APPROVED BY
HAZARDOUS MATERIALS SYSTEMS
(BOE) ASSOCIATION OF AMERICAN
RAILROADS
DATE 1/6/89

LOADING AND BRACING (CL & LCL) IN BOX CARS OF PROPELLANTS, OTHER SOLIDS, OR LIQUIDS IN METAL DRUMS

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

CAUTION:

CARS EQUIPPED WITH MECHANICAL BRACING DEVICES MUST NOT BE USED FOR SHIPMENT OF EXPLOSIVES SUCH AS DYNAMITE, T.N.T., 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. IT IS PERMISSABLE TO SHIP "CARPET ROLLS" OF PROPELLANTS WHEN PACKED IN METAL DRUMS.

THIS DRAWING SUPERSEDES DRAWING 19-48-2471-5C89, DATED 21 NOVEMBER 1957 (REFERENCE IS MADE TO PAGES 24 AND 25).

REVISIONS			

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U.S. ARMY AMC DRAWING

FEBRUARY 1989

CLASS	DIVISION	DRAWING	FILE
19	48	4173	5F 1000

DO NOT SCALE

PROJECT FSA 75-66

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 HEREIN APPLY TO PROPELLANT POWDER, SOLIDS, OR LIQUIDS IN METAL DRUMS. SEE "CAUTION" NOTE ON COVER PAGE.

C. FOR DETAILS AND SPECIFICATIONS OF DRUMS, SEE "TYPICAL DRUM DETAILS" ON PAGE 3.

D. TO DETERMINE THE LOADING PATTERN, CAR SIZE, DUNNAGE REQUIREMENTS, ETC, FOR OUTLOADING A COMMODITY, REFER TO THE FOLLOWING:

1. FROM THE "TYPICAL DRUM DETAILS" ON PAGE 3, SELECT THE DRUM TYPE TO BE OUTLOADED.

2. FIND SPECIMEN CONTAINER IN CHART ON PAGE 4. READ ACROSS CHART FOR REQUIREMENTS, AND APPLY THE GUIDANCE OF SPECIAL NOTES ON PAGE 4 AND IN THE DETAILS ON PAGE 5.

E. THE OUTLOADING PROCEDURES SHOWN ON PAGES 6 THROUGH 15 ARE FOR CONVENTIONAL TYPE BOX CARS OF VARIOUS LENGTHS AND WIDTHS HAVING CONVENTIONAL SLIDING DOORS OR PLUG DOORS. CAUTION: DUNNAGE MATERIAL MUST NOT BE NAILED TO ANY PLUG DOOR, WHETHER AUXILIARY OR MAIN, EXCEPT TO A NAILING STRIP IF A DOOR IS SO EQUIPPED, FOR SECURING SUCH ITEMS AS GATE HOLD DOWN OR DOORWAY SPANNER DUNNAGE; ALSO, SPECIAL PROVISIONS MUST BE IMPLEMENTED AS DIRECTED WITHIN THE "SPECIAL NOTES" SECTION WHICH APPLIES TO THE BASIC LOADS INVOLVED. 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. ATTENTION IS DIRECTED TO GENERAL NOTE "P".

F. THE OUTLOADING PROCEDURES DEPICTED ON PAGES 16 THROUGH 28 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 HEREIN. CAUTION: BOX CARS EQUIPPED WITH MEMBERS WHICH DO NOT MEET THE LOCATION REQUIREMENTS MUST NOT BE USED.

1. A CROSS MEMBER, WHEN USED AS SPECIFIED BY ANY ONE OF THE OUTLOADING METHODS CONTAINED HEREIN, WILL NOT BE RELIED UPON TO RETAIN MORE LADING WEIGHT ON EITHER SIDE THAN 4,000 POUNDS, FOR THE SPECIFIC OUTLOADING METHOD BEING USED. VOIDS LENGTHWISE WITHIN THE LOAD MUST BE HELD TO A MINIMUM AND CROSS MEMBERS MUST BE PLACED AGAINST THE LADING OR GATE AS TIGHTLY AS THE SPACING OF 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 BEING USED FOR SHIPMENT HAS A "BOWED END", RATHER THAN SQUARING OFF THE END BY INSTALLING DUNNAGE, ADDITIONAL CROSS MEMBERS (AND GATES IF REQUIRED FOR THE LOAD) CAN BE INSTALLED NEAR THE END WALL OF THE CAR TO PROVIDE A "SQUARED" END. THESE CROSS MEMBERS SHOULD BE INSTALLED IN THE SAME QUANTITY AND AT THE SAME HEIGHTS AS THE CROSS MEMBERS USED THROUGHOUT THE LOAD AS LOAD BLOCKING MEMBERS.

G. THE NUMBER OF LADING UNITS MAY BE ADJUSTED TO FIT THE SIZE OF THE BOX CAR BEING LOADED OR THE QUANTITY TO BE SHIPPED; HOWEVER, THE APPROVED METHODS SPECIFIED HEREIN MUST BE FOLLOWED AS CLOSELY AS POSSIBLE FOR BLOCKING, BRACING, AND STAYING OF THE DESIGNATED ITEM. SEE GENERAL NOTE "Q".

(GENERAL NOTES 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.

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

PLYWOOD --: GROUP 8, CONSTRUCTION AND INDUSTRIAL PLYWOOD, INTERIOR WITH EXTERIOR GLUE, GRADE C-D. IF SPECIFIED GRADE IS NOT AVAILABLE, A BETTER INTERIOR OR EXTERIOR GRADE MAY BE SUBSTITUTED; FED SPEC NN-P-530.

WIRE: ------: ANNEALED, BLACK; FED SPEC QQ-W-461.

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)

H. OTHER TYPES OF LADING ITEMS MAY BE LOADED IN THE CARS WHICH ARE PARTIALLY LOADED WITH THE DESIGNATED 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.

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

K. 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.

L. 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 SIDE WALL OF THE TRANSPORTING VEHICLE, OR WHEN LAMINATING DUNNAGE. 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.

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 SIDE WALL OF THE CAR, THAT GUIDANCE SHOULD BE APPLIED FOR THE NAILING OF THE APPLICABLE DUNNAGE PIECES. IF A NAIL SIZE IS NOT SPECIFIED, 30d NAILS SHOULD BE USED.

N. FOR ADDITIONAL GUIDANCE, ATTENTION IS DIRECTED TO THE "TYPICAL DRUM DETAILS" ON PAGE 3 AND TO THE "SPECIAL NOTES" SECTION WHICH IS IMMEDIATELY ADJACENT TO THE DEPICTED OUTLOADING METHODS.

O. THE DOORWAY AREA WITHIN A CAR IS DEFINED AS THE CARGO SPACE THAT IS ADJACENT TO A CONVENTIONAL TYPE AND/OR A PLUG DOOR. THE LENGTH OF A "DOORWAY AREA" CAN BE AS MUCH AS 24 FEET IN SOME CARS THAT ARE EQUIPPED WITH STAGGERED DOORS.

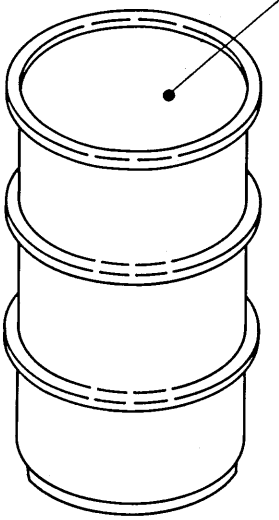
P. NOTICE: THE TYPICAL LOADS AS DEPICTED ON PAGES 6 THROUGH 15 SHOW DOORWAY OPENINGS FROM 6'-0" WIDE TO 12'-0" WIDE. THE WIDER DOOR CARS HAVE BEEN DEPICTED TO SHOW TYPICAL APPLICATIONS OF DOORWAY BLOCKING. HOWEVER, IT IS RECOMMENDED THAT CARS WITH NARROW DOOR OPENINGS BE USED AS OFTEN AS POSSIBLE. THE NARROWER DOOR OPENINGS WILL REQUIRE LESS DUNNAGE MATERIAL, LESS MANHOURS, AND WILL SPEED LOADING OPERATIONS. IT IS ALSO RECOMMENDED THAT 40'-6" LONG CONVENTIONAL TYPE CARS BE USED FOR FIBER DRUM SHIPMENTS IN LIEU OF 50'-6" CARS WHEREVER POSSIBLE, PROVIDING THE USE OF A SHORTER CAR DOES NOT RESULT IN UNFAVORABLE OUTLOADING AND/OR TRANSPORTATION COSTS. LOADS IN 40'-6" LONG CARS WILL NOT COMPACT AND/OR SHIFT AS MUCH DURING SHIPMENT AS LOADS IN 50'-6" CARS.

Q. ALTHOUGH MANY LOADS ARE SPECIFIED HEREIN, ALL OF THE DIFFERENT DRUMS IN USE ARE NOT COVERED SPECIFICALLY. THE LOADS AS SHOWN ARE BASED ON DIFFERENT SIZE AND TYPE DRUMS THAT HAVE BEEN SELECTED TO REPRESENT THIS FAMILY OF CONTAINERS. IF A DRUM IS TO BE SHIPPED AND THIS PROCEDURE DRAWING DOES NOT SPECIFY PROCEDURES FOR THAT SPECIFIC DRUM, THE GUIDANCE DATA AND THE LOADING AND BLOCKING PRINCIPLES CONTAINED HEREIN WILL BE APPLIED. SUFFICIENT MATERIAL IS INCLUDED TO MAKE IT POSSIBLE TO LOAD, BLOCK AND BRACE ANY DRUM IN ACCORDANCE WITH THESE APPROVED PROCEDURES. NOTICE/CAUTION: CARE MUST BE EXERCISED TO ENSURE THAT AN ECONOMICAL LOAD IS BUILT FOR SHIPMENT, AND THAT THE "LOAD LIMIT" OF THE CAR BEING USED IS NOT EXCEEDED.

R. POWER DRIVEN STAPLES MAY BE USED AS ALTERNATIVE FASTENERS FOR NAILS WHEN CONSTRUCTING DUNNAGE ASSEMBLIES WHICH ARE TO BE USED IN THE DELINEATED TRAILER 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.

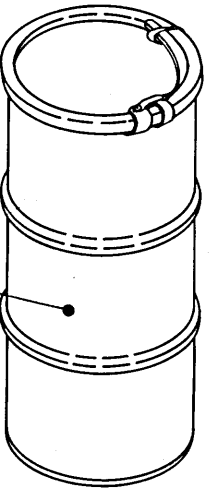
S. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, ONE SEAL CRIMPED WITH TWO PAIR OF NOTCHES, WILL BE USED TO SEAL THE JOINT.

T. THE PROCEDURES DEPICTED WITHIN THIS DRAWING ARE BASED ON ENGLISH MEASUREMENTS. THE METRIC EQUIVALENT MAY BE COMPUTED BY USING 1" EQUALS 25.4MM. METRIC EQUIVALENTS FOR WEIGHTS ARE BASED ON 1 POUND EQUALS 0.454KG.



DRUM, METAL SHIPPING, STEEL, FED SPEC PPP-D-705 AND 736, BOLTED-RING CLOSURE, SWEDGED-IN OR I BAR ROLLING HOOP. FOR METAL DRUM MIL SPEC MIL-C-70469, SEE SPECIAL NOTE BELOW.

SPECIMEN DRUM NO. 1

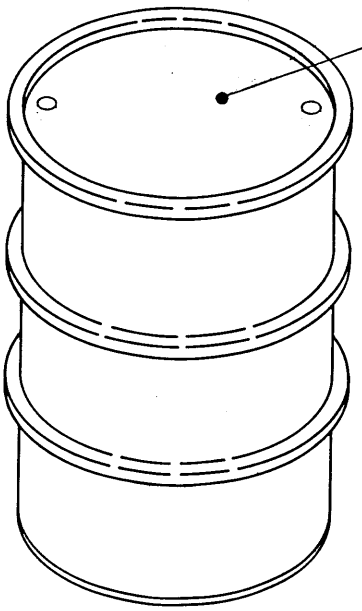


DRUM, METAL SHIPPING, STEEL, FED SPEC PPP-D-705 AND 736, LEVER-LOCK TYPE CLOSURE SWEDGED-IN OR I BAR ROLLING HOOP.

SPECIMEN DRUM NO. 2

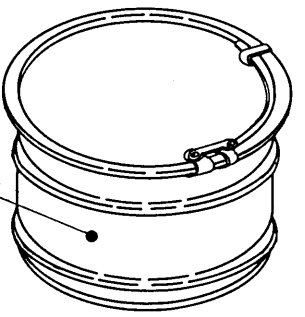
SPECIAL NOTE:

INCLUDED AS SPECIMEN NO. 1 IS AN IMPROVED METAL DRUM, MIL SPEC MIL-C-70469 WHICH IS STACKABLE (VERTICAL NESTING), HAS A LEVER-LOCK TYPE CLOSURE AND FOUR WIDE-FACED FLAT ROLLING HOOPS. FOR BLOCKING AND BRACING A LOAD OF THIS SPECIFIC TYPE IMPROVED METAL DRUM, THE PROCEDURES SPECIFIED ON PAGES 8 AND 9 IN THIS DRAWING WILL BE USED.



DRUM, METAL, 55 GAL FED SPEC PPP-D-700, 729 AND 732.

SPECIMEN DRUM NO. 3



POWDER CONTAINER, METAL, MK2 MOD O, FOR BALLISTITE SHEET PROPELLANT. SEE BUORD DRAWING NO. 591971, DATED 12-31-47.

SPECIMEN DRUM NO. 4

TYPICAL DRUM DETAILS

SPECIAL NOTES:

1. DRUMS MUST FORM STRAIGHT LINES ACROSS THE WIDTH OF THE BOX CAR.

2. WHEN LOADING METAL DRUMS IN A BOX CAR, AS SHOWN IN PATTERN NO. 1 ON PAGE 5, THE FIRST DRUM SHOULD CONTACT THE CAR END WALL AND SIDE WALL. THE REMAINING DRUMS IN THAT STACK SHOULD BE POSITIONED TO CONTACT THE CAR END WALL AND AN ADJACENT DRUM. THE REMAINING SPACE BETWEEN THE LAST POSITIONED DRUM IN THAT STACK AND THE CAR SIDE WALL SHOULD BE EQUAL TO ONE-HALF (1/2) OF THE DRUM DIAMETER (FOR INSTANCE, IF THE DIAMETER OF THE DRUM IS 16", THE SPACE SHOULD BE 8"). IF THE EXCESS SPACE IS NOT EQUAL TO ONE-HALF (1/2) THE DRUM DIAMETER, SOLID FILL OR CRIB FILL, OR A COMBINATION OF BOTH, SHOULD BE USED TO ENSURE A TIGHT LOAD. IN SOME CASES A SMALL AMOUNT OF SPACE MAY BE LEFT BETWEEN LATERALLY ADJACENT DRUMS TO SPEED OUTLOADING PROCEDURES, AS DEPICTED ON PAGES 7 AND 9.

3. TO SPEED LOADING OPERATIONS OF DRUMS, A PLYWOOD DECKING MAY BE USED BETWEEN EACH LAYER OF THE LOAD SO THAT CONVEYOR MAY BE POSITIONED ON AN INSTALLED LAYER OF DRUMS. THIS WILL ALSO MAKE A PLATFORM FOR THE LOADING CREW, SO THAT THE CONTAINER LIDS ARE NOT DAMAGED. THE DECKING SHOULD BE CAR WIDTH BY LOAD LENGTH. THE DECKING MUST BE INSTALLED IN SUCH A MANNER THAT IT WILL NOT SHIFT OUT OF PLACE DURING TRANSIT.

4. WHEN SEPARATOR GATES AND CENTER GATES ARE USED, ALIGN DRUMS ON ONE SIDE OF A GATE WITH DRUMS IN A SIMILAR LOCATION ON THE OPPOSITE SIDE.

5. THE FOLLOWING PROCEDURES CAN BE USED TO HELP SELECT THE PROPER "NESTED" LOADING PATTERN FOR A DRUM SHIPMENT. THE FORMULAS OF THESE PROCEDURES CAN BE USED TO DETERMINE THE NUMBER OF DRUMS IN WIDTH THE FIRST STACK TO BE LOADED INTO A CAR WILL BE AND HOW TO POSITION THESE DRUMS ACROSS THE WIDTH OF THE CAR BEING USED, AND HOW TO DETERMINE THE NUMBER OF STACKS THAT CAN BE LOADED INTO A BAY AND/OR INTO A CAR. INCHES ARE TO BE USED FOR ALL CALCULATIONS.

   A. TO DETERMINE CONFIGURATION OF A "FIRST" STACK:

   (1) DIVIDE THE INSIDE WIDTH OF THE CAR TO BE USED BY THE DIAMETER OF THE DRUM TO BE SHIPPED, TO OBTAIN THE NUMBER OF DRUMS WHICH CAN BE LOADED ACROSS THE WIDTH OF THE CAR. DISREGARD THE FRACTIONAL PART OF THIS ANSWER AND RETAIN THE WHOLE NUMBER PART. EXCEPTION: IF FRACTIONAL PART OF ANSWER IS EXACTLY ONE-HALF (1/2 OR .50), THE "OFF-SET NESTED PATTERN" SHOULD BE SELECTED IMMEDIATELY, AND THE FOLLOWING STEPS (2), (3), AND (4) DISREGARDED.

(CONTINUED AT RIGHT)

(SPECIAL NOTES CONTINUED)

(2) MULTIPLY THE WHOLE NUMBER OF THE ANSWER FOUND BY (1) AT LEFT, BY THE DRUM DIAMETER TO OBTAIN THE TOTAL LOAD WIDTH, AND SUBTRACT THIS ANSWER FROM THE INSIDE WIDTH OF THE CAR, TO FIND THE AMOUNT OF EXCESS (UNUSED) SPACE ACROSS THE WIDTH OF THE CAR.

(3) FOR A NESTED PATTERN SUCH AS THE 4-3-4 ARRANGEMENT SHOWN ON PAGE 5 DIVIDE THE EXCESS SPACE ANSWER FOUND BY (2) ABOVE BY ONE LESS THAN THE WHOLE NUMBER ANSWER FOUND BY (1) AT LEFT, TO OBTAIN THE SPACE TO BE LEFT AT EACH LOCATION BETWEEN LATERALLY ADJACENT DRUMS. CAUTION: THIS ANSWER, THE AMOUNT FOR A SINGLE SPACE, CAN NOT EXCEED 1-1/2".

(4) FOR A NESTED PATTERN SUCH AS THE 6-6-6 ARRANGEMENT SHOWN ON PAGE 5 DIVIDE THE EXCESS SPACE ANSWER FOUND BY (2) ABOVE BY ONE-HALF (1/2) OF ONE LESS THAN THE WHOLE NUMBER ANSWER FOUND BY (1) AT LEFT, TO OBTAIN THE SPACE TO BE LEFT AT EACH LOCATION BETWEEN LATERALLY ADJACENT DRUMS. "FILL" MATERIAL, AS SPECIFIED ON PAGE 5, MUST BE USED TO GET THE EXCESS SPACE BACK WITHIN LIMITS.

B. TO DETERMINE NUMBER OF STACKS PER A CERTAIN LENGTH BAY AND/OR PER THE TOTAL LENGTH OF A CAR IT IS NECESSARY TO SELECT THE TYPE OF "NESTED" CONFIGURATION THAT WILL BE USED BY APPLYING PARAGRAPH A CRITERIA ABOVE, AND THEN:

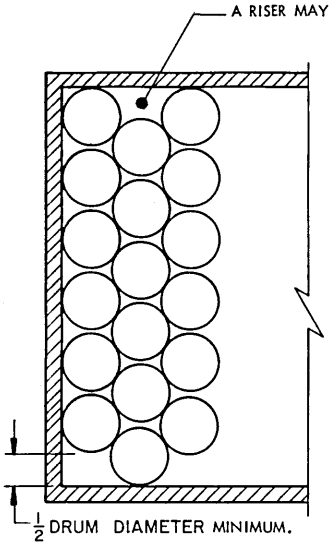
(1) DETERMINE THE LENGTHWISE CENTER-TO-CENTER DISTANCE BETWEEN "NESTED" STACKS BY "SQUARING" THE SUMMATION OF ONE-HALF OF ONE DRUM DIAMETER AND ONE-HALF OF ONE SPACE BETWEEN LATERALLY ADJACENT DRUMS, SUBTRACTING THIS ANSWER FROM THE DIAMETER OF ONE DRUM "SQUARED", AND THEN BY TAKING THE "SQUARE ROOT" OF THIS LAST ANSWER.

(2) TO DETERMINE THE NUMBER OF STACKS PER A PRE-SELECTED LENGTH BAY (I.E., ONE-FOURTH OF A CAR LENGTH) OR THE NUMBER OF STACKS PER CAR LENGTH IF THE LOAD IS NOT TO BE BAYED OFF, SUBTRACT THE DIAMETER OF ONE DRUM FROM THE PRE-SELECTED OR CAR LENGTH FIGURE, DIVIDE THIS RESULTANT ANSWER BY THE CENTER-TO-CENTER ANSWER FOUND BY (1) AT LEFT, DROP THE FRACTIONAL PART OF THIS ANSWER KEEPING THE WHOLE NUMBER PART, AND ADD ONE TO THE WHOLE NUMBER TO GET THE NUMBER-OF-STACKS ANSWER. WHERE CALCULATIONS ARE BASED ON A BAYED-LOAD, INCREASING THE NUMBER OF BAYS OR USING UNEVEN LENGTH BAYS WILL MAKE IT POSSIBLE TO PLAN AN EFFICIENT LOAD FOR THE QUANTITY OF DRUMS THAT ARE TO BE SHIPPED.

C. SOME DRUMS, BECAUSE OF THEIR SIZE, CAN BE LOADED BY THE 6-6-6 TYPE OR THE 4-3-4 TYPE PATTERN. FOR THESE INSTANCES, A PATTERN SHOULD BE SELECTED THAT BEST SUITS THE QUANTITY TO BE SHIPPED AND/OR REQUIRES THE LEAST AMOUNT OF MANHOURS AND DUNNAGE TO LOAD, BLOCK AND BRACE.

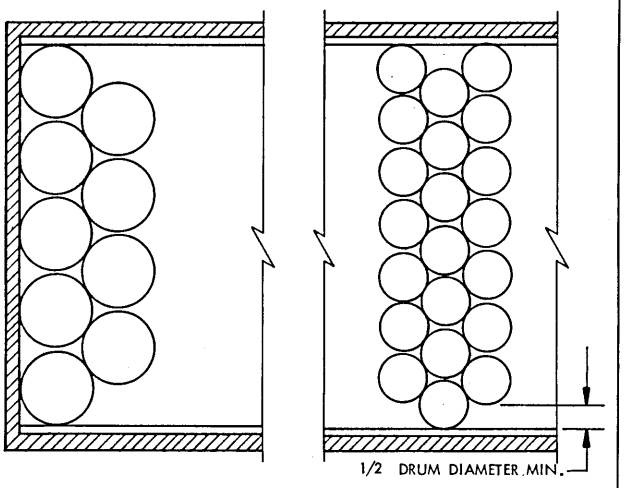
ITEM	CHARACTERISTICS	DRUMS CAPABLE OF BEING NESTED	DRUMS CAPABLE OF BEING STACKED	RISER REQUIRED	SEPARATOR GATE REQUIRED	SUGGESTED LOADING PATTERN	DECKING REQD SEE "NOTE ● " ON PAGE 5	REFERENCE LOADING PROCEDURE	EXCEPTIONS
METAL DRUMS	SPECIMEN DRUM NO. 1 ROLLING HOOP BOLT RING CLOSURE	YES	YES	YES	YES (BAYS ONLY)	1 OR 2	NO SEE EXCEPTIONS	PAGES - 6 & 7, 8 & 9, 13, 14, 15, 16 & 17, 18 & 19, 20 & 21, 27, 28	DECKING MAY BE DELETED FROM SPECIFIED LOAD VIEWS.
	*SPECIMEN DRUM NO. 1 ROLLING HOOP LEVER-LOCK TYPE CLOSURE	NO/YES	YES	YES	YES (BAYS ONLY)	1 OR 2	YES	PAGES - 8 & 9, 14, 20 & 21, 28	SEE PAGES 6 & 7 FOR TYPICAL DECKING REQUIREMENTS
	SPECIMEN DRUM NO. 2 LARGE TOP LEVER-LOCK TYPE CLOSURE	NO	NO	NO	YES (BETWEEN STACKS)	3	YES	PAGES - 8 & 9, 14, 20 & 21, 18	SEE PAGES 6 & 7 FOR TYPICAL DECKING REQUIREMENTS
	SPECIMEN DRUM NO. 2 LARGE TOP BOLT RING CLOSURE	NO	YES	NO	YES (BETWEEN STACKS)	3	NO	PAGES - 8 & 9, 14, 20 & 21, 28	
	SPECIMEN DRUM NO. 3 (55 GAL)	YES	NO	YES	YES (BAYS ONLY)	1 OR 2	YES	PAGES - 10 & 11, 13, 15, 22 & 23, 27, 28	
	SPECIMEN DRUM NO. 4 (POWDER CONTAINER)	YES	YES	YES	NO	1	NO	PAGES - 13, 24 & 25, 27	USE "RISER D" DETAILED ON PAGE 41

* SEE THE SPECIAL NOTE ON PAGE 3.



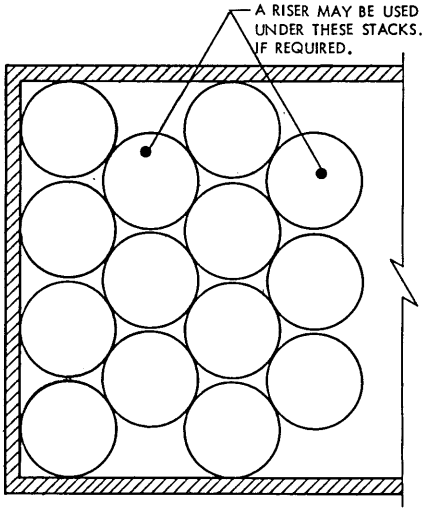
NOTE:

DRUMS MUST FORM STRAIGHT ROWS ACROSS THE WIDTH OF THE CAR TO ENSURE THAT ALL OF THE DRUMS ADJACENT TO A SEPARATOR OR CENTER GATE ARE IN DIRECT CONTACT WITH THE GATE, TO PREVENT LOOSENING OF THE LOAD DUE TO MILLING OF THE DRUMS.



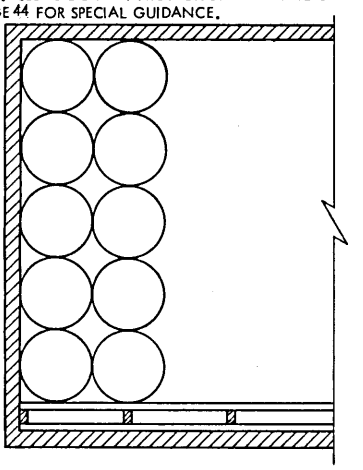
SIDE FILL ON BOTH SIDES OF CAR

① OFFSET NESTED LOADING PATTERN

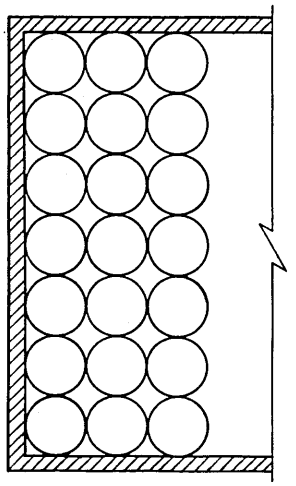


② NESTED LOADING PATTERN

MAY BE POSITIONED AT ONE SIDE OF CAR ONLY, IF DESIRED. HOWEVER, IF THE CAR BEING LOADED HAS PLUG DOORS, "FILL" MUST BE USED ON BOTH SIDES OF CAR. SEE "DOORWAY PROTECTION C" DETAIL ON PAGE 44 FOR SPECIAL GUIDANCE.

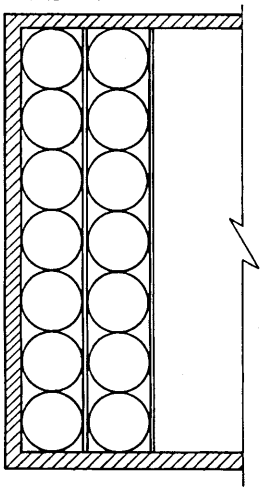


CRIB FILL AT ONE SIDE OF CAR



③ STRAIGHT-LINE LOADING PATTERN

MAY BE POSITIONED AT BOTH SIDES OF THE CAR. IF EXCESS CRIB FILL IS REQUIRED A DIFFERENT LOADING PATTERN MAY BE REQUIRED. NOTE THAT IF THE CAR BEING LOADED HAS PLUG DOORS, "FILL" MUST BE USED ON BOTH SIDES OF CAR. SEE "DOORWAY PROTECTION C" DETAIL ON PAGE 44 FOR SPECIAL GUIDANCE.

