

HAWK

LOADING AND BRACING (CL & LCL) IN BOX CARS[⊕] OF ROCKET MOTOR, M22E8 OR M112, PACKED IN WOODEN CRATE[⊗]

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⊕ **NOTE:**
 SELECTION OF A CAR FOR A FULL LOAD SHIPMENT OF A SPECIFIC MOTOR MUST COMPLY WITH CRITERIA SET FORTH WITHIN GENERAL NOTES "E" AND "F" ON PAGE 2. THE DRAWING INCLUDES CONVENTIONAL TYPE BOX CARS AND CUSHIONED BOX CARS EQUIPPED WITH LOAD DIVIDERS (BULKHEADS). TO BE ACCEPTABLE, CARS EQUIPPED WITH LOAD DIVIDERS MUST ALSO SATISFY THE SPECIAL REQUIREMENTS SET FORTH WITHIN THE SPECIAL NOTES ON PAGE 19.

⊗ **CAUTION:**
 THE WOODEN CRATE CONTAINING THE M22E8 MOTOR DESIGNATED HEREIN MUST BE MODIFIED IN ACCORDANCE WITH DRAWING NUMBER 19-48-AMXAC-4103, REV 1, DATED SEPTEMBER 1971. THE CRATE CONTAINING THE M112 MOTOR DESIGNATED HEREIN MUST BE MODIFIED IN ACCORDANCE WITH DRAWING NUMBER 19-48-AMXAC-4321.

THIS DRAWING, INCLUDING REVISION 1, SUPERSEDES DRAWING 19-48-5453-GM5A140, DATED DECEMBER 1963.

DO NOT SCALE

REVISIONS				DRAFTSMAN P.P.	PROJ ENG
1	MAY 74	<i>M112 RHS</i>	<i>Wesley E. Gilleland</i> <i>A. S. Egan</i>	<i>AA</i>	<i>MWD/M112</i>
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				USAMC AMMO CENTER	
				U. S. ARMY MATERIEL COMMAND	
				MAY 1974	
				CLASS	DIVISION
				DRAWING	FILE
				19	48
				5453	GM 5HA6

GENERAL NOTES

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AMCR 740-13, AND AUGMENTS TM 743-200-1 (CHAPTER 5).
- B. THE OUTLOADING PROCEDURES SPECIFIED HEREIN ARE APPLICABLE TO THE ROCKET MOTOR M22E8 OR M112, WHEN IT IS PACKED IN A WOODEN CRATE. SUBSEQUENT REFERENCE TO CONTAINER HEREIN MEANS THE WOODEN SHIPPING CRATE WITH CONTENTS.
- C. FOR DETAILS OF THE CONTAINER FOR THE M22E8 MOTOR, SEE DRAWING NO. 9070094, AND DRAWING NO. 19-48-AMXAC-4103, REV. 1.

CONTAINER DIMENSIONS --- 113-1/2" LONG X 20-3/4" WIDE X 23-1/2" HIGH.
GROSS WEIGHT ----- 1,091 POUNDS (APPROX).

FOR DETAILS OF THE CONTAINER FOR THE M112 MOTOR, SEE DRAWING NO. 10242897, AND DRAWING NO. 19-48-AMXAC-4321.

CONTAINER DIMENSIONS --- 118" LONG X 20-1/4" WIDE X 22-7/8" HIGH.
GROSS WEIGHT ----- 1,128 POUNDS (APPROX).

- D. THESE ITEMS ARE DOT CLASS "B" EXPLOSIVES. THE OUTLOADING PROCEDURES SPECIFIED HEREIN CAN ALSO BE UTILIZED FOR SHIPMENT OF THE DEPICTED CONTAINERS WHEN THEY ARE EMPTY OR LOADED WITH AN ITEM WHICH IS IDENTIFIED DIFFERENTLY BY NOMENCLATURE THAN THE ITEMS DESIGNATED WITHIN THE DRAWING TITLE.
- E. THE OUTLOADING PROCEDURES SPECIFIED HEREIN ARE BASED ON 40'-6" AND 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL BOX CARS, INCLUDING ALL METAL CARS, WITH WOOD OR NAILABLE METAL FLOORS AND EQUIPPED WITH CONVENTIONAL SLIDING AND/OR PLUG TYPE DOORS NOT LESS THAN 8'-0" HIGH. WIDER OR LONGER CARS CAN BE USED. SEE NOTE "F" BELOW FOR ADDITIONAL REQUIREMENTS BASED ON THE SPECIFIC MOTOR/CONTAINER TO BE SHIPPED. PROCEDURES ARE ALSO INCLUDED FOR SHIPMENTS IN CUSHIONED BOX CARS EQUIPPED WITH LOAD DIVIDER BULKHEADS. HOWEVER, ONLY THOSE LOAD-DIVIDER EQUIPPED CARS WHICH SATISFY THE SPECIFICATIONS CONTAINED ON PAGE 19 CAN BE USED. SEE GENERAL NOTE "R" AT RIGHT.
- F. TO PERMIT LOADING OF FULL LOAD QUANTITIES OF CONTAINERS AS SHOWN ON PAGES 4 THROUGH 7 AND 18 AND 19, THE FOLLOWING ADDITIONAL CRITERIA FOR BOX CARS WILL APPLY BASED ON THE SPECIFIC MOTORS TO BE SHIPPED:

1. FOR A LOAD OF M22E8 MOTORS:

A 40'-6" LONG CONVENTIONAL BOX CAR OR LOAD-DIVIDER EQUIPPED CAR MUST HAVE STAGGERED DOOR OPENINGS AND THEY MUST BE NOT LESS THAN 14'-0" WIDE.

A 50'-6" LONG CONVENTIONAL BOX CAR OR LOAD-DIVIDER EQUIPPED CAR MUST HAVE 10'-0" MINIMUM WIDE THROUGH DOOR OPENINGS OR ANY WIDTH STAGGERED DOOR OPENINGS.

2. FOR A LOAD OF M112 MOTORS:

A 40'-6" LONG CONVENTIONAL BOX CAR MUST HAVE STAGGERED DOOR OPENINGS AND THEY MUST BE NOT LESS THAN 14'-0" WIDE.

A 50'-6" LONG CONVENTIONAL BOX CAR MUST HAVE THROUGH DOOR OPENINGS AND THEY MUST BE NOT LESS THAN 12'-0" WIDE. CARS WITH STAGGERED DOOR OPENINGS CANNOT BE USED UNLESS THE CAR IS AT LEAST 51'-6" LONG.

LOAD-DIVIDER EQUIPPED CARS MUST BE AT LEAST 42'-6" LONG AND 52'-6" LONG TO PROVIDE SUFFICIENT OPERATING SPACE FOR POSITIONING AND SECURING THE LOAD DIVIDER BULKHEADS AFTER THE CAR IS LOADED. IF THESE LONGER CARS ARE NOT AVAILABLE, IT WILL BE NECESSARY TO OMIT ONE LOAD UNIT FROM A LOAD OF M112 MOTORS.

A 42'-6" LONG LOAD-DIVIDER EQUIPPED CAR MUST HAVE STAGGERED DOOR OPENINGS AND THEY MUST BE NOT LESS THAN 14'-0" WIDE.

A 52'-6" LONG LOAD-DIVIDER EQUIPPED CAR MUST HAVE THROUGH DOOR OPENINGS AND THEY MUST BE NOT LESS THAN 10'-0" WIDE. CARS WITH STAGGERED DOOR OPENINGS CANNOT BE USED.

(CONTINUED AT RIGHT)

MATERIAL SPECIFICATIONS

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

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

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

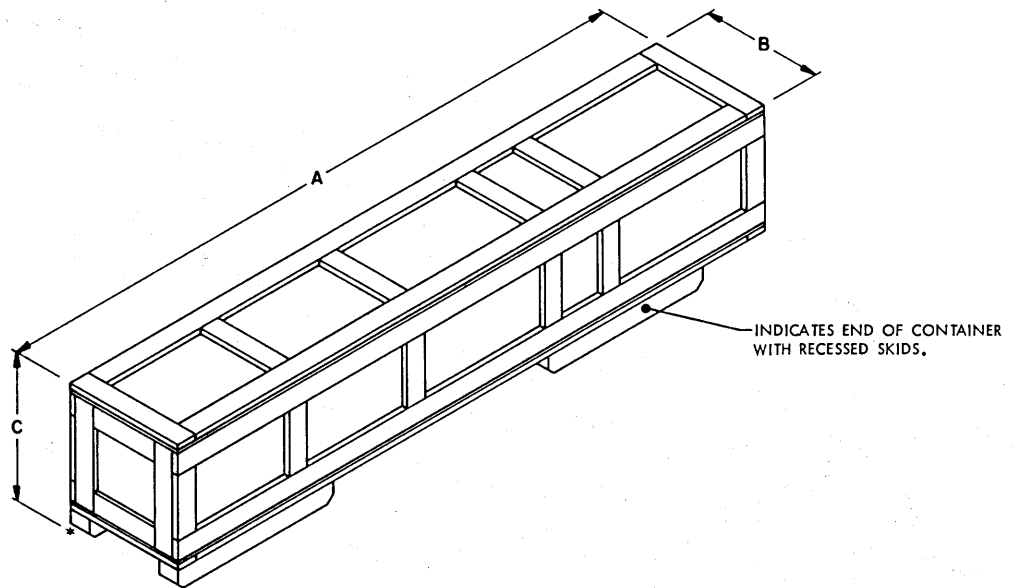
STRAP SEAL -----: COMMERCIAL GRADE.

- G. DOORWAY PROTECTION REQUIREMENTS WITHIN THE "DOORWAY AREA" OF A CAR ARE INCLUDED IN THE PROCEDURES AND ARE APPLICABLE TO 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. CAUTION: DUNNAGE MATERIAL MUST NOT BE NAILED TO ANY PLUG DOOR, WHETHER AUXILIARY OR MAIN, EXCEPT TO A NAILING STRIP FOR SECURING SUCH ITEMS AS THE DOORWAY SPANNER PIECE OF A K-BRACE ASSEMBLY, IF A DOOR IS SO EQUIPPED. ALSO, AFTER THE PLUG DOORS ON A CAR ARE CLOSED AND READY FOR THE INSTALLATION OF "CAR SEALS", A PIECE OF WIRE OF SUITABLE SIZE WILL BE USED IN ADDITION TO, AND IN CONJUNCTION WITH, EACH CAR SEAL USED TO "SEAL" THE CAR. THE WIRE WILL BE THREADED THROUGH THE HOLES IN THE DOOR LATCH ASSEMBLY ONE OR MORE TIMES, AND THE WIRE ENDS WILL BE TWISTED TOGETHER.
- H. THE SELECTION OF RAILCARS FOR TRANSPORT OF THE DESIGNATED ITEMS WILL BE IN ACCORDANCE WITH HAZARDOUS MATERIALS REGULATIONS OF DOT AND AR 55-355, CHAPTER 213, FOR EXPLOSIVES OR OTHER DANGEROUS ARTICLES, IN FULL.
- J. NOTICE: A SHIPMENT WILL BE POSITIONED IN THE CAR IN COMPLIANCE WITH THE WEIGHT DISTRIBUTION REQUIREMENTS OF THE AAR. THE APPROVED BLOCKING, BRACING, AND STAYING METHODS FOR THE LOADS SPECIFIED MUST BE FOLLOWED. THE NUMBER OF UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE CAR TO BE LOADED, OR THE QUANTITY TO BE SHIPPED. FOR A LOAD QUANTITY OTHER THAN SPECIFIED, THE APPROVED METHODS MUST BE FOLLOWED AS CLOSELY AS POSSIBLE.
- K. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN A CAR WHICH IS PARTIALLY LOADED WITH THE DESIGNATED ITEMS, PROVIDING THE TOTAL LOAD IS COMPATIBLE, EXISTING DIRECTIVES ARE NOT VIOLATED, AND OTHER LADING ITEMS ARE BLOCKED AND BRACED TO EQUAL THE BLOCKING AND BRACING CRITERIA SPECIFIED.
- L. IF THE CAR BEING USED FOR A SHIPMENT IS EQUIPPED WITH A NAILABLE METAL FLOOR AND THE NAIL SIZE FOR FLOOR NAILING IS MARKED ON THE SIDE WALL OF THE CAR, THAT GUIDANCE SHOULD BE APPLIED FOR THE NAILING OF THE APPLICABLE DUNNAGE PIECES. IF THE NAIL SIZE IS NOT SPECIFIED IN THE CAR, 30d NAILS SHOULD BE USED IN LIEU OF THOSE SPECIFIED IN THE KEY NUMBERS.
- M. DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE. FOR EXAMPLE, 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE OR 1-5/8" THICK BY 3-5/8" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE OR 1-5/8" THICK BY 5-5/8" WIDE.
- N. 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.
- O. WHEN ANY STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, A MINIMUM OF TWO (2) SEALS, BUTTED TOGETHER, WITH TWO (2) PAIR OF CRIMPS PER SEAL WILL BE USED TO SEAL THE JOINT. CAUTION: EXERCISE CARE DURING TENSIONING TO PREVENT DAMAGE TO THE LADING ITEMS.
- P. THROUGHOUT THIS PROCEDURAL DRAWING, PORTIONS OF THE BLOCKING COMPONENTS AND OF THE DEPICTED CARS, SUCH AS A CAR SIDE WALL, HAVE BEEN OMITTED FROM THE LOAD VIEWS FOR CLARITY PURPOSES.
- Q. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "SPECIAL NOTES" SECTIONS WHICH ARE IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.
- R. CAUTION: THE PARTIAL LAYER BRACING PROCEDURES AS SPECIFIED ON PAGES 8 THRU TO REQUIRE USE OF CARS HAVING NAILABLE WALLS. HOWEVER, IF CARS WITH NAILABLE WALLS ARE NOT AVAILABLE, IT IS POSSIBLE TO USE AN ALL-METAL CAR FOR A SHIPMENT IN WHICH THE TOP LAYER HAS LESS THAN A FULL QUANTITY OF CONTAINERS BY USING A "FILLER ASSEMBLY", AS DETAILED ON PAGE 16, IN THE PLACE OF EACH OMITTED CONTAINER.

