

HAWK

LOADING AND BRACING ON EUROPEAN RAILCAR OF BATTERY CONTROL CENTRAL, SIMULATOR STATION, AND SHOP EQUIPMENT

⊙ 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.

DO NOT SCALE

REVISIONS				DRAFTSMAN <i>PB/Max</i>	PROJ. ENG. <i>JNW/MW</i>	AMSHI-SP <i>SP-7</i>
				CHECKER <i>RSW/ABC</i>	LOC. ENGRG. OFFICE <i>John Bayne</i>	
				APPROVED <i>Wesley E. Gilleland</i>		
				APPROVED BY ORDER OF COMMANDING GENERAL U. S. ARMY MATERIEL COMMAND		
				<i>AT Ehinger</i>		
				U.S. ARMY MATERIEL COMMAND USAMC AMMO CENTER		
				APRIL 1976		
				CLASS	DIVISION	DRAWING
				19	48	7815
						GSE 5HA62

GENERAL NOTES

(GENERAL NOTES CONTINUED)

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1.
- B. THE OUTLOADING PROCEDURES SHOWN HEREIN ARE APPLICABLE TO EUROPEAN RAILCARS, WHICH CONFORM TO RIV REQUIREMENTS.
- C. THE LOADS AS SHOWN ON PAGES 4 THRU 8 ARE BASED ON RIV RAILCARS (K85 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) CAR SIDES. ADDITIONAL UNITS OR OTHER ITEMS MAY BE LOADED ON THE CAR, WITH THE VIEW TOWARD FULL UTILIZATION OF CARRIER EQUIPMENT.
- D. FOR LOADING DATA, SEE THE CHART ON PAGE 3.
- E. A LIST OF RAILCARS THAT MAY BE USED FOR SHIPMENTS OF THE DEPICTED LOAD IS SHOWN IN THE 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.
- F. REMOVE ALL POSTS FROM SIDE OF CAR AND PLACE IN RACKS UNDER CAR, IF APPLICABLE.
- G. 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.

- N. 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 POUND EQUALS 0.454 KG. METRIC EQUIVALENTS FOR TORQUE ARE BASED ON 1 FOOT-POUND EQUALS 0.7376 NEWTON-METERS.
- O. 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.

- H. **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.
- J. 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" AT THE RIGHT AND THE "TYPICAL NAILING OF FLOOR LINE BLOCKING TO CAR FLOOR" DETAIL ON PAGE 8. 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.
- K. 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 DAMAGE TO THE LADING.
- L. WHEN STEEL STRAPPING IS SEALED AT AN END-OVER 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. STEEL WIRE USED FOR HOLD-DOWNS MUST HAVE A MINIMUM DIAMETER OF 3 MM. WHERE REQUIRED WITHIN THIS DOCUMENT, NO. 8 GAGE BLACK ANNEALED WIRE HAS BEEN SPECIFIED FOR WIRE HOLD-DOWNS. IF DESIRED, OR IF NO. 8 GAGE WIRE IS NOT AVAILABLE, WIRE OF A LARGER DIAMETER, OR 3/8" (OR LARGER) STEEL WIRE ROPE, MAY BE SUBSTITUTED.

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 "J".

(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.
- WIRE** ----- : ANNEALED, BLACK. REF: FED SPEC QQ-W-461.
- EDGE PROTECTOR** ----- : COMMERCIAL GRADE.
- ROPE** ----- : STEEL WIRE, PLAIN, PREFORMED, REGULAR LAY. REF: FED SPEC RR-W-410.
- CLIP** ----- : "U" BOLT, CROSBY, HEAVY DUTY (OR EQUAL). REF: FED SPEC FF-C-450, TYPE I, CLASS I.

LIST OF RAILCARS THAT MAY BE USED FOR SHIPMENTS			
TYPE OF RAILCAR	LENGTH OF RAILCAR	NO. OF ITEMS	MAXIMUM TOTAL WEIGHT (APPROX) OF ITEMS **
KLMS--440	34'-11-11/16" (10,660 MM)	1	8,100 LBS (3,682 KG)
KLM---505	30'-4-9/16" (9,260 MM)	1	8,100 LBS (3,682 KG)
KLM---506	34'-8-1/2" (10,580 MM)	1	8,100 LBS (3,682 KG)
K85---442/443	41'-0-1/8" (12,500 MM)	1	8,100 LBS (3,682 KG)
KLS---442/443	41'-0-1/8" (12,500 MM)	1	8,100 LBS (3,682 KG)
RMMS--663/664	41'-5-51/64" (12,644 MM)	1	8,100 LBS (3,682 KG)
RS----680/681	60'-8-23/64" (18,500 MM)	2	16,200 LBS (7,364 KG)
RS----683/684	60'-8-23/64" (18,500 MM)	2	16,200 LBS (7,364 KG)
SAS--710	49'-2-9/16" (15,000 MM)	2	16,200 LBS (7,364 KG)

