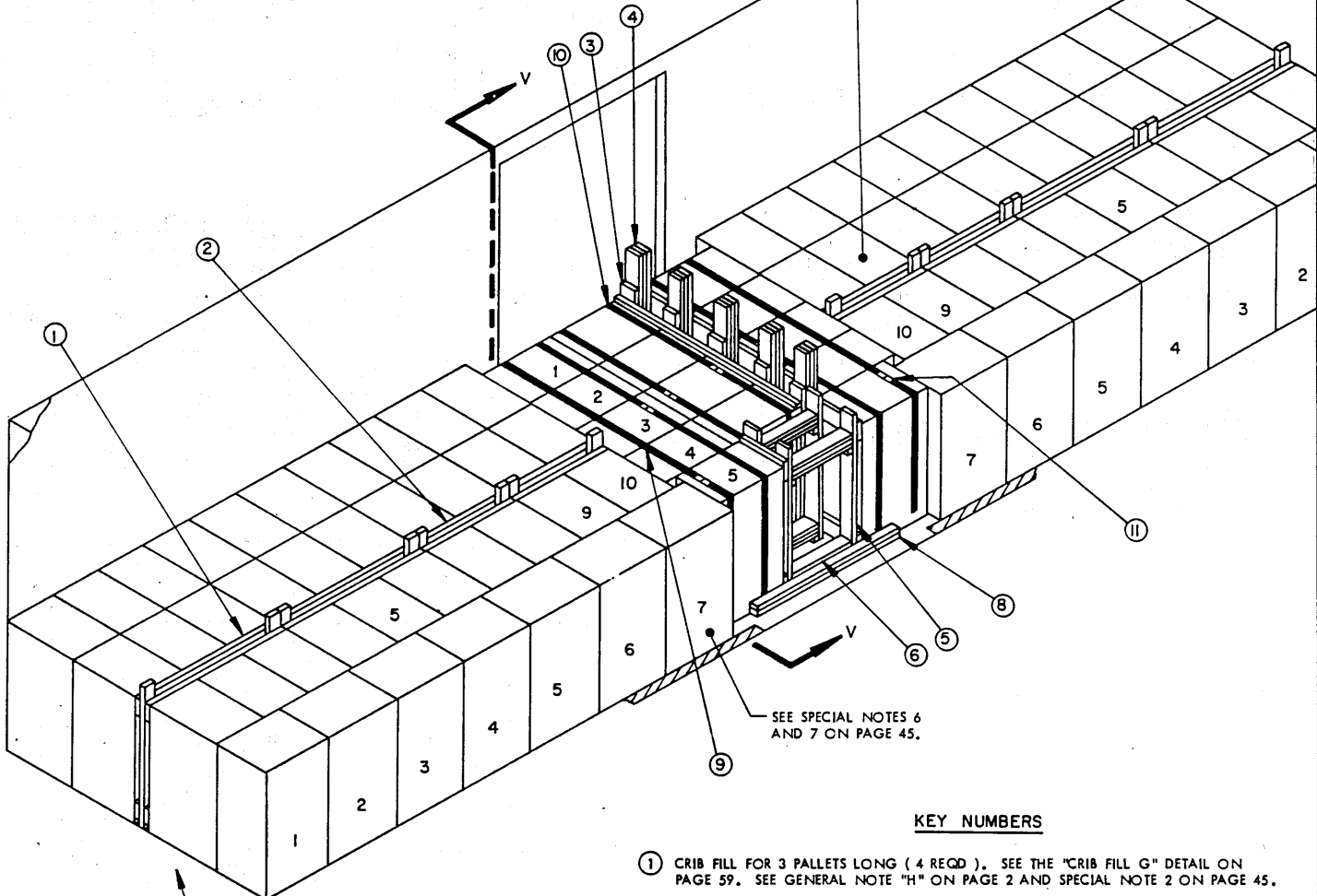
8" PROJECTILE (6/LARGE PALLET)

78-UNIT LOAD IN A 50'-6" LONG BY 9'-0" WIDE BOX CAR (CONVENTIONAL)

( KEY NUMBERS CONTINUED FROM RIGHT )

- ⑩ DOORWAY PROTECTION STRAP, 1-1/4" X .035" ( OR .031" ) X 23'-0" LONG STEEL STRAPPING ( 2 REQD ). INSTALL SO AS TO ENCIRCLE FOUR ( 4 ) PALLET UNITS.
- ⑪ SEAL FOR 1-1/4" STRAPPING ( 12 REQD, 2 PER STRAP JOINT ). SEE GENERAL NOTE "K" ON PAGE 2.

INDICATES THE RECOMMENDED LOCATION FOR A FILLER ASSEMBLY IF ONE IS REQUIRED. SEE SPECIAL NOTE 5 ON PAGE 45.



ISOMETRIC VIEW

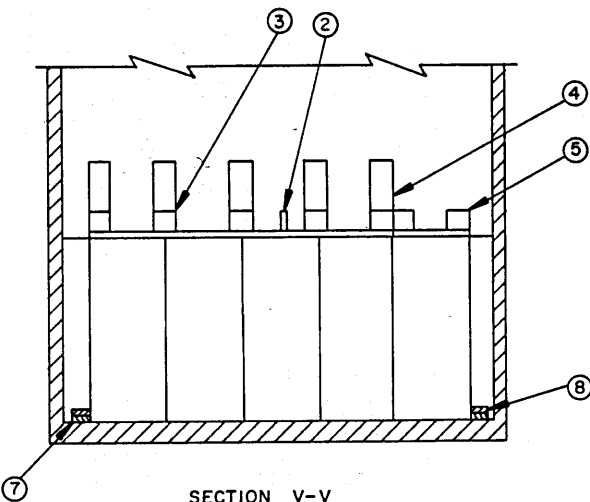
IF THE CAR END WALL IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" DETAIL ON PAGE 56.

SEE SPECIAL NOTES 6 AND 7 ON PAGE 45.

KEY NUMBERS

- ① CRIB FILL FOR 3 PALLET LONG ( 4 REQD ). SEE THE "CRIB FILL G" DETAIL ON PAGE 59. SEE GENERAL NOTE "H" ON PAGE 2 AND SPECIAL NOTE 2 ON PAGE 45.
- ② CRIB FILL FOR 2 PALLET LONG ( 4 REQD ). SEE THE "CRIB FILL G" DETAIL ON PAGE 59. SEE SPECIAL NOTES 6 AND 7 ON PAGE 45.
- ③ CENTER GATE ( 2 REQD ). SEE THE "CENTER GATE C" DETAIL AND THE "CENTER GATE C DIMENSIONAL CHART" FOR A 4-LONG GATE ON PAGE 61.
- ④ SOLID FILL, 6" WIDE BY 64" LONG BY THE THICKNESS REQUIRED TO PROVIDE A WEDGE FIT BETWEEN THE VERTICAL PIECES OF THE LONGITUDINALLY ADJACENT CENTER GATES, PIECES MARKED ③ ( REQD AT 5 PLACES ). NAIL THE FIRST PIECE TO THE EXTENDED VERTICAL PIECE OF ONE CENTER GATE W/5-10d NAILS. NAIL EACH ADDITIONAL PIECE TO A PREVIOUSLY INSTALLED PIECE W/5-10d NAILS. NAIL THRU EACH VERTICAL PIECE OF THE OTHER CENTER GATE INTO THE SOLID FILL PIECES W/3-10d NAILS.
- ⑤ CENTER GATE ( 2 REQD ). SEE THE "CENTER GATE E" DETAIL AND THE "CENTER GATE E DIMENSIONAL CHART" FOR A 1-LONG GATE ON PAGE 62.
- ⑥ STRUT, 2" X 6" BY CUT-TO-FIT ( TRIPLD ) ( 4 REQD ). LAMINATE W/1-10d NAIL EVERY 6" AND TOENAIL THE TOP PIECE TO THE GATE VERTICAL PIECES W/2-12d NAILS AT EACH END. SEE SPECIAL NOTE 3 ON PAGE 45.
- ⑦ DOORWAY BLOCKING, 2" X 6" BY CUT-TO-FIT ( REF: 8'-0" ) DOUBLED ( 1 REQD ). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE THE "SECTION V-V" VIEW AT LEFT. SEE GENERAL NOTE "G" ON PAGE 3.
- ⑧ DOORWAY BLOCKING, 2" X 6" X 60" ( DOUBLED ) ( 1 REQD ). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑨ DOORWAY PROTECTION STRAP, 1-1/4" X .035" ( OR .031" ) X 26'-0" LONG STEEL STRAPPING ( 4 REQD ). INSTALL SO AS TO ENCIRCLE FIVE ( 5 ) PALLET UNITS.

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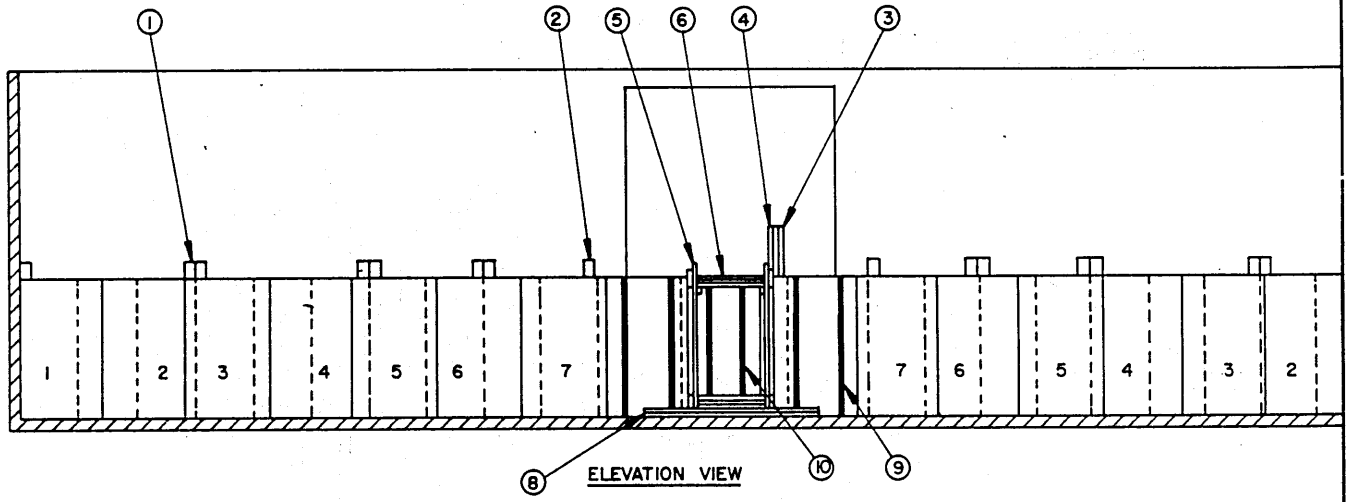


SECTION V-V

8" PROJECTILES ( 6 TALL PROJECTILES / SMALL PALLET )

88-UNIT LOAD IN A 40'-6" LONG BY 9'-2" WIDE BOX CAR ( CONVENTIONAL )





( SPECIAL NOTES CONTINUED )

- THE DEPICTED LOADING PATTERN IS ADEQUATE FOR 40'-6" LONG CARS HAVING SINGLE DOOR OPENINGS WHICH ARE FROM 6' TO 9' WIDE, EITHER CONVENTIONAL SLIDING OR PLUG DOOR TYPE. IF THE CAR IS EQUIPPED WITH DOOR OPENINGS WHICH ARE 10' OR 12' WIDE, THE LOAD WILL BE LIMITED TO 86 PALLET UNITS. OMIT THE THREE PALLET UNITS IN THE GROUP IN WHICH ONE IS MARKED WITH THE FIGURE 10. MODIFY A "FILLER ASSEMBLY A" WHICH IS DETAILED ON PAGE 66, AS NECESSARY TO PROVIDE FOR A SQUARED OFF LOAD AT THE END OF THE SIXTH PALLET ALONG THE NEAR SIDEWALL AND THE NINTH GROUP OF THREE IN THE CENTER ROWS. NOTE THAT SIX ( 6 ) PIECES MARKED ① WILL BE REQUIRED IN LIEU OF FOUR AND PIECES MARKED ② WILL NOT BE REQUIRED. FOUR ( 4 ) CROSSWISE ROWS OF FIVE PALLETS, CENTERED IN THE WIDTH OF THE CAR, CAN BE LOADED. ENCIRCLE EACH ROW WITH TWO DOORWAY PROTECTION STRAPS, PIECES MARKED ⑨. THE DOORWAY BLOCKING, PIECE MARKED ⑦, WILL BE 11'-3" ( REF ) IN LENGTH, AND THE DOORWAY BLOCKING, PIECE MARKED ⑧, WILL BE 9'-0" LONG. INSTALL CENTER GATES C FOR 5-LONG, AND STRUTS OR SOLID FILL, AS APPLICABLE.
- IF THE CAR IS EQUIPPED WITH DOUBLE "THRU" PLUG TYPE DOORS, LOAD EIGHT GROUPS OF 3 WIDE DOWN THE CENTER AND FIVE PALLET UNITS ALONG THE SIDEWALL IN EACH END OF THE CAR AND FIVE CROSSWISE ROWS OF 5 ACROSS IN THE DOORWAY AREA FOR A TOTAL LOAD OF 88 PALLET UNITS. MODIFY A "FILLER ASSEMBLY A" TO BE POSITIONED AT THE END OF THE FIFTH PALLET UNIT ALONG THE CAR SIDEWALL TO PROVIDE A SQUARED OFF LOAD. PIECES MARKED ② WILL NOT BE REQUIRED, PIECE MARKED ⑦ WILL BE 14'-6" LONG ( REF ), AND PIECE MARKED ⑧ WILL BE 12'-0" LONG. INSTALL CENTER GATE C FOR 5-LONG AND STRUTS. FOR CARS EQUIPPED WITH DOUBLE STAGGERED PLUG TYPE DOORS, OR A COMBINATION OF DOOR TYPES WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE ENTIRE DOORWAY AREA ( APPROX 22 OR 24 FEET ) MUST BE LOADED WITH CROSSWISE ROWS. ENCIRCLE EACH CROSSWISE ROW WITH TWO DOORWAY PROTECTION STRAPS AND INSTALL DOORWAY BLOCKING, PIECE MARKED ⑧, OF APPROPRIATE LENGTH. NOTE THAT A MODIFIED FILLER ASSEMBLY "A" OR "C" MAY BE INSTALLED IN EACH END OF THE CAR, OR FILL MATERIAL MAY BE ADDED TO EACH GATE, IN ORDER TO PROVIDE EVEN BEARING SURFACES.
- FOR CARS EQUIPPED WITH DOUBLE STAGGERED SLIDING DOORS, DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE LATERAL BRACING FOR THE ADJACENT UNITS. THE CENTER AREA OF THE CAR ADJACENT TO THE MAIN DOOR OPENINGS WILL BE LOADED AS SHOWN FOR THE DEPICTED LOAD.

SPECIAL NOTES:

- AN 88-UNIT LOAD OF 8" PROJECTILES, PALLETIZED 6 TALL PROJECTILES PER SMALL PALLET, IS SHOWN IN A 40'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTES 6 THRU 8.
- THE LOADING PROCEDURE ON PAGE 44 IS APPLICABLE FOR 9'-2" WIDE CARS HAVING EITHER NAILABLE OR NON-NAILABLE SIDEWALLS. IF A 9'-4" OR 9'-6" WIDE CAR IS FURNISHED FOR LOADING, USE CRIB FILL B FOR TWO PALLETS LONG IN LIEU OF USING PIECE MARKED ②. SEE THE DETAIL AND THE "CRIB FILL B DIMENSIONAL CHART" ON PAGE 57. USE CRIB FILL C FOR THREE PALLETS LONG IN LIEU OF USING PIECE MARKED ①. SEE THE DETAIL AND THE "CRIB FILL C DIMENSIONAL CHART" ON PAGE 58. IF A 9'-0" WIDE CAR IS FURNISHED FOR LOADING, USE CRIB FILL A IN LIEU OF PIECES MARKED ① AND ②. NOTE THAT IN A 9'-0" WIDE CAR THE DOORWAY BLOCKING MUST BE 2" X 4" IN LIEU OF 2" X 6". IF THE CAR FURNISHED HAS NAILABLE SIDEWALLS, SIDE FILL MATERIAL SIMILAR TO PIECE MARKED ① ON PAGE 28 MAY BE LAMINATED TO THE CAR SIDEWALL. SEE THE "SECTION N-N" VIEW ON PAGE 28 FOR HEIGHT LOCATION GUIDANCE. NOTE THAT WHETHER USING CRIB FILL ASSEMBLIES OR NAILABLE SIDE FILL, THE TOTAL ACCUMULATED SPACE ACROSS THE CAR MUST NOT EXCEED TWO INCHES ( 2" ).
- IF AVAILABLE, 4" X 6" MATERIAL ( POSITIONED FLAT ) MAY BE USED IN LIEU OF THE DEPICTED TRIPLED 2" X 6" STRUTS, PROVIDED THE ROW BEING RETAINED DOES NOT CONTAIN MORE THAN THIRTEEN ( 13 ) PALLET UNITS. SEE THE "LOAD CAPACITY CHART" ON PAGE 72.
- THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED BY ADDING A PARTIAL SECOND LAYER IN ONE OR BOTH ENDS OF THE CAR, PROVIDED THE CAR HAS NAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR WILL NOT BE EXCEEDED. NOTE THAT THE LOAD LIMIT OF THE CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LADING PLUS DUNNAGE IN THE HEAVY END OF THE CAR. INCREASE THE HEIGHT AND ADJUST THE LENGTH OF THE CRIB FILL ASSEMBLIES TO PROVIDE LATERAL BRACING FOR THE PARTIAL LAYER. IF SIDE FILL PIECES SIMILAR TO PIECE MARKED ① ON PAGE 28 ARE USED, INSTALL ADDITIONAL PIECES AT 43-1/2" AND 6'-2" ABOVE THE CAR FLOOR. INSTALL THE PROPER SIZE K-BRACE TO RETAIN THE PARTIAL LAYER. SEE THE TYPICAL INSTALLATION ON PAGE 50 AND/OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE.
- THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. THE LOAD CAN BE REDUCED BY FOUR PALLET UNITS BY OMITTING ONE CROSSWISE ROW FROM THE CENTER OF THE CAR. A REDUCTION OF THREE OR FOUR PALLET UNITS OR MULTIPLES THEREOF CAN BE ACCOMPLISHED BY OMITTING ONE OR MORE GROUPS OF THREE HAVING THE 28-1/2" DIMENSION ACROSS THE CAR AND THE LATERAL ADJACENT UNIT ( 5 ) HAVING THE 19-1/2" DIMENSION ACROSS THE CAR. FOR THOSE QUANTITIES WHICH CANNOT BE ATTAINED BY ANY OF THE PREVIOUS METHODS, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS TO REACH THE DESIRED QUANTITY. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66. NOTE THAT CENTER GATES AND STRUTS, SIMILAR TO THE LOAD SHOWN ON PAGE 4, WILL BE USED IN LIEU OF THE DEPICTED CENTER GATES AND SOLID FILL WHEN THE EXCESS SPACE IN THE CENTER OF THE CAR IS APPROXIMATELY 18" OR MORE. FURTHER REDUCTION OF A LOAD CAN BE ACCOMPLISHED BY EMPLOYING THE PROCEDURES SHOWN ON PAGES 48 AND 49 AS GUIDANCE. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53 OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	35	12
2" X 3"	12	6
2" X 4"	64	43
2" X 6"	324	324
NAILS	NO. REQD	POUNDS
10d ( 3" )	465	7-1/4
12d ( 3-1/4" )	16	1/2
16d ( 3-1/2" )	38	1
STEEL STRAPPING, 1-1/4" X .035" ( OR .031" ) -- 150' REQD --	22 LBS	
SEAL FOR 1-1/4" STRAPPING	12 REQD	NIL

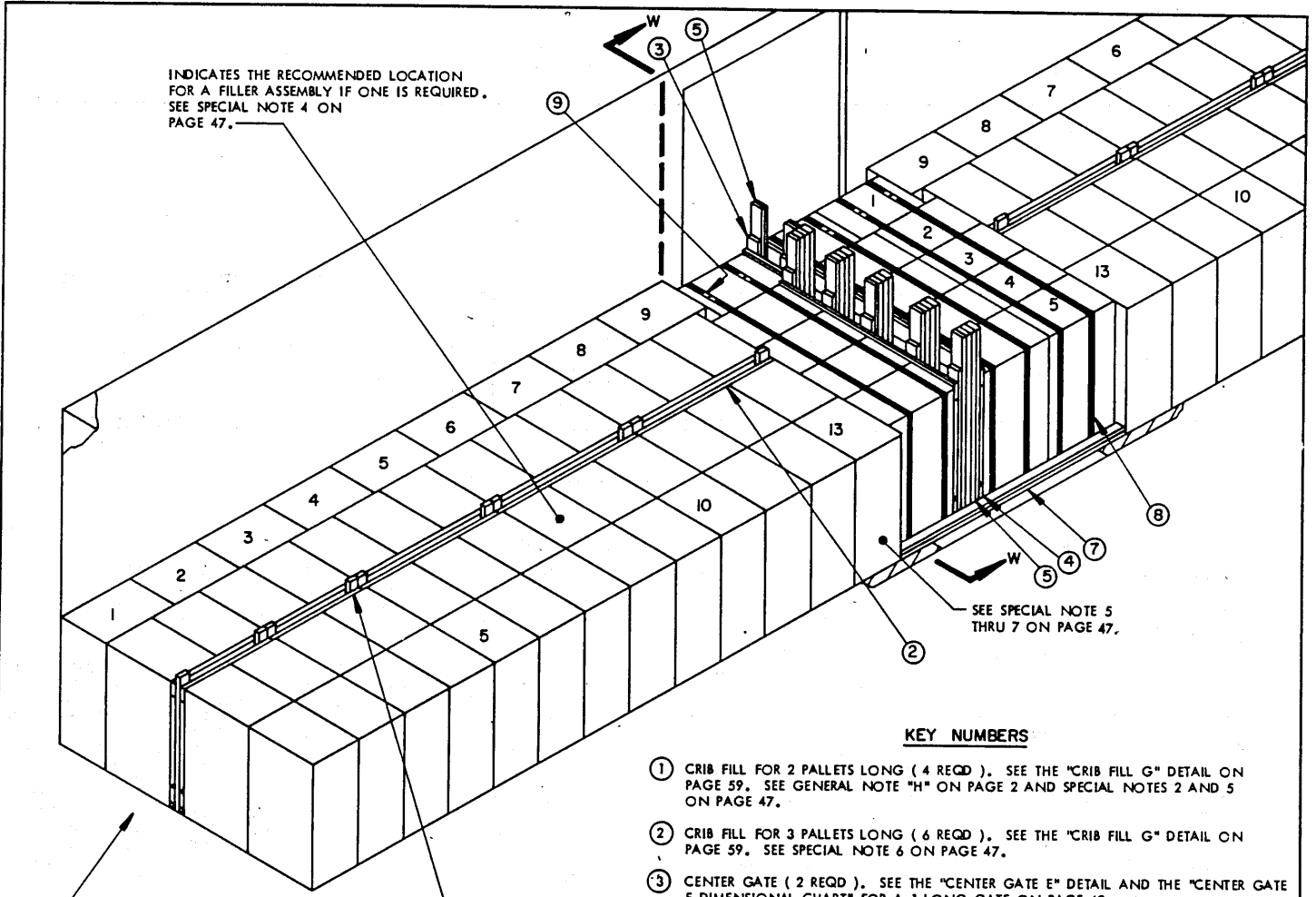
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LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT ( APPROX )
8" ( 6 TALL/SMALL PALLET )	88	114,048 LBS
DUNNAGE		801 LBS
TOTAL WEIGHT		114,849 LBS

8" PROJECTILES ( 6 TALL PROJECTILES / SMALL PALLET )  
88- UNIT LOAD IN A 40'-6" LONG BY 9'-2" WIDE BOX CAR ( CONVENTIONAL )

INDICATES THE RECOMMENDED LOCATION FOR A FILLER ASSEMBLY IF ONE IS REQUIRED. SEE SPECIAL NOTE 4 ON PAGE 47.

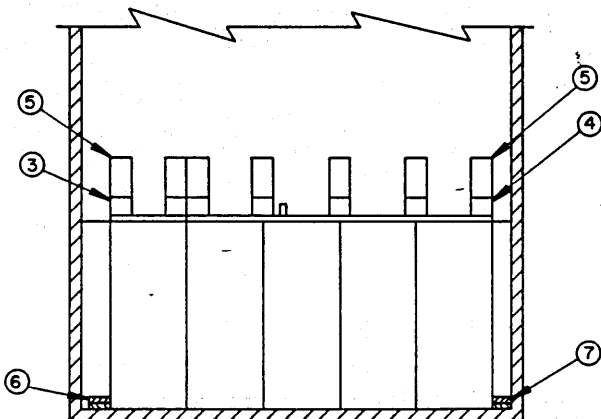


ISOMETRIC VIEW

IF THE CAR END WALL IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" DETAIL ON PAGE 56.

**KEY NUMBERS**

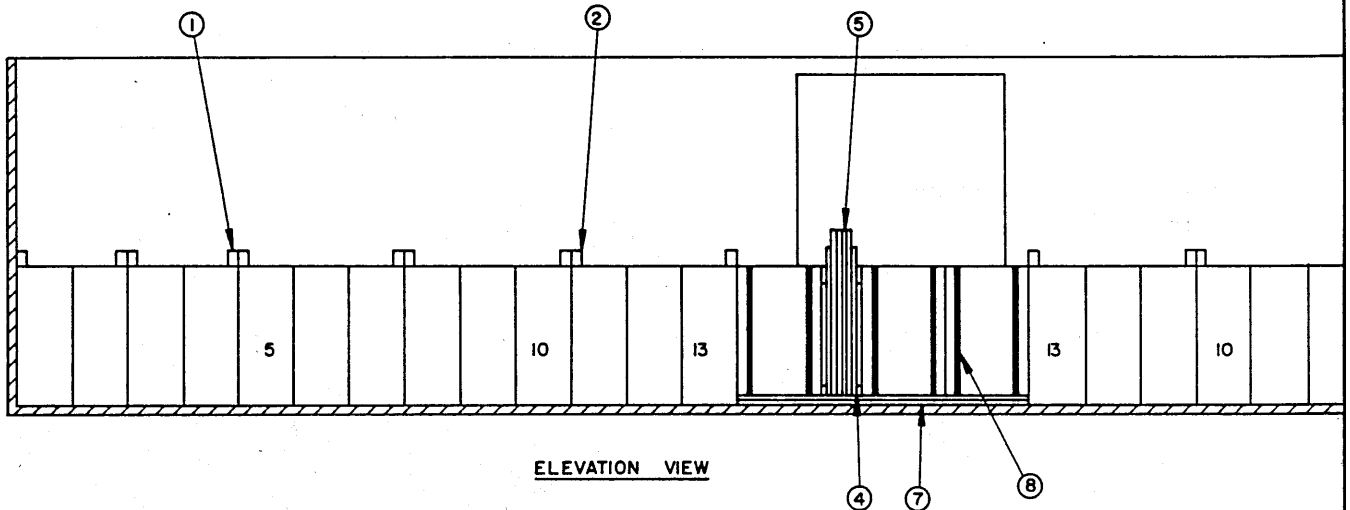
- ① CRIB FILL FOR 2 PALLETS LONG ( 4 REQD ). SEE THE "CRIB FILL G" DETAIL ON PAGE 59. SEE GENERAL NOTE "H" ON PAGE 2 AND SPECIAL NOTES 2 AND 5 ON PAGE 47.
- ② CRIB FILL FOR 3 PALLETS LONG ( 6 REQD ). SEE THE "CRIB FILL G" DETAIL ON PAGE 59. SEE SPECIAL NOTE 6 ON PAGE 47.
- ③ CENTER GATE ( 2 REQD ). SEE THE "CENTER GATE E" DETAIL AND THE "CENTER GATE E DIMENSIONAL CHART" FOR A 1-LONG GATE ON PAGE 62.
- ④ CENTER GATE ( 2 REQD ). SEE THE "CENTER GATE C" DETAIL AND THE "CENTER GATE C DIMENSIONAL CHART" FOR A 4-LONG GATE ON PAGE 61.
- ⑤ SOLID FILL, 6" WIDE BY 64" LONG BY THE THICKNESS REQUIRED TO PROVIDE A WEDGE FIT BETWEEN THE VERTICAL PIECES OF THE LONGITUDINALLY ADJACENT CENTER GATES ( REQD AT 2 PLACES BETWEEN PIECES MARKED ③ ), AND REQD AT 5 PLACES BETWEEN PIECES MARKED ④ ). NAIL THE FIRST PIECE TO THE EXTENDED VERTICAL PIECE OF ONE CENTER GATE W/5-10d NAILS. NAIL EACH ADDITIONAL PIECE TO A PREVIOUSLY INSTALLED PIECE W/5-10d NAILS. NAIL THRU EACH VERTICAL PIECE OF THE OTHER CENTER GATE INTO THE SOLID FILL PIECES W/3-10d NAILS.
- ⑥ DOORWAY BLOCKING, 2" X 6" X 66" ( DOUBLED ) ( 1 REQD ). POSITION SO AS TO BE CENTERED ON THE THREE CROSSWISE ROWS AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE THE "SECTION W-W" VIEW AT LEFT.
- ⑦ DOORWAY BLOCKING, 2" X 6" BY CUT-TO-FIT ( REF: 8'-3" ) ( DOUBLED ) ( 1 REQD ). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "G" ON PAGE 3.
- ⑧ DOORWAY PROTECTION STRAP, 1-1/4" X .035" ( OR .031" ) X 26'-0" LONG STEEL STRAPPING ( 6 REQD ). INSTALL SO AS TO ENCIRCLE FIVE ( 5 ) PALLET UNITS.
- ⑨ SEAL FOR 1-1/4" STRAPPING ( 12 REQD, 2 PER STRAP JOINT ). SEE GENERAL NOTE "K" ON PAGE 2.



SECTION W-W

8" PROJECTILES ( 6 TALL PROJECTILES / SMALL PALLET )

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



ELEVATION VIEW

( SPECIAL NOTES CONTINUED )

IN THE GROUP IN WHICH ONE IS MARKED WITH THE FIGURE 13. MODIFY A "FILLER ASSEMBLY A" WHICH IS DETAILED ON PAGE 66, AS NECESSARY TO PROVIDE FOR A SQUARED OFF LOAD AT THE END OF THE EIGHTH PALLET ALONG THE FAR SIDEWALL AND THE TWELFTH GROUP OF THREE IN THE CENTER ROWS. NOTE THAT EIGHT ( 8 ) PIECES MARKED ② WILL BE REQUIRED IN LIEU OF SIX, AND PIECES MARKED ① WILL NOT BE REQUIRED. FOUR ( 4 ) CROSSWISE ROWS OF FIVE PALLETS, CENTERED IN THE WIDTH OF THE CAR, CAN BE LOADED. ENCIRCLE EACH ROW WITH TWO DOORWAY PROTECTION STRAPS, PIECES MARKED ⑧. THE DOORWAY BLOCKING, PIECE MARKED ⑦ WILL BE 10'-0" LONG, AND THE DOORWAY BLOCKING, PIECE MARKED ⑦, WILL BE 11'-6" LONG ( REF ). INSTALL CENTER GATES C FOR 5-LONG, AND STRUTS.

6. IF THE CAR IS EQUIPPED WITH DOUBLE "THRU" PLUG DOORS, LOAD TEN GROUPS OF 3 WIDE DOWN THE CENTER AND SEVEN PALLET UNITS ALONG THE SIDEWALL IN EACH END OF THE CAR AND SEVEN PALLET UNITS ALONG THE SIDEWALL IN EACH END OF THE CAR AND SEVEN PALLET UNITS ALONG THE SIDEWALL IN EACH END OF THE CAR FOR A TOTAL LOAD OF 109 PALLET UNITS. INSTALL TWO ( 2 ) EACH DOORWAY PROTECTION STRAPS, PIECES MARKED ⑧, AROUND THE SEVEN CROSSWISE ROWS IN THE DOORWAY AREA. ONLY FOUR ( 4 ) PIECES MARKED ② WILL BE REQUIRED IN LIEU OF SIX, PIECES MARKED ⑥ WILL BE 16'-0" LONG, AND PIECE MARKED ⑦ WILL BE 18'-0" LONG ( REF ). INSTALL CENTER GATE C, CENTER GATE E, AND SOLID FILL. FOR CARS EQUIPPED WITH DOUBLE STAGGERED PLUG TYPE DOORS, OR A COMBINATION OF DOOR TYPES WITH A PLUG TYPE AUXILIARY AND A CONVENTIONAL SLIDING MAIN DOOR, THE ENTIRE DOORWAY AREA ( APPROX 22 OR 24 FEET ) MUST BE LOADED WITH CROSSWISE ROWS. ENCIRCLE EACH CROSSWISE ROW WITH TWO DOORWAY PROTECTION STRAPS AND INSTALL DOORWAY BLOCKING, PIECE MARKED ⑧, OF APPROPRIATE LENGTH. NOTE THAT A MODIFIED FILLER ASSEMBLY "A" OR "C" MAY BE INSTALLED IN EACH END OF THE CAR, OR FILL MATERIAL MAY BE ADDED TO EACH GATE, IN ORDER TO PROVIDE EVEN BEARING SURFACES.
7. FOR CARS EQUIPPED WITH DOUBLE STAGGERED SLIDING DOORS, DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE LATERAL BRACING FOR THE ADJACENT UNITS. THE CENTER AREA OF THE CAR ADJACENT TO THE MAIN DOOR OPENINGS WILL BE LOADED AS SHOWN FOR THE DEPICTED LOAD.

SPECIAL NOTES:

1. A 111-UNIT LOAD OF 8" PROJECTILES, 6 TALL PROJECTILES PER SMALL PALLET, IS SHOWN IN A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS, UP TO AND INCLUDING 60-FOOT LONG CARS, AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTES 5 THRU 7.
2. THE LOADING PROCEDURE ON PAGE 46 IS APPLICABLE FOR 9'-2" WIDE CARS HAVING EITHER NAILABLE OR NON-NAILABLE SIDEWALLS. IF A 9'-4" OR 9'-6" WIDE CAR IS FURNISHED FOR LOADING, USE CRIB FILL B FOR TWO PALLETS LONG IN LIEU OF USING PIECE MARKED ①. SEE THE DETAIL AND THE "CRIB FILL B DIMENSIONAL CHART" ON PAGE 57. USE CRIB FILL C FOR THREE PALLETS LONG IN LIEU OF USING PIECE MARKED ②. SEE THE DETAIL AND THE "CRIB FILL C DIMENSIONAL CHART" ON PAGE 58. IF A 9'-0" WIDE CAR IS FURNISHED FOR LOADING, USE CRIB FILL A IN LIEU OF PIECES MARKED ① AND ②. NOTE THAT IN A 9'-0" WIDE CAR THE DOORWAY BLOCKING MUST BE 2" X 4" IN LIEU OF 2" X 6". IF THE CAR FURNISHED HAS NAILABLE SIDEWALLS, SIDE FILL MATERIAL SIMILAR TO PIECE MARKED ① ON PAGE 28 MAY BE LAMINATED TO THE CAR SIDEWALL. SEE THE "SECTION N-N" VIEW ON PAGE 28 FOR HEIGHT LOCATION GUIDANCE. NOTE THAT WHETHER USING CRIB FILL ASSEMBLIES OR NAILABLE SIDE FILL, THE TOTAL ACCUMULATED SPACE ACROSS THE CAR MUST NOT EXCEED TWO INCHES ( 2" ).
3. THE DEPICTED LOAD CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED BY ADDING A PARTIAL SECOND LAYER IN ONE OR BOTH ENDS OF THE CAR, PROVIDING THE CAR HAS NAILABLE SIDEWALLS AND PROVIDED THE LOAD LIMIT OF THE CAR WILL NOT BE EXCEEDED. NOTE THAT THE LOAD LIMIT OF THE CAR MUST BE APPROXIMATELY TWO TIMES THE COMBINED WEIGHT OF THE LADING PLUS DUNNAGE IN THE HEAVY END OF THE CAR. INCREASE THE HEIGHT AND ADJUST THE LENGTH OF THE CRIB FILL ASSEMBLIES TO PROVIDE LATERAL BRACING FOR THE PARTIAL LAYER. IF SIDE FILL PIECES SIMILAR TO PIECE MARKED ① ON PAGE 28 ARE USED, INSTALL ADDITIONAL PIECES AT 43-1/2" AND 6'-2" ABOVE THE CAR FLOOR. INSTALL THE PROPER SIZE K-BRACE TO RETAIN THE PARTIAL LAYER. SEE THE TYPICAL INSTALLATION ON PAGE 50 AND/OR THE DETAILS ON PAGES 51 THRU 53 FOR GUIDANCE.
4. THE DEPICTED LOAD CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. THE LOAD CAN BE REDUCED BY FIVE PALLET UNITS BY OMITTING ONE CROSSWISE ROW FROM THE CENTER OF THE CAR. A REDUCTION OF THREE OR FOUR PALLET UNITS OR MULTIPLES OF THEREOF CAN BE ACCOMPLISHED BY OMITTING ONE OR MORE GROUPS OF THREE HAVING THE 28-1/2" DIMENSION ACROSS THE CAR AND THE LATERALLY ADJACENT UNIT ( S ) HAVING THE 19-1/2" DIMENSION ACROSS THE CAR. FOR THOSE QUANTITIES WHICH CANNOT BE ATTAINED BY ANY OF THE PREVIOUS METHODS, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS TO REACH THE DESIRED QUANTITY. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66. NOTE THAT CENTER GATES AND STRUTS, SIMILAR TO THE LOAD SHOWN ON PAGE 4, WILL BE USED IN LIEU OF THE DEPICTED CENTER GATES AND SOLID FILL WHEN THE EXCESS SPACE IN THE CENTER OF THE CAR IS APPROXIMATELY 18" OR MORE. FURTHER REDUCTION OF A LOAD CAN BE ACCOMPLISHED BY EMPLOYING THE PROCEDURES SHOWN ON PAGES 48 AND 49 AS GUIDANCE. SMALL QUANTITIES CAN BE SHIPPED BY USING ONE OF THE K-BRACE ASSEMBLIES SHOWN ON PAGES 50 THRU 53 OR BY USING KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 54 AND 55.
5. THE DEPICTED LOADING PATTERN IS ADEQUATE FOR 50'-6" LONG CARS HAVING SINGLE DOOR OPENINGS WHICH ARE 6' TO 9' WIDE, EITHER CONVENTIONAL SLIDING OR PLUG DOOR TYPE. IF THE CAR IS EQUIPPED WITH DOOR OPENINGS WHICH ARE 10' OR 12' WIDE, THE LOAD WILL BE LIMITED TO 108 PALLET UNITS. OMIT FROM EACH END OF THE LOAD THE THREE PALLET UNITS

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	10	4
2" X 3"	8	4
2" X 4"	80	54
2" X 6"	464	464
NAILS	NO. REQD	POUNDS
10d ( 3" )	556	8-3/4
16d ( 3-1/2" )	40	1
STEEL STRAPPING, 1-1/4" X .035" ( OR .031" ) - 156' REQD - 23 LBS		
SEAL FOR 1-1/4" STRAPPING ----- 12 REQD - NIL		

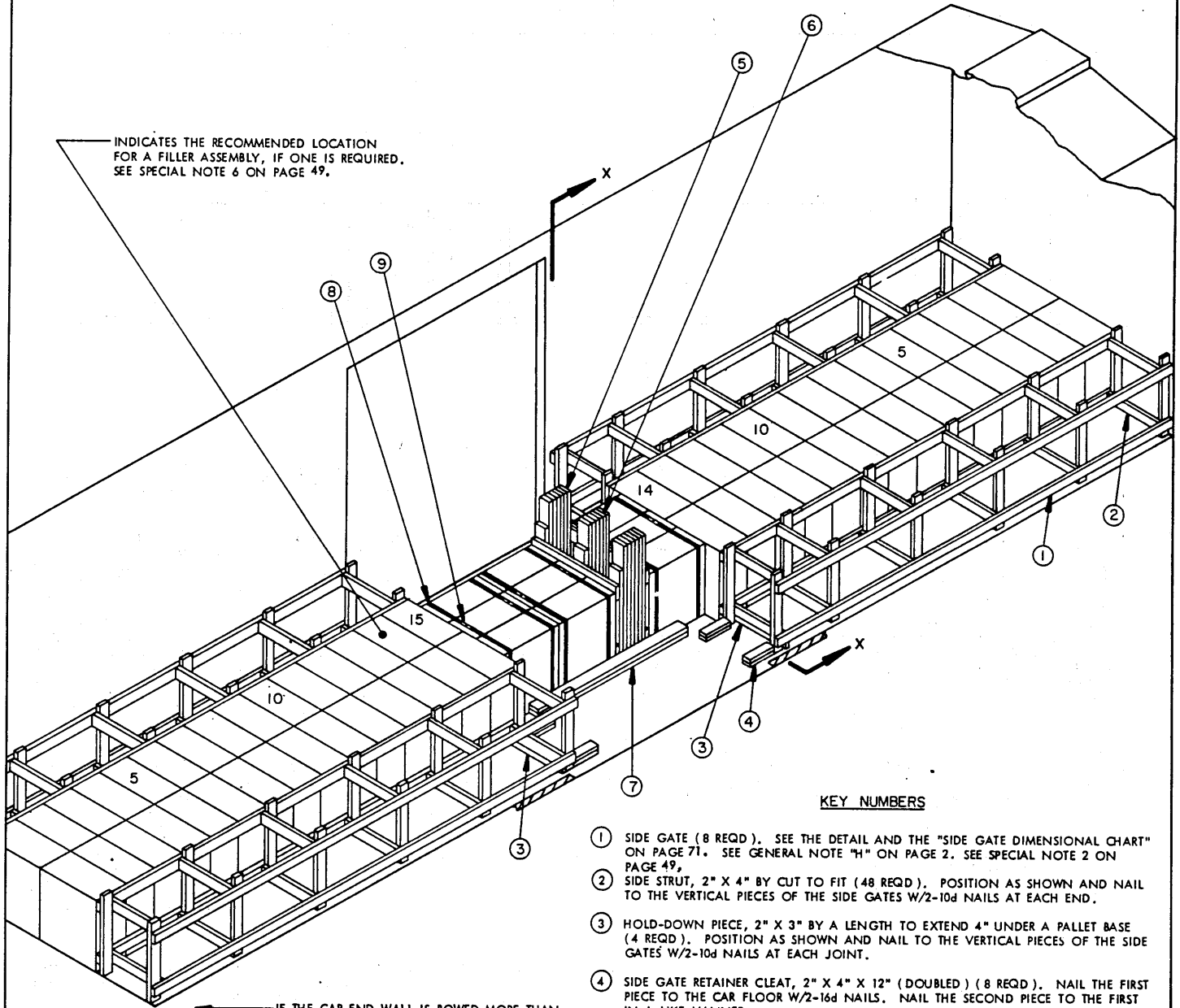
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LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT ( APPROX )
8" ( 6 TALL/SMALL PALLET ) - 111	-----	143,856 LBS
DUNNAGE	-----	1,077 LBS
TOTAL WEIGHT -----		144,933 LBS

8" PROJECTILES ( 6 TALL PROJECTILES/ SMALL PALLET )  
111-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR ( CONVENTIONAL )

INDICATES THE RECOMMENDED LOCATION FOR A FILLER ASSEMBLY, IF ONE IS REQUIRED. SEE SPECIAL NOTE 6 ON PAGE 49.

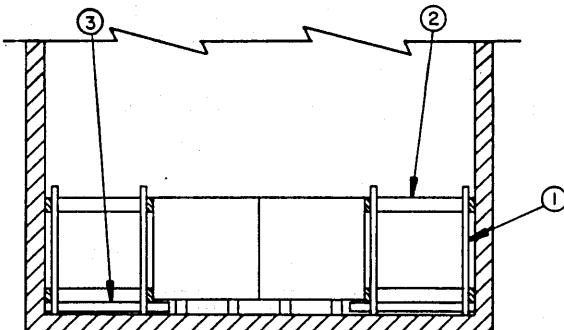


ISOMETRIC VIEW

IF THE CAR END WALL IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" DETAIL ON PAGE 56.

KEY NUMBERS

- ① SIDE GATE (8 REQD). SEE THE DETAIL AND THE "SIDE GATE DIMENSIONAL CHART" ON PAGE 71. SEE GENERAL NOTE "H" ON PAGE 2. SEE SPECIAL NOTE 2 ON PAGE 49.
- ② SIDE STRUT, 2" X 4" BY CUT TO FIT (48 REQD). POSITION AS SHOWN AND NAIL TO THE VERTICAL PIECES OF THE SIDE GATES W/2-10d NAILS AT EACH END.
- ③ HOLD-DOWN PIECE, 2" X 3" BY A LENGTH TO EXTEND 4" UNDER A PALLET BASE (4 REQD). POSITION AS SHOWN AND NAIL TO THE VERTICAL PIECES OF THE SIDE GATES W/2-10d NAILS AT EACH JOINT.
- ④ SIDE GATE RETAINER CLEAT, 2" X 4" X 12" (DOUBLED) (8 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/2-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑤ CENTER GATE (2 REQD). SEE THE "CENTER GATE E" DETAIL AND THE "CENTER GATE E DIMENSIONAL CHART" ON PAGE 62. SEE THE "LOAD PATTERN CHART" AND SPECIAL NOTE 5 ON PAGE 49.
- ⑥ SOLID FILL, 6" WIDE BY PALLET COVER HEIGHT PLUS 18" LONG BY THE THICKNESS REQUIRED TO PROVIDE A WEDGE FIT BETWEEN THE VERTICAL PIECES OF THE LONGITUDINALLY ADJACENT CENTER GATES (REQD AT 3 PLACES). NAIL THE FIRST PIECE TO THE EXTENDED VERTICAL PIECE OF ONE CENTER GATE W/5-10d NAILS. NAIL EACH ADDITIONAL PIECE TO A PREVIOUSLY INSTALLED PIECE W/5-10d NAILS. NAIL THRU EACH VERTICAL PIECE OF THE OTHER CENTER GATE INTO THE LAST SOLID FILL PIECE W/3-10d NAILS. SEE SPECIAL NOTE 4 ON PAGE 49.
- ⑦ DOORWAY BLOCKING, 2" X 6" BY A LENGTH TO EXTEND TO THE CENTERS OF THE WIDTH OF THE OUTWARD CROSSWISE ROWS (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVE:Y 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "G" ON PAGE 3.
- ⑧ DOORWAY PROTECTION STRAP, 1-1/4" X .035" OR .031" BY A LENGTH TO SUIT STEEL STRAPPING (6 REQD).
- ⑨ SEAL FOR 1-1/4" STRAPPING (12 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "K" ON PAGE 2.



SECTION X-X

TYPICAL LCL LOAD USING SIDE GATES  
IN A 40'-6" LONG BY 9'-2" WIDE BOX CAR (CONVENTIONAL)

LOAD PATTERN CHART				
ITEM	LENGTHWISE ROWS		CROSSWISE ROWS	
	NO. WIDE	GATE REQD*	NO. OF UNITS	GATE REQD
155MM 8 PER SMALL PALLET	3-WIDE	GATE K	5 MIN 6 7 MAX	GATE C GATE C GATE B
	2-WIDE	GATE J	3 MIN 4 .5 MAX	GATE D OR E GATE C GATE C
	1-WIDE	GATE M	NONE PERMITTED	
155MM 8 PER LARGE PALLET	3-WIDE	GATE K	5 MIN 6 7 MAX	GATE C GATE C GATE B
	2-WIDE	GATE J	3 MIN 4 5 MAX	GATE D OR E GATE C GATE C
	1-WIDE	GATE M	NONE PERMITTED	
175MM 6 PER PALLET	4-WIDE	GATE H	5 MIN 6 MAX	GATE C GATE C
	3-WIDE	GATE K	4 MIN 5 MAX	GATE C GATE C
	2-WIDE	GATE J	3 MIN 4 MAX	GATE D GATE C
	1-WIDE	GATE M	NONE PERMITTED	
8", 3 PER PALLET	3-WIDE	GATE K	8 MIN 9 10 MAX	GATE B GATE B GATE B
	2-WIDE	GATE J	5 MIN 6 7 MAX	GATE C GATE C GATE B
	1-WIDE	GATE M	NONE PERMITTED	
8", 6 PER SMALL PALLET	3-WIDE	GATE K	4 MIN 5 MAX	GATE C GATE C
	2-WIDE	GATE J	2 MIN 3 MAX	GATE E GATE D
	1-WIDE	GATE M	NONE PERMITTED	
8", 6 PER LARGE PALLET	3-WIDE	GATE K	4 MIN 4 MAX	GATE C GATE C
	2-WIDE	GATE J	2 MIN 3 MAX	GATE E GATE D
	1-WIDE	GATE M	NONE PERMITTED	
8", 6 TALL/ SMALL PALLET	3-WIDE	GATE K	4 MIN 5 MAX	GATE C GATE C
	2-WIDE	GATE J	2 MIN 3 MAX	GATE E GATE D
	1-WIDE	GATE M	NONE PERMITTED	

\*THE CENTER GATE SPECIFIED IN THIS COLUMN IS FOR USE ONLY WHEN THERE ARE NO CROSSWISE ROWS IN THE LOAD.

BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	7	3
2" X 3"	18	9
2" X 4"	509	340
2" X 6"	119	119
NAILS	NO. REQD	POUNDS
10d (3")	642	10
16d (3-1/2")	68	1-1/2
STEEL STRAPPING, 1-1/4" X .035" (OR .031")— 78' REQD -- 12 LBS		
SEAL FOR 1-1/4" STRAPPING ----- 12 REQD ---- NIL		

**SPECIAL NOTES:**

1. A 47-UNIT LOAD OF 155MM PROJECTILES/PALLETIZED 8 PER PALLET IS SHOWN AS A TYPICAL LCL LOAD; A 40'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR EQUIPPED WITH 8'-0" WIDE DOOR OPENINGS IS SHOWN AS A TYPICAL CAR. CARS OF OTHER DIMENSIONS AND CARS HAVING DOOR OPENINGS OF OTHER WIDTHS CAN BE USED. THE SPECIFIED PROCEDURES ARE ALSO APPLICABLE FOR SHIPMENTS OF ONE OR MORE ROWS OF ANY OF THE OTHER PALLET UNITS DEPICTED ON PAGES 102 AND 103, EXCEPT FOR THE 175MM PALLETIZED 20 PER PALLET WHICH WILL BE LIMITED TO ONE ROW AND IS COVERED BY SPECIAL NOTE 7 ON PAGE 27.
2. THE PALLET UNITS IN EITHER END OF THE CAR WHICH ARE POSITIONED WITH THE WIDTH (LONG DIMENSION) ACROSS THE CAR MUST NOT BE LOADED SO AS TO EXTEND INTO THE DOORWAY AREA OF A CAR EQUIPPED WITH SINGLE CONVENTIONAL SLIDING OR PLUG TYPE "THRU" DOORS. THE NUMBER OF LOAD UNITS IN EACH END POSITIONED WITH THE WIDTH ACROSS THE CAR MUST BE REDUCED (WITH AN ACCOMPANYING REDUCTION IN THE LENGTH OF THE SIDE GATE, PIECE MARKED ①), AND THE NUMBER OF CROSSWISE ROWS IN THE DOORWAY AND/OR THE AMOUNT OF CENTER BLOCKING INCREASED TO SATISFY THIS REQUIREMENT. FOR CARS EQUIPPED WITH STAGGERED DOUBLE SLIDING DOORS, DOORWAY PROTECTION GATES SHOULD BE INSTALLED IN THE AUXILIARY DOOR OPENINGS TO PROVIDE LATERAL BRACING FOR THE SIDE GATES, PIECES MARKED ①. SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 69 OR THE "DOORWAY PROTECTION B" DETAIL ON PAGE 70. **CAUTION:** CARS EQUIPPED WITH STAGGERED DOUBLE PLUG DOORS MUST NOT BE USED.
3. CENTER GATE E IS USED FOR BRACING OF THE DEPICTED TYPICAL LOAD. DEPENDING UPON THE ITEM BEING LOADED AND THE LOAD PATTERN BEING USED, CENTER GATE B, C, OR D MAY BE REQUIRED IN LIEU OF CENTER GATE E FOR BRACING AGAINST THE CROSSWISE ROWS IN THE CENTER OF THE CAR. IF THE LOAD CONTAINS NO CROSSWISE ROWS, CENTER GATE H, J, K, OR L, AS APPLICABLE, WILL BE SUBSTITUTED.
4. SOLID FILL TYPE CENTER BLOCKING AS TYPICALLY SHOWN IS APPLICABLE WHEN THE VOID SPACE AT THE CENTER OF THE CAR IS APPROXIMATELY 18" OR LESS. FOR A GREATER SPACE, STRUT TYPE CENTER BLOCKING WILL BE USED. SEE THE LOAD VIEW ON PAGE 4 FOR A TYPICAL INSTALLATION. LOADS SHOULD BE DESIGNED SO THAT THE STRUTS WILL BE AS SHORT AS POSSIBLE. HOWEVER, IF LONG STRUTS CANNOT BE AVOIDED, STRUTS WHICH ARE 72" OR LONGER MUST BE STIFFENED BY THE APPLICATION OF STRUT BRACING. SEE THE "TYPICAL STRUT BRACING" DETAIL ON PAGE 69 FOR GUIDANCE IN THE STIFFENING OF TRIPLED STRUTS.
5. A LOAD WHERE THE MAIN PORTION IS 2 PALLET UNITS WIDE AND WHERE THERE ARE 3 CROSSWISE ROWS AT THE CENTER WHICH ARE 3 PALLET UNITS IN LENGTH IS SHOWN AS A TYPICAL LOAD PATTERN. THE NUMBER OF ROWS IN THE MAIN PORTION MAY BE ADJUSTED FROM 1 THRU 3 (4 FOR THE 175MM) AND THE NUMBER OF CROSSWISE ROWS MAY BE ADJUSTED FROM 2 THRU 4. THE NUMBER OF UNITS LONG ACROSS THE CAR IN THE CENTER PORTION IS ALSO ADJUSTABLE BUT MUST NOT VARY MORE THAN THE MINIMUM AND MAXIMUM NUMBERS SPECIFIED BY THE "LOAD PATTERN CHART" AT LEFT FOR THE NUMBER OF LENGTHWISE ROWS IN THE MAIN PORTION OF THE LOAD. THE PROPER CENTER GATES TO BE USED ARE ALSO SPECIFIED IN THE CHART, EITHER FOR BRACING BETWEEN THE CROSSWISE ROWS, OR FOR BRACING BETWEEN THE LENGTHWISE ROWS IN LOADS NOT HAVING ANY CROSSWISE ROWS.
6. FOR THOSE LOAD QUANTITIES WHICH CANNOT BE ATTAINED BY ADJUSTING THE LOAD PATTERN AS SPECIFIED IN SPECIAL NOTE 5 AND AS INDICATED IN THE "LOAD PATTERN CHART" AT LEFT, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS TO REACH THE DESIRED QUANTITY. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66.
7. THESE LCL PROCEDURES MAY BE USED IN LONG CARS (60'-8" TO 86'-6") TO OBTAIN A FULL-WEIGHT LOAD. THE LOAD SHOULD BE DESIGNED SO THAT SOLID FILL TYPE CENTER BLOCKING CAN BE USED IF POSSIBLE. IF STRUTTING MUST BE USED, REFER TO THE "LOAD CAPACITY CHART" ON PAGE 72 FOR GUIDANCE AS TO THE MAXIMUM QUANTITY OF PALLET UNITS THAT CAN BE RETAINED IN THE HEAVY END OF A CAR WITH THE LISTED NUMBER OF EITHER TRIPLED 2" X 6" STRUTS OR 4" X 6" STRUTS. NOTE THAT IT MAY BE NECESSARY TO APPLY EXTRA VERTICAL PIECES TO EACH OF THE CENTER GATES, IN ADDITION TO THOSE SPECIFIED, IN ORDER TO ACCOMMODATE THE REQUIRED NUMBER OF STRUTS.

**LOAD AS SHOWN (TYPICAL)**

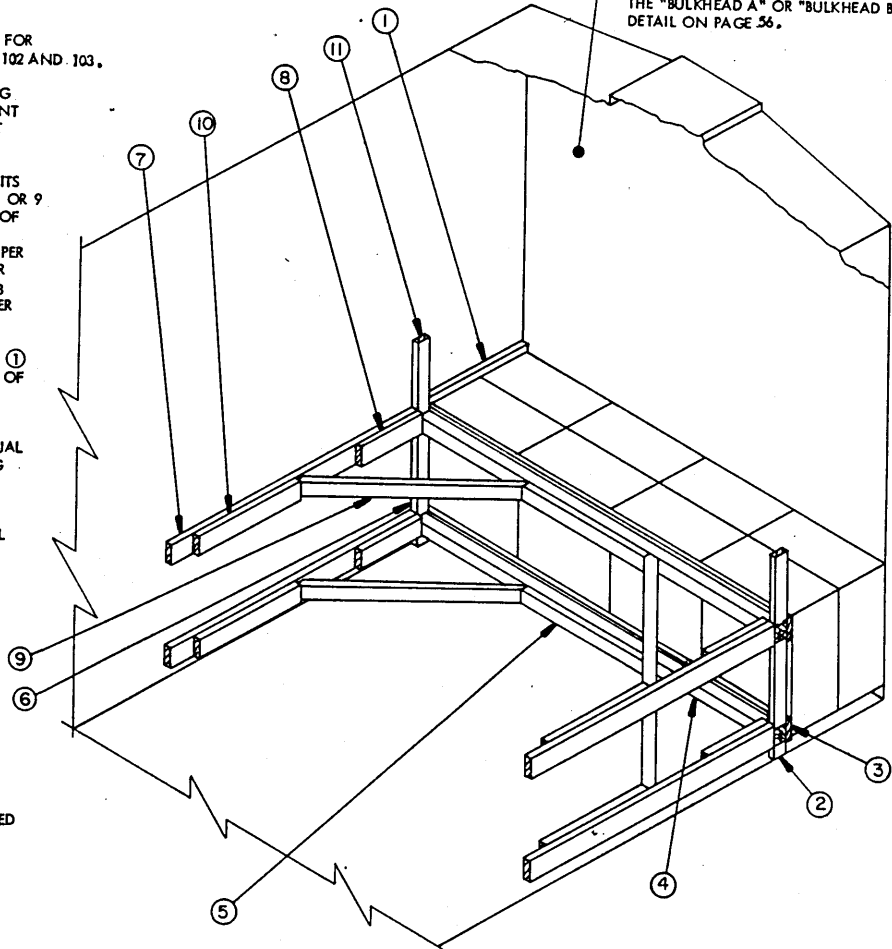
ITEM	QUANTITY	WEIGHT (APPROX)
155MM (8/SMALL PALLET)	67	53,600 LBS
DUNNAGE		966 LBS
<b>TOTAL WEIGHT</b>		<b>54,566 LBS</b>

TYPICAL LCL LOAD USING SIDE GATES IN A 40'-6" LONG BY 9'-2" WIDE BOX CAR (CONVENTIONAL)

**SPECIAL NOTES:**

1. A 9'-2" WIDE CONVENTIONAL, WOOD-LINED BOX CAR IS SHOWN. WOOD-LINED CARS OF OTHER WIDTHS CAN BE USED.
2. AN LCL LOAD OF 155MM PROJECTILES IS SHOWN AS A TYPICAL LOAD. THE PROCEDURES ARE ALSO APPLICABLE FOR ANY OF THE OTHER PALLET UNITS DEPICTED ON PAGES 102 AND 103.
3. THE K-BRACE METHOD OF PARTIAL-LAYER (TIER) BRACING MAY BE USED IN WOOD-LINED CARS FOR THE SECUREMENT OF EITHER A PARTIAL SECOND LAYER OR A PARTIAL FIRST LAYER. THE TYPE "A" BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL LAYER OF NOT MORE THAN 8,000 POUNDS. THIS WILL BE NOT MORE THAN 10 PALLET UNITS OF 155MM PROJECTILES PALLETIZED 8 PER SMALL PALLET OR 9 PALLET UNITS PALLETIZED 8 PER LARGE PALLET, 8 UNITS OF 175MM PALLETIZED 6 PER PALLET, 2 UNITS OF 175MM PALLETIZED 20 PER PALLET, 12 UNITS OF 8" PALLETIZED 3 PER PALLET, OR 6 UNITS OF 8" PROJECTILES PALLETIZED 6 PER SMALL OR LARGE PALLET. REFER TO PAGE 51, 52, OR 53 FOR A K-BRACE WHICH WILL BE ADEQUATE FOR A GREATER QUANTITY OF PALLET UNITS.
4. THE SUPPORT CLEAT, PIECE MARKED ② (PIECE MARKED ① ON PAGES 51, 52, AND 53), WILL BE 4" LONG IN LIEU OF 4' LONG WHEN BRACING FIRST-LAYER UNITS OF 175MM PROJECTILES PALLETIZED 20 PER PALLET WHICH HAVE THE INDIVIDUAL PALLET SKIDS INTACT, OR WHEN BRACING SECOND-LAYER UNITS WHICH ARE WITHOUT THE INDIVIDUAL PALLET SKIDS. THE SUPPORT CLEAT WILL BE 8-1/4" LONG WHEN BRACING SECOND-LAYER UNITS WHICH HAVE THE INDIVIDUAL PALLET SKIDS INTACT.
5. THE CENTER CLEAT, SHOWN AS PIECE MARKED ⑤, WILL BE 28" LONG FOR AN 8'-6" WIDE CAR, 36" LONG FOR A 9'-2" WIDE CAR, 38" LONG FOR A 9'-4" WIDE CAR, AND 40" LONG FOR A 9'-6" WIDE CAR. ADJUST THE LENGTH PROPORTIONALLY FOR CARS OF OTHER WIDTHS.
6. FILLER ASSEMBLY A OR FILLER ASSEMBLY B, AS APPLICABLE, WILL BE USED IN OBTAINING A QUANTITY OTHER THAN A FULL LOAD UNIT OR A MULTIPLE THEREOF. SEE THE DETAILS ON PAGES 66 AND 67 RESPECTIVELY.
7. THE SIDE FILL, PIECE MARKED ①, IS APPLICABLE FOR 155MM PROJECTILES IN A 9'-2" WIDE CAR. THE PROPER LATERAL BRACING TO BE USED WILL BE AS SHOWN FOR THE APPLICABLE FULL CAR LOAD FOR THE ITEM TO BE SHIPPED OR AS DESIGNATED IN THE SPECIAL NOTES FOR THAT LOAD.

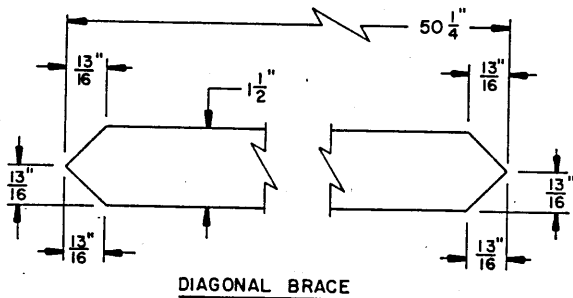
INDICATES CAR END WALL. IF THE END WALL IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" OR "BULKHEAD B" DETAIL ON PAGE 56.



ISOMETRIC VIEW

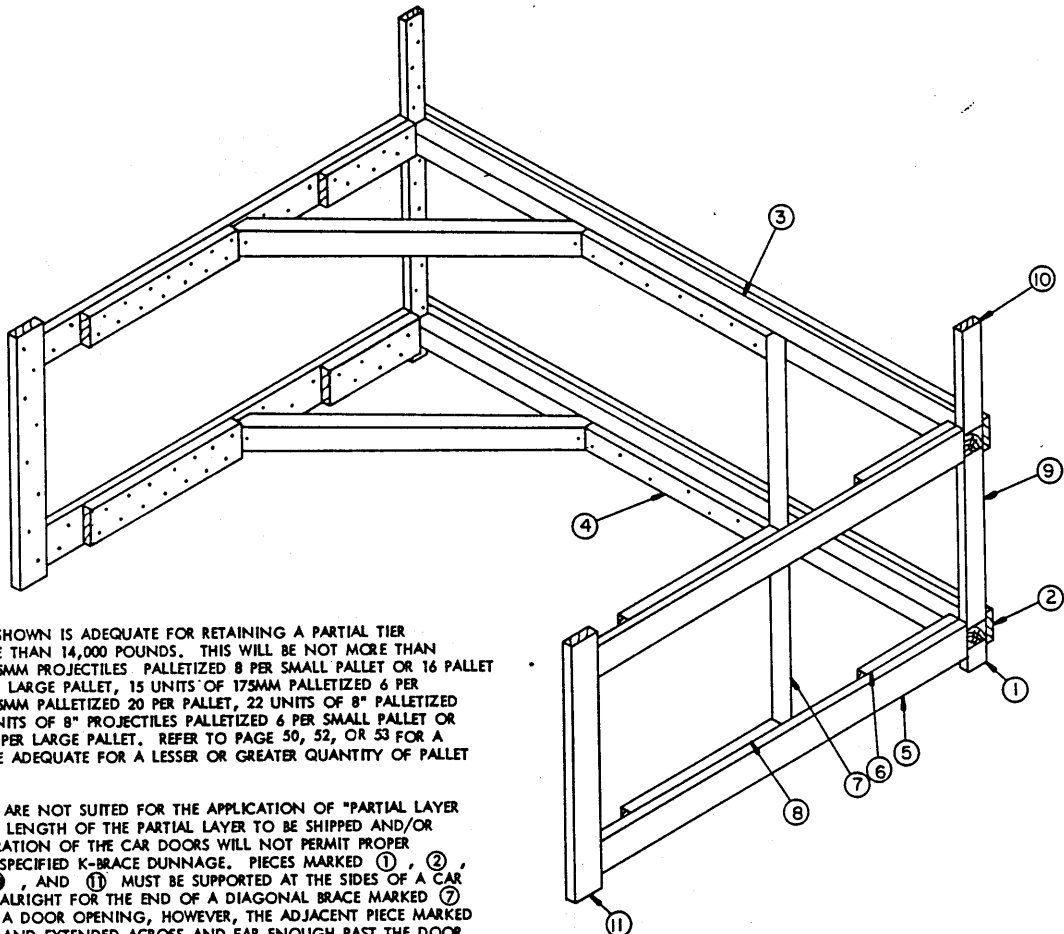
**KEY NUMBERS**

- ① SIDE FILL, 2" X 6" X 27" (2 REQD). POSITION AT THE HEIGHTS SHOWN BY THE "SECTION A-A" VIEW ON PAGE 4. NAIL TO THE CAR SIDEWALL W/3-10d NAILS. SEE GENERAL NOTE "H" ON PAGE 2. SEE SPECIAL NOTE 7 AT LEFT.
- ② SUPPORT CLEAT, 2" X 4" X 4" (2 REQD). PRE-DRILL AND NAIL TO THE CAR SIDEWALL W/2-12d NAILS. SEE SPECIAL NOTE 4 AT LEFT.
- ③ LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH IN LENGTH (CUT TO FIT) (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ④, W/1-12d NAIL EVERY 6".
- ④ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH IN LENGTH (CUT TO FIT) (2 REQD).
- ⑤ CENTER CLEAT, 2" X 4" X 36" (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ④, W/7-16d NAILS. SEE SPECIAL NOTE 5 AT LEFT.
- ⑥ SPACER CLEAT, 2" X 4" X 32" FOR THE 175MM PROJECTILES PALLETIZED 20 PER PALLET, OR PALLET UNIT COVER HEIGHT MINUS 10" FOR ALL OTHER UNITS (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.
- ⑦ HORIZONTAL WALL CLEAT, 2" X 6" X 72" (4 REQD). NAIL TO THE CAR SIDEWALL W/16-12d NAILS.
- ⑧ POCKET CLEAT, 2" X 6" X 12" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑦, W/4-16d NAILS.
- ⑨ DIAGONAL BRACE, 2" X 4" X 50-1/4" (4 REQD). SEE THE DETAIL AT LEFT FOR BEVEL CUTS REQUIRED. TOENAIL TO THE CROSS CAR BRACE, PIECE MARKED ④, AND TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑦, W/2-16d NAILS AT EACH END.
- ⑩ BACK-UP CLEAT, 2" X 6" X 24" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑦, W/8-16d NAILS.
- ⑪ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.



DIAGONAL BRACE

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



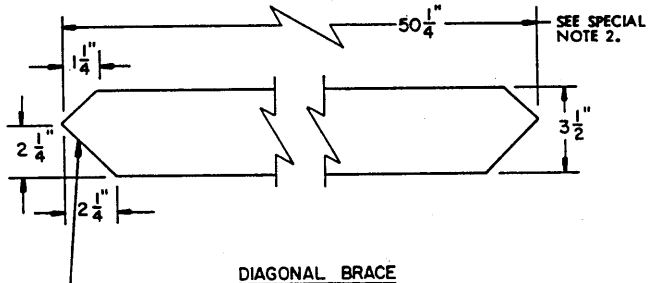
ISOMETRIC VIEW

KEY NUMBERS

SPECIAL NOTES:

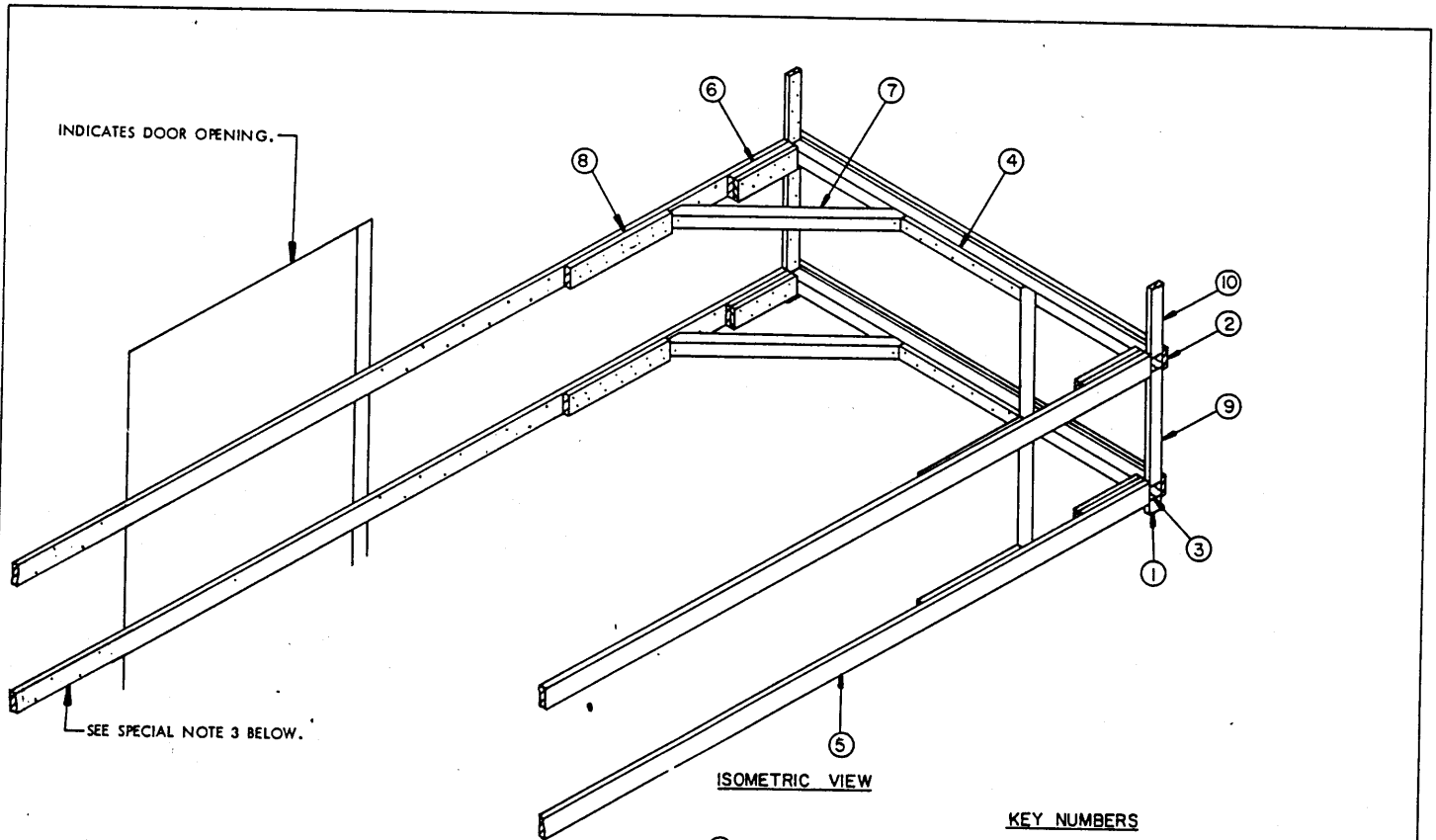
1. THE TYPE "B" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER (LAYER) OF NOT MORE THAN 14,000 POUNDS. THIS WILL BE NOT MORE THAN 17 PALLET UNITS OF 155MM PROJECTILES PALLETIZED 8 PER SMALL PALLET OR 16 PALLET UNITS PALLETIZED 8 PER LARGE PALLET, 15 UNITS OF 175MM PALLETIZED 6 PER PALLET, 4 UNITS OF 175MM PALLETIZED 20 PER PALLET, 22 UNITS OF 8" PALLETIZED 3 PER PALLET, OR 11 UNITS OF 8" PROJECTILES PALLETIZED 6 PER SMALL PALLET OR 10 UNITS PALLETIZED 6 PER LARGE PALLET. REFER TO PAGE 50, 52, OR 53 FOR A K-BRACE WHICH WILL BE ADEQUATE FOR A LESSER OR GREATER QUANTITY OF PALLET UNITS.
2. CAUTION: SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL LAYER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ①, ②, ③, ④, ⑨, ⑩, AND ⑪ MUST BE SUPPORTED AT THE SIDES OF A CAR BY A SIDEWALL. IT IS ALRIGHT FOR THE END OF A DIAGONAL BRACE 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 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" WIDE CAR, 38" LONG FOR A 9'-4" WIDE CAR, AND 40" FOR A 9'-6" WIDE CAR. ADJUST THE LENGTH PROPORTIONATELY FOR CARS OF OTHER WIDTHS.
4. REFER TO PAGE 50 FOR A TYPICAL INSTALLATION OF A K-BRACE.

- ① SUPPORT CLEAT, 2" X 4" X 4" (2 REQD). PRE-DRILL AND NAIL TO THE CAR SIDEWALL W/2-12d NAILS. SEE SPECIAL NOTE 4 ON PAGE 50.
- 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 "H" 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 AT LEFT FOR BEVEL CUTS REQUIRED. TOENAIL TO THE CROSS CAR BRACE, PIECE MARKED ③, AND TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/1-50d NAIL AT EACH END. SEE SPECIAL NOTE 2 AT LEFT.
- ⑧ BACK-UP CLEAT, 2" X 6" X 30" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/14-16d NAILS.
- ⑨ SPACER CLEAT, 2" X 4" X 32" FOR THE 175MM PROJECTILES PALLETIZED 20 PER PALLET, OR PALLET UNIT COVER HEIGHT MINUS 10" FOR ALL OTHER UNITS (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 VERTICAL BACK-UP CLEAT, 2" X 6" BY UNIT HEIGHT (2 REQD). NAIL TO THE CAR SIDEWALL W/8-12d NAILS.



DIAGONAL BRACE

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



ISOMETRIC VIEW

KEY NUMBERS

- ① SUPPORT CLEAT, 2" X 4" X 4" (2 REQD). PRE-DRILL AND NAIL TO THE CAR SIDEWALL W/2-12d NAILS. SEE SPECIAL NOTE 4 ON PAGE 50.
- 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 "H" 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 ON PAGE 51.
- ⑤ HORIZONTAL WALL CLEAT, 2" X 6" BY CUT TO FIT (4 REQD). A CLEAT WILL BE OF A LENGTH AS NECESSARY TO EXTEND ACROSS AND FAR ENOUGH PAST THE DOOR OPENING TO CONTACT PIECE MARKED ③ OF THE K-BRACE IN THE OPPOSITE END OF THE CAR. NAIL TO THE CAR SIDEWALL W/40-12d NAILS.
- ⑥ POCKET CLEAT, 2" X 6" X 18" (DOUBLED) (4 REQD). NAIL THE FIRST PIECE TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/7-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑦ DIAGONAL BRACE, 4" X 4" X 50-1/4" (4 REQD). SEE THE DETAIL AT LEFT 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. SEE SPECIAL NOTE 2 AT LEFT.
- ⑧ BACK-UP CLEAT, 2" X 6" X 30" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑤, W/14-16d NAILS.
- ⑨ SPACER CLEAT, 2" X 4" X 32" FOR THE 175MM PROJECTILES PALLETTIZED 20 PER PALLET, OR PALLET UNIT COVER HEIGHT MINUS 10" FOR ALL OTHER UNITS (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.

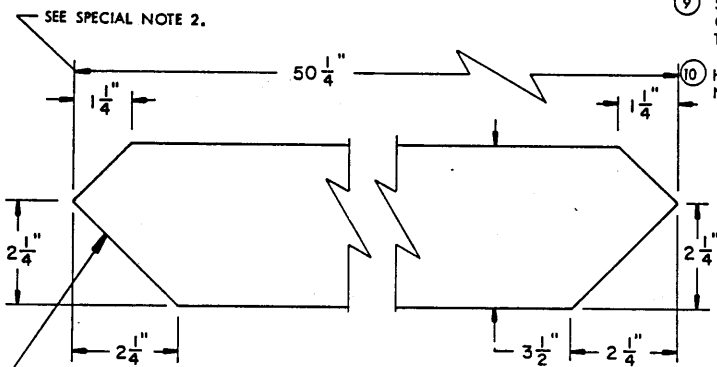
SPECIAL NOTES:

1. THE TYPE "C" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER (LAYER) OF NOT MORE THAN 20,000 POUNDS IN EACH END OF THE CAR. THIS WILL BE NOT MORE THAN 25 PALLET UNITS OF 155MM PROJECTILES PALLETTIZED 8 PER SMALL PALLET OR 22 PALLET UNITS PALLETTIZED 8 PER LARGE PALLET, 21 UNITS OF 175MM PALLETTIZED 6 PER PALLET, 5 UNITS OF 175MM PALLETTIZED 20 PER PALLET, 31 UNITS OF 8" PALLETTIZED 3 PER PALLET, OR 15 UNITS OF 8" PROJECTILES PALLETTIZED 6 PER SMALL OR LARGE PALLET. REFER TO PAGE 50, 51, OR 53 FOR A K-BRACE WHICH WILL BE ADEQUATE FOR A LESSER OR GREATER QUANTITY OF PALLET UNITS.
2. CAUTION: SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "PARTIAL-LAYER BRACING" BECAUSE THE LENGTH OF THE PARTIAL TIER TO BE SHIPPED AND/OR THE SIZE OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ①, ②, ③, ④, ⑤, ⑥, ⑦, ⑧, ⑨ 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.

(CONTINUED AT RIGHT)

(SPECIAL NOTES CONTINUED)

3. 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.
4. REFER TO PAGE 50 FOR A TYPICAL INSTALLATION OF A K-BRACE.

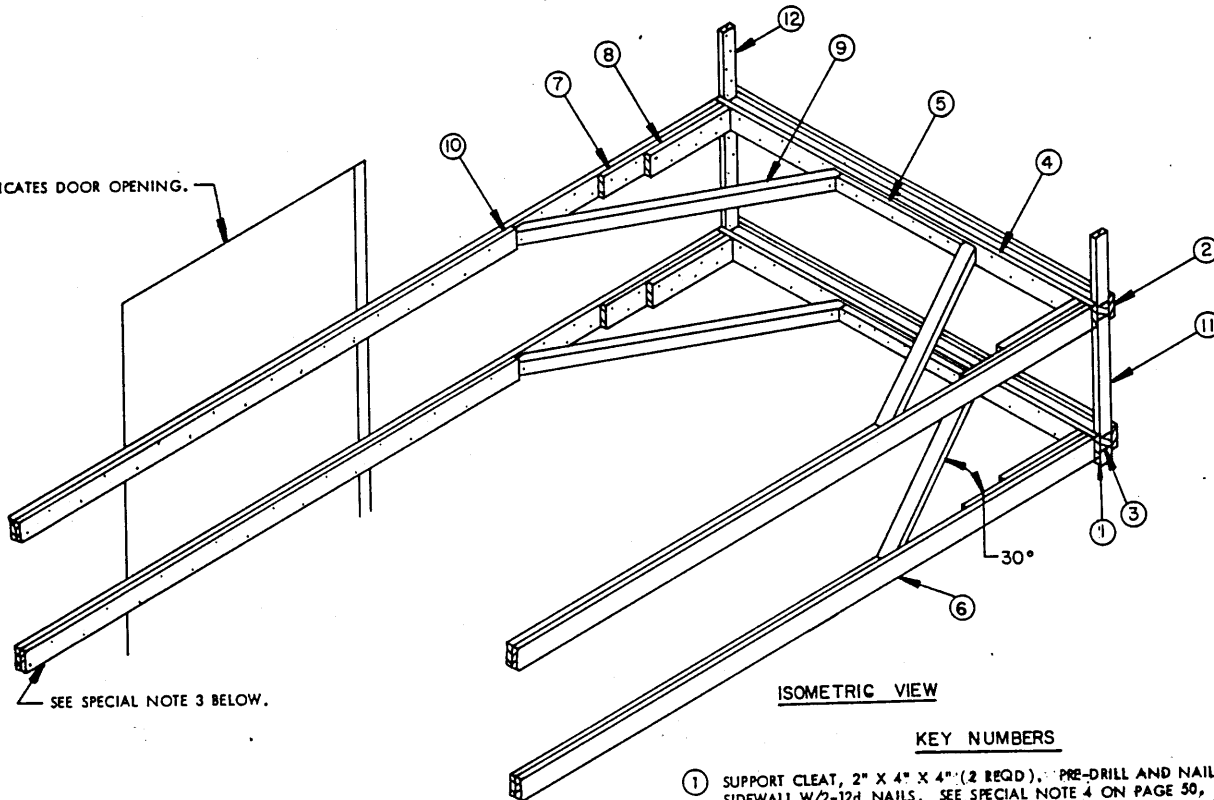


DIAGONAL BRACE

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



INDICATES DOOR OPENING.



SEE SPECIAL NOTE 3 BELOW.

ISOMETRIC VIEW

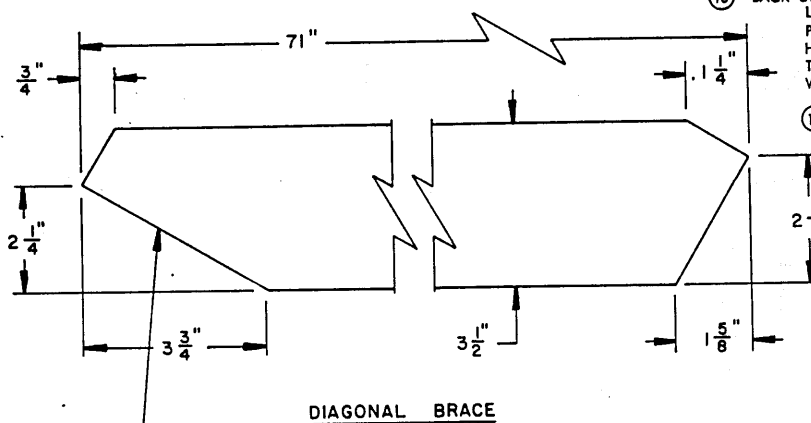
KEY NUMBERS

- ① SUPPORT CLEAT, 2" X 4" X 4" (2 REQD). PRE-DRILL AND NAIL TO THE CAR SIDEWALL W/2-12d NAILS. SEE SPECIAL NOTE 4 ON PAGE 50.
- 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 "H" ON PAGE 2.
- ③ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH (CUT TO FIT) (2 REQD).
- ④ HORIZONTAL BRACE, 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 5 ON PAGE 50.
- 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 AT LEFT 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. SEE SPECIAL NOTE 2 AT LEFT.
- ⑩ BACK-UP CLEAT, 2" X 6" BY CUT TO FIT (4 REQD). A CLEAT WILL BE OF A LENGTH AS NECESSARY TO EXTEND TO CONTACT THE DIAGONAL BRACE, PIECE MARKED ⑨, IN THE OPPOSITE END OF THE CAR. NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑥, W/18-16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL WALL CLEAT WITHIN THE DOOR OPENING, IF APPLICABLE.
- ⑪ SPACER CLEAT, 2" X 4" X 32" FOR THE 175MM PROJECTILES PALLETIZED 20 PER PALLET, OR PALLET UNIT COVER HEIGHT MINUS 10" FOR ALL OTHER UNITS (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.

SPECIAL NOTES:

1. THE TYPE "D" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER (LAYER) OF NOT MORE THAN 25,000 POUNDS IN EACH END OF THE CAR. THIS WILL BE NOT MORE THAN 1 PALLET UNITS OF 155MM PROJECTILES PALLETIZED 8 PER SMALL PALLET OR 2 PALLET UNITS PALLETIZED 8 PER LARGE PALLET, 26 UNITS OF 175MM PALLETIZED 6 PER PALLET, 7 UNITS OF 175MM PALLETIZED 20 PER PALLET, 39 UNITS OF 8" PALLETIZED 3 PER PALLET, OR 20 UNITS OF 8" PROJECTILES PALLETIZED 6 PER SMALL PALLET OR 19 PALLET UNITS PALLETIZED 6 PER LARGE PALLET. REFER TO PAGE 50, 51, OR 52 FOR A K-BRACE WHICH WILL BE ADEQUATE FOR A LESSER QUANTITY OF PALLET UNITS.
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, ⑩, 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.

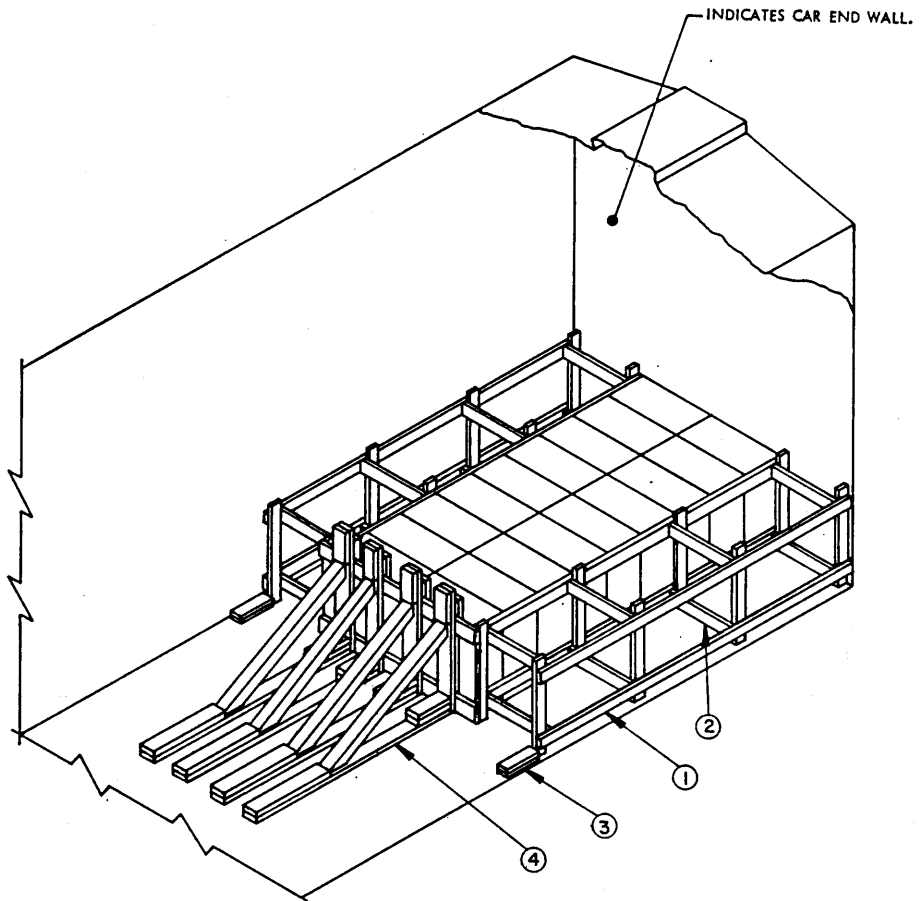
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THIS BEARING SURFACE MUST BE POSITIONED SO AS TO BE IN CONTACT WITH A HORIZONTAL WALL CLEAT, PIECE MARKED ⑥.

(SPECIAL NOTES CONTINUED)

3. 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.
4. REFER TO PAGE 50 FOR A TYPICAL INSTALLATION OF A K-BRACE.



ISOMETRIC VIEW

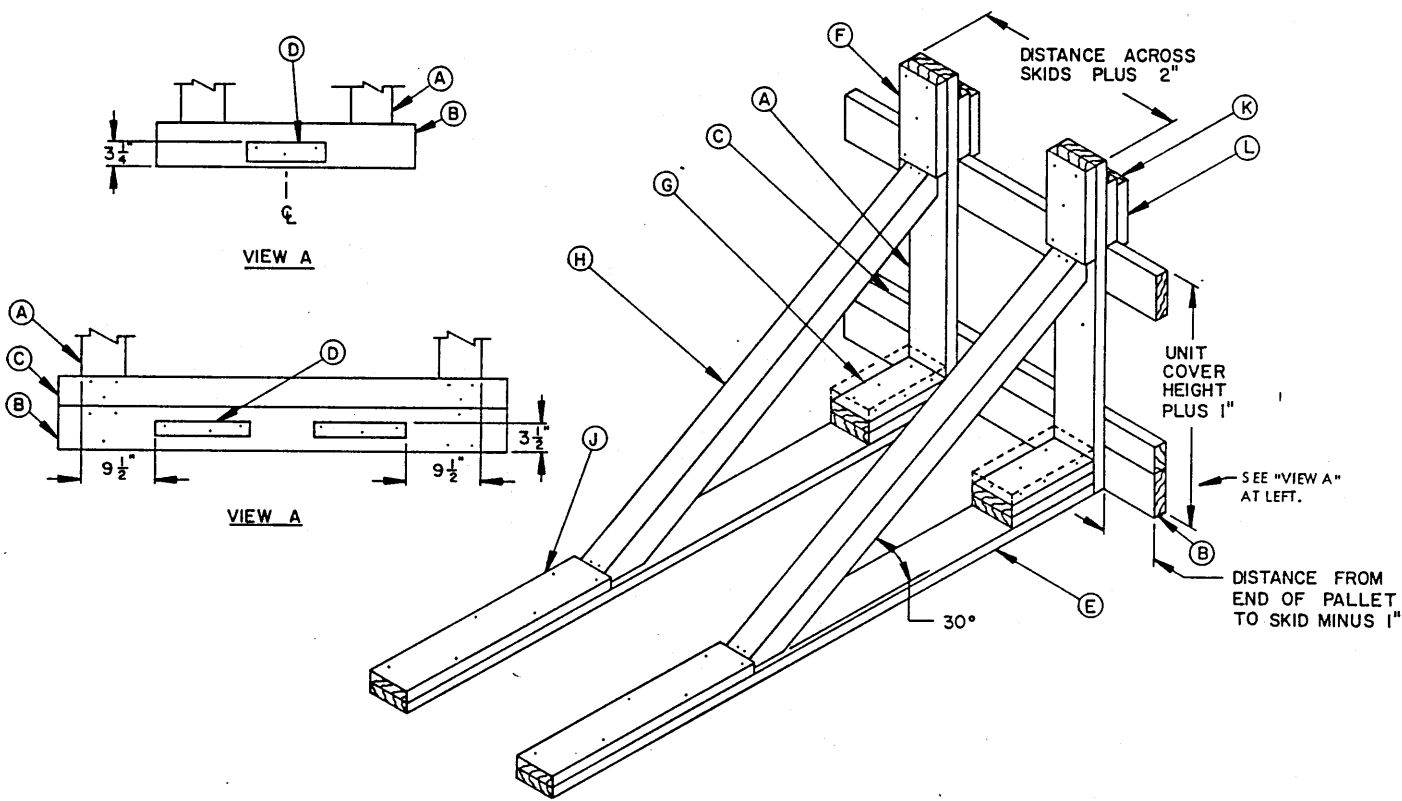
**SPECIAL NOTES:**

1. AN 18-UNIT LOAD OF 155MM PROJECTILES PALLETIZED 8 PER PALLET IS SHOWN AS A TYPICAL LCL LOAD; A 9'-4" WIDE CONVENTIONAL BOX CAR IS SHOWN AS A TYPICAL CAR. CARS OF OTHER WIDTHS CAN BE USED. THE SPECIFIED PROCEDURES ARE ALSO APPLICABLE FOR ANY OF THE OTHER PALLET UNITS AS DEPICTED ON PAGES 102 AND 103.
2. A KNEE BRACE ASSEMBLY WILL BE USED FOR EACH ROW OF PALLET UNITS. ONE (1) KNEE BRACE ASSEMBLY IS ADEQUATE FOR RETAINING A MAXIMUM LCL LOAD OF 8,500 POUNDS. THIS WILL BE NOT MORE IN EACH ROW THAN 10 PALLET UNITS OF 155MM PROJECTILES 8 PER SMALL PALLET OR 9 PALLET UNITS PALLETIZED 8 PER LARGE PALLET, 9 UNITS OF 175MM PALLETIZED 6 PER PALLET, 2 UNITS OF 175MM PALLETIZED 20 PER PALLET, 13 UNITS OF 8" PALLETIZED 3 PER PALLET OR 6 UNITS OF 8" PROJECTILES PALLETIZED 6 PER SMALL OR LARGE PALLET. SEE NOTE 5.
3. IF TWO ROWS OF 175MM PALLETIZED 20 PER PALLET ARE TO BE LOADED, CRIB FILL D WILL BE USED IN LIEU OF THE SIDE GATES AND STRUTS, PIECES MARKED ① AND ②, RESPECTIVELY. SEE THE DETAIL ON PAGE 58. ADJUST THE LENGTH OF THE CRIB FILL AS NECESSARY. IF LOADING FOUR ROWS OF 155MM PROJECTILES, EITHER NAILED SIDE FILL SHOWN AS PIECE MARKED ① ON PAGE 4 OR CRIB FILL A AS DETAILED ON PAGE 57 WILL BE SUBSTITUTED FOR PIECES MARKED ① AND ② ABOVE. IF LOADING FOUR ROWS OF 175MM PALLETIZED 6 PER PALLET, CRIB FILL B AND/OR CRIB FILL C WILL BE USED IN LIEU OF PIECES MARKED ① AND ②. SEE THE DETAILS ON PAGES 57 AND 58, RESPECTIVELY.
4. WHEN LOADING MORE THAN ONE ROW OF PALLET UNITS, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS TO PROVIDE FOR EVEN ROWS AND TO ATTAIN THE QUANTITY IT IS DESIRED TO SHIP. SEE THE "FILLER ASSEMBLY A" OR THE "FILLER ASSEMBLY B" DETAILS ON PAGES 66 AND 67, RESPECTIVELY.
5. ADDITIONAL PALLET UNITS CAN BE RETAINED BY ADDING AN EXTRA "KNEE", PIECES MARKED (A) AND (E) THRU (I) ON PAGE 55, SO AS TO BE CENTERED BETWEEN THE BRACES OF EACH ASSEMBLY. EACH ASSEMBLY WILL THEN BE ADEQUATE FOR RETAINING A MAXIMUM LCL LOAD OF 12,750 POUNDS. THIS WILL BE NOT MORE IN EACH ROW THAN 15 PALLET UNITS OF 155MM PROJECTILES PALLETIZED 8 PER SMALL PALLET OR 14 PALLET UNITS PALLETIZED 8 PER LARGE PALLET, 13 UNITS OF 175MM PALLETIZED 6 PER PALLET, 3 UNITS OF 175MM PALLETIZED 20 PER PALLET, 20 UNITS OF 8" PALLETIZED 3 PER PALLET, 10 UNITS OF 8" PALLETIZED 6 PER SMALL PALLET OR 9 PALLET UNITS PALLETIZED 6 PER LARGE PALLET.

**KEY NUMBERS**

- ① SIDE GATE (4 REQD). SEE THE DETAIL ON PAGE 71. SEE GENERAL NOTE "H" ON PAGE 2 AND SPECIAL NOTE 3 AT LEFT.
- ② SIDE STRUT, 2" X 4" BY CUT TO FIT (16 REQD). POSITION AS SHOWN AND NAIL TO THE VERTICAL PIECES OF THE SIDE GATES W/2-10d NAILS AT EACH END.
- ③ SIDE GATE RETAINER CLEAT, 2" X 4" X 12" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/2-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ④ KNEE BRACE ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 55 FOR CONSTRUCTION SPECIFICATIONS AND NAILING REQUIREMENTS.

TYPICAL LCL LOAD USING KNEE BRACING METHOD  
OF PARTIAL-LAYER BRACING



KNEE BRACE ASSEMBLY

**SPECIAL NOTES:**

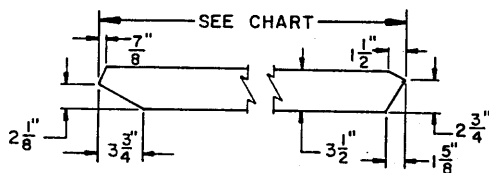
- ONE (1) KNEE BRACE ASSEMBLY IS SHOWN. ADDITIONAL ASSEMBLIES MUST BE USED WHEN SHIPPING MORE THAN ONE ROW OF PALLET UNITS.
- THE QUANTITIES SPECIFIED IN KEY LETTER (A) AND KEY LETTERS (D) THRU (L) ARE APPLICABLE FOR ONLY ONE (1) ASSEMBLY. THE QUANTITIES MUST BE ADJUSTED IF TWO, THREE, OR FOUR ASSEMBLIES ARE TO BE USED.

**KEY LETTERS**

- (A) VERTICAL PIECE, 2" X 6" BY PALLET UNIT COVER HEIGHT PLUS 12" (SEE CHART AT LEFT FOR REFERENCE DIMENSIONS) (2 REQD). SEE SPECIAL NOTE 2 AT LEFT.
- (B) HORIZONTAL PIECE, 2" X 6" BY LOAD WIDTH PLUS 6" (2 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT. SEE GENERAL NOTE "H" ON PAGE 2.
- (C) FOR 175MM PROJECTILES PALLETIZED 20 PER PALLET ONLY: HORIZONTAL PIECE, 2" X 4" BY LOAD WIDTH PLUS 6" (1 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.
- (D) HOLD-DOWN CLEAT, 2" X 3" MATERIAL OF A LENGTH AS SPECIFIED IN THE CHART AT LEFT. LOCATE AS SHOWN BY THE APPLICABLE "VIEW A" ABOVE. (1 REQD PER ROW FOR ALL UNITS EXCEPT THE 175MM 20 PER PALLET WHICH WILL REQUIRE 2 PER ROW). PRE-DRILL AS NECESSARY AND NAIL TO A HORIZONTAL PIECE W/3-10d NAILS.
- (E) FLOOR CLEAT, 2" X 6" MATERIAL OF A LENGTH AS SPECIFIED IN THE CHART AT LEFT (2 REQD PER ROW). ALIGN WITH A VERTICAL PIECE AND NAIL TO THE CAR FLOOR W/1-16d NAIL EVERY 8".
- (F) HOLD-DOWN CLEAT 2" X 4" X 12" (2 REQD). NAIL TO A VERTICAL PIECE W/5-10d NAILS.
- (G) POCKET CLEAT, 2" X 6" X 12" (DOUBLED) (TRIPLED FOR THE 175MM PALLETIZED 20 PER PALLET) (2 REQD). NAIL THE FIRST PIECE TO THE FLOOR CLEAT, PIECE MARKED (E), W/4-16d NAILS. NAIL EACH ADDITIONAL PIECE IN A LIKE MANNER AND TOENAIL THE TOP PIECE TO A VERTICAL PIECE, PIECE MARKED (A), W/2-16d NAILS.
- (H) BRACE, 4" X 4" MATERIAL OF A LENGTH AS SPECIFIED IN THE CHART AT LEFT (2 REQD). SEE THE DETAIL AT LEFT FOR BEVEL CUTS REQUIRED. TOENAIL TO A VERTICAL PIECE AND TO A FLOOR CLEAT, PIECES MARKED (A) AND (E), RESPECTIVELY, W/2-16d NAILS AT EACH END.
- (J) BACK-UP CLEAT, 2" X 6" X 30" (2 REQD). NAIL TO A FLOOR CLEAT, PIECE MARKED (E), W/6-40d NAILS.
- (K) FILLER PIECE, 2" X 6" X 8" (2 REQD). NAIL TO A VERTICAL PIECE W/3-10d NAILS.
- (L) REINFORCING PIECE, 2" X 6" X 8" (2 REQD). POSITION TO CONTACT PALLET COVER AND NAIL TO A FILLER PIECE, PIECE MARKED (K), W/3-10d NAILS.

**KNEE BRACE ASSEMBLY CHART**

ITEM	LENGTH OF PIECE		
	VERTICAL PIECE (A)	FLOOR CLEAT (E)	BRACE (H)
155MM, SMALL PALLET	42"	6'-8"	57"
155MM, LARGE PALLET	50"	66"	6'-1"
175MM, 6 PER PALLET	51"	8'-0"	6'-3"
175MM, 20 PER PALLET W/SKIDS	56-1/2"	8'-9"	7'-2"
175MM, 20 PER PALLET W/O SKIDS	53"	8'-3"	6'-7"
8", 3 PER PALLET	48"	7'-6"	69"
8", 6 PER SMALL PALLET	48"	7'-6"	69"
8", 6 PER LARGE PALLET	57-1/2"	7'-6"	7'-4"
8", 6 TALL/SMALL PALLET	58-1/2"	7'-6"	7'-4"



BRACE (H)

VERTICAL PIECE, 2" X 6" BY LENGTH TO SUIT (6 REQD). LOCATE SO AS TO BE EQUALLY SPACED.

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

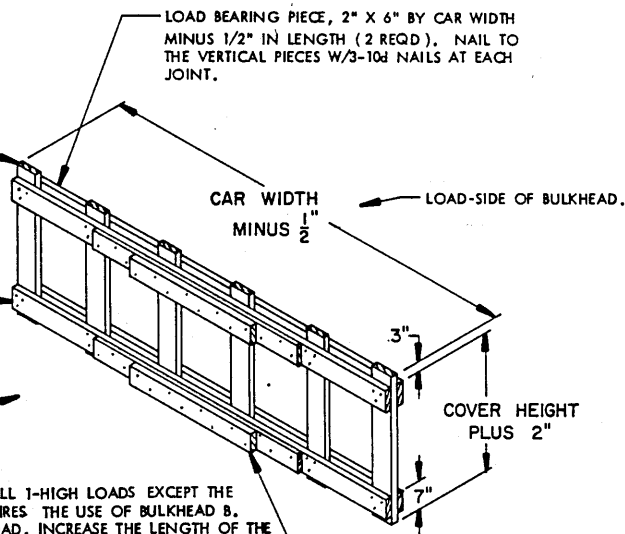
BUFFER PIECE, 2" X 6" BY CAR WIDTH MINUS 1/2" IN LENGTH (2 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.

PLACE THIS SIDE OF THE BULKHEAD AGAINST THE CAR END WALL.

**BULKHEAD A**

THIS BULKHEAD IS FOR USE AT THE ENDS OF ALL 1-HIGH LOADS EXCEPT THE 175MM PALLETIZED 20 PER PALLET WHICH REQUIRES THE USE OF BULKHEAD B. IF A BULKHEAD IS REQUIRED FOR A 2-HIGH LOAD, INCREASE THE LENGTH OF THE VERTICAL PIECES AS REQUIRED. ADD BUFFER PIECES AND LOAD BEARING PIECES AT 7" ABOVE THE HEIGHT OF THE COVER OF THE LOWER UNITS AND AT 2" ABOVE THE COVER HEIGHT OF THE SECOND-LAYER UNITS. SEE GENERAL NOTE "B" ON PAGE 3.

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



BULKHEAD B DIMENSIONAL CHART								
WITH SKIDS OF 175MM PALLET INTACT								
DIMENSION ACROSS CAR	HEIGHT DIMENSION					WIDTH DIMENSION		
	A	B	C	D	E	F	G	H
40"	7'-10"	12-1/2"	44-1/2"	59"	7'-6-3/4"	9-1/2"	23"	36"
51-1/4"	7'-10"	12-1/2"	44-1/2"	59"	7'-6-3/4"	10-1/2"	28"	46"
WITH SKIDS OF 175MM PALLET REMOVED								
DIMENSION ACROSS CAR	HEIGHT DIMENSION					WIDTH DIMENSION		
	A	B	C	D	E	F	G	H
40"	7'-3"	9"	42"	51-3/4"	6'-11-1/2"	9-1/2"	23"	36"
51-1/4"	7'-3"	9"	42"	51-3/4"	6'-11-1/2"	10-1/2"	28"	46"

LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH MINUS 1/2" IN LENGTH (4 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.

