

APPROVED BY
 MECH DIV AAR, THEIR LETTER
 DATED 13 JUL 82 FILE LR-110.31
 SIGNED G. W. Malsbick
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 MTMCTEA, FT EUSTIS, VA

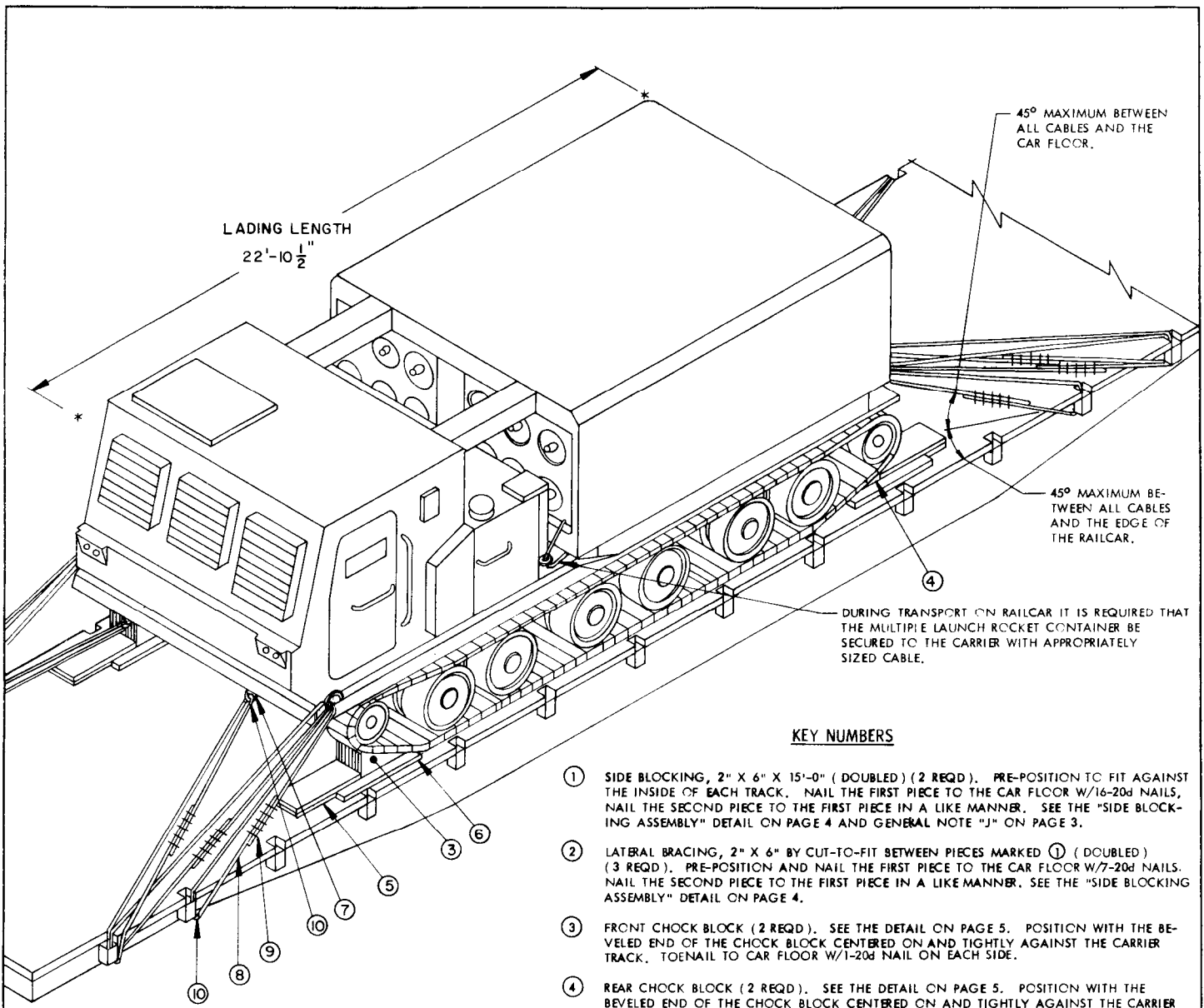
MLRS

LOADING AND BRACING ON FLAT CAR OF THE MULTIPLE LAUNCH ROCKET SYSTEM SELF PROPELLED LAUNCHER LOADER

THIS OUTLOADING PROCEDURAL DRAWING INCLUDES
 PROCEDURES FOR GENERAL SERVICE FLAT CARS (FM)
 AND FOR CUSHIONED FLAT CARS (FMS) EQUIPPED
 WITH SPECIAL CHAIN TIE-DOWN DEVICES OF VARIOUS
 DESIGN AND MANUFACTURE.

DO NOT SCALE

