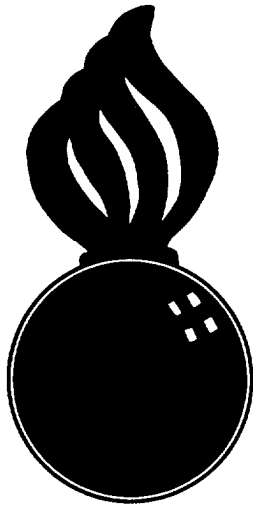


APPROVED  
 BUREAU OF EXPLOSIVES  
*A. F. Dussanck*  
 MILITARY ASSISTANT  
 DATE 5/23/63



# LOADING & BRACING (CL & LCL) IN "DF"-TYPE BOX CARS OF CBU ITEMS PACKED IN XM468 CONTAINER

⊙ THE TERM, "DF"-TYPE, IS USED HEREIN TO INDICATE ALL BOX CARS EQUIPPED WITH MECHANICAL BRACING DEVICES OF VARIOUS DESIGN AND MANUFACTURE.

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DO NOT SCALE

LOADING & BRACING (CL & LCL) IN "DF"-TYPE BOX CARS OF CBU ITEMS PACKED IN XM468 CONTAINER			
DRAFTSMAN JDS	TRACER	ENGINEER Dw / 4	SUBMITTED
CHECKER GWP/KV	CHECKER	ENGINEER	<i>A. F. Dussanck</i> COMMANDER, SAVANNAH ARMY DEPOT
REVISIONS			EXAMINED
			<i>R. E. Oulough</i> AMMUNITION PROCUREMENT & SUPPLY AGENCY APPROVED BY ORDER OF COMMANDER, ARMY MATERIEL COMMAND <i>Frank C. Oulough</i> ARMY SUPPLY & MAINTENANCE COMMAND MATERIEL COMMAND U.S.A.
23 JULY 1963			
	CLASS	DIVISION	DRAWING
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## GENERAL NOTES

- A. PROCEDURES SHOWN HEREIN MAY BE ADAPTED AS REQUIRED TO FACILITATE THE USE OF BOX CARS EQUIPPED WITH VARIOUS TYPES OF SELF-CONTAINED MECHANICAL BRACING DEVICES; HOWEVER, WALL MEMBERS (ADJUSTABLE OR FIXED) AND DOORWAY MEMBERS MUST BE LOCATED WITHIN THE TOLERANCED LIMITS OF THE SPECIFIED HEIGHTS ABOVE THE CAR FLOOR.  
**CAUTION:** BOX CARS EQUIPPED WITH MEMBERS WHICH DO NOT MEET THE LOCATION REQUIREMENTS MUST NOT BE USED.
- B. LOADS AS SHOWN HEREIN ARE BASED ON "DF"-TYPE BOX CARS (WITH 8'-0" MINIMUM DOORWAY OPENING) EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS.
- C. THE LOAD AS SHOWN ON PAGE 3 IS BASED ON "DF"-TYPE BOX CARS 60'-6" LONG x 8'-6" WIDE (MINIMUM INSIDE CLEARANCE) EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS AND DOORWAY MEMBERS POSITIONED AT SPECIFIED HEIGHTS ABOVE THE CAR FLOOR.
- D. THE LOAD AS SHOWN ON PAGE 4 IS BASED ON "DF"-TYPE BOX CARS 40'-6" LONG x 8'-6" WIDE (MINIMUM INSIDE CLEARANCE) EQUIPPED WITH DOORWAY MEMBERS, AND FIXED WALL MEMBERS ATTACHED TO SIDE WALLS, AT SPECIFIED HEIGHTS ABOVE THE CAR FLOOR.  
**CAUTION:** THE "DF" MEMBER HEIGHT LOCATION DIMENSIONS SPECIFIED ON PAGE 4 DIFFER FROM THOSE SPECIFIED FOR THE LOAD SHOWN ON PAGE 3. CARS EQUIPPED WITH CROSS MEMBERS WITHOUT A MAILABLE SURFACE CANNOT BE USED FOR THIS METHOD.
- E. THE TYPICAL LCL METHODS SHOWN ON PAGE 6 ARE BASED ON "DF"-TYPE BOX CARS 8'-6" WIDE (MINIMUM INSIDE CLEARANCE) EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS LOCATED AT SPECIFIED HEIGHTS ABOVE THE CAR FLOOR. FOR LCL SHIPMENTS IN "DF"-TYPE BOX CARS EQUIPPED WITH FIXED WALL MEMBERS LOCATED AT HEIGHTS OTHER THAN SPECIFIED, PRINCIPLES SHOWN ON PAGE 6 MAY BE EMPLOYED IF FIXED WALL MEMBERS ARE LOCATED WITHIN THE TOLERANCED LIMITS OF THE DIMENSIONS SPECIFIED ON PAGE 4.
- F. ANTI-CHAFING MATERIAL OF SUITABLE THICKNESS MUST BE USED BETWEEN CONTAINERS AND CAR SIDE WALLS TO PREVENT CONTACT OF THE CONTAINERS WITH ANY EXPOSED METAL SURFACE. THE ANTI-CHAFING MATERIAL MUST BE SECURED TO PREVENT DISPLACEMENT DURING TRANSIT.
- G. EACH CROSS MEMBER WILL BE USED IN SUCH A MANNER THAT IT WILL NOT BE RELIED ON TO RETAIN MORE THAN 4,000 POUNDS OF LADING ON EITHER SIDE. VOIDS LENGTHWISE WITHIN THE LOAD MUST BE MINIMUM AND CROSS MEMBERS MUST BE PLACED AGAINST THE LADING AS TIGHTLY AS THE WALL MEMBER LOCKING HOLE SPACING PERMITS. LOCKING BARS (LEVER JACK) SHOULD BE USED FOR THIS PURPOSE. AN ADDITIONAL 1/2" OF ADJUSTMENT CAN BE MADE BY TURNING THE CROSS MEMBER END FOR END WHEN LOCKING PINS ARE OFF-CENTER.  
**NOTE:** IT IS RECOMMENDED THAT CROSS MEMBERS BE INSTALLED WITH EACH END ATTACHED AS NEARLY AS POSSIBLE IN "MATED" POSITIONS, AT EQUAL HEIGHTS AND AT EQUAL DISTANCES FROM END OF CAR.
- H. **CAUTION:** ALL BLOCKING AND BRACING COMPONENTS ("DF" MEMBERS) 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.
- J. DETAIL OF XM468 CONTAINER:  
CONTAINER DIMENSIONS - 136" LONG x 30" WIDE x 28-1/2" HIGH.  
GROSS WEIGHT - 1,282 POUNDS (APPROX).
- K. ALL 1-1/4" STRAPPING WILL BE SEALED WITH TWO (2) SEALS AND TWO (2) CRIMPS PER SEAL.
- L. STEEL STRAPPING, 1-1/4" x .035", WILL BE USED TO UNITIZE CONTAINERS AS SHOWN. IF THE CAPACITY OF THE MNE PERMITS, IT IS RECOMMENDED THAT CONTAINERS BE UNITIZED PRIOR TO PLACEMENT WITHIN THE CAR.
- M. H.E. ITEM IS AN ICC CLASS "A" EXPLOSIVE. PROCEDURES SHOWN HEREIN ARE ALSO APPLICABLE FOR THE SHIPMENT OF XM468 CONTAINERS WITH INERT LOADED, EMPTY OR PRACTICE CBU ITEMS, AND OF EMPTY CONTAINERS.