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

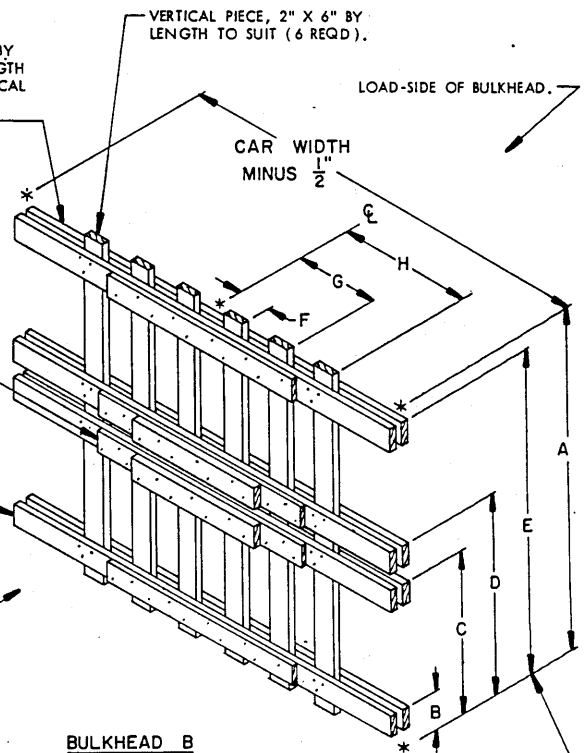
BUFFER PIECE, 2" X 6" BY CAR WIDTH MINUS 1/2" IN LENGTH (4 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.

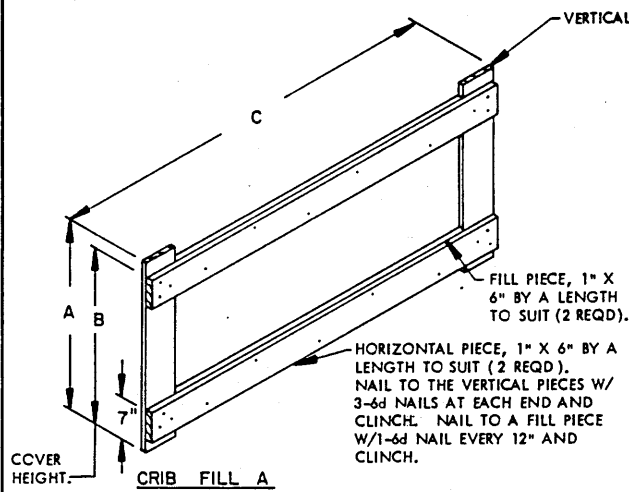
PLACE THIS SIDE OF THE BULKHEAD AGAINST THE CAR END WALL.

**BULKHEAD B**

THIS BULKHEAD IS FOR USE AT THE ENDS OF LOADS OF 175MM PALLETIZED 20 PER PALLET SHOWN ON PAGES 24 AND 26. USE ONLY THE LOWER PORTION 48" HIGH FOR A 1-LAYER LOAD. SEE GENERAL NOTE "B" ON PAGE 3.

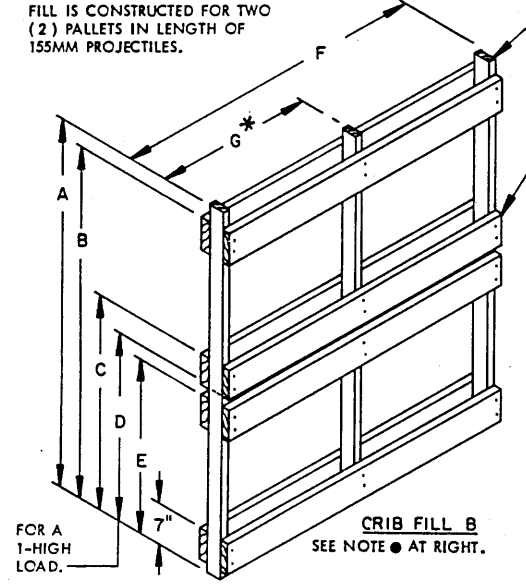
SEE THE "BULKHEAD B DIMENSIONAL CHART" ABOVE FOR FIGURES FOR THE LETTERED DIMENSIONS.





ITEM	CAR WIDTH	DIM A	DIM B	DIM C				LOAD PAGE
				NO. LONG OR WIDE				
				2	3	4	5	
155MM SMALL PALLET	9'-2"	32"	30"	---	40"L	54"L	67-1/2"L	4, 6
8", 3 PER PALLET	9'-0"	38"	36"	---	7'-1-1/2"W OR 7'-11"W *	9'-6"W OR 10'-3-1/2"W *	---	28,30
8", 6 PER SMALL PALLET	9'-0"	38"	36"	39"L	58-1/2"L	---	---	32,34
8", M509E1	9'-4"	48"	45-1/2"	---	68"L	7'-6-1/2"L	---	36,38
8", XM650E5	9'-4"	46"	43"	---	68"L	7'-6-1/2"L	---	36,38
8", 6 TALL PROJECTILE PER SMALL PALLET	9'-0"	48"	45-1/2"	39"	58-1/2"	---	---	44,46

\* OMIT THE VERTICAL PIECE AT LOCATION "G" WHEN THE CRIB FILL IS CONSTRUCTED FOR TWO (2) PALLET IN LENGTH OF 155MM PROJECTILES.



VERTICAL PIECE, 2" MATERIAL OF A WIDTH AND LENGTH AS SPECIFIED IN THE "CRIB FILL B DIMENSIONAL CHART" BELOW (3 REQD).  
 \* THIS IS A REFERENCE DIMENSION WHICH INCLUDES THE LENGTH OF A FILLER ASSEMBLY C.

HORIZONTAL PIECE, 1" X 6" AND/OR 2" X 6" BY DIMENSION "F" (AS REQD). NAIL TO THE VERTICAL PIECES W/3-6d NAILS AT EACH JOINT IF 1" X 6" MATERIAL IS USED, OR W/2-10d NAILS AT EACH JOINT IF 2" X 6" MATERIAL IS USED, AS APPLICABLE.

NOTE ● :  
 THIS CRIB FILL IS FOR LATERAL BRACING OF 155MM PROJECTILES 2, 3, OR 4 PALLET UNITS LONG, AND FOR 2 PALLET UNITS LONG OR WIDE, AS APPLICABLE, OF THE OTHER LISTED ITEMS.

● THE DIM B, C, AND E SHOWN FOR THE 155MM LARGE PALLET ARE BASED ON UNITS HAVING A COVER HEIGHT OF 38". ADJUST DIMENSIONS PROPORTIONALLY FOR UNITS OF OTHER HEIGHT DIMENSIONS.

ITEM	CAR WIDTH	SIZE OF VERTICALS	SIZE OF HORIZONTALS	DIM A	DIM B	DIM C	DIM D	DIM E	DIM F	DIM G	LOAD PAGE
155MM SMALL PALLET	9'-0" (ONE SIDE)	2" X 4"	2" X 6"	63"	60"	37"	32"	30"	27" OR 54"	27"	8
		2" X 4"	1" X 6" AND 2" X 6"	63"	60"	37"	32"	30"	77" OR 54"	27"	8
	9'-4"	2" X 2"	1" X 6"	63"	60"	37"	32"	30"	27", 40-1/2" OR 54"	20-1/4" OR 27"	4, 6
		2" X 3"	2" X 6"	63"	60"	37"	32"	30"	27", 40-1/2" OR 54"	20-1/4" OR 27"	4, 6
155MM LARGE PALLET	9'-0"	2" X 4"	1" X 6"	61-7"	61-4"	45"	41"	38"	58-1/2"	29-1/4"	12
		2" X 4"	2" X 6"	61-7"	61-4"	45"	41"	38"	58-1/2"	29-1/4"	12
	9'-4"	2" X 6"	2" X 6"	61-7"	61-4"	45"	41"	38"	58-1/2"	29-1/4"	12
		2" X 8"	2" X 6"	61-7"	61-4"	45"	41"	38"	58-1/2"	29-1/4"	12
175MM, 6 PER PALLET	9'-0"	2" X 4"	1" X 6"	61-9"	61-6"	46"	42"	39"	34"	17"	16, 18
		2" X 6"	1" X 6"	61-9"	61-6"	46"	42"	39"	34"	17"	16, 18
	9'-4"	2" X 8"	1" X 6"	61-9"	61-6"	46"	42"	39"	34"	17"	16, 18
		2" X 10"	1" X 6"	61-9"	61-6"	46"	42"	39"	34"	17"	16, 18
8", 3 PER PALLET	9'-4" (ONE SIDE)	2" X 2"	1" X 6" AND 2" X 6"	61-3"	61-0"	43"	38"	36"	57"	28-1/2"	28, 30
		2" X 3"	1" X 6"	61-3"	61-0"	43"	38"	36"	57"	28-1/2"	28, 30
	9'-6" (OPPOSITE SIDE)	2" X 3"	1" X 6" AND 2" X 6"	61-3"	61-0"	43"	38"	36"	57"	28-1/2"	28, 30
8", 6 PER SMALL PALLET	9'-4"	2" X 4"	2" X 6"	61-3"	61-0"	43"	38"	36"	39"	19-1/2"	32, 34
	9'-6"	2" X 6"	1" X 6" AND 2" X 6"	61-3"	61-0"	43"	38"	36"	39"	19-1/2"	32, 34
8", M509E1	9'-0"	2" X 4"	1" X 6" AND 2" X 6"	81-0"	71-9"	54-1/2"	48"	45-1/2"	45-1/4"	72-1/2"	40, 42
8", XM650E5	9'-0"	2" X 4"	1" X 6" AND 2" X 6"	71-7"	71-4"	52"	46"	43"	45-1/4"	22-1/2"	40, 42
8", 6 TALL PROJECTILE PER SMALL PALLET	9'-4"	2" X 4"	2" X 6"	81-0"	71-9"	54-1/2"	48"	45-1/2"	39"	19-1/2"	44, 46
		2" X 6"	1" X 6" AND 2" X 6"	81-0"	71-9"	54-1/2"	48"	45-1/2"	39"	19-1/2"	44, 46

DETAILS

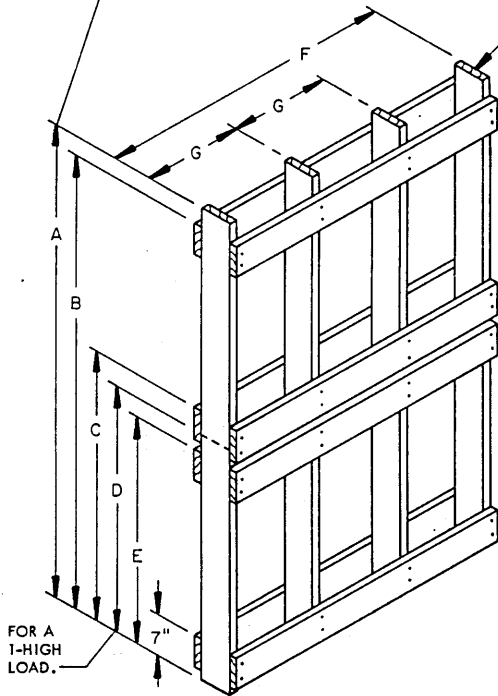
CRIB FILL C DIMENSIONAL CHART

ITEM	CAR WIDTH	SIZE OF VERTICALS	SIZE OF HORIZONTALS	DIM A	DIM B	DIM C	DIM D	DIM E	DIM F	DIM G	LOAD PAGE
155MM LARGE PALLET ①	9'-0"	2" X 4"	1" X 6"	6'-7"	6'-4"	45"	41"	38"	7'-3-3/4"	29-1/4"	12, 14
	9'-2"	2" X 4"	2" X 6"	6'-7"	6'-4"	45"	41"	38"	7'-3-3/4"	29-1/4"	12, 14
	9'-4"	2" X 6"	2" X 6"	6'-7"	6'-4"	45"	41"	38"	7'-3-3/4"	29-1/4"	12, 14
	9'-6"	2" X 8"	2" X 6"	6'-7"	6'-4"	45"	41"	38"	7'-3-3/4"	29-1/4"	12, 14
175MM, 6 PER PALLET	9'-0"	2" X 4"	1" X 6"	6'-9"	6'-6"	46"	42"	39"	51"	17"	16, 18
	9'-2"	2" X 4"	1" X 6"	6'-9"	6'-6"	46"	42"	39"	51"	17"	16, 18
	9'-4"	2" X 8"	1" X 6"	6'-9"	6'-6"	46"	42"	39"	51"	17"	16, 18
	9'-6"	2" X 10"	1" X 6"	6'-9"	6'-6"	46"	42"	39"	51"	17"	16, 18
8", 3 PER PALLET	9'-4" (ONE SIDE)	2" X 2"	1" X 6" AND 2" X 6"	6"-3"	6'-0"	43"	38"	36"	* 7'-1-1/2" OR 7'-11"	28-1/2"	28, 30
	9'-6" (ONE SIDE)	2" X 3"	1" X 6"	6'-3"	6'-0"	43"	38"	36"	* 7'-1-1/2" OR 7'-11"	28-1/2"	28, 30
	9'-6" (OPPOSITE SIDE)	2" X 3"	1" X 6" AND 2" X 6"	6'-3"	6'-0"	43"	38"	36"	* 7'-1-1/2" OR 7'-11"	28-1/2"	28, 30
8", 6 PER SMALL PALLET	9'-4"	2" X 4"	2" X 6"	6'-3"	6'-0"	43"	38"	36"	58-1/2"	19-1/2"	32, 34
	9'-6"	2" X 6"	1" X 6" AND 2" X 6"	6'-3"	6'-0"	43"	38"	36"	58-1/2"	19-1/2"	32, 34
8", M509E1	9'-0"	2" X 4"	1" X 6" AND 2" X 6"	8'-0"	7'-9"	54-1/2"	48"	45-1/2"	68"	22-1/2"	40, 42
8", XM605ES	9'-0"	2" X 4"	1" X 6" AND 2" X 6"	7'-7"	7'-4"	52"	46"	43"	68"	22-1/2"	40, 42
8", 6 TALL/ SMALL PALLET	9'-4"	2" X 4"	2" X 6"	8'-0"	7'-11"	55-1/2"	48"	46-1/2"	58-1/2"	19-1/2"	32, 34
	9'-6"	2" X 6"	1" X 6" AND 2" X 6"	8'-0"	7'-11"	55-1/2"	48"	46-1/2"	58-1/2"	19-1/2"	32, 34

\* ONE EXTRA VERTICAL PIECE, CENTERED AT 28-1/2" FROM THE END, IS REQUIRED FOR A CRIB FILL C ASSEMBLY WHICH IS 7'-11" LONG. SEE THE ASSEMBLY USED AGAINST LOAD UNITS 7, 8, AND 9 IN THE LOAD ON PAGE 26.

① THE DIM B, C, AND E SHOWN FOR THE 155 MM LARGE PALLET ARE BASED ON UNITS HAVING A COVER HEIGHT OF 38". ADJUST DIMENSIONS PROPORTIONALLY FOR UNITS OF OTHER HEIGHT DIMENSIONS.

SEE THE "CRIB FILL C DIMENSIONAL CHART" ABOVE FOR FIGURES FOR THE LETTERED DIMENSIONS.



VERTICAL PIECE, 2" MATERIAL OF A WIDTH AND LENGTH AS SPECIFIED IN THE "CRIB FILL C DIMENSIONAL CHART" ABOVE (4 REQD).

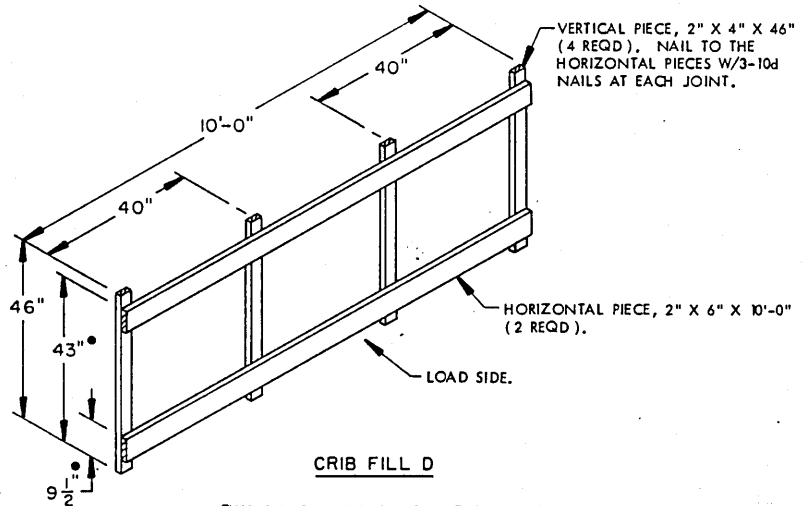
HORIZONTAL PIECE, 1" X 6" AND/OR 2" X 6" BY DIMENSION "F" (AS REQD). NAIL TO THE VERTICAL PIECES W/3-6d NAILS AT EACH JOINT IF 1" X 6" MATERIAL IS USED, OR W/2-10d NAILS AT EACH JOINT IF 2" X 6" MATERIAL IS USED, AS APPLICABLE.

FOR A 1-HIGH LOAD, 7"

**CRIB FILL C**

THIS CRIB FILL IS FOR LATERAL BRACING OF 3 OR 6 PALLET UNITS LONG OR WIDE, AS APPLICABLE.

• THE 9-1/2" AND 43" DIMENSIONS ARE APPLICABLE WHEN THE SKIDS OF THE 5-PROJECTILE PALLET HAVE BEEN REMOVED. THE DIMENSIONS WILL BE 12-1/2" AND 46-1/2" WHEN THE SKIDS ARE INTACT. INCREASE THE LENGTH OF THE VERTICAL PIECES TO 48".



VERTICAL PIECE, 2" X 4" X 46" (4 REQD). NAIL TO THE HORIZONTAL PIECES W/3-10d NAILS AT EACH JOINT.

HORIZONTAL PIECE, 2" X 6" X 10'-0" (2 REQD).

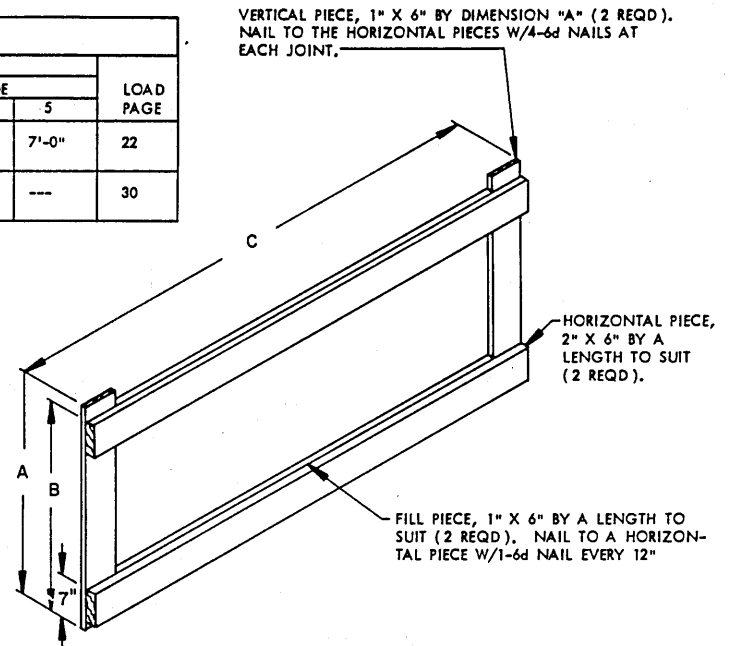
LOAD SIDE.

**CRIB FILL D**

THIS CRIB FILL IS FOR USE IN THE LOAD FOR 175MM PROJECTILES (20 PER PALLET) SHOWN ON PAGE 26 AS AN ALTERNATIVE TO THE SIDEWALL CLEATS, PIECES MARKED ①.

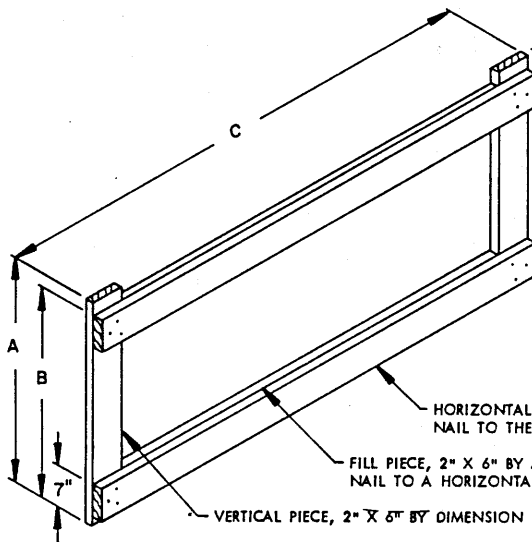
CRIB FILL E DIMENSIONAL CHART								
ITEM	CAR WIDTH	DIM A	DIM B	DIM C				LOAD PAGE
				NO. LONG OR WIDE				
				2	3	4	5	
175MM, 6 PER PALLET	9'-6"	42"	39"	---	51"	68"	7'-0"	22
8", 3 PER PALLET	9'-4"	38"	36"	57"	7'-1-1/2" *OR 7'-11"	9'-6"	---	30

\* INCLUDES A FILLER ASSEMBLY, PIECE MARKED (3).



CRIB FILL E

BECAUSE THIS CRIB PROVIDES SOLID BEARING THROUGHOUT THE LENGTH, THE LENGTH NEED NOT BE HELD TO THE SPECIFIED DIMENSIONS; THE LENGTH MAY BE ADJUSTED TO SUIT THE LOAD BEING SHIPPED.



CRIB FILL F

CRIB FILL F DIMENSIONAL CHART						
ITEM	CAR WIDTH	DIM A	DIM B	DIM C		LOAD PAGE
				NO. LONG OR WIDE		
				3	4	
8", 3 PER PALLET	9'-2"	38"	36"	7'-1-1/2" *OR 7'-11"	---	28, 30
8", M509E1	9'-6"	48"	45-1/2"	---	7'-6-1/2"	38
8", XM605E5	9'-6"	46"	43"	---	7'-6-1/2"	38

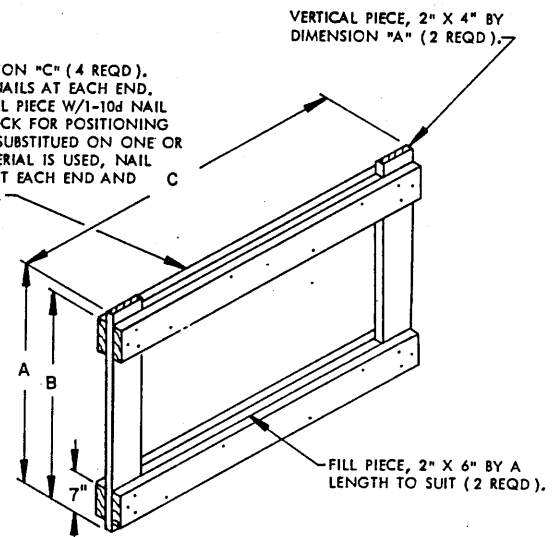
\* INCLUDES A FILLER ASSEMBLY, PIECE MARKED (3).

NOTE:

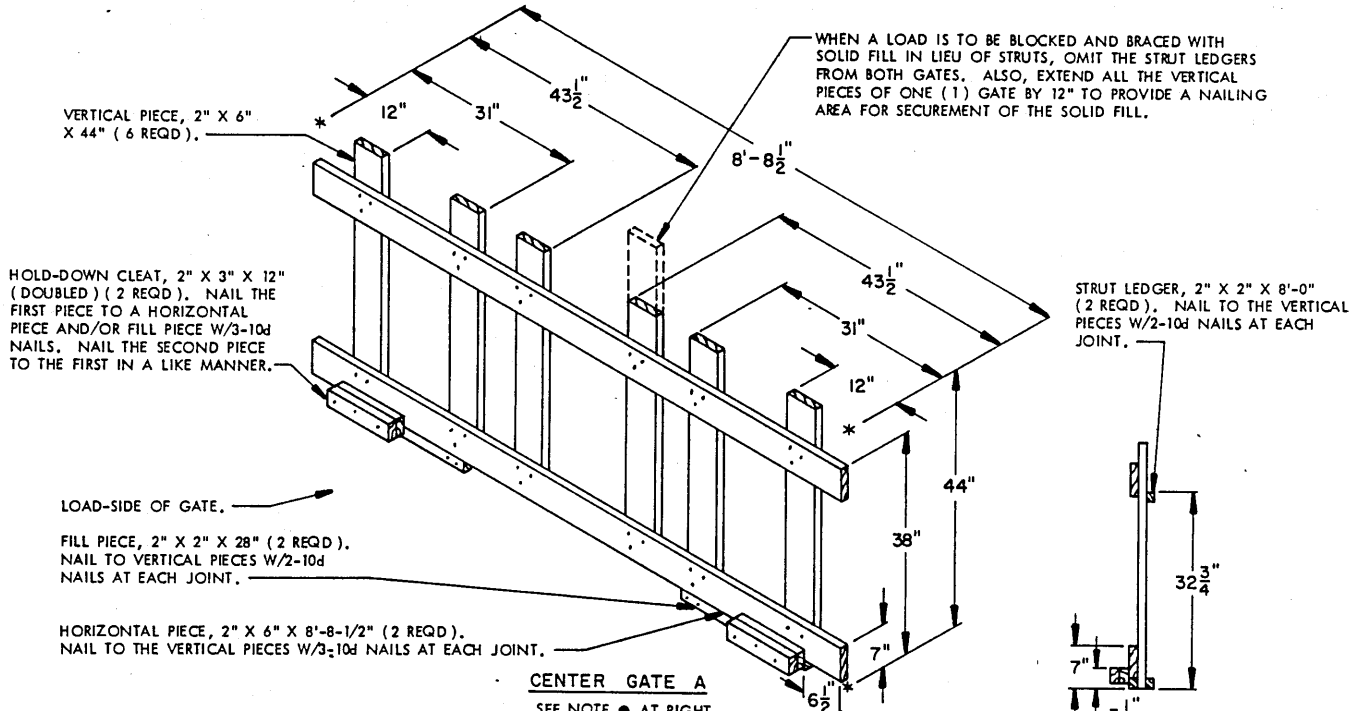
BECAUSE THIS CRIB PROVIDES SOLID BEARING THROUGHOUT THE LENGTH, THE LENGTH NEED NOT BE HELD TO THE SPECIFIED DIMENSIONS; THE LENGTH MAY BE ADJUSTED TO SUIT THE LOAD BEING SHIPPED.

HORIZONTAL PIECE, 2" X 6" BY DIMENSION "C" (4 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH END. NAIL EACH PIECE OF ONE PAIR TO A FILL PIECE W/1-10d NAIL EVERY 12". IF THE CRIB FILL IS TOO THICK FOR POSITIONING IN A LOAD, 1" X 6" MATERIAL MAY BE SUBSTITUTED ON ONE OR BOTH SIDES, AS NECESSARY. IF 1" MATERIAL IS USED, NAIL TO THE VERTICAL PIECES W/4-6d NAILS AT EACH END AND TO A FILL PIECE W/1-6d NAIL EVERY 12".

CRIB FILL G DIMENSIONAL CHART							
ITEM	CAR WIDTH	DIM A	DIM B	DIM C			LOAD PAGE
				2-LONG	3-LONG	4-LONG	
8", 6 PER SMALL PALLET	9'-2"	38"	36"	39"	58-1/2"	---	32, 34
8", M509E1	9'-6"	48"	45-1/2"	---	68"	7'-6-1/2"	38
8", XM605E5	9'-6"	46"	43"	---	68"	7'-6-1/2"	38
8", 6 TALL PROJECTILE PER SMALL PALLET	9'-2"	48"	46-1/2"	39"	58-1/2"	---	44, 46



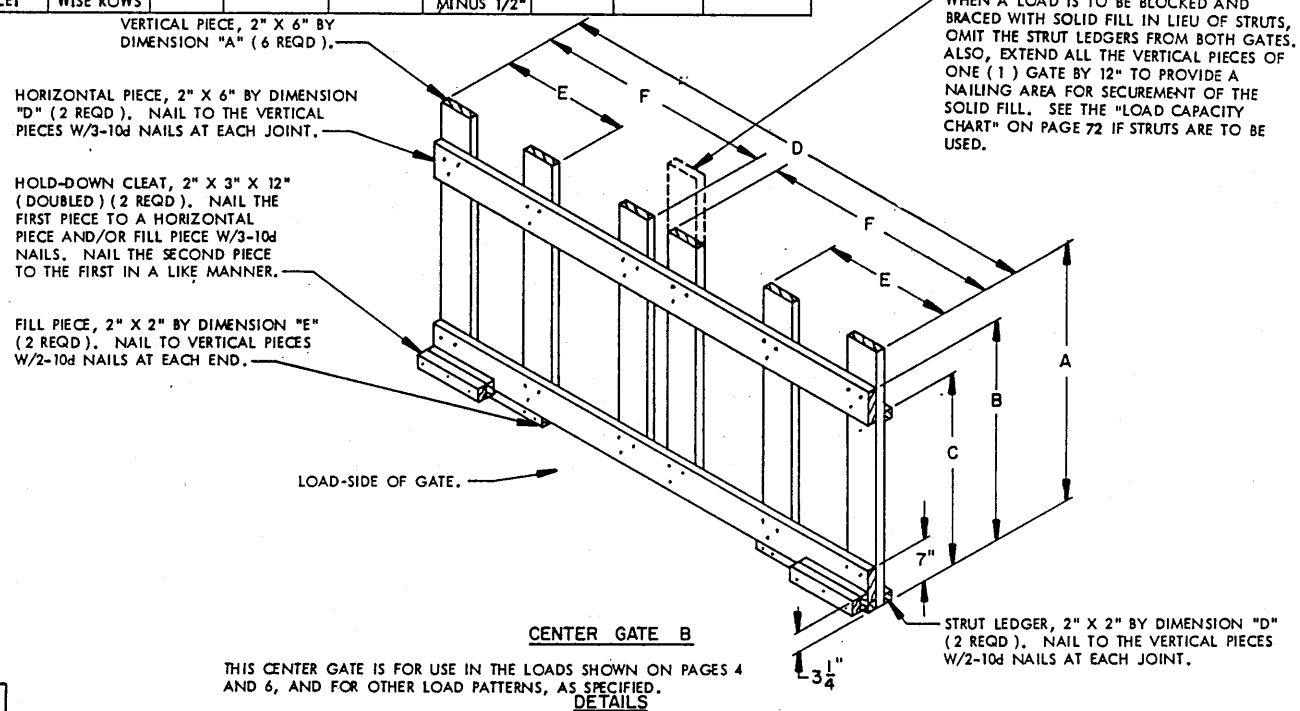
CRIB FILL G



CENTER GATE B DIMENSIONAL CHART

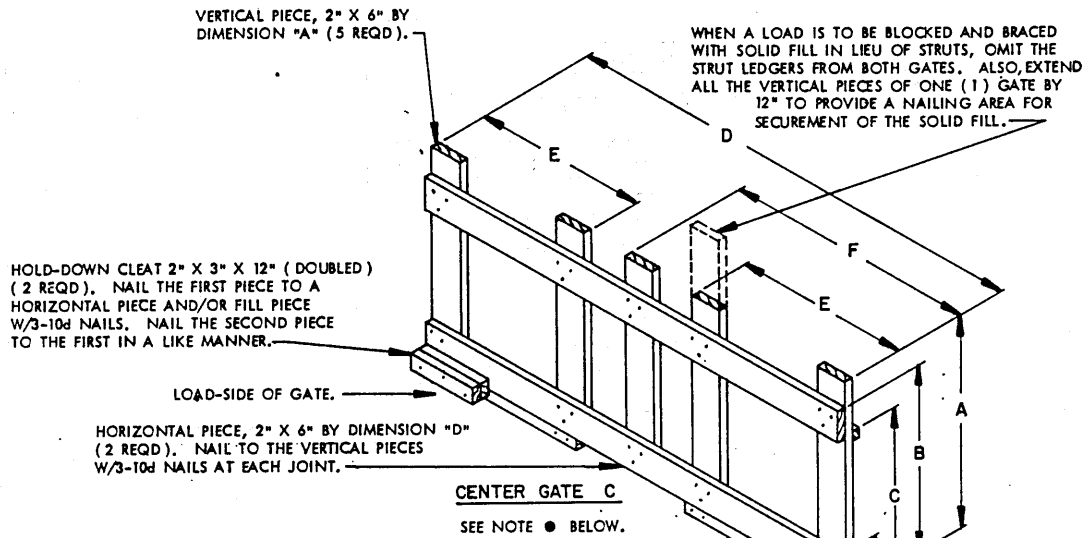
ITEM	LOAD PATTERN	DIMENSION						LOAD PAGE
		A	B	C	D	E	F	
155MM, SMALL	8-LONG	36"	32"	26-3/4"	9'-0"	29-3/4"	43-1/4"	4, 6, 8, 10 4, 6, 8, 10
	7-LONG	36"	32"	26-3/4"	7'-10-1/2"	29-3/4"	43-1/4"	
175MM, 6 PER PALLET	6-LONG	45"	41"	35-3/4"	8'-6"	28"	45-1/2"	22 16, 18 20, 22
	NO CROSS-WISE ROWS	45"	41"	35-3/4"	CAR WIDTH MINUS 1/2"	28"	51"	
	NO CROSS-WISE ROWS	45"	41"	35-3/4"	CAR WIDTH MINUS 1/2"	19-1/2"	46"	
8", 3 PER PALLET	10-LONG	42"	38"	32-3/4"	7'-11"	21-3/4"	40-3/4"	30
	9-LONG	42"	38"	32-3/4"	7'-1-1/2"	21-3/4"	40-3/4"	
	8-LONG	42"	38"	32-3/4"	6'-4"	21-3/4"	31-1/4"	
	7-LONG	42"	38"	32-3/4"	66-1/2"	21-3/4"	31-1/4"	
8", M509E1	NO CROSS-WISE ROWS	52"	47-1/2"	42-1/4"	CAR WIDTH MINUS 1/2"	25-1/2"	54"	38
8", XM650E5	NO CROSS-WISE ROWS	49"	45"	39-3/4"	CAR WIDTH MINUS 1/2"	25-1/2"	54"	38
8", 6 TALL/SMALL PALLET	NO CROSS-WISE ROWS	52"	47-1/2"	42-1/4"	CAR WIDTH MINUS 1/2"	25-1/2"	54"	38

NOTE ● :  
THIS CENTER GATE IS FOR USE IN THE LOADS SHOWN ON PAGES 28 AND 30. SEE THE "LOAD CAPACITY CHART" ON PAGE 72 IF STRUTS ARE TO BE USED.



THIS CENTER GATE IS FOR USE IN THE LOADS SHOWN ON PAGES 4 AND 6, AND FOR OTHER LOAD PATTERNS, AS SPECIFIED.





CENTER GATE C DIMENSIONAL CHART

ITEM	LOAD PATTERN	DIMENSION						LOAD PAGE
		A	B	C	D	E	F	
155MM SMALL PALLET	6-LONG	36"	32"	26-3/4"	6'-9"	29-3/4"	43-1/4"	8, 10, 40
	5-LONG	36"	32"	26-3/4"	67-1/2"	23"	36-1/2"	40
	4-LONG	36"	32"	26-3/4"	54"	16-1/4"	29-3/4"	40
155MM LARGE PALLET *	7-LONG	44"	40"	34-3/4"	8'-6"	32"	54"	12, 14
	6-LONG	44"	40"	34-3/4"	7'-4"	32"	46-1/2"	40
	5-LONG	44"	40"	34-3/4"	6'-1"	24-1/2"	39-1/4"	40
	4-LONG	44"	40"	34-3/4"	58-1/2"	17-1/2"	32"	40
175MM, 6 PER PALLET	6-LONG	45"	41"	35-3/4"	8'-6"	36-3/4"	53-3/4"	16, 18
	5-LONG	45"	41"	35-3/4"	7'-1"	28-1/4"	45-1/4"	40
	4-LONG	45"	41"	35-3/4"	68"	19-3/4"	36-3/4"	40
8", 3 PER PALLET	6-LONG	42"	38"	32-3/4"	57"	21-3/4"	31-1/4"	40
	5-LONG	42"	38"	32-3/4"	47-1/2"	17"	26-1/2"	40
8", 6 PER SMALL PALLET	5-LONG	42"	38"	32-3/4"	8'-1-1/2"	32"	51-1/2"	40
	4-LONG	42"	38"	32-3/4"	6'-6"	22-1/4"	41-3/4"	28, 30, 40
8", MS09E1	4-LONG	52"	47-1/2"	42-1/4"	7'-6-1/2"	25-1/2"	48"	34, 40
8", XM650E5	4-LONG	49"	45"	39-3/4"	7'-6-1/2"	25-1/2"	48"	34, 40
8", MS09E1	NO CROSS-WISE ROWS	52"	47-1/2"	42-1/4"	CAR WIDTH MINUS 1/2"	25-1/2"	57-1/2"	36
8", XM650E5	NO CROSS-WISE ROWS	49"	45"	39-3/4"	CAR WIDTH MINUS 1/2"	25-1/2"	57-1/2"	36
8", 6 TALL/ SMALL PALLET	5-LONG	52"	47-1/2"	42-1/2"	8'-1-1/2"	32"	51-1/2"	38
	4-LONG	52"	47-1/2"	42-1/2"	6'-6"	22-1/4"	41-3/4"	38

\* DIMENSIONS "A", "B", AND "C" ARE BASED ON A PALLET UNIT HAVING A COVER HEIGHT OF 38". THESE DIMENSIONS MUST BE ADJUSTED FOR PALLET UNITS OF OTHER HEIGHTS.

NOTE ● :

THIS CENTER GATE IS FOR USE IN THE LOADS SHOWN ON PAGES 16 AND 18, AND FOR OTHER LOAD PATTERNS, AS SPECIFIED. SEE THE "LOAD CAPACITY CHART" ON PAGE 32 IF STRUTS ARE TO BE USED.

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

CENTER GATE D DIMENSIONAL CHART

ITEM	LOAD PATTERN	DIMENSION					LOAD PAGE
		A	B	C	D	E	
155MM	3-LONG	36"	32"	26-3/4"	40-1/2"	16-1/4"	48
175MM, 6 PER PALLET	3-LONG	45"	41"	35-3/4"	51"	19-3/4"	48
8", 3 PER PALLET	4-LONG	42"	38"	32-3/4"	38"	17"	48
8", 6 PER SMALL PALLET	3-LONG	42"	38"	32-3/4"	58-1/2"	22-1/4"	48
8", MS09E1	4-LONG	52"	47-1/2"	42-1/4"	7'-6-1/2"	36-3/4"	36-42
	3-WIDE	52"	47-1/2"	42-1/4"	7'-11-1/2"	34-1/2"	40, 42
8", XM650E5	4-LONG	49"	45"	39-3/4"	7'-6-1/2"	36-3/4"	36-42
	3-WIDE	49"	45"	39-3/4"	7'-11-1/2"	34-1/2"	40, 42
8" 6 TALL/ SMALL PALLET	3-LONG	51"	47"	41-3/4"	58-1/2"	22-1/4"	48

HOLD-DOWN CLEAT, 2" X 3" X 12" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO A HORIZONTAL PIECE AND/OR FILL PIECE W/3-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.

FILL PIECE, 2" X 2" X DIMENSION "E" (2 REQD). NAIL TO VERTICAL PIECES W/2-10d NAILS AT EACH END.

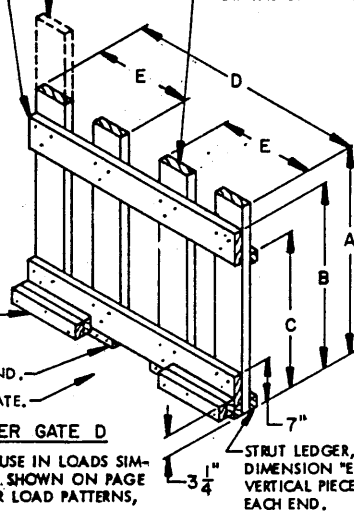
LOAD-SIDE OF GATE.

CENTER GATE D

THIS GATE IS FOR USE IN LOADS SIMILAR TO THE LOAD SHOWN ON PAGE 48 AND FOR OTHER LOAD PATTERNS, AS SPECIFIED.

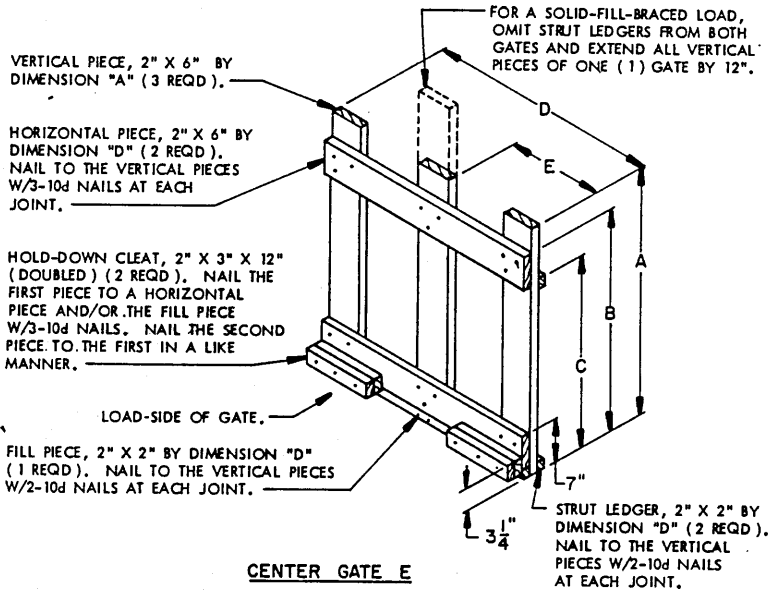
WHEN A LOAD IS TO BE BLOCKED AND BRACED WITH SOLID FILL IN LIEU OF STRUTS, OMIT THE STRUT LEDGERS FROM BOTH GATES. ALSO, EXTEND ALL THE VERTICAL PIECES OF ONE (1) GATE BY 12" TO PROVIDE A NAILING AREA FOR SECUREMENT OF THE SOLID FILL. SEE THE "LOAD CAPACITY CHART" ON PAGE 32 IF THE STRUTS ARE TO BE USED.

VERTICAL PIECE, 2" X 6" BY DIMENSION "A" (4 REQD).



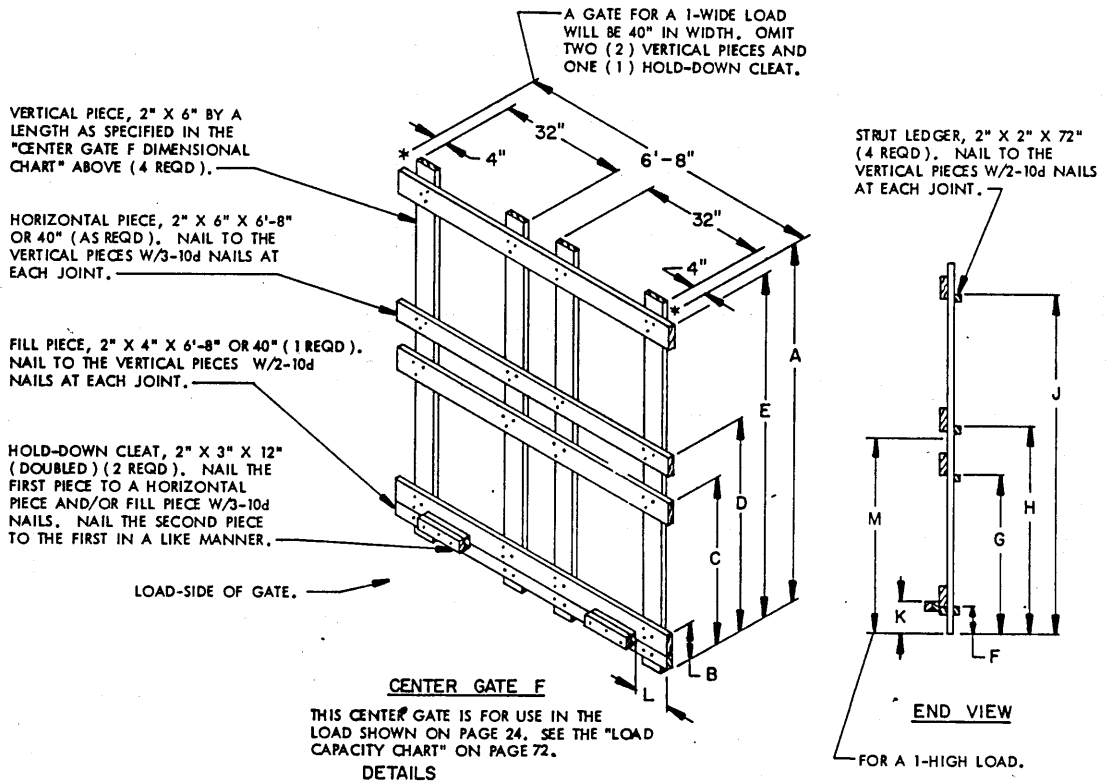
DETAILS AS SPECIFIED.

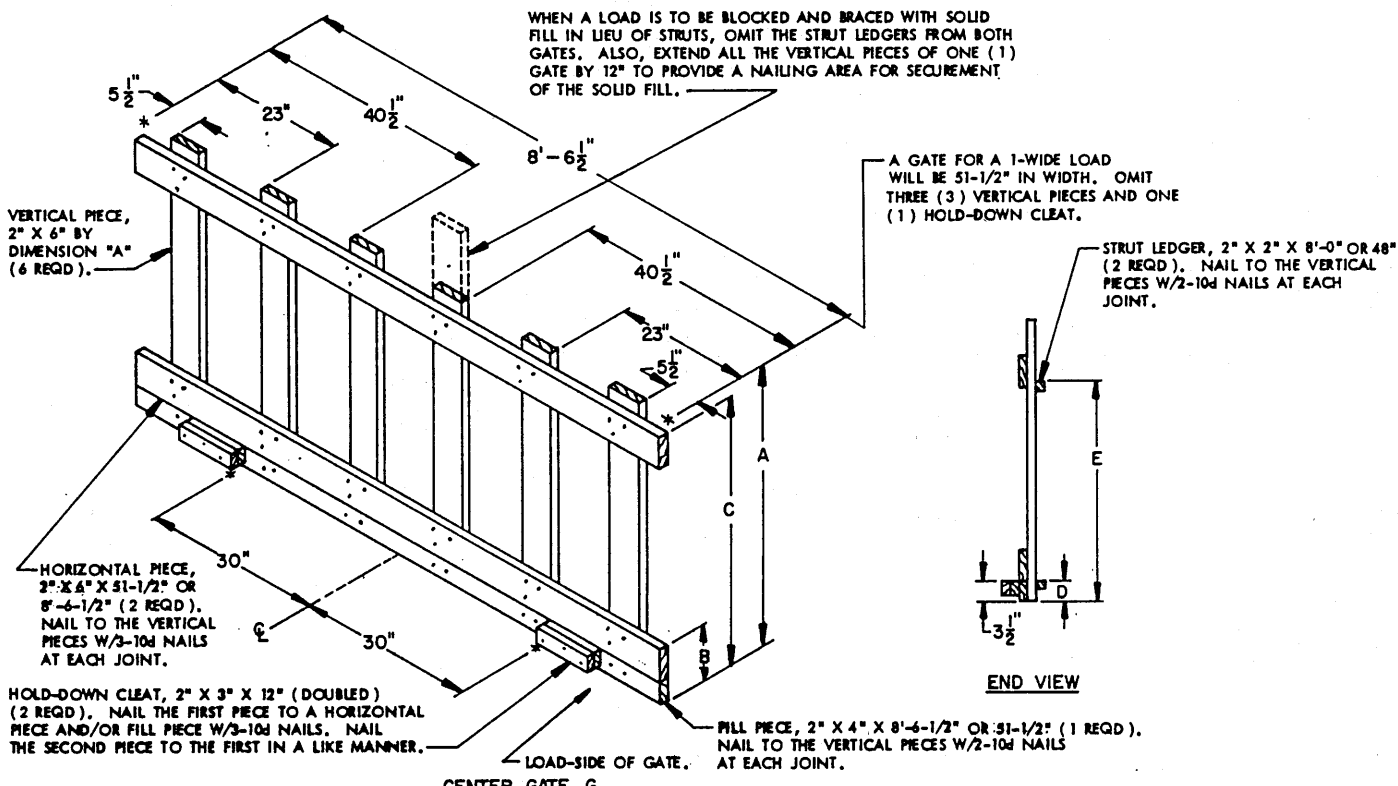
CENTER GATE E DIMENSIONAL CHART						
ITEM	LOAD PATTERN	DIMENSION				
		A	B	C	D	E
155MM	3-LONG	36"	32"	26-3/4"	40-1/2"	17-1/2"
	2-LONG	36"	32"	26-3/4"	27"	10-3/4"
8", 6 PER SMALL PLT	2-LONG	42"	38"	32-3/4"	39"	16-3/4"
	1-LONG	42"	38"	32-3/4"	19-1/2"	----
8", 6 TALL/ SMALL PLT	2-LONG	52"	48"	43-1/2"	39"	16-3/4"
	1-LONG	52"	48"	43-1/2"	19-1/2"	----



THIS CENTER GATE IS FOR USE IN THE LOAD SHOWN ON PAGE 44 AND FOR OTHER LOAD PATTERNS, AS SPECIFIED. SEE THE "LOAD CAPACITY CHART" ON PAGE 72 IF STRUTS ARE TO BE USED.

CENTER GATE F DIMENSIONAL CHART												
PALLET TYPE	DIMENSION											
	A	B	C	D	E	F	G	H	J	K	L	M
WITH SKIDS	8'-0"	12-1/2"	46-1/2"	58-1/2"	7'-8-1/2"	7"	41-1/2"	53-1/2"	7'-3-1/2"	8"	9-1/2"	51"
W/O SKIDS	7'-4"	9"	42-1/2"	51-1/2"	7'-0-1/2"	3-1/2"	37-1/2"	46-1/2"	6'-7-1/2"	3-3/4"	0"	48"





**CENTER GATE G**

THIS CENTER GATE IS FOR USE IN THE LOAD SHOWN ON PAGE 26. SEE THE "LOAD CAPACITY CHART" ON PAGE 32 IF STRUTS ARE TO BE USED.

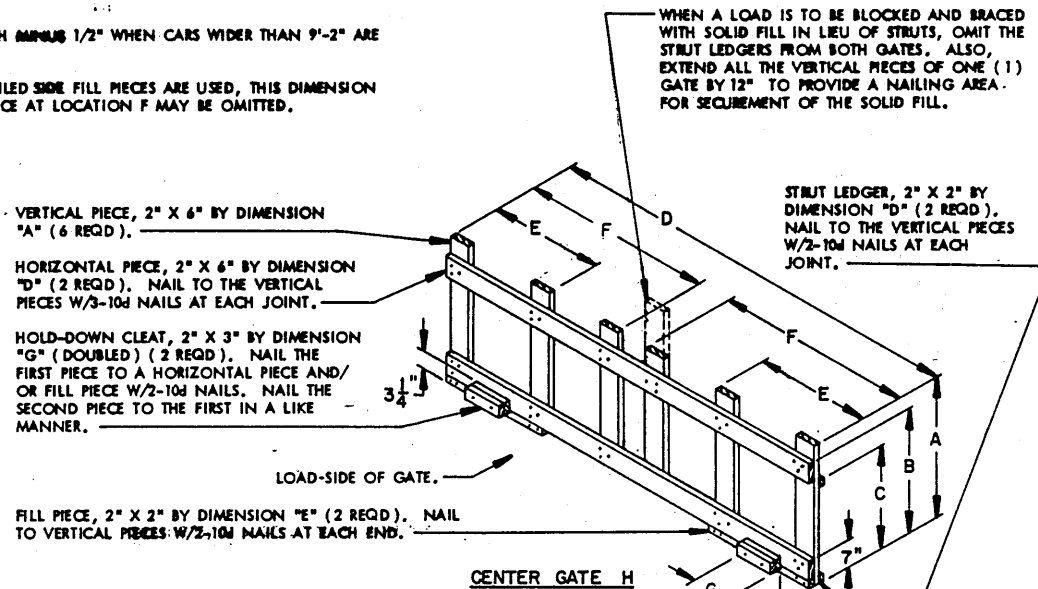
CENTER GATE H DIMENSIONAL CHART										
ITEM	LOAD PATTERN	DIMENSION								LOAD PAGE
		A	B	C	D	E	F	G	H	
155MM	4-WIDE	36"	32"	26-3/4"	9'-0"*	29-1/2"	54"	30"	8-1/2"	4,6
175MM, 6 PER PALLET	4-WIDE	45"	41"	35-3/4"	9'-1-1/2"⊙	28-1/2"	51"	6-1/2"	9-1/2"	16,18

CENTER GATE G DIMENSIONAL CHART					
PALLET TYPE	DIMENSION				
	A	B	C	D	E
WITH SKIDS	32"	10-1/2"	46-1/2"	7"	41-1/2"
W/O SKIDS	48"	9"	42-1/2"	3-1/2"	37-1/2"

\* THIS DIMENSION WILL BE CAR WIDTH MINUS 1/2" WHEN CRIB FILL IS USED BETWEEN THE CENTER ROWS.