REVISIONS				DRAFTSMAN	PT	PROJ. ENG.	CHKD BY
				<i>GRS</i>		<i>JDS/Alw</i>	<i>Hondo/KH</i>
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				SEPTEMBER 1982			
				CLASS	DIVISION	DRAWING	FILE
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LADING LENGTH
22'-10 1/2"

45° MAXIMUM BETWEEN ALL CABLES AND THE CAR FLOOR.

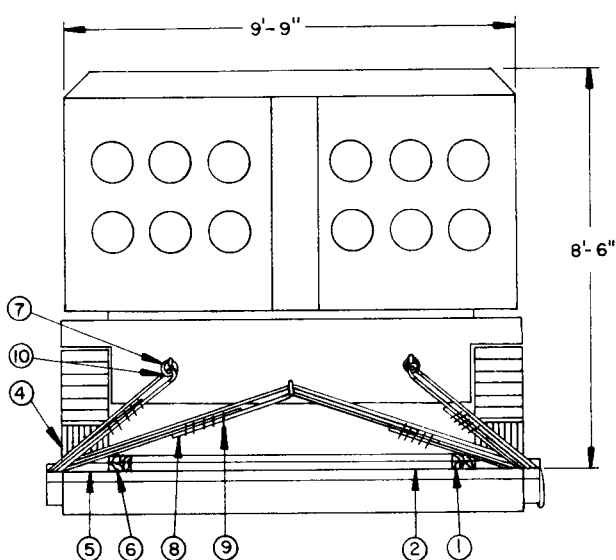
45° MAXIMUM BETWEEN ALL CABLES AND THE EDGE OF THE RAILCAR.

DURING TRANSPORT ON RAILCAR IT IS REQUIRED THAT THE MULTIPLE LAUNCH ROCKET CONTAINER BE SECURED TO THE CARRIER WITH APPROPRIATELY SIZED CABLE.

