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MOVEMENT SUPPORT

RAIL

(ENGLISH)

Issued on Authority of the Chief of Defence Staff

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FOREWORD

1. This manual, B-GJ-005-404/FP-020, Movement Support - Rail, is issued under the authority of the Chief of Defence Staff. It is one publication in the five-part series of staff manuals dealing with the movement of Canadian Forces (CF). This manual provides detail on the movement by rail of formed units, their vehicles, and equipment primarily within Canada. When deployed overseas, the general principles will continue to apply but points of detail must be confirmed through reconnaissance, or with the Host Nation Movement Co-ordination Centre or senior deployed Movement Co-ordination Centre (for allied or coalition operations). It does not address the peacetime movement of individuals. The other related publications in the series are as follows:

- a. B-GJ-005-404/FP-000, Movement Doctrine for Canadian Forces Operations (Movement General).
- b. B-GJ-005-404/FP-010, Movement Support Sea.
- c. B-GJ-005-404/FP-030 Movement Support Road.
- d. B-GJ-005-404/FP-040 Movement Support Air.

2. This publication is effective on receipt and supersedes B-GL-303-010/FP-002 Volume 10 Part 2 dated Jul 90. It is published on the Defence Wide Area Network (DWAN) on the J4 Movements (J4 Mov) Web Site and not in hard copy, any hard copy is to be downloaded from the DWAN.

3. Recommendations for change should be submitted to the Canadian Forces Joint Doctrine Board (CFDB) through the chain of command to J4 Mov for the attention of J4 Mov Doctrine.

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CHAPTER 1

INTRODUCTION

101. AIM

1. There are two primary aims for this manual. First to provide the doctrine for rail movement for Canadian Forces (CF), thus enabling staff and movement agencies to plan and execute the movement of forces by rail. Second to serve as a practical guide, for the member in the field, that details the precise method of securing vehicles and equipment to rail cars.

102. SCOPE

1. This publication provides details on the movement by rail of formed units and their vehicles and equipment in Canada and overseas. It has not been possible to obtain approval for the application of Canadian Railway Circulars in the US. This is essentially because the control of US rail transportation is decentralized. To receive American Association of Railways (AAR) authorization, for the implementation of Canadian Railways Circulars in the US, would take a prohibitive amount of time (due to the number of governing bodies whose approval would be required). If there is a requirement for a unit or a formation to move by rail into the US, the full AAR rules must be followed. This manual does not address the rail movement of individuals by rail; this type of movement is detailed in CFAO 20-12. The normal peacetime movement of materiel by rail is expanded in A-LM-158-004/AG-002.

103. ABBREVIATIONS AND DEFINITIONS

1. Abbreviations used are in accordance with A-AD-121-F01/JX-000, Manual of Abbreviations for the CF dated 1995. All words and terms used in this manual are in accordance with A-AD-121-AAP/JX-001, NATO Glossary of Military Terms and Definitions AAP-6 and with the Concise Oxford Dictionary. A glossary of frequently used terms and definitions related to rail movement is provided at the end of this manual.

104. RAIL MOVEMENT

1. Rail movement can be carried out using special trains (passenger, freight or mixed) dedicated solely to military use or using rail cars forming part of regular trains. This mode of transportation (MOT) offers an unrivalled capacity for moving large quantities of freight (materiel) and numbers of personnel over long distances at relatively high speeds in almost all weather conditions. These advantages can be significant when viewed in terms of the vast quantities of stores and equipment required to support military operations. On the negative side these advantages may be offset, to some extent, by the inflexibility of existing railway systems and their vulnerability to enemy action. Although personnel have not been moved by rail, in significant numbers, for many years this MOT should not be discounted as an option. Within Canada mixed passenger/freight trains have not been used recently in peace time, as they are an expensive option, requiring special agreement between CN/CP Rail/ VIA Rail and DND. However each operational move should be based on Mission analysis and a Movement Estimate.

2. Planning staffs must recognize the potential offered by rail movement and endeavour to integrate the use of railway systems into the total movement plan. It must be remembered that there may well be differences in procedures between Canada and other countries (due to differences in rail track gauges, equipment and geography). What works in Canada does not necessarily work in the rest of the world, although general principles tend to remain extant.

105. REFERENCES

1. A List of associated rail movement publications which are either used in this manual or which should be read in conjunction with it is included at Annex A.

106. UNITS OF MEASUREMENT

1. The operation of railways in Canada is regulated by Transport Canada (TC), and in the US by the Federal Railway Association (FRA). "the Association of American Railway Rules" governs the interchange of railway equipment, between Canada and the US. These rules, which have been accepted by the Canadian Transport Commission Association (CTA), the final authority for the operation of railways in Canada, do not permit the use of metric measurement now, nor is it anticipated in the near future. As a result, measurements in this manual primarily use the Imperial system, however, movement planners and operators must remember that when using rail in many other countries they may need to use metric measurements. Therefore imperial/metric conversion factors and tables are included at Annex Q to this manual.

107. RAIL COMPANIES

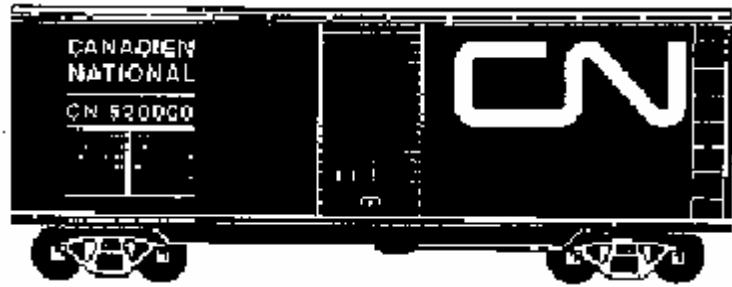
1. In Canada there are three major rail companies:

- a. Canadian National Railways (CNR or CN), freight movement,
- b. Canadian Pacific Railways (CPR or CP), freight movement, and
- c. VIA Rail, passenger movement.

2. CNR and CPR (both private companies) are concerned solely with the movement of freight. They have rail networks that cover most of the country and parts of the US. VIA Rail is a Crown Corporation and is concerned solely with carrying passengers. VIA Rail uses the CNR and CPR rail networks. There are other rail companies in Canada, but they tend to be smaller regional carriers. Consequently the CF deals primarily, but not exclusively, with CNR, CPR and VIA Rail when moving by rail in Canada. Some common forms of track and rolling stock are described below

108. EQUIPMENT AND TERMINOLOGY

1. Some general information on basic railway terminology and rolling stock is provided in Figure 1-1 to Figure 1-3. Transportation (Tn) officers who require more detailed information on railway equipment in Canada should contact their local CNR, CPR or VIA Rail representative. Users can order the RAC Pamphlet CL-/20 from the RAC. However, if asked, companies usually provide technical information pamphlets on rolling stock and other equipment.



The markings on this box car tell you its size, weight and capacity, as well as other important facts. Here is a complete explanation of the markings.

NOTE

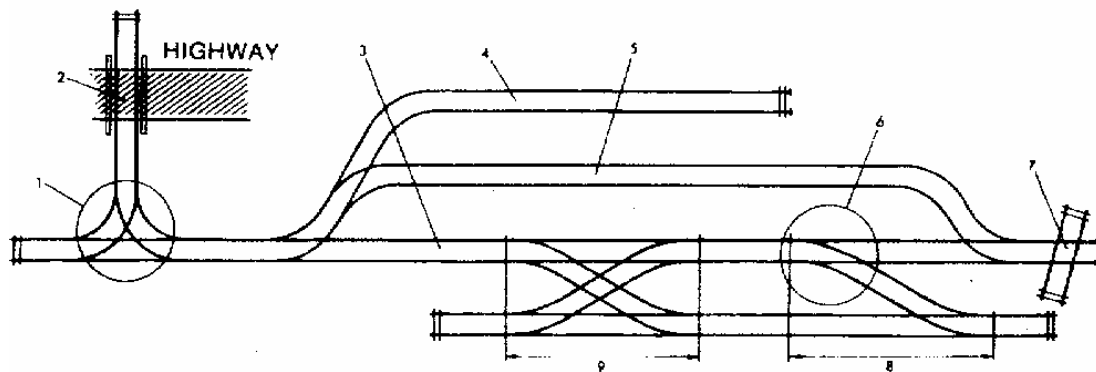
The following information appears courtesy of CNR.

RHB Mechanical designation of type of rail car as listed in official railway equipment register.	EX.W. 10.8 H. 14.7 Extreme width of rail car is 10'8" at a height of 14'7" above the rails.
CAPY. 130 000 This rail car's nominal capacity is a 130,000 pound (lb) load.	E.W. 9.4 H. 14.1 Width of rail car at eaves is 9'4" at 14'1" above rails.
LD.LMT. 132,100 Load limit is 132,100 pounds (lb) and must not be exceeded.	I.L. 40.6 inside length 40'6".
LT.WT. 44,900 This is the weight of the rail car when empty.	I.W. 9.2 Inside width 9'2".
BLT. 11.66 Rail car was built in November, 1966.	I.H. 10.0 Inside height 10'.
H.Q. 6.78 Last shopping of rail car was in Montreal in June, 1978.	CU. FT. 3712 Volume of rail car in cubic ft.

Figure 1-1 How to Read Rail Car Markings

1.	Y	6.	TURNOUT
2.	HIGHWAY CROSSING (INTERSECTION OF RAILWAY AND HIGHWAY)	7.	RAILWAY CROSSING (INTERSECTION OF TWO TRACKS)
3.	MAIN TRACK	8.	CROSS-OVER
4.	YARD TRACK	9.	DOUBLE CROSS-OVER (OR SCISSORS)
5.	SIDING (OR PASSING TRACK)		

CN engineers distinguish between “railway crossing” and “highway crossing”. “Railway crossing” is still used interchangeably in some documents.



NOTES

1. Basic track structures are the “**turnout**”, by which means rolling stock may be diverted from one track to another; the “**cross-over**”, which provides a continuous passage between two nearby and generally parallel tracks; and the “**railway crossing**”, whereby one track crosses another at grade.
2. A “**turnout**” is composed of a “**switch**”, consisting essentially of two tapered movable rails, designed to divert rolling stock from one track to another, and a “**frog**”, which permits wheel flanges to cross over opposing rails.
3. The “**cross-over**” is comprised of two “**turnouts**” and the track between them.
4. A crossing consists of four connected “**frogs**”.
5. The information in this figure is provided courtesy of CNR.

Figure 1-2 Railway “Switches” and “Crossings”

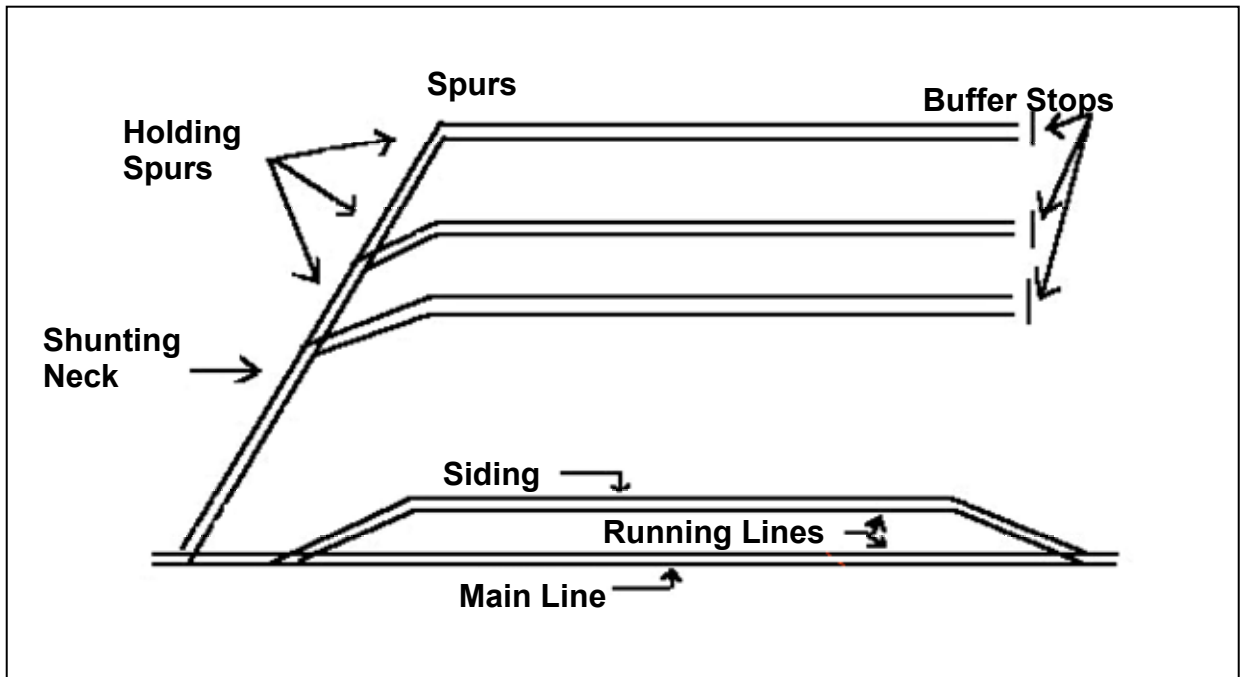
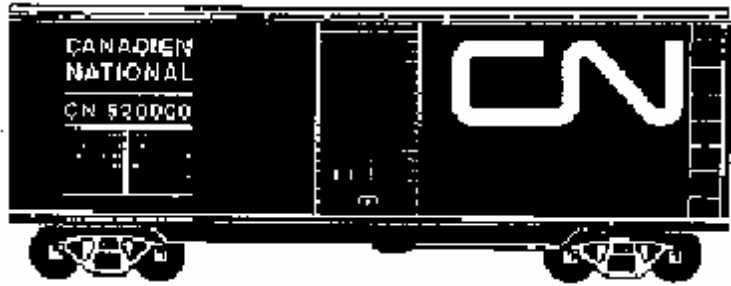
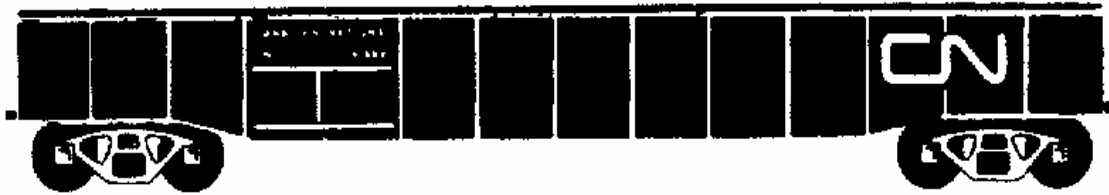


Figure 1-3 Shunting Neck



BOX CAR

A roofed rail car with enclosed sides, used for general service and especially for cargo or "lading" which must be protected from the weather or pilferage. Usually with side sliding doors.



GONDOLA CAR

"Gondolas" are open-top rail cars with fixed sides, fixed or drop ends and a floor which may be solid or provided with bottom doors. Used for hauling steel, rock and other heavy loads.



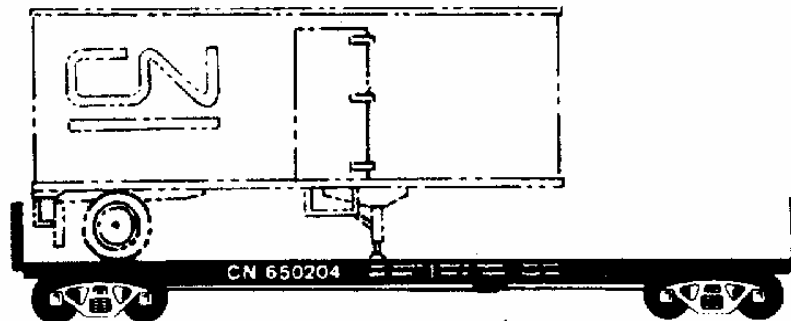
FLAT CAR

A rail car with a floor laid over the sills and without permanent raised sides, ends or covering.



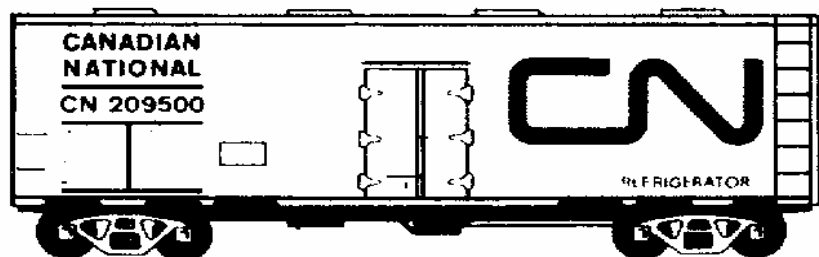
HOPPER CAR

An open-top rail car with the floor sloping to one or more “hoppers”. Used for carrying bulk loads (coal, sand), which are emptied by gravity through hinged doors in the bottom. Covered hopper rail cars with a permanent roof and roof hatches are used for the shipment of dry or powered bulk commodities (cement, flour and other materials requiring weather protection). Loading and unloading can also be accomplished by pneumatic means.



PIGGYBACK FLAT CAR

A “Piggyback Flat Car” is essentially a flat rail car especially built for carrying truck trailers. Piggyback services provide door-to-door transportation by the teaming up of rail cars with highway vehicles.



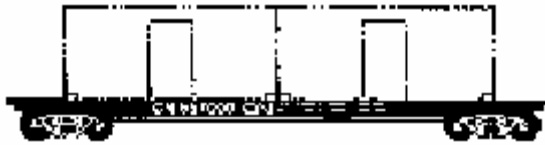
REFRIGERATOR CAR

An insulated rail car used primarily as a refrigerator for carrying perishable commodities. Usually also adaptable by the installation of heating units for transporting products that must be protected against freezing.



TANK CAR

A rail car whose body consists of a tank for carrying liquids or gases in bulk.



CONTAINER FLAT CAR

A flat or low-sided gondola car specially fitted for the accommodation of sea containers. Generally replaced by "Deep Well Container Flat Cars". The essential difference is that sea containers must be lowered into a deep well container flat precluding the use of fork lift trucks.



BULKHEAD FLAT CAR

A flat rail car with a "bulkhead" at both ends, often used to carry pulpwood.



AUTOMOBILE CAR (OR TRI-LEVEL)

A rail car for carrying automobiles, usually with two (bi-) or three (tri-) levels, and fitted with special tie-down devices. CF generally only uses bi-level automobile rail cars.

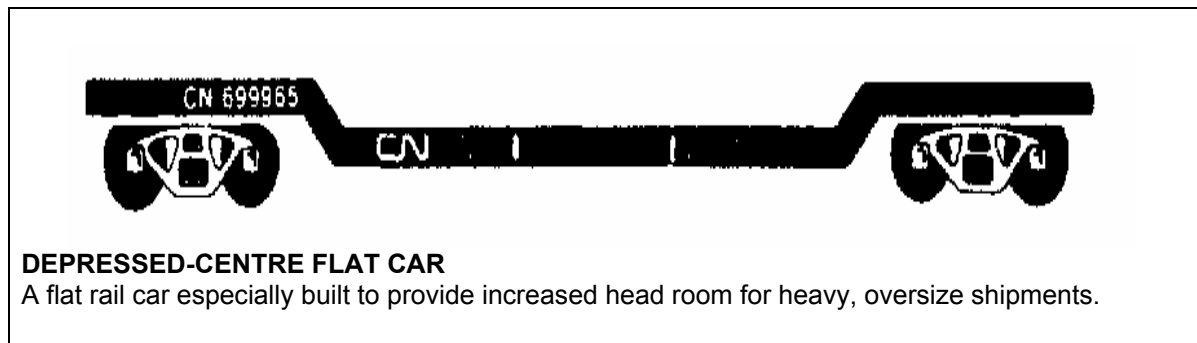


Figure 1-4 Freight Equipment

Notes:

1. The information and drawings in Figure 1-4 appear courtesy of CNR.
2. In some countries, it is common to have one nationalized rail carrier, which handles all rail traffic in that country, e.g., in Germany the Deutsche Bundesbahn (DB).
3. As previously mentioned the rail cars and equipment used in North America are quite different from those used in Europe and other parts of the world, such that different tie-down procedures may be required when operating outside North America. CF planners and operators may have to adopt the principles in this manual when operating outside Canada.

109. LEGAL CONSIDERATIONS

1. This manual provides commanders and planners direction in Movement for operations, exercises and routine administration whether in Canada or abroad. In planning an operation, exercise or effecting routine administration, commanders at all levels must also take into account the appropriate Canadian laws, the laws of the host nation, if applicable, as well as the international laws that may affect the conduct of the operation/exercise. In case of uncertainty, the local representative of the Judge Advocate General should be consulted.

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CHAPTER 2

RAIL MOVEMENT PLANNING

SECTION 1 - ORGANIZATION AND RESPONSIBILITIES

201. GENERAL

1. Depending upon the size, rail movement will normally involve a number of agencies, from NDHQ to the unit being moved. This section outlines the agencies involved and their responsibilities for rail movement in Canada. Agencies and their responsibilities in an area of operations are covered in Chapter 5.

202. ORGANIZATIONS

1. The following agencies are normally involved in the movement of forces by rail in Canada:
 - a. **NDHQ.** J4 Mov and DLBM;
 - b. **Command/Formation HQ.** G4 Transportation (Tn);
 - c. **4 Canadian Forces Movement Control Unit (4 CFMCU);**
 - d. **Formation or unit being moved,** Task Force Movement Officer (TFMO) or Unit Embarkation Officer (UEO) depending on level of move;
 - e. **Movement Control (Mov Con) Unit/Detachment (Det).** The Movement Unit, or Det tasked to operate a rail terminal.
 - f. **Railway Company (Carrier).** In Canada usually either Canadian National Railways (CNR), Canadian Pacific Railways (CPR) or VIA Rail.

203. RESPONSIBILITIES

1. In general terms, J4 Mov is responsible for developing and implementing strategic plans, policies and standardising CF movement doctrine and procedures. For the general movement of forces by rail, J4 Mov co-ordinates inter-command/area activity where appropriate. J4 Mov identifies requirements to DLBM TM who in turn negotiates and signs contracts with carriers. The headquarters directing the move identifies the origins and destinations relevant to that move.
2. **Headquarters/Formation Commanding Movement.** The Headquarters /Formation in command for movement is responsible for the general planning and co-ordination of that movement which includes the following activities:
 - a. identifying requirements;
 - b. obtaining rates from carriers, normally through NDHQ DLBM TM;
 - c. estimating costs;
 - d. preparing and issuing rail movement orders (Mov O);
 - e. co-ordinating activities of Rail Mov Con Det Comds and movement units through the G4 Tn (or MCC if established); and
 - f. confirming with the carriers (once authorised by DLBM TM through J4 Mov for direct liaison) the type of rail cars provided in order to obtain the necessary dunnaging and tie-down equipment,(within Canada CF normally provides its own "blocking and bracing" (chocks) and may provide "tie down"

equipment if not supplied by the carrier. When operating overseas, if contracting arrangements do not include this tie down equipment, it is essential that the equipment used is compatible with the rolling stock).

Note: within Canada DLBM TM conducts all contract, and rate, negotiations.

3. **Movement Co-ordination Centre (MCC)** – (sometimes referred to as Movement Operations Centre). Whether formed from an existing transportation/movements staff (for example, G4 Tn Staff at a Bde HQ), or established as a separate entity reporting directly to the senior headquarters involved (for example, a task for 4 CFMCU), the MCC is the instrument through which a commander co-ordinates a move. The MCC is responsible for the following:

- a. co-ordinating the move within the parameters laid down by the commander responsible for the move;
- b. controlling and co-ordinating the activities of the movement units and Rail Mov Con Det Comds involved in the move;
- c. effecting liaison with commercial carriers and military movement agencies as required; and
- d. providing Movement Situation Reports (MOVSITREPS) to higher headquarters when required.

4. **Formation/Task Force Being Moved.** The formation/Task Force being moved by rail (it is likely that rail will be but one of a number of modes of transport) under the control of a higher headquarters is responsible for:

- a. identifying the formation/Task Force's requirements;
- b. if not already provided, co-ordinating the requests for dunnaging and tie-down equipment as detailed in Chapter 3;
- c. confirming to the Rail Mov Con Det the equipment and stores to be moved including complete details of any equipment that requires special security arrangements;
- d. issuing Rail Mov Os;
- e. appointing a Task Force Movement Officer (TFMO) to co-ordinate the activities of all the Unit Embarkation Officers (UEOs) throughout the move; and
- f. For a Formation or Task Force move a Train Conducting Officer (TCO) is likely to be appointed to act as the TFMO's "eyes and ears" at the train and supervise loading and unloading.

5. **Unit Being Moved.** Responsibilities will differ depending on whether it is a single unit move or part of a Formation/Task Force move:

- a. **Single Unit Move.** The unit is responsible for:
 - (1) notifying the Rail Mov Con Det Comd of the equipment and stores to be moved, including complete details on any equipment that requires special security arrangements;
 - (2) obtaining the necessary dunnaging and tie down equipment as detailed in Chapter 3;
 - (3) preparing vehicles and equipment for shipment;
 - (4) preparing loads lists showing details of equipment to be shipped (condition of vehicles and major equipment is to be reported);
 - (5) undertaking the physical loading, securing and dunnaging of the rail cars;

- (6) when required, providing a rail security party, or rail escort party, to accompany the train (threat dependent);
- (7) making adjustments to securing or dunnaging as specified by the carrier at the time of inspecting the loaded rail car(s);
- (8) unloading rail cars at destination, removing dunnage and cleaning rail cars after unloading, accounting for rail tie down kits as specified in the Mov O; and
- (9) appointing the following personnel:
 - (a) Unit Embarkation Officer (UEO) - to oversee the planning, loading and shipping of the unit; and
 - (b) Train Conducting Officer - (one for each train) to command any rail security party or rail escort party accompanying a train (duties at Annex K, Appendix 2). Depending on other demands the UEO may do this him/herself.

b. **Part of a Formation/Task Force Move.** The unit is responsible for:

- (1) notifying the Formation HQ/TFMO of the equipment and stores to be moved, including complete details on any equipment that requires special security arrangements; and
- (2) **providing personnel and completing tasks as directed in the Formation/Task Force Move.**

6. **Rail Mov Con Det Comd.** A Mov Con Det is likely to be tasked to a Rail Terminal. The Rail Mov Con Det Comd is responsible for the co-ordination and control of military activity at the rail terminal and for the following:

- a. providing the local railway agent with full details of the materiel to be shipped;
- b. consulting with J4 Mov to order suitable rail cars through DLBM TM;
- c. obtaining technical instructions and, when necessary, skilled assistance from the railway agent;
- d. assisting the formation/unit in preparing a loading plan to allocate equipment, cargo and personnel to each rail car;
- e. inspecting the rail cars prior to loading to ensure they are suitable for shipment. He is to refuse to load any rail car that he considers unsuitable, and request that the carrier provide another rail car;
- f. ensuring where necessary, that qualified technical personnel (including service representatives) are available to advise on any technical loading problems or special precautions required and provide skilled assistance in the loading of certain types of materiel;
- g. where necessary, receiving, storing, inspecting and issuing rail tie-down kits, that is, during the employment phase of an exercise or operation prior to redeployment of the unit/formation;
- h. accompanying the inspector inspecting loaded rail cars as they are turned over to the railway agent; (although the carrier is the authority to ensure that the vehicles and equipment are properly secured this "double check" is to make sure that no military equipment [especially weapons] are left behind and that CF are confident that the inspector has done his job properly) .
- i. sending a Train Departure Advice or Train Arrival Advice to the necessary agencies;
- j. completing shipping documentation in accordance with (IAW) rates and tariffs, paying the carrier invoices IAW negotiated rates and Financial Coding (Fin Codes) provided by the formation; where

the formation being moved is under higher headquarters direction, the act of paying the bill is based on rates established at NDHQ (by DLBM TM during the contract negotiations) and 4 CFMCU verifying that the number and type of rail cars supplied are in accordance with the contract.

- k. ensuring that tight control is kept over the access of DND personnel to the rail yards and that all DND personnel follow yard safety regulations, and wear the required safety equipment/clothing.
7. Rail Carrier. The rail carrier is responsible for:
- a. providing suitable railway equipment for the shipment (in accordance with the contract if applicable);
 - b. providing the Rail Mov Con Det Comd with full technical railway instructions governing the loading, securing and dunnaging of the particular shipment; and
 - c. inspecting loaded rail cars to ensure that securing and dunnaging meets railway specifications. (Closed rail cars are inspected at the discretion of the carrier or at the request of the shipper).

SECTION 2 - ESTIMATING RAIL REQUIREMENTS

204. GENERAL

1. In planning movement by rail, transportation (Tn) staffs must at an early stage estimate the number and type of rail cars required and, increasingly, be able to provide an estimate of the cost. These estimates will form the basis of Movement Orders (Mov Os)/ Movement Instructions (Mov Instr) to the formation or unit being moved. In conjunction with the Rail Mov Con Det Comd and the railway agent, the formation/unit can then prepare detailed loading plans. This section outlines the procedures used in estimating requirements and in preparing loading plans.

205. IDENTIFYING THE TRANSPORTATION REQUIREMENTS

1. The primary information for estimating the number of rail cars required for a Formation/Task Force move is taken from the Task Force Movement Table (TFMT), or for an independent unit move from the Unit Movement Staff Table (UMST). Essentially the TFMT is drawn from the Table of Organization and Equipment (TO&E). Produced by the operations staff (Ops Staff) the TO&E identifies the personnel and equipment authorised to deploy on a mission. In accordance with the Comd's (Op Staff) priorities, the Movement Staff (Mov Staff) take the information in the TO&E and add in additional information, mainly relating to theatre stocks, to produce the TFMT. The TFMT is produced using the Joint Establishment and Movement Management System (JEMMS) software. The TFMT shows the following information relating to the Task Force to be moved:

- a. priority of movement for elements of the Task Force;
 - b. number of personnel;
 - c. number of vehicles by Equipment Configuration Code (ECC), showing dimensions height (including reduced height), laden weight and cube;
 - d. weight and cube of cargo not stored in vehicles (sea containers);
 - e. dangerous goods; and
 - f. ammunition.
2. Much of the weight and dimensional data, for individual vehicle(s) or equipment that is required in the TFMT may be found in the JEMMS database. If the information is not available on JEMMS, it must be obtained from the veh/eqpt documents.
3. Using the data contained in the TFMT, DLBM TM can contract for the requisite rail resources to facilitate movement. If required to make such an estimate manually a Transportation Requirements Worksheet is prepared for each point of origin. This worksheet summarizes the movement requirements for each location. An example is given at Annex B. The worksheet includes the following information:
- a. item description (ECC, Paul Bunyan, pallet, etc);
 - b. quantity;
 - c. weight;
 - d. dimensions;
 - e. cube; and
 - f. quantity and type of tie-down kits and "braces and blocks" (chocks).

206. RAIL LOADING WORKSHEET

1. The Rail Loading Worksheet is based on the Transportation Requirements Worksheet and is used to determine the numbers of rail cars, by types that are needed. If required to prepare the loading plan and cost estimates manually, the following paragraphs provide guidance. An example is given at Appendix 1 to Annex B.

2. To prepare the Rail Loading Worksheet, a working knowledge of capacities and characteristics of the various types of rail cars is required. Data for commonly used freight rail cars is given at Annexes C and D respectively.

3. Within Canada, CF normally uses OTTX, or HTTX rail cars (for long heavy loads like Main Battle Tanks [MBT]), it is normal to “bulk out” before exceeding the weight limit. The following factors are considered when determining the number and type of rail cars required:

- a. **Weight.** Each type of rail car has a “rated load limit” which must not be exceeded. This should not be confused with the rail car “capacity”, which is a nominal weight and places the rail car in a certain “load class”. (For example, a rail car with a capacity of 130,000 lbs might have a load limit of 132,000 lbs.) The capacity should be used for planning purposes, as in most cases military vehicle loads will be well below this figure. Although CF normally contracts rail cars by type that is, 60’, 89’ etc, rather than weight, in some countries rates may be based on rail car “load minimum weights”, which vary by type and length of rail car. The cost to move this “minimum weight” must be paid, even though the weight of the load might be below the minimum. Every effort must be made to meet the minimum weights, by distributing the heaviest items on as many rail cars as possible; otherwise, extra costs are likely to be incurred.
- b. **Height and Width.** The maximum permissible height and width of a load varies according to the line(s) over which the train moves. Guidance can be sought from the carrier on these limiting factors.
- c. **Length.** The length of vehicles in relation to length of rail car is usually the critical factor in planning loads. 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), in addition what space is to be left between vehicles on the rail car bed for securing tie-down devices/to avoid bumping? This distance will vary between vehicle types and mixes, the key factor is actually that the angle of the tie down should be as close to 45 degrees as possible for example, for an Iltis the distance could be a minimum 10 inches whereas an HLVW would require 18 inches. The planning figure used in this manual is 18 inches between vehicles. Figure 2-1 shows the minimum spacing required between vehicles and at the ends of the rail car. As a rule of thumb, the maximum length for a westbound train in Canada is 10,000 feet (although this may be extended on special request) and 6,100 feet for an eastbound train. (that is, West bound train 70 x 89 foot flat, 65 pedestals or 100 HTTX cars (60 to 65 foot).