## MATERIAL SPECIFICATIONS

LUMBER: SEE ODOM 3-4.

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

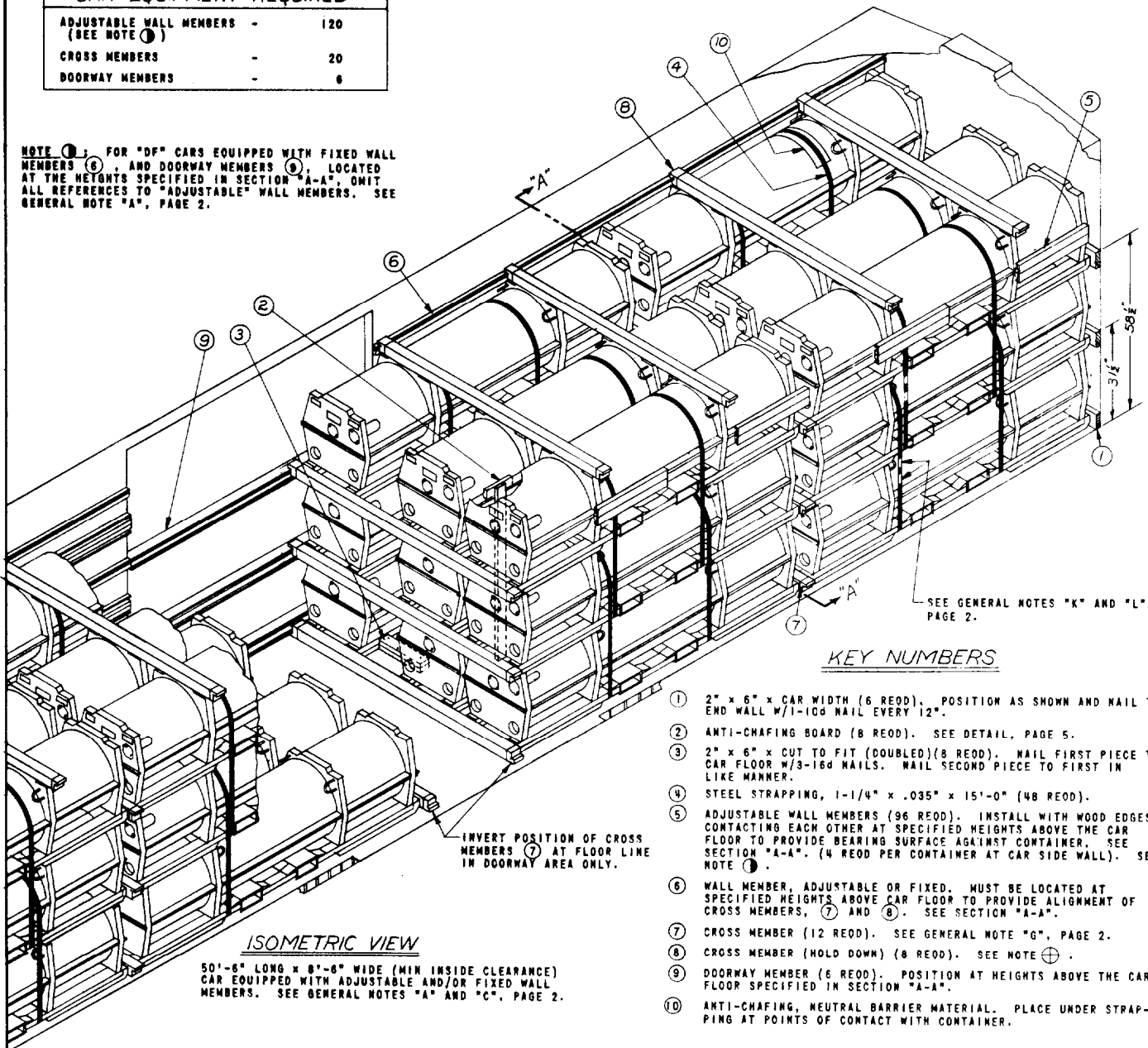
STRAPPING, STEEL: TYPE I, CLASS "A" OR "C", FED SPEC 00-5-781.

