


# LANCE

## LOADING AND BRACING (CL & LCL) ON EUROPEAN RAILCAR OF THE MAIN ASSEMBLAGE, M5, PACKED IN THE M599 CONTAINER

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 DELINEATED LOADING AND BRACING PROCEDURES COMPLY  
 WITH THE REGOLAMENTO INTERNAZIONALE VEICOLI (RIV):  
 REGULATIONS GOVERNING THE RECIPROCAL USE OF WAGONS  
 IN INTERNATIONAL TRAFFIC.

NOTICE: DEPICTED LOADS ARE NOT OVERSIZE.

REVISIONS				DRAFTSMAN 92 Dec	PROJ ENR MWD/hww	SCM-LOG idm/1110
1	MAR 76	<i>Wesley E. Gilliland</i>	<i>Wesley E. Gilliland</i>	ENGINEER K.B. BODS	LOG ENGINE OFFICE <i>John Byrd</i>	APPROVED <i>M.B.</i>
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				U. S. ARMY MATERIEL COMMAND JUNE 1973		
				CLASS	DIVISION	DRAWING
				19	48	5502
						FILE GM 5LC2

**DO NOT SCALE**

**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 SHOWN HEREIN ARE APPLICABLE TO EUROPEAN RAILCARS WHICH CONFORM TO THE RIV REQUIREMENTS.
- C. THE LOAD AS SHOWN ON PAGES 4 AND 5 IS BASED ON RIV RAILCARS ( KBS 442/443 AND KLS 442/443 ) 41'-0-1/8" ( 12,500 MM ) LONG BY 9'-1-3/64" ( 2,770 MM ) WIDE WITH 18" ( 457 MM ) HIGH CAR SIDES.
- D. THE OUTLOADING PROCEDURES SPECIFIED IN THIS DRAWING ARE APPLICABLE TO THE M5 MAIN ASSEMBLAGE PACKED IN THE M599 CONTAINER. SUBSEQUENT REFERENCE TO A CONTAINER HEREIN MEANS THE CONTAINER WITH THE M5 MAIN ASSEMBLAGE.
- E. THE MAIN ASSEMBLAGE IS AN EXPLOSIVE ITEM. THESE PROCEDURES CAN ALSO BE UTILIZED FOR THE SHIPMENT OF THE CONTAINER WHEN IT IS LOADED WITH AN ITEM OTHER THAN THE MAIN ASSEMBLAGE, OR WHEN THEY ARE EMPTY. FOR REFERENCE PURPOSES, THIS ITEM IS A DOT CLASS "B" EXPLOSIVE WITHIN CONUS.
- F. FOR DETAILS OF THE M599 CONTAINER, SEE DRAWING NO. 10161905.

CONTAINER DIMENSIONS --- 161" ( 4,089 MM ) LONG BY 39" ( 991 MM ) WIDE BY 43" ( 1,092 MM ) HIGH.

GROSS WEIGHT ----- 3,993 POUNDS ( 1,811 KG ) ( APPROX ).