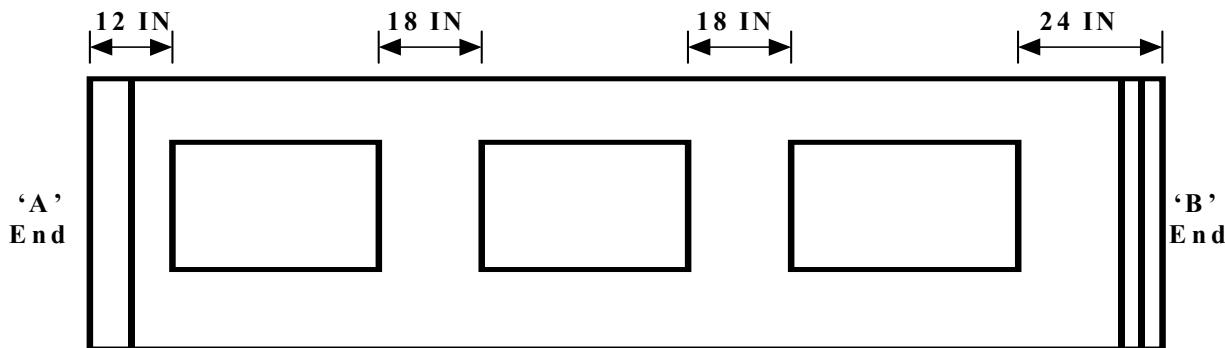


Figure 2-1 Minimum Spacing Requirement

- d. **Cube.** In planning loads for “boxcars”, unless the loads are regular in shape, provision is made for lost space because of the shape of the equipment. For unit stores, this broken stowage should be estimated at 20 per cent. Thus a 50 - foot boxcar with a capacity of 4860 cubic feet is considered to have a usable space of 3888 cubic feet. Where the cube of stores to be shipped is not available, the following may be used to estimate requirements:
- (1) Military stores-385 lbs. per cubic yard; and
 - (2) Ammunition – 1764 lbs per cubic yard.
4. To aid in planning, the table at Annex E shows the capacity of various rail cars in terms of the most common types of military equipment. Whenever possible, make the most effective use of rail equipment by meeting minimum weights, when cost is a significant factor. Military loads are not generally homogeneous, but tend to comprise a mixture of equipment. To assist in these calculations, it is recommended that loading scales, or templates, be produced and scaled to the length (and width if necessary) of rail cars and vehicles. An example of Rail Car Loading Scales is included at Annex F, Appendix 1.
5. When the Rail Loading Worksheet is completed, it is “cross-checked” with the Transportation Requirements Worksheet to ensure that all vehicles and equipment are included. A separate worksheet is prepared for passenger requirements (see Annex B).

207. RAIL COSTINGS

1. Especially in peacetime and increasingly on operations, costs are an important factor in determining the type of rail cars to be used and how they are loaded. Rail rates and classifications in Canada are a complex subject, essentially conducted by DLBM TM, and are beyond the scope of this manual.
2. If required to estimate costs on a deployed operation, a sample Rail Costing Worksheet is included at Appendix 2 to Annex B as an aid in this task. It is designed for use in conjunction with the Rail Loading Worksheet (Appendix 1 to Annex B).

208. RAIL LOADING PLANS

1. The planning process described up to this point describes those measures required by the command, or formation, headquarters to determine the amount of rail equipment required, and to estimate the costs of the move. Once this has been done, it is necessary for the TFMO (UEO if a single unit move), with the advice of the Rail Mov Con Det Comd, to prepare a loading plan showing the detailed allocation of vehicles, equipment and stores to individual rail cars (Annex F).

SECTION 3 - RECONNAISSANCE OF RAIL FACILITIES

209. THE REQUIREMENTS FOR RECONNAISSANCE

1. There are two types of reconnaissance (recce) involved in planning movement by rail. The first is the routine recce conducted by a TFMO or UEO for a specific movement. It is in essence the "on-site" inspection of the loading point, and liaison with the railway agent, stationmaster and Rail Mov Con Det Comd in order to prepare detailed instructions for loading the Formation/Task Force/unit. The second type of recce is that carried out by Movement Staff (Mov Staff) in conjunction with large-scale movements by rail, especially in a theatre of operations. Recce forms the basis for an estimate of the rail movement facilities required in order to plan the most effective means of movement, to establish the utility of rail as a transportation network or to meet unforeseen contingencies.

210. ROUTINE RECONNAISSANCE

1. In preparation for the movement of the Formation/Task Force the TFMO, or if only a single unit, the UEO (Chapter 4, Section 3) visits the point of loading with the railway agent and the Rail Mov Con Det Comd. This enables him/her to prepare a loading site plan. In this recce, the following is considered:

- a. the rail car capacity of each siding to be used and the availability/suitability of loading ramps;
- b. the ability of the carrier to provide the required services on a 24 hour basis; if not, what are the resultant limitations /implications?;
- c. the availability of materiel handling (MHE), heavy lift, or other equipment including portable lighting equipment;
- d. the routes and travelling times to the loading site, the probable traffic congestion areas and obstacles such as one way streets, tunnels, narrow bridges, overhead wires, etc;
- e. the traffic plan in and out of the loading site, including the traffic control and security plans;
- f. the marshalling areas for personnel and vehicles within, or near the site;
- g. a "wash down" point to allow washing of vehicles prior to loading;
- h. the platforms available for embarking personnel; and
- i. if possible, a recce of the destination unloading area and facilities should also be carried out.

211. MOVEMENT STAFF RECONNAISSANCE

1. The assessment of rail facilities for movement planning requires a detailed recce by a trained movement officer. Experience has proven that the only sure way of obtaining accurate information, is for the movement officer to actually conduct the recce. The movement officer is likely to require the assistance of technical advisers (e.g. MP for traffic circulation at the railhead). The movement officer will normally try to secure a detailed map to support the report, when this is not possible he/she must draw a sketch plan with measurements (by pacing out if necessary), of the lengths of lines, platforms, etc.

2. A movement facilities reconnaissance report is basically a transportation estimate and contains the information listed below (these points are the minimum required):

- a. How many rail car loads (i.e. what is the longest train) the station can hold clear of the running lines?
- b. how many freight rail cars can be dealt with simultaneously:

- (1) by military transport backing up to the rail car, and
 - (2) at a platform?
- c. How many end and side-loading platforms and ramps are there and what is their capacity (vehicle classification)? How many rail cars can be put into them on a straight track? If there are no platforms or ramps, what other facilities exist that could be converted for the same purpose and how much construction would be required?
- d. A sketch is made of the railway layout, showing the lengths of track useful for dealing with traffic. The sketch is appended to the report and shows:
- (1) name of the Station (specify whether it is CNR or CPR, or other carrier);
 - (2) length of sidings and loops;
 - (3) end and side-loading platforms and ramps suitable for vehicles;
 - (4) existing Materiel Handling Equipment (MHE) facilities;
 - (5) width of pavement between and beside sidings;
 - (6) location of lights;
 - (7) location of water points (potable and non-potable);
 - (8) vehicle wash down point;
 - (9) location of latrines;
 - (10) entrance and exit to yards for military transport and road approaches, including a traffic circulation plan;
 - (11) areas for temporary storage of materiel;
 - (12) lying-up areas for military transport and waiting areas for personnel;
 - (13) location of accommodation suitable for offices; and
 - (14) communications (telephone, facsimile [fax], Internet, etc); and
- e. if possible a reconnaissance of the destination facilities should also be made to ensure it can handle the "flow" dispatched from the sending railhead.
3. The recommended Reconnaissance Report format is at Annex G.

212. LAYOUT OF A RAILHEAD

1. Railheads fall broadly into two classes: those suitable for handling materiel and those suitable for handling personnel, and accompanying equipment. Often both types of traffic can be handled at the same railhead, but the facilities that help one invariably hinder the other.
2. Personnel and vehicles are best handled using a platform at the same height as the rail car floor. However, materiel stores are best handled using a line alongside a paved area, which permits vehicles to back up against a rail car, with the floors of the road and rail vehicles at approximately the same level.
3. The following may be taken as the main features of a well-designed yard:

- a. adequate width of roadway alongside sidings to enable all siding to be served at the same time by military transport without congestion (see Annex G for details on roadway width);
- b. good road approaches, preferably with separate entrances and exits;
- c. level sidings, or with slight slope towards the “buffer stops”;
- d. a “shunting neck”, equal in length to the longest siding plus locomotive, to enable the yard to be shunted quickly without interference to other trains; and
- e. sufficient holding sidings to enable a full train to be brought in;

Note: Generally speaking, for every two trains to be handled at a railhead during a 24-hour period, one holding siding and preferably a “loop”, is required in addition to the running lines (main line with a loop on a single line). This figure depends on the rate at which trains are unloaded and the proportions will have to be greater in the case of materiel, which is slower to unload than personnel, and vice versa.

- f. end and side loading platforms and the necessary ramps to facilitate the loading and unloading of vehicles, heavy equipment, etc;
 - g. MHE to assist in the loading and unloading of awkward and/or heavy lifts; and
 - h. adequate yard and station lighting.
9. An illustrative layout of railhead is depicted at Figure 2-2.

213. LAYOUT OF A REGULATING STATION

1. A station or yard may be used purely for regulating, or as a combined railhead and regulating station. In general, the layout requirements are similar to those given for a railhead.
2. A regulating station must be able to hold trains for an indefinite period and sufficient holding sidings must be available. Full trains (with locomotive and brake cars) may have to be held and, consequently, sidings earmarked for this purpose must be long enough to accommodate them. If a particular station is being considered for concurrent use as a railhead and for regulating, then in addition to extra sidings for regulating purposes, the shunting facilities must be capable of handling both jobs. A regulating station is normally used only in an area of operations.

214. SERVICE REQUIREMENTS AT A RAILHEAD

1. The user service requirements at a railhead are many and varied. Some of the more important are given below:
 - a. **Vehicles and Artillery Equipment.** End or side loading platforms and ramps are needed with good hard entrances and exits from the ramps and hard standing close at hand.
 - b. **Ammunition.** Good “off loading” facilities, including MHE with some temporary storage space with hard standings (if possible, covered) and plenty of room for vehicles to manoeuvre are needed. Whenever possible the yard or station should be used for ammunition only, it is a hazardous commodity to handle and should be kept clear of other materiel and important points such as bridges.
 - c. **Petroleum Oil and Lubricants (POL) - (Packaged).** The requirements are the same as those for ammunition.
 - d. **Personnel.** Good covered platforms, lighting, drinking water and latrines are needed.

e. **Ambulance Trains.** As follows:

- (1) as for personnel, with the addition of good entrances and exits and some hard standings for ambulances close at hand;
- (2) under the terms of the Geneva Convention, ambulance railheads are to be separate from those handling other military traffic;

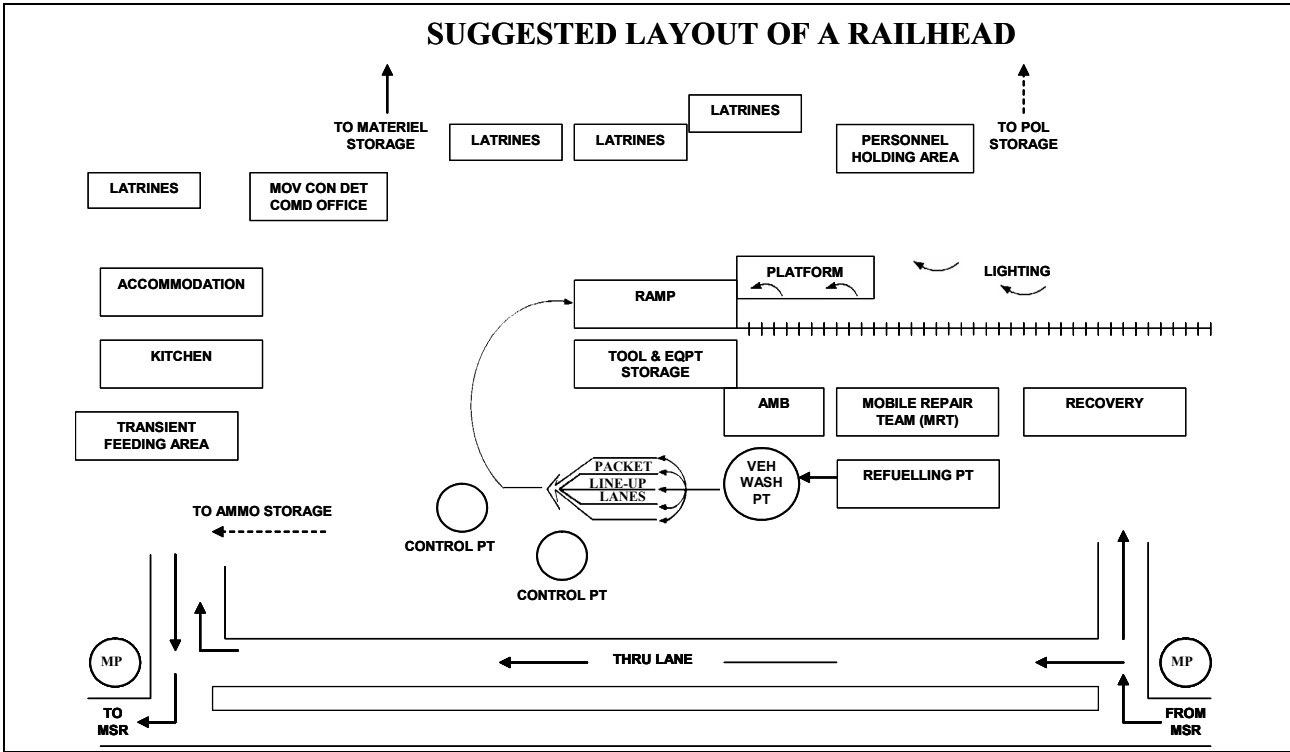


Figure 2-2 Suggested Layout of a Railhead

CHAPTER 3

MOVEMENT OF VEHICLES AND EQUIPMENT

SECTION 1 - LOADING AND TIE-DOWN PROCEDURES

301. RESPONSIBILITY FOR LOADING

1. As stated in Chapter 2, the formation/Task Force or unit being moved is responsible for preparing its vehicles for shipment, physically loading them on to rail cars and securing them. There are precise rules governing the loading of rail cars, the Rail Mov Con Det Comd and the railway agent must provide technical advice and assistance to the unit. A final inspection must be made of all loaded rail cars, by the carrier (railway inspector) accepting the load and a representative of the Canadian Forces (CF) to ensure loads are correctly secured. The CF representative is normally the Mov Con Det Comd.

302. PREPARATION OF VEHICLES

1. Vehicles to be loaded on open rail cars (flats, gondola, multi-level, etc) are to be prepared as follows:
 - a. All tools, detachable parts, tarpaulins, etc are to be secured in locked toolboxes, or in steel-strapped wooden cases, firmly secured within the vehicle, or in box rail cars. Fragile parts that have not been detached must be suitably protected.
 - b. Vehicles, aircraft or other equipment supplied with protective covers are to be shipped with those covers on. Such covers must be securely tied down to prevent flapping and tearing.
 - c. All boxes or cases containing detachable parts are to be annotated on the bill of lading. When vehicles or other materiel are shipped with protective covers in position, the covers are to be specified on bills of lading.
 - d. when ordered, all glass, (that is, headlights, tail-lights, windows, etc) is to be completely covered to prevent glare.
 - e. To prevent theft, all keys for vehicles, toolboxes, etc, are to be held by personnel accompanying the train, or sent with the advance party.
 - f. Vehicle fuel tanks are to be filled to a maximum 75 per cent of their capacity, unless otherwise instructed.
 - g. Ensure that all vehicles are fitted with a complete set of serviceable clevis prior to arrival at the railhead.
 - h. Bulk POL transporters are normally shipped empty (diesel) and purged (gasoline, AVGAS).
 - i. Water trailers are normally shipped empty.
 - j. When shipping COUGARS and GRIZZLIES, COYOTES AND LAV IIIs, the breechblocks are to be shipped separately.
 - k. Weapons, weapons components and systems (laser) and valuables, are not to be left on vehicles, but are to be shipped separately IAW A-SJ-100-001/AS-000.

303. LOADING CLOSED RAIL CARS

1. Detailed instructions for loading closed rail cars are contained in A-LM-158-004/AG-001, Chapter 9 Sect 4 Art 928

304. LOADING OPEN RAIL CARS

1. Procedures for loading, blocking and bracing equipment have been established by the Association of American Railroads (AAR). Paragraphs 1 to 4 of this section and Figure 3-1 are reproduced from the AAR Open Top Loading Rules. For open rail cars, these procedures have been published as “Rules Governing the Loading of Commodities on Open Top Cars and Trailers” and apply to shipments on both Canadian and US railways. However DND, CPR and CNR have a separate agreement for tying down CF military vehicles and equipment that are moved by rail in Canada. The agreed tie-down procedures are detailed in the Railway Association of Canada (RAC) Pamphlet CL-20, Securement Methods for Military Rail Movements. This pamphlet was developed by the Railway Association of Canada (RAC) in co-operation with DND and is distributed by CNR and CPR to their agents and representatives, for completeness it is reproduced, by permission of RAC, as Annex H to this manual. This tie-down agreement is to be used when conducting a rail move in Canada, but AAR rules must be followed for a rail move in the US.

2. In accordance with the terms agreed with RAC, when discussing tie-down procedures with local CNR or CPR representatives, the RAC Pamphlet CL-20, Securement Methods for Military Rail Movements in Canada, has authority over this manual. Although in practice the two documents should be in complete agreement. The AAR rules are the authority for matters other than tie-down procedures. Of particular interest in the AAR rules are Section 1 (General Rules) and Section 6 (Defence Materiel). The following paragraphs provide a brief introduction to these regulations.

3. Section 1 (of the AAR Rules) provides rules that apply to shipments on open rail cars, and the principal rules of this section are summarized below:

- a. **Rule 1-Inspection and Compliance.** This rule requires that:
 - (1) each rail car must be inspected, by the originating carrier, before loading commences;
 - (2) the shipper must inspect the shipment after loading, to see that it is properly and safely secured and that all rules have been complied with; and
 - (3) that the carrier must inspect the shipment for proper loading.
- b. **Rule 2-Brake Wheel Clearance.** This rule details the necessary brake wheel clearance on a rail car. The brake wheel clearance must not be less than the requirement shown at Figure 3-1, and is to be increased as much as is consistent with the proper location of the load.
- c. **Rule 4-Maximum Load Weight.** This rule specifies that the load limit of a rail car must not be exceeded, and further states the percentage of the load, which may be loaded on any part of the rail car, and provides rules for the location of the centre of gravity.
- d. **Rule 5-Location of Load.** This rule states that the weight of the load on one truck (wheel unit) must not exceed one half of the load limit.
- e. **Rule 7-Over Dimensional Loads.** This rule states that loads must be within the clearance limits of the rail line(s) over which they are to be carried.
- f. **Rule 8-Idler Cars.** This rule provides instructions for using idler rail cars when loads project beyond the end sill of a carrying rail car; for example, when a crane with a long boom is carried. Further details on the use of idler rail cars are detailed in A-LM-158-004/AG-001, Chapter 9.
- g. **Rule 19-Machinery-Rotary or Swinging.** This rule states that rotating parts, such as turrets and cranes, must be secured, and have an inspection certificate attached.

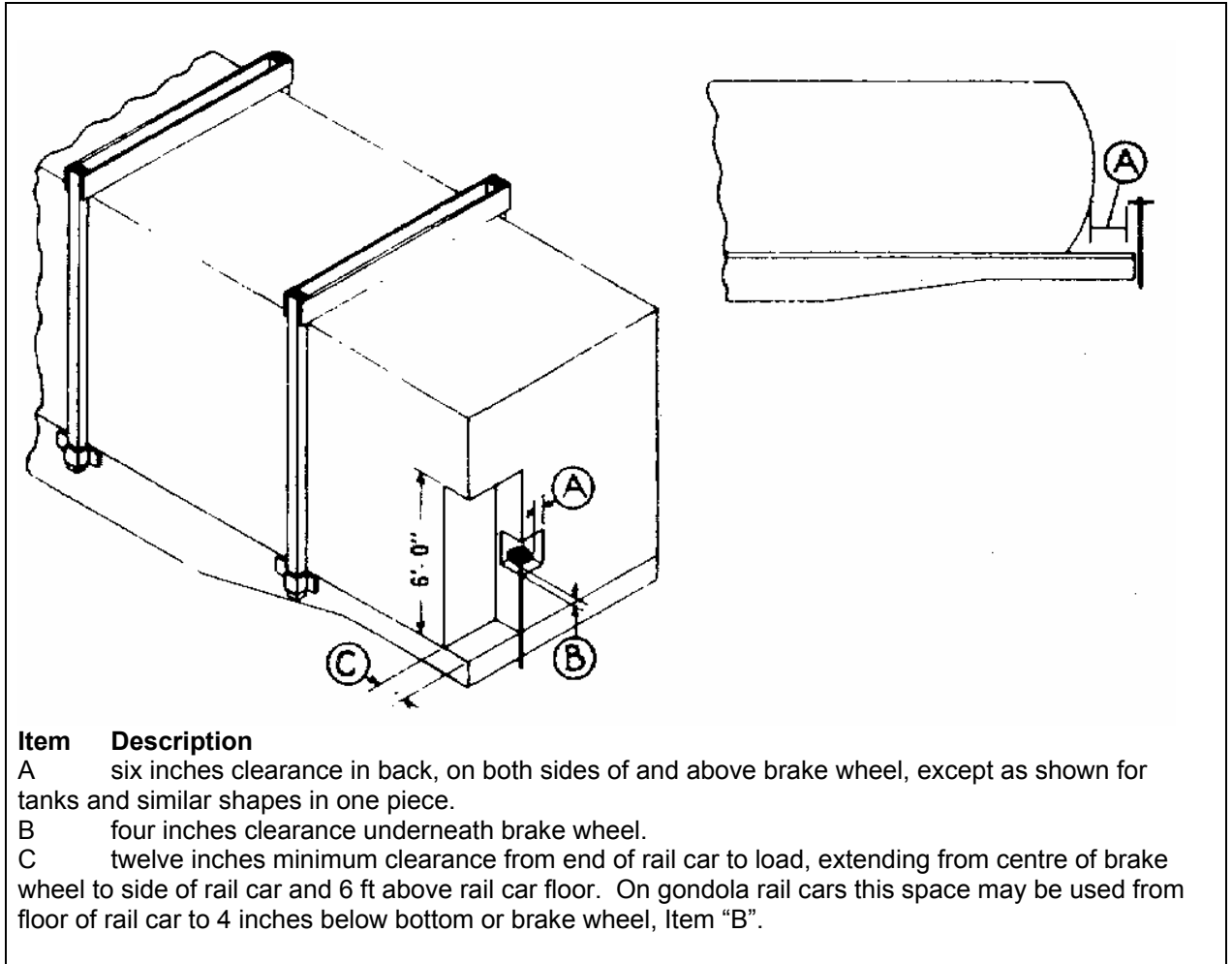


Figure 3-1 Brake Wheel Clearance

4. If a unit discovers that they must move vehicles or equipment by rail that are not covered in Annex H or (RAC Pamphlet CL-20/CF - Securement Methods for Military Rail Movements in Canada) the UEO is to consult the Rail Mov Con Det Comd. If necessary, the Rail Mov Con Det Comd consults the local railway representative to determine the proper procedure. If no solution is possible at the local level, the problem should be passed up the chain of command of the unit being moved unless otherwise directed.

305. METHOD OF LOADING AND OFF-LOADING

1. Preparation for Loading. In preparation for loading, depending on whether a Formation/Task Force or single unit move, the TFMO (TCO if tasked by the TFMO)/ UEO's duties are to:
 - a. conduct a recce to determine loading ramps, marshalling areas, etc. (see Chapter 2);
 - b. arrange for materiel handling equipment (MHE), if required, and the necessary tools;
 - c. arrange for a loading party;
 - d. arrange for a heavy lift recovery vehicle "wrecker", for loading special equipment, and a mobile repair team (MRT), with welding equipment, to assist in starting vehicles or in making emergency repairs;
 - e. arrange for an ambulance to be on site in case of injury;

- f. arrange for, or obtain, and place in position the necessary tie-down equipment;
- g. ensure that bridge-plates are available if the train is to be loaded by the circus method (see paragraph 3);
- h. inspect vehicles to ensure that they have been properly prepared for shipments, including preparation of VDIS if required; and
- i. in conjunction with the Rail Mov Con Det Comd and the railway agent, determine the proper method of loading and securing the equipment.

2. **Inspection of Cars.** Rail cars provided are inspected by the Rail Mov Con Det Comd to ensure their acceptability. The TFMO/TCO or UEO accompanies him, along with a railway representative. The following are to be checked:

- a. conformity with the size and type ordered;
- b. roofs and sheathing of closed rail cars must be sound, and tight, and doors and fastenings must be in good condition and operative;
- c. interiors of rail cars must be clean and dry, with floors intact and free from residue from previous loadings;
- d. rail cars must be free from foreign matter such as snow, ice, mud, oil, grease, acid, lime or contaminating odours such as creosote, which are likely to damage the shipment; and
- e. protruding nails, bolts and dunnage must be removed.

3. **Loading.** Box rail cars are loaded with the aid of MHE according to the principles outlined in A-LM-158-004/AG-001. The most common method of loading vehicles on to flat rail cars is the so-called "circus" method. The circus method uses flat rail cars as a roadbed with bridge-plates placed between rail cars. All vehicles are loaded from an "end-ramp" onto the rearmost rail car and are moved forward to their assigned places. This method requires that vehicles are marshalled in the desired order of loading. A well-formulated loading plan is essential to successful loading. The following is a suggested sequence of events:

- a. marshal vehicles at the loading area under control of the Rail Mov Con Det Comd and ensure recovery vehicle and ambulance are in position before loading commences;
- b. brief drivers, guides and the loading party on hand signals, clearances, tie-down positions and equipment;
- c. load first vehicle; secure and tie it down while the other crews watch to ensure they understand how it is done;
- d. load remaining vehicles and tie them down; guides must assist the drivers, vehicles are not to be moved on the train without a guide;
- e. check loaded cars for security of the loads and compliance with regulations;
- f. inspection by railway inspector, this can be combined with e. above;
- g. the carrier bill of lading and/or the waybill/straight bill of lading (WSBL) are completed IAW negotiated rates and published regulations. The Financial coding (Fin Code) is provided by the DCDS, Environmental Chief of Staff (ECS) or appropriate budget holder;
- h. brief rail escort party and have them board the train (when appropriate); and
- i. the Rail Mov Con Det Comd sends a Train Departure Advice (Annex I).

4. When planning rail moves, the “unit integrity” concept is followed, as far is practical and indiscriminate mixing of units is avoided wherever possible. Trailers and towed guns should remain attached to their prime mover whenever possible. This may require a few extra rail cars, but it speeds up loading and off-loading considerably. It also avoids the difficulties inherent in manhandling loaded trailers on and off of rail cars. Also, most trailers require wood dunnaging (secured by cable) under the tow bar when administratively loaded (that is, without prime mover) onto pedestal cars.

5. **Off-Loading.** At the destination, the loading procedure is reversed. A MRT and a recovery vehicle are to be available to assist with starting and towing, and an ambulance for possible emergencies. All tie-downs and dunnaging materials are to be removed and, where practical, collected for further use. Vehicles are off-loaded and marshalled before proceeding under Task Force/unit arrangements. The Rail Mov Con Det Comd is responsible for notifying the appropriate headquarters of the arrival of the train (Train Arrival Advice, Annex J); the progress in off-loading and the time the rolling stock is released. The Rail Mov Con Det Comd is also responsible for advising the railway company when the empty rolling stock is available for re-tasking.

306. INSPECTION OF UNIT VEHICLES FOR DAMAGE

1. Vehicle Delivery Inspection Sheet (VDIS). Note the following:
 - a. A VDIS is to be prepared in five copies only when significant damage (\$100.00 or above) to vehicle/trailer/eqpt has been identified at loading and/or unloading points. Signatures of the TFMO/TCO/UEO (depending on level of move), Rail Mov Con Det Comd and rail carrier representative are required on the VDIS.
 - b. Distribution of the VDIS is to be as follows:
 - (1) Copy one - All “copy number ones” VDIS relating to a unit are to be consolidated in an envelope marked "Consolidated VDIS For Unit" (Name, and taped on the right hand front seat of the first vehicle (veh) to be off loaded for the unit. Veh and rail car numbers are to be annotated on the rail dispatch advice.
 - (2) Copy two is to be attached to the WSBL and continuation sheet to be shipped to MCC HQ/destination Mov Con Det by priority post.
 - (3) Copy three is to be given to the TFMO/TCO/UEO (depending on level of move).
 - (4) Copy four is to be given to the Mov Con Det.
 - (5) Copy five is to be given to the rail carrier.
 - c. A sample VDIS is attached at Annex M.
2. Vehicle Acceptance Sheet. Note the following:
 - a. A Vehicle Acceptance sheet is to be completed in five copies for each train and issued IAW the distribution list.
 - b. A self-explanatory sample vehicle Acceptance Sheet is attached at Annex R.

307. SHIPMENT OF DANGEROUS GOODS

1. Detailed procedures for shipping dangerous goods by rail are contained in A-LM-158-004/AG-001, Chapter 15, Sections 1521 - 1530 inclusive, and is governed by the Transportation of Dangerous Goods Act and Regulations (TDG Regs). These regulations define:
 - a. commodities that are classed as explosive, radioactive or dangerous;

- b. compatibility of types of ammunition and explosives;
- c. compatibility of corrosives with other commodities;
- d. handling precautions for dangerous goods; and
- e. packing and labelling requirements.

SECTION 2 - RAIL TIE-DOWN KITS, DUNNAGE AND BRIDGE-PLATES

308. GENERAL

1. Any tie-down kits are used in accordance with Annex H and RAC Pamphlet CL-20 - Securement Methods for Military Rail Movements in Canada, to tie-down vehicles in Canada. For rail movement in the US, the rules laid down by the AAR are followed. With the prevalent use of OTTX, ITTX, and HTTX rail cars for the movement of vehs and equipment, the requirement for tie-down kits, in most cases is minimal as these rail cars are supplied with their own tie down chains. If using rail transport outside North America the provision and use of tie downs/restraining devices must be clarified prior to using this mode of transport (MOT).

309. ESTIMATING TIE-DOWN KIT AND DUNNAGE REQUIREMENTS

1. The HQ commanding the movement is responsible for obtaining tie-down kits, chocks and material for blocking and bracing. The Rail Mov Con Det Comd can advise on the quantities required. Where the tie-down procedure for a particular vehicle, or piece of equipment, is not included in RAC Pamphlet CL-20 - Securement Methods for Military Rail Movements in Canada, the Rail Mov Con Det Comd must consult the carrier and higher headquarters for advice before proceeding. Annex E details the quantity and type of tie-down chains and chocks required for the rail movement of military vehicles in Canada.

310. LOAD TRIALS

1. When a new vehicle enters service, NDHQ/ J4 Mov/DLBM requests that a command be tasked to perform a loading trial to establish a standard tie-down procedure. J4 Mov/DLBM liases with RAC, CNR and CPR to have their representatives at the loading trial. This is to ensure acceptance of the trial results by the principal rail companies. The results of the trial are forwarded, by J4 Mov Doc, NDHQ to RAC, for inclusion in RAC Pamphlet CL-20 - Securement Methods for Military Rail Movements in Canada, and subsequently this manual.