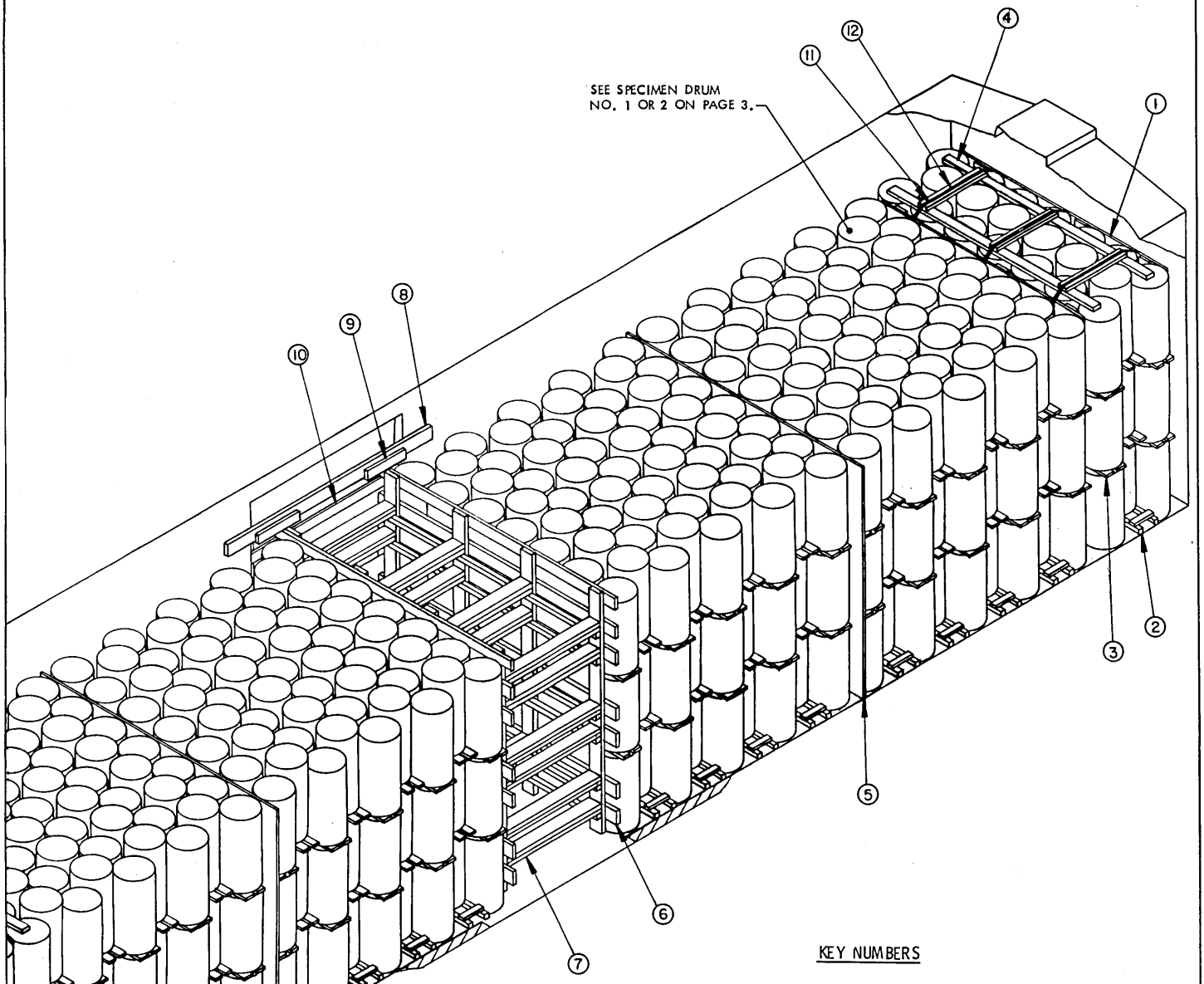


SEPARATOR GATE (PLYWOOD)

NOTE ● :

TO RETAIN INTERMEDIATE DECKING UNDER A PARTIAL LAYER, SEE "INTERMEDIATE DECKING STOP" DETAIL ON PAGE 43 WHICH MUST BE USED.

THREE BASIC LOADING PATTERNS AND SIDE FILL DETAILS



ISOMETRIC VIEW

KEY NUMBERS

(1) SEPARATOR GATE (4 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 29. SEE GENERAL NOTE "L" ON PAGE 2.

(2) RISER (AS REQUIRED TO RAISE NESTED DRUMS SO THAT A BODY TO SWEDGED RING, SWEDGED RING TO BODY CONTACT IS MAINTAINED THROUGHOUT EACH BAY). SEE "RISER A" DETAIL ON PAGE 34.

(3) INTERMEDIATE DECKING, 1" MATERIAL BY CAR WIDTH MINUS 1/2" (1/2" PLYWOOD MAY BE SUBSTITUTED). POSITION BETWEEN FIRST AND SECOND LAYER AND SECOND AND THIRD LAYER OF DRUMS AS DEPICTED IN THE "ELEVATION VIEW" ON PAGE 7.

(4) STRAPPING BOARD ASSEMBLY (2 REQD). SEE THE "STRAPPING BOARD ASSEMBLY" DETAIL ON PAGE 29.

(5) SEPARATOR GATE, PLYWOOD, 1/2" THICK BY CAR WIDTH MINUS 1/2" BY LOAD HEIGHT PLUS 2" (ONE REQUIRED TO FACE OFF EACH BAY, TWO REQUIRED IN THE LOAD AS SHOWN). CAUTION: MAKE CERTAIN THAT DRUMS ON EACH SIDE OF A GATE ARE DIRECTLY OPPOSITE EACH OTHER AS SHOWN IN THE "PLAN VIEW" SHOWN ON PAGE 7, THAT IS, A SEVEN WIDE DRUM STACK IS OPPOSITE A SEVEN WIDE DRUM STACK, SIX OPPOSITE A SIX, ETC. SEE THE PLYWOOD SPLICING DETAILS ON PAGE 32.

(6) CENTER GATE (2 REQD). SEE THE "CENTER GATE A" DETAIL ON PAGE 33.

(7) STRUT, 2" X 6" BY CUT TO FIT (DOUBLED) (24 REQD IN THE LOAD AS SHOWN). LAMINATE W/1-10d NAIL EVERY 6" AND TOENAIL THE TOP PIECE TO THE CENTER GATE W/2-12d NAILS AT EACH END, FOR STRUTS 48" OR GREATER IN LENGTH SEE THE "STRUT BRACING" DETAIL ON PAGE 35. SEE SPECIAL NOTES 3 AND 5 ON PAGE 7.

(8) GATE HOLDDOWN, 2" X 6" BY DOOR OPENING PLUS 24" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-10d NAILS AT EACH END.

(CONTINUED AT LEFT)

(KEY NUMBERS CONTINUED)

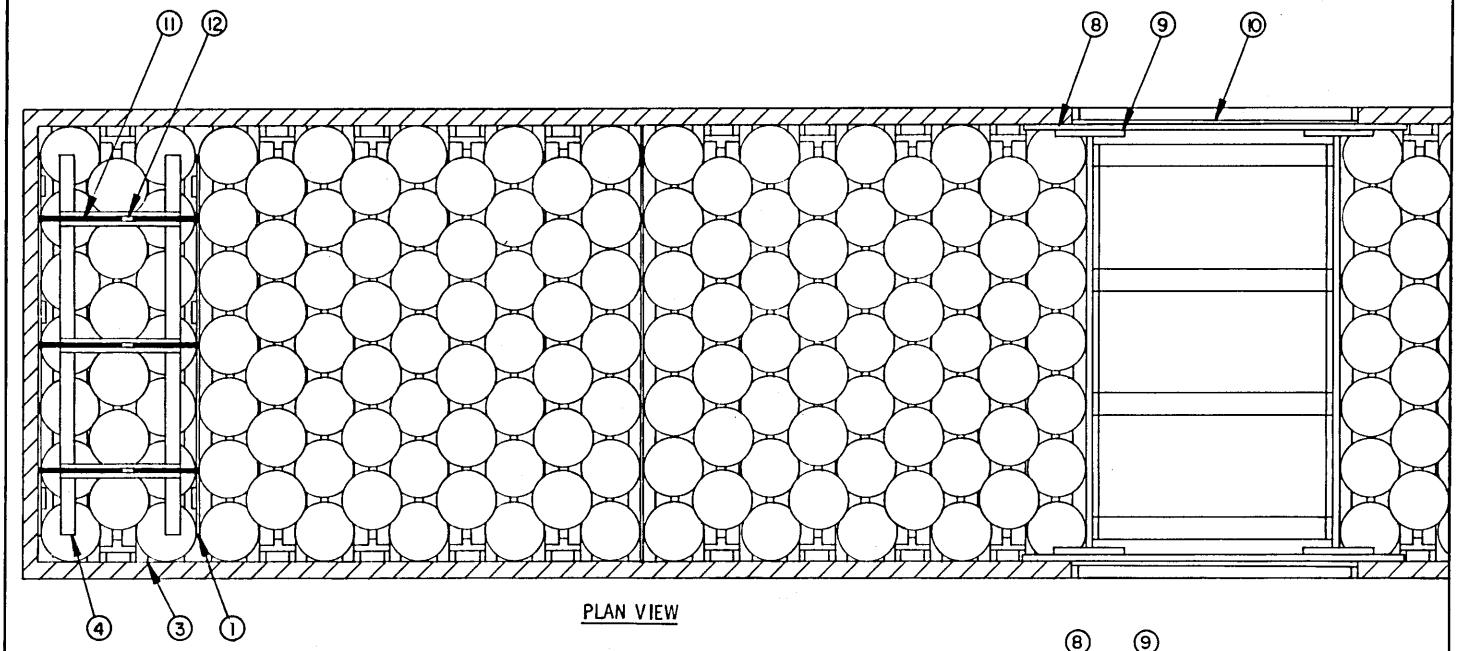
(9) GATE HOLD DOWN BLOCK, 2" X 4" X 18" (4 REQD). NAIL TO THE GATE HOLD DOWN, PIECE MARKED (8), W/4-10d NAILS.

(10) DOORWAY PROTECTION (2 REQD). SEE THE "DOORWAY PROTECTION B" DETAIL ON PAGE 36. SEE SPECIAL NOTE 4 ON PAGE 7.

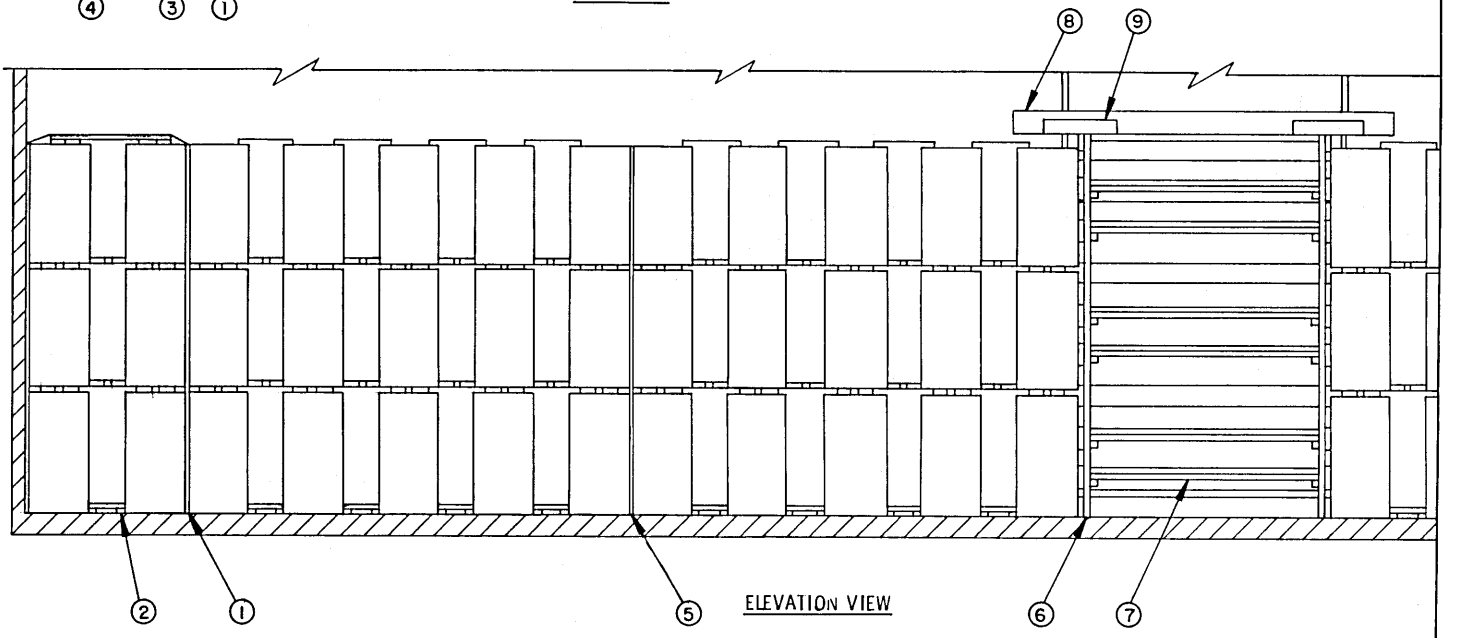
(11) BUNDLING STRAP, 1-1/4" X .035" OR .031" BY 25'-0" LONG STEEL STRAPPING (6 REQD). PRE-POSITION SO AS TO BE LOCATED AS SHOWN IN THE ISOMETRIC VIEW.

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

CARLOADING OF METAL DRUMS-IN A CONVENTIONAL BOX CAR



PLAN VIEW



ELEVATION VIEW

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	1581	527
1" X 6"	142	71
2" X 2"	430	143
2" X 3"	32	16
2" X 4"	71	48
2" X 6"	418	418
NAILS	NO. REQD	POUNDS
6d (2")	392	2-1/2
10d (3")	540	8-1/2
12d (3-1/4")	116	2
PLYWOOD, 1/2" THICK ---------- 400 SQ FT ------ 550 LBS		
STEEL STRAP, 1-1/4" X .035" OR .031"-------- 150' REQD ----21-1/2 LBS		
SEAL, FOR 1-1/4" STRAP ---------- 6 REQD --------- NIL		

(SPECIAL NOTES CONTINUED)

FILL AND TO THE VERTICAL PIECE OF THE CENTER GATE W/2-6d NAILS AT EACH JOINT. THESE CLEATS TO BE INSTALLED AT THE TOP AND BOTTOM OF THE FILL ON BOTH SIDES OF THE FILL. SIXTEEN (16) CLEATS WILL BE REQUIRED PER LAYER. REPEAT THESE PROCEDURES FOR EACH LAYER. SIX (6) CENTER CLEATS WILL BE REQUIRED.

6. WHEN IT IS NECESSARY TO SHIP A PARTIAL-LAYER LOAD IN LIEU OF THE LOAD AS DEPICTED, SEE THE "PARTIAL-LAYER BRACING" DETAILS AND NOTES ON PAGES 30 AND 31. ALSO, SEE PIECE MARKED (7) ON PAGE 8.

SPECIAL NOTES:

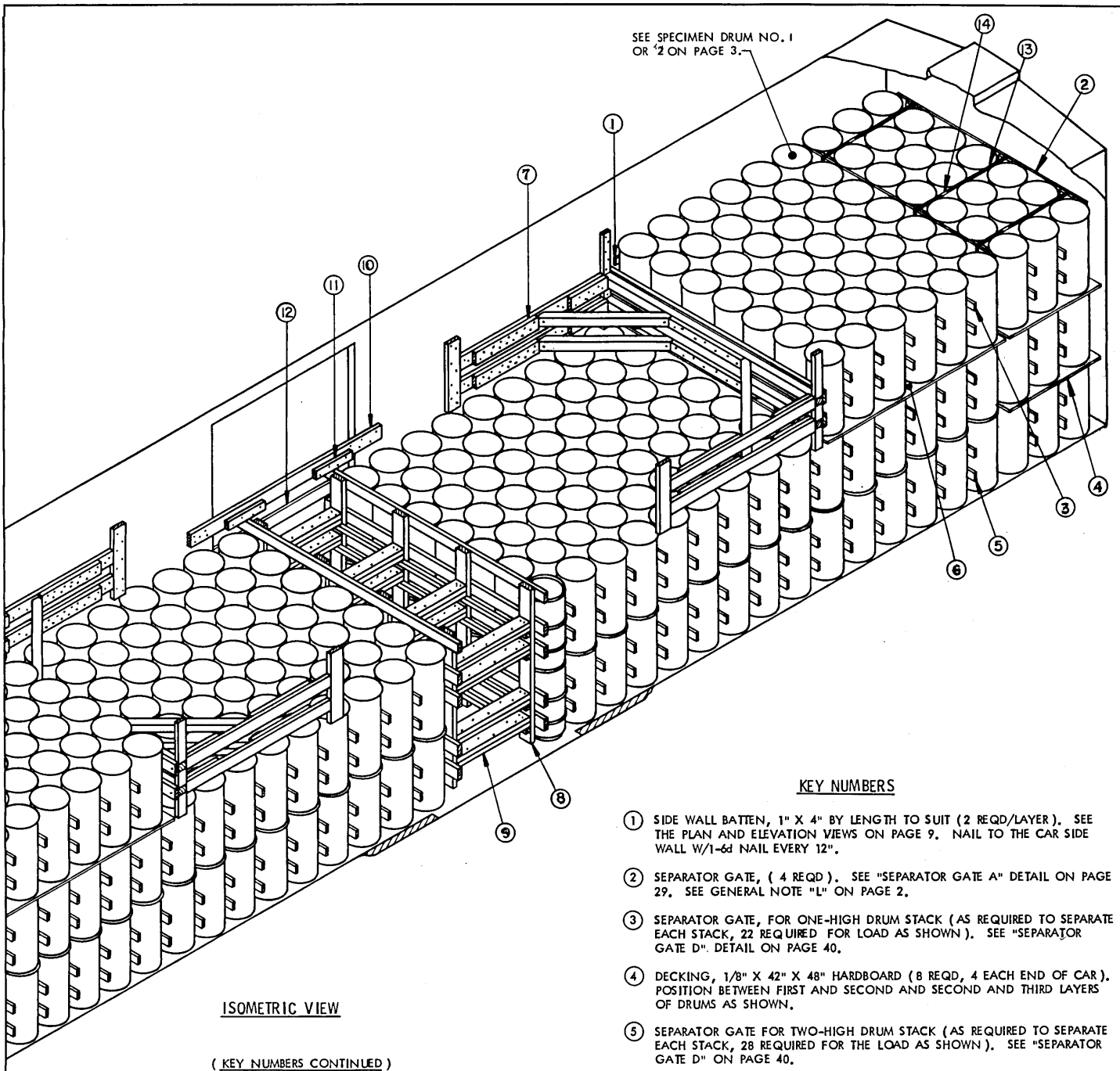
1. THE LOAD AS SHOWN IS BASED ON A CONVENTIONAL TYPE BOX CAR 50'-6" LONG BY 9' 2" WIDE EQUIPPED WITH 6' 0" WIDE SLIDING DOORS.
2. THE TYPICAL VIEWS DEPICT A METAL DRUM WITH A LEVER LOCK TYPE CLOSURE HAVING A DIAMETER OF 15" AND A HEIGHT OF 30-3/4" AND A WEIGHT OF 160 POUNDS. ANY TYPE OF DRUM THAT CAN BE NESTED MAY BE LOADED USING THIS CONFIGURATION.
3. TWENTY-FOUR (24) DOUBLED 2" X 6" STRUTS ARE ADEQUATE FOR RETAINING A MAXIMUM LOAD OF 99,000 POUNDS IN EACH END OF THE BOX CAR. SEE THE "STRUT CHART" ON PAGE 35.
4. IF THE CAR BEING USED HAS PLUG DOORS OR EXTRA WIDE DOORS, SEE THE "DOORWAY PROTECTION C" DETAIL ON PAGE 44.
5. WHEN THE VOID BETWEEN THE CENTER GATES IS LESS THAN 20" IT WILL BE NECESSARY TO USE SOLID FILL IN LIEU OF STRUTS, SHORTEN THE GATE HEIGHT TO ONE DRUM HEIGHT AND DELETE THE STRUT LEDGERS. INSTALL 6" WIDE SOLID FILL MATERIAL BETWEEN THE CENTER GATE VERTICAL PIECES. NAIL A 1" X 4" BY CUT-TO-FIT CLEAT TO THE SOLID

(CONTINUED AT LEFT)

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
METAL DRUM	828	132,480 LBS
DUNNAGE		3,031 LBS
TOTAL WEIGHT		135,511 LBS

CARLOADING OF METAL DRUMS IN A CONVENTIONAL BOX CAR



ISOMETRIC VIEW

(KEY NUMBERS CONTINUED)

⑭ SEAL FOR 1-1/4" STRAPPING (6 REQD, 1 PER STRAP). DOUBLE NOTCH EACH SEAL. SEE GENERAL NOTE "S" ON PAGE 2.

KEY NUMBERS

① SIDE WALL BATTEN, 1" X 4" BY LENGTH TO SUIT (2 REQD/LAYER). SEE THE PLAN AND ELEVATION VIEWS ON PAGE 9. NAIL TO THE CAR SIDE WALL W/1-6d NAIL EVERY 12".

② SEPARATOR GATE, (4 REQD). SEE "SEPARATOR GATE A" DETAIL ON PAGE 29. SEE GENERAL NOTE "L" ON PAGE 2.

③ SEPARATOR GATE, FOR ONE-HIGH DRUM STACK (AS REQUIRED TO SEPARATE EACH STACK, 22 REQUIRED FOR LOAD AS SHOWN). SEE "SEPARATOR GATE D". DETAIL ON PAGE 40.

④ DECKING, 1/8" X 42" X 48" HARDBOARD (8 REQD, 4 EACH END OF CAR). POSITION BETWEEN FIRST AND SECOND AND SECOND AND THIRD LAYERS OF DRUMS AS SHOWN.

⑤ SEPARATOR GATE FOR TWO-HIGH DRUM STACK (AS REQUIRED TO SEPARATE EACH STACK, 28 REQUIRED FOR THE LOAD AS SHOWN). SEE "SEPARATOR GATE D" ON PAGE 40.

⑥ DECKING, 1/8" X 48" X 7'-6½" HARDBOARD (4 REQD, 2 EACH END OF CAR). POSITION LENGTHWISE IN CAR BETWEEN SECOND AND THIRD LAYER. POSITION SO AS TO BE APPROXIMATELY 4" FROM CAR SIDE WALL AND 2" FROM THE SEPARATOR GATE, PIECE MARKED ② .

⑦ K-BRACE (2 REQD). SEE THE "PARTIAL LAYER BRACE" AND NOTES ON PAGES 30 AND 31. SEE SPECIAL NOTE 6 ON PAGE 9.

⑧ CENTER GATE (2 REQD). SEE THE "CENTER GATE B" ON PAGE 36.

⑨ STRUT , 2" X 6" X CUT TO FIT (DOUBLED) (16 REQUIRED IN THE LOAD AS SHOWN). LAMINATE W/1-10d NAIL EVERY 6" AND TOENAIL THE TOP PIECE TO THE CENTER GATE W/2-12d NAILS AT EACH END. FOR STRUTS 48" OR GREATER IN LENGTH SEE THE "STRUT BRACING" DETAIL ON PAGE 35. SEE SPECIAL NOTES 4 AND 5 ON PAGE 9.

⑩ GATE HOLD DOWN, 2" X 6" BY DOOR OPENING PLUS 24" (2 REQD). NAIL TO THE CAR SIDE WALL W/5-10d NAILS AT EACH END.

⑪ GATE HOLD DOWN BLOCK, 2" X 4" X 18" (4 REQD). CENTER OVER CENTER GATE AND NAIL TO THE GATE HOLD DOWN, PIECE MARKED ⑩, W/4-10d NAILS.

⑫ DOORWAY PROTECTION (2 REQD). SEE THE "DOORWAY PROTECTION A" DETAIL ON PAGE 29. SEE SPECIAL NOTE 3 ON PAGE 9.

⑬ BUNDLING STRAP, 1-1/4" X .035" OR .031" BY 26'-0" LONG STEEL STRAPPING (6 REQD). PRE-POSITION SO AS TO BE LOCATED AS SHOWN IN THE ISOMETRIC VIEW.

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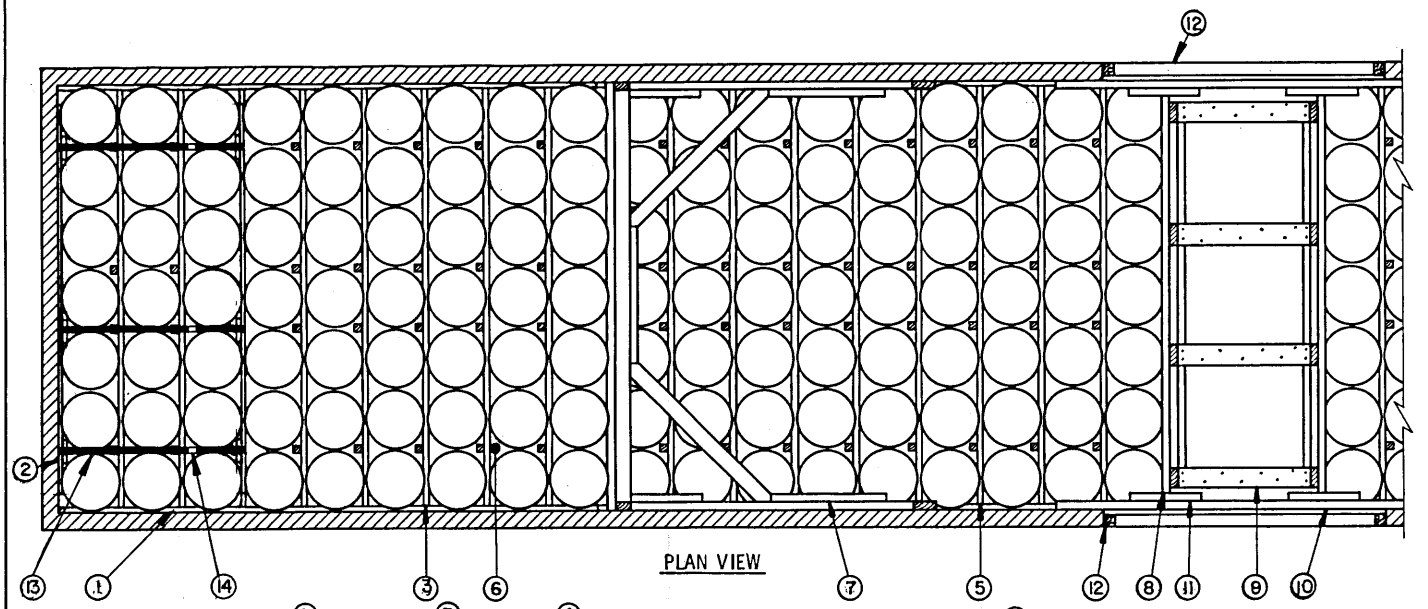
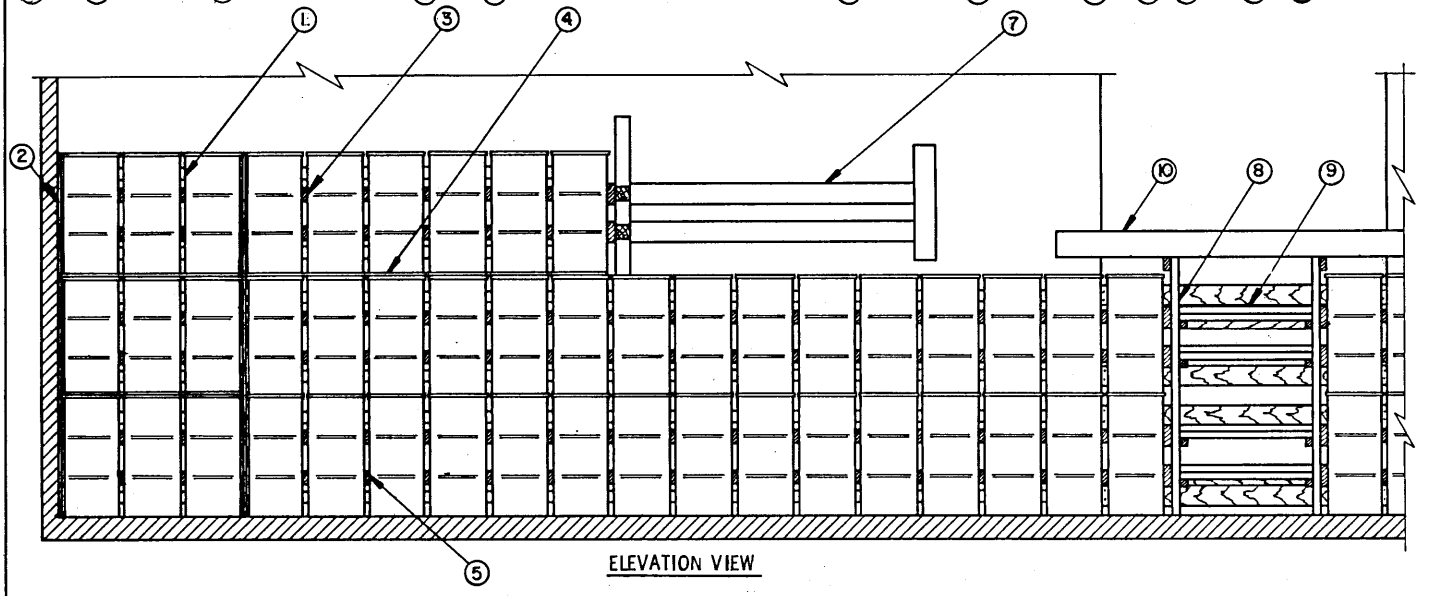
CARLOADING OF METAL DRUMS IN A CONVENTIONAL BOX CAR



PLAN VIEW



ELEVATION VIEW

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	432	144
1" X 6"	142	71
2" X 2"	862	287
2" X 3"	20	10
2" X 4"	1,460	973
2" X 6"	304	304
4" X 4"	70	93
NAILS	NO. REQD	POUNDS
6d (2")	668	4
10d (3")	1,456	22-1/2
12d (3-1/4")	200	3-1/2
16d (3-1/2")	192	4-1/4
60d (6")	16	1-1/2
PLYWOOD, 1/2" THICK ------ 248 SQ FT REQD ---------- 341 LBS		
HARDBOARD, 1/8" THICK ---- 232 SQ FT REQD ---------- 102 LBS		
STEEL STRAP, 1-1/4" X .035" OR .031" - 156' REQD ------- 22 LBS		
SEAL FOR 1-1/4" STRAP ---------- 6 REQD ------- NIL		

