

APPROVED BY
 MECH DIV AAR, THEIR LETTER
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 SIGNED Charles G. Ellis
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 MTMCTEA, FT EUSTIS, VA.

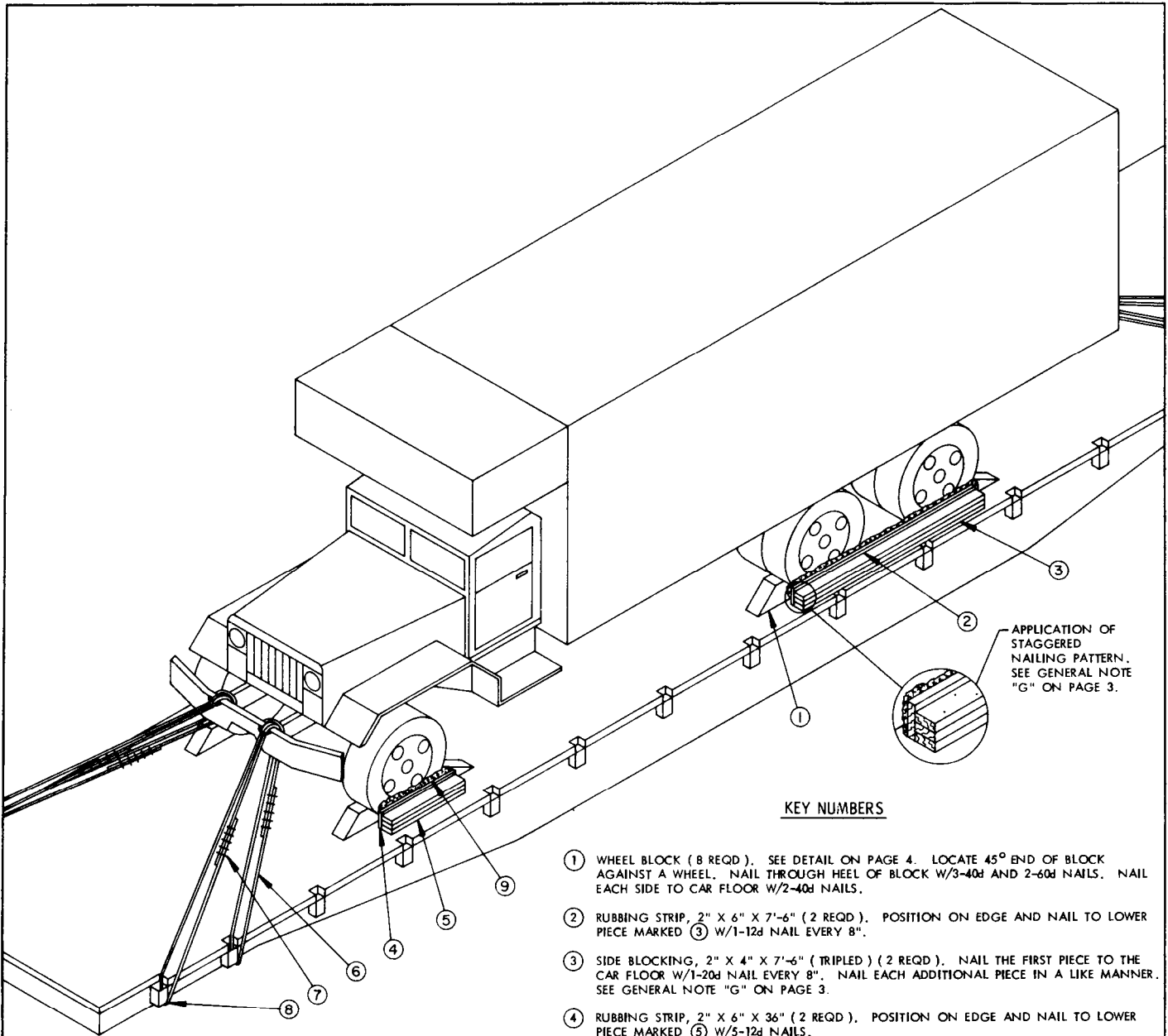
LOADING AND BRACING ON FLAT CAR OF CALIBRATION ELECTRONIC EQUIPMENT MOUNTED ON 5-TON TRUCK, M820A2

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.