311. CONTROL OF TIE-DOWN KITS

1. As previously mentioned, with the prevalent use of OTTX, ITTX, and HTTX rail cars for the movement of vehs and equipment in Canada, the requirement for tie-down kits is, in most cases, minimal. Owing to the relatively high cost of holding and maintaining stocks of tie-down kits, which are essentially redundant, holdings have been minimised to those units with an identified requirement. Stocks are being run down to zero for depots.

2. When a unit requires tie-down kits and metal chocks for a move, that exceeds domestic holdings, a normal supply requisition (CF 2227) is to be submitted to the supporting base supply. If not available at base supply, a message demand is sent by the base supply officer (B Sup O) to the formation HQ. If the formation HQ can meet the requisition from any residual stocks in depots, or by cross servicing from other units in the formation, it does so. If it cannot meet the requisition, the next course of action depends on the level of the move. If it is a formation movement requirement, the formation may have to buy, or lease the tie-down sets from its own budget. However, if it is a national move, the formation HQ sends a consolidated requisition (indicating unit requirements, dates, etc.) to NDHQ J4 Log with an information copy to J4 Mov. J4 Log verifies the requirement with J4 Mov (as the technical authority). If it is agreed that it is a national task, and a reasonable request, J4 Log will attempt to secure the requisite tie-down sets from within CF. If they are not available, or if it is impractical to cross service, J4 Log will then instigate Immediate Operational Requirement (IOR) action to procure the items commercially. Once procured the items will be supplied to the most appropriate unit, to hold on account and maintain.

3. J4 Log maintains a record of tie-down sets procured through the IOR process and which unit/formation/depot they are held by.

4. All tie-down chains and metal chocks are returned to the unit/formation/depot from which they originated once the unit move is complete in accordance with direction from the appropriate formation or J4 Log. Each holding or receiving unit ensures that kits are inspected, segregated by Stock Code and properly marked prior to any onward distribution. When tie-down kits are shipped to another unit/formation/depot, a message is to be sent by the issuing unit/agency to the formation/J4 Log directing the issue, stating the following; the shipping date, list of tie-down kits supplied/returned and details of any damage or loss.

5. Normally, a unit retains rail tie-down kits for the whole period of deployment, employment and redeployment and then returns the kits to the appropriate agency. However, if the unit is involved in a large-scale exercise, or overseas deployment, it may be necessary to sign-over the tie-down kits to the local Rail Mov Con Det Comd to retain for the employment period of the exercise or operation. If the tie-down kits are signed-over to the Rail Mov Con Det Comd, the formation/J4 Log that initially supplied/directed the issue is to be informed by message. This would facilitate re-distribution where there is a shortage, or to meet an operational need.

6. The inspection of RUD tie-down chains is covered by C-83-100-000/MM-000 is. The guiding principle for inspection is that the chains are to be inspected before and after use.

312. BRIDGE-PLATES

1. When vehicles are loaded on a train using the circus method, "bridge-plates" are used to bridge the gap between rail cars to allow vehicles to drive from one rail car to another. Some rail cars have integral bridge-plates, but most do not. Two bridge-plates are required to cross the gap between two rail cars. Bridge-plates are to be used for the loading and unloading of wheeled vehicles only. Bridge-plates are not to be used for the loading and unloading of tracked vehicles

2. In Canada, CNR and CPR have developed a standard design bridge-plate that meets the DND requirement. Bridge-plates are normally held and maintained by Mov units regularly executing rail movement. Bridge-plates are not normally shipped with a train, are retained by the holding unit, unless the bridge-plates are integral to the rail car itself. Thus, in a rail move planners must check to ensure that bridge-plates are available at both the origin and destination rail terminal.

313. DND 748/750 WAYBILL/STRAIGHT BILL OF LADING (WSBL)

1. A "DND 748/750" (Waybill/Straight Bill of Lading - WSBL) form is completed by the Rail Mov Con Det Comd at the point of origin. It is used to authorize the transport of Canadian Government materiel by military and common carrier. It is prepared in accordance with Chapter 4 of A-LM-158-004/AG-001. WSBL must be annotated "NO HUMPING" where appropriate.

2. Details of the Fin code are normally provided in the Mov O / movement instruction (Mov Instr) by the HQ ordering the move. The Fin code for national third line freight is not to be used unless, specific authority has been granted by DLBM/Transport Management (TM).

314. TRAIN DEPARTURE ADVICE

1. A "Train Departure Advice" Message is sent by the Rail Mov Con Det Comd, at the originating rail terminal, when equipment is dispatched by rail. The format is shown at Annex I.

315. TRAIN ARRIVAL ADVICE

2. A "Train Arrival Advice" Message is sent by the destination Rail Mov Con Det Comd, when the train arrives at the destination rail terminal. The format for the train arrival advice is shown at Annex J.

316. RAIL MOVEMENT CREDIT

1. To facilitate quick identification at arrival rail terminals, trains that carry two or more units may use colour coding in the front windshield of each vehicle. In addition vehicles are identified by a rail movement credit as required by A Mov P - 3.
2. The rail movement credit comprises a series of figures, letters or symbols, arranged as follows:
 - a. One figure indicates the movement execution priority. The movement execution priority has three classes (1, 2, 3); priority number 1 is the highest and is assigned in exceptional cases only.
 - b. Two letters indicate the country of origin (Canada is "CA").
 - c. Two figures indicate the day of departure (in the current month).
 - d. The national identification code number (6 x digits) is assigned by the military authorities of the country of origin, in Canada the number is assigned by the headquarters controlling the move.
 - e. Two letters indicate the country of destination.
3. An example of a rail movement credit is "2-CA-07-436291-CA", which means:
 - a. The movement execution priority is 2.
 - b. The country of origin is Canada.
 - c. The date of departure is the 7th day of the current month.
 - d. The national identification code number is 436291.
 - e. The train is headed for a destination in Canada.
4. Rail movement credits are allocated in the Mov O/Mov Instr by the formation, or command headquarters, controlling the move.

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CHAPTER 4
GROUP MOVEMENT
SECTION 1 - TYPES OF MOVEMENT

401. GENERAL

1. The move of a formation or unit may involve some movement by rail, although it is unlikely that a formation or unit will move entirely by rail. A likely situation could be the rail movement of tracked vehicles, heavier wheeled vehicles and engineer plant, combined with the road move of the remaining wheeled vehicles and an airlift of the majority of personnel. Air or road movement tends to be the most common for personnel however they could be moved by rail. Regardless of the size of the rail party, the group movement procedures outlined in this chapter are to be applied.

402. TYPES OF RAIL PERSONNEL (PASSENGER) MOVEMENT

1. There are two general types of unit rail movement:
 - a. **Special Car.** In this type of rail movement, one or more extra rail cars, reserved exclusively for military use, are added to a regularly scheduled train. This relatively small-scale movement is quite simple to organize and may be arranged at the local level, between the unit/formation, using the technical expertise of local Mov Staff as the Technical Authority (TA), and the local railway agent. It is however usual to utilise the expertise of DLBM TM, at NDHQ, in accordance with A-LM-158-004/AG-001 Chapter 9 Art 917 para 2 and Art 927 para 1 a. (2).
 - b. **Special Train.** Special trains are operated on different schedules, exclusively for military use. Because of the different configuration and a greater possible variety of rail equipment, movement control must be centralized. The command headquarters in conjunction with J4 Mov and DLBM TM co-ordinates this movement with the area and/or national head office of the carrier.

403. CLASSIFICATION OF TRAINS

1. For the purpose of military movement, trains fall into three classifications:
 - a. **Passenger Train.** These move personnel and personal baggage only.
 - b. **Freight Train.** These consist of rail freight cars only and are used to move equipment and vehicles. As the threat level develops there may be a requirement to task rail security parties, or rail escort parties, these would be the only "passengers" transported on the train.
 - c. **Mixed Trains.** These are made up of passenger and freight rail cars. This category is the most difficult type of move, as increased co-ordination, facilities and time are required for loading and unloading. Mixed trains are not generally used in peacetime operations.

SECTION 2 - MOVEMENT PLANNING

404. INTRODUCTION

1. As with every type of movement operation, sound planning is the basis for the effective control of rail movement. To ensure sound planning, the following sequence of activity is followed:

- a. collection of information, and intelligence;
- b. development of tentative rail movement plan;
- c. liaison with railway company/companies;
- d. issue of warning order (Wng O);
- e. preparation of the movement order (Mov O); and
- f. preparation of the related movement instructions (Mov Instr).

2. Although these activities apply to all rail movement they may not be completed for every movement. For instance, both a Mov O and detailed Mov Instr would probably not be produced for the movement of a small group of personnel. In this case, a Mov O in the form of a simple message might suffice, although the general planning sequence would still be followed.

405. INFORMATION COLLECTION

1. Once a move is ordered, certain information is required to enable planning to progress. This information is generally available from movement agencies and the staff originating the movement. The following list is not exhaustive, but includes the main items to be considered:

- a. home base(s), points of origin, of formation(s)/unit(s) to be moved;
- b. Table of Organization and Equipment (TO&E) of formation(s)/unit(s) to be moved;
- c. order of movement by units;
- d. dates on which units will be available for movement;
- e. dates on which units should arrive at destination, the Comd's Required Date (CRD);
- f. scale of personal/unit equipment that is to accompany personnel; and
- g. availability and capacity of railway equipment and installations.

2. If the rail move is to a port of embarkation (POE – air or sea) in conjunction with a sealift or airlift, the following additional information is required:

- a. availability of shipping space (ships and aircraft); and
- b. capability of reception staffs to provide:
 - (1) accommodation,
 - (2) medical facilities,
 - (3) baggage and MHE, and

- (4) processing staffs.

406. INITIAL RAIL MOVEMENT PLAN

1. Given the required information, the planner then proceeds to develop the initial plan. At this stage, the plan will be concerned mainly with estimating the rail requirements as outlined in Chapter 2.

407. LIAISON WITH RAILWAY COMPANY/COMPANIES (CARRIERS)

1. A meeting with representatives of the railway company/companies (carriers) is required once the initial plan has been developed. The initial plan is presented to the railway carriers' representatives to comment on the feasibility of the plan in relation to the availability of equipment and installations. Note that when the shipment exceeds twenty tons, DLBM negotiates the tariffs with the carriers.
2. The railway carriers' representatives indicate the volume of business that their respective companies can handle, and a plan is worked out using the least amount of equipment. Feeding arrangements, handling of baggage and equipment, and other associated problems are discussed at this meeting.
3. The revised movement plan resulting from the meeting is staffed, as required, for concurrence. If the plan is approved, the railway carrier/s is/are asked to confirm train schedules and train "consists" (details of the rail equipment comprising the train).

408. WARNING ORDER

1. All units involved in the move are then issued a warning order (Wng O) indicating:
 - a. composition of each group;
 - b. order of movement;
 - c. destination;
 - d. method of movement;
 - e. approximate movement dates; and
 - f. composition and move of advance parties.

409. MOVEMENT ORDER

1. Once all the details for the move have been confirmed, and the railways have issued the confirmatory documentation, the senior military headquarters publishes a Movement Order (Mov O).
2. The Mov O tends to cover all modes of transport (MOT) used and is published in sufficient detail to enable movement/transportation staffs at subordinate headquarters to issue their own Mov O and/or a detailed Mov Instr. As a minimum, a Mov O contains:
 - a. security measures, as applicable;
 - b. the split between road, air, sea and rail parties, if applicable;
 - c. details of the single MOT, road, sea and air, moves, if applicable (may also be issued as single MOT Mov Instrs);
 - d. name of rail carrier/s, train schedules and consists;
 - e. designation of departure and arrival railheads (including which rail company operates which station);

- f. details regarding accompanying baggage and equipment;
- g. enroute feeding arrangements;
- h. details of halts, if applicable;
- i. medical arrangements; and
- j. documentation requirements (including the Fin Code to be used).

410. MOVEMENT INSTRUCTION

1. The Mov O provides all the information required by units to execute the rail movement. Mov Instr are issued as necessary, perhaps by the Mov Con Unit/Det tasked with co-ordinating the move, to provide the detailed information required to execute the task. A Mov Instr may contain some, or all, of the following information:

- a. units and movement dates;
- b. unit strengths, including advance and rear parties;
- c. instructions for the preparation of nominal rolls;
- d. documentation requirements;
- e. designation of the Task Force Movement Officer (TFMO) and Unit Embarkation Officer (UEO) as required;
- f. designation of embarkation points and details of the transport required to move personnel and equipment to these points;
- g. baggage limits;
- h. baggage handling procedures;
- i. detailed instructions for the marking and movement of accompanying equipment;
- j. details of train accommodation;
- k. designation of a train conducting officer (TCO) for each train;
- l. disciplinary matters;
- m. instructions for the guidance of the TCO;
- n. medical arrangements on trains, including enroute disembarkation of casualties; and
- o. security instructions.

2. Rail movement tables may be attached as annexes to the Mov O/Mov Instr provide a synopsis of the move and detail the following:

- a. the rail movement credit assigned (as applicable);
- b. unit train strength;
- c. departure railhead and departure time;
- d. arrival railhead and arrival time;

- e. feeding arrangements;
- f. assignment of accommodation;
- g. instructions to Rail Mov Con Det Comds;
- h. train consists; and
- i. train running schedule.

SECTION 3 - EMBARKATION PROCEDURES

411. INTRODUCTION

1. In order to ensure a smooth and timely execution of rail movement, it is important that all members of the controlling staff work together and fulfil their assigned responsibilities.

2. Once the necessary executive order (Movement Order [Mov O]) for the movement is received, the TFMO/UEO (depending on the level of the move) arranges a meeting with railway company/companies (carriers) representatives. Also invited to this meeting are the Rail Mov Con Det Comd and other key, supporting, formation/unit personnel, required to plan the embarkation/disembarkation. The meeting addresses the following points:

- a. the time for pre-positioning or "spotting" the railway equipment and when rail loading/unloading is to commence;
- b. a plan for arrival of baggage, and freight, vehicles;
- c. routing and flow of vehicles within the station/railhead area;
- d. size and designation of loading parties, provision and quantity of tie-downs, bridge plates chocks, dunnage and safety equipment as applicable;
- e. location of an assembly area from which personnel and equipment are called forward for embarkation/loading;
- f. administrative arrangements (including feeding and sanitary) in or near the station/railhead;
- g. lighting requirements for night loading;
- h. any restrictions on smoking, or access to particular areas;
- i. requirement for unloading parties at the destination railhead;
- j. the requirement for an OIC advance party to contact the destination Rail Mov Con Det Comd; and
- k. any other points required by those present.

412. FORMATION/TASK FORCE/UNIT PROCEDURES AND TRAIN STAFF

1. The TFMO/UEO is normally the officer who plans and co-ordinates rail moves for the formation/Task Force/unit (depending on the level of the move). Once the TFMO/UEO receives the Mov O from higher headquarters he/she produces a Mov O/Mov Instr covering all the modes involved. The TFMO/UEO plans the move and makes the preliminary liaison with outside agencies (for example, Rail Mov Con Det Comd, Area/Bde G4 Tn etc). Details on the responsibilities of TFMO/UEO are included at Annex K, Appendix 1 and 2 respectively. Once the detailed formation/unit Mov O/Mov Instr is issued, the actual execution of the move may be delegated to others in the case of a rail move they are:

- a. **TCO.** The TCO is normally an officer designated by the Comd of the formation/Task Force or, CO of the unit being moved, to act for the TFMO/UEO at the railhead if the overall complexity of a move prevents the TFMO/UEO being present on site. For a simple move the TFMO/UEO may perform these duties him/herself. Often one unit in a formation/Task Force, or a company/squadron in a unit, is tasked to provide all the staff for one train (TCO, Train WO/Tp Sr NCO, Rail Car NCO, etc). The TCO is responsible for discipline, but conforms to Mov Con staff technical instructions. The TCO is responsible for loading and unloading the vehicles and equipment to/from the train, therefore the rail

loading party is under his/her direct supervision. Details on the responsibilities of TCOs are included at Annex K, Appendix 3.

- b. **Train WO/Troop Senior Non-Commissioned Officer (Train WO/Tp Sr NCO).** A WO/Tp Sr NCO may be appointed to assist in loading and unloading operations and the maintenance of discipline.
 - c. **Rail Car NCOs.** An NCO is appointed to be responsible for each rail car and its personnel.
 - d. **Train Medical Officer or NCM.** If moving personnel by rail, depending on the duration of the journey, a train medical officer (MO) or medical NCO may be designated. As a minimum a first aid NCO is appointed and all personnel are advised of the MO or medical NCO's location on the train.
 - e. **Rail Loading Party WO/Sr NCO.** A WO/Sgt is appointed to run the rail loading party (often composed of members of his/her own platoon). This WO/Sr NCO reports to the TCO. For more details see subsection 413 paragraphs 1 to subsection 415 paragraph 2 below.
 - f. **Rail Security Party.** An appropriately manned rail security party, is tasked in accordance with the threat. The IC of the Rail Security Party reports to the TCO.
2. In addition to the military train staff, railway carrier may appoint representatives to travel on special trains. These officials may consist of a travelling passenger representative (TPR) and a dining car inspector (DCI), actual titles are likely to vary depending on the carrier and country.

413. RAIL ESCORT PARTY

1. The rail loading party, tie down the vehicles and equipment to the rail cars. Part, or all, of this group may accompany the train as the rail escort party and assist with the unloading at the destination rail terminal and assist in checking and adjusting chains and restraints etc at en route stops. The rail escort party is normally commanded by an appointed Offr/NCO, perhaps the TCO (Capt/Lt), who is assisted by a senior NCO 2 IC. The responsibility for authorizing the use of a rail escort party rests with the headquarters controlling the move. However, during normal peacetime operations, the rail escort party is not normally used.
2. Where there is a requirement for a rail escort party some form of suitable passenger rail car must be provided along with communications to the train crew.
3. The rail escort party's primary duties are to assist in loading and unloading DND vehicles, and to maintain visual surveillance of DND vehicles and equipment. Escorts immediately report any incidents of theft, or damage, to the train carrier's representative (traditionally the "conductor").
4. The escort is responsible for carrying:
 - a. all the keys used to operate or secure the vehicles on the train;
 - b. two copies of a rail car load list by Canadian Forces Registration (CFR) and unit for vehicles on the train;
 - c. a list of all dangerous goods carried in each rail car; and
 - d. copies of the rail waybills (WSBLs) for the rail cars in the train.
 - e. the tools and/or equipment required for adjusting chains and restraints.
5. The escort party is usually issued hard rations unless their rail car has facilities to prepare food. Each member of the escort party should have sufficient funds to purchase one hot meal a day, if the situation and schedule permits. Most stops are only 20-25 minutes, just long enough to change train crews or engines. Each escort party is responsible for its own medical support. For this reason a medical assistant may accompany the party. The escort party follows the safety guidelines detailed in Annex N, Appendix 1.

6. Upon arrival at the destination the rail escort party falls under the control of the Rail Mov Con Det Comd until their equipment has been unloaded. While en route, the “conductor” is in charge of the train and his instructions must be followed when dealing with matters affecting the operation of the train.

414. INSPECTION OF RAIL CARS

1. Prior to embarkation, all allotted railway equipment is inspected to ascertain its physical condition as well as the state of cleanliness. The TFMO/TCO/UEO (as appointed) conducts this inspection together with the Rail Mov Con Det Comd and a railway official. At the conclusion of an inspection of passenger rail cars, the “Report of Inspection of Passenger (Personnel) Train Equipment” is completed, detailing the full particulars of the condition of the rail cars before embarkation. A format copy of this report is included at Annex L.

415. EMBARKATION AND LOADING

1. A comprehensive loading/embarkation plan is developed and followed to ensure efficient operations and adherence to time schedules. Usually, the TFMO/TCO/UEO supervises the loading of vehicles and equipment, while the WO/Train Sr NCO supervises the embarkation of personnel.

2. The following guidelines should be considered when developing the loading/embarkation plan:

- a. The senior NCO 2IC uses the train nominal roll and the “train consist” to complete the berthing cards for all personnel to be embarked.
- b. Allowance is made for accommodation for the train headquarters, normally in a compartment near the head of the train.
- c. Baggage vehicles and baggage cars are “spotted” in advance to facilitate loading. When loading directly from a vehicle to the baggage car, the size and composition of a baggage party is determined by the circumstances pertaining to each rail operation.
- d. Markers are positioned at the front end of each part of the train accommodation allocated to each sub-unit. This procedure, along with pre-distribution of envelopes containing berthing cards by rail car, enables simultaneous embarkation of sub-units. Embarked personnel are also checked against nominal rolls at this time.
- e. Once all personnel have embarked, the Train WO/Tp Sr NCO reports to the Rail Mov Con Det Comd to advise the actual number of personnel aboard.

416. NOTIFICATION OF DISPATCH MESSAGE

1. Upon departure of the train, the Rail Mov Con Det Comd dispatches a train Departure Advice Message (IAW Chapter 3, subsection 314, paragraph 1) to the destination and any intermediate Rail Mov Con Det Comds or movement agencies and the headquarters controlling the move. The TFMO/TCO/UEO also notes the actual departure time on the TCO Report.

SECTION 4 - EN ROUTE PROCEDURES

417. GENERAL

1. To establish and maintain effective control over all aspects of the rail movement, Standing Operating Procedures (SOPs) need to be developed, and maintained, a daily routine established and all personnel involved must be kept informed of progress and developments. Items included are:

- a. train organization;
- b. train discipline;
- c. feeding arrangements;
- d. medical facilities;
- e. security requirements and safety rules;
- f. action in the event of an accident or emergency; and
- g. action at halts.

2. These instructions are promulgated via Train Orders prepared by the TFMO/TCO/UEO (as applicable to the particular move, for guidance of the appointed OC Embarked Personnel for a particular train). All personnel are briefed by Rail Car NCOs and copies of Train Orders are posted at the front of each rail car. A suggested format for Train Orders is included at Annex N.

418. TRAIN ORGANIZATION

1. All personnel are briefed about the train organization and the responsibilities of key appointments, including the OC Embarked Personnel, medical officer/NCM, Train WO/Tp Sr NCO, NCO IC rail escort party, NCO IC rail security party and Rail Car NCOs as appropriate to the particular move. Personnel are told the location of the "aboard" train headquarters, Train HQ, the chain of command and their relationship with railway personnel.

419. TRAIN DISCIPLINE

1. The TFMO/TCO/UEO is responsible for discipline at the railhead, however for a passenger (personnel) train, an "OC Embarked Personnel" must be designated. The OC Embarked Personnel's responsibilities are exercised through the Train WO/Tp Sr NCO and the designated Rail Car NCOs. All personnel being transported are to be briefed on, and comply with, the relevant railway company regulations especially against:

- a. leaning out of windows, opening or leaning out of vestibule doors;
- b. boarding or leaving trains in motion;
- c. throwing anything, including lighted matches or burning cigarettes, out of train windows or doors;
- d. causing damage to railway property;
- e. chalking on or defacing the sides of rail cars;
- f. wasting water on trains;
- g. plugging toilets;

- h. smoking in berths; and
- i. improper use of the emergency cord and emergency equipment.

420. MESSING ARRANGEMENTS

1. Personnel are ideally fed from the regular rail dining cars. For shorter journeys, however, personnel may be fed by distribution of pre-packed meals (box lunches, etc).
2. The OC Embarked Personnel details the messing arrangements and designates the meal hours and order of sitting. Meal parades may be organized by starting with personnel in the rail cars farthest from the dining car(s) and working towards the dining car(s).
3. Rail Car NCOs ensure that their rail cars are cleaned after each meal in order to ensure that there is no build-up of discarded food and packaging that could quickly lead to unsanitary conditions. When drinking water is in limited supply it should not be used to clean eating utensils.

421. MEDICAL FACILITIES

1. The location of the Train MO/ Med NCO must be known by all personnel. The daily routine must include timings for the daily Sick Parade.
2. In addition to normal duties, the train MO/ Med NCO conducts at least two inspections of the train daily, to note the general condition and health of personnel as well as any unsanitary or other unhealthy conditions, which may exist.
3. If any personnel require medical attention beyond the capability of the train medical staff, the OC Embarked Personnel and Travelling Passenger Representative (TPR), if appointed, are to arrange for medical attention to be made available at the next halt/station.

422. ACTION IN EVENT OF ACCIDENT OR EMERGENCY

1. Although train accidents occur infrequently, the OC Embarked Personnel is to establish procedures to prevent panic and to provide care for the injured in the event of an accident. In the event of such an occurrence, the embarked personnel are to assist the railway personnel.
2. In the event of an accident, all personnel are to be advised where to muster under the command of Rail Car NCOs. Rail Car NCOs are to check nominal rolls and then report to OC Embarked Personnel /Train WO/Tp Sr NCO for further instructions.

423. ACTION AT HALTS

1. The OC Embarked Personnel advises, based on information provided from the train schedule, when personnel may leave the train during halts.
2. On arrival at the halting point, personnel are ordered to disembark, normally leaving their weapons and equipment under guard. Personnel remain in their rail car groups under the control of the Rail Car NCOs.
3. At the designated time, Rail Car NCOs re-form their personnel, check that all are present and report to OC Embarked Personnel / Train WO/Tp Sr NCO. When all are accounted for, personnel re-embark to continue the journey.

SECTION 5 - RAIL SECURITY EN ROUTE

424. GENERAL

1. Normal security procedures and regulations are followed based on available intelligence and threat, and risk, assessments. If the rail movement is classified, additional security measures such as non-disclosure of information, censorship of mail, etc may be imposed. Further details on rail security in an area of operations are provided in Chapter 5.
2. Each Rail Car NCO details a guard for each end of his rail car. The guard is responsible for preventing personnel from moving between rail cars, unless they are authorized to do so, and to provide physical security for the contents of each rail car.
3. In addition to the rail escort party and the security provisions detailed in paragraph 2 above, there may be a requirement for other types of security personnel, either the "Rail Security Party (Rail Sy Pty)" or the "Train Patrol". Normally there is a greater threat to security when personnel are moving outside of Canada than within, and so more stringent security arrangements may be required outside Canada. Normal peacetime security is the responsibility of the carrier.

425. RAIL SECURITY PARTY

1. The authority for the use of a Rail Sy Pty (as the threat dictates) rests with the command or formation controlling the move. Duties are detailed in the applicable Movement Orders/Instructions (Mov O/Mov Instr). The Rail Sy Pty has no jurisdiction over the operation of the train, and is only responsible for the security of the DND property being moved on the train. The Rail Sy Pty is provided from the unit being moved, not by Military Police, and the Sr NCO in charge of the party reports to the OC Embarked Personnel. The purpose of the Rail Sy Pty is twofold:
 - a. to provide security for the DND vehicles, equipment and supplies being moved; and
 - b. if employed on passenger or mixed trains, to assist the OC Embarked Personnel in providing security for the embarked personnel.
2. Chapter 28 of the National Defence Security Policy must be adhered to when transporting weapons. Commanders at all levels must ensure that the appropriate Rules of Engagement (ROE's) are requested through the chain of command, in accordance with Volumes 1 and 2 of Use of Force manual (B-GJ-005-501/FP-010).
3. If weapons are carried, their use and the control of ammunition by the OC Embarked Personnel (or in the OC Embarked Personnel absence, the 2IC) must be specifically detailed in accordance with command/formation directives.
4. Where a suitable rail car is provided for the Rail Sy Pty, these personnel may be responsible for preparing their own meals. The Rail Sy Pty should also be provided with suitable communications, if possible, hand-held radios of the type used by railway personnel, for internal train communication, and perhaps a mobile phone for communication with the controlling HQ. The Rail Sy Pty is to be thoroughly briefed on the safety rules applicable to riding in rail cars, especially on freight trains. These safety rules are outlined in Annex N.
5. Ideally, the Rail Sy Pty is commanded by a WO, who is responsible to the OC Embarked Personnel.

426. TRAIN PATROL

1. A "Train Patrol" was traditionally a Military Police detachment that was responsible for maintaining order and discipline on a train when a substantial number of personnel, who are not part of a formed unit, are embarked. It is very unlikely that a Train Patrol will be required as personnel/passenger trains are so rarely

used and officers and NCOs are quite capable of performing this task themselves. Where it is considered that a Train Patrol might be required, Military Police advice is to be obtained. If a Train Patrol is tasked, all embarked personnel are to be briefed accordingly.

2. Train Patrols may be authorized by the command responsible for the personnel in transit, and coordinated with NDHQ, other commands and the civilian/military police as necessary. Further details on Train Patrols are to be obtained from the Military Police chain of command.

SECTION 6 - DISEMBARKATION

427. GENERAL

1. An orderly and well-timed disembarkation procedure is necessary to ensure that all personnel and their equipment are correctly accounted for, processed for onward movement, and that the railway station/railhead is cleared as efficiently as possible.

428. DISEMBARKATION

1. The initial disembarkation plan is developed by the TFMO/TCO/UEO and briefed to the OC Embarked Personnel. Upon arrival at the disembarkation station, this officer liaises with the destination Rail Mov Con Det Comd and the formation/Task Force/unit representative to finalize details.

2. Personnel disembark on orders from the OC Embarked Personnel and form up on the platform. Unloading of baggage takes place concurrently by the embarked baggage party or, by a party provided by the formation/Task Force/unit advance party.

3. Personnel are moved to an assembly area clear of the station for processing for onward movement.

4. The OC Embarked Personnel delivers the required documentation to the Rail Mov Con Det Comd at the disembarkation station.

429. INSPECTION OF RAILWAY EQUIPMENT

1. When all personnel and equipment are disembarked, the OC Embarked Personnel, accompanied by the destination Rail Mov Con Det Comd and railway officials, inspects the train. During this inspection, any loss or damage of rail equipment is noted, documented, and it is confirmed that all personnel and equipment have been unloaded.

2. At the conclusion of the inspection, a report is completed (Annex L).

SECTION 7 - DOCUMENTATION

430. DOCUMENTATION REQUIREMENTS

1. The following documentation is required for a rail movement. Depending on the size and circumstances of the move, these documents may not all be required:
 - a. **Rail Tickets or other Authorizing Document.** Regardless of the procedure established, some form of documentation authorizing embarkation is required. The move may be authorized by a group ticket obtained by the local Movement Staff on a credit account, by issue of individual tickets or by some other established procedure. The authorizing document may include meals, or these may have to be provided by CF, or purchased individually for reimbursement later.
 - b. **Nominal Rolls.** Nominal rolls are prepared by the unit being moved and are presented by the TFMO/TCO/UEO (as appointed) to Rail Mov Con Det Comds as required.
 - c. **Train Berthing Cards.** For special cars and special trains, these cards are prepared by the TCO to allocate sleeping accommodation to all embarked personnel. A sample Berthing Card is reproduced at Annex P.
 - d. **Report of Inspection of Passenger (Personnel) Train Equipment.** This report is completed prior to embarkation and after disembarkation. The report is signed by the applicable Rail Mov Con Det Comds, the TCO (or OC Embarked Personnel) and a representative of the railway company. A sample format is included at Annex L.
 - e. **Train Departure/Arrival Advice Message.** The "Train Departure Advice" Message is dispatched by the Rail Mov Con Det Comd, at the embarkation station, in the format shown at Annex I. The "Train Arrival Advice" Message is dispatched by the Rail Mov Con Det Comd, at the disembarkation station, in the format shown at Annex J.
 - f. **Train Conducting Officer's Report.** The TCO's report is prepared in the format shown at Annex K Appendix 4 and provides a summary of the rail move. This report details the number of the train, timings, number of personnel by classification of travel to each destination (if more than one), number of meals consumed (if accounting is required), train staff, receipts of warrants issued and details of any noteworthy occurrences.

CHAPTER 5

RAIL MOVEMENT IN AN AREA OF OPERATIONS

SECTION 1 - RAILWAY ORGANIZATION IN AN AREA OF OPERATIONS

501. GENERAL

1. Personnel and materiel moving by rail in an area of operations will normally use civilian railway facilities, however these facilities may be operated by host nation (HN) civilians, HN military or other Allied military organizations.
2. Operating procedures for rail moves vary depending upon the railway operating agency. Procedures may differ from Canadian peacetime procedures in the following ways:
 - a. method of requesting rail movement,
 - b. control of movement,
 - c. security requirements,
 - d. type(s) of rail equipment, and
 - e. documentation requirements.
3. Railway movement in a NATO area of operations, is governed by the provisions of the STANAGs, and A Mov Ps, listed in Annex A. For non-NATO operations, procedures will need to be established and confirmed in advance of operations.