** SEE THE "LOADING DATA CHART" ON PAGE 3 FOR THE WEIGHT OF SPECIFIC ITEMS.

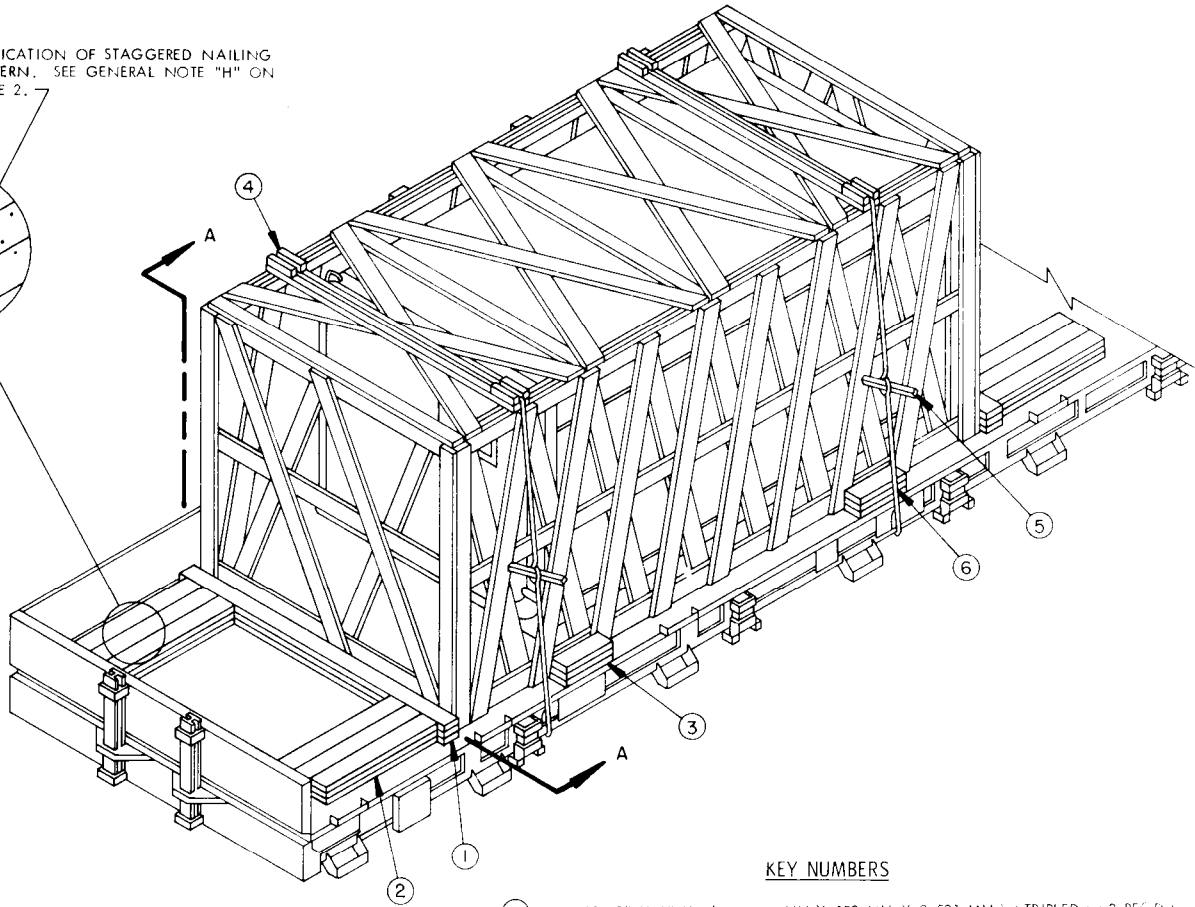
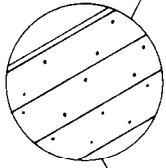
NOTICE: WHEN SHIPPING THE CRATED AN/TSM-107 SHOP EQUIPMENT AND ACCESSORY ITEMS, A CAR OF 41'-0-1/8" (12,500 MM) IN LENGTH IS THE MINIMUM LENGTH CAR THAT CAN BE USED. ALSO, ONLY ONE CRATE WITH ACCESSORY ITEMS CAN BE LOADED ON A CAR.

LADING DATA CHART (CRATED)

ITEM	LENGTH		WIDTH		HEIGHT		WEIGHT		
	FT-IN	(MM)	FT-IN	(MM)	FT-IN	(MM)	LBS	(KG)	
ITEM 1	CENTRAL, BATTERY CONTROL AN/TSW-2 AND/OR AN/TSW-8		16'-5"	(5,004)	8'-1"	(2,464)	7'-8"	(2,337)	7,470 (3,400)
ITEM 2	SIMULATOR STATION AN/TPQ-21 AND/OR AN/TPQ-29		16'-5"	(5,004)	8'-1"	(2,464)	7'-8"	(2,337)	7,800 (3,545)
ITEM 3	SHOP EQUIPMENT (SHOP 1) AN/TSM-88		15'-0"	(4,572)	8'-1"	(2,464)	7'-8"	(2,337)	5,055 (2,298)
	AN/TSM-106*		15'-0"	(4,572)	8'-1"	(2,464)	7'-8"	(2,337)	7,285 (3,311)
ITEM 4	SHOP EQUIPMENT (SHOP 2) AN/TSM-41		16'-5"	(5,004)	8'-1"	(2,464)	7'-8"	(2,337)	7,659 (3,481)
	AN/TSM-108		16'-5"	(5,004)	8'-1"	(2,464)	7'-8"	(2,337)	7,530 (3,423)
ITEM 5	SHOP EQUIPMENT (SHOP 3) AN/TSM-42		16'-5"	(5,004)	8'-1"	(2,464)	7'-8"	(2,337)	7,726 (3,512)
	AN/TSM-90		16'-5"	(5,004)	8'-1"	(2,464)	7'-8"	(2,337)	7,280 (3,309)
	AN/TSM-104*		16'-5"	(5,004)	8'-1"	(2,464)	7'-8"	(2,337)	7,938 (3,608)
ITEM 6	SHOP EQUIPMENT (SHOP 4) AN/TSM-43		16'-5"	(5,004)	8'-1"	(2,464)	7'-8"	(2,337)	7,617 (3,462)
	AN/TSM-91		16'-5"	(5,004)	8'-1"	(2,464)	7'-8"	(2,337)	7,351 (3,341)
ITEM 7	SHOP EQUIPMENT (SHOP 5) M2E2		16'-5"	(5,004)	8'-1"	(2,464)	7'-8"	(2,337)	8,100 (3,682)
ITEM 8	SHOP EQUIPMENT (SHOP 6) AN/TSM-45		16'-5"	(5,004)	8'-1"	(2,464)	7'-8"	(2,337)	7,900 (3,590)
	AN/TSM-92		16'-5"	(5,004)	8'-1"	(2,464)	7'-8"	(2,337)	7,480 (3,400)
ITEM 9	SHOP EQUIPMENT (SHOP 7) AN/TSM-40		16'-5"	(5,004)	8'-1"	(2,464)	7'-8"	(2,337)	7,900 (3,590)
ITEM 10	SHOP EQUIPMENT (SHOP 8) AN/TSM-107*		16'-5"	(5,004)	8'-1"	(2,464)	7'-8"	(2,337)	7,873 (3,580)
ITEM 11	SHOP EQUIPMENT (SHOP 9) AN/TSM-121		16'-5"	(5,004)	8'-1"	(2,464)	7'-8"	(2,337)	6,715 (3,052)
ITEM 12	SHOP EQUIPMENT (MOBILE TEAM) AN/TSM-89 AND/OR AN/TSM-105		16'-5"	(5,004)	8'-1"	(2,464)	7'-8"	(2,337)	7,945 (3,611)
	ACCESSORY ITEM FOR THE AN/TSM-104 WOODEN BOX		28-1/4"	(718)	28-1/4"	(718)	9-3/4"	(248)	122 (56)
	ACCESSORY ITEMS FOR THE AN/TSM-106 BOX NUMBER 1		45-3/4"	(1,163)	30-1/4"	(769)	36-1/2"	(928)	315 (143)
	BOX NUMBER 2		35-3/4"	(909)	22-3/8"	(569)	31-3/8"	(797)	200 (91)
	ACCESSORY ITEMS FOR THE AN/TSM-107								
	1	BORESIGHT FIXTURE AND CASE	8'-9-5/8"	(2,683)	24-1/2"	(623)	28"	(712)	542 (246)
	2	DUMMY LOAD CASE	50"	(1,270)	35"	(889)	18-7/8"	(480)	223 (102)
	3	ANTENNA MAST GROUP CASE	66-1/4"	(1,683)	34-1/2"	(877)	17-1/4"	(439)	189 (86)
	4	CABLE ASSEMBLY AND REEL (10110319)	29-3/4"	(1,756)	29-3/4"	(756)	20-1/4"	(515)	167 (76)
	5	CONSOLIDATED ITEMS	42-1/4"	(1,074)	33"	(839)	23"	(585)	137 (72)
	6	FILTER UNIT	51-1/4"	(1,302)	36-1/8"	(918)	44-1/8"	(1,121)	520 (236)
	7	CABLE ASSEMBLY AND REEL (9186364)	28-1/4"	(718)	28-1/4"	(718)	9-13/16"	(234)	122 (56)
	8	GRID BOARD AND CASE	8'-0-3/4"	(2,458)	37-3/4"	(959)	11-7/8"	(302)	50 (23)
	9	COMPRESSOR	34-3/4"	(883)	24"	(610)	27-11/16"	(704)	205 (93)

