RAC PAMPHLET CL-20

Securement Methods for Military Rail Movements

SECUREMENT METHODS FOR MILITARY RAIL MOVEMENTS IN CANADA

(INCLUDING ALL FOREIGN MILITARY ESTABLISHMENTS)

FIFTH EDITION
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SAFETY
IS A PRIME CONCERN
TO ALL

RULES FOR LOADING MILITARY EQUIPMENT

PRODUCED BY

THE RAILWAY ASSOCIATION OF CANADA

IN COOPERATION WITH

THE DEPARTMENT OF NATIONAL DEFENCE

OF CANADA

BASED ON

THE ASSOCIATION OF AMERICAN RAILROADS

RULES GOVERNING THE LOADING OF MILITARY

EQUIPMENT ON OPEN TOP CARS.

PREFACE

This is the fifth edition and supersedes the earlier edition of this pamphlet. It contains some changes and revised Railway Association of Canada (RAC) Loading Rules. This pamphlet will aid members of the Canadian Forces and railway inspectors in ensuring safe rail transport of equipment. It contains general information, procedures, and figures for the correct tie-down of military equipment on rail cars.

This pamphlet covers minimum standards; your local railroad may require additional securement based on the condition of the rail car or other factors that cannot be standardized. The pamphlet is not designed to cover every military vehicle in the Canadian Forces inventory or other NATO forces visiting or exercising in Canada under the Status of Forces Agreement (SOFA). The vehicles covered herein are those most commonly transported by rail. When in doubt, check with the Loading Rules of the Railway Association of Canada or with the mechanical personnel of the railroad transporting your equipment.

Remember, all equipment loaded onto rail cars must be firmly and properly secured to counteract longitudinal, lateral, and vertical forces. AAR General Rules require both the rail carrier and the shipper to comply with all applicable loading rules and observe the drawings and specifications of applicable figures.

The law in Canada, clearly defined in The Railway Safety Act which governs the loading regulations on open top cars, shall be complied with by all concerned.

NOTE: NATO visiting forces using the North American Rail System **cannot** use the NATO tiedown chain system used by their Forces in Europe.

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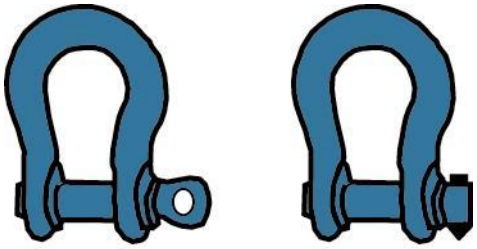
GENERAL GUIDELINES FOR SECUREMENT OF MILITARY VEHICLES ON RAIL FLAT CARS

PREPARING VEHICLES PRIOR TO LOADING

- Make sure that all lifting and tie-down clevises and shackles are attached to the vehicles.



SCREW PIN **ROUND PIN**

1. Clevises/shackles must have strength equal to or greater than the securement attached to it.
2. Clevis/shackle pins must be secured to prevent displacement. When cotter pins are used, the legs of the cotter pins must be fully open.
3. Clevises/shackles equipped with screw pins must be wired to prevent displacement. Pin must protrude the threaded side of the shackle.
4. **On vehicles weighing more than 16,000LBS. shackles used must be of the threaded or screwed type**

- Make sure that fuel tanks are no more than three-quarters full and jerry cans are empty.
- Remove or band canvas and bows to prevent wind damage. (At the discretion of the military, one of these two options must be used).
- Protect windshields from damages, i.e. thrown rocks. (Optional).
- Reduce vehicles to their lowest configuration (for shipping) unless cargo is loaded with military equipment then it must be fully secured, braced and banded.
- Secure materials or equipment loaded in beds of trucks by banding or any other approved method. Bands should be at least 3/4'' by 0.020 inches.
- Hoods must be secured. (Wind can tear hoods off).
- Inflate tires to highway pressure. Repair or replace leaking tires. A flat tire on a truck loaded on a moving train can cause a fire.

PREPARING RAILCARS FOR LOADING

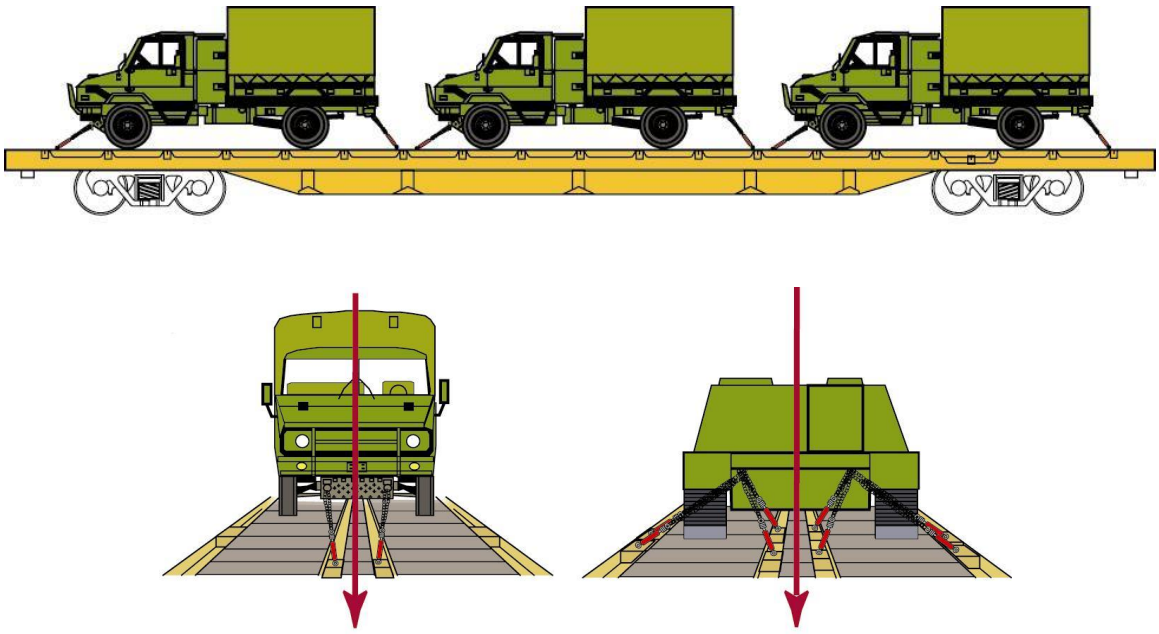
- Inspect rail cars to verify deck suitability.
- On chain equipped cars, locking channels should not be bent.
- All chains and tightening devices should be operative.
- Loading team should have rust retardant oil to free locking devices.
- All necessary tools should be available at rail site including bridge plates, lumber of various sizes, wire and strapping material.
- Store unused chains in channels to prevent damage when loading vehicles.
- Clean debris from locking channels to allow locking devices to be moved the length of channel.
- Remove any protruding nails from deck of car (safety hazard).
- Make sure winches or ratchets are in good working condition, at the right place. Ratchets should be positioned on the car prior to loading to avoid having them under or behind the vehicles.

LOADING VEHICLES

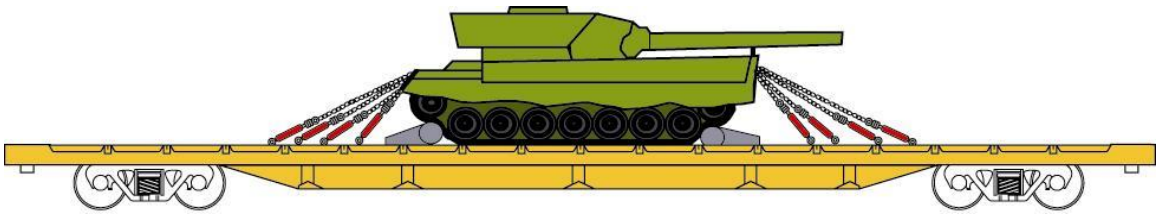
- Set hand brakes on each rail car.
- Position ramp, secure and brace properly so that vehicles can roll on without slipping and turning.
- Position bridge plates in between rail cars when loading wheeled vehicles. (Not required when loading tracked vehicles as this could create a safety hazard).
- When load is prepared on cars with side mounted hand brakes, load maybe located not closer than 1 foot from either end of car.
- When loading vehicles on a standard rail flat car, allow 12'' minimum clearance from the A end of the car, and 24'' from the B end (brake end).
- When loading vehicles, follow the directions of rail and ground guides.
- Guides should keep one rail car distance between them, and the vehicle being loaded.
- Guides should never walk backwards.

- When loading wheeled vehicles on multilevel rail cars, load the bottom deck first, since the upper deck ramp may block the lower deck.

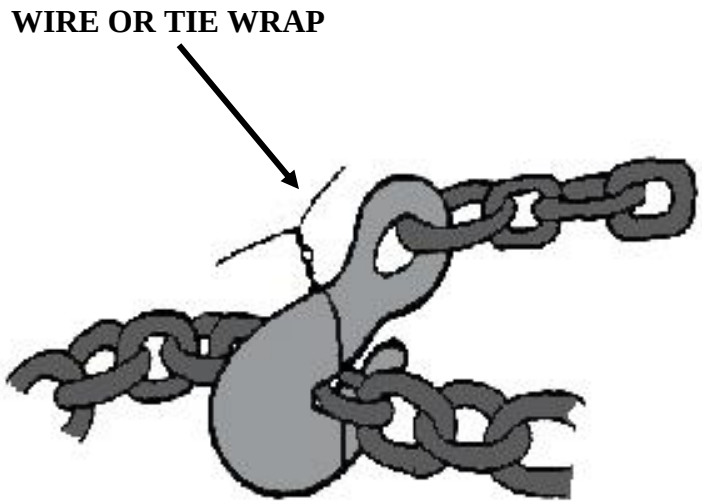
- Load must be located centrally on the rail car, both laterally and longitudinally. Weight of the load must be distributed evenly.



- When loading military tank on a rail equipped car (i.e.: HTTX) or general purpose flat car, only **ONE** tank must be loaded and centrally located on the rail car. No other vehicles can be loaded to use the vacant space at front and rear of the tank.

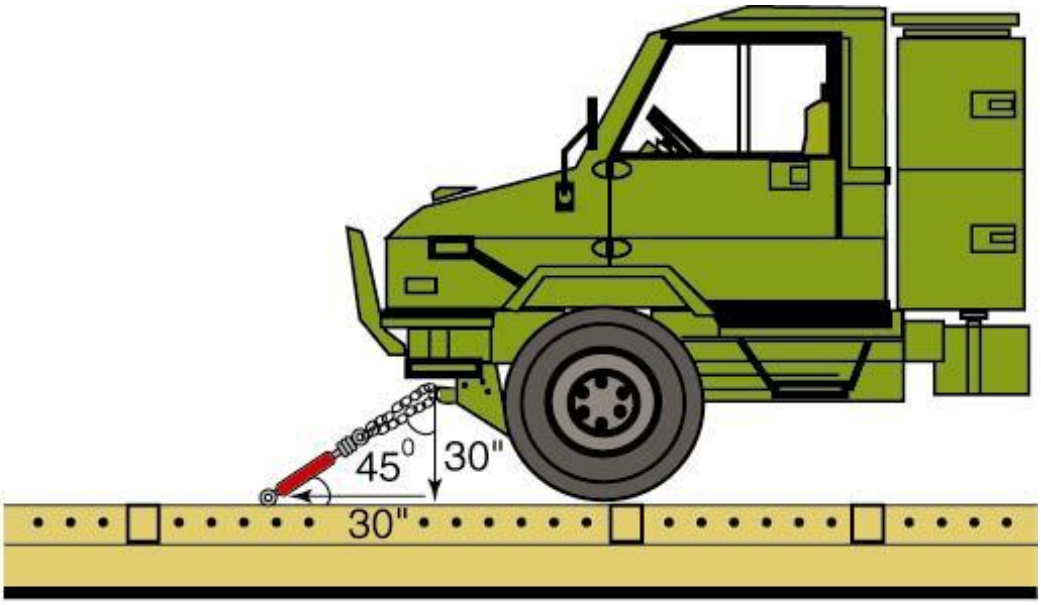


- A safety appliance may be temporarily removed to facilitate loading or unloading a commodity, when necessary, provided it is replaced immediately following loading or unloading operations and prior to releasing the car into service.
- Ensure all winches are in proper direction so that the chain is taken up on the underside of the ratchet wheel.
- Be sure proper tension of wire rope or chains exists.
- Tension chain to achieve a moderate deflection of the vehicle's suspension.
- After initially tensioning each chain, strike it sharply with a hammer or bar and retighten. This helps the links seat in their longest length and helps prevent loose chains in transit.
- Secure excess wire rope or chain to the tension bearing part of the wire rope or chain.
- Tie-down equipment should be affixed to designated attachment points on vehicles, not to axles, springs, or bumpers.
- On chain devices, secure open-faced hooks to the chain link with wire.



SECURING VEHICLES

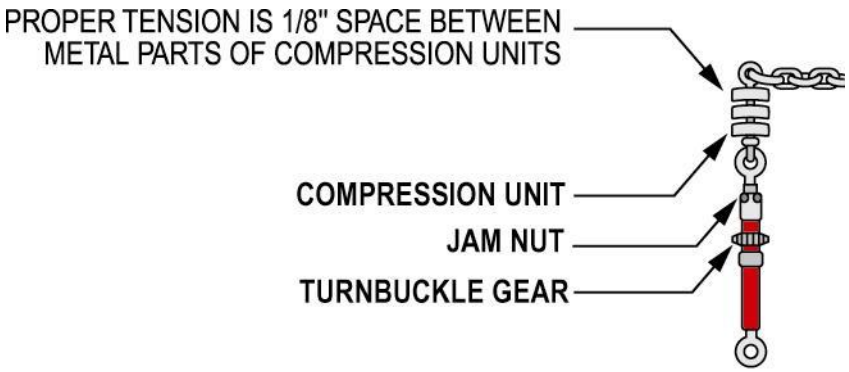
- All winches/ratchets must be located at equal distances from the vehicles, maintaining a 45-degree angle.
- The length of chain should be equal to the distance between the top of the deck and the tie-down point on the vehicles. **(See Note).**



NOTE:	1.	MEASURE DISTANCE FROM ATTACHMENT POINT OF VEHICLE TO FLAT CAR DECK IN A VERTICAL POSITION.
	2.	TAKE VERTICAL DISTANCE (FROM ATTACHMENT POINT TO DECK OF FLAT CAR) AND MEASURE SAME LENGTH HORIZONTALLY AWAY FROM THE VEHICLE.

- Before securement, ensure chains are not kinked or twisted and correct position of chain anchor.
- Do not cross chains.
- Loose chains are not to be wrapped around shackles and winches or ratchets.

- Proper tension is 1/8’’ space between metal parts of compression units on chain assemblies so equipped.



- Lock chain-tightening devices with wire.
- Turnbuckles must have jam nuts tightened wrench tight.
- When in doubt concerning number of chains required use the following restraint guidelines:

Restraint values for general commodities

Direction of Restraint	G Force to Yield
Longitudinal	3.0 Gs Total load restraint in each direction should equal three times object weight.
Lateral	2.0 Gs Total load restraint in each direction should equal two times object weight.
Vertical	2.0 Gs Total load restraint should equal two times object weight.

TIE-DOWN CONFIGURATIONS FOR SPECIALLY EQUIPPED RAIL FLAT CARS

Now that we have covered the previous sections as an introduction to the actual loading, it is time to get on with the job. You will see in this section that it is very easy to load military equipment on open top cars. By following simple rules as set forth in this section, you, the driver, will be able to load and tie down your own equipment under the direct supervision of the movement control organization and the railway inspector. It is an easy process as the rail cars are already equipped with chain tie-down systems. You must be careful when loading your vehicle on the rail cars and follow the rules that are of safety to you and the equipment.

This section is divided into three parts:

WHEELED VEHICLES

TRACKED VEHICLES

ENGINEERING EQUIPMENT

WHEELED VEHICLES

1. Transmissions shall be in neutral. Set the parking brake (if it is available and operational) to prevent the vehicle from inadvertently moving during the securement and unloading process.

2. Vehicles must face in the same direction and be uniformly spaced the length of the car to allow sufficient space at each end of car and between vehicles for securement. Tie-downs in the channels are to be in line across the car. The angle of tie-downs must be as close to 45 degrees as possible.

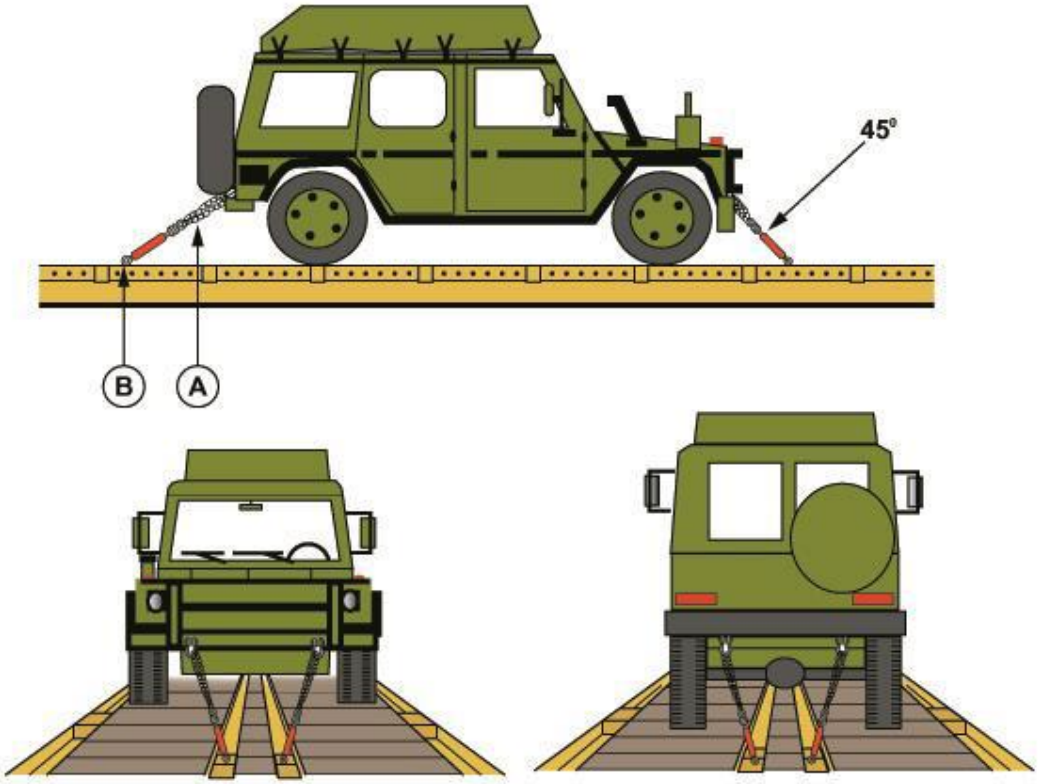
3. Tie-down chains, Items A must be sufficiently tensioned; they must not be crossed and must be free from twisted or kinked links prior to their application to the vehicle.

4. Open hooks must be secured with wire over the opening to prevent hook from becoming disengaged from the chain-link to which it is secured.

5. If equipped, turret gun should be in a straightforward position. If vehicle is not equipped with a workable external locking device, one piece of 3/8” cable extra strength, proof tested to at least 8700 LBS. MBS doubled (complete loop), one each side of vehicle. Protection must be applied at tie-down points when sharp edges are present.

WHEELED VEHICLES

LUVW 3/4 TON
RAC 6088B



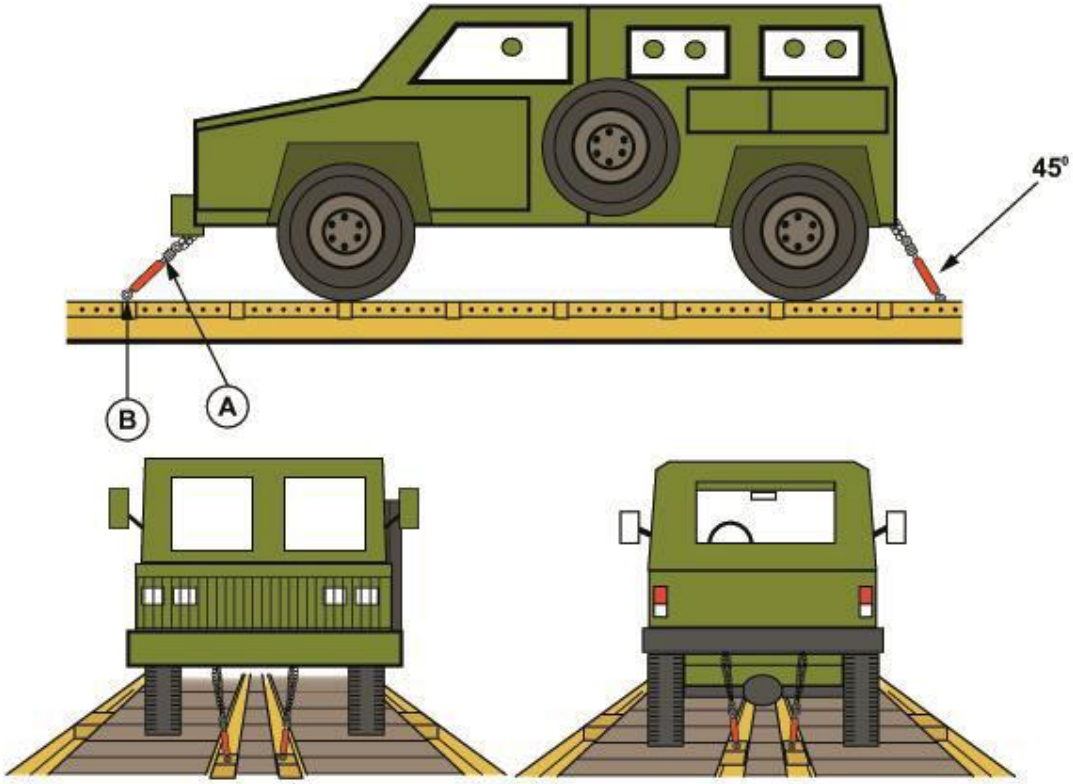
Item	No. of Pcs.	Description
A	4	Chains 3/8” (MBS 36,000 LBS.)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:

LUVW	10,252 LBS.
LUVW 1TM 4X4 MILCOT	8,223 LBS.
LUVW ¾ T 4X4 C AND R	10,251 LBS.
VTT	851 LBS.
AMBULANCE 4X4	15,013 LBS.
CREW CAB 4X4	6,113 LBS.

