

# HAWK

## LOADING AND BRACING ON EUROPEAN RAILCAR OF LAUNCHER, SELF- PROPELLED, M754

⊙ DELINEATED LOADING AND BRACING PROCEDURES COMPLY WITH THE REQUIREMENTS OF APPENDIX C TO TM 55-601.

NOTICE: DEPICTED LOAD IS NOT OVERSIZE.

**DO NOT SCALE**

REVISIONS				DRAFTSMAN D.L.P./GKE	PROJECT C7/NEW
1	FEB 76	<i>Wesley &amp; Gilliland</i> <i>A. H. Chang</i>	<i>Wesley &amp; Gilliland</i> <i>A. H. Chang</i>	CHECKER R.S./D.H.C.	LOG ENGINE OFFICE <i>E. R. Baker</i>
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				U. S. ARMY MATERIEL COMMAND	
				DECEMBER 1972	
				CLASS	DIVISION
				19	48
				DRAWING	FILE
				7070	GSE 5HA52

**GENERAL NOTES**

- 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 LOAD AS SHOWN IS BASED ON RIV RAILCARS ( KBS 442/443 AND KLS 442/443 ) 41'-0-1/8" ( 12,500 MM ) LONG BY 9'-1-3/4" ( 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. LADING DATA:  
 ITEM DIMENSIONS ----- 17'-11-1/2" ( 5,474 MM ) LONG BY 8'-4" ( 2,540 MM ) WIDE BY 8'-8-1/2" ( 2,654 MM ) HIGH.  
 ITEM GROSS WEIGHT ---- 22,650 POUNDS ( APPROX ) ( 10,274 KG ).
- 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, AS APPLICABLE.

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 )

- 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.
- 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 "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.
- K. CAUTION: DURING WIRE ROPE INSTALLATION AVOID ALL CONTACT WITH ELECTRICAL WIRING, VEHICLE CONTROLS AND OTHER APPURTENANCES.
- L. FIVE-EIGHTS INCH ( 5/8" ) STEEL WIRE ROPE IS SPECIFIED WHERE REQUIRED FOR TIEDOWNS TO SECURE THE ITEM. IF DESIRED, OR IF 5/8" STEEL WIRE ROPE IS NOT AVAILABLE, STEEL WIRE ROPE OF A LARGER DIAMETER MAY BE USED. WIRE ROPE CABLE MUST BE TENSIONED SUFFICIENTLY TO CAUSE SLIGHT VEHICLE BODY DEPRESSION. TENSIONING CAN BE ACCOMPLISHED BY EMPLOYING TWO ( 2 ) CABLE "GRIPPERS" AND AN APPLICABLY SIZED "COME-A-LONG" TYPE MECHANICAL HOIST.
- M. ALL HAND BRAKES MUST BE "SET" WITH THE HAND LEVERS WIRE TIED OR BLOCKED.
- 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 LB EQUALS 0.454 KG. METRIC EQUIVALENTS FOR TORQUE ARE BASED ON 1 FOOT-POUND EQUALS 0.7376 NEWTON-METERS.

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

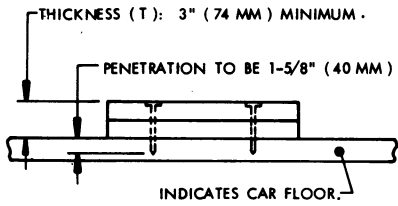
LIST OF RAILCARS THAT MAY BE USED FOR SHIPMENTS			
TYPE OF RAILCAR	LENGTH OF RAILCAR	NO. OF ITEMS	MAXIMUM TOTAL WEIGHT ( APPROX ) OF ITEMS
KLMS ---- 440	34'-11-11/16" ( 10,660 MM )	1	22,650 LBS ( 10,274 KG )
KLM ---- 505	30'-4-9/16" ( 9,260 MM )	1	22,650 LBS ( 10,274 KG )
KLM ---- 506	34'-8-1/2" ( 10,580 MM )	1	22,650 LBS ( 10,274 KG )
KBS -----442/443	41'-0-1/8" ( 12,500 MM )	2	45,300 LBS ( 20,543 KG )
KLS -----442/443	41'-0-1/8" ( 12,500 MM )	2	45,300 LBS ( 20,543 KG )
RMMS ---663/664	41'-5-51/64" ( 12,644 MM )	2	45,300 LBS ( 20,543 KG )
RS - -----680/681	60'-8-23/64" ( 18,500 MM )	3	67,950 LBS ( 43,198 KG )
RS - -----683/684	60'-8-23/64" ( 18,500 MM )	3	67,950 LBS ( 43,198 KG )