*SEE LISTED ACCESSORY ITEMS AS IDENTIFIED AT THE BOTTOM PORTION OF THE LADING DATA CHART.

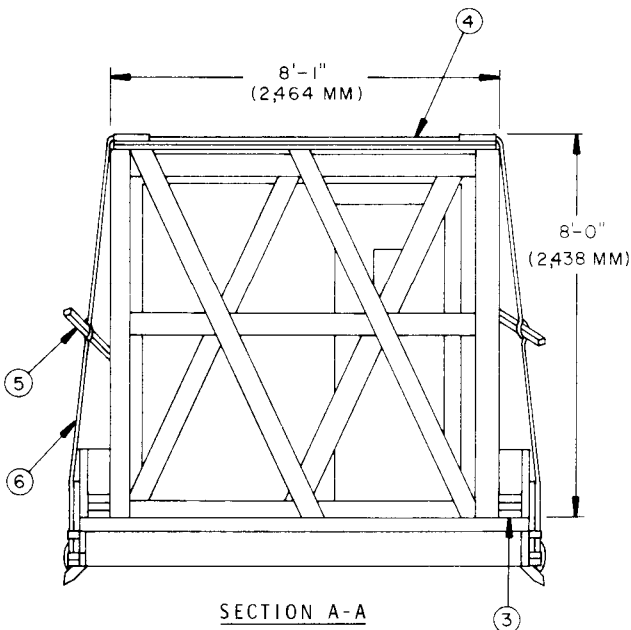
APPLICATION OF STAGGERED NAILING PATTERN. SEE GENERAL NOTE "H" ON PAGE 2.



ISOMETRIC VIEW

KEY NUMBERS

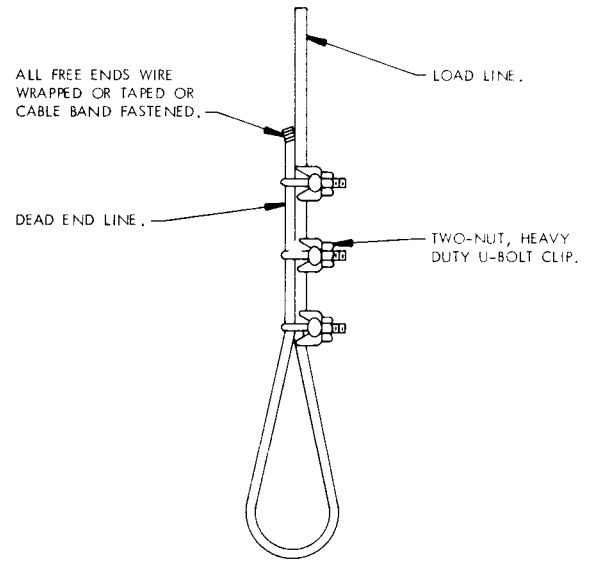
- ① HEADER, 2" X 6" X 8'-6" (51 MM X 152 MM X 2,591 MM) (TRIPLED) (2 REQ'D). PLACE THE SECOND PIECE DIRECTLY ON TOP OF THE FIRST AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/20 NAILS. PLACE THE THIRD PIECE DIRECTLY ON TOP OF THE FIRST TWO PIECES AND NAIL THRU PIECE THREE INTO PIECES ONE AND TWO W/20 NAILS. SEE GENERAL NOTE "H" ON PAGE 2. REFER TO THE "TYPICAL NAILING OF FLOOR LINE BLOCKING TO CAR FLOOR" DETAIL ON PAGE 8.
- ② BACK-UP CLEAT, 2" X 6" X 42" (51 MM X 152 MM X 1,067 MM) (TRIPLED) (12 REQ'D). POSITION THREE TRIPLED CLEATS SIDE BY SIDE IN ALIGNMENT WITH A SKID ON THE CRATE AS SHOWN. PLACE THE SECOND PIECE DIRECTLY ON TOP OF THE FIRST AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/10 NAILS. PLACE THE THIRD PIECE DIRECTLY ON TOP OF THE FIRST TWO PIECES AND NAIL THRU PIECE THREE INTO PIECES ONE AND TWO W/10 NAILS.
- ③ SIDE BLOCKING, 2" X 6" X 18" (51 MM X 152 MM X 457 MM) (TRIPLED) (4 REQ'D). POSITION AGAINST THE SKIDS ON THE CRATE AS SHOWN. PLACE THE SECOND PIECE DIRECTLY ON TOP OF THE FIRST AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/3 NAILS. PLACE THE THIRD PIECE DIRECTLY ON TOP OF THE FIRST TWO PIECES AND NAIL THRU PIECE THREE INTO PIECES ONE AND TWO W/3 NAILS. SEE SPECIAL NOTE 3 ON PAGE 5.
- ④ TIE DOWN BOARD (2 REQ'D). SEE THE "TIE DOWN BOARD ASSEMBLY" DETAIL ON PAGE 8.
- ⑤ WIRE TWISTER, 2" X 2" (51 MM X 51 MM) BY A LENGTH TO SUIT (2 REQ'D). SEE SPECIAL NOTE 2 ON PAGE 5.
- ⑥ WIRE HOLD-DOWN, SIX (6) STRANDS OF NO. 8 GAGE (3 MM MINIMUM DIAMETER) BLACK ANNEALED WIRE (2 REQ'D). PASS THRU A RAILCAR FACILITY ON THE OPPOSITE SIDE OF THE RAILCAR AND BACK OVER THE LADING TO FORM A COMPLETE LOOP. TWIST TAUT WITH PIECE MARKED ⑤. SEE GENERAL NOTE "M" ON PAGE 2, AND SPECIAL NOTES 3 AND 4 ON PAGE 5.