⊙ THIS DIMENSION WILL BE CAR WIDTH MINUS 1/2" WHEN CARS WIDER THAN 9'-2" ARE USED.

⊙ IF GATE IS USED IN CAR WHERE NAILED SIDE FILL PIECES ARE USED, THIS DIMENSION WILL BE 57" AND ONE VERTICAL PIECE AT LOCATION F MAY BE OMITTED.



**CENTER GATE H**

THIS CENTER GATE IS FOR USE IN A 4-WIDE LOAD WHEN THERE ARE NO CROSSWISE ROWS. SEE THE "LOAD CAPACITY CHART" ON PAGE 28 IF STRUTS ARE TO BE USED.

**DETAILS**

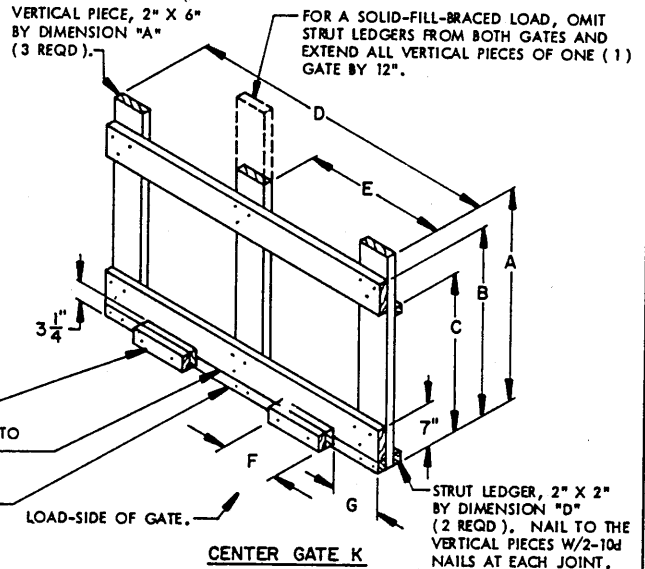
**CENTER GATE K DIMENSIONAL CHART**

ITEM	LOAD PATTERN	DIMENSION						
		A	B	C	D	E	F	G
155MM SMALL	2-WIDE	36"	32"	26-3/4"	54"	24"	10"	8-1/2"
155MM LARGE	2-WIDE	48"	40"	34-3/4"	58"	26-1/4"	12"	8-1/2"
175MM, 6 PER PALLET	2-WIDE	45"	41"	35-3/4"	51"	23"	6-1/2"	9-1/2"
8", 3 PER PALLET	2-WIDE	42"	38"	32-3/4"	57"	26"	11-1/2"	8-1/2"
8", SMALL PALLET	2-WIDE	42"	38"	32-3/4"	57"	26"	7-1/2"	10-1/4"
8", M509E1	2-WIDE	52"	47-1/2"	42-1/4"	63-1/2"	29"	10"	11"
8" XM650E1	2-WIDE	49"	45"	39-3/4"	63-1/2"	29"	10"	11"
8", 6 TALL SMALL PLT	2-WIDE	49"	45"	39-3/4"	57"	26"	7-1/2"	10-1/4"

HOLD-DOWN CLEAT, 2" X 3" BY DIMENSION "F" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO A HORIZONTAL PIECE AND/OR FILL PIECE W/2-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.

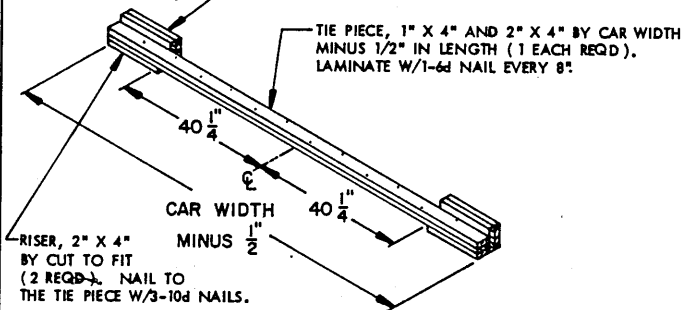
HORIZONTAL PIECE, 2" X 6" BY DIMENSION "D" (2 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH JOINT.

FILL PIECE, 2" X 2" BY DIMENSION "D" (1 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH JOINT.



● DIMENSIONS "A", "B", AND "C" ARE BASED ON A PALLET UNIT HAVING A COVER HEIGHT OF 38". THESE DIMENSIONS MUST BE ADJUSTED FOR PALLET UNITS OF OTHER HEIGHTS.

SIDE BLOCKING, 2" X 6" BY CUT TO FIT (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE TIE PIECE AND/OR RISER W/3-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.



THIS SIDE BLOCKING IS FOR USE IN THE LOAD SHOWN ON PAGE 12.

THIS CENTER GATE IS FOR USE IN A 2-WIDE LOAD SIMILAR TO THE LOAD SHOWN ON PAGE 48 EXCEPT WHEN THERE ARE NO CROSSWISE ROWS. SEE THE "LOAD CAPACITY CHART" ON PAGE 72 IF STRUTS ARE TO BE USED.

**CENTER GATE J DIMENSIONAL CHART**

ITEM	LOAD PATTERN	DIMENSION						
		A	B	C	D	E	F	G
155MM SMALL	3-WIDE	36"	32"	26-3/4"	6'-9"	29-1/2"	10"	8-1/2"
155MM LARGE	3-WIDE	48"	40"	34-3/4"	7'-3-1/2"	32"	12"	8-1/2"
175MM, 6 PER PALLET	3-WIDE	45"	41"	35-3/4"	6'-4-1/2"	28-1/2"	6-1/2"	9-1/2"
8", 3 PER PALLET	3-WIDE	42"	38"	32-3/4"	7'-1-1/2"	31-1/2"	11-1/2"	8-1/2"
8", SMALL PALLET	3-WIDE	42"	38"	32-3/4"	7'-1-1/2"	31-1/2"	7-1/2"	10-1/4"
8", M509E1	3-WIDE	52"	47-1/2"	42-1/4"	7'-11"	34-1/2"	10"	11"
8", XM650E5	3-WIDE	49"	45"	39-3/4"	7'-11"	34-1/2"	10"	11"
8", 6 TALL SMALL PLT	3-WIDE	49"	45"	39-3/4"	7'-1-1/2"	31-1/2"	7-1/2"	10-1/4"

VERTICAL PIECE, 2" X 6" BY DIMENSION "A" (4 REQD).

WHEN A LOAD IS TO BE BLOCKED AND BRACED WITH SOLID FILL IN LIEU OF STRUTS, OMIT THE STRUT LEDGERS FROM BOTH GATES. ALSO, EXTEND ALL THE VERTICAL PIECES OF ONE (1) GATE BY 12" TO PROVIDE A NAILING AREA FOR SECUREMENT OF THE SOLID FILL.

FILL PIECE, 2" X 2" BY DIMENSION "E" (2 REQD). NAIL TO VERTICAL PIECES W/2-10d NAILS AT EACH END.

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

HOLD-DOWN CLEAT, 2" X 3" BY DIMENSION "F" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO A HORIZONTAL PIECE AND/OR FILL PIECE W/2-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.

SEE THE "CENTER GATE J DIMENSIONAL CHART" ABOVE FOR FIGURES FOR THE LETTERED DIMENSIONS.

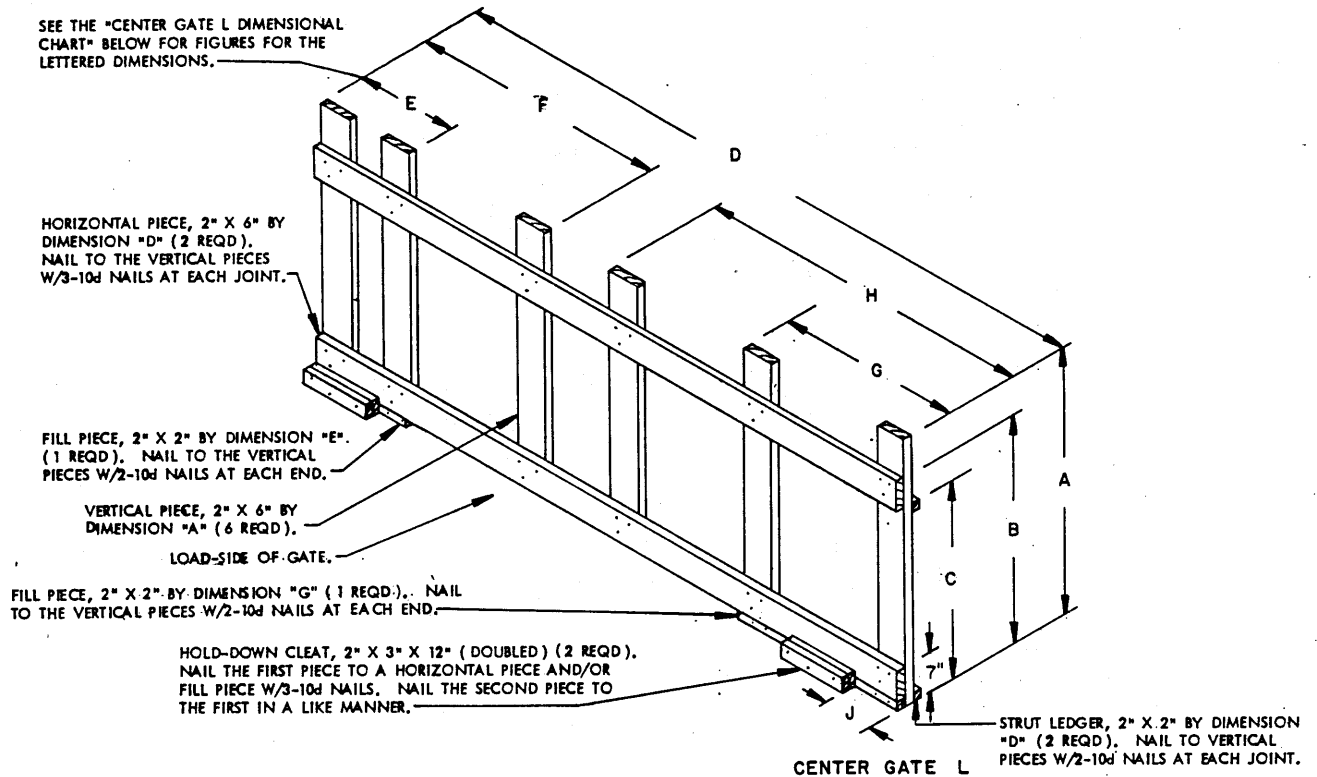
LOAD-SIDE OF GATE.

STRUT LEDGER, 2" X 2" BY DIMENSION "E" (4 REQD). NAIL TO VERTICAL PIECES W/2-10d NAILS AT EACH END.

**CENTER GATE J**

THIS CENTER GATE IS FOR USE IN A 3-WIDE LOAD SIMILAR TO THE LOAD SHOWN ON PAGE 48 EXCEPT WHEN THERE ARE NO CROSSWISE ROWS. SEE THE "LOAD CAPACITY CHART" ON PAGE 72 IF STRUTS ARE TO BE USED.

SEE THE "CENTER GATE L DIMENSIONAL CHART" BELOW FOR FIGURES FOR THE LETTERED DIMENSIONS.



THIS CENTER GATE IS FOR USE IN LOADS WHICH HAVE NO CROSSWISE ROWS. NOTE THAT ONE RIGHT HAND AND ONE LEFT HAND ARE REQUIRED.

CENTER GATE L DIMENSIONAL CHART										
ITEM	DIMENSION									LOAD PAGE
	A	B	C	D	E	F	G	H	J	
155MM, SMALL PALLET	36"	32"	26-3/4"	7'-10-1/2"	16-1/4"	40-1/2"	29-3/4"	54"	8-1/2"	8, 10
155MM, LARGE PALLET	46"	40"	34-3/4"	CAR WIDTH MINUS 1/2"	17"	43-1/2"	31-1/2"	58"	6-1/2"	12, 14
8", 3 PER PALLET	42"	38"	32-3/4"	8'-8-1/2"	15"	40-1/2"	15"	40-1/2"	0"	28, 30

\* DIMENSIONS "A", "B", AND "C" ARE BASED ON A PALLET UNIT HAVING A COVER HEIGHT OF 38". THESE DIMENSIONS MUST BE ADJUSTED FOR PALLET UNITS OF OTHER HEIGHTS.

WHEN A LOAD IS TO BE BLOCKED AND BRACED WITH SOLID FILL IN LIEU OF STRUTS, OMIT THE STRUT LEDGERS FROM BOTH GATES. ALSO, EXTEND ALL THE VERTICAL PIECES OF ONE (1) GATE BY 12" TO PROVIDE A NAILING AREA FOR SECUREMENT OF THE SOLID FILL.

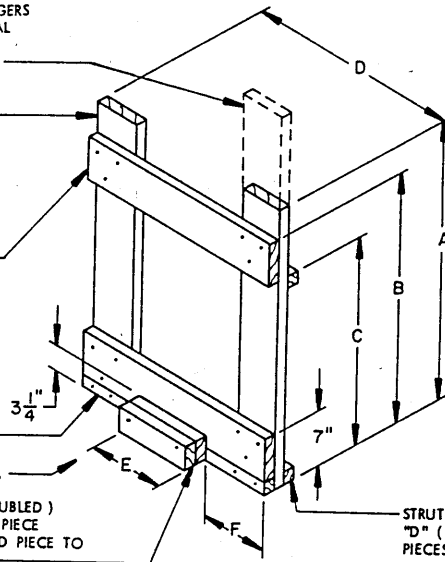
VERTICAL PIECE, 2" X 6" BY DIMENSION "A" (2 REQD).

HORIZONTAL PIECE, 2" X 6" BY DIMENSION "D" (2 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH END.

FILL PIECE, 2" X 2" BY DIMENSION "D" (1 REQD). NAIL TO THE VERTICAL PIECES W/3-10d NAILS AT EACH END.

LOAD-SIDE OF GATE.

HOLD-DOWN CLEAT, 2" X 3" BY DIMENSION "E" (DOUBLED) (1 REQD). NAIL THE FIRST PIECE TO A HORIZONTAL PIECE AND/OR FILL PIECE W/2-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.



STRUT LEDGER, 2" X 2" BY DIMENSION "D" (2 REQD). NAIL TO THE VERTICAL PIECES W/2-10d NAILS AT EACH END.

CENTER GATE M

THIS CENTER GATE IS FOR USE IN A 1-WIDE LOAD SIMILAR TO THE LOAD SHOWN ON PAGE 48 EXCEPT WHEN THERE ARE NO CROSSWISE ROWS. SEE THE "LOAD CAPACITY CHART" ON PAGE 72 IF STRUTS ARE TO BE USED.

STRUT, 2" X 6" BY CUT TO SUIT (DOUBLED) (4 REQD). NAIL THE FIRST PIECE TO THE VERTICAL PIECE: W/2-10d NAILS AT EACH END. NAIL THE SECOND PIECE TO THE FIRST W/1-10d NAIL EVERY 6" (MINIMUM OF 2). NOTE THAT THE ASSEMBLY IS TO BE POSITIONED ONLY WITH THE STRUTS LONGITUDINALLY IN A CAR.

CENTER GATE M DIMENSIONAL CHART							
ITEM	LOAD PATTERN	DIMENSION					
		A	B	C	D	E	F
155MM SMALL	1-WIDE	36"	32"	26-3/4"	27"	10"	8-1/2"
155MM LARGE	1-WIDE	48"	40"	34-3/4"	29"	12"	8-1/2"
175MM, 6 PER PALLET	1-WIDE	45"	41"	35-3/4"	25-1/2"	6-1/2"	9-1/2"
8", 3 PER PALLET	1-WIDE	42"	38"	32-3/4"	28-1/2"	11-1/2"	8-1/2"
8", SMALL PALLET	1-WIDE	42"	38"	32-3/4"	28-1/2"	7-1/2"	10-1/4"
8", M509E1	1-WIDE	52"	47-1/2"	42-1/4"	31-3/4"	10"	11"
8", XM650E5	1-WIDE	49"	45"	39-3/4"	31-3/4"	10"	11"
8", 6 TALL / SMALL PLT	1-WIDE	48"	45"	39-3/4"	28-1/2"	7-1/2"	10-1/4"

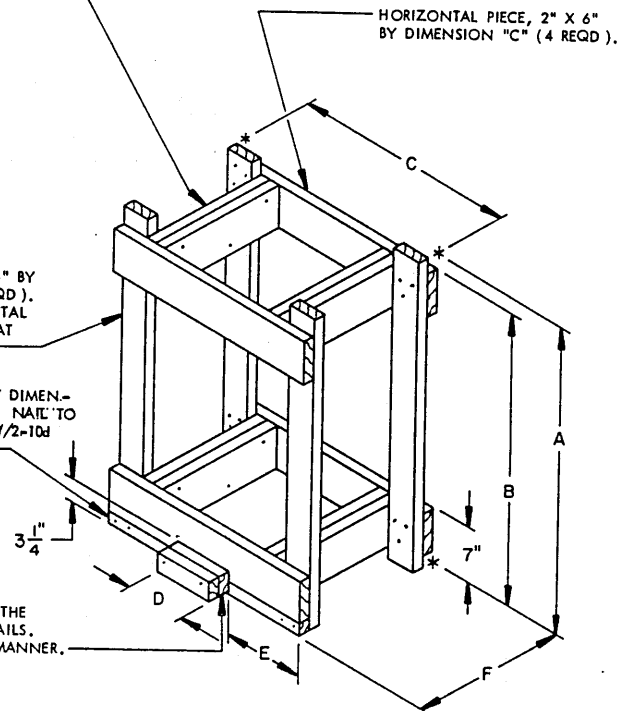
• DIMENSIONS "A", "B", AND "C" ARE BASED ON A PALLET UNIT HAVING A COVER HEIGHT OF 38". THESE DIMENSIONS MUST BE ADJUSTED FOR PALLET UNITS OF OTHER HEIGHTS.

▲ DIMENSIONS "A" AND "B" ARE BASED ON A PALLET UNIT HAVING A COVER HEIGHT OF 38". THESE DIMENSIONS MUST BE ADJUSTED FOR PALLET UNITS OF OTHER HEIGHTS.

FILLER ASSEMBLY A DIMENSIONAL CHART							
ITEM	DIMENSION						
	A	B	C *	D	E	F *	
155MM, SMALL	36"	32"	27"	10"	8-1/2"	13-1/2"	
155MM, LARGE	48"	40"	29"	12"	8-1/2"	14-5/8"	
175MM, 6 PER PALLET	44"	41"	25-1/2"	6-1/2"	9-1/2"	17"	
8", 3 PER PALLET	40"	38"	28-1/2"	11-1/2"	8-1/2"	9-1/2"	
8", SMALL PALLET	40"	38"	28-1/2"	7-1/2"	10-1/4"	19-1/2"	
8", M509E1	52"	47-1/2"	31-3/4"	10"	11"	22-5/8"	
8", XM650E5	49"	45"	31-3/4"	10"	11"	22-5/8"	
8", 6 TALL / SMALL PLT	49"	45"	28-1/2"	7-1/2"	10-1/4"	19-1/2"	

\* THE DIMENSIONS IN COLUMNS C AND F MAY NEED TO BE REVERSED OR MAY NEED TO BE ADJUSTED TO SUIT THE LOCATION THE FILLER IS TO BE USED.

HOLD-DOWN CLEAT, 2" X 3" BY DIMENSION "D" (DOUBLED) (1 REQD). NAIL THE FIRST PIECE TO THE HORIZONTAL PIECE AND/OR FILL PIECE W/2-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.



FILLER ASSEMBLY A

THIS ASSEMBLY IS FOR USE IN THE PLACE OF ANY OMITTED PALLET UNIT EXCEPT THE 175MM PALLETIZED 20 PER PALLET.

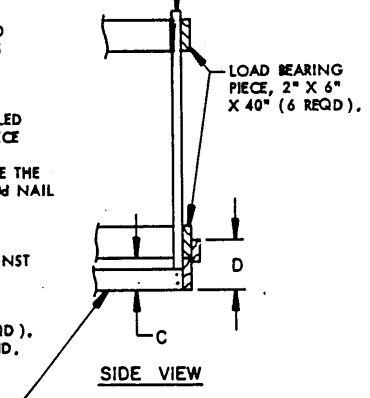
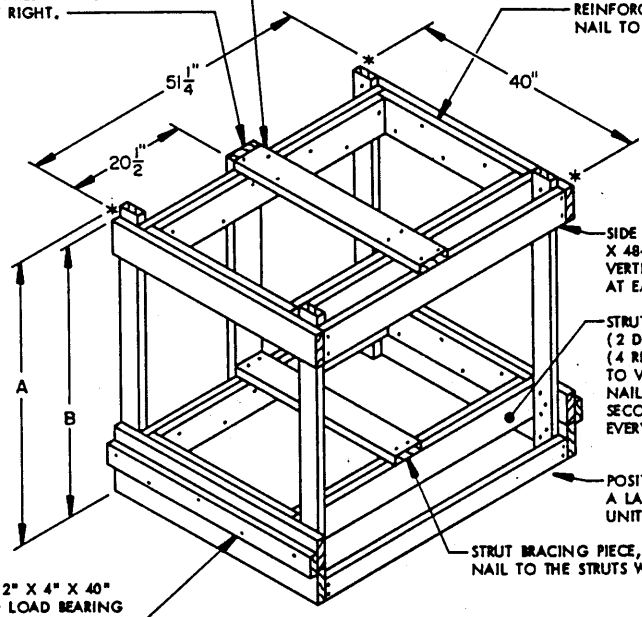
STRAPPING BOARD, 2" X 6" BY DIMENSION "B" MINUS DIMENSION "C" (1 REQD.). NAIL TO THE STRUTS W/3-10d NAILS AT EACH END. SEE THE SIDE VIEW AT RIGHT.

STRAPPING BOARD, 2" X 6" X 36-1/2" (1 REQD.). NAIL TO STRUTS AND TO THE 2" X 6" SIDE BEARING PIECE W/2-10d NAILS AT EACH JOINT.

REINFORCING PIECE, 2" X 6" X 28-1/2" (4 REQD.). NAIL TO A LOAD BEARING PIECE W/4-10d NAILS.

VERTICAL PIECE, 2" X 4" BY DIMENSION "A" (4 REQD.). NAIL TO THE LOAD BEARING PIECES W/3-10d NAILS AT EACH JOINT.

LOAD BEARING PIECE, 2" X 6" X 40" (6 REQD.).



HOLD-DOWN CLEAT, 2" X 4" X 40" (2 REQD.). NAIL TO LOAD BEARING PIECE W/3-10d NAILS.

STRUT BRACING PIECE, 2" X 6" X 31-1/2" (1 REQD.). NAIL TO THE STRUTS W/2-10d NAILS AT EACH END.

**FILLER ASSEMBLY B**

THIS ASSEMBLY IS FOR USE IN PLACE OF A PALLET UNIT OF 175MM PROJECTILES (20 PER PALLET) OMITTED FROM THE LOAD SHOWN ON PAGE 24. SECURE TO A LATERALLY ADJACENT PALLET UNIT WITH A PIECE MARKED ⑦.

FILLER ASSEMBLY B DIMENSIONAL CHART					
ITEM	PALLET TYPE	DIMENSION			
		A	B	C	D
175MM, 20 PER PALLET	W/SKID	48"	46-1/2"	5-1/2"	8-1/2"
	W/O SKID	45"	42-1/2"	3-1/2"	5"

REF: 9-1/2" FOR 8" 3/PALLET  
13" FOR 8" 6/LARGE PALLET  
17" FOR 175MM 6/PALLET

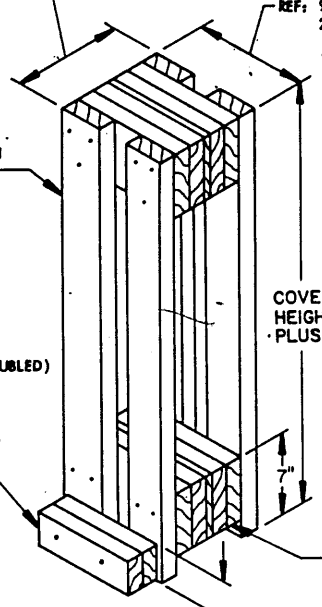
REF: 9-1/2" FOR 8" 3/PALLET  
22-5/8" FOR 8" 6/LARGE PALLET  
17" FOR 175MM 6/PALLET

VERTICAL PIECE, 2" X 4" BY A LENGTH TO SUIT (4 REQD.). NAIL TO THE SOLID FILL W/3-10d NAILS AT EACH JOINT.

HOLD-DOWN CLEAT, 2" X 3" X PALLET LENGTH (DOUBLED) (1 REQD.). NAIL THE FIRST PIECE TO THE VERTICAL PIECES W/1-10d NAIL AT EACH END. NAIL THE SECOND PIECE TO THE FIRST W/2-10d NAILS.

COVER HEIGHT PLUS 2"

SOLID FILL, 6" WIDE BY PALLET LENGTH MATERIAL (AS REQD.). LAMINATE W/3-10d NAILS.



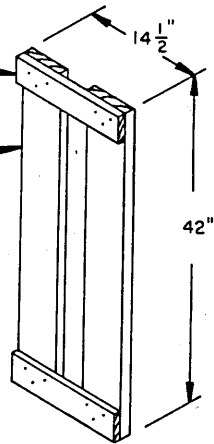
**FILLER ASSEMBLY C**

THIS ASSEMBLY IS FOR USE IN THE LOADS SHOWN ON PAGES 28, 30, AND 36.

**DETAILS**

HORIZONTAL PIECE, 1" X 4" X  
14-1/2" (2 REQD). NAIL TO  
THE VERTICAL PIECES W/3-6d  
NAILS AT EACH END AND  
CLINCH.

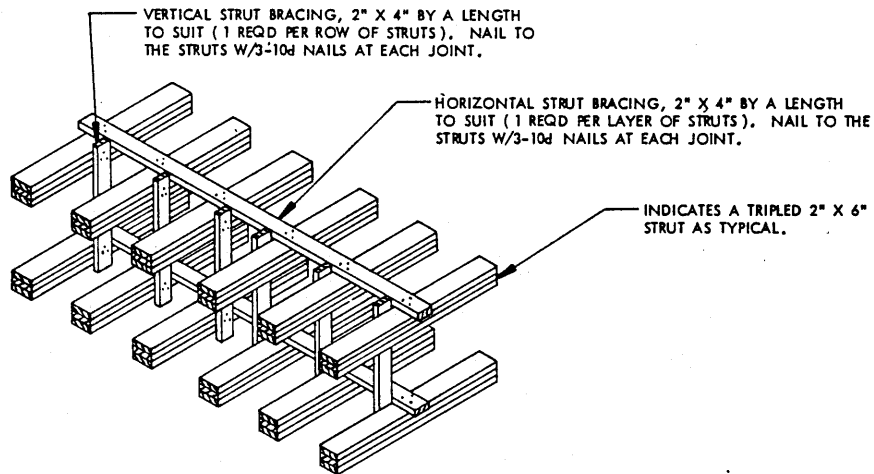
VERTICAL PIECE, 1" X 6"  
X 42" (2 REQD).



**FILLER ASSEMBLY D**

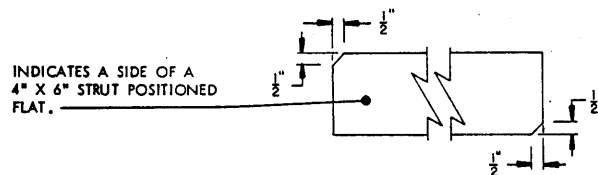
THIS ASSEMBLY IS FOR USE IN THE LOADS SHOWN ON  
PAGES 12 AND 14. THE HEIGHT OF THIS ASSEMBLY IS  
BASED ON A PALLET UNIT HAVING A COVER HEIGHT  
OF 38"; INCREASE HEIGHT AS NECESSARY FOR TALLER  
UNITS.



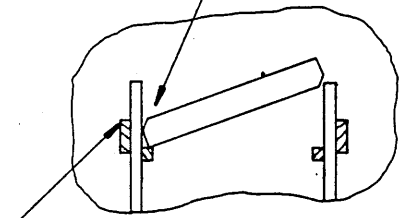


**TYPICAL STRUT BRACING**

THIS DETAIL DEPICTS THE BRACING OF TRIPLED 2" X 6" STRUTS AS TYPICAL. ONE SET OF STRUT BRACING IS REQUIRED EVERY 72" IF EITHER TRIPLED 2" X 6" STRUTS, OR 4" X 6" STRUTS POSITIONED FLAT, ARE LONGER THAN 72". ONE SET IS REQUIRED EVERY 48" FOR DOUBLED 2" X 6" STRUTS LONGER THAN 48".



BEVEL-CUT THIS CORNER ONLY IF THE 4" X 6" STRUTS ARE VERY SHORT.

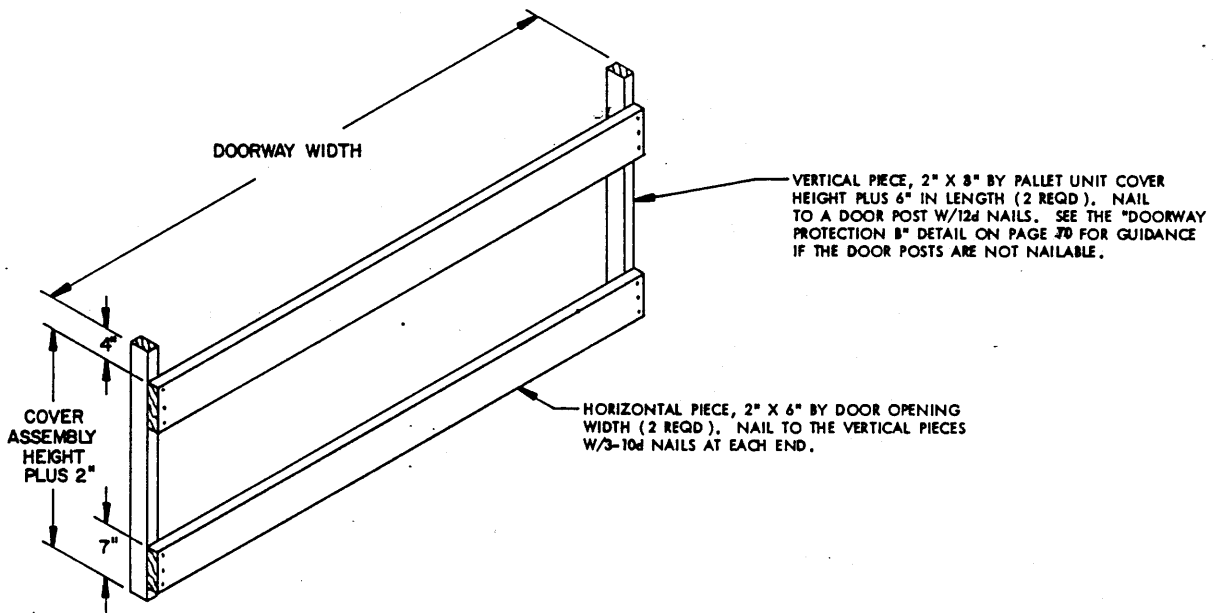


**BEVEL CUT**

BEVEL CUTTING OF 4" X 6" FLAT 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**

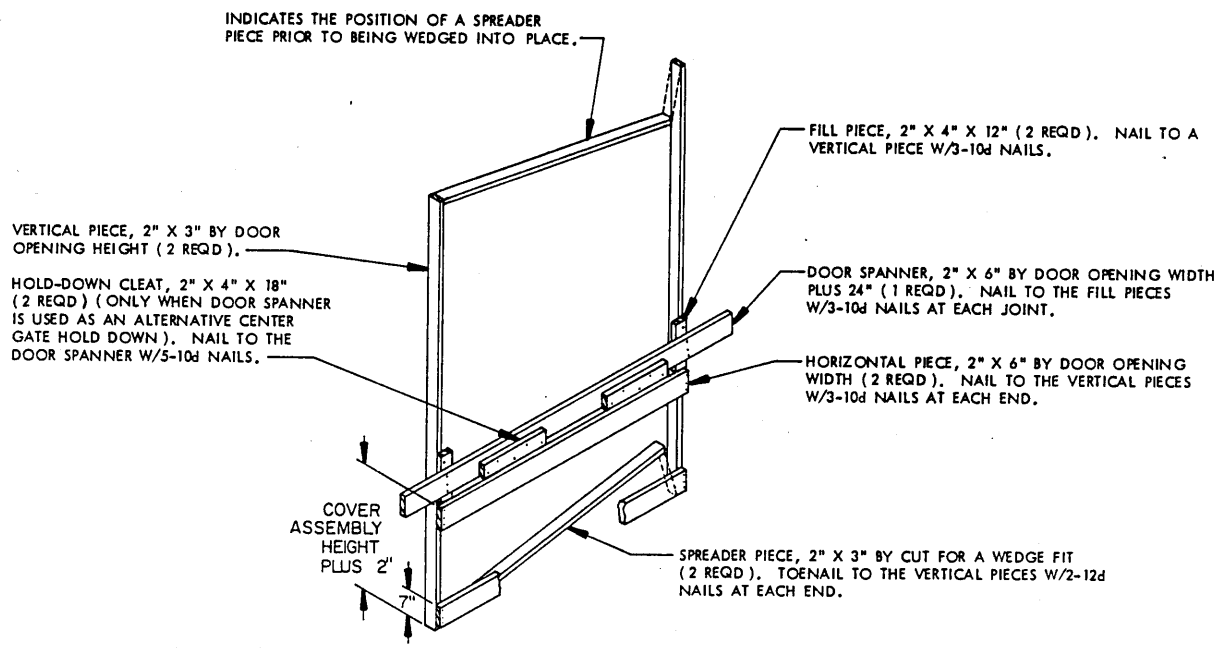
SEE GENERAL NOTE "E" ON PAGE 3 FOR ADDITIONAL STRUT INSTALLATION GUIDANCE.



**DOORWAY PROTECTION A**

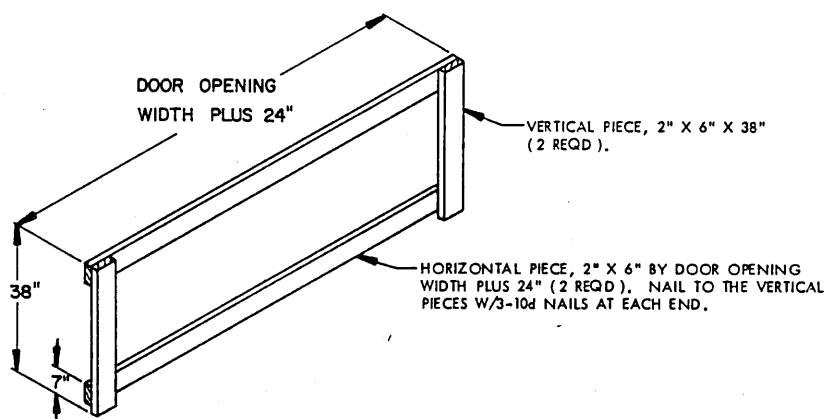
THIS DOORWAY PROTECTION IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS WHEN THE DOOR POSTS ARE WOODEN, OR ARE STEEL AND HAVE HOLES IN WHICH TO ACCOMPLISH THE NAILING OF THE VERTICAL PIECES. SEE THE "DOORWAY PROTECTION B" DETAIL ON PAGE 70 FOR GUIDANCE IF THE DOOR POSTS ARE NOT AVAILABLE.

**DETAILS**



**DOORWAY PROTECTION B**

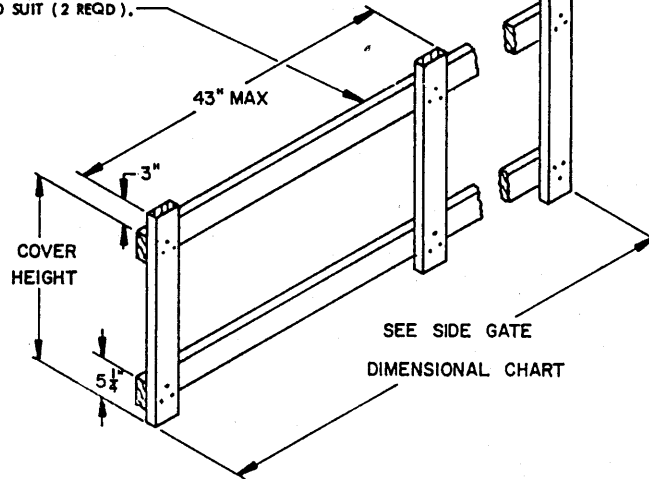
THIS DOORWAY PROTECTION IS FOR USE IN CARS EQUIPPED WITH CONVENTIONAL SLIDING DOORS WHEN THE DOOR POSTS ARE STEEL AND ARE WITHOUT HOLES FOR NAILING INTO. THE "DOORWAY PROTECTION A" AS DETAILED ON PAGE 69 MAY BE USED IF THE DOOR POSTS ARE AVAILABLE. NOTE THAT THE HOLD-DOWN CLEATS AND DOOR SPANNER PIECES IN THE DETAIL ABOVE CAN BE USED AS AN ALTERNATIVE TO USING THE HOLD-DOWN CLEATS ON ANY OF THE CENTER GATES DEPICTED HEREIN WHICH ARE CONSTRUCTED TO BE CAR WIDTH MINUS 1/2" IN LENGTH.



**DOORWAY PROTECTION C**

THIS DOORWAY PROTECTION IS FOR USE IN THE LOAD SHOWN ON PAGE 24.

BEARING PIECE, 2" X 4" BY A LENGTH TO SUIT (2 REQD).



VERTICAL PIECE, 2" X 4" BY PALLET UNIT COVER ASSEMBLY HEIGHT PLUS 3" (AS REQD). NAIL TO THE BEARING PIECES W/3-10d NAILS AT EACH JOINT.

SEE SIDE GATE DIMENSIONAL CHART

SIDE GATE

THIS SIDE GATE IS FOR USE IN THE TYPICAL LCL LOAD SHOWN ON PAGE 48.

SIDE GATE DIMENSIONAL CHART

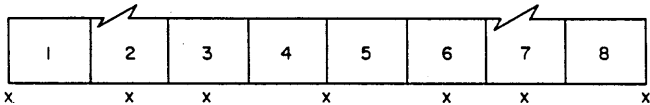
155MM SMALL		155MM LARGE		175MM 6/PALLET		8" 3/PALLET		8" 6/SMALL		8" 6/LARGE		8" 6 JARALS/SMALL	
NO. LONG	LENGTH	NO. LONG	LENGTH	NO. LONG	LENGTH	NO. LONG	LENGTH	NO. LONG	LENGTH	NO. LONG	LENGTH	NO. LONG	LENGTH
13	14'-7-1/2"	13	15'-10-1/2"	10	14'-2"	24	19'-0"	9	14'-7-1/2"	6	11'-4"	9	14'-7-1/2"
14	15'-9"	14	17'-1"	11	15'-7"	25	19'-9-1/2"	10	16'-3"	7	13'-2-1/2"	10	16'-3"
15	16'-10-1/2"	15	18'-3-1/2"	12	17'-0"	26	20'-7"	11	17'-10-1/2"	8	15'-1"	11	17'-10-1/2"
16	18'-0"	16	19'-5"	13	18'-5"	27	21'-4-1/2"	12	19'-6"	9	17'-0"	12	19'-6"
17	19'-1-1/2"	17	20'-9"	14	19'-10"	28	22'-2"	13	21'-1-1/2"	10	18'-10-1/2"	13	21'-1-1/2"
18	20'-3"	18	21'-11-1/2"	15	21'-3"	29	22'-11-1/2"	14	22'-9"	11	20'-9"	14	22'-9"
19	21'-4-1/2"	19	23'-2"	16	22'-8"	30	23'-9"	15	24'-4-1/2"	12	23'-8-1/2"	15	24'-4-1/2"

LOAD CAPACITY CHART									
NO. OF TRIPLED 2" X 6" STRUTS ●	MAX WEIGHT IN HEAVY END OF CAR	MAXIMUM PALLET UNITS IN HEAVY END *							
		155MM SMALL	155MM LARGE	175MM/6	175MM/20	8"/3	8"/6 SMALL	8"/6 LARGE	8" 6 TALL/ SMALL
4	24,750 LBS	30	28	26	7	39	19	19	19
6	37,125 LBS	46	42	39	11	58	29	28	28
8	49,500 LBS	61	56	52	14	78	39	38	38
10	61,875 LBS	77	70	66	18	97	49	48	47
12	74,250 LBS	92	84	79	22	117	59	57	57
14	86,625 LBS	108	99	92	25	136	68	67	66
16	99,000 LBS	123	113	105	29	156	78	76	76

LOAD CAPACITY CHART									
NO. OF 4" X 6" STRUTS ●	MAX WEIGHT IN HEAVY END OF CAR	MAXIMUM PALLET UNITS IN HEAVY END *							
		155MM SMALL	155MM LARGE	175MM/6	175MM/20	8"/3	8"/6 SMALL	8"/6 LARGE	8" 6 TALL/ SMALL
4	19,250 LBS	24	22	20	5	30	15	14	14
6	28,875 LBS	36	33	30	8	45	22	22	22
8	38,500 LBS	48	44	41	11	60	30	29	29
10	48,125 LBS	60	55	51	14	76	38	37	37
12	57,750 LBS	72	66	61	17	91	45	44	44
14	67,375 LBS	84	77	72	20	106	53	52	51
16	77,000 LBS	96	88	82	22	121	61	59	59
18	86,625 LBS	108	99	93	25	137	69	67	66
20	96,250 LBS	120	110	103	28	152	76	74	74

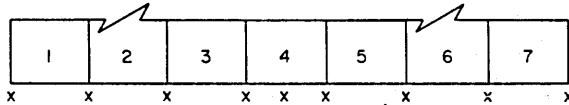
\* THE MAXIMUM PALLET UNITS IN HEAVY END OF A CAR IS BASED ON THE PALLET WEIGHTS AS SPECIFIED IN GENERAL NOTE "C" ON PAGE 2. IF A PALLET UNIT IS HEAVIER THAN SPECIFIED ON PAGE 2, ONLY THE "MAXIMUM WEIGHT IN HEAVY END OF CAR" COLUMN OF THE ABOVE CHARTS SHOULD BE EMPLOYED.

● IF THE CENTER GATE FOR A LOAD DOES NOT CONTAIN SUFFICIENT VERTICAL PIECES TO SUPPORT THE NUMBER OF STRUTS FOR A LOAD TO BE SHIPPED, AS SPECIFIED BY THE LOAD CAPACITY CHARTS ABOVE, ADDITIONAL VERTICAL PIECES MUST BE USED. REFER TO THE "STRUT LOCATION PLAN VIEWS" (PARTIAL). BELOW WHICH SHOW VARIOUS WIDTH LOADS FOR THE DIFFERENT SIZE PALLET UNITS AND STRUT LOCATION GUIDANCE.



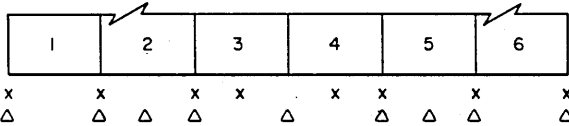
**155MM SMALL PALLET**

- 7 VERTICALS ----- POSITION AS MARKED "X".
- 8 VERTICALS ----- POSITION 1 AT EACH END AND 1 CENTERED ON INTER-MEDIATE PALLETS.
- 9 VERTICALS ----- POSITION 1 AT EACH END AND 1 CENTERED ON EACH JOINT.



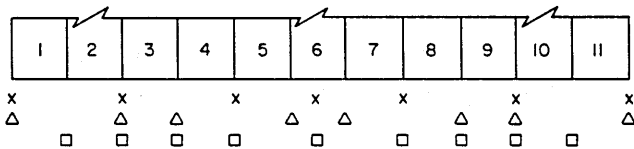
**155MM SMALL OR LARGE PALLET**

- 7 VERTICALS ----- POSITION 1 AT EACH END AND 1 CENTERED ON INTER-MEDIATE PALLETS.
- 8 VERTICALS ----- POSITION 1 AT EACH END AND 1 CENTERED ON EACH JOINT.
- 9 VERTICALS ----- POSITION AS MARKED "X".



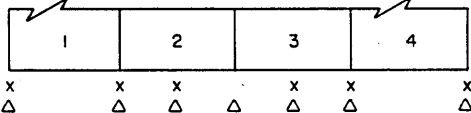
**175MM 6/PALLET**

- 6 VERTICALS ----- POSITION 1 AT EACH END AND 1 CENTERED ON INTER-MEDIATE PALLETS.
- 7 VERTICALS ----- POSITION 1 AT EACH END AND 1 CENTERED ON EACH JOINT.
- 8 VERTICALS ----- POSITION AS MARKED "X".
- 9 VERTICALS ----- POSITION AS MARKED "Δ".



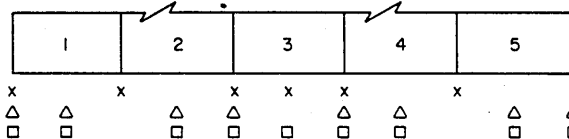
**8' 3/SMALL PALLET**

- 7 VERTICALS ----- POSITION AS MARKED "X".
- 8 VERTICALS ----- POSITION AS MARKED "Δ".
- 9 VERTICALS ----- POSITION AS MARKED "□".



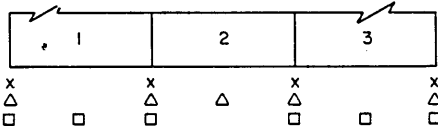
**8' 6/LARGE PALLET**

- 6 VERTICALS ----- POSITION AS MARKED "X".
- 7 VERTICALS ----- POSITION AS MARKED "Δ".



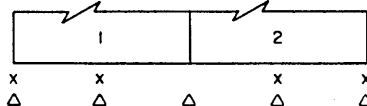
**8' 6/SMALL PALLET OR 6 TALL PROJECTILE/SMALL PALLET**

- 5 VERTICALS ----- POSITION 1 AT EACH END AND 1 CENTERED ON INTER-MEDIATE PALLETS.
- 6 VERTICALS ----- POSITION 1 AT EACH END AND 1 ON EACH JOINT.
- 7 VERTICALS ----- POSITION AS MARKED "X".
- 8 VERTICALS ----- POSITION AS MARKED "Δ".
- 9 VERTICALS ----- POSITION AS MARKED "□".



**ANY PALLET (LCL)**

- 4 VERTICALS ----- POSITION AS MARKED "X".
- 5 VERTICALS ----- POSITION AS MARKED "Δ".
- 6 VERTICALS ----- POSITION AS MARKED "□".



**ANY PALLET (LCL)**

- 4 VERTICALS ----- POSITION AS MARKED "X".
- 5 VERTICALS ----- POSITION AS MARKED "Δ".

## GENERAL NOTES

(FOR CARS EQUIPPED WITH MECHANICAL BRACING DEVICES)

- A. THE SELECTION OF RAIL CARS FOR THE TRANSPORT OF PALLETIZED SEPARATE LOADING PROJECTILES 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. REFER TO GENERAL NOTE "E" ON PAGE 2 FOR ADDITIONAL REQUIREMENTS.
- B. THE OUTLOADING PROCEDURES SPECIFIED ON PAGES 74 THRU 98 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. VOIDS LENGTHWISE WITHIN THE LOAD MUST BE HELD TO A MINIMUM AND CROSS MEMBERS MUST BE PLACED AGAINST THE LADING AS TIGHTLY AS THE SPACING OF THE LOCKING HOLES IN THE WALL MEMBERS PERMITS. LOCKING BARS (LEVER JACKS) SHOULD BE USED FOR THIS PURPOSE. AN ADDITIONAL 1/2" OF ADJUSTMENT CAN BE MADE BY TURNING A CROSS MEMBER END-FOR-END WHEN LOCKING PINS ON THE 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.
- C. 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 SURFACE AREA FOR SIDE BEARING AGAINST A PALLET COVER.
- 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 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 ITEMS MUST BE FOLLOWED AS CLOSELY AS POSSIBLE.
- E. NOTICE: WHEN POSITIONING PALLET UNITS IN A CAR THEY SHOULD BE PLACED TIGHTLY AGAINST A CAR SIDEWALL, AGAINST A CRIB FILL ASSEMBLY, OR AGAINST A LATERALLY ADJACENT UNIT, AS APPLICABLE. THE LADING PLUS THE DUNNAGE SHOULD TOTALLY FILL THE WIDTH OF THE CAR AS NEARLY AS POSSIBLE. HOWEVER, A TOTAL ACCUMULATED SPACE ACROSS A CAR OF UP TO BUT NOT EXCEEDING TWO INCHES (2") IS PERMITTED. THE CRIB FILL ASSEMBLIES SPECIFIED FOR THE VARIOUS WIDTH CARS ARE DESIGNED SO AS TO PROVIDE AN EXCESS LATERAL VOID ACROSS A CAR OF APPROXIMATELY 1/2" TO 1". IF VARIATIONS IN THE WIDTH OF THE CAR BEING LOADED OR IN THE PALLET UNIT LENGTHS AND/OR WIDTHS DO NOT PERMIT INSERTION OF THE CRIB FILL, OR IF THE REMAINING LATERAL SPACE AFTER A CRIB FILL IS INSERTED IS MORE THAN 2", ADJUSTMENTS MUST BE MADE TO THE CRIB FILL ASSEMBLIES. ADJUSTMENTS CAN BE ACCOMPLISHED BY VARYING THE WIDTH AND/OR THICKNESS, AS APPLICABLE, OF THE COMPONENT PARTS OF THE CRIB FILL ASSEMBLIES.
- F. ALL LOADS SHOWN FOR CARS EQUIPPED WITH MECHANICAL BRACING DEVICES ARE BASED ON THE USE OF HIGH CAPACITY CARS. THE NUMBER OF UNITS MUST BE REDUCED IF THE LOAD LIMIT OF THE CAR BEING LOADED IS NOT AT LEAST AS GREAT AS THE TOTAL WEIGHT OF THE LADING AND DUNNAGE SPECIFIED IN THE "LOAD AS SHOWN", OR A LOAD LIMIT AS INDICATED WITHIN THE SPECIAL NOTES FOR THOSE ITEMS LOADED IN AN OFFSET PATTERN. 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.
- G. 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 SPECIFIED DOORWAY BLOCKING AND/OR SIDE BLOCKING PIECES IN THE LOADS. IF A NAIL SIZE IS NOT SPECIFIED IN THE CAR, 304 NAILS SHOULD BE USED IN LIEU OF THOSE SPECIFIED IN THE APPLICABLE KEY NUMBERS OR SPECIAL NOTES.
- H. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.

**CAR EQUIPMENT REQUIRED**

ADJUSTABLE WALL MEMBERS	-----	48
(SEE "NOTE 1")		
CROSS MEMBERS	-----	48
DOORWAY MEMBERS	-----	4

NOTE 1: FOR BOX CARS EQUIPPED WITH FIXED WALL MEMBERS AND DOORWAY MEMBERS LOCATED AT THE HEIGHTS SPECIFIED IN "SECTION Y-Y", OMIT ALL REFERENCES TO ADJUSTABLE WALL MEMBERS.