CAUTION: LOAD AS SHOWN MAY REQUIRE "CLEARANCE" CONSIDERATION BECAUSE OF EXCESSIVE LADING SIZE.

DO NOT SCALE

REVISIONS				DESIGNED BY	CHKD BY	APP'D BY	DATE
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				U.S. ARMY AMC DRAWING			
				JUNE 1986			
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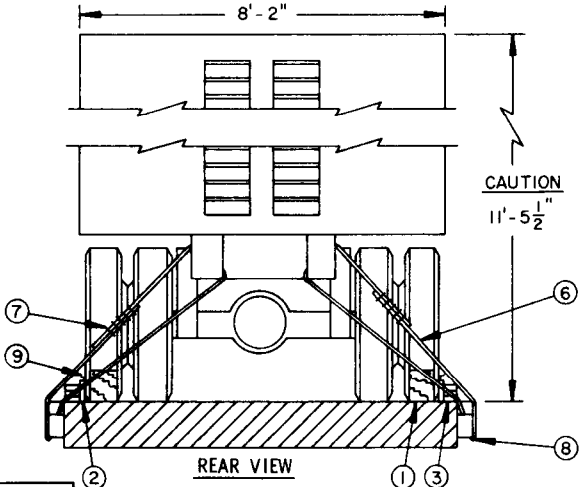


APPLICATION OF STAGGERED NAILING PATTERN. SEE GENERAL NOTE "G" ON PAGE 3.