ANTI-CHAFING MATERIAL: NEUTRAL BARRIER MATERIAL MIL-R-121 OR EQUAL.

**CAR EQUIPMENT REQUIRED**

ADJUSTABLE WALL MEMBERS - (SEE NOTE ①)	120
CROSS MEMBERS	20
DOORWAY MEMBERS	6

NOTE ①: FOR "DF" CARS EQUIPPED WITH FIXED WALL MEMBERS ⑥, AND DOORWAY MEMBERS ⑨, LOCATED AT THE HEIGHTS SPECIFIED IN SECTION "A-A", OMIT ALL REFERENCES TO "ADJUSTABLE" WALL MEMBERS. SEE GENERAL NOTE "A", PAGE 2.



**ISOMETRIC VIEW**

50'-8" LONG x 8'-8" WIDE (MIN INSIDE CLEARANCE) CAR EQUIPPED WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS. SEE GENERAL NOTES "A" AND "C", PAGE 2.

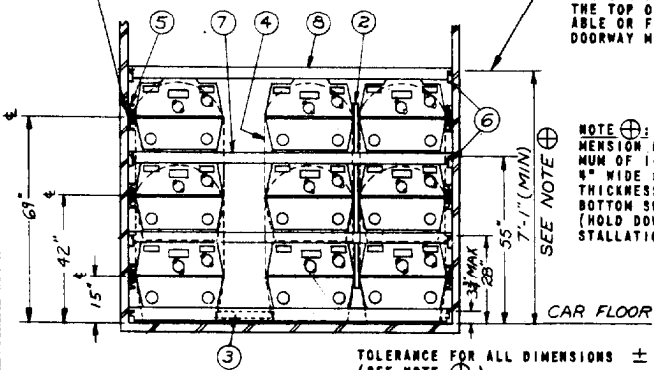
SEE GENERAL NOTES "K" AND "L", PAGE 2.

**KEY NUMBERS**

- ① 2" x 6" x CAR WIDTH (6 REED). POSITION AS SHOWN AND NAIL TO END WALL W/1-10G NAIL EVERY 12".
- ② ANTI-CHAFING BOARD (8 REED). SEE DETAIL, PAGE 5.
- ③ 2" x 6" x CUT TO FIT (DOUBLED) (8 REED). NAIL FIRST PIECE TO CAR FLOOR W/3-16d NAILS. NAIL SECOND PIECE TO FIRST IN LIKE MANNER.
- ④ STEEL STRAPPING, 1-1/4" x .035" x 15'-0" (48 REED).
- ⑤ ADJUSTABLE WALL MEMBERS (96 REED). INSTALL WITH WOOD EDGES CONTACTING EACH OTHER AT SPECIFIED HEIGHTS ABOVE THE CAR FLOOR TO PROVIDE BEARING SURFACE AGAINST CONTAINER. SEE SECTION "A-A". (4 REED PER CONTAINER AT CAR SIDE WALL). SEE NOTE ①.
- ⑥ WALL MEMBER, ADJUSTABLE OR FIXED. MUST BE LOCATED AT SPECIFIED HEIGHTS ABOVE CAR FLOOR TO PROVIDE ALIGNMENT OF CROSS MEMBERS, ⑦ AND ⑧. SEE SECTION "A-A".
- ⑦ CROSS MEMBER (12 REED). SEE GENERAL NOTE "G", PAGE 2.
- ⑧ CROSS MEMBER (HOLD DOWN) (8 REED). SEE NOTE ④.
- ⑨ DOORWAY MEMBER (6 REED). POSITION AT HEIGHTS ABOVE THE CAR FLOOR SPECIFIED IN SECTION "A-A".
- ⑩ ANTI-CHAFING, NEUTRAL BARRIER MATERIAL. PLACE UNDER STRAPPING AT POINTS OF CONTACT WITH CONTAINER.

