APPROVED BY
BUREAU OF EXPLOSIVES
E. P. Ralbin
SUPERVISOR, MILITARY & INTERMODAL SERVICES
DATE 10/4/85

LOADING AND BRACING (CL & LCL) IN BOX CARS OF 21-GALLON FIBERBOARD DRUMS

INDEX

CAUTION:
CARS EQUIPPED WITH MECHANICAL BRACING DEVICES MUST NOT BE USED FOR SHIPMENT OF BULK EXPLOSIVES AS IT IS LIABLE TO SIFT OR BECOME LODGED IN THE MECHANISM OF THE LOADING AND BRACING DEVICE IN THE EVENT OF A CONTAINER FAILURE. ALL STEEL CARS (I.E., CAR WITH STEEL LINING AND STEEL FLOORS, NAILABLE OR NONNAILABLE) MUST ALSO NOT BE USED.

DO NOT SCALE

REVISIONS			

DRAFTSMAN KJ / ds lb | PROJ ENG RSH / WKF
CHECKER GAS | LOG ENGRG OFFICE WHEmit

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U.S. ARMY AMC DRAWING
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CLASS	DIVISION	DRAWING	FILE
19	48	4175	5N 1002

PROJECT CA 192-82

GENERAL NOTES

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

B. THE OUTLOADING PROCEDURES SPECIFIED IN THIS DRAWING ARE APPLICABLE FOR THE SHIPMENT OF BULK EXPLOSIVES PACKED IN 21-GALLON FIBERBOARD DRUMS CONSTRUCTED IN ACCORDANCE WITH MILITARY SPECIFICATION MIL-C-70470.

C. DETAIL OF DRUM:

DIMENSIONS ----- 16" DIAMETER BY 27-3/4" HIGH.
GROSS WEIGHT -- 176 POUNDS (APPROX).

D. THE SELECTION OF RAIL CARS FOR THE TRANSPORT OF THE DESIGNATED ITEM IS THE RESPONSIBILITY OF THE CARRIER AND THE SHIPPER. ONLY CARS WHICH HAVE "SOUND" FLOORS AND ARE OTHERWISE IN PROPER CONDITION TO SAFELY TRANSPORT THE LADING TO DESTINATION WITHOUT DAMAGE WILL BE SELECTED. EVERY EFFORT SHOULD BE MADE TO OBTAIN BOX CARS THAT DO NOT HAVE BOWED END WALLS, HOWEVER, CARS HAVING ONLY SLIGHTLY BOWED ENDS CAN BE USED.

E. IT IS RECOMMENDED THAT CARS EQUIPPED WITH END-OF-CAR CUSHIONING DEVICES BE USED, PROVIDING THESE CARS ALSO COMPLY WITH THE RESTRICTIONS AND SAFETY REQUIREMENTS SET FORTH BY THE "CAUTION" NOTE ON THE COVER PAGE.

F. THE LOADS AS SHOWN ARE BASED ON CARS WHICH HAVE 8'-0" WIDE DOORS OF THE CONVENTIONAL SLIDING TYPE. THE DEPICTED OUTLOADING PROCEDURES ARE ALSO APPLICABLE TO CARS WHICH ARE EQUIPPED WITH PLUG DOORS. ONLY CARS HAVING DOOR OPENINGS OF 8'-0" OR LESS MAY BE USED FOR SHIPMENT OF FULL LOADS AS DEPICTED WITHIN THIS DRAWING. CAUTION: DUNNAGE MATERIAL MUST NOT BE NAILED TO ANY PLUG DOOR. 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 THE PROCEDURES FOR PLUG DOORS ON PAGES 15 AND 16.

G. PORTIONS OF THE DEPICTED CARS, SUCH AS CAR SIDEWALLS, HAVE BEEN OMITTED FROM THE LOAD VIEWS FOR CLARITY PURPOSES.

H. 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.

J. A STAGGERED NAILING PATTERN WILL BE USED WHEREVER POSSIBLE WHEN NAILS ARE DRIVEN INTO JOINTS OF DUNNAGE ASSEMBLIES. ALSO, A STAGGERED NAILING PATTERN WILL BE USED WHEN DUNNAGE IS NAILED TO THE FLOOR OR SIDEWALL OF THE TRANSPORTING VEHICLE, OR WHEN LAMINATING DUNNAGE. THE NAILING PATTERN WILL BE ADJUSTED AS REQUIRED SO THAT A NAIL DOES NOT PENETRATE INTO OR NEAR A CRACK BETWEEN FLOOR BOARDS OR SIDEWALL BOARDS. ADDITIONALLY, THE NAILING PATTERN FOR AN UPPER PIECE OF LAMINATED DUNNAGE WILL BE ADJUSTED AS REQUIRED SO THAT A NAIL FOR THAT PIECE WILL NOT BE DRIVEN THROUGH ONTO OR RIGHT BESIDE A NAIL IN A LOWER PIECE.

K. WHEN THE QUANTITY OF DRUMS TO BE SHIPPED IS SUCH THAT A FILLER ASSEMBLY IS REQUIRED IT IS RECOMMENDED THAT AN EMPTY DRUM BE FILLED WITH INERT MATERIAL TO APPROXIMATE THE WEIGHT OF THE EXPLOSIVE FILLED DRUMS. IN ACCORDANCE WITH MIL-STD-129, AN EMPTY DRUM USED AS A FILLER MUST BE PAINTED ORANGE WITH THE WORD "EMPTY" MARKED IN CONTRASTING COLOR ON THE TOP AND ON THE SIDE. AN ALTERNATIVE FILLER ASSEMBLY CONSTRUCTED OF WOOD AND SHOWN ON PAGE 3 OF THIS DRAWING MAY ALSO BE USED. WHEN USING EITHER AN INERT FILLED DRUM OR A FILLER ASSEMBLY, IT MUST NOT BE "BURIED" WITHIN THE LOAD, OR AGAINST THE END OF A CAR; IT SHALL BE PLACED ADJACENT TO A DIVIDER, SEPARATOR GATE, OR CENTER GATE IN THE TOP LAYER OF THE LOAD.

L. POWER DRIVEN STAPLES MAY BE USED AS ALTERNATIVE FASTENERS FOR NAILS WHEN CONSTRUCTING DUNNAGE ASSEMBLIES WHICH ARE TO BE USED IN THE DELINEATED BOX CAR LOADS SHOWN THROUGHOUT THIS DRAWING. THE STAPLES TO BE USED MUST BE EQUAL IN LENGTH TO THE SPECIFIED NAIL SIZE AND MUST BE SUBSTITUTED ON A ONE STAPLE FOR ONE NAIL BASIS. STAPLES WHICH ARE 2-1/2" OR LESS IN LENGTH SHOULD BE IN ACCORDANCE WITH FEDERAL SPECIFICATION FF-N-105 AS NEARLY AS PRACTICABLE. STAPLES WHICH ARE LONGER THAN 2-1/2" WILL BE A COMMERCIAL GRADE, OF A QUALITY EQUIVALENT TO THOSE MANUFACTURED BY SENCO PRODUCTS INCORPORATED. NOTE: STAPLES WILL NOT BE SUBSTITUTED FOR NAILS IN ANY LOAD RESTRAINING FLOOR DUNNAGE APPLICATION.

(CONTINUED AT RIGHT)

MATERIAL SPECIFICATIONS

LUMBER ---------- : SEE TM 743-200-1 (DUNNAGE LUMBER) AND FED SPEC MM-L-751.

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

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

HARDBOARD ------- : TYPE I; FED SPEC LL-B-810.

STRAPPING, STEEL-- : CLASS I, TYPE I OR IV, HEAVY DUTY, FINISH A, B (GRADE 2), OR C; FED SPEC QQ-S-781.

STRAP SEAL -------- : TYPE D, STYLE I, II, OR IV, CLASS H; FINISH A, B (GRADE 2), OR C; FED SPEC QQ-S-781.

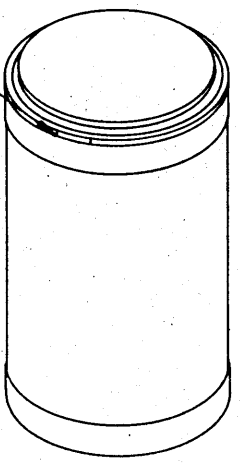
(GENERAL NOTES CONTINUED)

M. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, ONE SEAL CRIMPED WITH TWO PAIR OF NOTCHES, WILL BE USED TO SEAL THE JOINT.

N. CONVERSION TO METRIC EQUIVALENTS: DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENT MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM AND ONE POUND EQUALS 0.454KG.

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

INDICATES LOCKING DEVICE ON COVER LOCKING RING. A DRUM WILL BE POSITIONED IN A CAR SO THAT THE LOCKING DEVICE WILL BE IN A VOID AREA, AND NOT IN CONTACT WITH AN ADJACENT DRUM, A CAR SIDEWALL, A DIVISIONAL GATE, OR A CENTER GATE.

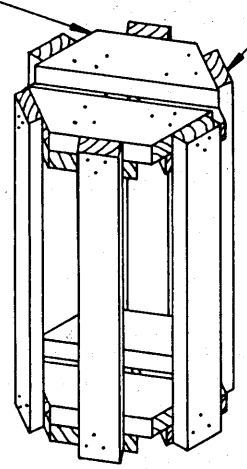


21-GALLON FIBERBOARD DRUM

DIMENSIONS---- 16" DIA X 27-3/4" HIGH.
GROSS WEIGHT - 176 LBS (APPROX).
CUBE ---------- 2.8 CU. FT.

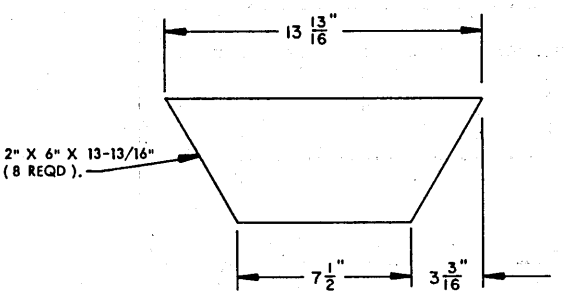
END ASSEMBLY (2 REQD). FABRICATE EACH ASSEMBLY FROM FOUR (4) PIECES OF 2" X 6" X 13-13/16" MATERIAL. LAMINATE AS SHOWN W/3-10d NAILS AT EACH JOINT. SEE THE "DETAIL A" AT THE RIGHT.

VERTICAL PIECE, 2" X 4" X 27" (6 REQD). NAIL TO THE END ASSEMBLY W/3-10d NAILS AT EACH END.