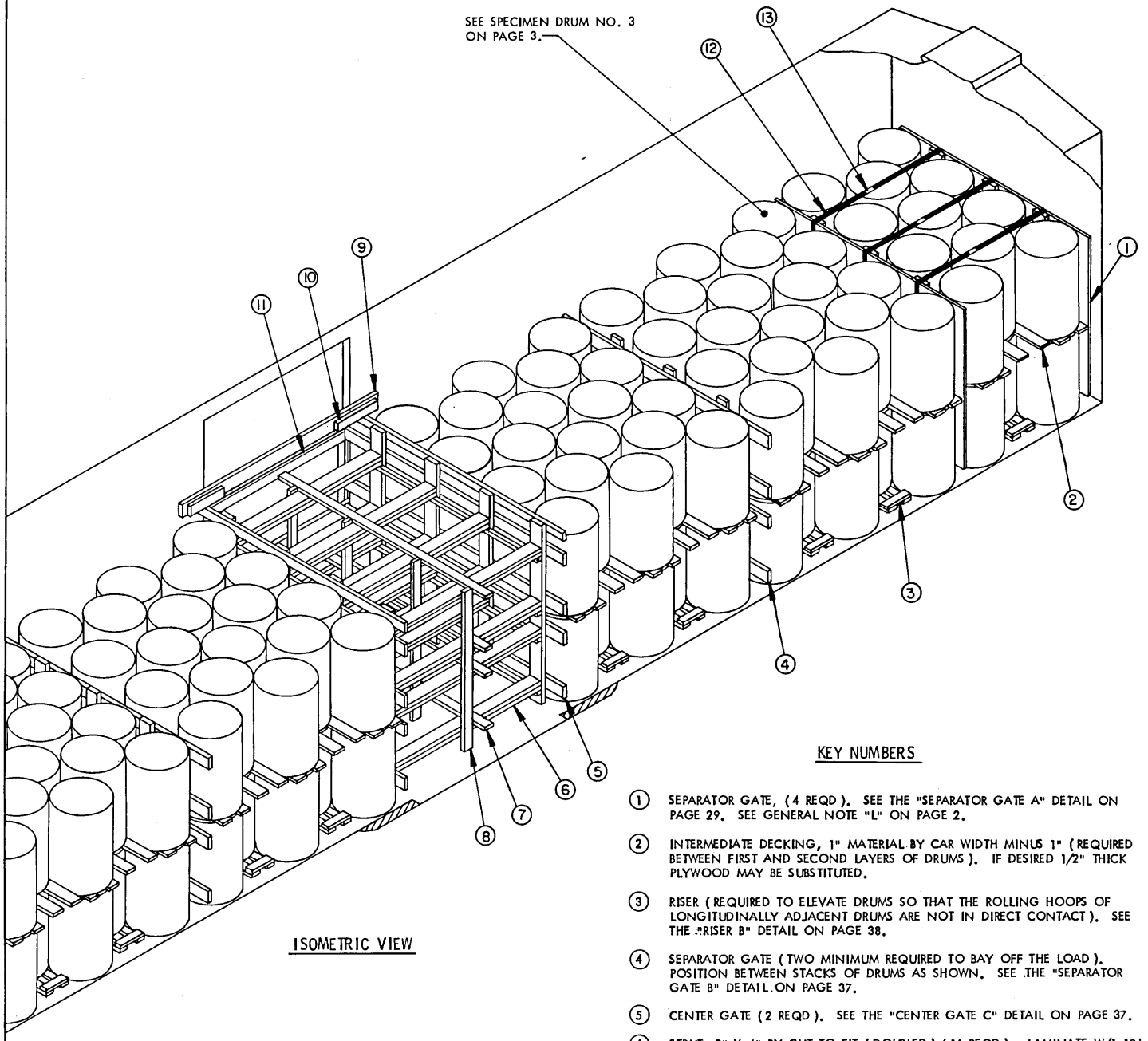
SPECIAL NOTES:

1. THE LOAD AS SHOWN IS BASED ON A CONVENTIONAL TYPE BOX CAR 50'-6" LONG BY 9'-2" WIDE (INSIDE CLEARANCE) EQUIPPED WITH 6'-0" WIDE SLIDING DOORS.
2. THE TYPICAL CARLOAD VIEWS DEPICT A METAL DRUM WITH A BOLTED-RING TYPE CLOSURE HAVING A 15-1/2" DIAMETER (30-3/4" HIGH) AND A WEIGHT OF 160 POUNDS.
3. IF THE CAR BEING OUTLOADED HAS PLUG DOORS OR EXTRA WIDE DOORS SEE "DOORWAY PROTECTION C" DETAIL ON PAGE 44.
4. SIXTEEN (16) DOUBLED 2" X 6" STRUTS ARE ADEQUATE FOR RETAINING A MAXIMUM LOAD OF 66,000 POUNDS IN EACH END OF THE BOX CAR. SEE "STRUT CHART" ON PAGE 33.
5. WHEN THE VOID BETWEEN THE CENTER GATES IS LESS THAN 20" IT WILL BE NECESSARY TO USE SOLID FILL IN LIEU OF STRUTS AS DEPICTED. THE CENTER GATES FOR ALL LAYERS EXCEPT FOR THE TOP LAYER WILL BE DRUM HEIGHT; THE TOP LAYER CENTER GATE WILL BE DRUM HEIGHT PLUS FOUR INCHES (4"). DELETE STRUT LEDGER PIECES FROM THE CENTER GATES. INSTALL 6" WIDE BY DRUM HEIGHT SOLID FILL MATERIAL BETWEEN THE CENTER GATE VERTICAL PIECES. NAIL A 1" X 4" BY CUT TO FIT CLEAT TO THE SOLID FILL AND TO THE VERTICAL PIECES OF THE CENTER GATE W/2-6d NAILS AT EACH JOINT. THESE CLEATS TO BE INSTALLED AT THE TOP AND BOTTOM OF THE FILL ON BOTH SIDES OF THE FILL. SIXTEEN (16) CLEATS WILL BE REQUIRED PER LAYER. REPEAT THESE PROCEDURES FOR EACH LAYER; FOUR (4) CENTER GATES WILL BE REQUIRED.
6. THE USE OF THE "K-BRACE" IS SPECIFIED FOR THE DEPICTED LOAD ONLY TO SHOW A TYPICAL APPLICATION. A "K-BRACE" MAY BE USED IN THE LOAD AS REQUIRED TO BRACE A PARTIAL LAYER LOAD. SEE "CAUTION" NOTE ON PAGE 31.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
METAL DRUM	630	100,800 LBS
DUNNAGE		4,079 LBS
TOTAL WEIGHT		104,879 LBS

CARLOADING OF METAL DRUMS IN A CONVENTIONAL BOX CAR



ISOMETRIC VIEW

KEY NUMBERS

(1) SEPARATOR GATE, (4 REQD). SEE THE "SEPARATOR GATE A" DETAIL ON PAGE 29. SEE GENERAL NOTE "L" ON PAGE 2.

(2) INTERMEDIATE DECKING, 1" MATERIAL BY CAR WIDTH MINUS 1" (REQUIRED BETWEEN FIRST AND SECOND LAYERS OF DRUMS). IF DESIRED 1/2" THICK PLYWOOD MAY BE SUBSTITUTED.

(3) RISER (REQUIRED TO ELEVATE DRUMS SO THAT THE ROLLING HOOPS OF LONGITUDINALLY ADJACENT DRUMS ARE NOT IN DIRECT CONTACT). SEE THE "RISER B" DETAIL ON PAGE 38.

(4) SEPARATOR GATE (TWO MINIMUM REQUIRED TO BAY OFF THE LOAD). POSITION BETWEEN STACKS OF DRUMS AS SHOWN. SEE THE "SEPARATOR GATE B" DETAIL ON PAGE 37.

(5) CENTER GATE (2 REQD). SEE THE "CENTER GATE C" DETAIL ON PAGE 37.

(6) STRUT, 2" X 6" BY CUT TO FIT (DOUBLED) (16 REQD). LAMINATE W/1-10d NAIL EVERY 6". TOENAIL THE TOP PIECE TO THE CENTER GATE W/2-12d NAILS AT EACH END. SEE SPECIAL NOTES 4 AND 5 ON PAGE 9.

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

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

(9) GATE HOLD DOWN, 2" X 6" BY DOOR OPENING PLUS 24" (2 REQD). NAIL TO THE CAR SIDEWALL W/5-10d NAILS AT EACH END.

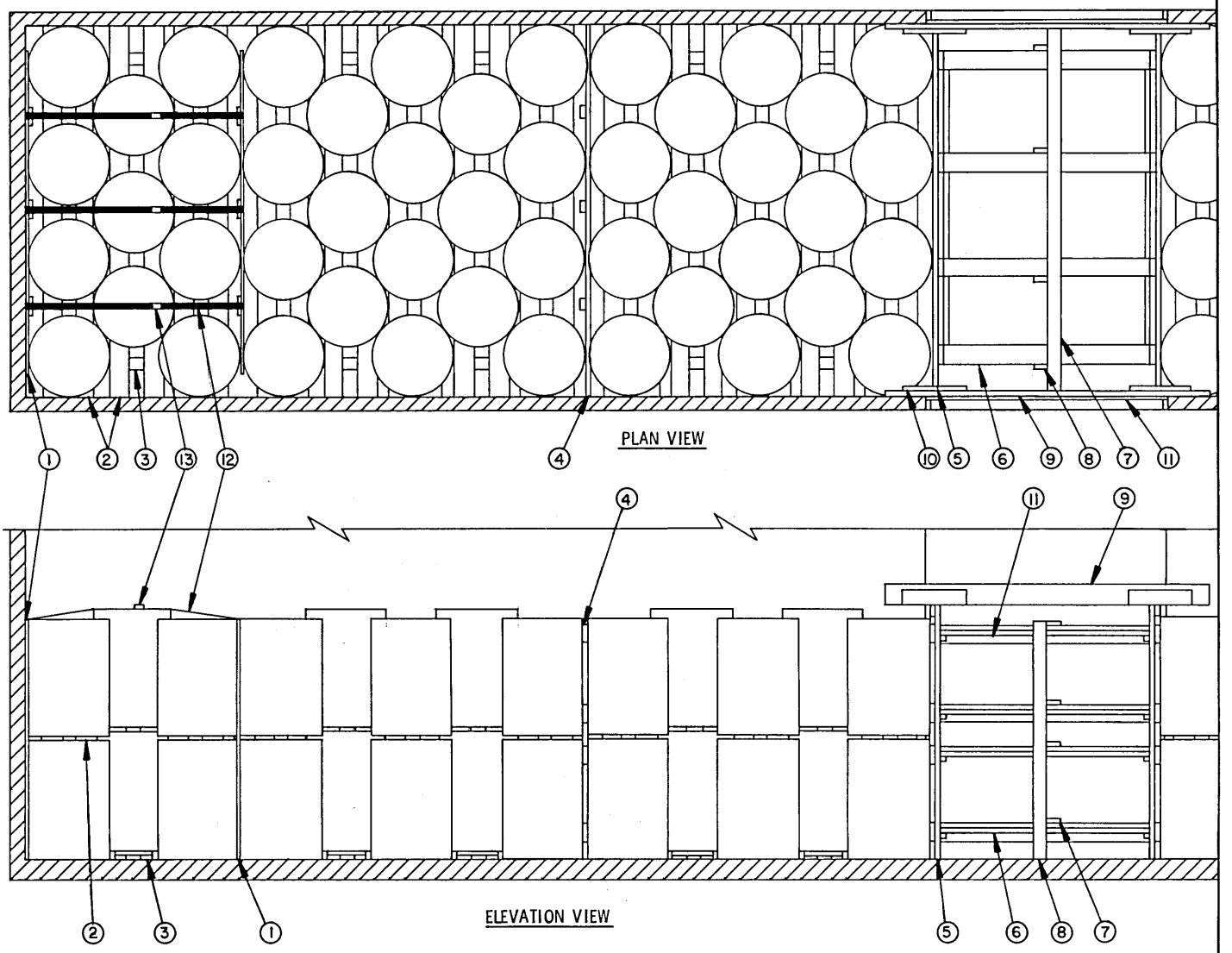
(10) GATE HOLD DOWN CLEAT, 2" X 4" X 18" (4 REQD). NAIL TO THE GATE HOLD DOWN, PIECE MARKED (9), W4/10d NAILS.

(11) DOORWAY PROTECTION (2 REQD). SEE THE "DOORWAY PROTECTION B" DETAIL ON PAGE 36. SEE SPECIAL NOTE 3 ON PAGE 11.

(12) BUNDLING STRAP, 1-1/4" X .035" OR .031" BY 23'-0" LONG STEEL STRAPPING (6 REQD). PRE-POSITION SO AS TO BE LOCATED AS SHOWN IN THE ISOMETRIC VIEW.

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

CARLOADING OF METAL DRUMS IN A CONVENTIONAL BOX CAR



BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	25	8
1" X 6"	581	290
2" X 2"	56	19
2" X 3"	24	12
2" X 4"	260	174
2" X 6"	335	335
NAILS	NO. REQD	POUNDS
6d (2")	310	2
10d (3")	532	8-1/4
12d (3-1/4")	80	1-3/4
PLYWOOD, 1/2" THICK ---------- 192 SQ FT REQD ------ 264 LBS		
STEEL STRAP, 1-1/4" X .035" OR .031" -- 138' REQD ---------- 20 LBS		
SEAL FOR 1-1/4" STRAP ---------- 6 REQD ---------- NIL		

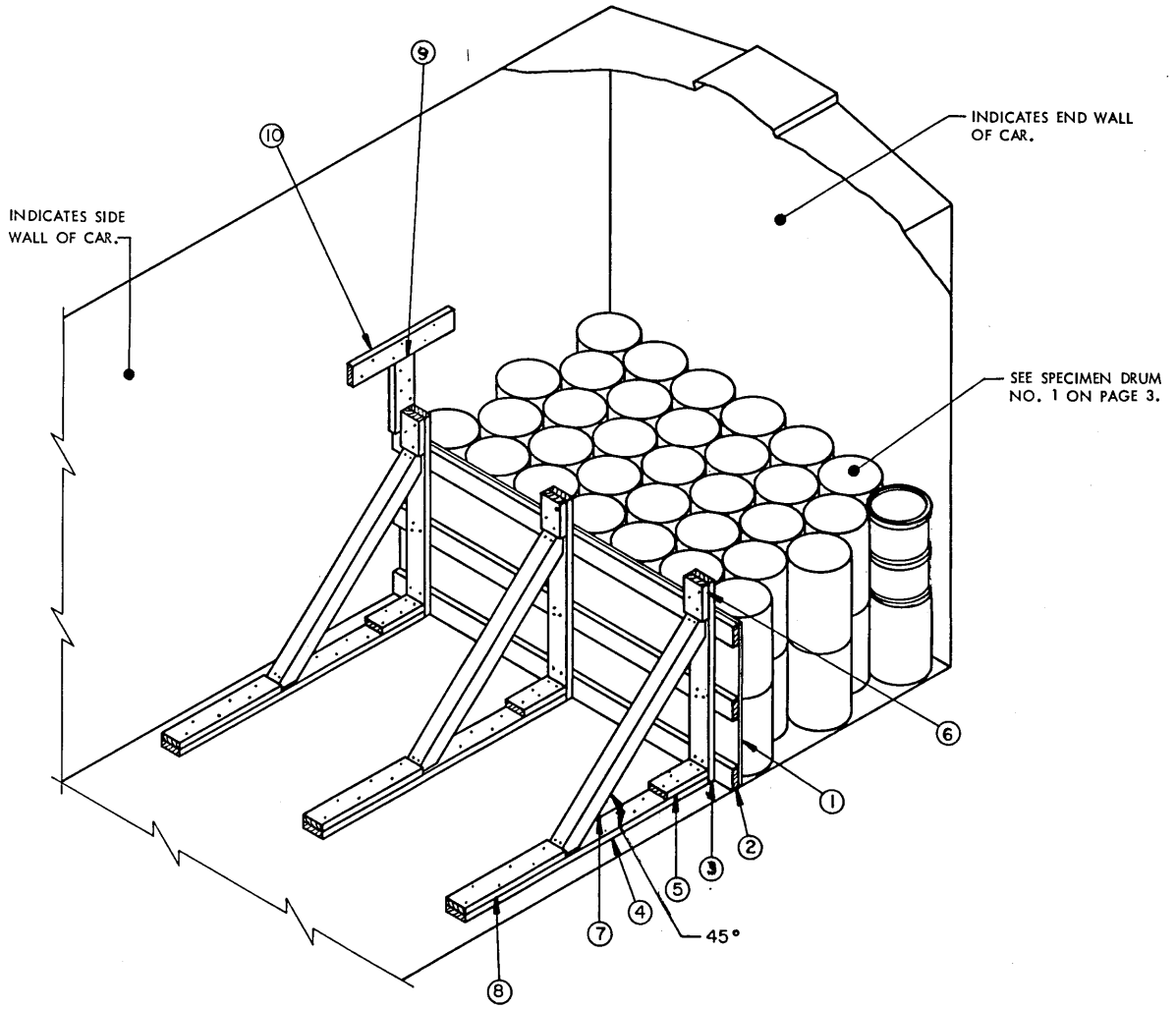
SPECIAL NOTES:

1. THE LOAD AS SHOWN IS BASED ON A CONVENTIONAL TYPE BOX CAR 50'-6" LONG BY 9'-2" WIDE (INSIDE CLEARANCE) EQUIPPED WITH 6'-0" WIDE SLIDING DOORS.
2. THE TYPICAL CARLOAD VIEWS DEPICT A 55 GALLON DRUM HAVING A 24" DIAMETER (35" HIGH) AND A WEIGHT OF 450 POUNDS. NOTE: LOADING PROCEDURES ARE NOT TO BE USED FOR TOP OPENING DRUMS.
3. WHEN THE CAR BEING OUTLOADED IS EQUIPPED WITH PLUG DOORS OR EXTRA WIDE DOORS SEE "DOORWAY PROTECTION C" DETAIL ON PAGE 44.
4. SIXTEEN (16) DOUBLED 2" X 6" STRUTS ARE ADEQUATE FOR RETAINING A MAXIMUM LOAD OF 48,740 POUNDS IN EACH END OF THE BOX CAR. SEE "STRUT CHART" ON PAGE 33.
5. WHEN THE VOID BETWEEN THE CENTER GATES IS LESS THAN 20" IT WILL BE NECESSARY TO USE SOLID FILL IN LIEU OF STRUTS AS DEPICTED. THE CENTER GATES FOR ALL LAYERS EXCEPT FOR THE TOP LAYER WILL BE DRUM HEIGHT, THE TOP LAYER CENTER GATE WILL BE DRUM HEIGHT PLUS FOUR INCHES (4"). DELETE STRUT LEDGER PIECES FROM THE CENTER GATES. INSTALL 6" WIDE BY DRUM HEIGHT SOLID FILL MATERIAL BETWEEN THE CENTER GATE VERTICAL PIECES. NAIL A 1" X 4" BY CUT TO FIT CLEAT TO THE SOLID FILL AND TO THE VERTICAL PIECES OF THE CENTER GATE W/2-6d NAILS AT EACH JOINT. THESE CLEATS TO BE INSTALLED AT THE TOP AND BOTTOM OF THE FILL ON BOTH SIDES OF THE FILL. SIXTEEN (16) CLEATS WILL BE REQUIRED PER LAYER. REPEAT THESE PROCEDURES FOR EACH LAYER. FOUR (4) CENTER GATES WILL BE REQUIRED.
6. WHEN IT IS NECESSARY TO SHIP A PARTIAL-LAYER LOAD IN LIEU OF THE LOAD AS DEPICTED, SEE "PARTIAL-LAYER BRACING" DETAILS AND NOTES ON PAGES 30 AND 31.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
METAL DRUM	188	84,600 LBS
DUNNAGE		1,972 LBS
TOTAL WEIGHT		86,572 LBS

CARLOADING OF METAL DRUMS IN A CONVENTIONAL BOX CAR



ISOMETRIC VIEW

SPECIAL NOTES:

1. LOAD AS SHOWN IS BASED ON AN 8'-6" WIDE BOX CAR. WIDER CARS MAY BE USED.
2. IF A CAR WITH PLUG DOORS IS USED AND THE BLOCKING EXTENDS PAST THE DOOR POST, SUBSTITUTE TWO 2" X 6" BY DOOR OPENING PLUS 24" DOOR SPANNERS IN LIEU OF GATE HOLD DOWN AND HOLD DOWN CLEAT. NAIL TO CAR SIDE WALL W/5-10d NAILS AT EACH END OF EACH PIECE.
3. IF THE LADING EXTENDS PAST THE POST OF A PLUG DOOR, THREE 2" X 6" BY DOOR OPENING PLUS 24" DOOR SPANNERS MUST BE USED. POSITION AT TOP, AT JOINT AND BOTTOM OF LADING. NAIL TO CAR SIDE WALL W/5-10d NAILS AT EACH END.
4. KNEE-BRACE AS SHOWN IS ADEQUATE FOR RETAINING A MAXIMUM LCL LOAD OF NOT MORE THAN 8,500 POUNDS.
5. THE ITEM DEPICTED IN THIS LOAD IS A METAL DRUM, 14-1/2" IN DIAMETER BY 21" HIGH, WEIGHING APPROXIMATELY 100 POUNDS.

KEY NUMBERS

(1) BULKHEAD, PLYWOOD, 1/2" THICK BY CAR WIDTH MINUS 1/2" BY LOAD HEIGHT PLUS 2" (1 REQD). NAIL TO GATE LATERAL PIECES W/14d NAILS EVERY 8". SEE PLYWOOD SPLICING DETAILS ON PAGE 32.

(2) GATE LATERAL PIECE, 2" X 6" BY CAR WIDTH MINUS 1/2" (3 REQD). POSITION AT TOP AND BOTTOM OF BULKHEAD AND CENTER ON EACH JOINT BETWEEN LAYERS.

(3) GATE VERTICAL PIECE, 2" X 6" BY LOAD HEIGHT PLUS 9" (3 REQD). NAIL TO GATE LATERAL PIECES W/3-10d NAILS AT EACH JOINT.

(4) FLOOR CLEAT, 2" X 6" X 72" (FOR LOAD DEPICTED) (3 REQD). NAIL TO CAR FLOOR W/1-16d NAIL EVERY 8". SEE GENERAL NOTES "L" AND "M" ON PAGE 2.

(5) POCKET CLEAT, 2" X 6" X 12" (3 REQD). NAIL TO FLOOR CLEAT W/3-12d NAILS. TOENAIL TO GATE VERTICAL PIECE W/2-12d NAILS.

(6) HOLD-DOWN CLEAT, 2" X 6" X 9" (3 REQD). NAIL TO GATE VERTICAL PIECE W/4-10d NAILS.

(7) DIAGONAL BRACE, 4" X 4" BY CUT TO FIT (DOUBLE BEVEL EACH END WITH 45° CUTS) (3 REQD). TOENAIL TO GATE VERTICAL PIECE AND FLOOR CLEAT W/2-16d NAILS AT EACH END.

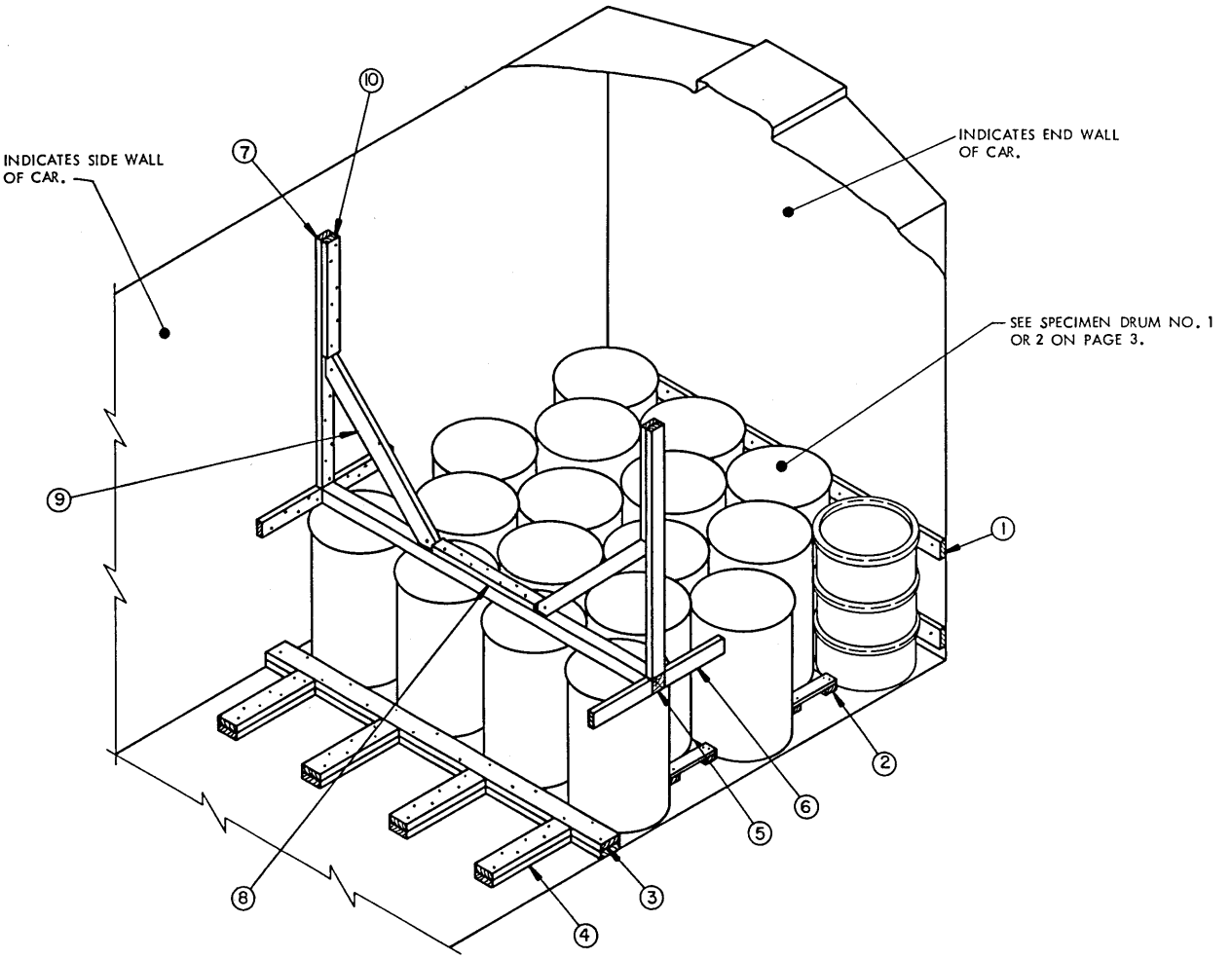
(8) BACK-UP CLEAT, 2" X 6" X 30" (3 REQD). NAIL TO FLOOR CLEAT W/6-40d NAILS.

(9) GATE HOLD DOWN, 2" X 6" X 18" (2 REQD). NAIL TO CAR SIDE WALL W/5-10d NAILS.

(10) HOLD-DOWN CLEAT, 2" X 4" X 30" (2 REQD). CENTER ABOVE GATE HOLD DOWN AND NAIL TO CAR SIDE WALL W/6-10d NAILS.

TYPICAL LCL IN A CONVENTIONAL BOX CAR

PROJECT FSA 75-66



ISOMETRIC VIEW

SPECIAL NOTES:

1. LOAD AS SHOWN IS BASED ON AN 8'-6" WIDE BOX CAR. WIDER CARS MAY BE USED.
2. IT IS NOT RECOMMENDED TO SHIP THIS LOAD IN A BOX CAR EQUIPPED WITH PLUG DOORS WHEN HOLD DOWN BRACE, PIECES MARKED ⑤ THRU ⑩, EXTENDS PAST THE DOOR POST. IF NECESSARY TO SHIP THIS LOAD WHEN PIECES MARKED ⑤ THRU ⑩ EXTEND PAST THE DOOR POST, FOUR DOOR SPANNER PIECES, 2" X 6" BY DOOR OPENING PLUS 24", WOULD BE REQUIRED ON EACH SIDE, SPANNING THE DOOR TO SUPPORT THESE PIECES. NAIL TO THE CAR SIDE WALL W/5-10d NAILS AT EACH END.
3. IF THE LADING EXTENDS PAST THE POST OF A PLUG DOOR, TWO 2" X 6" BY DOOR OPENING PLUS 24" DOOR SPANNERS MUST BE USED. POSITION NEAR THE TOP AND BOTTOM OF THE LADING. NAIL TO CAR WALL W/5-10d NAILS AT EACH END.
4. FOUR BACK-UP CLEATS SHOWN AS PIECES MARKED ④ ARE ADEQUATE FOR RETAINING A MAXIMUM LCL LOAD OF NOT MORE THAN 17,500 POUNDS.
5. THE ITEM DEPICTED IN THIS LOAD IS A 55 GALLON METAL DRUM, 24" IN DIAMETER BY 35" HIGH, WEIGHING APPROXIMATELY 400 POUNDS.

KEY NUMBERS

① END WALL BATTEN, 1" X 4" BY CAR WIDTH MINUS 1/2" (2 REQD). NAIL TO END WALL W/1-10d NAIL EVERY 12".

② RISER (2 REQUIRED FOR LOAD AS SHOWN). SEE "RISER B" DETAIL ON PAGE 38.

③ HEADER, 2" X 6" BY CAR WIDTH MINUS 1/2" (DOUBLED) (1 REQD). NAIL FIRST PIECE TO CAR FLOOR W/1-16d NAIL EVERY 8". NAIL SECOND PIECE TO FIRST W/1-40d NAIL EVERY 8". SEE GENERAL NOTES "L" AND "M" ON PAGE 2.

④ BACK-UP, 2" X 6" X 30" (DOUBLED) (4 REQD). NAIL FIRST PIECE TO CAR FLOOR W/6-16d NAILS. NAIL SECOND PIECE TO FIRST W/6-40d NAILS.

⑤ HOLD-DOWN, 4" X 4" BY CAR WIDTH (1 REQD). CENTER OVER LAST STACK OF DRUMS.

⑥ POCKET CLEAT, 2" X 4" X 18" (4 REQD). NAIL TO CAR SIDE WALL W/5-10d NAILS.

