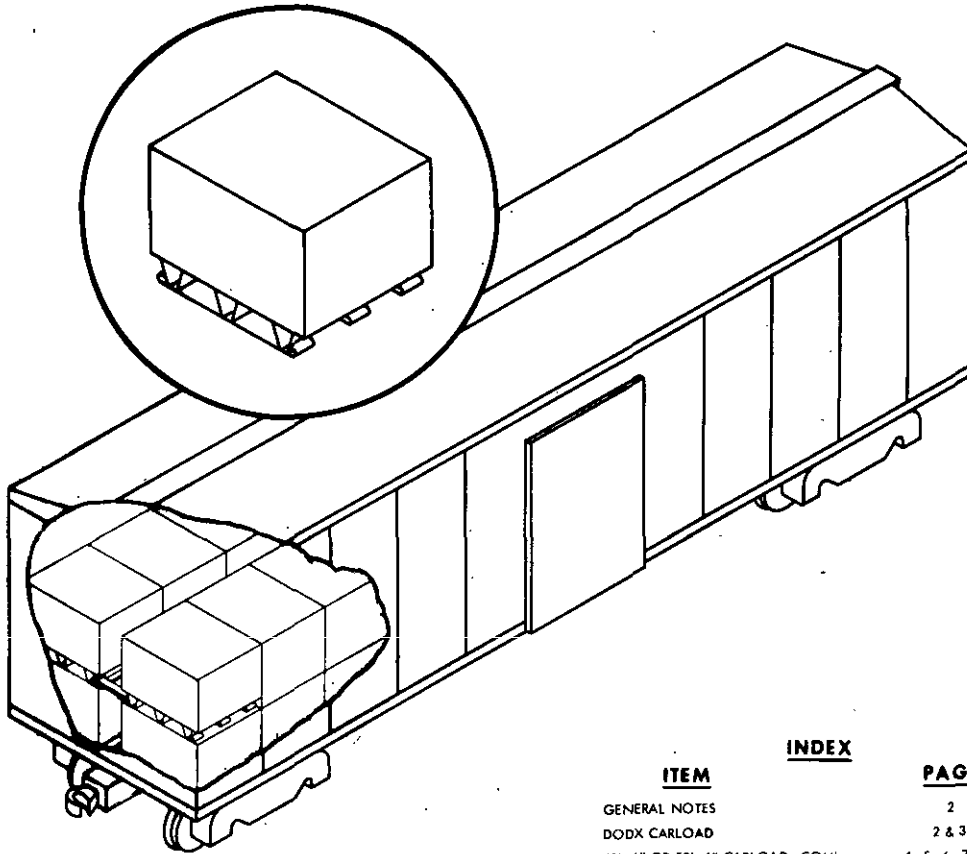


**MILITARY STANDARD**  
**RAILCAR LOADING OF HAZARDOUS MATERIALS**  
 TYPICAL CARLOADING PROCEDURES  
 FOR PALLETIZED UNIT LOADS  
 (2 ROWS ACROSS CAR)

**MIL-STD-1325-100**  
**(NAVY)**

7 FEBRUARY 1975  
 SUPERSEDING  
 WR-52/100A  
 10 NOVEMBER 1970



**NOTES:**

1. UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.
2. FOR CROSS REFERENCE TO ASSOCIATED PALLETIZING, TRUCKLOADING AND CONTAINERLOADING MILITARY STANDARDS, REFER TO INDEX TO STANDARDS MIL-HDBK-236 (NAVY).

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**FSC 8140**

**AUTHORIZED AND RELEASED FOR  
 GENERAL USE.**

**APPROVED BY BUREAU OF EXPLOSIVES**

*M.S. Gray NWHL* 2/3/75  
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 SIGNATURE

**NAVAL WEAPONS HANDLING LABORATORY**  
 N A D EARLE, NEW JERSEY

**MIL-STD-1325-100 (NAVY)****GENERAL NOTES**

1. FOR GENERAL INFORMATION CONCERNING ORDERING, INSPECTING, AND PREPARING CARS, AND FOR DUNNAGING MATERIALS, DESIGN, AND INSTALLATION OF DUNNAGE SEE THE GENERAL DOCUMENT MIL-STD-1325 (NAVY) RAILCAR LOADING OF HAZARDOUS MATERIALS. MIL-STD-1325 (NAVY) AND THE APPLICABLE SLASH/DASH NUMBER DOCUMENTS MAY BE ORDERED FROM NAVAL SUPPLY DEPOT, 5801 TABOR AVENUE, PHILADELPHIA, PA. 19120, USING DD FORM 1425.
2. WHEN PLANNING SHIPMENTS ORDER THE MINIMUM NUMBER OF CARS OF THE CAPACITY REQUIRED FOR THE SHIPMENT. UTILITY LOADER CARS USED FOR SHIPPING HAZARDOUS MATERIALS SHALL BE SERIES DODX 29000.
3. LOADING PLANS SHOWN ARE FOR DODX UTILITY LOADER CAR WITH 50 FT 6 INCHES INSIDE LENGTH, 107 3/4 INCHES INSIDE WIDTH BETWEEN RAILS (111 INCHES INSIDE WIDTH BETWEEN SIDE WALLS), COMMERCIAL BOXCARS WITH 40 FT 6 INCHES OR 50 FT 6 INCHES INSIDE LENGTH, 110 INCHES INSIDE WIDTH. CARLOAD IS TO BE PREPARED IN ACCORDANCE WITH LOADING AND DUNNAGING PROCEDURE FOR THE TYPE AND SIZE OF CAR SELECTED.
4. IF END WALLS OF CARS ARE NOT SQUARE THEY MUST BE SQUARED OFF BEFORE STARTING TO LOAD CAR.
5. THE LOAD CONSISTS OF TYPICAL PALLETIZED UNIT LOADS OF AMMUNITION OR AMMUNITION COMPONENTS IN METAL OR WOOD CONTAINERS. THE UNIT LOADS MUST BE OF SUCH A SIZE THAT TWO ROWS ONLY MAY BE LOADED IN THE CAR. AS MANY UNIT LOADS AS POSSIBLE MAY BE LOADED, PROVIDED THE LOAD LIMIT OF THE CAR IS NOT EXCEEDED AND WEIGHT DISTRIBUTION RULES OF THE AAR ARE ADHERED TO.
6. THE PALLET MAY BE EITHER THE 40" x 48" OR 35" x 45 1/2" METAL OR WOOD PALLET, OR THE VARIABLE SIZED EXPENDABLE WOOD PALLET. BASED ON WEIGHT AND DIMENSIONS, THE UNIT LOAD MAY BE POSITIONED IN THE CAR WITH EITHER THE LONG OR SHORT DIMENSION PLACED LENGTHWISE IN THE CAR: WHICHEVER GIVES THE MOST EFFICIENT LOAD.
7. THE UNIT LOADS ARE HANDLED AND LOADED WITH A SUITABLE FORK LIFT TRUCK.
8. UNLESS OTHERWISE SPECIFIED, NAILING SHALL BE IN ACCORDANCE WITH WR-52.
9. APPLICABLE MATERIAL SPECIFICATIONS:
  - DUNNAGE LUMBER - FED. SPEC MM-L-751
  - NAILS - FED. SPEC FF-N-105
  - STRAPPING - FED. SPEC QQ-S-781, TYPE I, HEAVY DUTY, CLASS A, DRY (UNLUBRICATED).
  - SEALS - FED. SPEC QQ-S-781, STYLE III, HEAVY DUTY
10. AFTER BLOCKING AND BRACING HAS BEEN INSPECTED ATTACH SHIPPING DOCUMENTS INSIDE THE CAR IN AN ACCESSIBLE AREA, CLOSE AND SEAL BOXCAR DOORS, AND ATTACH APPLICABLE PLACARDS TO THE OUTSIDE OF CAR AS PRESCRIBED IN OP 2163 (VOL 1).

**50 FT 6 IN. BOXCAR, DODX**

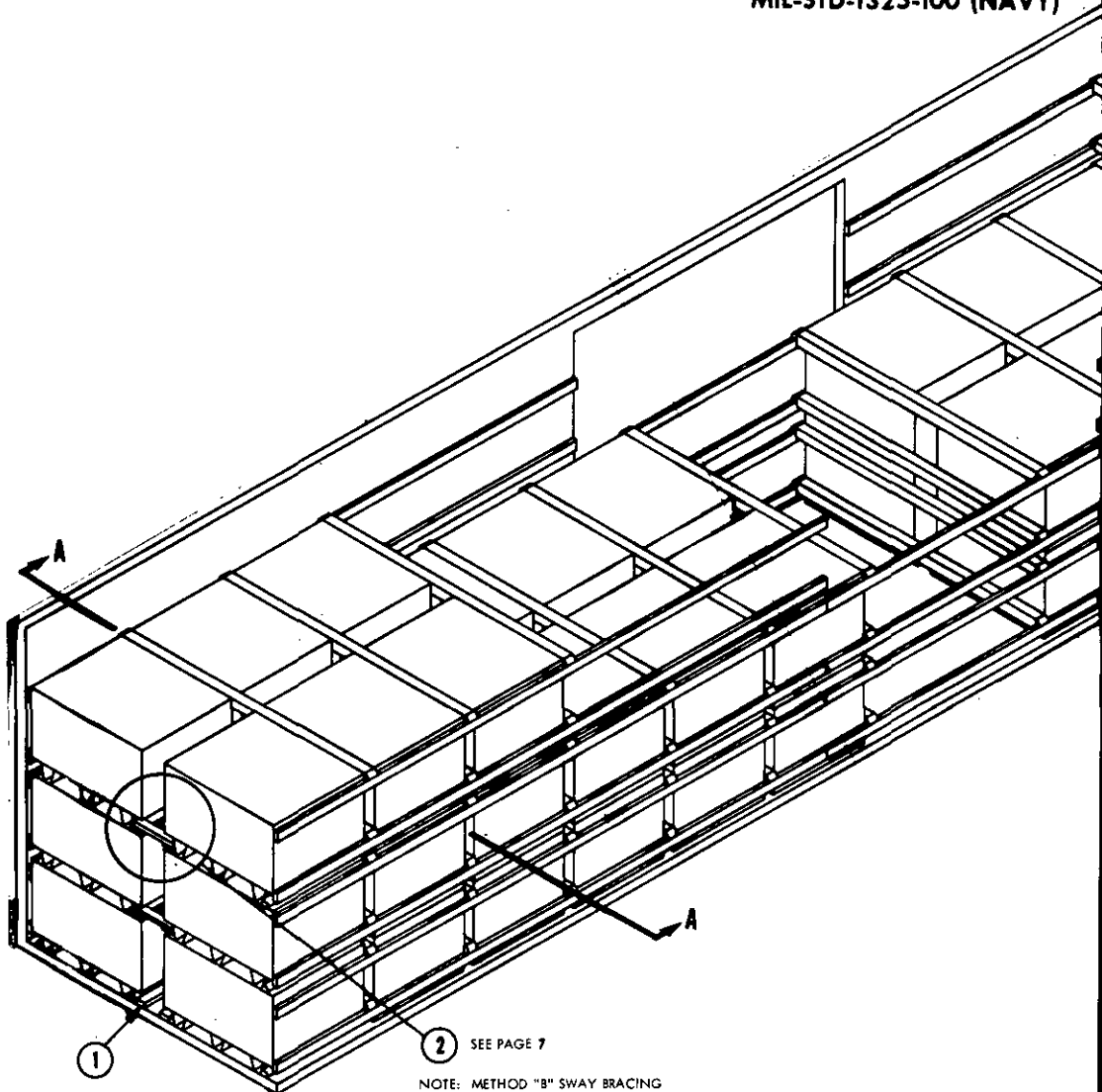
LOADING AND DUNNAGING PROCEDURE - A DETAILED DESCRIPTION AND OPERATING INSTRUCTIONS FOR THE UTILITY LOADER ARE CONTAINED IN OP 1750. THE FOLLOWING PROCEDURE IS TO BE USED FOR LOADING, BRACING, AND DUNNAGING A TYPICAL PALLETIZED UNIT LOAD:

1. BASED ON THE WEIGHT AND DIMENSIONS OF THE UNIT LOAD, THE DIMENSIONS AND LOAD LIMIT OF THE CAR, AND THE SIXTY CROSS MEMBERS AVAILABLE IN EACH CAR DETERMINE THE NUMBER AND ORIENTATION OF THE PALLETIZED UNIT LOADS THAT MAY BE POSITIONED IN THE CAR.
2. EACH CROSS MEMBER HAS A CAPACITY RATING OF 3000 LBS. BASED ON THIS RATING AND WEIGHT OF THE UNIT LOADS, DETERMINE THE NUMBER OF STACKS IN EACH BAY AND THE NUMBER OF CROSS MEMBERS REQUIRED.
3. DETERMINE HEIGHTS AT WHICH CROSS MEMBERS SHOULD BE POSITIONED SO THAT THEY WILL BEAR AGAINST THE UNIT LOAD IN AREAS OF GREATEST STRENGTH. BASED ON THIS INFORMATION, POSITION DETACHABLE WALL MEMBERS, IN ADDITION TO THE FIXED WALL MEMBERS, AT THE REQUIRED HEIGHTS.
4. PLACE UNIT LOADS COMPRISING THE FIRST BAY IN THE CAR AS DETERMINED BY STEPS 1 & 2 ABOVE AND IN A SIMILAR MANNER AS SHOWN IN THE TYPICAL LOAD PLAN ON PAGE 3.
5. PLACE LONGITUDINAL SLEEPERS AGAINST PALLETS AND NAIL TO FLOOR WITH 16d NAILS STAGGERED EVERY 6 INCHES. SLEEPERS MAY BE POSITIONED PRIOR TO STEP 4 IF REQUIRED TO NAIL PROPERLY.
6. FABRICATE SWAY BRACING, (METHOD "B"), AND INSTALL AS SHOWN ON PAGE 7.
7. REPEAT STEP 6 FOR ADDITIONAL LAYER IF REQUIRED.
8. POSITION CROSS MEMBERS FOR FIRST BAY AT THE HEIGHTS DETERMINED IN STEP 3.
9. LOAD SUCCEEDING BAYS, BOTH ENDS OF CAR, (EXCEPT FOR DOORWAY LOADS) AS ABOVE UNTIL THE NUMBER OF PALLETIZED UNIT LOADS DETERMINED BY STEPS 1 & 2 ARE LOADED IN THE CAR.
10. POSITION DOORWAY MEMBERS, AT THE SAME HEIGHTS AS THE WALL MEMBERS IN USE, IN THE DOORWAY FARTHEST FROM THE LOADING PLATFORM. (THERE IS A MAXIMUM OF FIVE DOORWAY MEMBERS TO EACH DOORWAY.)
11. LOAD DOORWAY BAY OR BAYS, INSTALLING SLEEPERS AND SWAY BRACING AS IN STEPS 5 & 6.
12. POSITION DOORWAY MEMBERS IN DOORWAY NEAREST LOADING PLATFORM AT SAME HEIGHTS AS OTHER DOORWAY MEMBERS.
13. INSTALL CROSS MEMBERS RETAINING DOORWAY BAY.
14. TO PREVENT UNUSED "DF" EQUIPMENT FROM BECOMING DISLODGED DURING TRANSIT, SECURE IT AT ANY LOCATION ON THE BOXCAR WHICH WILL NOT INTERFERE WITH UNLOADING.

WHEN LESS THAN CARLOAD (LCL) QUANTITIES ARE REQUIRED TO BE SHIPPED THE SAME PROCEDURES AND METHODS OF BLOCKING ARE APPLICABLE. ANY BAYS OR PORTION THEREOF MAY BE USED PROVIDING THE WEIGHT DISTRIBUTION REQUIREMENTS OF THE AAR ARE COMPLIED WITH (SEE MIL-STD-1325 (NAVY)). EACH CROSS MEMBER WILL BE USED IN SUCH A MANNER THAT IT WILL RETAIN NOT MORE THAN 3000 LBS OF THE LADING.

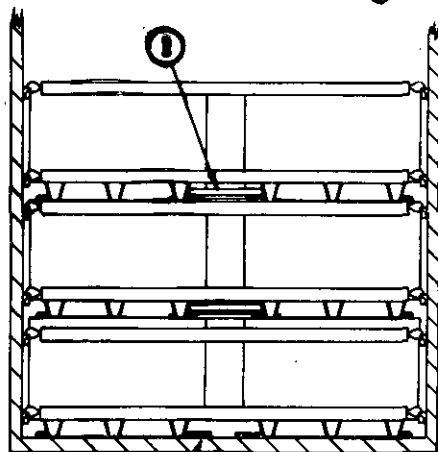
COMMERCIAL BOXCARS EQUIPPED WITH MECHANICAL BRACING AND HAVING FIXED WALL MEMBERS MAY BE USED IF THE FIXED WALL MEMBERS ARE LOCATED AT HEIGHTS WHICH ALLOW THE REQUIRED NUMBER OF CROSS MEMBERS TO BE POSITIONED SO THAT THEY WILL BEAR AGAINST THE UNIT LOAD IN AREAS OF GREATEST STRENGTH. SUFFICIENT CROSS MEMBERS MUST BE AVAILABLE TO MAKE UP AN EFFICIENT CARLOAD. IN LOADING COMMERCIAL BOXCARS EQUIPPED WITH MECHANICAL BRACING, EACH CROSS MEMBER WILL BE USED IN SUCH A MANNER THAT IT WILL RETAIN NOT MORE THAN THE SAFE LOAD DESIGNATED FOR THE MEMBER. IN THE ABSENCE OF ANY DESIGNATED LOAD CARRYING CAPACITY, THE LOAD PER CROSS MEMBER WILL BE LIMITED TO 3000 LBS.

MIL-STD-1325-100 (NAVY)



② SEE PAGE 7

NOTE: METHOD "B" SWAY BRACING MUST BE USED WHEN LOADING DODX CARS.



SECTION A-A

"Z" = DIMENSION OF PALLET LENGTHWISE IN THE CAR.

PIECE NO.	DESCRIPTION	SIZE	NO. PCS REQD	NAIL TO	NUMBER	SIZE
2	SWAY BRACE	SEE PAGE 7	AS REQD	-	-	-
1	SLEEPER	2 x 4 x "Z"	AS REQD	CAR FLOOR	2 PER FOOT	16d
					NAILS	

LIST OF MATERIALS AND NAILING DATA

**MIL-STD-1325-100 (NAVY)****40 FT 6 IN. OR 50 FT 6 IN. BOXCAR, COMMERCIAL**

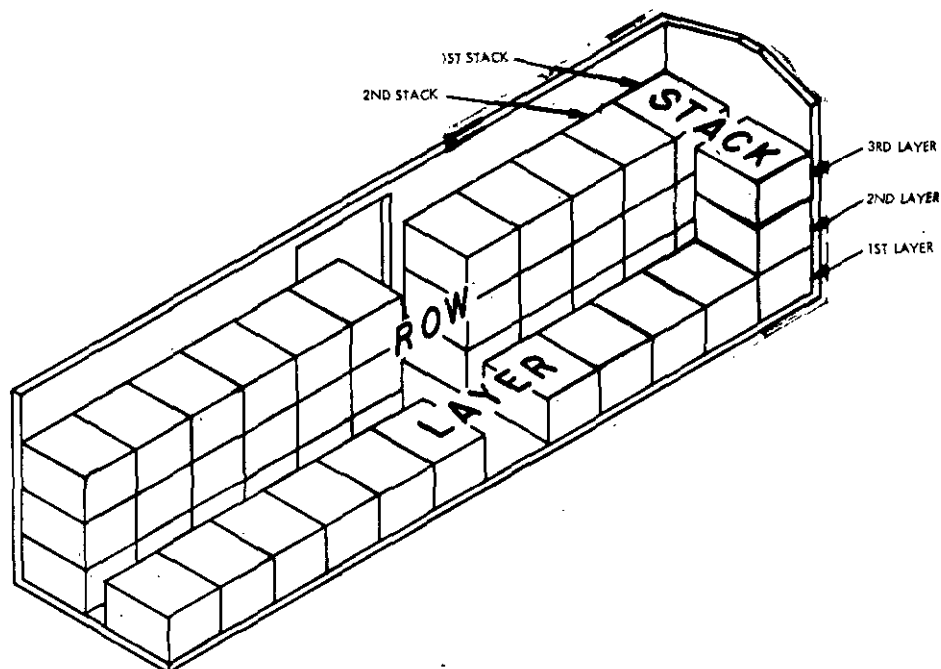
LOADING AND DUNNAGING PROCEDURE - THE FOLLOWING PROCEDURE IS TO BE USED FOR LOADING, BRACING, AND DUNNAGING A TYPICAL PALLETIZED UNIT LOAD:

1. BASED ON THE WEIGHT AND DIMENSIONS OF THE UNIT LOAD THE DIMENSIONS OF THE CAR AND THE LOAD LIMIT OF THE CAR DETERMINE THE NUMBER AND ORIENTATION OF THE PALLETIZED UNIT LOADS THAT MAY BE POSITIONED IN THE CAR.
2. PLACE UNIT LOADS COMPRISING THE FIRST STACK IN THE CAR AS DETERMINED BY STEP 1 ABOVE IN A SIMILAR MANNER AS SHOWN IN THE TYPICAL LOAD PLANS PAGES 5 & 6.
3. PLACE LONGITUDINAL SLEEPERS AGAINST PALLETS AND NAIL TO FLOOR WITH 16d NAILS STAGGERED EVERY 6 INCHES. SLEEPERS MAY BE POSITIONED PRIOR TO STEP 2 IF REQUIRED TO NAIL PROPERLY. IF CAR FLOOR IS NOT AVAILABLE INSTALL SWAY BRACE FRAME SIMILAR TO UPPER LAYER SWAY BRACING.
4. FABRICATE SWAY BRACING, SELECTING THE REQUIRED METHOD, AND INSTALL BETWEEN SECOND LAYER PALLETS AS SHOWN ON PAGE 7.
5. REPEAT STEP 4 FOR ADDITIONAL LAYERS IF REQUIRED.
6. LOAD SUCCEEDING STACKS, BOTH ENDS OF CAR, AS ABOVE UNTIL THE NUMBER OF PALLETIZED UNIT LOADS DETERMINED BY STEP 1 ARE LOADED IN THE CAR.
7. PREASSEMBLE CENTER GATES AS SHOWN IN DETAIL A, PAGE 9, AND POSITION WITH HORIZONTAL GATE MEMBERS (PIECE 1) AGAINST THE LAST STACK OF UNIT LOADS. TO HOLD GATE ASSEMBLY DOWN BE SURE DOUBLED 2 x 4 x CUT TO SUIT (2 x 3 MATERIAL MAY BE USED IF 2 x 4 DOES NOT FIT) FITS UNDER PALLET DECK OR OVERHANG OF THE UNIT LOAD SO AS TO PREVENT THE GATE ASSEMBLY FROM RISING. GATE CLEAT IS REQUIRED ONLY WHEN GATE IS IN DOORWAY AREA AND DOORWAY PROTECTION IS NOT REQUIRED.
8. POSITION CENTER GATE ASSEMBLIES WITH HORIZONTAL GATE MEMBERS (PIECE 3) AGAINST LAST STACK OF UNIT LOADS.
9. POSITION STRUTS (PIECE 9) ON STRUT CLEATS (PIECE 5) AND TOENAIL TO VERTICAL GATE MEMBERS (PIECE 4) WITH TWO 12d NAILS. NOMINAL 2 x 6 STRUTS DOUBLED AND LAMINATED WITH 10d NAILS MAY BE SUBSTITUTED IN PLACE OF 4 x 4's. DO NOT NAIL GATES OR STRUTS TO CAR FLOOR OR WALLS.
10. INSTALL DOORWAY PROTECTION AS SHOWN ON PAGE 9 WHEN MORE THAN HALF OF A UNIT LOAD FALLS WITHIN THE DOORWAY AREA.

WHEN CARLOAD OR LESS THAN CARLOAD (LCL) QUANTITIES ARE SHIPPED IN COMMERCIAL BOXCARS HAVING WOOD SIDEWALLS AND A PARTIAL LAYER RESULTS, THE PARTIAL LAYER OF LADING MAY BE RETAINED BY MEANS OF END BRACING AND/OR PARTIAL LAYER BRACING CONSTRUCTED IN ACCORDANCE WITH DETAILS, PAGES 10 THROUGH 18. IF THE BOXCAR HAS METAL SIDEWALLS OR WOOD SIDEWALLS THE PARTIAL LAYER MAY BE RETAINED IN ACCORDANCE WITH MIL-STD-1325-102 (NAVY). SELECT THE TYPE OF BRACING TO COMPLY WITH THE WEIGHT OF THE UNITS TO BE RETAINED. THE CENTER GATE SHOULD BE ADJUSTED AS REQUIRED.