REVISIONS

REVISION NO. 1, DATED MAY 1974, CONSISTS OF:

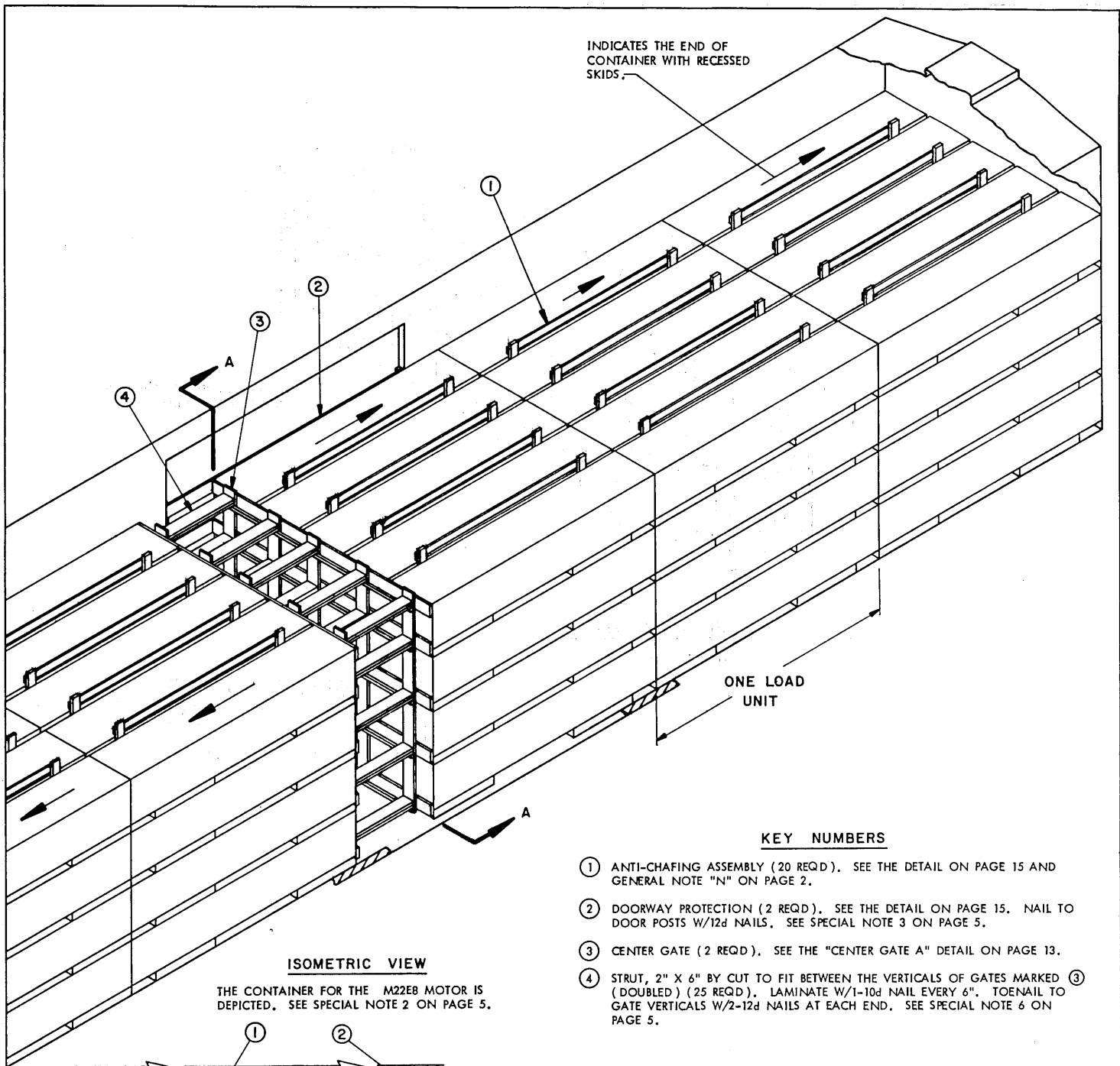
1. ADDING PROVISIONS FOR SHIPPING THE M112 MOTOR.
2. ADDING "CONTAINER DETAIL" ON PAGE 3.
3. ADDING PROVISIONS FOR CARS EQUIPPED WITH LOAD DIVIDERS.
4. CHANGES AS NECESSARY TO UPDATE DRAWING FORMAT.
5. CHANGING DRAWING FILE NO. FROM GMSA140 TO GMSHA6.



CONTAINER DETAIL

SEE "DIMENSION CHART A".

DIMENSION CHART A			
MOTOR	DIM A	DIM B	DIM C
M22E8	113-1/2"	20-3/4"	23-1/2"
M112	118"	20-1/4"	22-7/8"

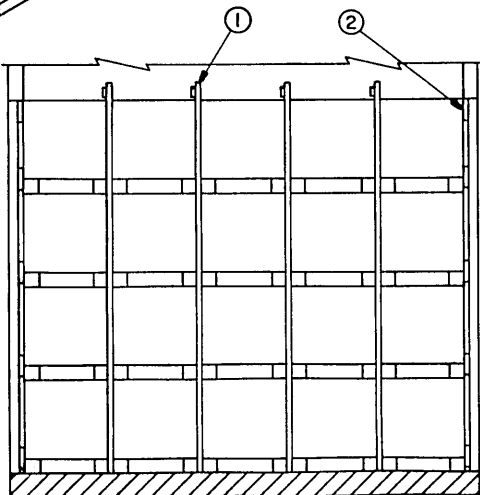


ISOMETRIC VIEW

THE CONTAINER FOR THE M22EB MOTOR IS DEPICTED. SEE SPECIAL NOTE 2 ON PAGE 5.

KEY NUMBERS

- ① ANTI-CHAFING ASSEMBLY (20 REQD). SEE THE DETAIL ON PAGE 15 AND GENERAL NOTE "N" ON PAGE 2.
- ② DOORWAY PROTECTION (2 REQD). SEE THE DETAIL ON PAGE 15. NAIL TO DOOR POSTS W/12d NAILS. SEE SPECIAL NOTE 3 ON PAGE 5.
- ③ CENTER GATE (2 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 13.
- ④ STRUT, 2" X 6" BY CUT TO FIT BETWEEN THE VERTICALS OF GATES MARKED ③ (DOUBLED) (25 REQD). LAMINATE W/1-10d NAIL EVERY 6". TOENAIL TO GATE VERTICALS W/2-12d NAILS AT EACH END. SEE SPECIAL NOTE 6 ON PAGE 5.



SECTION A-A

SPECIAL NOTES:

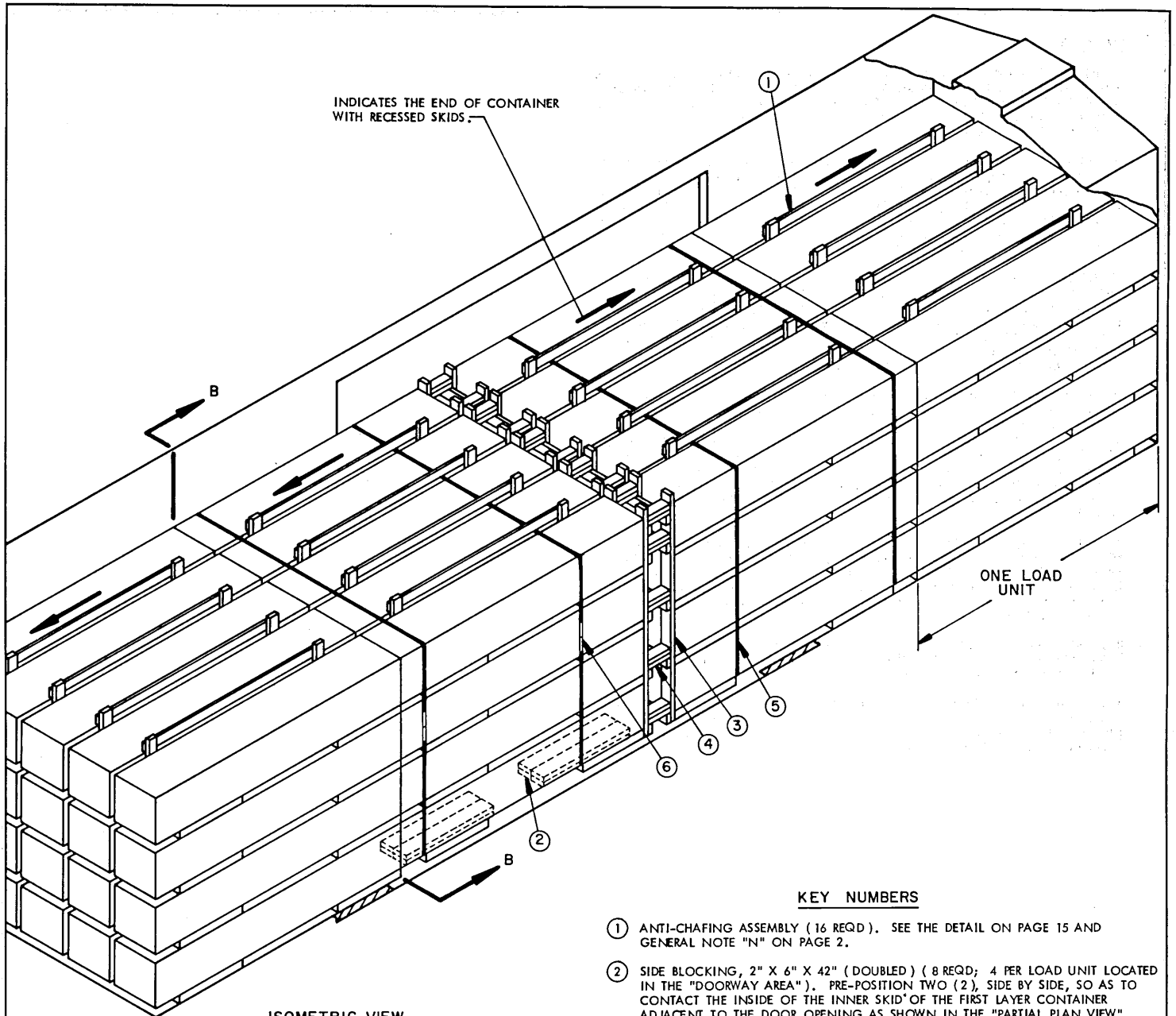
1. A 100-UNIT LOAD OF M22E8 MOTORS IS SHOWN IN A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL BOX CAR EQUIPPED WITH 10'-0" WIDE BY 8'-0" HIGH DOORS OF THE CONVENTIONAL SLIDING TYPE. SEE GENERAL NOTES "E" AND "F" ON PAGE 2 FOR OTHER CARS THAT CAN BE USED FOR SHIPMENT OF A LOAD OF M22E8 MOTORS. ALSO SEE NOTE 3 BELOW.
2. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR SHIPPING THE SAME QUANTITY OF M112 MOTORS IN A 50'-6" LONG CAR, EXCEPT THAT IN LIEU OF TWO (2) CENTER GATES AND TWENTY-FIVE (25) STRUTS, PIECES MARKED ③ AND ④ ON PAGE 4, USE THE TEN (10) CENTER GATES AND FIFTY (50) STRUTS SPECIFIED AS PIECES MARKED ③ AND ④ ON PAGE 6. SEE GENERAL NOTES "E" AND "F" ON PAGE 2 FOR SPECIFIC CARS THAT MUST BE USED FOR SHIPMENT OF A LOAD OF M112 MOTORS. ALSO SEE NOTE 7 BELOW.
3. IF THE CAR IS EQUIPPED WITH PLUG DOORS OR STAGGERED DOORS, IT WILL BE NECESSARY TO OMIT DOORWAY PROTECTION, PIECES MARKED ② ON PAGE 4, AND IN LIEU THEREOF, TO USE PREPOSITIONED SIDE BLOCKING AND DOORWAY PROTECTION BUNDLING STRAPS, PIECES MARKED ②, ⑤ AND ⑥ ON PAGES 6 AND 7, FOR EACH LOAD UNIT OF CONTAINERS WHICH EXTENDS MORE THAN HALF THE LENGTH OF A CONTAINER INTO THE "DOORWAY AREA" ON EITHER SIDE OF THE CAR. SEE GENERAL NOTE "G" ON PAGE 2.
4. IF THE DELINEATED OUTLOADING METHOD IS USED FOR THE SHIPMENT OF A LESS-THAN-FULL-LOAD QUANTITY OF CONTAINERS, AND THE QUANTITY CANNOT BE SATISFIED BY OMITTING A COMPLETE LAYER, A "FILLER ASSEMBLY", AS DETAILED ON PAGE 16, MAY BE SUBSTITUTED IN THE PLACE OF EACH OMITTED CONTAINER. "FILLER ASSEMBLIES" CAN ONLY BE USED IN THE TOP LAYER OF ONE OR MORE LOAD UNITS. ADDITIONALLY, IF FIVE (5) OR MORE CONTAINERS ARE TO BE OMITTED FROM THE LOAD, "PARTIAL LAYER BRACING" SHOULD BE USED AS DEPICTED IN THE APPLICABLE PLAN VIEW OF THE "PARTIAL LAYER PROCEDURES" SPECIFIED ON PAGE 8.
5. A 100-UNIT LOAD OF M22E8 OR M112 MOTORS CAN BE SHIPPED IN A CUSHIONED BOX CAR EQUIPPED WITH LOAD DIVIDER BULKHEADS AS DEPICTED ON PAGES 18 AND 19. HOWEVER, THE CRITERIA SET FORTH IN GENERAL NOTES "E" AND "F" ON PAGE 2 AND IN THE SPECIAL NOTES ON PAGE 19 WILL APPLY. ALSO NOTE THAT THE CAR MUST BE AT LEAST 52'-6" LONG FOR SHIPMENT OF FIVE (5) LOAD UNITS OF M112 MOTORS.
6. IF DESIRED, THE STRUT PIECES MARKED ④ MAY BE 4" X 4" MATERIAL IN LIEU OF 2" X 6" DOUBLED. ALSO WHEN STRUTS ARE 48" OR GREATER IN LENGTH, STRUT BRACING MUST BE USED AS DETAILED ON PAGE 16.
7. WHEN A 51'-6" LONG OR LONGER CAR IS OFFERED FOR SHIPMENT OF A LOAD OF M112 MOTORS, THE PROCEDURES SPECIFIED ON PAGE 4 WILL APPLY, EXCEPT THAT THE "CENTER GATE C" DETAIL ON PAGE 14 MUST BE USED FOR FABRICATING THE TWO (2) CENTER GATES MARKED ③.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	140	47
1" X 6"	100	50
2" X 2"	64	22
2" X 3"	40	20
2" X 4"	405	270
2" X 6"	273	273
NAILS	NO. REQD	POUNDS
6d (2")	180	1-1/4
10d (3")	464	7-1/4
12d (3-1/4")	132	2-1/4

LOAD AS SHOWN

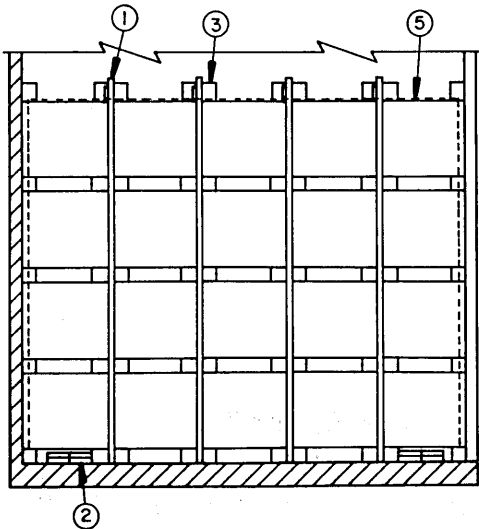
ITEM	QUANTITY	WEIGHT (APPROX)
M22E8 MOTOR	100	109,100 LBS *
DUNNAGE		1,716 LBS
TOTAL WEIGHT		110,816 LBS

* LADING WEIGHT FOR THE M112 MOTOR IS 112,800 POUNDS (APPROX).



ISOMETRIC VIEW

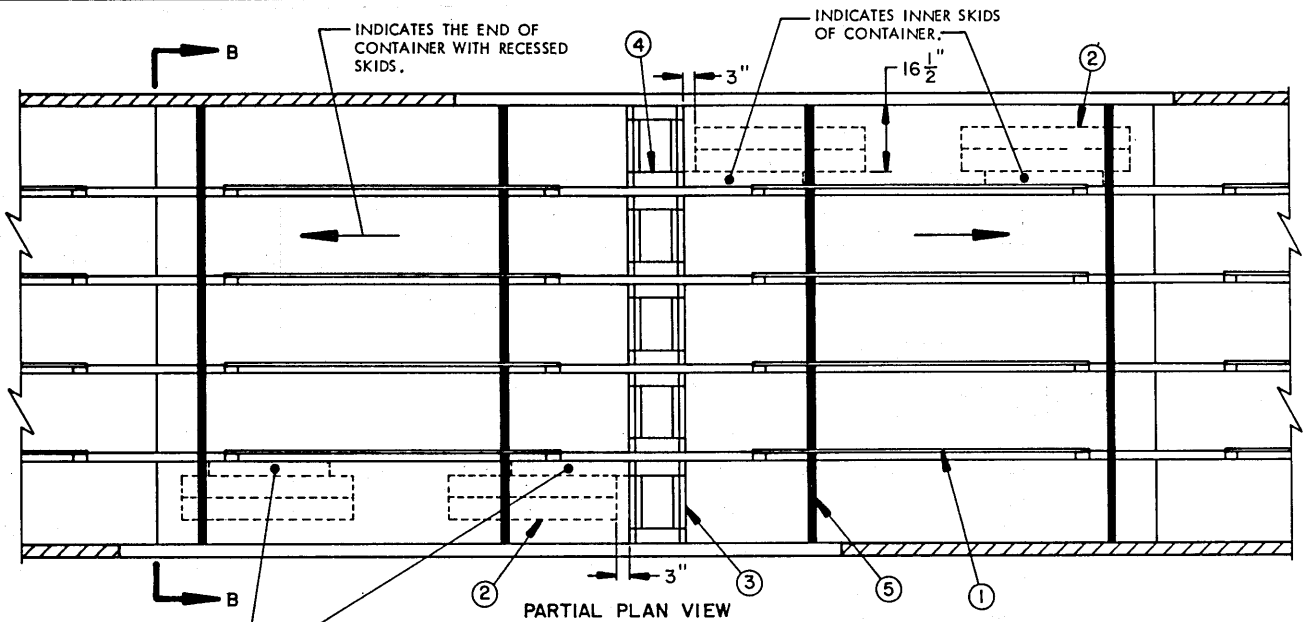
THE CONTAINER FOR THE M112 MOTOR IS SHOWN. SEE SPECIAL NOTE 2 ON PAGE 7.