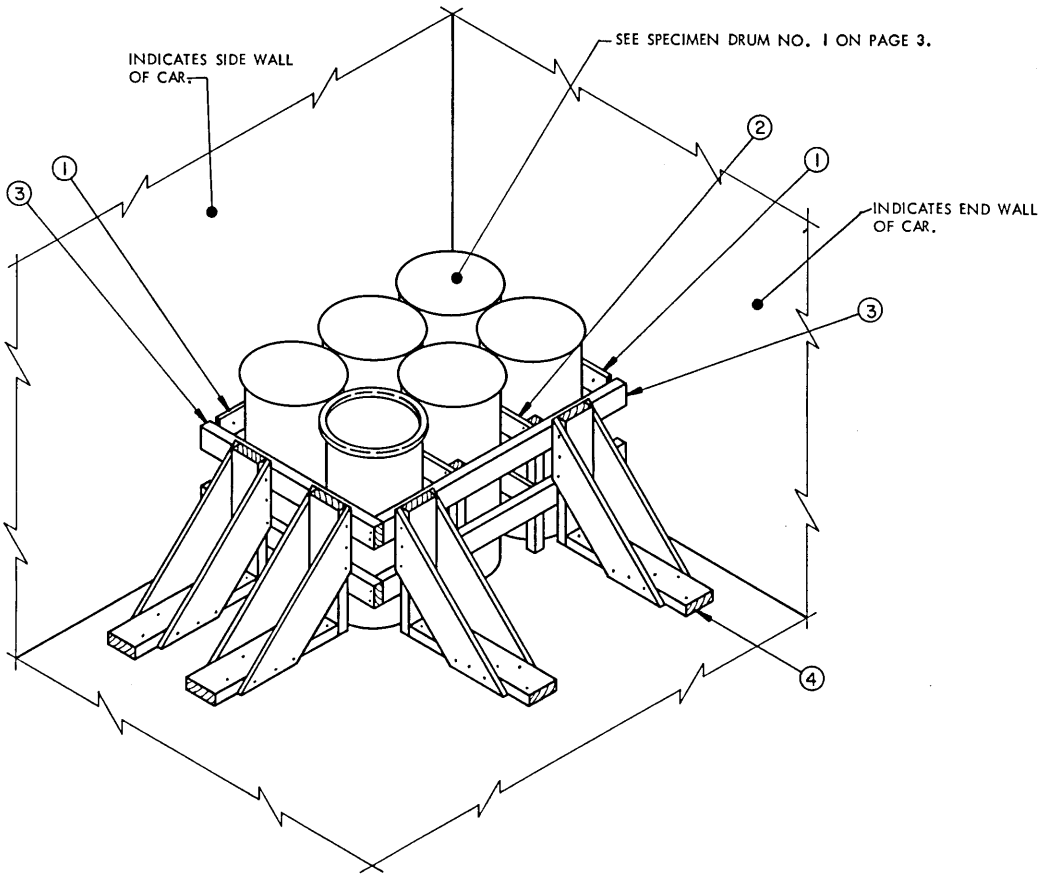
⑦ WALL CLEAT, 2" X 4" BY LENGTH TO SUIT (REF: 66") (2 REQD). NAIL TO CAR SIDE WALL W/1-10d NAIL EVERY 6".

⑧ CENTER CLEAT, 2" X 4" X 30" (1 REQD). NAIL TO HOLD DOWN W/7-10d NAILS.

⑨ DIAGONAL BRACE, 2" X 4" BY CUT TO FIT, DOUBLE BEVEL EACH END WITH 45° CUTS (2 REQD). POSITION ON EDGE AS SHOWN. TOENAIL TO HOLD DOWN AND WALL CLEAT W/2-12d NAILS AT EACH END.

⑩ BACK-UP CLEAT, 2" X 4" X 30" (2 REQD). NAIL TO WALL CLEAT W/6-16d NAILS.

TYPICAL LCL IN A CONVENTIONAL BOX CAR



ISOMETRIC VIEW

KEY NUMBERS

(1) WALL BATTEN, 1" X 4" BY CUT TO FIT (4 REQD). POSITION ON ROLLING HOOPS OF DRUMS AND NAIL TO CAR WALL W/1-6d NAIL EVERY 8".

(2) SEPARATOR GATE (2 REQD). SEE "SEPARATOR GATE C" ON PAGE 38.

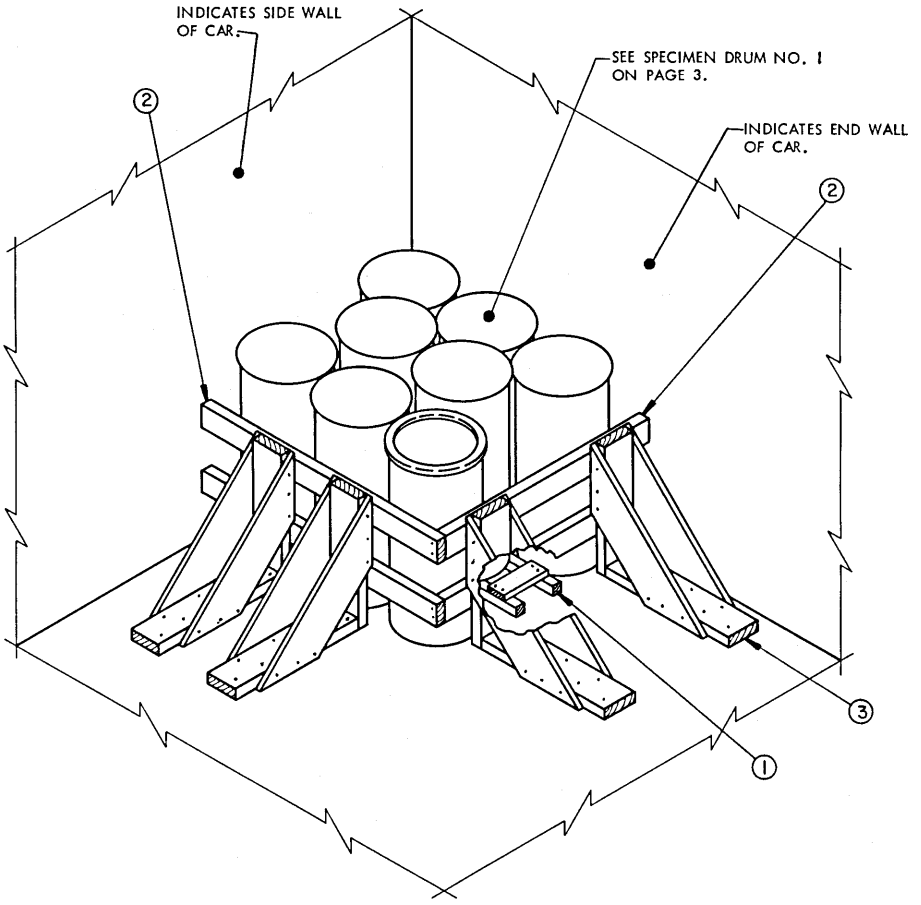
(3) 2" MATERIAL, POSITION ON ROLLING HOOPS OF DRUMS AND NAIL TO "LCL BRACE" W/3-10d NAILS AT EACH JOINT. NAIL TOGETHER W/2-12d NAILS AT THE CORNER AS SHOWN.

(4) LCL BRACE (4 REQD). SEE DETAIL ON PAGE 38 AND SPECIAL NOTES ON THIS PAGE. NAIL TO CAR FLOOR W/7-16d NAILS.

SPECIAL NOTES:

1. THIS OUTLOADING PROCEDURE IS SHOWN DEPICTING USE OF LCL BRACE. CAUTION: CONTAINERS MUST NOT BE STACKED IF THIS BLOCKING PROCEDURE IS USED.
2. THE ITEM DEPICTED IN THIS LOAD IS A METAL DRUM, 15-1/2" IN DIAMETER BY 30-3/4" HIGH, WEIGHING APPROXIMATELY 150 POUNDS.
3. EACH BRACE AS APPLIED FOR LONGITUDINAL OR LATERAL BRACING WILL SUPPORT 2,000 OR 8,000 POUNDS OF LADING, RESPECTIVELY. ALSO RESPECTIVELY, A BRACE MUST BE USED FOR EACH 30" OR 48" INCREMENT OF LOAD DIMENSION; ADDITIONALLY, A MINIMUM OF TWO (2) BRACES MUST BE USED IN THEIR RESPECTIVE DIRECTIONS IF THE LOAD IS MORE THAN TWO (2) DRUMS LONG OR WIDE.

TYPICAL LCL IN A CONVENTIONAL BOX CAR



ISOMETRIC VIEW

SEE SPECIAL NOTES ON PAGE 14.

KEY NUMBERS

(1) RISER (1 REQD). SEE "RISER C" DETAIL ON PAGE 39.

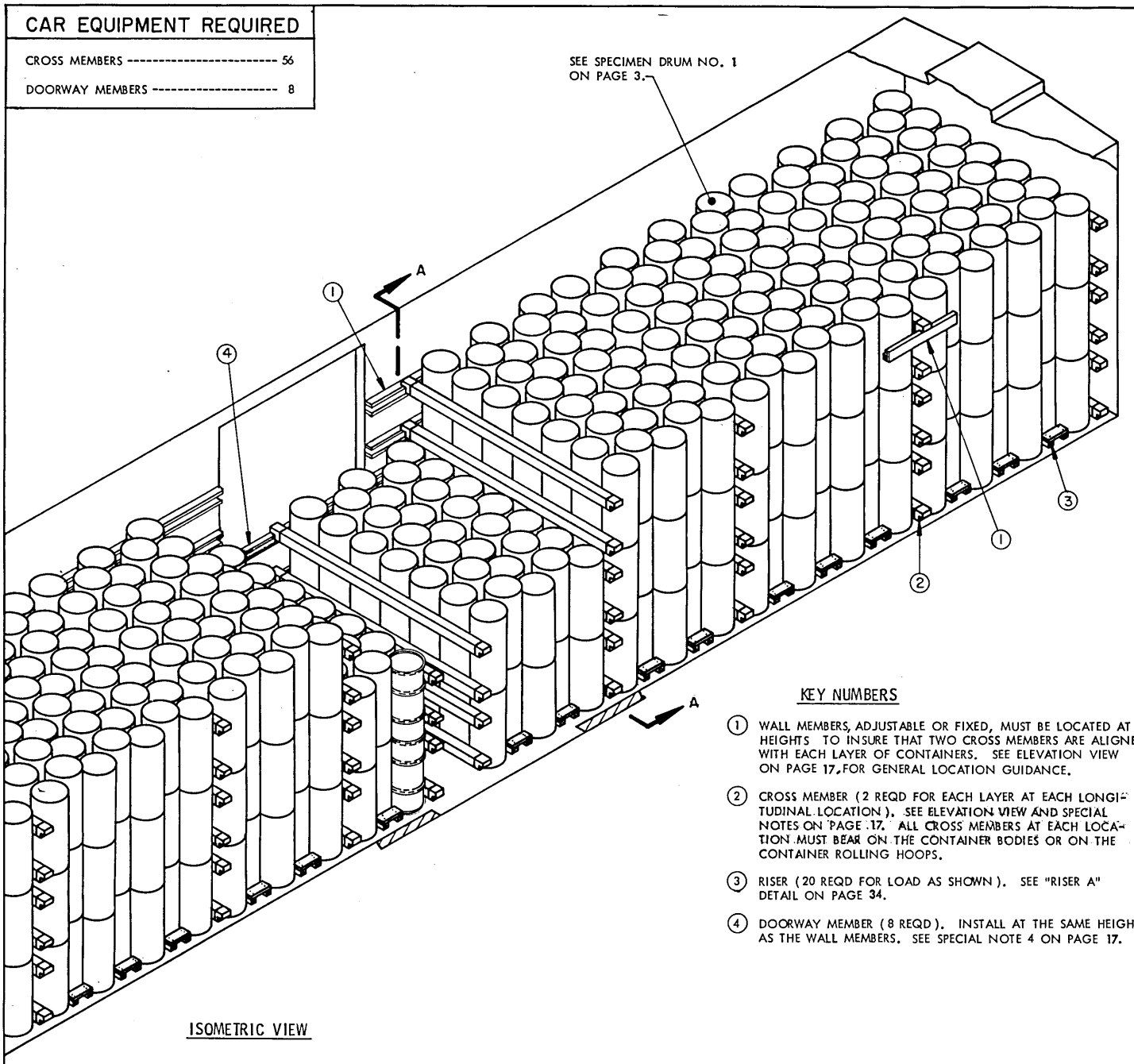
(2) 2" MATERIAL, POSITION ON ROLLING HOOPS OF DRUMS AND NAIL TO LCL BRACE W/3-10d NAILS AT EACH JOINT. NAIL TOGETHER W/2-12d NAILS AT THE CORNER AS SHOWN.

(3) LCL BRACE (4 REQD). SEE DETAIL ON PAGE 38 AND SPECIAL NOTES ON PAGE 14. NAIL TO CAR FLOOR W/7-16d NAILS.

CAR EQUIPMENT REQUIRED

CROSS MEMBERS ---------- 56

DOORWAY MEMBERS ---------- 8



ISOMETRIC VIEW

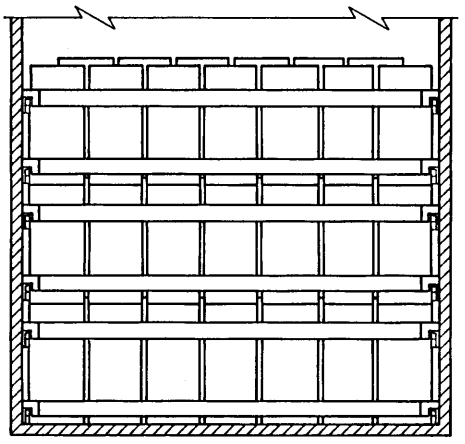
KEY NUMBERS

(1) WALL MEMBERS, ADJUSTABLE OR FIXED, MUST BE LOCATED AT HEIGHTS TO INSURE THAT TWO CROSS MEMBERS ARE ALIGNED WITH EACH LAYER OF CONTAINERS. SEE ELEVATION VIEW ON PAGE 17, FOR GENERAL LOCATION GUIDANCE.

(2) CROSS MEMBER (2 REQD FOR EACH LAYER AT EACH LONGITUDINAL LOCATION). SEE ELEVATION VIEW AND SPECIAL NOTES ON PAGE 17. ALL CROSS MEMBERS AT EACH LOCATION MUST BEAR ON THE CONTAINER BODIES OR ON THE CONTAINER ROLLING HOOPS.

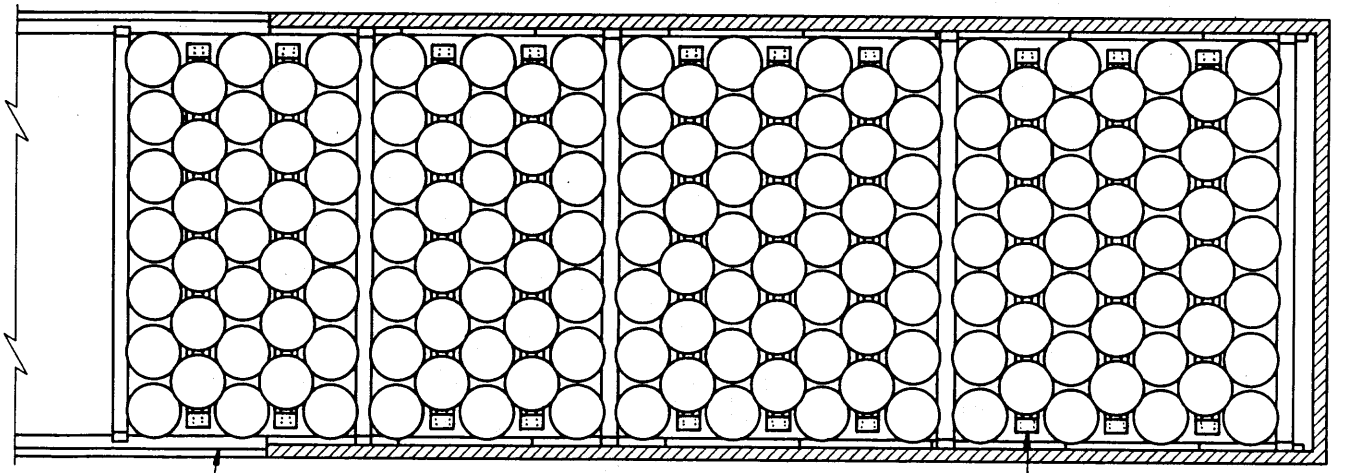
(3) RISER (20 REQD FOR LOAD AS SHOWN). SEE "RISER A" DETAIL ON PAGE 34.

(4) DOORWAY MEMBER (8 REQD). INSTALL AT THE SAME HEIGHT AS THE WALL MEMBERS. SEE SPECIAL NOTE 4 ON PAGE 17.

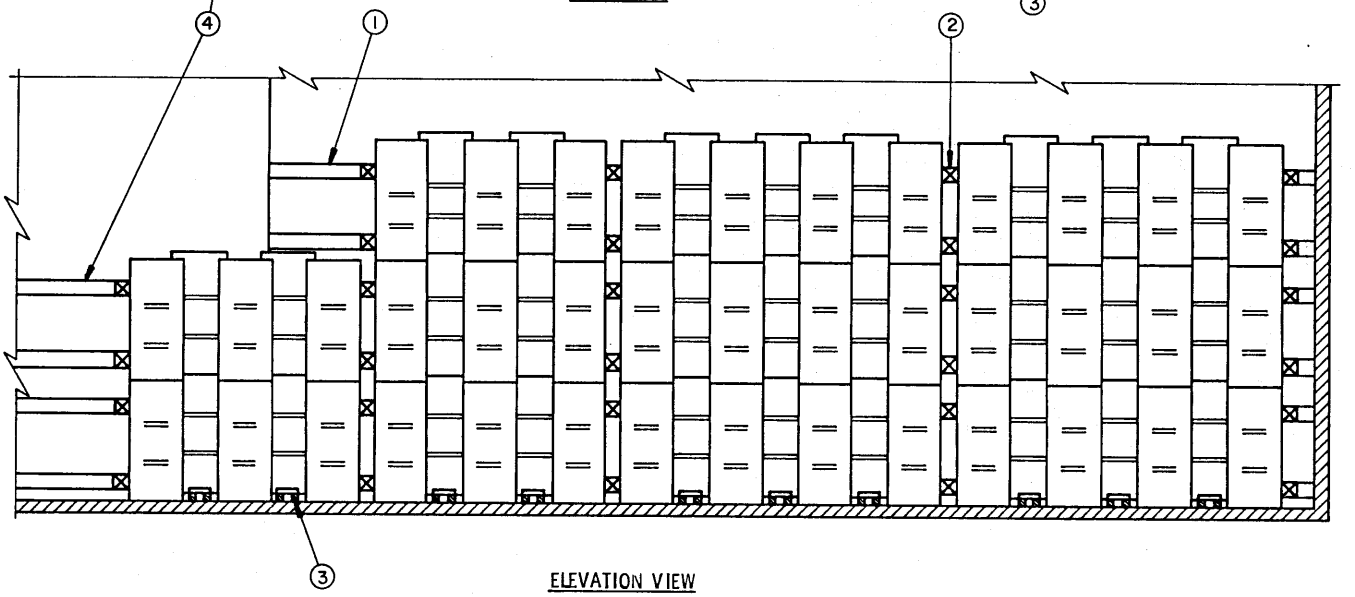


SECTION A-A

CARLOADING OF METAL DRUMS IN A BOX CAR
EQUIPPED WITH MECHANICAL BRACING DEVICES



PLAN VIEW



ELEVATION VIEW

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	20	7
2" X 2"	330	110
NAILS	NO. REQD	POUNDS
6d (2")	160	1

SPECIAL NOTES:

1. THE LOAD AS SHOWN IS BASED ON A 50'-6" LONG BY 8'-9" WIDE (INSIDE CLEARANCE) BOX CAR EQUIPPED WITH MECHANICAL BRACING DEVICES WHICH HAVE ADJUSTABLE AND/OR FIXED WALL MEMBERS. OTHER SIZE CARS CAN BE USED.
2. THE TYPICAL CARLOAD VIEWS DEPICT A METAL DRUM WITH A BOLTED-RING TYPE CLOSURE HAVING A 14" DIAMETER (30-3/4" HIGH).
3. IF THE CAR BEING USED FOR SHIPPING THIS LOAD HAS GOOD STRAIGHT WOOD END WALLS, THE CROSS MEMBERS AT THE END OF THE CAR MAY BE OMITTED. POSITION CONTAINERS DIRECTLY AGAINST THE CAR END WALL.
4. A PARTIAL LAYER HAS BEEN SHOWN IN EACH END OF THE CAR BECAUSE MOST CARS WITH MECHANICAL BRACING DEVICES DO NOT HAVE MORE THAN TEN DOORWAY MEMBERS. IF THE CAR BEING LOADED HAS TWELVE DOORWAY MEMBERS THREE COMPLETE LAYERS MAY BE LOADED INTO THE CAR, PROVIDING THE LOAD LIMIT OF THE CAR IS NOT EXCEEDED.
5. IF DECKING IS REQUIRED BETWEEN LAYERS TO FACILITATE PROPER STACKING, PIECES MARKED ⑤ ("INTERMEDIATE DECKING") AS SPECIFIED ON PAGES 18 AND 19, MAY BE USED.

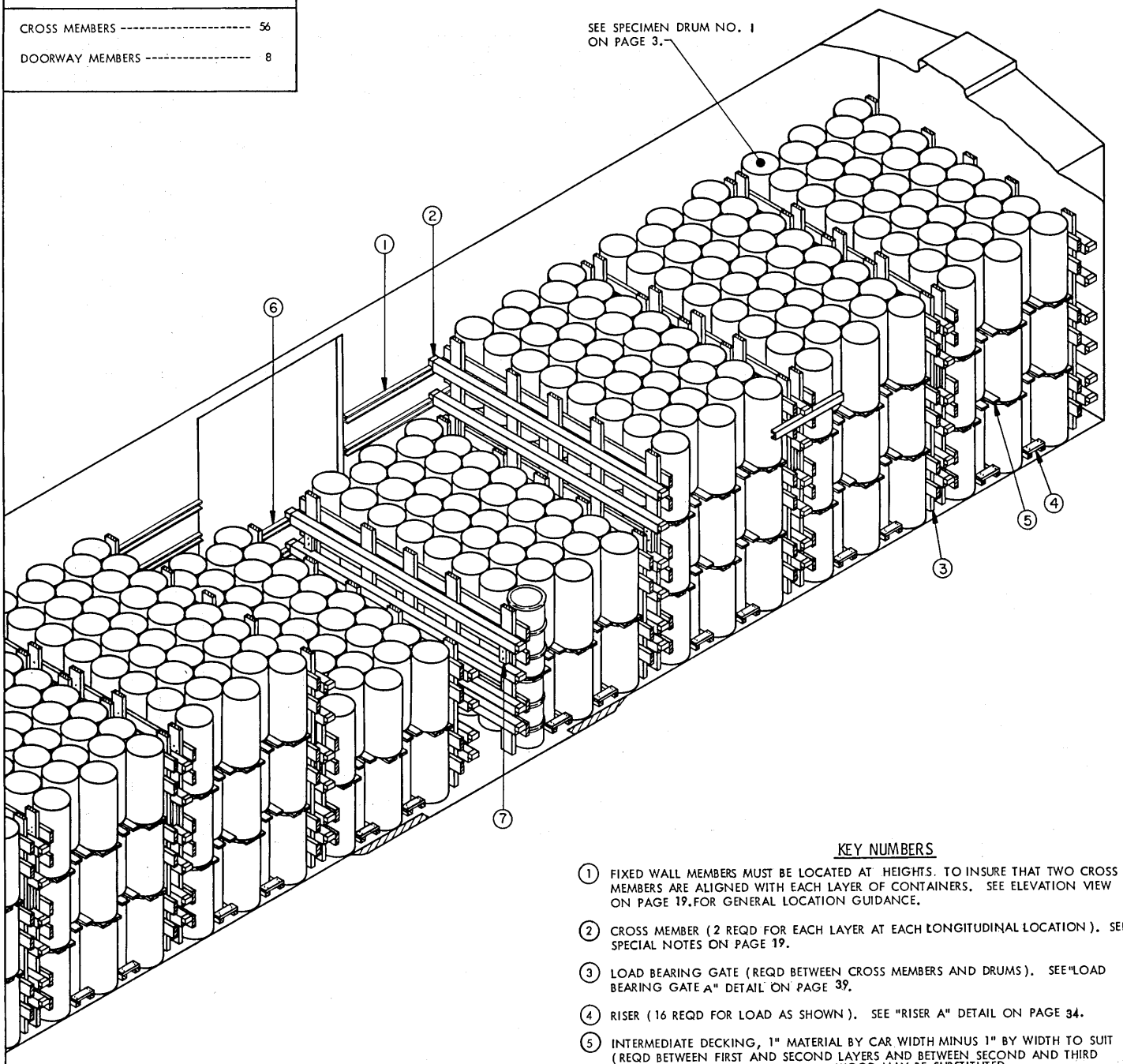
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
METAL DRUM	816	122,400 LBS
DUNNAGE		235 LBS
TOTAL WEIGHT		122,635 LBS

CARLOADING OF METAL DRUMS IN A BOX CAR
EQUIPPED WITH MECHANICAL BRACING DEVICES

CAR EQUIPMENT REQUIRED

CROSS MEMBERS	56
DOORWAY MEMBERS	8



ISOMETRIC VIEW

KEY NUMBERS

(1) FIXED WALL MEMBERS MUST BE LOCATED AT HEIGHTS. TO INSURE THAT TWO CROSS MEMBERS ARE ALIGNED WITH EACH LAYER OF CONTAINERS. SEE ELEVATION VIEW ON PAGE 19. FOR GENERAL LOCATION GUIDANCE.

(2) CROSS MEMBER (2 REQD FOR EACH LAYER AT EACH LONGITUDINAL LOCATION). SEE SPECIAL NOTES ON PAGE 19.

(3) LOAD BEARING GATE (REQD BETWEEN CROSS MEMBERS AND DRUMS). SEE "LOAD BEARING GATE A" DETAIL ON PAGE 39.

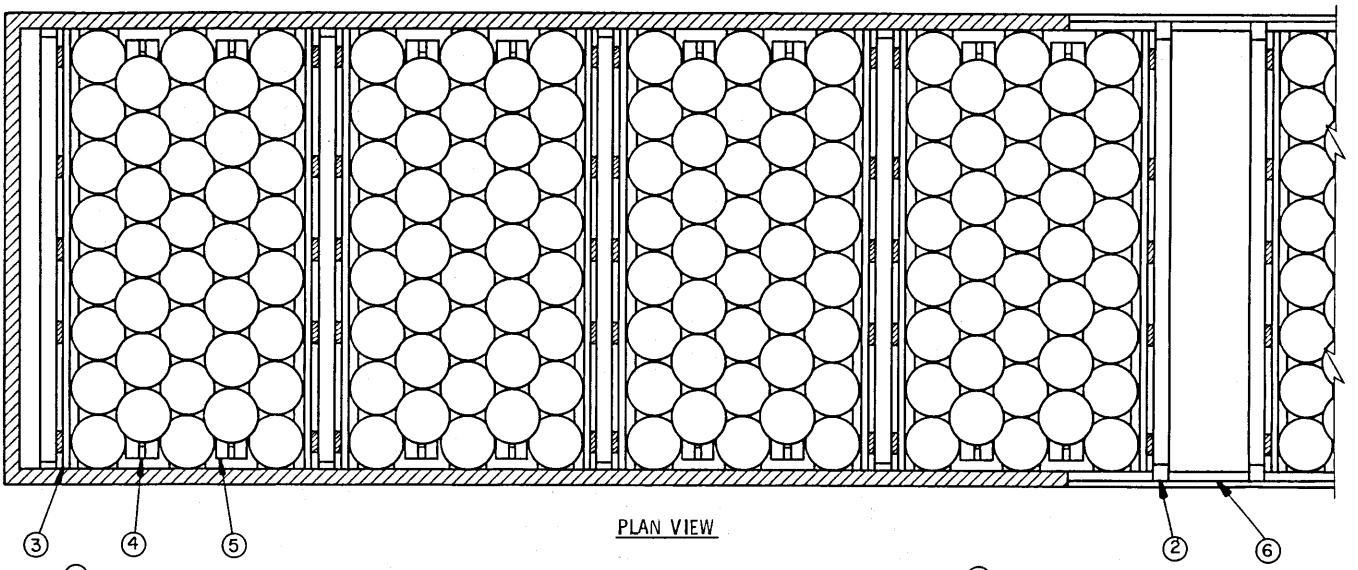
(4) RISER (16 REQD FOR LOAD AS SHOWN). SEE "RISER A" DETAIL ON PAGE 34.

(5) INTERMEDIATE DECKING, 1" MATERIAL BY CAR WIDTH MINUS 1" BY WIDTH TO SUIT (REQD BETWEEN FIRST AND SECOND LAYERS AND BETWEEN SECOND AND THIRD LAYERS OF DRUMS). 1/2" THICK PLYWOOD MAY BE SUBSTITUTED.

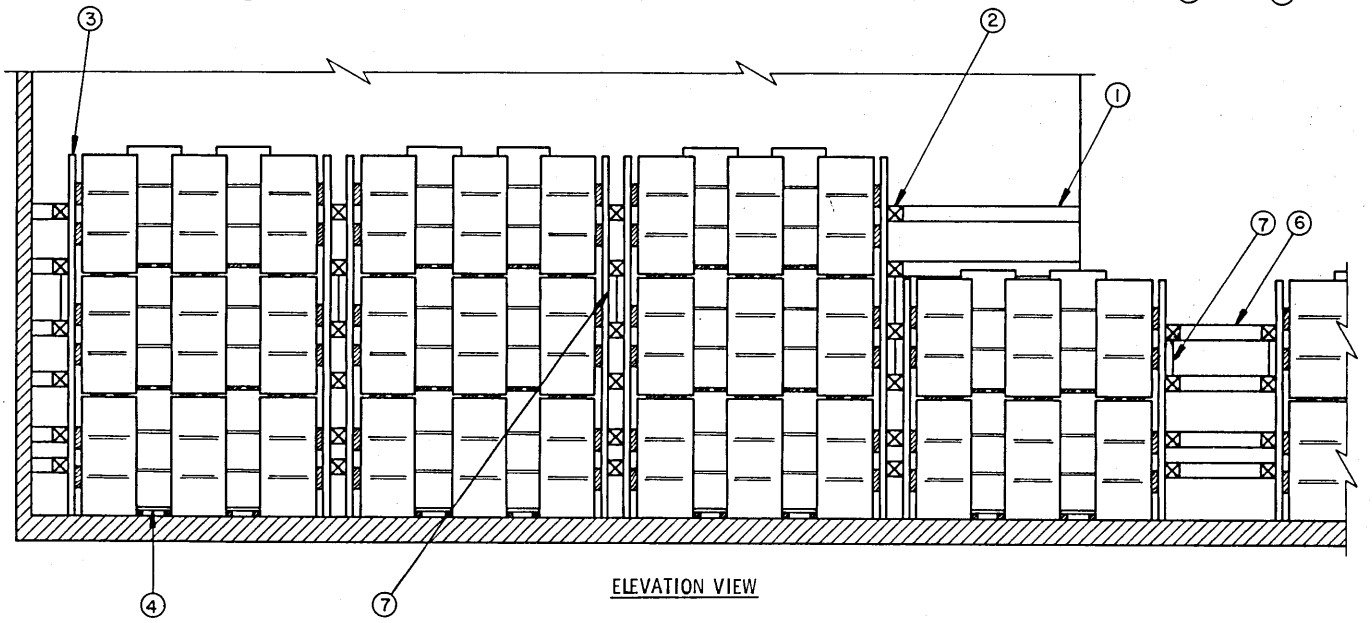
(6) DOORWAY MEMBER (8 REQD). INSTALL AT THE SAME HEIGHTS AS THE ADJACENT WALL MEMBERS.

