

APPROVED BY  
 MECH DIV AAR, THEIR LETTER  
 DATED 17 DEC 73 FILE LR-11.0.15  
 SIGNED Frank L. Purr  
 DATE 17 DEC 1973  
 TEA, MTMTS, FT EUSTIS, VA.

# MULTIPLE SYSTEMS

## LOADING AND BRACING ON FLAT CAR OF 45KW GENERATOR, TRAILER MOUNTED

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.

THIS DRAWING SUPERSEDES USAMC DRAWINGS 19-48-7073-GSE 5HA32 AND 19-48-7098-GSE 5PR5.

**DO NOT SCALE**

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## GENERAL NOTES

- A. THIS DOCUMENT HAS BEEN PREPARED AND ISSUED IN ACCORDANCE WITH AMCR 740-13
- B. THE LOAD AS SHOWN IS BASED ON A GENERAL SERVICE FM\* TYPE FLAT CAR 9'-0" WIDE ( PLATFORM ). WIDER CARS MAY BE USED. THE ITEM CAN BE LOADED ON AN 8'-6" WIDE ( PLATFORM ) FLAT CAR ( SEE "ALTERNATIVE WHEEL BRACING", PAGE 3 ). ONLY ONE UNIT OF LADING IS SHOWN; HOWEVER, MULTIPLES OF UNITS, AS SHOWN OR DISSIMILAR IN NATURE, MAY BE LOADED ON A CAR. 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 CUSHIONED CAR EQUIPPED WITH SPECIAL TIE DOWN CHANNELS AND MOVABLE ANCHOR AND CHAIN ASSEMBLY TIE DOWN DEVICES\*, SUCH AS IS USED FOR TRANSPORTING AGRICULTURAL MACHINERY AND HEAVY EARTH MOVING EQUIPMENT. SEE THE "SPECIAL PROVISIONS" AT THE RIGHT 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".

### C. LADING DATA:

ITEM DIMENSIONS ----- 13'-10-1/2" LONG X 7'-9" WIDE X 7'-2" HIGH.  
ITEM GROSS WEIGHT --- 6,960 POUNDS ( APPROX ) WITH CABLE REEL.  
6,600 POUNDS ( APPROX ) WITHOUT CABLE REEL.

- D. REFER TO ORD D-49 19-48-C-ORDJU-588, "WIRE ROPE AND ANNEALED WIRE APPLICATION METHODS FOR SECURING LADING ON RAIL & MOTOR CARRIER EQUIP", FOR PROPER TIE DOWN APPLICATION, EXCEPT THAT THE NUTS ON 3/8" CABLE CLIPS WILL BE TIGHTENED TO A TORQUE OF 35 TO 40 FOOT POUNDS. CAUTION: DURING WIRE ROPE INSTALLATION, AVOID CONTACT WITH ALL ELECTRICAL WIRING, VEHICLE CONTROLS AND OTHER APPURTENANCES. METAL FILLERS WILL BE USED BETWEEN TIE DOWN WIRES AND/OR CABLES AND ALL SHARP EDGES, AND ANTI-CHAFING MATERIAL MUST BE USED BETWEEN CONTACTING TIE DOWN WIRES AND LADING TIRES. ADDITIONALLY, LADING TIRES WILL BE INFLATED TO 10 PSI ABOVE HIGH-WAY OPERATING PRESSURE. AND ALL HAND BRAKES MUST BE "SET" WITH THE HAND LEVERS WIRE-TIED OR BLOCKED.
- E. REFER TO ASSOCIATION OF AMERICAN RAILROADS MANUAL, "GENERAL RULES GOVERNING THE LOADING OF COMMODITIES ON OPEN TOP CARS", FOR APPLICABLE LOADING RULES. PREFACE, 1-A, 2,3,4,5,9,10-D, 14, 15, AND 19-B
- F. WIRE ROPE CABLE MUST BE TENSIONED SUFFICIENTLY TO CAUSE SLIGHT VEHICLE BODY DEPRESSION, AS APPLICABLE. TENSIONING CAN BE ACCOMPLISHED BY EMPLOYING TWO ( 2 ) CABLE GRIPPERS AND AN APPLICABLY SIZED "COME-A-LONG" TYPE MECHANICAL HOIST.
- G. 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 OR 1-5/8" THICK BY 3-5/8" WIDE AND 2" X 6" MATERIAL IS ACTUALLY 1-1/2" THICK BY 5-1/2" WIDE OR 1-5/8" THICK BY 5-5/8" WIDE.
- H. 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.