SECTION B-B

KEY NUMBERS

- ① ANTI-CHAFING ASSEMBLY (16 REQD). SEE THE DETAIL ON PAGE 15 AND GENERAL NOTE "N" ON PAGE 2.
- ② SIDE BLOCKING, 2" X 6" X 42" (DOUBLED) (8 REQD; 4 PER LOAD UNIT LOCATED IN THE "DOORWAY AREA"). PRE-POSITION TWO (2), SIDE BY SIDE, SO AS TO CONTACT THE INSIDE OF THE INNER SKID OF THE FIRST LAYER CONTAINER ADJACENT TO THE DOOR OPENING AS SHOWN IN THE "PARTIAL PLAN VIEW" ON PAGE 7. NAIL THE FIRST PIECE TO THE CAR FLOOR W/9-16d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER. SEE SPECIAL NOTE 7 ON PAGE 7.
- ③ CENTER GATE (10 REQD). SEE THE "CENTER GATE B" DETAIL ON PAGE 13. NOTE: WHEN LOADING THE LAST LOAD UNIT OF CONTAINERS INTO THE CAR, TWO (2) CENTER GATES AND TEN (10) STRUTS, PIECES MARKED ④, MUST BE INSTALLED AFTER EACH INDIVIDUAL STACK OF CONTAINERS IS POSITIONED IN THE CAR.
- ④ STRUT, 2" X 4" BY CUT TO FIT BETWEEN THE VERTICALS OF CENTER GATES MARKED ③ (DOUBLED) (50 REQD). LAMINATE W/3-10d NAILS AND TOENAIL TO THE GATE VERTICALS W/2-12d NAILS AT EACH END. SEE SPECIAL NOTE 6 ON PAGE 7.
- ⑤ DOORWAY PROTECTION BUNDLING STRAP, 1-1/4" X .035" X 36'-0" LONG STEEL STRAPPING (4 REQD). PRE-POSITION TO ENCIRCLE A LOAD UNIT IN THE "DOORWAY AREA" AS SHOWN. SEE GENERAL NOTE "G" ON PAGE 2.
- ⑥ SEAL FOR 1-1/4" STRAPPING (8 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "O" ON PAGE 2.



INDICATES INNER SKIDS OF CONTAINER.

SPECIAL NOTES:

1. AN 80-UNIT LOAD OF M112 MOTORS IS SHOWN IN A 40'-6" LONG BY 9'-2" WIDE CONVENTIONAL BOX CAR EQUIPPED WITH 14'-0" WIDE BY 8'-0" HIGH STAGGERED DOORS OF THE CONVENTIONAL SLIDING AND/OR PLUG TYPE. SEE GENERAL NOTES "E" AND "F" ON PAGE 2 FOR SPECIFIC CARS THAT MUST BE USED FOR SHIPMENT OF A LOAD OF M112 MOTORS. SEE NOTE 3 BELOW.
2. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR SHIPPING THE SAME QUANTITY OF M22EB MOTORS, EXCEPT THAT IN LIEU OF TEN (10) CENTER GATES AND FIFTY (50) STRUTS, PIECES MARKED ③ AND ④ ON PAGE 6, USE THE TWO (2) CENTER GATES AND TWENTY-FIVE (25) STRUTS SPECIFIED AS PIECES MARKED ③ AND ④ ON PAGE 4. SEE GENERAL NOTES "E" AND "F" ON PAGE 2 FOR SPECIFIC CARS THAT MUST BE USED FOR SHIPMENT OF A LOAD OF M22EB MOTORS.
3. WHEN A 41'-6" LONG OR LONGER CAR IS OFFERED FOR SHIPMENT OF A LOAD OF M112 MOTORS, TWO (2) CENTER GATES AND TWENTY-FIVE (25) STRUTS SPECIFIED AS PIECES MARKED ③ AND ④ ON PAGE 4 SHOULD BE USED IN LIEU OF THOSE SPECIFIED IN THE LOAD VIEW ON PAGE 6. HOWEVER, THE TWO (2) CENTER GATES SHOULD BE FABRICATED AS SHOWN IN THE "CENTER GATE C" DETAIL ON PAGE 14 WHICH APPLIES TO A LOAD OF M112 MOTORS.
4. IF THE DELINEATED OUTLOADING METHOD IS USED FOR THE SHIPMENT OF A LESS-THAN-FULL-LOAD QUANTITY OF CONTAINERS, AND THE QUANTITY CANNOT BE SATISFIED BY OMITTING A COMPLETE LAYER, A "FILLER ASSEMBLY", AS DETAILED ON PAGE 16, MAY BE SUBSTITUTED IN THE PLACE OF EACH OMITTED CONTAINER. "FILLER ASSEMBLIES" CAN ONLY BE USED IN THE TOP LAYER OF ONE OR MORE LOAD UNITS. ADDITIONALLY, IF FIVE (5) OR MORE CONTAINERS ARE TO BE OMITTED FROM THE LOAD, "PARTIAL LAYER BRACING" SHOULD BE USED AS DEPICTED IN THE APPLICABLE PLAN VIEW OF THE "PARTIAL LAYER PROCEDURES" SPECIFIED ON PAGE 8.
5. AN 80-UNIT LOAD OF M22EB OR M112 MOTORS CAN BE SHIPPED IN A CUSHIONED BOX CAR EQUIPPED WITH LOAD DIVIDER BULKHEADS AS DEPICTED ON PAGES 18 AND 19. HOWEVER, THE CRITERIA SET FORTH IN GENERAL NOTES "E" AND "F" ON PAGE 2 AND IN THE SPECIAL NOTES ON PAGE 19 WILL APPLY. ALSO NOTE THAT THE CAR MUST BE AT LEAST 42'-6" LONG FOR SHIPMENT OF FOUR (4) LOAD UNITS OF M112 MOTORS.
6. IF DESIRED, THE STRUT PIECES MARKED ④ MAY BE 4" X 4" MATERIAL IN LIEU OF 2" X 4" DOUBLED. ALSO WHEN STRUTS ARE 48" OR GREATER IN LENGTH, STRUT BRACING MUST BE USED AS DEPICTED ON PAGE 16.
7. ALL CARS WITH PLUG DOORS OR STAGGERED DOOR OPENINGS WILL REQUIRE USE OF PRE-POSITIONED SIDE BLOCKING AND DOORWAY PROTECTION BUNDLING STRAPS, PIECES MARKED ②, ⑤ AND ⑥ FOR EACH LOAD UNIT OF CONTAINERS WHICH EXTENDS MORE THAN HALF THE LENGTH OF A CONTAINER INTO THE "DOORWAY AREA" ON EITHER SIDE OF THE CAR. HOWEVER, IF ONE END OF A LOAD UNIT IN THE DOORWAY AREA IS RETAINED BY AT LEAST 6" OF THE CAR SIDEWALL ON BOTH SIDES OF THE CAR, THE BUNDLING STRAP AT THAT END OF THE LOAD UNIT MAY BE OMITTED. SEE GENERAL NOTE "G" ON PAGE 2.

BILL OF MATERIAL

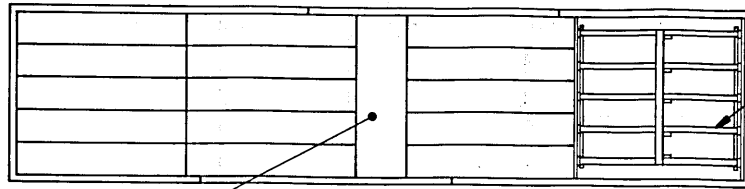
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	112	38
2" X 3"	10	5
2" X 4"	548	366
2" X 6"	56	56
NAILS	NO. REQD	POUNDS
6d (2")	96	3/4
10d (3")	510	8
12d (3-1/4")	200	3-1/2
16d (3-1/2")	144	3-1/4
STEEL STRAPPING, 1-1/4" X .035"----- 144' REQD -----		21 LBS
SEAL FOR 1-1/4" STRAPPING ----- 8 REQD -----		1/2 LB

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
M112 MOTOR -----	80 -----	90,240 LBS*
DUNNAGE -----		1,199 LBS

TOTAL WEIGHT ----- 91,439 LBS

* LADING WEIGHT FOR THE M22EB MOTOR IS 87,280 POUNDS (APPROX).

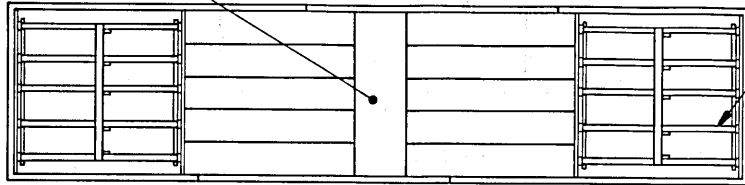


END-OF-CAR TYPE PARTIAL-LAYER BRACING AS DETAILED ON PAGE 9. INSTALL AT EITHER END OF THE CAR.

INDICATES CENTER-GATE BLOCKING AREA.

15-CONTAINER LAYER

SEE SPECIAL NOTE BELOW.



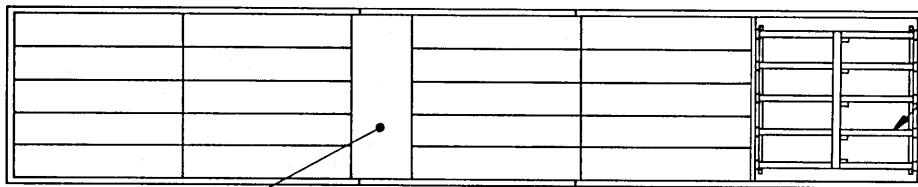
END-OF-CAR TYPE PARTIAL-LAYER BRACING AS DETAILED ON PAGE 9. INSTALL AT EACH END OF THE CAR.

10-CONTAINER LAYER

SEE SPECIAL NOTE BELOW.

PARTIAL-LAYER PLAN VIEWS FOR 40'-6" LONG CARS

SEE GENERAL NOTES "E", "F" AND "R" ON PAGE 2.

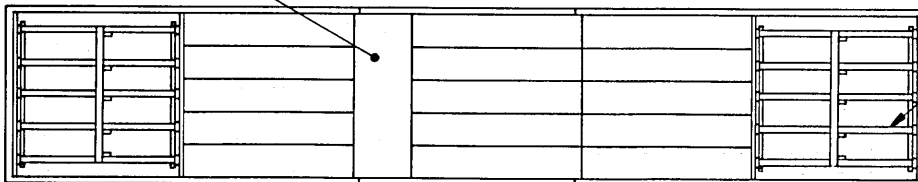


END-OF-CAR TYPE PARTIAL-LAYER BRACING AS DETAILED ON PAGE 9. INSTALL AT EITHER END OF THE CAR.

INDICATES CENTER-GATE BLOCKING AREA.

20-CONTAINER LAYER

SEE SPECIAL NOTE BELOW.

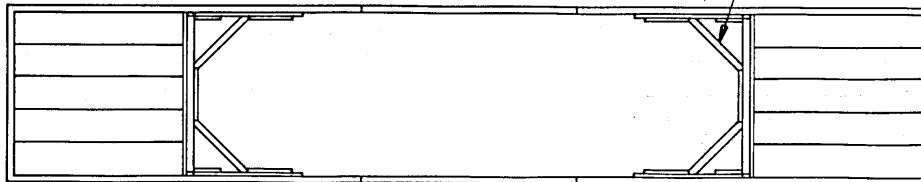


END-OF-CAR TYPE PARTIAL-LAYER BRACING AS DETAILED ON PAGE 9. INSTALL AT EACH END OF THE CAR.

15-CONTAINER LAYER

SEE SPECIAL NOTE BELOW.

K-BRACE TYPE PARTIAL-LAYER BRACING AS DETAILED ON PAGE 10. INSTALL AT EACH END OF THE CAR. FOR A 5-CONTAINER LAYER, INSTALL AT EITHER END OF THE CAR. SEE SPECIAL NOTE 2 ON PAGE 10.



10-CONTAINER LAYER

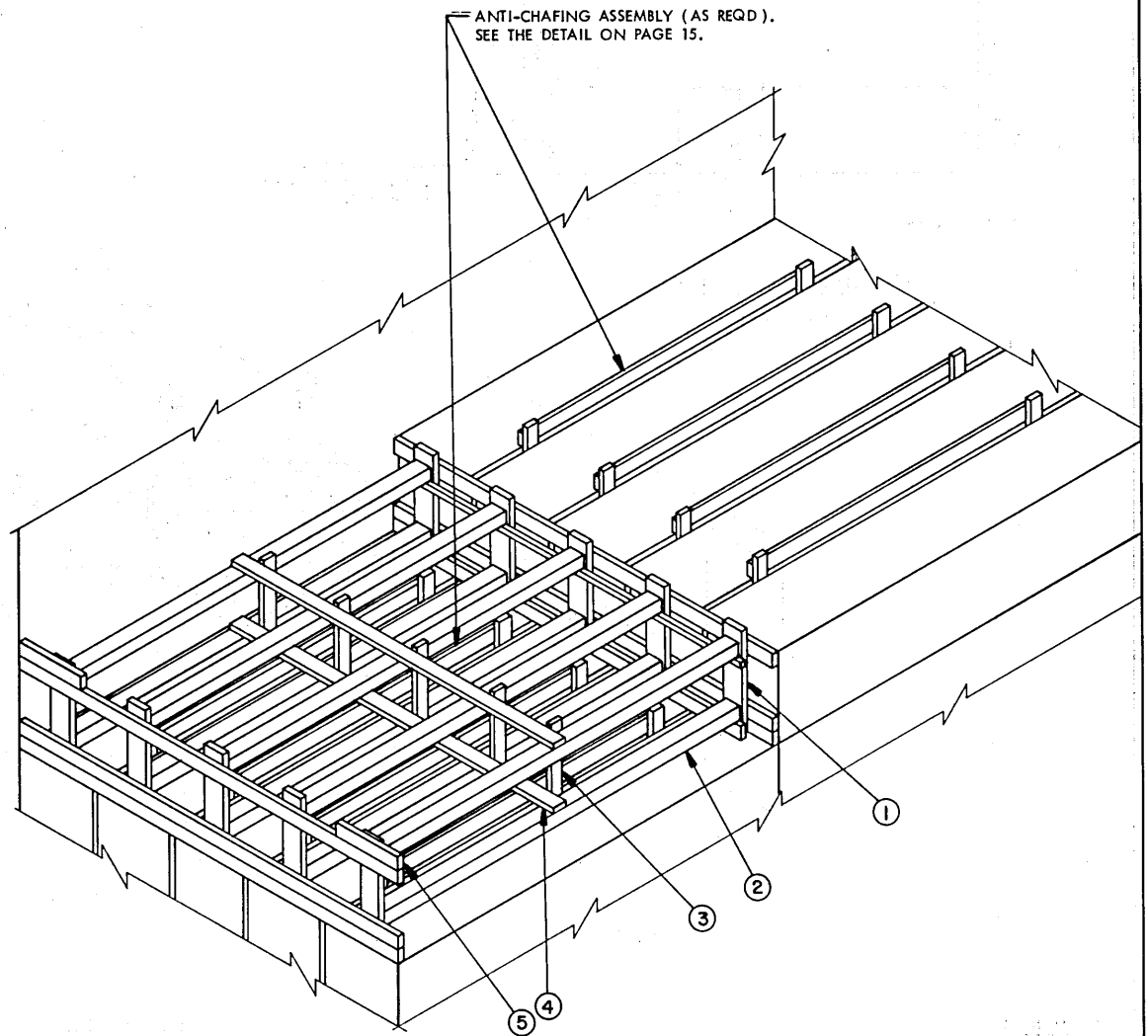
SEE SPECIAL NOTE AT LEFT.