(7) GATE HOLD DOWN, 2" X 4" BY CUT TO FIT BETWEEN TWO CROSS MEMBERS (2 REQD/GATE). NAIL TO VERTICAL PIECE OF LOAD BEARING GATE W/3-10d NAILS.

CARLOADING OF METAL DRUMS IN A BOX CAR
EQUIPPED WITH MECHANICAL BRACING DEVICES



PLAN VIEW



ELEVATION VIEW

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	1,317	439
2" X 2"	296	99
2" X 4"	32	22
2" X 6"	1,383	1,383
NAILS	NO. REQD	POUNDS
6d (2")	128	3/4
10d (3")	1,416	21-3/4

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
METAL DRUM	836	125,400 LBS
DUNNAGE		3,909 LBS
TOTAL WEIGHT		129,309 LBS

SPECIAL NOTES:

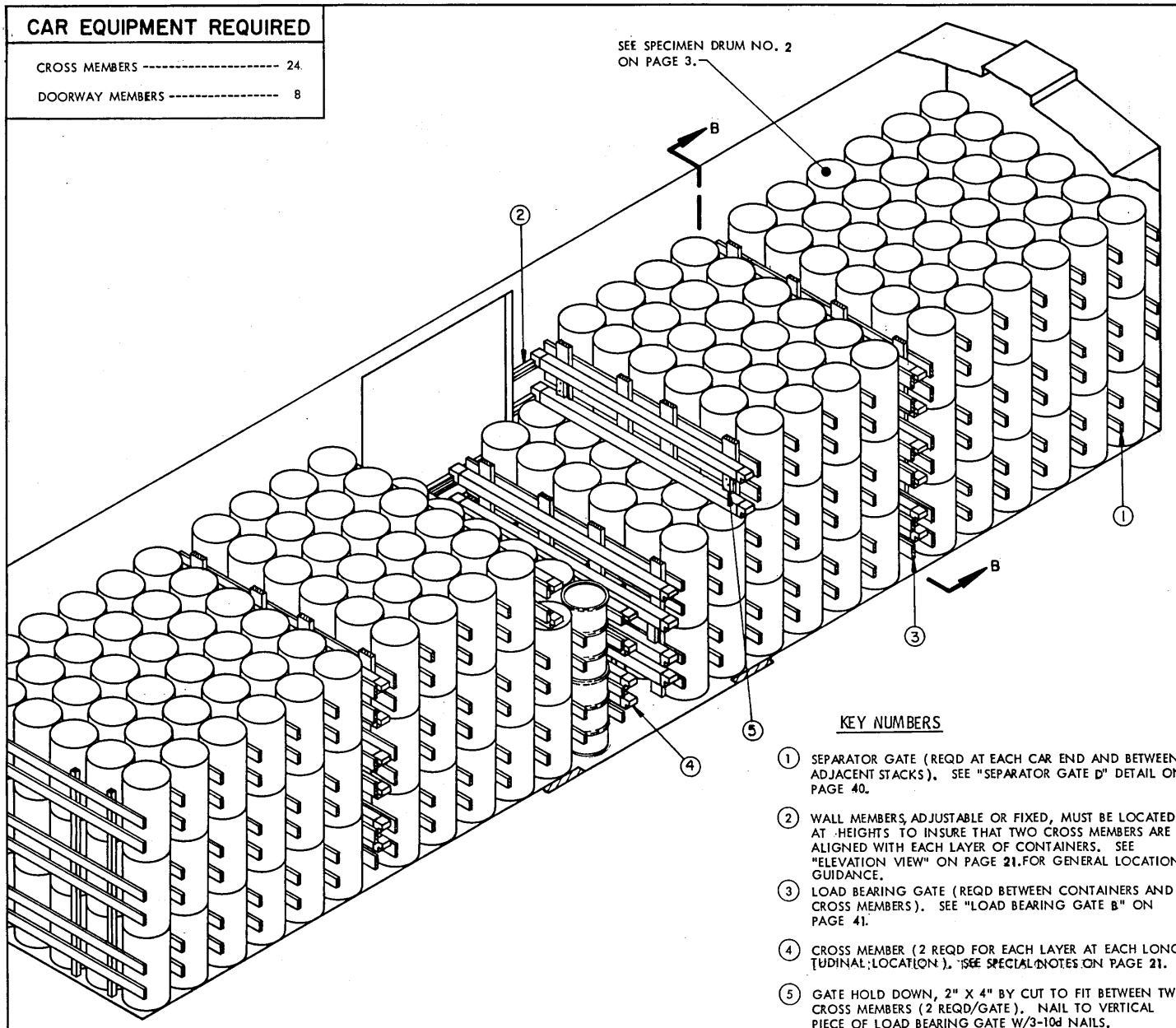
1. THE LOAD AS SHOWN IS BASED ON A 50'-6" LONG BY 9'-4" WIDE (INSIDE CLEARANCE) BOX CAR EQUIPPED WITH MECHANICAL BRACING DEVICES WHICH HAVE FIXED WALL MEMBERS. OTHER SIZE CARS CAN BE USED.
2. THE TYPICAL CARLOAD VIEWS DEPICT A METAL DRUM HAVING A 14" DIAMETER (30-3/4" HIGH). WITH A WEIGHT OF APPROXIMATELY 150 POUNDS.
3. IF THE CAR BEING USED FOR SHIPPING THIS LOAD HAS SOLID STRAIGHT WOOD END WALLS, THE LOAD BEARING GATE AND THE CROSS MEMBERS AT EACH END OF THE CAR MAY BE OMITTED. POSITION CONTAINERS DIRECTLY AGAINST THE CAR END WALL.
4. A PARTIAL LAYER HAS BEEN SHOWN IN EACH END OF THE CAR BECAUSE MOST CARS WITH MECHANICAL BRACING DEVICES DO NOT HAVE MORE THAN TEN DOORWAY MEMBERS. IF THE CAR BEING LOADED HAS TWELVE DOORWAY MEMBERS THREE COMPLETE LAYERS MAY BE LOADED INTO THE CAR, PROVIDING THE LOAD LIMIT OF THE CAR IS NOT EXCEEDED.
5. IF THE CAR BEING LOADED HAS FIXED WALL MEMBERS AT HEIGHTS SO THAT CROSS MEMBERS WOULD ALL BEAR ON THE BODY OF THE CONTAINERS, OR WILL BEAR ON THE ROLLING HOOPS OF THE CONTAINERS, TWO CROSS MEMBERS PER LAYER, THE LOAD BEARING GATES COULD BE OMITTED. IT WOULD BE ADVISABLE TO ORDER A CAR WITH ADJUSTABLE WALL MEMBERS IF POSSIBLE, BECAUSE WITH THIS TYPE CAR NO LOAD BEARING GATES ARE REQUIRED AS SPECIFIED ON PAGES 18 AND 19. SEE LOAD ON PAGES 16 AND 17 FOR A NO-GATE CONFIGURATION.

CARLOADING OF METAL DRUMS IN A BOX CAR
EQUIPPED WITH MECHANICAL BRACING DEVICES

CAR EQUIPMENT REQUIRED

CROSS MEMBERS ---------- 24

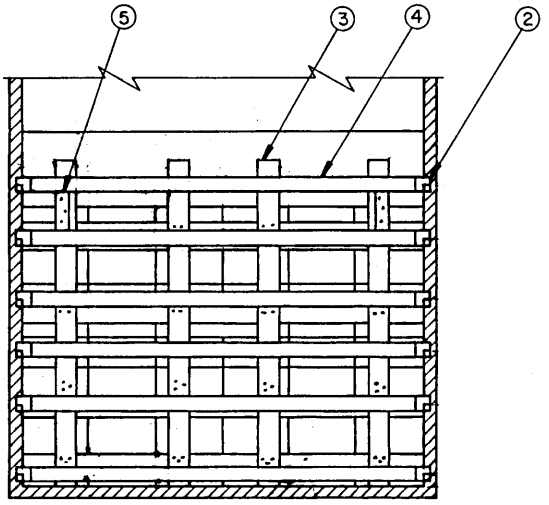
DOORWAY MEMBERS ---------- 8



ISOMETRIC VIEW

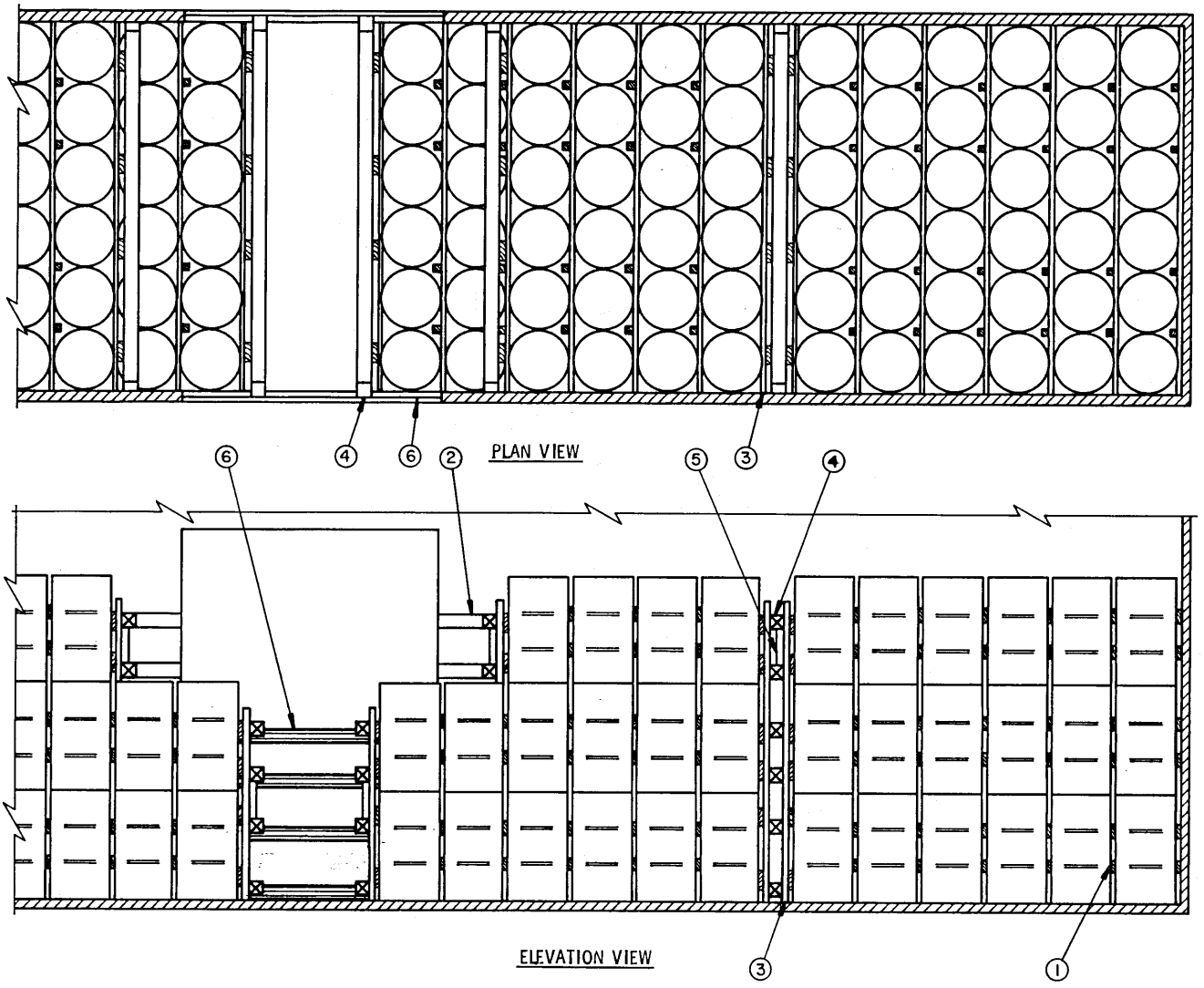
KEY NUMBERS

1. SEPARATOR GATE (REQD AT EACH CAR END AND BETWEEN ADJACENT STACKS). SEE "SEPARATOR GATE D" DETAIL ON PAGE 40.
2. WALL MEMBERS, ADJUSTABLE OR FIXED, MUST BE LOCATED AT HEIGHTS TO INSURE THAT TWO CROSS MEMBERS ARE ALIGNED WITH EACH LAYER OF CONTAINERS. SEE "ELEVATION VIEW" ON PAGE 21. FOR GENERAL LOCATION GUIDANCE.
3. LOAD BEARING GATE (REQD BETWEEN CONTAINERS AND CROSS MEMBERS). SEE "LOAD BEARING GATE B" ON PAGE 41.
4. CROSS MEMBER (2 REQD FOR EACH LAYER AT EACH LONGITUDINAL LOCATION). SEE SPECIAL NOTES ON PAGE 21.
5. GATE HOLD DOWN, 2" X 4" BY CUT TO FIT BETWEEN TWO CROSS MEMBERS (2 REQD/GATE). NAIL TO VERTICAL PIECE OF LOAD BEARING GATE W/3-10d NAILS.
6. DOORWAY MEMBER (8 REQD). INSTALL AT THE SAME HEIGHTS AS THE ADJACENT WALL MEMBERS.



SECTION B-B

CARLOADING OF METAL DRUMS IN A BOX CAR
EQUIPPED WITH MECHANICAL BRACING DEVICES



BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	536	179
2" X 4"	998	666
2" X 6"	511	511
NAILS	NO. REQD	POUNDS
10d (3")	1,408	21-3/4

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
METAL DRUM	408	65,280 LBS
DUNNAGE		2,734 LBS
TOTAL WEIGHT		68,014 LBS

SPECIAL NOTES:

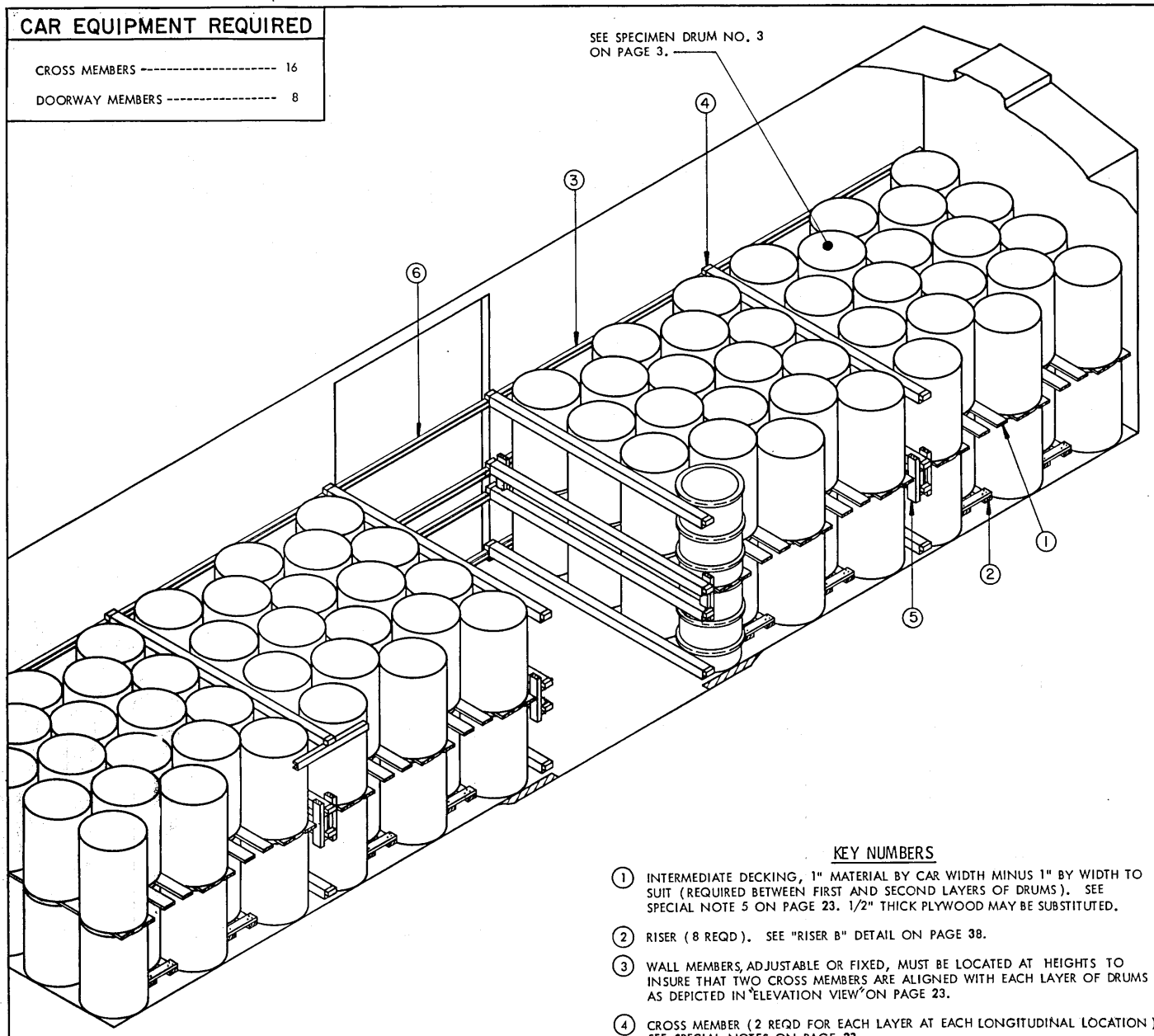
1. THE LOAD AS SHOWN IS BASED ON A 50'-6" LONG BY 8'-6" WIDE (INSIDE CLEARANCE) BOX CAR EQUIPPED WITH MECHANICAL BRACING DEVICES WHICH HAVE ADJUSTABLE AND/OR FIXED WALL MEMBERS. OTHER SIZE CARS CAN BE USED.
2. THE TYPICAL CARLOAD VIEWS DEPICT A METAL DRUM HAVING A 17" DIAMETER (30-3/4" HIGH) AND HAVING A RING-TYPE TOP CLOSURE AND A WEIGHT OF 160 POUNDS.
3. IF THE CAR BEING USED FOR SHIPPING THIS LOAD HAS STEEL END WALLS, IS BOWED OR HAS A BAD WOOD END WALL, ONE ADDITIONAL LOAD BEARING GATE AND ONE SET OF SIX CROSS MEMBERS WOULD BE REQUIRED AT EACH END OF THE CAR IN LIEU OF THE SEPARATOR GATE SHOWN.
4. A PARTIAL LAYER HAS BEEN SHOWN IN EACH END OF THE CAR BECAUSE MOST CARS WITH MECHANICAL BRACING DEVICES DO NOT HAVE MORE THAN TEN DOORWAY MEMBERS, THREE COMPLETE LAYERS MAY BE LOADED INTO THE CAR, PROVIDING THE LOAD DOES NOT EXCEED THE LOAD LIMIT OF THE CAR.
5. IF THE CAR BEING LOADED HAS FIXED WALL MEMBERS AT HEIGHTS SO THAT CROSS MEMBERS WILL ALL BEAR ON THE BODY OF THE DRUMS OR WILL ALL BEAR ON THE ROLLING HOOPS OF THE DRUMS, THE LOAD BEARING GATES CAN BE OMITTED. IT WOULD BE ADVISABLE TO ORDER A CAR WITH ADJUSTABLE WALL MEMBERS IF POSSIBLE, BECAUSE WITH THIS TYPE CAR NO LOAD BEARING GATES ARE REQUIRED.
6. IF DECKING IS REQUIRED BETWEEN LAYERS TO FACILITATE PROPER STACKING, PIECES MARKED ⑤ ("INTERMEDIATE DECKING") AS SPECIFIED ON PAGES 18 AND 19, MAY BE USED.

CARLOADING OF METAL DRUMS IN A BOX CAR
EQUIPPED WITH MECHANICAL BRACING DEVICES

CAR EQUIPMENT REQUIRED

CROSS MEMBERS ---------- 16

DOORWAY MEMBERS ---------- 8



ISOMETRIC VIEW

KEY NUMBERS

(1) INTERMEDIATE DECKING, 1" MATERIAL BY CAR WIDTH MINUS 1" BY WIDTH TO SUIT (REQUIRED BETWEEN FIRST AND SECOND LAYERS OF DRUMS). SEE SPECIAL NOTE 5 ON PAGE 23. 1/2" THICK PLYWOOD MAY BE SUBSTITUTED.

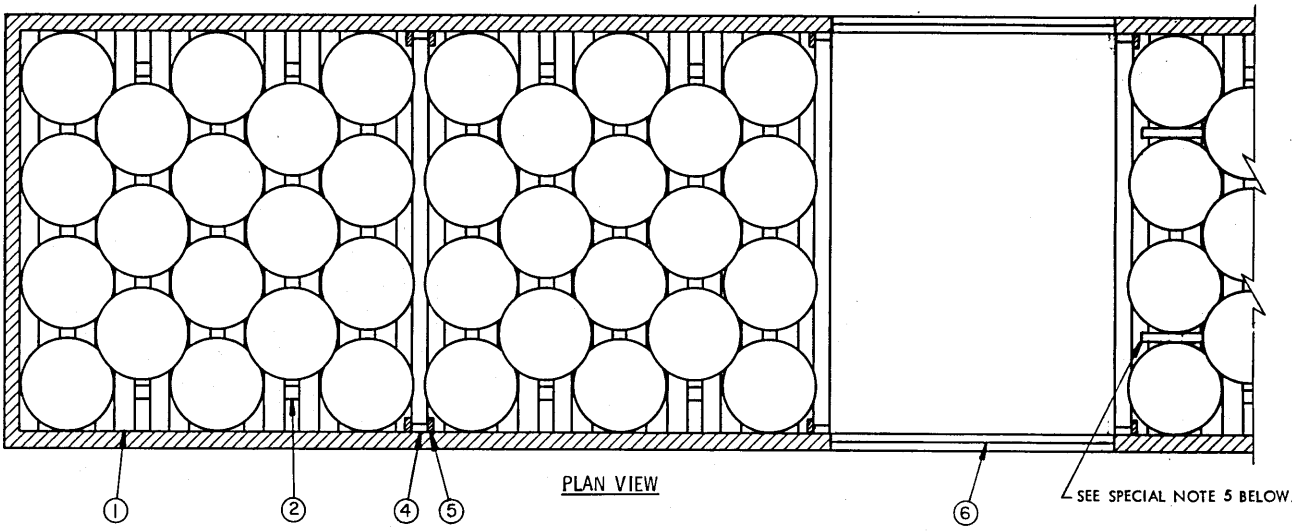
(2) RISER (8 REQD). SEE "RISER B" DETAIL ON PAGE 38.

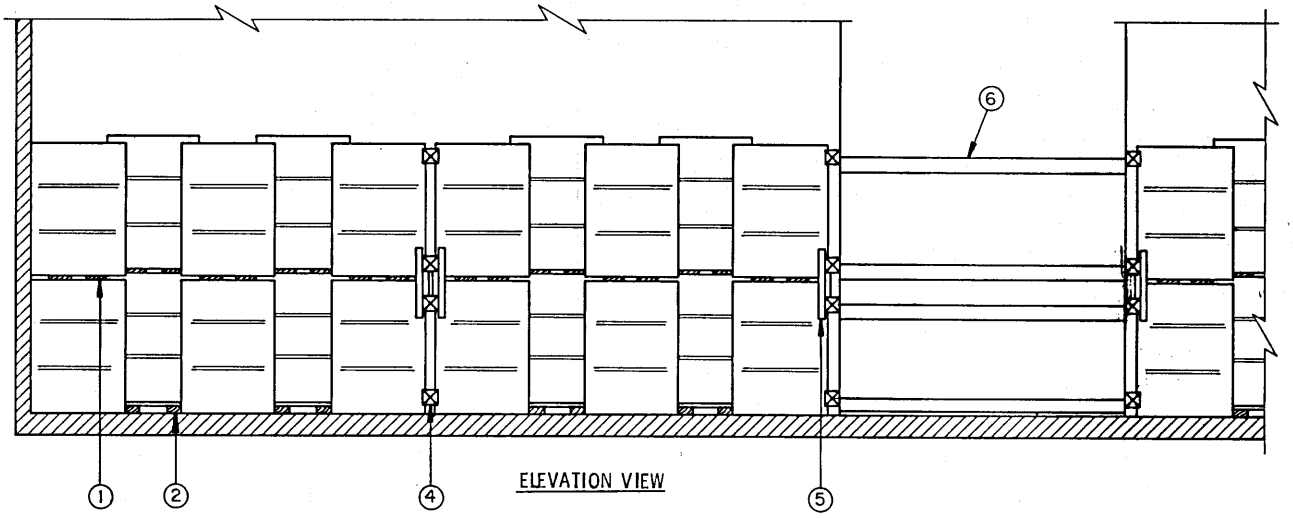
(3) WALL MEMBERS, ADJUSTABLE OR FIXED, MUST BE LOCATED AT HEIGHTS TO INSURE THAT TWO CROSS MEMBERS ARE ALIGNED WITH EACH LAYER OF DRUMS AS DEPICTED IN "ELEVATION VIEW" ON PAGE 23.

(4) CROSS MEMBER (2 REQD FOR EACH LAYER AT EACH LONGITUDINAL LOCATION). SEE SPECIAL NOTES ON PAGE 23.

(5) INTERMEDIATE DECKING STOP BLOCK (12 REQD). SEE DETAIL ON PAGE 43.

(6) DOORWAY MEMBER (8 REQD). INSTALL AT THE SAME HEIGHTS AS THE ADJACENT WALL MEMBERS.





BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1" X 4"	15	5
1" X 6"	337	169
2" X 4"	152	102
NAILS	NO. REQD	POUNDS
6d (2")	96	1/2
10d (2")	48	3/4
WIRE, 8-14 GAGE ---------- 80' REQD ---------- 1-1/2 LBS		

SPECIAL NOTES:

1. THE LOAD AS SHOWN IS BASED ON A 40'-6" LONG BY 8'-6" WIDE (INSIDE CLEARANCE) BOX CAR EQUIPPED WITH MECHANICAL BRACING DEVICES WHICH HAVE ADJUSTABLE AND/OR FIXED WALL MEMBERS. OTHER SIZE CARS CAN BE USED.
2. THE TYPICAL CARLOAD VIEWS DEPICT A 55 GALLON METAL DRUM HAVING A 24" DIAMETER (34" HIGH). NOTE: LOADING PROCEDURES ARE NOT TO BE USED FOR TOP OPENING DRUMS.
3. IF THE CAR BEING USED FOR SHIPPING THIS LOAD HAS STEEL END WALLS, IS BOWED OR HAS A BAD-WOOD END WALL, ONE SET OF FOUR ADDITIONAL CROSS MEMBERS WILL BE REQUIRED AT EACH END OF THE CAR. ALSO, FOUR (4) ADDITIONAL INTERMEDIATE STOP BLOCKS WILL BE REQUIRED.
4. IF THE LOAD LIMIT OF THE CAR IS NOT EXCEEDED, AN ADDITIONAL PARTIAL BAY MAY BE POSITIONED IN THE CENTER AREA OF THE CAR. PROVISIONS MUST BE MADE FOR KEEPING THE INTERMEDIATE DECKING IN PLACE LATERALLY.
5. IF A STACK OF DRUMS WITH INTERMEDIATE DECKING EXTENDS INTO THE DOORWAY AREA, IT WILL BE NECESSARY TO PROVIDE A LATERAL STOP FOR THE DECKING. NAIL A PIECE OF DUNNAGE (REF: 2" X 2" BY CUT TO FIT) BETWEEN LATERALLY ADJACENT DRUMS TO PREVENT THE DECKING FROM BECOMING DISPLACED. THIS STOP IS REQUIRED ON ALL STACKS IN THE DOORWAY AREA. THIS STOP MAY BE POSITIONED ON TOP OR UNDER THE DECKING; NAIL THRU THE 1" MATERIAL INTO THE 2" MATERIAL W/6d NAILS.