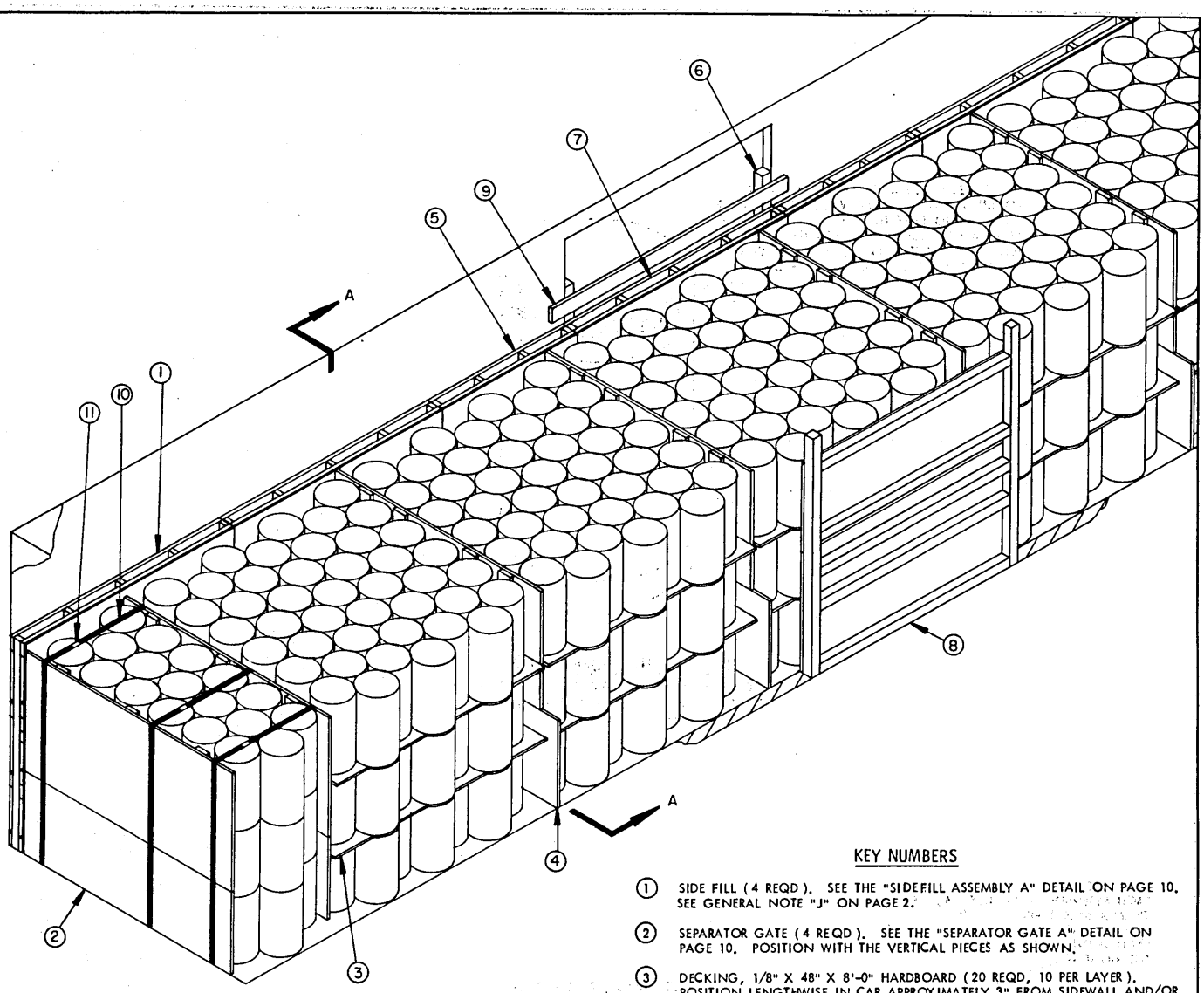


ALTERNATIVE FILLER ASSEMBLY

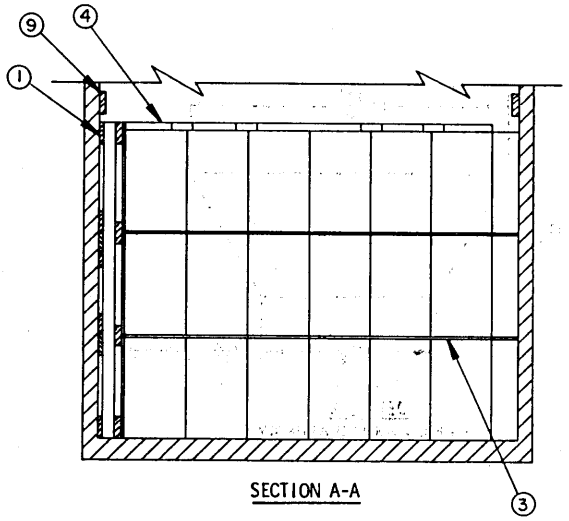
THIS FILLER ASSEMBLY IS AN ALTERNATIVE TO USING AN INERT FILLED DRUM WITHIN A LOAD. SEE GENERAL NOTE "K" ON PAGE 2. WHEN USING THIS FILLER ASSEMBLY, IT SHALL BE PLACED AGAINST A DIVIDER, SEPARATOR GATE, OR CENTER GATE. THE DIVIDER OR GATE SHALL THEN BE NAILED TO A VERTICAL PIECE OF THE FILLER ASSEMBLY W/4-6d NAILS. FILLER ASSEMBLY MUST BE POSITIONED SO THAT VERTICAL PIECES CONTACT ADJACENT DRUMS.



DETAIL A
(4 REQD PER END ASSEMBLY)



ISOMETRIC VIEW



SECTION A-A

KEY NUMBERS

1. SIDE FILL (4 REQD). SEE THE "SIDEFILL ASSEMBLY A" DETAIL ON PAGE 10. SEE GENERAL NOTE "J" ON PAGE 2.
2. SEPARATOR GATE (4 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 10. POSITION WITH THE VERTICAL PIECES AS SHOWN.
3. DECKING, 1/8" X 48" X 8'-0" HARDBOARD (20 REQD, 10 PER LAYER). POSITION LENGTHWISE IN CAR APPROXIMATELY 3" FROM SIDEWALL AND/OR SIDE FILL, PIECE MARKED (1) , AND 3" FROM A SEPARATOR GATE, PIECE MARKED (3) , AND/OR A DIVIDER, PIECE MARKED (4) .
4. DIVIDER (4 REQD). SEE THE "DIVIDER A" DETAIL ON PAGE 11. POSITION BETWEEN SEVENTH AND EIGHTH STACKS OF DRUMS. TOP PORTION OF DIVIDER MUST CONTACT THE SIDE FILL ASSEMBLIES AS SHOWN IN THE LOAD VIEW.
5. SIDE FILL (2 REQD). SEE THE "SIDE FILL ASSEMBLY B" DETAIL ON PAGE 11. CONSTRUCT TO A LENGTH WHICH WILL BE APPROXIMATELY ONE-HALF INCH LESS THAN THE DISTANCE FROM PIECE MARKED (1) TO THE DOOR.
6. DOORWAY PROTECTION FOR THE SIDE OPPOSITE THE LOADING SIDE OF CAR (1 REQD). SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 12.
7. SIDE FILL FOR DOORWAY (1 REQD). SEE THE "SIDE FILL ASSEMBLY A" DETAIL ON PAGE 10.
8. DOORWAY PROTECTION FOR THE LOADING SIDE OF CAR (1 REQD). SEE THE "DOORWAY PROTECTION B" DETAIL ON PAGE 12.
9. RETAINER PIECE, 2" X 6" BY DOORWAY OPENING PLUS 24" (2 REQD). NAIL TO THE VERTICAL PIECES OF THE DOORWAY PROTECTION, PIECES MARKED (6) AND (8) , W/3-12d NAILS AT EACH JOINT.
10. BUNDLING STRAP, 1-1/4" X .035" OR .031" BY 24'-0" LONG STEEL STRAPPING (6 REQD). PRE-POSITION SO AS TO BE CENTERED AT 8" AND 56-1/2" FROM A SIDE FILL ASSEMBLY, PIECE MARKED (1) , AND AT 16" FROM THE OPPOSITE SIDEWALL OF THE CAR.
11. SEAL FOR 1-1/4" STRAPPING (6 REQD, 1 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "M" ON PAGE 2.

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR IS SHOWN. OTHER LENGTH AND WIDTH CARS SHOULD NOT BE USED. THE DEPICTED CAR IS EQUIPPED WITH 8'-0" WIDE DOOR OPENINGS. CARS WITH OTHER WIDTH DOOR OPENINGS SHOULD NOT BE USED.

2. THE DEPICTED LOAD OF 738 DRUMS CONSISTS OF 41 STACKS OF 18 DRUMS EACH. THE STACKS IN THE ENDS OF THE CAR MUST BE STARTED ON THE SAME SIDE OF THE CAR. WHEN PLACING A SEPARATOR GATE OR DIVIDER, PIECES MARKED ② OR ④ , WITHIN THE LOAD, THE STACKS OF DRUMS ADJACENT TO THE SEPARATOR GATE OR DIVIDER WILL BE STARTED ON THE SAME SIDE OF THE CAR.

3. WHEN LOADING THE DRUMS WITHIN THE CAR, POSITION THE DRUMS SO THAT THE LOCKING DEVICE WILL BE IN A VOID AREA, AND NOT IN CONTACT WITH AN ADJACENT DRUM, A CAR SIDEWALL, A DIVISIONAL GATE, OR A CENTER GATE.

4. IN THE EVENT THAT A VOID AREA APPEARS IN THE CENTER OF A CAR WHEN THE DRUMS HAVE BEEN LOADED, REFER TO THE DETAILS ON PAGE 13. IF THE VOID IS LARGER THAN 24" , THE "STRUT METHOD" MUST BE USED. IF THE VOID AREA IS 23" OR LESS, THEN THE "SOLID FILL" METHOD MUST BE USED.