KEY NUMBERS

- ① SIDE BLOCKING, 2" X 6" X 15'-0" (DOUBLED) (2 REQD). PRE-POSITION TO FIT AGAINST THE INSIDE OF EACH TRACK. NAIL THE FIRST PIECE TO THE CAR FLOOR W/16-20d NAILS, NAIL THE SECOND PIECE TO THE FIRST PIECE IN A LIKE MANNER. SEE THE "SIDE BLOCKING ASSEMBLY" DETAIL ON PAGE 4 AND GENERAL NOTE "J" ON PAGE 3.
- ② LATERAL BRACING, 2" X 6" BY CUT-TO-FIT BETWEEN PIECES MARKED ① (DOUBLED) (3 REQD). PRE-POSITION AND NAIL THE FIRST PIECE TO THE CAR FLOOR W/7-20d NAILS. NAIL THE SECOND PIECE TO THE FIRST PIECE IN A LIKE MANNER. SEE THE "SIDE BLOCKING ASSEMBLY" DETAIL ON PAGE 4.
- ③ FRONT CHOCK BLOCK (2 REQD). SEE THE DETAIL ON PAGE 5. POSITION WITH THE BEVELED END OF THE CHOCK BLOCK CENTERED ON AND TIGHTLY AGAINST THE CARRIER TRACK. TOENAIL TO CAR FLOOR W/1-20d NAIL ON EACH SIDE.
- ④ REAR CHOCK BLOCK (2 REQD). SEE THE DETAIL ON PAGE 5. POSITION WITH THE BEVELED END OF THE CHOCK BLOCK CENTERED ON AND TIGHTLY AGAINST THE CARRIER TRACK. TOENAIL TO CAR FLOOR W/1-20d NAIL ON EACH SIDE.
- ⑤ CHOCK BLOCK BACK-UP, 2" X 12" X 30" (DOUBLED) (4 REQD). POSITION TIGHTLY AGAINST THE CHOCK BLOCK. NAIL THE FIRST PIECE TO THE CAR FLOOR W/5-20d NAILS. NAIL THE SECOND PIECE TO THE FIRST W/5-50d NAILS.
- ⑥ CHOCK BLOCK RETAINER, 2" X 4" X 36" (8 REQD). POSITION ONE AGAINST THE INSIDE AND ONE AGAINST THE OUTSIDE OF EACH CHOCK BLOCK. NAIL TO THE CAR FLOOR W/4-20d NAILS.
- ⑦ SHACKLE, SIZE 7/8" (4 REQD). INSTALL ONE EACH AT THE TWO FRONT AND TWO REAR TIE-DOWN FITTINGS ON THE VEHICLE.
- ⑧ STEEL WIRE ROPE, 5/8" DIAMETER, 17.9 TONS (12 REQD). INSTALL CABLE AS SHOWN TO FORM A COMPLETE LOOP FROM THE STAKE POCKET ON THE CAR, THRU A VEHICLE LIFT FITTING, A VEHICLE TIE-DOWN FITTING, OR THE VEHICLE TOWING PINTLE, AND BACK TO THE STAKE POCKET. SEE THE "CABLE JOINT" DETAIL ON PAGE 4. SEE GENERAL NOTES "D" AND "F" AND THE "SPECIAL PROVISIONS" ON PAGE 3.
- ⑨ CLIP, WIRE ROPE, SIZE 5/8" (82 REQD). FIVE (5) PER CABLE AND ONE (1) PER THIMBLE. SEE GENERAL NOTE "D" ON PAGE 3 AND KEY NUMBER ⑩ GUIDANCE BELOW. SEE "CABLE JOINT" DETAIL ON PAGE 4.
- ⑩ THIMBLE, STANDARD, SIZE 5/8" (22 REQD). ONE (1) PER STAKE POCKET AND ONE (1) PER VEHICLE LIFT FITTING AND/OR VEHICLE TIE-DOWN FITTING. DO NOT USE A THIMBLE ON THE TOWING PINTLE. SECURE TO THE STEEL WIRE ROPE CABLE MARKED ⑧ W/1-CLIP PER THIMBLE. NOTE: A STANDARD THIMBLE, AS SPECIFIED CAN BE SECURED TO A CABLE WITH A 5/8" CLIP. HOWEVER, IF DESIRED, OR IF THE 5/8" THIMBLE BEING USED IS OF A TYPE WHICH CANNOT BE SECURED WITH A 5/8" CLIP, A 3/4" CLIP MAY BE USED. NOTE THAT AN "OPEN PATTERN" THIMBLE IS RECOMMENDED. SEE GENERAL NOTE "D" ON PAGE 3.

ISOMETRIC VIEW



REAR VIEW

GENERAL NOTES

SPECIAL PROVISIONS: (SEE GENERAL NOTE "B" ON THIS PAGE)

LADING MAY BE SECURED ON A CUSHIONED FMS TYPE FLAT CAR WITH CHAIN TIEDOWN ASSEMBLIES IN LIEU OF USING THE DEPICTED GENERAL SERVICE FM TYPE CAR AND THE SPECIFIED TIEDOWN MATERIALS, PROVIDING THE FOLLOWING CONDITIONS ARE MET:

1. ONE (1) MOVABLE ANCHOR HAVING A 1/2 INCH, 27,500-POUND PROOF TEST ALLOY CHAIN ASSEMBLY TIEDOWN DEVICE MUST BE SUBSTITUTED FOR EACH WIRE ROPE CABLE TIEDOWN MARKED (B). OR FOUR (4) MOVABLE ANCHORS HAVING 3/8 INCH, 18,000-POUND PROOF TEST ALLOY CHAIN ASSEMBLY TIEDOWN DEVICES* MUST BE INSTALLED AT EACH CORNER OF THE VEHICLE, TWO AT EACH TIEDOWN FITTING, AS APPLICABLE. CHAINS WILL BE ATTACHED TO THE LADING AT THE SAME LOCATIONS SHOWN FOR THE WIRE ROPE. ANCHOR DEVICES WILL BE LOCATED SO AS TO POSITION THE CHAINS WITHIN THE ANGULAR TOLERANCES SPECIFIED ON THE LOAD VIEWS. PIECES MARKED (1) THRU (6) WILL BE USED.
2. BEFORE AND DURING INSTALLATION, THE ANCHOR DEVICES SHALL BE INSPECTED FOR BENT HOOKS, STRETCH, GOUGES, BENT LINKS, AND WEAR IN THE CHAINS, AND FOR DAMAGED LOAD BINDERS OR WINCHES, OR ANY OTHER NOTICEABLE DEFECTS. ANY DEFICIENCY SHALL BE CAUSE FOR NOT USING AN ANCHOR AND CHAIN ASSEMBLY.
3. CHAINS MUST NOT BE TWISTED DURING INSTALLATION. CHAINS ARE TO BE STRUCK WITH A HAMMER OR BAR AFTER TIGHTENING TO ELIMINATE ANY POSSIBLE MISALIGNMENT OF LINKS. FURTHER TIGHTENING MAY BE REQUIRED TO TAKE UP ANY SLACK THAT DEVELOPS DUE TO LINK ALIGNMENT.
4. TURNBUCKLES OR OTHER TENSIONING DEVICES NOT EQUIPPED WITH SELF-LOCKING DEVICES MUST BE WIRED OR PINNED TO PREVENT THEM FROM TURNING OR LOOSENING DURING TRANSIT.
5. OPEN HOOKS MUST BE SECURED WITH A WIRE AS REQUIRED TO PREVENT THE HOOK FROM BECOMING DISENGAGED FROM THE CHAIN LINK TO WHICH IT IS ATTACHED.
6. ANTI-CHAFING MATERIAL MUST BE PLACED AND SECURED BETWEEN THE CHAINS AND THE LADING AT ALL POINTS OF CONTACT EXCEPT AT DEFINITIVE TIEDOWN POINTS.

*CAUTION: THE LENGTH OF THE 3/8" CHAINS ON SOME CARS EQUIPPED WITH CHAIN ASSEMBLY TIEDOWN DEVICES MAY NOT BE SUFFICIENT TO PERMIT INSTALLATION OF THE CHAINS WITHIN THE SPECIFIED 45° MAXIMUM ANGLE WITH THE CAR FLOOR.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	24	16
2" X 6"	91	91
2" X 12"	49	98
NAILS	NO. REQD	POUNDS
10d (3")	112	1-3/4
20d (4")	160	5-3/4
50d (5-1/2")	20	4
ROPE, STEEL WIRE, 5/8" DIA	280' REQD	193 LBS
CLIP, 5/8"	82 REQD	52 LBS
THIMBLE, STANDARD, 5/8"	22 REQD	7 LBS
SHACKLE, 7/8"	4 REQD	16 LBS

MATERIAL SPECIFICATIONS

- LUMBER ----- : DOUGLAS FIR OR COMPARABLE LUMBER WITH STRAIGHT GRAIN AND FREE FROM MATERIAL DEFECTS. REF: FED SPEC MM-L-751.
- NAILS ----- : COMMON. REF: FED SPEC FF-N-105.
- ROPE ----- : STEEL WIRE, PLAIN, PREFORMED, REGULAR LAY, 17.9 TONS, 6 X 19, FLEXIBLE IWRC, MACWHYTE WIRE ROPE CO (OR EQUAL). REF: FED SPEC RR-W-410.
- CLIP ----- : "U" BCLT, CROSBY, HEAVY DUTY (OR EQUAL). REF: FED SPEC FF-C-450, TYPE I, CLASS I.
- THIMBLE, STAKE
POCKET PROTECTOR: COMMERCIAL GRADE.
- SHACKLE ----- : TYPE IV, CLASS 4. FED SPEC RR-C-271.