SEE SPECIAL NOTE 2 ON PAGE 75.

SEE GENERAL NOTE "C" ON PAGE 73.

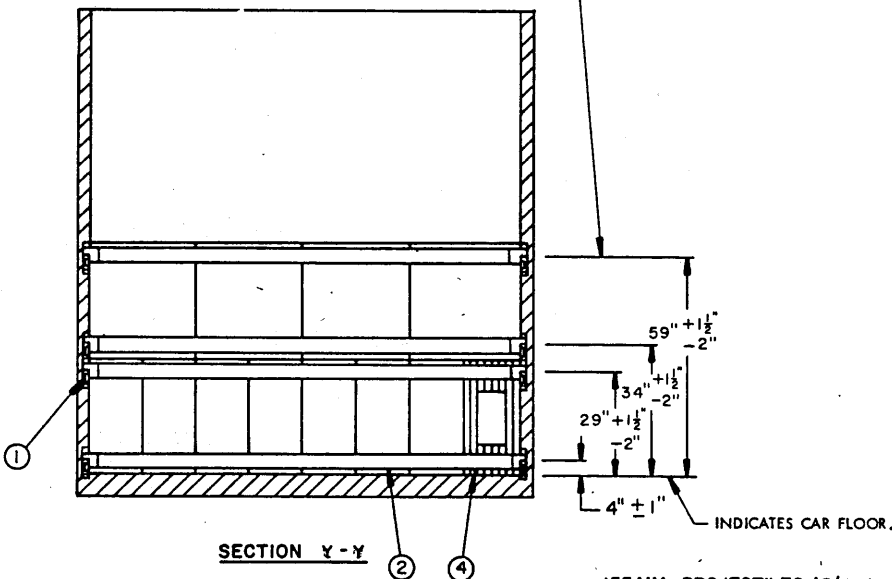
SEE GENERAL NOTE "B-3" ON PAGE 73.

**ISOMETRIC VIEW**

EACH DIMENSIONED HEIGHT ABOVE THE CAR FLOOR TO AN ADJUSTABLE OR FIXED WALL MEMBER MARKED 1 AND/OR A DOORWAY MEMBER MARKED 3 IS SPECIFIED TO LOCATE THE CENTER LINE OF A CROSS MEMBER.

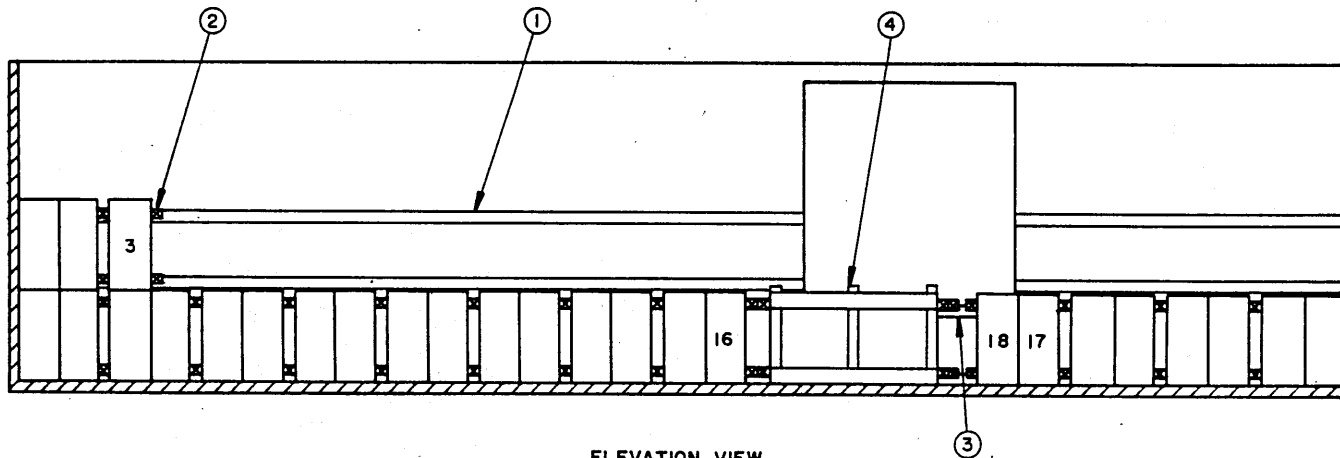
**KEY NUMBERS**

- 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 2. SEE THE "SECTION Y-Y" VIEW BELOW FOR LOCATION GUIDANCE.
- 2 CROSS MEMBER (48 REQD). SEE GENERAL NOTE "B" ON PAGE 73. NOTE THAT TWO (2) CROSS MEMBERS ARE REQUIRED AT EACH END OF THE TWO CROSSWISE ROWS IN THE DOORWAY AREA. SEE SPECIAL NOTE 4 ON PAGE 75.
- 3 DOORWAY MEMBER (4 REQD). SEE THE "SECTION Y-Y" VIEW BELOW FOR LOCATION GUIDANCE. SEE SPECIAL NOTE 6 ON PAGE 75.
- 4 FILLER ASSEMBLY (1 REQD). SEE THE "FILLER ASSEMBLY E" DETAIL AND THE "FILLER ASSEMBLY E DIMENSIONAL CHART" ON PAGE 90. SEE SPECIAL NOTES 3 AND 5 ON PAGE 75. SEE GENERAL NOTE "H" ON PAGE 2.



155 MM PROJECTILES (8) SMALL PALLET

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



ELEVATION VIEW

(SPECIAL NOTES CONTINUED)

SPECIAL NOTES:

8. THE DEPICTED PROCEDURES IN CONJUNCTION WITH THE PROCEDURES SHOWN ON PAGE 78 CAN BE UTILIZED FOR THE BLOCKING AND BRACING OF LCL SHIPMENTS. FOR A LOAD QUANTITY OF LESS THAN 4 PALLET UNITS, INSTALL CROSS MEMBERS AT THE DESIGNATED HEIGHTS AT BOTH ENDS OF THE LOAD UNIT. PROVIDE LATERAL BRACING FOR THE UNIT (5) BY POSITIONING A SPACER ASSEMBLY ON EACH LONGITUDINALLY ADJACENT PAIR OF CROSS MEMBERS. SEE PIECE MARKED (3) ON PAGE 78 FOR A TYPICAL INSTALLATION. SEE THE DETAIL ON PAGE 92 FOR CONSTRUCTION GUIDANCE.
9. ONE HUNDRED AND FIFTY (150) PALLET UNITS, APPROXIMATELY 120,000 POUNDS, CAN BE LOADED IN A 50'-6" LONG CAR WITHOUT PUTTING ANY UNITS IN THE SECOND LAYER. ONE HUNDRED AND TEN (110) PALLET UNITS, APPROXIMATELY 88,000 POUNDS, CAN BE LOADED ON THE FLOOR OF A 40'-6" LONG CAR.
10. CROSS MEMBERS CANNOT BE EFFECTIVELY INSTALLED WITHIN A DOOR OPENING SO AS TO BE COMMON TO TWO BAYS. THEREFORE, THE DEPICTED DOORWAY-AREA LOAD PATTERN MAY ONLY BE APPLICABLE FOR CARS HAVING 6', 7', OR 8' WIDE DOORS. FOR CARS WITH 9', 10', OR 12' WIDE DOORS, OMIT THE BAY OF LOAD UNITS MARKED 17 AND 18 AND IN ITS PLACE POSITION A SINGLE CROSSWISE ROW OF 7 OR 8 PALLET UNITS, WITH OR WITHOUT A "FILLER ASSEMBLY F", AS APPLICABLE. SEE THE DETAIL ON PAGE 90. ONE BAY OF TWO CROSSWISE ROWS AS SHOWN IN THE DEPICTED LOAD CAN ALSO BE LOADED IN THE DOORWAY AREA. BOTH BAYS IN THE DOORWAY AREA SHOULD BE INDIVIDUALLY BLOCKED. THIS GUIDANCE IS SPECIFICALLY APPLICABLE FOR 50'-6" LONG CARS; ADJUSTMENTS WILL BE NECESSARY WHEN LOADING CARS OF OTHER LENGTHS.
11. IF A CAR FURNISHED FOR LOADING HAS AN INSIDE CLEARANCE LESS THAN 9'-1", USE A 3-WIDE PATTERN SIMILAR TO THE LOAD SHOWN ON PAGE 74. ANTI-SWAY BRACE D AND ANTI-SWAY BRACE E (IF APPLICABLE); PIECES MARKED (3) AND (4) RESPECTIVELY, ON PAGE 76 WILL BE USED TO PROVIDE LATERAL BRACING.

1. A 174-UNIT LOAD OF 155MM PROJECTILES PALLETIZED 8 PER SMALL PALLET IS SHOWN IN A 50'-6" LONG BY 9'-2" WIDE (INSIDE CLEARANCE) BOX CAR EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS, AND WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS (9'-1" MINIMUM WIDTH FOR A 4-WIDE LOAD) AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTES 10 AND 11.
2. THE TOTAL ACCUMULATED SPACE ACROSS A CAR MUST NOT EXCEED TWO INCHES (2"). IF VARIATIONS IN PALLET WIDTHS CAUSES A SPACE WIDER THAN TWO INCHES, OR IF A CAR WHICH IS WIDER THAN 9'-2" IS USED, A CRIB FILL ASSEMBLY MUST BE POSITIONED BETWEEN THE CENTER ROWS TO FILL THE VOID. SEE THE "CRIB FILL B" DETAIL ON PAGE 57 FOR CONSTRUCTION GUIDANCE.
3. TWO PALLET UNITS MAY BE LOADED IN THE PLACE OF THE FILLER ASSEMBLY WHICH IS POSITIONED IN THE CROSSWISE ROWS, IF DESIRED. DEPENDING UPON THE WIDTH OF THE CAR BEING LOADED, THE FILLER ASSEMBLY MAY STILL BE REQUIRED IN ORDER TO REDUCE THE LATERAL VOID TO A TOTAL OF 2" OR LESS. SEE SPECIAL NOTE 5.
4. PALLET UNITS IN THE DOORWAY AREA MAY BE FORMED IN SINGLE ROWS IN LIEU OF THE TWO SIDE-BY-SIDE ROWS SHOWN, IF DESIRED. ONE (1) CROSS MEMBER AT EACH BLOCKING LEVEL IS ADEQUATE FOR RETAINING ONE CROSSWISE ROW OF PALLET UNITS. HOWEVER, DUE TO THE DIFFICULTY OF PROPERLY INSTALLING CROSS MEMBERS AT BOTH ENDS OF MORE THAN ONE LOAD UNIT IN THE DOORWAY AREA, MEMBERS CANNOT BE INSTALLED SO AS TO BE COMMON TO TWO ROWS; INDIVIDUAL ROWS MUST BE SEPARATELY BLOCKED. FILLER ASSEMBLY "F" WILL BE USED IN LIEU OF THE DEPICTED FILLER ASSEMBLY WHEN SINGLE ROWS ARE FORMED. SEE SPECIAL NOTE 5. SEE THE "FILLER ASSEMBLY F" DETAIL ON PAGE 90.
5. IN LIEU OF USING FILLER ASSEMBLIES, PIECES MARKED (4), SIDE BLOCKING FOR THE CROSSWISE ROWS IN THE DOORWAY AREA CAN BE PROVIDED BY INSTALLING DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS SIMILAR TO PIECES MARKED (3), (4), AND (7) SHOWN ON PAGE 76. THE DOORWAY BLOCKING, EITHER APPLIED TO BOTH SIDES FOR UNITS CENTERED IN THE CAR OR APPLIED TO ONE SIDE ONLY WITH THE UNITS LOADED AGAINST THE DOORWAY MEMBERS ON THE OPPOSITE SIDE, WILL BE 48" LONG FOR TWO CROSSWISE ROWS OR 24" LONG FOR A SINGLE ROW. DOORWAY PROTECTION STRAPS FOR THE LOAD SHOWN WILL BE 24'-0" LONG AND WILL BE OF A LENGTH TO SUIT WHEN THE NUMBER OF PALLET UNITS IN A CROSSWISE ROW IS OTHER THAN 7. NOTE THAT A CROSSWISE ROW MUST CONSIST OF AT LEAST THREE (3) PALLET UNITS.
6. IF THE CAR BEING LOADED DOES NOT HAVE A SUFFICIENT QUANTITY OF DOORWAY MEMBERS, PIECES MARKED (3), OR IF DESIRED IN LIEU OF POSITIONING PALLET UNITS IN THE DOORWAY AREA, UNITS MAY BE ADDED TO THE SECOND LAYER PORTION IN EITHER OR BOTH ENDS OF THE CAR.
7. THE DEPICTED LOAD CAN BE INCREASED, LOAD LIMIT OF THE CAR PERMITTING, OR DECREASED BY A MULTIPLE OF 8 PALLET UNITS BY ADDING ONE LAYER TO 2-LONG BAYS OR OMITTING ONE LAYER FROM 2-LONG BAYS, OR CAN BE ADJUSTED BY 4 UNITS BY ADDING 4 PALLET TO A 1-LONG BAY OR BY OMITTING A 1-LONG BAY. THE LOAD CAN BE REDUCED BY 2 PALLET UNITS BY OMITTING A LONGITUDINALLY ADJACENT PAIR OF UNITS FROM THE TWO CROSSWISE ROWS IN THE DOORWAY AREA, USE BLOCKING AS SPECIFIED IN SPECIAL NOTE 5. AN ADJUSTMENT BY ONE PALLET UNIT CAN BE ACCOMPLISHED BY FORMING TWO (2) 1-LONG BAYS OF THE REQUIRED QUANTITIES IN LIEU OF THE BAY OF 2 CROSSWISE ROWS IN THE DOORWAY AREA. IF THERE ARE NO CROSSWISE ROWS IN A LOAD, OR IF DESIRED, A FILLER ASSEMBLY CAN BE POSITIONED IN THE PLACE OF A PALLET OMITTED FROM A 2-LONG BAY WITHIN THE LOAD. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	40	27
2" X 6"	18	18
NAILS	NO. REQD	POUNDS
10d (3")	108	1-3/4

(CONTINUED AT LEFT)

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
155MM (8/PALLET)	174	139,200 LBS
DUNNAGE		92 LBS
TOTAL WEIGHT		139,292 LBS

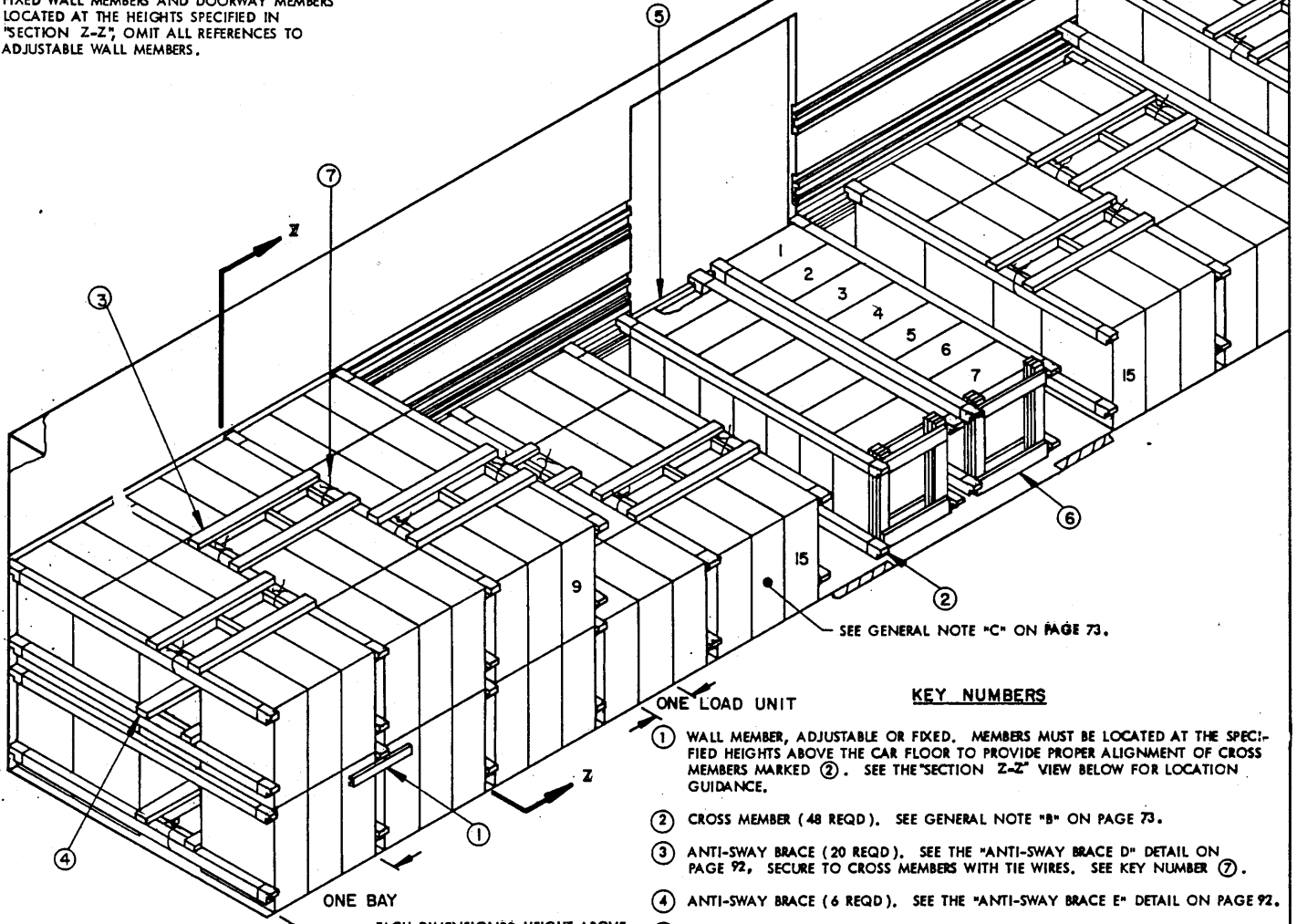
155 MM PROJECTILES (8/SMALL PALLET)

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

**CAR EQUIPMENT REQUIRED**

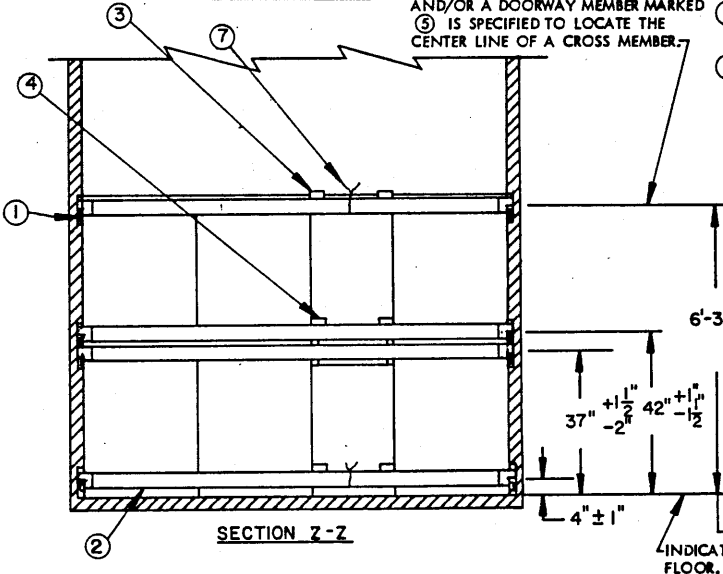
ADJUSTABLE WALL MEMBERS -----	60
(SEE "NOTE 1")	
CROSS MEMBERS -----	48
DOORWAY MEMBERS -----	4

NOTE 1: FOR BOX CARS EQUIPPED WITH FIXED WALL MEMBERS AND DOORWAY MEMBERS LOCATED AT THE HEIGHTS SPECIFIED IN "SECTION Z-Z", 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.



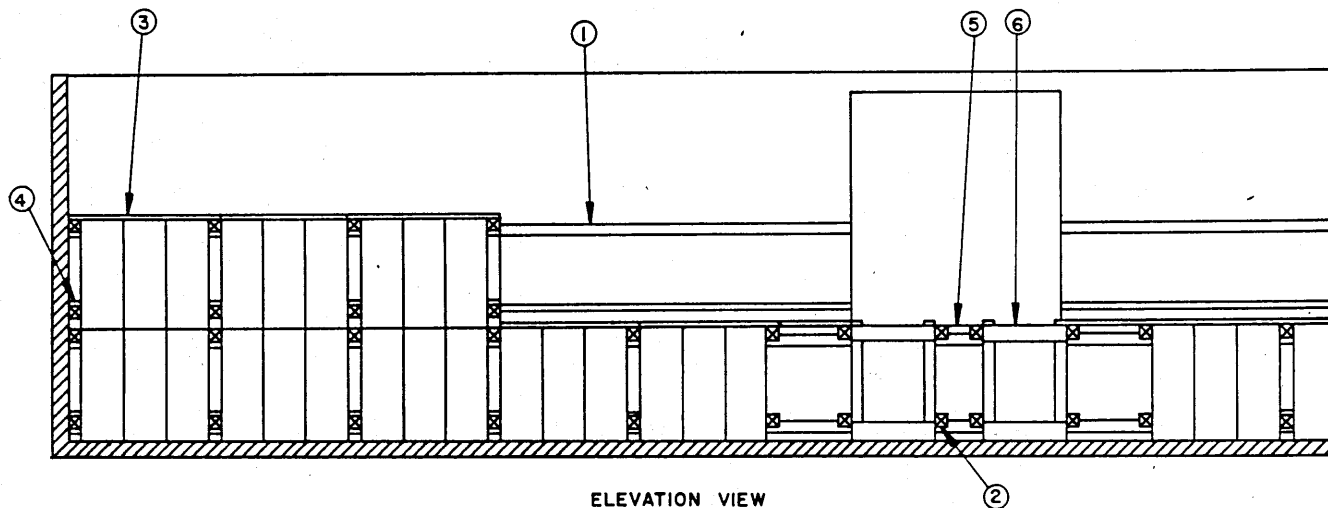
**KEY NUMBERS**

- 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 ②. SEE THE "SECTION Z-Z" VIEW BELOW FOR LOCATION GUIDANCE.
- ② CROSS MEMBER (48 REQD). SEE GENERAL NOTE "B" ON PAGE 73.
- ③ ANTI-SWAY BRACE (20 REQD). SEE THE "ANTI-SWAY BRACE D" DETAIL ON PAGE 92, SECURE TO CROSS MEMBERS WITH TIE WIRES. SEE KEY NUMBER ⑦.
- ④ ANTI-SWAY BRACE (6 REQD). SEE THE "ANTI-SWAY BRACE E" DETAIL ON PAGE 92.
- ⑤ DOORWAY MEMBER (4 REQD). SEE THE "SECTION Z-Z" VIEW AT LEFT FOR LOCATION GUIDANCE. SEE SPECIAL NOTE 5 ON PAGE 77.
- ⑥ FILLER ASSEMBLY (2 REQD). SEE THE "FILLER ASSEMBLY F" DETAIL ON PAGE 90. SEE SPECIAL NOTES 3 AND 4 ON PAGE 77. SEE GENERAL NOTE "H" ON PAGE 2.
- ⑦ WIRE TIE, NO. 14 GAGE WIRE 48" LONG (40 REQD). INSTALL TO FORM TWO (2) COMPLETE LOOPS AROUND A CROSS BRACE OF AN ANTI-SWAY BRACE, PIECE MARKED ③, AND AN ADJACENT CROSS MEMBER, PIECE MARKED ②. BRING THE ENDS TOGETHER AND TWIST TAUT.

155 MM PROJECTILES (8/LARGE PALLET)

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





ELEVATION VIEW

( SPECIAL NOTES CONTINUED )

- 8. ONE HUNDRED AND FOUR ( 104 ) PALLET UNITS, APPROXIMATELY 90,896 POUNDS, CAN BE LOADED IN A 50'-6" LONG CAR WITHOUT PUTTING ANY UNITS IN THE SECOND LAYER. EIGHTY-SIX ( 86 ) PALLET UNITS, APPROXIMATELY 75,164 POUNDS, CAN BE LOADED ON THE FLOOR OF A 40'-6" LONG CAR.
- 9. CROSS MEMBERS CANNOT BE EFFECTIVELY INSTALLED WITHIN A DOOR OPENING SO AS TO BE COMMON TO TWO BAYS. THEREFORE, THE DEPICTED DOORWAY AREA LOAD PATTERN MAY ONLY BE APPLICABLE FOR CARS HAVING 6', 7', 8', OR 9' WIDE DOORS. FOR CARS WITH 10' OR 12' WIDE DOORS, OMIT LOAD UNIT MARKED 15 FROM ONE END OF THE LOAD AND FORM A TWO-LOAD-UNIT BAY AT THAT END OF THE LOAD. IT MAY THEN BE POSSIBLE TO POSITION THREE INDIVIDUALLY-BLOCKED CROSSWISE ROWS OF 7 PALLET UNITS IN THE DOORWAY AREA. THIS GUIDANCE IS SPECIFICALLY APPLICABLE FOR 50'-6" LONG CARS; ADJUSTMENTS WILL BE NECESSARY WHEN LOADING CARS OF OTHER LENGTHS.

SPECIAL NOTES:

- 1. A 158-UNIT LOAD OF 155MM PROJECTILES PALLETIZED 8 PER LARGE PALLET IS SHOWN IN A 50'-6" LONG BY 9'-2" WIDE (INSIDE CLEARANCE) BOX CAR EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS, AND WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED.
- 2. THE HEIGHT DIMENSIONS FOR THE LOCATION OF THE CROSS MEMBERS AND DOORWAY MEMBERS, PIECES MARKED ② AND ⑤, RESPECTIVELY, ARE BASED ON A PALLET UNIT COVER HEIGHT OF 38". THE HEIGHT LOCATIONS WILL BE ADJUSTED PROPORTIONALLY FOR PALLET UNITS OF OTHER HEIGHTS.
- 3. THE TOTAL ACCUMULATED SPACE ACROSS A CAR MUST NOT EXCEED TWO INCHES ( 2" ). THE WIDTH OF THE ANTI-SWAY BRACE D ASSEMBLIES, PIECES MARKED ③, THE ANTI-SWAY BRACE E ASSEMBLIES, PIECES MARKED ④, AND OF EACH FILLER ASSEMBLY F, PIECE MARKED ⑥, MUST BE ADJUSTED IN ORDER TO COMPLY WITH THIS MANDATORY REQUIREMENT.
- 4. IN LIEU OF USING FILLER ASSEMBLIES, PIECES MARKED ⑥, SIDE BLOCKING FOR THE CROSSWISE ROWS IN THE DOORWAY AREA CAN BE PROVIDED BY INSTALLING DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS SIMILAR TO PIECES MARKED ③, ④, AND ⑦ SHOWN ON PAGE 14. THE DOORWAY BLOCKING, EITHER APPLIED TO BOTH SIDES FOR UNITS CENTERED IN THE CAR OR APPLIED TO ONE SIDE ONLY WITH THE UNITS LOADED AGAINST THE DOORWAY MEMBERS ON THE OPPOSITE SIDE, WILL BE 24" LONG FOR A SINGLE CROSSWISE ROW. DOORWAY PROTECTION STRAPS FOR THE LOAD SHOWN WILL BE 25'-0" LONG AND WILL BE OF A LENGTH TO SUIT WHEN THE NUMBER OF PALLET UNITS IN A CROSSWISE ROW IS OTHER THAN 7. NOTE THAT A CROSSWISE ROW MUST CONSIST OF AT LEAST THREE ( 3 ) PALLET UNITS.
- 5. IF THE CAR BEING LOADED DOES NOT HAVE A SUFFICIENT QUANTITY OF DOORWAY MEMBERS, PIECES MARKED ⑤, OR IF DESIRED IN LIEU OF POSITIONING PALLET UNITS IN THE DOORWAY AREA, UNITS MAY BE ADDED TO THE SECOND LAYER PORTION IN EITHER OR BOTH ENDS OF THE CAR.
- 6. THE DEPICTED LOAD CAN BE INCREASED, LOAD LIMIT OF THE CAR PERMITTING, OR DECREASED BY A MULTIPLE OF 9 PALLET UNITS BY ADDING ONE LAYER TO THE 1-HIGH 3-LONG BAYS OR OMITTING ONE LAYER FROM THE 2-HIGH 3-LONG BAYS, OR CAN BE ADJUSTED BY 3 PALLET UNITS BY FORMING A 1-LONG-BAY OR BY OMITTING ONE LOAD UNIT FROM A DEPICTED 3-LONG BAY. THE LOAD CAN BE REDUCED BY ANY QUANTITY FROM 1 TO 11 BY OMITTING PALLET UNITS FROM THE CROSSWISE ROWS IN THE DOORWAY AREA, IF PRESENT; USE BLOCKING AS SPECIFIED IN SPECIAL NOTE 4. NOTE THAT A CROSSWISE ROW MUST CONTAIN AT LEAST THREE ( 3 ) PALLET UNITS. IF THERE ARE NO CROSSWISE ROWS IN A LOAD, OR IF DESIRED, A LOAD CAN BE REDUCED BY 1 PALLET UNIT BY INSTALLING A FILLER ASSEMBLY IN THE PLACE OF AN OMITTED PALLET. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66.
- 7. THE DEPICTED PROCEDURES IN CONJUNCTION WITH THE PROCEDURES SHOWN ON PAGE 78 CAN BE UTILIZED FOR THE BLOCKING AND BRACING OF LCL SHIPMENTS. FOR A LOAD QUANTITY OF LESS THAN 3 PALLET UNITS IN A BAY, INSTALL CROSS MEMBERS AT THE DESIGNATED HEIGHTS AT BOTH ENDS OF THE LOAD UNIT. PROVIDE LATERAL BRACING FOR THE UNIT ( 5 ) BY POSITIONING A SPACER ASSEMBLY ON EACH LONGITUDINALLY ADJACENT PAIR OF CROSS MEMBERS; SEE PIECE MARKED ⑤ ON PAGE 78 FOR A TYPICAL INSTALLATION. SEE THE DETAIL ON PAGE 92 FOR CONSTRUCTION GUIDANCE.

( CONTINUED AT LEFT )

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	465	310
2" X 6"	20	20
2" X 10"	64	107
NAILS	NO. REQD	POUNDS
10d ( 3" )	796	12-1/4
WIRE, NO. 14 GAGE	160' REQD	3 LBS

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT ( APPROX )
155MM ( 8/PALLET )	158	138,092 LBS
DUNNAGE		890 LBS
TOTAL WEIGHT		138,982 LBS

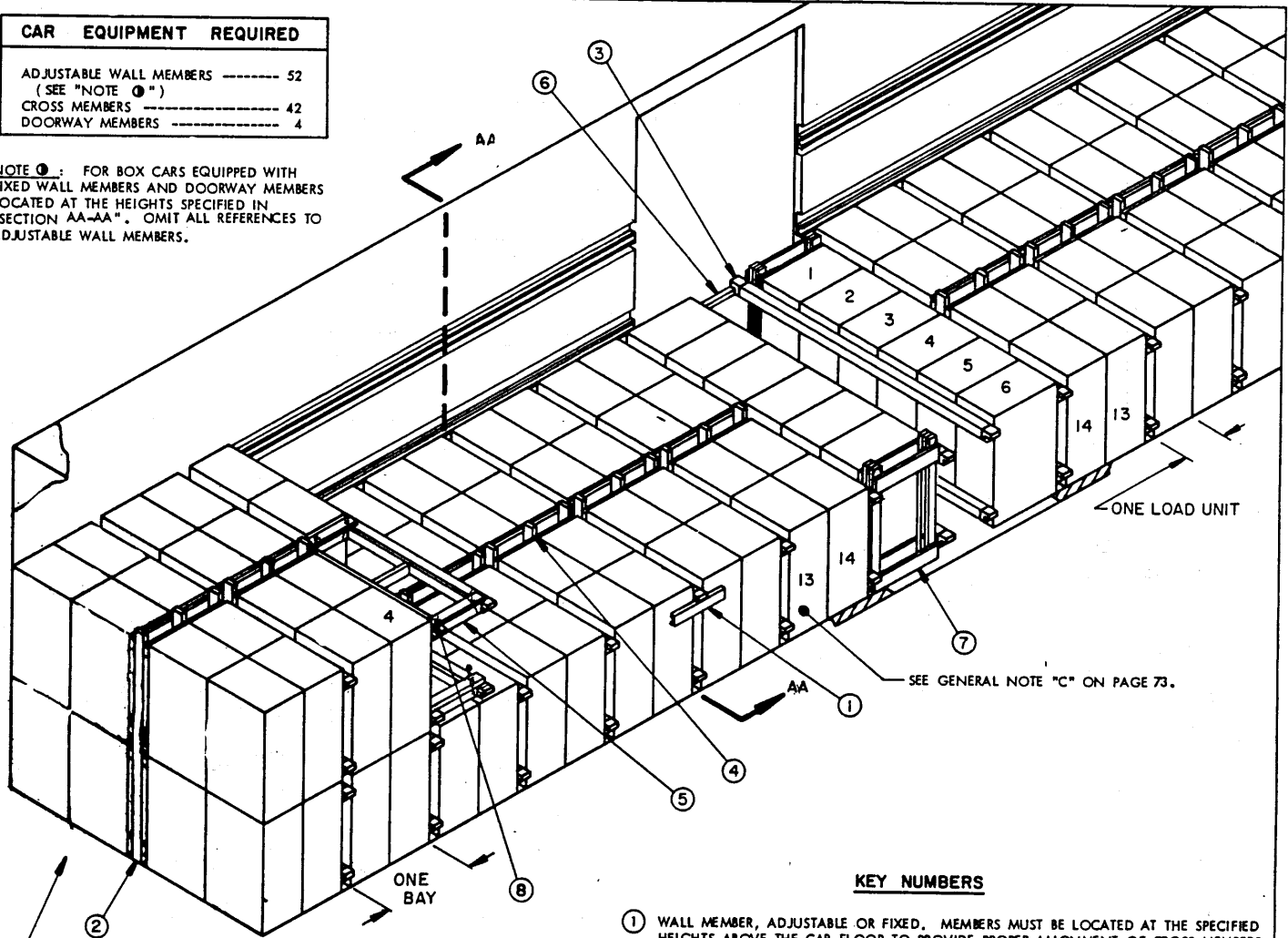
155 MM PROJECTILES ( 8/LARGE PALLET )

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

**CAR EQUIPMENT REQUIRED**

ADJUSTABLE WALL MEMBERS -----	52
(SEE "NOTE 1")	
CROSS MEMBERS -----	42
DOORWAY MEMBERS -----	4

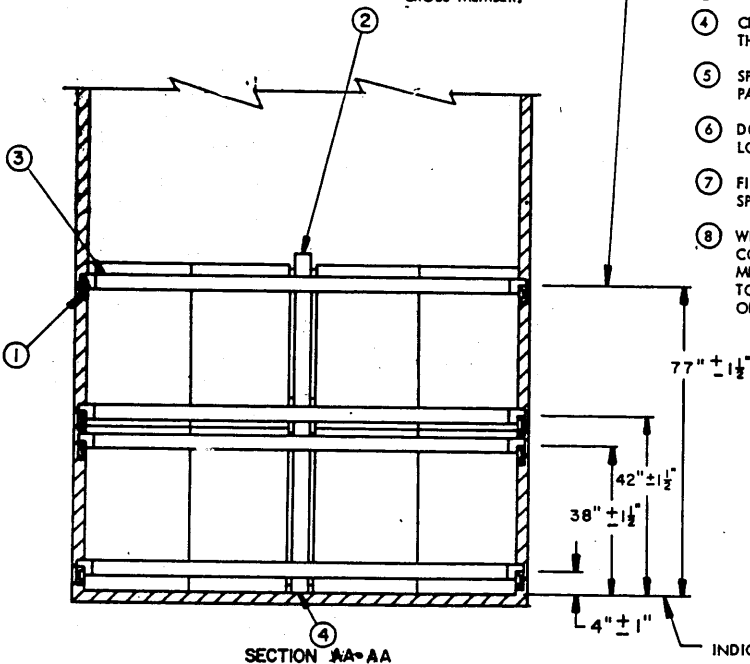
**NOTE 1:** FOR BOX CARS EQUIPPED WITH FIXED WALL MEMBERS AND DOORWAY MEMBERS LOCATED AT THE HEIGHTS SPECIFIED IN "SECTION AA-AA". OMIT ALL REFERENCES TO ADJUSTABLE WALL MEMBERS.



**ISOMETRIC VIEW**

SEE GENERAL NOTE "B-3" ON PAGE 73.

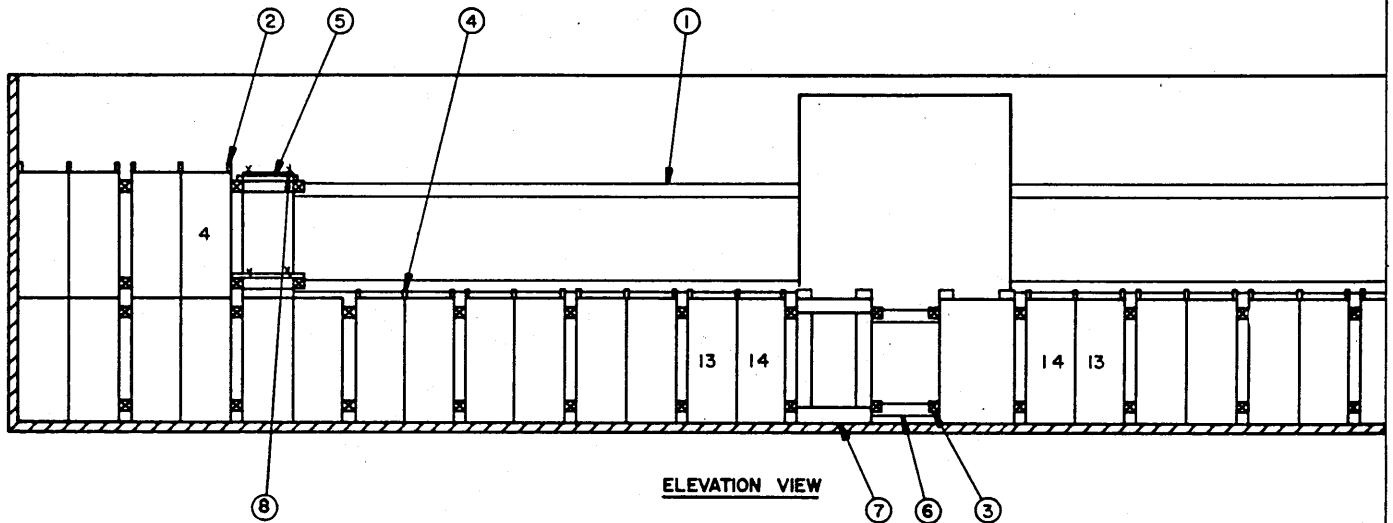
EACH DIMENSIONED HEIGHT ABOVE THE CAR FLOOR TO AN ADJUSTABLE OR FIXED WALL MEMBER MARKED ① AND/OR A DOORWAY MEMBER MARKED ⑥ IS SPECIFIED TO LOCATE THE CENTER LINE OF A CROSS MEMBER.



**SECTION AA-AA**

**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 ③. SEE THE "SECTION AA-AA" VIEW BELOW FOR LOCATION GUIDANCE.
- ② CRIB FILL FOR 2 PALLET UNITS HIGH (4 REQD). SEE THE "CRIB FILL B" DETAIL AND THE "CRIB FILL B DIMENSIONAL CHART" ON PAGE 57. SEE SPECIAL NOTE 2 ON PAGE 79.
- ③ CROSS MEMBER (42 REQD). SEE GENERAL NOTE "B" ON PAGE 73.
- ④ CRIB FILL FOR 1 PALLET UNIT HIGH (10 REQD). SEE THE "CRIB FILL B" DETAIL AND THE "CRIB FILL B DIMENSIONAL CHART" ON PAGE 57.
- ⑤ SPACER ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 92. SEE SPECIAL NOTE 3 ON PAGE 79. SEE KEY NUMBER ⑧.
- ⑥ DOORWAY MEMBER (4 REQD). SEE THE "SECTION AA-AA" VIEW AT LEFT FOR LOCATION GUIDANCE. SEE SPECIAL NOTE 5 ON PAGE 79.
- ⑦ FILLER ASSEMBLY (2 REQD). SEE THE "FILLER ASSEMBLY F" DETAIL ON PAGE 90. SEE SPECIAL NOTE 4 ON PAGE 79. SEE GENERAL NOTE "F" ON PAGE 2.
- ⑧ WIRE TIE, NO. 14 GAGE WIRE 48" LONG (8 REQD). INSTALL TO FORM TWO (2) COMPLETE LOOPS AROUND THE SPACER ASSEMBLY, PIECE MARKED ⑤, AND A CROSS MEMBER, PIECE MARKED ③. BRING THE ENDS TOGETHER AND TWIST TAUT. SECURE TO THE SPACER ASSEMBLY WITH A PARTIALLY DRIVEN 10d NAIL BENT OVER THE WIRE, OR WITH A STRAP STAPLE.



(SPECIAL NOTES CONTINUED)

**SPECIAL NOTES:**

7. THE DEPICTED PROCEDURES CAN BE UTILIZED FOR THE BLOCKING AND BRACING OF LCL SHIPMENTS. FOR A LOAD QUANTITY OF LESS THAN 4 PALLET UNITS, INSTALL CROSS MEMBERS AT THE DESIGNATED HEIGHTS AT BOTH ENDS OF THE LOAD UNIT. PROVIDE LATERAL BRACING AS SHOWN ON PAGE 78 FOR THE TWO PALLET UNITS IN THE SECOND LAYER.
8. ONE HUNDRED AND TWENTY-FOUR (124) PALLET UNITS, APPROXIMATELY 115,816 POUNDS, CAN BE LOADED IN A 50'-6" LONG CAR WITHOUT PUTTING ANY UNITS IN THE SECOND LAYER. NINETY-TWO (92) PALLET UNITS, APPROXIMATELY 85,928 POUNDS, CAN BE LOADED ON THE FLOOR OF A 40'-6" LONG CAR.
9. CROSS MEMBERS CANNOT BE EFFECTIVELY INSTALLED WITHIN A DOOR OPENING SO AS TO BE COMMON TO TWO BAYS. THEREFORE, IN CARS HAVING 7' THRU 9' WIDE DOORS THE TWO CROSSWISE ROWS OF 6 PALLET UNITS EACH MUST BE INDIVIDUALLY BLOCKED. IN A CAR HAVING 10' OR 12' WIDE DOORS, OMIT LOAD UNIT MARKED 14 FROM EACH END OF THE LOAD AND FORM A ONE-LOAD-UNIT BAY OF EACH LOAD UNIT MARKED 13. IT MAY THEN BE POSSIBLE TO POSITION THREE INDIVIDUALLY-BLOCKED CROSSWISE ROWS OF 6 PALLET UNITS IN THE DOORWAY AREA. THIS GUIDANCE IS SPECIFICALLY APPLICABLE FOR 50'-6" LONG CARS; ADJUSTMENTS WILL BE NECESSARY WHEN LOADING CARS OF OTHER LENGTHS.
1. A 158-UNIT LOAD OF 175MM PROJECTILES PALLETIZED 6 PER PALLET IS SHOWN IN A 50'-6" LONG BY 9'-2" WIDE (INSIDE CLEARANCE) BOX CAR EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS, AND WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTE 9.
2. THE TOTAL ACCUMULATED SPACE ACROSS A CAR, EITHER WITH OR WITHOUT THE USE OF CRIB FILL ASSEMBLIES, AS APPLICABLE, MUST NOT BE MORE THAN TWO INCHES (2"). THE WIDTH OF THE CRIB FILL ASSEMBLIES CAN BE ADJUSTED BY INCREASING OR DECREASING THE WIDTH OF THE VERTICAL PIECES AND/OR BY CHANGING THE THICKNESS OF, OR ADDING LAMINATIONS OF MATERIAL TO, THE HORIZONTAL PIECES, IN ORDER TO COMPLY WITH THIS MANDATORY REQUIREMENT. NOTE THAT IF A 1-LONG BAY IN THE SECOND LAYER IS LOADED ABOVE A 2-LONG BAY IN THE FIRST LAYER, THE HEIGHT OF THE CENTER VERTICAL PIECE OF A CRIB FILL IN THE FIRST LAYER MAY NEED TO BE TRIMMED TO PROVIDE CLEARANCE FOR A SPACER ASSEMBLY, IF USED, OR FOR THE CROSS MEMBER AGAINST THE SECOND-LAYER BAY.
3. SPACER ASSEMBLIES, PIECES MARKED ⑤, ARE ONLY SHOWN TO REPRESENT A TYPICAL INSTALLATION; PALLET UNITS MAY BE LOADED IN THE PLACE OF THE SPACER ASSEMBLIES, OR THE TWO UNITS IN THE BAY MAY BE OMITTED.
4. IN LIEU OF USING FILLER ASSEMBLIES, PIECES MARKED ⑦, SIDE BLOCKING FOR THE CROSSWISE ROWS IN THE DOORWAY AREA CAN BE PROVIDED BY INSTALLING DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS SIMILAR TO PIECES MARKED ⑤, ⑥, AND ⑦ SHOWN ON PAGE 82. THE DOORWAY BLOCKING, EITHER APPLIED TO BOTH SIDES FOR UNITS CENTERED IN THE CAR OR APPLIED TO ONE SIDE ONLY WITH THE UNITS LOADED AGAINST THE DOORWAY MEMBERS ON THE OPPOSITE SIDE, WILL BE 24" LONG. DOORWAY PROTECTION STRAPS FOR THE LOAD SHOWN WILL BE 26'-0" LONG, AND WILL BE OF A LENGTH TO SUIT WHEN THE NUMBER OF PALLET UNITS IN A CROSSWISE ROW IS OTHER THAN 6. NOTE THAT A CROSSWISE ROW MUST CONSIST OF AT LEAST THREE (3) PALLET UNITS.
5. IF THE CAR BEING LOADED DOES NOT HAVE A SUFFICIENT QUANTITY OF DOORWAY MEMBERS, PIECES MARKED ⑥, OR IF DESIRED IN LIEU OF POSITIONING PALLET UNITS IN THE DOORWAY AREA, UNITS MAY BE ADDED TO THE SECOND LAYER PORTION IN EITHER OR BOTH ENDS OF THE CAR.
6. THE DEPICTED LOAD CAN BE INCREASED, LOAD LIMIT OF THE CAR PERMITTING, OR DECREASED BY A MULTIPLE OF 8 PALLET UNITS BY ADDING ONE LAYER TO 2-LONG BAYS OR BY OMITTING ONE LAYER FROM 2-LONG BAYS, OR CAN BE ADJUSTED BY 4 UNITS BY ADDING OR OMITTING A 1-LONG BAY. THE LOAD CAN BE REDUCED BY SINGLE PALLET UNITS BY OMITTING ONE OR MORE PALLET UNITS FROM A CROSSWISE ROW IN THE DOORWAY AREA; USE BLOCKING AS SPECIFIED IN SPECIAL NOTE 4. IF THERE ARE NO CROSSWISE ROWS IN A LOAD, A LOAD CAN BE REDUCED BY ONE UNIT BY POSITIONING A FILLER ASSEMBLY IN THE PLACE OF A PALLET UNIT OMITTED FROM A 2-LONG BAY WITHIN THE LOAD. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 86.

**BILL OF MATERIAL**

LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	204	102
2" X 4"	37	25
2" X 6"	203	203
NAILS	NO. REQD	POUNDS
6d (2")	648	4
10d (3")	86	1-1/2
WIRE, NO. 14 GAGE	32' REQD	NIL

(CONTINUED AT LEFT)

**LOAD AS SHOWN**

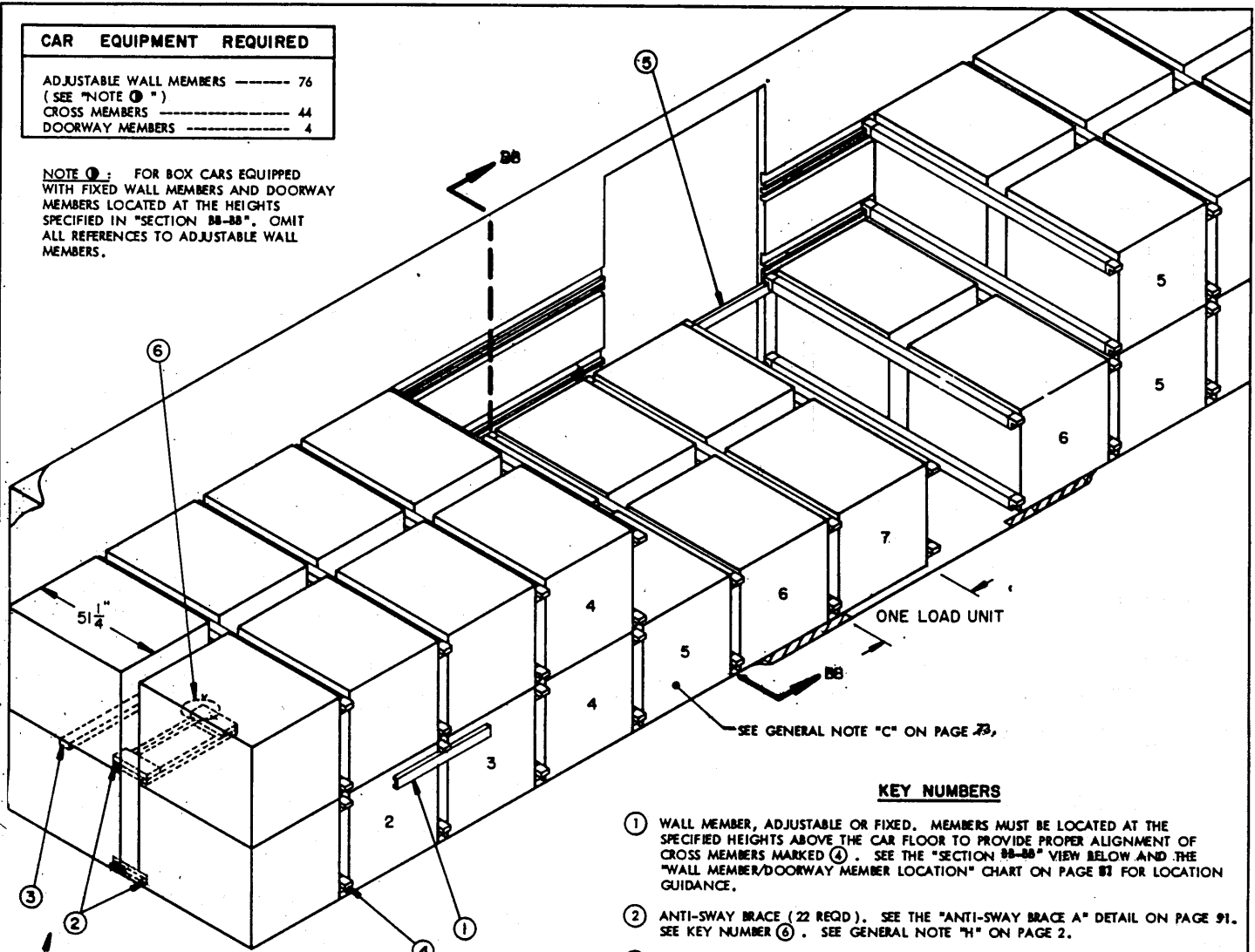
ITEM	QUANTITY	WEIGHT (APPROX)
175MM (6/PALLET)	158	147,572 LBS
DUNNAGE		666 LBS
<b>TOTAL WEIGHT</b>		<b>148,238 LBS</b>

175 MM PROJECTILES (6/PALLET)  
158-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR (MECHANICAL)

**CAR EQUIPMENT REQUIRED**

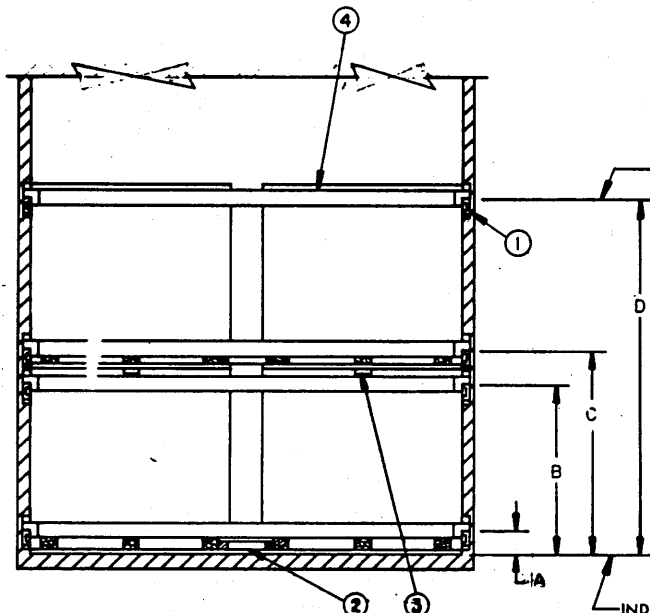
ADJUSTABLE WALL MEMBERS -----	76
(SEE "NOTE 1")	
CROSS MEMBERS -----	44
DOORWAY MEMBERS -----	4

**NOTE 1:** FOR BOX CARS EQUIPPED WITH FIXED WALL MEMBERS AND DOORWAY MEMBERS LOCATED AT THE HEIGHTS SPECIFIED IN "SECTION BB-BB". OMIT ALL REFERENCES TO ADJUSTABLE WALL MEMBERS.