WHEELED VEHICLES

RG31 MK3
RAC 6088B

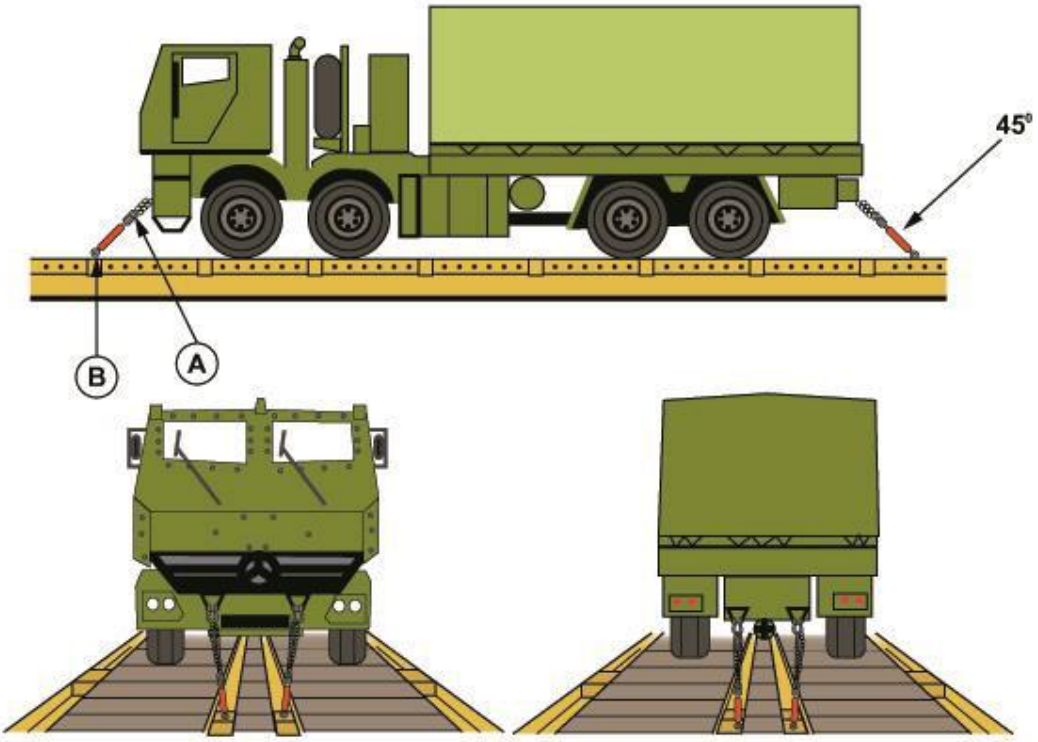


Item	No. of Pcs.	Description
A	8 or 4	Chains 3/8” (MBS 36,000 LBS.) Chains 1/2” (MBS 55,000 LBS.)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: RG31 MK3 23,386 LBS.

WHEELED VEHICLES

AHSVS CARGO & CRANE
RAC 6088B



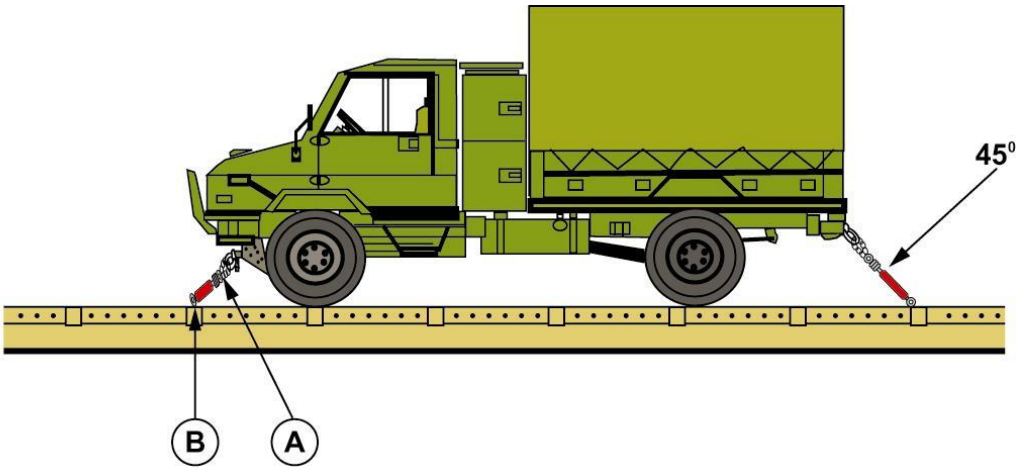
Item	No. of Pcs.	Description
A	4	Chains 1/2” (MBS 55,000 LBS.)
B	8 1 ea. Item A	Chains 1/2” (MBS 55,000 LBS.) Trucks over 40,000 LBS. Turnbuckles with jam nuts tightened wrench tight.

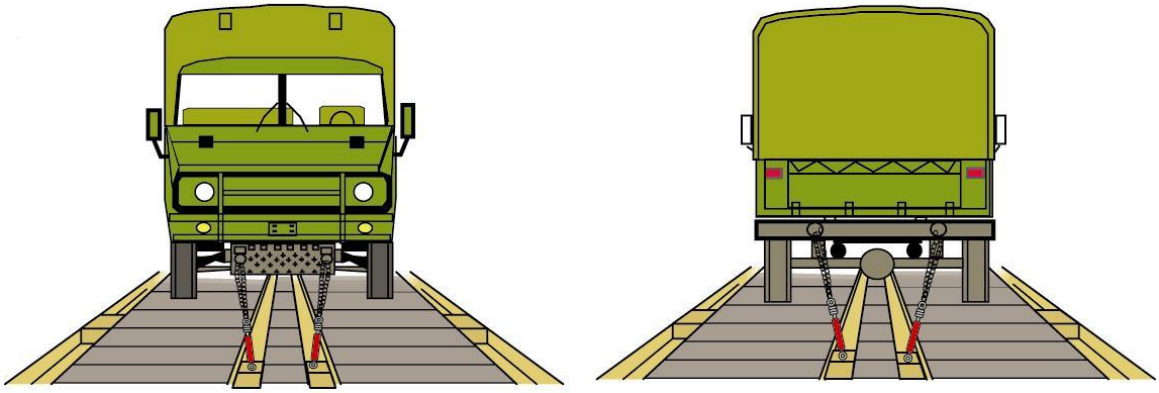
DESCRIPTION AND WEIGHT:

AHSVS	26,500 LBS.
AHSVS PALLETIZED LOADING SYSTEM 16 TON	54,120 LBS.

WHEELED VEHICLES

LIGHT SUPPORT VEHICLE WHEEL (LSVW)
RAC 6088B





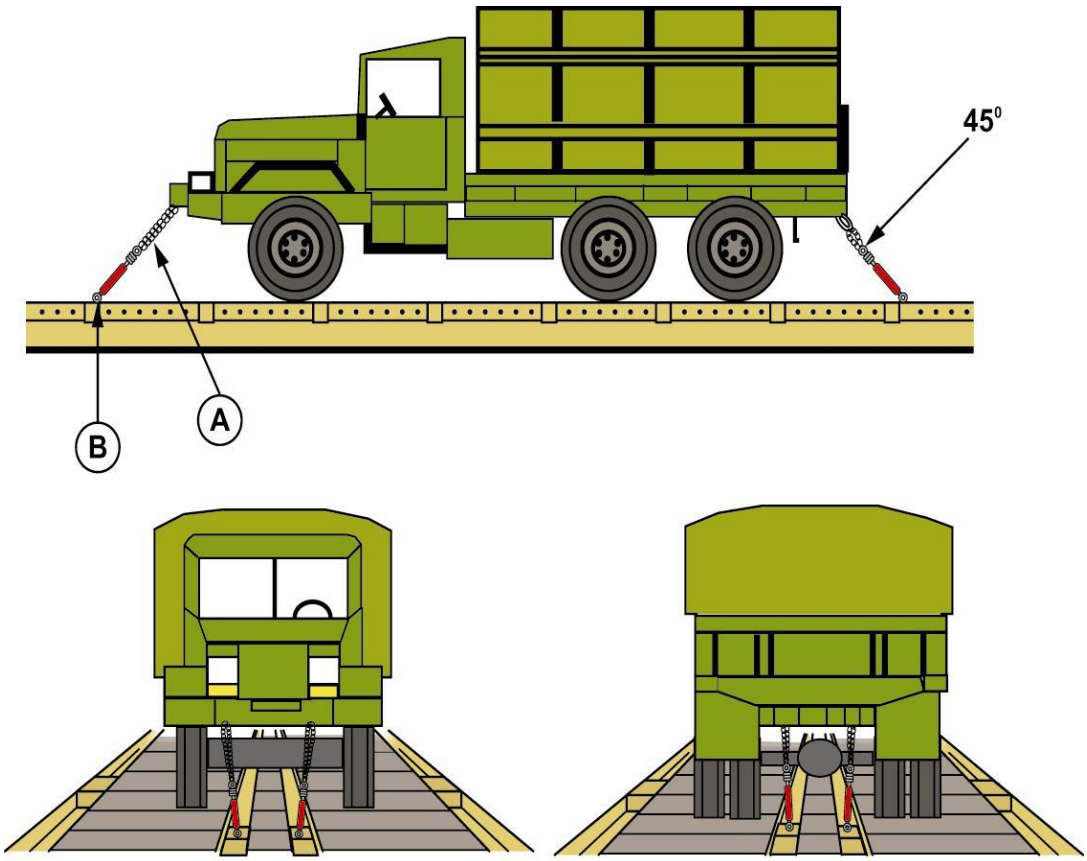
Item	No. of Pcs.	Description
A	4	Chains 3/8” (MBS 36,000 LBS.)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:

All types of LSVW max. weight:	14,400 LBS.
LSVW 1.5 TM	11,574 LBS.
LSVW AMBULANCE	11,574 LBS.
LSVW 1.5 TM DES	11,575 LBS.
LSVW 1.5 TM LAN SERVER	11,618 LBS.
LSVW 1.5 TM WITH S805 SHELTER	12,037 LBS.
LSVW 1.5 TM RADIO NODE	11,574 LBS.

WHEELED VEHICLES

MLVW (2 ½ TON)
RAC 6088B



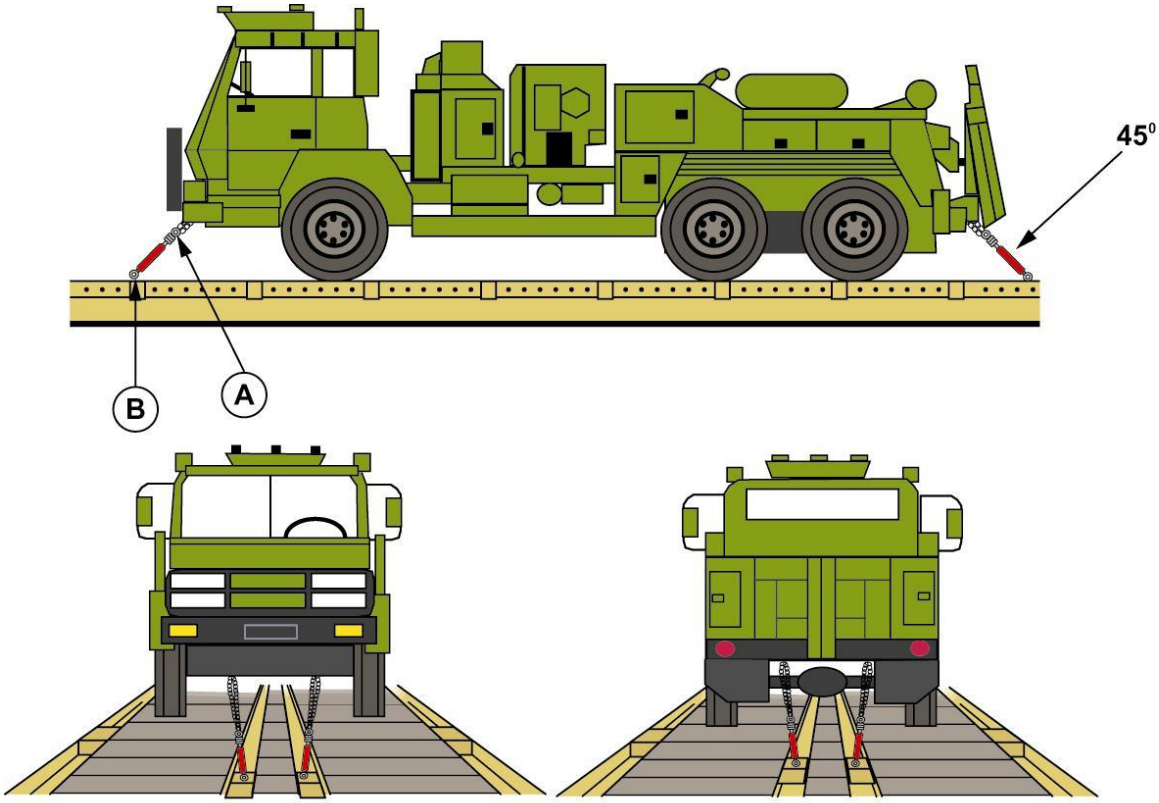
Item	No. of Pcs.	Description
A	8 or 4	Chains 3/8” (MBS 36,000 LBS.) Chains 1/2” (MBS 55,000 LBS.)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:

CG (MLVW)	19,309 LBS.
VAN (MLVW)	19,309 LBS.
BOWSER	19,609 LBS.

WHEELED VEHICLES

HLVW (10 TON) TRUCK RECOVERY
RAC 6088B

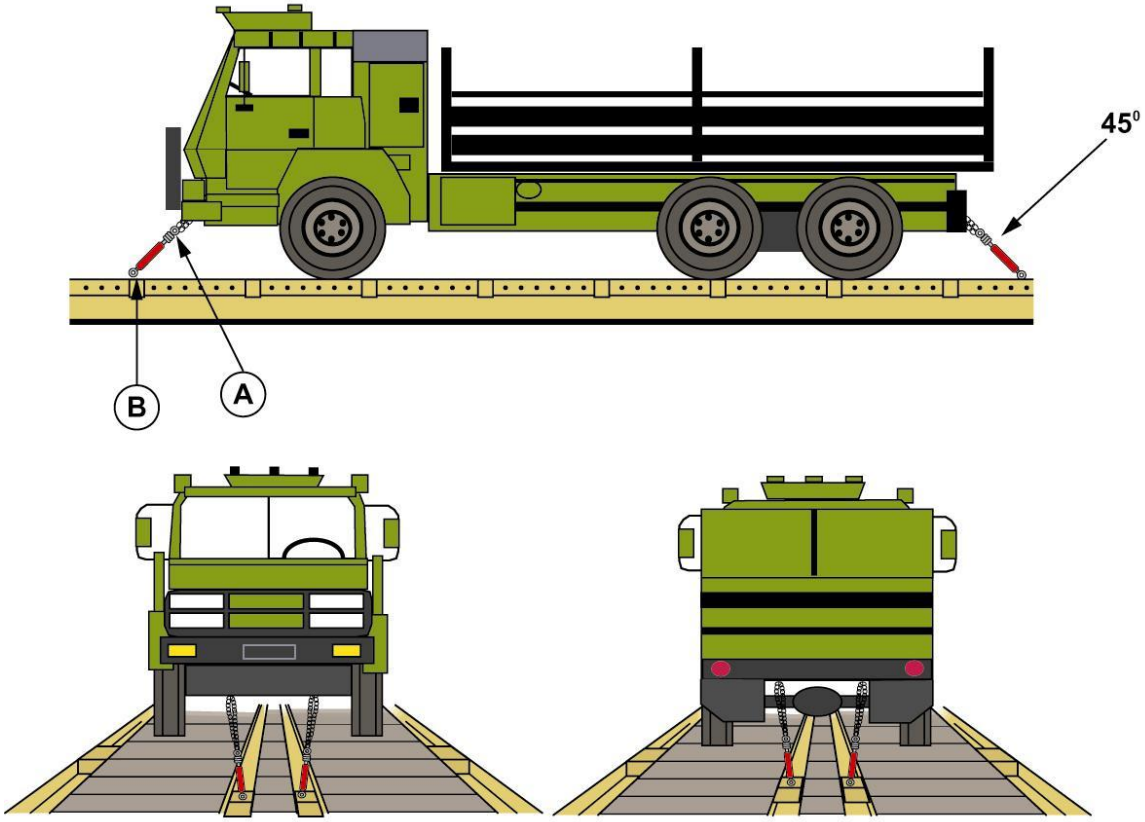


Item	No. of Pcs.	Description
A	4	Chains 1/2” (MBS 55,000 LBS.)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: HLVW 36,129 LBS.
MAINTLINE 4X4 37,077 LBS.

WHEELED VEHICLES

HLVW (10 TON) TRUCK
RAC 6088B



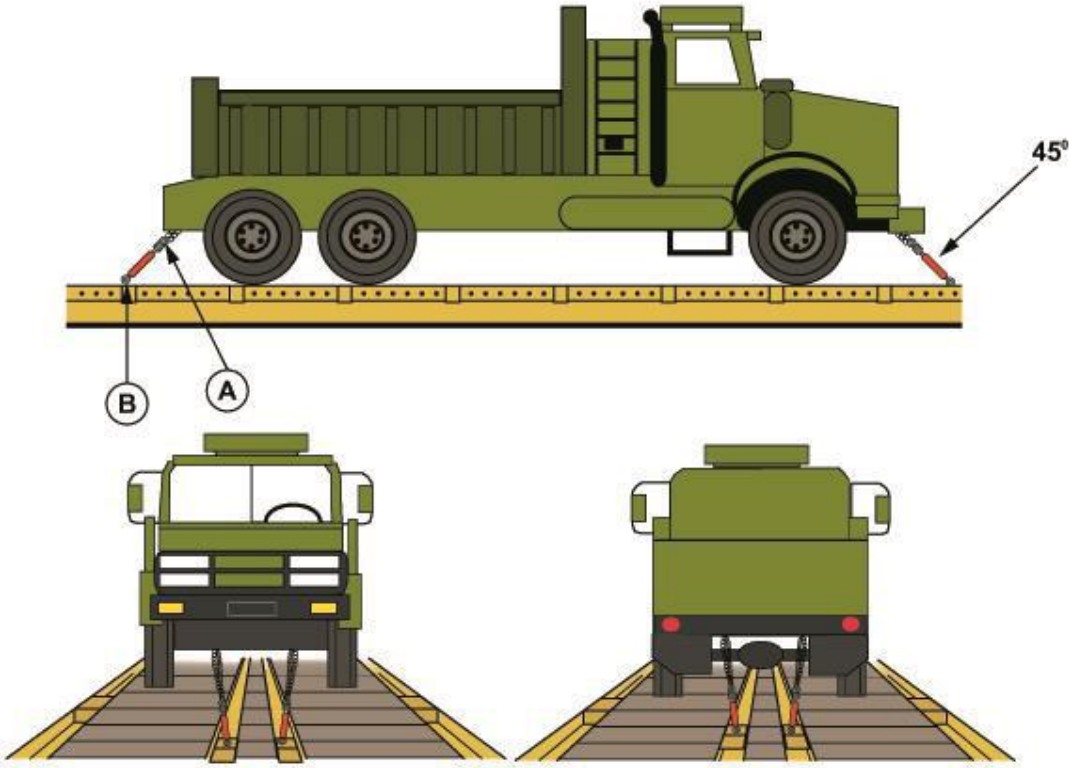
Item	No. of Pcs.	Description
A	4	Chains 1/2” (MBS 55,000 LBS.) or
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:

HLVW	27,387 LBS.
HLVW WINCH AND CRANE	30,810 LBS.
HLVW CARGO SCRN 10 TM	29,542 LBS.
HLVW PLS 16 TM 6X6	35,274 LBS.
HLVW REFUELER	29,983 LBS.
DUMP TRUCK HD 6X6	33,863 LBS.

WHEELED VEHICLES

HESV PALLET LOADER / DUMP MODULE
RAC 6088B

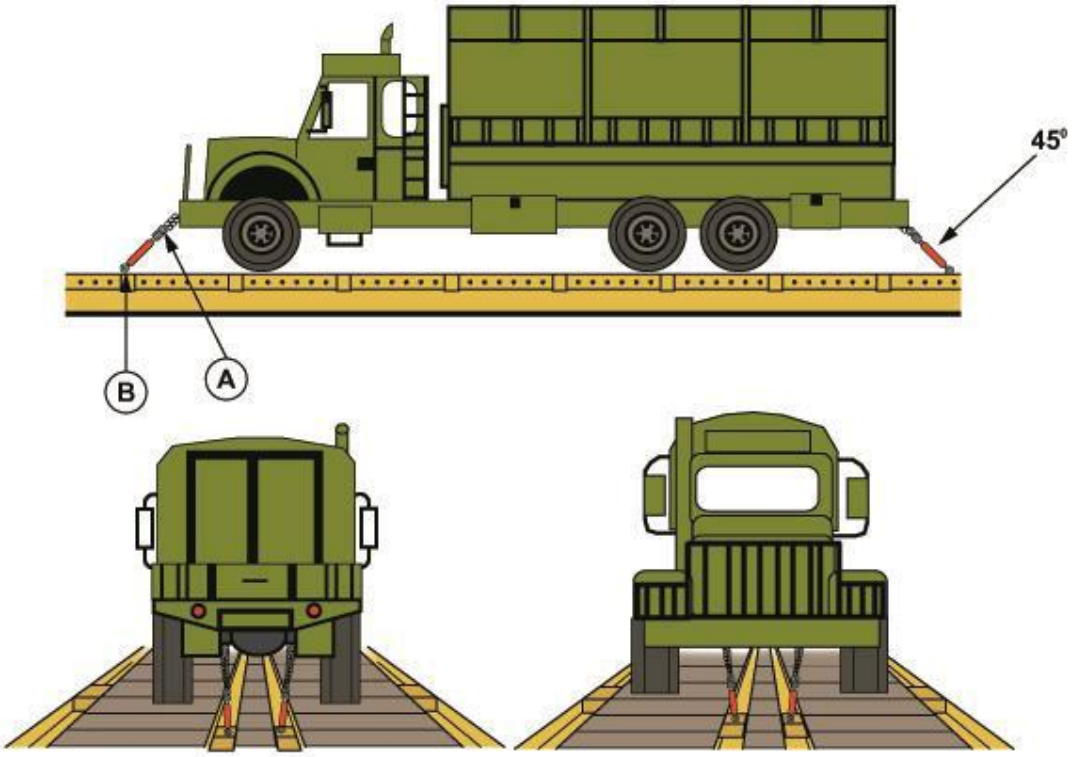


Item	No. of Pcs.	Description
A	4	Chains 1/2” (MBS 55,000 LBS.)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: HESV 33,000 LBS.