- G. A LIST OF RAILCARS THAT MAY BE USED FOR SHIPMENTS OF THE DEPICTED LOADS IS SHOWN IN A CHART ON THIS PAGE. OTHER TYPES OF RAILCARS CAN BE USED PROVIDING THESE OTHER CARS ARE PROPERLY EQUIPPED FOR THE APPLICATION OF THE PRESCRIBED LOAD-SECURING BLOCKING IN ACCORDANCE WITH THE SPECIFIED PROCEDURES. MINOR DEVIATIONS FROM THE LOCATIONS SHOWN IN THE LOAD VIEWS FOR INSTALLING BLOCKING AND TIE DOWN COMPONENTS ON A CAR ARE PERMITTED. HOWEVER, THE INTENT OF THE SPECIFIED BLOCKING PROCEDURES MUST BE ACHIEVED.
- H. REMOVE ALL POSTS FROM SIDE OF CAR AND PLACE IN RACKS UNDER CAR, IF APPLICABLE.
- J. THE NUMBER OF UNITS MAY BE ADJUSTED TO FIT THE RAILCAR CONCERNED, OR THE QUANTITY TO BE SHIPPED; HOWEVER, THE APPROVED METHODS CONTAINED HEREIN, FOR FULL OR PARTIAL CARLOAD, MUST BE FOLLOWED FOR BLOCKING, BRACING, AND STAYING OF THIS ITEM.
- K. OTHER TYPES OF LADING ITEMS MAY BE LOADED ON A CAR WHICH IS PARTIALLY LOADED WITH THE DESIGNATED ITEM, 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.
- L. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER-END LAP JOINT, A MINIMUM OF TWO ( 2 ) SEALS, BUTTED TOGETHER, WITH TWO ( 2 ) PAIR OF CRIMPS PER SEAL MUST BE USED TO SEAL THE JOINT.
- M. 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 OF THE RAILCAR, OR WHEN LAMINATING DUNNAGE. THE NAILING PATTERN WILL BE ADJUSTED AS REQUIRED, SO THAT A NAIL DOES NOT PENETRATE INTO OR NEAR A CRACK BETWEEN FLOOR BOARDS. 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.
- N. NAILS USED FOR FLOOR LINE BLOCKING WILL HAVE A MINIMUM DIAMETER OF 5 MM. NAIL SIZES WILL BE SELECTED TO PROVIDE A MINIMUM OF 40 MM PENETRATION INTO THE CAR FLOOR. HOWEVER, THE LENGTH OF THE NAIL WILL BE SUCH THAT THE NAIL DOES NOT COMPLETELY PENETRATE THE CAR FLOOR. SEE THE "NAIL CHART" AND THE "SPECIAL NAILING GUIDANCE" ON PAGE 3. NAILS WHICH ARE OF OTHER SIZES, OR WHICH HAVE A NOMENCLATURE DIFFERENT THAN THAT USED HEREIN, MAY ALSO BE USED PROVIDED THEY MEET THE MINIMUM REQUIREMENTS STIPULATED WITHIN THIS DOCUMENT.
- O. NAILS USED FOR FABRICATING DUNNAGE ASSEMBLIES SHALL BE OF THE MAXIMUM PRACTICAL LENGTH WHICH WILL PREVENT THE NAIL POINT FROM COMPLETELY PENETRATING THE DUNNAGE ASSEMBLY. THE NAIL POINT IS TO BE CONCEALED WITHIN THE DUNNAGE ASSEMBLY TO PREVENT POSSIBLE DAMAGE TO THE LADING.

( CONTINUED AT RIGHT )

**MATERIAL SPECIFICATIONS**

- LUMBER** ----- : DOUGLAS FIR OR COMPARABLE LUMBER WITH STRAIGHT GRAIN AND FREE FROM MATERIAL DEFECTS. REF: FED SPEC MM-L-751.
- NAILS** ----- : COMMON, CEMENT COATED OR CHEMICALLY ETCHED. REF: FED SPEC FF-N-105. ALT: ANNULAR-RING TYPE NAIL OF THE SAME SIZE.
- STRAPPING, STEEL** --- : CLASS I, TYPE I OR IV, HEAVY DUTY, FINISH A, B ( GRADE 2 ), OR C. REF: FED SPEC QQ-S-781.
- STRAP SEAL** ----- : TYPE D, STYLE I, II, OR IV, CLASS H, REF: FED SPEC QQ-S-781.

**( GENERAL NOTES CONTINUED )**

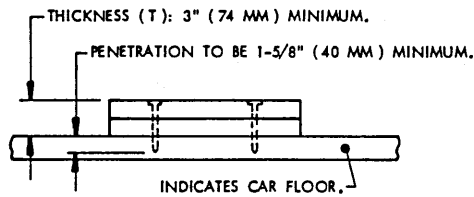
- P. THE PROCEDURES DEPICTED WITHIN THIS DRAWING ARE BASED ON THE USE OF DIMENSIONAL SIZED LUMBER. IN MOST CASES THE METRIC EQUIVALENT IS GIVEN IN PARENTHESIS FOLLOWING THE DIMENSION. HOWEVER, WHERE THE METRIC EQUIVALENT IS NOT SHOWN, IT MAY BE COMPUTED BY USING 1" EQUALS 25.4 MM. METRIC EQUIVALENTS FOR WEIGHTS ARE BASED ON 1 LB EQUALS 0.454 KG. METRIC EQUIVALENTS FOR TORQUE ARE BASED ON 1 FOOT-POUND EQUALS 0.7376 NEWTON-METERS.
- Q. STEEL STRAPPING DEPICTED IN THIS DRAWING HAS BEEN SPECIFIED AS 1-1/4" ( 32 MM ) X .035" ( .889 MM ). HOWEVER, .031" ( .787 MM ) THICK STRAP MAY BE USED IN LIEU OF .035" THICK STRAP.