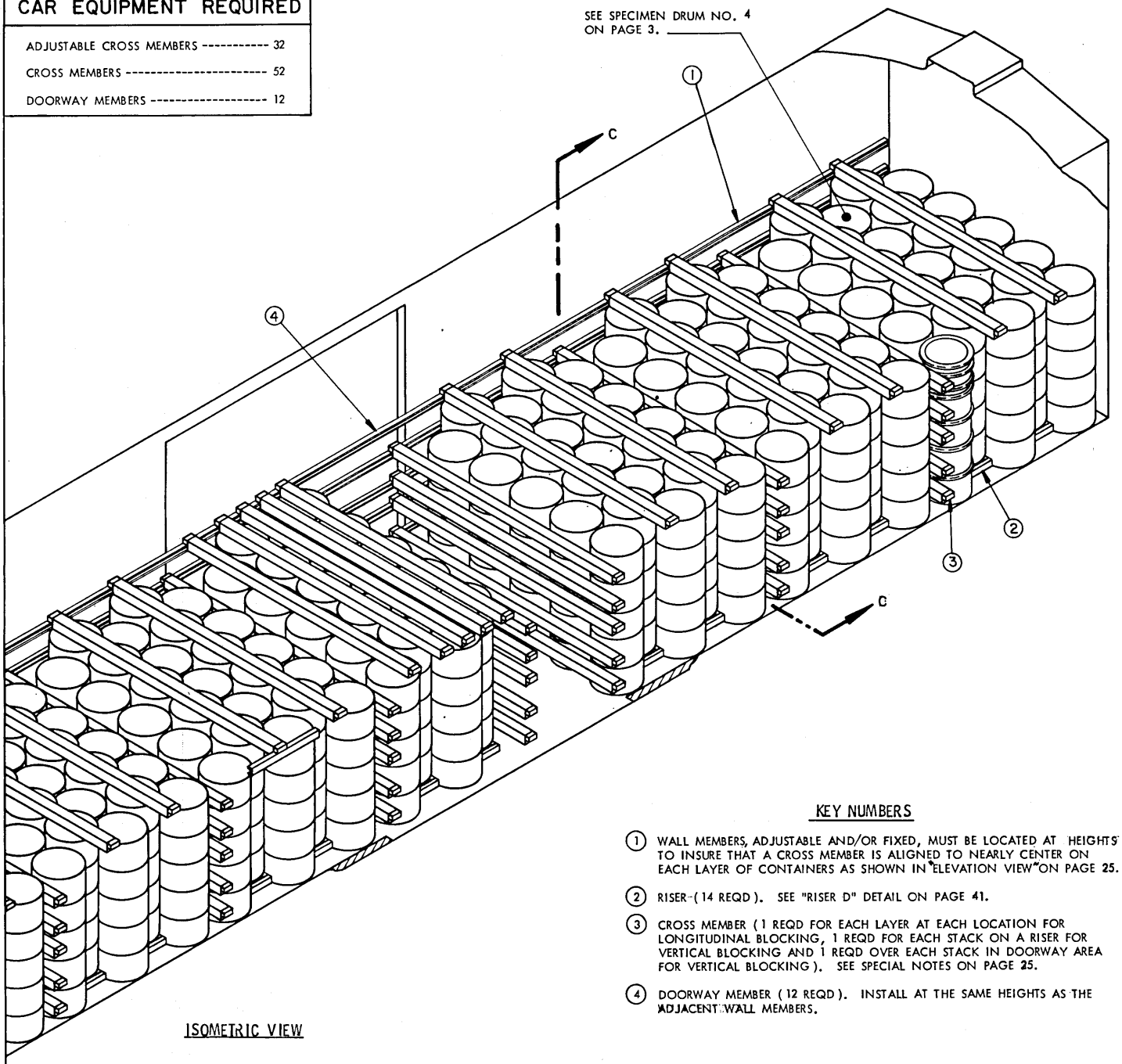
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
METAL DRUM	144	64,800 LBS
DUNNAGE		555 LBS
TOTAL WEIGHT		65,355 LBS

CARLOADING OF METAL DRUMS IN A BOX CAR
EQUIPPED WITH MECHANICAL BRACING DEVICES

CAR EQUIPMENT REQUIRED

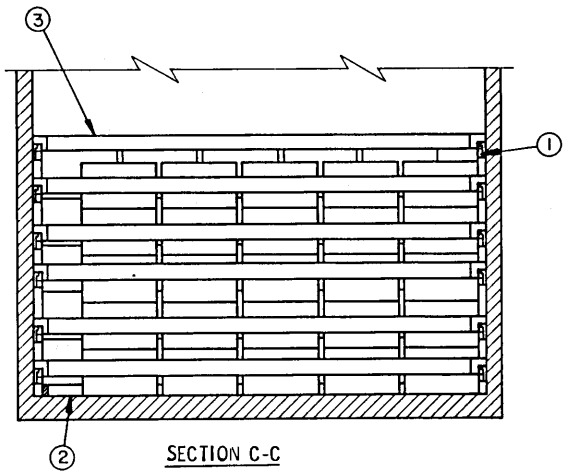
ADJUSTABLE CROSS MEMBERS	32
CROSS MEMBERS	52
DOORWAY MEMBERS	12



ISOMETRIC VIEW

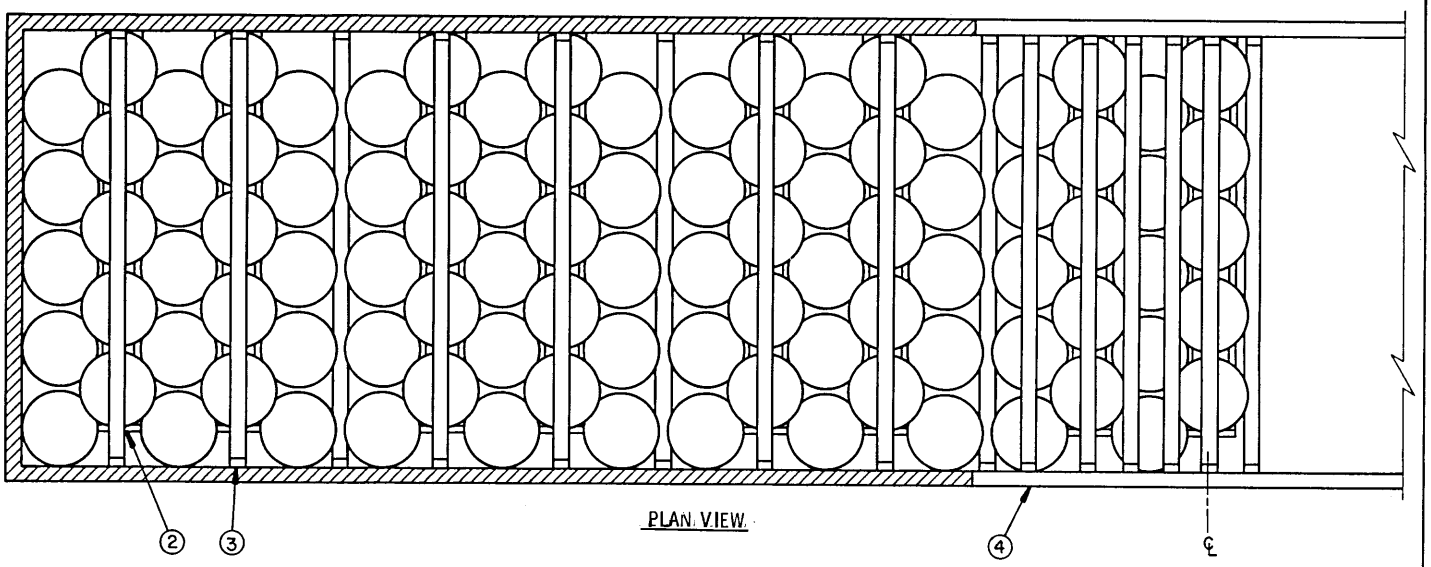
KEY NUMBERS

1. WALL MEMBERS, ADJUSTABLE AND/OR FIXED, MUST BE LOCATED AT HEIGHTS TO INSURE THAT A CROSS MEMBER IS ALIGNED TO NEARLY CENTER ON EACH LAYER OF CONTAINERS AS SHOWN IN "ELEVATION VIEW" ON PAGE 25.
2. RISER - (14 REQD). SEE "RISER D" DETAIL ON PAGE 41.
3. CROSS MEMBER (1 REQD FOR EACH LAYER AT EACH LOCATION FOR LONGITUDINAL BLOCKING, 1 REQD FOR EACH STACK ON A RISER FOR VERTICAL BLOCKING AND 1 REQD OVER EACH STACK IN DOORWAY AREA FOR VERTICAL BLOCKING). SEE SPECIAL NOTES ON PAGE 25.
4. DOORWAY MEMBER (12 REQD). INSTALL AT THE SAME HEIGHTS AS THE ADJACENT WALL MEMBERS.

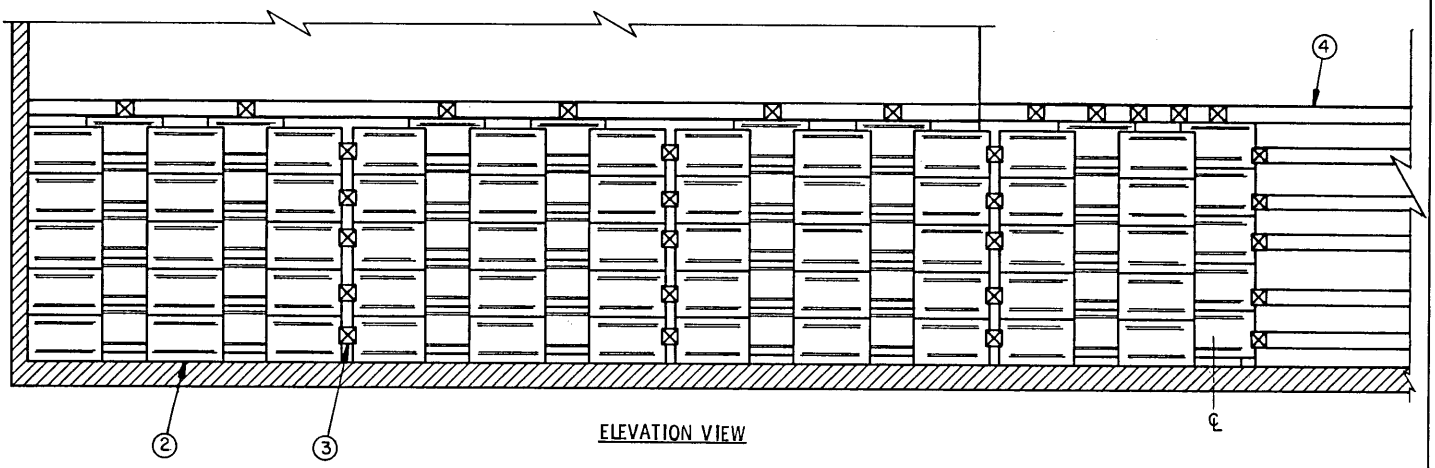


SECTION C-C

CARLOADING OF METAL DRUMS IN A BOX CAR
EQUIPPED WITH MECHANICAL BRACING DEVICES



PLAN VIEW



ELEVATION VIEW

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
1-5/8" X 2-3/4"	258	130
NAILS	NO. REQD	POUNDS
10d (3")	112	1-3/4

SPECIAL NOTES:

1. THE LOAD AS SHOWN IS BASED ON A 50'-6" LONG BY 9'-3" WIDE (INSIDE CLEARANCE) BOX CAR EQUIPPED WITH MECHANICAL BRACING DEVICES WHICH HAVE ADJUSTABLE AND/OR FIXED WALL MEMBERS. OTHER SIZE CARS CAN BE USED.
2. THE TYPICAL CARLOAD VIEWS DEPICT A POWDER CONTAINER, MK2, MOD O, HAVING A 10-1/2" DIAMETER (12" HIGH).
3. IF THE CAR BEING USED FOR SHIPPING THIS LOAD HAS STEEL END WALLS, IS BOWED OR HAS A BAD-WOOD END WALL, ONE SET OF FIVE ADDITIONAL CROSS MEMBERS WILL BE REQUIRED AT EACH END OF THE CAR.
4. IF THE CAR BEING USED FOR SHIPPING THIS LOAD HAS ONLY TEN DOORWAY MEMBERS THE LOAD UNITS EXTENDING INTO THE DOOR AREA WILL HAVE TO BE REDUCED TO FOUR-CONTAINERS HIGH.

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
METAL DRUM	850	25,500 LBS
DUNNAGE		262 LBS
TOTAL WEIGHT		25,762 LBS

CARLOADING OF METAL DRUMS IN A BOX CAR
EQUIPPED WITH MECHANICAL BRACING DEVICES

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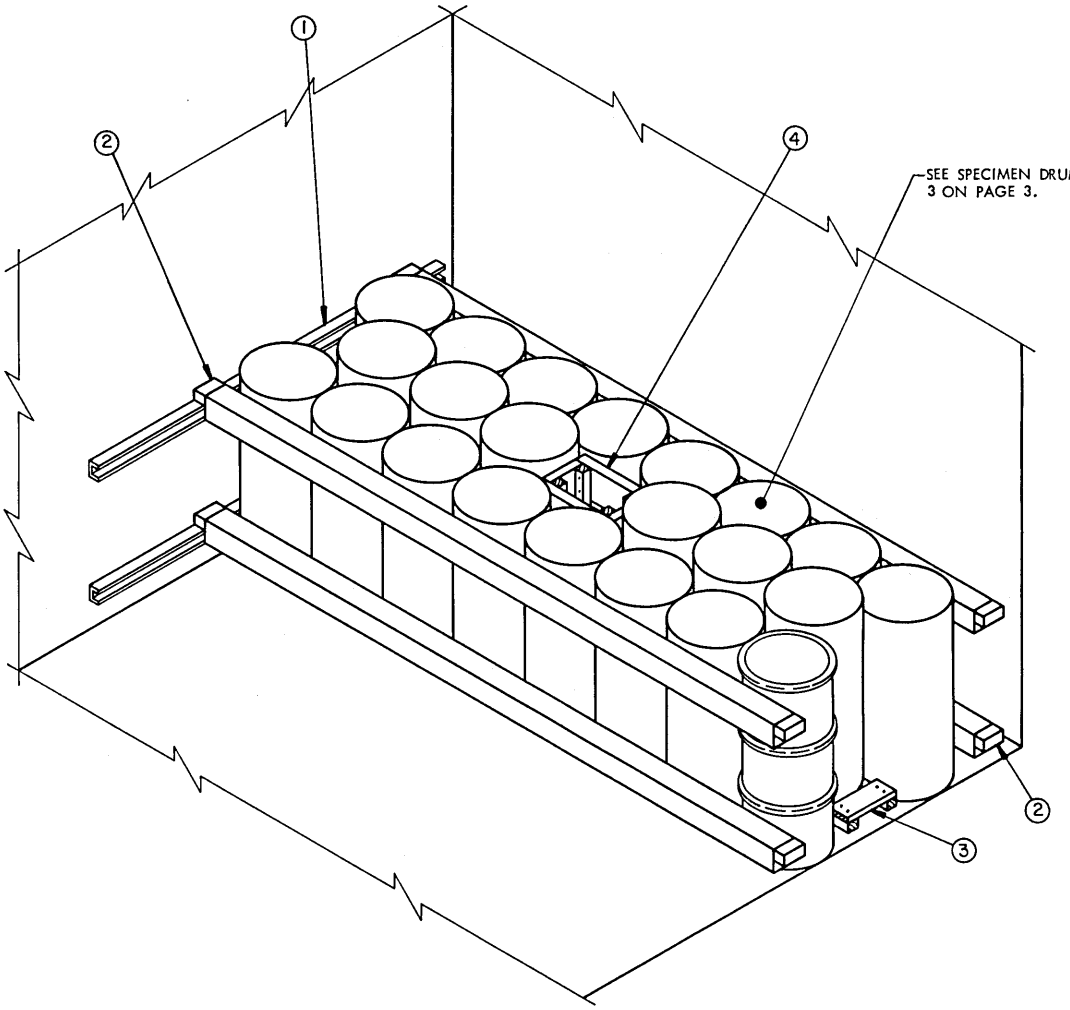


ISOMETRIC VIEW

KEY NUMBERS

(1) WALL MEMBER ADJUSTABLE OR FIXED, MUST BE LOCATED AT HEIGHTS TO INSURE THAT BOTH CROSS MEMBERS ARE ALIGNED TO BEAR ON THE BODY OF THE DRUMS, ONE NEAR THE TOP AND ONE NEAR THE BOTTOM. DO NOT POSITION ON THE ROLLING HOOP, OR ON THE TOP OR BOTTOM RING OF THE CONTAINER.

(2) CROSS MEMBER (4 REQD FOR THE LOAD AS SHOWN). SEE SPECIAL NOTES ON THIS PAGE.

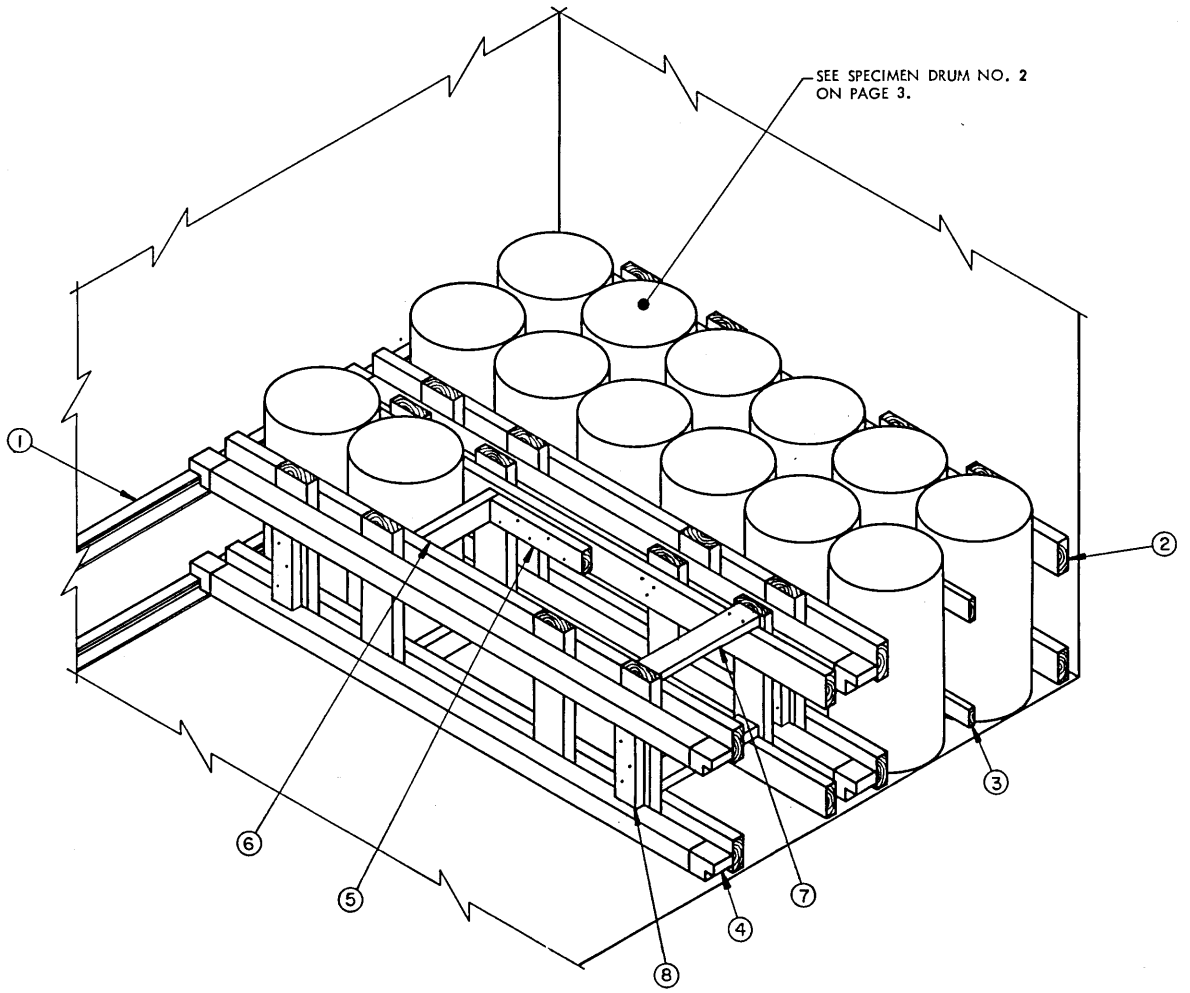
(3) RISER (1 REQD). SEE "RISER A" DETAIL ON PAGE 34.

(4) FILLER FOR OMITTED METAL DRUM (1 REQD FOR EACH OMITTED DRUM). SEE DETAIL ON PAGE 40.

SPECIAL NOTES:

1. THE LOAD AS SHOWN IS BASED ON A BOX CAR EQUIPPED WITH MECHANICAL BRACING DEVICES WHICH HAVE ADJUSTABLE OR FIXED WALL MEMBERS AT HEIGHTS SO THAT TWO CROSS MEMBERS WILL CONTACT THE DRUMS (NEAR THE TOP AND NEAR THE BOTTOM OF EACH LAYER).
2. THE ITEM DEPICTED IN THE LOAD IS A METAL DRUM 14" IN DIAMETER BY 30-3/4" HIGH.
3. THIS LOAD MAY BE INCREASED IN HEIGHT OR LENGTH AS REQUIRED; USE ADDITIONAL CROSS MEMBERS IN ACCORDANCE WITH SPECIFICATIONS CONTAINED HEREIN. IF NECESSARY, ADDITIONAL FILLERS FOR OMITTED DRUMS MAY BE USED AS REQUIRED. THE FILLER ASSEMBLY AS SHOWN HAS ONLY BEEN SPECIFIED FOR THE DEPICTED LCL LOAD TO SHOW A TYPICAL INSTALLATION.

TYPICAL LCL IN A BOX CAR EQUIPPED WITH MECHANICAL BRACING DEVICES



ISOMETRIC VIEW

SPECIAL NOTES:

1. THE LOAD AS SHOWN IS BASED ON A BOX CAR EQUIPPED WITH MECHANICAL BRACING DEVICES WHICH HAVE FIXED WALL MEMBERS AT HEIGHTS SO THAT TWO CROSS MEMBERS WILL CONTACT THE LOAD BEARING GATE (NEAR THE TOP AND THE BOTTOM OF THE LOAD).
2. THE ITEM DEPICTED IN THE LOAD IS A METAL DRUM 17" IN DIAMETER BY 30-3/4" HIGH.
3. PIECES MARKED ⑤, ⑥ AND ⑦ HAVE ONLY BEEN SPECIFIED FOR THE DEPICTED LCL LOAD TO SHOW A TYPICAL INSTALLATION THAT IS REQUIRED TO BLOCK A PARTIAL STACK.

KEY NUMBERS

① WALL MEMBERS, FIXED, MUST BE LOCATED AT HEIGHTS TO INSURE THAT BOTH CROSS MEMBERS ARE ALIGNED TO BEAR ON THE HEIGHT OF THE DRUMS AS SHOWN; ONE CROSS MEMBER NEAR THE TOP AND ONE NEAR THE BOTTOM.

② LOAD BEARING GATE (4 REQD). SEE "LOAD BEARING GATE C" DETAIL ON PAGE 42.

③ SEPARATOR GATE (1 REQD). SEE "SEPARATOR GATE E" DETAIL ON PAGE 42.

④ CROSS MEMBER (4 REQD FOR THE LOAD AS SHOWN). SEE SPECIAL NOTES ON THIS PAGE.

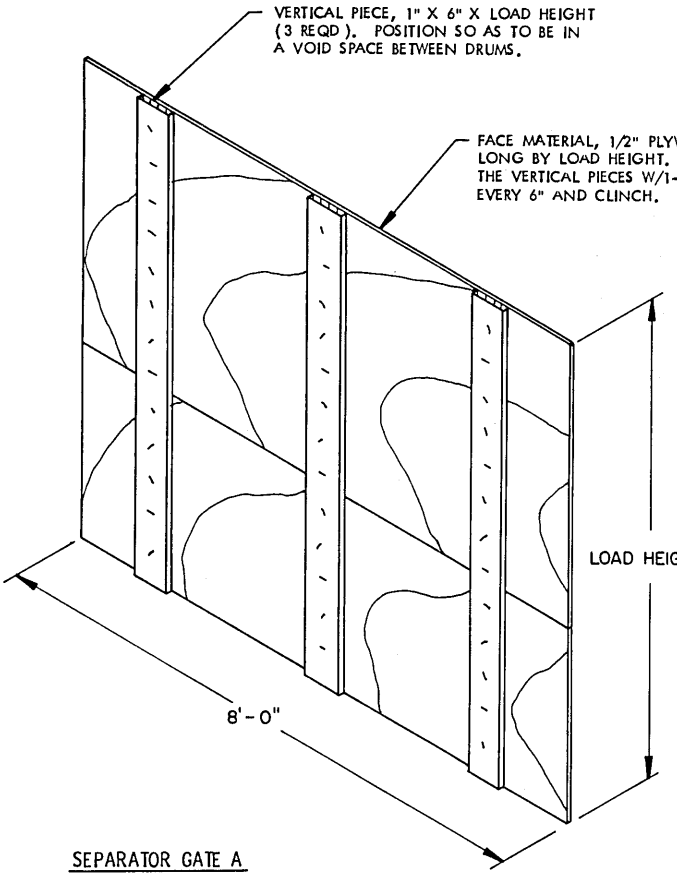
⑤ SIDE BEARING PIECE BACK-UP, 2" X 4" X 18" (4 REQD). NAIL TO LATERAL PIECE OF LOAD BEARING GATE W/5-10d NAILS.

⑥ SIDE BEARING PIECE, 2" X 4" BY CUT TO FIT (2 REQD). NAIL TO SIDE BEARING PIECE BACK-UP W/2-12d NAILS AT EACH END.

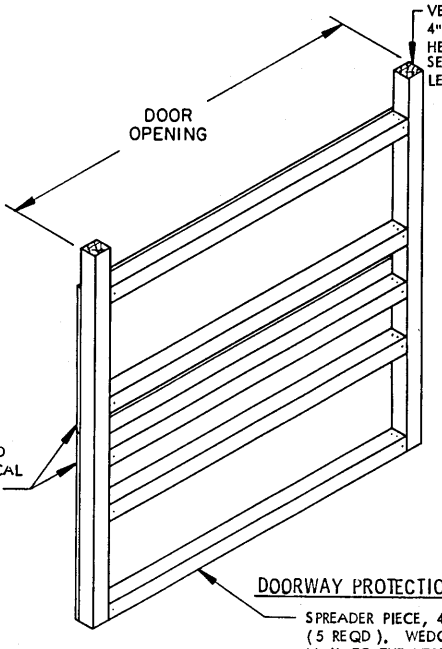
⑦ STRUT, 2" X 4" BY CUT TO FIT (2 REQD). NAIL TO LATERAL PIECE OF LOAD BEARING GATE W/2-12d NAILS.

⑧ GATE HOLD-DOWN, 2" X 4" BY CUT TO FIT BETWEEN CROSS MEMBERS (8 REQD). NAIL TO VERTICAL OF LOAD BEARING GATE W/3-10d NAILS..

TYPICAL LCL IN A BOX CAR EQUIPPED WITH MECHANICAL BRACING DEVICES



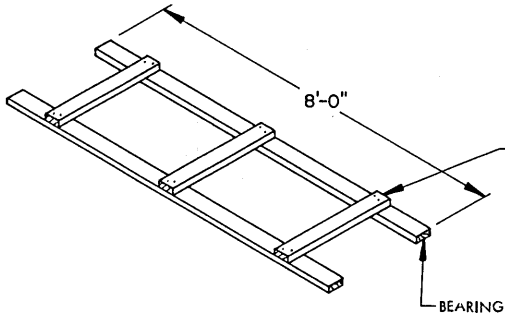
SEPARATOR GATE A



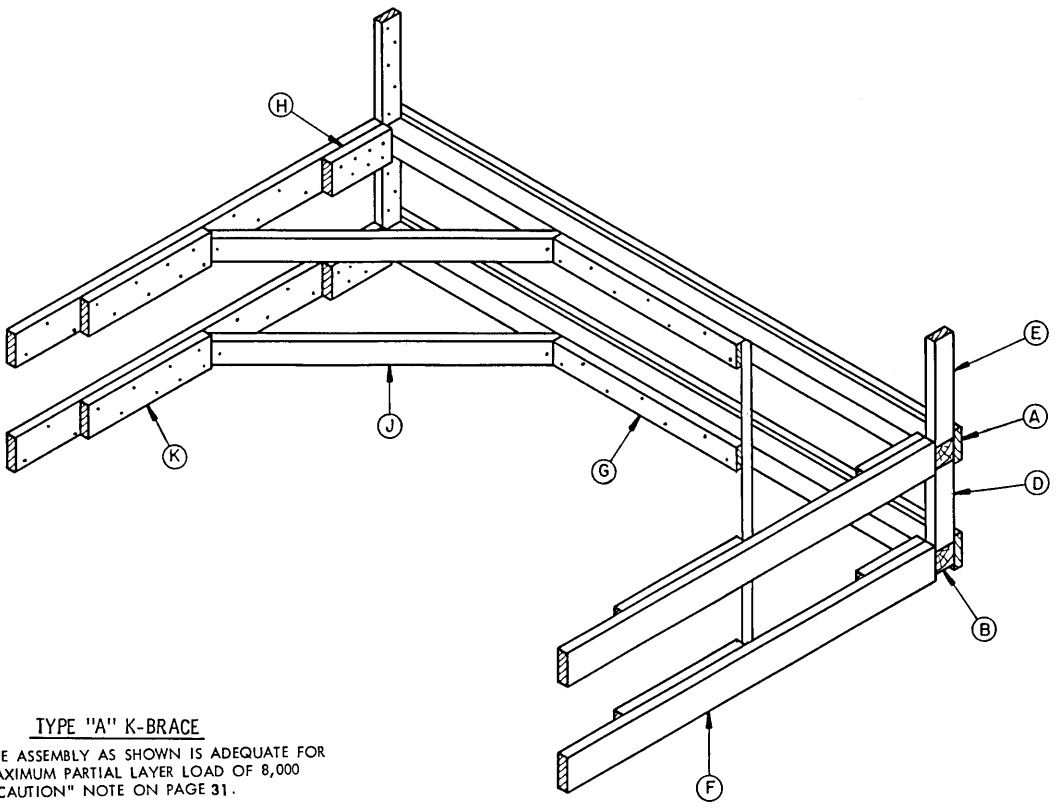
NOTE: IF CAR HAS NAILABLE DOOR POSTS, USE DOUBLED 2" X 4" MATERIAL FOR THE VERTICAL PIECES IN LIEU OF 4" X 4". NAIL THE FIRST PIECE TO THE DOOR POSTS W/12d NAILS. NAIL THE SECOND TO THE FIRST IN A LIKE MANNER.

DOORWAY PROTECTION A

SPREADER PIECE, 4" X 4" BY CUT TO FIT (5 REQD). WEDGE IN PLACE AND TOE NAIL TO THE VERTICAL PIECES W/3-16d NAILS AT EACH END.