502. LAYOUT OF A RAIL LINE OF COMMUNICATION

1. The layout of a military rail line of communication (LOC/L of C) in an area of operations depends upon the layout and condition of the existing civilian railway system. The ideal system permits traffic to move as follows:
 - a. directly onto rail from Ports of Disembarkation (POD)/Marshalling Areas (MA),
 - b. from the POD/MA to base installations, and
 - c. from rear installations to railheads.
2. The fastest and most efficient method of rail movement is directly from the POD/MA to the forward railhead(s). Because of different destinations and other factors, this is sometimes not practicable. A number of facilities are required along the rail LOC/L of C. For illustrative purposes, a rail layout, compatible with the administrative systems of most NATO countries is depicted at Figure 5-1. It is accepted that the actual LOC/L of C may not comprise all these facilities, and could include the following:
 - a. **Rail Served Port of Disembarkation (SPOD) Facilities.** These facilities comprise the alongside rail sidings available for transferring traffic directly from sea transport to rail transport. Some SPODs may require the use of other forms of land transport or materiel handling equipment (MHE) as an intermediate phase between sea and rail movement.
 - b. **Dock Sorting and Exchange Sidings.** The loaded rail cars are moved from the SPOD to the dock "sorting and exchange sidings" where they are sorted by destination and prepared for onward movement. The Port Mov Con Det controls internal SPOD movement, while onward movement from the transit area is directed by the MCC (when established) of the controlling headquarters.

- c. **Rear Supply Areas.** Rear supply areas, which may be located in a rear support area (sometimes referred to as a Communications Zone or “Comm Z”), act as collecting centres for the initial sorting and storage of materiel.
- d. **Rail Marshalling Yard.** A rail marshalling yard may be identified and established within the Marshalling Area. It receives forward moving traffic dispatched from ports of disembarkation (PODs), rear depots and the return traffic from the forward railheads. Forward moving traffic for forward Supply Areas may arrive unsorted and may have to be marshalled into trains according to destination.
- e. **Regulating Station.** Intermediate “regulating” stations may or may not be required, depending on the prevailing tactical and technical situation. Under relatively static conditions, trains may be permitted to “through-run” from the marshalling yard to the forward railheads or supply areas. If required, regulating stations may perform one or all of three main functions:
 - (1) identify and allocate the correct destination for trains;
 - (2) control the time of departure so that arrival at the destination can be timed to suit conditions; and
 - (3) when necessary, alter the load, composition or marshalling order of trains.
- f. **Forward Supply Areas and Railheads.** The Forward Supply Areas (Force/Corps/Div/Bde etc depending on the type /level of operation) or railheads in the forward area of the Communications Zone (Comm Z) are normally the final destination for trains. However, in some instances there may be railheads in the “Combat Zone”. The distance from the regulating station is kept short in order to assist in the control of arrival timings. The main rail tasks of these organizations are rapid and efficient unloading and tallying, reloading with return traffic and dispatching back along the LOC/L of C.

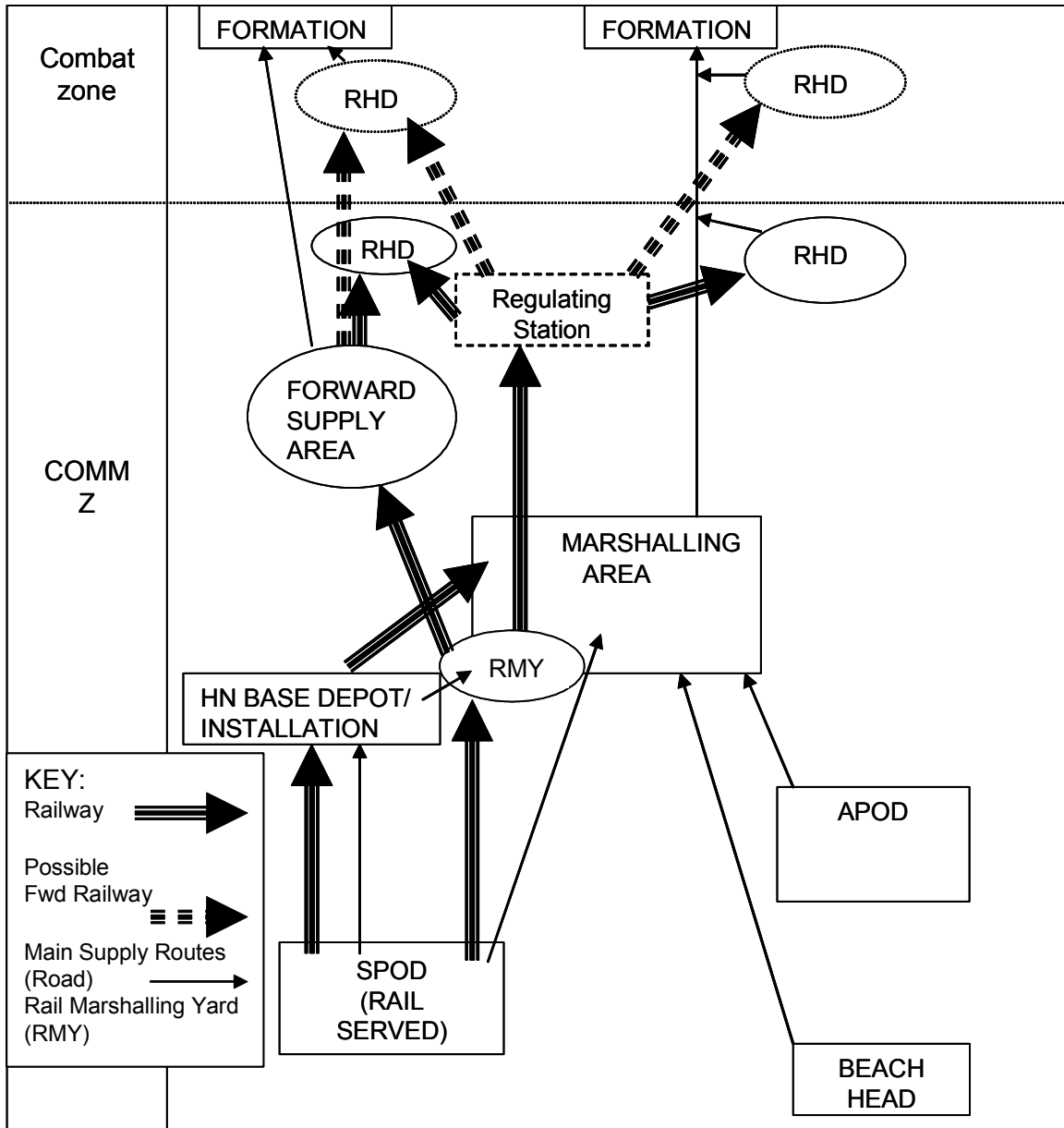


Figure 5-1 The Rail Line of Communications (line diagram)

Rail System Layout

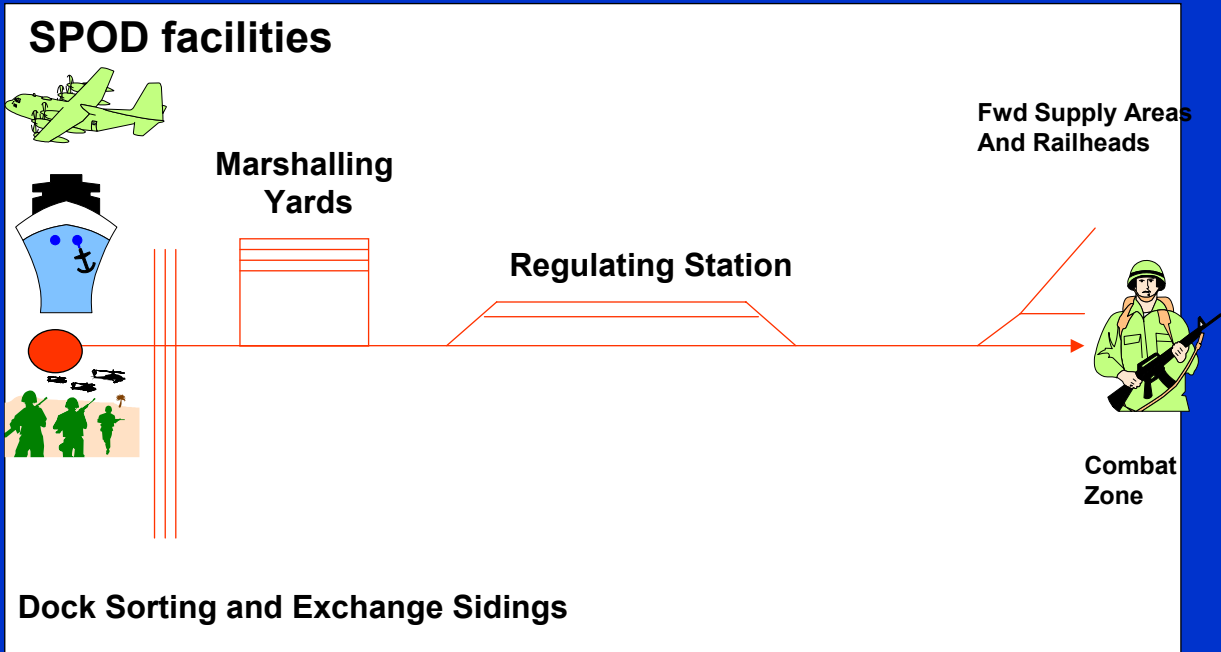


Figure 5-2 The Rail Line of Communications (illustration)

503. RAIL SERVICES IN AN AREA OF OPERATIONS

1. The following rail services may be provided:
 - a. daily supply trains (if applicable);
 - b. ambulance trains;
 - c. Personnel trains;
 - d. bulk freight traffic;
 - e. prisoner of war (POW) traffic.
 - f. unused capacity made available as applicable.
2. Based on the priority allotted to each type of traffic, the allocation of routes for each train is decided at the daily Train Conference.

504. SECURITY

1. Because of their vulnerability and susceptibility to enemy action, railways can provide high value targets for enemy intelligence operations. Information can be gleaned about future intentions, the order of battle and other important military operations merely by observing railway operations. The civilians employed by railways can also increase the security risk.
2. To provide some form of security it is normal to conceal final destination, numbers of personnel and the amount of stores moving by rail. To accomplish this, the following procedures should be adopted:
 - a. **Freight Movement.** As follows:
 - (1) A code name is given to every railhead dealing with a particular commodity or group of commodities.
 - (2) When a regular supply train system is being employed, a supply number is also allotted to every receiving formation/unit. These code numbers are issued by the operations staff (Ops Staff) and are changed regularly.
 - (3) Trains are given a number.
 - (4) The railhead code names and the train and supply numbers referred to above are used on all documentation concerning the rail movement.
 - b. **Personnel Movement.** As follows:
 - (1) The Ops Staff allocate a code name to the move of each formation and unit.
 - (2) Stations used for personnel movement or as regulating stations are also given code names.
 - (3) Trains are allocated numbers.
 - (4) These code names and numbers are used on all documentation concerning the movement.
3. A further measure to enhance security is to disseminate information on a "need to know" basis only. Mov Con Dets at originating and terminating stations require more information than Mov Con Dets at stations through which trains simply transit. Passage of information must be commensurate with these needs.

505. MOVEMENT CONTROL UNITS AND DETACHMENTS

1. Mov Con Units/Dets are responsible to the Task Force Comd for the control of movement. They act as liaison between any personnel being moved, the Movement Staff (Mov Staff) and the railway operator. It is normal for the Mov Con Det Comd to issue orders through the senior officer or NCO of the transiting formation/unit/party.
2. All members of the Mov Con Unit need to have a good knowledge of the railway system. Information to be recorded by each Mov Con Det includes the following:
 - a. lengths of sidings and their capacities;
 - b. loading facilities (side, end and portable ramps);
 - c. time factors for embarkation and disembarkation;
 - d. access routes and manoeuvre space in rail yards;
 - e. availability of cover from weather, observation or attack; and

- f. administrative facilities: water, toilets, rest areas, etc.

SECTION 2 - FORMATION/TASK FORCE AND UNIT MOVEMENT

506. GENERAL

1. Basic planning considerations for formation/Task Force and unit rail movement in an area of operations are similar to those detailed for group movement in Section 2 of Chapter 4.
2. The sequence of planning and orders differs mainly because of increased security requirements and the pre-positioning "spotting" and loading of unit vehicles and equipment.

507. DENSITY OF MOVEMENT

1. In an area of operations it is important that movements are completed as quickly as possible. Density of movement becomes a critical factor in planning. In rail operations density is defined as the number of trains per twenty-four hour (24 hr) period over a particular route. Density depends upon the total practical capacity, expressed as a number of trains, on the most restricted portion of the route, and the proportion of this capacity that can be allocated to the specific type of rail movement (for example, freight, ambulance POW trains etc). Priorities are set, and it is normal in a rail LOC/L of C of sufficient capacity to permanently allocate a number of "paths" to each type of rail movement.
2. Similarly, if the rail LOC/L of C is sufficiently large, standard trains of uniform composition for the movement of similar sized and equipped units can be formed. Thus, given the size of the formation/Task Force or unit to be moved, the planning time required to assemble the requisite number of standard trains could be reduced.

508. VEHICLE AND STORES CONSIDERATIONS

1. In addition to personnel and baggage considerations, planners must also be aware of the requirements specifically associated with the rail movement of vehicles and stores. Technical considerations regarding loading vehicles and stores are detailed in Chapter 3. This section highlights planning considerations only.
2. The following points, in addition to those discussed in Chapter 4, are considered when planning the move of a formation or unit:
 - a. rail marshalling areas,
 - b. loading facilities,
 - c. loading/unloading parties,
 - d. materiel handling equipment (MHE), and
 - e. tie-down sets and dunnage.

509. RAIL MARSHALLING AREAS

1. The Area/Formation/Task Force Movement (Mov) Staff/MCC advises on the location of stations for embarkation. By conducting prior reconnaissance (recce), movement personnel compile detailed information on all available stations in their area. One of the factors when selecting a station is to ensure that the selected station has an adjacent rail marshalling area, or areas, that meet the formation/Task Force/unit's requirements.
2. The rail marshalling area should provide the following:
 - a. sufficient manoeuvre space;

- b. parking facilities;
 - c. administrative areas for feeding, rest, etc;
 - d. sanitary facilities;
 - e. area(s) to effect vehicle/stores preparation and maintenance, if required;
 - f. security from observation and attack; and
 - g. good access to loading site(s).
3. The call forward of personnel, stores and vehicles from the rail marshalling areas to the railhead loading sites is arranged between the formation/Task Force/unit representative, normally the TFMO or UEO, depending on the level of move, and the Mov Con Det.

510. LOADING FACILITIES

1. A prime consideration in the selection of stations/railheads is the availability of loading facilities. The four main types are:
- a. end loading dock;
 - b. side loading dock;
 - c. portable ramps; and
 - d. improvised ramps, such as those made from railway ties.
2. End and side loading docks are preferred, but where these are not available, it is the responsibility of the Mov Con Det, through the appropriate HQ Mov Staff/ MCC, to arrange alternative facilities. Where the length of the loading site is insufficient to allow simultaneous loading of all rail cars, then time and space allowance is made for intermediate shunting of portions of the train.
3. It is essential that a full estimate is conducted and that realistic time allowances are made. Timings vary according to facilities available, training of the unit, amount to be loaded, weather conditions and the tactical situation.

511. LOADING/UNLOADING PARTIES

1. The unit being moved is responsible for the provision of personnel to load/unload vehicles and stores. The local Mov Con Det advises the numbers of personnel required and supervises the actual loading and unloading.

512. MATERIEL HANDLING EQUIPMENT

1. During the preliminary planning conference, special requirements such as the need for MHE for loading/unloading are identified.
2. It is likely that the unit being moved will not possess the required MHE. As such, it is the responsibility of the Mov Con Det (though the appropriate HQ Mov Staff/MCC) to ensure that the required MHE is available at both the embarkation and disembarkation station/railhead.

513. SECURING AND DUNNAGING

1. Securing of vehicles on rail cars, and the "dunnaging" of boxcars if required, is carried out by unit personnel, under the supervision of the Mov Con Det.

2. Certain types of rail cars contain securing materials as part of their normal equipment. However, when this is not the case, it is the responsibility of the Mov Con Det at the station of embarkation to ensure, through the appropriate HQ Mov Staff/MCC, that the required chains, wires, lumber, etc, for tie-down and dunnaging are provided. The Mov Con Det at the station of disembarkation ensures that as much of this material as possible is salvaged for future use.

514. DOCUMENTATION

1. Documentation requirements for rail movement, in an area of operations, vary according to procedures established in that particular area. Factors such as the following dictate documentation requirements:

- a. whether the railway is operated by civilians or the military;
 - b. which national civil agency manages/military force commands the rail LOC/L of C; and
 - c. extent of utilization of the rail LOC/L of C.
2. Examples of the types of movement authorizing documents are:
- a. rail tickets,
 - b. Waybills/Straight bills of lading (WSBLs), or
 - c. other authorizing documents as detailed.
3. The documents identified in paragraph 2, above, may be supported by supplementary documents such as: nominal rolls, meal vouchers and other documents, as directed by the controlling headquarters.

515. REPORTING OF MOVEMENT

1. Effective communications are essential to the efficient operation and use of the rail LOC/L of C. Upon the departure or arrival of each train, the Mov Con Det at the station of embarkation will immediately provide details (Train Departure/Arrival Advice Messages) to the Controlling HQ Mov Staff/MCC. Depending on local procedures, the Controlling HQ Mov Staff/MCC or the embarkation Mov Con Det also advises train details to units at intermediate stations and the station of disembarkation, as well as any other MCC that may be concerned with the move.

SECTION 3 - FREIGHT (MATERIEL) MOVEMENT

516. GENERAL

1. While the military generally refer to “materiel”, civil operators use the term “freight”. Throughout this section both terms are used in accordance with how they would be commonly encountered. Standard procedures are developed for the control and allocation of limited resources. This practice applies equally to the movement of materiel in an area of operations as well as to the management of other scarce resources.
2. This section describes the general principles and procedures to be followed for the rail movement of materiel in an area of operations.

517. CONTROL OF FREIGHT RAIL CARS

1. The railway equipment used for military materiel is normally referred to as “freight” equipment. Railway freight equipment is distributed and controlled as follows:
 - a. all demands for empty rail cars are made daily to the Controlling HQ Mov Staff/MCC by the agency requiring to load them;
 - b. these demands are consolidated and co-ordinated by the Mov Staff/MCC;
 - c. routine regulation of allocations and priority between areas, loading agencies and commodities are made by the movement staff/ MCC at the Controlling HQ however when there are insufficient resources to meet all tasks, priorities are obtained from the operations staff (Ops Staff); and
 - d. subject to the conditions imposed by sub-paragraph c above, the MCC makes allocations and arranges for distribution with the railway operating service, whether it is a civilian or a military agency.

518. ALLOCATION OF RAIL CARS

1. There are three main factors to be considered in the allocation of rail cars:
 - a. the number of freight trains to be run,
 - b. the ability of the destination terminal to accept, and
 - c. number of empty rail cars available.
2. **Number of Freight Trains to be Run.** The allocation of available line capacity (number of trains that can run per day) between the various types of trains (personnel, ambulance, freight, etc) is decided by the Ops Staff at the Controlling HQ. The Ops Staff make their decision based on advice from the Mov Staff/MCC, which is then tasked to co-ordinate the movement. The average number of loaded rail cars that each freight train can move can also be calculated. Thus, the average number of rail cars that may be loaded on one day is fixed. It is a cardinal principle that empty rail cars are not loaded unless trains are available to move them to their destination within a reasonable time. However, in order to maximise loading of trains, that might otherwise carry a light load, it may be advantageous to hold some rail cars loaded with bulk stores at the marshalling yard that can be inserted into the flow as required. The number of any surplus rail cars should be proportionate to the need.
3. **Ability of Destination to Accept.** The Controlling HQ Mov Staff/MCC issues rail (freight) programs that lay down the bulk quantities for movement from supply areas or PODs to forward installations and railheads over a given period. This is not a “one-time lift” capacity, and as such, Mov Con Dets must ensure that rail cars are not loaded or dispatched to the consignees unless they are certain that the traffic can be accepted. Violation of this principle can lead to a blockage of the system, wastes available capacity, and ties

up valuable resources. The Controlling HQ Mov Staff/MCC must keep all Mov Con Dets informed of the situation by means of a daily situation report.

4. **Number of Empty Rail Cars Available.** The daily average number of rail cars that a railway can provide must be established and the general maximum allocation for each area is then governed by a forecast made by the Controlling HQ Mov Staff/MCC. When the demand for rail cars exceeds the number available the Mov Staff/MCC agrees the priority of allocation with the Ops Staff.

519. FINAL ALLOCATION OF RAIL CARS

1. Close liaison with the railway operating service is an essential element in the allocation of rail cars. This is best accomplished by having the railway operating service represented at the daily meeting where the decisions on the allocation of rail cars are made.

2. The final allocation of rail cars, by the Controlling HQ Mov Staff/MCC, is passed to all concerned (Mov Con Units/Dets, demanding agencies and the railway operating service) by means of an Allocation of Rail Cars (or similar) Form. After receipt of the allocation, demanding agencies, should verify that the requisite number of empty rail cars has been supplied and that all necessary shunting is carried out to facilitate loading.

520. LOADING OF RAIL CARS

1. Depots/Supply areas may be required to load rail cars daily for many different consignees and destinations. It follows that considerable sorting, marshalling and subsequent shunting, at either the depot sidings or the marshalling yard, can be avoided by judicious loading of rail cars (as much as possible in the order that they are required). The Mov Con Dets, when in possession of the relevant movement information, and understanding the complexities of assembling trains, are in a position to advise on the most convenient order of loading. Mov Con Dets closely monitor the loading of rail cars so that they can be called forward at the required time. They also ensure that the most suitable type of rail car is used and that optimum loading is achieved. However, to avoid loss and confusion, shipments for more than one consignee or destination are not normally loaded on the same rail car, albeit that this runs contrary to the principle of loading to the full capacity of the rail car.

521. RAIL CARS IN TRANSIT

1. The transit of rail cars, after dispatch from Depots/Supply Area and until their arrival at Destination Railheads, may be divided into the following stages:

- a. movement from Depots/Supply Area to the Rail Marshalling Yard;
- b. shunting and marshalling at the Rail Marshalling Yard;
- c. movement from the Rail Marshalling Yard to the Regulating Station;
- d. shunting and holding at the Regulating Station (if necessary); and
- e. movement from the Regulating Station to the Destination Railhead.

2. The procedure at each of these in-transit locations is basically the same and, in simplified terms, consists of:

- a. verifying the rail cars received against the Train Warrant;
- b. recording the freight movement;
- c. re-marshalling as necessary;

- d. dispatching the train to the next destination; and
- e. advising all concerned of the progress of the train, especially dispatch and significant delay.

522. RAILHEAD PROCEDURES

1. Based on the "Departure Advice" message received from the dispatching Mov Con Det, the destination railhead Mov Con Det advises the consignee of the impending arrival, so that arrangements can be made for the labour and road transport to clear the incoming freight.
2. Then the Mov Con Det:
 - a. liaises with the railway operating service regarding sidings to be used for unloading;
 - b. arranges for provision of any required MHE;
 - c. supervises unloading to ensure that it is completed efficiently;
 - d. takes over empty rail cars from the consignee;
 - e. advises the railway operating service of the availability of unloaded rail cars;
 - f. at the same time, advises the railway operating service of rail cars required for loading of freight for movement rearward; and
 - g. institutes the procedures described in this section for the rearward movement of freight.
3. Return traffic is moved using the same procedures as described in this section for forward movement of freight.

ANNEX A - REFERENCES AND STANDARDIZATION AGREEMENTS

1. The following publications are related to and may be used in conjunction with this manual:
 - a. A-LM-158-001/AG-001, Transportation Manual, Volume 1, General.
 - b. A-LM-158-004/AG-001, Transportation Manual, Volume 4, Movement of Materiel.
 - c. B-GJ-005-404/FP-000, Movement Doctrine for Canadian Forces Operations.
 - d. Association of American Railroads-Rules Governing the Loading of Commodities on Open Top Cars and Trailers.
 - e. Canadian National Railways Freight Equipment Register.
 - f. Canadian Pacific Railways Equipment Data Book.
 - g. Canadian National Railways, Linguistic Services-Vocab.
 - h. Transportation of Dangerous Goods Regulations (TDG Regs).
 - i. National Defence Security Instructions.
 - j. Supplementary Metric Practice Guide, Sector 1.02 Rail Transport.
 - k. C-83-100-000/MM-000, Inspection of Rail Tie-down Chain.
 - l. Rail Association of Canada Pamphlet CL-20, Securement Methods for Military Rail Movements (also available a supporting video).
 - m. B-GL-331-005/FP-001 (The Electronic Battle Box (EBB) Rail Planner.

2. The following NATO Standardization Agreements have been wholly or partially incorporated into this manual:
 - a. Allied Movement Publication (AMovP) 3.
 - b. STANAG 2152 (Edition 3), Loading Ramps Made from Railway Sleepers.
 - c. STANAG 2158 (Edition 4, amendment 3) Identification of Military Trains.
 - d. STANAG 2171 (Edition 6, amendment 1), Procedures for Military Trains Crossing Frontiers.
 - e. STANAG 2173 (Edition 4, amendment 1), Regulations for the Securing of Military Tracked and Wheeled Vehicles on Railway Wagons.
 - f. STANAG 2175 (Edition 6, amendment 2), Classification and Designation of Flat Wagons Suitable for Transporting Military Vehicles and Equipment.
 - g. STANAG 2832 (Edition 3), Restrictions for the Transport of Military Equipment by Rail on European Railways.

3. The following ABCA Quadripartite Standardization Agreements have been partially incorporated into this manual:
 - a. QSTAG 165 (Edition 2 Amendment 1) - Movement Principles, Policies and Duties.
 - b. QSTAG 592 (Edition 1 Amendment 1) Forecast Movement Requirements - Rail, Road and Inland Waterways.

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ANNEX B - ESTIMATING RAIL REQUIREMENTS

1. In order to assist in calculating the number of rail cars required to move particular vehicles and equipment the following guidance is provided. It is imperative that Movement Planners verify with the rail carriers particular criteria that effects the formulas provided for example:
 - a. What is the exact length of the rail car bed? e.g. in Canada a 62 foot flat car has a workable bed of 720 inches rather than the 744 inches that might be assumed;
 - b. What space is to be left at each end of the rail car? e.g. in Canada on a standard rail flat car a 12 inch minimum clearance is left from the “A” end and a 24 inch minimum clearance is left from the “B” (brake) end; and
 - c. What space is to be left between vehicles on the rail car bed for tie downs/to avoid bumping? This will vary between vehicle types and mixes the key factor is actually that the angle of the tie down should be as close to 45 degrees as possible e.g. for an Iltis the distance could be a minimum 10 inches whereas an HLVW would require 18 inches. The planning figure used in the formula below, and the examples at Appendix 2 to this Annex, is 18 inches between vehicles.

2. First Principles Method For Loading Vehicles and Equipment on Rail Car Flats. The First Principles method may be followed using either a Formula method (which may be conducted either manually or using a software tool) or a manual method.
 - a. Manual Method. The following is a description of the manual method:
 - (1) find the dimensions for all vehicles; (AVIMS or vehicle handbook);
 - (2) divide track and wheeled vehicle types;
 - (3) hints:
 - (a) 1½ ton trailers are normally attached to MLVWs;
 - (b) kitchen and water trailers are normally attached to MLVWs;
 - (c) “puppy pods” are normally attached to HLVW Pods;
 - (d) ¾ ton trailers are normally attached to LSVWs;
 - (e) ¼ ton trailers are normally attached to Iltis;
 - (f) you cannot load an Iltis in the back of an HLVW;
 - (g) do not get wrapped “around the axle” over the 3” differences in the LSVW lengths – treat them as the all the same length;
 - (4) add the number of the vehicle types;
 - (5) add the number of trailers of each type;
 - (6) list the vehicles and vehicle/trailer combinations;
 - (7) verify that you have the correct number of “pieces”;
 - (8) list the lengths of the various vehicles and vehicle/trailer combinations;
 - (9) add 18” between vehicles (but see para 1 c above);

- (10) determine which combinations will fit on a rail car;
- (11) as a general rule do not mix track and wheeled vehicles on
- (12) the same rail car;
- (13) determine the railcar loads; and
- (14) when all vehicles are loaded recount the pieces loaded to
- (15) verify your numbers.

b. **These Formula Method:** You may use either a manual method or a software tool to use the Formula method. The formula is as seen below:

$$\frac{\text{Total Length of Vehicles} + (\text{Number of Vehicles} \times \text{Space Between Vehicles})}{\text{Rail Car Length} - \text{Required Distance at either end (for brake wheel and Tie Downs)}}$$

or

$$\frac{\text{TLV} + (\text{NV} \times \text{SBV})}{\text{RCL} - \text{D}}$$

Notes

- 1. Round up (always round up) to next highest value (i.e. 54.30 = 55).
- 2. Add 10% for “fudge” factor.
- 3. **Box Car Loads.** When planning boxcar loads, unless the loads are regular in shape, such as with identical sized pallets and boxes, you should plan on losing 20% of the rated cubic capacity of the box car. This lost space is known as “broken stowage”. The broken stowage factor is subtracted from the cubic capacity of the box car leaving the remainder value as the “useable space”. Therefore the following applies:
 - a. A 40’ boxcar with a capacity of 143 cubic yds and a broken stow factor of 20% will have a useable space of 114.4 cubic yds i.e. $143 \times 20\% = 28.6$ cubic yds
or
 $143 - 28.6 = 114.4$ cubic yds
 - b. In most cases you will not know the cube of the stores to be moved, therefore the planning figures should be used:
 - (1) **Military stores** – 385 lbs per cubic yd (will bulk out before reaching the max wt of the car): and
 - (2) **Ammunition** – 1764 lbs per cubic yd (will weigh out the car before reaching the max cubic capacity of the car)

ANNEX B - APPENDIX 1 - TRANSPORTATION REQUIREMENTS WORKSHEET (EXAMPLE)

ORIGIN: CALGARY
DESTINATION: WAINWRIGHT

UNIT: CF TASK FORCE ALPHA
DATE: 16 MAY 02

CONTROLLING HQ:

Item	Qty	Dimensions L x W x H (in.) or Cube (Ft ³)	Planning Weight Lbs. un-laden	Total No. &Type Chain		Total No. &Type Chock		Remarks Remarks should specify any reduced heights and cubes, and whether weights are laden or un-laden
				3/8"	1/2"	MTR (NOTE 1)	MWH (NOTE 2)	
APC Carrier, M113A1 (ECC 114130)	21	193 x 106 x 98	20 870	168	84	84		
Carrier, Lynx M113-1/2 (ECC 113405)	4	182 x 95 x 86	18 051	32	16	16		
LSVW ILTIS (ECC 121501)	16	157 x 49 x 73	4 500	64	Data		128	
MLVW, M35, ECC 124035	11	278 x 96 x 128	14 350	88	44		88	
MLVW M36 with Crane (ECC 124266)	2	327 x 96 x 128	15 350	16	8		16	
HLVW (10 ton) Truck Recovery (ECC 126810)	2	349 x 99 x 128	42 990	32	16		24	

Item	Qty	Dimensions L x W x H (in.) or Cube (Ft ³)	Planning Weight Lbs. un-laden	Total No. &Type Chain		Total No. &Type Chock		Remarks Remarks should specify any reduced heights and cubes, and whether weights are laden or un-laden
				3/8"	1/2"	MTR (NOTE 1)	MWH (NOTE 2)	
Tlr, Cargo 1/4 Ton (ECC 131101)	12	109 x 57 x 42	567		48		48	Palletized
Tlr, Cargo, 1-1/2 Ton (ECC 133101)	7	166 x 83 x 100	2 405	28			28	
Tlr, Tank, Water 1- 1/2 Ton (ECC 133301)	2	164 x 83 x 78	2 365	4	8			
Camp Stores	-	100 ft ³	1 000					

NOTES

1. MTR--Metal tracked chock.
2. MWH--Metal wheeled chock.

Box	Pedestal	Gondola	Flat				Multi		Piggy-back	Total
	89 ft	50 ft	40 ft	52 ft	62 ft	89 ft	BI	TRI		
4	-	-	-	-	-	17	11	1	-	33

NOTE

1. BI -- Bi-level car.
2. TRI -- Tri-level car.

Figure B1-2 Rail Loading Worksheet (Summary)

ANNEX B - APPENDIX 3 - RAIL COSTING WORKSHEET

(EXAMPLE if required to work costs on deployed Operations)

ORIGIN: MOMBASSA
DESTINATION: NAIROBIUNIT: TASK FORCE "ALPHA"
DATE: 3 MAY 01

Type Car	Weight (lbs)	No. Cars	Total Weight (lbs.)	Rate Per 100 lbs. Kenyan Shilling (KS)	Cost Kenyan Shilling (KS)	Remarks
89'	92 000	2	184 000	6.10	11 224.00	
89'	88 000	2	176 000	6.10	10 736.00	
89'	80 000	1	80 000	6.38	4 880.00	
89'	63 900	8	511 200	6.38	32 614.56	
89'	68 400	1	68 400	6.28	4 363.92	
89'	72 900	1	72 900	6.28	4 651.02	
89'	66 600	1	66 600	6.38	4 249.08	
89'	73 400	1	73 400	6.38	4 682.92	
89'	62 800	1	62 800	6.38	4 006.64	
89'	78 000	4	312 000	6.38	19 905.60	
TRI	--	1	--	2 976.00	2 976.00	
BI	--	11	--	2 530.00	7 830.00	
BOX	34 000	3	102 000	5.78	5 895.60	
BOX	39 500	1	39 500	5.78	2 283.10	
				TOTAL	KS 140 298.44	

NOTES

- Total: KS 140 298.44 X 2 = KS 280 596.88 return cost.
- Dunnaging (if required):

18 tracks at KS 200.00 =	KS 3 600.00
71 wheels at KS 80.00 =	KS <u>5 680.00</u>
TOTAL	KS 289 876.88 @ 1 \$ Cdn = 10 KS = \$ 28 987.688 Cdn
- Bi-level and tri-level cars are usually not costs by weight, but rather are given a flat rate by the carrier.