**REVISIONS**

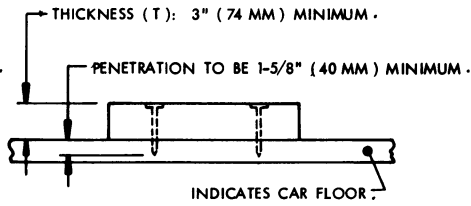
- REVISION NO. 1, DATED FEB 1976, CONSISTS OF:
1. UPDATING THE DRAWING FORMAT.
  2. UPDATING THE GENERAL NOTES.

**MATERIAL SPECIFICATIONS**

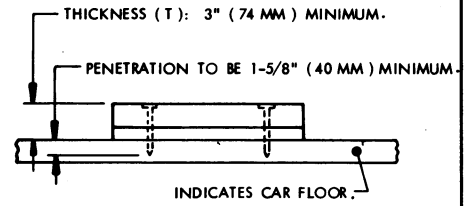
- LUMBER** --- : DOUGLAS FIR OR COMPARABLE LUMBER WITH STRAIGHT GRAIN AND FREE OF MATERIAL DEFECTS. REF: FED SPEC MM-L-751.
- NAILS**----- : COMMON, CEMENT COATED OR CHEMICALLY ETCHED. REF: FED SPEC FF-N-105. ALT: ANNULAR-RING TYPE NAIL OF SAME SIZE.
- ROPE**----- : STEEL, WIRE, PLAIN, PREFORMED, REGULAR LAY. REF: FED SPEC RR-W-410.
- CLIPS**----- : "U" BOLT, CROSBY, HEAVY DUTY ( OR EQUAL ). REF: FED SPEC FF-C-450, TYPE 1, CLASS 1.
- SHACKLE**--- : TYPE IV, CLASS 4: FED SPEC RR-C-271.
- THIMBLE**----- : COMMERCIAL GRADE.