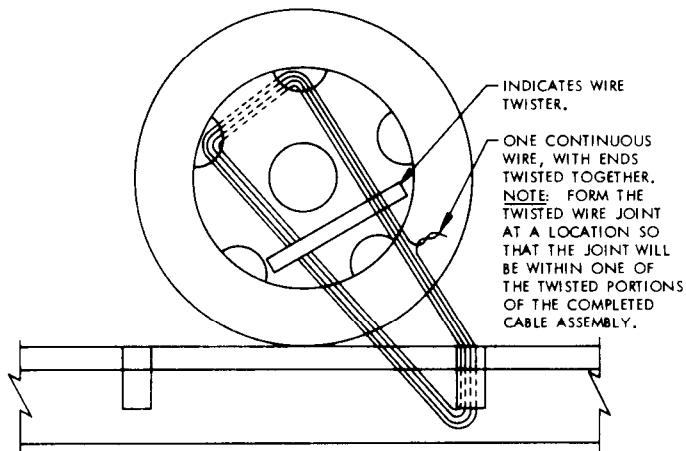
### SPECIAL PROVISIONS:

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

1. THE CAR MUST HAVE A NAILABLE FLOOR, AT LEAST 24" WIDE BETWEEN THE INBOARD CHANNELS, FOR THE SECUREMENT OF THE SUPPORT ASSEMBLY.
2. ONE ( 1 ) MOVABLE ANCHOR WITH CHAIN ASSEMBLY TIE DOWN DEVICE MUST BE SUBSTITUTED FOR EACH WIRE ROPE CABLE TIE DOWN MARKED ( 8 ). 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 TIE DOWNS AT THE SAME END OF THE TRAILER SHOULD BE ATTACHED TO A MATED PAIR OF INBOARD OR OUTBOARD TIE DOWN CHANNELS OF THE CAR FLOOR. ANCHOR DEVICES SHOULD BE LOCATED SO THAT THE MATCHING PAIR OF CHAIN TIE DOWNS 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°.
3. FOR SECURING THE WHEELS, IN LIEU OF STRANDED-WIRE TIE DOWNS, CHOCK BLOCKS, AND SIDE BLOCKING PIECES, TWO ( 2 ) CHAIN ASSEMBLIES WILL BE ATTACHED TO THE LIGHTENING HOLES IN EACH WHEEL. HOWEVER, IF THE LIGHTENING HOLES ARE NOT LARGE ENOUGH TO RECEIVE THE CHAINS, A STEEL WIRE ROPE ( CABLE ) LOOP MUST BE PROVIDED FOR ATTACHMENT OF THE CHAINS. SEE THE "ALTERNATIVE WHEEL SECUREMENT" DETAIL ON PAGE 3 FOR METHOD OF APPLYING CABLE.
4. IN LIEU OF THE STRANDED-WIRE TIE DOWN MARKED ( 7 ) FOR SECURING THE LADING LUNETTE, TWO ( 2 ) CHAIN ASSEMBLIES WILL BE SUBSTITUTED.
5. BEFORE AND DURING INSTALLATION, THE ANCHOR DEVICES SHALL BE INSPECTED FOR BENT HOOKS, STRETCH, GOUGES, BENT LINKS, AND EXCESSIVE 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.
6. 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.
7. 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.
8. OPEN HOOKS MUST BE SECURED WITH WIRE AS REQUIRED TO PREVENT THE HOOK FROM BECOMING DISENGAGED FROM THE CHAIN LINK TO WHICH IT IS ATTACHED.
9. ANTI-CHAFING MATERIAL MUST BE PLACED AND SECURED BETWEEN THE CHAINS AND THE LADING AT ALL POINTS OF CONTACT, EXCEPT AT DEFINITIVE TIE DOWN POINTS.