THE LOADS AS SHOWN ARE BASED ON 6 FT WIDE DOORWAY OPENINGS IN A 40' -6" BOXCAR AND 10 FT WIDE OPENINGS IN A 50' -6" BOXCAR EQUIPPED WITH CONVENTIONAL SLIDING TYPE DOORS. THE DEPICTED PROCEDURES AND METHODS OF BLOCKING ARE APPLICABLE TO BOXCARS EQUIPPED WITH CONVENTIONAL SLIDING TYPE DOORS OTHER THAN THESE WIDTHS.

WHEN PLUG DOOR EQUIPPED BOXCARS ARE TO BE LOADED, THE ADDITIONAL PROCEDURES OUTLINED ON PAGE 19 ARE TO BE FOLLOWED.

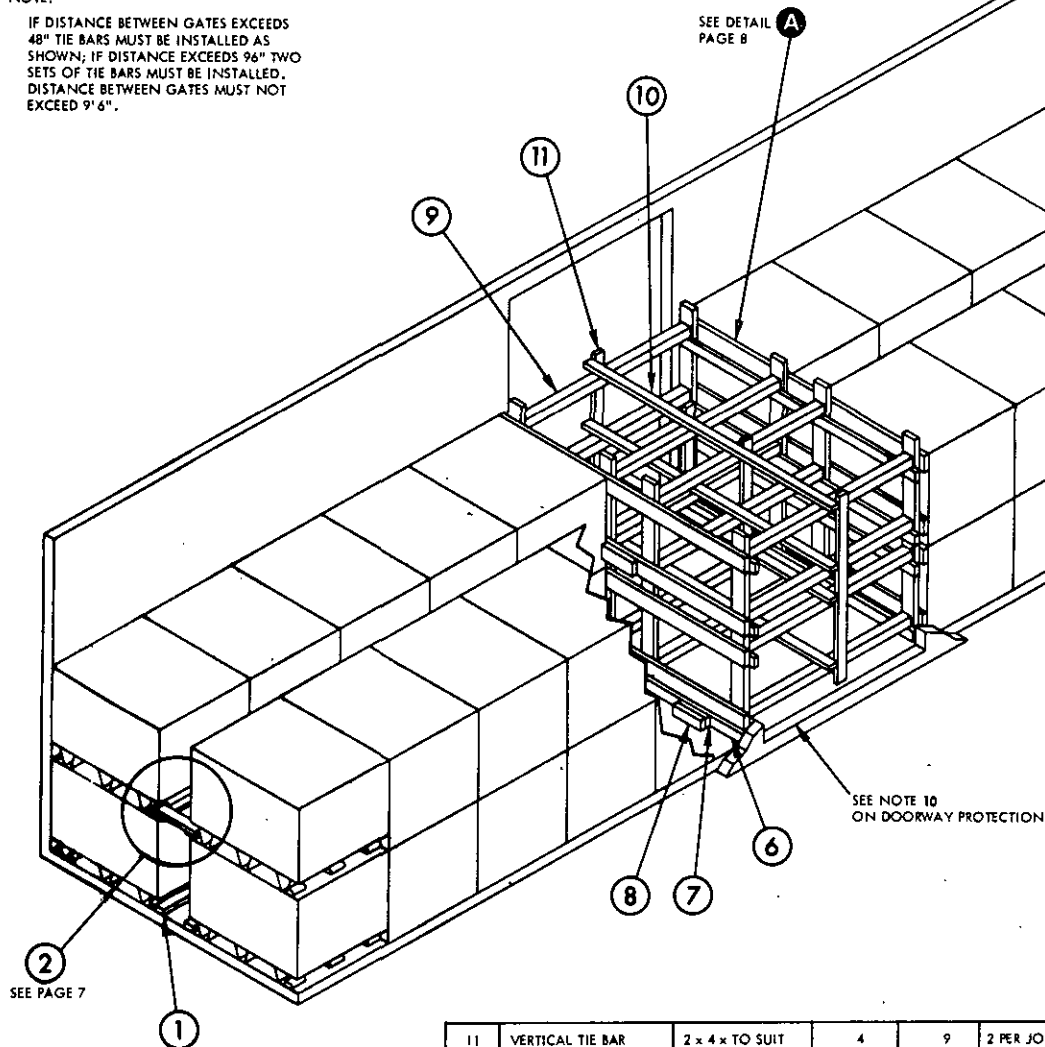


MIL-STD-1325-100 (NAVY)

40'-6" BOXCAR, COMMERCIAL

NOTE:

IF DISTANCE BETWEEN GATES EXCEEDS 48" TIE BARS MUST BE INSTALLED AS SHOWN; IF DISTANCE EXCEEDS 96" TWO SETS OF TIE BARS MUST BE INSTALLED. DISTANCE BETWEEN GATES MUST NOT EXCEED 9'6".



Y - DIMENSION OF UNIT LOAD LENGTHWISE IN THE CAR.  
H - HEIGHT OF UNIT LOAD.

\* - DOUBLED 2 x 4 x CUT TO SUIT AND FIELD POSITIONED TO FIT UNDER PALLET DECK OR OVERHANG OF THE UNIT LOAD. 2 x 3 MATERIAL MAY BE USED IF 2 x 4 DOES NOT FIT.

\*\* - 2 x 6 STRUTS DOUBLED AND LAMINATED WITH 10d NAILS MAY BE SUBSTITUTED IN PLACE OF 4 x 4'S.

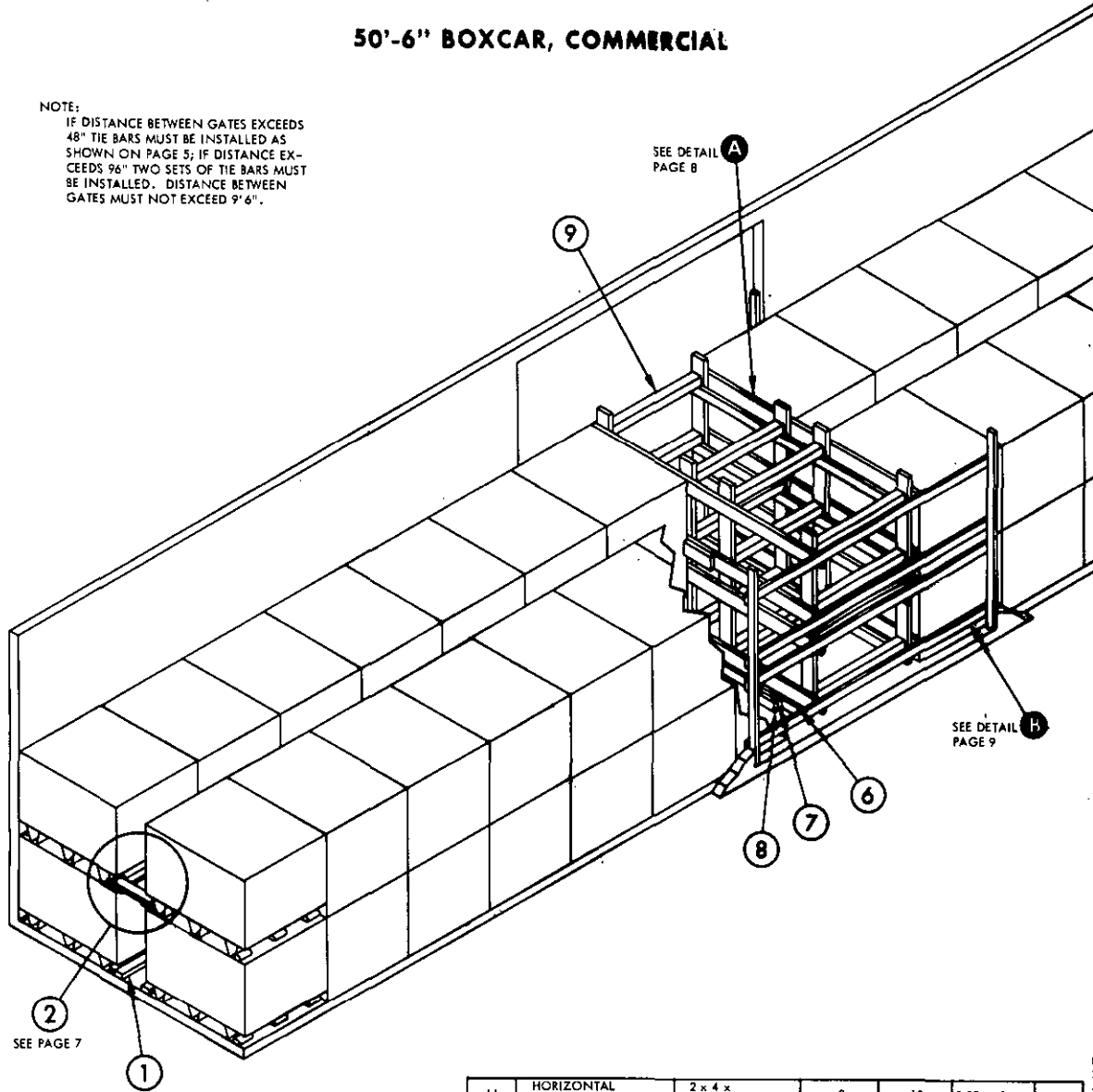
11	VERTICAL TIE BAR	2 x 4 x TO SUIT	4	9	2 PER JOINT	16d
10	HORIZONTAL TIE BAR	2 x 4 x CAR WIDTH-1	4	9	2 PER JOINT	16d
9	STRUT	4 x 4 x WEDGE FIT **	16	4	2 PER JOINT	16d
8	HOLD DOWN CLEAT	2 x 4 x CUT TO SUIT *	4	7	4	16d
7	HOLD DOWN CLEAT	2 x 4 x CUT TO SUIT *	4	6	4	10d
6	HOLD DOWN SPACER	2 x 4 x CAR WIDTH-1	2	4	3 PER JOINT	10d
5	CENTER GATE STRUT CLEAT	2 x 4 x CAR WIDTH-1	8	4	3 PER JOINT	10d
4	CENTER GATE VERTICAL	2 x 6 x (2H + 6)	8	SEE 3	-	-
3	CENTER GATE HORIZONTAL	2 x 6 x CAR WIDTH-1	8	4	3 PER JOINT	10d
2	SWAY BRACE	SEE PAGE 7	AS REQ'D	-	-	-
1	SLEEPER	2 x 4 x Y	AS REQ'D	CAR FLOOR	2 PER FOOT	16d
PIECE NO.	DESCRIPTION	SIZE	NO. PCS REQD	NAIL TO	NUMBER	SIZE
						NAILS

LIST OF MATERIALS AND NAILING DATA

MIL-STD-1325-100 (NAVY)

50'-6" BOXCAR, COMMERCIAL

NOTE:  
IF DISTANCE BETWEEN GATES EXCEEDS 48" TIE BARS MUST BE INSTALLED AS SHOWN ON PAGE 5; IF DISTANCE EXCEEDS 96" TWO SETS OF THE BARS MUST BE INSTALLED. DISTANCE BETWEEN GATES MUST NOT EXCEED 9'6".



Y - DIMENSION OF UNIT LOAD LENGTHWISE IN THE CAR.  
H - HEIGHT OF UNIT LOAD.

\* - DOUBLED 2 x 4 x CUT TO SUIT AND FIELD POSITIONED TO FIT UNDER PALLET DECK OR OVERHANG OF THE UNIT LOAD. 2 x 3 MATERIAL MAY BE USED IF 2 x 4 DOES NOT FIT.

\*\* - 2 x 6 STRUTS DOUBLED AND LAMINATED WITH 10d NAILS MAY BE SUBSTITUTED IN PLACE OF 4 x 4'S.