LIST OF RAILCARS THAT MAY BE USED FOR SHIPMENTS			
TYPE OF RAILCAR	LENGTH OF RAILCAR	ITEMS	TOTAL WEIGHT ( APPROX ) OF ITEMS
KLMS --440	34'-11-11/16" ( 10,660 MM )	4	15,972 LBS ( 7,247 KG )
KLM --505	30'-4-9/16" ( 9,260 MM )	2	7,986 LBS ( 3,623 KG )
KLM --506	34'-8-1/2" ( 10,580 MM )	4	15,972 LBS ( 7,247 KG )
KBS ---442/443	41'-0-1/8" ( 12,500 MM )	4	15,972 LBS ( 7,247 KG )
KLS ---442/443	41'-0-1/8" ( 12,500 MM )	4	15,972 LBS ( 7,247 KG )
RMMS --663/664	41'-5-51/64" ( 12,644 MM )	4	15,972 LBS ( 7,247 KG )
RS ---680/681	60'-8-23/64" ( 18,500 MM )	6	23,958 LBS ( 10,870 KG )
RS ---683/684	60'-8-23/64" ( 18,500 MM )	6	23,958 LBS ( 10,870 KG )
SAS ---710	49'-2-9/16" ( 15,000 MM )	4	15,972 LBS ( 7,247 KG )

**REVISIONS**

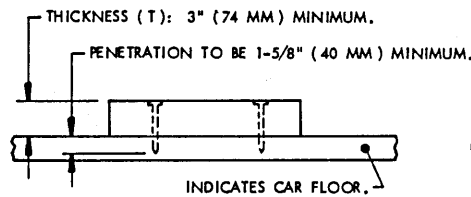
REVISION NO. 1, DATED MARCH 1976, CONSISTS OF:

1. UPDATING THE GENERAL NOTES.
2. UPDATING THE DRAWING FORMAT.



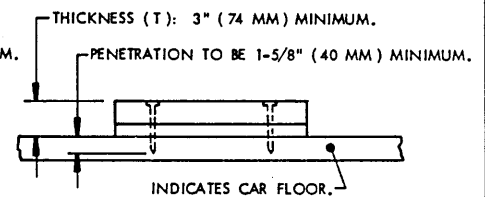
**DOUBLED 2' X 6' LUMBER SHOWN**

DETAIL A



**4' X 6' LUMBER SHOWN**

DETAIL B



**MIXED THICKNESSES OF LUMBER SHOWN**

DETAIL C

**TYPICAL NAILING OF FLOOR LINE BLOCKING TO CAR FLOOR**

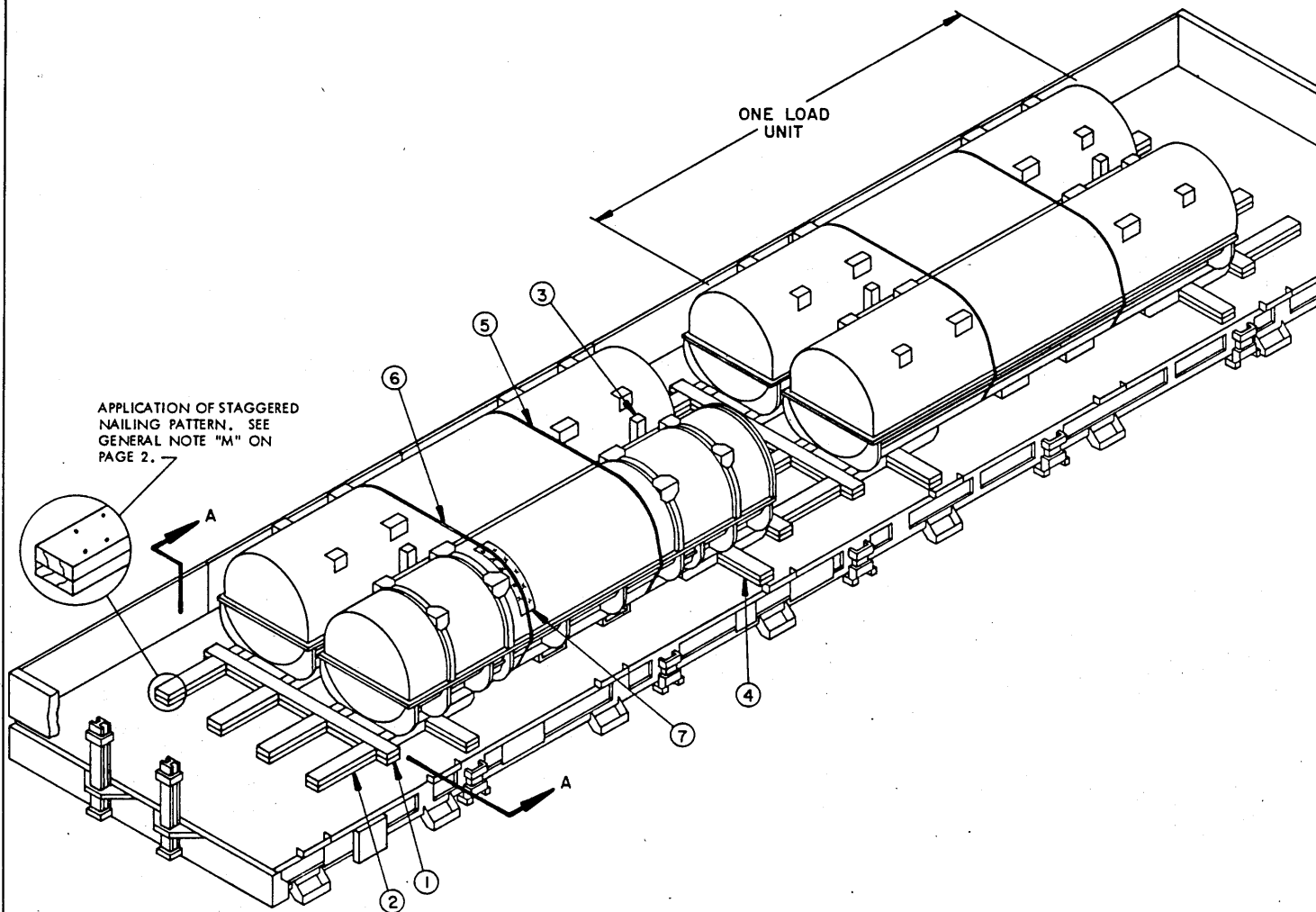
**SPECIAL NOTES:**

1. THE DETAILS ON THIS PAGE DEPICT POSSIBLE VARIATIONS THAT MAY RESULT FROM USING AVAILABLE LUMBER FOR FLOOR LINE BLOCKING. KEY NUMBERS THROUGHOUT THIS DOCUMENT SPECIFY DOUBLED PIECES OF LUMBER WHICH ARE 2" X 6" IN SIZE FOR HEADERS, BACK-UP CLEATS, AND SIDE-BLOCKING, AS TYPICALLY SHOWN IN DETAIL A ABOVE. IT IS PERMISSIBLE TO USE 4" X 6" LUMBER, OR MIXED THICKNESSES OF LUMBER, AS TYPICALLY SHOWN IN DETAILS B AND C, IN LIEU OF THE SPECIFIED DOUBLED 2" X 6" LUMBER. THE INTENT OF THE SPECIFIED BLOCKING PROCEDURE MUST BE OBTAINED.
2. THE NUMBER OF NAILS USED TO SECURE EACH PIECE OF BLOCKING WILL BE AS SPECIFIED IN THE KEY NUMBERS FOR EACH SPECIFIC PROCEDURE. THE LENGTH OF THE NAILS SELECTED WILL BE ADEQUATE TO NAIL THROUGH THE BLOCKING AND ACHIEVE THE PENETRATION OF THE CAR FLOOR AS SPECIFIED. WHEN NAILING FLOOR LINE BLOCKING TO THE CAR FLOOR, AS DEPICTED IN DETAILS A, B, AND C, THE FOLLOWING APPLIES:

THICKNESS (T) OF BLOCKING		SIZE OF NAIL
MINIMUM	MAXIMUM	
3" ( 74 MM )	3" ( 74 MM )	30d (4-1/2") (114 MM)
3" ( 74 MM )	3-3/8" ( 87 MM )	40d (5") (127 MM)
3-3/8" ( 87 MM )	4" (100 MM)	50d (5-1/2") (140 MM)
4" (100 MM)	4-3/8" (112 MM)	60d (6") (152 MM)