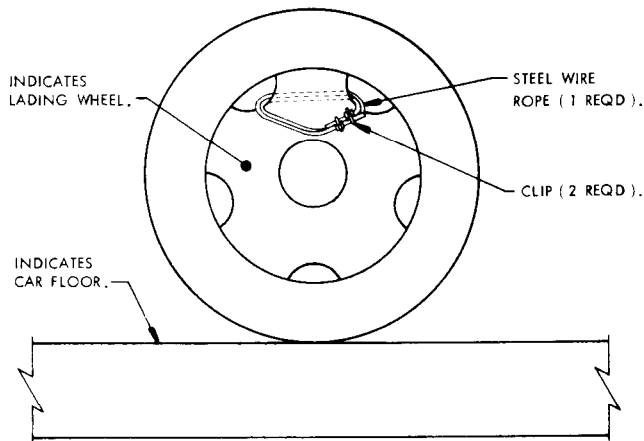
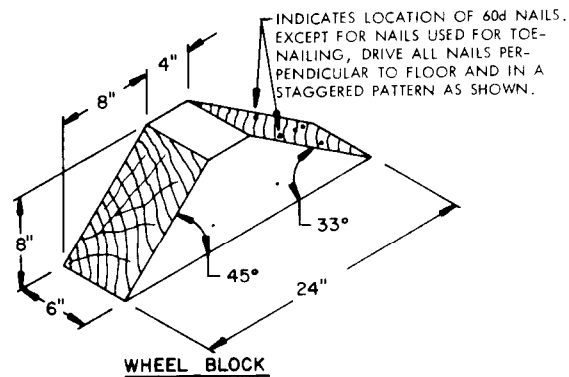
## MATERIAL SPECIFICATIONS

- 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, 6.56 TONS, 6 X 19, FLEXIBLE IWRC, MACWHYTE WIRE ROPE CO ( OR EQUAL ).  
REF: FED SPEC RR-W-410
- CLIPS**----- "U" BOLT, CROSBY, HEAVY DUTY ( OR EQUAL ). REF: FED SPEC FF-C-450, TYPE 1, CLASS 1.
- WIRE**----- ANNEALED, BLACK. REF: FED SPEC QQ-W-461.



**WHEEL SECUREMENT**

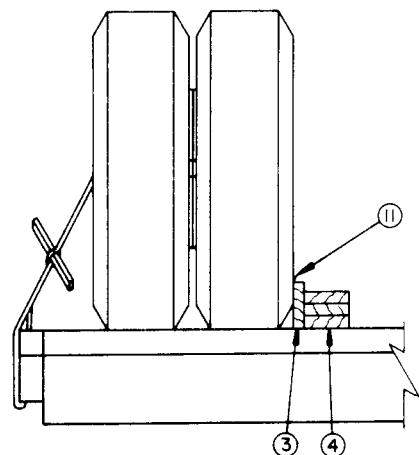
AN EIGHT (8) STRAND INSTALLATION OF NO. 8 GAGE BLACK ANNEALED WIRE IS SHOWN, PASSED THRU HOLES IN WHEEL AND CAR STAKE POCKET TO FORM A COMPLETE LOOP, AND READY TO BE TWISTED TAUT WITH WIRE TWISTER.



AN INSTALLATION OF 1/2" DIAMETER STEEL WIRE ROPE IS SHOWN, PASSED THRU THE UPPER HOLES IN THE WHEEL TO FORM A COMPLETE DOUBLE LOOP WITH AN END-OVER-END LAP JOINT SECURED WITH TWO (2), SIZE 1/2", U-BOLT CLIPS. THE SIZE OF THE LOOP SHALL BE THE MINIMUM NECESSARY TO PERMIT ATTACHMENT OF TWO (2) CHAIN TIE DOWN ASSEMBLIES.