DOUBLED 2' X 6' LUMBER SHOWN



4' X 6' LUMBER SHOWN



MIXED THICKNESSES OF LUMBER SHOWN

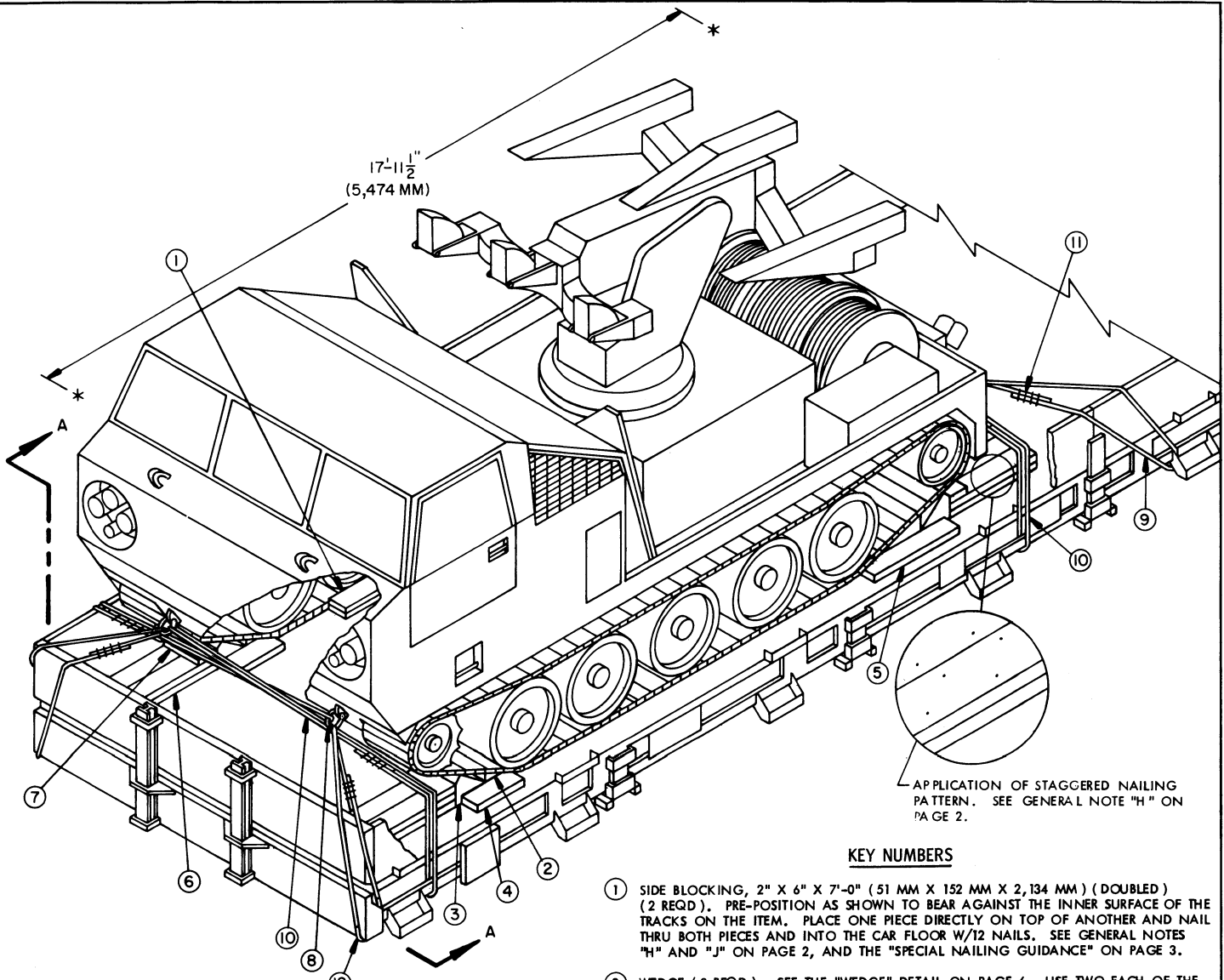
TYPICAL NAILING OF FLOOR LINE BLOCKING TO CAR FLOOR

SPECIAL NOTES:

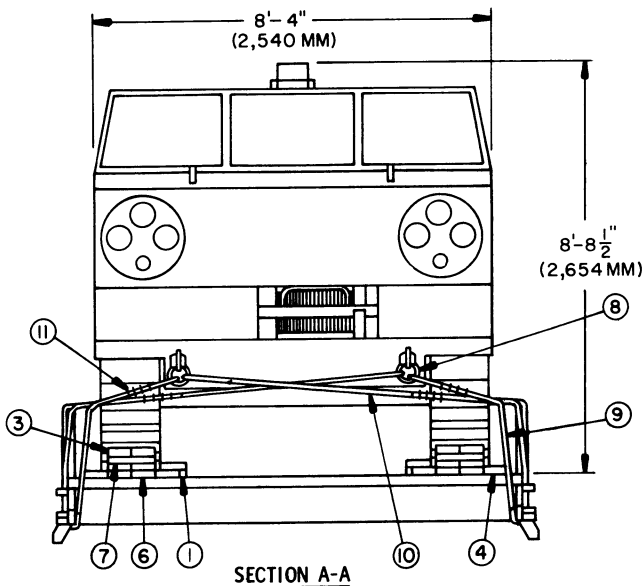
1. THE DETAILS ON THIS PAGE DEPICT POSSIBLE VARIATIONS THAT MAY RESULT FROM USING AVAILABLE LUMBER FOR FLOOR LINE BLOCKING. KEY NUMBERS THROUGHOUT THIS DOCUMENT SPECIFY DOUBLED PIECES OF LUMBER WHICH ARE 2" X 6" IN SIZE FOR HEADERS, BACK-UP CLEATS, AND SIDE BLOCKING, AS TYPICALLY SHOWN IN DETAIL A ABOVE. 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 )

3. WHEN NAILING CHOCK BLOCKS TO THE CAR FLOOR, THE NAILING SHALL COMPLY WITH THE PENETRATION REQUIREMENTS, AS TYPICALLY SHOWN ABOVE, AND AS SPECIFIED IN GENERAL NOTE "J" ON PAGE 2.