BILL OF MATERIAL

LUMBER	LINEAR FEET	BOARD FEET
1" X 6"	395	198
2" X 3"	256	128
2" X 4"	51	34
2" X 6"	323	323
4" X 4"	62	83
NAILS	**NO. REQD**	**POUNDS**
4d (1-1/2")	518	1-1/2
6d (2")	672	4
10d (3")	462	7
12d (3-1/4")	12	1/4
16d (3-1/2")	24	1/2

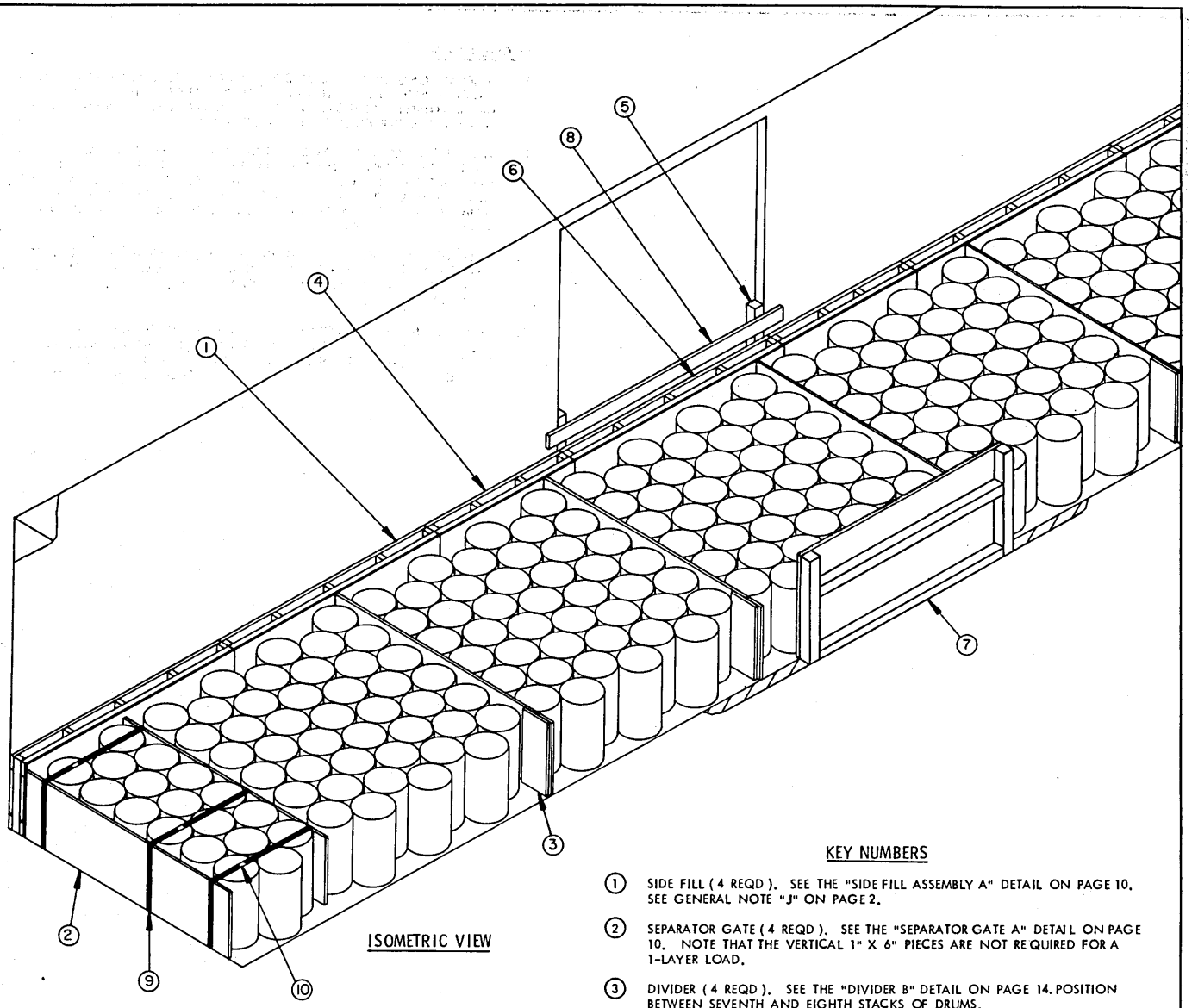
PLYWOOD, 1/2" THICK ---------- 496 SQ FT REQD --- 682 LBS
HARDBOARD, 1/8" THICK ---------- 992 SQ FT REQD --- 434 LBS
STEEL STRAPPING, 1-1/4" X .035" --- 144' REQD --------- 20-1/2 LBS
SEAL FOR 1-1/4" STRAPPING --------- 6 REQD ---------- 1/4 LB

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
FIBER DRUM	738	129,888 LBS
DUNNAGE		2,682 LBS

TOTAL GROSS WEIGHT ---------- 132,570 LBS

738-CONTAINER LOAD IN A 50'-6" LONG BY 9'-2" WIDE BOX CAR



ISOMETRIC VIEW

SPECIAL NOTES:

1. A 50'-6" LONG BY 9'-2" WIDE CONVENTIONAL TYPE BOX CAR IS SHOWN. OTHER LENGTH AND WIDTH CARS SHOULD NOT BE USED. THE DEPICTED CAR IS EQUIPPED WITH 8'-0" WIDE DOOR OPENINGS. CARS WITH OTHER WIDTH DOOR OPENINGS SHOULD NOT BE USED.
2. THE STACKS IN THE ENDS OF THE CAR MUST BE STARTED ON THE SAME SIDE OF THE CAR. WHEN PLACING A SEPARATOR GATE OR DIVIDER, PIECES MARKED (2) OR (3) , WITHIN THE LOAD, THE STACKS OF DRUMS ADJACENT TO THE SEPARATOR GATE OR DIVIDER WILL BE STARTED ON THE SAME SIDE OF THE CAR.
3. WHEN LOADING THE DRUMS WITHIN THE CAR, POSITION THE DRUMS SO THAT THE LOCKING DEVICE WILL BE IN A VOID AREA, AND NOT IN CONTACT WITH AN ADJACENT DRUM, A CAR SIDEWALL, A DIVISIONAL GATE, OR A CENTER GATE.
4. IN THE EVENT THAT A VOID AREA APPEARS IN THE CENTER OF A CAR WHEN THE DRUMS HAVE BEEN LOADED, REFER TO THE DETAILS ON PAGE 13. IF THE VOID IS LARGER THAN 24", THE "STRUT METHOD" MUST BE USED. IF THE VOID AREA IS 23" OR LESS, THEN THE "SOLID FILL" METHOD MUST BE USED.

KEY NUMBERS

(1) SIDE FILL (4 REQD). SEE THE "SIDE FILL ASSEMBLY A" DETAIL ON PAGE 10. SEE GENERAL NOTE "J" ON PAGE 2.

(2) SEPARATOR GATE (4 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 10. NOTE THAT THE VERTICAL 1" X 6" PIECES ARE NOT REQUIRED FOR A 1-LAYER LOAD.

(3) DIVIDER (4 REQD). SEE THE "DIVIDER B" DETAIL ON PAGE 14. POSITION BETWEEN SEVENTH AND EIGHTH STACKS OF DRUMS.

(4) SIDE FILL (2 REQD). SEE THE "SIDE FILL ASSEMBLY B" DETAIL ON PAGE 11. CONSTRUCT TO A LENGTH WHICH WILL BE APPROXIMATELY ONE-HALF INCH LESS THAN THE DISTANCE FROM PIECE MARKED (1) TO THE DOOR.

(5) DOORWAY PROTECTION FOR THE SIDE OPPOSITE THE LOADING SIDE OF CAR (1 REQD). SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 12.

(6) SIDE FILL FOR DOORWAY (1 REQD). SEE THE "SIDE FILL ASSEMBLY A" DETAIL ON PAGE 10.

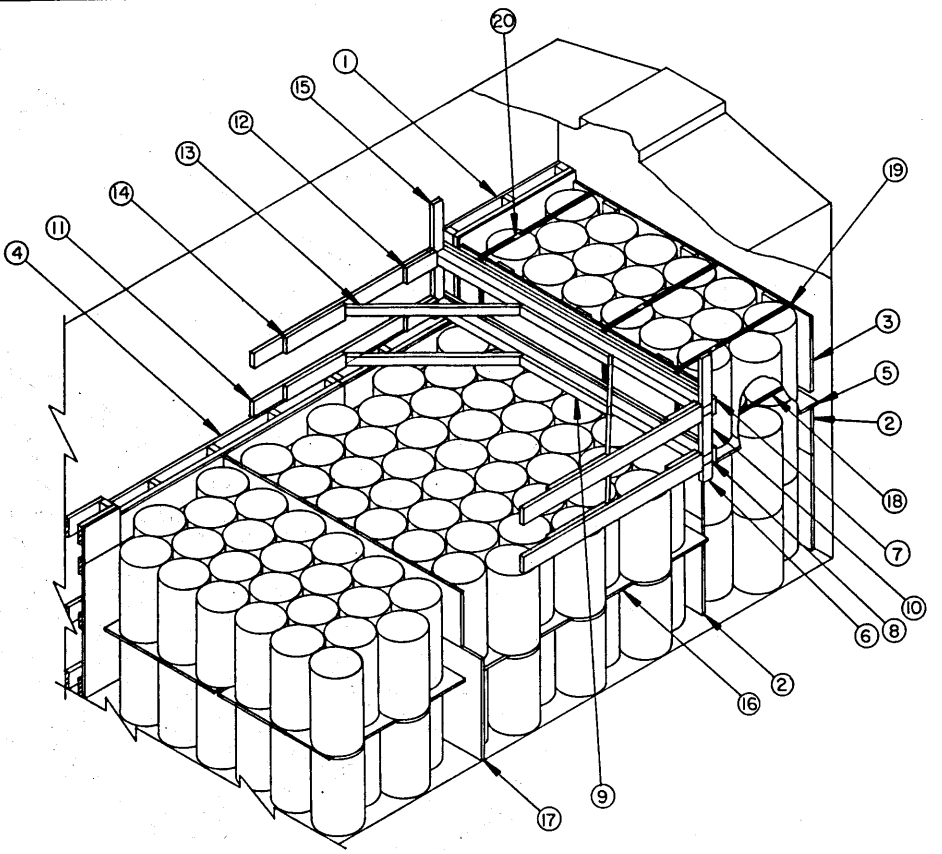
(7) DOORWAY PROTECTION FOR THE LOADING SIDE OF CAR (1 REQD). SEE THE "DOORWAY PROTECTION B" DETAIL ON PAGE 12.

(8) RETAINER PIECE, 2" X 6" BY DOORWAY OPENING PLUS 24" (2 REQD). NAIL TO THE VERTICAL PIECES OF THE DOORWAY PROTECTION, PIECES MARKED (5) AND (7) , W/3-12d NAILS AT EACH JOINT.

(9) BUNDLING STRAP, 1-1/4" X .035" OR .031" BY 14'-0" LONG STEEL STRAPPING (6 REQD). PRE-POSITION SO AS TO BE CENTERED AT 8" AND 56-1/2" FROM A SIDE FILL ASSEMBLY, PIECE MARKED (1) , AND AT 16" FROM THE OPPOSITE SIDEWALL OF THE CAR.

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

TYPICAL 1-LAYER LCL LOAD



ISOMETRIC VIEW

SPECIAL NOTES:

1. A 9'-2" WIDE CONVENTIONAL TYPE BOX CAR IS SHOWN. OTHER WIDTH CARS SHOULD NOT BE USED.
2. THE TYPE "A" K-BRACE SHOWN IS ADEQUATE FOR RETAINING A PARTIAL TIER OF NOT MORE THAN 8,000 POUNDS.
3. TWO SIDE FILL ASSEMBLIES, PIECES MARKED ④ , MUST BE REDUCED IN HEIGHT TO 56" TO ALLOW FOR THE NAILING OF THE LOWER HORIZONTAL WALL CLEAT AND SUPPORT CLEAT, PIECES MARKED ⑪ AND ⑥ TO THE CAR SIDEWALL.