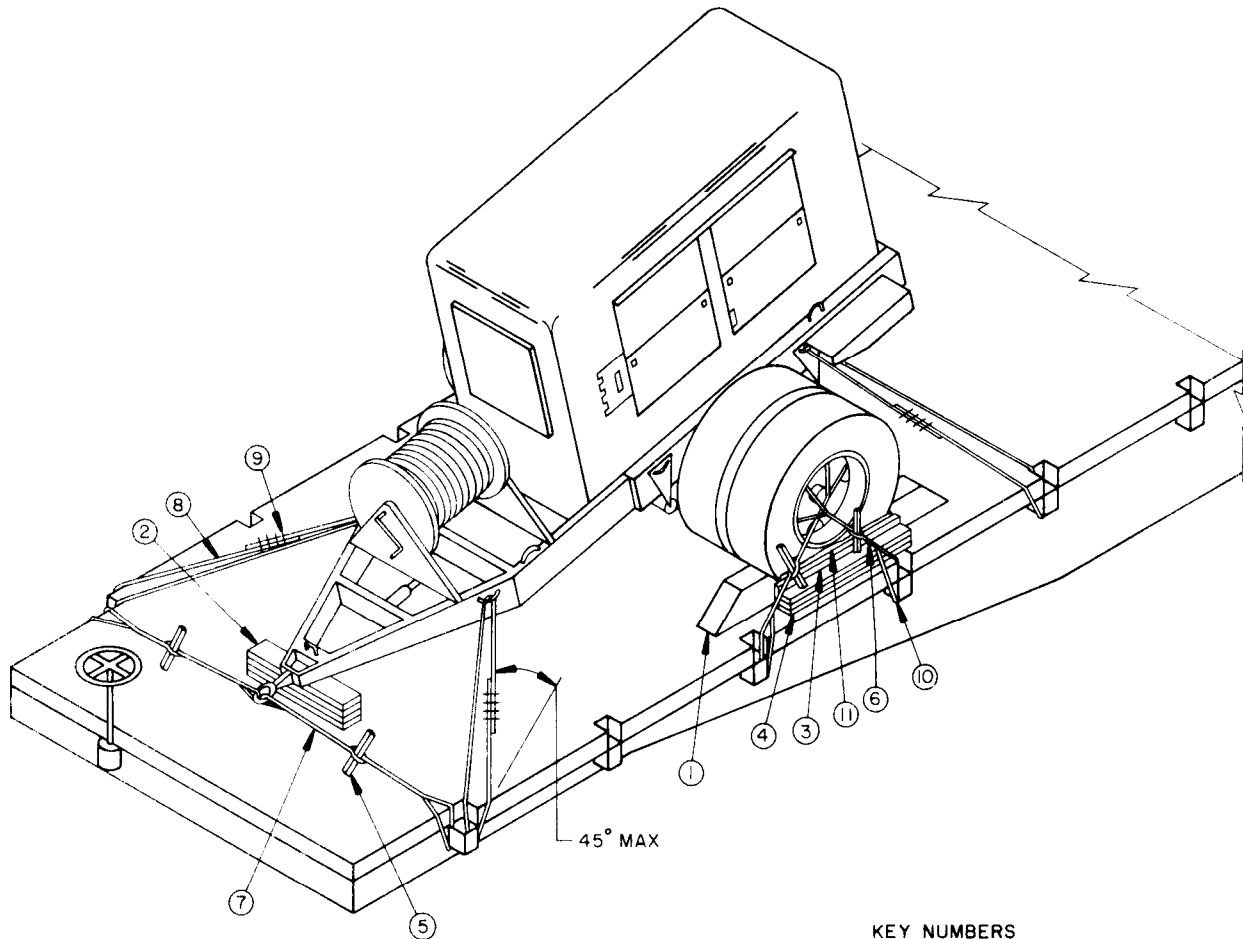
**ALTERNATIVE WHEEL SECUREMENT**

(FOR USE WITH CHAIN TIE DOWNS)