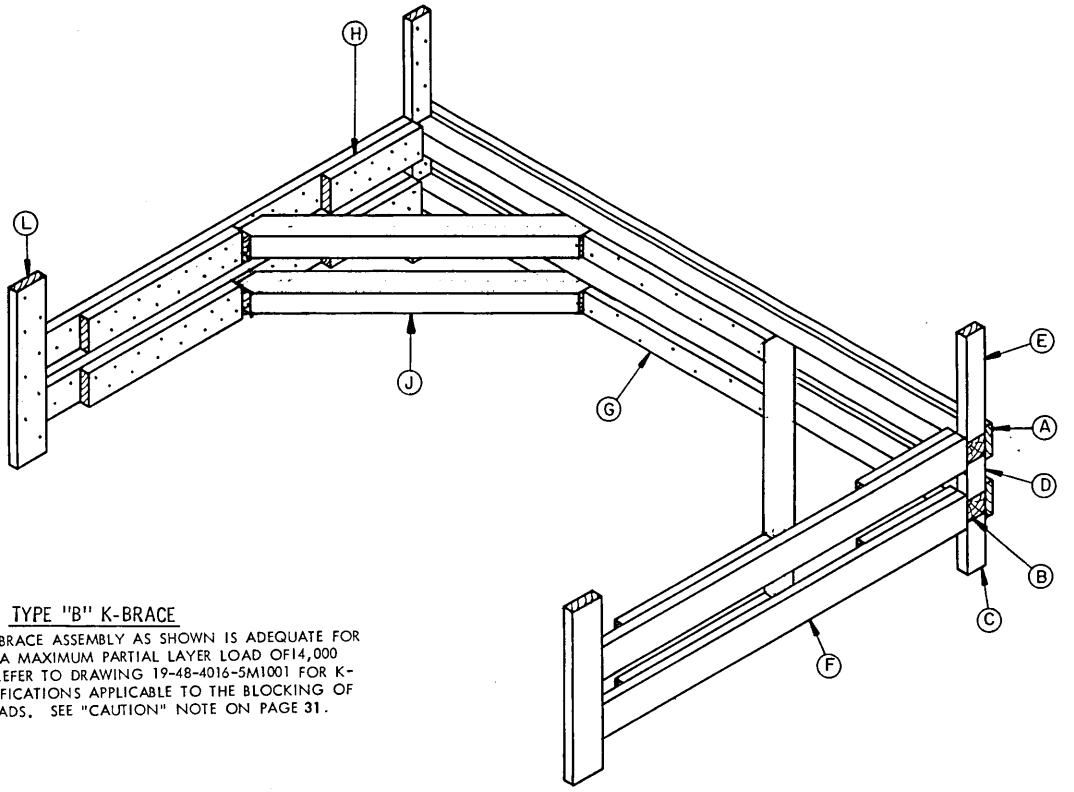


STRAPPING BOARD ASSEMBLY



TYPE "A" K-BRACE

TYPE "A" K-BRACE ASSEMBLY AS SHOWN IS ADEQUATE FOR RETAINING A MAXIMUM PARTIAL LAYER LOAD OF 8,000 POUNDS. SEE "CAUTION" NOTE ON PAGE 31.



TYPE "B" K-BRACE

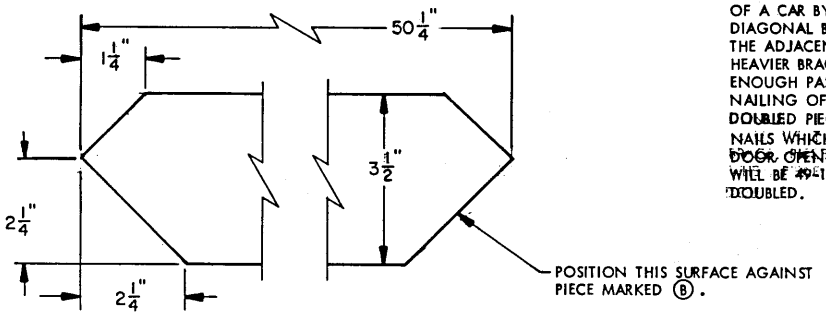
TYPE "B" K-BRACE ASSEMBLY AS SHOWN IS ADEQUATE FOR RETAINING A MAXIMUM PARTIAL LAYER LOAD OF14,000 POUNDS. REFER TO DRAWING 19-48-4016-5M1001 FOR K-BRACE SPECIFICATIONS APPLICABLE TO THE BLOCKING OF HEAVIER LOADS. SEE "CAUTION" NOTE ON PAGE 31.

K-BRACE LUMBER AND NAILING CHART *					
TYPE BRACE	PC MK	NO. REQD	SIZE	NAIL TO	NAILS
"A" & "B"	Ⓐ	2	2" X 6" BY CAR WIDTH	Ⓑ	1-12d EVERY 6"
"A" & "B"	Ⓑ	2	4" X 4" BY CAR WIDTH	----------	----------
"B"	Ⓒ	2	2" X 4" X 9"	CAR WALL	3-12d
"A" & "B"	Ⓓ	2	2" X 4" BY CUT TO FIT	CAR WALL	3-12d
"A" & "B"	Ⓔ	2	2" X 4" X 18"	CAR WALL	5-12d
"A" & "B"	Ⓕ	4	2" X 6" X 72"	CAR WALL	16-12d
"A" & "B"	Ⓖ	2	2" X 4" X 28" FOR A 8'-6" CAR 2" X 4" X 36" FOR A 9'-2" CAR 2" X 4" X 38" FOR A 9'-4" CAR	Ⓑ	7-12d
"A"	Ⓗ	4	2" X 6" X 12"	Ⓕ	7-16d
"B"	Ⓗ	4	2" X 6" X 18"	Ⓕ	10-16d
"A"	Ⓙ	4	2" X 4" MATERIAL. SEE "BRACE" DETAIL BELOW.	Ⓑ & Ⓕ	1-16d EACH END
"B"	Ⓙ	4	4" X 4" MATERIAL. SEE "BRACE" DETAIL BELOW	Ⓑ & Ⓕ	1-60d EACH END
"A"	Ⓚ	4	2" X 6" X 24"	Ⓕ	8-16d
"B"	Ⓚ	4	2" X 6" X 30"	Ⓕ	14-16d
"B"	Ⓛ	2	2" X 6" BY SLIGHTLY ABOVE THE LOAD	CAR WALL	8-12d

*SEE GENERAL NOTE "L" ON PAGE 2.

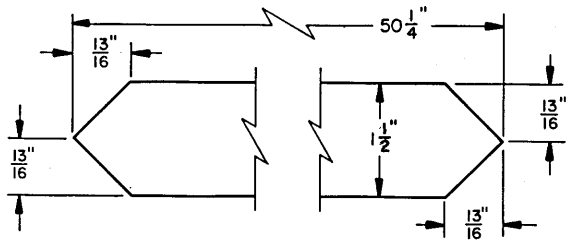
CAUTION:

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 Ⓐ, Ⓑ, Ⓒ, Ⓓ, Ⓔ, AND Ⓗ OR THE COMPARABLE PIECES ON A HEAVIER BRACE MUST BE SUPPORTED AT THE SIDES OF A CAR BY A CAR SIDE WALL. IT IS ALRIGHT FOR THE END OF A DIAGONAL BRACE TO BEAR IN FRONT OF A DOOR OPENING; HOWEVER, THE ADJACENT PIECE MARKED Ⓕ OR THE COMPARABLE PIECE ON A HEAVIER BRACE 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 Ⓕ TO THE FIRST W/16d NAILS. CLINCH THOSE NAILS WHICH PROTRUDE THRU THE HORIZONTAL WALL CLEAT WITHIN THE DOOR OPENING. NOTE THAT THE DIAGONAL BRACE, PIECE MARKED Ⓙ WILL BE 49-1/8" LONG IN LIEU OF 50-1/4" WHEN PIECE MARKED Ⓕ IS DOUBLED.



BRACE FOR TYPE "B" K-BRACE

PIECE MARKED Ⓙ, 4" X 4" MATERIAL.



BRACE FOR TYPE "A" K-BRACE

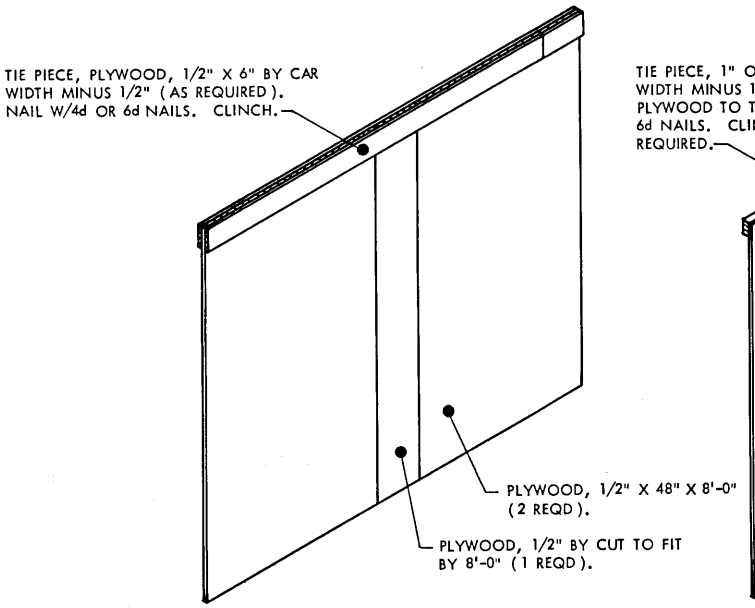
PIECE MARKED Ⓙ, 2" X 4" MATERIAL.

NOTE:

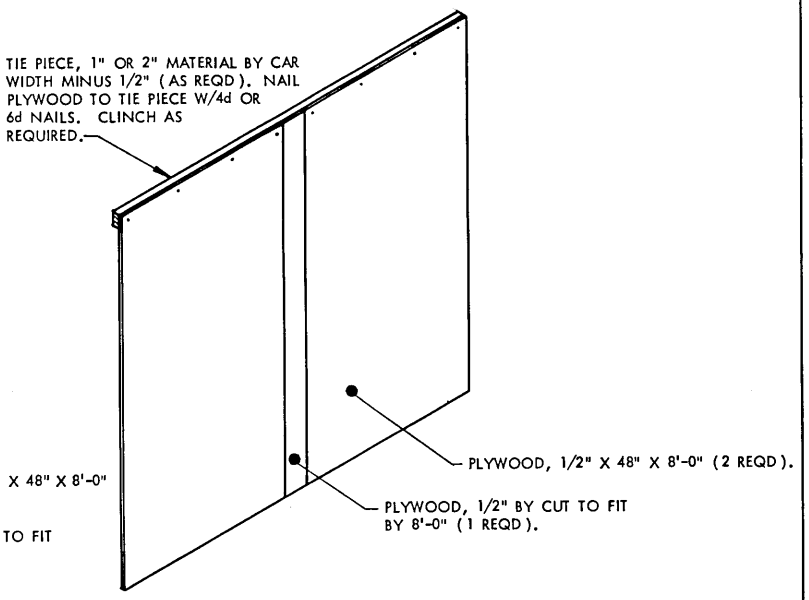
THESE DETAILS DEPICT DIFFERENT METHODS OF SPLICING PLYWOOD SEPARATOR GATES. "METHOD A" AND "METHOD B" DEPICTS THE USE OF "TIE PIECES" POSITIONED ABOVE THE LADING. IF THE 8'-0" HEIGHT OF THESE GATES EXTEND ABOVE THE LADING MORE THAN 12", THEY SHOULD BE CONSTRUCTED TO LADING HEIGHT PLUS A SUFFICIENT HEIGHT TO CLEAR THE DRUMS. STAPLES MAY BE SUBSTITUTED FOR THE 4d OR 6d NAILS, IF NAILS ARE USED, AND IF THEY PROTRUDE THROUGH THE LAST LAMINATION OF THE GATE, THEY MUST BE CLINCHED SO THAT THE NAIL POINTS DO NOT PROVIDE A HAZARD.

"METHOD C" DEPICTS THE USE OF "TIE PIECES" THAT CONTACT THE DRUMS ON ONE SIDE OF THE GATE. THESE PIECES ARE POSITIONED TO CONTACT THE DRUMS AT THE TOP AND BOTTOM OF EACH LAYER OF DRUMS. THE SMOOTH SIDE OF THE GATE IS POSITIONED DIRECTLY AGAINST A STACK OF DRUMS. CARE MUST BE EXERCISED TO ASSURE THAT A DRUM DOES NOT CONTACT A JOINT IN THE PLYWOOD GATE. IF THE 8'-0" HEIGHT OF THIS GATE EXTENDS ABOVE THE LADING MORE THAN 12", IT SHOULD BE CONSTRUCTED TO LADING HEIGHT PLUS 2".

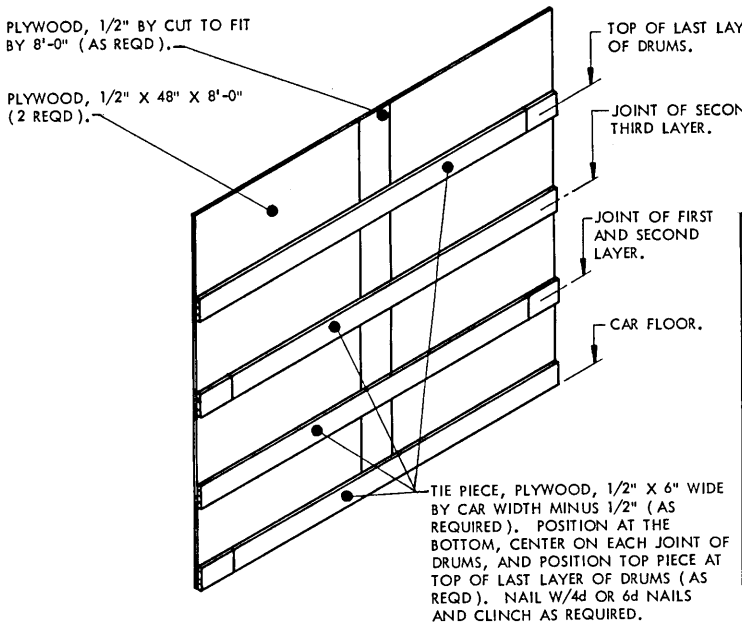
"METHOD D" DEPICTS THE USE OF "TIE PIECES" THAT RUN VERTICALLY WITH THE JOINTS OF THE PLYWOOD. THE JOINTS AND TIE PIECES ARE TO BE AT A LOCATION WHERE THE DRUMS WILL NOT CONTACT THE TIE PIECES.



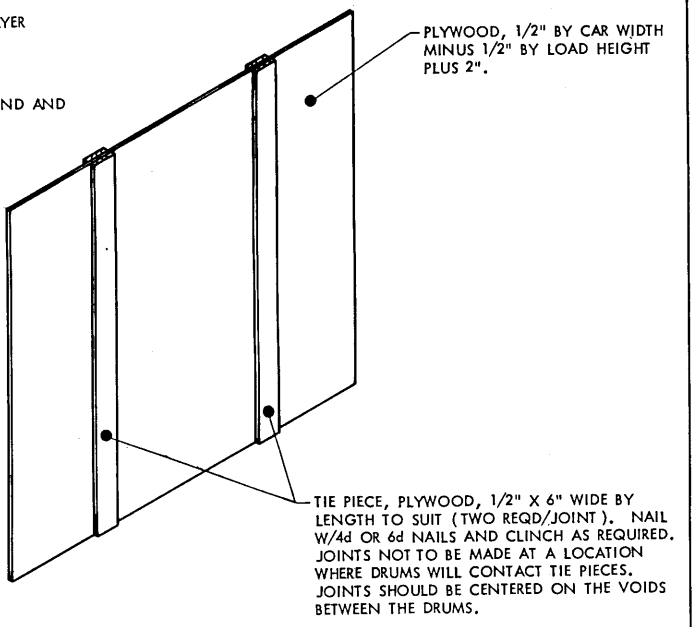
METHOD A



METHOD B



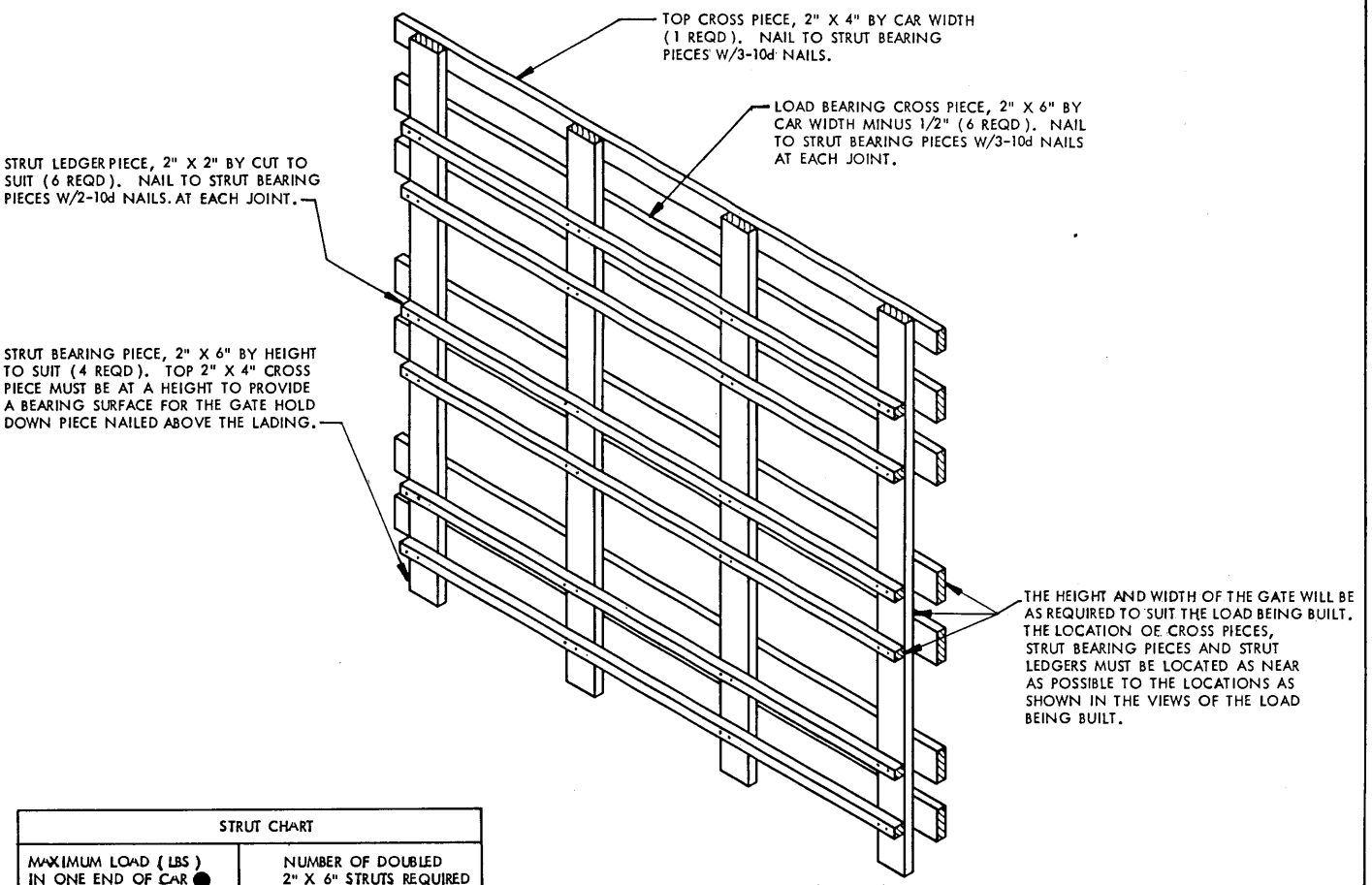
METHOD C



METHOD D

SPLICING METHODS FOR PLYWOOD SEPARATOR GATES

PROJECT FSA 75-66



CENTER GATE A

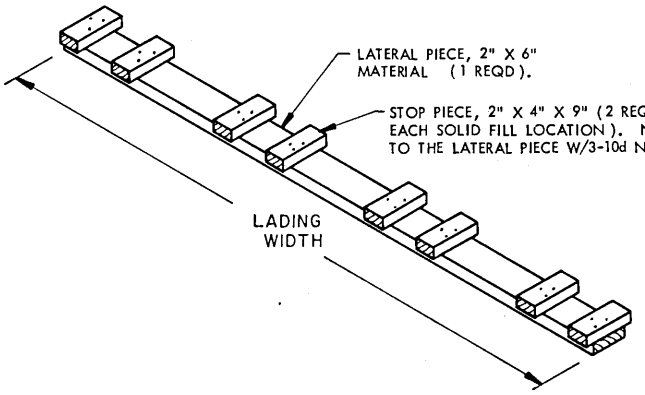
STRUT CHART	
MAXIMUM LOAD (LBS) IN ONE END OF CAR ●	NUMBER OF DOUBLED 2" X 6" STRUTS REQUIRED
UP TO 49,500	12
49,500 TO 57,750	14
57,750 TO 61,875	15
61,875 TO 66,000	16
66,000 TO 74,250	18
74,250 TO 82,500	20
82,500 TO 86,625	21
86,625 TO 90,750	22
90,750 TO 99,000	24

● IF THE CAR IS LOADED WITH A GREATER NUMBER OF DRUMS IN ONE END OF THE CAR THAN THE OTHER, THE NUMBER OF STRUTS REQUIRED WILL BE BASED ON THE HEAVY END OF THE LOAD.

SPECIAL NOTE:

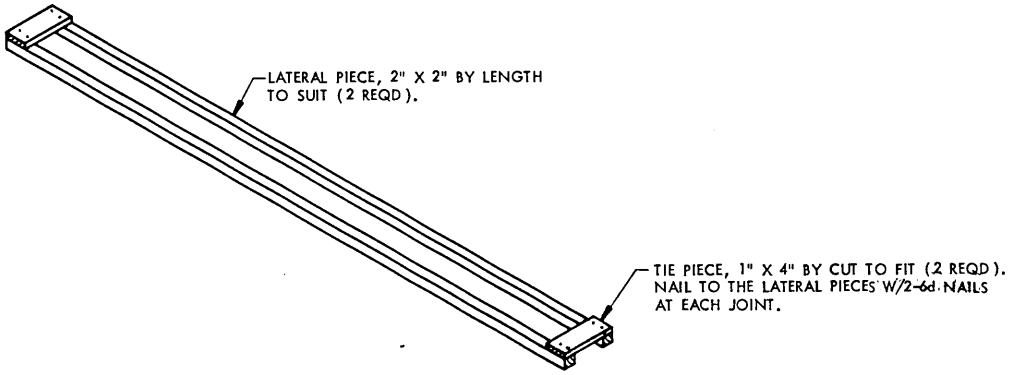
1. THE NUMBER OF STRUTS REQUIRED TO BRACE THE WEIGHT SHOWN IN THE STRUT CHART ABOVE IS BASED ON A LONGITUDINAL FORCE OF 6 G'S AND USING 1,500 LBS PER SQUARE INCH COMPRESSION. IF IT IS DESIRED, A SINGLE 4" X 4" STRUT MAY BE USED IN LIEU OF DOUBLED 2" X 6" STRUTS BUT THE NUMBER OF STRUTS REQUIRED TO BLOCK THE WEIGHT SHOWN WILL BE IN ACCORDANCE WITH THE ALTERNATIVE STRUT CHART BELOW.

ALTERNATIVE STRUT CHART	
MAXIMUM LOAD (LBS) IN ONE END OF CAR ●	NUMBER OF SINGLE 4" X 4" STRUTS REQUIRED
UP TO 36,750	12
36,750 TO 42,875	14
42,875 TO 45,937	15
45,937 TO 49,000	16
49,000 TO 55,125	18
55,125 TO 61,250	20
61,250 TO 64,312	21
64,312 TO 67,375	22
67,375 TO 73,500	24

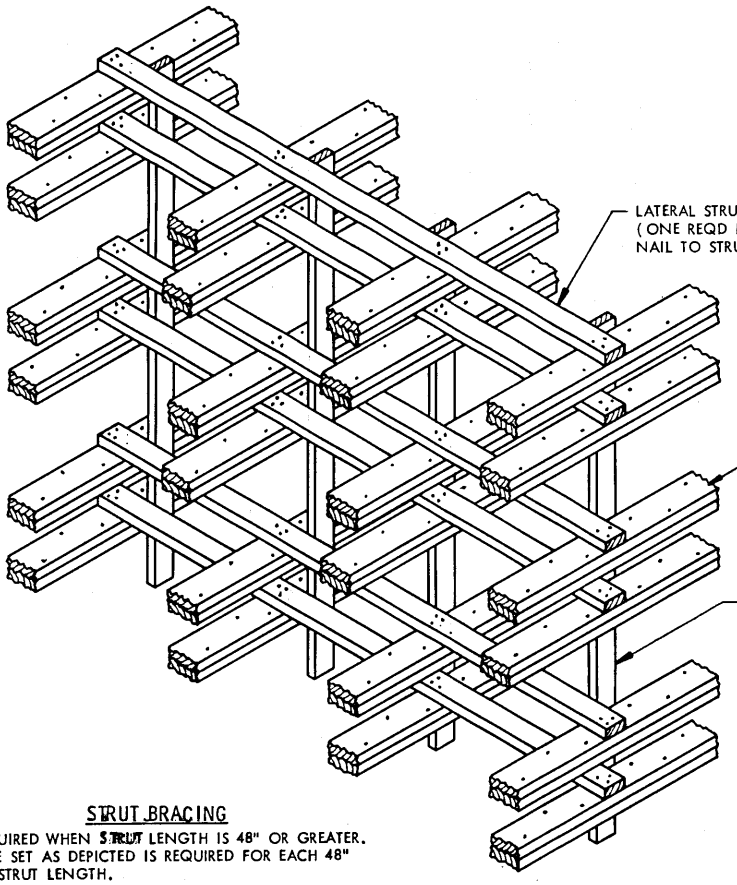


SOLID FILL LOCATOR

DEPICTS ASSEMBLY USED TO KEEP SOLID FILL IN POSITION ON THE FLOOR OF THE CAR WHEN SOLID FILL CANNOT BE TOE-NAILED OR CLEATED AT THE BOTTOM OF THE GATE. DO NOT NAIL THIS ASSEMBLY TO THE FLOOR OF THE CAR.

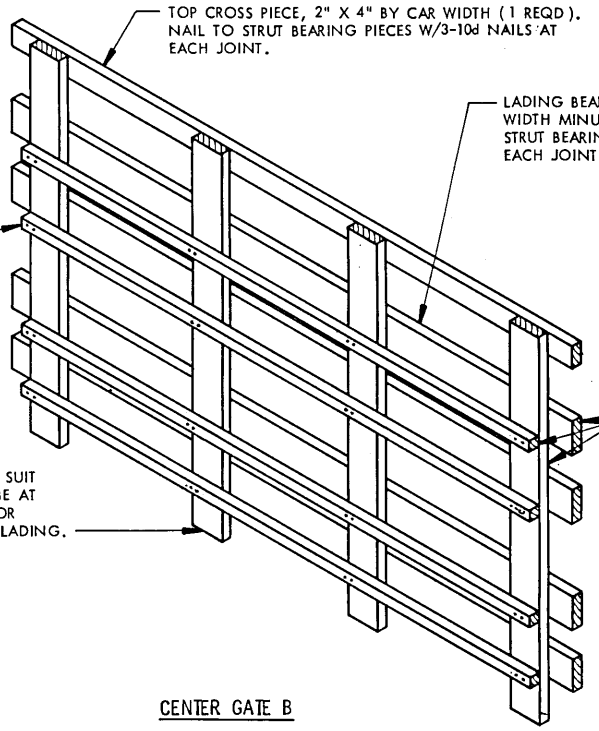


RISER A



STRUT BRACING

REQUIRED WHEN STRUT LENGTH IS 48" OR GREATER. ONE SET AS DEPICTED IS REQUIRED FOR EACH 48" OF STRUT LENGTH.

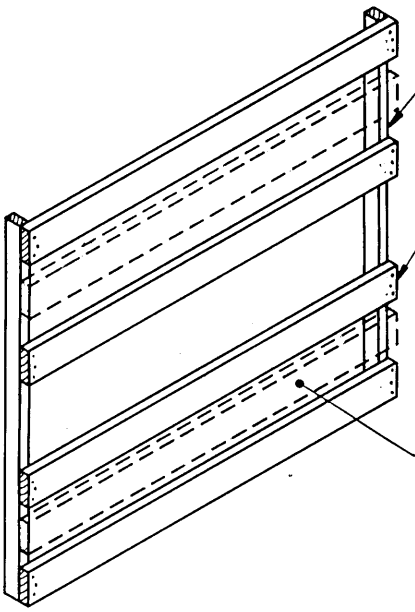


CENTER GATE B

NOTE:

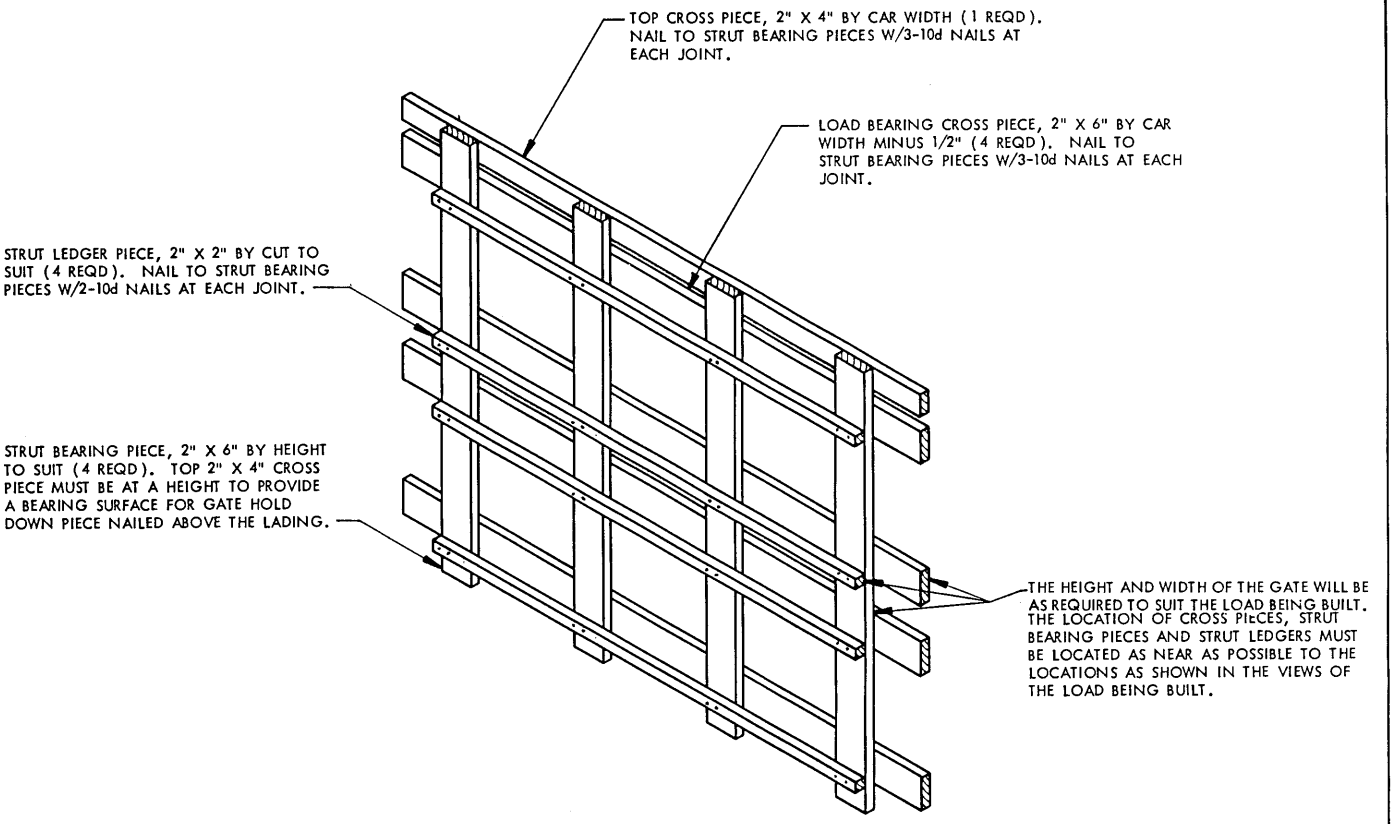
WHEN A CAR HAS DOOR POSTS WHICH DO NOT PROVIDE FOR ADEQUATE SECUREMENT OF THE GATE BY THE SPECIFIED NAILING METHOD, REFER TO DRAWING 19-48-1634-5A29 OR "BUREAU OF EXPLOSIVES PAMPHLET NO. 6A" FOR ALTERNATIVE GATE SECURING METHODS OR DOORWAY PROTECTION SPECIFICATIONS.