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AR 740-1.
- B. THE LOAD AS SHOWN IS BASED ON A FLAT CAR 10'-6" WIDE (PLATFORM). CARS OF OTHER WIDTHS MAY BE USED PROVIDING THE PLATFORM IS AT LEAST 10'-0" WIDE. ONLY ONE UNIT OF LADING IS SHOWN; HOWEVER, MULTIPLES OF UNITS, AS SHOWN OR DISSIMILAR IN NATURE, MAY BE LOADED ON A CAR IF SPACE PERMITS. THE NUMBER OF UNITS TO BE LOADED ON A CAR WILL BE DEPENDENT ON THE SIZE OF THE CAR USED OR THE QUANTITIES OF UNITS TO BE SHIPPED, WITH THE VIEW OF FULL UTILIZATION OF CARRIER EQUIPMENT.

NOTICE TO TRANSPORTATION OFFICER:

IN LIEU OF REQUISITIONING A GENERAL SERVICE FM* FLAT CAR AS DEPICTED HEREIN, EVERY EFFORT SHOULD BE MADE TO ACQUIRE AN FMS* TYPE CAR. THIS IS A CUSHIONED CAR EQUIPPED WITH SPECIAL TIEDOWN CHANNELS AND MOVABLE ANCHOR AND CHAIN ASSEMBLY TIEDOWN DEVICES* SUCH AS IS USED FOR TRANSPORTING AGRICULTURAL MACHINERY AND HEAVY, EARTH MOVING EQUIPMENT. SEE THE "SPECIAL PROVISIONS" ON THIS PAGE FOR GUIDANCE.

* ASSOCIATION OF AMERICAN RAILROADS (AAR) MECHANICAL DESIGNATION FOR CAR TYPE. REFERENCE IS MADE TO THE "OFFICIAL RAILWAY EQUIPMENT REGISTER".

** A TYPICAL CAR OF THIS TYPE IS SHOWN BY FIGURE 88-B OF SECTION 6 IN PUBLICATION OF AAR TITLE "GENERAL RULES GOVERNING THE LOADING OF COMMODITIES ON OPEN TOP CARS AND TRAILERS. CHAINS MUST PROOF TEST AT LEAST 18,000 POUNDS.