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ANNEX C - PASSENGER RAIL CAR DATA

1. Because there is a great variety of passenger equipment in service, the data in this Annex should be considered as illustrative and not exhaustive. Actual capacities must be verified with the carrier:
 - a. **Day Coaches.** 60-70 seats. For operational moves, plan on using 55 seats to allow space for personal weapons, personal equipment etc.
 - b. **Sleeping Rail Cars.** As follows:
 - (1) 12 section rail car - 27 berths.
 - (2) 14 section rail car - 28 berths.
 - c. **Diners.** Normal seating is for 48. One diner is required for each 150 passengers, based on three sittings.
 - d. **Buffer/Baggage Cars.** One rail baggage car is required for every 250 personnel/passengers. This rail car also serves as a buffer between passenger cars.
2. During the movement of large formed bodies of personnel, the carrier selected determines the quantity of rolling stock required, to meet the needs of the user. If the movement is in Canada, the carrier is usually VIA Rail. For moves elsewhere this will need to be confirmed with local carriers/Host Nation (HN) or Allied Movement Agencies.

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ANNEX D - FREIGHT RAIL CAR DATA

1. There are many different types of freight rail cars available. This Annex includes data on the more common, and thus more readily available, rail cars in North America. If using rail on deployed operations, it is essential to obtain details relevant to that theatre.

2. Box Cars. The standard box rail cars are the 50, 60 and 86 ft steel rail cars. General specifications are as follows:

a. 50 ft Rail Car

(1) Inside Dimensions. As follows:

- (a) length - 50 ft 6 in.;
- (b) width - 9 ft 2 in.; and
- (c) height - 10 ft 6 in.;

(2) Door Dimensions. As follows:

- (a) width – 15 ft 1 in.;
- (b) height - 9 ft 9 in.;

(3) Capacity (Average). As follows:

- (a) cube - 4860 ft³;
- (b) weight – 119,048 lbs.

b. 60 ft Rail Car

(1) Inside Dimensions. As follows:

- (a) length - 60 ft 9 in.;
- (b) width - 9 ft 2 in.; and
- (c) height - 10 ft 9 in to 11ft 7in.;

(2) Door Dimensions. As follows:

- (a) width – 16 ft 0 in.;
- (b) height - 10 ft 9 in.;

(3) Capacity (Average). As follows:

- (a) cube - 5880 ft³;
- (b) weight – 141,094 – 163,140 lbs.

c. 86 ft Rail Car

(1) Inside Dimensions. As follows:

- (a) length - 86 ft 06 in.;

(b) width - 9 ft 2 in.; and

(c) height - 12 ft 9 in;

(2) Door Dimensions. As follows:

(a) width – 20 ft 0 in;

(b) height - 12 ft 9 in;

(3) Capacity (Average). As follows:

(a) cube – 10,000 ft³;

(b) weight – 141,094 lbs.

3. Flat Rail Cars. In addition to the standard flat rail car, which is available in different lengths, many specialised flat rail cars have been developed for automobile and equipment manufacturers. The most common rail cars used to move military vehicles as follows:

a. Standard Flat Rail Cars. As follows:

(1) 52 ft flat rail car (CPR)-

(a) inside length - 52 ft to 56 ft 6 in.;

(b) inside width - 9 ft 2 in. To 10 ft 4 in.; and

(c) capacity - 125 000 lbs to 170,000 lbs;

(2) 62 ft flat rail car-

(a) inside length - 61 ft to 65 ft;

(b) inside width - 9 ft to 10 ft 4 in;

(c) capacity - 170,000 lbs to 200,000 lbs;

(3) 89 ft flat rail car-

(a) inside length - 89 ft to 89 ft 4 in;

(b) inside width - 8 ft 2 in. to 9 ft 6 in;

(c) capacity - 120,000 lbs to 182,000 lbs;

b. Pedestal Flat Rail Cars. As follows:

(1) inside length - 86 ft 6 in. to 89 ft 4 in;

(2) inside width - 9 ft to 9 ft 2 in;

(3) capacity - 112,000 lbs to 150,000 lbs;

c. Bi-Level Auto Transporter Rail Cars. As follows:

(1) inside length - 89 ft 1 in. to 89 ft 4 in;

(2) inside width - 8 ft 2 in. to 8 ft 10 in;

- (3) capacity - 90,000 lbs to 130,000 lbs;
- d. Tri-Level Auto Transporter Rail Cars. As follows:
 - (1) inside length - 89 ft 1 in. to 89 ft 4 in;
 - (2) inside width - 8 ft 2 in. to 8 ft 4 in;
 - (3) capacity - 70,000 lbs to 90,000 lbs;
- e. Flat Rail Cars (Bulkhead End). As follows:
 - (1) inside length - 41 ft to 66 ft;
 - (2) inside width - 8 ft 10 in. to 10 ft 4 in;
 - (3) height - 7 ft 8 in to 10 ft 10 in
 - (4) capacity - 86,000 lbs to 187,000 lb.
- f. "Gondolas". As follows:
 - (1) inside length - 36 ft to 65 ft 6 in;
 - (2) inside width - 7 ft 9 in. to 9 ft 6 in;
 - (3) capacity - 96,000 to 191,000 lbs.
- g. Tank Rail Cars. Capacity - 16,000 gal, 18,000 gal and 24,000 gal (Super Jumbo only West).
- h. HTTX Cars. These rail cars are normally "tie-down equipped" and are provided through CNR or CPR.
 - (1) inside length - 60 ft;
 - (2) inside width – 10 ft 6 in;
 - (3) capacity - 154,000 lbs.
- i. OTTX Cars. These rail cars are normally "tie-down equipped" and are provided through CNR or CPR.
 - (1) inside length - 60 ft;
 - (2) inside width – 10 ft 6 in;
 - (3) capacity - 154,000 lbs.

Details are to be verified through the local CNR or CPR representative.

Note Where a range of figures is given, the dimensions and capacities of rail cars vary depending on the type of rail car provided. More detailed information on the capacities and dimensions of rolling stock is readily available from the local representatives of CNR and CPR. The two companies do not necessarily use the same equipment.

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ANNEX E - TABLE OF TIE-DOWN EQUIPMENT REQUIREMENTS AND RAIL CAR CAPACITIES

LADEN WEIGHT VS UNLADEN WEIGHT

1. Most vehicle weights and dimensions can be found in JEMMS. This data is drawn from the AVIMS database, which is the CF authority. In many cases the weight of a vehicle when actually shipped will be different and will need to be confirmed at a weighbridge. The actual laden weight will vary from vehicle to vehicle. The over-riding authority for determining which chains may be used on a particular vehicle is RAC Pamphlet CL-20.

Ser	Vehicle Type	Length in. (Cm)	Weight Max Laden Lb (Kg)	Controlled Rail Move Quantity and Type of Chain	Unrestricted Rail Move Quantity and Type of Chain	Quantity And Type of Chocks	Railway Equipment (North American)						Remarks
							53' Flat	62' Flat	89' Flat	89' Pedestal	Bi-level	Tri- level	
1	TANK, LEOPARD C1, ECC 116101	375 (950)	93 476 (42 400)	8 x VSK 13/10	NIL	4 x METAL TRACKED	1	1	1	--	--	--	NOTE (1)
2	TANK, BRIDGE LAYING, ECC 116401	466 1182	99 296 45040	8 x VSK 13/10	NIL	4 x METAL TRACKED	1	1	1	--	--	--	NOTE (1)
3	ARMOURED RECOVERY, VEHICLE, ECC 116801	299 (757)	89 463 40580	8 x VSK 13/10	NIL	4 x METAL TRACKED	1	1	1	--	--	--	NOTE (1)
4	HOWITZER, MEDIUM, SP, M109, ECC 119202	356 (904)	55 049 24 970	8 x VSK 13/10	NIL	4 x METAL TRACKED	1	1	2	--	--	--	NOTE (1)
5	APC FULL TRCKD AMPH, M113 A1, ECC	193 (488)	24 081 (10 923)	4 x VSK 14/5	4 x VSK 13/10	4 x METAL TRACKED	2	3	4	4	--	--	NOTE (1)

Ser	Vehicle Type	Length in. (Cm)	Weight Max Laden Lb (Kg)	Controlled Rail Move Quantity and Type of Chain	Unrestricted Rail Move Quantity and Type of Chain	Quantity And Type of Chocks	Railway Equipment (North American)						Remarks
							53' Flat	62' Flat	89' Flat	89' Pedestal	Bi-level	Tri-level	
	114130												
6	APC FULL TRCKD AMPH, M113 A1, W/DOZER, ECC 114147	232 (589)	24 800 (11 249)	4 x VSK 14/5	4 x VSK 13/10	4 x METAL TRACKED	2	2	4	4	--	--	BLADE REMOVED
7	CARRIER TRCKD ARTIC PERS (BV 206) ECC 115200	271 (688)	13 978 (6 340)	8 x VSK 10/5	8 x VSK 10/5	4 x METAL TRACKED 4 x METAL WHEELED	2	2	3	--	--	--	TRACKS ARE TOO WIDE FOR PEDESTAL
8	CARRIER FULL TRCKD AMPH, M548/ CARGO, ECC 114133	232 (589)	26 504 (12 022)	4 x VSK 14/5	4 x VSK 13/10	4 x METAL TRACKED	2	2	4	4	--	--	
9	CARRIER, COMD POST, M577 A1 ECC 114129	193 (488)	24 260 (11 004)	4 x VSK 14/5	4 x VSK 13/10	4 x METAL TRACKED	2	3	4	4	--	--	
10	HOWITZER, EQPT LT TOWED, 105 MM, C1, ECC 251102	236 (599)	5 100 (2 313)	4 x VSK 10/5	4 x VSK 10/5	4 x METAL WHEELED	2	2	4	4	--	--	NOTE (2 & 4)

Ser	Vehicle Type	Length in. (Cm)	Weight Max Laden Lb (Kg)	Controlled Rail Move Quantity and Type of Chain	Unrestricted Rail Move Quantity and Type of Chain	Quantity And Type of Chocks	Railway Equipment (North American)						Remarks
							53' Flat	62' Flat	89' Flat	89' Pedestal	Bi-level	Tri- level	
11	PACK HOWITZER, 105 MM, L5A1, ECC 251301	144 (366)	2 880 (1 306)	4 x VSK 10/5	4 x VSK 10/5	4 x METAL WHEELED	3	4	5	5	--	--	NOTE (2 & 4)
12	HOWITZER, EQPT MED TOWED, 155 MM, C1 M114 ECC 252101	255 (647)	12 712 (5 766)	4 x VSK 14/5	4 x VSK 14/5	4 x METAL WHEELED	1	2	3	3	--	--	NOTE (2 & 4)
13	TRUCK CARGO 1.5T LSVW 4x4, ECC 123120	233 (566)	11 575 (5 250)	4 x VSK 10/5	4 x VSK 10/5	8 x METAL WHEELED	3	4	6	6	12	18	
14	TRUCK, CARGO, 2.5T 6x6, M35, WO WINCH ECC 124035 & 124135	280 (709)	22 294 (8 777)	4 x VSK 14/5	4 x VSK 14/5	8 x METAL WHEELED	2	2	3	3	--	--	
15	TRUCK, CARGO, 2.5T 6x6, M36, ECC 124036 & 124136	328 (833)	28 486 (9 292)	4 x VSK 14/5	4 x VSK 14/5	8 x METAL WHEELED	1	1	3	3	--	--	

Ser	Vehicle Type	Length in. (Cm)	Weight Max Laden Lb (Kg)	Controlled Rail Move Quantity and Type of Chain	Unrestricted Rail Move Quantity and Type of Chain	Quantity And Type of Chocks	Railway Equipment (North American)						Remarks
							53' Flat	62' Flat	89' Flat	89' Pedestal	Bi-level	Tri-level	
16	TRUCK, CARGO, DUMP, 5 TON, 6x6 M817, ECC 125412	290 (735)	34 397 (15 602)	4 x VSK 14/5	4 x VSK 14/5	12 x METAL WHEELED	2	2	3	3	--	--	
17	TRAILER, CARGO, ¼ TON, 2 WHL ECC 131101	110 (277)	1 068 (484)	4 x VSK 10/5	4 x VSK 10/5	4 x METAL WHEELED	14	16	12	12	24	36	NOTE (2 & 4)
18	TRAILER, CARGO, ¾ TON, 2 WHL ECC 132101	145 (368)	3 590 (1 628)	4 x VSK 10/5	4 x VSK 10/5	4 x METAL WHEELED	5	6	9	9	18	27	NOTE (2 & 4)
19	TRAILER, CARGO, ¾ TON W/GEN SET 10KW ECC 132107	145 (368)	3 590 (1 628)	4 x VSK 10/5	4 x VSK 10/5	4 x METAL WHEELED	5	6	9	9	18	27	NOTE (2 & 4)
20	TRAILER, CARGO, 1.5T 2WHL, ECC 133101	167 (422)	5 413 (2 455)	4 x VSK 10/5	4 x VSK 10/5	4 x METAL WHEELED	5	5	8	8	16	24	NOTE (2 & 4)

Ser	Vehicle Type	Length in. (Cm)	Weight Max Laden Lb (Kg)	Controlled Rail Move Quantity and Type of Chain	Unrestricted Rail Move Quantity and Type of Chain	Quantity And Type of Chocks	Railway Equipment (North American)						Remarks
							53' Flat	62' Flat	89' Flat	89' Pedestal	Bi-level	Tri-level	
21	TRAILER, TANK, WATER 330 IMP GAL, ECC 133301	165 (417)	5 708 (2 589)	4 x VSK 10/5	4 x VSK 10/5	4 x METAL WHEELED	5	5	8	8	16	--	NOTE (2 & 4)
22	CAR APC WHL 6x6 DIESEL, GRIZZLY, ECC 112301	236 (597)	23 149 (10 500)	4 x VSK 14/5	4 x VSK 14/5	8 x METAL WHEELED	2	2	4	4	--	--	
23	CAR ARMD FIRESW WHL, COUGAR, ECC 112302	235 (597)	23 149 (10 500)	4 x VSK 14/5	4 x VSK 14/5	8 x METAL WHEELED	2	2	4	4	--	--	
24	CAR ARMD REC/MAINT, HUSKY, ECC 112303	266 (674)	23 590 (10 700)	4 x VSK 14/5	4 x VSK 14/5	8 x METAL WHEELED	2	2	4	4	--	--	
25	CRANE, WHEEL MOUNTED 4 X 4, ECC 161213???	395 (1 003)	43 270 (19 601)	4 x VSK 13/10	4 x VSK 13/10	8 x METAL WHEELED	1	1	2	--	--	--	
26	TRACTOR, WHEELED, INDUSTRIAL, 4x2	306 (776)	19 401 (8 800)	6 x VSK 14/5	6 x VSK 14/5	8 x METAL WHEELED	2	2	3	3	--	--	

ECC 162620													
------------	--	--	--	--	--	--	--	--	--	--	--	--	--

Ser	Vehicle Type	Length in. (Cm)	Weight Max Laden Lb (Kg)	Controlled Rail Move Quantity and Type of Chain	Unrestricted Rail Move Quantity and Type of Chain	Quantity And Type of Chocks	Railway Equipment (North American)						Remarks
							53' Flat	62' Flat	89' Flat	89' Pedestal	Bi-level	Tri-level	
27	GRADER, RD, MOTORIZED, 6 X 4 TANDEM, ECC 166245	310 (785)	22 150 (10 047)	6 x VSK 14/5	4 x VSK 13/10 2 x VSK 14/5	8 x METAL WHEELED	1	2	3	--	--	--	
28	TRUCK CARGO 8.5TM HLVW 6x6 ECC 126803	362 (919)	46 440 (21 065)	Need Data	Need Data	Need Data	Need Data	Need Data	Need Data	Need Data	Need Data	Need Data	Need Data
29	CAR ARMD INF SECT WHL 8x8 BISON ECC 112304	256 (648)	28 460 (12 909)	Need Data	Need Data	Need Data	Need Data	Need Data	Need Data	Need Data	Need Data	Need Data	Need Data
30	LAV III COYOTE W/SURV PKG ECC 112307	254 (645)	29 498 (13 380)	Need Data	Need Data	Need Data	Need Data	Need Data	Need Data	Need Data	Need Data	Need Data	Need Data

NOTES

1. CNR/CPR will only move as a controlled move.
2. If secured to prime mover by trailer hitch in normal manner only two chains are required.
3. Dual wheel tandem vehicles require 12 metal chocks.

4. Towed guns and trailers will normally remain hitched to their prime mover for the move, and if this is the case the number of guns or trailers per rail car will be less than that specified in this chart.
5. The NATO stock numbers of chains and chocks are detailed in Annex H.

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ANNEX F - TRAIN LOADING PLAN (EXAMPLE)

TRAIN NO.:2-CA-07-426391-CA
 UNIT (S): CF JSR
 1 PWOR

LOADING PT: KINGSTON
 UNLOADING PT: HARDISTY
 BEGIN LOADING: 1600
 DEP DTG: 081400 JUN 01

Ser	Car Type	Load	CFR	TFMT	Unit	Elm	Remarks
1	B1	U 3 X 1-1/4 Ton Van	28676	1100	1 JSR	MAIN	Req Escort
		1 X 1½ tonLSVW	28028	1140	1 JSR	MAIN	
		2 x 3/4 ton Tlr (W)	27745	1250	1 JSR	MAIN	
		L 2 X 1/4 ton Truck	24295	1725	1 JSR	MAIN	
			24315	1140	1 JSR	MAIN	
			08596	0530	1 JSR	MAIN	
		07714	0400	1 JSR	MAIN		
2	B1	U 3 X 1-1/4 Ton Cg	26894	1180	1 PWOR	ADV	Req Escort
			27621	1780	1 PWOR	ADV	
			27425	1760	1 PWOR	ADV	
		2 X 1/4 Ton Tlr	22916	1780	1 PWOR	ADV	
			22878	1760	1 PWOR	ADV	
		L 2 X 1/4 Ton Truck	08890	1751	1 PWOR	ADV	
			08892	1752	1 PWOR	ADV	
		2 X 3/4 Ton Tlr	12465	1751	1 PWOR	ADV	
	12466	0625	1 PWOR	ADV			
3	P 60'F	1 x Truck Van 1½Ton LSVW	27435	1900	1 JSR	MAIN	
		1 x Tlr ¾ Ton	27716	1910	1 JSR	MAIN	
		1 x Truck 2 ½ Ton MLVW	27430	1520	1 JSR	MAIN	
4	60' P	2 x Truck 2 ½ Ton MLVW	53558	0780	1 PWOR	ADV	
			52557	0810	1 PWOR	ADV	

NOTES

1. BI--Bi-level Car
2. Cg--Cargo.
3. F--Flat Rail Car.
4. MAIN--Main Body.
5. P--Pedestal.
6. TFMT--Task Force Movement Table.
7. (W)--Water.

ANNEX F - APPENDIX 1 - RAIL CAR LOADING SCALES

12	1
24	2
36	3
48	4
60	5
72	6
84	7
96	8
108	9
120	10
132	11
144	12
156	13
168	14
180	15
192	16
204	17
216	18
228	19
240	20
252	21
264	22
276	23
288	24
300	25
312	26
324	27
336	28
348	29
360	30
372	31
384	32
396	33
408	34
420	35
432	36
444	37
456	38
468	39
480	40
492	41
504	42
516	43
528	44
540	45
552	46
564	47
576	48
588	49
600	50
612	51
624	52
636	53

SCALE No 1

INCHES				
109	¼ TON TLR			
139	¼ TON TRUCK			
147	½ TON TRUCK			
224	1½ TON TRUCK			
267	2½ TON TRUCK			
320	5 TON TRUCK			

SCALE No 2

Figure F1-1 Rail Car Loading Scales

NOTES ON USE OF LOADING SCALES

1. As discussed in Chapter 2, Section 2, paragraphs 1 to 5, it is usually the length of vehicles in relation to the length of rail cars, which is the most important factor in load planning. As such, the scales above are concerned with the length factor only. However, for any volume of rail car loading, it is advantageous to prepare templates scales to both length and width of flat rail cars and vehicles.

2. Scale No. 1 above is the Rail Car Loading Scale. It is divided into blocks, each representing 1 foot (12 inches).

3. For conversion to metric, use the multiplication factors:

a. ft to cm-30.48.

b. in to cm-2.54.

4. Scale No. 2 is the Vehicle Loading Scale. Each length of this scale (e.g. 109 inches, 139 inches, 147 inches, etc) represents the length of a particular vehicle type.

5. By superimposing the vehicle lengths of Scale No. 2 onto the rail car length of Scale No. 1, different load configurations can be calculated until the optimum load layout is achieved. It must be remembered, however, that the two scales in this example deal with length only.

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ANNEX G - RAIL MOVEMENT RECONNAISSANCE REPORT

INTRODUCTION

1. The aim of a rail movement reconnaissance (recce) report is to establish the strengths, weaknesses and viability of the facilities being studied. No mode or facility should be looked at in isolation; the supporting infrastructure, reception and distribution (onward movement) means are equally important. Ideally each recce should be conducted with a mode expert available.
2. The outline format for a recce report is provided below and it needs to be supplemented from the appendix to this Annex, which contains detailed headings for each facility. It is not designed to be followed absolutely rigidly but to provide a useful aide-memoire, which will be reinforced by experience.

OUTLINE RAIL RECONNAISSANCE REPORT

1. **To:** (Authority requesting report)
2. **From:** (Rank, name and unit of person making report)
3. **Maps:** (In addition to normal maps include specialist maps, e.g. station and shunting yard plan etc)
4. **Publications:** (e.g. Facility handbook, intelligence briefing)
5. **Date Time Group:** (when report was dispatched)
6. **General Information**
 - a. Object of the recce, name, location and general description of site (incl grid reference).
 - b. Dates and times of recce.
 - c. Controlling authority at site, names and telephone numbers.
 - d. Security and defence of the location.
 - e. Summary of main points.
7. **Detailed Information**

See following appendix for applicable headings
8. **Enclosures**

Overlays, plans, sketches, photos etc to be attached to the report.

ANNEX G - APPENDIX 1 - RAIL RECONNAISSANCE REPORT DETAILED HEADINGS**Detailed Information**

1. **Train Unloading Areas.**
 - a. ramp availability (end or side);
 - b. platform length and availability;
 - c. suitable for loading/unloading vehicles, heavy equipment, personnel, stores;
 - d. width of pavement beside track; and
 - e. vehicle access including holding and cross-loading areas.
2. **MHE Availability.** Quantity (eqpt and ops) lift capacity and time per lift.
3. **Cargo Holding Area** (*if ground dumped*). Type and capacity of storage area, dangerous goods restrictions, sea container parks.
4. **Transport Modes Available for Clearance.**
 - a. quantity and capacity of each mode i.e. road/inland water way (IWW), preferably separate entrance and exit roadways;
 - b. height and weight restrictions;
 - c. traffic circuits and routes (including holding and admin areas) and traffic control;
 - d. turnaround time from railhead to first destination (this will help determine the practicality of the mode);
 - e. current and potential utilisation of commercial transport; and
 - f. operating requirements (fuel, maintenance, etc).
5. **Restrictions.** imposed by the effects of climate, weather and the time of day on operations.
6. **Railway Carrying Capacity.**
 - a. availability of locomotives (including shunting) and rolling stock;
 - b. train carrying capacity;
 - c. number and gauge of tracks/sidings/passing loops/turntables;
 - d. number of train loads the station can hold clear of running lines;
 - e. number of freight rail cars that can be handled simultaneously;
 - f. station suitable for handling passengers, vehicles or materiel;
 - g. Sidings/Spurs:
 - (1) capacity (see Note 1);
 - (2) other means available which can be used as sidings;

- (3) level and/or sloping;
 - (4) shunting neck available (see Note 2);
 - (5) width of pavement beside sidings (see Note 3).
- h. limitations on rail movement.
7. **Marshalling Areas:**
- a. required for temporary storage of materiel;
 - b. required for transport; and
 - c. for personnel.
8. **Administrative Facilities:**
- a. fuel, water (drinking and wash-down), power and lighting;
 - b. communication systems;
 - c. accommodation areas including office accommodation for Port Mov Con Det etc;
 - d. station buildings;
 - e. medical facilities; and
 - f. available civil labour (particularly skilled tradesman).

Load Specific Requirements

9. **Vehicles Tracked and Wheeled will require;**
- a. an end loading or side loading dock and ramps;
 - b. hard standing at entrances and exits from the ramps; and
 - c. sufficient manoeuvre space.
10. **Ammunition and Packed POL will require;**
- a. sufficient MHE for cross-loading and working inside rail cars;
 - b. sufficient temporary storage space with hard standing to permit separation of dangerous commodities (Ideally the yard or station should be used for ammunition only or for packed POL only; and
 - c. sufficient room for vehicles to manoeuvre.
11. **Personnel will require;**
- a. Covered platforms/shelter from the elements;
 - b. adequate lighting; and
 - c. drinking water and latrines.

12. **Ambulance Trains.** In addition to the requirements for personnel, in para 10 above, ambulance trains will require; suitable access for cross loading from ambulances; and under the terms of the Geneva Convention, ambulance railheads must be situated as far as possible from other traffic. This may limit the use of the railhead whilst ambulance trains are being operated.

NOTES

1. For every two trains handled at a rail terminal during a 24-hour period, one holding siding, preferably a loop, is required in addition to the running lines (main line with loop on a single line). This figure depends on the rate at which trains are unloaded.
2. The shunting neck is equal in length to the longest siding plus locomotive to allow the yard to be shunted quickly and without hindrance.
3. Roadway beside sidings must be wide enough to enable all sidings to be served simultaneously without congestion.
 - a. i.e. for MLVW requires at least 70 ft width between pairs of sidings and 40 ft for single siding.
 - b. for HLWV 10 ton truck -requires at least 120 ft width between pairs of sidings and 60 ft for single siding.

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ANNEX H - TIE-DOWN INSTRUCTIONS AND PRINCIPLES

GENERAL

1. The Railway Association of Canada (RAC) in co-operation with DND developed RAC Pamphlet CL-20 "Securement Methods for Military Rail Movements in Canada". Although the Canadian Forces Publication Depot allocates the CF Catalogue number B-LM-158-000/FP-00 to this publication, copies have to be purchased using local purchase funds. It is based on the Association of American Railroads rules governing the loading of military equipment on open top cars. This pamphlet (CL-20) outlines the official method for securing CF Standard Military Pattern (SMP) vehicles to rail cars in Canada, and is issued to the local representatives of Canadian National Railways (CNR) and Canadian Pacific Railways (CPR) as the official procedures for their respective companies. Pamphlet CL-20 is the definitive guide and authority for the securing CF Standard Military Pattern vehicles to rail cars in Canada.
2. To avoid confusion when dealing with railway representatives, quote the RAC Pamphlet CL-20 page number and article as the authority and not this Annex (albeit they should be identical!). For the benefit of Movement Planners, Pamphlet CL-20 is reproduced as Appendix 1 to this Annex by permission of the Railway Association of Canada (RAC). Copies of this Annex should not be downloaded for use at railheads, and Canadian railways will accept only original Pamphlet CL-20s.
3. As Section 1, Figure 2 of the AAR Open Top Loading Rules is frequently quoted, for the sake of convenience, it's essential text is reproduced in Chapter 3, Section 1, paragraphs 1-4 and Figure 3-1.

LADEN VS UNLADEN WEIGHT

4. The critical factor in determining which chain should be used to secure a vehicle is the weight of the vehicle plus the load it is carrying.

CANADIAN AND OTHER RAILWAYS

5. The conditions and railway equipment involved in rail moves elsewhere in the world may differ considerably from those in Canada. For example German rail cars have cushioning systems that Canadian rail cars normally lack. What works in another country does not necessarily work in Canada and vice versa. For this reason, prior to rail movement outside Canada, it is essential to confirm local arrangements, systems and protocols.

RESTRICTED VS UNRESTRICTED MOVEMENT

6. Generally, unrestricted movement only occurs when a small number of rail cars (less than five) are involved. This usually happens only when vehicles are being returned to a depot or workshop for servicing, etc. Unit/formation moves are always restricted and controlled moves.

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RAC PAMPHLET CL-20

Securement Methods for Military Rail Movements

SECUREMENT METHODS
FOR
MILITARY RAIL MOVEMENTS

IN CANADA

(INCLUDING ALL FOREIGN MILITARY ESTABLISHMENTS)

THIRD EDITION
JANUARY 2002



The Railway Association of Canada

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SAFETY IS A PRIME CONCERN TO ALL

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**RULES FOR LOADING
MILITARY EQUIPMENT**

PRODUCED BY

THE RAILWAY ASSOCIATION OF CANADA

IN COOPERATION WITH

THE DEPARTMENT OF NATIONAL DEFENCE

BASED ON

THE ASSOCIATION OF AMERICAN RAILROADS
RULES GOVERNING THE LOADING OF MILITARY
EQUIPMENT ON OPEN TOP CARS.

PREFACE

This is the third edition and supersedes the earlier edition of this pamphlet. It contains some changes and revised AAR Loading Rules (January 1996). 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 the Association of American Railroads Loading Rules or check with 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 authorizes the regulations of the loading on open top cars, shall be complied with by all concerned.

NOTE: a bold black vertical line on the unbound margin identifies revisions and additions.