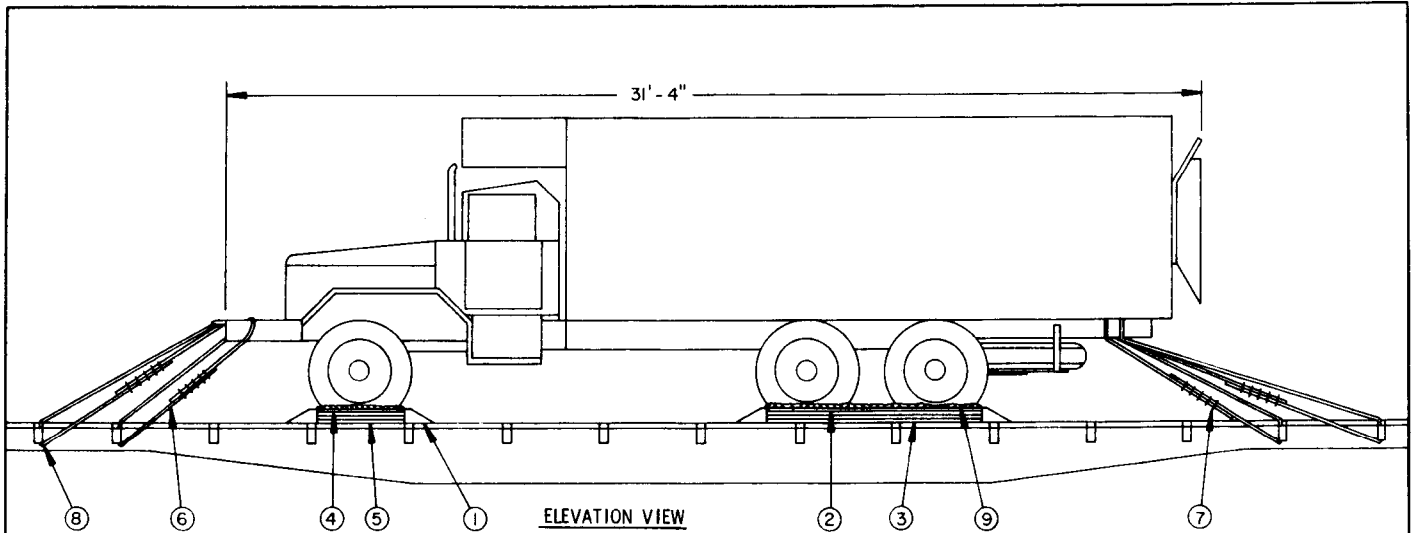
KEY NUMBERS

- ① WHEEL BLOCK (8 REQD). SEE DETAIL ON PAGE 4. LOCATE 45° END OF BLOCK AGAINST A WHEEL. NAIL THROUGH HEEL OF BLOCK W/3-40d AND 2-60d NAILS. NAIL EACH SIDE TO CAR FLOOR W/2-40d NAILS.
- ② RUBBING STRIP, 2" X 6" X 7'-6" (2 REQD). POSITION ON EDGE AND NAIL TO LOWER PIECE MARKED ③ W/1-12d NAIL EVERY 8".
- ③ SIDE BLOCKING, 2" X 4" X 7'-6" (TRIPLED) (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/1-20d NAIL EVERY 8". NAIL EACH ADDITIONAL PIECE IN A LIKE MANNER. SEE GENERAL NOTE "G" ON PAGE 3.
- ④ RUBBING STRIP, 2" X 6" X 36" (2 REQD). POSITION ON EDGE AND NAIL TO LOWER PIECE MARKED ⑤ W/5-12d NAILS.
- ⑤ SIDE BLOCKING, 2" X 4" X 36" (TRIPLED) (2 REQD). NAIL THE FIRST PIECE TO THE CAR FLOOR W/5-20d NAILS. NAIL EACH ADDITIONAL PIECE IN A LIKE MANNER.
- ⑥ STEEL WIRE ROPE, 5/8" DIA, 17.9 TONS (8 REQD). INSTALL CABLE ANGULARLY AS SHOWN AND TO FORM A COMPLETE LOOP FROM STAKE POCKET ON CAR TO POINT OF ATTACHMENT ON LADING AND BACK TO STAKE POCKET; AT REAR OF LADING, EXTEND AROUND MAIN FRAME MEMBER; AT FRONT OF LADING, EACH SIDE, EXTEND ONE CABLE THRU LADING LIFTING DEVICE, AROUND MAIN FRAME MEMBER AND BACK THRU LIFTING DEVICE; OTHER CABLE TO EXTEND UNDER BUMPER AND AROUND TRUCK MAIN FRAME MEMBER. **CAUTION:** DO NOT TIE TO LADING LIFTING DEVICES OR BUMPERETTES. **NOTE:** CABLE OF A LARGER SIZE MAY BE USED IF AVAILABLE, WHEN SPECIFIED CABLE IS NOT AVAILABLE. SEE GENERAL NOTES "D", "F", AND "J" ON PAGE 3. SEE THE "SPECIAL PROVISIONS" ON PAGE 4.
- ⑦ CLIP, WIRE ROPE, SIZE 5/8" (48 REQD). USE FIVE (5) PER CABLE JOINT OF PIECE MARKED ⑥ AND ONE (1) 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 TO A CABLE WITH A 5/8" CLIP, A 3/4" CLIP MAY BE USED. **ALT:** NO. 14 GAGE WIRE MAY BE USED IN LIEU OF A CLIP FOR SECUREMENT OF THE THIMBLE TO THE HOLD DOWN CABLE.
- ⑧ THIMBLE, STANDARD, SIZE 5/8" (8 REQD). USE ONE (1) PER STAKE POCKET. SECURE TO CABLES, PIECES MARKED ⑥, W/1-CLIP PER THIMBLE. **NOTE:** THAT AN "OPEN PATTERN" THIMBLE IS RECOMMENDED.
- ⑨ WATERPROOF PAPER OF A SUFFICIENT SIZE TO POSITION UNDER AND EXTEND 2" ABOVE PIECES MARKED ② AND ④.

ISOMETRIC VIEW



REAR VIEW



(GENERAL NOTES CONTINUED)

- G. 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.
- H. DUNNAGE LUMBER SPECIFIED THROUGHOUT THIS PROCEDURAL DRAWING IS OF NOMINAL SIZE UNLESS OTHERWISE DIMENSIONED. FOR EXAMPLE, 2" X 4" MATERIAL IS ACTUALLY 1-1/2" THICK BY 3-1/2" WIDE.
- J. THE CABLES MUST BE INSTALLED AT THE ANGLE SHOWN IN THE LOAD VIEWS.
- K. CONVERSION TO METRIC EQUIVALENTS: THE DIMENSIONS WITHIN THIS DOCUMENT ARE EXPRESSED IN INCHES AND WEIGHTS ARE EXPRESSED IN POUNDS. WHEN NECESSARY, THE METRIC EQUIVALENT MAY BE COMPUTED ON THE BASIS OF ONE INCH EQUALS 25.4MM AND ONE POUND EQUALS 0.454KG.
- L. IF THE LADING ITEM IS TO BE LOADED ONTO OR OFF OF THE TRANSPORTING CAR BY OVERHEAD SLINGING, CARE MUST BE EXERCISED SO THAT THIS ITEM IS NOT DAMAGED DURING THE HANDLING OPERATION BY THE USE OF IMPROPER EQUIPMENT. ONE RECOMMENDED PROCEDURE IS DELINEATED IN THE "SLINGING PROVISIONS" DETAIL ON PAGE 5.

BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 4"	63	42
2" X 6"	21	21
6" X 8"	10	40
NAILS	NO. REQD	POUNDS
12d (3-1/4")	32	1/2
20d (4")	108	4
40d (5")	56	3-1/2
60d (6")	16	1-3/4
ROPE, STEEL WIRE, 5/8" DIA	164' REQD	113 LBS
CLIP, 5/8"	48 REQD	30 LBS
CLIP, 3/4" (ALT FOR 5/8")	8 REQD	12 LBS
THIMBLE, STANDARD, 5/8"	8 REQD	3 LBS
WATERPROOF PAPER	AS REQD	NIL

MATERIAL SPECIFICATIONS

- LUMBER** ----- DOUGLAS FIR OR COMPARABLE LUMBER WITH STRAIGHT GRAIN AND FREE OF MATERIAL DEFECTS. REF: FED SPEC MM-L-751.
- NAILS** ----- COMMON, 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" BOLT, CROSBY, HEAVY DUTY (OR EQUAL). REF: FED SPEC FF-C-450, TYPE I CLASS 1.
- THIMBLE** ----- TYPE II REF: FED SPEC FF-T-276.
- WATERPROOF PAPER** ----- NEUTRAL BARRIER MATERIAL MIL-B-121 (OR EQUAL).

GENERAL NOTES

- 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 9'-2" WIDE (PLATFORM). WIDER CARS CAN BE USED. 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 PAGE 4 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 TITLED "GENERAL RULES GOVERNING THE LOADING OF COMMODITIES ON OPEN TOP CARS AND TRAILERS." CHAIN MUST PROOF TEST AT LEAST 18,000 POUNDS.

C. LADING DATA:

ITEM DIMENSIONS -----31'-4" LONG X 8'-2" WIDE X 11'-5-1/2" HIGH.
ITEM GROSS WEIGHT -----27,300 POUNDS (APPROX).

- D. REFER TO ORD DWG 19-48-C-ORDJLJ-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. NOTE: IF A TORQUE WRENCH IS NOT AVAILABLE FOR TIGHTENING CLIP NUTS, THE PROPER TORQUE FOR CLIP NUTS CAN BE ACHIEVED BY USING BOX AND/OR OPEN-END OR SOCKET WRENCHES THAT HAVE 24" LONG HANDLES. CAUTION: DURING WIRE ROPE INSTALLATION AVOID CONTACT WITH ALL ELECTRICAL WIRING, VEHICLE CONTROL AND OTHER APPURTENANCES. METAL FILLERS OR COMPARABLE CUSHIONING MATERIAL MUST BE USED BETWEEN TIEDOWN CABLES AND ALL SHARP EDGES, AND ANTI-CHAFING MATERIAL MUST BE USED BETWEEN SIDE BLOCKING DUNNAGE AND LADING TIRES.
- E. REFER TO ASSOCIATION OF AMERICAN RAILROADS MANUAL, "GENERAL RULES GOVERNING THE LOADING OF COMMODITIES ON OPEN TOP CARS", FOR APPLICABLE LOADING RULES; PREFACE, 1A, 2, 3, 4, 5, 7, 9, 14, 15, 19A AND 19B. ADDITIONALLY, LADING TIRES WILL BE INFLATED TO 10 PSI ABOVE HIGHWAY OPERATING PRESSURE, AND ALL HAND BRAKES MUST BE "SET" WITH THE HAND LEVERS WIRE TIED OR BLOCKED.
- F. WIRE ROPE CABLE MUST BE TENSIONED TO CAUSE SLIGHT VEHICLE BODY DEPRESSION. TENSIONING CAN BE ACCOMPLISHED BY EMPLOYING TWO (2) CABLE "GRIPPERS" AND AN APPLICABLE SIZED "COME-A-LONG" TYPE MECHANICAL HOIST