**ALTERNATIVE WHEEL BRACING**

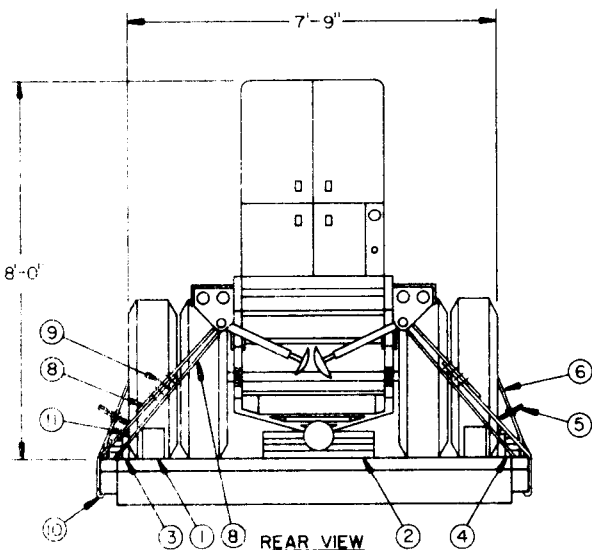
THE ABOVE PARTIAL REAR VIEW DEPICTS PIECES MARKED ③, ④ AND ① POSITIONED AGAINST THE INSIDE OF THE WHEEL WHEN THE 45KW GENERATOR IS LOADED ON AN 8'-6" WIDE FLAT CAR. THESE PIECES MAY BE PRE-POSITIONED.