11	HORIZONTAL DOORWAY MEMBER	2 x 4 x DOOR WIDTH	8	10	3 PER JOINT	10d
10	VERTICAL DOORWAY MEMBER	2 x 3 x (2H + 12)	4	DOOR POST	2 PER FOOT	20d
9	STRUT	4 x 4 x WEDGE FIT **	16	4	2 PER JOINT	16d
8	HOLD DOWN CLEAT	2 x 4 x CUT TO SUIT *	4	6	4	16d
7	HOLD DOWN CLEAT	2 x 4 x CUT TO SUIT *	4	6	4	10d
6	HOLD DOWN SPACER	2 x 4 x CAR WIDTH - 1	2	4	3 PER JOINT	10d
5	CENTER GATE STRUT CLEAT	2 x 4 x CAR WIDTH - 1	8	4	3 PER JOINT	10d
4	CENTER GATE VERTICAL	2 x 6 x (2H + 6)	8	SEE 3	-	-
3	CENTER GATE HORIZONTAL	2 x 6 x CAR WIDTH - 1	8	4	3 PER JOINT	10d
2	SWAY BRACE	SEE PAGE 7	AS REQ'D	-	-	-
1	SLEEPER	2 x 4 x Y	AS REQ'D	CAR FLOOR	2 PER FOOT	16d
PIECE NO.	DESCRIPTION	SIZE	NO. PCS REQD	NAIL TO	NUMBER	SIZE
						NAILS

LIST OF MATERIALS AND NAILING DATA

MIL-STD-1325-100 (NAVY)

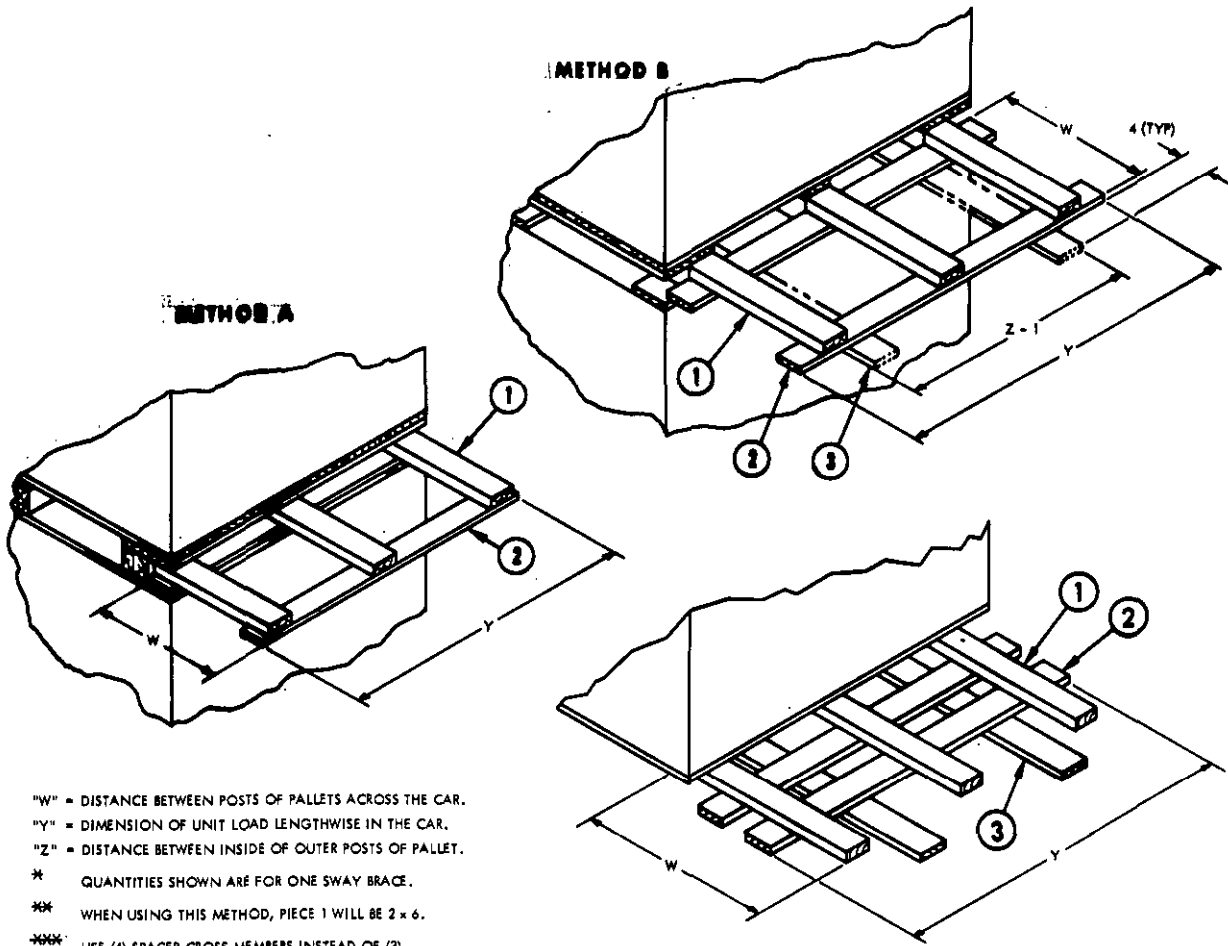
# SWAY BRACE

## FABRICATION AND INSTALLATION OF SWAY BRACING

THE SWAY BRACE CONSISTS OF A FRAME MADE UP OF ITEMS 1 AND 2 OR OF THE FRAME AND FRAME SUPPORTS, ITEM 3. THE FRAME IS FABRICATED BY NAILING STRINGERS (ITEM 2) TO CROSS MEMBERS (ITEM 1) WITH THREE 10d NAILS, CLINCHED, EACH JOINT. THE CROSS MEMBERS MUST BE POSITIONED AGAINST POSTS OF ADJACENT PALLETS.

WHEN USING METHOD A, THE FRAME IS FABRICATED AND SLID INTO PLACE BETWEEN PALLETS AS SHOWN. IF CENTER GATE MEMBERS ARE NOT LOCATED SO THAT THEY RETAIN THE FRAMES IN POSITION A SUITABLE LENGTH 2 x 4 MEMBER, WHICH WILL RETAIN THE FRAMES, MUST BE NAILED TO THE GATE WITH 10d NAILS.

WHEN USING METHOD B, FRAME SUPPORTS (ITEM 3) ARE INSERTED BETWEEN PALLET POSTS AS SHOWN. THE FRAME IS FABRICATED AND POSITIONED BETWEEN PALLETS ON TOP OF FRAME SUPPORTS. STRINGERS (ITEM 2) ARE NAILED TO SUPPORTS (ITEM 3) WITH ONE 6d NAIL EACH JOINT.



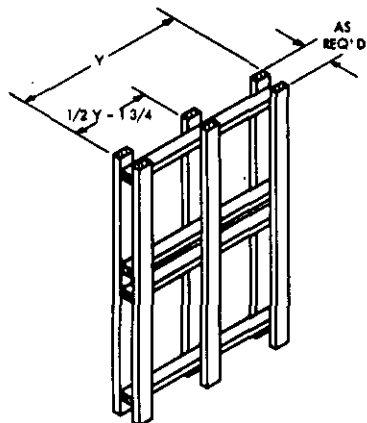
CONFIGURATION OF SWAY BRACE FRAME FOR UNIT LOADS WITH OVERHANG THAT INTERFERES WITH NAILING TO SUPPORT PIECE.

PALLET	LONGITUDINAL DIMENSION OF PALLET PLACED CROSSWISE IN THE CAR	LONGITUDINAL DIMENSION OF PALLET PLACED LENGTHWISE IN THE CAR
MK 12	METHOD A **	METHOD B
MK 3	METHOD A	METHOD B ***
MK 2	METHOD A	METHOD B ***
MK 7	METHOD A **	METHOD B
15011 (WOOD)	METHOD A	METHOD B
3938 (WOOD)	METHOD A	METHOD B ***
1350881 (WOOD)	METHOD B	METHOD B

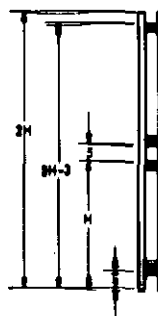
PIECE NO.	DESCRIPTION	SIZE	NO. PCS REQD *	NAIL TO	NUMBER	SIZE
3	SPACER FRAME SUPPORT	1 x 4 x (W + B)	2	SEE 2	-	-
2	SPACER STRINGER	1 x 4 x "Y"	2	1, 3	SEE NOTE ABOVE	
1	SPACER CROSS MEMBER	2 x 4 x "W"	3	SEE 2	-	-

LIST OF MATERIALS AND NAILING DATA

MIL-STD-1325-100 (NAVY)



Y - DIMENSION OF UNIT LOAD LENGTHWISE IN THE CAR.  
H - HEIGHT OF UNIT LOAD.  
MATERIAL SIZE - 2 INCH THICK BY WIDTH AS REQUIRED.



SWAY BRACE FRAME  
FOR VOIDS 8 INCHES OR LESS

NOTE: WIDTH OF SWAY BRACE FRAME MAY BE VARIED BY NAILING THE VERTICALS TO EITHER THE WIDTH OR THICKNESS DIMENSION OF THE HORIZONTALS AND/OR BY ADDING MATERIAL TO THE VERTICALS. FOR CARLOADS OF MORE THAN 2 LAYERS INCREASE THE HEIGHT OF THE VERTICALS AS REQUIRED FOR THE ADDITIONAL LAYERS AND ADD THE NECESSARY HORIZONTALS TO RETAIN EACH ADDITIONAL LAYER IN THE SAME MANNER AS THE LOWER LAYERS.

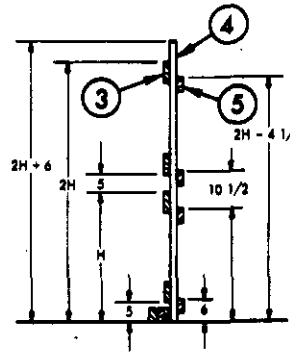
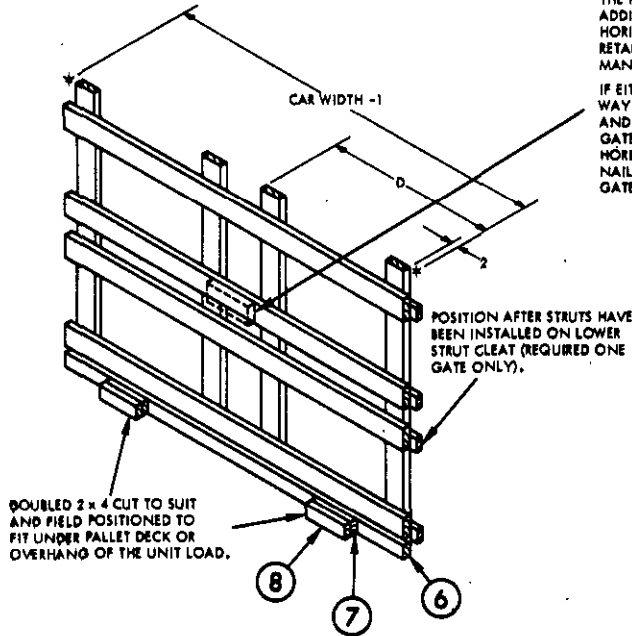


MIL-STD-1325-100 (NAVY)

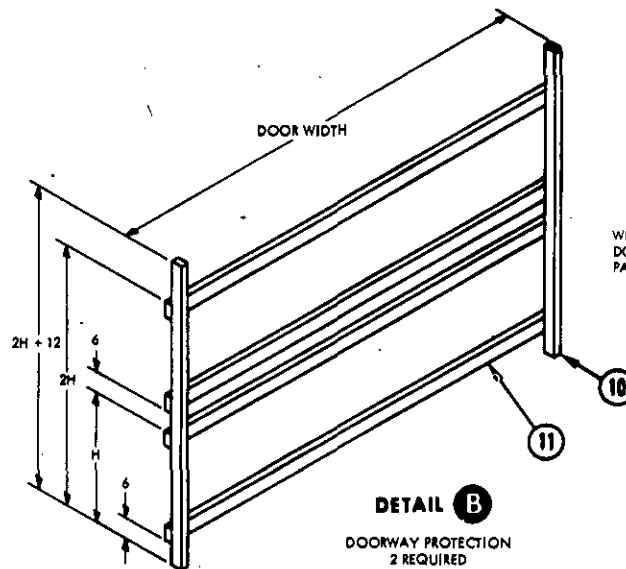
H - HEIGHT OF UNIT LOAD.  
 D - DIMENSION OF UNIT LOAD  
 CROSSWISE IN THE CAR.