SECTION A-A

SPECIAL NOTES:

1. A ONE UNIT LOAD IS SHOWN ON A 9'-1-3/4" (2,770 MM) WIDE EUROPEAN RAILCAR. SEE GENERAL NOTE "E" ON PAGE 2 AND SPECIAL NOTE 5 BELOW. THE LOAD AS SHOWN ON PAGE 4 WILL BE USED WHEN SHIPPING ANY SINGLE CRATED ITEM. WHEN SHIPPING THE CRATED AN/TSM-107 SHOP EQUIPMENT WITH ACCESSORY ITEMS, REFER TO THE LOAD AS SHOWN ON PAGES 6 AND 7. SIMILAR PROCEDURES WILL BE USED WHEN SHIPPING THE CRATED AN/TSM-104 AND/OR 106 SHOP EQUIPMENT WITH ACCESSORY ITEMS.
2. THE WIRE TWISTERS, PIECES MARKED (5), MUST NOT PROTRUDE BEYOND THE SIDES OF THE CAR WHEN SECURED FOR MOVEMENT. THE TWISTER SHALL BE SECURED TO PREVENT UNTWISTING AND LOOSENING OF THE WIRE HOLD-DOWN.
3. AT ANY LOCATION WHERE THE TWISTED WIRE HOLD-DOWN PASSES AROUND A SHARP CORNER, PROVIDE SUITABLE CUSHIONING OR BUFFERING MATERIAL TO PROTECT THE WIRE FROM BEING CUT ON THE SHARP CORNER.
4. IF DESIRED, OR IF ANNEALED WIRE IS NOT AVAILABLE FOR FABRICATING TWISTED WIRE HOLD-DOWNS, MARKED AS KEY NUMBER (6), 3/8" (OR LARGER) STEEL WIRE ROPE MAY BE INSTALLED IN LIEU OF THE TWISTED WIRE HOLD-DOWNS. ONE END OF THE STEEL WIRE ROPE WILL PASS THRU A RAILCAR TIEDOWN FACILITY, WILL BE FOLDED BACK UPON THE OTHER LEG OF THE ROPE, AND BE SECURED WITH THREE CLIPS, AS SHOWN IN THE "CABLE JOINT" DETAIL ON THIS PAGE. THE STEEL WIRE ROPE WILL THEN PASS OVER THE LADING, ON TOP OF THE TIE-DOWN BOARD, AND THE OTHER END OF THE STEEL WIRE ROPE WILL BE PASSED THROUGH A RAILCAR TIEDOWN FACILITY ON THE OPPOSITE SIDE OF THE CAR AND BE SECURED IN THE SAME MANNER. TENSIONING OF THE STEEL WIRE ROPE CAN BE ACCOMPLISHED BY EMPLOYING TWO CABLE GRIPPERS ON AN APPLICABLE SIZED COME-A-LONG TYPE MECHANICAL HOIST. THE STEEL WIRE ROPE SHALL BE TENSIONED SUFFICIENTLY SO AS TO BE TAUT, BUT NOT SO MUCH AS TO DAMAGE THE CRATE. THE NUTS ON THE CABLE SHALL BE TIGHTENED TO A TORQUE OF APPROXIMATELY 40 FOOT-POUNDS. A PROPER TORQUE CAN BE ACHIEVED BY USING A WRENCH WHICH HAS A HANDLE THAT IS AT LEAST 12" LONG. PROVIDE A THIMBLE OR OTHER SUITABLE PROTECTION AT ANY POINT WHERE THE WIRE ROPE PASSES AROUND A SHARP CORNER. SECURE EACH THIMBLE WITH AN ADDITIONAL CLIP OR BY EQUIVALENT MEANS. WHEN USING A STEEL WIRE ROPE WHICH IS LARGER THAN 3/8", THE NUTS ON THE CABLE CLIPS SHALL BE TIGHTENED TO A TORQUE OF AT LEAST 60 FOOT-POUNDS. A WRENCH WHICH HAS A HANDLE THAT IS AT LEAST 15" LONG MAY BE USED TO OBTAIN THE 60 FOOT-POUND TORQUE. SEE GENERAL NOTE "N" ON PAGE 2.
5. NARROWER CARS CAN BE USED FOR SHIPMENT OF THESE CRATED ITEMS. THE SIDE BLOCKING PIECES WILL BE DOUBLED AND MUST BE PRE-POSITIONED AND NAILED PRIOR TO LOADING THE CRATE. THE CRATE WILL BE FIELD CHECKED AND THE SIDE BLOCKING PIECES, MARKED AS KEY NUMBER (3), WILL BE PRE-POSITIONED SO AS TO BEAR AGAINST THE INSIDE SURFACE OF THE SKIDS ON BOTH SIDES OF THE CRATE. IF DOUBLED 2" X 6" LUMBER IS TOO THICK TO FIT UNDER THE CRATE AND AGAINST THE SKID, 1" X 6" AND 2" X 6" LUMBER MAY BE USED. PLACE THE 2" X 6" PIECE ON TOP OF THE 1" X 6" PIECE AND NAIL AS SPECIFIED.