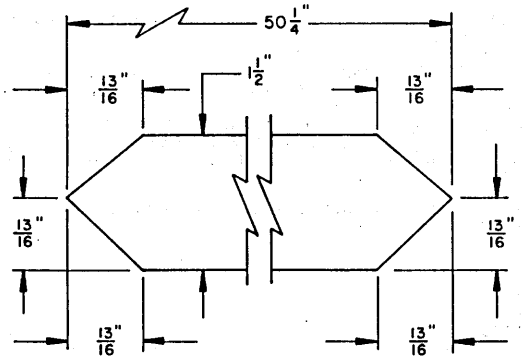
(CONTINUED FROM RIGHT)

⑰ DIVIDER (1 REQD). SEE THE "DIVIDER A" DETAIL ON PAGE 11. POSITION BETWEEN THE SEVENTH AND EIGHTH STACKS OF DRUMS.

⑱ BUNDLING STRAP, 1-1/4" X .035" OR .031" X 19'-0" LONG STEEL STRAPPING (3 REQD). PRE-POSITION SO AS TO ENCIRCLE THE LOWER TWO TIERS OF DRUMS AND TO BE CENTERED AT 8" AND 56-1/2" FROM A SIDE FILL ASSEMBLY, PIECE MARKED ① , AND AT 16" FROM THE OPPOSITE SIDEWALL OF THE CAR.

⑲ BUNDLING STRAP, 1-1/4" X .035" OR .031" BY 14'-0" LONG STEEL STRAPPING (3 REQD). PRE-POSITION SO AS TO ENCIRCLE THE THIRD TIER OF DRUMS IN THE SAME MANNER AS PIECE MARKED ⑱ .

⑳ SEAL FOR 1-1/4" STRAPPING (6 REQD, 1 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "M" ON PAGE 2.



DIAGONAL BRACE

KEY NUMBERS

① SIDE FILL ASSEMBLY (1 REQD). SEE THE "SIDE FILL ASSEMBLY A" DETAIL ON PAGE 10. NOTE THAT THE LENGTH OF THIS SIDE FILL ASSEMBLY WILL BE REDUCED FROM 8'-0" TO 45". SEE GENERAL NOTE "J" ON PAGE 2.

② SEPARATOR GATE FOR 2-HIGH (2 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 10. POSITION WITH THE VERTICAL PIECES AS SHOWN.

③ SEPARATOR GATE FOR 1-HIGH (2 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 10. POSITION WITH THE VERTICAL PIECES AS SHOWN.

④ SIDE FILL ASSEMBLY (AS REQD). SEE THE "SIDE FILL ASSEMBLY A" DETAIL ON PAGE 10. SEE SPECIAL NOTE 3 AT THE LEFT.

⑤ DECKING, 1/2" X 48" X 44" PLYWOOD (2 REQD). POSITION BETWEEN THE SECOND AND THIRD LAYER OF THE FIRST 3-STACKS AS SHOWN.

⑥ SUPPORT CLEAT, 2" X 4" X 6" (2 REQD). NAIL TO THE CAR SIDEWALL W/2-12d NAILS.

⑦ LOAD BEARING PIECE, 2" X 6" BY CAR WIDTH MINUS 1/2" (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ⑧ , W/1-12d NAIL EVERY 6".

⑧ CROSS CAR BRACE, 4" X 4" BY CAR WIDTH MINUS 1/2" (2 REQD).

⑨ CENTER CLEAT, 2" X 4" X 36" (2 REQD). NAIL TO THE CROSS CAR BRACE, PIECE MARKED ⑧ , W/7-16d NAILS.

⑩ SPACER CLEAT, 2" X 4" X 14" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.

⑪ HORIZONTAL WALL CLEAT, 2" X 6" X 72" (4 REQD). NAIL TO THE CAR SIDEWALL W/16-12d NAILS.

⑫ POCKET CLEAT, 2" X 6" X 12" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑪ , W/4-16d NAILS.

⑬ DIAGONAL BRACE, 2" X 4" X 50-1/4" (4 REQD). SEE THE DETAIL AT THE LEFT FOR BEVEL CUTS REQUIRED. TOENAIL TO THE CROSS CAR BRACE, PIECE MARKED ⑧ , AND TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑪ , W/2-16d NAILS AT EACH END.

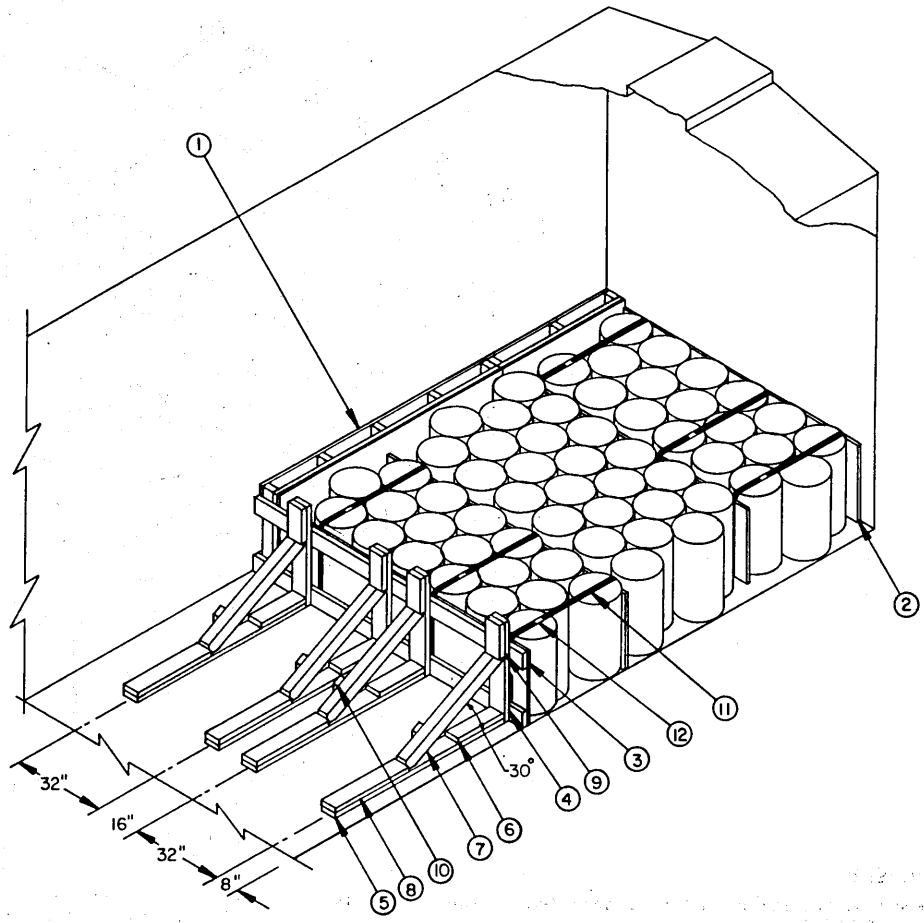
⑭ BACK-UP CLEAT, 2" X 6" X 24" (4 REQD). NAIL TO THE HORIZONTAL WALL CLEAT, PIECE MARKED ⑪ , W/8-16d NAILS.

⑮ HOLD-DOWN CLEAT, 2" X 4" X 18" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-12d NAILS.

⑯ DECKING, 1/8" X 48" X 8'-0" HARDBOARD (2 REQD PER LOAD BAY). POSITION LENGTHWISE IN CAR APPROXIMATELY 3" FROM SIDEWALL AND/OR SIDE FILL, PIECE MARKED ① , AND 3" FROM A SEPARATOR GATE, PIECE MARKED ② , AND/OR A DIVIDER, PIECE MARKED ⑰ .

(CONTINUED AT LEFT)

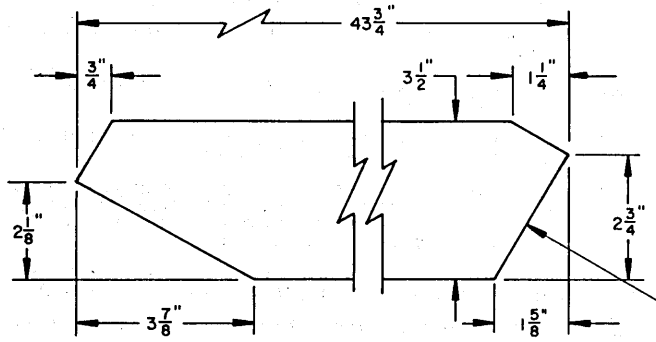
TYPICAL LCL LOAD USING K-BRACE METHOD OF PARTIAL-LAYER (TIER) BRACING



ISOMETRIC VIEW

SPECIAL NOTES:

1. A 9'-2" WIDE CONVENTIONAL TYPE BOX CAR IS SHOWN. OTHER WIDTH CARS SHOULD NOT BE USED.
2. THE LOAD SHOWN DEPICTING THE KNEE BRACE METHOD OF PARTIAL-LAYER BRACING (BOTTOM TIER ONLY) IS TYPICAL. THE PROCEDURES ARE ALSO APPLICABLE FOR OTHER QUANTITIES OF DRUMS.
3. FOUR KNEE BRACE ASSEMBLIES AS SHOWN ARE ADEQUATE FOR RETAINING NOT MORE THAN 17,000 POUNDS OF LADING.
4. WHEN LOADING THE DRUMS WITHIN A CAR, POSITION THE DRUMS SO THAT THE LOCKING DEVICE WILL BE IN A VOID AREA, AND NOT IN CONTACT WITH AN ADJACENT DRUM, A CAR SIDEWALL, OR A SEPARATOR GATE.
5. WHEN CONSTRUCTING THE SIDE FILL, PIECES MARKED ① , THE LENGTH OF ONE ASSEMBLY MAY HAVE TO BE REDUCED AS SHOWN IN THE VIEW ABOVE. THE LENGTH OF THE SIDE FILL SHOWN ABOVE WILL BE APPROXIMATELY 41" LONG.



DIAGONAL BRACE

THIS BRACE MUST BE INSTALLED SO THAT THIS BEARING SURFACE WILL BE IN CONTACT WITH THE VERTICAL PIECE MARKED ④ .

KEY NUMBERS

① SIDE FILL (2 REQD). SEE THE "SIDE FILL ASSEMBLY A" DETAIL ON PAGE 10. SEE GENERAL NOTE "J" ON PAGE 2 AND SPECIAL NOTE 5 AT THE LEFT.

② SEPARATOR GATE (4 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 10.

③ HORIZONTAL PIECE, 2" X 6" BY CAR WIDTH MINUS 1/2" (2 REQD). NAIL TO PIECE MARKED ④ W/3-10d NAILS AT EACH JOINT.

④ VERTICAL PIECE, 2" X 6" X 36" (4 REQD). POSITION SO AS TO BE IN ALIGNMENT WITH THE DIMENSIONS SHOWN IN THE ISOMETRIC VIEW.

⑤ FLOOR CLEAT, 2" X 6" X 67-3/4" (4 REQD). NAIL TO THE CAR FLOOR W/1-16d NAIL EVERY 8".