NOTE 1: FOR CARLOADS OF MORE THAN 2 LAYERS INCREASE THE HEIGHT OF THE VERTICALS AS REQUIRED FOR THE ADDITIONAL LAYERS AND ADD THE NECESSARY HORIZONTALS, STRUT CLEATS, AND STRUTS TO RETAIN EACH ADDITIONAL LAYER IN THE SAME MANNER AS THE LOWER LAYERS.

IF EITHER CENTER GATE SHOULD FALL IN THE DOORWAY AREA (CONVENTIONAL SLIDING TYPE DOOR) AND DOORWAY PROTECTION IS NOT REQUIRED, A GATE CLEAT (2 x 6 NAILED TO THE CENTER GATE HORIZONTAL BETWEEN UNIT LOADS WITH FIVE 10d NAILS TO PREVENT MOVEMENT OF THE CENTER GATE AGAINST THE DOOR.



**DETAIL A**  
 CENTER GATE  
 2 REQUIRED

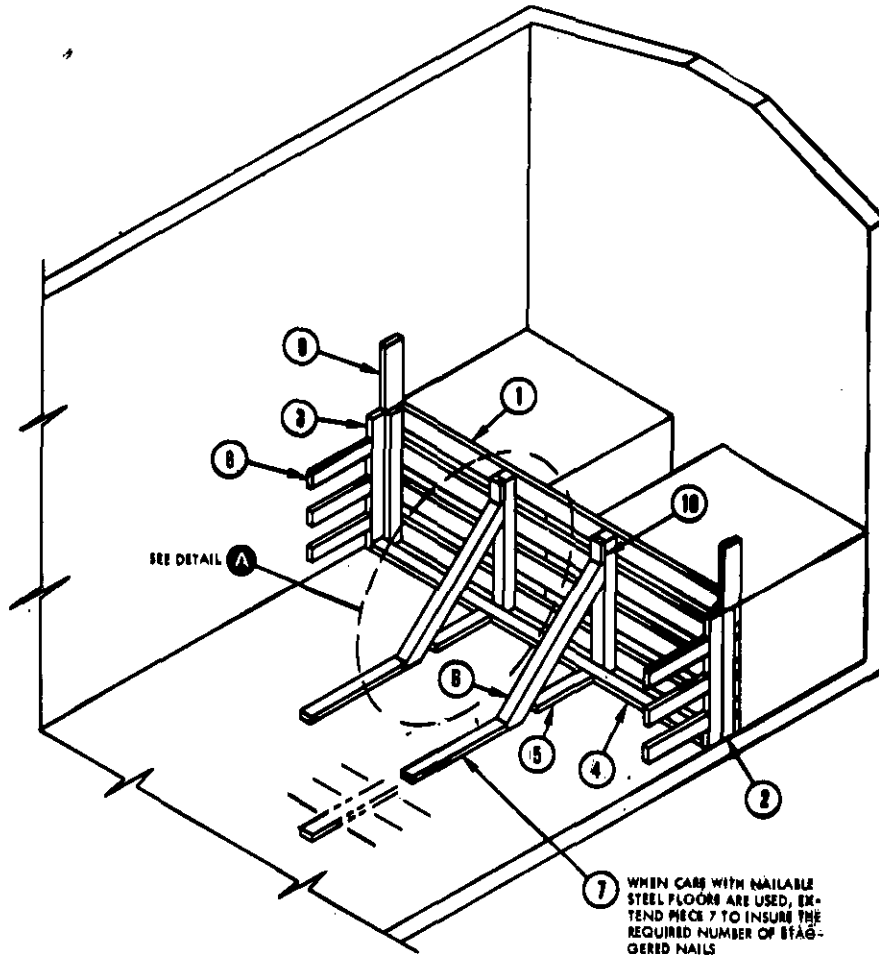


WHEN BOXCAR HAS STEEL DOOR POSTS, DOORWAY PROTECTION AS PER WR-52 PAGE 35, FIG. 21 IS REQUIRED.

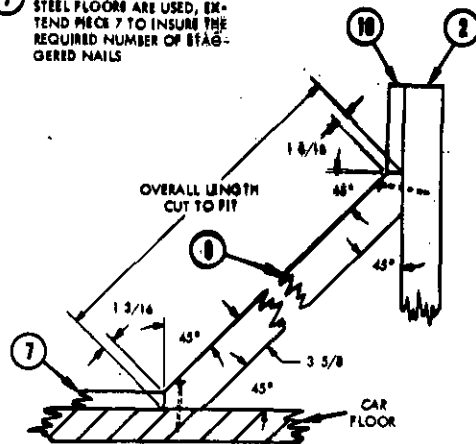
**DETAIL B**  
 DOORWAY PROTECTION  
 2 REQUIRED

MIL-STD-1325-100 (NAVY)

END BRACE  
LCL SHIPMENTS UP TO 5,000 LBS



7 WHEN CARS WITH AVAILABLE STEEL FLOORS ARE USED, EXTEND PIECE 7 TO INSURE THE REQUIRED NUMBER OF STAGGERED NAILS



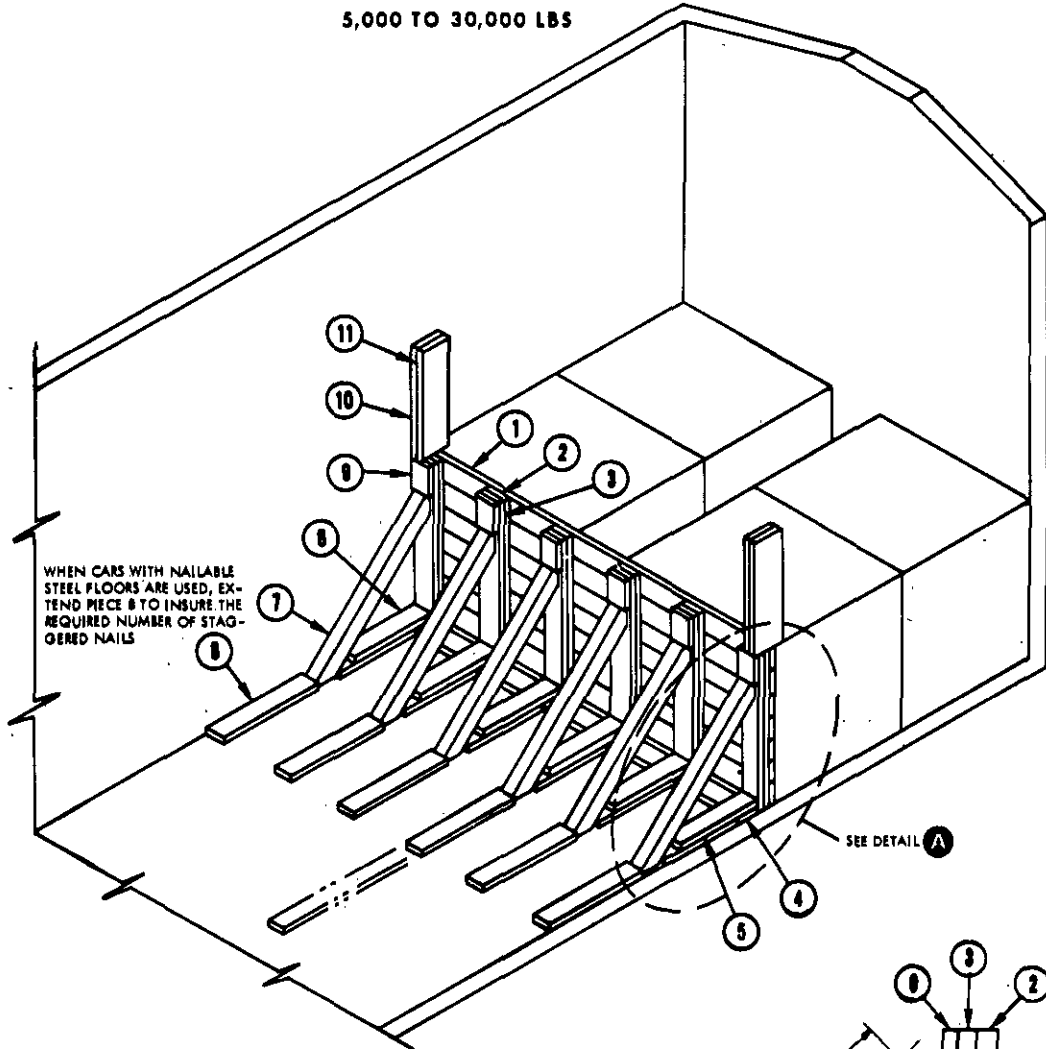
DETAIL A  
POSITIONING OF  
DIAGONAL BRACE

PIECE NO.	DESCRIPTION	SIZE	NO. PCS REQD	NAIL TO	NUMBER	SIZE
10	UPPER CLEAT	2 x 4 x CUT TO FIT	2	2	4	10d
9	HOLD DOWN CLEAT	2 x 6 x 18	2	CAR WALL	6	10d
8	SIDE WALL BACK-UP CLEAT	2 x 4 x 18	6	CAR WALL	4	10d
7	FLOOR CLEAT	2 x 4 x 30 MIN	2	CAR FLOOR	5	20d
6	DIAGONAL BRACE	4 x 4 x CUT TO FIT	2	2, CAR FLOOR	2 EACH END	20d
5	FLOOR BRACE CLEAT	2 x 4 x 18	2	CAR FLOOR	4	20d
4	LATERAL FLOOR BRACE	2 x 4 x CAR WIDTH - 3 1/4	1	CAR FLOOR	2 PER FOOT	20d
3	VERTICAL BACK-UP	2 x 4 x LOAD HEIGHT	2	CAR WALL	2 PER FOOT	10d
2	END BRACE VERTICAL	4 x 4 x LOAD HEIGHT	4	SEE 1	-	-
1	END BRACE HORIZONTAL	2 x 6 x CAR WIDTH	4 MIN	2	3 PER JOINT	16d

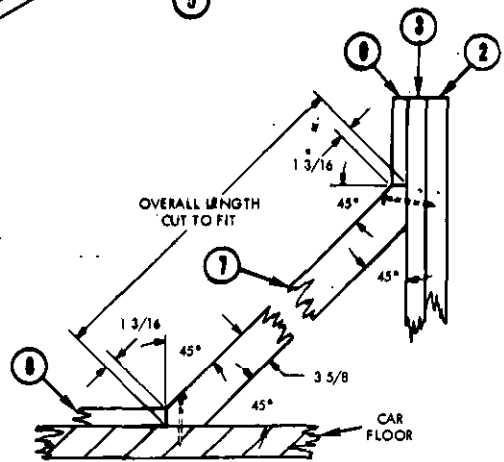
LIST OF MATERIALS AND NAILING DATA

MIL-STD-1325-100 (NAVY)