EACH DIMENSIONED HEIGHT ABOVE THE CAR FLOOR IS SPECIFIED TO THE CONTACTING WOOD EDGES OF THE ADJUSTABLE WALL MEMBERS ⑤. SEE NOTE ① AND GENERAL NOTE "F", PAGE 2.

EACH DIMENSIONED HEIGHT ABOVE THE CAR FLOOR IS SPECIFIED TO THE TOP OF A WALL MEMBER (ADJUSTABLE OR FIXED) ⑥ AND/OR A DOORWAY MEMBER ⑨.



NOTE ④: THE 7'-1" LOCATION DIMENSION MAY BE INCREASED A MAXIMUM OF 1-3/4". FILLER MATERIAL, 4" WIDE x 12" LONG x REQUIRED THICKNESS, WILL BE NAILED TO THE BOTTOM SURFACE OF CROSS MEMBER (HOLD DOWN) ⑧ PRIOR TO INSTALLATION.

TOLERANCE FOR ALL DIMENSIONS ± 1/2" (SEE NOTE ④).

**SECTION "A-A"**

**"DF" TYPE CAR WITH ADJUSTABLE AND/OR FIXED WALL MEMBERS**

**BILL OF MATERIAL**

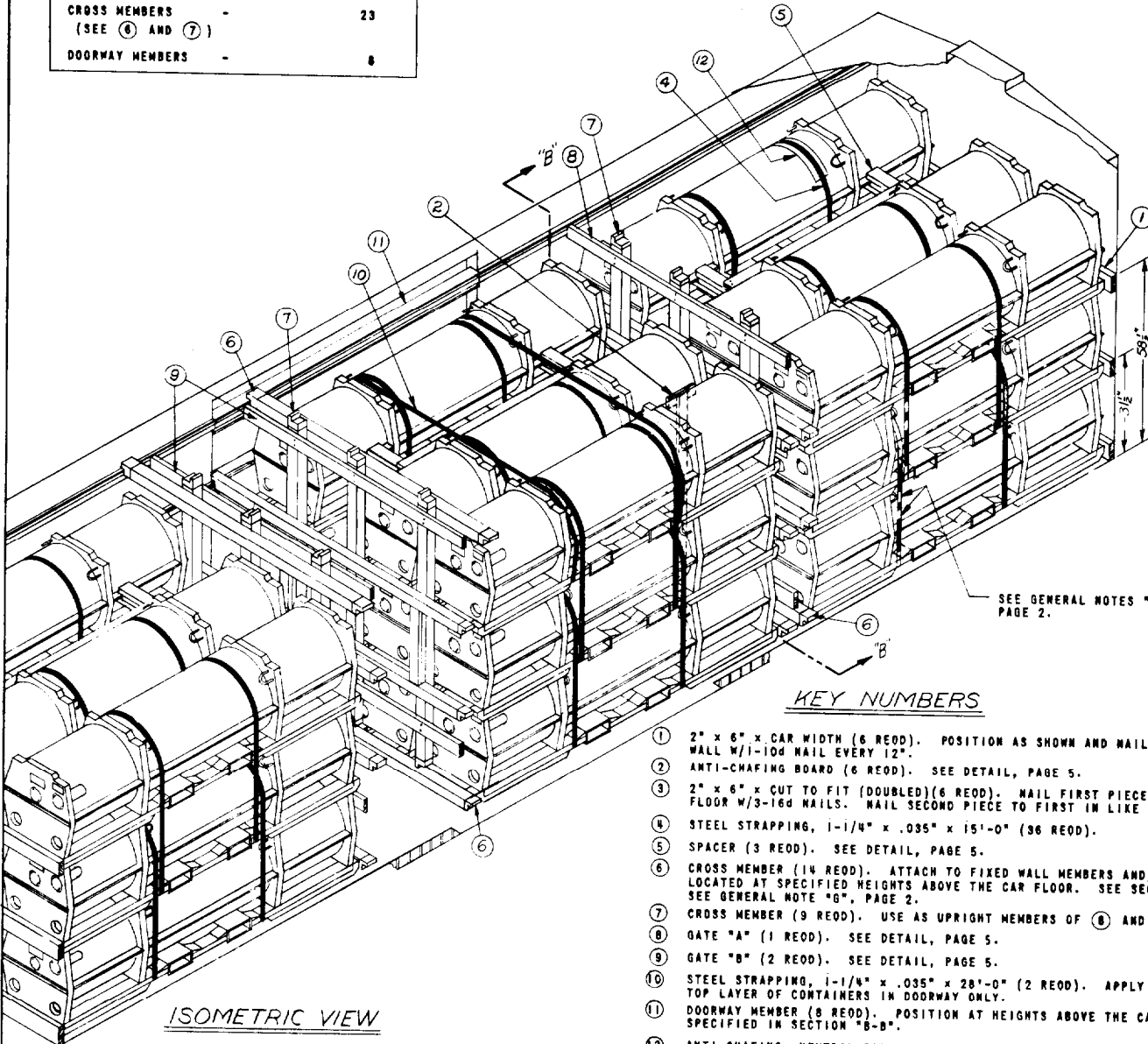
LUMBER	LINEAL FEET	BOARD FEET
2" x 4"	56	19
2" x 6"	77	77
NAILS	NO. REED	POUNDS
10d (3")	78	1
16d (3 1/2")	48	1
STRAPPING, STEEL, 1 1/4" x .035" - 720' REED -		103 LBS
ANTI-CHAFING MATERIAL - AS REED		

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT
CONTAINER, XM468	36	46,152 LBS (APPROX)
DUNNAGE		345 LBS
<b>TOTAL WEIGHT</b>		<b>46,497 LBS (APPROX)</b>

**CAR EQUIPMENT REQUIRED**

CROSS MEMBERS (SEE ④ AND ⑦)	23
DOORWAY MEMBERS	8



SEE GENERAL NOTES "K" AND "L" PAGE 2.