ISOMETRIC VIEW



SECTION A-A

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

KEY NUMBERS

- ① SIDE BLOCKING, 2" X 6" X 7'-0" (51 MM X 152 MM X 2,134 MM) (DOUBLED) (2 REQD). PRE-POSITION AS SHOWN TO BEAR AGAINST THE INNER SURFACE OF THE TRACKS ON THE ITEM. PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/2 NAILS. SEE GENERAL NOTES "H" AND "J" ON PAGE 2, AND THE "SPECIAL NAILING GUIDANCE" ON PAGE 3.
- ② WEDGE (8 REQD). SEE THE "WEDGE" DETAIL ON PAGE 6. USE TWO EACH OF THE APPROPRIATE WEDGES SIDE-BY-SIDE AT EACH BLOCKING LOCATION. LOCATE BEVELED END OF EACH WEDGE FIRMLY AGAINST THE TRACK.
- ③ CHOCK BLOCK (8 REQD). SEE THE "CHOCK BLOCK" DETAIL ON PAGE 6. USE TWO EACH SIDE-BY-SIDE AT EACH BLOCKING LOCATION. POSITION IN ALIGNMENT WITH AND FIRMLY AGAINST THE WEDGES AND TOENAIL ONE (1) SIDE OF EACH BLOCK TO THE CAR FLOOR W/2 NAILS.
- ④ FORWARD SIDE CLEAT, 2" X 6" X 16" (51 MM X 152 MM X 406 MM) (4 REQD). POSITION TO BEAR AGAINST THE SIDES OF PIECES MARKED ② AND ③ AS SHOWN AND NAIL TO THE CAR FLOOR W/3 NAILS.
- ⑤ REAR SIDE CLEAT, 2" X 6" X 30" (51 MM X 152 MM X 762 MM) (4 REQD). POSITION TO BEAR AGAINST THE SIDES OF PIECES MARKED ② AND ③ AS SHOWN AND NAIL TO THE CAR FLOOR W/5 NAILS.
- ⑥ BACK-UP CLEAT, 2" X 6" X 30" (51 MM X 152 MM X 762 MM) (DOUBLED) (8 REQD). POSITION TWO DOUBLED CLEATS SIDE-BY-SIDE IN ALIGNMENT WITH PIECE MARKED ③, AS SHOWN. PLACE ONE PIECE DIRECTLY ON TOP OF ANOTHER AND NAIL THRU BOTH PIECES AND INTO THE CAR FLOOR W/6 NAILS.
- ⑦ BUFFER CLEAT, 2" X 6" X 12" (52 MM X 152 MM X 305 MM) (4 REQD). POSITION AS SHOWN AT THE END OF THE CHOCK BLOCK. NAIL TO PIECES MARKED ⑥ W/3 NAILS AT EACH JOINT.
- ⑧ SHACKLE, SIZE 1" (25.4 MM) (4 REQD). INSTALL ONE EACH AT TWO FRONT AND TWO REAR TIEDOWN POINTS ON VEHICLE. NOTE: NOT REQUIRED IF VEHICLE IS ALREADY EQUIPPED WITH SHACKLES WHEN OFFERED FOR SHIPMENT. SEE SPECIAL NOTE 3 ON PAGE 5.
- ⑨ STEEL WIRE ROPE, 5/8" (15.875 MM) DIAMETER, 17.9 TONS (16,217 KG) (4 REQD). INSTALL CABLE AS SHOWN TO FORM A COMPLETE LOOP FROM TIEDOWN FACILITY ON THE RAILCAR THRU LADING TIEDOWN DEVICE AND BACK TO THE RAILCAR TIEDOWN FACILITY. SEE GENERAL NOTES "K", "L", AND "N" ON PAGE 2. SEE SPECIAL NOTE 2 ON PAGE 5.