WHEELED VEHICLES

MSVS MILCOT (MEDIUM SUPPORT VEHICLE SYSTEM)
RAC 6088B

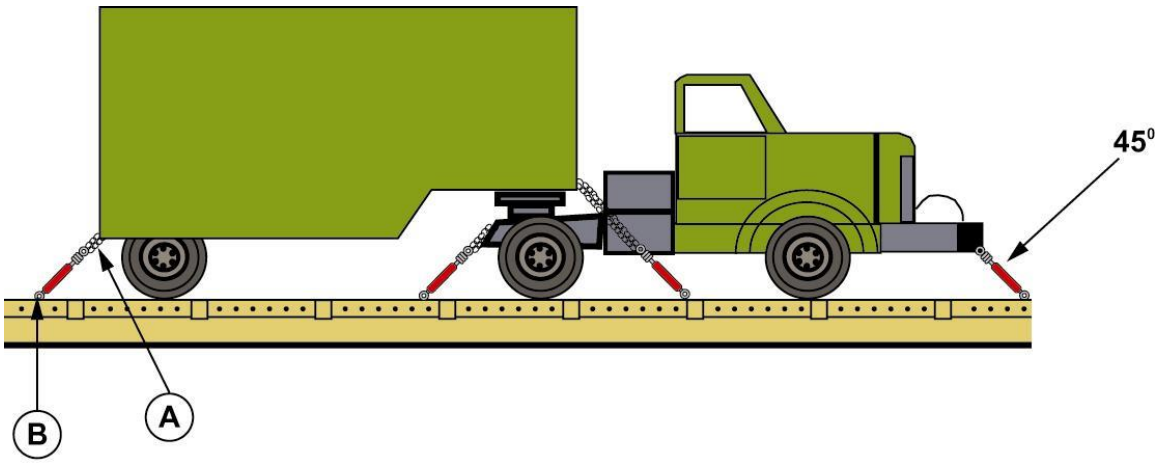


Item	No. of Pcs.	Description
A	4	Chains 1/2” (MBS 55,000 LBS.)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: MSVS MILCOT 27,101 LBS.

WHEELED VEHICLES

SEMI-TRAILER ATTACHED TO PRIME MOVER
RAC 6088B



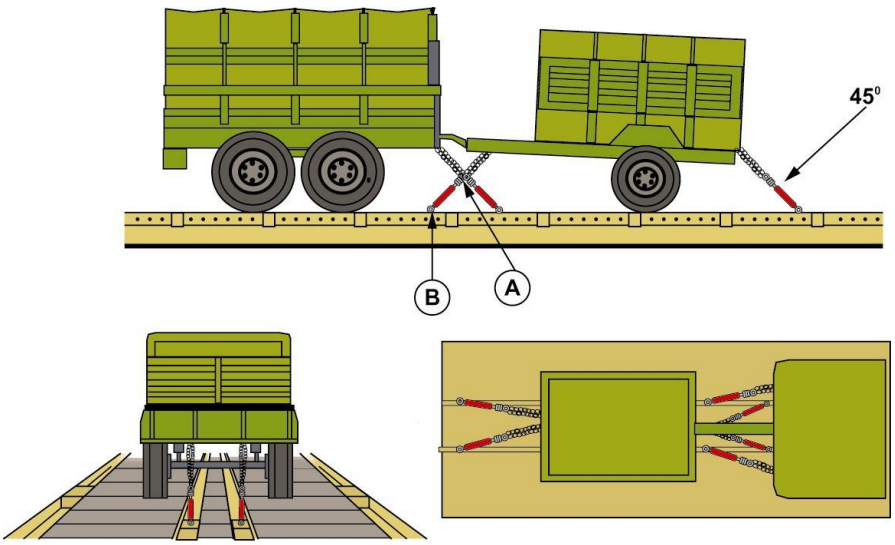
Item	No. of Pcs.	Description
A	8	Chains 1/2” (MBS 55,000 LBS.)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

TRACTOR WITH 20 TON TLR	32,070 LBS.
TRACTOR WITH 18,000 LITRE TANK	27,660 LBS.
5 TON TRUCK AND TRAILER (PALLET LOADING 63’ LONGWITH RACK)	38,000 LBS.
SEMI TRAILER BULL HAULER FUEL DISP 32,000 LITRES	15,256 LBS.
SEMI TRAILER LOW BED 35TM VARIABLE DECK DUALS	22,300 LBS.
SEMI TRAILER LOW BED 45TM 24FT DECK	24,471 LBS.
SEMI TRAILER LOW BED 45T 24FT DECK REM ADJ GOOSENECK	24,471 LBS.

NOTE: SECURE THE PRIME MOVER AS IF IT WERE ALONE AND THE TRAILER AS ANOTHER PIECE OF EQUIPMENT.

WHEELED VEHICLES

TRAILER AND PRIME MOVER
(WHEN ATTACHED)
RAC 6088B



Item	No. of Pcs.	Description
A	4	Chains 3/8” (MBS 36,000 LBS.)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:

1/4 TON TLR	1,060 LBS.
3/4 TON TLR CG	2,200 LBS.
3/4 TON TLR 10 KW	2,520 LBS.
1 1/2 TON POD TLR	3,451 LBS.
1 1/2 TON GEN TLR	3,590 LBS.
1 1/2 TON CG	4,100 LBS.
1 1/2 TON KITCHEN TLR	5,489 LBS.
1 1/2 TON ERDALATOR	5,700 LBS.
TRAILER 3.5T 2WHL M353 W/HYDRAULIC TOOL SYSTEM	10,121 LBS.

WHEELED VEHICLES

TRAILER AND PRIME MOVER
(WHEN ATTACHED)

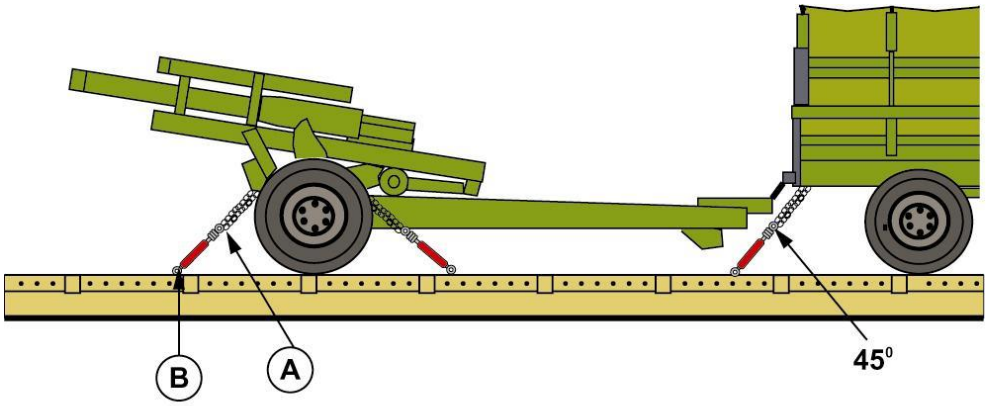
RAC 6088B (Concluded)

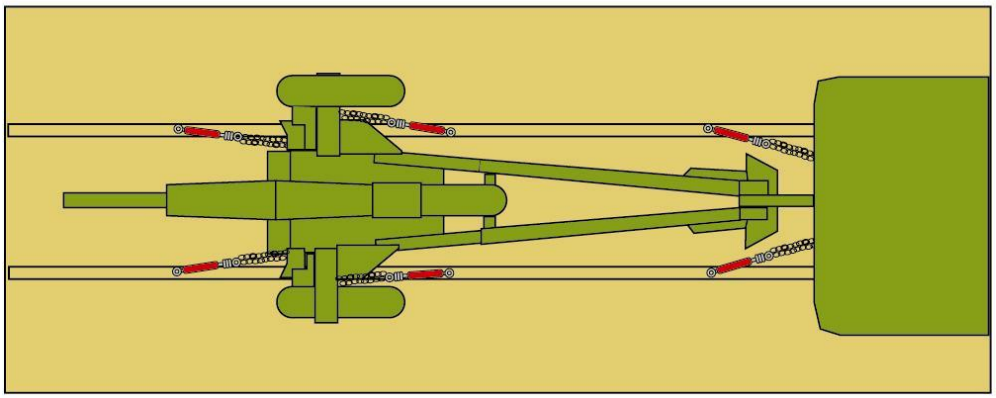
TRAILER CARGO 4 WHEELED /SKI AMPH 1000KG PAYLOAD	2,403 LBS.
TRAILER FLATBED BEAVERTAIL TILT DECK 30K LBS.	7,785 LBS.
TRAILER FLATBED BEAVERTAIL 40K LBS.	9,800 LBS.
TRAILER PLS FULL 15FT	6,614 LBS.
TRAILER TANK WATER 1.5TM	2,403 LBS.

NOTE: PINTLES MUST HAVE PINTLE LOCK SECURED WITH COTTER KEY OR WIRE

WHEELED VEHICLES

TOWED ARTILLERY GUN
RAC 6088B



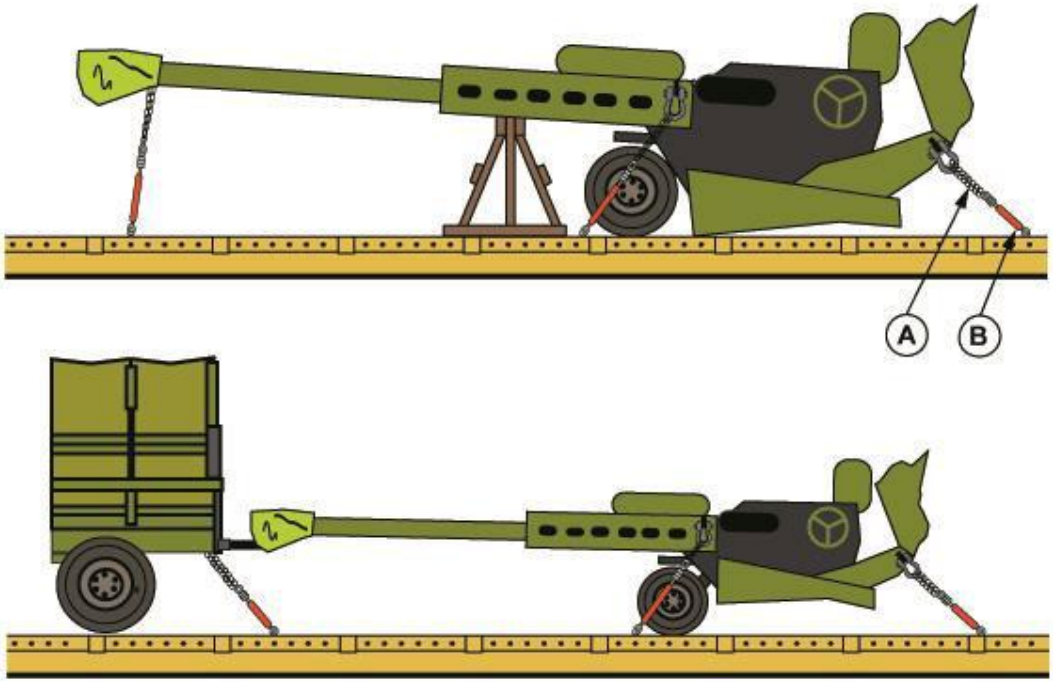


Item	No. of Pcs.	Description
A	4	Chains 3/8'' (MBS 36,000 LBS.)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: GUN L5 (105MM) 2,440 LBS.
GUN C1 (105MM) 4,620 LBS.

WHEELED VEHICLES

TOWED ARTILLERY GUN M777 A1
RAC 6088B

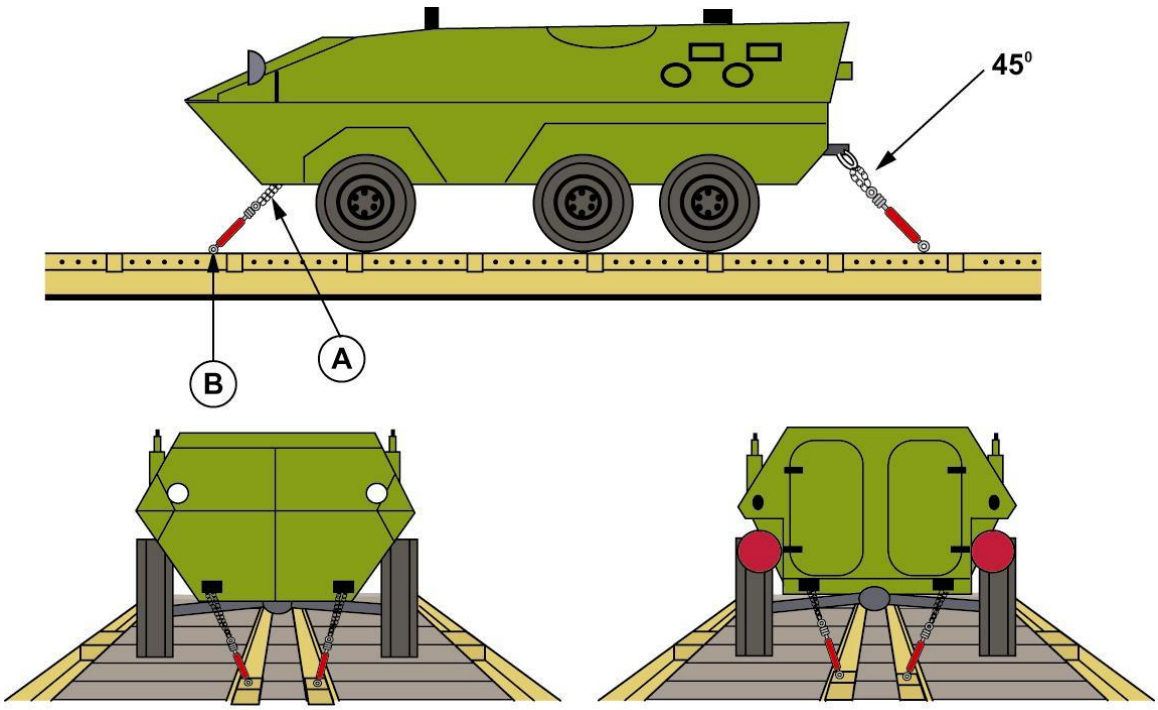


Item	No. of Pcs.	Description
A	6	Chains 3/8'' (MBS 36,000 LBS.)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: M777 8,700 LBS.

WHEELED VEHICLES

AVGP FAMILY
(ARMED VEHICLE GENERAL PURPOSE)
RAC 6088B



Item	No. of Pcs.	Description
A	4	Chains 1/2'' (MBS 55,000 LBS.)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

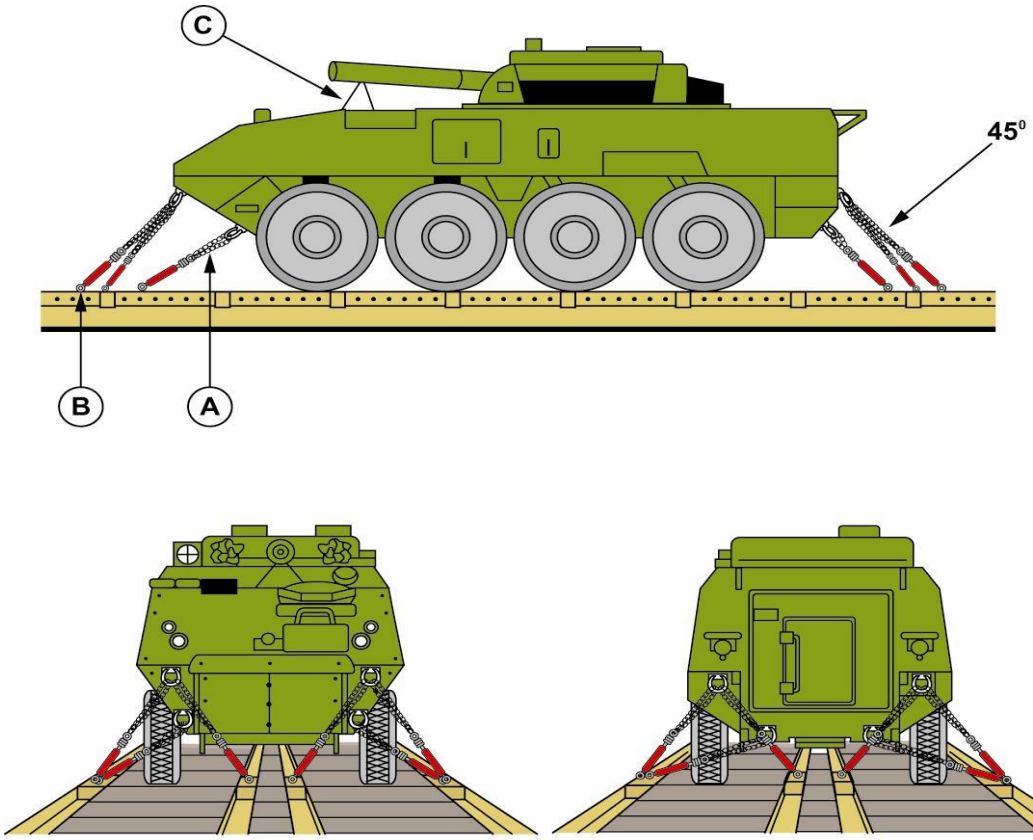
DESCRIPTION AND WEIGHT:

COUGAR	22,540 LBS.	BISON AMB	27,999 LBS.
GRIZZLY	21,700 LBS.	BISON C31	28,660 LBS.
HUSKY	25,240 LBS.	BISON MRT	32,066 LBS.
BISON	28,459 LBS.	COYOTE MTD	32,827 LBS.
HUSKY MRT	23,589 LBS.		

NOTE: SPECIAL PRECAUTIONS SHOULD BE TAKEN ON THE COUGAR TO MAKE SURE THAT TURRET GUN IS IN STRAIGHT FORWARD POSITION (AS AN EXCEPTION) AND TURRET IS LOCKED. GUN BARREL MUST BE SECURELY FASTENED BY PLACING WIRE ROPE LOOPS AROUND THE GUN BARREL AND SECURING ONE LOOP TO EACH SIDE OF THE HULL.

WHEELED VEHICLES

LIGHT ARMORED VEHICLE (LAV)
AND SIMILAR VEHICLES FROM 31,000 LBS. TO 64,000 LBS.
RAC 6088B

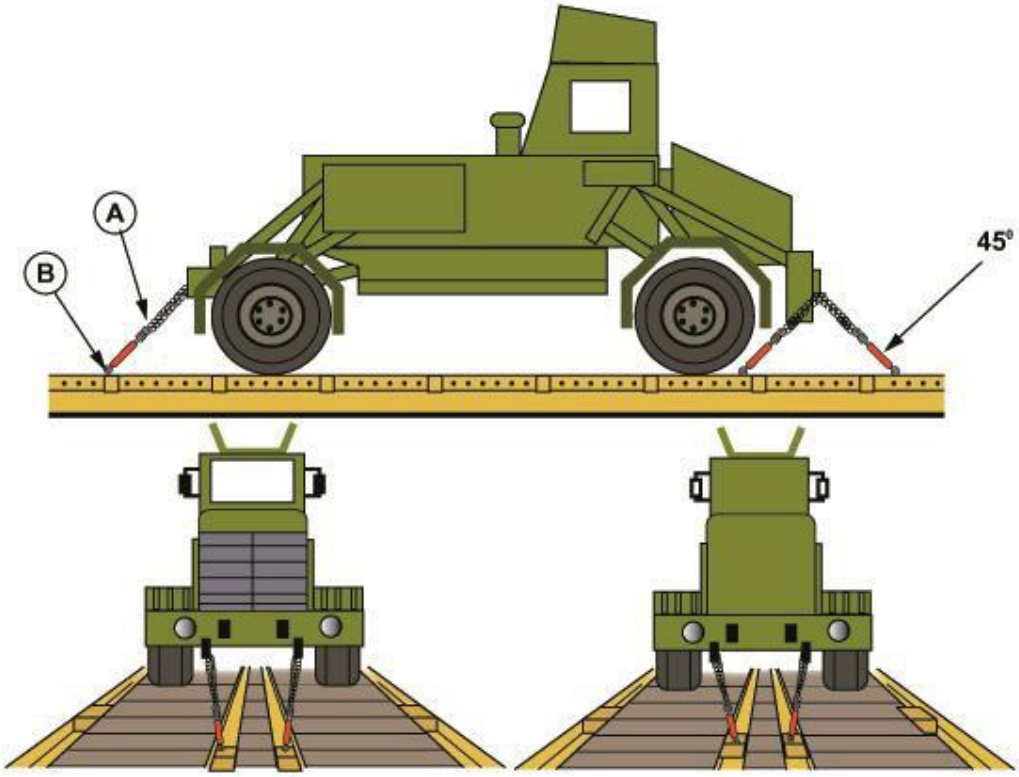


Item	No. of Pcs.	Description
A	12	1/2” diameter alloy steel chain, extra strength, (MBS 55,000 LBS.) for vehicles weighing over 31,000 LBS. to 64,000 LBS. inclusive.
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.
C	1	3/8” cable extra strength, (MBS 8,700 LBS.), doubled (complete loop), one each side of vehicle.
		NOTE: When vehicle is equipped with blade, add 2 additional 1/2” chains to the blade.

DESCRIPTION AND WEIGHT: LAV 31,000 LBS. TO 64,000 LBS.
COUGAR ENGINEER RAPID
RESPONSE VEHICLE 64,000 LBS.