C. LADING DATA:

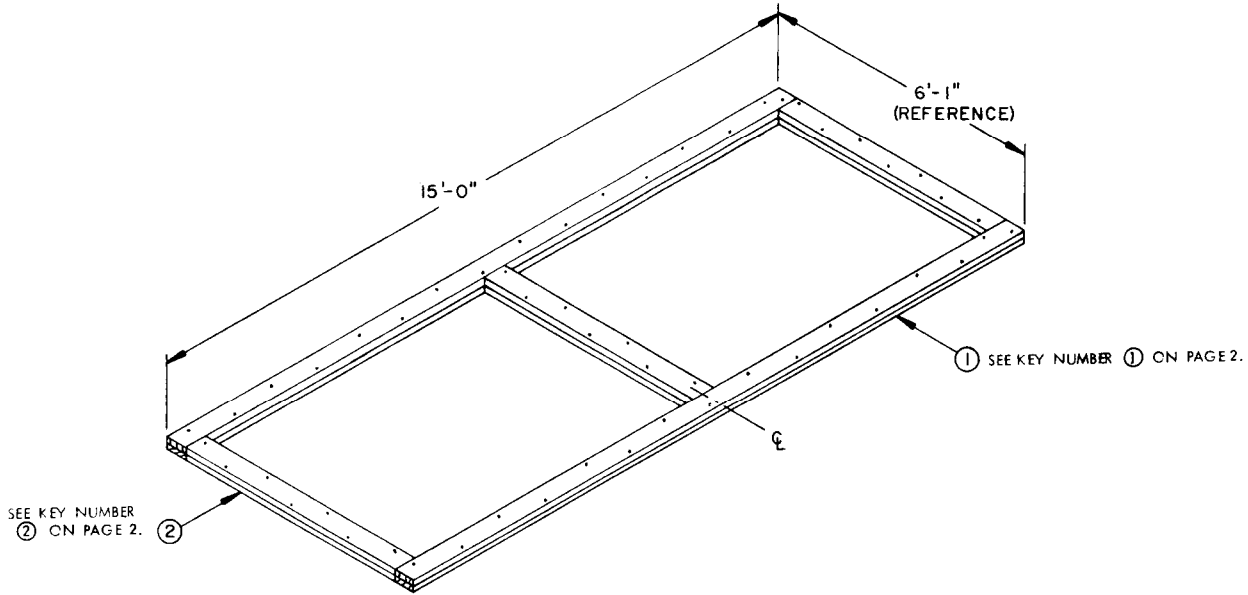
ITEM DIMENSIONS ----- 22'-10-1/2" LONG BY 9'-9" WIDE BY 8'-6" HIGH
ITEM GROSS WEIGHT ----- 42,772 POUNDS (APPROX)

- D. REFER TO ORD DWG 19-48-C-ORDJU-588, "WIRE ROPE AND ANNEALED WIRE APPLICATION METHODS FOR SECURING LADING ON RAIL & MOTOR CARRIER EQUIP", FOR PROPER TIEDOWN APPLICATION, EXCEPT THAT THE NUTS ON 5/8" CLIPS WILL BE TIGHTENED TO A TORQUE OF 135 TO 150 FOOT POUNDS. A PROPER TORQUE CAN BE ACHIEVED BY USING A WRENCH WHICH HAS A HANDLE THAT IS AT LEAST 24" LONG. CAUTION: DURING WIRE ROPE INSTALLATION, AVOID CONTACT WITH ALL ELECTRICAL WIRING, VEHICLE CONTROLS AND OTHER APPURTENANCES. METAL FILLERS OR COMPARABLE CUSHIONING MATERIAL MUST BE USED BETWEEN TIEDOWN CABLES AND ALL SHARP EDGES.
- E. REFER TO ASSOCIATION OF AMERICAN RAILROADS MANUAL, "GENERAL RULES GOVERNING THE LOADING OF COMMODITIES ON OPEN TOP CARS AND TRAILERS", FOR APPLICABLE LOADING RULES. PREFACE, 1-A, 2, 3, 4, 5, 7, 9, 14, AND 15.
- F. 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 SIZE "COME-A-LONG" TYPE MECHANICAL HOIST. NOTE: CABLES WILL BE TENSIONED SUFFICIENTLY TO CAUSE THE BODY OF THE TRACK VEHICLE TO DEPRESS APPROXIMATELY ONE INCH (1").
- G. CAUTION: IT IS RECOMMENDED THAT STEEL WIRE ROPE BE INSTALLED TO APPROXIMATE THE ANGLE SHOWN; HOWEVER, IF PLACEMENT OF TRANSPORTER TIEDOWN FACILITIES PREVENTS THIS, CARE MUST BE EXERCISED TO ENSURE THAT CABLES ON THE SAME SIDE OF THE LADING ARE INSTALLED SO THEIR RETENTION FORCES ACT IN OPPOSITE LONGITUDINAL DIRECTIONS.
- H. DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE UNLESS OTHERWISE SPECIFIED. FOR EXAMPLE, 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE.
- J. NOTICE: A STAGGERED NAILING PATTERN WILL BE USED WHEN DUNNAGE IS NAILED TO THE FLOOR OF THE TRANSPORTING VEHICLE, OR WHEN LAMINATING DUNNAGE. 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.