**ISOMETRIC VIEW**

SEE GENERAL NOTE "B-3" ON PAGE 73.



**SECTION BB-BB**

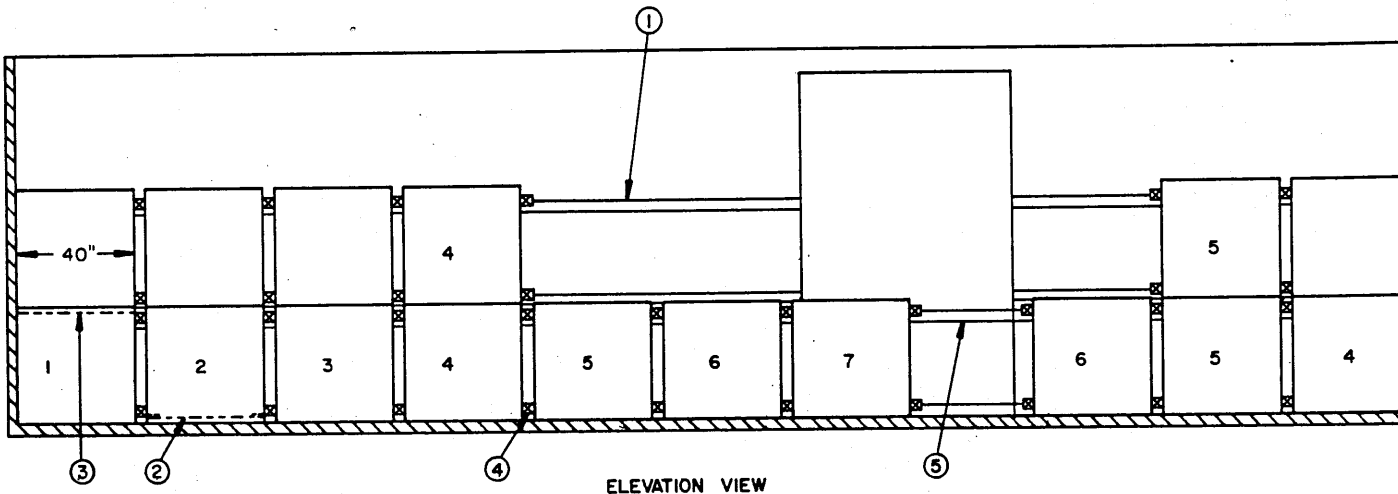
EACH DIMENSIONED HEIGHT ABOVE THE CAR FLOOR TO AN ADJUSTABLE OR FIXED WALL MEMBER MARKED ① AND/OR A DOORWAY MEMBER MARKED ⑤ IS SPECIFIED TO LOCATE THE CENTER LINE OF A CROSS MEMBER.

**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 BB-BB" VIEW BELOW AND THE "WALL MEMBER/DOORWAY MEMBER LOCATION" CHART ON PAGE 81 FOR LOCATION GUIDANCE.
- ② ANTI-SWAY BRACE (22 REQD). SEE THE "ANTI-SWAY BRACE A" DETAIL ON PAGE 91. SEE KEY NUMBER ⑥. SEE GENERAL NOTE "H" ON PAGE 2.
- ③ SUPPORT PIECE, 2" X 4" X 40" (18 REQD). POSITION UNDER THE PALLET UNITIZING STRAP AND ON THE 1" X 6" ON THE TOP OF A PALLET UNIT IN THE BOTTOM LAYER WHICH IS TO HAVE A PALLET UNIT STACKED UPON IT.
- ④ CROSS MEMBER (44 REQD). SEE GENERAL NOTE "B" ON PAGE 73.
- ⑤ DOORWAY MEMBER (4 REQD). SEE THE "SECTION BB-BB" VIEW AT LEFT AND THE "WALL MEMBER/DOORWAY MEMBER LOCATION" CHART ON PAGE 81 FOR LOCATION GUIDANCE. SEE SPECIAL NOTE 2 ON PAGE 81.
- ⑥ WIRE TIE, NO. 14 GAGE WIRE 48" LONG (22 REQD). SECURE TO THE TIE PIECE OF THE ANTI-SWAY BRACE, PIECE MARKED ②, WITH A STRAP STAPLE OR WITH A PARTIALLY DRIVEN 10d NAIL BENT OVER THE WIRE. INSTALL TO FORM A COMPLETE LOOP AROUND THE PALLET POST OF AN ADJACENT PALLET UNIT. BRING THE ENDS TOGETHER AND TWIST TAUT.

ONE LOAD UNIT

SEE GENERAL NOTE "C" ON PAGE 73.



**ELEVATION VIEW**

**SPECIAL NOTES:**

1. A 44-UNIT LOAD OF 175MM PROJECTILES PALLETIZED 20 PER PALLET IS SHOWN IN A 50'-6" LONG BY 9'-2" WIDE (INSIDE CLEARANCE) BOX CAR EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS, AND WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED.
2. IF THE CAR BEING LOADED DOES NOT HAVE A SUFFICIENT QUANTITY OF DOORWAY MEMBERS, PIECES MARKED (3), OR IF DESIRED IN LIEU OF POSITIONING PALLET UNITS IN THE DOORWAY AREA, UNITS MAY BE ADDED TO THE SECOND LAYER IN THE SHORT-LOAD END OF THE CAR.
3. THE DEPICTED LOAD CAN BE INCREASED, LOAD LIMIT OF THE CAR PERMITTING, OR DECREASED BY A MULTIPLE OF 2 PALLET UNITS BY ADDING ONE LAYER TO A 1-HIGH BAY OR BY OMITTING ONE LAYER FROM A 2-HIGH BAY OR BY OMITTING A 1-HIGH BAY. A LOAD CAN BE ADJUSTED BY ONE PALLET UNIT BY FORMING A 1-UNIT BAY. POSITION THE PALLET UNIT IN THE CENTER OF THE CAR WIDTH AND PROVIDE SIDE BLOCKING BY NAILING DOUBLED 2" X 6" X 36" LONG PIECES TO THE CAR FLOOR AT EACH SIDE OF THE UNIT SO AS TO BE IN CONTACT WITH THE BOTTOM DECK BOARDS OF THE PALLET. NAIL EACH LAYER W/1-16d NAIL EVERY 8".
4. TWENTY-SIX (26) PALLET UNITS, APPROXIMATELY 87,516 POUNDS, CAN BE LOADED IN A 50'-6" LONG CAR WITHOUT PUTTING ANY UNITS IN THE SECOND LAYER. TWENTY (20) PALLET UNITS, APPROXIMATELY 67,320 POUNDS, OR POSSIBLY TWENTY-TWO (22) PALLET UNITS FOR A LOAD OF APPROXIMATELY 74,052 POUNDS, CAN BE LOADED ON THE FLOOR OF A 40'-6" LONG CAR.
5. CAUTION: THE CAR TO BE USED FOR THE SHIPMENT OF FORTY-FOUR (44) PALLET UNITS POSITIONED AS SHOWN MUST HAVE A LOAD LIMIT OF AT LEAST 151,500 POUNDS. IF THE TWO PALLETS IN LOAD UNIT NUMBER 7 IN THE NEAR END ARE PLACED ON TOP OF THE PALLETS IN LOAD UNIT NUMBER 5 IN THE NEAR END OF THE CAR, THE LOAD LIMIT NEEDS TO BE ONLY 148,500 POUNDS OR GREATER.

WALL MEMBER/DOORWAY MEMBER LOCATION		
LOCATION IDENTITY	UNIT WITH SKIDS	UNIT W/O SKIDS
A	9", PLUS 1/4" OR MINUS 3/8"	6", PLUS OR MINUS 1"
B	43-1/2", PLUS OR MINUS 1-1/2"	40", PLUS OR MINUS 1-1/2"
C	54", PLUS 1" OR MINUS 3/8"	50-1/2", PLUS OR MINUS 1"
D	88", PLUS OR MINUS 1-1/2"	84-1/2", PLUS OR MINUS 1-1/2"

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	54	18
2" X 2"	147	49
2" X 4"	103	69
NAILS	NO. REQD	POUNDS
6d (2")	308	2
10d (3")	176	2-3/4
WIRE, NO. 14 GAGE ----- 88' REQD ----- 1-1/2 LBS		

**LOAD AS SHOWN**

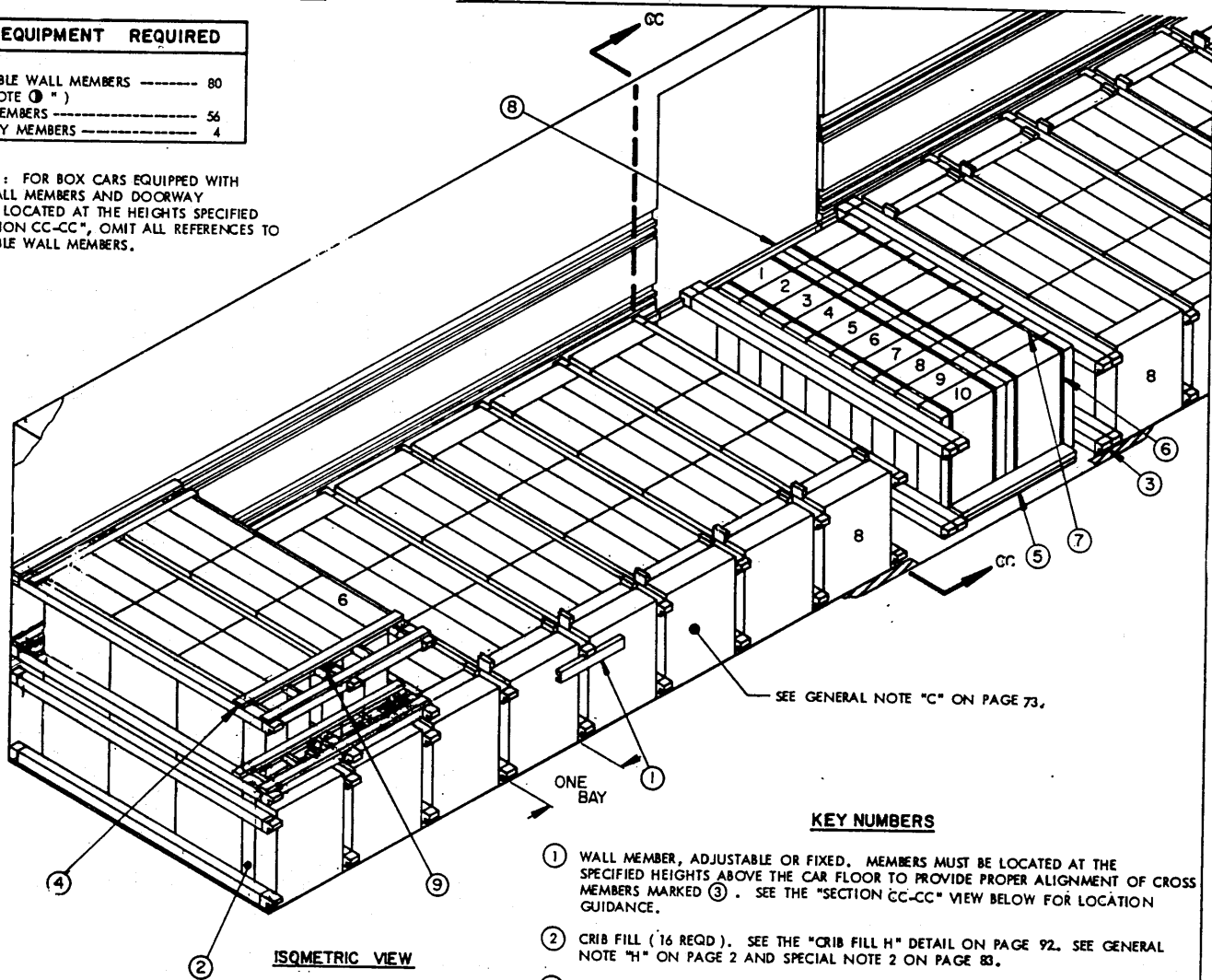
ITEM	QUANTITY	WEIGHT (APPROX)
175MM (20/PALLET)	44	148,104 LBS
DUNNAGE		279 LBS
<b>TOTAL WEIGHT</b>		<b>148,383 LBS</b>

175 MM PROJECTILES (20/PALLET)  
**44-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR (MECHANICAL)**

**CAR EQUIPMENT REQUIRED**

ADJUSTABLE WALL MEMBERS -----	80
( SEE "NOTE 1" )	
CROSS MEMBERS -----	56
DOORWAY MEMBERS -----	4

NOTE 1: FOR BOX CARS EQUIPPED WITH FIXED WALL MEMBERS AND DOORWAY MEMBERS LOCATED AT THE HEIGHTS SPECIFIED IN "SECTION CC-CC", OMIT ALL REFERENCES TO ADJUSTABLE WALL MEMBERS.

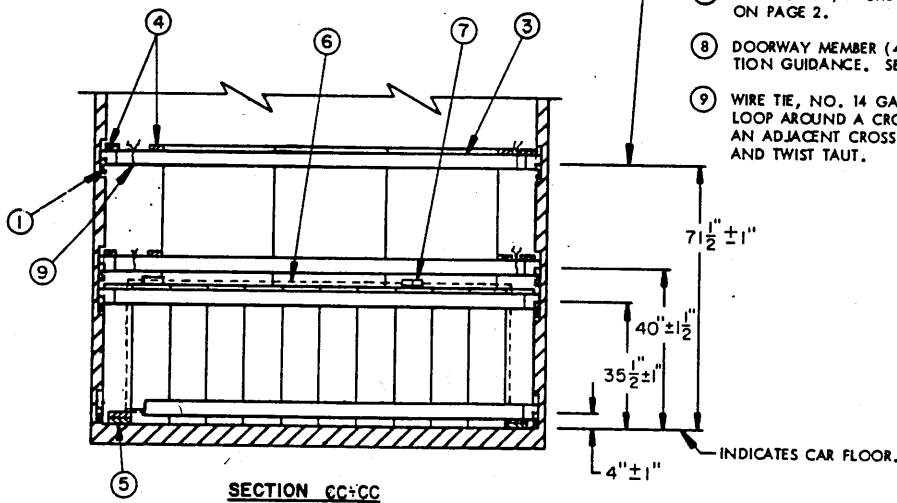


**ISOMETRIC VIEW**

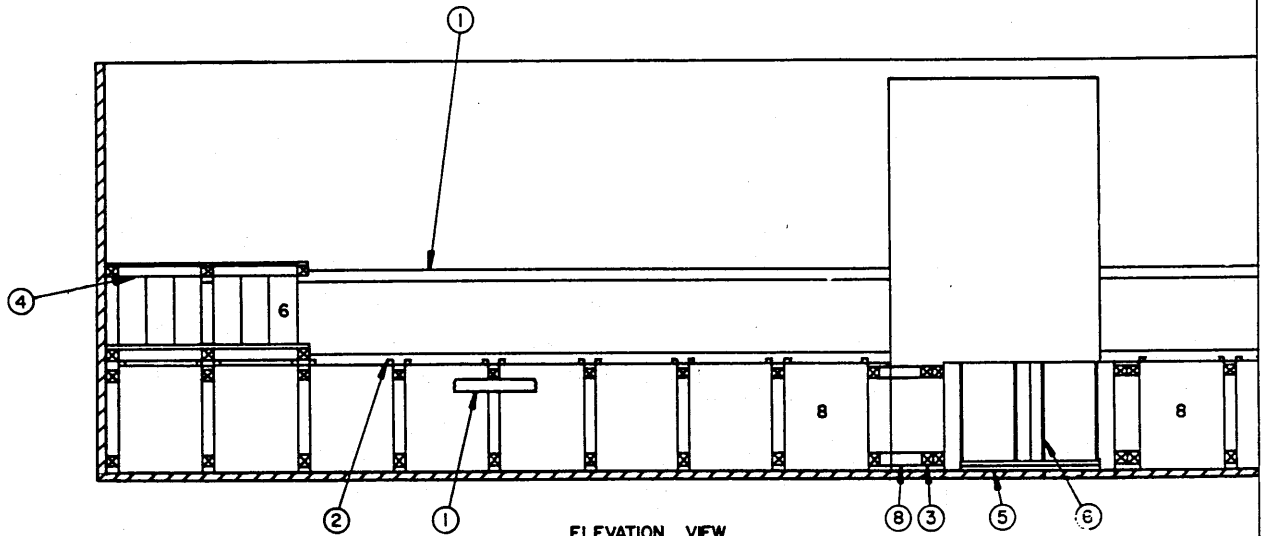
**KEY NUMBERS**

- ① WALL MEMBER, ADJUSTABLE OR FIXED. MEMBERS MUST BE LOCATED AT THE SPECIFIED HEIGHTS ABOVE THE CAR FLOOR TO PROVIDE PROPER ALIGNMENT OF CROSS MEMBERS MARKED ③. SEE THE "SECTION CC-CC" VIEW BELOW FOR LOCATION GUIDANCE.
- ② CRIB FILL (16 REQD). SEE THE "CRIB FILL H" DETAIL ON PAGE 92. SEE GENERAL NOTE "H" ON PAGE 2 AND SPECIAL NOTE 2 ON PAGE 83.
- ③ CROSS MEMBER (48 REQD). SEE GENERAL NOTE "8" ON PAGE 73. NOTE THAT TWO (2) CROSS MEMBERS ARE REQUIRED AT EACH END OF THE TWO CROSSWISE ROWS IN THE DOORWAY AREA. SEE SPECIAL NOTE 3 ON PAGE 83.
- ④ ANTI-SWAY BRACE (8 REQD). SEE THE "ANTI-SWAY BRACE B" DETAIL ON PAGE 91. SECURE TO CROSS MEMBERS WITH TIE WIRE. SEE KEY NUMBER ⑨.
- ⑤ DOORWAY BLOCKING, 2" X 6" X 48" (DOUBLED) (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE SPECIAL NOTE 4 ON PAGE 83. SEE GENERAL NOTE "G" ON PAGE 3.
- ⑥ DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 23'-0" LONG STEEL STRAPPING (4 REQD).
- ⑦ SEAL FOR 1-1/4" STRAPPING (8 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "K" ON PAGE 2.
- ⑧ DOORWAY MEMBER (4 REQD). SEE THE "SECTION CC-CC" VIEW AT LEFT FOR LOCATION GUIDANCE. SEE SPECIAL NOTE 5 ON PAGE 83.
- ⑨ WIRE TIE, NO. 14 GAGE WIRE 36" LONG (16 REQD). INSTALL TO FORM A COMPLETE LOOP AROUND A CROSS BRACE OF AN ANTI-SWAY BRACE, PIECE MARKED ④, AND AN ADJACENT CROSS MEMBER, PIECE MARKED ③. BRING THE ENDS TOGETHER AND TWIST TAUT.

EACH DIMENSIONED HEIGHT ABOVE THE CAR FLOOR TO AN ADJUSTABLE OR FIXED WALL MEMBER MARKED ① AND/OR A DOORWAY MEMBER MARKED ⑧ IS SPECIFIED TO LOCATE THE CENTER LINE OF A CROSS MEMBER.



**SECTION CC-CC**



**ELEVATION VIEW**

(SPECIAL NOTES CONTINUED)

**SPECIAL NOTES:**

7. THE DEPICTED PROCEDURES CAN ALSO BE UTILIZED FOR THE BLOCKING AND BRACING OF LCL SHIPMENTS. A LOAD QUANTITY OF 4 THRU 10 PALLET UNITS CAN BE ATTAINED BY OMITTING VARIOUS COMBINATIONS OF CROSSWISE AND LENGTHWISE-POSITIONED UNITS FROM A FULL BAY OF 11. PROVIDE LATERAL BLOCKING BY INSTALLING TWO (2) ANTI-SWAY BRACES, PIECES MARKED ④ AT ONE SIDE OF THE LOAD. NOTE THAT NAILED FLOORLINE BLOCKING SIMILAR TO THE DOORWAY BLOCKING, PIECES MARKED ③, MAY BE USED IN LIEU OF A LOWER ANTI-SWAY BRACE IN A 1-HIGH BAY. FOR A QUANTITY OF 1 THRU 3 PALLET UNITS, USE ONLY LENGTHWISE-POSITIONED UNITS AND BLOCK SIMILARLY.
8. ONE HUNDRED AND NINETY-SIX (196) PALLET UNITS, APPROXIMATELY 124,068 POUNDS, CAN BE LOADED IN A 50'-6" LONG CAR WITHOUT PUTTING ANY UNITS IN THE SECOND LAYER. ONE HUNDRED AND FIFTY-TWO (152) PALLET UNITS, APPROXIMATELY 96,216 POUNDS, CAN BE LOADED ON THE FLOOR OF A 40'-6" LONG CAR.
9. CROSS MEMBERS CANNOT BE EFFECTIVELY INSTALLED WITHIN A DOOR OPENING SO AS TO BE COMMON TO TWO BAYS. THEREFORE, THE DEPICTED POSITIONING OF THE TWO CROSSWISE ROWS IS ONLY APPLICABLE IN A CAR HAVING 6' WIDE DOORS. IN CARS HAVING 7' THRU 10' WIDE DOORS, THE BAY CONSISTING OF TWO CROSSWISE ROWS OF 10 PALLET UNITS MUST BE INDIVIDUALLY BLOCKED. THE BAY MARKED 8 AT THE RIGHT OF THE DOOR OPENING IN THE DEPICTED LOAD WILL THEN REQUIRE ONLY ONE (1) CROSSMEMBER AT EACH HEIGHT ON THE DOORWAY SIDE. TO FACILITATE LOADING THE DOORWAY AREA OF CARS EQUIPPED WITH 12' WIDE DOORS, OMIT THE BAYS MARKED 8 FROM EACH END OF THE LOAD. IT SHOULD THEN BE POSSIBLE TO POSITION TWO BAYS CONSISTING OF TWO CROSSWISE ROWS OF 10 PALLET UNITS, WITH EACH BAY INDIVIDUALLY BLOCKED, IN THE DOORWAY AREA. THIS GUIDANCE IS SPECIFICALLY APPLICABLE FOR 50'-6" LONG CARS; ADJUSTMENTS WILL BE NECESSARY WHEN LOADING CARS OF OTHER LENGTHS.

1. A 232-UNIT LOAD OF 8" PROJECTILES PALLETIZED 3 PER PALLET IS SHOWN IN A 50'-6" LONG BY 9'-2" WIDE (INSIDE CLEARANCE) BOX CAR EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS, AND WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTE 9.
2. THE TOTAL ACCUMULATED SPACE ACROSS A CAR MUST NOT BE MORE THAN TWO INCHES (2"). THE WIDTH OF THE CRIB FILL, PIECE MARKED ②, MUST BE ADJUSTED IN ORDER TO COMPLY WITH THIS MANDATORY REQUIREMENT. NOTE THAT THE HEIGHT OF THE VERTICAL PIECES OF A CRIB FILL MUST BE TRIMMED TO PROVIDE CLEARANCE FOR AN ANTI-SWAY BRACE, PIECE MARKED ④, IMMEDIATELY ABOVE.
3. PALLET UNITS IN THE DOORWAY AREA MAY BE FORMED IN SINGLE ROWS IN LIEU OF THE TWO SIDE-BY-SIDE ROWS SHOWN, IF DESIRED. ONE (1) CROSS MEMBER AT EACH BLOCKING LEVEL IS ADEQUATE FOR RETAINING ONE CROSSWISE ROW OF PALLET UNITS. HOWEVER, DUE TO THE DIFFICULTY OF PROPERLY INSTALLING CROSS MEMBERS AT BOTH ENDS OF MORE THAN ONE LOAD UNIT IN THE DOORWAY AREA, MEMBERS CANNOT BE INSTALLED SO AS TO BE COMMON TO TWO ROWS; INDIVIDUAL ROWS MUST BE SEPARATELY BLOCKED.
4. IN LIEU OF USING DOORWAY BLOCKING PIECES AND DOOR PROTECTION STRAPS, PIECES MARKED ⑤ AND ⑥, SIDE BLOCKING FOR THE CROSSWISE ROWS IN THE DOORWAY AREA CAN BE OTHERWISE PROVIDED. LOAD THE CROSSWISE ROWS SO AS TO BE IN CONTACT WITH THE DOORWAY MEMBER ON THE SIDE OPPOSITE THE LOADING SIDE OF THE CAR AND POSITION FILLER ASSEMBLY "E" IN THE VOID ON THE LOADING SIDE. SEE THE "FILLER ASSEMBLY E" DETAIL ON PAGE 90.
5. IF THE CAR BEING LOADED DOES NOT HAVE A SUFFICIENT QUANTITY OF DOORWAY MEMBERS, PIECES MARKED ⑧, OR IF DESIRED IN LIEU OF POSITIONING PALLET UNITS IN THE DOORWAY AREA, UNITS MAY BE ADDED TO THE SECOND-LAYER PORTION IN EITHER OR BOTH ENDS OF THE CAR.
6. THE DEPICTED LOAD CAN BE INCREASED, LOAD LIMIT OF THE CAR PERMITTING, OR DECREASED BY A MULTIPLE OF 9 PALLET UNITS BY ADDING OR OMITTING ONE OR MORE SECOND-LAYER PORTIONS OF A BAY. THE LOAD CAN BE DECREASED BY A MULTIPLE OF 11 PALLET UNITS BY OMITTING ONE OR MORE 1-HIGH BAYS; THE LOAD CAN BE REDUCED BY MULTIPLES OF 2 PALLET UNITS BY OMITTING LONGITUDINALLY ADJACENT PAIRS OF UNITS FROM THE CROSSWISE ROWS IN THE DOORWAY AREA. SINGLE CROSSWISE ROWS MUST BE FORMED IN THE DOORWAY AREA IN ORDER TO REDUCE A LOAD BY ONE PALLET UNIT OR BY A SMALL ODD QUANTITY. IF THERE ARE NO CROSSWISE ROWS IN A LOAD, A LOAD CAN BE REDUCED BY ONE UNIT BY POSITIONING A FILLER ASSEMBLY IN THE PLACE OF A PALLET UNIT OMITTED FROM A 11-UNIT BAY WITHIN THE LOAD. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	195	130
2" X 6"	254	254
NAILS	NO. REQD	POUNDS
10d (3")	672	11-1/4
16d (3-1/2")	24	3/4
STEEL STRAPPING, 1-1/4" X .035" OR .031" - 92' REQD ---- 14 LBS		
SEAL FOR 1-1/4" STRAPPING ----- 8 REQD ---- 1/2 LB		
WIRE, NO. 14 GAGE ----- 48' REQD ---- 1 LB		

(CONTINUED AT LEFT)

**LOAD AS SHOWN**

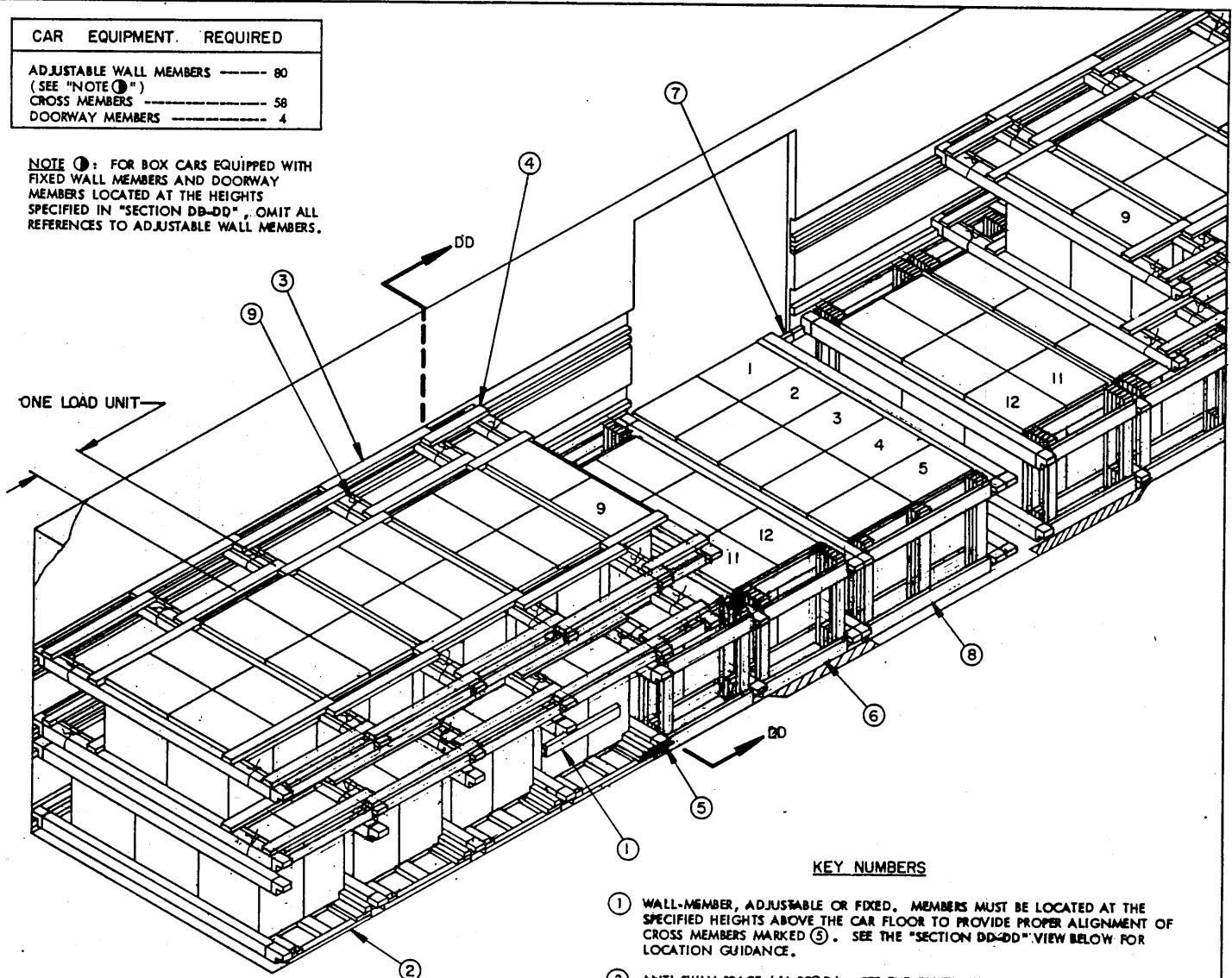
ITEM	QUANTITY	WEIGHT (APPROX)
8" (3/PALLET)	232	146,856 LBS
DUNNAGE		795 LBS
<b>TOTAL WEIGHT</b>		<b>147,651 LBS</b>

**8" PROJECTILES (3/PALLET)  
232-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR (MECHANICAL)**

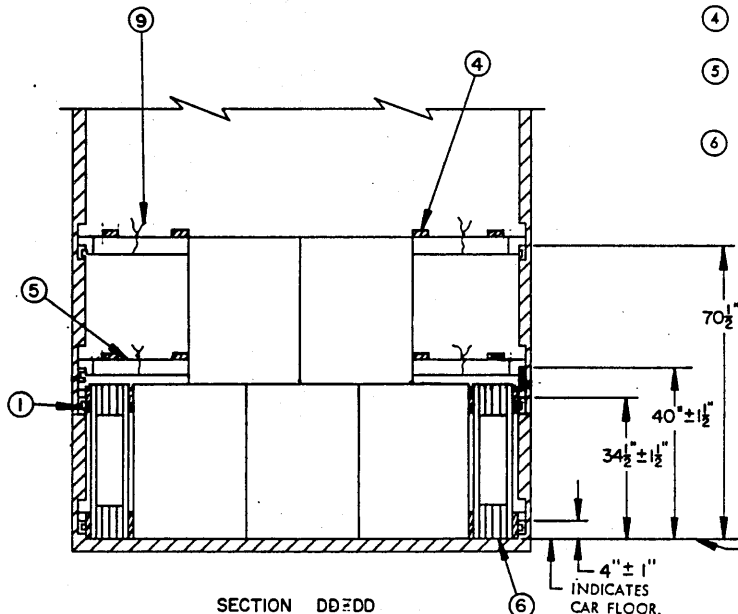
**CAR EQUIPMENT. REQUIRED**

ADJUSTABLE WALL MEMBERS (SEE "NOTE 1")	80
CROSS MEMBERS	58
DOORWAY MEMBERS	4

**NOTE 1:** FOR BOX CARS EQUIPPED WITH FIXED WALL MEMBERS AND DOORWAY MEMBERS LOCATED AT THE HEIGHTS SPECIFIED IN "SECTION DD-DD", OMIT ALL REFERENCES TO ADJUSTABLE WALL MEMBERS.



**ISOMETRIC VIEW**



**SECTION DD-DD**

**KEY NUMBERS**

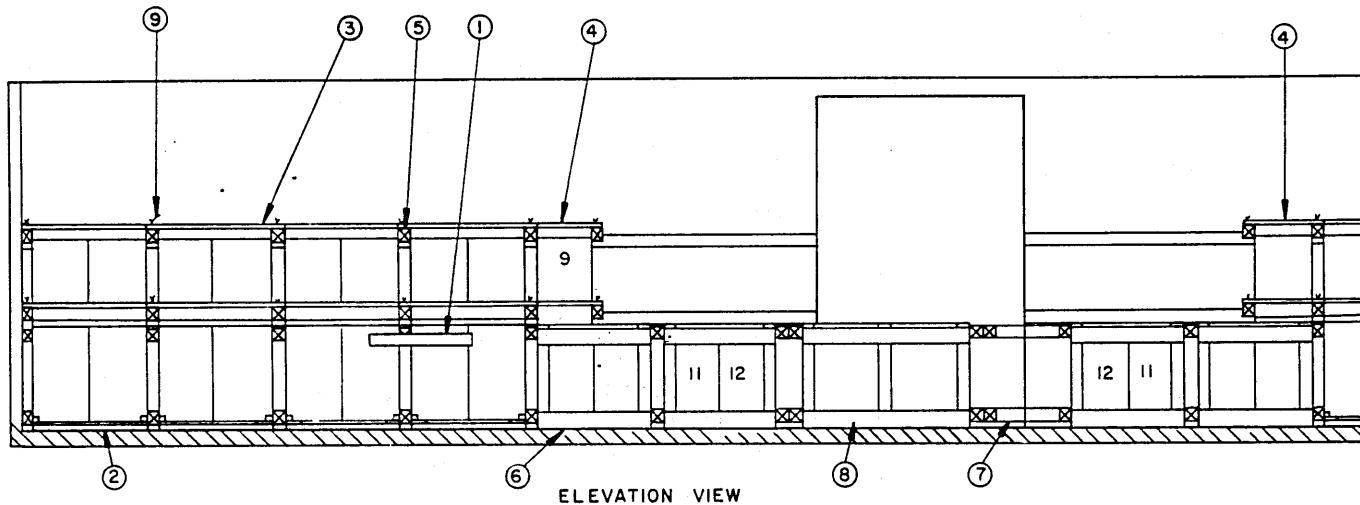
- 1 WALL-MEMBER, ADJUSTABLE OR FIXED. MEMBERS MUST BE LOCATED AT THE SPECIFIED HEIGHTS ABOVE THE CAR FLOOR TO PROVIDE PROPER ALIGNMENT OF CROSS MEMBERS MARKED 5. SEE THE "SECTION DD-DD" VIEW BELOW FOR LOCATION GUIDANCE.
- 2 ANTI-SWAY BRACE (16 REQD). SEE THE "ANTI-SWAY BRACE C" DETAIL ON PAGE 91.
- 3 ANTI-SWAY BRACE FOR 2 PALLETS LONG (16 REQD). SEE THE "ANTI-SWAY BRACE D" DETAIL ON PAGE 92. ALTERNATE THE POSITION OF LONGITUDINALLY ADJACENT ASSEMBLIES.
- 4 ANTI-SWAY BRACE FOR 1 PALLET LONG (4 REQD). SEE THE "ANTI-SWAY BRACE D" DETAIL ON PAGE 92.
- 5 CROSS MEMBER (58 REQD). SEE GENERAL NOTE "B" ON PAGE 73. NOTE THAT THE CROSS MEMBERS AT BOTH ENDS OF THE CROSSWISE ROWS ARE DOUBLED. SEE SPECIAL NOTE 3 ON PAGE 85.
- 6 FILLER ASSEMBLY (8 REQD). SEE THE "FILLER ASSEMBLY F" DETAIL ON PAGE 90. SEE GENERAL NOTE "H" ON PAGE 2.
- 7 DOORWAY MEMBER (4 REQD). SEE THE "SECTION DD-DD" VIEW AT LEFT FOR LOCATION GUIDANCE. SEE SPECIAL NOTE 4 ON PAGE 88.
- 8 FILLER ASSEMBLY (2 REQD). SEE THE "FILLER ASSEMBLY E" DETAIL ON PAGE 90. SEE SPECIAL NOTE 5 ON PAGE 88.
- 9 WIRE TIE, NO. 14 GAGE WIRE 48" LONG (48 REQD). INSTALL TO FORM TWO (2) COMPLETE LOOPS AROUND A CROSS BRACE OF AN ANTI-SWAY BRACE, PIECE MARKED 3 AND/OR 4, AND AN ADJACENT CROSS MEMBER, PIECE MARKED 5. BRING THE ENDS TOGETHER AND TWIST TAUT.

EACH DIMENSIONED HEIGHT ABOVE THE CAR FLOOR TO AN ADJUSTABLE OR FIXED WALL MEMBER MARKED 1 AND/OR A DOORWAY MEMBER MARKED 7 IS SPECIFIED TO LOCATE THE CENTER LINE OF A CROSS MEMBER.

8" PROJECTILES (6/SMALL PALLET)

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





ELEVATION VIEW

( SPECIAL NOTES CONTINUED )

7. THE DEPICTED PROCEDURES IN CONJUNCTION WITH THE PROCEDURES SHOWN ON PAGES 78 AND 82 CAN BE UTILIZED FOR THE BLOCKING AND BRACING OF LCL SHIPMENTS. IF CROSS MEMBERS CAN BE INSTALLED AT THE FOUR DESIGNATED LOCATION HEIGHTS, ONE LOAD UNIT AS SHOWN WILL PROVIDE FOR A 5-UNIT LCL LOAD. OTHERWISE, TWO SEPARATE BAYS MUST BE FORMED, ONE OF 3-UNITS AND ONE OF 2. A BAY OF 3 UNITS, POSITIONED AGAINST ONE CAR SIDEWALL, CAN BE BLOCKED AT THE SIDE WITH A FILLER ASSEMBLY, PIECE MARKED ②. SIDE BLOCKING FOR THE 2-UNIT BAY, OR FOR A 1-UNIT BAY IF ONE IS REQUIRED, CAN BE PROVIDED BY INSTALLING ONE (1) SPACER ASSEMBLY, PIECE MARKED ⑤ ON PAGE 78, ON EACH LEVEL OF CROSS MEMBERS ON EACH SIDE OF THE LOAD, OR ON ONE SIDE ONLY IF THE UNITS ARE POSITIONED AGAINST ONE SIDEWALL. NAILED FLOORLINE BLOCKING, SIMILAR TO THE DOORWAY BLOCKING, PIECE MARKED ⑥ ON PAGE 82, WILL BE USED AGAINST THE SKID (S) OF THE UNIT (S).
8. EIGHTY-TWO (82) PALLET UNITS, APPROXIMATELY 102,992 POUNDS, CAN BE LOADED IN A 50'-6" LONG CAR WITHOUT PUTTING ANY UNITS IN THE SECOND LAYER. SIXTY-FOUR (64) PALLET UNITS, APPROXIMATELY 80,384 POUNDS, CAN BE LOADED ON THE FLOOR OF A 40'-6" LONG CAR.
9. CROSS MEMBERS CANNOT BE EFFECTIVELY INSTALLED WITHIN A DOOR OPENING SO AS TO BE COMMON TO TWO BAYS. THEREFORE, THE DEPICTED POSITIONING OF THE TWO CROSSWISE ROWS IS ONLY APPLICABLE IN A CAR HAVING 6' WIDE DOORS. IN CARS HAVING 7' THRU 10' WIDE DOORS, THE BAY CONSISTING OF TWO CROSSWISE ROWS OF 5 PALLET UNITS MUST BE INDIVIDUALLY BLOCKED. THE BAY CONTAINING THE LOAD UNIT MARKED 12 AT THE LEFT OF THE DOOR OPENING IN THE DEPICTED LOAD WILL THEN REQUIRE ONLY ONE (1) CROSS MEMBER AT EACH HEIGHT ON THE DOORWAY SIDE. TO FACILITATE LOADING THE DOORWAY AREA OF CARS EQUIPPED WITH 12' WIDE DOORS, OMIT THE LOAD UNIT MARKED 12 FROM EACH END OF THE LOAD AND FORM A ONE-LONG-UNIT BAY OF EACH LOAD UNIT MARKED 11. THEN POSITION ONE BAY OF TWO CROSSWISE ROWS OF 5 PALLET UNITS AND ONE BAY CONSISTING OF ONE CROSSWISE ROW IN THE DOORWAY AREA. EACH BAY MUST BE INDIVIDUALLY BLOCKED. NOTE THAT FILLER ASSEMBLY F, AS DETAILED ON PAGE 90 EXCEPT THAT DIMENSION "C" WILL BE 28-1/2" IN LIEU OF 39", WILL BE USED FOR THE ONE CROSSWISE ROW. THIS GUIDANCE IS SPECIFICALLY APPLICABLE FOR 50'-6" LONG CARS; ADJUSTMENTS WILL BE NECESSARY WHEN LOADING CARS OF OTHER LENGTHS.

SPECIAL NOTES:

1. A 118-UNIT LOAD OF 8" PROJECTILES PALLETIZED 6 PER SMALL PALLET IS SHOWN IN A 50'-6" LONG BY 9'-2" WIDE (INSIDE CLEARANCE) BOX CAR EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS, AND WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED. SEE SPECIAL NOTE 9.
2. TO PREVENT A TIPPING ACTION, LATERAL BRACING OF A FIRST-LAYER BAY HAVING EITHER NO SECOND-LAYER UNITS OR HAVING LESS THAN A FULL SECOND LAYER MUST BE PROVIDED EITHER BY THE USE OF A FILLER ASSEMBLY, PIECE MARKED ②, IN LIEU OF THE ANTI-SWAY BRACE, PIECE MARKED ③, OR BY THE INSTALLATION OF ANTI-SWAY BRACES, PIECES MARKED ③ OR ④ ON EACH PAIR OF CROSS MEMBERS ON EACH SIDE OF THE LOAD.
3. PALLET UNITS IN THE DOORWAY AREA MAY BE FORMED IN SINGLE ROWS IN LIEU OF THE TWO SIDE-BY-SIDE ROWS SHOWN, IF DESIRED. ONE (1) CROSS MEMBER AT EACH BLOCKING LEVEL IS ADEQUATE FOR RETAINING ONE CROSSWISE ROW OF PALLET UNITS. HOWEVER, DUE TO THE DIFFICULTY OF PROPERLY INSTALLING CROSS MEMBERS AT BOTH ENDS OF MORE THAN ONE LOAD UNIT IN THE DOORWAY AREA, MEMBERS CANNOT BE INSTALLED SO AS TO BE COMMON TO TWO ROWS; INDIVIDUAL ROWS MUST BE SEPARATELY BLOCKED.
4. IF THE CAR BEING LOADED DOES NOT HAVE A SUFFICIENT QUANTITY OF DOORWAY MEMBERS, PIECES MARKED ⑦, OR IF DESIRED IN LIEU OF POSITIONING PALLET UNITS IN THE DOORWAY AREA, UNITS MAY BE ADDED TO THE SECOND LAYER PORTION IN EITHER OR BOTH ENDS OF THE CAR.
5. IN LIEU OF USING FILLER ASSEMBLIES, PIECES MARKED ⑧, SIDE BLOCKING FOR THE CROSSWISE ROWS IN THE DOORWAY AREA CAN BE PROVIDED BY INSTALLING DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS SIMILAR TO PIECES MARKED ③, ④, AND ⑦ SHOWN ON PAGE 82. THE DOORWAY BLOCKING, EITHER APPLIED TO BOTH SIDES FOR UNITS CENTERED IN THE CAR OR APPLIED TO ONE SIDE ONLY WITH THE UNITS LOADED AGAINST THE DOORWAY MEMBERS ON THE OPPOSITE SIDE, WILL BE 48" LONG FOR TWO CROSSWISE ROWS OR 24" LONG FOR A SINGLE ROW. DOORWAY PROTECTION STRAPS FOR THE LOAD SHOWN WILL BE 25'-0" LONG, AND WILL BE OF A LENGTH TO SUIT WHEN THE NUMBER OF PALLET UNITS IN A CROSSWISE ROW IS OTHER THAN 5. NOTE THAT A CROSSWISE ROW MUST CONSIST OF AT LEAST TWO (2) PALLET UNITS.
6. THE DEPICTED LOAD CAN BE INCREASED, LOAD LIMIT OF THE CAR PERMITTING, OR DECREASED BY 2 PALLET UNITS BY ADDING OR OMITTING PAIRS OF SECOND-LAYER UNITS IN EITHER END OF THE CAR. A LOAD CAN BE REDUCED BY MULTIPLES OF 5 UNITS BY OMITTING ONE OR MORE FULL LOAD UNITS AND/OR OMITTING FULL CROSSWISE ROWS. THE LOAD CAN BE REDUCED BY 2 PALLET UNITS BY OMITTING A LONGITUDINALLY ADJACENT PAIR OF UNITS FROM THE TWO CROSSWISE ROWS IN THE DOORWAY AREA; USE BLOCKING AS SPECIFIED IN SPECIAL NOTE 5. AN ADJUSTMENT BY ONE PALLET UNIT CAN BE ACCOMPLISHED BY FORMING TWO (2) 1-LONG BAYS OF THE REQUIRED QUANTITIES IN LIEU OF THE BAY OF 2 CROSSWISE ROWS IN THE DOORWAY AREA. IF THERE ARE NO CROSSWISE ROWS, OR IF DESIRED, A FILLER ASSEMBLY CAN BE POSITIONED IN THE PLACE OF A PALLET OMITTED FROM A 1-HIGH BAY WITHIN THE LOAD. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66.

( CONTINUED AT LEFT )

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	51	17
2" X 2"	128	43
2" X 4"	321	214
2" X 6"	130	130
NAILS	NO. REQD	POUNDS
6d (2")	256	1-1/2
10d (3")	808	12-1/2
WIRE, NO. 14 GAGE	----- 192' REQD -----	4 LBS

LOAD AS SHOWN

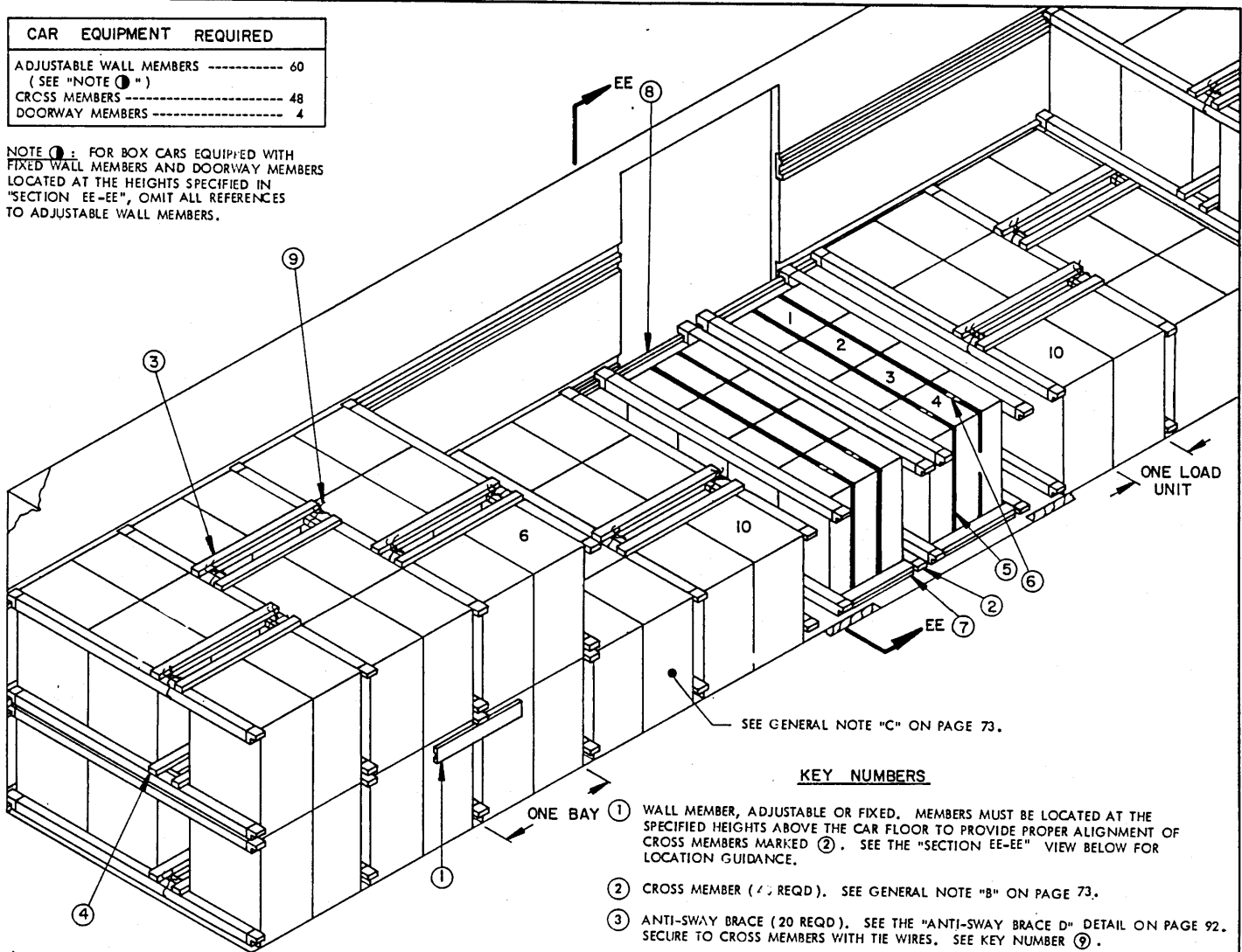
ITEM	QUANTITY	WEIGHT (APPROX)
8" (6/PALLET)	----- 118 -----	148,208 LBS
DUNNAGE	-----	826 LBS
TOTAL WEIGHT	-----	149,114 LBS

8" PROJECTILES (6/SMALL PALLET)  
118-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR (MECHANICAL)

**CAR EQUIPMENT REQUIRED**

ADJUSTABLE WALL MEMBERS -----	60
(SEE "NOTE 1")	
CROSS MEMBERS -----	48
DOORWAY MEMBERS -----	4

NOTE 1: FOR BOX CARS EQUIPPED WITH FIXED WALL MEMBERS AND DOORWAY MEMBERS LOCATED AT THE HEIGHTS SPECIFIED IN "SECTION EE-EE", OMIT ALL REFERENCES TO ADJUSTABLE WALL MEMBERS.