DOORWAY PROTECTION DUNNAGE AS SHOWN IS NOT REQUIRED IF ALL OF THE DOORS IN A CAR ARE OF THE PLUG TYPE; FOR CARS EQUIPPED WITH WITH "PLUG DOORS", SEE "DOORWAY PROTECTION C" DETAIL ON PAGE 44, WHICH MUST BE USED.

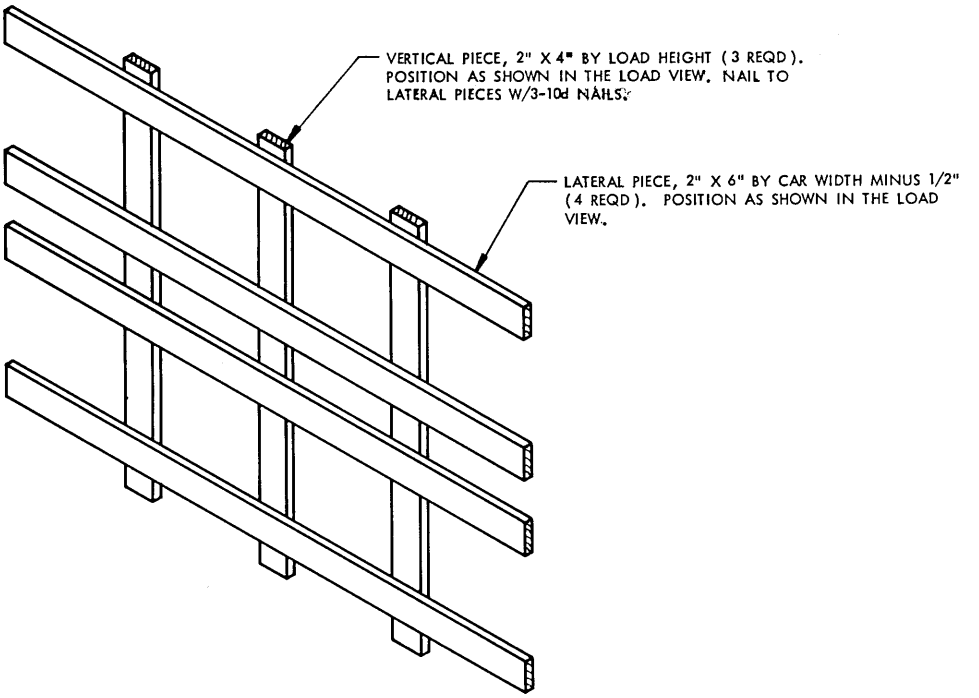


DOORWAY PROTECTION B

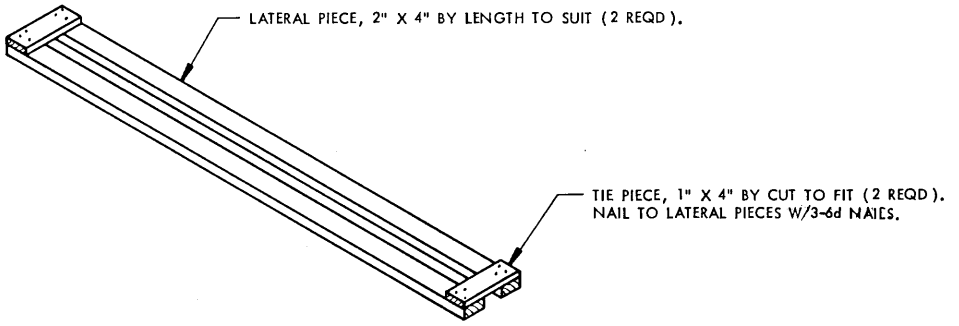
SEE "DOORWAY PROTECTION C" DETAIL ON PAGE 44, WHICH MUST BE USED FOR CARS EQUIPPED WITH "PLUG DOORS".



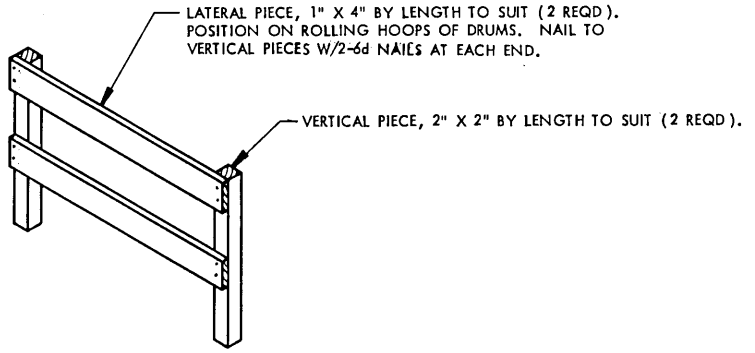
CENTER GATE-C



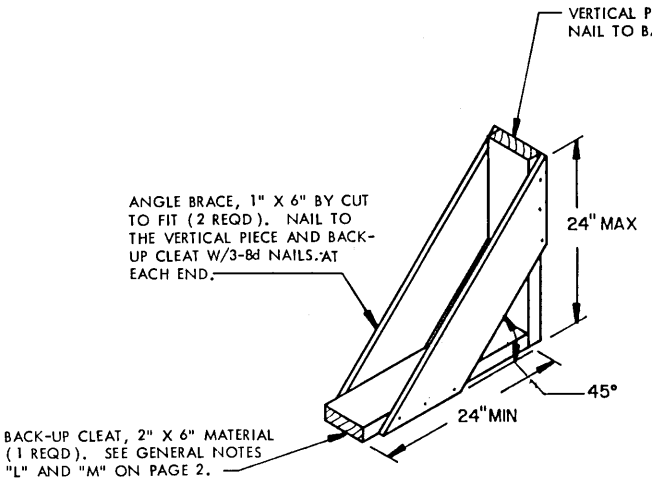
SEPARATOR GATE B



RISER B



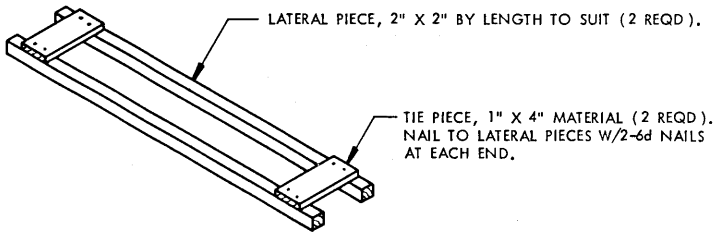
SEPARATOR GATE C



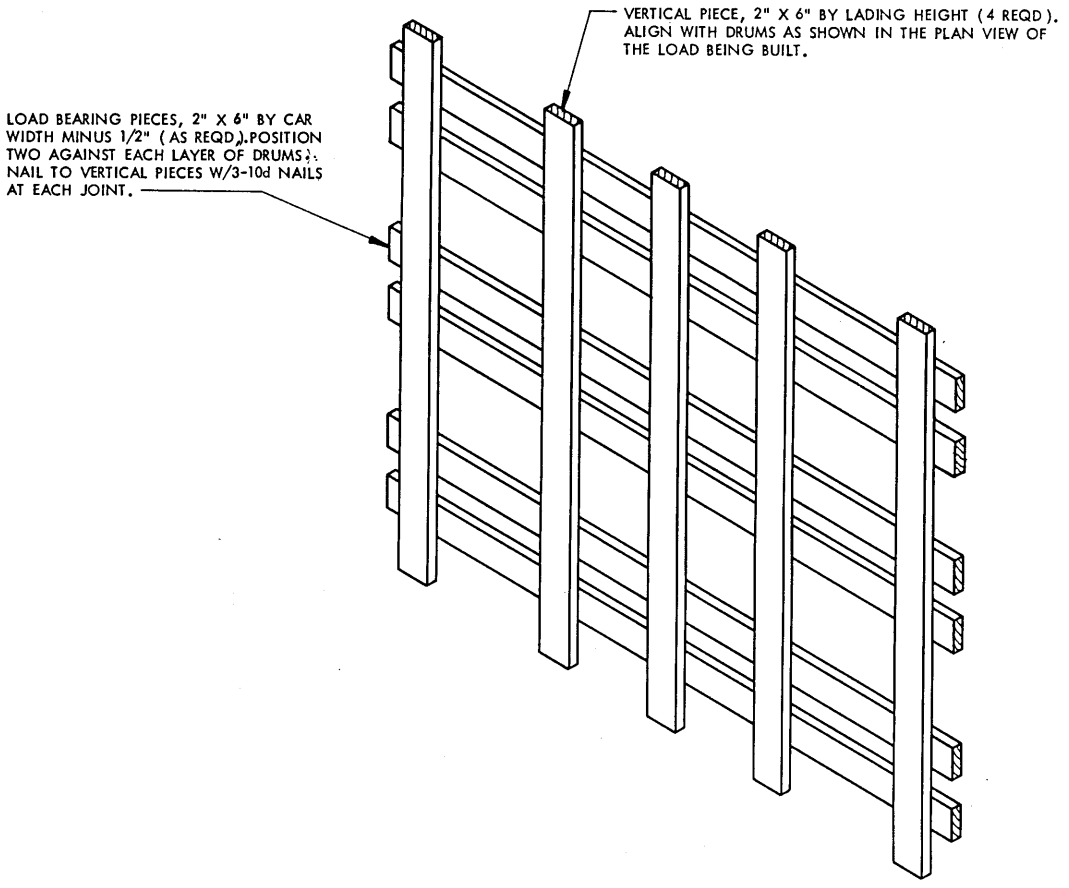
NOTE:

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

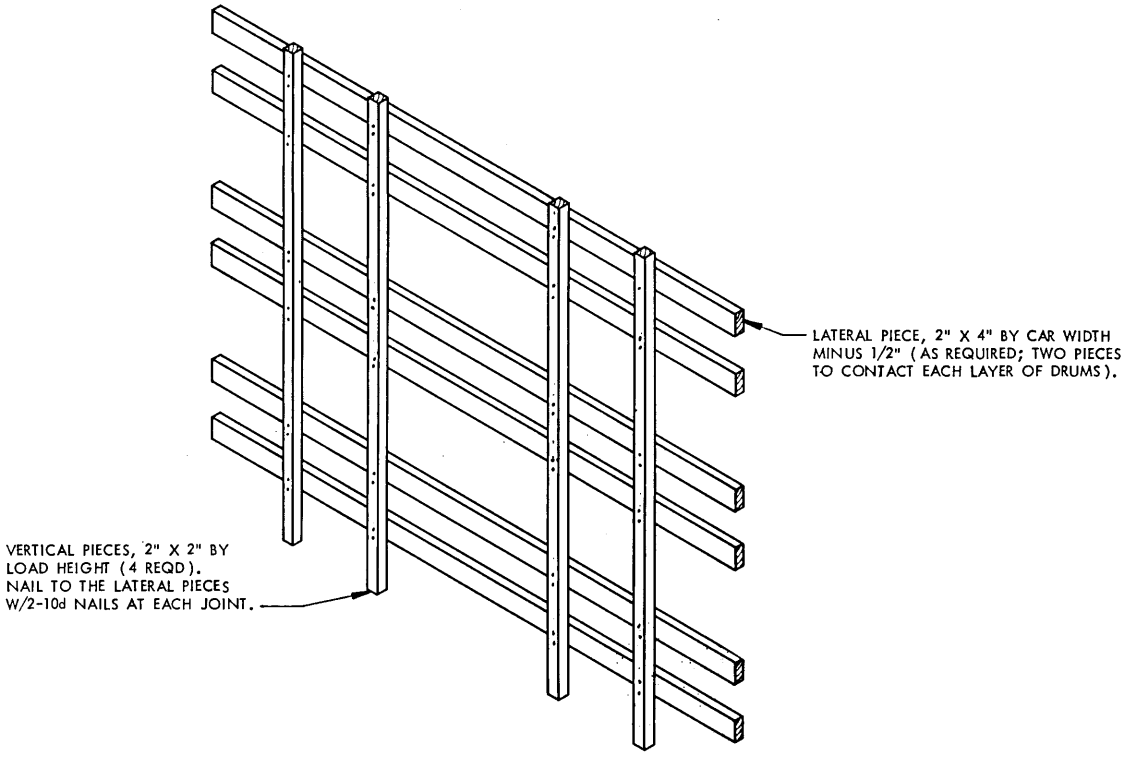
LCL BRACE



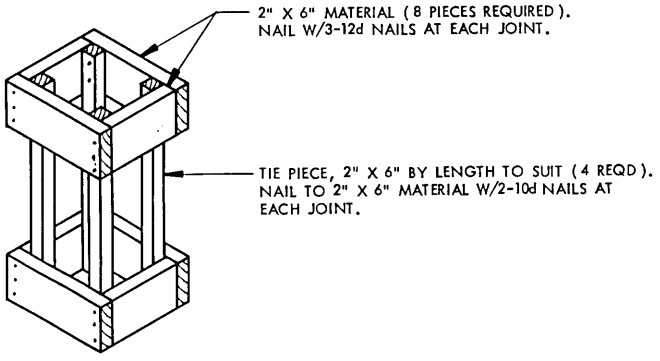
RISER C



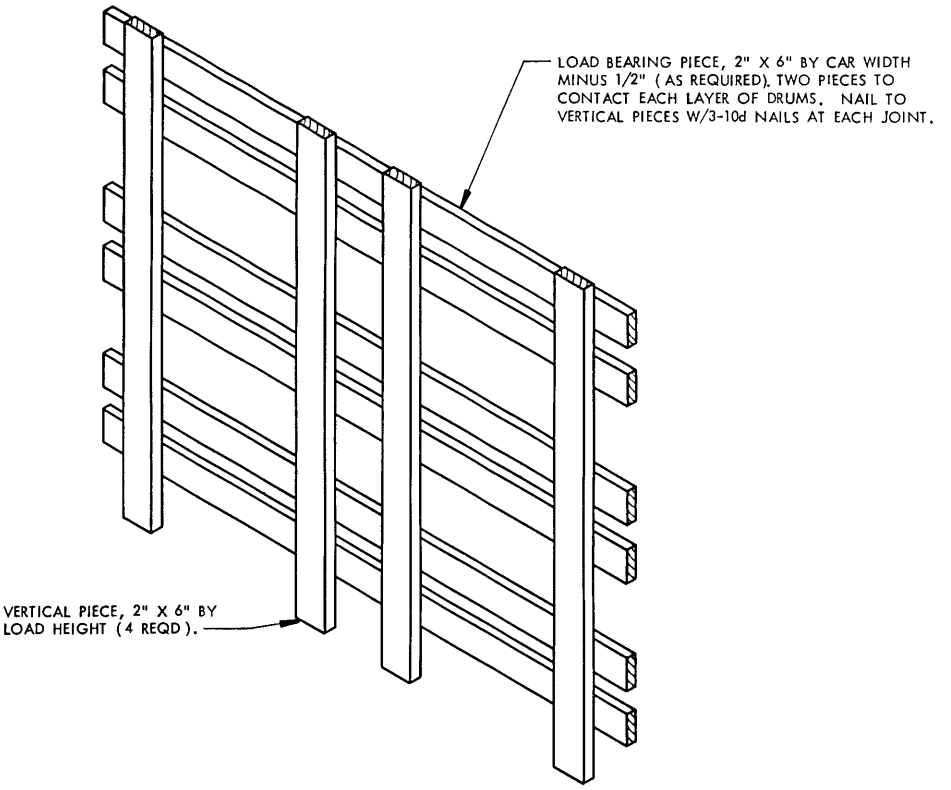
LOAD BEARING GATE A



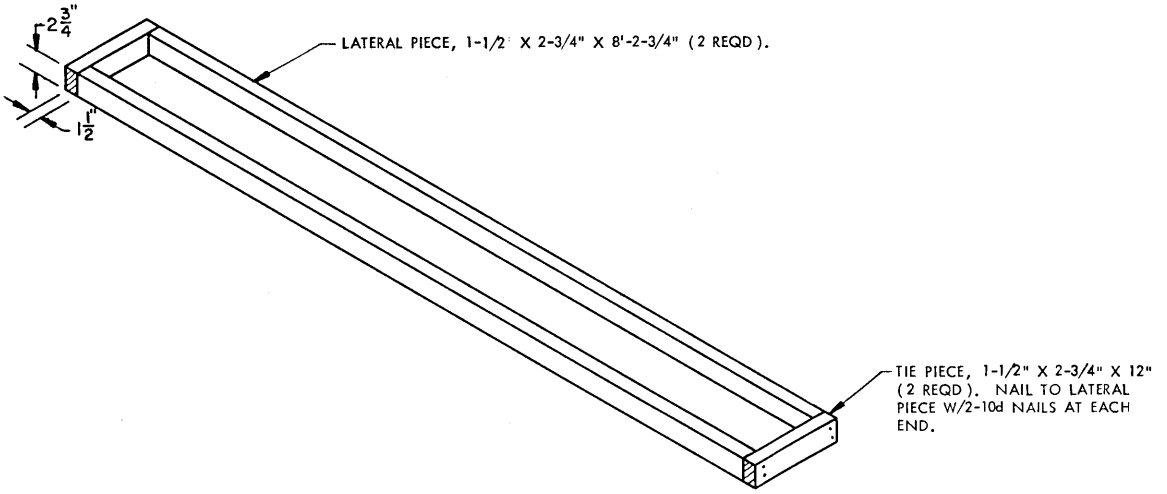
SEPARATOR GATE D



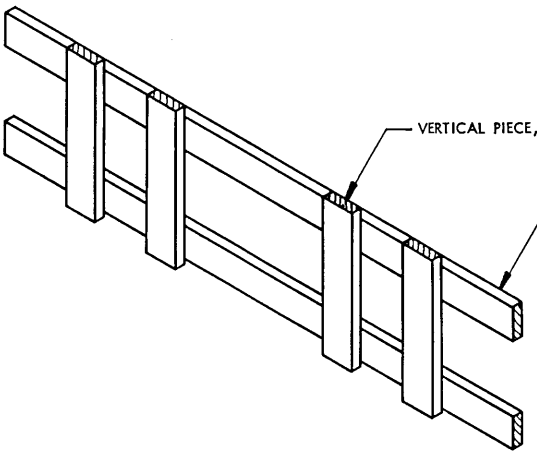
FILLER FOR OMITTED METAL DRUM



LOAD BEARING GATE B



RISER D



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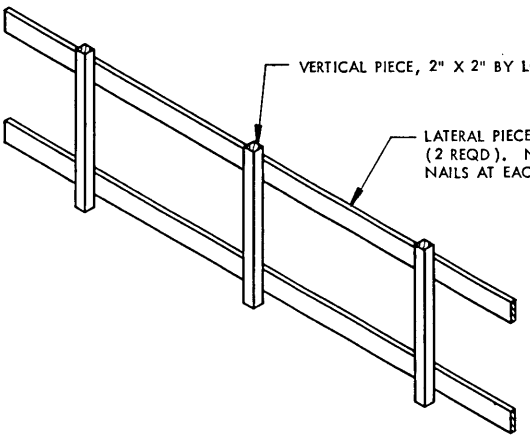
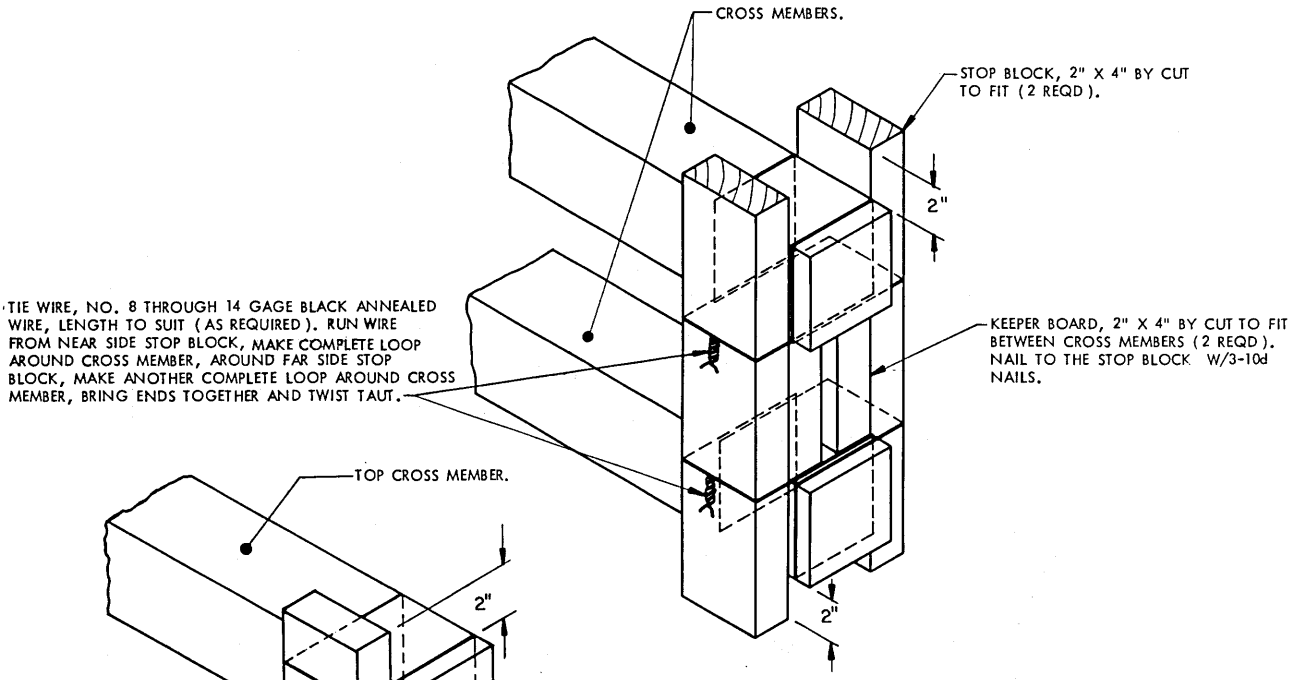
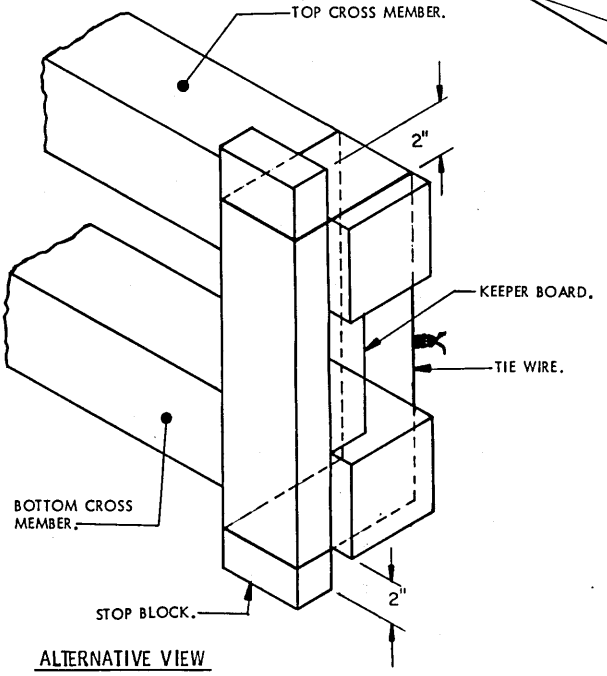


SEPARATOR GATE E

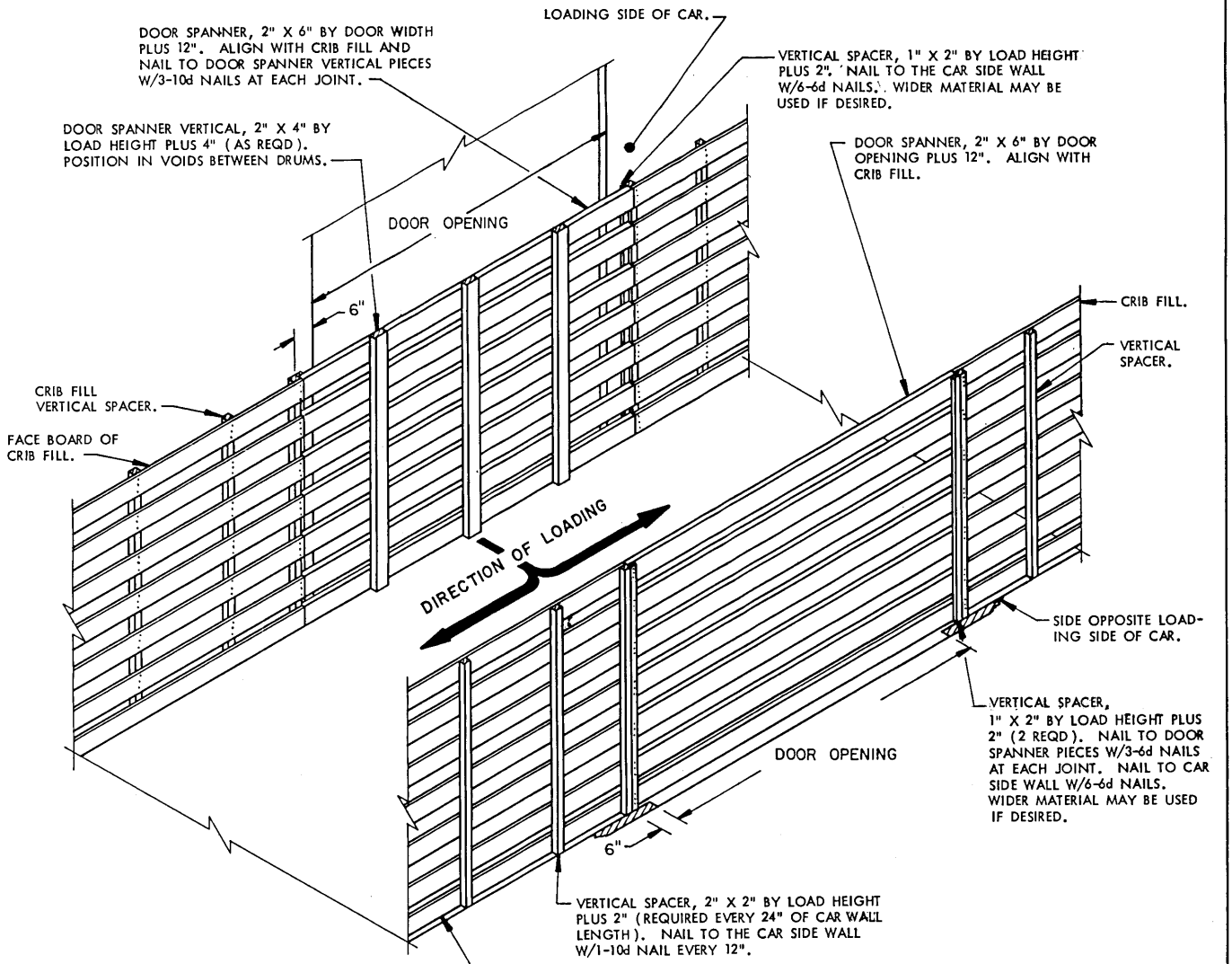


INTERMEDIATE DECKING STOP

WHEN A STOP BLOCK IS ONLY REQUIRED ON ONE SIDE OF THE CROSS MEMBERS, LIKE IN THE CENTER OF THE CAR, ONLY ONE STOP BLOCK AND KEEPER BOARD IS REQUIRED. RUN THE TIE WIRE OVER THE TOP CROSS MEMBER, AROUND STOP BLOCK AT TOP, BACK DOWN AND UNDER LOWER CROSS MEMBER, AROUND STOP BLOCK AT BOTTOM, BACK UNDER CROSS MEMBER, BRING ENDS TOGETHER AND TWIST TAUT. SEE "ALTERNATIVE VIEW" AT LEFT.



ALTERNATIVE VIEW



DOORWAY PROTECTION C

SEE NOTE BELOW.

NOTE:

WHEN OUTLOADING DRUMS IN CARS EQUIPPED WITH PLUG DOORS AND NAILABLE SIDE WALLS, SPECIAL PROVISIONS AS SHOWN ABOVE WILL BE REQUIRED. CRIB FILL WILL BE INSTALLED ON BOTH SIDES OF THE CAR TO FILL VOIDS BETWEEN DRUMS AND CAR SIDE WALL. VERTICAL SPACER PIECES AND DOOR SPANNER PIECES WILL BE INSTALLED ON SIDE OPPOSITE LOADING SIDE OF CAR TO EQUAL THE THICKNESS OF THE CRIB FILL ON THAT SIDE OF CAR. INSTALL VERTICAL SPACERS ON LOADING SIDE OF CAR. AFTER CAR IS LOADED INSTALL DOOR SPANNER AND DOOR SPANNER VERTICAL PIECES. NAIL DOOR SPANNER PIECES TO DOOR SPANNER VERTICALS W/3-10d NAILS AT EACH JOINT.

THE THICKNESS OF THE CRIB FILL AND VERTICAL SPACER PIECES WILL VARY WITH DIFFERENT SIZE DRUMS AND CAR WIDTHS. THE TOTAL THICKNESS OF THE CRIB FILL AND THE TOTAL THICKNESS OF THE DOORWAY PIECES WILL BE EQUAL TO PROVIDE AN EVEN SURFACE THE ENTIRE LENGTH OF THE CAR.

THE DUNNAGE SHOWN IS BASED ON A DRUM WITH A 17-1/2" DIAMETER LOADED IN A 9'-2" WIDE BOX CAR. THE DUNNAGE REQUIREMENTS MAY BE CHANGED TO SUIT THE DRUM BEING SHIPPED.

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