LOAD AS SHOWN

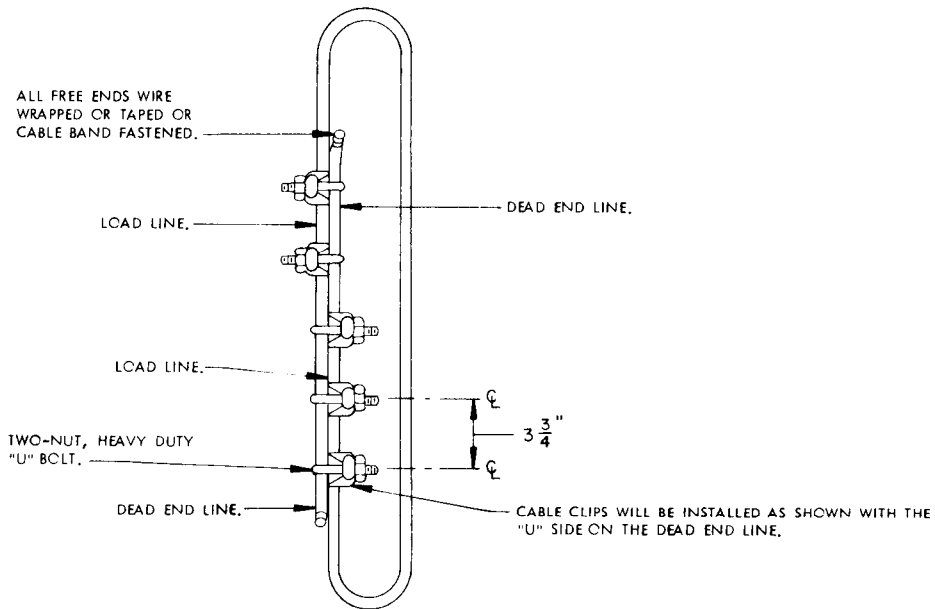
ITEM	QUANTITY	WEIGHT (APPROX)
SELF PROPELLED LAUNCHER	1	42,772 LBS
DUNNAGE		690 LBS

TOTAL WEIGHT ----- 43,462 LBS (APPROX)



SIDE BLOCKING ASSEMBLY

THIS ASSEMBLY MUST BE PRE-POSITIONED AND NAILED IN PLACE PRIOR TO LOADING THE SELF PROPELLED LAUNCHER LOADER. SEE KEY NUMBERS ① AND ② ON PAGE 2 FOR MATERIAL AND NAILING SPECIFICATIONS. THE DIMENSION BETWEEN THE INSIDE OF THE CARRIER TRACKS IS 6'-3" (APPROX).