CABLE JOINT

PROPER TIGHTENING OF THE WIRE ROPE CLIP NUTS CAN BE ACCOMPLISHED BY UTILIZING A PROPER SIZED TORQUE WRENCH. AFTER THE NUTS HAVE BEEN INITIALLY TIGHTENED, THE "U" SIDE OF EACH CLIP MUST BE STRUCK SEVERAL TIMES WITH A HAMMER TO INSURE PROPER SEATING INTO THE DEAD END LINE. FINAL TORQUE WILL BE ACQUIRED BY REPEATEDLY AND ALTERNATELY TIGHTENING EACH CLIP NUT.

BILL OF MATERIAL		
LUMBER	LENGTH	BOARD FEET
2" X 2" (51 MM X 51 MM)	12 FT (3,658 MM)	4
2" X 6" (51 MM X 152 MM)	195 FT (59,436 MM)	195
NAILS	NO. REQD	WEIGHT
SIZE AS REQD	360	21 LBS
WIRE, NO. 8 GAGE (3 MM DIA)	336' REQD	31 LBS
EDGE PROTECTOR	4 REQD	NIL

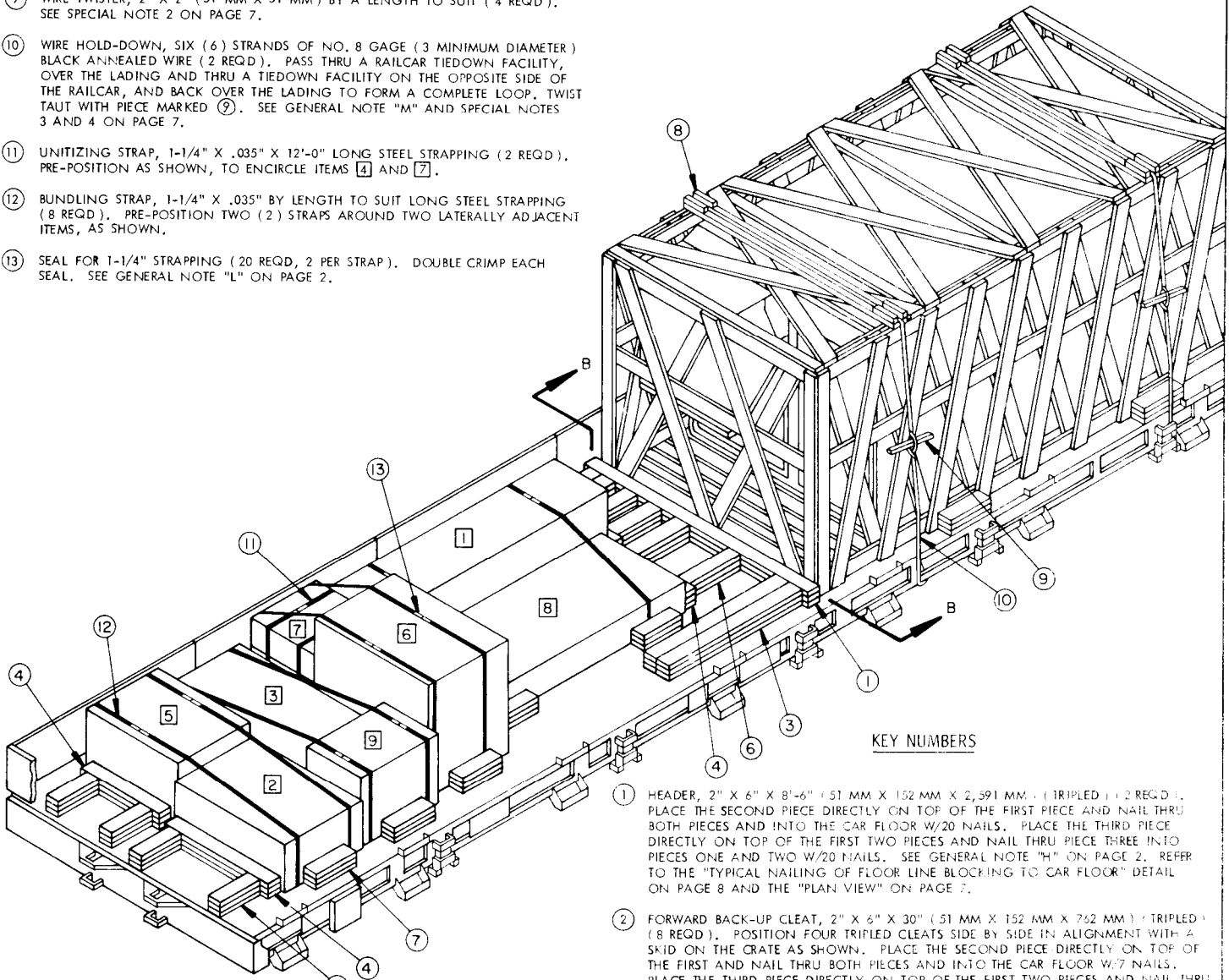
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT* (APPROX)
SHOP EQUIPMENT	1	8,100 LBS (3,674 KG)
DUNNAGE		550 LBS (250 KG)
TOTAL WEIGHT		8,650 LBS (3,924 KG)

* SEE THE "LADING DATA CHART" ON PAGE 3 FOR WEIGHTS APPLICABLE TO SPECIFIC ITEMS.