WHEELED VEHICLES

HUSKY MKIII TOWING MINE DETECTION VEHICLE
RAC 6088B



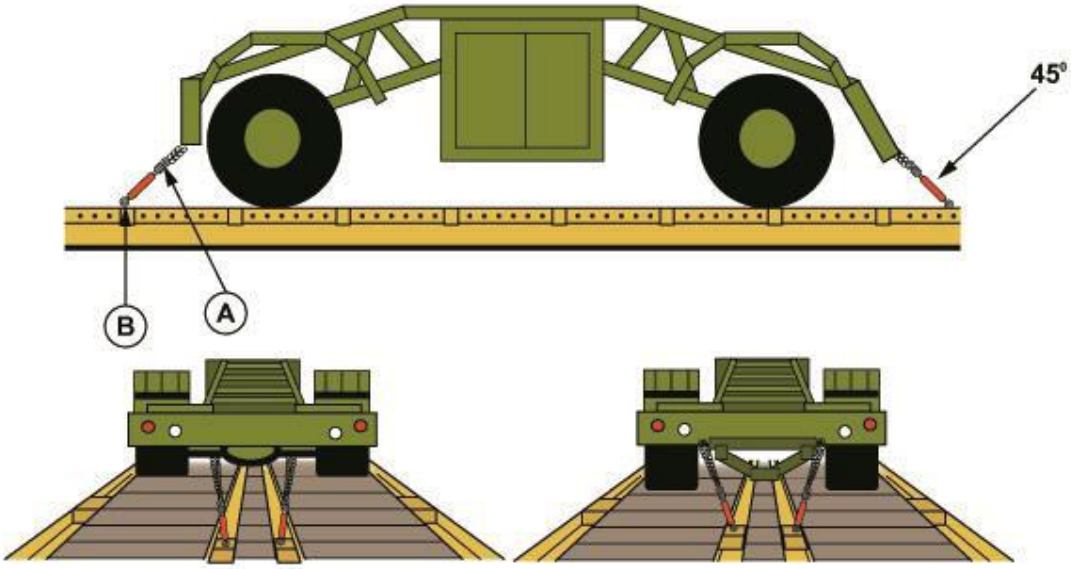
Item	No. of Pcs.	Description
A	4	Chains 3/8'' (MBS 36,000 LBS.)
	12	Chains 1/2'' (MBS 55,000 LBS.) on MIV
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:

HUSKY MKIII	19,140 LBS.
MIV BUFFALO 6X6 MINE INVESTIGATION VEHICLE	83,824 LBS.

WHEELED VEHICLES

HUSKY TOWING MINE DETECTION VEHICLE
RAC 6088B

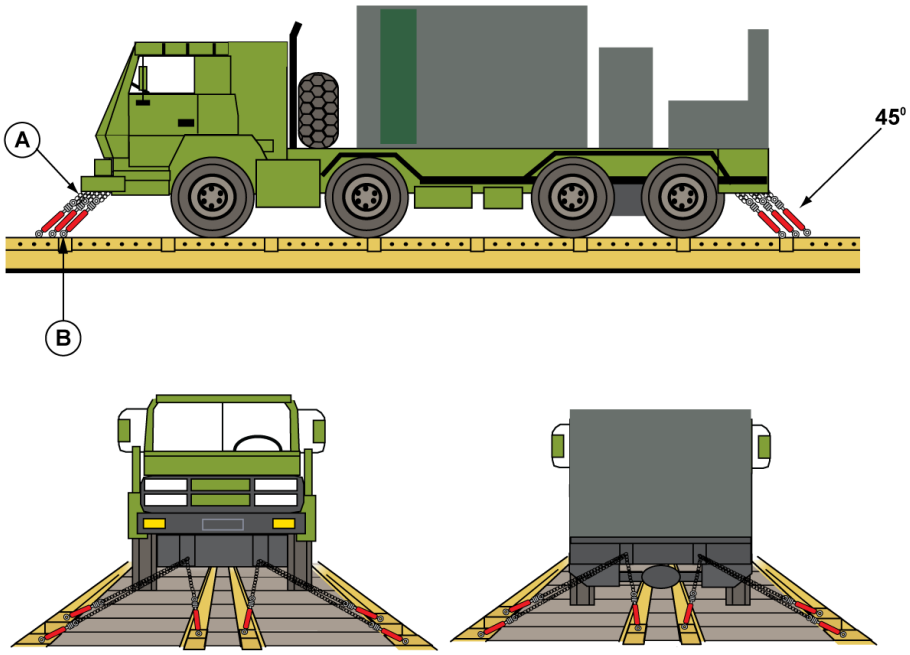


Item	No. of Pcs.	Description
A	4	Chains 3/8'' (MBS 36,000 LBS.)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: HUSKY 12,026 LBS.

WHEELED VEHICLES

MRT TRUCK
RAC 6088B
New 08-2016 (Ref: AAR Fig. 88-B)



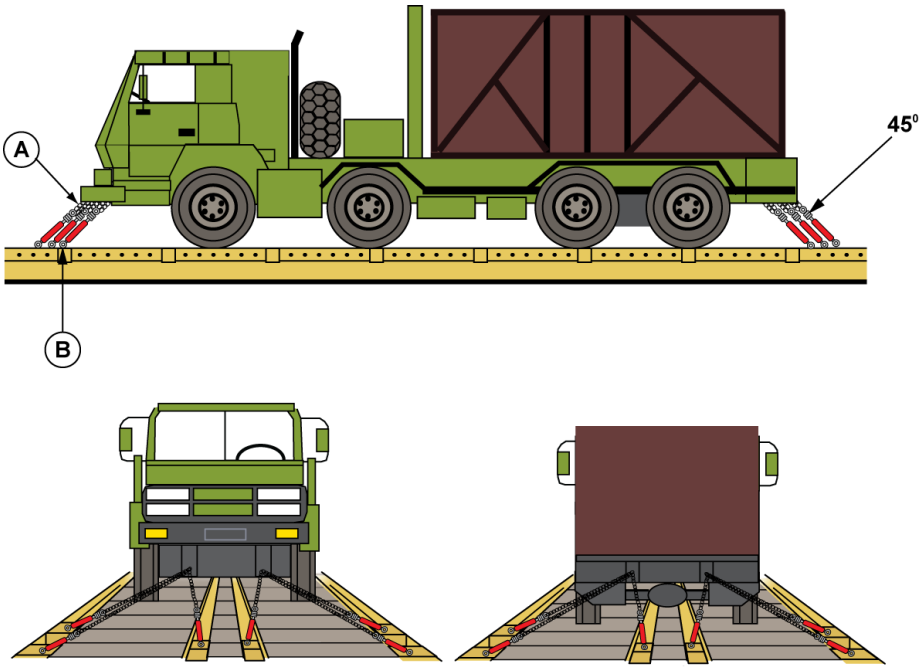
Item	No. of Pcs.	Description
A	12	Chains 1/2'' (MBS 55,000 LBS.)
B	1 ea, Item A	Turnbuckles with jam nuts tightened wrench tight

DESCRIPTION AND WEIGHT: MRT TRUCK 56,070 LBS.

NOTE: THE TIE-DOWN SHACKLES ON THIS VEHICLE MUST BE OF THE THREADED OR SCREWED TYPE ONLY (NSN - 4030-21-907-6585). NO OTHER IN-LIEU SHACKLES ARE PERMITTED AS THE NORMAL SHACKLES WILL SPLIT APART.

WHEELED VEHICLES

LHS TRUCK
RAC 6088B
New 08-2016 (Ref: AAR Fig. 88-B)



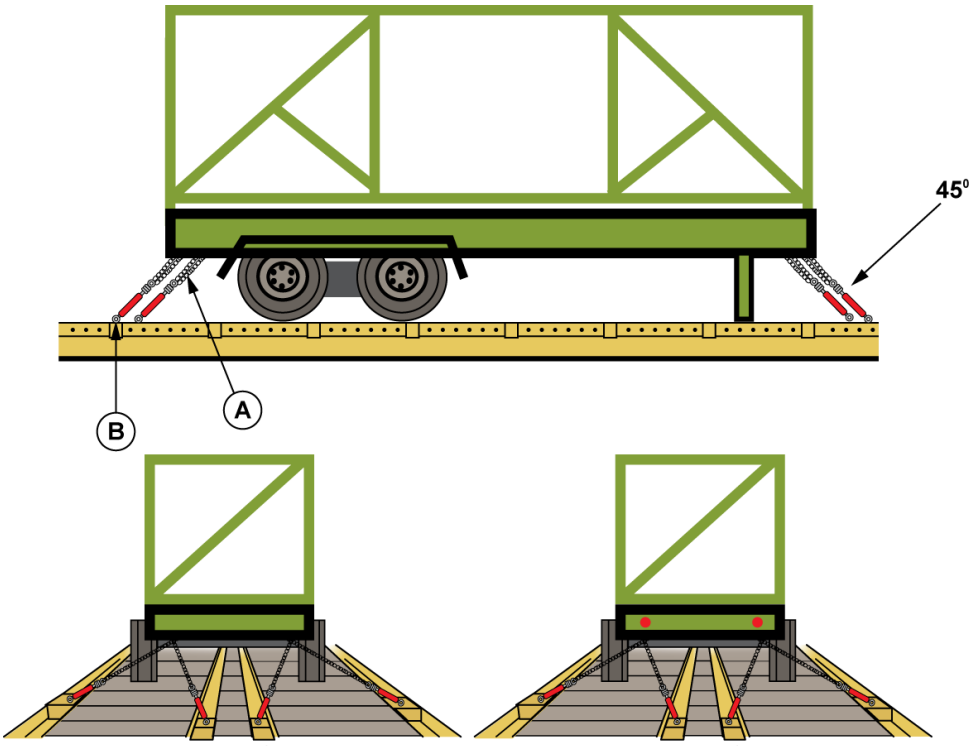
Item	No. of Pcs.	Description
A	12	Chains 1/2’’(MBS 55,000 LBS.)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: LHS TRUCK 66,039 LBS.

NOTE: THE TIE-DOWN SHACKLES ON THIS VEHICLE MUST BE OF THE THREADED OR SCREWED TYPE ONLY (NSN - 4030-21-907-6585). NO OTHER IN-LIEU SHACKLES ARE PERMITTED AS THE NORMAL SHACKLES WILL SPLIT APART.

WHEELED VEHICLES

LHS TRAILER
RAC 6088B
New 08-2016 (Ref: AAR Fig. 88-B)



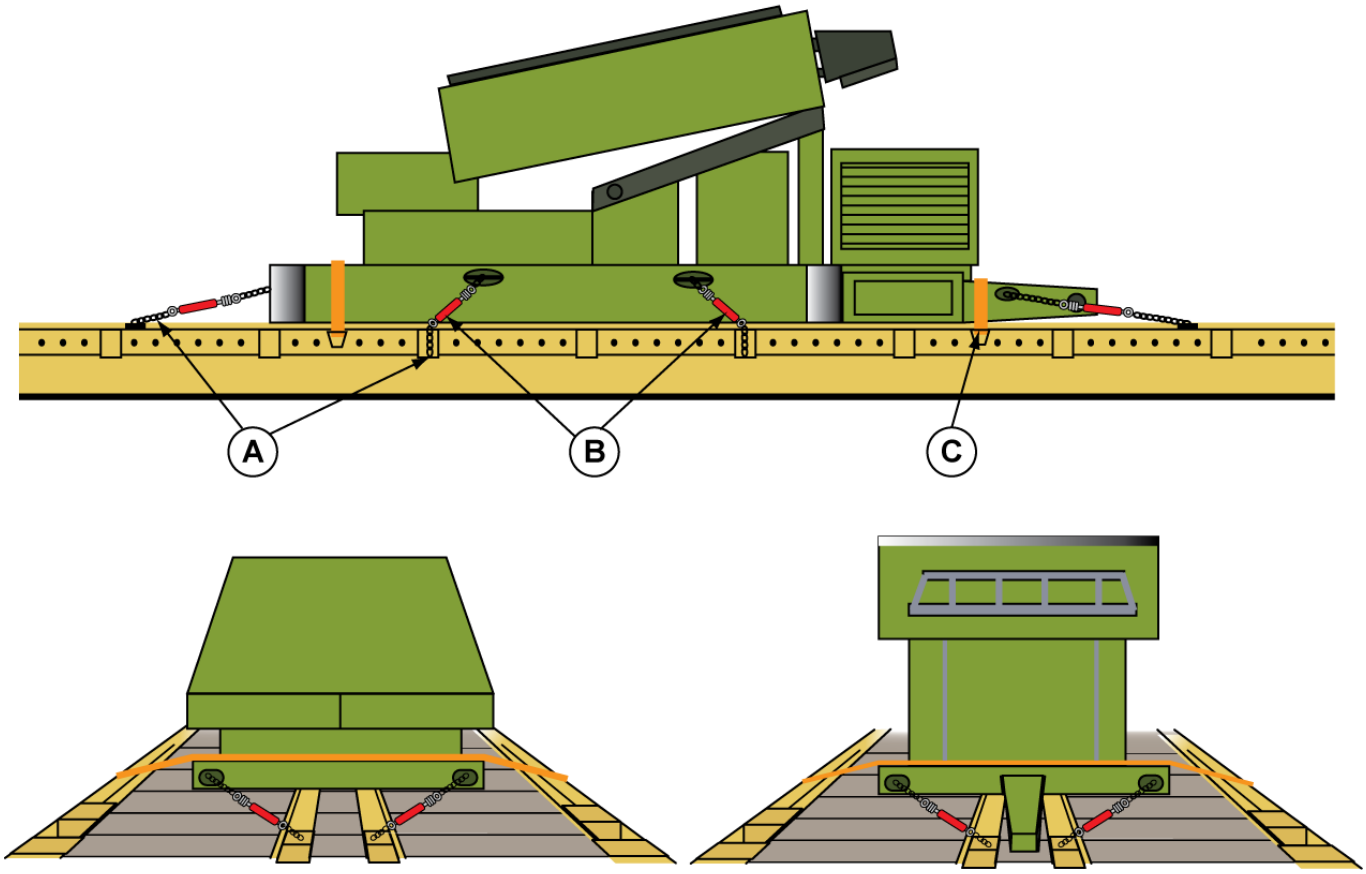
Item	No. of Pcs.	Description
A	8	Chains 1/2'' (MBS 55,000 LBS.)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: LHS TRAILER 34,118 LBS.

NOTE: THE TIE-DOWN SHACKLES ON THIS VEHICLE MUST BE OF THE THREADED OR SCREWED TYPE ONLY (NSN - 4030-21-907-6585). NO OTHER IN-LIEU SHACKLES ARE PERMITTED AS THE NORMAL SHACKLES WILL SPLIT APART.

WHEELED VEHICLES

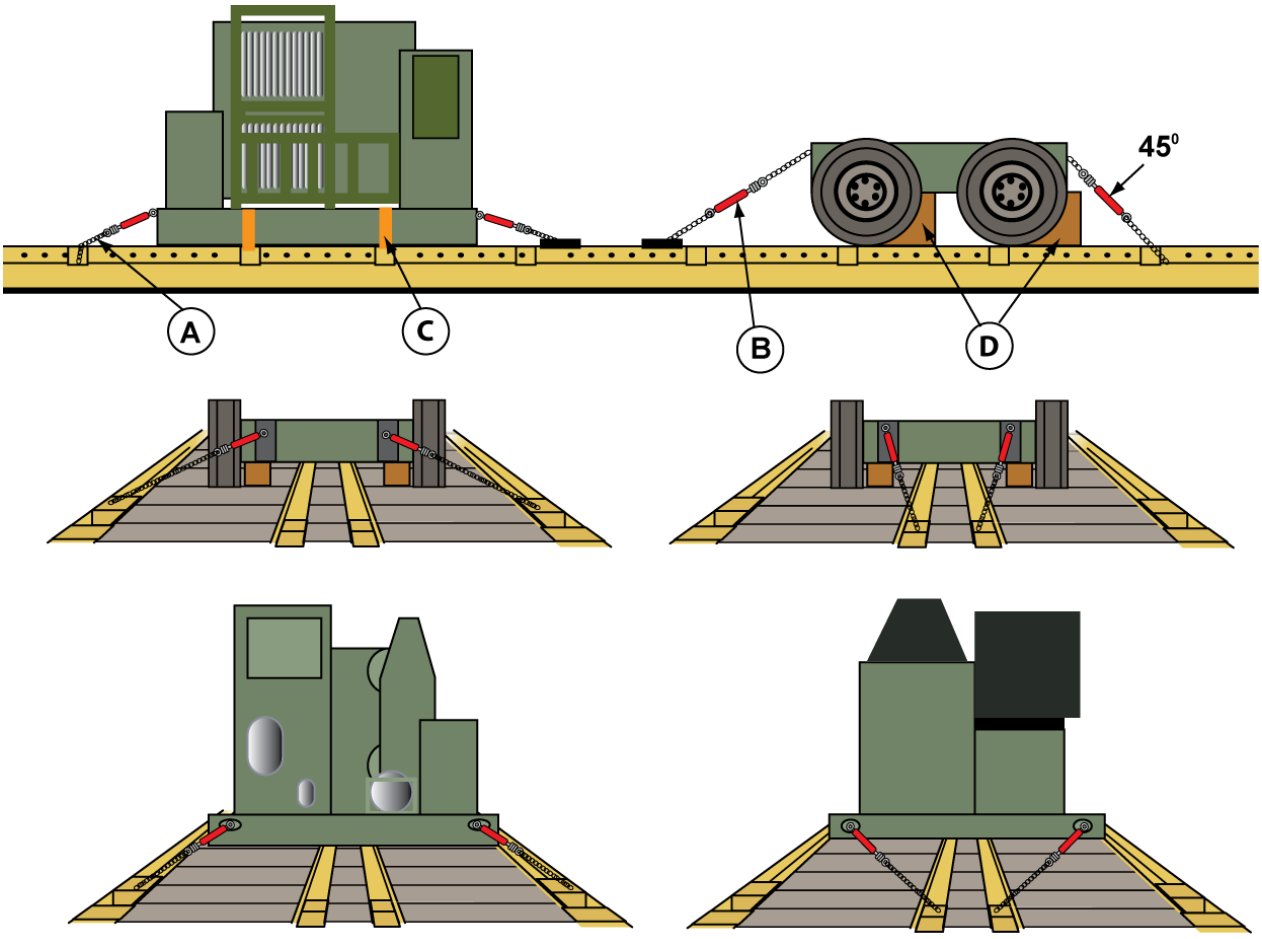
MRR (MEDIUM RANGE RADAR)
RAC 6088B
New 08-2017 (Ref: AAR Fig. 88-B)



Item	No. of Pcs.	Description
A	8	Chains 3/8'' (MBS 36,000 LBS.), 2 at each end of car, 2 on each side of car.
B	1 ea, Item A	Turnbuckles with jam nuts tightened wrench tight.
C	2	4-inch web strap with a MBS of 20,000 LBS. place from side pocket to other side pocket.

DESCRIPTION AND WEIGHT: MRR 22,000 LB

WHEELED VEHICLES
PDB (POWER DISTRIBUTION BOX AND WHEEL TRUCK)
RAC 6088B
New 08-2017 (Ref: AAR Fig. 88-B)



Item	No. of Pcs.	Description
A	4	Chains 3/8'' (MBS 36,000 LBS.) 2 at each end of car.
B	1 ea, Item A	Turnbuckles with jam nuts tightened wrench tight.
C	2	4-inch web strap with a MBS of 20,000 LBS. place from side pocket to other side pocket.

DESCRIPTION AND WEIGHT: PDB 10,000 LBS.

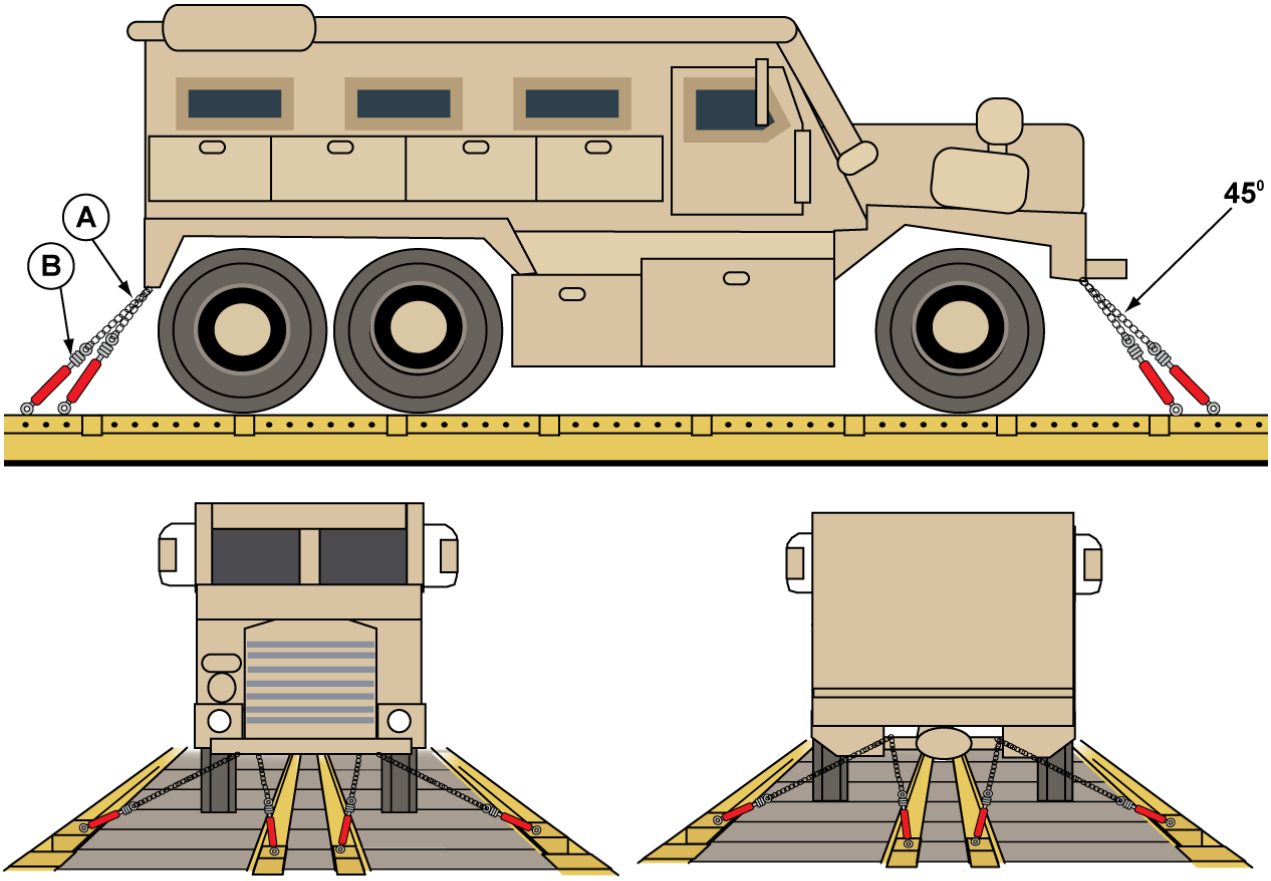
PDB (POWER DISTRIBUTION BOX AND WHEEL TRUCK) (Concluded)
RAC 6088B
New 08-2017 (Ref: AAR Fig. 88-B)

Item	No. of Pcs.	Description
A	4	Chains 3/8'' (MBS 36,000 LBS.) 2 at each end of car.
B	1 each Item A	Turnbuckles with jam nuts tightened wrench tight.
D	4	4 wooden blocks 20 in. high x 20 in. wide x 24 in. long. Place beneath axles as shown.