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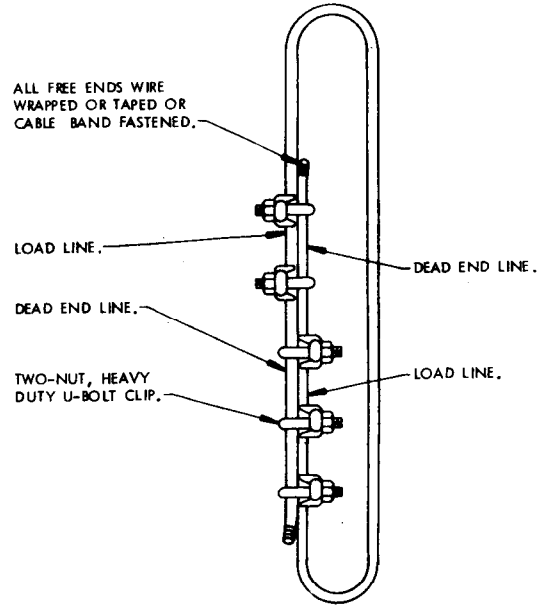
LOAD AS SHOWN

ITEM	QUANTITY	WEIGHT (APPROX)
CALIBRATION VAN	1	27,300 LBS
DUNNAGE		362 LBS
TOTAL WEIGHT		27,662 LBS

SPECIAL PROVISIONS:

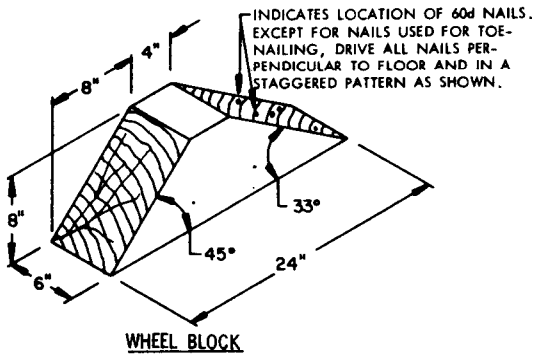
LADING MAY BE SECURED ON A CUSHIONED FMS TYPE FLAT CAR WITH CHAIN TIEDOWN ASSEMBLIES IN LIEU OF USING THE DEPICTED GENERAL SERVICE FM TYPE CAR AND THE SPECIFIED TIEDOWN MATERIALS, PROVIDING THE FOLLOWING CONDITIONS ARE MET:

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 (6), OR AT EACH CORNER OF THE LADING, THREE (3) MOVABLE ANCHORS HAVING A 3/8 INCH, 18,000 POUND PROOF TEST ALLOY CHAIN ASSEMBLY TIEDOWN DEVICE MUST BE SUBSTITUTED FOR EACH WIRE ROPE CABLE, PIECE MARKED (6), AT THAT LOCATION. CHAINS WILL BE ATTACHED TO THE LADING AT THE SAME LOCATIONS SHOWN FOR THE WIRE ROPE. THE ANCHOR DEVICES OF A MATCHING PAIR OF CHAIN TIEDOWNS AT THE SAME END OF THE TRUCK SHOULD BE ATTACHED TO A MATED PAIR OF INBOARD OR OUTBOARD TIEDOWN CHANNELS OF THE CAR FLOOR. ANCHOR DEVICES SHOULD BE LOCATED SO THAT THE MATCHING PAIR OF CHAIN TIEDOWNS ARE AS PARALLEL TO EACH OTHER AS POSSIBLE AND SO THAT THE VERTICAL ANGLE BETWEEN THE CAR FLOOR AND A CHAIN DOES NOT EXCEED 45°.
2. BEFORE AND DURING INSTALLATION, THE ANCHOR DEVICES SHALL BE INSPECTED FOR BENT HOOKS, STRETCH, GOUGES, BENT LINKS, AND EXCESSIVE WEAR IN THE CHAIN 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.