(KEY NUMBERS CONTINUED)

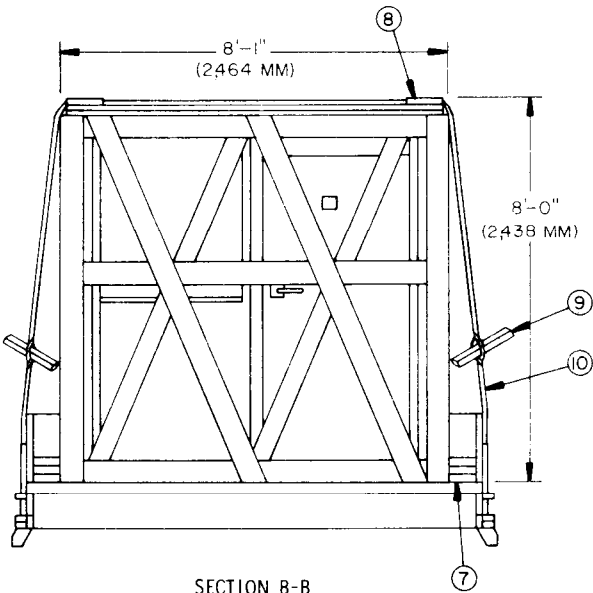
- 9 WIRE TWISTER, 2" X 2" (51 MM X 51 MM) BY A LENGTH TO SUIT (4 REQD). SEE SPECIAL NOTE 2 ON PAGE 7.
- 10 WIRE HOLD-DOWN, SIX (6) STRANDS OF NO. 8 GAGE (3 MINIMUM DIAMETER) BLACK ANNEALED WIRE (2 REQD). PASS THRU A RAILCAR TIEDOWN FACILITY, OVER THE LADING AND THRU A TIEDOWN FACILITY ON THE OPPOSITE SIDE OF THE RAILCAR, AND BACK OVER THE LADING TO FORM A COMPLETE LOOP. TWIST TAUT WITH PIECE MARKED 9. SEE GENERAL NOTE "M" AND SPECIAL NOTES 3 AND 4 ON PAGE 7.
- 11 UNITIZING STRAP, 1-1/4" X .035" X 12'-0" LONG STEEL STRAPPING (2 REQD). PRE-POSITION AS SHOWN, TO ENCIRCLE ITEMS 4 AND 7.
- 12 BUNDLING STRAP, 1-1/4" X .035" BY LENGTH TO SUIT LONG STEEL STRAPPING (8 REQD). PRE-POSITION TWO (2) STRAPS AROUND TWO LATERALLY ADJACENT ITEMS, AS SHOWN.
- 13 SEAL FOR 1-1/4" STRAPPING (20 REQD, 2 PER STRAP). DOUBLE CRIMP EACH SEAL. SEE GENERAL NOTE "L" ON PAGE 2.