SPECIAL NOTE:

TO FURTHER REDUCE QUANTITIES OF CONTAINERS AS SHOWN IN A PARTIAL-LAYER PLAN VIEW, A "FILLER ASSEMBLY", AS DETAILED ON PAGE 16, MAY BE USED IN THE PLACE OF EACH ADDITIONALLY OMITTED CONTAINER IN THE TOP LAYER.

PARTIAL-LAYER PLAN VIEWS FOR 50'-6" LONG CARS

SEE GENERAL NOTES "E", "F" AND "R" ON PAGE 2.



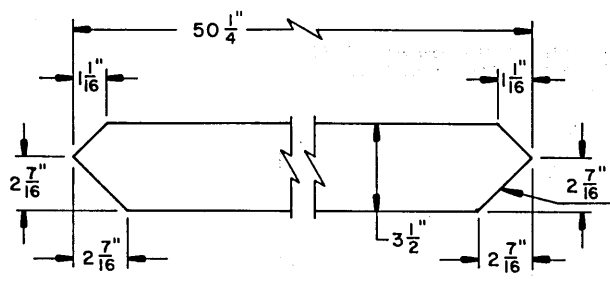
ISOMETRIC VIEW

SPECIAL NOTES:

1. THE END-OF-CAR TYPE BRACING IS DESIGNED FOR RETAINING A PARTIAL LAYER OF NOT MORE THAN TWENTY (20) CONTAINERS OF M22E8 OR M112 MOTORS AND IS DEPICTED IN A 9'-2" WIDE CAR EQUIPPED WITH AVAILABLE END WALLS. WIDER CARS CAN BE USED. THE END-OF-CAR TYPE PARTIAL-LAYER BRACING CAN BE USED AT EITHER OR BOTH ENDS OF A CAR. SEE THE PARTIAL-LAYER PROCEDURES ON PAGE 8 FOR APPLICATION. TO SATISFY THE QUANTITY OF CONTAINERS TO BE SHIPPED, ONE OR MORE "FILLER ASSEMBLIES", AS DETAILED ON PAGE 16, MAY BE USED IN CONJUNCTION WITH THE END-OF-CAR PARTIAL-LAYER BRACING. SEE GENERAL NOTES "E", "F" AND "R" ON PAGE 2.
2. PORTIONS OF THE CAR, LOWER CONTAINERS, AND RELATED BLOCKING AND BRACING ARE OMITTED FROM THE ISOMETRIC VIEW FOR CLARITY. REFER TO PAGES 4 THRU 7 FOR APPLICABLE BLOCKING AND BRACING PROCEDURES TO BE USED IN CONJUNCTION WITH PARTIAL-LAYER BRACING SPECIFIED ABOVE.
3. IF DESIRED, THE STRUT PIECES MARKED ② MAY BE DOUBLED 2" X 6" MATERIAL IN LIEU OF 4" X 4" MATERIAL. DOUBLED 2" X 6" MATERIAL MUST BE LAMINATED W/1-10d NAIL EVERY 6".

KEY NUMBERS

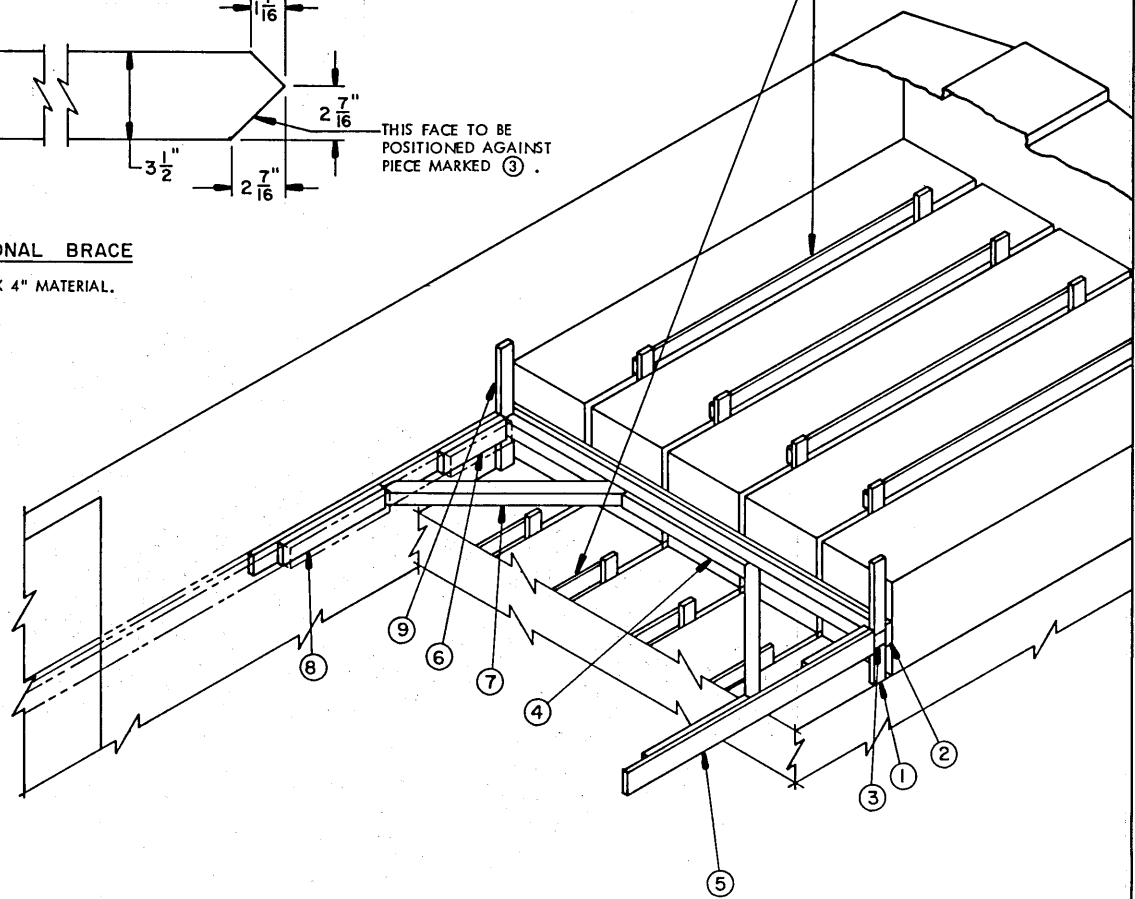
- ① PARTIAL-LAYER GATE (2 REQD). SEE THE "CENTER GATE A" DETAIL AND "DIMENSION CHART B" ON PAGE 13 AS APPLICABLE FOR ONE (1) LAYER OF CONTAINERS. NOTE: THE HOLD-DOWN/RETAINER PIECES, AS SHOWN IN THE DETAIL, MUST BE OMITTED FROM THE GATE WHICH IS TO BE POSITIONED AGAINST THE END WALL OF THE CAR. SEE KEY NUMBER ⑤ BELOW.
- ② STRUT, 4" X 4" BY CONTAINER LENGTH MINUS 6" (10 REQD). TOENAIL TO THE VERTICALS OF THE GATES W/2-12d NAILS AT EACH END. SEE SPECIAL NOTE 3 AT LEFT.
- ③ VERTICAL STRUT BRACING, 2" X 4" X 24" (5 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.
- ④ HORIZONTAL STRUT BRACING, 2" X 4" X 8'-0" (2 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT.
- ⑤ GATE HOLD-DOWN, 2" X 4" X 18" (2 REQD). POSITION AT END OF GATE AS SHOWN AND NAIL TO THE CAR END WALL W/4-12d NAILS.



DIAGONAL BRACE
4" X 4" MATERIAL.

ANTI-CHAFING ASSEMBLY (AS REQD).
SEE THE DETAIL ON PAGE 15.

THIS FACE TO BE
POSITIONED AGAINST
PIECE MARKED ③.



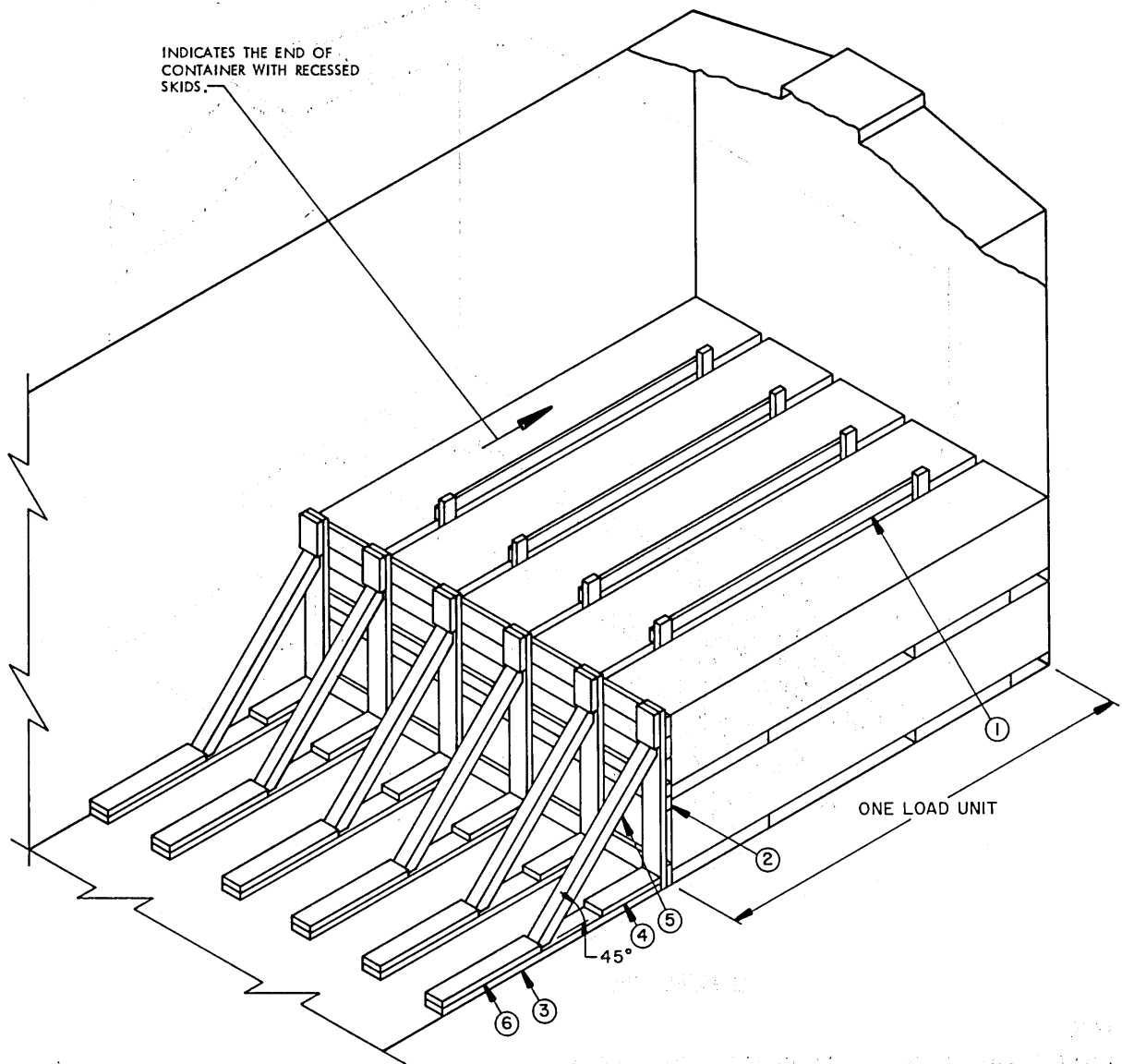
ISOMETRIC VIEW

SPECIAL NOTES:

1. THE K-BRACE AS SHOWN IS DESIGNED FOR BRACING A PARTIAL LAYER OF NOT MORE THAN FIVE (5) CONTAINERS OF M22E8 OR M112 MOTORS AND IS DEPICTED IN A 50'-6" LONG BY 9'-2" WIDE CAR EQUIPPED WITH 12'-0" WIDE THROUGH DOOR OPENINGS AND NAILABLE SIDEWALLS. WIDER CARS CAN BE USED BY INCREASING THE LENGTH OF THE CENTER CLEAT, PIECE MARKED ④, ACCORDINGLY. A K-BRACE AS SHOWN MAY BE USED AT EITHER OR BOTH ENDS OF A CAR. TO SATISFY THE QUANTITY OF CONTAINERS TO BE SHIPPED, ONE OR MORE "FILLER ASSEMBLIES", AS DETAILED ON PAGE 16, MAY BE USED IN CONJUNCTION WITH A K-BRACE. FOR PARTIAL LAYERS HAVING TEN (10) OR MORE CONTAINERS, REFER TO THE PARTIAL-LAYER PROCEDURES SHOWN ON PAGE 8. SEE GENERAL NOTES "E", "F" AND "R" ON PAGE 2.
2. **CAUTION:** SOME CARS ARE NOT SUITED FOR THE APPLICATION OF "K-BRACE TYPE PARTIAL-LAYER BRACING", BECAUSE THE LENGTH OF THE PARTIAL LAYER TO BE SHIPPED AND/OR THE SIZE AND/OR CONFIGURATION OF THE CAR DOORS WILL NOT PERMIT PROPER INSTALLATION OF THE SPECIFIED K-BRACE DUNNAGE. PIECES MARKED ①, ②, ③, ⑥ AND ⑨ MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDE WALL. IT IS ALRIGHT FOR THE END OF A DIAGONAL BRACE MARKED ⑦ TO BEAR IN FRONT OF A DOOR OPENING; HOWEVER, THE ADJACENT PIECE MARKED ⑤ MUST BE DOUBLED, AS SHOWN ABOVE IN PHANTOM LINES, AND EXTENDED ACROSS AND FAR ENOUGH PAST THE DOOR OPENING TO PROVIDE FOR THE SPECIFIED NAILING OF EACH PIECE.
3. PORTIONS OF THE CAR, LOWER CONTAINERS, AND RELATED BLOCKING AND BRACING ARE OMITTED FROM THE ISOMETRIC VIEW FOR CLARITY. REFER TO PAGES 4 THRU 7 FOR APPLICABLE BLOCKING AND BRACING PROCEDURES TO BE USED IN CONJUNCTION WITH PARTIAL-LAYER BRACING SPECIFIED ABOVE.