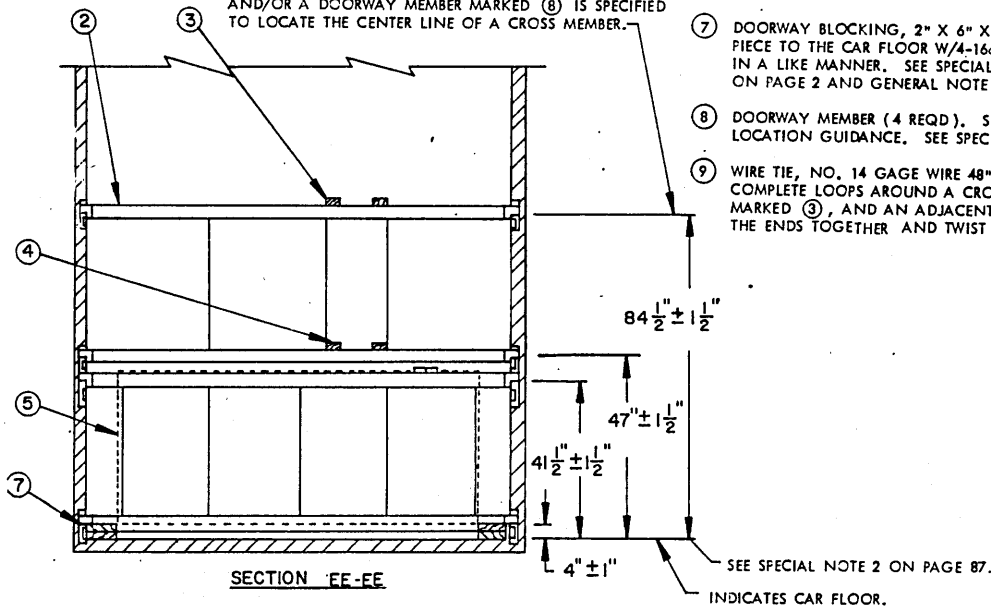


**ISOMETRIC VIEW**

**KEY NUMBERS**

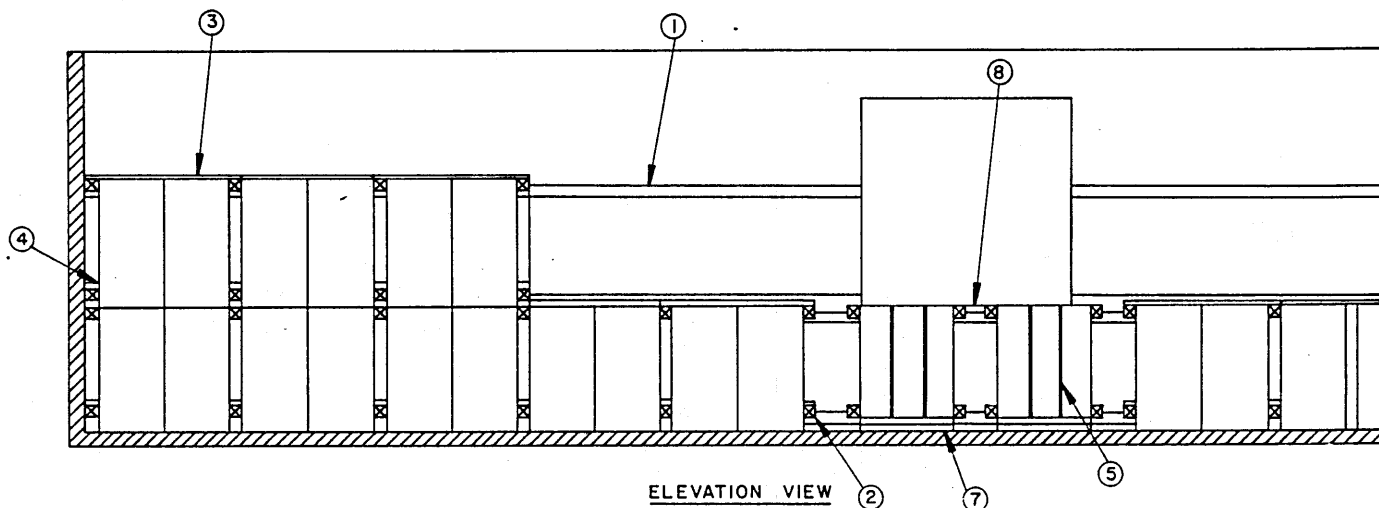
- 1 WALL MEMBER, ADJUSTABLE OR FIXED. MEMBERS MUST BE LOCATED AT THE SPECIFIED HEIGHTS ABOVE THE CAR FLOOR TO PROVIDE PROPER ALIGNMENT OF CROSS MEMBERS MARKED 2. SEE THE "SECTION EE-EE" VIEW BELOW FOR LOCATION GUIDANCE.
- 2 CROSS MEMBER (4 REQD). SEE GENERAL NOTE "B" ON PAGE 73.
- 3 ANTI-SWAY BRACE (20 REQD). SEE THE "ANTI-SWAY BRACE D" DETAIL ON PAGE 92. SECURE TO CROSS MEMBERS WITH TIE WIRES. SEE KEY NUMBER 9.
- 4 ANTI-SWAY BRACE (6 REQD). SEE THE "ANTI-SWAY BRACE E" DETAIL ON PAGE 92.
- 5 DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 24'-0" LONG STEEL STRAPPING (4 REQD). SEE SPECIAL NOTE 4 ON PAGE 87.
- 6 SEAL FOR 1-1/4" STRAPPING (8 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "K" ON PAGE 2.
- 7 DOORWAY BLOCKING, 2" X 6" X 30" (DOUBLED) (4 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/4-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE SPECIAL NOTE 4 ON PAGE 87. SEE GENERAL NOTE "H" ON PAGE 2 AND GENERAL NOTE "G" ON PAGE 3.
- 8 DOORWAY MEMBER (4 REQD). SEE THE "SECTION EE-EE" VIEW AT LEFT FOR LOCATION GUIDANCE. SEE SPECIAL NOTE 5 ON PAGE 87.
- 9 WIRE TIE, NO. 14 GAGE WIRE 48" LONG (40 REQD). INSTALL TO FORM TWO (2) COMPLETE LOOPS AROUND A CROSS BRACE OF AN ANTI-SWAY BRACE, PIECE MARKED 3, AND AN ADJACENT CROSS MEMBER, PIECE MARKED 2. BRING THE ENDS TOGETHER AND TWIST TAUT.

EACH DIMENSIONAL HEIGHT ABOVE THE CAR FLOOR TO AN ADJUSTABLE OR FIXED WALL MEMBER MARKED 1 AND/OR A DOORWAY MEMBER MARKED 8 IS SPECIFIED TO LOCATE THE CENTER LINE OF A CROSS MEMBER.



8" PROJECTILES (6/LARGE PALLET)

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



**( SPECIAL NOTES CONTINUED )**

9. CROSS MEMBERS CANNOT BE EFFECTIVELY INSTALLED WITHIN A DOOR OPENING SO AS TO BE COMMON TO TWO BAYS. THEREFORE, THE DEPICTED DOORWAY AREA LOAD PATTERN MAY ONLY BE APPLICABLE FOR CARS HAVING 6', 7', OR 8' WIDE DOORS. FOR CARS WITH 9', 10', OR 12' WIDE DOORS, OMIT ONE LOAD UNIT MARKED 10 FROM EACH END OF THE LOAD AND FORM A ONE-LOAD-UNIT BAY OF EACH LOAD UNIT MARKED 9. IT MAY THEN BE POSSIBLE TO POSITION THREE INDIVIDUALLY-BLOCKED CROSSWISE ROWS OF 4 PALLET UNITS IN THE DOORWAY AREA. THIS GUIDANCE IS SPECIFICALLY APPLICABLE FOR 50'-6" LONG CARS; ADJUSTMENTS WILL BE NECESSARY WHEN LOADING CARS OF OTHER LENGTHS.

**SPECIAL NOTES:**

1. A 104-UNIT LOAD OF 8" PROJECTILES PALLETIZED 6 PER LARGE PALLET IS SHOWN IN A 50'-6" LONG BY 9'-2" WIDE (INSIDE CLEARANCE) BOX CAR EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS, AND WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDER DOOR OPENINGS CAN BE USED.
2. THE HEIGHT DIMENSIONS FOR THE LOCATION OF THE CROSS MEMBERS AND DOORWAY MEMBERS, PIECES MARKED (2) AND (8), RESPECTIVELY, ARE BASED ON THE XM650E5 PROJECTILE. THE HEIGHT LOCATIONS WHEN SHIPPING THE M509E1 PROJECTILE WILL BE 4", 44", 49-1/2", AND 89-1/2", WITH THE SAME TOLERANCES AS SHOWN BY THE SECTION EE-EE VIEW.
3. THE TOTAL ACCUMULATED SPACE A CAR MUST NOT EXCEED TWO INCHES (2"). THE WIDTH OF THE ANTI-SWAY BRACE D ASSEMBLIES, PIECES MARKED (3), AND THE ANTI-SWAY BRACE E ASSEMBLIES, PIECES MARKED (4), MUST BE ADJUSTED IN ORDER TO COMPLY WITH THIS MANDATORY REQUIREMENT.
4. IN LIEU OF USING DOORWAY BLOCKING PIECES AND DOORWAY PROTECTION STRAPS, PIECES MARKED (7) AND (5), RESPECTIVELY, SIDE BLOCKING FOR THE CROSSWISE ROWS IN THE DOORWAY AREA CAN BE OTHERWISE PROVIDED. POSITION A FILLER ASSEMBLY F OF APPROPRIATE THICKNESS SO AS TO BE IN CONTACT WITH THE DOORWAY MEMBERS ON THE SIDE OPPOSITE THE LOADING SIDE OF THE CAR. LOAD THE FOUR PALLETES IN THE CROSSWISE ROW, AND THEN POSITION ANOTHER FILLER ASSEMBLY F AGAINST THE UNITS AND AGAINST THE LOADING-SIDE DOORWAY MEMBERS. SEE THE "FILLER ASSEMBLY F" DETAIL ON PAGE 90.
5. IF THE CAR BEING LOADED DOES NOT HAVE A SUFFICIENT QUANTITY OF DOORWAY MEMBERS, PIECE MARKED (8), OR IF DESIRED IN LIEU OF POSITIONING PALLET UNITS IN THE DOORWAY AREA, UNITS MAY BE ADDED TO THE SECOND LAYER POSITION IN EITHER OR BOTH ENDS OF THE CAR.
6. THE DEPICTED LOAD CAN BE INCREASED, LOAD LIMIT OF THE CAR PERMITTING, OR DECREASED BY A MULTIPLE OF 6 PALLET UNITS BY ADDING ONE LAYER TO 1-HIGH 2-LONG BAYS OR OMITTING ONE LAYER FROM 2-HIGH 2-LONG BAYS, OR CAN BE ADJUSTED BY 3 PALLET UNITS BY FORMING A 1-LONG BAY OR BY OMITTING ONE LOAD UNIT FROM A DEPICTED 1-HIGH 2-LONG BAY. THE LOAD CAN BE REDUCED BY ANY QUANTITY FROM 1 TO 6 BY OMITTING PALLET UNITS FROM THE CROSSWISE ROWS IN THE DOORWAY AREA, IF PRESENT. NOTE THAT A CROSSWISE ROW MUST CONTAIN AT LEAST TWO (2) PALLET UNITS. IF THERE ARE NO CROSSWISE ROWS IN A LOAD, OR IF DESIRED, A LOAD CAN BE REDUCED BY 1 PALLET UNIT BY INSTALLING A FILLER ASSEMBLY IN THE PLACE OF AN OMITTED PALLET. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66.
7. THE DEPICTED PROCEDURES IN CONJUNCTION WITH THE PROCEDURES SHOWN ON PAGE 74 CAN BE UTILIZED FOR THE BLOCKING AND BRACING OF LCL SHIPMENTS. FOR A LOAD QUANTITY OF LESS THAN 3 PALLET UNITS IN A BAY, INSTALL CROSS MEMBERS AT THE DESIGNATED HEIGHTS AT BOTH ENDS OF THE LOAD UNIT. PROVIDE LATERAL BRACING FOR EACH UNIT BY POSITIONING A SPACER ASSEMBLY ON EACH SIDE OF THE UNIT. PROVIDE LATERAL BRACING OF CROSS MEMBERS. SEE PIECE MARKED (9) ON PAGE 78 FOR A TYPICAL INSTALLATION. SEE THE DETAIL ON PAGE 86 FOR CONSTRUCTION GUIDANCE.
8. SIXTY-EIGHT (68) PALLET UNITS, APPROXIMATELY 87,584 POUNDS CAN BE LOADED IN A 50'-6" LONG CAR WITHOUT PUTTING ANY UNITS IN THE SECOND LAYER. FIFTY-SIX (56) PALLET UNITS, APPROXIMATELY 72,128 POUNDS, CAN BE LOADED ON THE FLOOR OF A 40'-6" LONG CAR.

(CONTINUED AT LEFT)

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	417	278
2" X 6"	20	20
2" X 10"	57	95
NAILS	NO. REQD	POUNDS
10d (3")	700	10-3/4
16d (3-1/2")	32	3/4
STEEL STRAPPING, 1-1/4" X .035" OR .031" - 96' REQD --- 14 LBS		
SEAL "OR 1-1/4" STRAPPING ----- 8 REQD --- 1/2 LB		
WIRE, NO. 14 GAGE ----- 160' REQD --- 3 LBS		

**LOAD AS SHOWN**

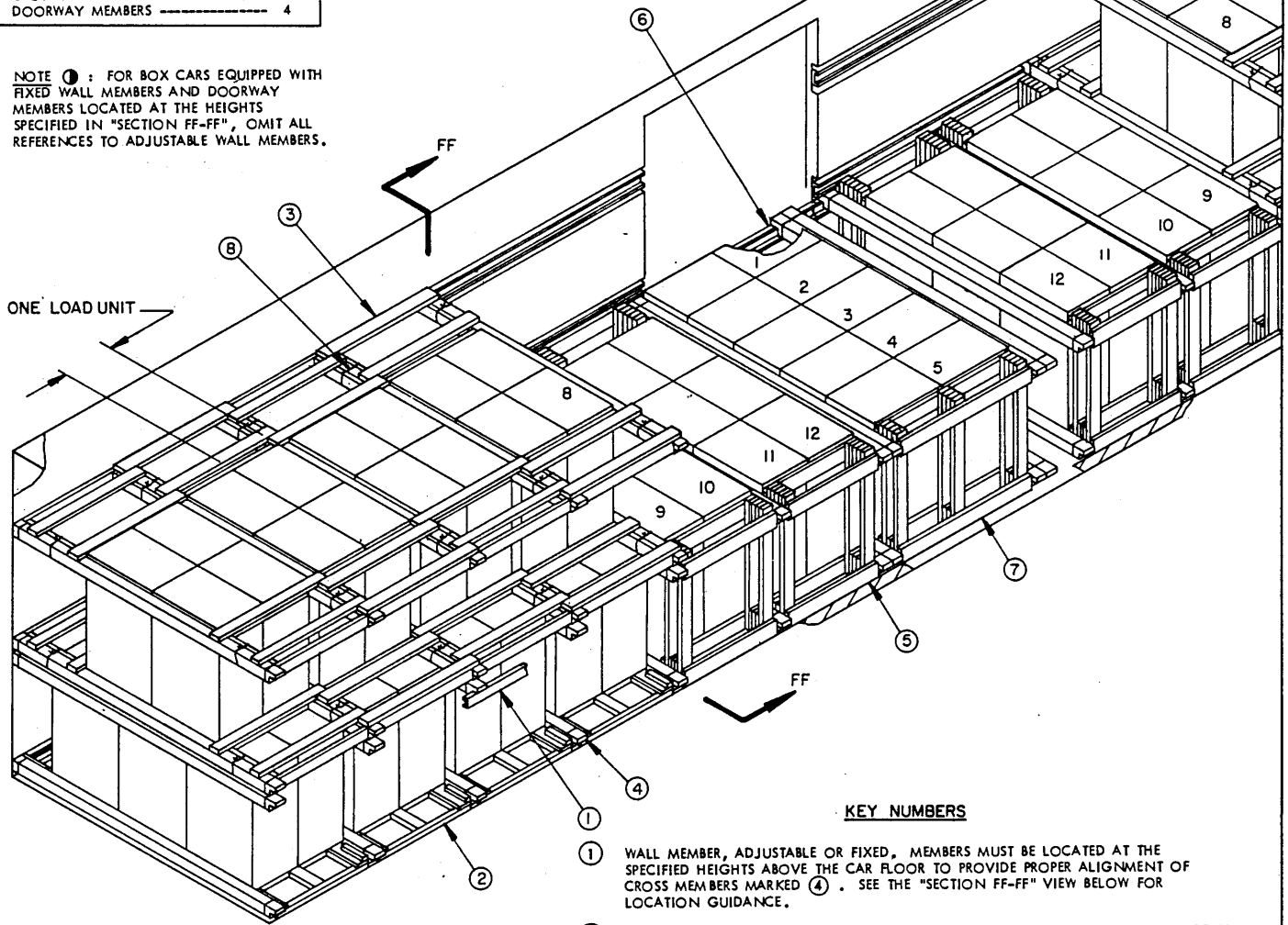
ITEM	QUANTITY	WEIGHT (APPROX)
8" (6/PALLET) -----	104	133,952 LBS
DUNNAGE -----		815 LBS
TOTAL WEIGHT -----		134,767 LBS

**8" PROJECTILES (6/LARGE PALLET)  
104 - UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR (MECHANICAL)**

**CAR EQUIPMENT REQUIRED**

ADJUSTABLE WALL MEMBERS -----	80
(SEE "NOTE 1")	
CROSS MEMBERS -----	54
DOORWAY MEMBERS -----	4

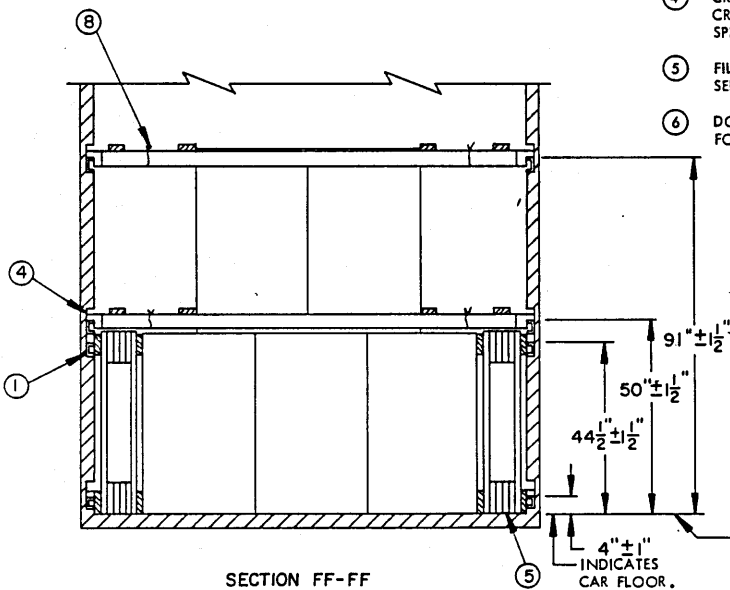
NOTE 1: FOR BOX CARS EQUIPPED WITH FIXED WALL MEMBERS AND DOORWAY MEMBERS LOCATED AT THE HEIGHTS SPECIFIED IN "SECTION FF-FF", OMIT ALL REFERENCES TO ADJUSTABLE WALL MEMBERS.



**ISOMETRIC VIEW**

**KEY NUMBERS**

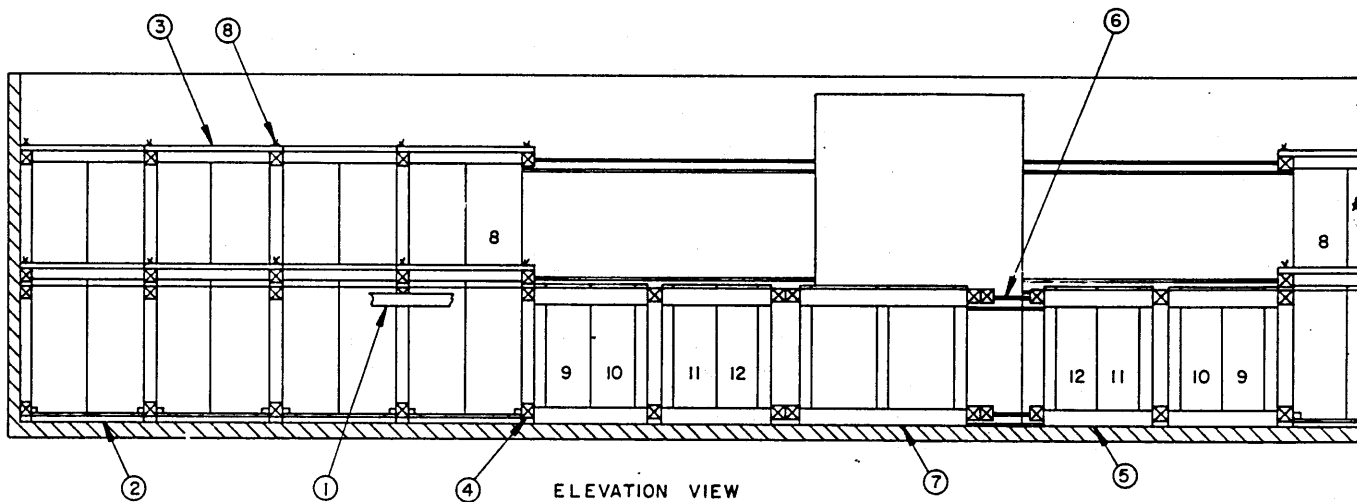
- 1 WALL MEMBER, ADJUSTABLE OR FIXED, MEMBERS MUST BE LOCATED AT THE SPECIFIED HEIGHTS ABOVE THE CAR FLOOR TO PROVIDE PROPER ALIGNMENT OF CROSS MEMBERS MARKED 4. SEE THE "SECTION FF-FF" VIEW BELOW FOR LOCATION GUIDANCE.
- 2 ANTI-SWAY BRACE ( 16 REQD ). SEE THE "ANTI-SWAY BRACE C" DETAIL ON PAGE 91.
- 3 ANTI-SWAY BRACE FOR 2 PALLETS LONG ( 16 REQD ). SEE THE "ANTI-SWAY BRACE D" DETAIL ON PAGE 92. ALTERNATE THE POSITION OF LONGITUDINALLY ADJACENT ASSEMBLIES.
- 4 CROSS MEMBER ( 54 REQD ). SEE GENERAL NOTE "B" ON PAGE 73. NOTE THAT THE CROSS MEMBERS AT BOTH ENDS OF THE CROSSWISE ROWS ARE DOUBLED. SEE SPECIAL NOTE 3 ON PAGE 89.
- 5 FILLER ASSEMBLY ( 8 REQD ). SEE THE "FILLER ASSEMBLY F" DETAIL ON PAGE 90. SEE GENERAL NOTE "H" ON PAGE 2.
- 6 DOORWAY MEMBER ( 4 REQD ). SEE THE "SECTION FF-FF" VIEW AT LEFT FOR LOCATION GUIDANCE. SEE SPECIAL NOTE 4 ON PAGE 89.
- 7 FILLER ASSEMBLY ( 2 REQD ). SEE THE "FILLER ASSEMBLY E" DETAIL ON PAGE 90. SEE SPECIAL NOTE 5 ON PAGE 89.
- 8 WIRE TIE, NO. 14 GAGE WIRE 48" LONG ( 48 REQD ). INSTALL TO FORM TWO ( 2 ) COMPLETE LOOPS AROUND A CROSS BRACE OF AN ANTI-SWAY BRACE, PIECE MARKED 2 AND/OR 3, AND AN ADJACENT CROSS MEMBER, PIECE MARKED 4. BRING THE ENDS TOGETHER AND TWIST TAUT.



**SECTION FF-FF**

EACH DIMENSIONED HEIGHT ABOVE THE CAR FLOOR TO AN ADJUSTABLE OR FIXED WALL MEMBER MARKED 1 AND/OR A DOORWAY MEMBER MARKED 6 IS SPECIFIED TO LOCATE THE CENTER LINE OF A CROSS MEMBER.

8" PROJECTILES ( 6 TALL PROJECTILES/SMALL PALLET )  
114-UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR (MECHANICAL)



( SPECIAL NOTES CONTINUED )

**SPECIAL NOTES:**

7. THE DEPICTED PROCEDURES IN CONJUNCTION WITH THE PROCEDURES SHOWN ON PAGES 78 AND 82 CAN BE UTILIZED FOR THE BLOCKING AND BRACING OF LCL SHIPMENTS. IF CROSS MEMBERS CAN BE INSTALLED AT THE FOUR DESIGNATED LOCATION HEIGHTS, ONE LOAD UNIT AS SHOWN WILL PROVIDE FOR A 5-UNIT LCL LOAD. OTHERWISE, TWO SEPARATE BAYS MUST BE FORMED, ONE OF 3-UNITS AND ONE OF 2. A BAY OF 3 UNITS, POSITIONED AGAINST ONE CAR SIDEWALL, CAN BE BLOCKED AT THE SIDE WITH A FILLER ASSEMBLY, PIECE MARKED (3). SIDE BLOCKING FOR THE 2-UNIT BAY, OR FOR A 1-UNIT BAY IF ONE IS REQUIRED, CAN BE PROVIDED BY INSTALLING ONE (1) SPACER ASSEMBLY, PIECE MARKED (5) ON PAGE 78, ON EACH LEVEL OF CROSS MEMBERS ON EACH SIDE OF THE LOAD, OR ON ONE SIDE ONLY IF THE UNITS ARE POSITIONED AGAINST ONE SIDEWALL. NAILED FLOORLINE BLOCKING, SIMILAR TO THE DOORWAY BLOCKING, PIECE MARKED (5) ON PAGE 82, WILL BE USED AGAINST THE SKID (5) OF THE UNIT (5).
8. EIGHTY-TWO ( 82 ) PALLET UNITS, APPROXIMATELY 102,992 POUNDS, CAN BE LOADED IN A 50'-6" LONG CAR WITHOUT PUTTING ANY UNITS IN THE SECOND LAYER. SIXTY-FOUR ( 64 ) PALLET UNITS, APPROXIMATELY 80,384 POUNDS, CAN BE LOADED ON THE FLOOR OF A 40'-6" LONG CAR.
9. CROSS MEMBERS CANNOT BE EFFECTIVELY INSTALLED WITHIN A DOOR OPENING SO AS TO BE COMMON TO TWO BAYS. THEREFORE, THE DEPICTED POSITIONING OF THE TWO CROSSWISE ROWS IS ONLY APPLICABLE IN A CAR HAVING 6' WIDE DOORS. IN CARS HAVING 7' THRU 10' WIDE DOORS, THE BAY CONSISTING OF TWO CROSSWISE ROWS OF 5 PALLET UNITS MUST BE INDIVIDUALLY BLOCKED. THE BAY CONTAINING THE LOAD UNIT MARKED 12 AT THE LEFT OF THE DOOR OPENING IN THE DEPICTED LOAD WILL THEN REQUIRE ONLY ONE (1) CROSS MEMBER AT EACH HEIGHT ON THE DOORWAY SIDE. TO FACILITATE LOADING THE DOORWAY AREA OF CARS EQUIPPED WITH 12' WIDE DOORS, OMIT THE LOAD UNIT MARKED 12 FROM EACH END OF THE LOAD AND FORM A ONE-LONG-UNIT BAY OF EACH LOAD UNIT MARKED 11. THEN POSITION ONE BAY OF TWO CROSSWISE ROWS OF 5 PALLET UNITS AND ONE BAY CONSISTING OF ONE CROSSWISE ROW IN THE DOORWAY AREA. EACH BAY MUST BE INDIVIDUALLY BLOCKED. NOTE THAT FILLER ASSEMBLY F, AS DETAILED ON PAGE 90 EXPECT THAT DIMENSION "C" WILL BE 28-1/2" IN LIEU OF 39". WILL BE USED FOR THE ONE CROSSWISE ROW. THIS GUIDANCE IS SPECIFICALLY APPLICABLE FOR 50'-6" LONG CARS; ADJUSTMENTS WILL BE NECESSARY WHEN LOADING CARS OF OTHER LENGTHS.

1. A 114-UNIT LOAD OF 8" PROJECTILES PALLETIZED 6 TALL PROJECTILES PER SMALL PALLET IS SHOWN IN A 50'-6" LONG BY 9'-2" WIDE ( INSIDE CLEARANCE ) BOX CAR EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS, AND WITH 6'-0" WIDE DOOR OPENINGS. CARS OF OTHER DIMENSIONS AND CARS HAVING WIDR DOOR OPENINGS CAN BE USED, SEE SPECIAL NOTE 9.
2. TO PREVENT A TIPPING ACTION, LATERAL BRACING OF A FIRST-LAYER BAY HAVING EITHER NO SECOND-LAYER UNITS OR HAVING LESS THAN A FULL SECOND LAYER MUST BE PROVIDED EITHER BY THE USE OF A FILLER ASSEMBLY, PIECE MARKED (3), IN LIEU OF THE ANTI-SWAY BRACE, PIECE MARKED (2), OR BY THE INSTALLATION OF ANTI-SWAY BRACES, PIECE MARKED (3), ON EACH PAIR OF CROSS MEMBERS ON EACH SIDE OF THE LOAD.
3. PALLET UNITS IN THE DOORWAY AREA MAY BE FORMED IN SINGLE ROWS IN LIEU OF THE TWO SIDE-BY-SIDE ROWS SHOWN, IF DESIRED. ONE (1) CROSS MEMBER AT EACH BLOCKING LEVEL IS ADEQUATE FOR RETAINING ONE CROSSWISE ROW OF PALLET UNITS. HOWEVER, DUE TO THE DIFFICULTY OF PROPERLY INSTALLING CROSS MEMBERS AT BOTH ENDS OF MORE THAN ONE LOAD UNIT IN THE DOORWAY AREA, MEMBERS CANNOT BE INSTALLED SO AS TO BE COMMON TO TWO ROWS; INDIVIDUAL ROWS MUST BE SEPARATELY BLOCKED.
4. IF THE CAR BEING LOADED DOES NOT HAVE A SUFFICIENT QUANTITY OF DOORWAY MEMBERS, PIECES MARKED (4), OR IF DESIRED IN LIEU OF POSITIONING PALLET UNITS IN THE DOORWAY AREA, UNITS MAY BE ADDED TO THE SECOND LAYER PORTION IN EITHER OR BOTH ENDS OF THE CAR.
5. IN LIEU OF USING FILLER ASSEMBLIES, PIECES MARKED (7), SIDE BLOCKING FOR THE CROSSWISE ROWS IN THE DOORWAY CAN BE PROVIDED BY INSTALLING DOORWAY BLOCKING AND DOORWAY PROTECTION STRAPS SIMILAR TO PIECES MARKED (5), (6), AND (7) SHOWN ON PAGE 82. THE DOORWAY BLOCKING, EITHER APPLIED TO BOTH SIDES FOR UNITS CENTERED IN THE CAR OR APPLIED TO ONE SIDE ONLY WITH THE UNITS LOADED AGAINST THE DOORWAY MEMBERS ON THE OPPOSITE SIDE, WILL BE 48" LONG FOR TWO CROSSWISE ROWS OR 24" LONG FOR A SINGLE ROW. DOORWAY PROTECTION STRAPS FOR THE LOAD SHOWN WILL BE 25'-0" LONG, AND WILL BE OF A LENGTH TO SUIT WHEN THE NUMBER OF PALLET UNITS IN A CROSSWISE ROW IS OTHER THAN 5. NOTE THAT A CROSSWISE ROW MUST CONSIST OF AT LEAST TWO (2) PALLET UNITS.
6. THE DEPICTED LOAD CAN BE INCREASED, LOAD LIMIT OF THE CAR PERMITTING OR DECREASED BY 2 PALLET UNITS BY ADDING OR OMITTING PAIRS OF SECOND-LAYER UNITS IN EITHER END OF THE CAR. A LOAD CAN BE REDUCED BY MULTIPLES OF 5 UNITS BY OMITTING ONE OR MORE FULL LOAD UNITS AND/OR OMITTING FULL CROSSWISE ROWS. THE LOAD CAN BE REDUCED BY 2 PALLET UNITS BY OMITTING A LONGITUDINALLY ADJACENT PAIR OF UNITS FROM THE TWO CROSSWISE ROWS IN THE DOORWAY AREA; USE BLOCKING AS SPECIFIED IN SPECIAL NOTE 5. AN ADJUSTMENT BY ONE PALLET UNIT CAN BE ACCOMPLISHED BY FORMING TWO (2) 1-LONG BAYS OF THE REQUIRED QUANTITIES IN LIEU OF THE BAY OF 2 CROSSWISE ROWS IN THE DOORWAY AREA. IF THERE ARE NO CROSSWISE ROWS, OR IF DESIRED, A FILLER ASSEMBLY CAN BE POSITIONED IN THE PLACE OF A PALLET OMITTED FROM A 1-HIGH BAY WITHIN THE LOAD. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66.

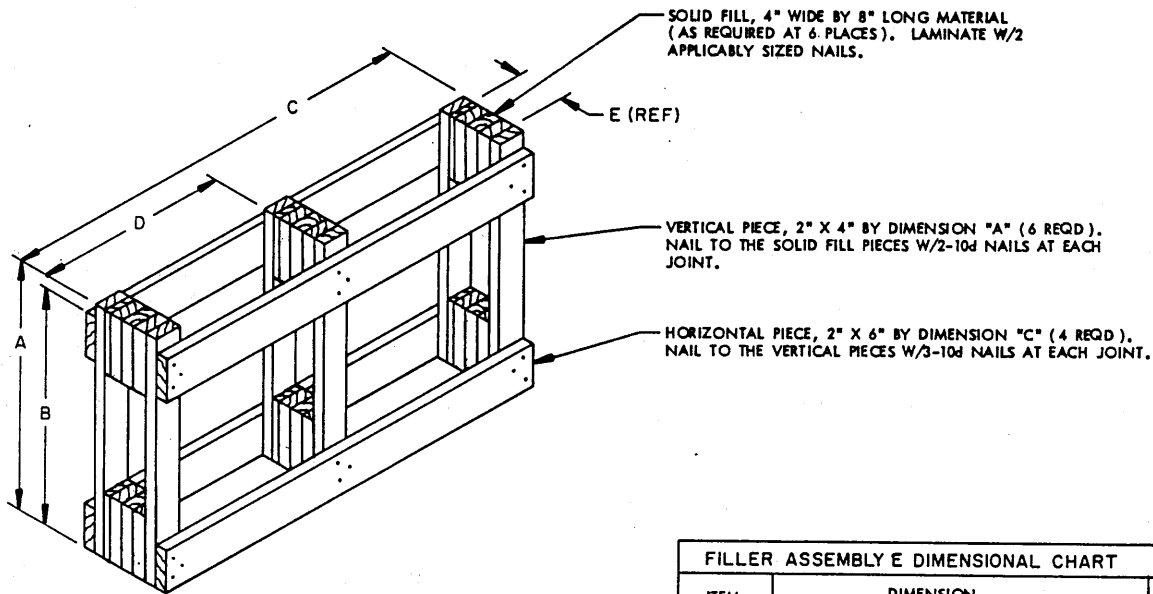
( CONTINUED AT LEFT )

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	59	20
2" X 2"	128	43
2" X 4"	596	398
2" X 6"	123	123
NAILS	NO. REQD	POUNDS
6d ( 2" )	256	1-1/2
10d ( 3" )	716	11-1/4
WIRE, NO. 14 GAGE	192' REQD	4 LBS

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT ( APPROX. )
8" ( 6 TALL/PALLET )	114	147,744 LBS
DUNNAGE		1,185 LBS
TOTAL WEIGHT		148,929 LBS

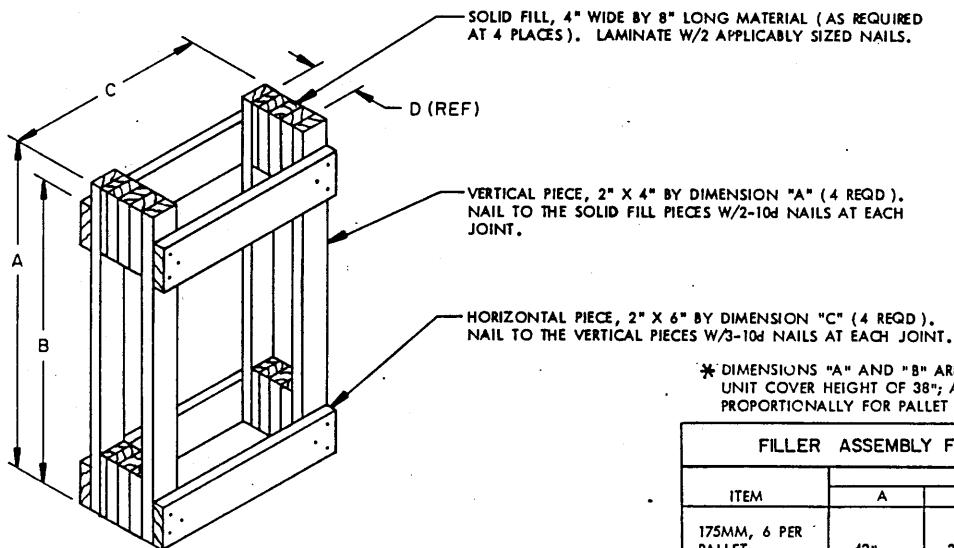
8" PROJECTILES (6 TALL PROJECTILES/SMALL PALLET)  
114 - UNIT LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR (MECHANICAL)



**FILLER ASSEMBLY E**

THIS ASSEMBLY IS FOR USE IN THE LOADS SHOWN ON PAGES 74, 84, AND 88, AND AS AN ALTERNATIVE FOR THE LOAD SHOWN ON PAGE 82.

FILLER ASSEMBLY E DIMENSIONAL CHART						
ITEM	DIMENSION					LOAD PAGE
	A	B	C	D	E (REF)	
155MM SMALL	32"	30"	54"	24-1/4"	9-1/2"	74
8", 6 PER SMALL PLT	38"	36"	57"	25-3/4"	6-1/2"	84
8", 3 PER PALLET	38"	36"	57"	25-3/4"	9"	82
8", 6 TALL/ SMALL PALLET	48"	46"	57"	25-3/4"	6-1/2"	88

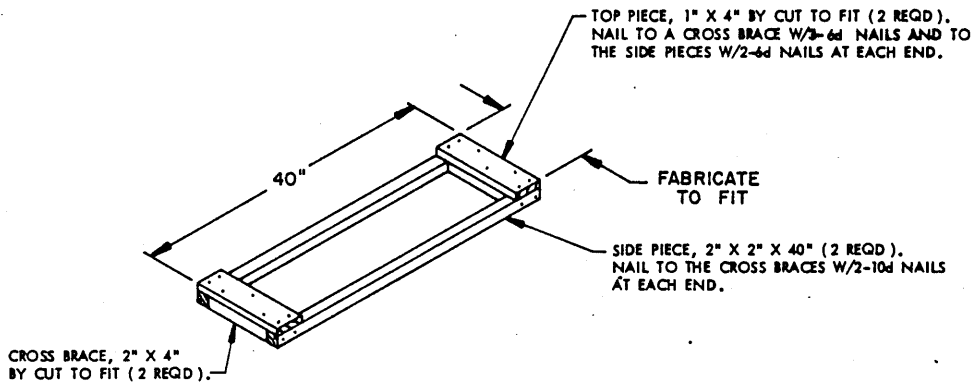


**FILLER ASSEMBLY F**

THIS ASSEMBLY IS FOR USE IN THE LOADS SHOWN ON THE SPECIFIED PAGES.

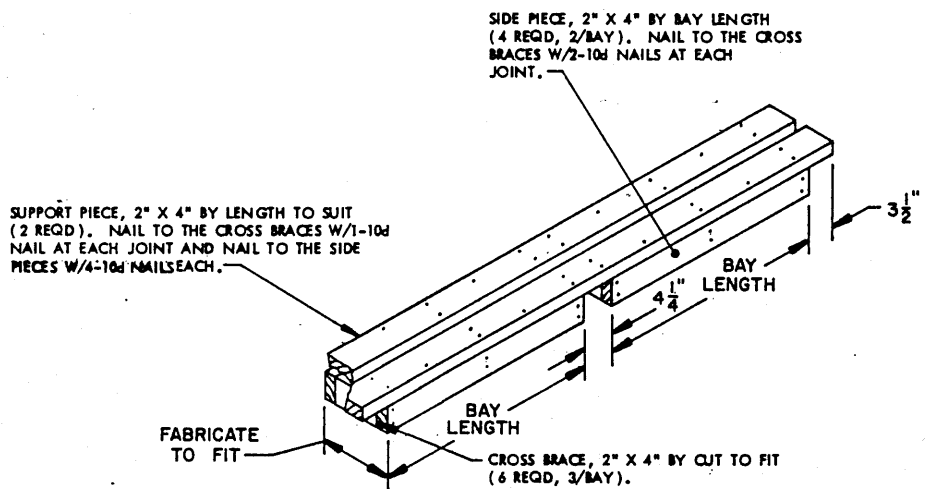
\* DIMENSIONS "A" AND "B" ARE BASED ON A PALLET UNIT COVER HEIGHT OF 38"; ADJUST DIMENSIONS PROPORTIONALLY FOR PALLET UNITS OF OTHER HEIGHTS.

FILLER ASSEMBLY F DIMENSIONAL CHART					
ITEM	DIMENSION				LOAD PAGE
	A	B	C	D (REF)	
175MM, 6 PER PALLET	42"	39"	25-1/2"	2"	78
8" 6 PER SMALL PALLET	38"	36"	39"	6-1/2"	84
155MM SMALL	32"	30"	27"	9-1/2"	74
155MM LARGE *	40"	38"	29"	1-1/2"	76
8", M509E1	52"	47-1/2"	31-3/4"	3-3/4"	86
8", XM650E5	49"	45"	31-3/4"	3-3/4"	86
8", 3 PER PALLET	38"	36"	28-1/2"	9"	82
8", 6 TALL/ SMALL PALLET	48"	46-1/2"	39"	6-1/2"	88



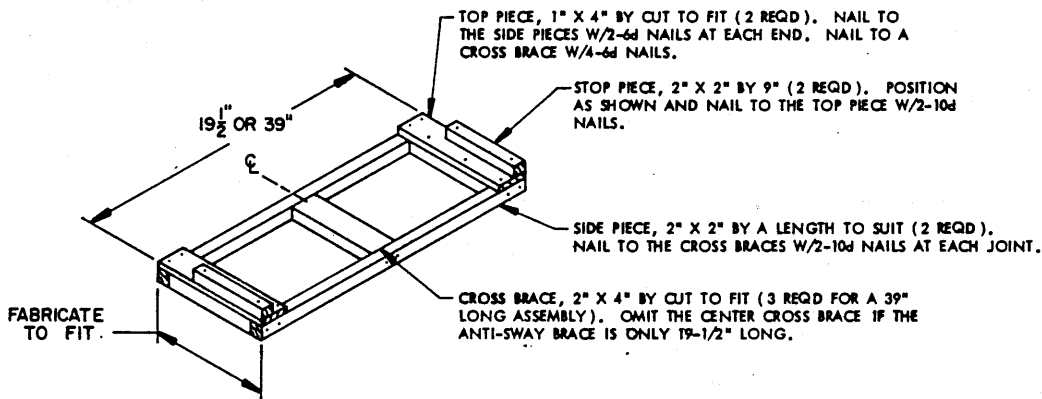
**ANTI-SWAY BRACE A**

THIS ANTI-SWAY BRACE IS FOR USE IN THE LOAD SHOWN ON PAGE 80.



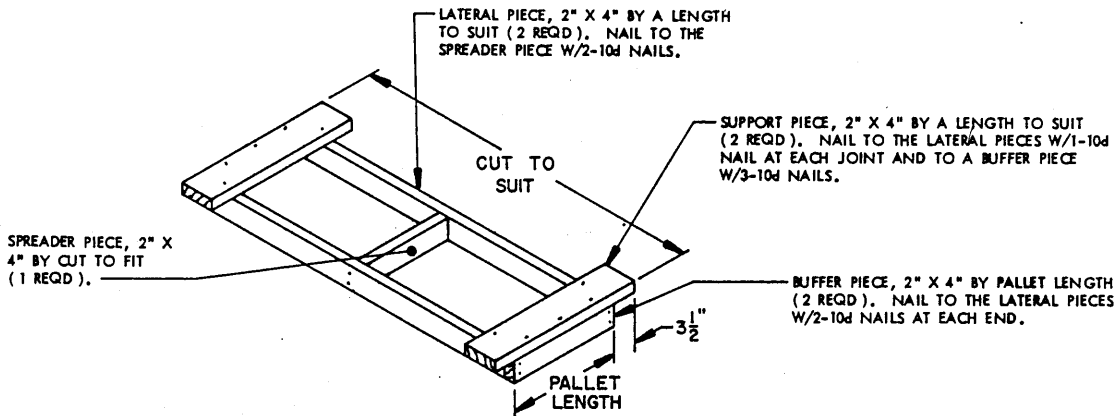
**ANTI-SWAY BRACE B**

THIS ANTI-SWAY BRACE IS FOR USE IN THE LOAD SHOWN ON PAGE 80. NOTE THAT IF THE ANTI-SWAY BRACE IS FOR USE FOR THE BRACING OF TWO BAYS ONE OF WHICH IS NOT AGAINST THE END OF THE CAR, THE SUPPORT PIECES MUST BE EXTENDED 3-1/2" AT BOTH ENDS IN ORDER TO REST ON CROSS MEMBERS.



**ANTI-SWAY BRACE C**

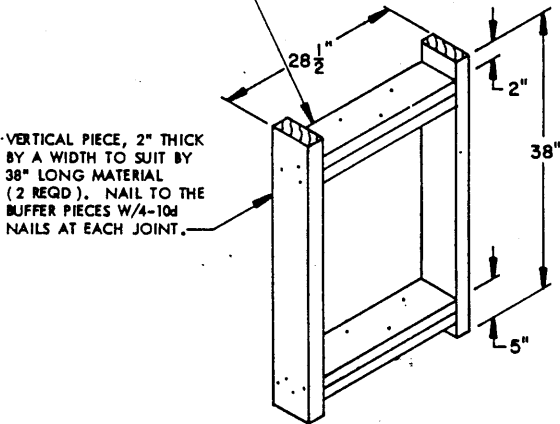
THIS ANTI-SWAY BRACE IS FOR USE IN THE LOAD SHOWN ON PAGES 84 AND 88.



**SPACER ASSEMBLY**

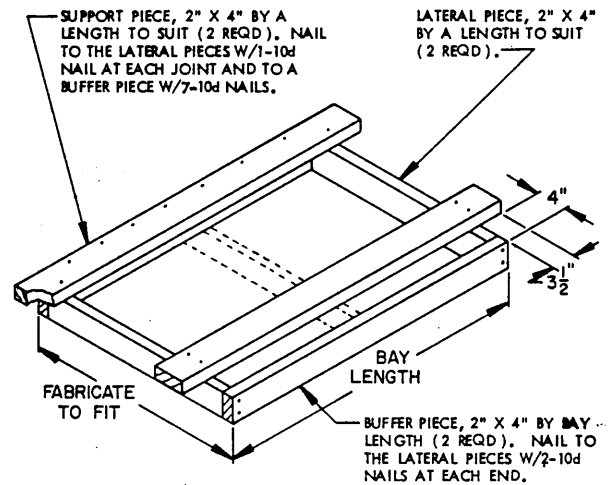
THIS ASSEMBLY IS FOR USE IN THE LOAD SHOWN ON PAGE 78, AND AS AN ALTERNATIVE FOR USE IN OTHER LOADS, AS SPECIFIED.

BUFFER PIECE, 2" THICK BY A WIDTH TO SUIT BY 25-1/2" LONG (DOUBLED) (2 REQD). LAMINATE W/3-10d NAILS.



**CRIB FILL H**

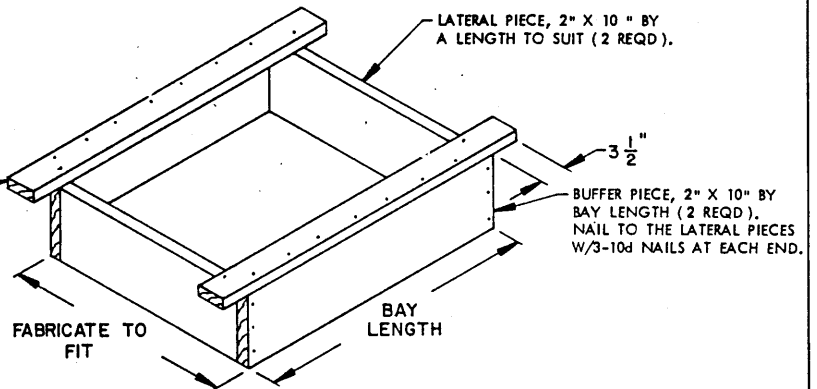
THIS CRIB FILL IS FOR USE IN THE LOAD SHOWN ON PAGE 82.



**ANTI-SWAY BRACE D.**

THIS ASSEMBLY IS FOR USE IN THE LOADS SHOWN ON PAGES 76, 84, 86 AND 88. NOTE THAT THE DOTTED-IN LATERAL PIECE IS TO BE CENTERED AND IS ONLY REQUIRED FOR THE LOAD ON PAGE 76. ALSO, THE 4" DIMENSION FOR LOCATING ONE SUPPORT PIECE IS ONLY APPLICABLE FOR THE LOAD ON PAGE 84 AND 88.

SUPPORT PIECE, 2" X 4" BY A LENGTH TO SUIT (2 REQD). NAIL TO THE LATERAL PIECES W/1-10d NAIL AT EACH JOINT AND TO A BUFFER PIECE W/7-10d NAILS.



**ANTI-SWAY BRACE E**

THIS ASSEMBLY IS FOR USE IN THE LOADS SHOWN ON PAGES 76 AND 86.