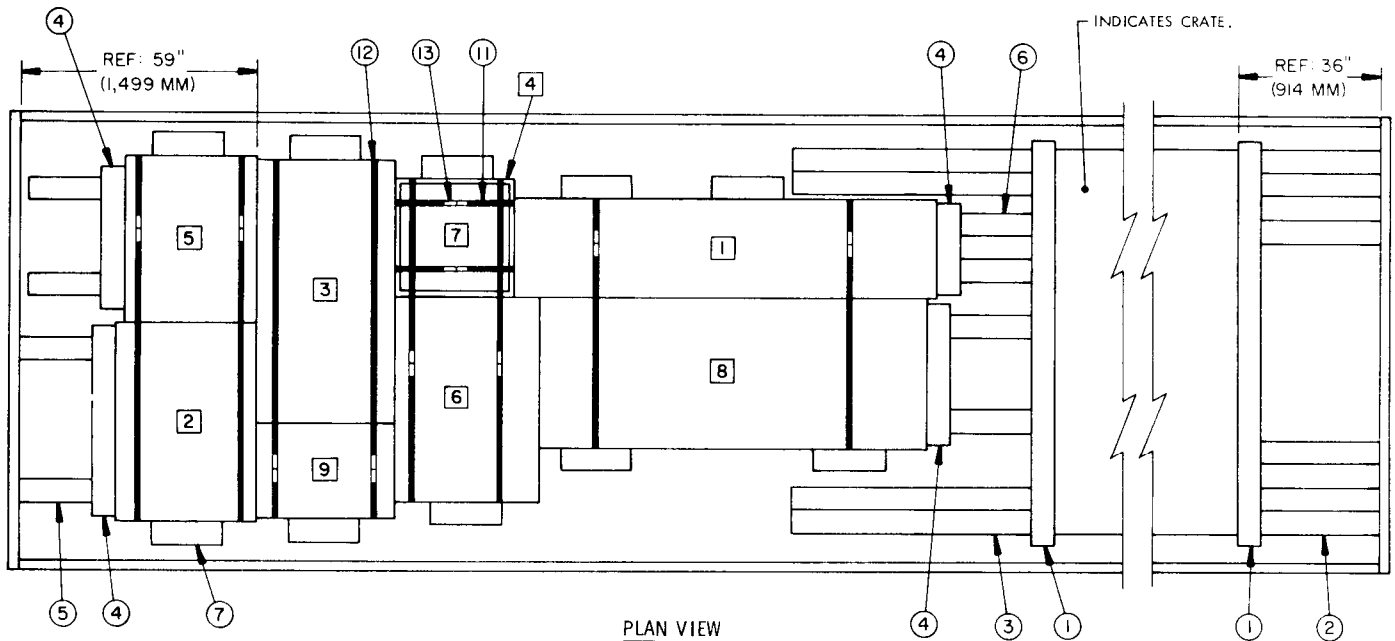
ISOMETRIC VIEW

KEY NUMBERS

- 1 HEADER, 2" X 6" X 8'-6" (51 MM X 152 MM X 2,591 MM) (TRIPLED) (2 REQD). PLACE THE SECOND PIECE DIRECTLY ON TOP OF THE FIRST PIECE AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/20 NAILS. PLACE THE THIRD PIECE DIRECTLY ON TOP OF THE FIRST TWO PIECES AND NAIL THRU PIECE THREE INTO PIECES ONE AND TWO W/20 NAILS. SEE GENERAL NOTE "H" ON PAGE 2. REFER TO THE "TYPICAL NAILING OF FLOOR LINE BLOCKING TO CAR FLOOR" DETAIL ON PAGE 8 AND THE "PLAN VIEW" ON PAGE 7.
- 2 FORWARD BACK-UP CLEAT, 2" X 6" X 30" (51 MM X 152 MM X 762 MM) (TRIPLED) (8 REQD). POSITION FOUR TRIPLED CLEATS SIDE BY SIDE IN ALIGNMENT WITH A SKID ON THE CRATE AS SHOWN. PLACE THE SECOND PIECE DIRECTLY ON TOP OF THE FIRST AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/7 NAILS. PLACE THE THIRD PIECE DIRECTLY ON TOP OF THE FIRST TWO PIECES AND NAIL THRU PIECE THREE INTO PIECES ONE AND TWO W/7 NAILS. SEE THE "PLAN VIEW" ON PAGE 7.
- 3 BACK-UP CLEAT, 2" X 6" X 60" (51 MM X 152 MM X 1,524 MM) (TRIPLED) (4 REQD). POSITION TWO TRIPLED CLEATS SIDE BY SIDE IN ALIGNMENT WITH A SKID ON THE CRATE AS SHOWN. PLACE THE SECOND PIECE DIRECTLY ON TOP OF THE FIRST AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/15 NAILS. PLACE THE THIRD PIECE DIRECTLY ON TOP OF THE FIRST TWO PIECES AND NAIL THRU PIECE THREE INTO PIECES ONE AND TWO W/15 NAILS.
- 4 HEADER, 2" X 6" (51 MM X 152 MM) BY LENGTH TO SUIT (TRIPLED) (4 REQD). PLACE THE SECOND PIECE DIRECTLY ON TOP OF THE FIRST PIECE AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/1 NAIL EVERY 4" (100 MM). PLACE THE THIRD PIECE DIRECTLY ON TOP OF THE FIRST TWO PIECES AND NAIL THRU PIECE THREE INTO PIECES ONE AND TWO IN THE SAME MANNER.
- 5 BACK-UP CLEAT, 2" X 6" X 18" (51 MM X 152 MM X 457 MM) (TRIPLED) (4 REQD). POSITION AS SHOWN TO BE THREE INCHES (3") (76 MM) IN FROM END OF HEADER, PIECE MARKED 4. PLACE THE SECOND PIECE DIRECTLY ON TOP OF THE FIRST PIECE AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/4 NAILS. PLACE THE THIRD PIECE DIRECTLY ON TOP OF THE FIRST TWO PIECES AND NAIL THRU PIECE THREE INTO PIECES ONE AND TWO W/4 NAILS.
- 6 BACK-UP CLEAT, 2" X 6" (51 MM X 152 MM) BY CUT-TO-FIT (TRIPLED) (4 REQD). POSITION AS SHOWN TO FIT BETWEEN PIECE MARKED 1 AND PIECE MARKED 4. POSITION BACK-UP CLEATS THREE INCHES (3") (76 MM) FROM ENDS OF PIECE MARKED 4. PLACE THE SECOND PIECE DIRECTLY ON TOP OF THE FIRST AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/4 NAILS. PLACE THE THIRD PIECE DIRECTLY ON TOP OF THE FIRST TWO PIECES AND NAIL THRU PIECE THREE INTO PIECES ONE AND TWO W/4 NAILS.
- 7 SIDE BLOCKING, 2" X 6" X 18" (51 MM X 152 MM X 457 MM) (TRIPLED) (14 REQD). POSITION AGAINST LADING AS SHOWN. PLACE THE SECOND PIECE DIRECTLY ON TOP OF THE FIRST AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/3 NAILS. PLACE THE THIRD PIECE DIRECTLY ON TOP OF THE FIRST TWO PIECES AND NAIL THRU PIECE THREE INTO PIECES ONE AND TWO W/3 NAILS.
- 8 TIE DOWN BOARD (2 REQD). SEE THE "TIE DOWN BOARD ASSEMBLY" DETAIL ON PAGE 8.



SECTION B-B



PLAN VIEW

SPECIAL NOTES:

(SPECIAL NOTES CONTINUED)

1. A ONE UNIT LOAD OF THE CRATED AN/TSM-107 SHOP EQUIPMENT WITH ACCESSORY ITEMS IS SHOWN ON A 41'-0-1/8" (12,500 MM) LONG BY 9'-1-3/64" (2,770 MM) WIDE EUROPEAN RAILCAR. A SHORTER CAR CANNOT BE USED. SIMILAR PROCEDURES WILL BE USED WHEN SHIPPING THE CRATED AN/TSM-104 AND/OR 106 SHOP EQUIPMENT WITH ACCESSORY ITEMS.
2. THE WIRE TWISTERS, PIECES MARKED (9), MUST NOT PROTRUDE BEYOND THE SIDES OF THE CAR WHEN SECURED FOR MOVEMENT. THE TWISTER SHALL BE SECURED TO PREVENT UNTWISTING AND LOOSENING OF THE WIRE HOLD-DOWN.
3. AT ANY LOCATION WHERE THE TWISTED WIRE HOLD-DOWN PASSES AROUND A SHARP CORNER, PROVIDE SUITABLE CUSHIONING OR BUFFERING MATERIAL TO PROTECT THE WIRE FROM BEING CUT ON THE SHARP CORNER.
4. IF DESIRED, OR IF ANNEALED WIRE IS NOT AVAILABLE FOR FABRICATING TWISTED WIRE HOLD-DOWNS, MARKED AS KEY NUMBER (10), 3/8" (OR LARGER) STEEL WIRE ROPE MAY BE INSTALLED IN LIEU OF THE TWISTED WIRE HOLD-DOWNS. ONE END OF THE STEEL WIRE ROPE WILL PASS THRU A RAILCAR TIEDOWN FACILITY, WILL BE FOLDED BACK UPON THE OTHER LEG OF THE ROPE, AND BE SECURED WITH THREE CLIPS, AS SHOWN IN THE "CABLE JOINT" DETAIL ON PAGE 5. THE STEEL WIRE ROPE WILL THEN PASS OVER THE LADING, ON TOP OF THE TIE-DOWN BOARD, AND THE OTHER END OF THE STEEL WIRE ROPE WILL BE PASSED THROUGH A RAILCAR TIEDOWN FACILITY ON THE OPPOSITE SIDE OF THE CAR AND BE SECURED IN THE SAME MANNER. TENSIONING OF THE STEEL WIRE ROPE CAN BE ACCOMPLISHED BY EMPLOYING TWO CABLE GRIPPERS ON AN APPLICABLE SIZED COME-A-LONG TYPE MECHANICAL HOIST. THE STEEL WIRE ROPE SHALL BE TENSIONED SUFFICIENTLY SO AS TO BE TAUT, BUT NOT SO MUCH AS TO DAMAGE THE LADING. THE NUTS ON THE CABLE CLIPS SHALL BE TIGHTENED TO A TORQUE OF APPROXIMATELY 40 FOOT-POUNDS. A PROPER TORQUE CAN BE ACHIEVED BY USING A WRENCH WHICH HAS A HANDLE THAT IS AT LEAST 12" LONG. PROVIDE A THIMBLE OR OTHER SUITABLE PROTECTION AT ANY POINT WHERE THE WIRE ROPE PASSES AROUND A SHARP CORNER. SECURE EACH THIMBLE WITH AN ADDITIONAL CLIP OR BY EQUIVALENT MEANS. WHEN USING A STEEL WIRE ROPE WHICH IS LARGER THAN 3/8", THE NUTS ON THE CABLE CLIPS SHALL BE TIGHTENED TO A TORQUE OF AT LEAST 60 FOOT-POUNDS. A WRENCH WHICH HAS A HANDLE THAT IS AT LEAST 15" LONG MAY BE USED TO OBTAIN THE 60 FOOT-POUND TORQUE. SEE GENERAL NOTE "N" ON PAGE 2.
5. WHEN LOADING THE ACCESSORY ITEMS ON THE RAILCAR, ITEMS (3) AND (9) SHOULD BE LOADED AND POSITIONED FIRST, AND THE REMAINING ACCESSORY ITEMS WILL THEN BE LOADED AND POSITIONED IN SEQUENCE.