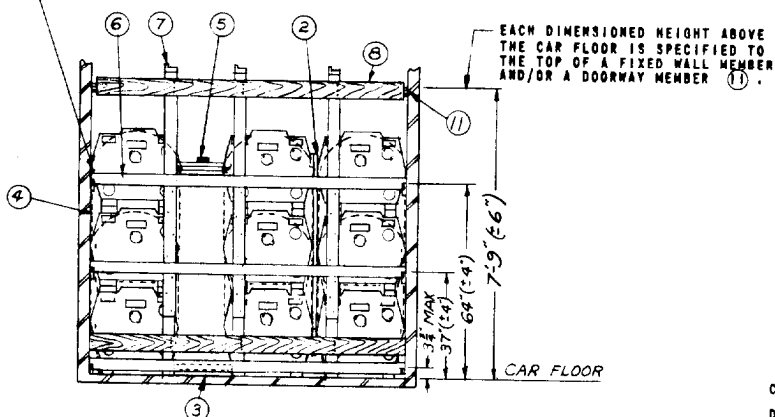
**KEY NUMBERS**

- ① 2" x 6" x CAR WIDTH (6 REOD). POSITION AS SHOWN AND NAIL TO END WALL W/1-10d NAIL EVERY 12".
- ② ANTI-CHAFING BOARD (6 REOD). SEE DETAIL, PAGE 5.
- ③ 2" x 6" x CUT TO FIT (DOUBLED)(6 REOD). NAIL FIRST PIECE TO CAR FLOOR W/3-16d NAILS. NAIL SECOND PIECE TO FIRST IN LIKE MANNER.
- ④ STEEL STRAPPING, 1-1/4" x .035" x 15'-0" (36 REOD).
- ⑤ SPACER (3 REOD). SEE DETAIL, PAGE 5.
- ⑥ CROSS MEMBER (14 REOD). ATTACH TO FIXED WALL MEMBERS AND/OR ⑪ LOCATED AT SPECIFIED HEIGHTS ABOVE THE CAR FLOOR. SEE SECTION "B-B". SEE GENERAL NOTE "G", PAGE 2.
- ⑦ CROSS MEMBER (9 REOD). USE AS UPRIGHT MEMBERS OF ⑧ AND ⑨.
- ⑧ GATE "A" (1 REOD). SEE DETAIL, PAGE 5.
- ⑨ GATE "B" (2 REOD). SEE DETAIL, PAGE 5.
- ⑩ STEEL STRAPPING, 1-1/4" x .035" x 28'-0" (2 REOD). APPLY AROUND TOP LAYER OF CONTAINERS IN DOORWAY ONLY.
- ⑪ DOORWAY MEMBER (8 REOD). POSITION AT HEIGHTS ABOVE THE CAR FLOOR SPECIFIED IN SECTION "B-B".
- ⑫ ANTI-CHAFING, NEUTRAL BARRIER MATERIAL. PLACE UNDER STRAPPING AT POINTS OF CONTACT WITH CONTAINER.

**ISOMETRIC VIEW**

40'-6" LONG x 8'-6" WIDE (MIN INSIDE CLEARANCE)  
CAR EQUIPPED WITH FIXED WALL MEMBERS. SEE GENERAL NOTES "A" AND "D", PAGE 2.

SEE GENERAL NOTE "F", PAGE 2.



EACH DIMENSIONED HEIGHT ABOVE THE CAR FLOOR IS SPECIFIED TO THE TOP OF A FIXED WALL MEMBER AND/OR A DOORWAY MEMBER ⑪.

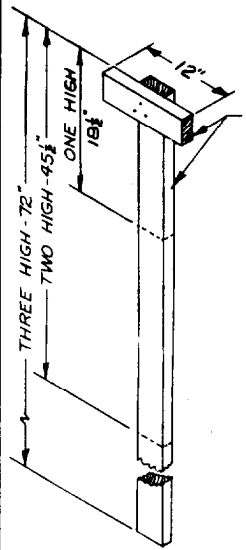
**SECTION "B-B"**

BILL OF MATERIAL		
LUMBER	LINEAL FEET	BOARD FEET
2" x 4"	129	86
2" x 6"	122	122
NAILS		
	NO. REOD	POUNDS
10d (3")	232	3-3/4
16d (3 1/4")	36	3/4
STRAPPING, STEEL, 1-1/4" x .035" - 596' REOD- 85 LBS		
ANTI-CHAFING MATERIAL - AS REOD		

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT
CONTAINER, XM468	27	34,614 LBS (APPROX)
DUNNAGE		610 LBS
<b>TOTAL WEIGHT</b>		<b>35,224 LBS (APPROX)</b>