**END BRACE  
FOR LCL SHIPMENTS FROM  
5,000 TO 30,000 LBS**



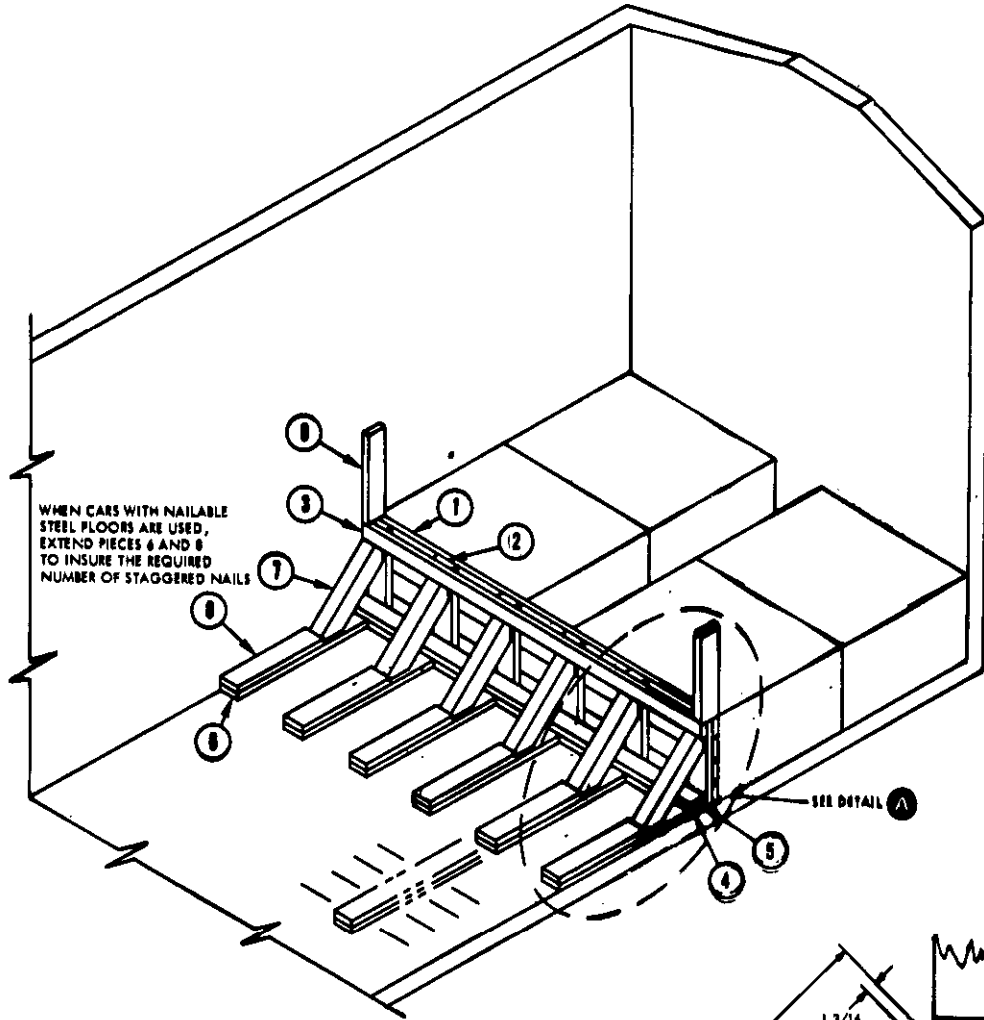
11	HOLD DOWN CLEAT	2 x 10 x 30	2	10	15	10d
10	HOLD DOWN CLEAT	2 x 10 x 30	2	CAR WALL	15	10d
9	UPPER CLEAT	2 x 6 x 8	6	3	5	10d
8	FLOOR CLEAT	2 x 6 x 30	6	CAR FLOOR	8	20d
7	DIAGONAL BRACE	4 x 4 x CUT TO FIT	6	3, CAR FLOOR	2 EACH END	20d
6	TOP CLEAT	2 x 6 x 30	6	4, 5	8	20d
5	FLOOR BRACE CLEAT	2 x 6 x 30	6	CAR FLOOR	8	20d
4	LATERAL FLOOR BRACE	2 x 6 x CAR WIDTH	1	CAR FLOOR	2 PER FOOT	20d
3	END BRACE VERTICAL	2 x 6 x LOAD HEIGHT	6	2	2 PER FOOT	10d
2	END BRACE VERTICAL	2 x 6 x LOAD HEIGHT	6	SEE 1	-	-
1	END BRACE HORIZONTAL	2 x 6 x CAR WIDTH	TO LOAD HEIGHT	2	3 PER JOINT	10d
PIECE NO.	DESCRIPTION	SIZE	NO. PCS REQD	NAIL TO	NUMBER	SIZE
LIST OF MATERIALS AND NAILING DATA						



**DETAIL A**  
POSITIONING OF  
DIAGONAL BRACE

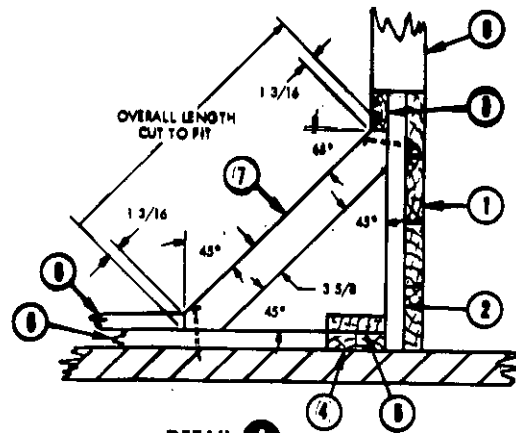
MIL-STD-1325-100 (NAVY)

END BRACE  
FOR LCL SHIPMENTS FROM  
5,000 TO 30,000 LBS



9	HOLD DOWN CLEAT	2 x 6 x 24	2	CAR WALL	10	10d
8	FLOOR CLEAT	2 x 6 x 30	6	6	8	20d
7	DIAGONAL BRACE	4 x 4 x CUT TO FIT	6	2, 6	2 EACH END	20d
6	FLOOR BRACE CLEAT	2 x 6 x TO SUIT	6	CAR FLOOR	10	20d
5	LATERAL FLOOR BRACE	2 x 6 x CAR WIDTH	1	4	2 PER FOOT	20d
4	LATERAL FLOOR BRACE	2 x 6 x CAR WIDTH	1	CAR FLOOR	2 PER FOOT	20d
3	UPPER CLEAT	2 x 4 x CAR WIDTH	1	2	3 PER JOINT	10d
2	END BRACE VERTICAL	2 x 6 x LOAD HEIGHT	6	SEE 1	-	-
1	END BRACE HORIZONTAL	2 x 6 x CAR WIDTH	TO LOAD HEIGHT	2	3 PER JOINT	10d
PIECE NO.	DESCRIPTION	SIZE	NO. PCS REQD	NAIL TO	NUMBER	SIZE NAILS

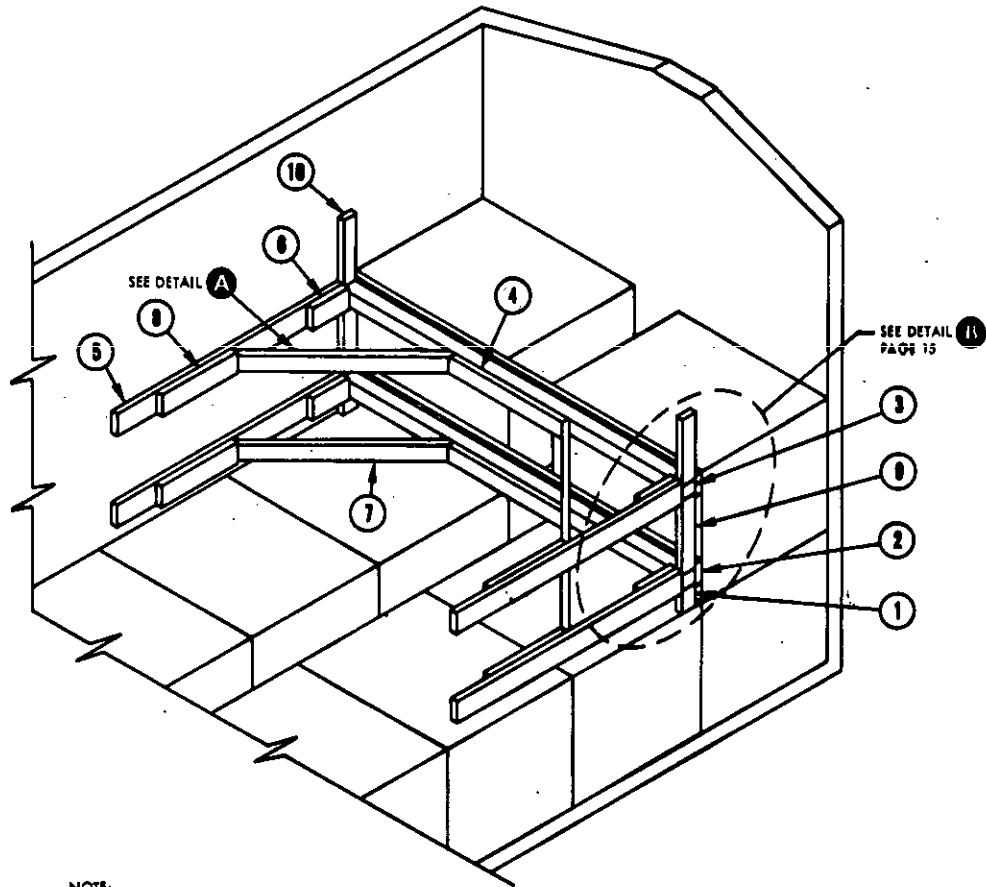
LIST OF MATERIALS AND NAILING DATA



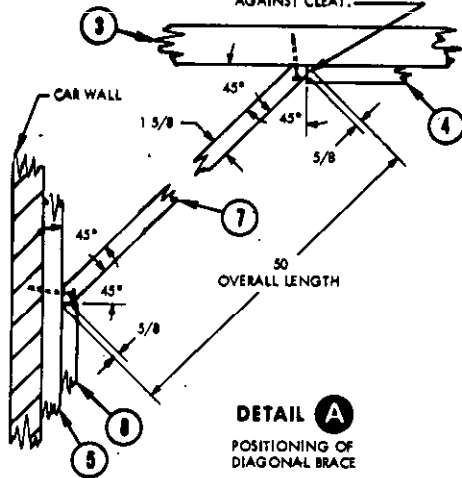
DETAIL A  
POSITIONING OF  
DIAGONAL BRACE

MIL-STD-1325-100 (NAVY)

PARTIAL LAYER BRACING  
UP TO 8,000 LBS



NOTE:  
BE CERTAIN THAT SHORTER  
DIAGONAL CUT IS PLACED  
AGAINST CLEAT.



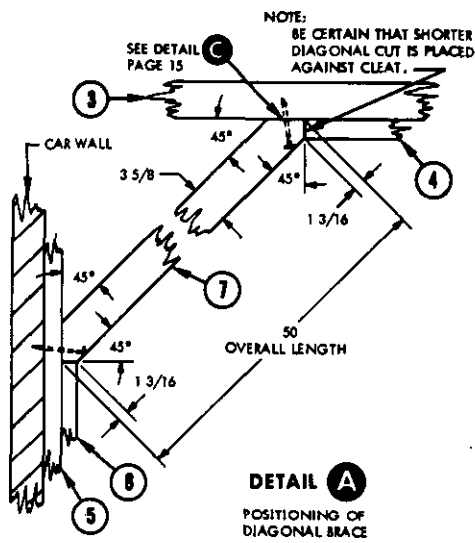
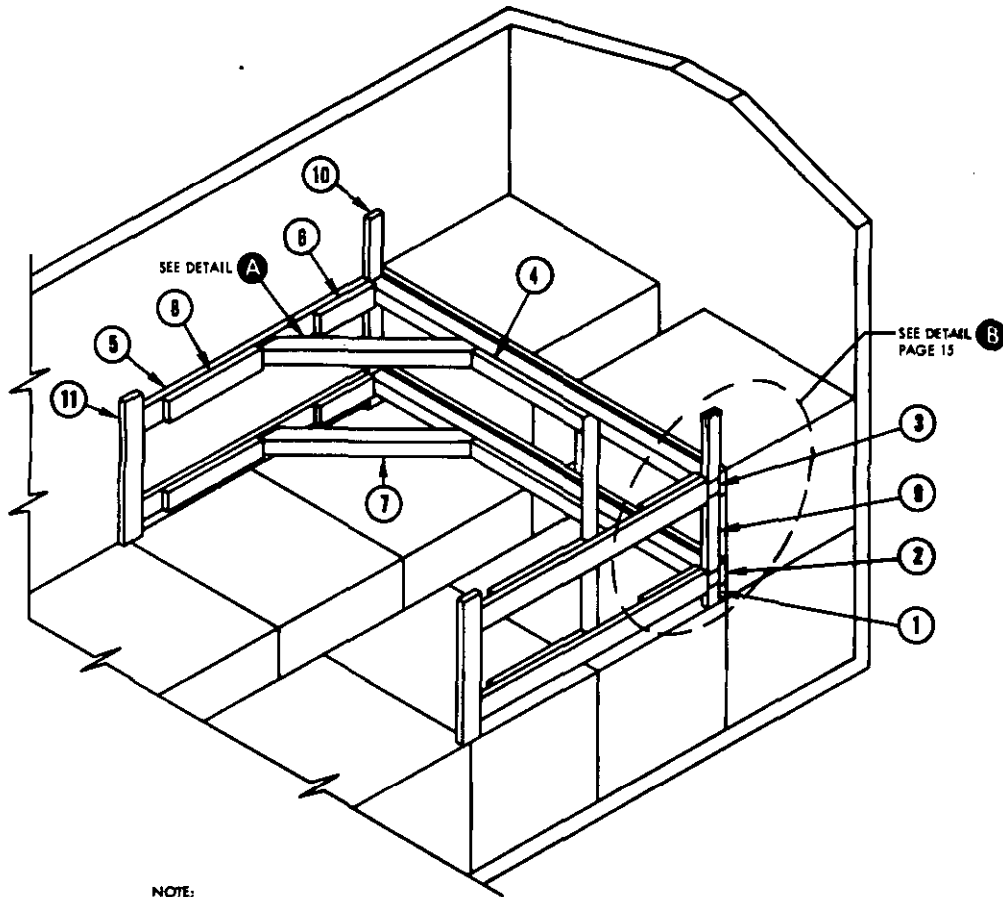
**DETAIL A**  
POSITIONING OF  
DIAGONAL BRACE