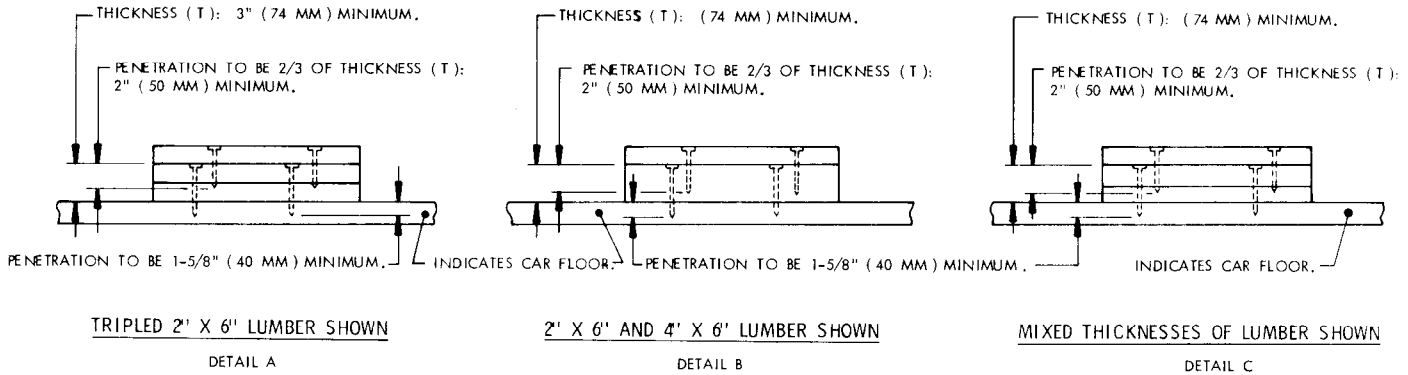
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BILL OF MATERIAL

LUMBER	LENGTH	BOARD FEET
2" X 2" (51 MM X 51 MM)	12 FT (3,658 MM)	4
2" X 6" (51 MM X 152 MM)	345 FT (105,156 MM)	345
NAILS	NO. REQD	WEIGHT
SIZE AS REQD	604	35-1/2 LBS
WIRE, NO. 8 GAGE (3 MM DIA)	336' REQD	31 LBS
STEEL STRAPPING, 1-1/4" X .035"	92' REQD	14 LBS
SEAL FOR 1-1/4" STRAPPING	20' REQD	1 LB

LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
SHOP EQUIPMENT		
(AN/TSM-107)	1	7,873 LBS (3,571 KG)
ACCESSORY ITEMS	9	2,175 LBS (987 KG)
DUNNAGE		954 LBS (433 KG)
TOTAL WEIGHT		11,002 LBS (4,991 KG)

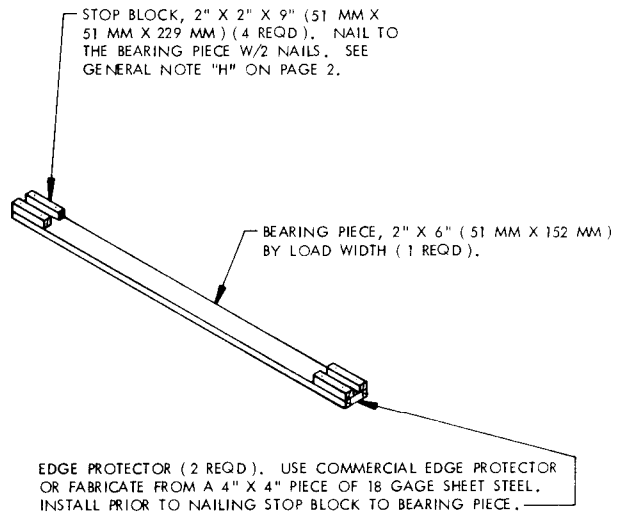


TYPICAL NAILING OF FLOOR LINE BLOCKING TO CAR FLOOR

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 TRIPLED 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 PERMISSABLE TO USE MIXED THICKNESSES OF LUMBER AS TYPICALLY SHOWN IN DETAILS B AND C, IN LIEU OF THE SPECIFIED TRIPLED 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)



TIE DOWN BOARD ASSEMBLY