KEY NUMBERS

- ① WALL CLEAT, 2" X 4" X 11" (2 REQD). NAIL TO THE CAR SIDE WALL W/3-12d NAILS. SEE GENERAL NOTE "N" ON PAGE 2.
- ② HORIZONTAL PIECE, 2" X 6" BY CAR WIDTH (CUT TO FIT) (1 REQD). NAIL TO THE CROSS CAR BRACE MARKED ③ W/1-16d NAIL EVERY 6".
- ③ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH (CUT TO FIT) (1 REQD).
- ④ CENTER CLEAT, 2" X 4" X 36" (1 REQD). CENTER ON AND NAIL TO THE CROSS CAR BRACE MARKED ③ W/7-20d NAILS.
- ⑤ HORIZONTAL WALL CLEAT, 2" X 6" X 72" (2 REQD). NAIL TO THE CAR SIDE WALL W/16-12d NAILS. SEE SPECIAL NOTE 2 AT LEFT.
- ⑥ POCKET CLEAT, 2" X 6" X 18" (2 REQD). NAIL TO THE HORIZONTAL WALL CLEAT MARKED ⑤ W/7-20d NAILS.
- ⑦ DIAGONAL BRACE, 4" X 4" X 50-1/4" (2 REQD). SEE THE DETAIL ABOVE. TOENAIL TO THE CROSS CAR BRACE MARKED ③ AND TO THE HORIZONTAL WALL CLEAT MARKED ⑤ W/1-60d NAIL AT EACH END.
- ⑧ BACK-UP CLEAT, 2" X 6" X 30" (2 REQD). NAIL TO THE HORIZONTAL WALL CLEAT MARKED ⑤ W/14-20d NAILS.
- ⑨ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDE WALL W/4-12d NAILS.



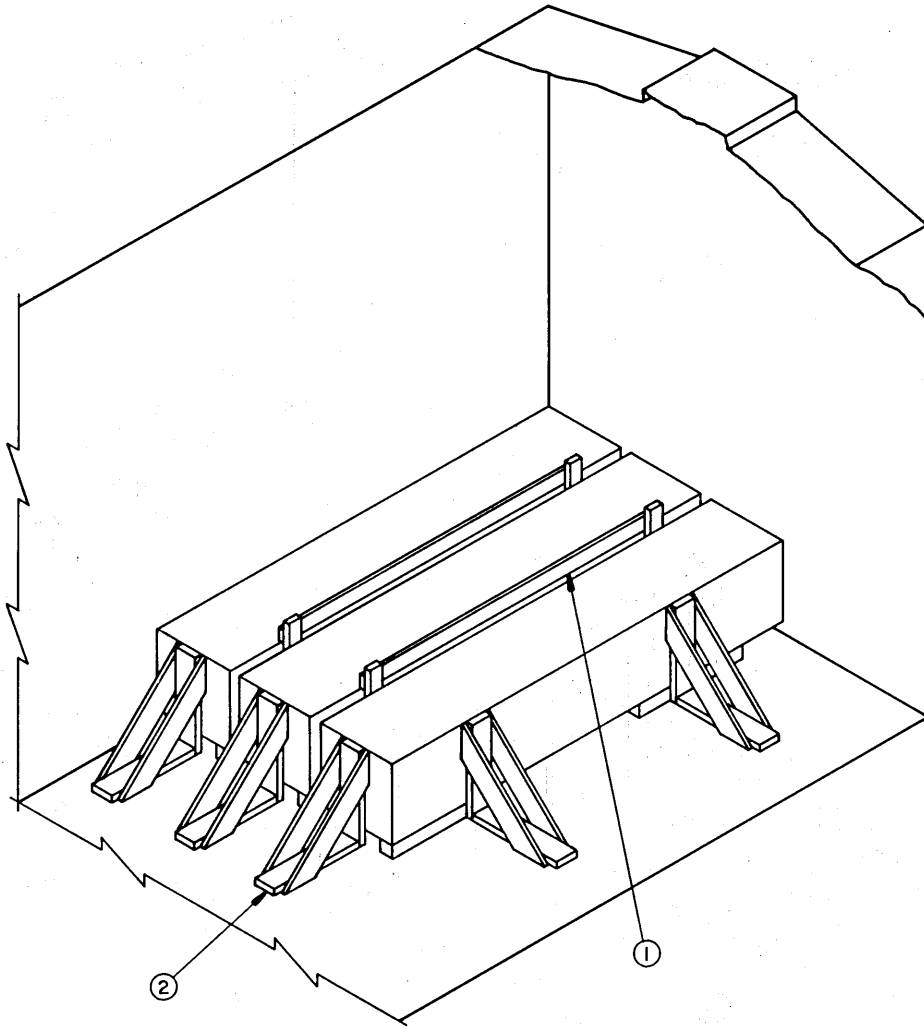
ISOMETRIC VIEW

SPECIAL NOTES:

1. A 10-UNIT LOAD OF CONTAINERS IS SHOWN IN A 9'-2" WIDE CAR AND DEPICTS THE USE OF KNEE-BRACES. THESE PROCEDURES ARE LIMITED TO A 2-LAYER LOAD BUT CAN BE APPLIED AT ONE OR BOTH ENDS OF A CAR. THE LCL GATE AND KNEE-BRACES AS SHOWN ARE ADEQUATE FOR RETAINING NOT MORE THAN TWENTY (20) CONTAINERS (TWO LOAD UNITS, TWO LAYERS EACH) OF EITHER THE M22E8 OR THE M112 MOTORS.
2. TO ADJUST THE QUANTITY OF CONTAINERS TO BE SHIPPED, ONE OR MORE CONTAINERS MAY BE OMITTED FROM THE TOP LAYER AND A "FILLER ASSEMBLY", AS DETAILED ON PAGE 16, USED IN THE PLACE OF EACH OMITTED CONTAINER.

KEY NUMBERS

- ① ANTI-CHAFING ASSEMBLY (4 REQD). SEE THE DETAIL ON PAGE 15.
- ② LCL GATE (1 REQD). SEE THE DETAIL ON PAGE 17 AND GENERAL NOTE "N" ON PAGE 2.
- ③ FLOOR CLEAT, 2" X 6" X 68" (6 REQD). ALIGN WITH VERTICAL OF GATE MARKED ② AND NAIL TO THE CAR FLOOR W/1-16d NAIL EVERY 6". SEE GENERAL NOTE "L" ON PAGE 2.
- ④ POCKET CLEAT, 2" X 6" X 18" (6 REQD). NAIL TO FLOOR CLEAT W/3-40d NAILS. TOENAIL TO VERTICAL OF LCL GATE W/2-12d NAILS.
- ⑤ DIAGONAL BRACE, 4" X 4" X 53" (6 REQD). SEE THE BRACE DETAIL ON PAGE 17. TOENAIL TO THE LCL GATE AND TO FLOOR CLEAT MARKED ③ W/2-16d NAILS AT EACH END.
- ⑥ BACK-UP CLEAT, 2" X 6" X 30" (6 REQD). POSITION AGAINST DIAGONAL BRACE MARKED ⑤ AND NAIL TO FLOOR CLEAT MARKED ③ W/6-40d NAILS.



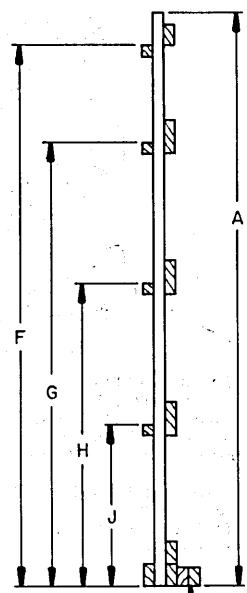
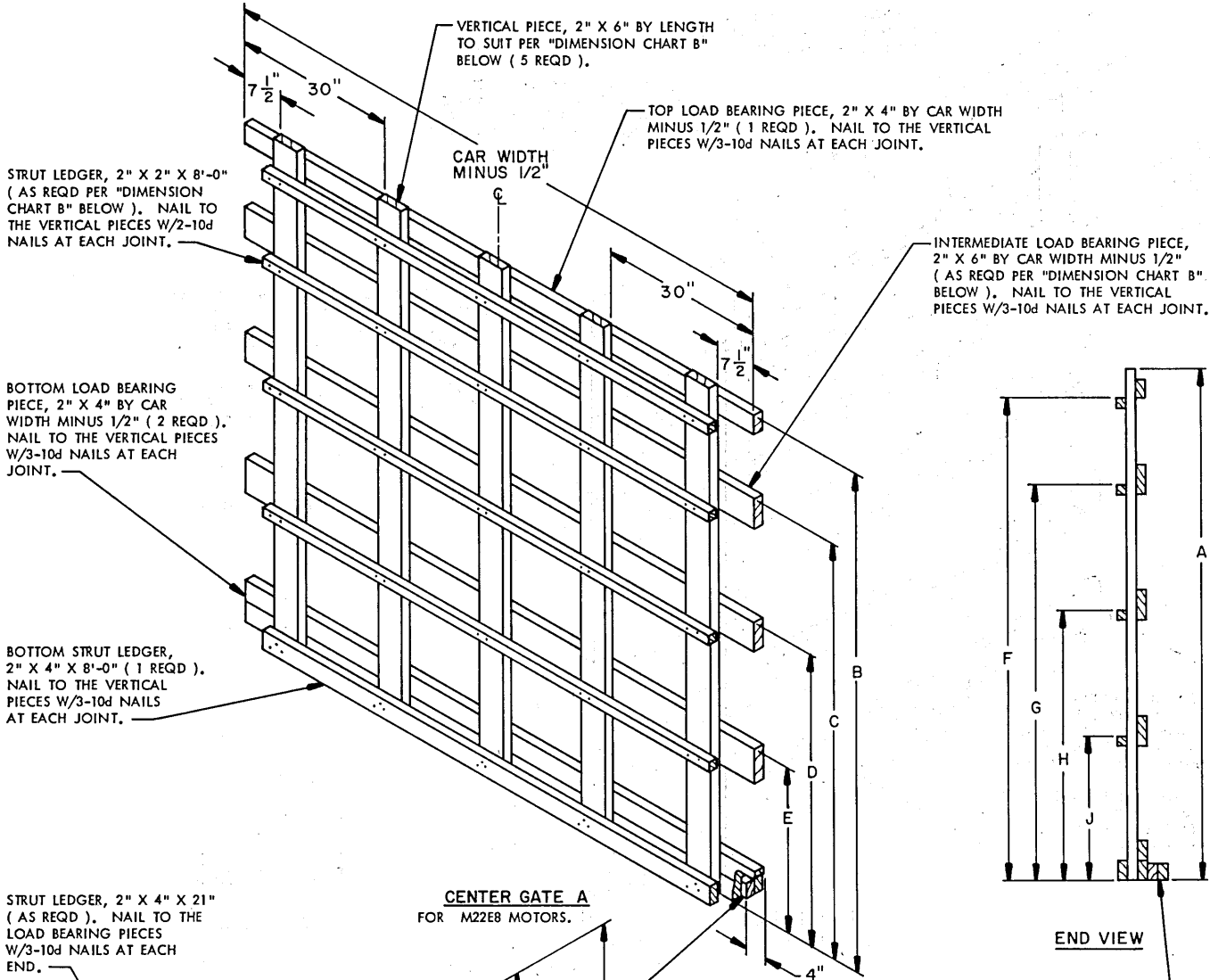
ISOMETRIC VIEW

SPECIAL NOTES:

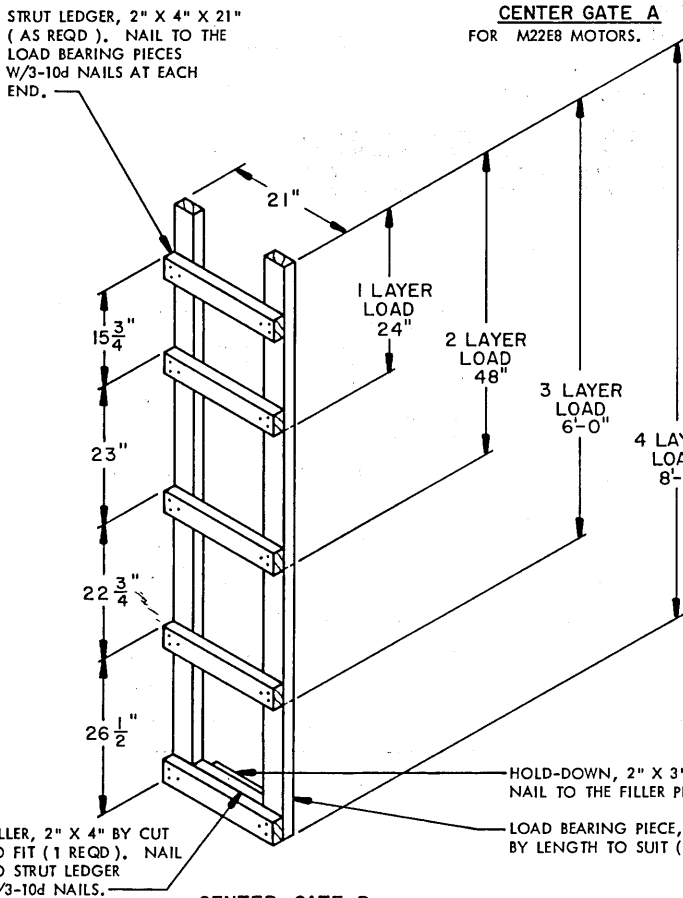
1. THESE LCL OUTLOADING PROCEDURES ARE SHOWN DEPICTING THE USE OF LCL BRACES IN A BOX CAR HAVING A WOOD OR A NAILABLE METAL FLOOR.
2. EACH LCL BRACE AS APPLIED FOR LONGITUDINAL BRACING WILL SUPPORT 2,000 POUNDS OF LADING. FOR LONGITUDINAL BRACING, AT LEAST ONE (1) BRACE IS REQUIRED FOR EACH UNIT. A MINIMUM OF TWO (2) LCL BRACES WILL BE USED FOR LATERAL BRACING.
3. THE LCL OUTLOADING PROCEDURES DEPICTED ABOVE MAY BE USED FOR SHIPPING EITHER THE M22EB OR THE M112 MOTOR.

KEY NUMBERS

- ① ANTI-CHAFING ASSEMBLY (2 REQD). SEE THE DETAIL ON PAGE 15.
- ② LCL BRACE (5 REQD). SEE THE DETAIL ON PAGE 17. NAIL TO THE CAR FLOOR W/9-16d NAILS. SEE SPECIAL NOTE 2 AT LEFT.



END VIEW



CENTER GATE A
FOR M22E8 MOTORS.