⑥ SUPPORT PIECE, 2" X 6" X 18" (4 REQD). NAIL TO PIECE MARKED ⑤ W/4-40d NAILS AND TOENAIL TO PIECE MARKED ④ W/2-12d NAILS.

⑦ DIAGONAL BRACE, 4" X 4" X 43-3/4" (4 REQD). SEE THE DETAIL AT THE LEFT. TOENAIL TO PIECES MARKED ④ AND ⑤ W/2-16d NAILS AT EACH END.

⑧ BACKUP CLEAT, 2" X 6" X 30" (4 REQD). NAIL TO PIECE MARKED ⑤ W/6-40d NAILS.

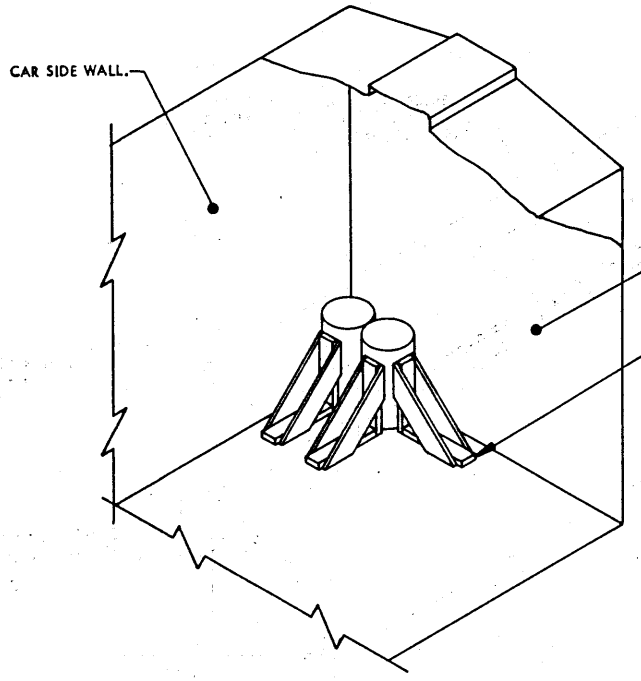
⑨ HOLDDOWN CLEAT, 2" X 6" X 12" (4 REQD). NAIL TO PIECE MARKED ④ W/ 4-12d NAILS.

⑩ DIAGONAL BRACE SUPPORT, 2" X 4" X CUT TO FIT (4 REQD). NAIL TO PIECES MARKED ⑤ AND ⑦ W/2-12d NAILS AT EACH END. SEE DETAIL AT LEFT.

⑪ BUNDLING STRAP, 1-1/4" X .035" OR .031" X 13'-0" LONG STEEL STRAPPING (6 REQD). PRE-POSITION SO AS TO BE CENTERED AT 8" AND 56-1/2" FROM A SIDE FILL ASSEMBLY, PIECE MARKED ① , AND AT 16" FROM THE OPPOSITE SIDEWALL OF THE CAR.

⑫ SEAL FOR 1-1/4" STRAPPING (6 REQD, 1 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "M" ON PAGE 2.

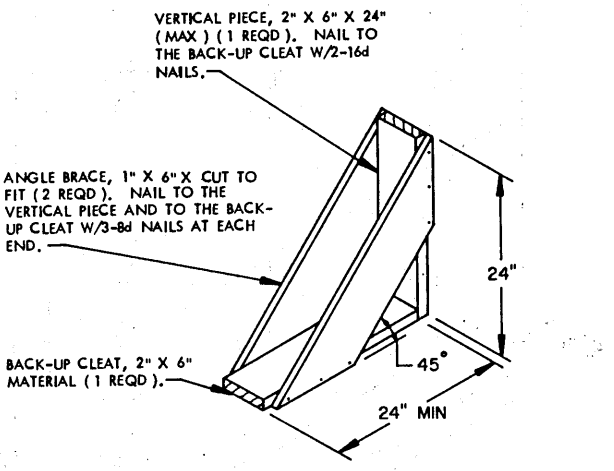
TYPICAL LCL LOAD USING KNEE BRACE METHOD OF BRACING



ISOMETRIC VIEW

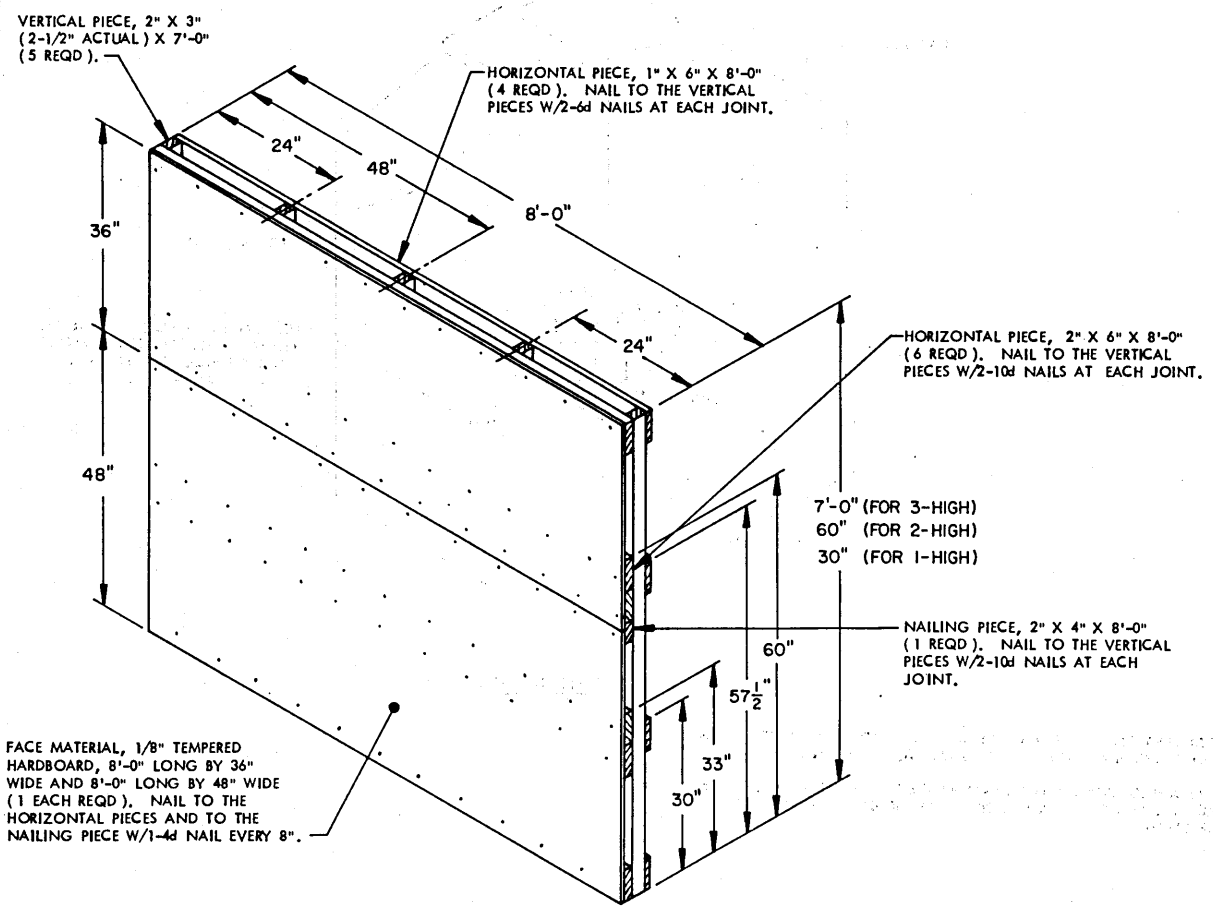
SPECIAL NOTES:

1. AN 8'-6" WIDE CONVENTIONAL TYPE BOX CAR HAVING A WOOD FLOOR IS SHOWN. CARS OF OTHER WIDTHS CAN BE USED. SEE GENERAL NOTE "G" ON PAGE 2.
2. EACH LCL BRACE AS APPLIED FOR LONGITUDINAL BRACING WILL RETAIN 2,000 POUNDS OF LADING. EACH LCL BRACE AS APPLIED FOR LATERAL BRACING WILL SUPPORT 8,000 POUNDS OF LADING.

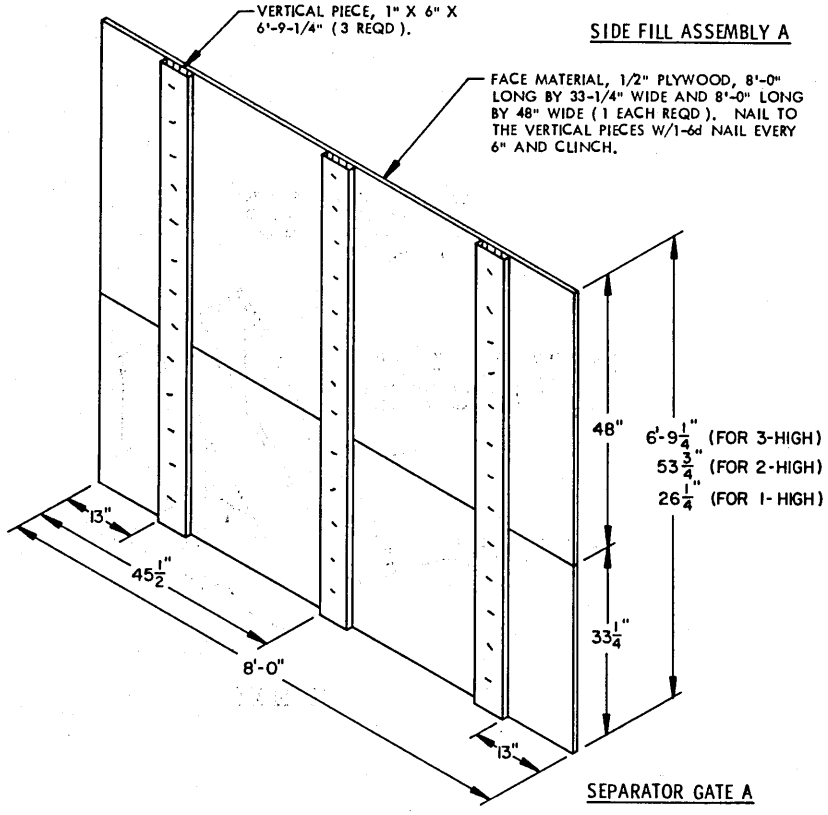


LCL BRACE

TYPICAL LCL (2-UNIT LOAD)