DESCRIPTION AND WEIGHT: WHEEL TRUCK 10,000 LBS.

WHEELED VEHICLES

COUGAR
RAC 6088B
New 05-2019 (Ref: AAR Fig. 88-B)

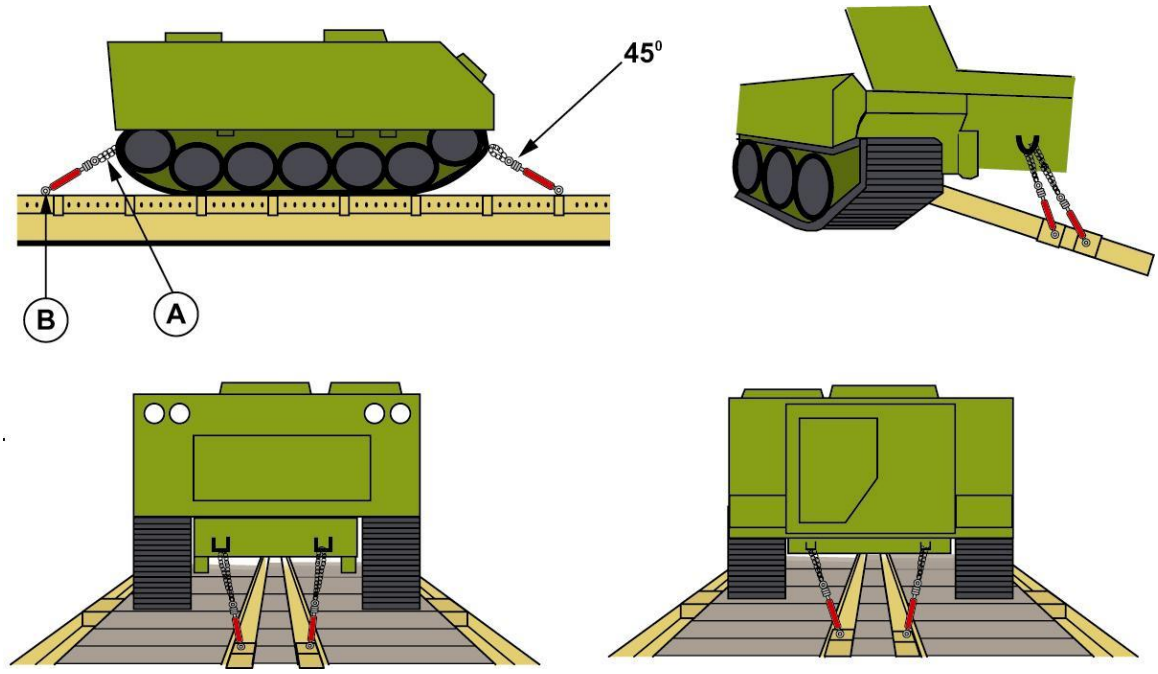


Item	No. of Pcs.	Description
A	8	Chains 1/2'' (MBS 55,000 LBS.), 4 at each end of car.
B	1 ea, Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: COUGAR 52,000 LBS

TRACKED VEHICLES

APC (ARMOURED PERSONNEL CARRIER)
M113 FAMILY Including M548 and M577
RAC 6087B



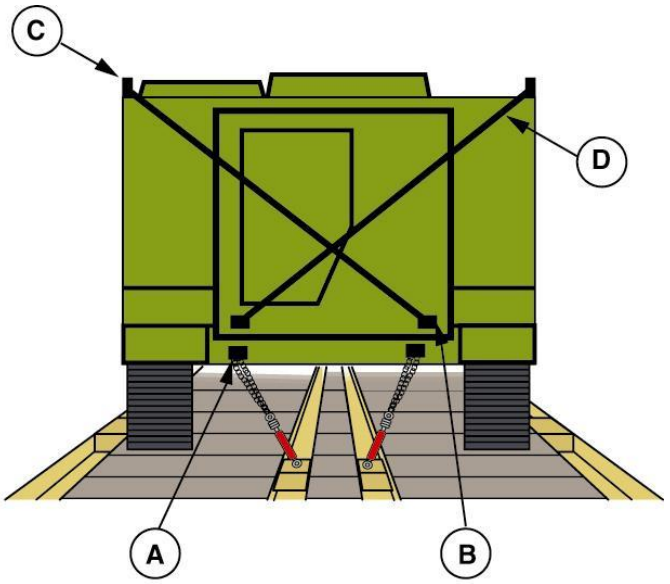
Item	No. of Pcs.	Description
A	4 or 8	Chains 1/2'' (MBS 55,000 LBS.) Chains 3/8'' (MBS 36,000 LBS.)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:

APC (M113)	19,775 LBS.
APC DOZER	22,900 LBS.
APC MRT	22,500 LBS.
APC ARVL	22,440 LBS.
BV206 CARRIER	13,977 LBS.

TRACKED VEHICLES

APC (ARMOURED PERSONNEL CARRIER)
M113 FAMILY Including M548 and M577
RAC 6087B (concluded)



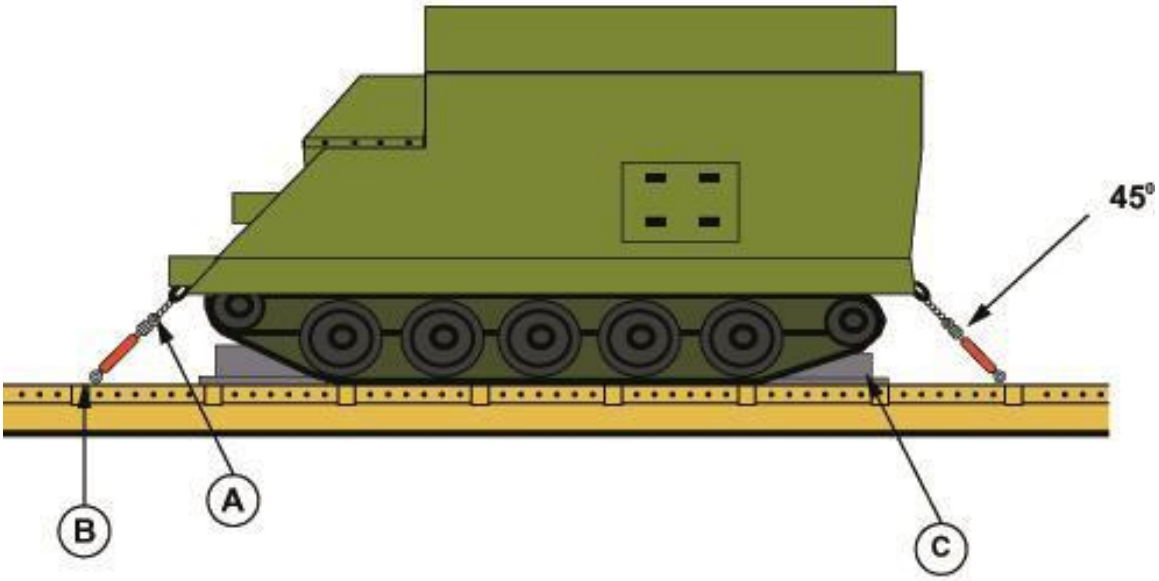
Item	No. of Pcs.	Description
A		Hull-mounted tie-down provisions.
B		Ramp-mounted tie-down provisions.
C		Lifting provisions
D	2	Complete loops ½" wire loop each with 4 clamps.

NOTES:

1. This applies to all M577 vehicles on which the tie-down provisions used to secure the vehicle are mounted on the ramp. The wire rope is not required on vehicles that have the rear tie down provisions mounted on the hull used for securement rather than those on the ramp.
2. Fully engage ramp latches.
3. The wire ropes must be crossed as shown. The wire ropes are routed from the lifting provision to the tie down shackle. The point where the two wire rope loops touch must be protected from chafing. Scrap rubber hose or sheet metal fastened in place will meet this requirement.
4. This securement method is a procedural fix for M577 with inadequate transportability. Do not allow transportability approval for these vehicles unless this procedure for safe transportation is applied.

TRACKED VEHICLES

LIGHT ARMOURED VEHICLE M577 (T-LAV)
RAC 6078B-F
Rev. 06-1996 (Ref: AAR Fig., 78-B)



Item	No. of Pcs.	Description
A	8	Chains 1/2'' (MBS 55,000 LBS.) or
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.
C	4	Chock blocks under each track front and back. Metal chock blocks may be used.

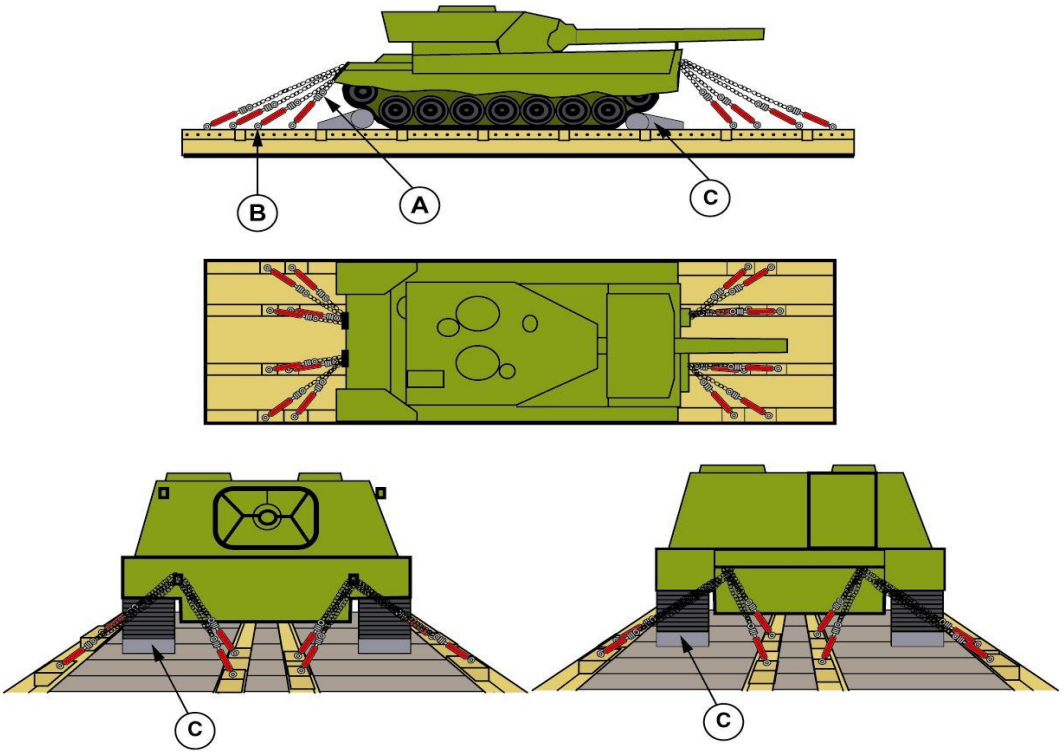
DESCRIPTION AND WEIGHT:

T-LAV M577	30,999 LBS.
T-LAV WITH TURRET	36,156 LBS.
T-LAV MAINTENANCE	40,124 LBS.

NOTE: SHACKLE - USE THE 21-TON (NSN 4030-21-256-2423) CAPACITY BOLT TYPE SHACKLES TO SECURE THE T-LAV BY ITS LOWEST TIE-DOWN POINTS. LEVEL PLATFORMS ARE TO BE USED FOR LOADING. PROTECTION FOR TURRET IS REQUIRED FOR WINDSHIELDS, IE WOODEN PLANKS AROUND VULNERABLE POINTS.

TRACKED VEHICLES

LEOPARD
RAC 6078B



Item	No. of Pcs.	Description
A	16	Chains 1/2'' (MBS 55,000 LBS.)
	20	Chains 1/2'' (MBS 55,000 LBS.) on Leopard 2 A6M
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.
C	4	Chock blocks under each track front and back for wooden floor. **NOTE:** Steel floor add 4 chains ½" (no chock block)

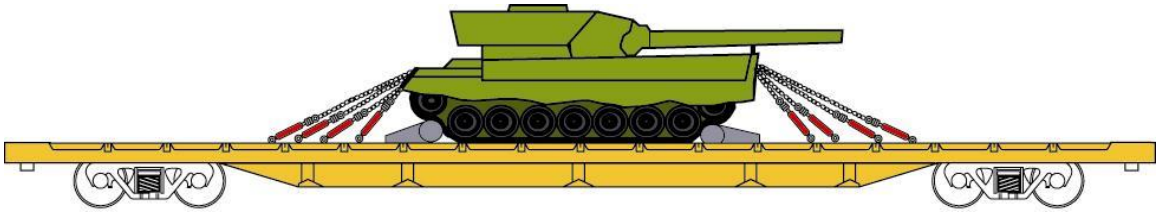
DESCRIPTION AND WEIGHT:

LEOPARD	89,065 LBS.
LEOPARD BRIDGE LAYER	94,054 LBS.
LEOPARD ARVL	92,600 LBS.
LEOPARD C1 AND C2	93,696 LBS.
LEOPARD 2 A6M	143,000 LBS.

NOTE: TURRET GUN MUST BE IN THE AFT (REAR) TRAVEL POSITION. TURRET ROTATION AND GUN ELEVATING CONTROL MUST BE ENGAGED AND WIRE TIED TO PREVENT MOVEMENT OF TURRET AND GUN. THE GUN MUST BE LOWERED INTO THE SADDLE BLOCK AND SECURED.

TRACKED VEHICLES

LEOPARD
RAC 6078B (concluded)

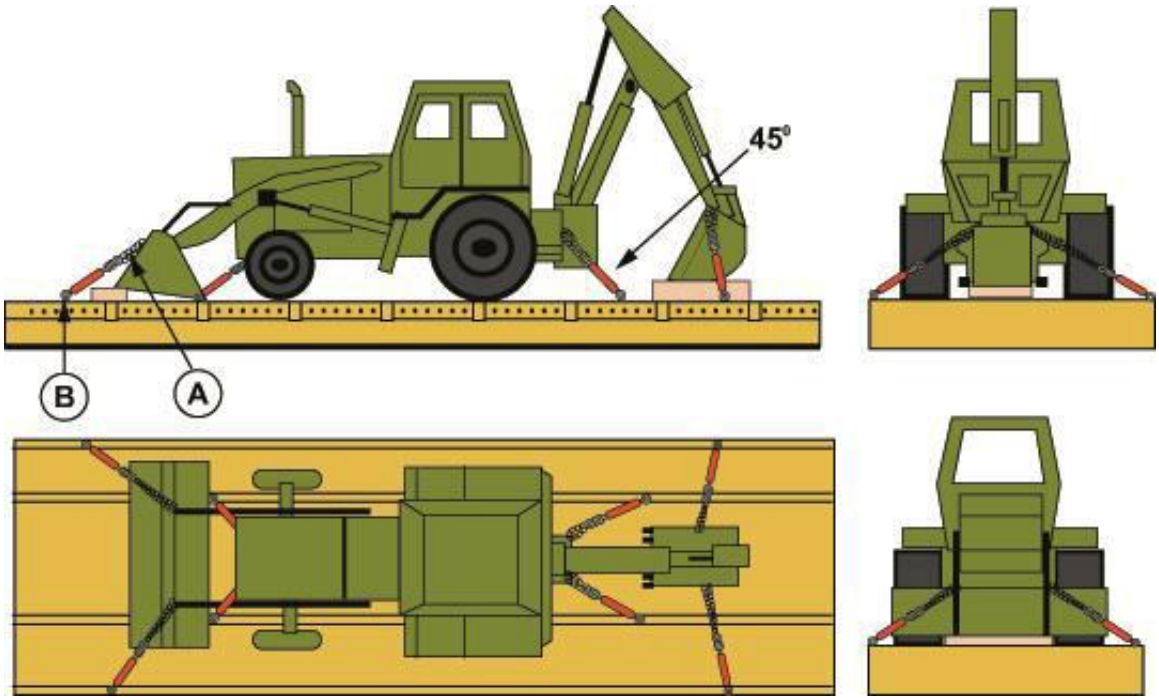


NOTE: When loading military tank on a rail equipped car (i.e.: HTTX) or general purpose flat car, only **ONE** tank must be loaded and centrally located on the rail car. No other vehicles can be loaded to use the vacant space at front and rear of the tank.

NOTE: To properly secure a tank on a rail flat car, use the 21-ton capacity bolt shackle (NSN 4030-21-256-2423) to secure the tank. No other type of shackles (i.e.: towing hook, as in above graphic) is allowed to secure the tank.

SPECIALIZED ENGINEERING EQUIPMENT WHEELED

EXCAVATOR
RAC 6054A



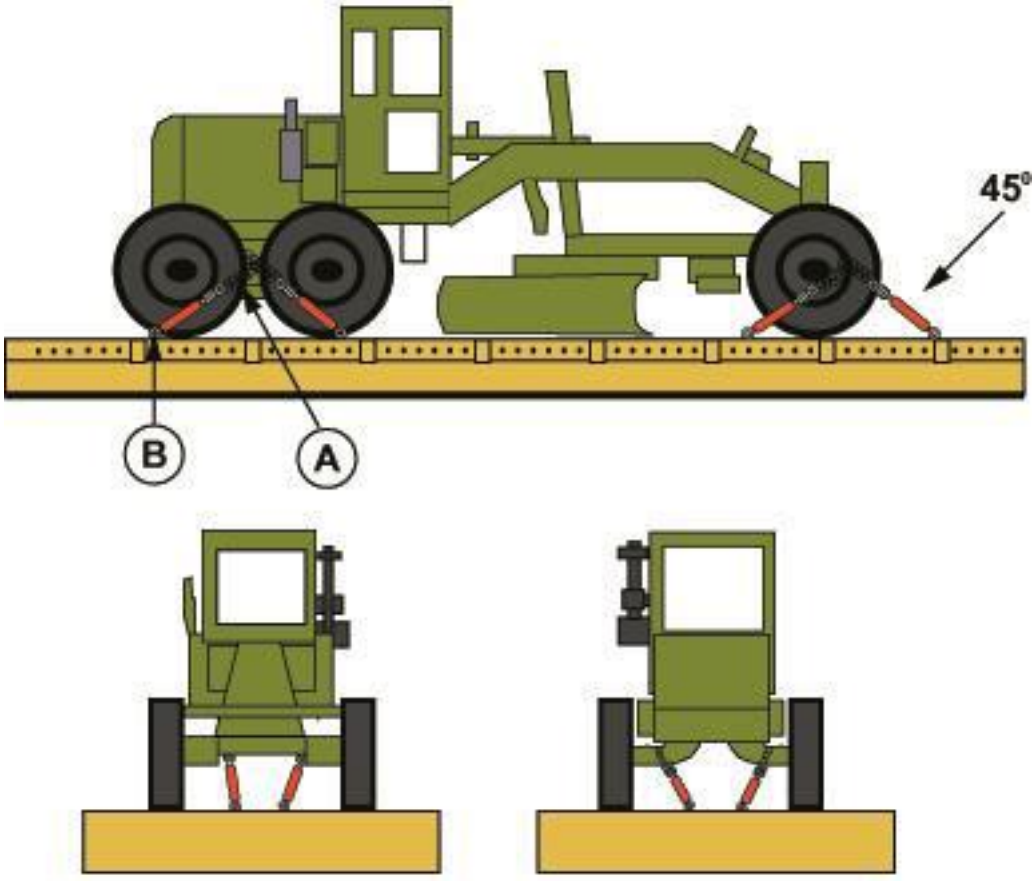
Item	No. of Pcs.	Description
A	8	Chains 1/2'' (MBS 55,000 LBS.)
	4	Chains 3/8'' (MBS 36,000 LBS.) for vehicles less than 15,000 LBS.
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: EXCAVATOR 30,000 LBS.
SCOOP LOADER 4X4 30,159 LBS.
SCOOP LOADER 4X4 SKID STEER 7,068 LBS.

NOTE:
A PIECE OF LUMBER MUST BE PLACED UNDER BOTH BUCKETS.
RIGGERS MUST BE SECURED WITH 3/8'' CHAINS OR VISIBLE LOCKING PIN.

SPECIALIZED ENGINEERING EQUIPMENT WHEELED

GRADER ROAD MOTORIZED
RAC 6054A

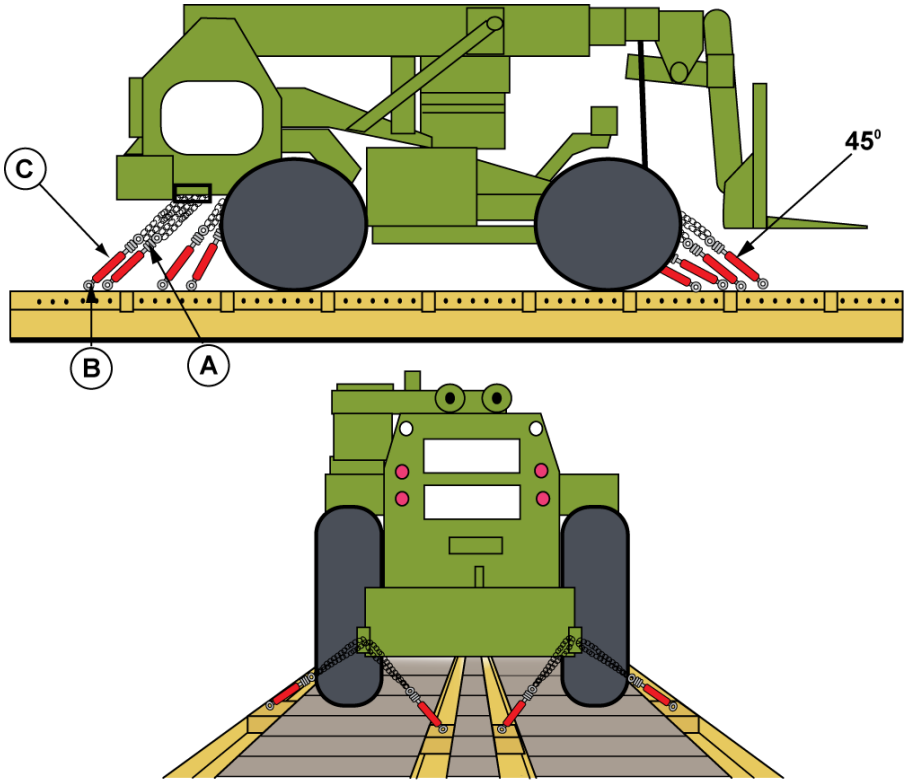


Item	No. of Pcs.	Description
A	8	Chains 1/2'' (MBS 55,000 LBS.)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: GRADER ROAD MOTORIZED 30,000 LBS.