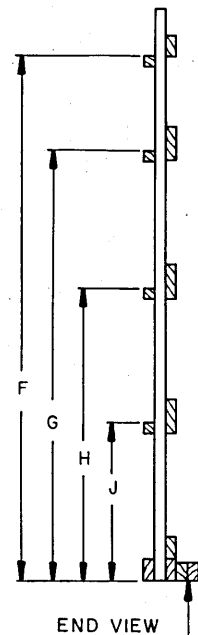
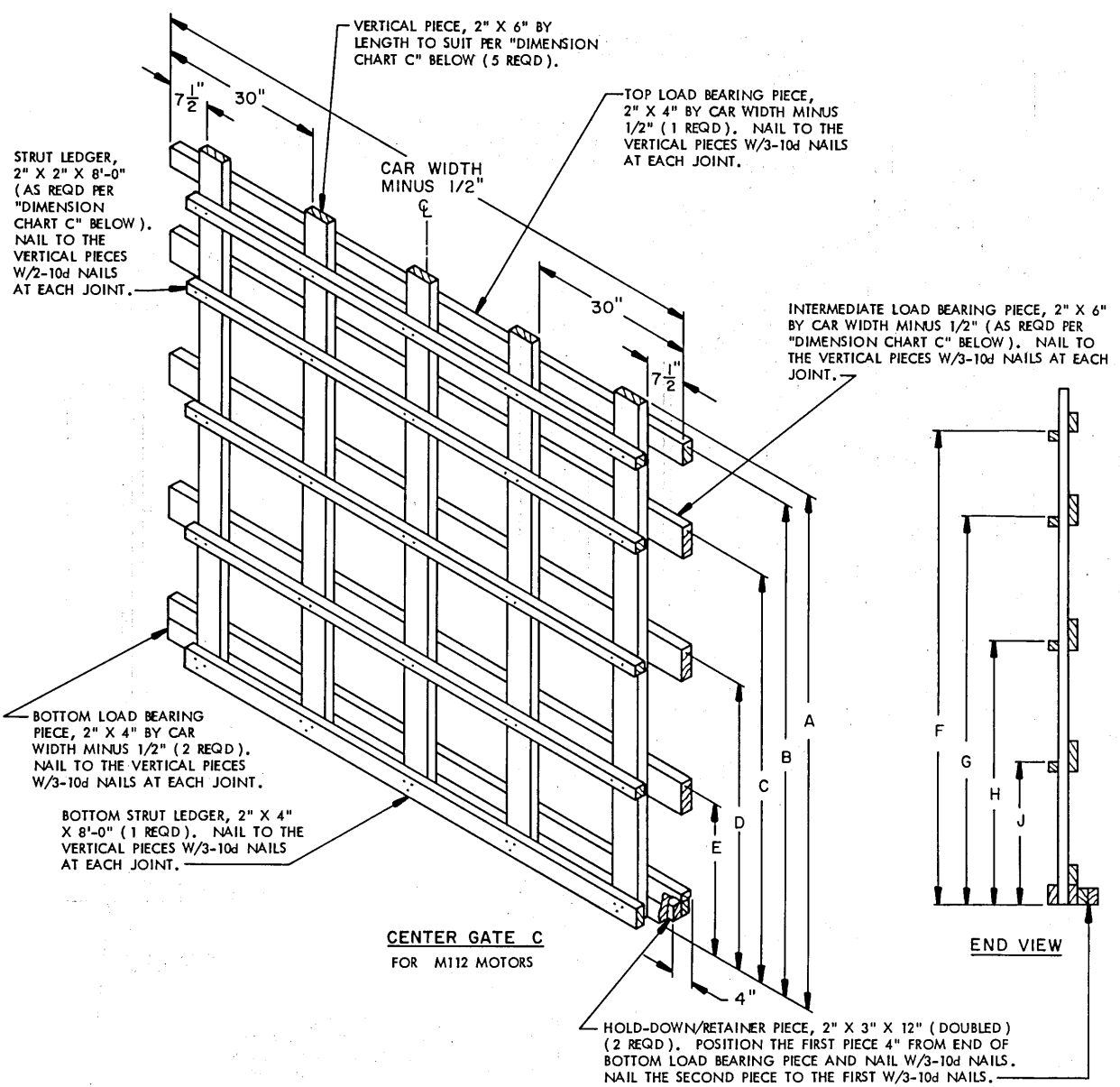
HOLD-DOWN/RETAINER PIECE, 2" X 3" X 12" (DOUBLED) (2 REQD). POSITION THE FIRST PIECE 4" FROM END OF BOTTOM LOAD BEARING PIECE AND NAIL W/3-10d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/3-10d NAILS.

DIM	LAYERS OF CONTAINERS			
	1	2	3	4
A	26"	48"	72"	8'-0"
B	23-1/2"	47"	70-1/2"	7'-10"
C	X	X	X	6'-6"
D	X	X	54-1/2"	54-1/2"
E	X	31"	31"	31"
F	20"	43-1/2"	67"	7'-6-1/2"
G	X	X	X	6'-2"
H	X	X	50-1/2"	50-1/2"
J	X	27"	27"	27"

DIMENSION CHART B

CENTER GATE B
FOR M112 MOTORS.

DETAILS

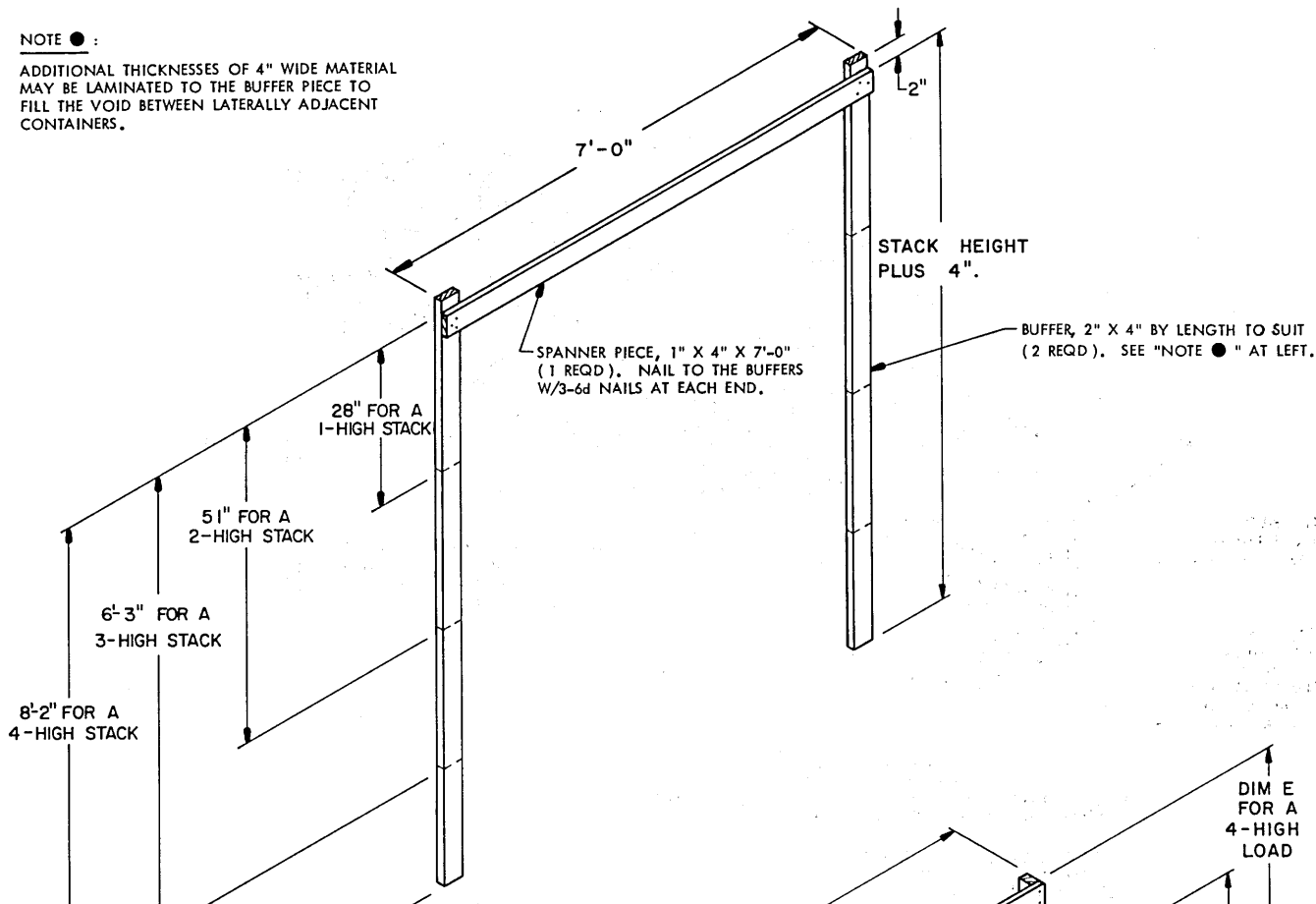


DIMENSION CHART C

DIM	LAYERS OF CONTAINERS			
	1	2	3	4
A	26"	48"	72"	8'-0"
B	22-3/4"	45-3/4"	68-1/2"	7'-7-1/2"
C	X	X	X	6'-4-1/4"
D	X	X	53-1/4"	53-1/4"
E	X	30-1/2"	30-1/2"	30-1/2"
F	19-1/4"	42-1/4"	65"	7'-4"
G	X	X	X	6'-0-1/4"
H	X	X	49-1/4"	49-1/4"
J	X	26-1/2"	26-1/2"	26-1/2"

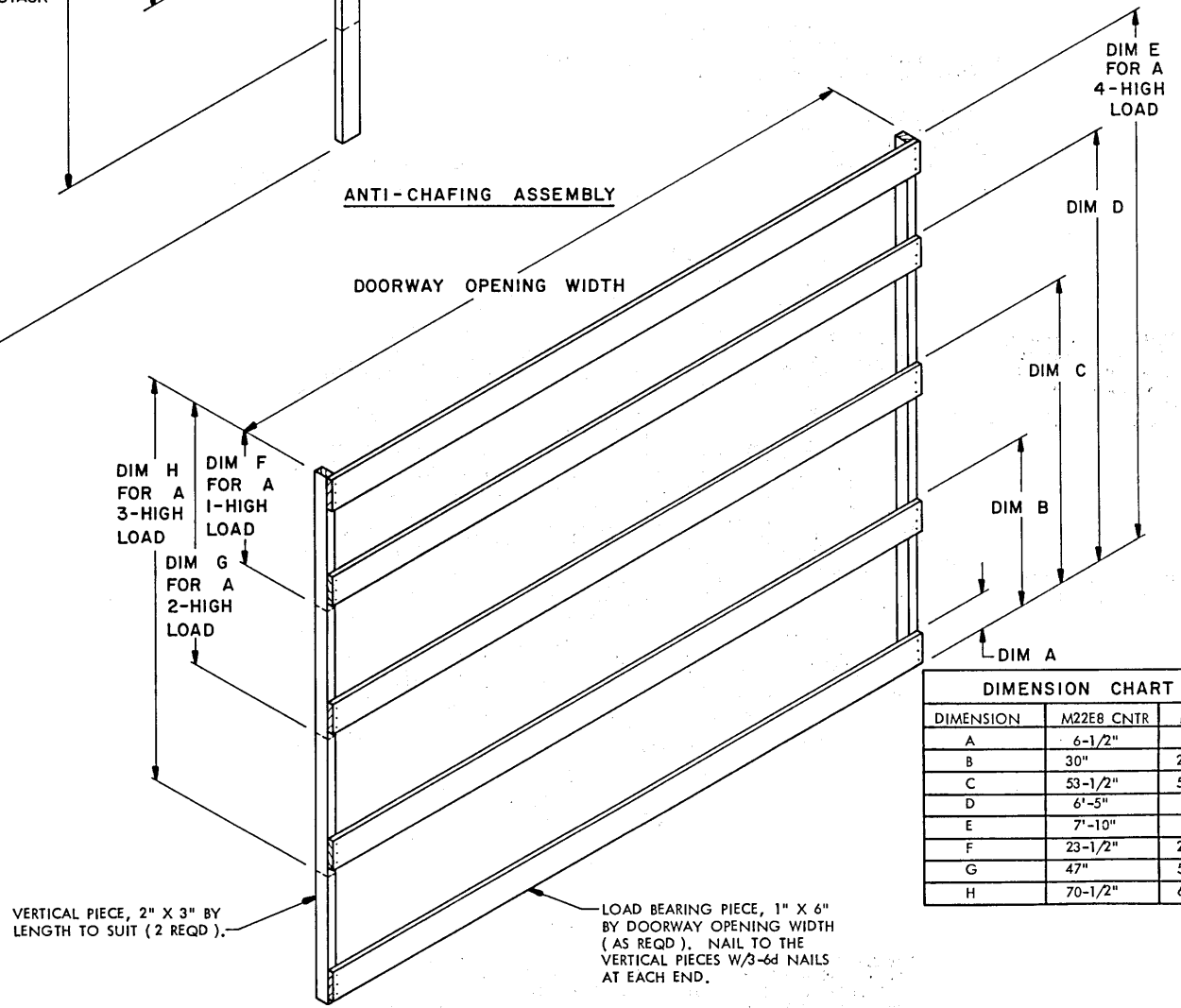
NOTE ● :

ADDITIONAL THICKNESSES OF 4" WIDE MATERIAL MAY BE LAMINATED TO THE BUFFER PIECE TO FILL THE VOID BETWEEN LATERALLY ADJACENT CONTAINERS.



ANTI-CHAFING ASSEMBLY

DOORWAY OPENING WIDTH

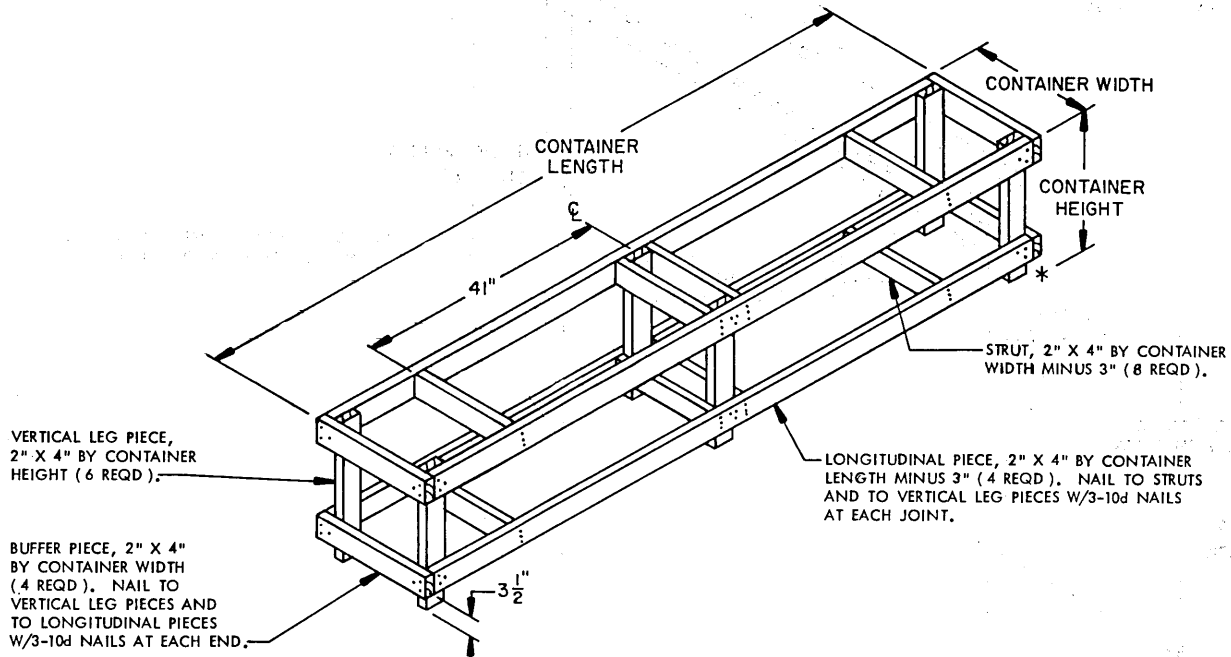


DOORWAY PROTECTION

SEE "DIMENSION CHART D"

DETAILS

DIMENSION CHART D		
DIMENSION	M22E8 CNTR	M112 CNTR
A	6-1/2"	6-1/2"
B	30"	29-1/2"
C	53-1/2"	52-1/4"
D	6'-5"	6'-3"
E	7'-10"	7'-7-1/2"
F	23-1/2"	28"
G	47"	55-3/4"
H	70-1/2"	6'-11-3/4"



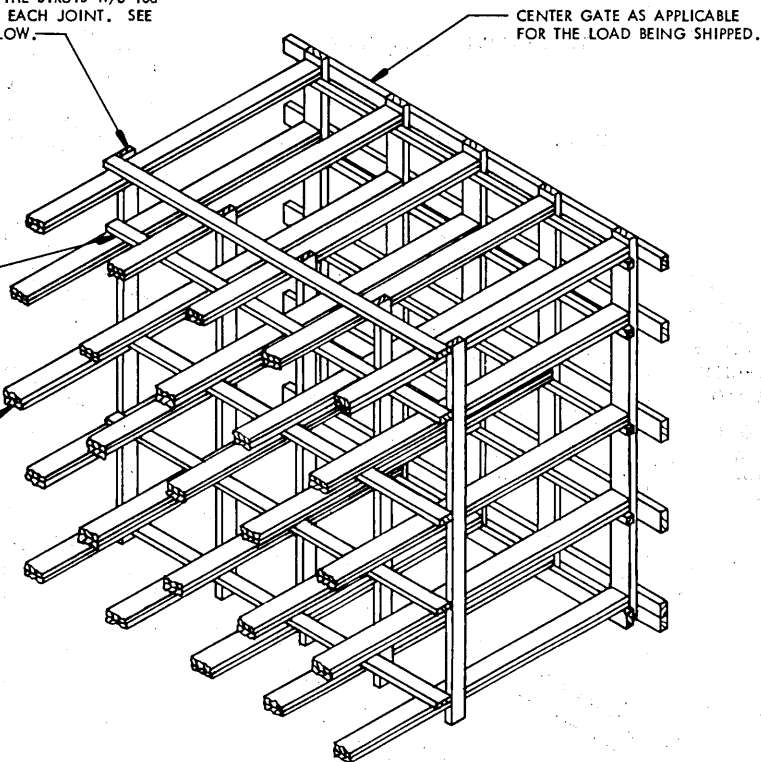
FILLER ASSEMBLY

A FILLER ASSEMBLY WILL BE USED IN THE PLACE OF EACH OMITTED CONTAINER WITHIN THE TOP LAYER OF A LOAD UNIT.