10	UPPER WALL CLEAT	2 x 4 x 18	2	CAR WALL	4	10d
9	INTERMEDIATE WALL CLEAT	2 x 4 x CUT TO FIT	2	CAR WALL	4	10d
8	HORIZONTAL BACK-UP CLEAT	2 x 6 x 24	4	5	8	16d
7	DIAGONAL BRACE	2 x 4 x 50	4	3,5	1 EACH END	16d
6	HORIZONTAL POCKET CLEAT	2 x 6 x 12	4	5	4	16d
5	HORIZONTAL WALL CLEAT	2 x 6 x 72	4	CAR WALL	16	10d
4	CENTER CLEAT	2 x 4 x 36	2	3	7	16d
3	CROSS BRACE	4 x 4 x CAR WIDTH	2	SEE 2	-	-
2	CROSS BRACE STIFFENER	2 x 6 x CAR WIDTH	2	3	2 PER FOOT	12d
1	LOWER WALL CLEAT	2 x 4 x 6	2	CAR WALL	3	10d
PIECE NO.	DESCRIPTION	SIZE	NO. PCS REQD	NAIL TO	NUMBER NAILS	SIZE

LIST OF MATERIALS AND NAILING DATA

MIL-STD-1325-100 (NAVY)

PARTIAL LAYER BRACING  
8,000 LBS TO 14,000 LBS

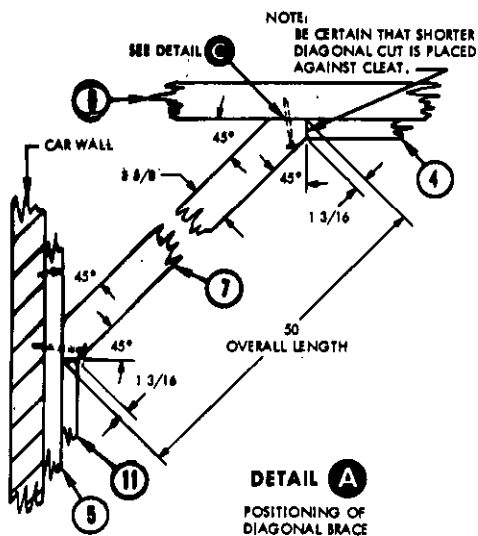
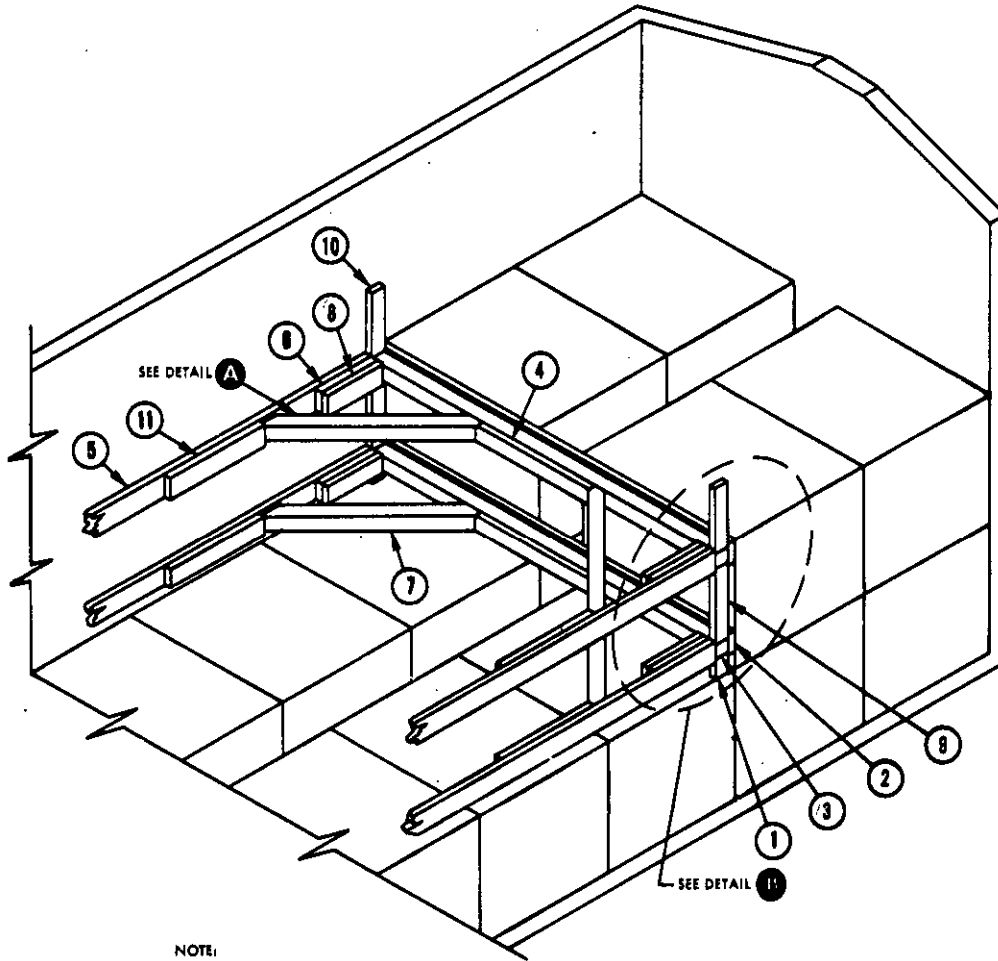


11	VERTICAL BACK-UP CLEAT	2 x 6 SLIGHTLY ABOVE LOAD	2	CAR WALL	8	10d
10	UPPER WALL CLEAT	2 x 4 x 18	2	CAR WALL	4	10d
9	INTERMEDIATE WALL CLEAT	2 x 4 x CUT TO FIT	2	CAR WALL	4	10d
8	HORIZONTAL BACK-UP CLEAT	2 x 6 x 30	4	5	14	16d
7	DIAGONAL BRACE	4 x 4 x 50	4	3, 5	1 EACH END	60d
6	HORIZONTAL POCKET CLEAT	2 x 6 x 18	4	5	7	16d
5	HORIZONTAL WALL CLEAT	2 x 6 x 72	4	CAR WALL	16	10d
4	CENTER CLEAT	2 x 4 x 36	2	3	7	16d
3	CROSS BRACE	4 x 4 x CAR WIDTH	2	SEE 2	-	-
2	CROSS BRACE STIFFENER	2 x 6 x CAR WIDTH	2	3	2 PER FOOT	12d
1	LOWER WALL CLEAT	2 x 4 x 6	2	CAR WALL	3	10d
PIECE NO.	DESCRIPTION	SIZE	NO. PCS REQD	NAIL TO	NUMBER	SIZE
						NAILS

LIST OF MATERIALS AND NAILING DATA

MIL-STD-1325-100 (NAVY)

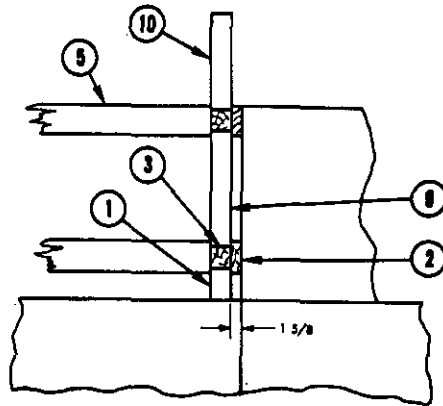
PARTIAL LAYER BRACING  
14,000 LBS TO 20,000 LBS



11	HORIZONTAL BACK-UP CLEAT	2 x 6 x 30	4	5	14	16d
10	UPPER WALL CLEAT	2 x 4 x 18	2	CAR WALL	4	10d
9	INTERMEDIATE WALL CLEAT	2 x 4 x CUT TO FIT	2	CAR WALL	4	10d
8	HORIZONTAL POCKET CLEAT	2 x 6 x 18	4	6	7	16d
7	DIAGONAL BRACE	4 x 4 x 50	4	3, 5	1 EACH END	60d
6	HORIZONTAL POCKET CLEAT	2 x 6 x 18	4	5	7	16d
5	HORIZONTAL WALL CLEAT	2 x 6 x EXTEND ACROSS DOOR	4	CAR WALL	40	10d
4	CENTER CLEAT	2 x 4 x 36	2	3	7	16d
3	CROSS BRACE	4 x 4 x CAR WIDTH	2	SEE 2	-	-
2	CROSS BRACE STIFFENER	2 x 6 x CAR WIDTH	2	3	2 PER FOOT	12d
1	LOWER WALL CLEAT	2 x 4 x 6	2	CAR WALL	3	10d
PIECE NO.	DESCRIPTION	SIZE	NO. PCS REQD	NAIL TO	NUMBER	SIZE
						NAILS

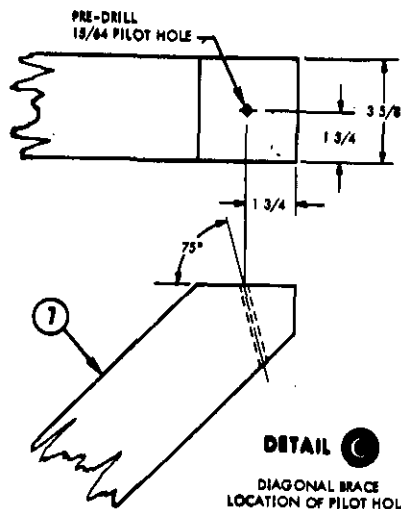
LIST OF MATERIALS AND NAILING DATA

MIL-STD-1325-100 (NAVY)