ENGINEERING EQUIPMENT WHEELED

FORKLIFT VARIABLE REACH
RAC 6054A



Item	No. of Pcs.	Description
A	4	Chains 1/2'' (MBS 55,000 LBS.) for vehicles less than 40,000 LBS.
B	8	Chains 1/2'' (MBS 55,000 LBS.)
C	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

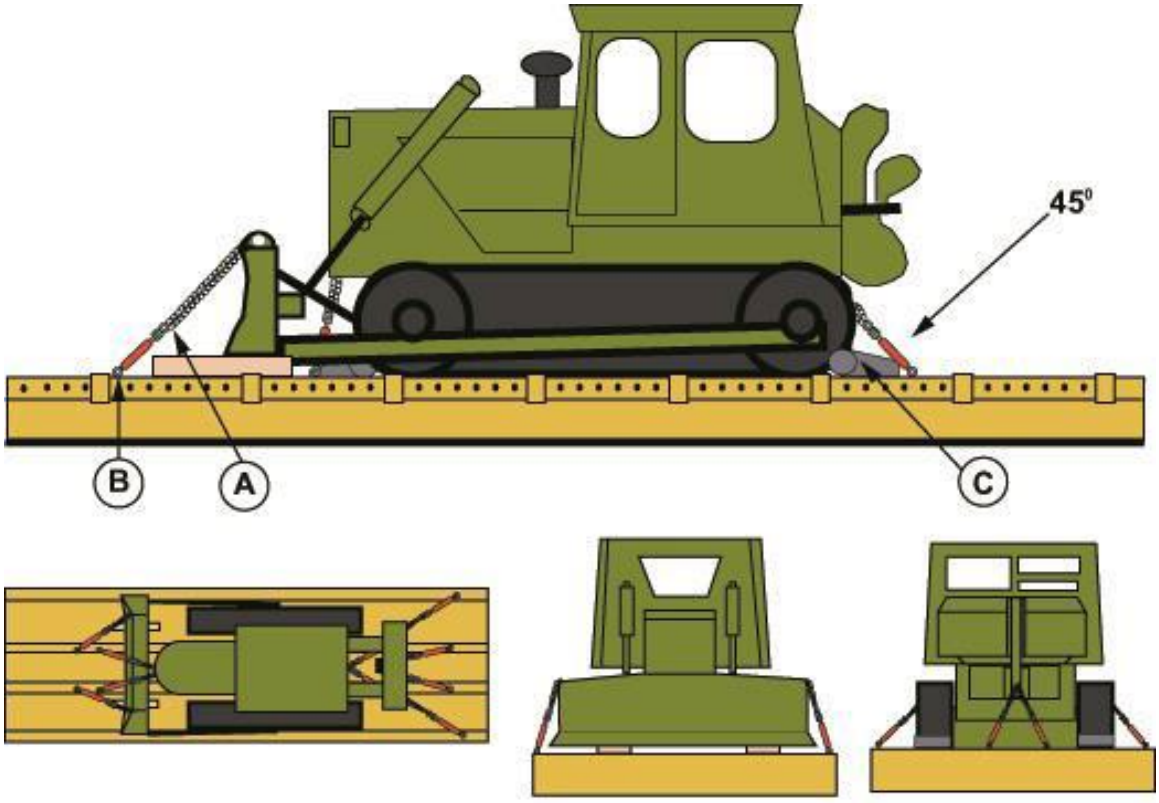
DESCRIPTION AND WEIGHT:

FEL (FRONT END LOADER)	27,260 LBS.
RTFL (ROUGH TERRAIN FORKLIFT)	17,030 LBS.
FORKLIFT 4X4	33,691 LBS.
CRANE ALL TERRAIN 4X4 WITH HYDRAULIC BOOM	53,612 LBS.

NOTE: FOR ADDITIONAL PIECES OF ENGINEERING EQUIPMENT THAT REQUIRE LOADING SPECIFICATIONS, RULES GOVERNING THEIR PECULIAR ASPECT OF LOADING CAN BE FOUND IN AAR SECTION 3.

SPECIALIZED ENGINEERING EQUIPMENT TRACKED

BULLDOZERS UP TO 59,000 LBS.
RAC 6054A



Item	No. of Pcs.	Description
A	10	Chains 1/2'' (MBS 55,000 LBS.) Including 2 on blade.
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.
C	4	Chock blocks under each track front and back for wooden floor.

DESCRIPTION AND WEIGHT:

INDUSTRIAL TRACTOR	16,920 LBS.
DOZER HD 11	36,920 LBS.
EXCAVATOR 6.4M DIGGING BUCKET	44,313 LBS.
TRACTOR FULL TRACK LOW SP	44,520 LBS.

NOTE: 4''X 8'' X 30'' LUMBER, (2 REQUIRED) STACKED UNDER CENTER RIPPER. DRILL AND TOENAIL FIRST BLOCK TO CAR FLOOR WITH FOUR 30-D (4 1/2'') NAILS. THEN NAIL SECOND BLOCK TO FIRST IN THE SAME MANNER. LOWER RIPPER ONTO BLOCKS. APPLY SAME PROCEDURE TO FRONT BLADE

TIE-DOWN CONFIGURATIONS FOR STANDARD RAIL FLAT CARS

Usually, the Canadian Forces move their equipment on specially equipped rail cars. However, when there is a shortage of such equipment, standard flat cars have to be used.

In this section, we will cover very briefly different commonly used figures to load military equipment on standard flat cars which require different types of tie-down and additional blocking and bracing.

The HLVW (10 Ton Truck), the TLARS (Track way Launching and Recovery System) and the APC (Personnel Carrier) will be used in this presentation as basic information to describe the proper procedures.

Furthermore, when loading vehicles on a standard flat rail car, allow 12 inches minimum clearance from the A end of the car and 24'' from the B end (brake end).

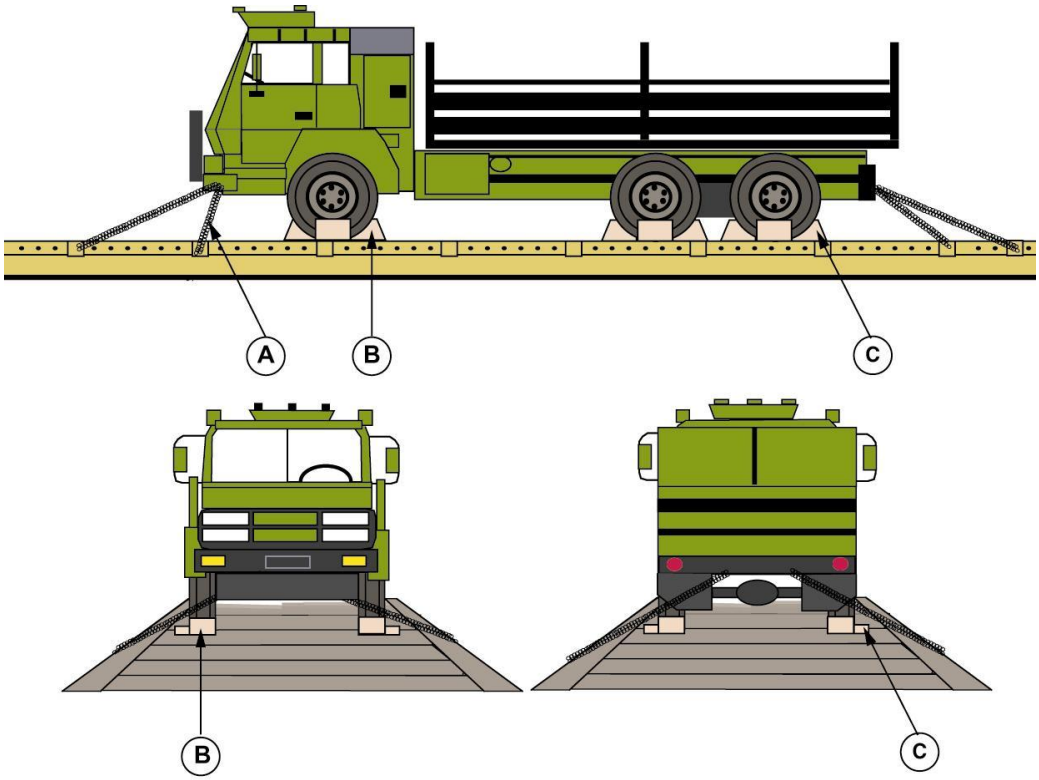
SECUREMENT STEPS

NOTE: WHEN ATTACHING BLOCKING AND BRACING ON STANDARD FLAT RAIL CARS, USE THE FOLLOWING ORDER TO GET THE BEST RESULTS.

1) NAIL FRONT CHOCK BLOCKS TO DECK IN FRONT OF EACH WHEEL.
2) ATTACH AND TENSION WIRE ROPE TO FRONT OF VEHICLE.
3) NAIL REAR CHOCK BLOCKS TO DECK IN BACK OF EACH WHEEL
4) ATTACH AND TENSION WIRE ROPE TO REAR OF VEHICLE.
5) APPLY SIDE BRACING/BLOCKING TO THE OUTSIDE OF EACH WHEEL BUT BE SURE TO APPLY PROTECTIVE MATERIAL BETWEEN THE SIDE BRACING AND TIRE TO PREVENT CHAFING WHILE IN TRANSIT.

WHEELED VEHICLES ON STANDARD RAIL FLAT CAR

HLVW (10 TON TRUCK)
RAC6088A



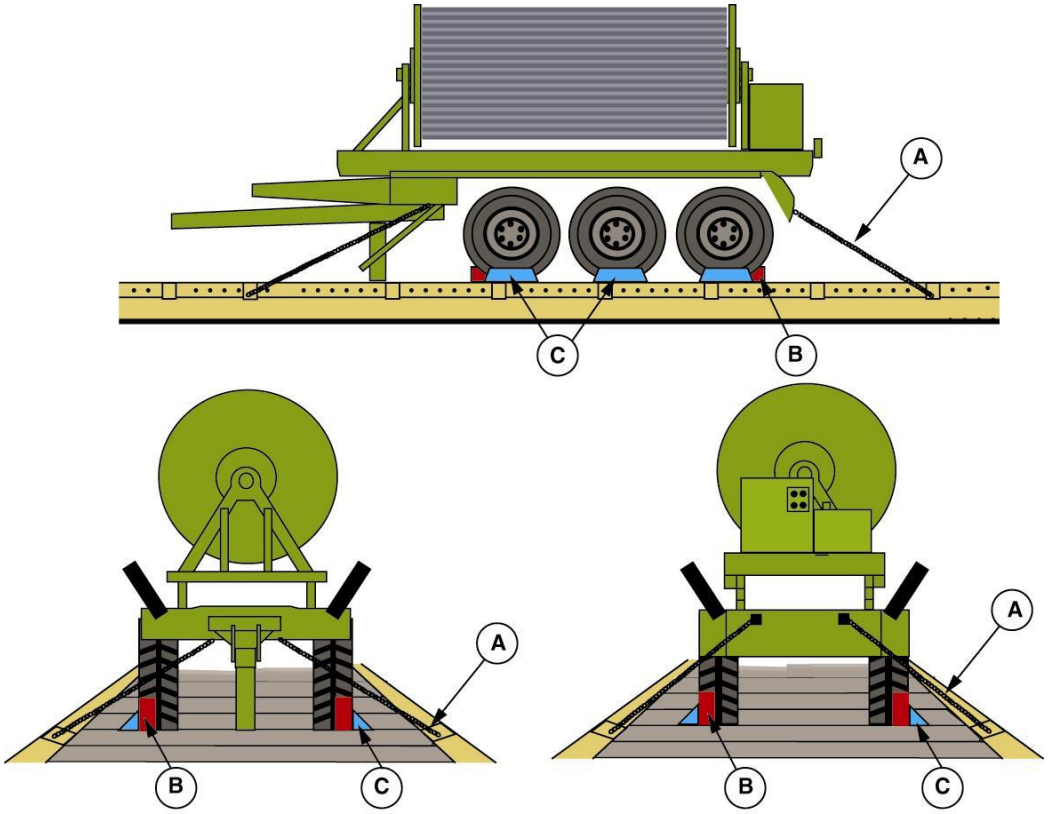
Item	No. of Pcs.	Description
A	4	Chains (13mm - 1/2'') (MBS 55,000 LBS.) or
	4	Cables 5/8" (6 x 19 wire rope)
		Complete loop for vehicles weighing 25,000 LBS. to 40,000 LBS. inclusive.
B	8 or 12	Blocks, pattern #16 will be required. Metal chock blocks may be used.
C	4 to 6	Blocks, pattern #89 of Section 6. Apply as side or lateral blockings. Metal blocks may be used.

DESCRIPTION AND WEIGHT: HLVW 25,000 LBS. – 40,000 LBS.

NOTE: THIS FIGURE WILL COVER MOST OF THE 4- OR 6-WHEEL TRUCKS (SINGLE OR DUAL AXLE)

WHEELED VEHICLES ON STANDARD RAIL FLAT CARS

TRACKWAY LAUNCHING AND RECOVERY SYSTEM (TLARS)
RAC6012



Item	No. of Pcs.	Description
A	4	Chain tie-downs: 1/2 in. alloy chains with an MBS of 55,000 LBS. Secure two outboard chains to the towing shackle at each end of the trailer. After tie-down chains are tensioned, they shall be hit sharply with a hammer to relieve any binding and tie-down chains re-tensioned, if necessary. There must be at least one full wrap of chain around the tensioning device drum.
B	4	Longitudinal metal chock blocks. Locate and secure as shown in drawing.
C	6	Lateral metal chock blocks. Locate and secure as shown in drawing.

DESCRIPTION AND WEIGHT: TLARS 25,000 LBS. – 40,000 LBS.

NOTES:
1. LOAD MUST BE CENTRALLY LOCATED ON CAR
2. ADEQUATE BRACING MUST BE ADDED TO SECURE DIESEL ENGINE AT REAR OF UNIT.

TRACKED VEHICLES ON STANDARD RAIL FLAT CAR

In general, the Army inventory of tracked vehicles shares a similar track assembly configuration. The differences between vehicles are mostly the weights.

Many tracked vehicles are wider than the rail car. Therefore, when loading tracked vehicles onto flat cars, be sure to center the vehicle on the flat car. The overhang of the vehicle on each side of the flat car must be equal to avoid rail clearance difficulties.

Once the tracked vehicle is in place on the flat car do not set the brakes until chock blocks are in place (see paragraph **1** below). Wire the turret lock and elevating mechanisms in place and engage any hull-mounted barrel lock. Put two complete wire rope loops around the barrel and secure one to each side of the hull. This procedure provides positive visible protection against the barrel elevating or the turret turning.

The following general procedures apply to figures in the tie-down guide:

1) CHOCK BLOCKS

Locate appropriate chock block against the front of the track and secure to the deck. Instruct the driver to pull forward until the tracks are up on the front blocks a few inches and set the brake. Next, place the appropriate block against the rear of the track, and nail it to the deck. Release the brake and allow the vehicle to settle against the blocks.

2) SIDE OR LATERAL BLOCKING

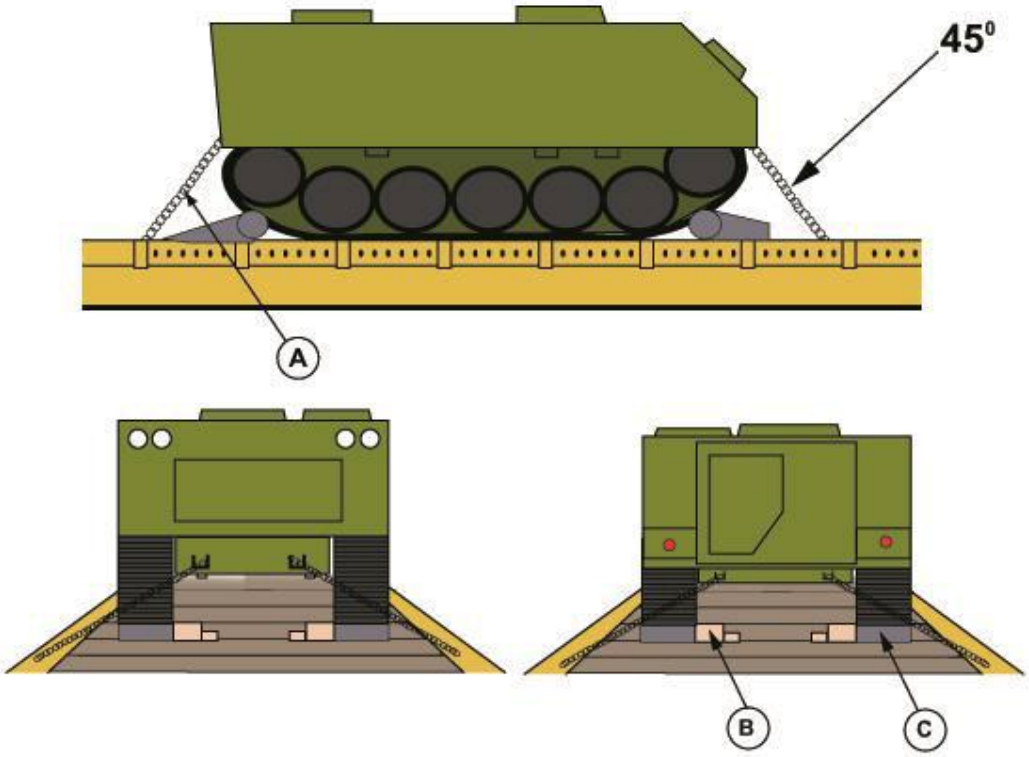
When possible, apply side blocking to the outside of the treads. When side blocking is not possible, apply lateral blocking on the interior of the treads. The lateral blocking frame may be put on the floor and secured before loading the tracked vehicle. To do this, measure the inside distance between the treads, cut the lumber and nail it to the flatcar deck. Then, carefully guide the vehicle onto the flat car. Interior lateral blocking can be deleted when the vehicle is shipped in controlled train service, which is generally short distance over rails owned or controlled by a single carrier. You will have to get the inspector’s approval for this type of service.

3) WIRE ROPE

Attach wire rope from the tie-down shackle on the vehicle to the side stake pocket, and secure with four clamps of the same diameter as the cable. Two pieces of wire rope are normally attached at each end of the vehicle, but both the size and number of cables will depend on the weight of the vehicle. Apply a thimble and a cable clamp at the point where the wire passes around the side stake pocket, to prevent the wire rope from chafing. Also, overlap the wire rope at least 24 inches.

TRACKED VEHICLES ON STANDARD RAIL FLAT CARS

APC (ARMOURED PERSONNEL CARRIER)
M113 FAMILY Including M548 and M577
RAC 6087B



Item	No. of Pcs.	Description
A	4 or 4	Chains (13 mm - 1/2'') (MBS 55,000 LBS.) or Wire Rope Cables (6 x 19) 5/8'' Doubled (Complete loops)
B	6	Lateral restraints (inside), 3 each side, or lateral blocking.
C	4	Blocks - 2 pattern #30 at front and 2 pattern #31 at rear. Metal chock blocks may be used.

DESCRIPTION AND WEIGHT: APC (M113) 19,775 LBS.

CHAIN REQUIREMENTS

The general guidelines for securing wheeled vehicles on chain-equipped cars by diameter of chains are as follows:

4 chains 3/8-inch with a maximum breaking strength of 36,000 LBS. for vehicles weighing less than 16,000 pounds.

8 chains 3/8-inch with a maximum breaking strength of 36,000 LBS. for vehicles weighing 16,000 pounds to 25,000 pounds.

4 chains 1/2-inch with a maximum breaking strength of 55,000 LBS. for vehicles weighing 25,000 pounds to 40,000 pounds.

8 chains 1/2-inch with a maximum breaking strength of 55,000 LBS. for vehicles weighing 40,000 pounds to 55,000 pounds.

12 chains 1/2-inch with a maximum breaking strength of 55,000 LBS. for vehicles weighing 55,000 pounds to 80,000 pounds.

However, the user must realize that it yields the least number of chains required. If the resulting number of chains required does not provide for the symmetrical configuration, add chains such that each tie-down has the same number. For example, if the formulated number of chains required is 9, use 12 to establish symmetry about the four tie-down provisions.