VERTICAL STRUT BRACING, 2" X 4" BY LENGTH TO SUIT (5 REQD). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT. SEE NOTE BELOW.

HORIZONTAL STRUT BRACING, 2" X 4" X 8'-0" (1 REQD PER LAYER OF STRUTS). NAIL TO THE STRUTS W/3-10d NAILS AT EACH JOINT. SEE NOTE BELOW.

DOUBLE 2" X 6" STRUTS OR 4" X 4" STRUTS.



STRUT BRACING

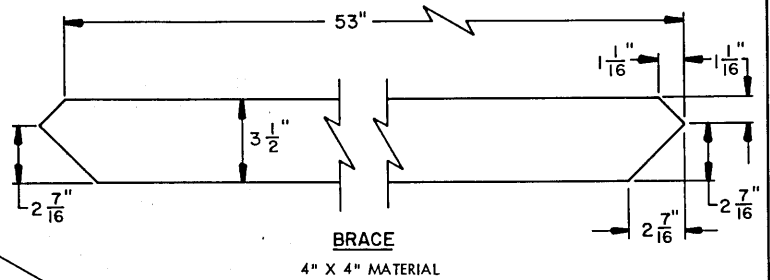
NOTE: THE ABOVE DETAIL AS SHOWN IS BASED ON A 4-CONTAINER HIGH LOAD. HOWEVER, THE PROCEDURES ALSO APPLY TO LOADS OTHER THAN 4-CONTAINERS HIGH. STRUT BRACING IS REQUIRED WHEN STRUTS ARE 48" OR GREATER IN LENGTH. ONE (1) SET OF BRACING IS REQUIRED FOR EVERY 48" OF STRUT LENGTH.

HOLD-DOWN CLEAT, 2" X 6" X 9"
(6 REQD). NAIL TO THE VERTICAL
PIECE W/5-10d NAILS.

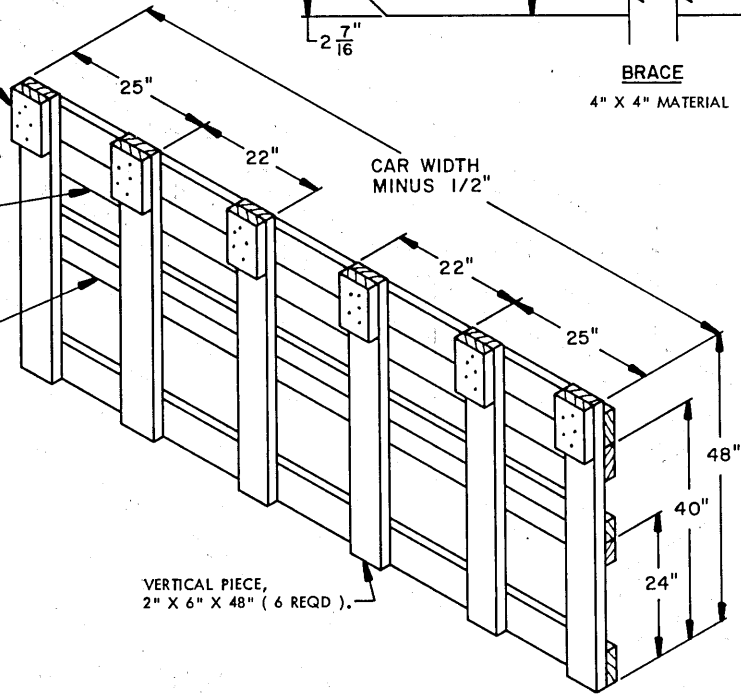
LOAD BEARING PIECE,
2" X 6" BY CAR WIDTH
MINUS 1/2" (3 REQD).
NAIL TO THE VERTICAL
PIECES W/3-10d NAILS
AT EACH JOINT.

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

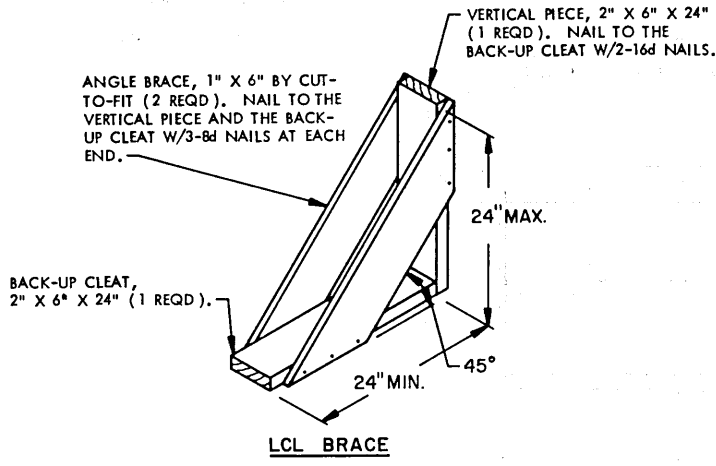
VERTICAL PIECE,
2" X 6" X 48" (6 REQD).



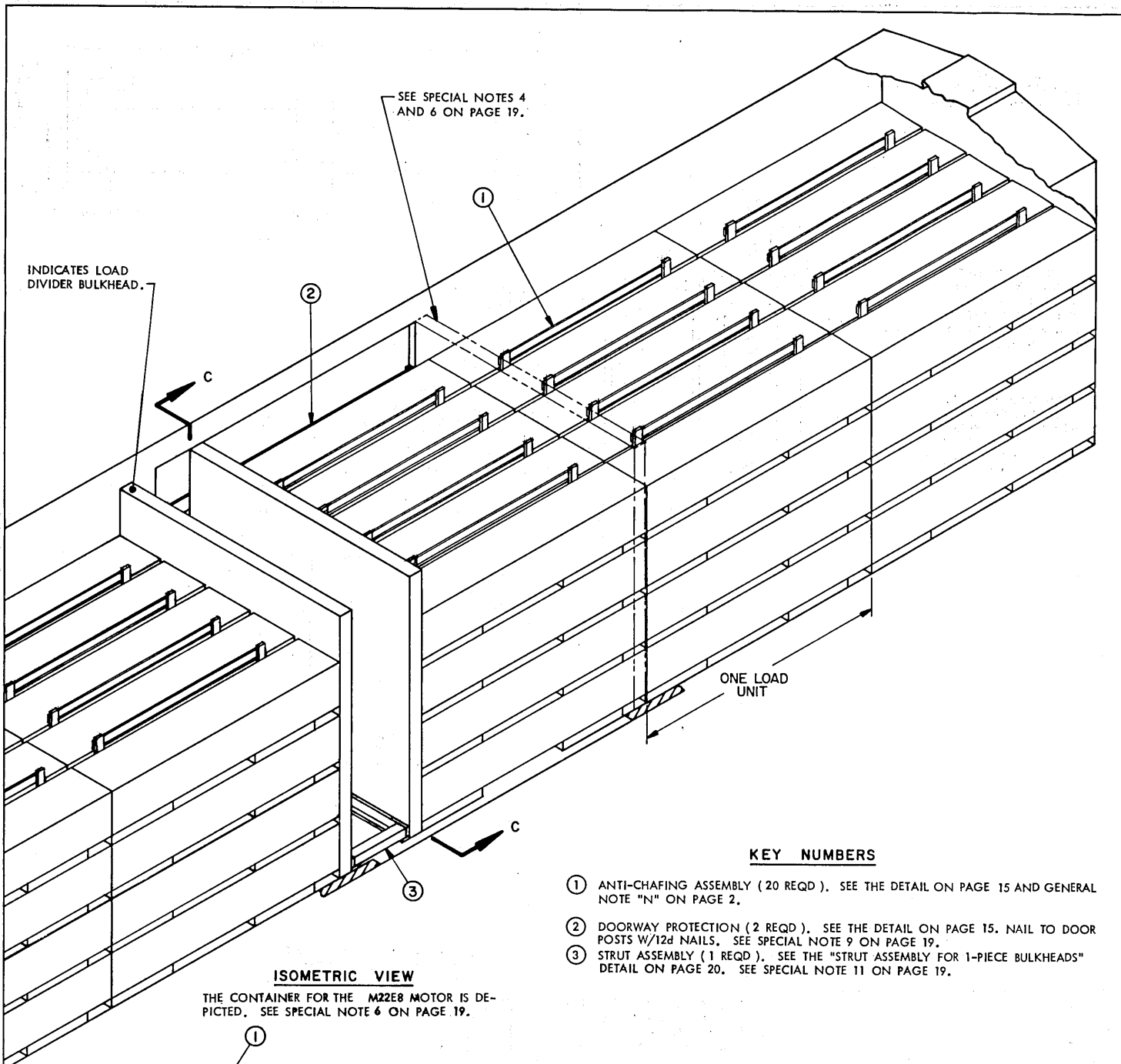
BRACE
4" X 4" MATERIAL



LCL GATE
FOR 2-LAYER LOAD ONLY.



LCL BRACE

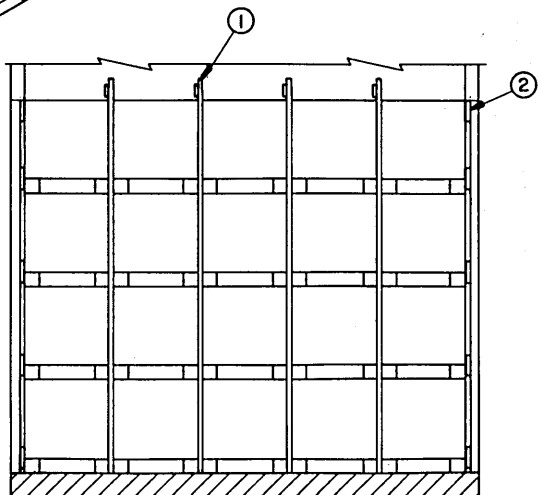


ISOMETRIC VIEW

THE CONTAINER FOR THE M22E8 MOTOR IS DEPICTED. SEE SPECIAL NOTE 6 ON PAGE 19.

KEY NUMBERS

- ① ANTI-CHAFING ASSEMBLY (20 REQD). SEE THE DETAIL ON PAGE 15 AND GENERAL NOTE "N" ON PAGE 2.
- ② DOORWAY PROTECTION (2 REQD). SEE THE DETAIL ON PAGE 15. NAIL TO DOOR POSTS W/12d NAILS. SEE SPECIAL NOTE 9 ON PAGE 19.
- ③ STRUT ASSEMBLY (1 REQD). SEE THE "STRUT ASSEMBLY FOR 1-PIECE BULKHEADS" DETAIL ON PAGE 20. SEE SPECIAL NOTE 11 ON PAGE 19.



SECTION C-C

SPECIAL NOTES:

1. THESE OUTLOADING PROCEDURES DEPICT A METHOD OF OUTLOADING THE M22E8 AND/OR THE M112 ROCKET MOTORS IN CUSHIONED BOX CARS WHICH ARE EQUIPPED WITH LOAD DIVIDER BULKHEADS AND WITH OR WITHOUT ADJUSTABLE SIDE FILLERS. **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. ALSO, 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.
2. 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 22 FOR GUIDANCE. IF THE BACKS OF THE SIDE FILLER PANELS ARE REINFORCED WITH VERTICAL AND HORIZONTAL STEEL MEMBERS AS SHOWN IN THE "TYPICAL TYPE B" VIEW ON PAGE 22, THE "FILL PIECE" MATERIAL IS NOT REQUIRED. **NOTE:** DUNNAGE MATERIALS MUST NOT BE NAILED TO SIDE FILLERS.
3. 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.
4. **CAUTION:** THE WEIGHT OF THE LOAD TO BE RETAINED BY ONE LOAD DIVIDER BULKHEAD MUST NOT EXCEED ONE-HALF OF THE LOAD LIMIT WHICH IS STENCILED ON THE SIDE OF THE CAR.
5. A 100-UNIT LOAD OF M22E8 MOTORS IS SHOWN IN A 50'-6" LONG BY 9'-2" WIDE (INSIDE DIMENSION) BOX CAR HAVING 10'-0" WIDE THROUGH DOORS OF THE CONVENTIONAL SLIDING TYPE. WIDER CARS AND CARS WITH WIDER THROUGH DOOR OPENINGS OR STAGGERED DOORS CAN BE USED. SEE SPECIAL NOTES 4, 7, AND 8 ON THIS PAGE. ALSO, SEE GENERAL NOTES "E" AND "F" ON PAGE 2.
6. THE DEPICTED PROCEDURES ARE ALSO APPLICABLE FOR SHIPMENT OF A 100-UNIT LOAD OF M112 MOTORS. HOWEVER, THE CAR MUST BE NOT LESS THAN 52'-6" LONG, MUST HAVE THROUGH DOOR OPENINGS AND THEY MUST BE NOT LESS THAN 10'-0" WIDE. CARS WITH STAGGERED DOOR OPENINGS CANNOT BE USED. IF 52'-6" LONG CARS ARE NOT AVAILABLE, THE LENGTH OF THE LOAD MUST BE REDUCED TO FOUR (4) LOAD UNITS. SEE SPECIAL NOTES 4, 7, AND 8 ON THIS PAGE. ALSO, SEE GENERAL NOTES "E" AND "F" ON PAGE 2.
7. IF THE DOOR OPENING OF THE CAR IS 10'-0" OR MORE IN HEIGHT AND THE MATERIALS HANDLING EQUIPMENT PERMITS, IT IS POSSIBLE TO SHIP A 5-LAYER LOAD OF CONTAINERS. HOWEVER, IT SHOULD BE NOTED THAT THE TOTAL WEIGHT OF A LOAD IN A CAR MUST NOT EXCEED THE LOAD LIMIT WHICH IS STENCILED ON THE SIDE OF THE CAR. ALSO, THE LOAD WEIGHT ON ONE TRUCK AT THE END OF THE CAR MUST NOT EXCEED ONE-HALF OF THE LOAD LIMIT. **CAUTION:** SEE NOTE 4 ABOVE.
8. A 40'-6" LONG CAR CAN BE USED FOR A FOUR (4) LOAD UNIT LONG LOAD OF M22E8 MOTORS. FOR FOUR (4) LOAD UNITS OF M112 MOTORS, A 42'-6" LONG CAR IS REQUIRED. HOWEVER, EITHER CAR MUST HAVE STAGGERED DOOR OPENINGS AND THEY MUST BE NOT LESS THAN 14'-0" WIDE. IF A 42'-6" LONG CAR IS NOT AVAILABLE, THE LENGTH OF THE LOAD OF M112 MOTORS MUST BE REDUCED TO THREE (3) LOAD UNITS. SEE GENERAL NOTES "E" AND "F" ON PAGE 2.
9. IF THE CAR IS EQUIPPED WITH PLUG DOORS OR STAGGERED DOOR OPENINGS, IT WILL BE NECESSARY TO OMIT DOORWAY PROTECTION PIECES MARKED ② ON PAGE 18, AND IN LIEU THEREOF, TO USE PRE-POSITIONED SIDE BLOCKING AND DOORWAY PROTECTION BUNDLING STRAPS, PIECES MARKED ②, ③ AND ④ ON PAGES 6 AND 7, FOR EACH LOAD UNIT OF CONTAINERS WHICH EXTENDS MORE THAN HALF THE LENGTH OF A CONTAINER INTO THE "DOORWAY AREA" ON EITHER SIDE OF THE CAR. SEE GENERAL NOTE "G" ON PAGE 2.
10. IF THE DELINEATED OUTLOADING METHOD IS USED FOR THE SHIPMENT OF A LESS-THAN-FULL-LOAD QUANTITY OF CONTAINERS, AND THE QUANTITY CANNOT BE SATISFIED BY OMITTING A COMPLETE LAYER OF CONTAINERS FROM ALL THE LOAD UNITS IN EITHER OR BOTH ENDS OF THE CAR, A "FILLER ASSEMBLY", AS DETAILED ON PAGE 16, MAY BE SUBSTITUTED IN THE PLACE OF EACH OMITTED CONTAINER. "FILLER ASSEMBLIES" CAN ONLY BE USED IN THE TOP LAYER OF ONE OR MORE LOAD UNITS.
11. SOME CARS ARE EQUIPPED WITH 2-PIECE BULKHEADS WHICH MAY REQUIRE THE USE OF TWO (2) STRUT ASSEMBLIES AS SHOWN IN THE "STRUT ASSEMBLY FOR 2-PIECE BULKHEADS" DETAIL ON PAGE 20. SEE "NOTE " ON PAGE 20.