NAIL CHART		
SIZE	LENGTH	DIAMETER
10d	3" ( 76 MM )	0.1483" (3.77 MM)
12d	3-1/4" ( 83 MM )	0.1483" (3.77 MM)
16d	3-1/2" ( 89 MM )	0.1620" (4.11 MM)
20d	4" ( 102 MM )	0.1920" (4.88 MM)
30d *	4-1/2" ( 114 MM )	0.2070" (5.26 MM)
40d *	5" ( 127 MM )	0.2253" (5.72 MM)
50d *	5-1/2" ( 140 MM )	0.2437" (6.19 MM)
60d *	6" ( 152 MM )	0.2625" (6.67 MM)

\* NAILS WHICH HAVE ADEQUATE DIAMETER FOR NAILING FLOOR LINE BLOCKING. THE LENGTH OF THE NAIL MUST MEET THE REQUIREMENTS OF GENERAL NOTE "N"

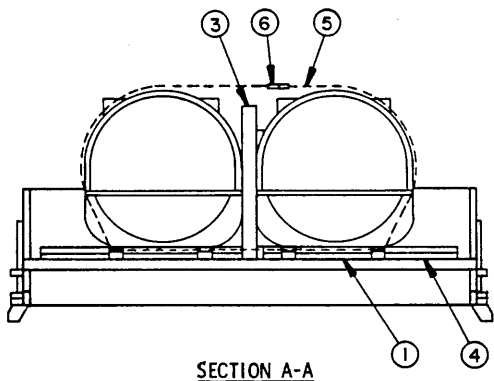


APPLICATION OF STAGGERED  
NAILING PATTERN. SEE  
GENERAL NOTE "M" ON  
PAGE 2.