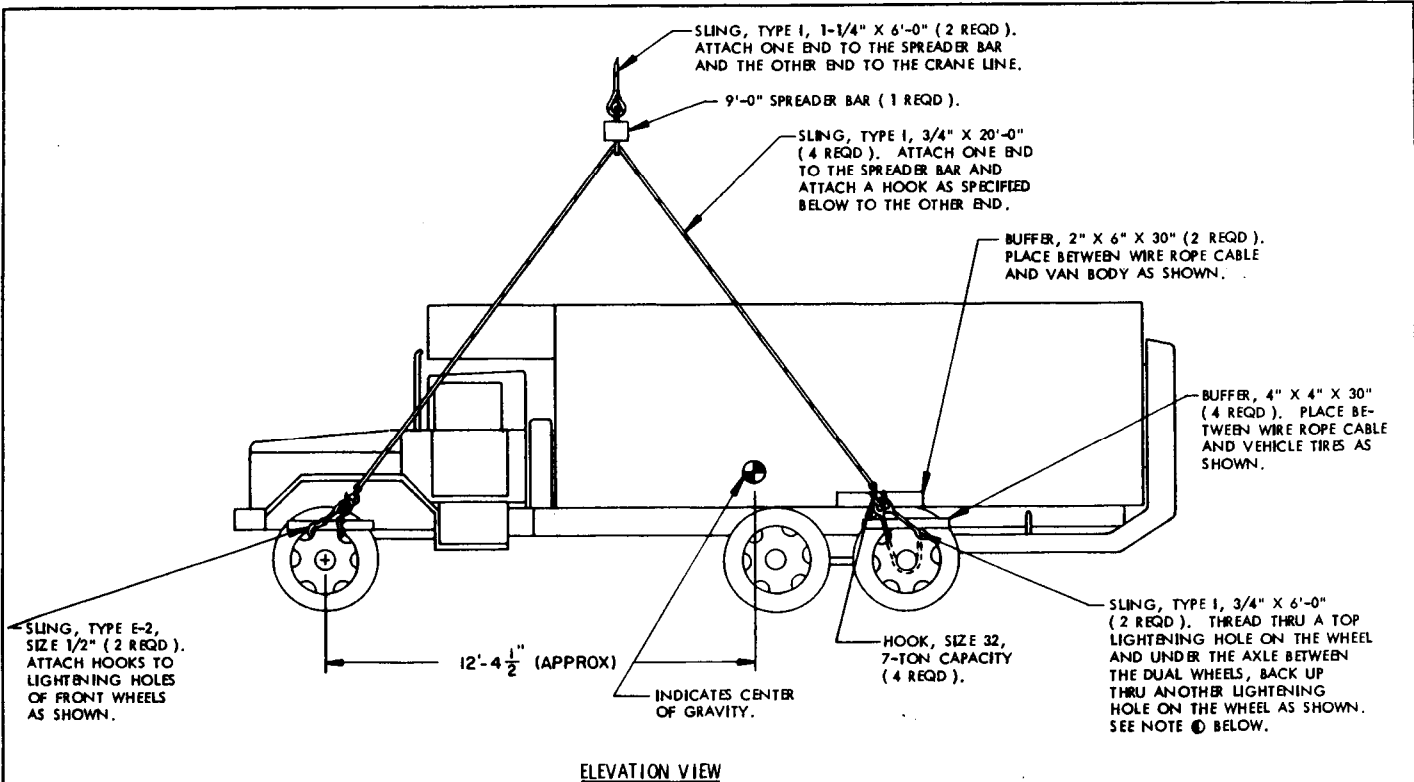


CABLE JOINT

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 GENERAL NOTE "D" ON PAGE 3.

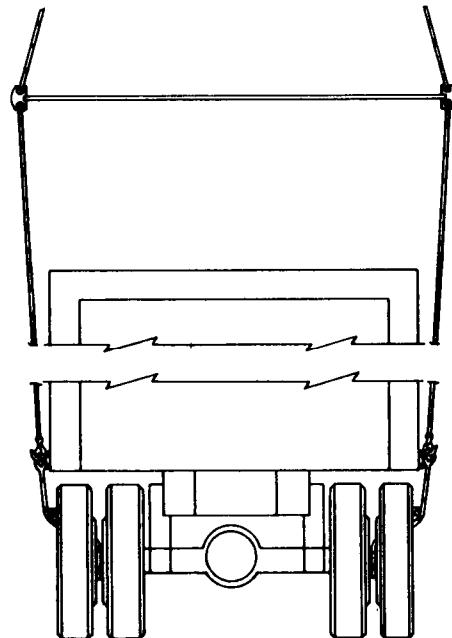


WHEEL BLOCK



NOTE 1:

CARE MUST BE USED WHEN PLACING THE ROPE SLING BETWEEN THE DUAL WHEELS. THE CABLE SHOULD BE POSITIONED SO AS TO NOT CONTACT THE VALVE STEMS OF THE WHEELS.



SLINGING PROVISIONS