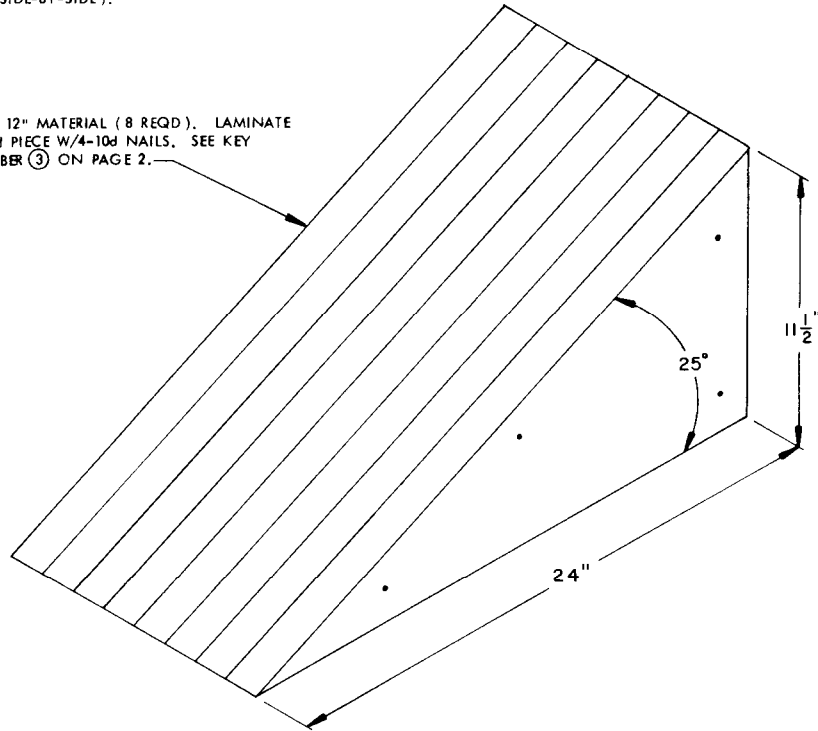
CABLE JOINT

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. SEE KEY NUMBERS ⑧ AND ⑨ ON PAGE 2.

NOTE ▲:

FOR AN ALTERNATIVE METHOD THE FRONT AND REAR CHOCK BLOCKS MAY BE CUT FROM 12" X 12" BY LENGTH-TO-SUIT MATERIAL OR FABRICATED FROM 6" X 12" BY LENGTH-TO-SUIT MATERIAL (USE TWO EACH, SIDE-BY-SIDE).

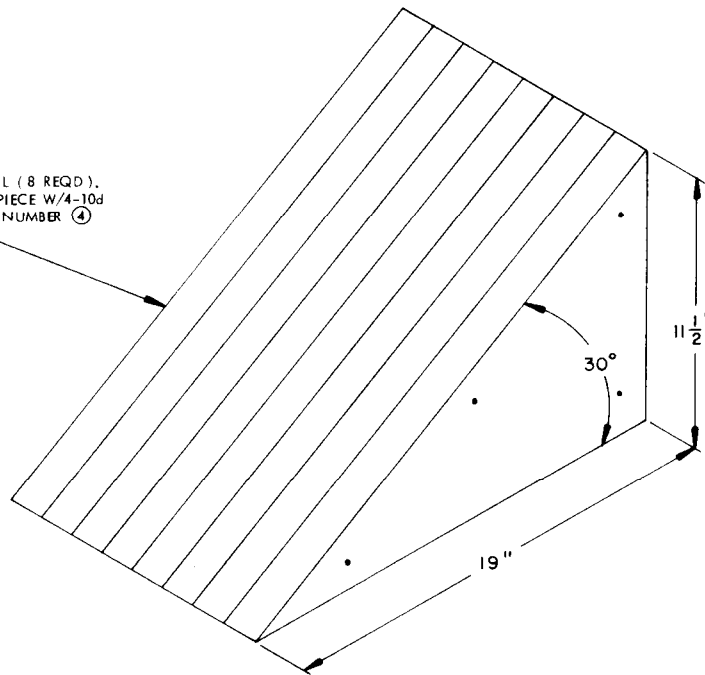
2" X 12" MATERIAL (8 REQD). LAMINATE EACH PIECE W/4-10d NAILS. SEE KEY NUMBER ③ ON PAGE 2.



FRONT CHOCK BLOCK

FABRICATE FROM 2" X 12" MATERIAL AS SHOWN ABOVE AND POSITION WITH BEVELED END OF THE CHOCK BLOCK CENTERED ON AND TIGHTLY AGAINST THE CARRIER TRACK AS SHOWN IN THE "ISOMETRIC VIEW" ON PAGE 2. FOR AN ALTERNATIVE METHOD SEE "NOTE ▲" ABOVE.

2" X 12" MATERIAL (8 REQD). LAMINATE EACH PIECE W/4-10d NAILS. SEE KEY NUMBER ④ ON PAGE 2.



REAR CHOCK BLOCK

FABRICATE FROM 2" X 12" MATERIAL AS SHOWN ABOVE AND POSITION WITH THE BEVELED END OF THE CHOCK BLOCK CENTERED ON AND TIGHTLY AGAINST THE CARRIER TRACK AS SHOWN IN THE "ISOMETRIC VIEW" ON PAGE 2. FOR AN ALTERNATIVE METHOD SEE "NOTE ▲" ABOVE.

DETAILS