VEHICLE SUMMARY TIE-DOWN TABLE

VEHICLE TYPE	VEHICLE WEIGHT (LBS.)	ALLOY STEEL CHAIN		
		Dia (in.)	Minimum Breaking Strength (LBS.)	Number of Chains per vehicle
AHSVS	26,500	1/2	55,000	4
AHSVS 16 Ton Palletized Loading	54,120	1/2	55,000	8
Ambulance 4X4	15,013	3/8	36,000	4
APC M113 family including M548 and M577	19,775	1/2	55,000	4
ATV	851	3/8	36,000	4
Bison	28,459	3/8	36,000	4
Bison AMB	27,999	3/8	36,000	4
Bison C31	28,660	3/8	36,000	4
Bison MRT	32,066	1/2	55,000	4
BV-206	13,977	3/8	36,000	4
COUGAR Engineer rapid response	64,000	1/2	55,000	12
COUGAR	52,000	1/2	55,000	8
Cargo Body SEV SEC SCRN 6ft	19,181	3/8	36,000	8
Coyote MTD	32,827	1/2	55,000	4
Crane Wheeled MTD DED All Terrain 4X4 hydraulic Boom	53,612	1/2	55,000	8
Crew Cab 1.5T 4X4	6,113 Empty	3/8	36,000	4

VEHICLE TYPE	VEHICLE WEIGHT (LBS.)	ALLOY STEEL CHAIN		
		Dia (in.)	Minimum Breaking Strength (LBS.)	Number of Chains per vehicle
Dump Truck HD	33,863 Empty	1/2	55,000	4
Excavator Tracked 6.4M Digging Bucket	44,313	1/2	55,000	8
Excavator wheeled with Digging Bucket	30,000	1/2	55,000	8
Forklift 4X4 9,000 LBS.	33,691	1/2	55,000	4
Grader Road Motorized	30,159	1/2	55,000	4
HLVW 10TM with Winch and Crane	30,810 Empty	1/2	55,000	4
HLVW Cargo SCRN 10TM	29,542 Empty	1/2	55,000	4
HLVW PLS 16TM	35,274	1/2	55,000	4
HLVW Refueller (FAR)	29,983 Empty	1/2	55,000	4
HLVW Wrecker	42,990 Empty	1/2	55,000	8
Husky MRT	23,589	3/8	36,000	4
Husky MKIII	19,140	3/8	36,000	8
Husky towing	19,140	3/8	36,000	8
Kitchen trailer MTD 1.5TM	5,631 Empty	3/8	36,000	4

VEHICLE TYPE	VEHICLE WEIGHT (LBS.)	ALLOY STEEL CHAIN		
		Dia (in.)	Minimum Breaking Strength (LBS.)	Number of Chains per vehicle
LAV III APC CP	38,000	1/2	55,000	8
LAV III Engineer APC	42,000	1/2	55,000	8
LAV III ICS	42,000	1/2	55,000	8
Leopard C1	93,696	1/2	55,000	16
Leopard C2	93,696	1/2	55,000	16
Leopard A6M	143000	1/2	55,000	20
LHS	66,039	1/2	55,000	12
LHS Trailer	34,118	1/2	55,000	8
LSVW 1.5TM	11,574	3/8	36,000	4
LSVW 1.5TM Ambulance SEV	11,574	3/8	36,000	4
LSVW 1.5TM DES	11,575	3/8	36,000	4
LSVW 1.5TM LCSS HQ LAN Server	11,618	3/8	36,000	4
LSVW 1.5TM MCT with S805 Shelter	12,037	3/8	36,000	4
LSVW 1.5TM Radio Node	11,574	3/8	36,000	4
LUVW 1TM 4X4 MILCOT Basic	8,223	3/8	36,000	4
LUVW 3/4 C and R	10,251	3/8	36,000	4
LUVW 3/4T	10,252	3/8	36,000	4
M777 A1	8,700	1/2	55,000	6

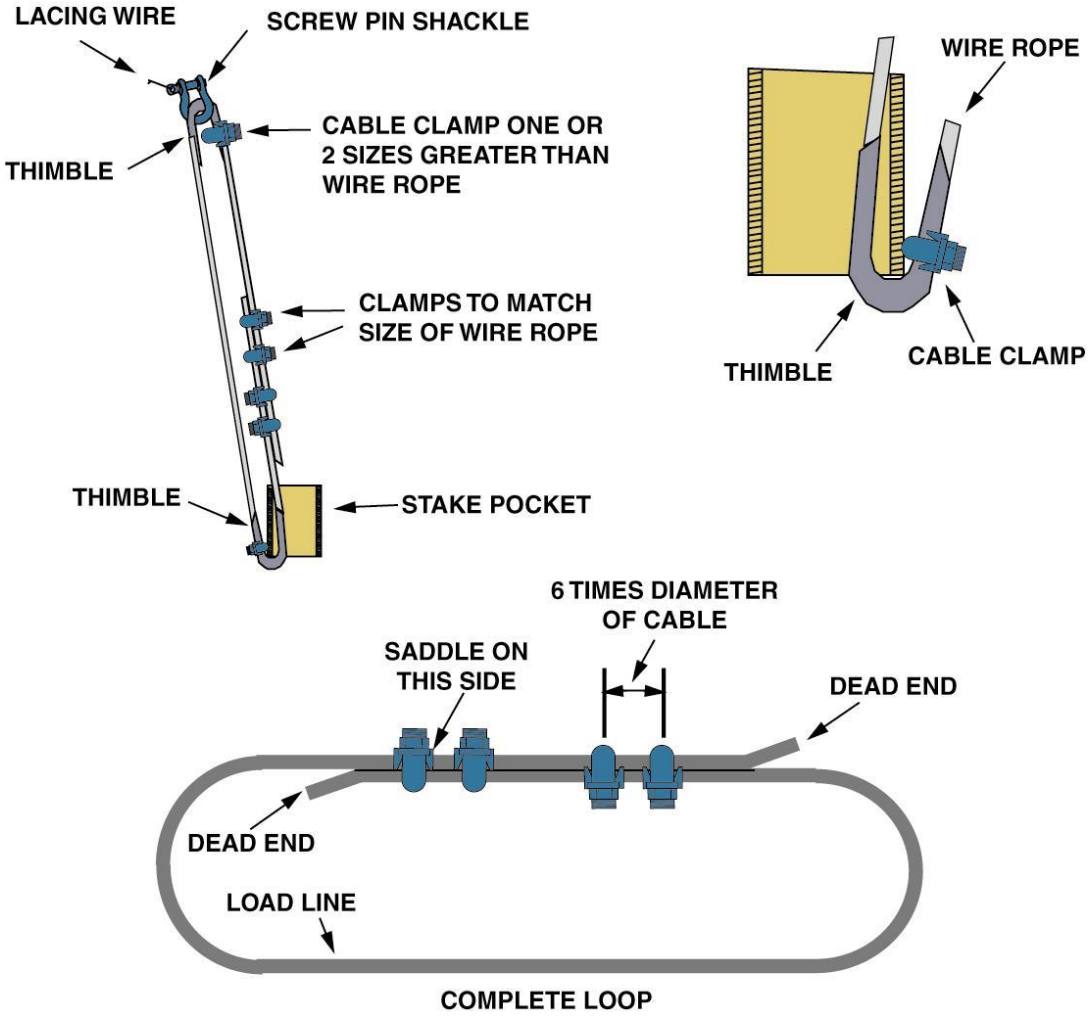
VEHICLE TYPE	VEHICLE WEIGHT (LBS.)	ALLOY STEEL CHAIN		
		Dia (in.)	Minimum Breaking Strength (LBS.)	Number of Chains per vehicle
Maintline 4X4	37,077	1/2	55,000	4
MIV Buffalo	83,824	1/2	55,000	16
MLVW 2.5TM	14,349 Empty	1/2	55,000	4
MRR	22,000	3/8	36,000	8
MRT	56,070	1/2	55,000	12
MSVS MILCOT	27,101	1/2	55,000	4
PDB and WHEEL TRUCK	10,000	3/8	36,000	4
RG31 MK3	23,386	3/8	36,000	4
Roller Towed Pneum Tires Hopper 13 WHL	53,196	1/2	55,000	8
Roller Towed Sheep foot Type SGL/DBL Roller	6,736	3/8	36,000	4
Roller Towed Vibrating DED Smooth Faced	12 ,980	3/8	36,000	4
Semi-trailer attached to prime mover	32,070	1/2	55,000	8
Scoop Loader	30,159	1/2	55,000	4
Scoop Loader type Wheeled 4X4 Skid Steer	7,068	3/8	36,000	4
Semi Trailer Bull Hauler Fuel disp 32000L	15,256 Empty	3/8	36,000	4
Semi trailer Low Bed 35TM Variable deck	22,300 Empty	3/8	36,000	8

VEHICLE TYPE	VEHICLE WEIGHT (LBS.)	ALLOY STEEL CHAIN		
		Dia (in.)	Minimum Breaking Strength (LBS.)	Number of Chains per vehicle
Semi Trailer Low Bed 45TM 24Ft deck	24,471 Empty	3/8	36,000	8
Semi Trailer Low bed 45T 24ft Deck REM ADJ Gooseneck	24,471 Empty	3/8	36,000	8
Snow blower Self Contained	11,475	3/8	36,000	4
Spreader Sandbagger	6,420 Empty	3/8	36,000	4
Towed artillery gun	2,440	3/8	36,000	4
Trailer Tank 2.5T Self contained FAR (TFAR)	5,199 Empty	3/8	36,000	4
T-LAV M577	30,999	1/2	55,000	12
T-LAV Maint Vehicle (Engineer)	40,124	1/2	55,000	12
T-LAV Maint Vehicle with Turret (Engineer)	36,156	1/2	55,000	12
Trackway Surfacing Outfit Vehicle Mounted	33,523	1/2	55,000	8
Tractor Full Track Low Speed 152to250 Net FLYW	44,520	1/2	55,000	8
Tractor Wheeled Industrial High Mobility 4X4	59,730	1/2	55,000	8
Trailer 3.5T 2WHL M353 w/Hydraulic Tool System	10,121	3/8	36,000	4

VEHICLE TYPE	VEHICLE WEIGHT (LBS.)	ALLOY STEEL CHAIN		
		Dia (in.)	Minimum Breaking Strength (LBS.)	Number of Chains per vehicle
Trailer cargo 850LBS.	1,477 Empty	3/8	36,000	4
Trailer Cargo 4 wheeled /ski Amph 1000Kg Payload	2,403 Empty	3/8	36,000	4
Trailer Cargo Combat Engineer ATV Trailer	1,650	3/8	36,000	4
Trailer Flatbed Beavertail Tilt Deck 30K LBS.	7,785 Empty	3/8	36,000	4
Trailer Flatbed Beavertail 40K LBS.	9,800 Empty	3/8	36,000	4
Trailer PLS Full 15ft	6,614 Empty	3/8	36,000	4
Trailer Tank water 1.5TM	2,403 Empty	3/8	36,000	4
Truck Multi Stop Delivery 2.0T	5,190 Empty	3/8	36,000	4
Truck Tractor 50K LBS.	27,337 Empty	1/2	55,000	4

WIRE ROPE

Apply wire rope through the tie-down provisions on the vehicle and through the side stake pockets on the flat car in a complete loop, as shown. Application and diameter of wire rope will depend on the weight of the vehicle. Be sure that the vehicle weight includes any cargo on the vehicle. Apply a thimble under the side stake pocket to prevent chafing of wire rope, as shown. Secure the thimble to the wire rope with a cable clamp one or two sizes larger than the wire rope being used.



PROPER SECUREMENT OF HOOK AND CHAIN LINK

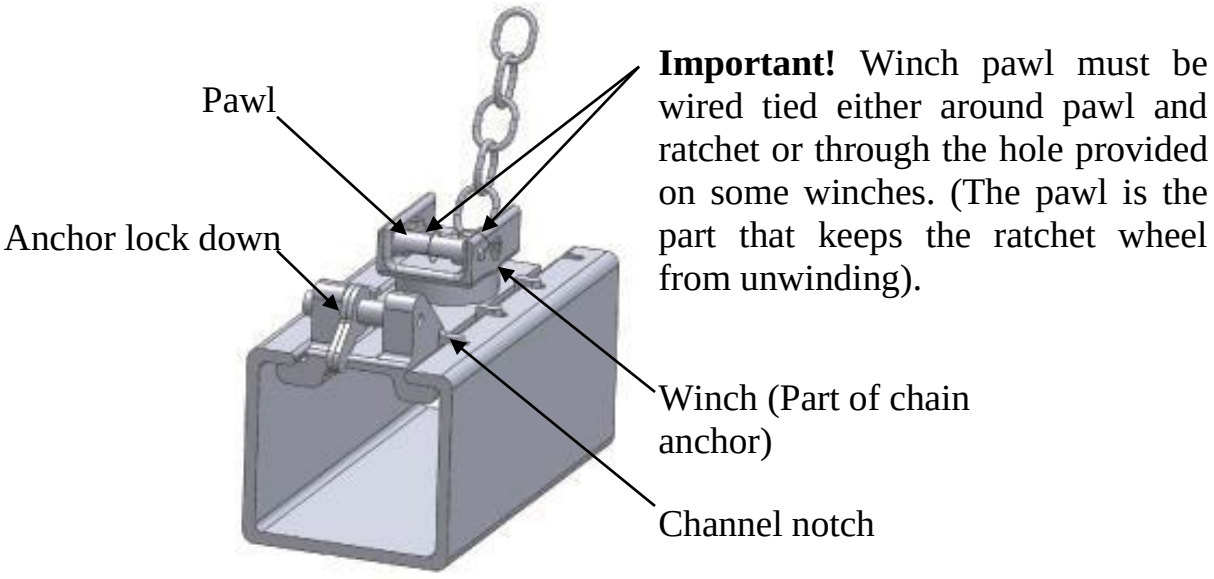
Most **COMMON** chain-equipped flat cars have either 3/8 - or 1/2-inch steel alloy chains. Apply chain hooks over the vehicle tie-down shackles, rather than under. Wire the hook to the chain link, as shown, to prevent disengagement. On chain cars equipped with outboard chain channels, use such channels when possible. Side bracing may be required on center rail chain-equipped cars.

TIE-DOWN EQUIPMENT

If turnbuckles (used to tighten chains) are not equipped with jam nuts or a locking device, they must be wired to prevent them from loosening.

Apply tie-down chains symmetrically around the vehicle with an angle from deck to chain of about 45 degrees. **When 45 degrees angle cannot be met additional chains can be required by the inspector.** Do not cross chains. Completely seat the chain anchors in the channels, as shown.

WHEN ATTACHING CHAINS TO THE VEHICLE, SECURE THE SHORTEST CHAINS FIRST AND THE LONGEST CHAINS LAST.



Important! Winch pawl must be wired tied either around pawl and ratchet or through the hole provided on some winches. (The pawl is the part that keeps the ratchet wheel from unwinding).

BLOCKING

Although other blocking patterns exist, the most commonly used are the following. The pattern numbers correspond to the numbers used in AAR Sections 1 and 6.

A. PATTERN 16
Chock block used mainly on wheeled vehicles.

B. PATTERN 30
Front chock block used mainly on tracked vehicles.

C. PATTERN 31
Rear chock block used mainly on tracked vehicles.

D. PATTERN 89
External side blocking used when flat car width allows.

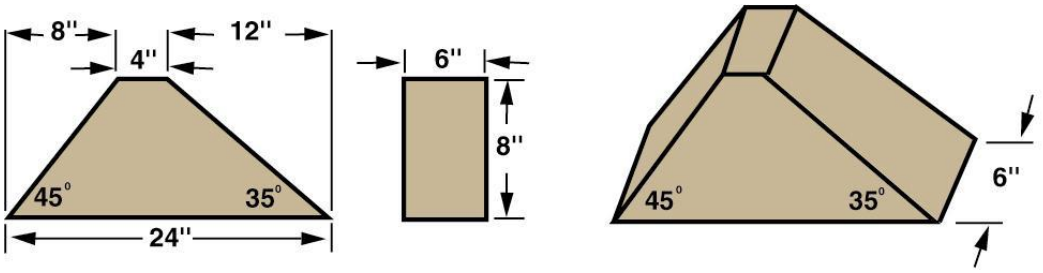
E. PATTERNS 90 AND 91
Front supports, or stanchions, used with trailers and semi-trailers on flat cars.

F. ROAD WHEEL BLOCKS
One or two pieces of lumber 2'' by 4'' on top. Also called bogie wheel blocks, these are used on tracked vehicles to block the road wheels.

G. LATERAL BLOCKING
Usually used when the width of the flat car does not allow for side blocks. Often called interior side blocking since it provides lateral support on the inside of the tires or tracks.

NOTE: BLOCKING MAY BE FABRICATED USING ROUGH OR COMMERCIAL DRESSED LUMBER OF THE NOMINAL SIZES INDICATED ON EACH DRAWING.

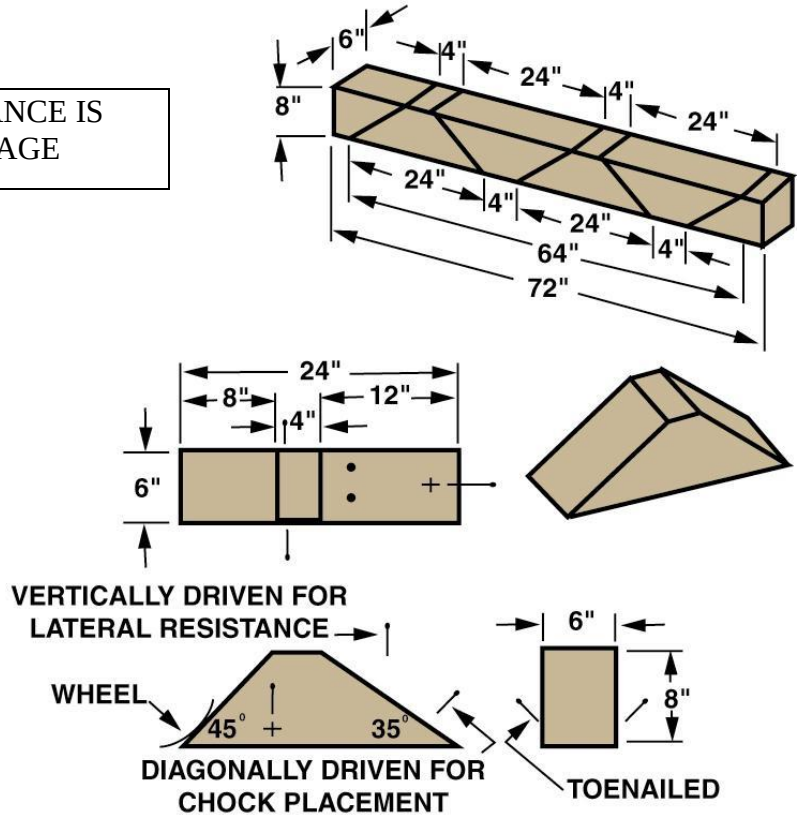
PATTERN 16



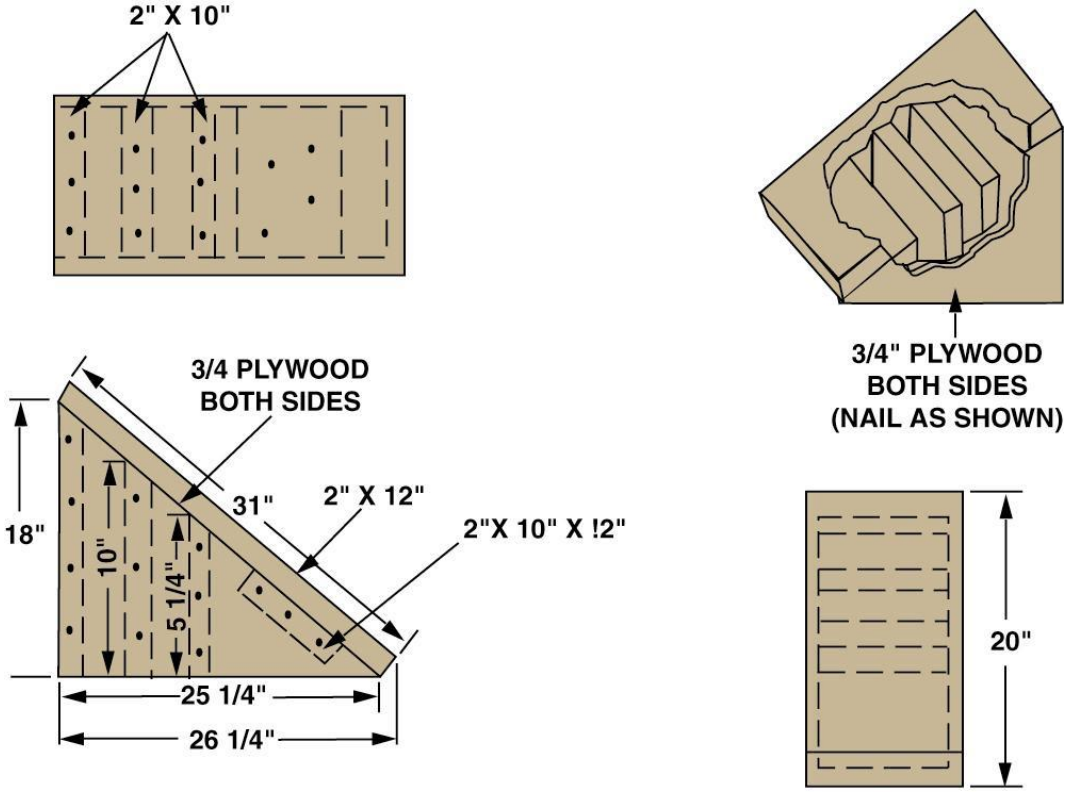
NOTE: LOCATE 45 DEGREES PORTION OF BLOCK AGAINST FRONT AND REAR OF WHEELS. SECURE HEEL OF BLOCK TO FLOOR WITH THREE 40-D (5'') NAILS AND TOENAIL THAT PORTION UNDER TIRE WITH TWO 40-D (5'') NAILS. USUALLY, 2 BLOCKS PER WHEEL ARE REQUIRED.

NOTE: PREDRILLING IS ADVISED TO PREVENT SPLITTING.