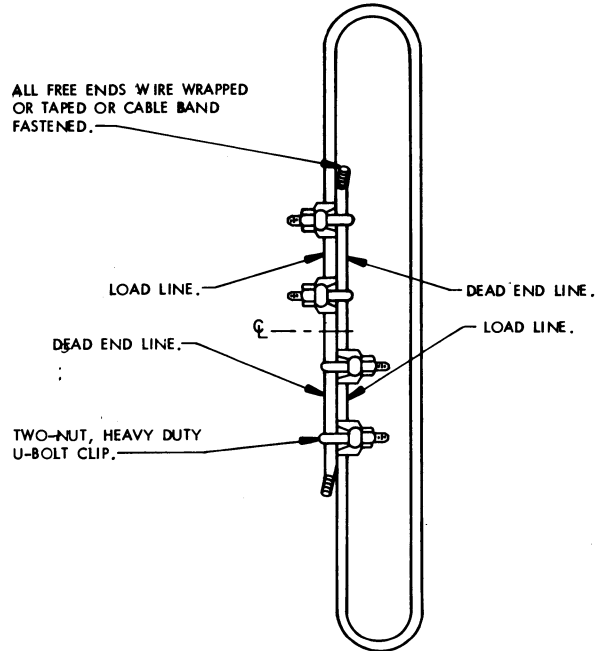
(CONTINUED ON PAGE 5)

**SPECIAL NOTES:**

1. A ONE UNIT LOAD IS SHOWN ON A 9'-1-3/64" (2,770 MM) WIDE EUROPEAN RAILCAR. SEE GENERAL NOTE "E" ON PAGE 2.
2. STEEL WIRE ROPE WILL PASS THRU A RAILCAR TIEDOWN FACILITY, THROUGH AN ANCHOR ON THE LADING AS SHOWN, AND BACK TOWARD THE RAILCAR TIEDOWN FACILITY TO FORM A COMPLETE LOOP. FOUR CLIPS WILL BE USED TO SECURE EACH CABLE JOINT. SEE THE "CABLE JOINT" DETAIL AT THE RIGHT. IF DESIRED, OR IF 5/8" STEEL WIRE ROPE IS NOT AVAILABLE, STEEL WIRE ROPE OF A LARGER DIAMETER MAY BE USED. TENSIONING OF THE STEEL WIRE ROPE CAN BE ACCOMPLISHED BY EMPLOYING TWO CABLE GRIPPERS ON AN APPLICABLY 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 60 FOOT-POUNDS. A PROPER TORQUE CAN BE ACHIEVED BY USING A WRENCH WHICH HAS A HANDLE THAT IS AT LEAST 15" 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. SEE GENERAL NOTE "N" ON PAGE 2.
3. MORE DISTANCE MAY BE REQUIRED BETWEEN THE DRILLED PADS AT THE OPEN END OF A SHACKLE SO THAT IT WILL FIT PROPERLY OVER THE THICKNESS OF THE TOWING/TIEDOWN BRACKET ON THE VEHICLE. TO PROVIDE THE NEEDED CLEARANCE, EQUAL AMOUNTS OF MATERIAL MAY BE REMOVED FROM THE SHACKLE PADS BY GRINDING OR MACHINING.

(KEY NUMBERS CONTINUED FROM PAGE 4)

- ⑩ STEEL WIRE ROPE, 5/8" (15.875 MM) DIAMETER, 17.9 TONS (16,217 KG) (4 REQD). INSTALL CABLE AS SHOWN TO FORM A COMPLETE LOOP FROM A LADING TIEDOWN DEVICE ON ONE SIDE TO A RAILCAR TIEDOWN FACILITY ON THE OPPOSITE SIDE. SEE GENERAL NOTES "K", "L", AND "N" ON PAGE 2. SEE SPECIAL NOTE 2 ON PAGE 5.
- ⑪ CLIP, WIRE ROPE, SIZE 5/8" (48 REQD). FOUR (4) PER CABLE JOINT AND ONE (1) PER THIMBLE.
- ⑫ THIMBLE, STANDARD SIZE 5/8" (16 REQD). ONE (1) PER RAILCAR TIEDOWN FACILITY AND ONE (1) PER LADING TIEDOWN DEVICE (SHACKLE). SECURE TO WIRE ROPE MARKED ⑩ AND/OR ⑪ W/1 CLIP PER THIMBLE. A STANDARD THIMBLE AS SPECIFIED CAN BE SECURED TO A CABLE WITH 5/8" CLIP. HOWEVER, IF DESIRED OR IF THE 5/8" THIMBLE BEING USED IS OF A TYPE WHICH CANNOT BE SECURED TO A CABLE WITH A 5/8" CLIP, A 7/8" CLIP MAY BE USED.