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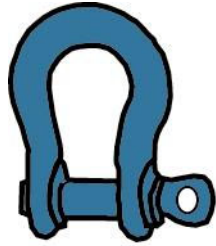
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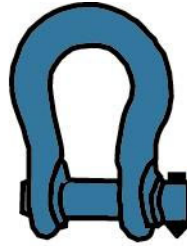
General guidelines for Securement of Military Vehicles on Rail flat Cars

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

- | |
|--|
| <ol style="list-style-type: none">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.3) Clevises/shackles equipped with screw pins must have additional securement to prevent displacement. |
|--|

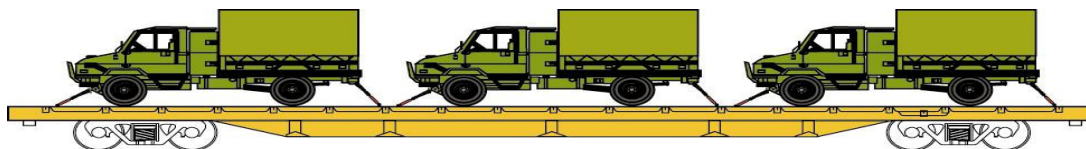
- Make sure that fuel tanks are no more than three-quarters full and jerry cans are empty.
- Remove or band canvas and bows to prevent wind damage. (At the discretion of the military).
- Protect windshields from damages, i.e. thrown rocks. (Optional).
- Reduce vehicles to their lowest configuration (for 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.
- Make certain that hood latches are functional and secure (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.

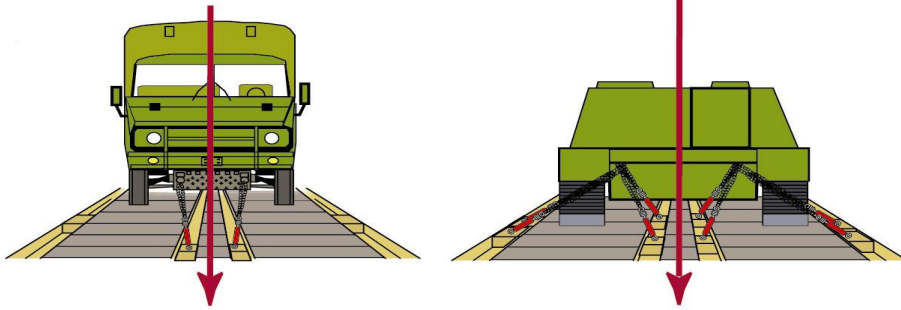
RAC The Railway Association of Canada
PREPARING RAILCARS FOR LOADING

- 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 in order to avoid having them under or behind the vehicles.

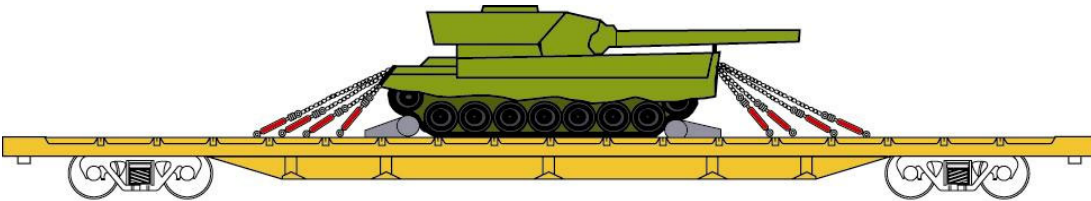
LOADING VEHICLES

- 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). (See General Rules, section 1.)
- 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 as per Section 1.





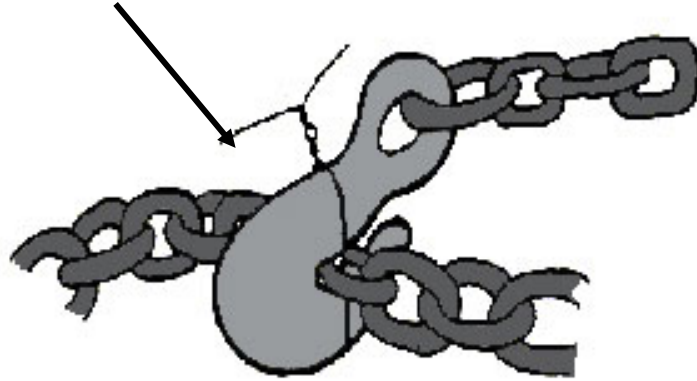
- When loading military tank on a rail equipped car (i.e.: HTTX) or general purpose flat car, only **ONE** tank must be loaded and centrally located on the rail car. No other vehicles can be loaded to use the vacant space at front and rear of the tank.



SECURING VEHICLES

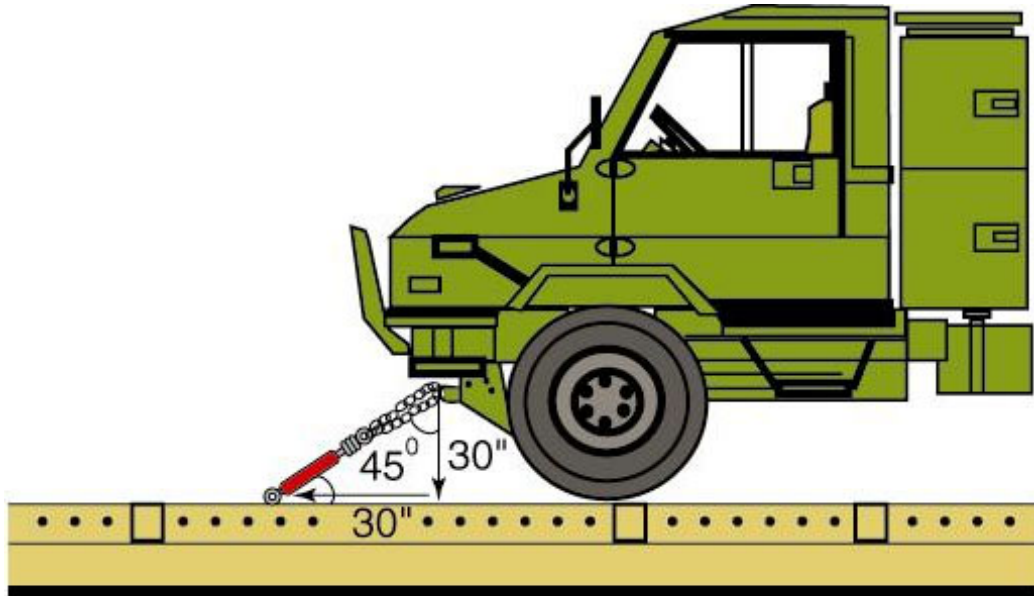
- Ensure all winches are in proper direction so that the chain is taken up on the underside of the ratchet wheel.
- Be sure proper tension of wire rope or chains exists.
- Tension chain to achieve a moderate deflection of the vehicle's suspension.
- After initially tensioning each chain, strike it sharply 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.

WIRE OR TIE WRAP



RAC The Railway Association of Canada
SECURING VEHICLES

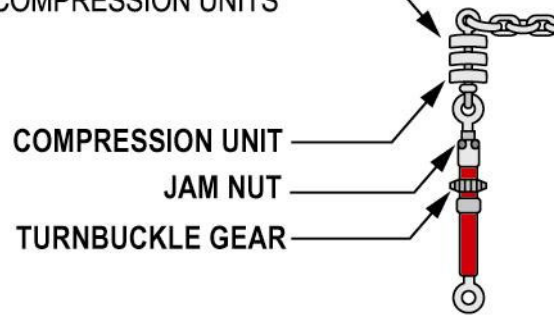
- All winches/ratchets must be located at equal distances from the vehicles, maintaining a 45-degree angle.
- The length of chain should be equal to the distance between the top of the deck and the tie-down point on the vehicles. (See Note).



- 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.

PROPER TENSION IS 1/8" SPACE BETWEEN
METAL PARTS OF COMPRESSION UNITS



- Lock chain-tightening devices with wire.
- Turnbuckles must have jam nuts tightened wrench tight.
- When in doubt concerning number of chains required or any issue of the loading procedures, please refer to sections #1, #3 and #6 of the **AAR OPEN TOP LOADING RULES**.

SECTION #1-	General Rules Governing the Loading of Commodities on Open Top Cars.
SECTION #3-	Rules Governing the Loading of Road Grading, Road Making, and Farm Equipment Machinery on Open Top Cars.
SECTION #6-	Rules Governing the Loading of Department of Defense Material on Open Top Cars.



The most common vehicles transported by rail, are shown in the RAC/DND Military Loading video.

The Rail Flat Cars

The most common vehicles transported by rail, are shown in the RAC/DND Military Loading video.

Tie-Down Configurations for Specially Equipped Rail Flat Cars

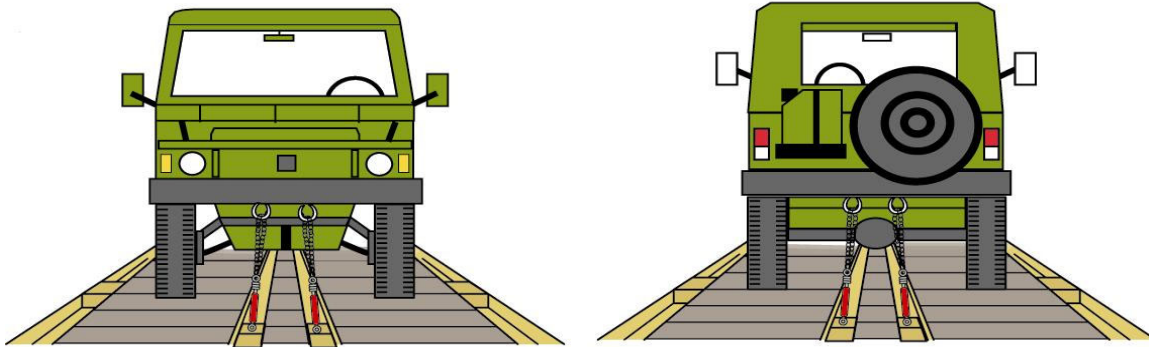
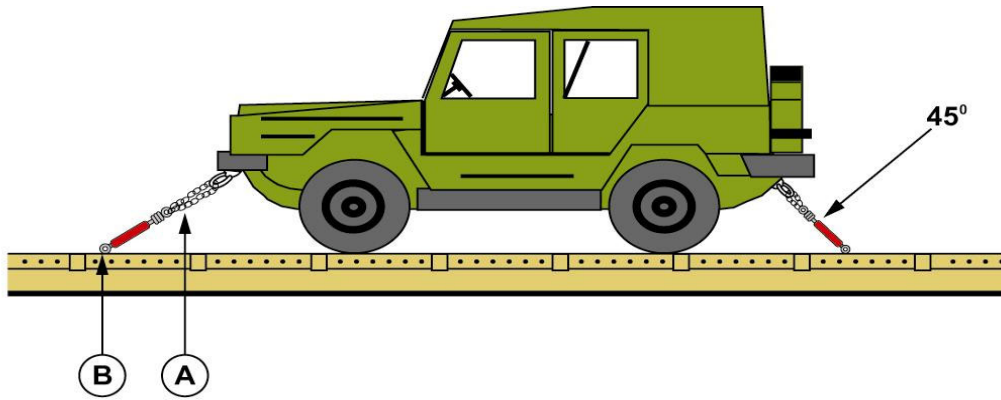
Now that we have covered the previous sections as an introduction to the actual loading, it is time to get on with the job. You will see in this section that it is very easy to load military equipment on open top cars. By following simple rules as set forth in this section, you, the driver, will be able 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 have to 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:

- A) WHEELED VEHICLES**
- B) TRACKED VEHICLES**
- C) ENGINEERING EQUIPMENT**

RAC  The Railway Association of Canada
WHEELED VEHICLES

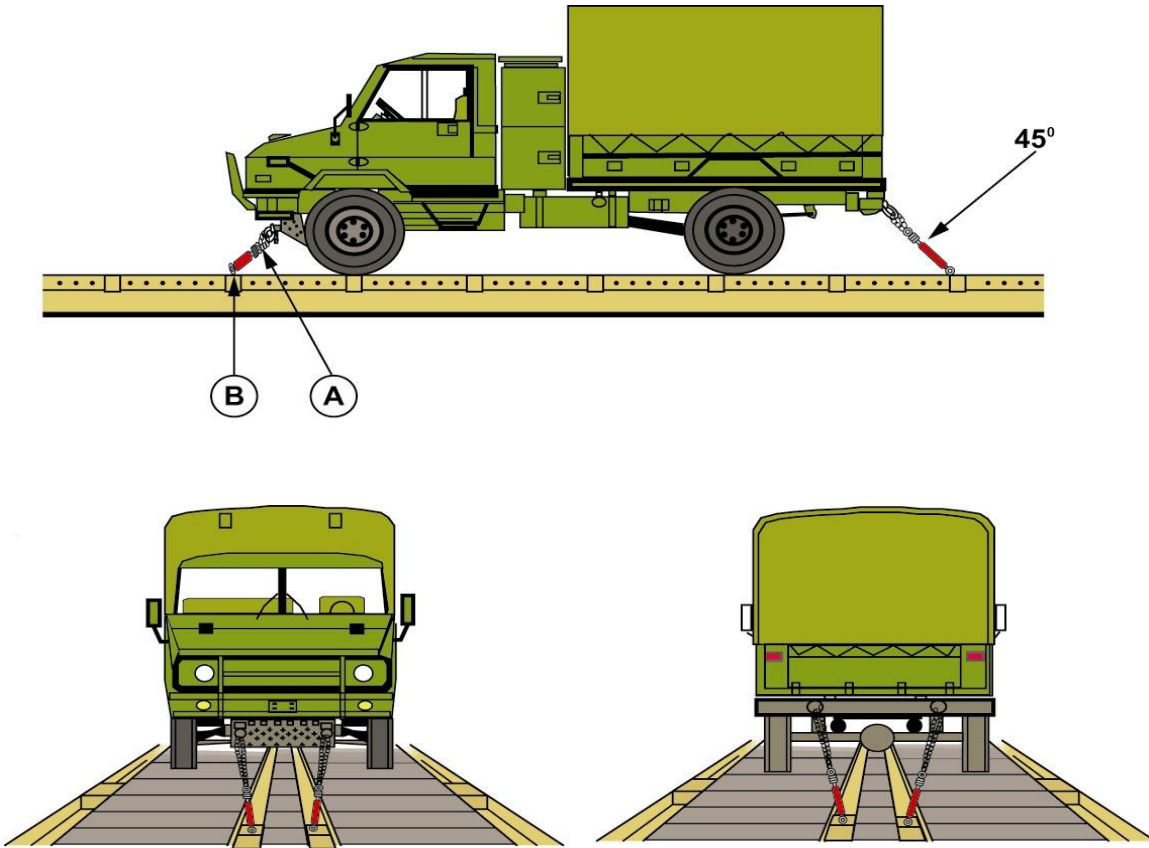
ILTIS 1/4 TON TRUCK UTILITY
 AND
 SIMILAR VEHICLES OF THAT CATEGORY
 RAC 6088B-F
 Rev. 06-1996 (Ref: AAR Fig. 88-B)



Item	No. of Pcs.	Description
A	4	Chains 3/8" (working load limit 9,000 lbs)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT: ILTIS: 4,500 LBS

WHEELED VEHICLES
 LIGHT SUPPORT VEHICLE WHEEL (LSVW)
 RAC 6088B-F
 Rev. 06-1996 (Ref: AAR Fig. 88-B)



Item	No. of Pcs.	Description
A	4	Chains 3/8" (working load limit 9,000 lbs)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

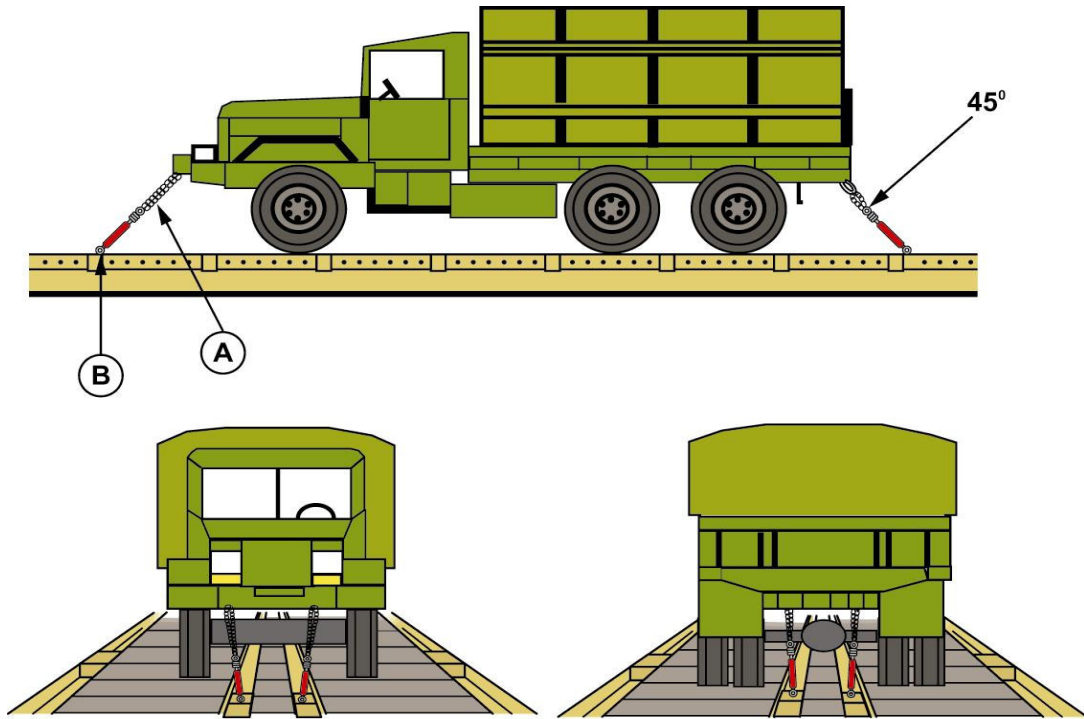
DESCRIPTION AND WEIGHT: All type of LSVW max. weight: 14,400 LBS

WHEELED VEHICLES

MLVW (2 ½ Ton)

RAC 6088B-F

Rev. 06-1996 (Ref: AAR Fig. 88-B)



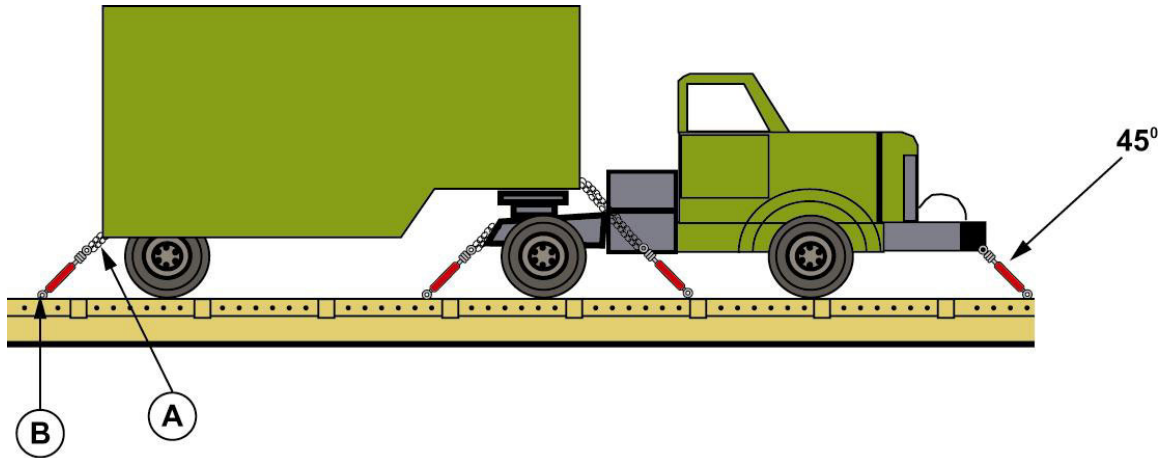
Item	No. of Pcs.	Description
A	4	Chains 1/2" (working load limit 11,250 lbs) or
	8	Chains 3/8" (working load limit 9,000 lbs)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:

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

NOTE: WHEN LOADING EQUIPMENT WITH 4 CHAINS 1/2" BE CAREFUL THAT CHAINS ARE PROOF TESTED TO 22,500 LBS, HAVING WORKING LOAD LIMIT OF 11,250 LBS, OTHERWISE CONSULT THE TRAIN INSPECTOR OR YOUR MOVEMENT CONTROL SECTION.

WHEELED VEHICLES
 SEMI-TRAILER ATTACHED TO PRIME MOVER
 RAC 6088B-F
 Rev. 06-1996 (Ref: AAR Fig. 88-B)

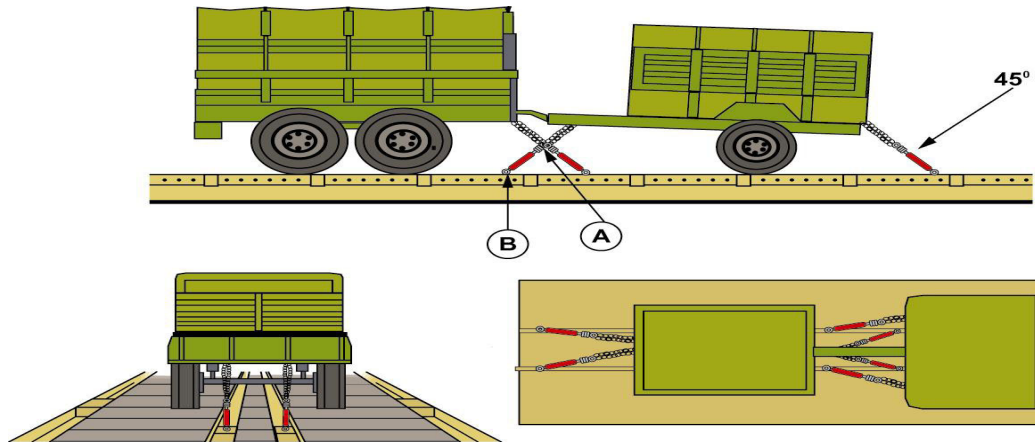


Item	No. of Pcs.	Description
A	8	Chains 1/2" (working load limit 13,750 lbs) or
	16	Chains 3/8" (working load limit 9,000 lbs)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:	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' LONG WITH RACK)	38,000 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-F
 Rev. 06-1996 (Ref: AAR Fig. 88-B)

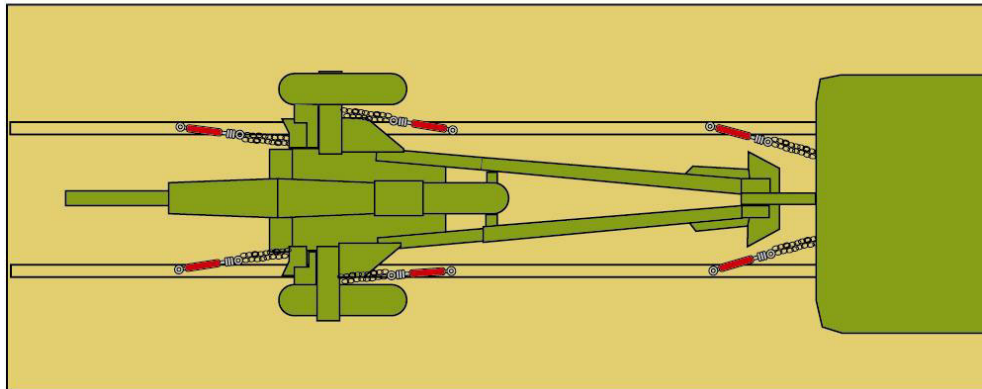
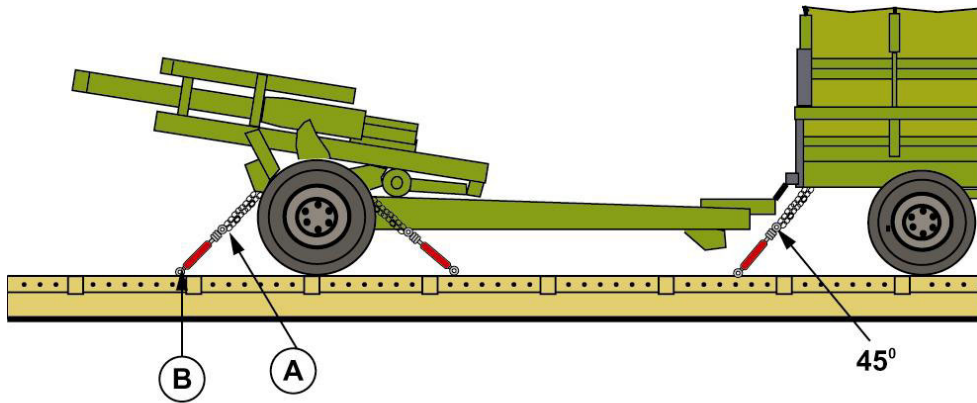


Item	No. of Pcs.	Description
A	2	1/4 TON TLR: Chains 3/8" (1/4 ton trailer attached to lltis and secured at rear of trailer)
	4	OTHER TLR: Chains 3/8 or 1/2" (whatever is available on the rail car that secures the prime mover.)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

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 TLR	5,700 LBS

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

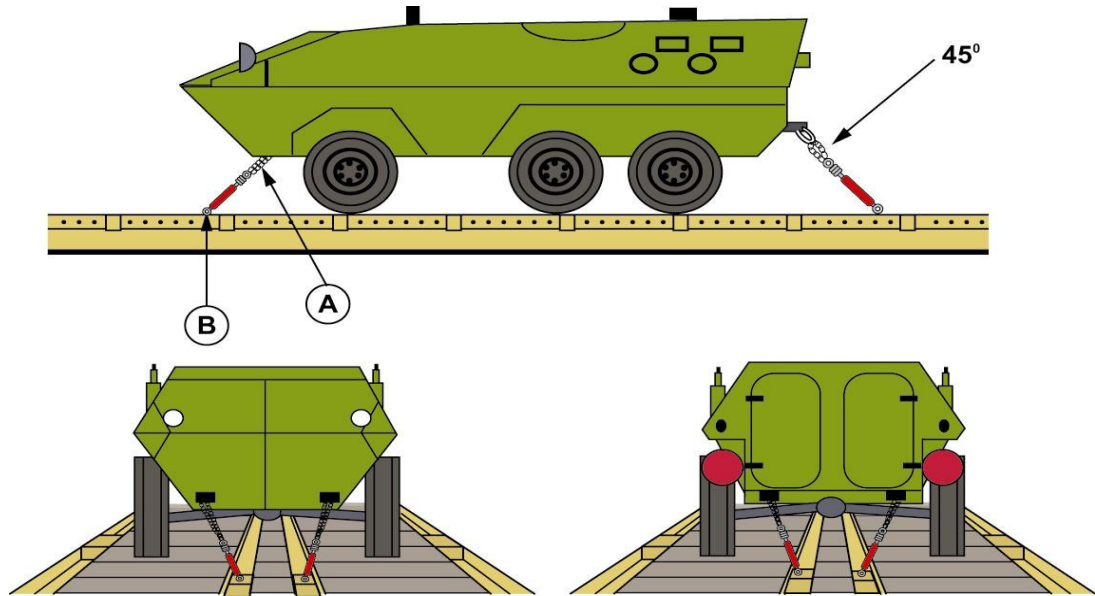
WHEELED VEHICLES
TOWED ARTILLERY GUN
 RAC 6088B-F
 Rev. 06-1996 (Ref: AAR Fig. 88-B)



Item	No. of Pcs.	Description
A	4	Chains 3/8" or 1/2" (whatever is available on the rail car that secures the prime mover)
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
 AVGP FAMILY
 (ARMED VEHICLE GENERAL PURPOSE)
 RAC 6088B-F
 Rev. 06-1996 (Ref: AAR Fig. 88-B)

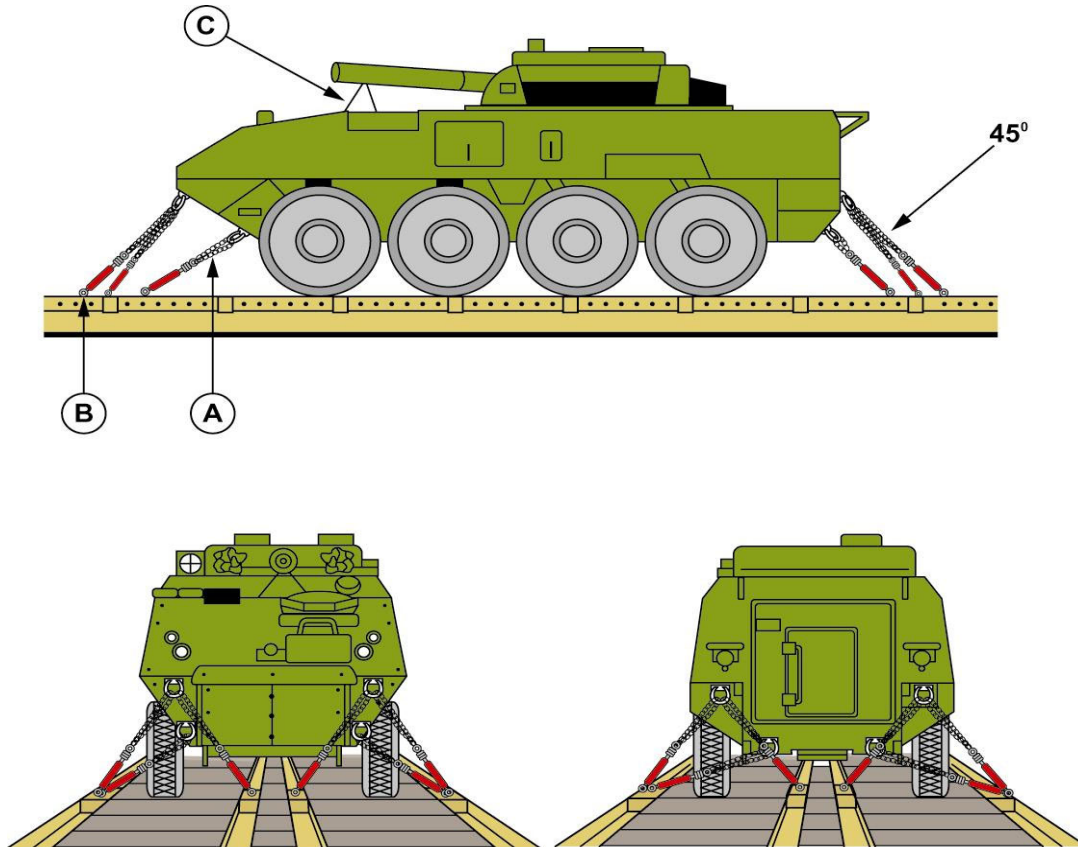


Item	No. of Pcs.	Description
A	4	Chains 1/2" (working load limit 13,750 lbs) or
B	8	Chains 3/8" (working load limit 9,000 lbs)
	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:	COUGAR	22,540 LBS
	GRIZZLY	21,700 LBS
	HUSKY	25,240 LBS
	BISON	24,970 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 42,000 LBS
RAC 6088B-F
 New 06-2000 (Ref: AAR Fig. 88-B)



Item	No. of Pcs.	Description
A	12	1/2" diameter alloy steel chain, extra strength, proof tested to minimum of 7,100 lbs., for vehicles weighing over 31,000 lbs. to 42,000 lbs., inclusive.
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.
C	1	3/8" cable extra strength, proof tested to at least 18,000 lbs., doubled (complete loop), one each side of vehicle.
NOTE: Steel floor add 4 chains 1/2" (no chock block)		