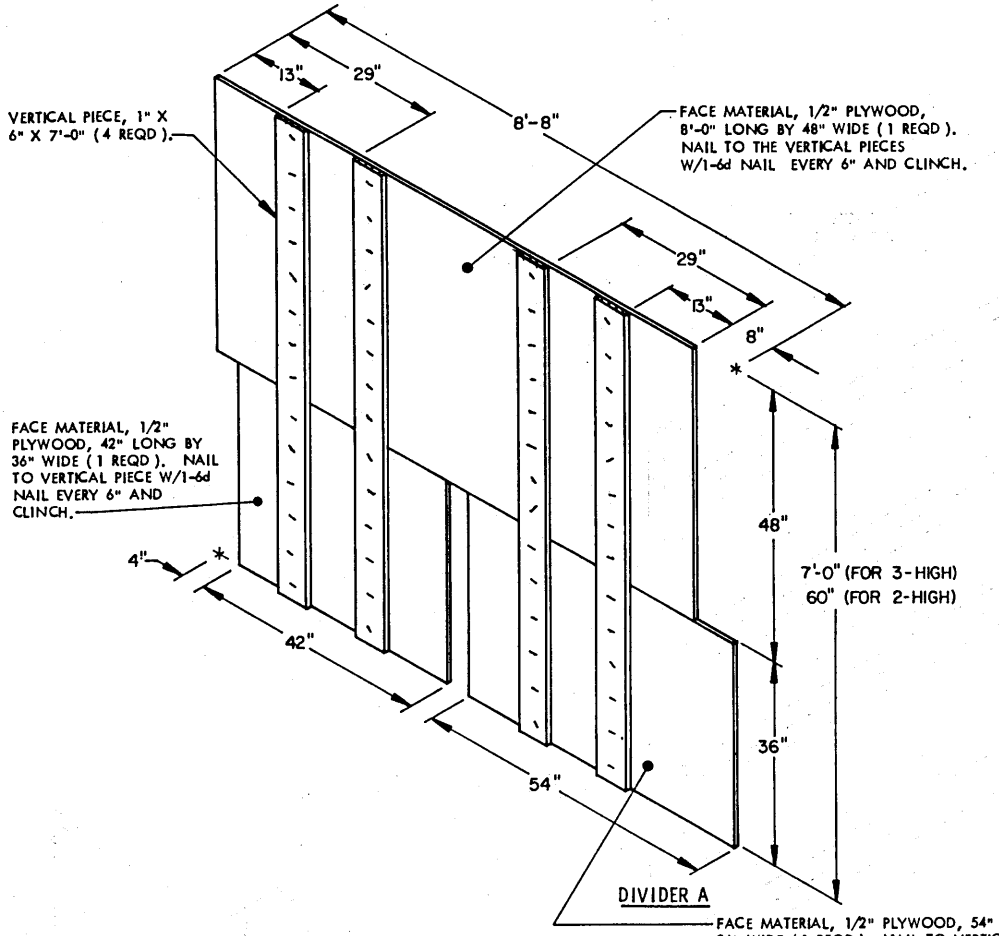


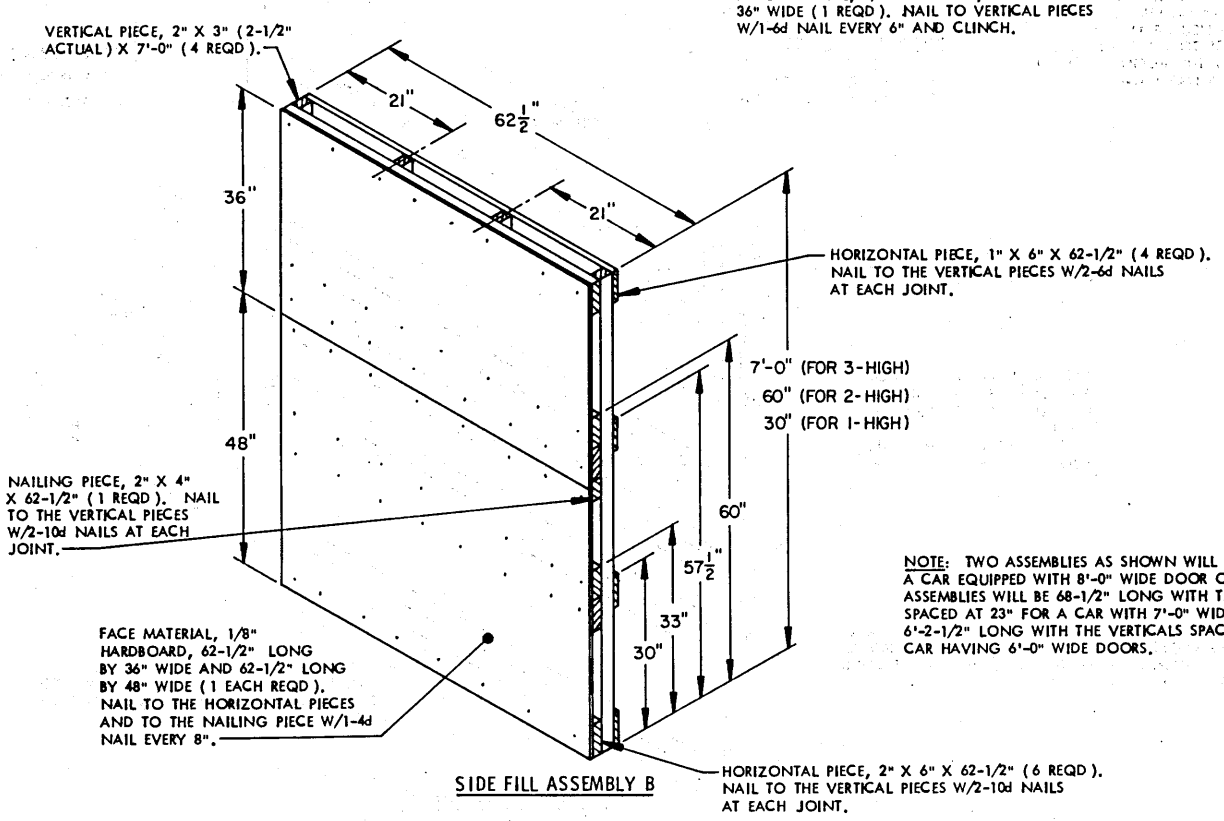
SIDE FILL ASSEMBLY A



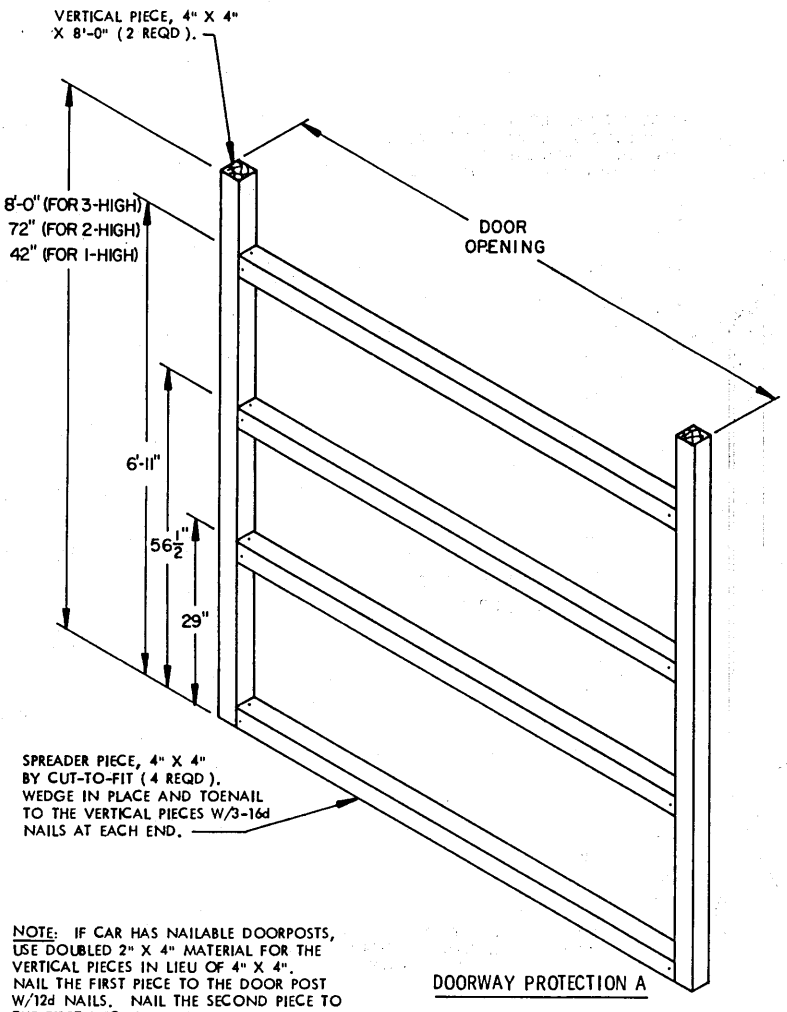
SEPARATOR GATE A

DETAILS





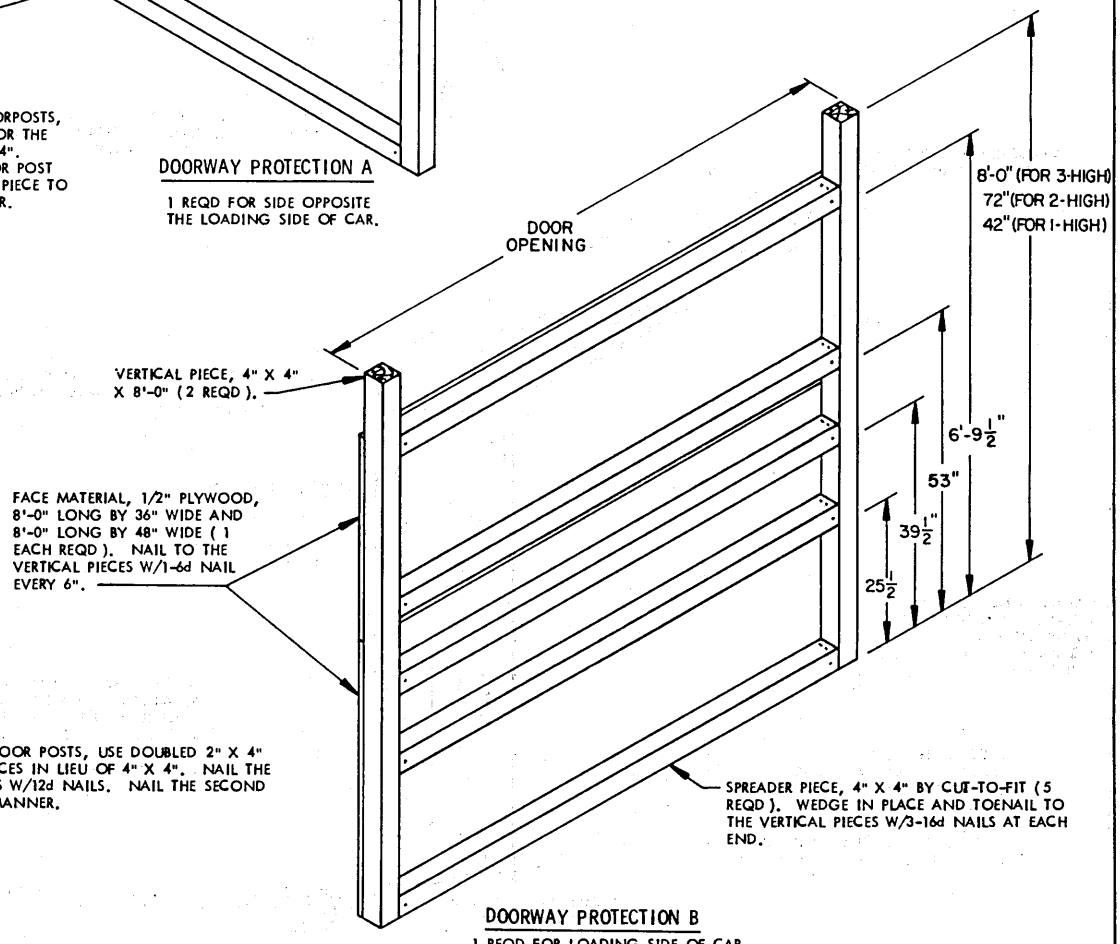
NOTE: TWO ASSEMBLIES AS SHOWN WILL BE REQUIRED FOR A CAR EQUIPPED WITH 8'-0" WIDE DOOR OPENINGS. THE ASSEMBLIES WILL BE 68-1/2" LONG WITH THE VERTICAL PIECES SPACED AT 23" FOR A CAR WITH 7'-0" WIDE DOORS, AND 6'-2-1/2" LONG WITH THE VERTICALS SPACED AT 25" FOR A CAR HAVING 6'-0" WIDE DOORS.