**DETAIL B**

POSITIONING OF LOWER  
WALL CLEAT



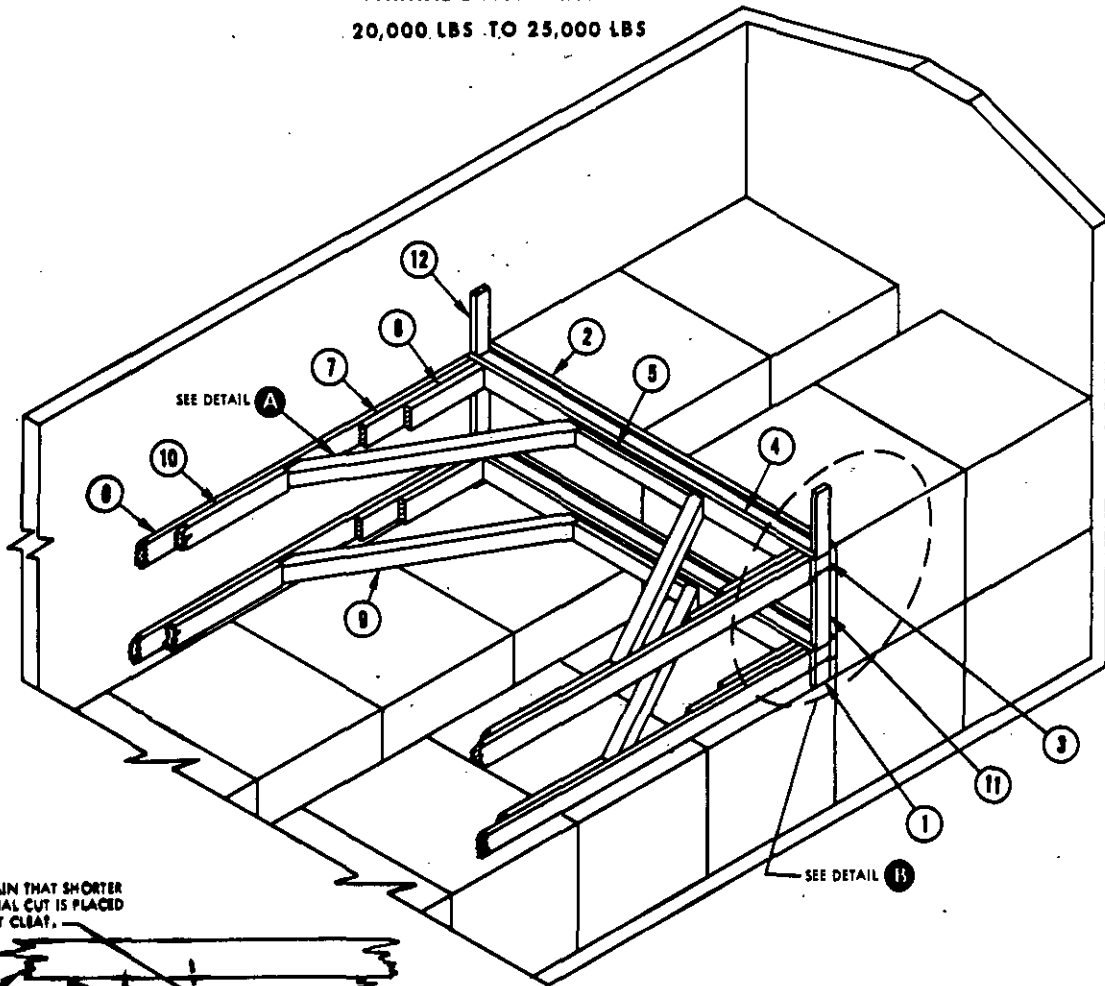
**DETAIL C**

DIAGONAL BRACE  
LOCATION OF PILOT HOLE  
FOR 60d NAIL

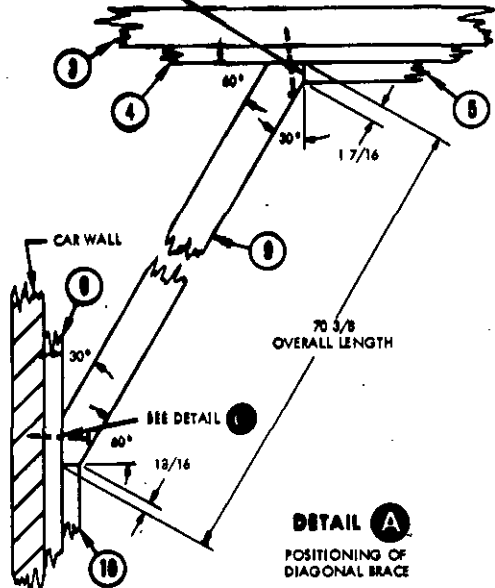


MIL-STD-1325-100 (NAVY)

**PARTIAL LAYER BRACING**  
20,000 LBS. TO 25,000 LBS



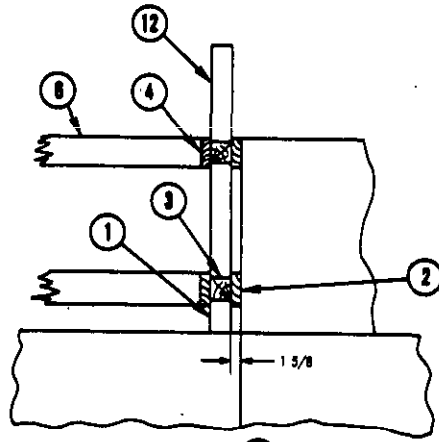
NOTE:  
BE CERTAIN THAT SHORTER  
DIAGONAL CUT IS PLACED  
AGAINST CLEAT.



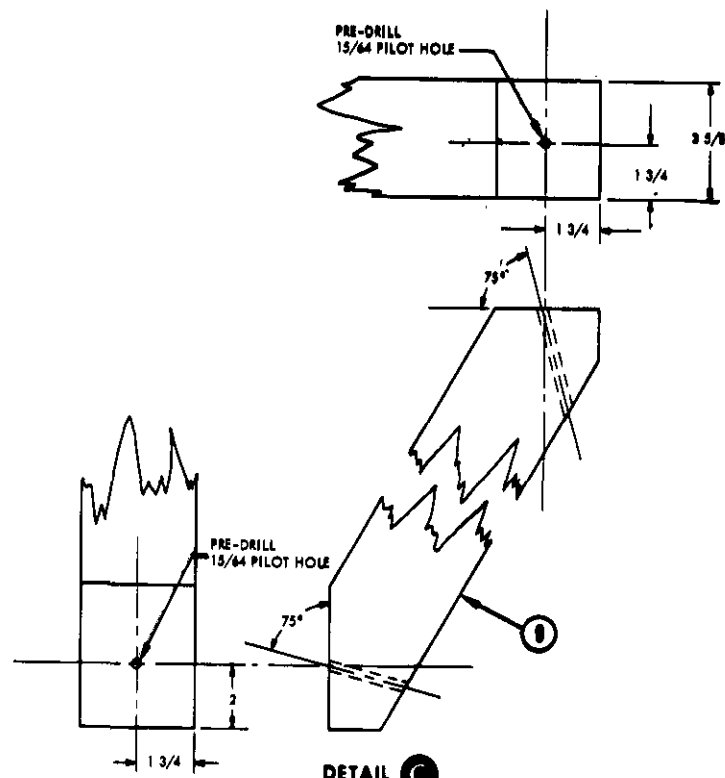
12	UPPER WALL CLEAT	2 x 4 x 18	2	CAR WALL	4	10d
11	INTERMEDIATE WALL CLEAT	2 x 4 x CUT TO FIT	2	CAR WALL	4	10d
10	HORIZONTAL BACK-UP CLEAT	2 x 6 x EXTEND ACROSS DOOR	4	6	18	16d
9	DIAGONAL BRACE	4 x 4 x 70 3/8	4	4, 6	1 EACH END	60d
8	HORIZONTAL POCKET CLEAT	2 x 6 x 24	4	6	7	16d
7	HORIZONTAL POCKET CLEAT	2 x 6 x 36	4	5	10	16d
6	HORIZONTAL WALL CLEAT	2 x 6 x EXTEND ACROSS DOOR	4	CAR WALL	40	10d
5	CENTER CLEAT	2 x 4 x 36	2	3	7	16d
4	CROSS BRACE STIFFENER	2 x 6 x CAR WIDTH	2	3	2 PER FOOT	12d
3	CROSS BRACE	4 x 4 x CAR WIDTH	2	SEE 2	-	-
2	CROSS BRACE STIFFENER	2 x 6 x CAR WIDTH	2	3	2 PER FOOT	12d
1	LOWER WALL CLEAT	2 x 4 x 6	2	CAR WALL	3	10d
PIECE NO.	DESCRIPTION	SIZE	NO. PCS REQD	NAIL TO	NUMBER	SIZE
					NAILS	

LIST OF MATERIALS AND NAILING DATA

MIL-STD-1325-100 (NAVY)



**DETAIL B**  
POSITIONING OF LOWER  
WALL CLEAT

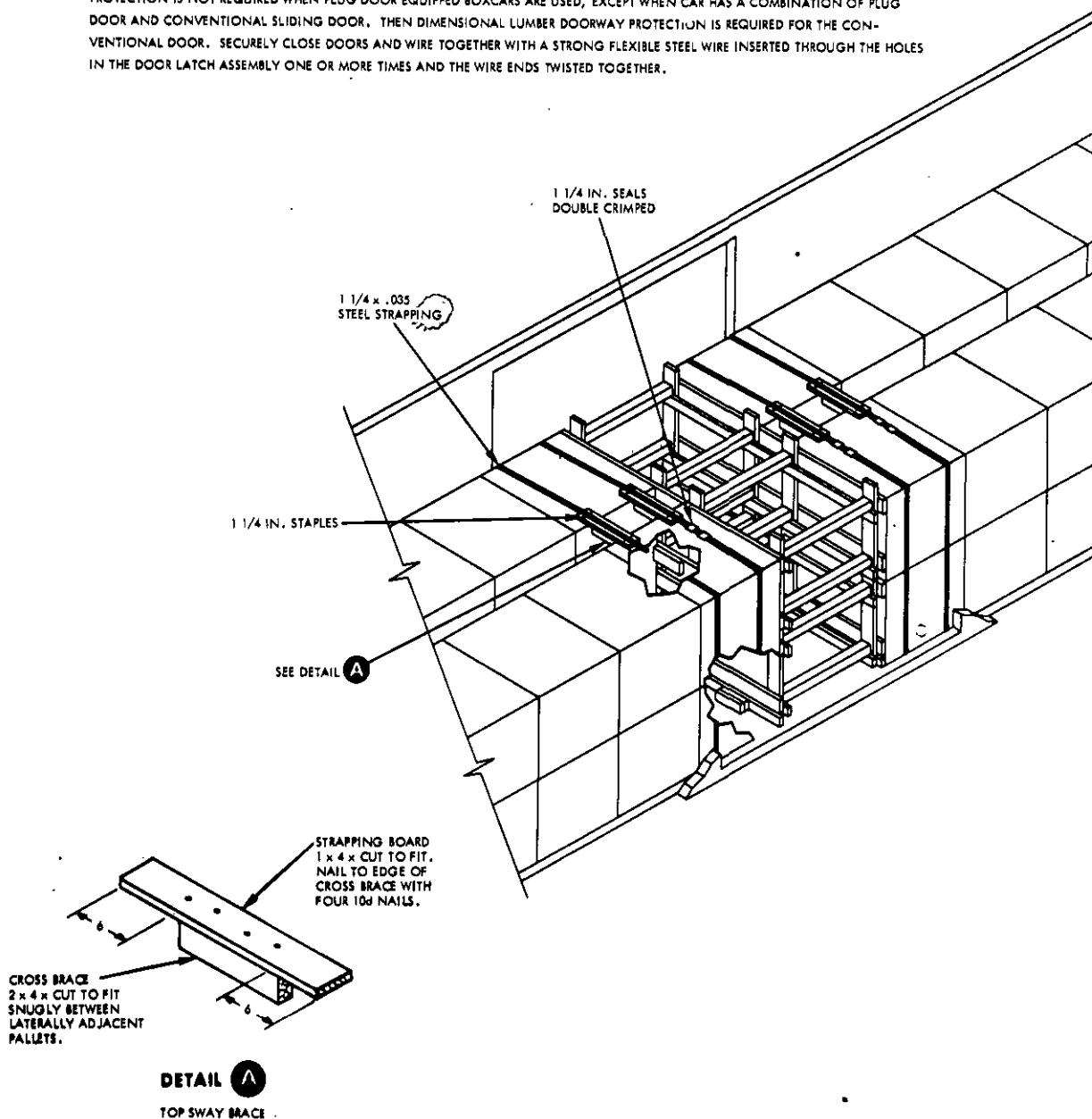


**DETAIL C**  
DIAGONAL BRACE  
LOCATION OF PILOT HOLE  
FOR 60d NAIL

MIL-STD-1325-100 (NAVY)

**PLUG DOOR EQUIPPED BOXCARS.**

THE DEPICTED PROCEDURES AND METHODS OF BLOCKING ARE ALSO APPLICABLE TO BOXCARS EQUIPPED WITH PLUG TYPE DOORS. STACKS WITH MORE THAN HALF OF THE UNIT LOAD IN THE DOORWAY AREA MUST BE UNITIZED FOR DOORWAY PROTECTION WITH TWO LATERALLY APPLIED 1 1/4" STEEL STRAPS PER STACK, EACH TENSIONED AND SEALED WITH TWO DOUBLE CRIMPED SEALS AND A TOP SWAY BRACE CONSISTING OF A STRAPPING BOARD AND CROSS BRACE, TWO PER STACK (SEE DETAIL A) MUST BE INSTALLED BETWEEN THE ROWS OF THE DOORWAY STACKS. STRAP IS SECURED TO STRAPPING BOARD WITH TWO 1 1/4" STAPLES. DIMENSIONAL LUMBER DOORWAY PROTECTION IS NOT REQUIRED WHEN PLUG DOOR EQUIPPED BOXCARS ARE USED, EXCEPT WHEN CAR HAS A COMBINATION OF PLUG DOOR AND CONVENTIONAL SLIDING DOOR, THEN DIMENSIONAL LUMBER DOORWAY PROTECTION IS REQUIRED FOR THE CONVENTIONAL DOOR. SECURELY CLOSE DOORS AND WIRE TOGETHER WITH A STRONG FLEXIBLE STEEL WIRE INSERTED THROUGH THE HOLES IN THE DOOR LATCH ASSEMBLY ONE OR MORE TIMES AND THE WIRE ENDS TWISTED TOGETHER.



REVIEW ACTIVITY  
NAVY - OS

PREPARING ACTIVITY  
NAVY - OS  
(PROJECT NO. B140-N274)