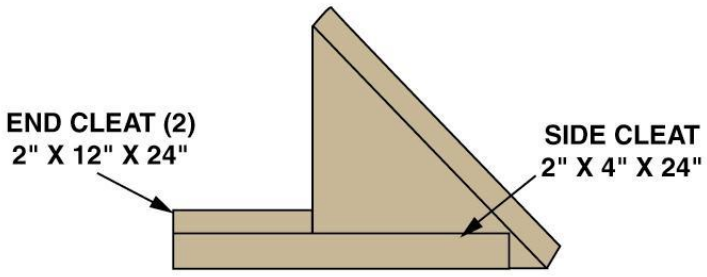
NOTE: AN 8" ALLOWANCE IS PROVIDED FOR WASTAGE



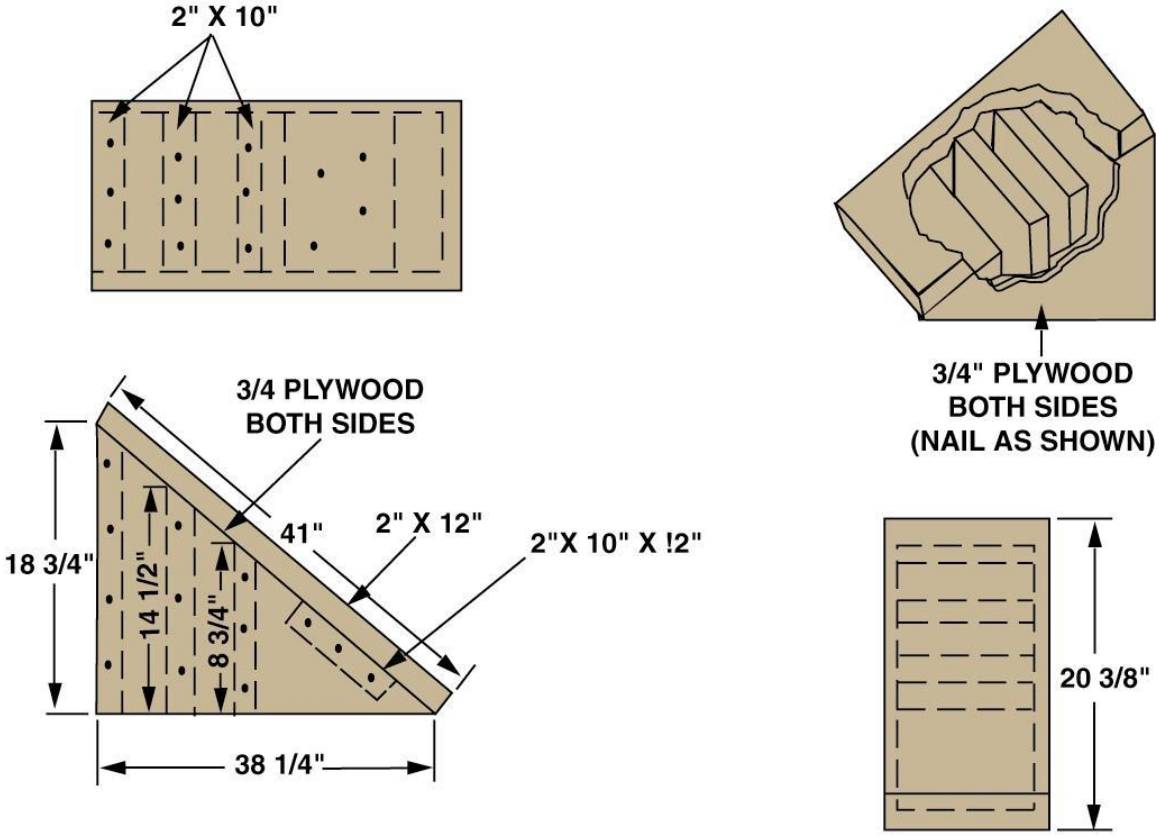
PATTERN 30



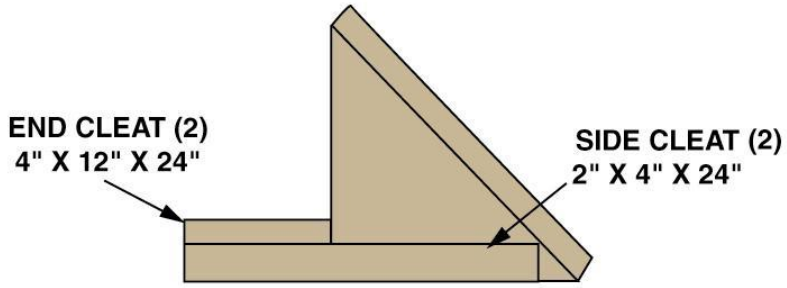
NOTE: AFTER ASSEMBLING THE BLOCK AS SHOWN, LOCATE THE INCLINED FACE OF THE BLOCK AGAINST THE TRACK, EVEN WITH THE INBOARD EDGE, AT THE FRONT OF THE VEHICLE. NEXT, CONSTRUCT 2 END CLEATS: EACH CONSISTING OF 2 PIECES OF 2'' X 12'' X 24'' LUMBER. SECURE THE LOWER PIECE TO THE FLOOR WITH FOUR 20-D (4'') NAILS. THEN, CONSTRUCT 2 SIDE CLEATS: EACH CONSISTING OF ONE PIECE OF 2'' X 4'' X 24'' LUMBER. LOCATE ON THE OUTSIDE OF THE BLOCK AND SECURE TO THE FLOOR WITH FOUR 20-D (4'') NAILS, (SEE BELOW)



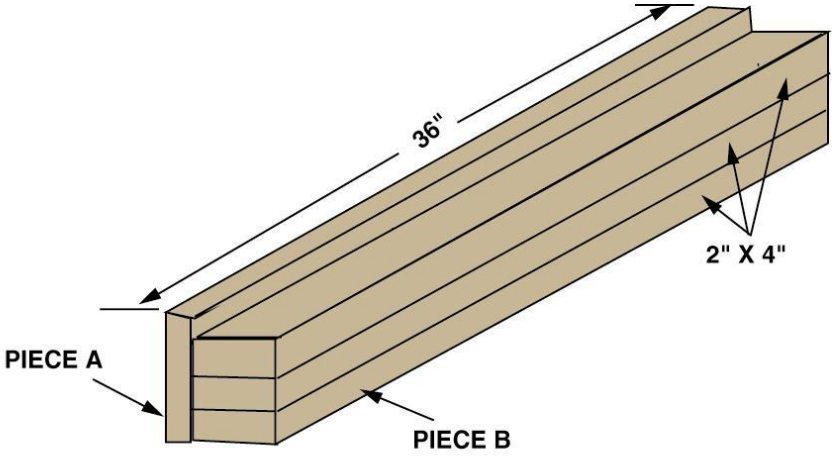
PATTERN 31



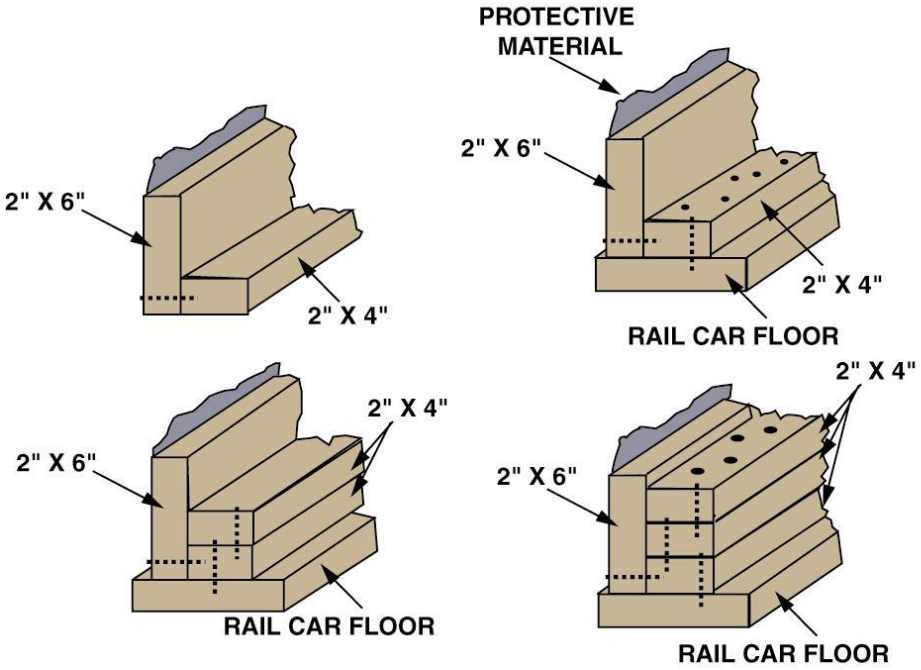
NOTE: AFTER ASSEMBLING THE BLOCK AS SHOWN, LOCATE THE INCLINED FACE OF THE BLOCK AGAINST THE TRACK, EVEN WITH THE INBOARD EDGE, AT THE REAR OF THE VEHICLE. NEXT, CONSTRUCT 2 END CLEATS: EACH CONSISTING OF 2 PIECES OF 2'' X 12'' X 24'' LUMBER. SECURE THE LOWER PIECE TO THE FLOOR WITH FOUR 20-D (4'') NAILS AND THE TOP PIECE TO THE ONE BELOW, WITH FOUR 20-D (4'') NAILS. THEN, CONSTRUCT 2 SIDE CLEATS: EACH CONSISTING OF ONE PIECE OF 2'' X 4'' X 24'' LUMBER. LOCATE ON THE OUTSIDE OF THE BLOCK AND SECURE TO THE FLOOR WITH FOUR 20-D (4'') NAILS. (SEE BELOW)



PATTERN 89



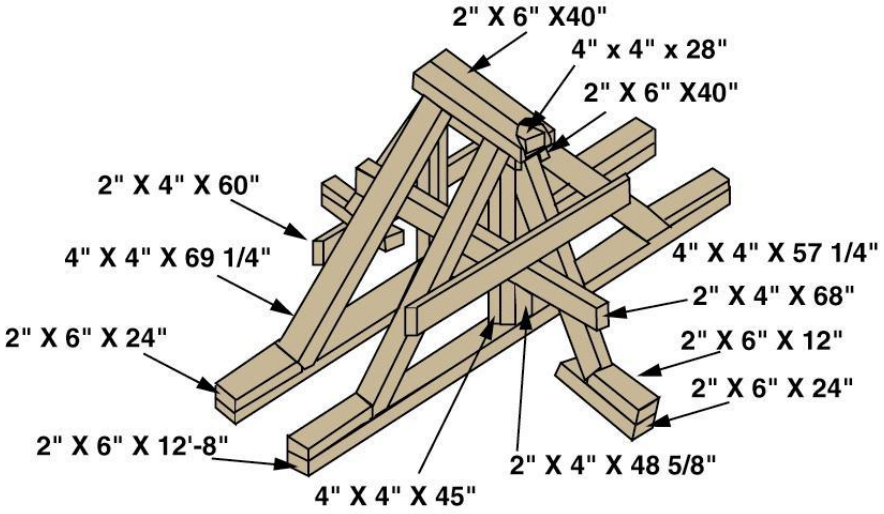
NOTE: NAIL PIECE **A** TO PIECE **B** WITH FIVE 12-D (3 ¼'') NAILS. NAIL PIECE **B** TO THE CAR FLOOR WITH FIVE 20-D (4'') NAILS. NAIL THE OTHER 2'' X 4'' PIECES TO THE ONE BELOW IN THE SAME MANNER



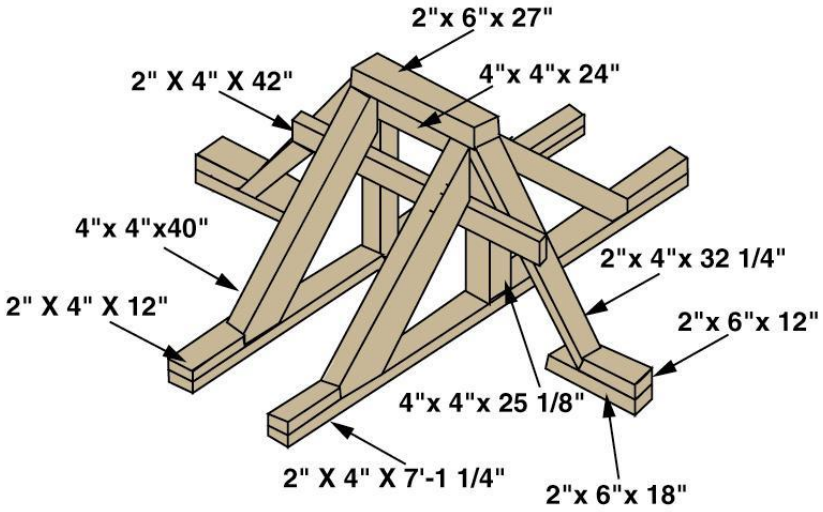
GENERAL INFORMATION

PATTERN 90 AND 91

NOTE: PATTERN 90 HEIGHT, USING DRESSED LUMBER DIMENSIONED AS SHOWN, WILL BE ABOUT 51 5/8’’



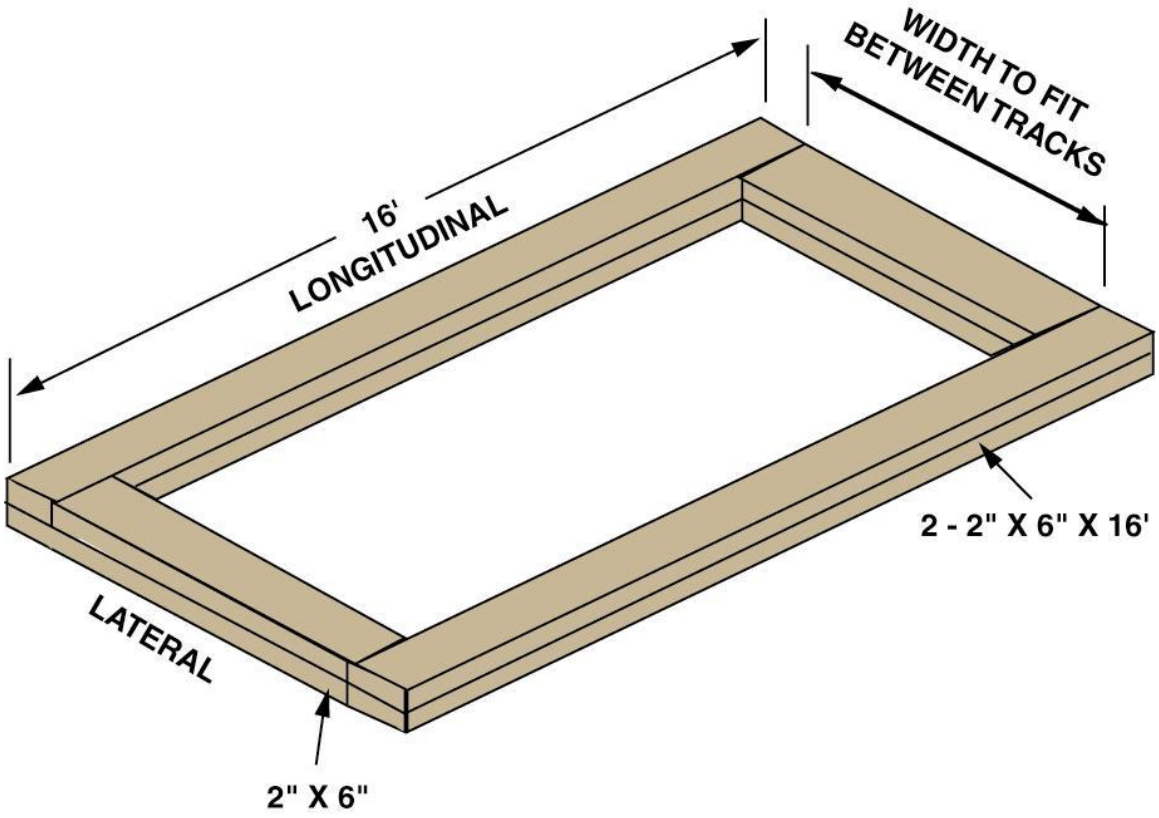
NOTE: PATTERN 91 HEIGHT, USING DRESSED LUMBER DIMENSIONED AS SHOWN, WILL BE ABOUT 28 1/8’’



NOTE: LENGTH OF SUPPORT MEMBERS AND OTHER COMPONENTS MAY VARY TO SUIT TRAILER TYPE AND HEIGHT.

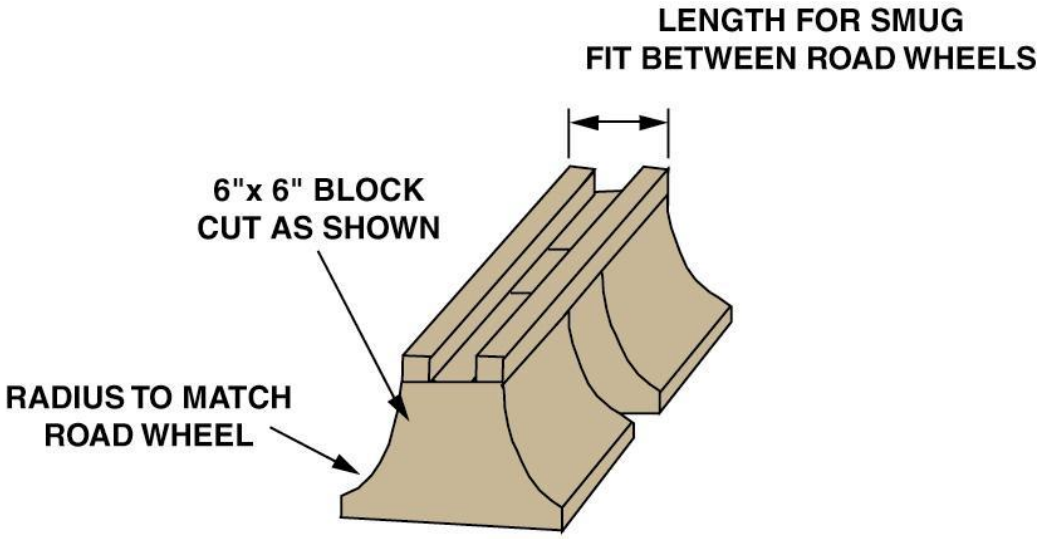
GENERAL INFORMATION

LATERAL BLOCKING



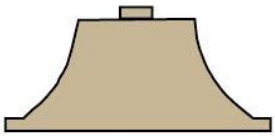
NOTE: FRAMEWORK TO CONSIST OF 4 PIECES OF LUMBER 2'' X 6'' X16''. LOCATE LOWER PIECES ON CAR FLOOR AGAINST INSIDE EDGE OF EACH CRAWLER THREAD. SECURE TO CAR FLOOR WITH TWELVE 20-D (4'') NAILS. SECURE TOP PIECE TO LOWER PIECE IN LIKE MANNER. APPLY NAILS IN STRAGGERED PATTERN. FOUR PIECES OF 2'' X 6'' LUMBER CUT-TO-FIT SHALL BE PLACED BETWEEN THE LONGITUDINAL PIECES. SECURE LOWER PIECES TO CAR FLOOR WITH FOUR 20-D (4'') NAILS. SECURE TOP PIECE TO LOWER PIECE IN LIKE MANNER.

ROAD WHEEL BLOCK



NOTE: 2'' X 4'' - TWO PLACES IF POSSIBLE (SKETCH 1) TIGHT AGAINST ROAD WHEELS. FASTEN EACH WITH FOUR 20-D (4'') NAILS AFTER PUTTING 6'' X 6'' BLOCKS IN PLACE.

SKETCH 1



SKETCH 2

NOTE: IF TWO 2'' X4'' PIECES WILL NOT FIT AS SHOWN IN SKETCH 1, USE ONE 2'' X 4'' AS SHOWN IN SKETCH 2. FASTEN WITH FOUR 20-D (4'') NAILS AFTER PUTTING 6'' X 6'' BLOCKS IN PLACE.

1. When ordering specialized railroad freight equipment, shippers should specify cars equipped with tie-down devices in the quantity required for proper attachments of their vehicles.
2. Vehicles must face in the same direction and be uniformly spaced along the length of the car to allow enough space at each end of the car and between the vehicles for securement. The angle of the tie-down must be as close to 45 degrees as possible. Quarter/ton trucks loaded on Bi-Level cars may have approximately 10'' space between each vehicle and maintain a 45-degree angle for the tie-down, however, bigger vehicles will need more space to achieve the same target.
3. Tie-downs **ARE NOT** to be secured to axles, springs, or bumpers of vehicles.
4. Gearshift levers on vehicles equipped with automatic or standard transmissions should have the gearshift lever wire-tied in the neutral position if necessary.
5. Open hooks must be secured over the opening to prevent the hook from becoming disengaged from the chain link to which it is secured. Clevises/shackles equipped with screw pins must have additional securement (wire).
6. Do not mix wheeled and tracked vehicles as a serious accident could occur when loading a tracked vehicle with the bridge plates installed.
7. Tank gun barrels must be placed in the tank gun brace and securely fastened. If gun brace is missing or broken, two 3/8-inch wire rope loops must be placed around the gun barrel, securing one loop to each side of the hull. Substitution of wire or banding is prohibited.
8. Hand brakes on vehicles must be set, except when stated otherwise in the individual vehicle-operating handbook.

9. Height and width of the load should not exceed railway line clearances. If it does, acceptance of the railroad must be obtained.

10. Loaded vehicles should not exceed the load limit specified on the car and/or the weight limit in a specific figure.

FINAL INSPECTION

It should be remembered that the loading priority and the positioning of the vehicles on the car belongs to the Armed Forces. **THE CARRIER'S INSPECTOR SHOULD BE PRESENT WHEN THE ACTUAL LOADING IS PERFORMED**. **A FINAL INSPECTION MUST** be made by the railroad inspector accepting the load and a representative of the Armed Forces. The railroad inspector has the final word concerning the acceptance of the loads. In case a disagreement concerning the Loading Rules occurs, it must be reported to the individual in charge of Car Loading Rules at the RAC (Tel: (613) 567-8591) who will provide authoritative interpretation on proper loading practices and regulations.

LOAD AND TIE-DOWN CHECKLIST
FOR VEHICLES ON CHAIN TIE-DOWN FLAT CARS

- Make certain all hood latches are secured.
- Face vehicles in same direction.
- Sufficient space should be left between vehicles to allow a **45-degree** angle for chain tie-down. **(Consideration must be given to the height of tie-down point in the planning of vehicle placement)**
- On multi level cars, a minimum space of 10 inches should be left between vehicles.
- Check for proper brake wheel clearance.
- Do not cross chains.
- Use symmetrical tie-down patterns.
- Seat and lock chain anchor or winch.
- Secure shackle in tie-down position with wire tie or cotter pins.
- Pull chain tight and attach hook above the compression unit.
- Tighten chain.
- Use appropriate tool.
- Make sure chain is not kinked or bind.
- Secure hooks with wire.
- Make sure turnbuckles are wired or locked.
- Wrenches tighten jam nuts.
- Do not secure chains to axles, springs, or bumpers.
- Make certain turrets and guns, radiator doors, side skirts, outriggers, mirrors, crane booms, expansible van bodies, and so forth are secured from extending up or over the side of the flat car.
- All unused chains and binders must be stored properly in tracks.
- All tools must be removed from cars.

NOTE: COPIES OF THIS PAGE SHOULD BE DISTRIBUTED TO LOADING TEAMS.

NOTES