**"DF" TYPE CAR WITH FIXED WALL MEMBERS**

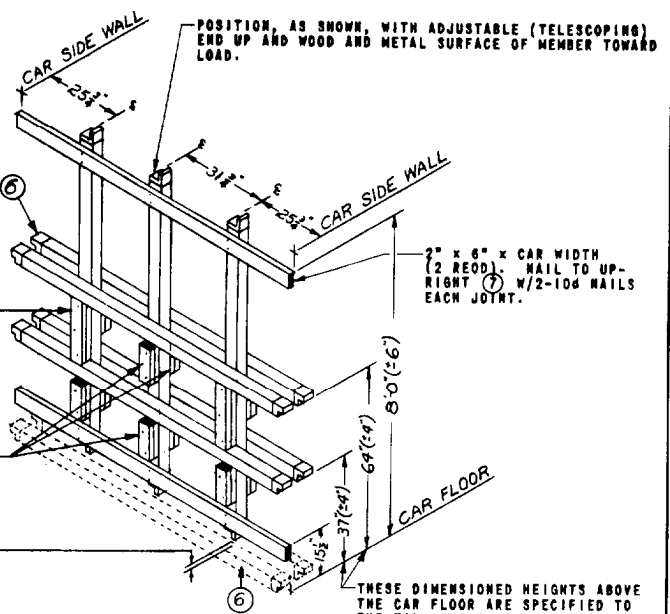


2" x 4" MATERIAL. NAIL W/3-10d NAILS.

2" x 4" x CUT TO FIT BETWEEN CROSS MEMBERS (DOUBLED) (2 REED). NAIL FIRST PIECE TO UPRIGHT ⑦ W/3-10d NAILS. NAIL SECOND PIECE TO FIRST IN LIKE MANNER.

2" x 4" x 12" (DOUBLED) (10 REED). CENTER ON CONTAINER SKID. NAIL FIRST PIECE TO UPRIGHT ⑦ W/2-10d NAILS. NAIL SECOND PIECE TO FIRST IN LIKE MANNER.

1" VERTICAL CLEARANCE BETWEEN FIXED END OF AND CROSSMEMBER ⑧.



POSITION, AS SHOWN, WITH ADJUSTABLE (TELESCOPING) END UP AND WOOD AND METAL SURFACE OF MEMBER TOWARD LOAD.

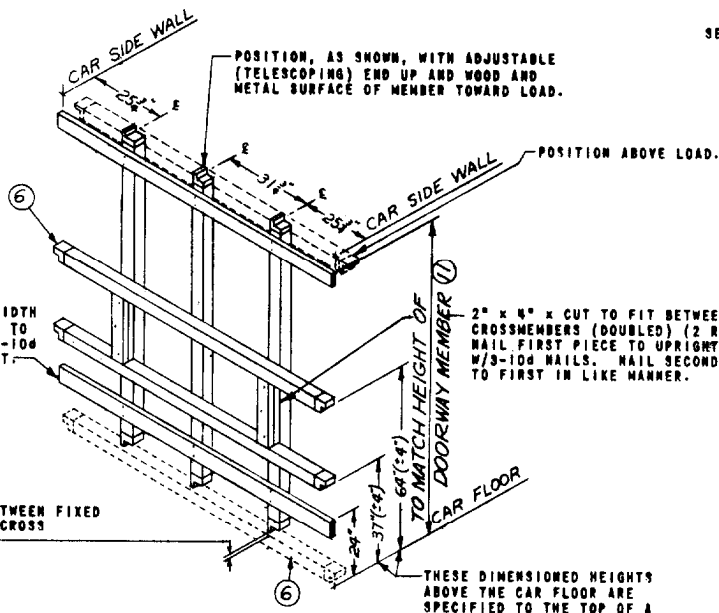
2" x 6" x CAR WIDTH (2 REED). NAIL TO UPRIGHT ⑦ W/2-10d NAILS EACH JOINT.

THESE DIMENSIONED HEIGHTS ABOVE THE CAR FLOOR ARE SPECIFIED TO THE TOP OF A FIXED WALL MEMBER AND/OR A DOORWAY MEMBER ⑪.

ANTI-CHAFING BOARD

GATE "A"

(1 REED)  
SEE NOTE Δ.



POSITION, AS SHOWN, WITH ADJUSTABLE (TELESCOPING) END UP AND WOOD AND METAL SURFACE OF MEMBER TOWARD LOAD.

POSITION ABOVE LOAD.

2" x 6" x CAR WIDTH (2 REED). NAIL TO UPRIGHT ⑦ W/2-10d NAILS EACH JOINT.

2" x 4" x CUT TO FIT BETWEEN CROSSMEMBERS (DOUBLED) (2 REED). NAIL FIRST PIECE TO UPRIGHT ⑦ W/3-10d NAILS. NAIL SECOND PIECE TO FIRST IN LIKE MANNER.