ISOMETRIC VIEW

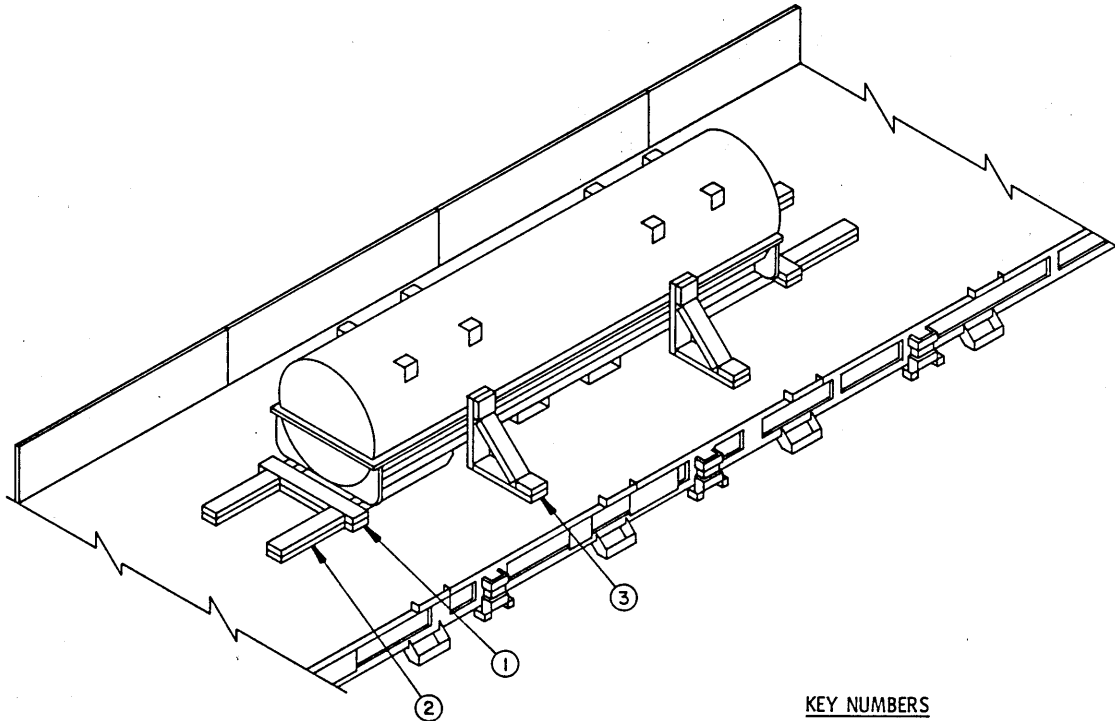
KEY NUMBERS

- ① HEADER, 2" X 6" X 6'-6" (51 MM X 152 MM X 1,981 MM) (DOUBLED) (4 REQD). POSITION AS SHOWN, PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/16 NAILS. SEE GENERAL NOTES "M", "N" AND "P" ON PAGE 2.
- ② BACK-UP CLEAT, 2" X 6" X 22" (51 MM X 152 MM X 559 MM) (DOUBLED) (12 REQD). POSITION AS SHOWN TO ALIGN WITH A CONTAINER SKID. PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/9 NAILS.
- ③ ANTI-CHAFING ASSEMBLY (2 REQD). SEE THE "ANTI-CHAFING ASSEMBLY" DETAIL ON PAGE 5. POSITION ONE ASSEMBLY BETWEEN TWO LATERALLY ADJACENT CONTAINERS, AS SHOWN.
- ④ SIDE BLOCKING, 2" X 6" X 18" (51 MM X 152 MM X 457 MM) (DOUBLED) (8 REQD). POSITION AGAINST A CONTAINER SKID, AS SHOWN. PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/3 NAILS.
- ⑤ BUNDLING STRAP, 1-1/4" X .035" X 24'-0" LONG STEEL STRAPPING (4 REQD). INSTALL TWO STRAPS AROUND EACH LOAD UNIT OF TWO LATERALLY ADJACENT CONTAINERS, AS SHOWN. SEE GENERAL NOTE "Q" ON PAGE 2.
- ⑥ SEAL FOR 1-1/4" STRAPPING (8 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "L" ON PAGE 2.
- ⑦ ANTI-CHAFING, NEUTRAL BARRIER MATERIAL (AS REQD). POSITION UNDER STRAPPING AT ALL POINTS OF CONTACT WITH THE CONTAINERS.



SECTION A-A





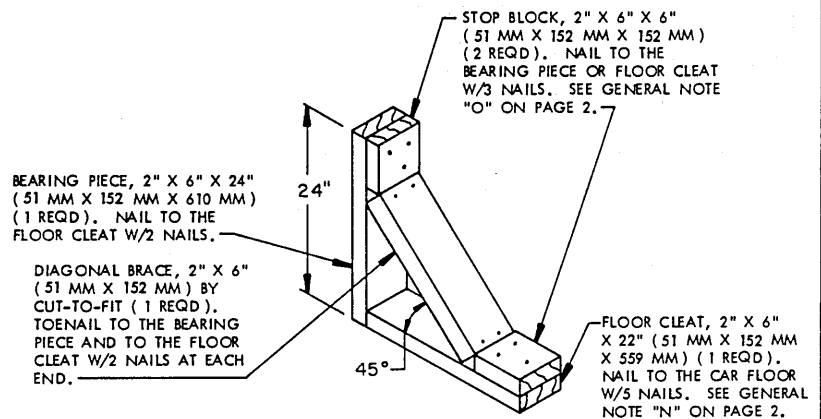
**ISOMETRIC VIEW**

**SPECIAL NOTES:**

1. A ONE-UNIT LOAD IS SHOWN. ANY CAR WITH A NAILABLE FLOOR 7'-6" (2,286 MM) WIDE (MINIMUM) MAY BE USED FOR SHIPMENT OF A ONE-UNIT LOAD.
2. THE PROCEDURES SHOWN FOR A ONE-UNIT LOAD MAY BE USED IN CONJUNCTION WITH THE PROCEDURES SHOWN ON PAGE 4 TO PROVIDE FOR THE SHIPMENT OF VARIOUS QUANTITIES OF CONTAINERS.

**KEY NUMBERS**

- ① HEADER, 2" X 6" X 36" (51 MM X 152 MM X 914 MM) (DOUBLED) (2 REQD). POSITION AS SHOWN, PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES INTO THE CAR FLOOR W/8 NAILS. SEE GENERAL NOTES "M" AND "N" ON PAGE 2.
- ② BACK-UP CLEAT, 2" X 6" X 22" (51 MM X 152 MM X 559 MM) (DOUBLED) (4 REQD). POSITION AS SHOWN TO ALIGN WITH A CONTAINER SKID. PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/9 NAILS.
- ③ ANTI-SWAY BRACE (4 REQD). SEE THE "ANTI-SWAY BRACE" DETAIL BELOW. POSITION AGAINST THE CONTAINER AS SHOWN AND NAIL TO THE CAR FLOOR W/5 NAILS.



**ANTI-SWAY BRACE**