DESCRIPTION AND WEIGHT: LAV

31,000 LBS TO 42,000 LBS

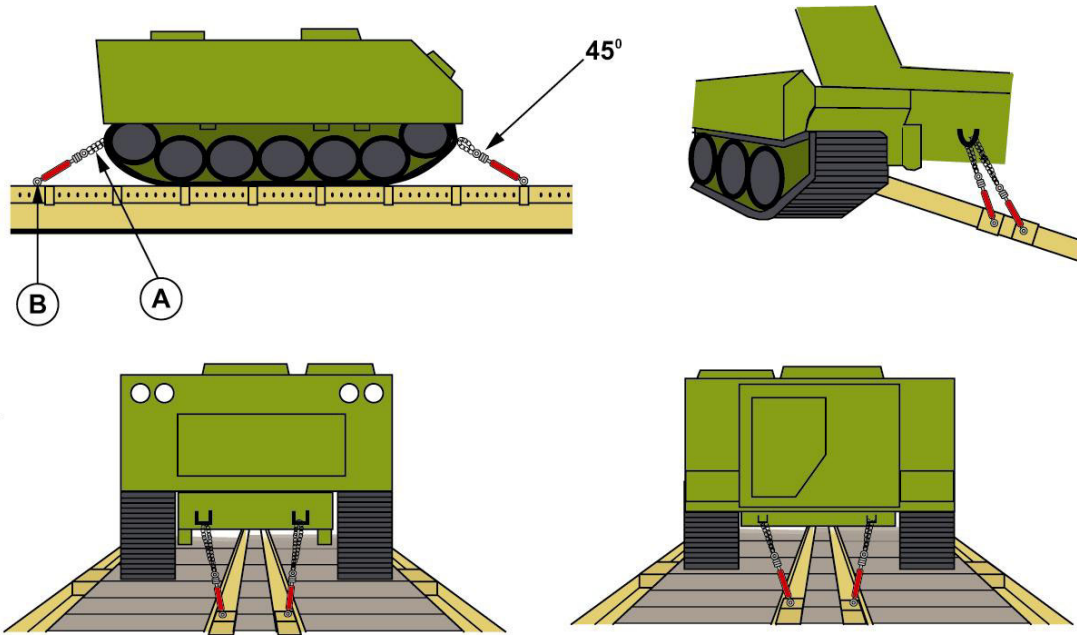


WHEELED VEHICLES
LIGHT ARMORED VEHICLE (LAV)
AND SIMILAR VEHICLES 31,000 TO 42,000 LBS
RAC 6088B-F (concluded)
New 06-2000(Ref: AAR Fig. 88-B)

NOTES:

1. Transmissions shall be in neutral with the lever wired in place. 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 inline across the car. The angle of tie-downs must be as close to 45 degrees as possible.
3. Tie-down chains, Items A, 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. All tie-down chains, Item "A", must be sufficiently tensioned to insure minimal movement.
6. 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" chain extra strength, proof tested to at least 18,000 lbs (WLL 9,000), doubled (complete loop), one each side of vehicle. Protection must be applied at tie-down points when sharp edges are present.
7. Testing must be done with cushioned draft gear as per MIL-STD-810E

TRACKED VEHICLES
 APC (ARMoured PERSONNEL CARRIER)
 M113 FAMILY Including M548 and M577
 RAC 6087B-F
 Rev. 06-1996 (Ref: AAR Fig. 87-B)



Item	No. of Pcs.	Description
A	4	Chains 1/2" (working load limit 11,125 lbs) or
	8	Chains 3/8" (working load limit 9,000 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

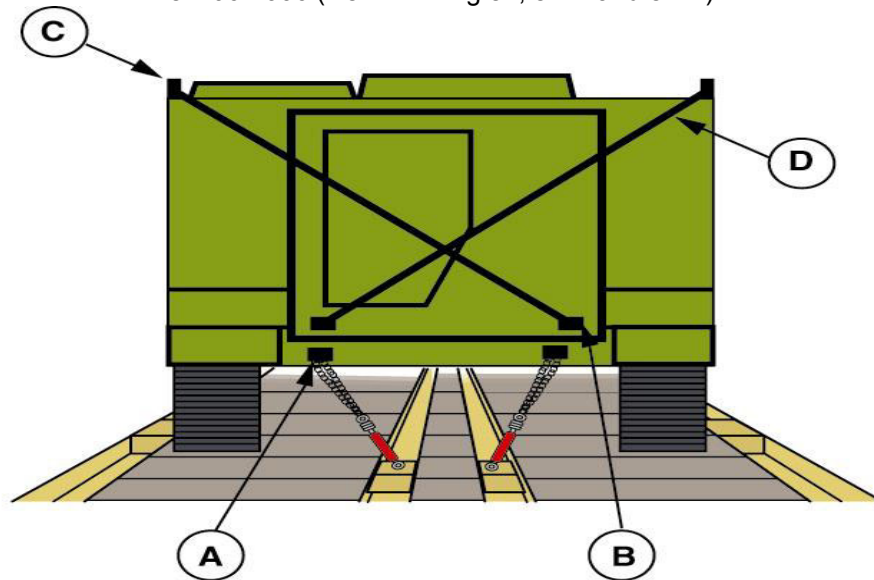
TRACKED VEHICLES

APC (ARMOURED PERSONNEL CARRIER)

M113 FAMILY Including M548 and M577

RAC 6087B-F (concluded)

Rev. 06-1996 (Ref: AAR Fig.87, 87-A and 87-B)

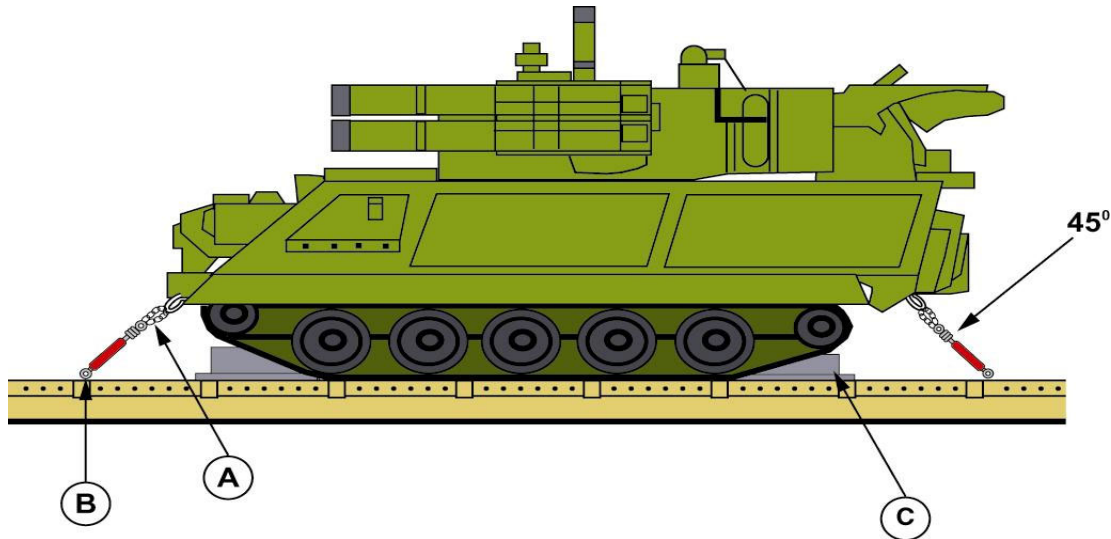


Item	No. of Pcs.	Description
A		Hull-mounted tie-down provisions.
B		Ramp-mounted tie-down provisions.
C		Lifting provisions
D	2	Complete loops 1/2" wire loop each with 4 clamps.

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 that require this procedure for safe transportation.

TRACKED VEHICLES
AIR DEFENCE ANTI-TANK SYSTEM (ADATS)
RAC 6078B-F
 Rev. 06-1996 (Ref: AAR Fig., 78-B)

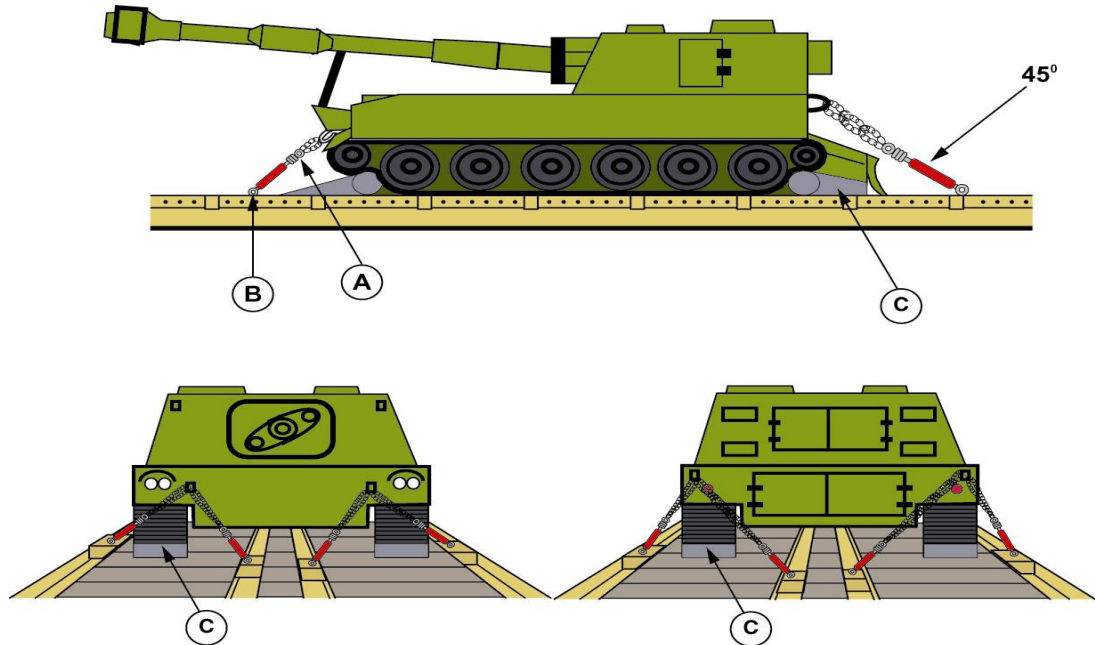


Item	No. of Pcs.	Description
A	4	Chains 1/2" (working load limit 13,750 lbs) or
B	8	Chains 1/2" (working load limit 11,125 lbs)
C	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.
	4	Chock blocks under each track front and back. Metal chock blocks may be used.

DESCRIPTION AND WEIGHT: ADATS 33,178 LBS

NOTE: SHACKLE - USE THE 21-TON (NSN 4030-21-256-2423) CAPACITY BOLT TYPE SHACKLES TO SECURE THE ADATS 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
 M109 (155 MM SELF PROPELLED GUN)
 AND M588 (RECOVERY)
 RAC 6078B-F
 Rev. 06-1996 (Ref: AAR Fig., 78-B)



Item	No. of Pcs.	Description
A	8	Chains 1/2" (working load limit 13,750 lbs) or
	16	Chains 3/8" (working load limit 9,000 lbs)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.
C	4	Chock blocks under each track front and back. 2 pattern #30 at front – 2 pattern #31 at rear. Metal chock blocks may be used.

DESCRIPTION AND WEIGHT: M109 (SP) 43,500 LBS
 M588 (RECOVERY) 32,850 LBS

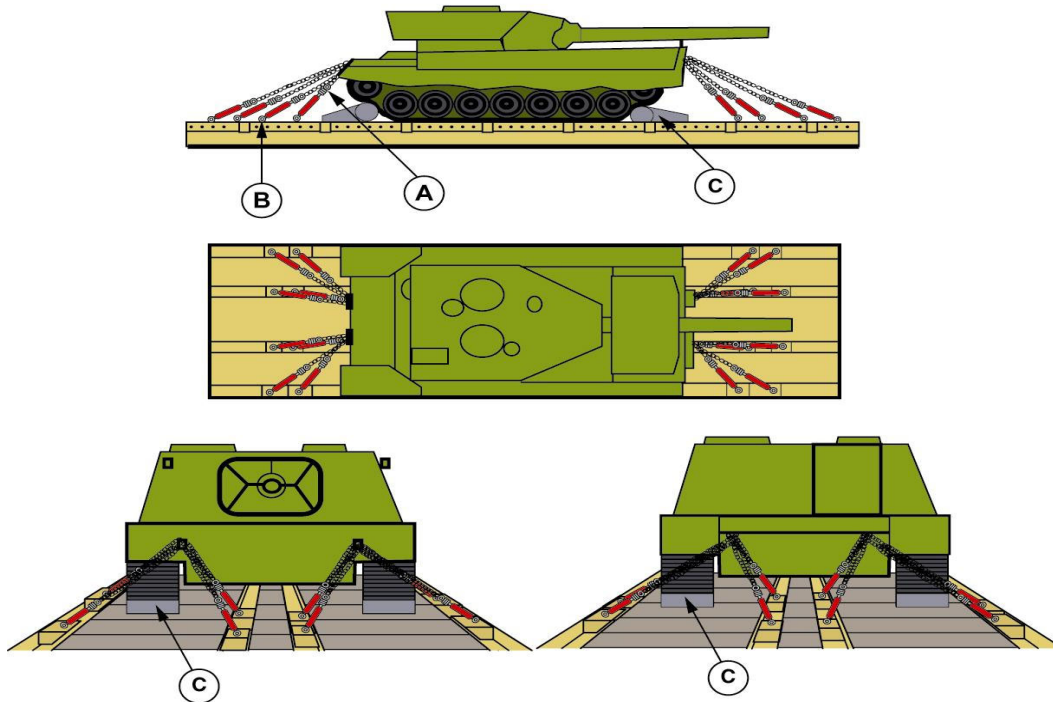
NOTE: TURRET GUN SHOULD BE IN A STRAIGHT FORWARD POSITION (AS AN EXCEPTION) AND TURRET GUN IS LOWERED INTO THE SADDLE BLOCK AND WIRE TIED. ALSO THE TURRET MECHANISM SHOULD BE LOCKED AND SECURED BY A WIRE TO PREVENT MOVEMENT OF GUN AND TURRET.

TRACKED VEHICLES

LEOPARD

RAC 6078B-F

Rev. 06-1996 (Ref: AAR Fig., 78-B)



Item	No. of Pcs.	Description
A	16	Chains 1/2" (working load limit 13,750 lbs)
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 1/2" (no chock block)		

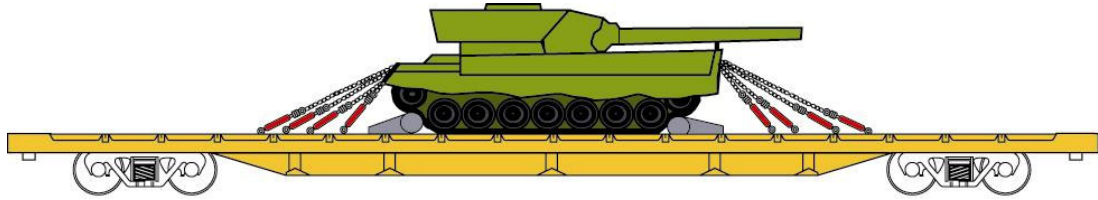
DESCRIPTION AND WEIGHT:	LEOPARD	89,065 LBS
	LEOPARD BRIDGE LAYER	94,054 LBS
	LEOPARD ARVL	92,600 LBS

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-F (concluded)

Rev. 06-1996 (Ref: AAR Fig., 78-B)

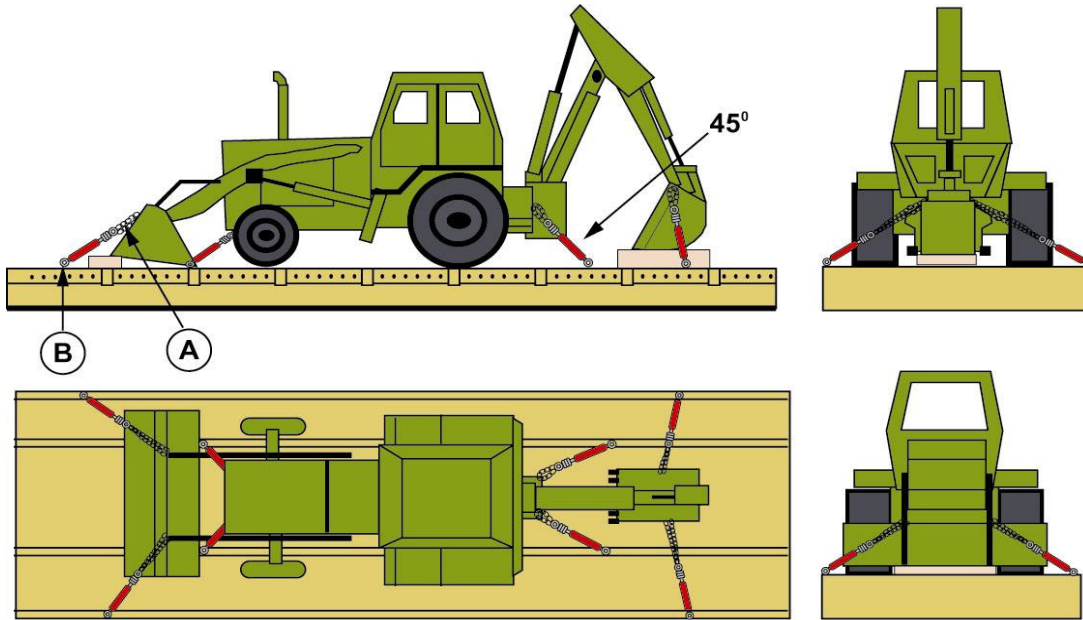


NOTE: When loading military tank on a rail equipped car (i.e.: HTTX) or general purpose flat car, only ONE tank must be loaded and centrally located on the rail car. No other vehicles can be loaded to use the vacant space at front and rear of the tank.

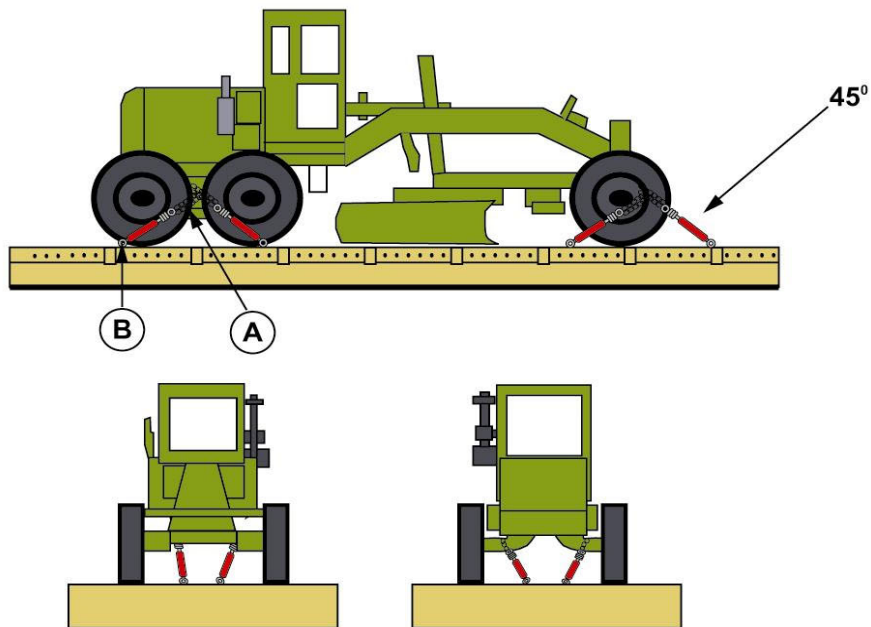


NOTE: To properly secure a tank on a rail flat car, use the 21-ton capacity bolt shackle (NSN 4030-21-256-2423) to secure the tank. No other type of shackles (i.e.: towing hook, as in above graphic) is allowed to secure the tank.

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



GRADERS ROAD UP TO 30,000 lbs.

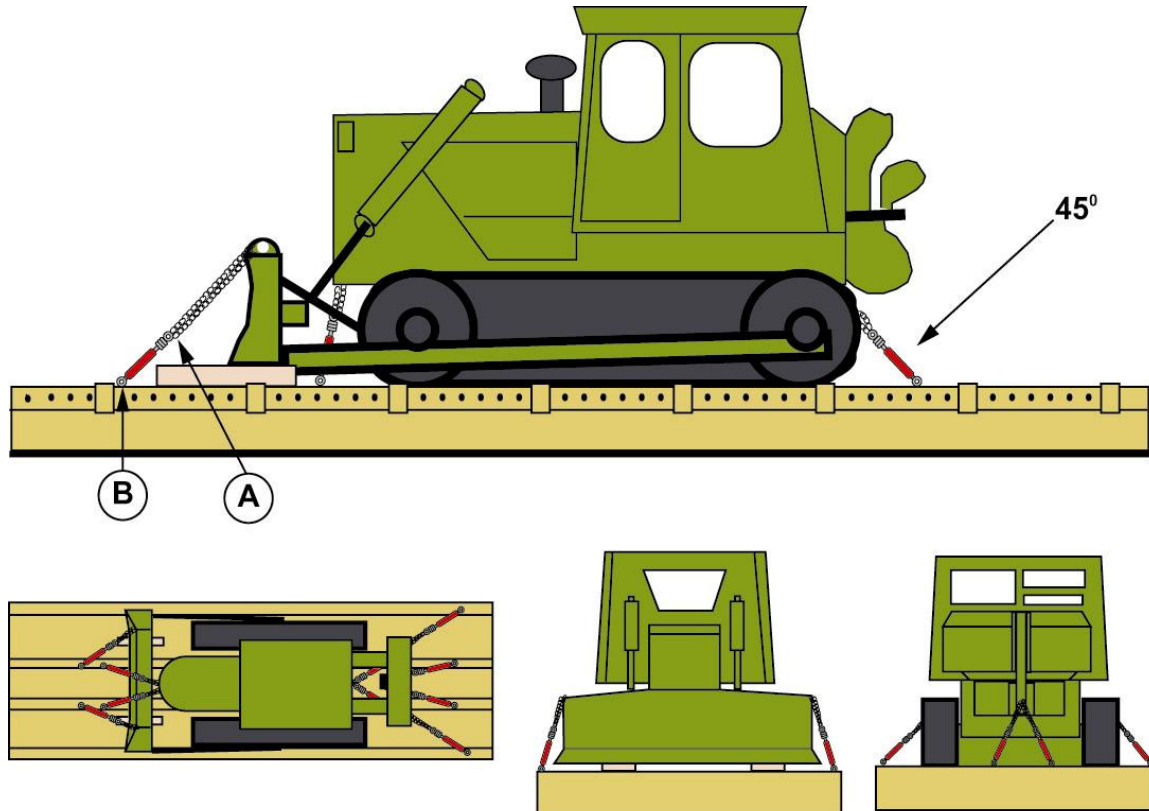


ENGINEERING EQUIPMENT

BULLDOZERS UP TO 59,000 lbs

RAC 6054A-F

Rev. 06-1996 (Ref: AAR Fig., 104, 105, 110, and 54-A)



NOTE A): 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.

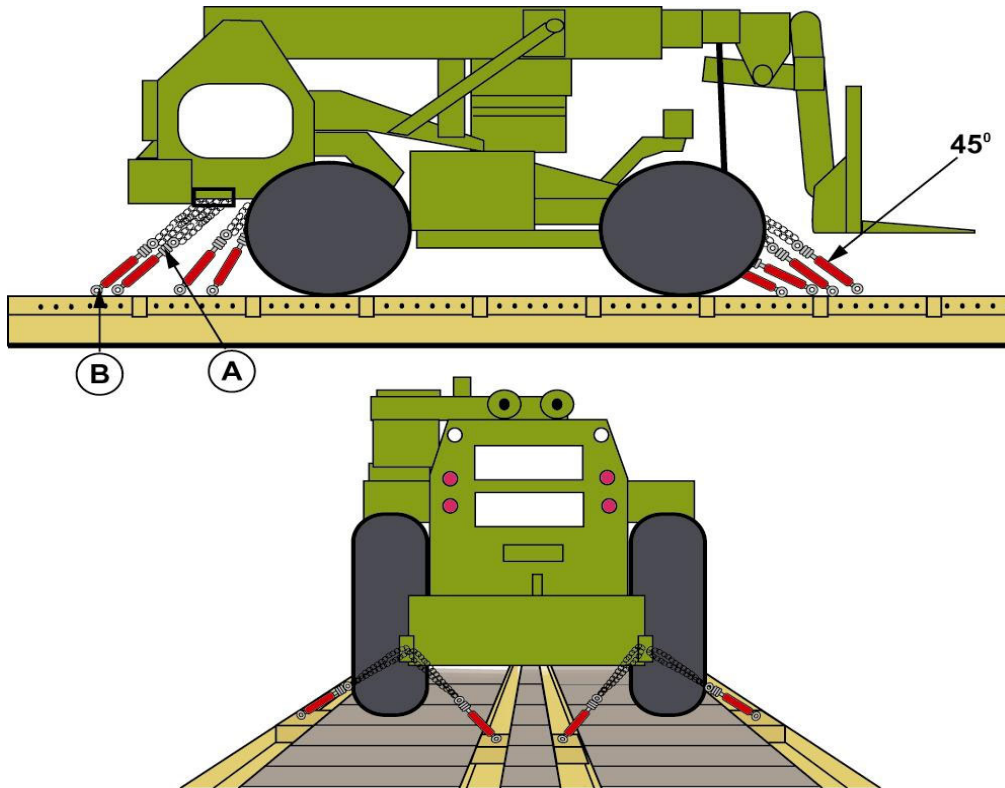
NOTE B): 4" X 8" X 30" LUMBER, PLACED UNDER BLADE LENGTHWISE. DRILL AND TOENAIL EACH BLOCK TO CAR FLOOR. LOWER BLADE. LOCK CYLINDERS IN POSITION. IN WINTER DO NOT LOCK CYLINDERS AS THEY MIGHT FREEZE-UP AND BECOME UNSERVICEABLE

ENGINEERING EQUIPMENT

FORKLIFT VARIABLE REACH 30,000 lbs.

RAC 6054A-F

Rev. 06-1996 (Ref: AAR Fig., 104, 105, 110, and 54-A)



Item	No. of Pcs.	Description
A	8	Chains 1/2" (working load limit 11,250 lbs)
B	1 ea. Item A	Turnbuckles with jam nuts tightened wrench tight.

DESCRIPTION AND WEIGHT:	INDUSTRIAL TRACTOR	16,920 LBS
	DOZER HD 11	36,920 LBS
	FEL (FRONT END LOADER)	27,260 LBS
	RTFL (ROUGH TERRAIN FORKLIFT)	17,030 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.

 **The Railway Association of Canada**
Tie-Down Configurations for Standard Rail Flat Cars

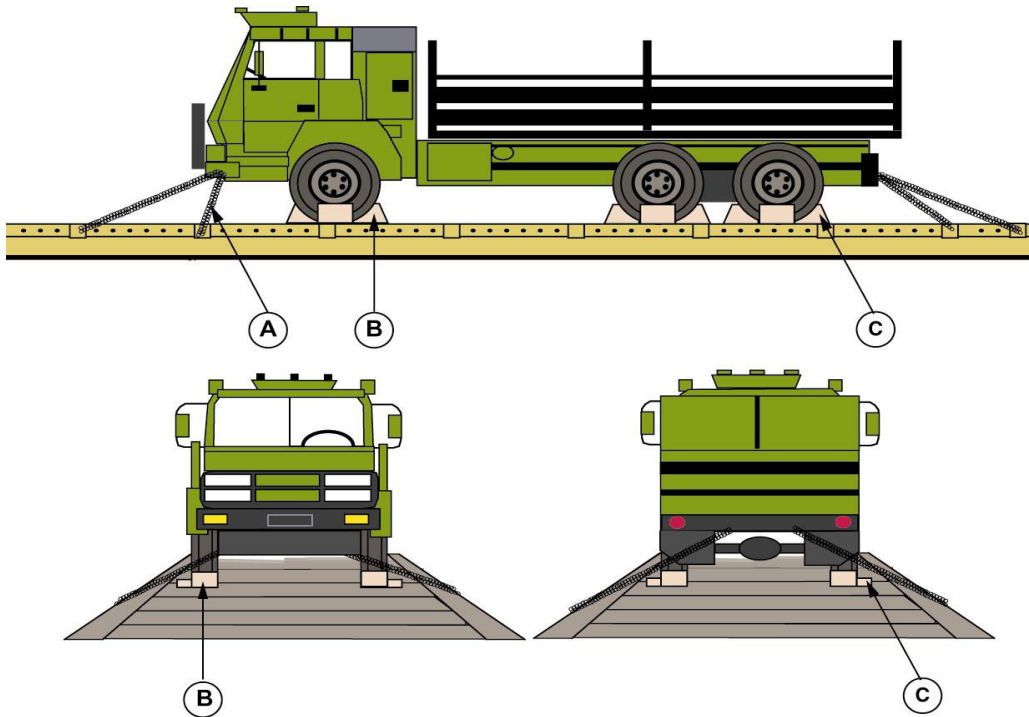
Usually, the Canadian Forces move their equipment on specially equipped rail cars. However, when there is a shortage of rail equipment, standard flat cars have to be used.

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 HLWV (10 Ton Truck), the TLARS (Trackway Launching and Recovery System) and the M109 (Self Propelled Gun) will be used in this presentation as basic information to describe the proper procedures.

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

WHEELED VEHICLES ON STANDARD RAIL FLAT CAR
 HLWV (10 TON TRUCK)
 RAC6088A-F
 Rev. 06-1996 (Ref: AAR Fig., 88-A)



Item	No. of Pcs.	Description
A	4	Chains (13mm - 1/2") (working load limit to 13,750 lbs) or Cables 5/8" (6 x 19 wire rope)
	4	
		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: HLWV 25,000 lbs – 40,000 lbs

NOTE: This figure will cover most of the 4 or 6 wheel trucks (single or dual AXLE)

 **The Railway Association of Canada**
WHEELED VEHICLES ON STANDARD RAIL FLAT CARS

HLVW (10 TON TRUCK)
RAC6088-A (concluded)
Rev. 06-1996 (Ref: AAR Fig., 88-A)

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.

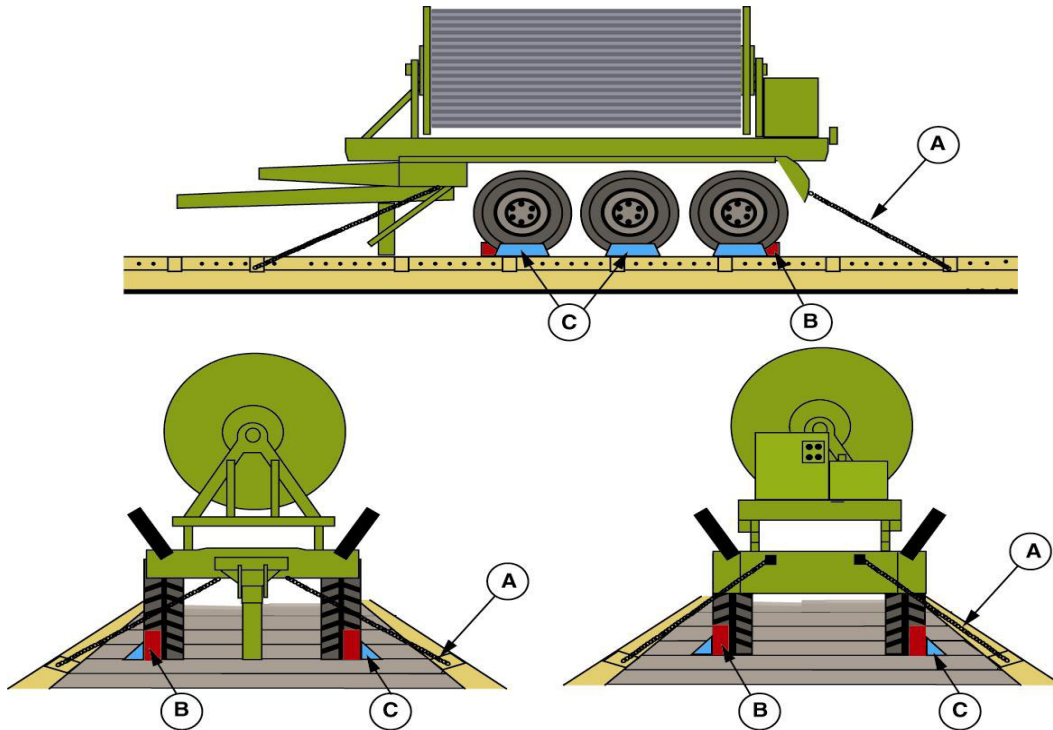
SECUREMENT STEPS

NOTE: WHEN ATTACHING BLOCKING AND BRACING ON STANDARD RAIL FLAT 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 CARS
TRACKWAY LAUNCHING AND RECOVERY SYSTEM (TLARS)
 RAC6012-F

New. 09-1997 (Ref: AAR Fig., 12)



Item	No. of Pcs.	Description
A	4	Chain tie-downs: ½ in. alloy chains with a minimum proof test of 27,500 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, tie the gearshift lever in the neutral position. 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.