1" CLEARANCE BETWEEN FIXED END OF MEMBER ⑧ AND CROSS

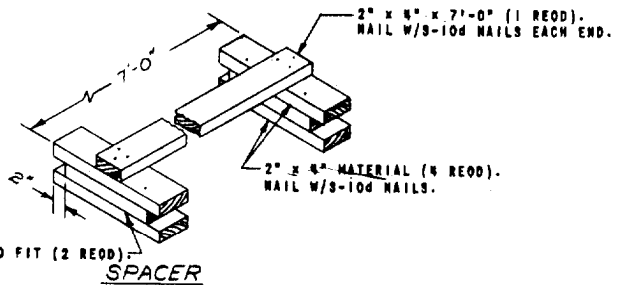
THESE DIMENSIONED HEIGHTS ABOVE THE CAR FLOOR ARE SPECIFIED TO THE TOP OF A FIXED WALL MEMBER AND/OR A DOORWAY MEMBER.

NOTE Δ.

IT IS RECOMMENDED THAT GATES ("A" AND/OR "B") BE PRE-ASSEMBLED AND INSTALLED AGAINST THE LADING AS A UNIT. DUNNAGE MATERIAL ON THE SIDE OF GATE OPPOSITE THE LADING SHOULD BE ADDED AFTER GATE HAS BEEN INSTALLED.

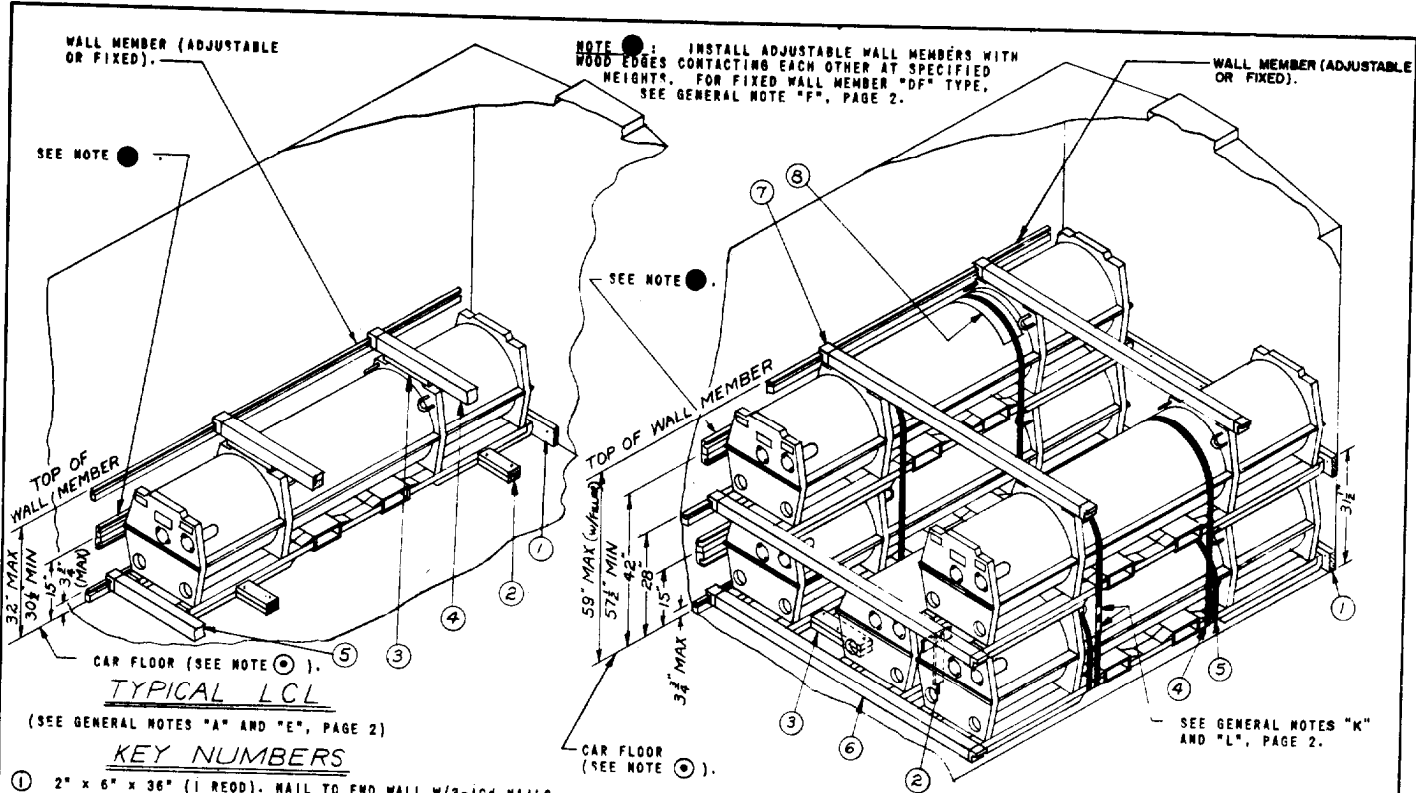
GATE "B"

(2 REED, 1 RIGHT HAND, AS SHOWN, AND 1 LEFT HAND) SEE NOTE Δ.