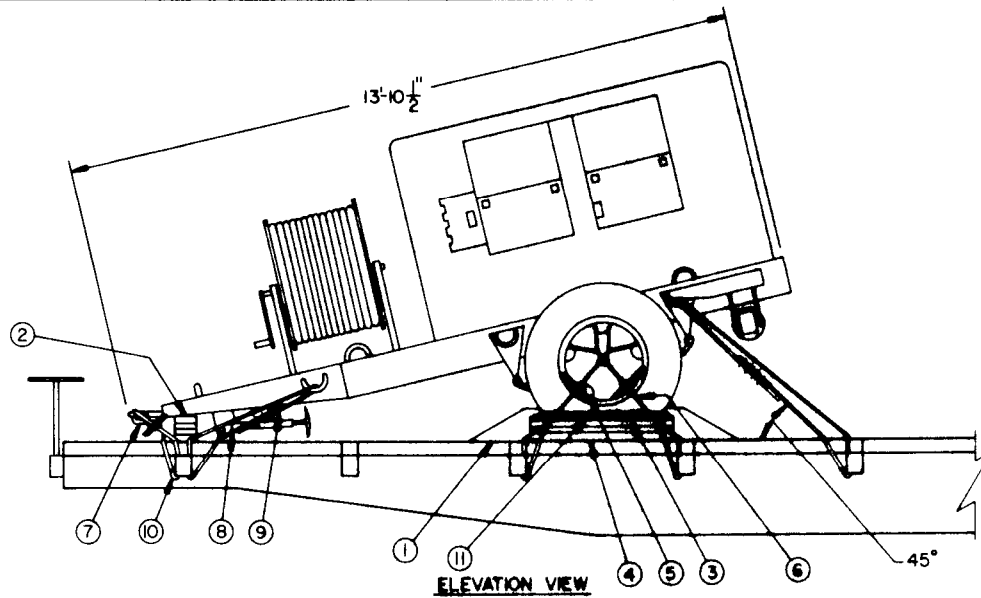
ISOMETRIC VIEW

**KEY NUMBERS**

- ① WHEEL BLOCK ( 4 REQD ). SEE THE DETAIL ON PAGE 3. LOCATE 45° END OF BLOCK AGAINST A WHEEL. NAIL THRU HEEL OF BLOCK W/3-40d NAILS AND 2-60d NAILS. TOENAIL EACH SIDE TO THE CAR FLOOR W/2-40d NAILS.
- ② SUPPORT ASSEMBLY, 2" X 6" X 28" ( QUADRUPLD ) ( 1 REQD ). CENTER UNDER THE FRONT OF THE TRAILER AS SHOWN. NAIL THE FIRST PIECE TO THE CAR FLOOR W/5-30d NAILS. NAIL EACH ADDITIONAL PIECE IN A LIKE MANNER. SEE GENERAL NOTE "H" ON PAGE 2.
- ③ RUBBING STRIP, 2" X 6" X 36" ( 2 REQD ). POSITION ON EDGE AND NAIL TO LOWER PIECE MARKED ④ W/5-12d NAILS.
- ④ SIDE BLOCKING, 2" X 4" X 36" ( TRIPLED ) ( 2 REQD ). NAIL THE FIRST PIECE TO THE CAR FLOOR W/6-30d NAILS. NAIL EACH ADDITIONAL PIECE IN A LIKE MANNER.
- ⑤ WIRE TWISTER, 2" X 2" BY LENGTH TO SUIT ( 6 REQD ). SEE GENERAL NOTE "D" ON PAGE 2.
- ⑥ EIGHT ( 8 ) STRANDS OF NO. 8 GAGE BLACK ANNEALED WIRE ( 4 REQD ). PASS THRU HOLES IN WHEEL HUB AND STAKE POCKET OF CAR TO FORM A COMPLETE LOOP. TWIST TAUT WITH PIECE MARKED ⑤. SEE THE "WHEEL SECUREMENT" DETAIL ON PAGE 3 AND GENERAL NOTES "D" AND "E" ON PAGE 2.
- ⑦ EIGHT ( 8 ) STRANDS NO. 8 GAGE BLACK ANNEALED WIRE ( 2 REQD ). PASS THRU LADING LUNETTE AND STAKE POCKET OF CAR TO FORM A COMPLETE LOOP. TWIST TAUT WITH PIECE MARKED ⑤. SEE THE "SPECIAL PROVISIONS" ON PAGE 2.
- ⑧ STEEL WIRE ROPE, 3/8" DIA., 6.56 TONS ( 4 REQD ). INSTALL CABLE ANGULARLY AS SHOWN AND FORM A COMPLETE LOOP FROM THE STAKE POCKET OF THE CAR THRU THE TIE DOWN DEVICE ON VEHICLE AND BACK TO THE STAKE POCKET. SEE GENERAL NOTE "F" ON PAGE 2. NOTE: CABLE OF A LARGER SIZE MAY BE USED.
- ⑨ CLIP, WIRE ROPE, SIZE 3/8" ( 24 REQD ). FOUR ( 4 ) PER CABLE AND ONE ( 1 ) PER THIMBLE. SEE GENERAL NOTE "D" ON PAGE 2.
- ⑩ THIMBLE, STANDARD, SIZE 3/8" ( 8 REQD ). USE ONE ( 1 ) PER CAR STAKE POCKET AND ONE ( 1 ) PER LADING TIE DOWN DEVICE. SECURE TO WIRE ROPE MARKED ⑧ W/3-CLIP PER THIMBLE. A STANDARD THIMBLE, AS SPECIFIED, CAN BE SECURED TO A CABLE WITH 3/8" CLIP. HOWEVER, IF DESIRED, OR IF THE 3/8" THIMBLE BEING USED IS A TYPE WHICH CANNOT BE SECURED WITH A 3/8" CLIP, A 1/2" CLIP MAY BE USED. NOTE THAT AN "OPEN-PATTERN" THIMBLE IS RECOMMENDED. SEE GENERAL NOTE "D" ON PAGE 2.
- ⑪ WATERPROOF PAPER OR BURLAP OF A SUFFICIENT SIZE TO POSITION UNDER AND EXTEND 2' ABOVE PIECE MARKED ③.



REAR VIEW



BILL OF MATERIAL		
LUMBER	LINEAR FEET	BOARD FEET
2" X 2"	9	3
2" X 4"	18	12
2" X 6"	16	16
6" X 8"	6	24
NAILS	NO. REQD	POUNDS
12d ( 3-1/4" )	10	1/4
30d ( 4-1/2" )	60	3
40d ( 5" )	28	1-3/4
60d ( 6" )	8	1
ROPE, STEEL WIRE, 3/8" DIA.	48' REQD	12 LBS
CLIP, 3/8"	24 REQD	8 LBS
THIMBLE, STANDARD, 3/8"	8 REQD	2 LBS
WIRE, NO. 8 GAGE	300' REQD	29 LBS
WATERPROOF PAPER OR BURLAP	AS REQD	NIL

ITEM	LOAD AS SHOWN QUANTITY	WEIGHT ( APPROX )
45KW GENERATOR	1	6,940 LBS *
DUNNAGE		195 LBS
TOTAL WEIGHT		7,135 LBS

\* SEE GENERAL NOTE "C" ON PAGE 2.