NOTE: IF CAR HAS NAILABLE DOORPOSTS, USE DOUBLED 2" X 4" MATERIAL FOR THE VERTICAL PIECES IN LIEU OF 4" X 4". NAIL THE FIRST PIECE TO THE DOOR POST W/12d NAILS. NAIL THE SECOND PIECE TO THE FIRST PIECE IN A LIKE MANNER.

DOORWAY PROTECTION A

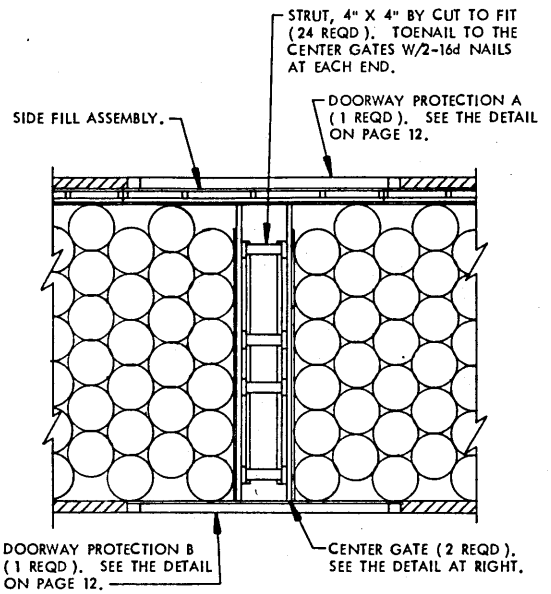
1 REQD FOR SIDE OPPOSITE THE LOADING SIDE OF CAR.



NOTE: IF CAR HAS NAILABLE DOOR POSTS, USE DOUBLED 2" X 4" MATERIAL FOR THE VERTICAL PIECES IN LIEU OF 4" X 4". NAIL THE FIRST PIECE TO THE DOOR POSTS W/12d NAILS. NAIL THE SECOND PIECE TO THE FIRST IN A LIKE MANNER.

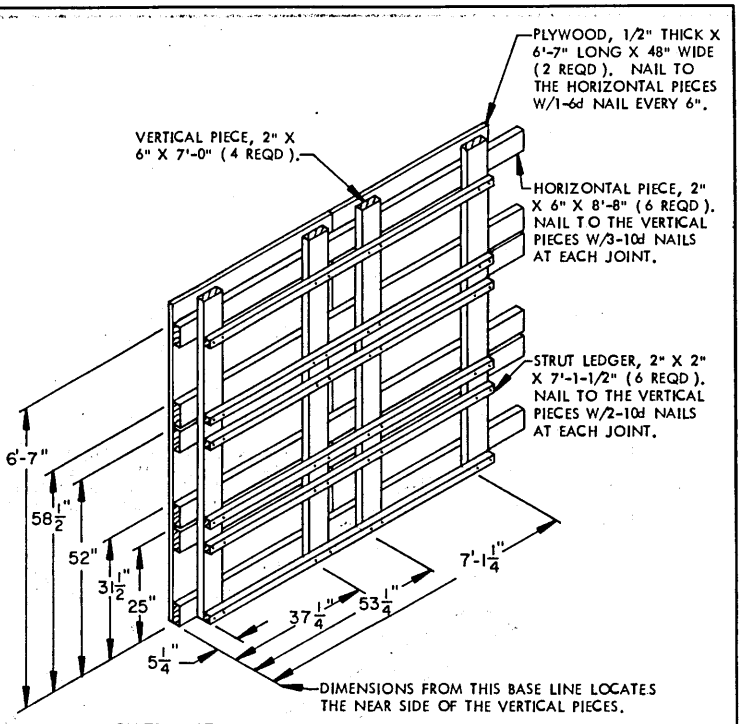
DOORWAY PROTECTION B

1 REQD FOR LOADING SIDE OF CAR



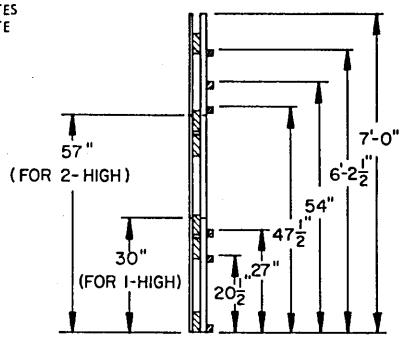
PARTIAL PLAN VIEW

THE ABOVE VIEW DEPICTS THE CENTER GATE/STRUT METHOD OF BLOCKING WHEN THE VOID AT THE CENTER OF THE CAR IS 24" OR MORE. IF THE VOID IS LESS THAN 24", REFER TO THE SOLID FILL METHOD PROCEDURES ON THE LOWER HALF OF THIS PAGE.



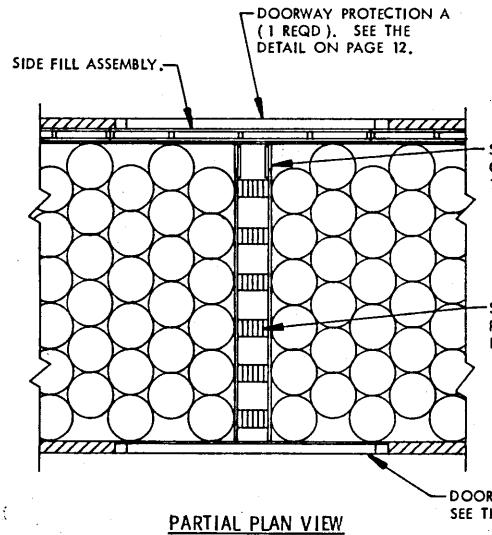
CENTER GATE

RIGHT HAND AND LEFT HAND GATES ARE REQUIRED. A LEFT HAND GATE IS SHOWN.



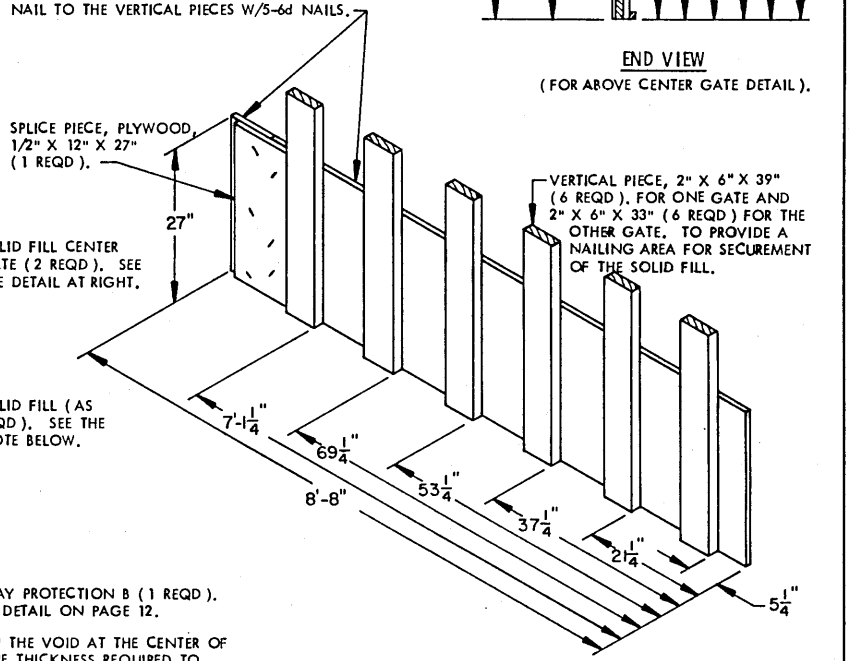
END VIEW

(FOR ABOVE CENTER GATE DETAIL).



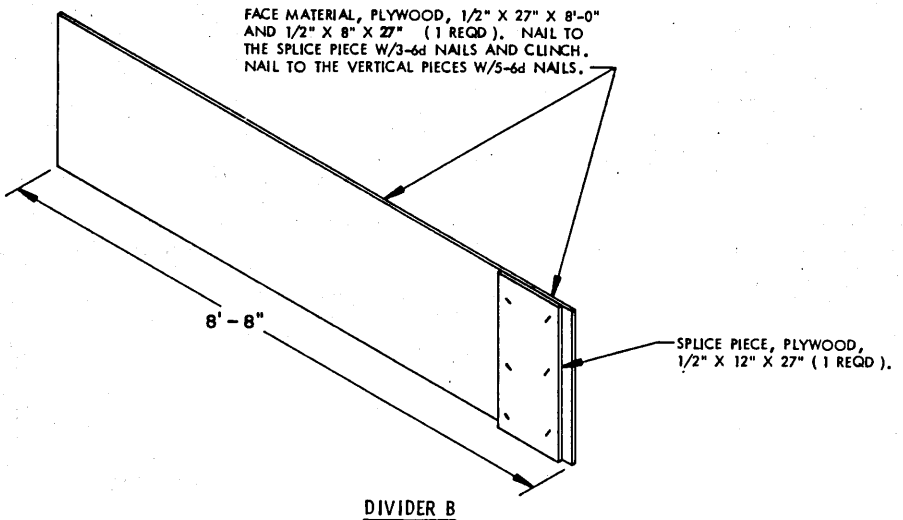
PARTIAL PLAN VIEW

THE ABOVE VIEW DEPICTS THE SOLID FILL/CENTER GATE METHOD WHEN THE VOID AT THE CENTER OF THE CAR IS LESS THAN 24". SOLID FILL, 6" WIDE BY 39" 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 PIECES 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 LAST SOLID FILL PIECE W/3-10d NAILS.