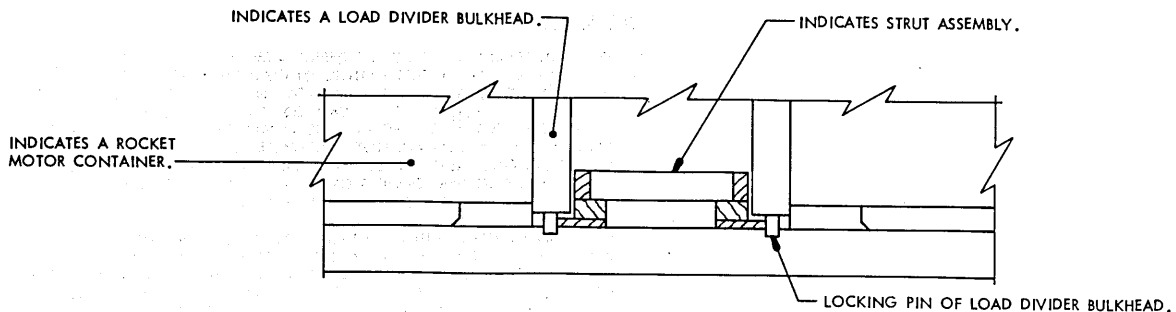
BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	140	47
1" X 6"	100	50
1" X 8"	16	12
2" X 3"	32	16
2" X 4"	370	247
2" X 6"	24	24
NAILS	NO. REQD	POUNDS
6d (2")	196	1-1/4
10d (3")	42	3/4
12d (3-1/4")	56	1

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
M22E8 MOTOR	100	109,100 LBS *
DUNNAGE		993 LBS

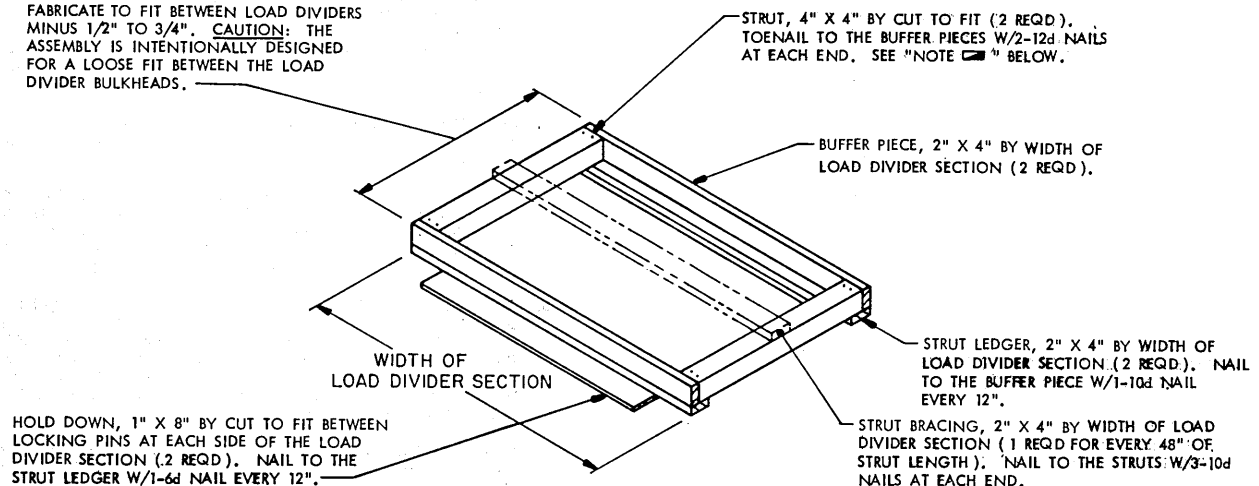
TOTAL WEIGHT ----- 110,093 LBS

* LADING WEIGHT FOR THE M112 MOTOR IS 112,800 POUNDS (APPROX).



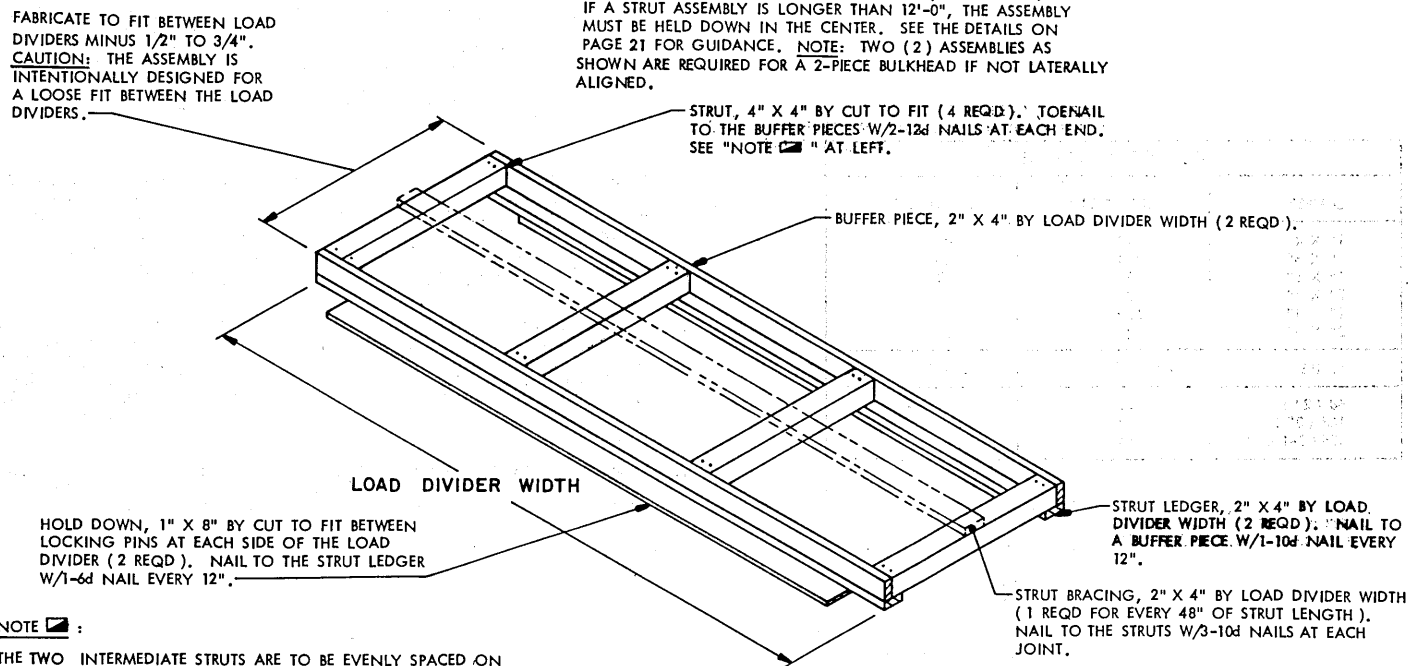
INSTALLATION OF STRUT ASSEMBLY

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 BULKHEADS.



STRUT ASSEMBLY FOR 2-PIECE BULKHEADS

A STRUT ASSEMBLY IS REQUIRED WHEN THE LOAD BEHIND EITHER LOAD DIVIDER BULKHEAD EXCEEDS 50,000 POUNDS. IF A STRUT ASSEMBLY IS LONGER THAN 12'-0", THE ASSEMBLY MUST BE HELD DOWN IN THE CENTER. SEE THE DETAILS ON PAGE 21 FOR GUIDANCE. NOTE: TWO (2) ASSEMBLIES AS SHOWN ARE REQUIRED FOR A 2-PIECE BULKHEAD IF NOT LATERALLY ALIGNED.

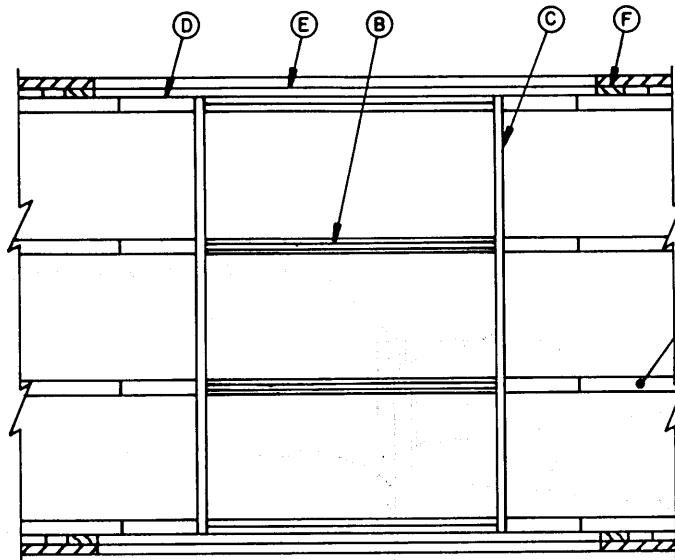


NOTE:

THE TWO INTERMEDIATE STRUTS ARE TO BE EVENLY SPACED ON THE WIDTH OF THE DIVIDER BULKHEADS, WITH ADJUSTMENTS MADE SO AS TO ALIGN WITH VERTICAL FRAMING WITHIN THE BULKHEADS. IF THE CAR IS EQUIPPED WITH 2-PIECE DIVIDER BULKHEADS AND THE BULKHEADS ARE LATERALLY ALIGNED WITH EACH OTHER, THE STRUTS SHOULD BE ALIGNED WITH THE EDGES OF THE BULKHEADS; IF THE BULKHEADS ARE NOT ALIGNED, THE "STRUT ASSEMBLY FOR 2-PIECE BULKHEADS" MUST BE USED. SEE THE DETAIL ABOVE.

STRUT ASSEMBLY FOR 1-PIECE BULKHEADS

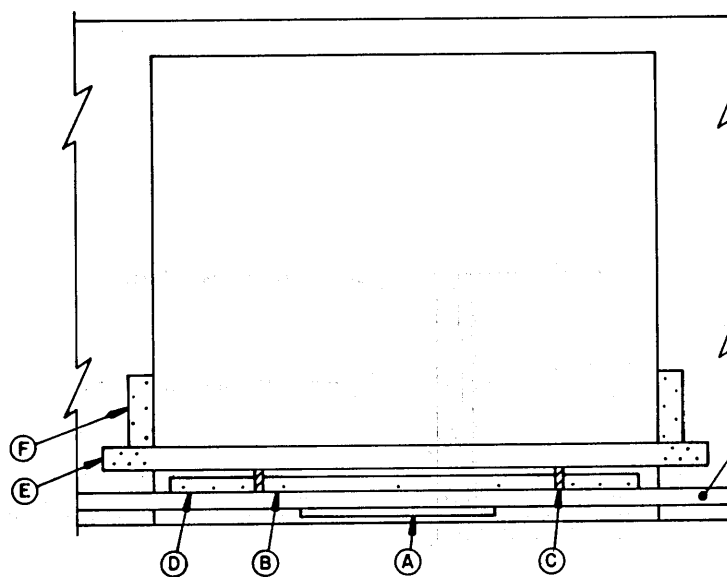
A STRUT ASSEMBLY IS REQUIRED WHEN THE LOAD BEHIND EITHER LOAD DIVIDER BULKHEAD EXCEEDS 50,000 POUNDS. IF A STRUT ASSEMBLY IS LONGER THAN 12'-0", THE ASSEMBLY MUST BE HELD DOWN IN THE CENTER. SEE THE DETAILS ON PAGE 21 FOR GUIDANCE.



INDICATES A 4" X 4" STRUT OF THE STRUT ASSEMBLY.

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.

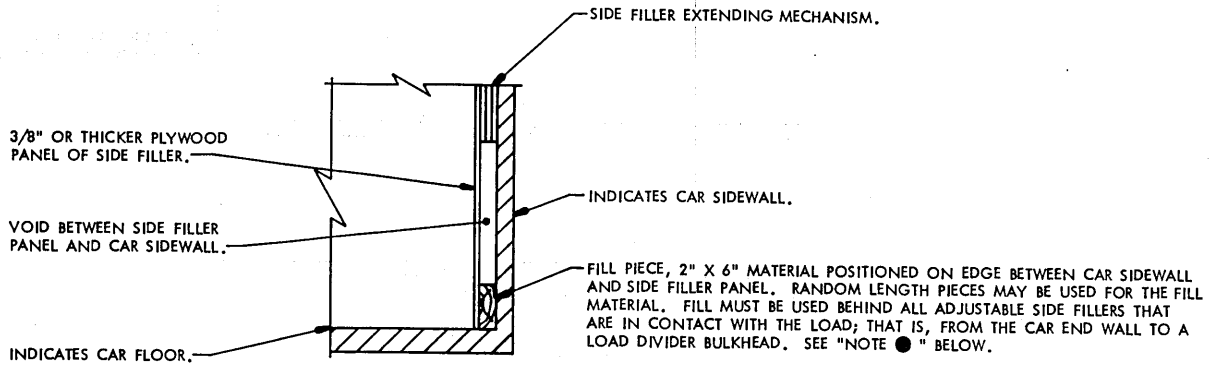


INDICATES A 4" X 4" STRUT OF THE STRUT ASSEMBLY.

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 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.

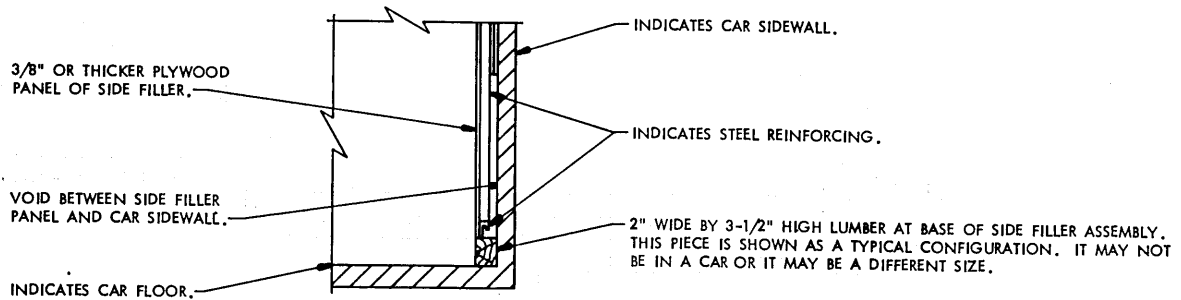


TYPICAL TYPE A

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

NOTE ● :

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



TYPICAL TYPE B

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