SPACER

DETAILS



**TYPICAL LCL**

(SEE GENERAL NOTES "A" AND "E", PAGE 2)

**KEY NUMBERS**

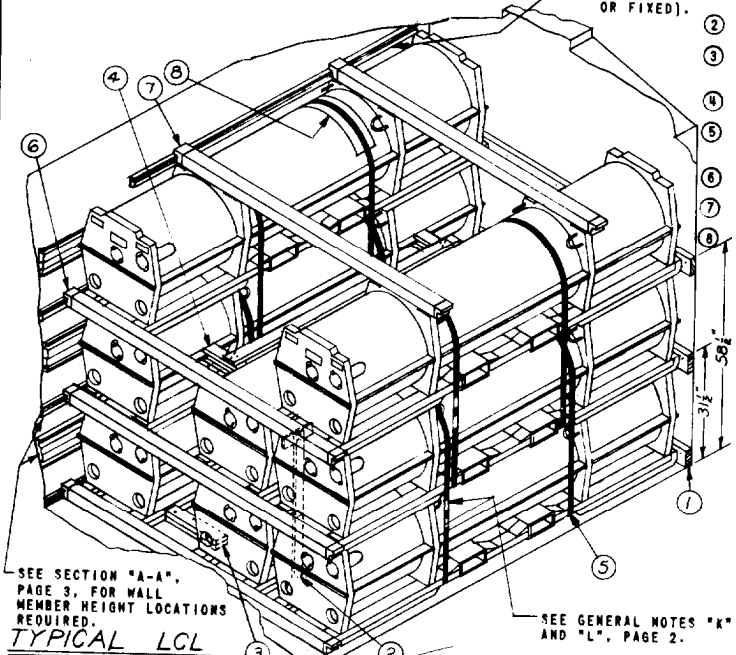
- ① 2" x 6" x 36" (1 REOD). NAIL TO END WALL W/3-10d NAILS.
- ② 2" x 6" x 12" (DOUBLED)(2 REOD). NAIL FIRST PIECE TO CAR FLOOR W/3-16d NAILS. NAIL SECOND PIECE TO FIRST IN LIKE MANNER.
- ③ FILLER MATERIAL (2 REOD), 4" WIDE x 18" LONG x REQUIRED THICKNESS. (NOMINAL 2" (1-5/8") MAXIMUM ALLOWABLE THICKNESS). NAIL TO ④ W/3-10d NAILS PRIOR TO INSTALLATION OF ④. OMIT WHEN WALL MEMBER IS AT 30-1/2" HEIGHT ABOVE CAR FLOOR.
- ④ CROSS MEMBER (HOLD DOWN) (2 REOD).
- ⑤ CROSS MEMBER (1 REOD). SEE GENERAL NOTE "G", PAGE 2.

**TYPICAL LCL**

(SEE GENERAL NOTES "A" AND "E", PAGE 2)

**KEY NUMBERS**

- ① 2" x 6" x CAR WIDTH (2 REOD). POSITION AS SHOWN AND NAIL TO END WALL W/1-10d NAIL EVERY 12".
- ② ANTI-CHAFING BOARD (2 REOD). 18 1/2" LONG. SEE DETAIL, PAGE 5.
- ③ 2" x 6" x CUT TO FIT (DOUBLED)(2 REOD). NAIL FIRST PIECE TO CAR FLOOR W/3-16d NAILS. NAIL SECOND PIECE TO FIRST IN LIKE MANNER.
- ④ STRAPPING, STEEL, 1-1/4" x .035" x 15'-0" (4 REOD).
- ⑤ STRAPPING, STEEL, 1-1/4" x .035" x 15'-0" (2 REOD). APPLY AS SHOWN AROUND TWO (2) ADJACENT CONTAINERS IN THE FIRST LAYER.
- ⑥ CROSS MEMBER (2 REOD). SEE GENERAL NOTE "G", PAGE 2.
- ⑦ CROSS MEMBER (HOLD DOWN)(2 REOD).
- ⑧ ANTI-CHAFING BARRIER MATERIAL. PLACE UNDER STRAPPING ④ AND ⑤ AT ALL POINTS OF CONTACT WITH CONTAINER.



**TYPICAL LCL**

(SEE GENERAL NOTES "A" AND "E", PAGE 2).

**KEY NUMBERS**

- ① 2" x 6" x CAR WIDTH (3 REOD). POSITION AS SHOWN AND NAIL TO END WALL W/1-10d NAIL EVERY 12".
- ② ANTI-CHAFING BOARD (2 REOD). 45-1/2" LONG. SEE DETAIL, PAGE 5.
- ③ 2" x 6" x CUT TO FIT (DOUBLED)(2 REOD). NAIL FIRST PIECE TO CAR FLOOR W/3-16d NAILS. NAIL SECOND PIECE TO FIRST IN LIKE MANNER.
- ④ SPACER (1 REOD) SEE DETAIL, PAGE 5.
- ⑤ STRAPPING, STEEL, 1-1/4" x .035" x 15'-0" (10 REOD).
- ⑥ CROSS MEMBER (3 REOD). SEE GENERAL NOTE "G", PAGE 2.
- ⑦ CROSS MEMBER (HOLD DOWN) (2 REOD).
- ⑧ ANTI-CHAFING, NEUTRAL BARRIER MATERIAL. PLACE UNDER STRAPPING ⑤ AT ALL POINTS OF CONTACT WITH CONTAINER.

**TYPICAL LCL METHODS**