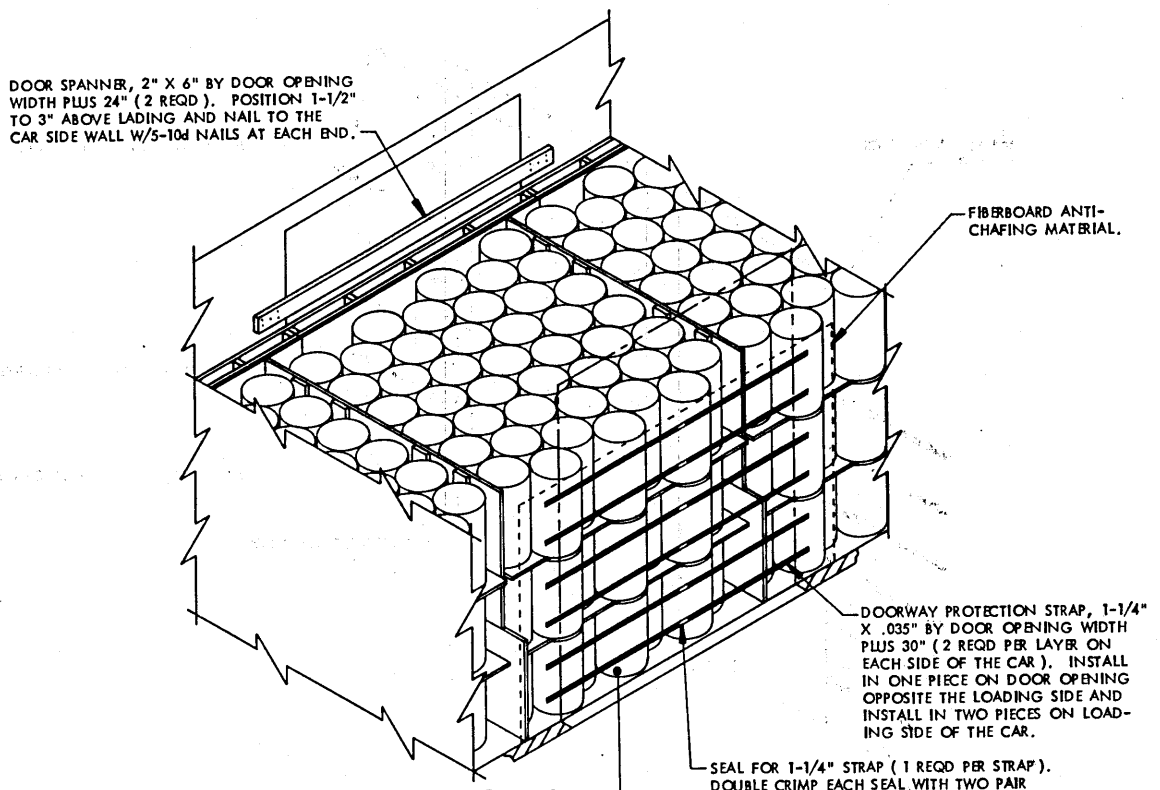


SOLID FILL CENTER GATE

RIGHT HAND AND LEFT HAND GATES ARE REQUIRED. A RIGHT HAND GATE IS SHOWN.


FACE MATERIAL, PLYWOOD, 1/2" X 27" X 8'-0" AND 1/2" X 8" X 27" (1 REQD). NAIL TO THE SPLICE PIECE W/3-6d NAILS AND CLINCH. NAIL TO THE VERTICAL PIECES W/5-6d NAILS.
8' - 8"
SPLICE PIECE, PLYWOOD, 1/2" X 12" X 27" (1 REQD).

DIVIDER B



DOORWAY PROTECTION FOR CARS EQUIPPED WITH PLUG TYPE DOORS

SEE "DOORWAY PROTECTION STRAP INSTALLATION" DETAIL ON PAGE 16.

SPECIAL NOTES:

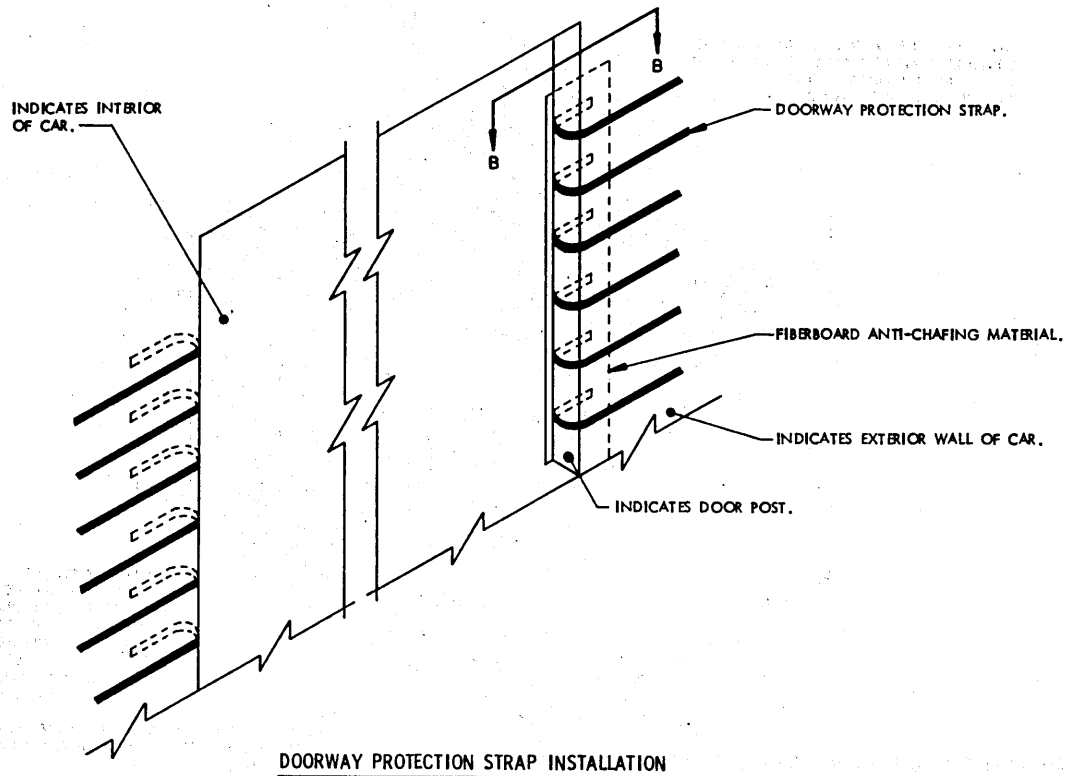
1. THE ISOMETRIC VIEW ABOVE DEPICTS THE PROCEDURES THAT MUST BE USED WHEN OUTLOADING CARS EQUIPPED WITH PLUG TYPE DOORS. TWO STRAPS WILL BE INSTALLED FOR EACH LAYER OF FIBERBOARD DRUMS ON EACH SIDE OF THE CAR. SEE SPECIAL NOTE 2.

2. WHEN A CAR EQUIPPED WITH A COMBINATION OF CONVENTIONAL SLIDING DOORS AND PLUG TYPE DOORS, A COMBINATION OF TWO TYPES OF DOORWAY PROTECTION MUST BE USED. SEE "DOORWAY PROTECTION" DETAILS ON PAGE 12 FOR CONVENTIONAL SLIDING TYPE DOORS AND DETAIL ABOVE FOR PLUG TYPE DOORS. SEE GENERAL NOTE "F" ON PAGE 2 AND SPECIAL NOTE 4 BELOW.

3. THE DOORWAY PROTECTION STRAP OPPOSITE THE LOADING SIDE OF THE CAR MAY BE INSTALLED PRIOR TO LOADING OPERATIONS. THE STRAPS ON THE LOADING SIDE MUST BE NAILED PRIOR TO LOADING DRUMS IN THE DOORWAY AREA, AND PLACED TO THE EXTERIOR OF THE CAR TO FACILITATE LOADING OPERATIONS. AFTER LOADING OPERATIONS ARE COMPLETED, THESE STRAPS MUST BE TENSIONED AND SEALED WITH ONE SEAL. SEE GENERAL NOTE "M" ON PAGE 2. IF NAIL-ON STRAPPING IS NOT AVAILABLE, NAILLESS STRAPPING MAY BE USED. IF NAILLESS STRAPPING IS USED, NAIL HOLES MUST BE DRILLED OR PUNCHED FOR SECURING THE STRAPPING TO THE DOOR POST.

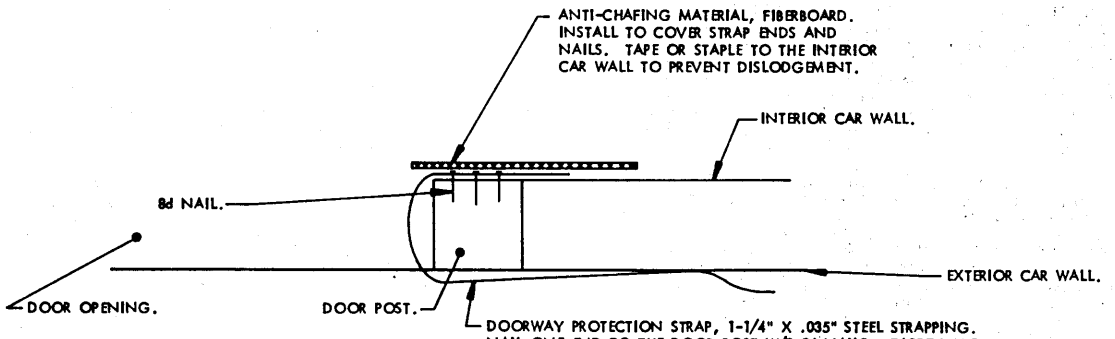
4. CAUTION: WHEN LOADING A CAR EQUIPPED WITH A COMBINATION OF SLIDING DOORS AND PLUG TYPE DOORS, THE DOORWAY PROTECTION STRAP MUST SPAN BOTH, THE SLIDING DOOR AND THE PLUG TYPE DOOR. THEN, THE CONVENTIONAL DOORWAY PROTECTION WILL BE INSTALLED IN THE CONVENTIONAL DOORWAY OPENING IN CONJUNCTION WITH THE STRAPPING.

5. ALTHOUGH NOT SHOWN IN THE DETAIL ABOVE FOR CLARITY PURPOSES, ANTI-CHAFING MATERIAL, SUCH AS SHEETS OF FIBERBOARD, MUST BE USED BETWEEN THE STEEL STRAPPING AND THE DRUMS CONTAINING EXPLOSIVE. ONE ACCEPTABLE METHOD FOR PROVIDING ANTI-CHAFING IS TO DRAPE PIECES OF FIBERBOARD FROM SCRAPPED BOXES OVER THE STRAPPING.



DOORWAY PROTECTION STRAP INSTALLATION

THE VIEW ABOVE DEPICTS THE LOADING SIDE OF THE CAR AFTER THE STRAPS HAVE BEEN NAILED TO THE DOOR POSTS OF THE CAR.



SECTION B-B