**DETAILS**



## GENERAL NOTES

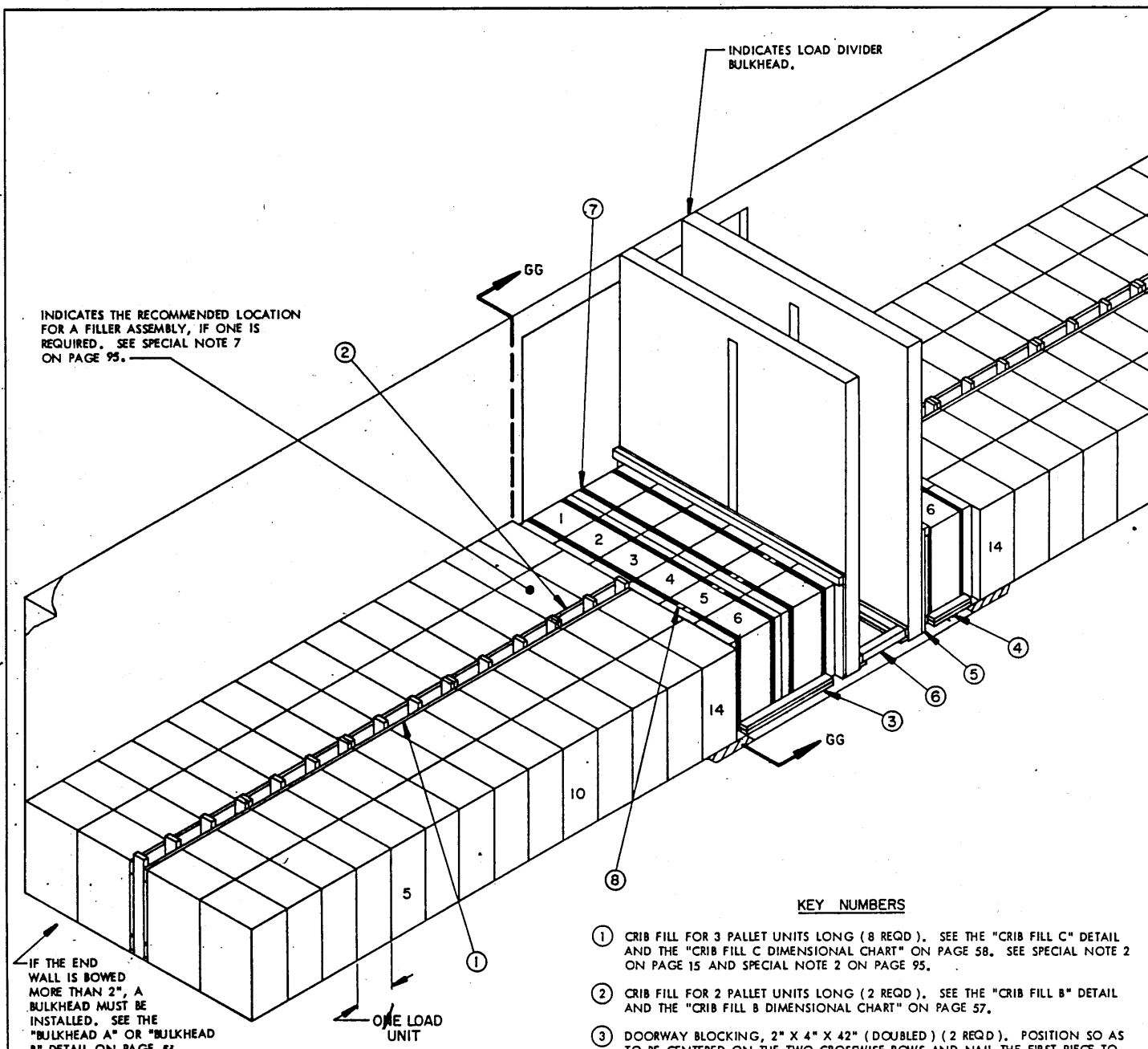
(FOR CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS)

- A. THE OUTLOADING PROCEDURES SPECIFIED ON PAGES 94 THRU 101 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 SEPARATE LOADING PROJECTILES 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. REFER TO GENERAL NOTE "E" ON PAGE 2 FOR ADDITIONAL REQUIREMENTS. 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 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. SEE THE "BULKHEAD A" AND "BULKHEAD B" DETAILS ON PAGE 36 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 101 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 101, THE "FILL PIECE" MATERIAL IS NOT REQUIRED.
- G. NOTICE: WHEN POSITIONING PALLET UNITS IN A CAR THEY SHOULD BE PLACED TIGHTLY AGAINST A CAR SIDEWALL, AGAINST NAILED SIDE FILL PIECES, AGAINST A CRIB FILL ASSEMBLY, OR AGAINST A LATERALLY ADJACENT UNIT, AS APPLICABLE. THE LADING PLUS THE DUNNAGE SHOULD TOTALLY FILL THE WIDTH OF A CAR AS NEARLY AS POSSIBLE. HOWEVER, A TOTAL ACCUMULATED SPACE ACROSS A CAR OF UP TO BUT NOT EXCEEDING TWO INCHES (2") IS PERMITTED. THE CRIB FILL ASSEMBLIES SPECIFIED FOR THE VARIOUS WIDTH CARS ARE DESIGNED SO AS TO PROVIDE AN EXCESS LATERAL VOID ACROSS A CAR OF APPROXIMATELY 1/2" TO 1". IF VARIATIONS IN THE WIDTH OF THE CAR BEING LOADED OR IN THE PALLET UNIT LENGTHS AND/OR WIDTHS DO NOT PERMIT INSERTION OF THE SPECIFIED CRIB FILL, OR IF THE REMAINING LATERAL SPACE AFTER A CRIB FILL IS INSERTED IS MORE THAN 2", ADJUSTMENTS MUST BE MADE TO THE CRIB FILL ASSEMBLIES. ADJUSTMENTS CAN BE ACCOMPLISHED BY VARYING THE WIDTH AND/OR THICKNESS, AS APPLICABLE, OF THE COMPONENT PARTS OF THE CRIB FILL ASSEMBLIES.
- H. 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.
- J. 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 "K-2" AT RIGHT. DETAILS OF STRUT ASSEMBLIES FOR USE BETWEEN 2-PIECE BULKHEADS AND BETWEEN 1-PIECE BULKHEADS ARE SHOWN ON PAGE 99, 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 100 FOR GUIDANCE.

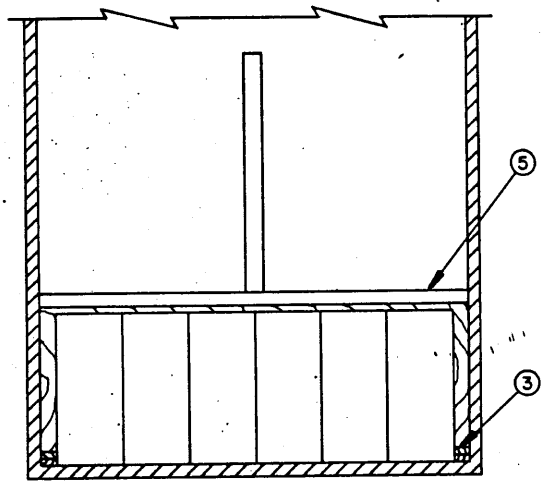
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## (GENERAL NOTES CONTINUED)

- K. 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 PALLET UNITS WHICH ARE IN ONE LOAD UNIT. A LOAD UNIT IS DEFINED AS A STACK OF PALLETS 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 LAYERS 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 FILLER ASSEMBLIES CAN BE USED IN THE PLACE OF OMITTED PALLET UNITS TO ADJUST A QUANTITY DOWNWARD BY OTHER THAN A MULTIPLE OF A FULL LOAD UNIT. SEE THE FILLER ASSEMBLY DETAILS ON PAGE 66.
  2. AT LOCATION (S) WHERE K-BRACES MIGHT NORMALLY BE USED IN A LOAD IN A CONVENTIONAL CAR, LOAD DIVIDER BULKHEADS CAN BE POSITIONED. LOADING CAN THEN CONTINUE TOWARD THE CENTER OF THE CAR FROM EACH INSTALLED LOAD DIVIDER BULKHEAD, IN A ONE-HIGH LAYER. INSTALL CENTER GATES AND STRUTS AS SHOWN IN THE APPLICABLE CONVENTIONAL BOX CAR DRAWING HEREIN, TO PROVIDE FOR A TIGHT LOAD BETWEEN THE BULKHEADS.
  3. ONE OR MORE UNITS CAN BE POSITIONED IN CONTACT WITH A LOAD DIVIDER BULKHEAD ON THE CENTER-OF-CAR SIDE. BLOCK AND BRACE WITH KNEE BRACE ASSEMBLIES AS SHOWN ON PAGES 34 AND 35.
- L. 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.
- M. 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 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 "H" ON PAGE 2.
- N. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTION IMMEDIATELY ADJACENT TO A DEPICTED OUTLOADING METHOD.



ISOMETRIC VIEW



SECTION GG-GG

KEY NUMBERS

- ① CRIB FILL FOR 3 PALLET UNITS LONG (8 REQD). SEE THE "CRIB FILL C" DETAIL AND THE "CRIB FILL C DIMENSIONAL CHART" ON PAGE 58. SEE SPECIAL NOTE 2 ON PAGE 15 AND SPECIAL NOTE 2 ON PAGE 95.
- ② CRIB FILL FOR 2 PALLET UNITS LONG (2 REQD). SEE THE "CRIB FILL B" DETAIL AND THE "CRIB FILL B DIMENSIONAL CHART" ON PAGE 57.
- ③ DOORWAY BLOCKING, 2" X 4" X 42" (DOUBLED) (2 REQD). POSITION SO AS TO BE CENTERED ON THE TWO CROSSWISE ROWS AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "M" ON PAGE 93.
- ④ DOORWAY BLOCKING, 2" X 4" X 18" (DOUBLED) (2 REQD). POSITION SO AS TO BE CENTERED ON THE CROSSWISE ROW AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/2-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.
- ⑤ BUFFER GATE (2 REQD). SEE THE DETAIL ON PAGE 98. SEE GENERAL NOTE "H" ON PAGE 2. SEE SPECIAL NOTE 5 ON PAGE 95.
- ⑥ STRUT ASSEMBLY (1 REQD). SEE THE DETAIL ON PAGE 99. SEE GENERAL NOTE "J" ON PAGE 93.
- ⑦ DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 26'-0" LONG STEEL STRAPPING (6 REQD).
- ⑧ SEAL FOR 1-1/4" STEEL STRAPPING (12 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "K" ON PAGE 2.

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

**SPECIAL NOTES:**

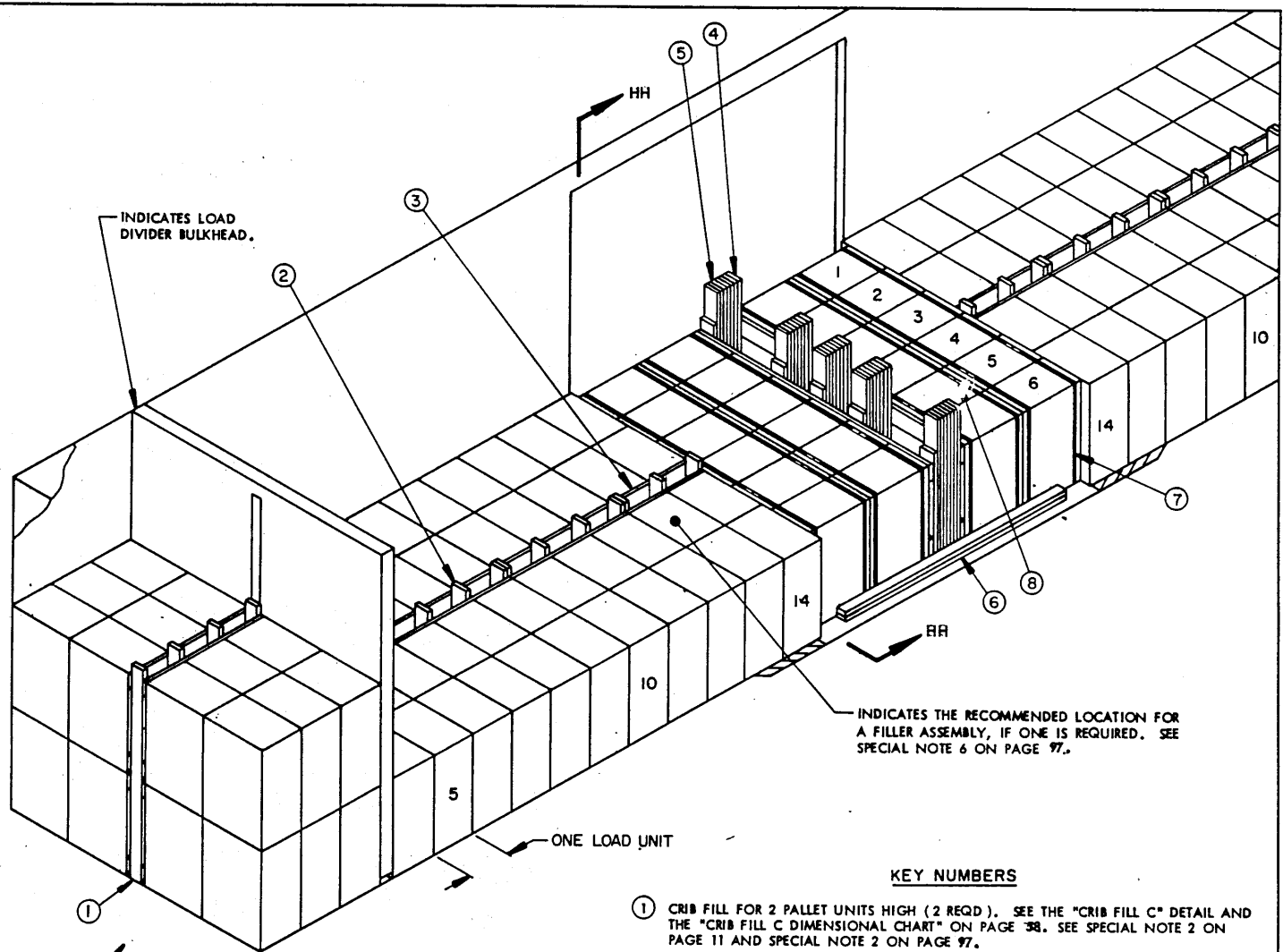
1. A 50'-6" LONG BY 9'-2" WIDE CUSHIONED BOX CAR EQUIPPED WITH LOAD DIVIDER BULKHEADS, AND WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING NARROWER OR WIDER DOOR OPENINGS CAN BE USED.
2. A LOAD OF 175MM PROJECTILES PALLETIZED 6 PER PALLET IS SHOWN AS TYPICAL. THE CRIB FILL AND OTHER BLOCKING AND BRACING COMPONENTS REFERENCED IN THE KEY NUMBERS, EXCEPT FOR THE BUFFER GATE AND THE STRUT ASSEMBLY, PIECES MARKED (3) AND (4), AS WELL AS THE SPECIFIED QUANTITIES REQUIRED ARE ONLY APPLICABLE WHEN LOADING THAT ITEM. THE DEPICTED PROCEDURES CAN BE ADAPTED AS NECESSARY SO AS TO BE APPLICABLE FOR SHIPMENTS OF ANY OF THE OTHER PALLET UNITS INCLUDED HEREIN.
3. THE PROCEDURES FOR CONVENTIONAL BOX CAR LOADING SHOWN ON PAGES 4 THRU 47 WILL BE USED IN CONJUNCTION WITH THE PROCEDURES SHOWN ON PAGE 94 FOR THE BLOCKING AND BRACING OF THE VARIOUS PALLETIZED UNITS. LATERAL BLOCKING (CRIB FILL) AND DOORWAY PROTECTION WILL BE AS SHOWN FOR THE APPLICABLE LOAD, HOWEVER, THE USE OF THE LOAD DIVIDER BULKHEADS WILL ELIMINATE THE NEED FOR THE CENTER GATES AND STRUTS. NOTE THAT SIDE FILL NAILED TO THE CAR SIDEWALL AS SHOWN IN SOME CONVENTIONAL BOX CAR LOADS CANNOT BE USED IN LOAD DIVIDER CARS WHICH ARE EQUIPPED WITH ADJUSTABLE SIDE FILLERS; CRIB FILL ASSEMBLIES MUST BE USED.
4. THE LOADING PROCEDURES ON PAGE 94 DEPICT A FULL 1-LAYER LOAD, WITH ALL THE LADING UNITS POSITIONED BETWEEN A CAR END WALL AND A LOAD DIVIDER BULKHEAD. IF THE LOAD LIMIT OF THE CAR PERMITS, AND IF IT IS DESIRED TO SHIP MORE PALLET UNITS THAN CAN BE POSITIONED ON THE FLOOR OF THE CAR, THE PROCEDURES SHOWN ON PAGE 96 CAN BE EMPLOYED FOR THE BRACING OF A PARTIAL SECOND LAYER IN THE LOAD.
5. THE BUFFER GATE, PIECE MARKED (5), IS ONLY REQUIRED WHEN THE SMALL DIMENSION OF PALLET UNITS OF 155MM, 175MM PALLETIZED 6 PER PALLET, OR 8" PALLETIZED EITHER 3 OR 6 PER PALLET IS POSITIONED SO AS TO BE ADJACENT TO A LOAD DIVIDER BULKHEAD. THE BUFFER GATE WILL NOT BE REQUIRED WHEN THE LONG DIMENSION OF THESE UNITS WILL BE ADJACENT TO THE BULKHEAD, OR WHEN LOADING THE 175MM PROJECTILES PALLETIZED 20 PER PALLET.
6. THE STRUT ASSEMBLY, PIECE MARKED (6), IS REQUIRED IF THE LOAD IN EITHER END OF THE CAR CONSISTS OF MORE THAN 50,000 POUNDS. THIS WOULD BE NOT MORE THAN SIXTY-TWO (62) PALLETS OF 155MM PALLETIZED 8 PER SMALL PALLET, FIFTY-SEVEN (57) UNITS OF 155MM PALLETIZED 8 PER LARGE PALLET, FIFTY-THREE (53) UNITS OF 175MM PALLETIZED 6 PER PALLET, FOURTEEN (14) UNITS OF 175MM PALLETIZED 20 PER PALLET, SEVENTY-EIGHT (78) UNITS OF 8" PALLETIZED 3 PER PALLET, THIRTY-NINE (39) PALLET UNITS OF 8" PALLETIZED 6 PER SMALL PALLET, OR THIRTY-EIGHT (38) UNITS OF 8" PALLETIZED 6 PER LARGE PALLET. NOTE THAT THE STRUT ASSEMBLY MAY BE OMITTED IF THE ENTIRE LOAD CONSISTS OF CLASS C EXPLOSIVES.
7. THE DEPICTED LOAD, AS WELL AS LOADS OF ANY OF THE OTHER PALLET UNITS, CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. THE LOAD DIVIDER BULKHEADS CAN BE POSITIONED NEARER THE CAR END WALL, THEREBY DECREASING THE NUMBER OF PALLET UNITS BY A MULTIPLE OF THE NUMBER OF PALLETS IN A LOAD UNIT OF LENGTHWISE-POSITIONED UNITS, OR DECREASING BY THE NUMBER IN A CROSSWISE ROW. THE LOAD DEPICTED CAN BE REDUCED BY A MULTIPLE OF SIX PALLET UNITS BY OMITTING ONE OR MORE OF THE CROSSWISE ROWS FROM THE CENTER OF THE CAR. THE NUMBER OF UNITS IN A CROSSWISE ROW MAY VARY, DEPENDING UPON WHICH PALLET UNIT IS BEING LOADED. SEE THE "LOAD PATTERN CHART" ON PAGE 49 FOR GUIDANCE AS TO THE PERMISSIBLE NUMBER OF UNITS IN A CROSSWISE ROW BASED ON THE NUMBER OF LENGTHWISE ROWS IN A LOAD. FOR THOSE QUANTITIES WHICH CANNOT BE ATTAINED IN ANY OF THESE WAYS, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS TO REACH THE DESIRED QUANTITY. SEE THE "FILLER ASSEMBLY A" DETAIL ON PAGE 66 FOR AN ASSEMBLY TO BE USED IN THE PLACE OF ANY OF THE PALLET UNITS EXCEPT THE 175MM PALLETIZED 20 PER PALLET WHICH REQUIRES THE USE OF "FILLER ASSEMBLY B". SEE THE DETAIL ON PAGE 67.

BILL OF MATERIAL (TYPICAL)		
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	142	71
1" X 8"	17	12
2" X 4"	75	50
2" X 6"	119	119
4" X 4"	13	18
NAILS	NO. REQD	POUNDS
6d (2")	462	2-3/4
10d (3")	18	1/2
12d (3-1/4")	16	1/2
16d (3-1/2")	28	3/4
PLYWOOD, 1/2" ----- 68 SQ FT REQD - 94 LBS		
STEEL STRAPPING, 1-1/4" X .035" (OR .031") - 156' REQD - 23 LBS		
SEAL FOR 1-1/4" STRAPPING ----- 12 REQD - NIL		

**LOAD AS SHOWN (TYPICAL)**

ITEM	QUANTITY	WEIGHT (APPROX)
175MM (6/PALLET) -----	130 -----	121,420 LBS
DUNNAGE -----		932 LBS
<b>TOTAL WEIGHT -----</b>		<b>122,352 LBS</b>

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



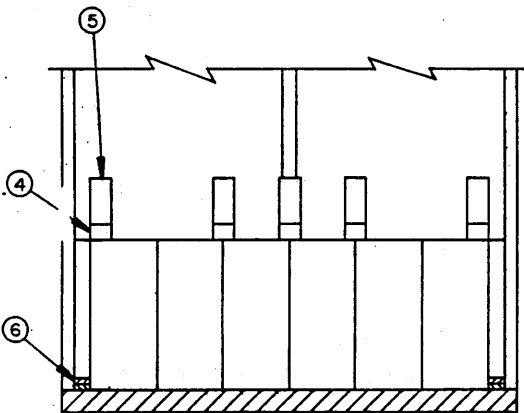
ISOMETRIC VIEW

IF THE CAR END WALL IS BOWED MORE THAN 2", A BULKHEAD MUST BE INSTALLED. SEE THE "BULKHEAD A" OR "BULKHEAD B" DETAIL ON PAGE 96.

INDICATES THE RECOMMENDED LOCATION FOR A FILLER ASSEMBLY, IF ONE IS REQUIRED. SEE SPECIAL NOTE 6 ON PAGE 97.

KEY NUMBERS

- ① CRIB FILL FOR 2 PALLET UNITS HIGH (2 REQD). SEE THE "CRIB FILL C" DETAIL AND THE "CRIB FILL C DIMENSIONAL CHART" ON PAGE 38. SEE SPECIAL NOTE 2 ON PAGE 11 AND SPECIAL NOTE 2 ON PAGE 97.
- ② CRIB FILL FOR 3 PALLET UNITS LONG (8 REQD). SEE THE "CRIB FILL C" DETAIL AND THE "CRIB FILL C DIMENSIONAL CHART" ON PAGE 58.
- ③ CRIB FILL FOR 2 PALLET UNITS LONG (2 REQD). SEE THE "CRIB FILL B" DETAIL AND THE "CRIB FILL B DIMENSIONAL CHART" ON PAGE 57.
- ④ CENTER GATE (2 REQD). SEE THE "CENTER GATE C" DETAIL AND THE "CENTER GATE C DIMENSIONAL CHART" FOR A 6-LONG GATE ON PAGE 61. SEE GENERAL NOTE "H" ON PAGE 2.
- ⑤ SOLID FILL, 6" WIDE BY 57" LONG BY THE THICKNESS REQUIRED TO PROVIDE A WEDGE FIT BETWEEN THE VERTICAL PIECES OF THE LONGITUDINALLY ADJACENT CENTER GATES (REQD AT 5 PLACES). NAIL THE FIRST PIECE TO THE EXTENDED VERTICAL PIECE OF ONE CENTER GATE W/5-10d NAILS. NAIL EACH ADDITIONAL PIECE TO A PREVIOUSLY INSTALLED PIECE W/5-10d NAILS. NAIL THRU EACH VERTICAL PIECE OF THE OTHER CENTER GATE INTO THE LAST SOLID FILL PIECE W/3-10d NAILS.
- ⑥ DOORWAY BLOCKING, 2" X 4" X 8'-0" (DOUBLED) (2 REQD). POSITION SO AS TO BE CENTERED ON THE FOUR CROSSWISE ROWS AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-16d NAIL EVERY 8". NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE GENERAL NOTE "M" ON PAGE 93.
- ⑦ DOORWAY PROTECTION STRAP, 1-1/4" X .035" (OR .031") X 26'-0" LONG STEEL STRAPPING (8 REQD).
- ⑧ SEAL FOR 1-1/4" STEEL STRAPPING (16 REQD, 2 PER STRAP JOINT). SEE GENERAL NOTE "Y" ON PAGE 2.



SECTION HH-HH

**SPECIAL NOTES:**

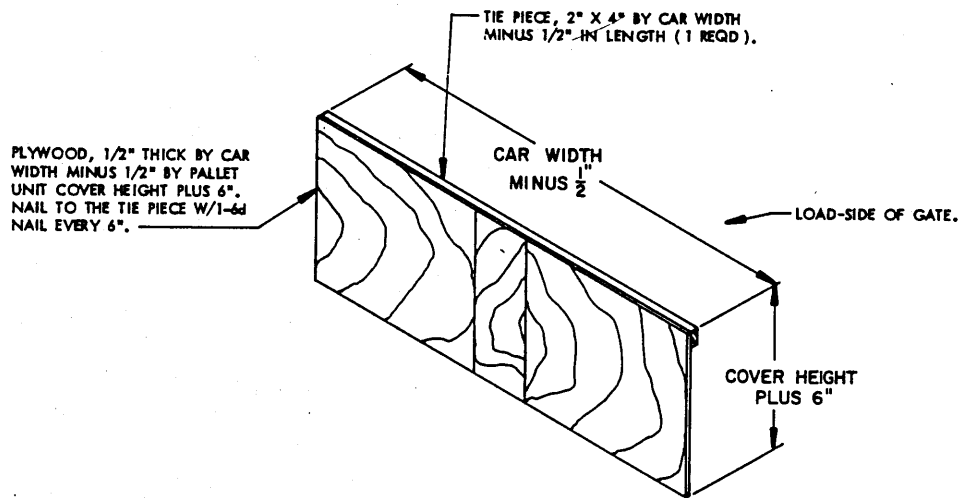
1. A 50'-6" LONG BY 9'-2" WIDE CUSHIONED BOX CAR EQUIPPED WITH LOAD DIVIDER BULKHEADS, AND WITH 10'-0" WIDE DOOR OPENINGS IS SHOWN. CARS OF OTHER DIMENSIONS AND CARS HAVING NARROWER OR WIDER DOOR OPENINGS CAN BE USED.
2. A LOAD OF 175MM PROJECTILES PALLETIZED 6 PER PALLET IS SHOWN AS TYPICAL. THE CRIB FILL, CENTER GATES, AND OTHER BLOCKING AND BRACING COMPONENTS REFERENCED IN THE KEY NUMBERS AS WELL AS THE SPECIFIED QUANTITIES REQUIRED ARE ONLY APPLICABLE WHEN LOADING THAT ITEM. THE DEPICTED PROCEDURES CAN BE ADAPTED AS NECESSARY SO AS TO BE APPLICABLE FOR SHIPMENTS OF ANY OF THE OTHER PALLET UNITS INCLUDED HEREIN.
3. THE PROCEDURES FOR CONVENTIONAL BOX CAR LOADING SHOWN ON PAGES 4 THRU 47 WILL BE USED IN CONJUNCTION WITH THE PROCEDURES SHOWN ON PAGE 96 FOR THE BLOCKING AND BRACING OF THE VARIOUS PALLETIZED UNITS. LATERAL BLOCKING (CRIB FILL) WILL BE AS SHOWN FOR THE APPLICABLE LOAD, HOWEVER, THE USE OF THE LOAD DIVIDER BULKHEADS WILL ELIMINATE THE NEED FOR THE ~~IN-BRACE/PARTIAL-LAYER BRACING~~ AS SPECIFIED WITHIN THE PROCEDURES FOR CONVENTIONAL BOX CAR LOADING. NOTE THAT SIDE FILL NAILED TO THE CAR SIDEWALL AS SHOWN IN SOME CONVENTIONAL BOX CAR LOADS CANNOT BE USED IN LOAD DIVIDER CARS WHICH ARE EQUIPPED WITH ADJUSTABLE SIDE FILLERS.
4. THE LOADING PROCEDURES ON PAGE 96 DEPICT A PARTIAL SECOND LAYER IN THE LOAD, WITH THE LOAD DIVIDER BULKHEAD POSITIONED AT THE END OF THAT PORTION OF THE LOAD AND WITH THE BALANCE OF THE UNITS BLOCKED AND BRACED AS FOR A CONVENTIONAL BOX CAR LOAD. NOTE THAT IN SOME CASES IT MAY BE MORE ADVANTAGEOUS TO LOAD IN TWO LAYERS, WITHOUT ANY UNITS BEING POSITIONED BETWEEN THE TWO LOAD DIVIDER BULKHEADS. IF A LOAD IS TO CONSIST OF ONLY ONE LAYER, REFER TO THE PROCEDURES ON PAGE 96 FOR GUIDANCE.
5. THE DEPICTED LOAD, AS WELL AS LOADS OF ANY OF THE OTHER PALLET UNITS, CAN BE INCREASED TO SUIT THE QUANTITY TO BE SHIPPED, PROVIDED THE LOAD LIMIT OF THE CAR WILL NOT BE EXCEEDED, BY POSITIONING ONE OR BOTH LOAD DIVIDER BULKHEADS AT A LOCATION WHICH IS NEARER THE CENTER OF THE CAR, THEREBY INCREASING THE NUMBER OF PALLET UNITS IN THE SECOND LAYER.
6. THE DEPICTED LOAD, AS WELL AS LOADS OF ANY OF THE OTHER PALLET UNITS, CAN BE DECREASED TO SUIT THE QUANTITY TO BE SHIPPED. THE LOAD DIVIDER BULKHEADS CAN BE POSITIONED NEARER THE CAR END WALL, THEREBY DECREASING THE NUMBER OF PALLET UNITS BY A MULTIPLE OF THE NUMBER OF PALLETS IN THE SECOND LAYER OF A LOAD UNIT. THE LOAD DEPICTED CAN BE REDUCED BY A MULTIPLE OF SIX PALLET UNITS BY OMITTING ONE OR TWO OF THE CROSSWISE ROWS FROM THE CENTER OF THE CAR. STRUTS WILL THEN BE USED BETWEEN THE CENTER GATES IN LIEU OF THE SOLID FILL SHOWN. THE NUMBER OF UNITS IN A CROSSWISE ROW MAY VARY, DEPENDING UPON WHICH PALLET UNIT IS BEING LOADED. FOR THE DEPICTED LOAD, THE NUMBER OF UNITS IN ALL THE CROSSWISE ROWS CAN BE CHANGED TO FIVE. SEE THE "LOAD PATTERN CHART" ON PAGE 49 FOR GUIDANCE AS TO THE PERMISSIBLE NUMBER OF UNITS IN A CROSSWISE ROW BASED ON THE NUMBER OF LENGTHWISE ROWS IN A LOAD. FOR THOSE QUANTITIES WHICH CANNOT BE ATTAINED IN ANY OF THESE WAYS, ONE OR MORE FILLER ASSEMBLIES CAN BE POSITIONED IN THE PLACE OF OMITTED PALLET UNITS TO REACH THE DESIRED QUANTITY. SEE THE "FILLER A" DETAIL ON PAGE 46 FOR AN ASSEMBLY TO BE USED IN THE PLACE OF ANY OF THE PALLET UNITS EXCEPT THE 175MM PALLETIZED 20 PER PALLET WHICH REQUIRES THE USE OF "FILLER ASSEMBLY B". SEE THE DETAIL ON PAGE 47.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	193	97
2" X 3"	8	4
2" X 4"	32	22
2" X 6"	383	383
NAILS	NO. REQD	POUNDS
6d (2")	552	3-1/4
10d (3")	249	4
16d (3-1/2")	48	1-1/4
STEEL STRAPPING, 1-1/4" X .035" (OR .031") - 208' REQD - 30 LBS		
SEAL FOR 1-1/4" STRAPPING ----- 16 REQD - 3/4 LB		

**LOAD AS SHOWN (TYPICAL)**

ITEM	QUANTITY	WEIGHT (APPROX)
175MM (6/PALLET) -----	160	149,440 LBS
DUNNAGE -----		1,052 LBS
TOTAL WEIGHT -----		150,492 LBS

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



PLYWOOD, 1/2" THICK BY CAR WIDTH MINUS 1/2" BY PALLET UNIT COVER HEIGHT PLUS 6". NAIL TO THE TIE PIECE W/1-6d NAIL EVERY 6".

TIE PIECE, 2" X 4" BY CAR WIDTH MINUS 1/2" IN LENGTH (1 REQD.).

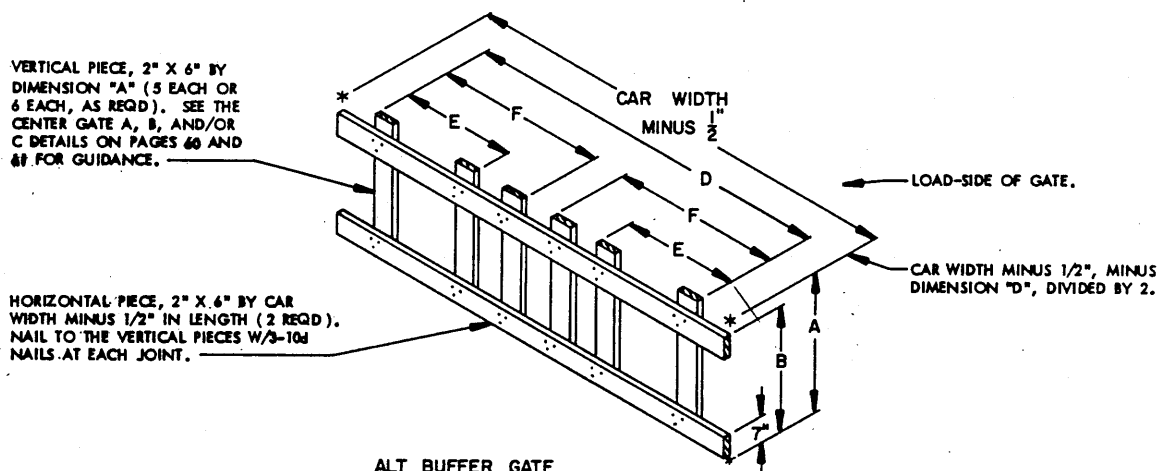
CAR WIDTH MINUS 1/2"

LOAD-SIDE OF GATE.

COVER HEIGHT PLUS 6"

**BUFFER GATE**

THIS BUFFER GATE IS FOR USE IN THE LOAD SHOWN ON PAGE 94. THE GATE IS TO BE POSITIONED BETWEEN THE LADING AND A LOAD DIVIDER BULKHEAD WHEN THE LENGTH OF THE PALLET UNITS (THE SHORT DIMENSION) ADJACENT TO THE BULKHEAD IS CROSSWISE IN THE CAR. THE GATE IS NOT REQUIRED FOR THE 175MM PALLETIZED 20 PER PALLET. SEE THE "ALT BUFFER GATE" DETAIL BELOW IF PLYWOOD IS NOT AVAILABLE, OR IF THE USE OF DIMENSIONAL LUMBER IS MORE ADVANTAGEOUS.



VERTICAL PIECE, 2" X 6" BY DIMENSION "A" (5 EACH OR 6 EACH, AS REQD.). SEE THE CENTER GATE A, B, AND/OR C DETAILS ON PAGES 60 AND 61 FOR GUIDANCE.

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

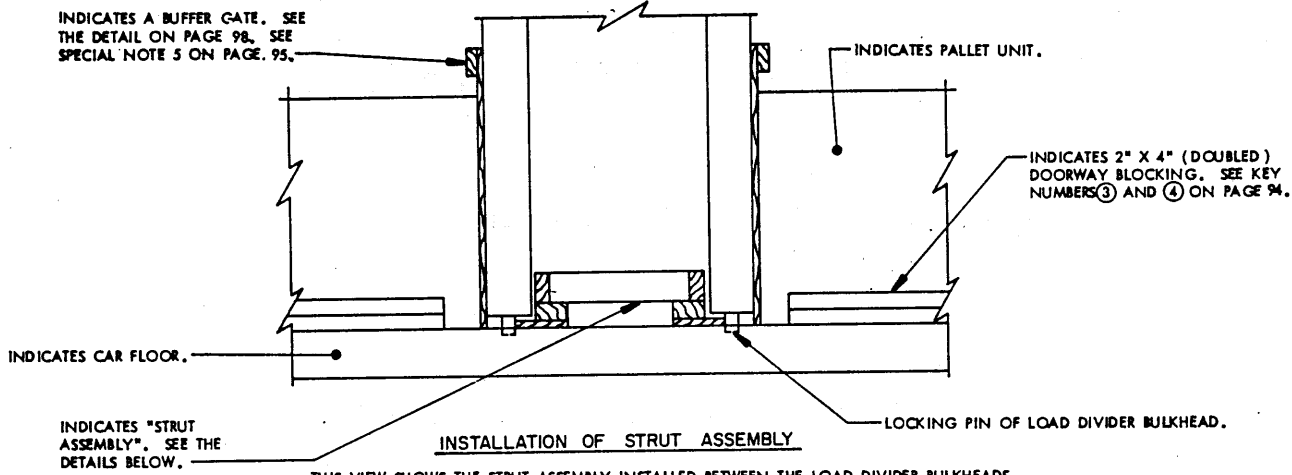
CAR WIDTH MINUS 1/2"

LOAD-SIDE OF GATE.

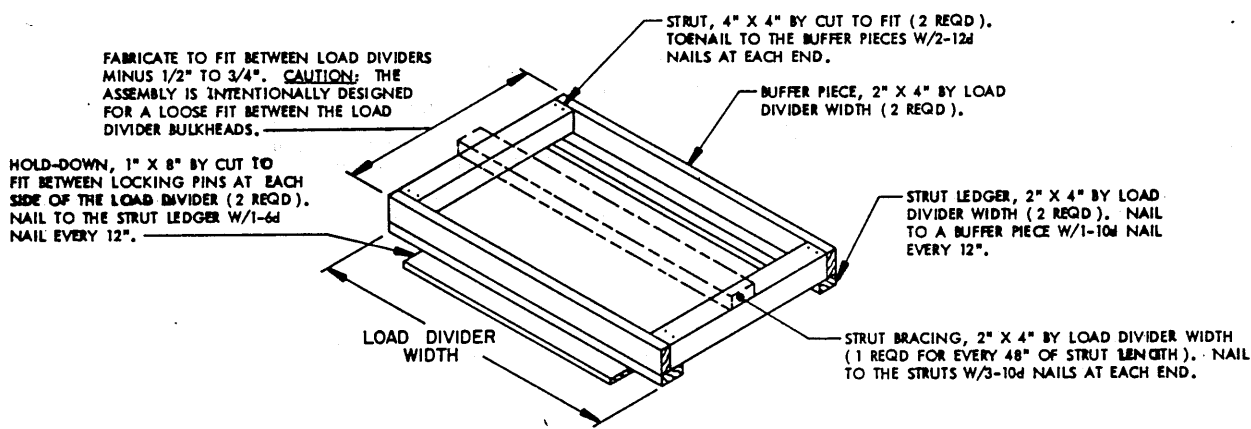
CAR WIDTH MINUS 1/2", MINUS DIMENSION "D", DIVIDED BY 2.

**ALT BUFFER GATE**

THIS BUFFER GATE IS FOR USE IN THE LOAD SHOWN ON PAGE 94 AS AN ALTERNATIVE TO THE BUFFER GATE ABOVE IF PLYWOOD IS NOT AVAILABLE OR IF IT IS DESIRED TO USE DIMENSIONAL LUMBER.

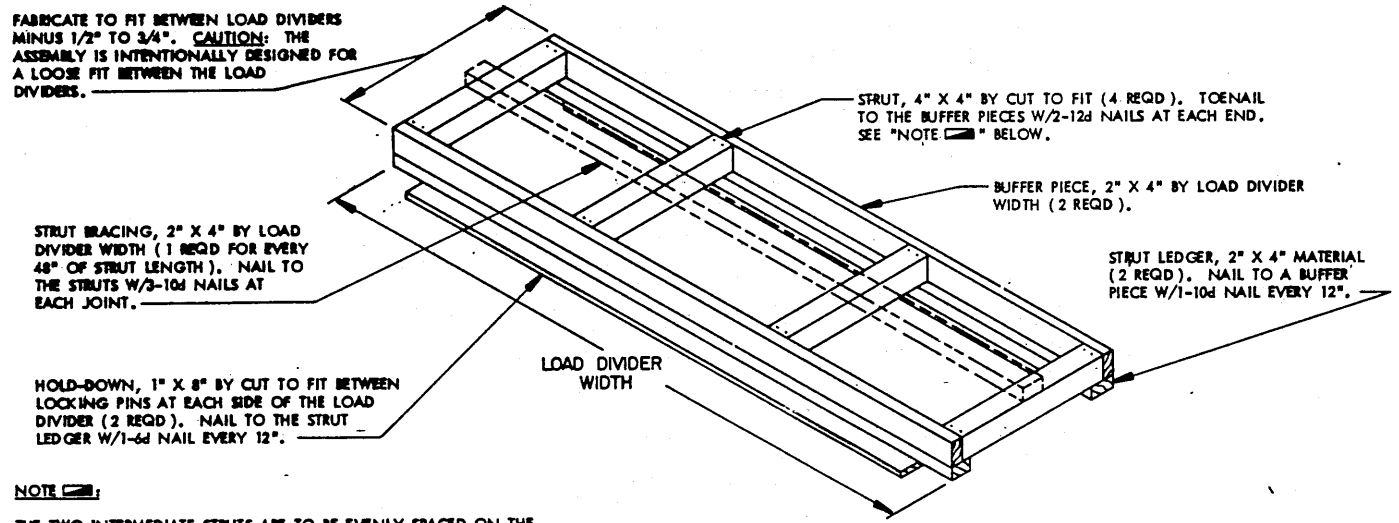


**INSTALLATION OF STRUT ASSEMBLY**  
 THIS VIEW SHOWS THE STRUT ASSEMBLY INSTALLED BETWEEN THE LOAD DIVIDER BULKHEADS. NOTE THE 1/2" TO 3/4" (TOTAL) SPACE INTENTIONALLY PROVIDED BETWEEN THE ASSEMBLY AND THE BULKHEADS.



**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 100 FOR GUIDANCE.

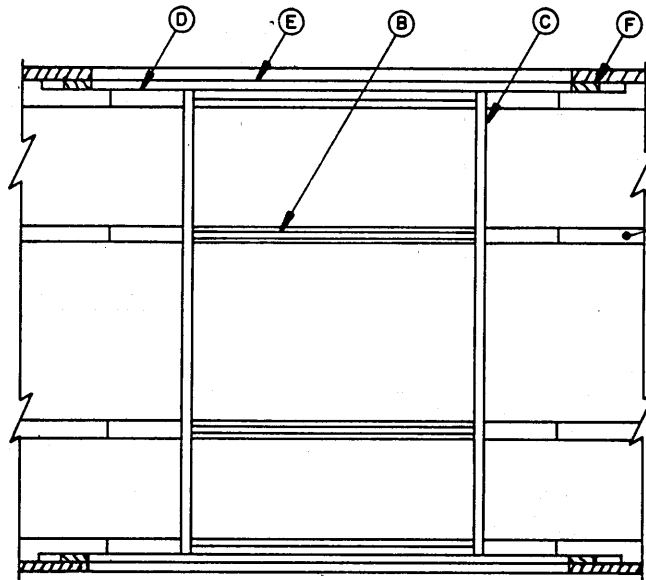


**STRUT ASSEMBLY FOR 1-PIECE BULKHEADS**

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 100 FOR GUIDANCE.

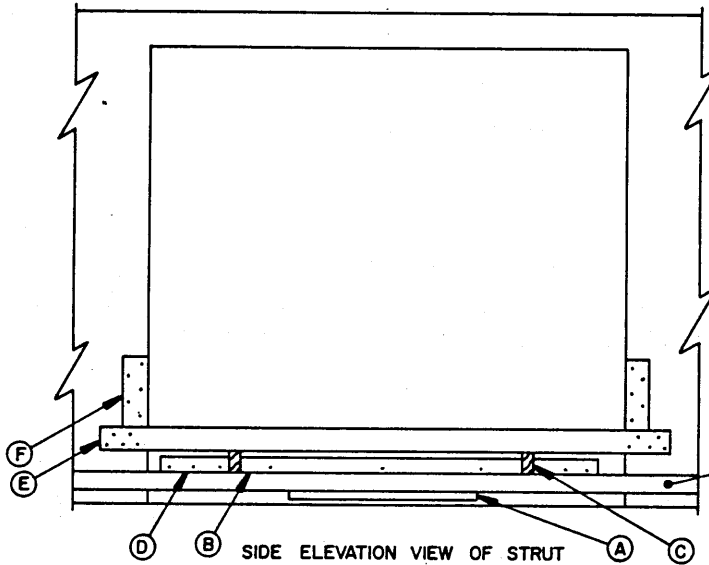
**NOTE:**  
 THE TWO INTERMEDIATE STRUTS ARE TO BE EVENLY SPACED ON THE WIDTH OF THE DIVIDER BULKHEADS, WITH ADJUSTMENTS MADE SO AS TO ALIGN WITH VERTICAL FRAMING WITHIN THE BULKHEADS. IF THE CAR IS EQUIPPED WITH 2-PIECE DIVIDER BULKHEADS AND THE BULKHEADS ARE LATERALLY ALIGNED WITH EACH OTHER, THE STRUTS 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.

**LOAD DIVIDER DETAILS**



PLAN VIEW OF STRUT  
ASSEMBLY HOLD DOWN

THIS PLAN VIEW AND THE SIDE ELEVATION VIEW BELOW DEPICT 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 DOOR IS MORE THAN 50,000 POUNDS, AND ONLY FOR LOADS OF CLASS A OR CLASS B EXPLOSIVES.

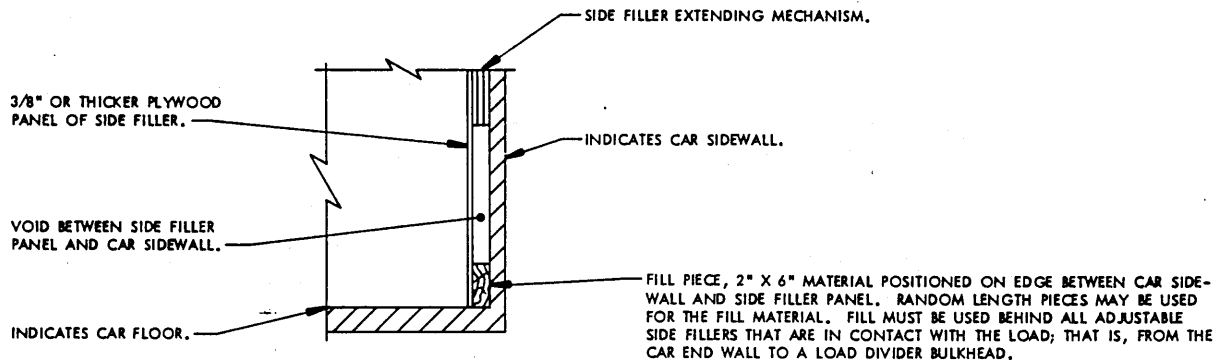


SIDE ELEVATION VIEW OF STRUT  
ASSEMBLY HOLD DOWN

**KEY LETTERS**

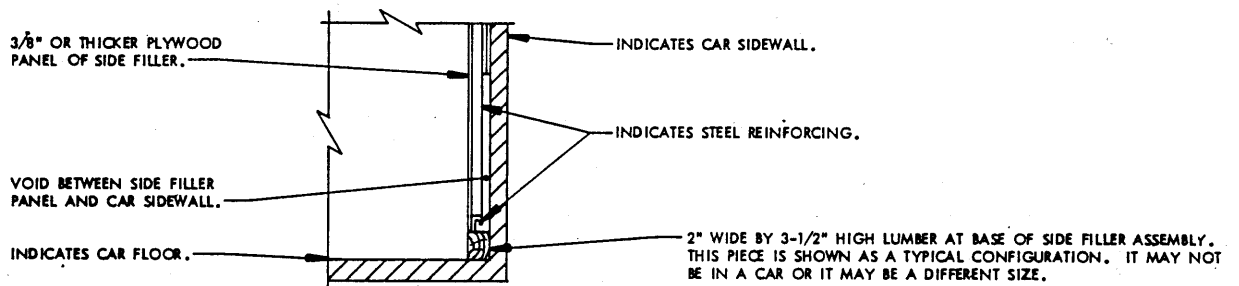
- (A) FILLER PIECE, 2" X 4" X 48" (4 REQD). POSITION SO AS TO BE CENTERED IN THE DOORWAY AREA AND NAIL TO THE BOTTOM SURFACE OF A STRUT W/4-10d NAILS.
- (B) SPACER PIECE, 2" X 4" X 72" (4 REQD). POSITION ON EDGE AND SO AS TO BE CENTERED IN THE DOORWAY AREA AND TOENAIL TO A STRUT W/3-12d NAILS ON EACH 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 EACH 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/SIDE WALL OR TO A NAILING STRIP W/5-12d NAILS.





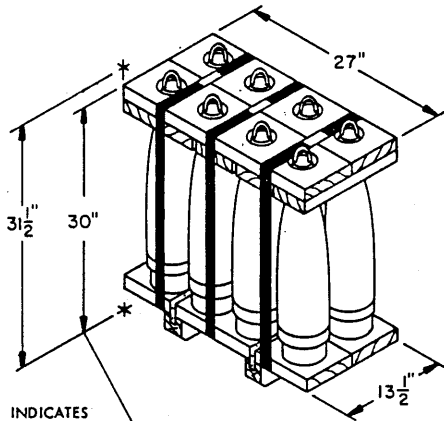
**TYPICAL TYPE A**

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



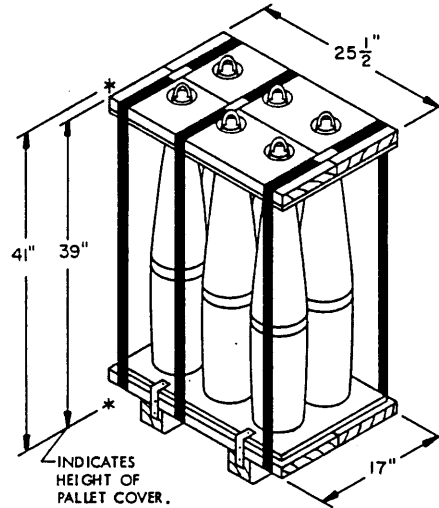
**TYPICAL TYPE B**

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.



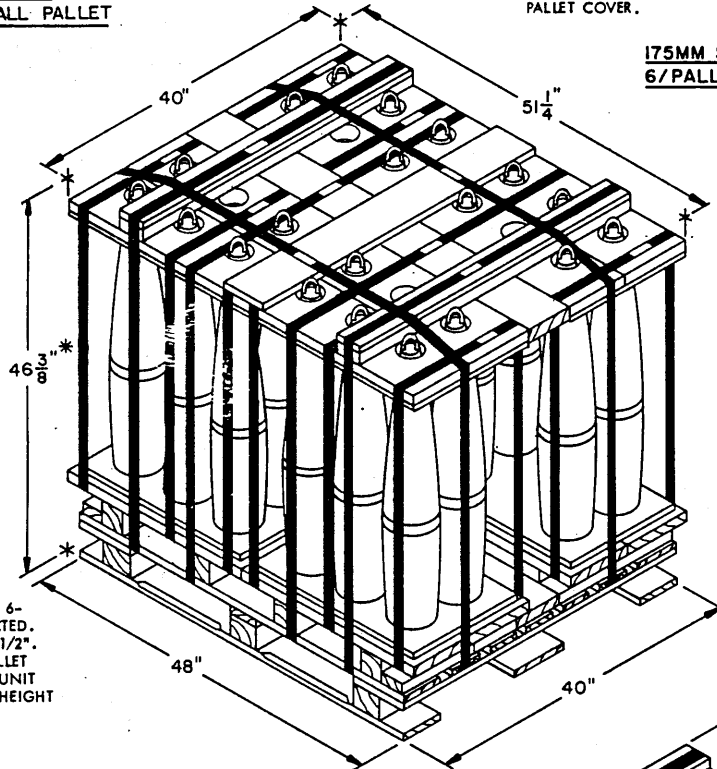
INDICATES HEIGHT OF PALLET COVER.

**155MM SLP  
8/SMALL PALLET**

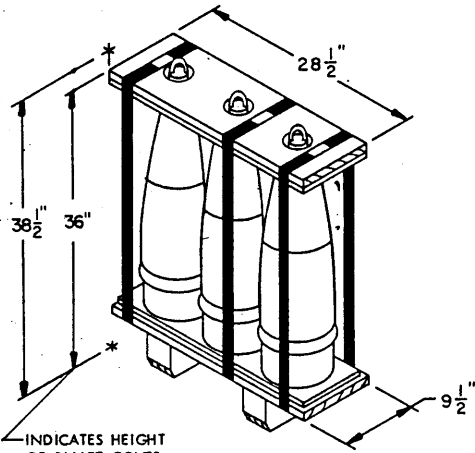


INDICATES HEIGHT OF PALLET COVER.

**175MM SLP  
6/PALLET**



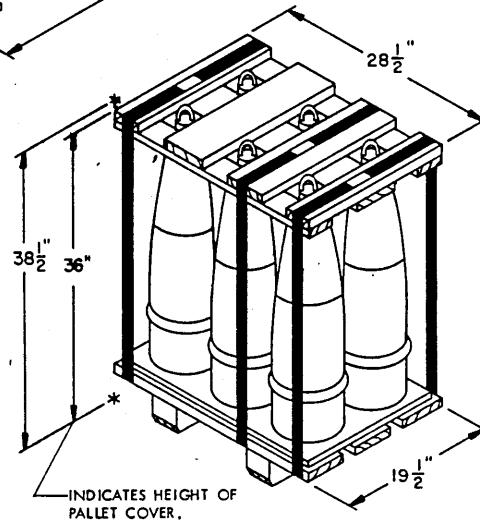
\* THE OVERALL HEIGHT OF THE 20/PALLET UNIT IS 46-3/8" WHEN THE SKIDS OF THE 6-PROJECTILE PALLET ARE INTACT, AS DEPICTED. THE HEIGHT OF THE PALLET COVER IS 44-1/2". WITH THE SKIDS OF THE 6-PROJECTILE PALLET REMOVED, THE OVERALL HEIGHT OF THE UNIT WILL BE 42-3/4" AND THE PALLET COVER HEIGHT WILL BE 40-7/8".



INDICATES HEIGHT OF PALLET COVER.

**8" SLP  
3/PALLET**

**175MM SLP  
20/PALLET**



INDICATES HEIGHT OF PALLET COVER.

**8" SLP  
6/SMALL PALLET**

**PALLET UNIT DETAILS**