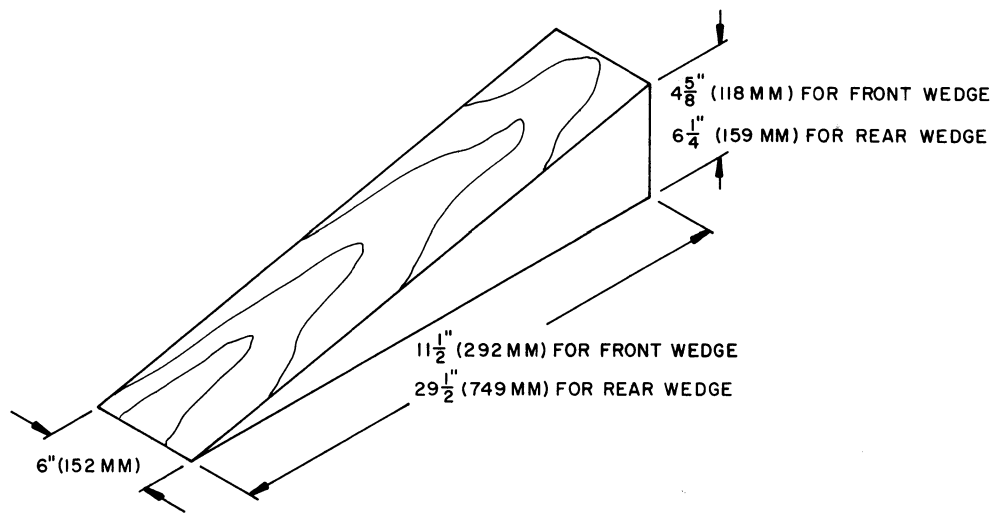
**CABLE JOINT**

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.

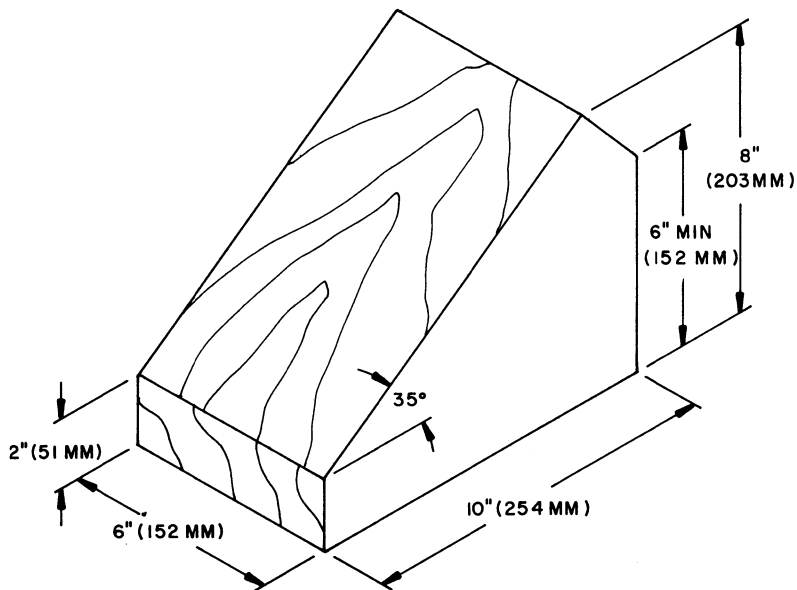
BILL OF MATERIAL		
LUMBER	LENGTH	BOARD FEET
2" X 6" (51 MM X 152 MM)	88 FT ( 26,822 MM )	88
6" X 8" ( 51 MM X 203 MM )	22 FT ( 6,706 MM )	88
NAILS	NO. REQD	WEIGHT
SIZE AS REQD	165	11 LBS ( 5 KG )
ROPE, STEEL WIRE, 5/8" DIA	200' REQD	137-1/2 LBS
CLIP, 5/8"	48 REQD	30 LBS
SHACKLE, 1"	4 REQD	22 LBS
THIMBLE, 5/8"	16 REQD	5 LBS

**LOAD AS SHOWN**

ITEM	QUANTITY	WEIGHT (APPROX)
LAUNCHER, M754	1	22,650 LBS ( 10,274 KG )
DUNNAGE		646 LBS ( 293 KG )
<b>TOTAL WEIGHT</b>		<b>23,296 LBS ( 10,567 KG )</b>



WEDGE



CHOCK BLOCK