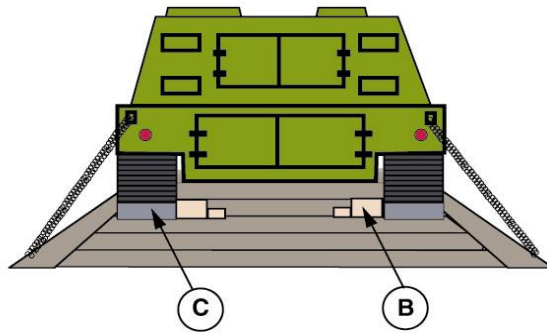
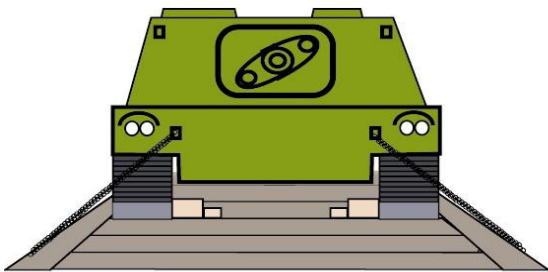
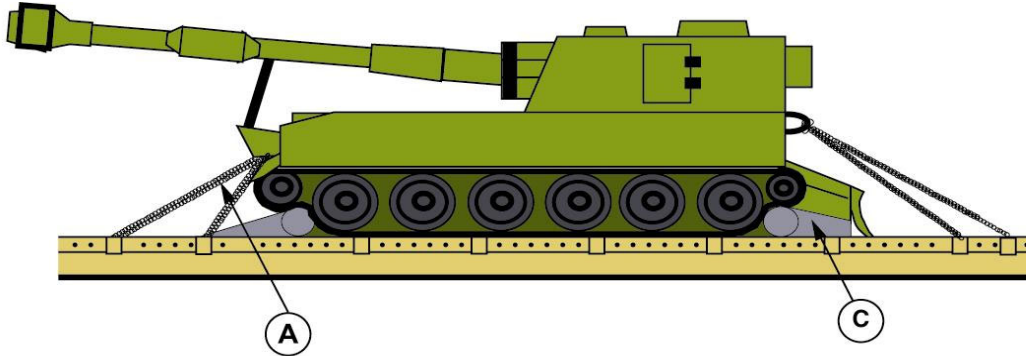
TRACKED VEHICLES ON STANDARD RAIL FLAT CARS

M109 SP

(155 MM SELF PROPELLED GUN)

RAC 6079-F

Rev. 06-1996 (Ref: AAR Fig., 79)



Item	No. of Pcs.	Description
A	8	Chains (13 mm - 1/2") (working load limit to 13,750 lbs) or Wire Rope Cables (6 x 19) 5/8" Doubled (Complete loops)
	8	
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: M109

43,500 lbs



CHAIN REQUIREMENTS

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

3/8-inch chain-	Extra-strength proof-tested to at least 18,000 pounds (WLL 9,000 lbs) for vehicles 8,500 to 16,000 pounds
1/2-inch chain-	Proof-tested to at least 22,500 pounds (WLL 11,250 lbs) for vehicles 16,000 to 25,000 pounds
1/2-inch chain-	Extra-strength proof-tested to at least 27,500 pounds (WLL 13,750 lbs) for vehicles 25,000 to 40,000 pounds

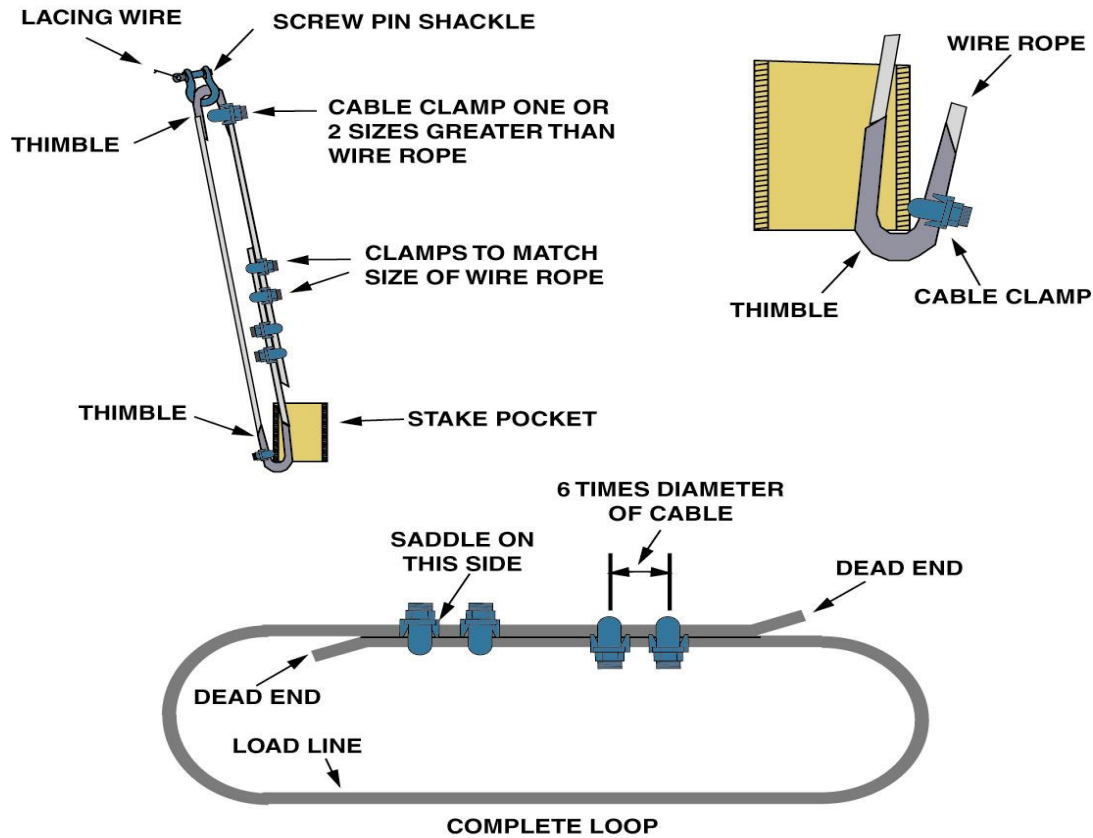
For vehicles not covered above, use the following formula to determine the number of chains required:

$$\text{Number of chains required} = \frac{\text{vehicle weight}}{\text{chain working load limit}} \times 2$$

However, when using this formula in the field, 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.

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. Secure the thimble to the wire rope with a cable clamp one or two sizes larger than the wire rope being used.



NOTE: PAST INTERPRETATION OF THE AAR - WHEN THE CABLE IS APPLIED IN A LOOP AS SHOWN OR USED AS A TIE-DOWN, THE STRENGTH IS DOUBLED.

GENERAL INFORMATION

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.

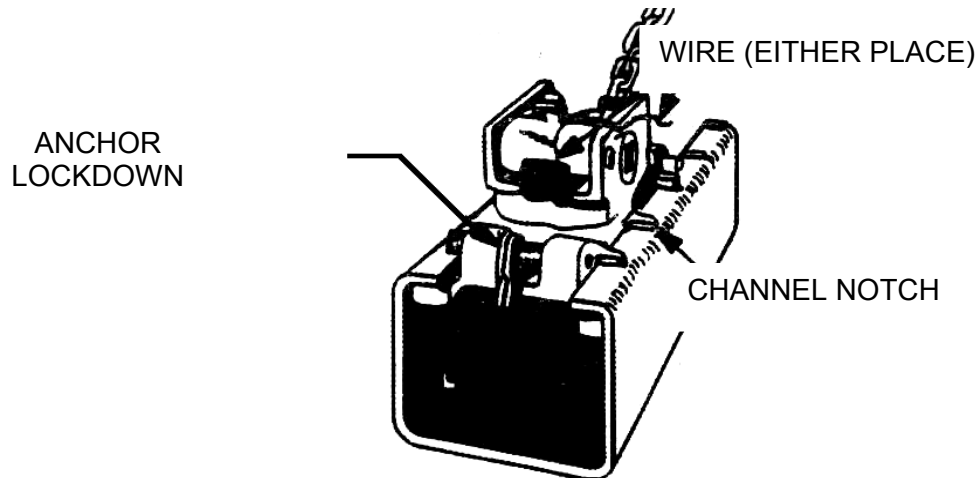
TIE-DOWN EQUIPMENT

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. 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.

CHAIN GOES UNDER THE WINCH (NOT OVER)



BLOCKINGS

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

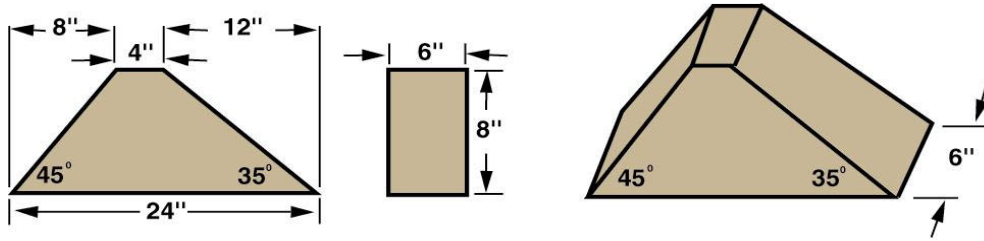
One or two pieces of lumber 2" by 4" on top. Also called bogie wheel blocks, these are used on tracked vehicles to block the road wheels.

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.

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

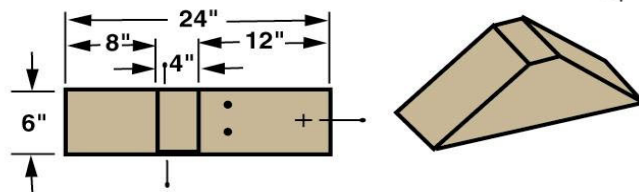
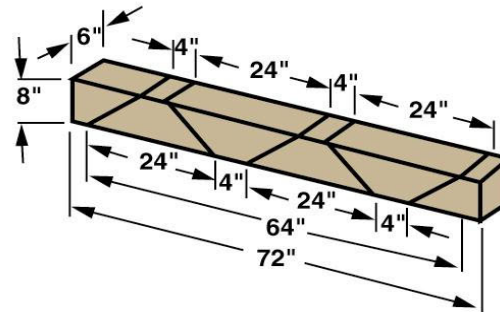
PATTERN 16



NOTE: LOCATE 45 DEGREE 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.

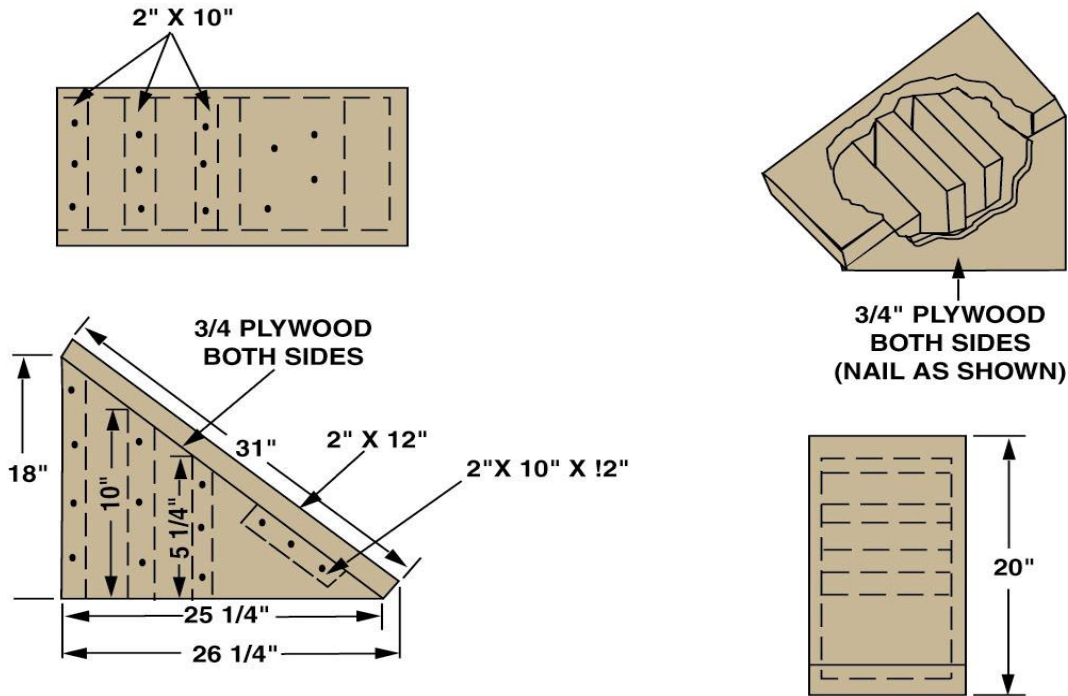
NOTE: AN 8" ALLOWANCE IS PROVIDED FOR WASTAGE



VERTICALLY DRIVEN FOR LATERAL RESISTANCE

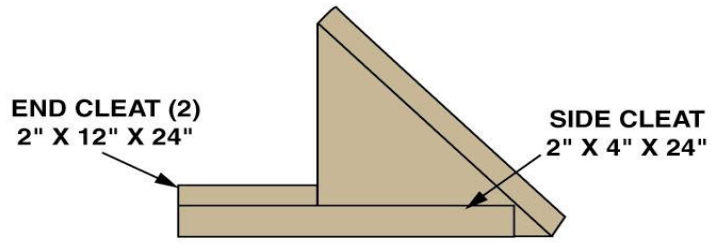


PATTERN 30



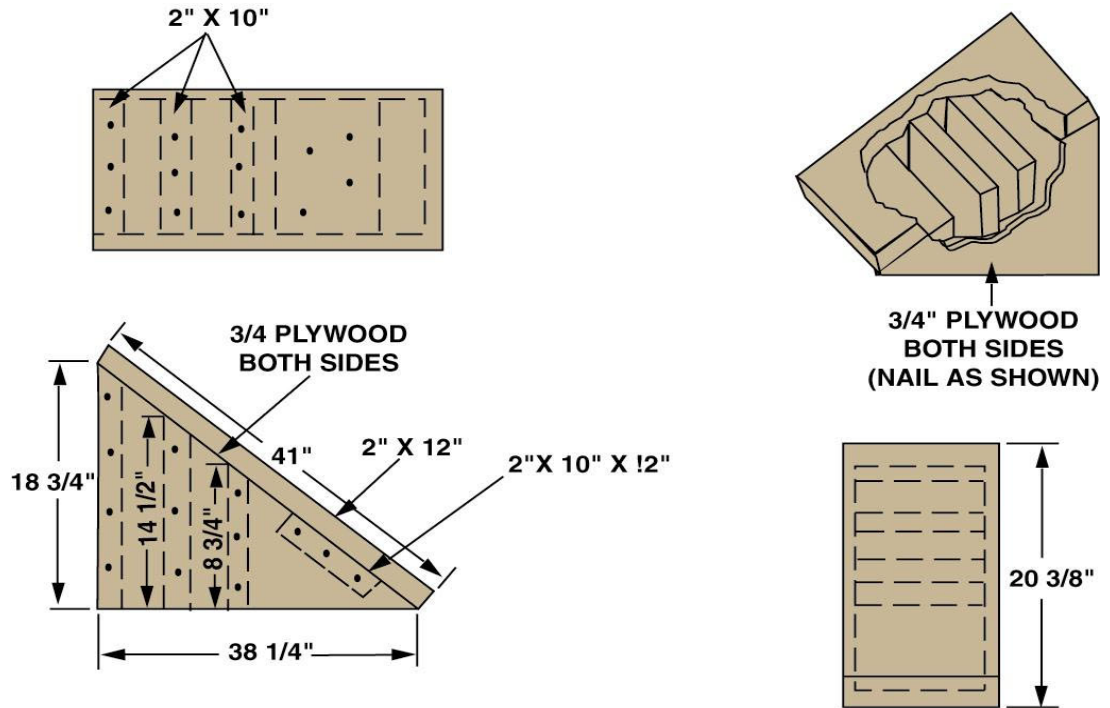
3/4" PLYWOOD
 BOTH SIDES
 (NAIL AS SHOWN)

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)

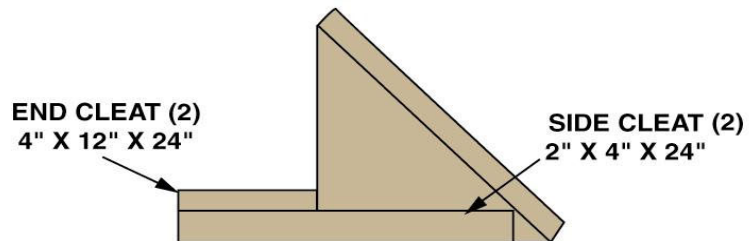


RAC The Railway Association of Canada
GENERAL INFORMATION

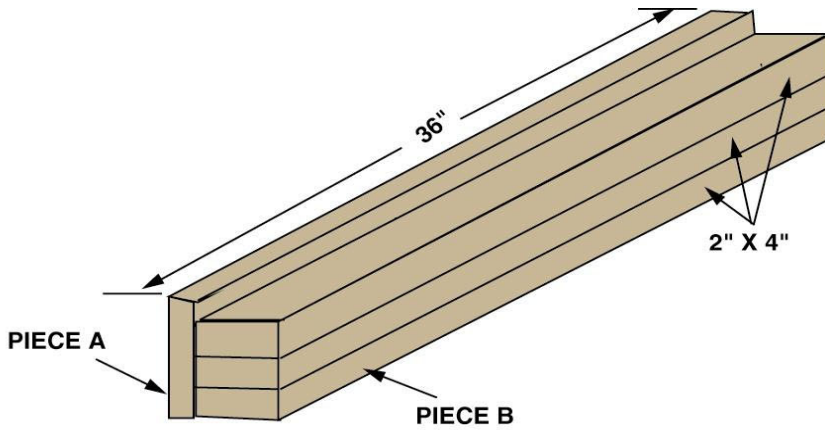
PATTERN 31



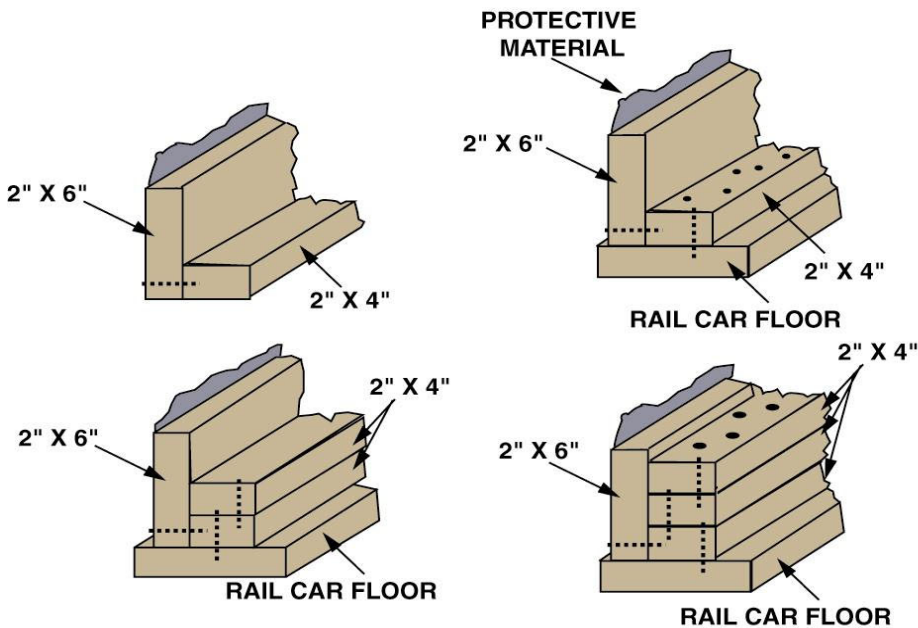
NOTE: AFTER ASSEMBLING THE BLOCK AS SHOWN, LOCATE THE INCLINED FACE OF THE BLOCK AGAINST THE TRACK, EVEN WITH THE INBOARD EDGE, AT THE REAR OF THE VEHICLE. NEXT, CONSTRUCT 2 END CLEATS: EACH CONSISTING OF 2 PIECES OF 2" X 12" X 24" LUMBER. SECURE THE LOWER PIECE TO THE FLOOR WITH FOUR 20-D (4") NAILS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



GENERAL INFORMATION
PATTERN 89



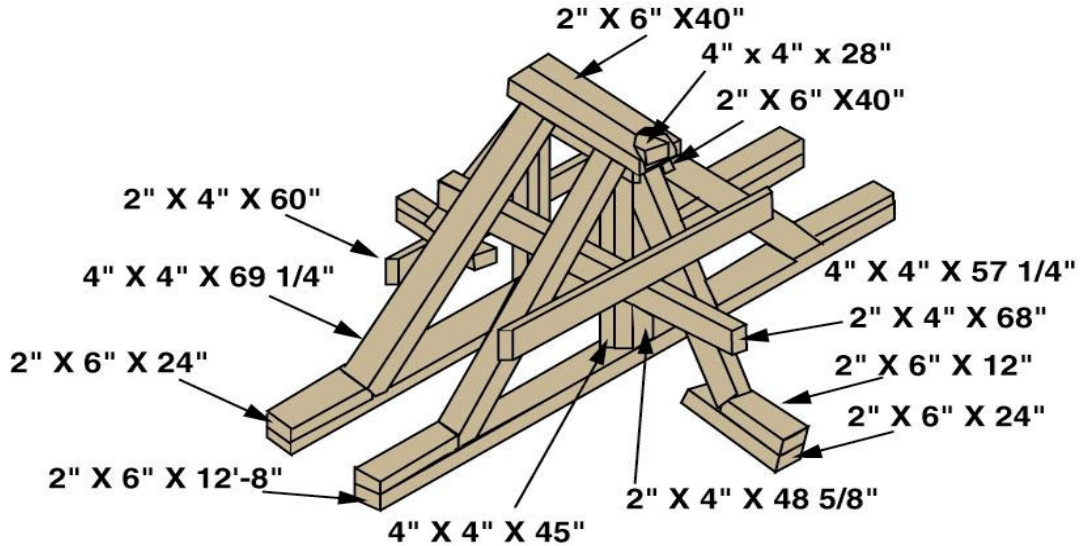
NOTE: NAIL PIECE A TO PIECE B WITH FIVE 12-D (3 1/4") NAILS. NAIL PIECE B TO THE CAR FLOOR WITH FIVE 20-D (4") NAILS. NAIL THE OTHER 2" X 4" PIECES TO THE ONE BELOW IN THE SAME MANNER



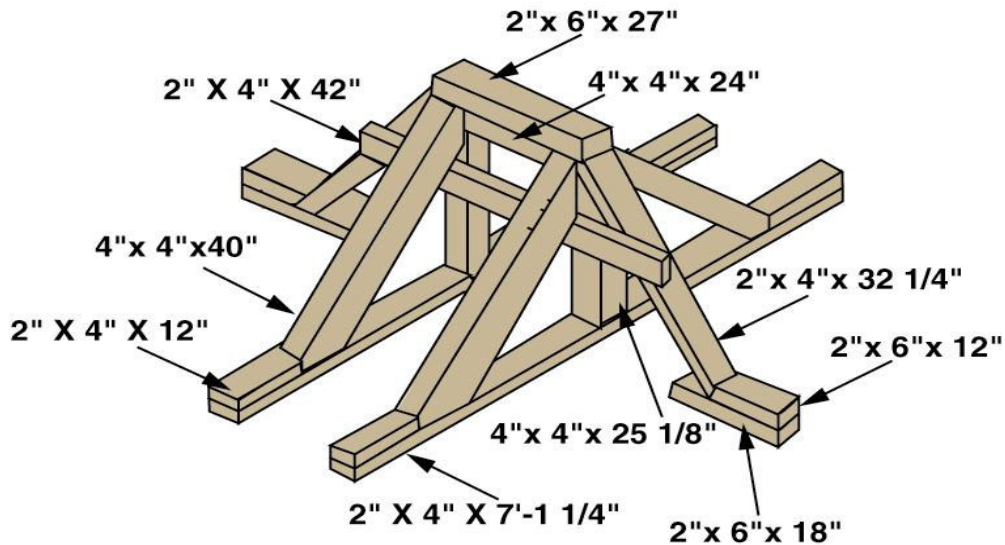
RAC The Railway Association of Canada
GENERAL INFORMATION

PATTERN 90 AND 91

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

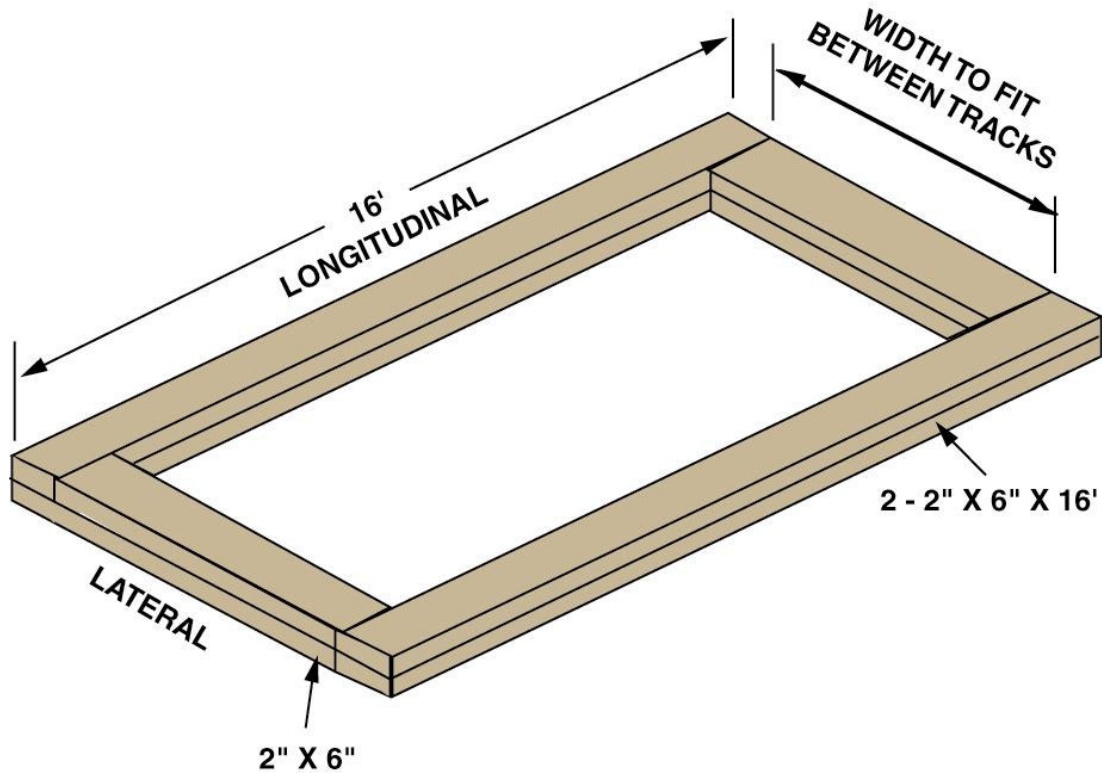


NOTE: PATTERN 91 HEIGHT, USING DRESSED LUMBER DIMENSIONED AS SHOWN, WILL BE ABOUT 28 1/8"



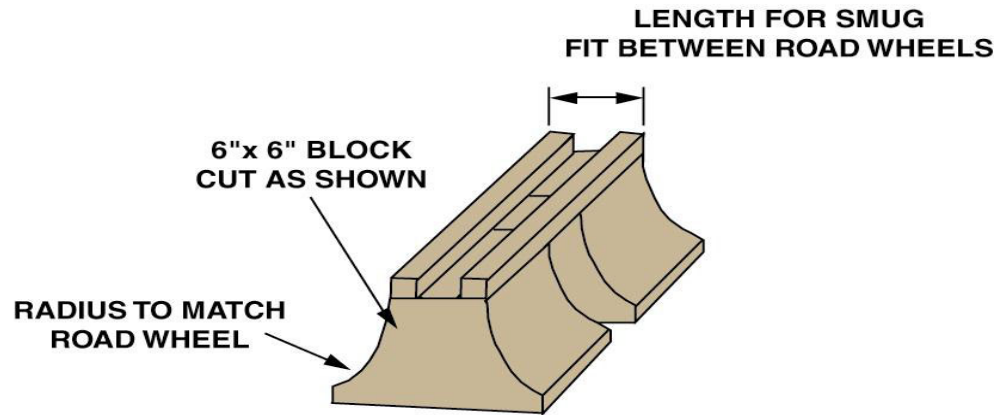
NOTE: LENGTH OF SUPPORT MEMBERS AND OTHER COMPONENTS MAY VARY TO SUIT TRAILER TYPE AND HEIGHT.

LATERAL BLOCKING

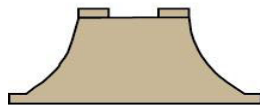


NOTE: FRAMEWORK TO CONSIST OF 4 PIECES OF LUMBER 2" X 6" X 16". LOCATE LOWER PIECES ON CAR FLOOR AGAINST INSIDE EDGE OF EACH CRAWLER THREAD. SECURE TO CAR FLOOR WITH TWELVE 20-D (4") NAILS. SECURE TOP PIECE TO LOWER PIECE IN LIKE MANNER. APPLY NAILS IN STRAGGERED PATTERN. FOUR PIECES OF 2" X 6" LUMBER 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.

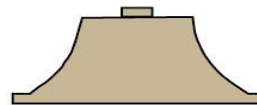
ROAD WHEEL BLOCK



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" X 4" 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 sufficient 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 should 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. If a misunderstanding concerning the AAR Loading Rules occurs, it may be reported to the Managers of Car Loading Rules of The Railway Association of Canada (RAC tel: 613-564-8095) who will provide authoritative interpretation of proper loading practices and regulations.

 **The Railway Association of Canada**
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. However, 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 bended.
- Secure hooks with wire.
- Make sure turnbuckles are wired or locked.
- Wrench 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.

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

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ANNEX I - TRAIN DEPARTURE ADVICE MESSAGE - FORMAT

PRECEDENCE: **PRIORITY**

FROM: MOVEMENT AGENCY AT ORIGIN (1)

TO: MOVEMENT AGENCY AT DESTINATION (1)

INFO: COMMAND HQ CONTROLLING MOVE// G4 TN// NDHQ J4 MOV// NDCC//(5)
PARENT FORMATION/UNIT

SUBJ: TRAIN DEPARTURE ADVICE MESSAGE -(EXERCISE OR OPERATION NAME)

REFS: A. MOV O (AND OR MOV INSTR)
 B. EXERCISE DIRECTIVE

1. MOVEMENT CREDIT (2)
2. DATE/TIME OF TRAIN DEPARTURE
3. DESTINATION AND ETA
4. NAME OF RAIL CARRIER
5. DETAILS OF SHIPMENT (RAIL CAR NUMBERS SHOWING LOAD BY VEHICLE TYPE AND QUANTITY)
6. BILL OF LADING NUMBER
7. SPECIAL INFORMATION (3)

NOTES

1. This will normally be the Rail Mov Con Det; within Canada this Det is usually part of the General Support Battalion Movement Platoon. If the movement is a national responsibility (a DCDS Operation) or out of Canada the Rail Mov Con Det may be provided from 4 CFMCU.
2. Movement credits are explained in Chapter 3, Section 2, subsection 316 paragraphs 1-4.
3. Any additional information to be noted here, such as special handling requirements, name and rank of NCO IC rail escort party. OC Train and TCO.
4. When directed to do so in Mov O.

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ANNEX J - TRAIN ARRIVAL ADVICE MESSAGE - FORMAT

PRECEDENCE: PRIORITY

FROM: MOVEMENT AGENCY AT DESTINATION (1)

TO: MOVEMENT AGENCY AT ORIGIN (1)

INFO: COMMAND HQ CONTROLLING MOVE G4 TN//NDHQ J4 MOV//NDCC
(2)//PARENT FORMATION/UNIT

SUBJ: TRAIN ARRIVAL ADVICE MESSAGE - (EXERCISE OR OPERATION NAME)

REFS: A. MOV O (AND OR MOV INSTR)
 B. EXERCISE DIRECTIVE

1. MOVEMENT CREDIT (3)

2. DATE/TIME OF TRAIN ARRIVAL

3. NAME OF RAIL CARRIER

4. DETAILS OF ANY RAIL CARS THAT FAILED TO ARRIVE WITH TRAIN (CAR NUMBER, REASON FOR DELAY, CURRENT LOCATION, ETA, ETC)

5. ESTIMATED TIME OF UNIT DEPARTURE FROM RAIL TERMINAL

6. REMARKS

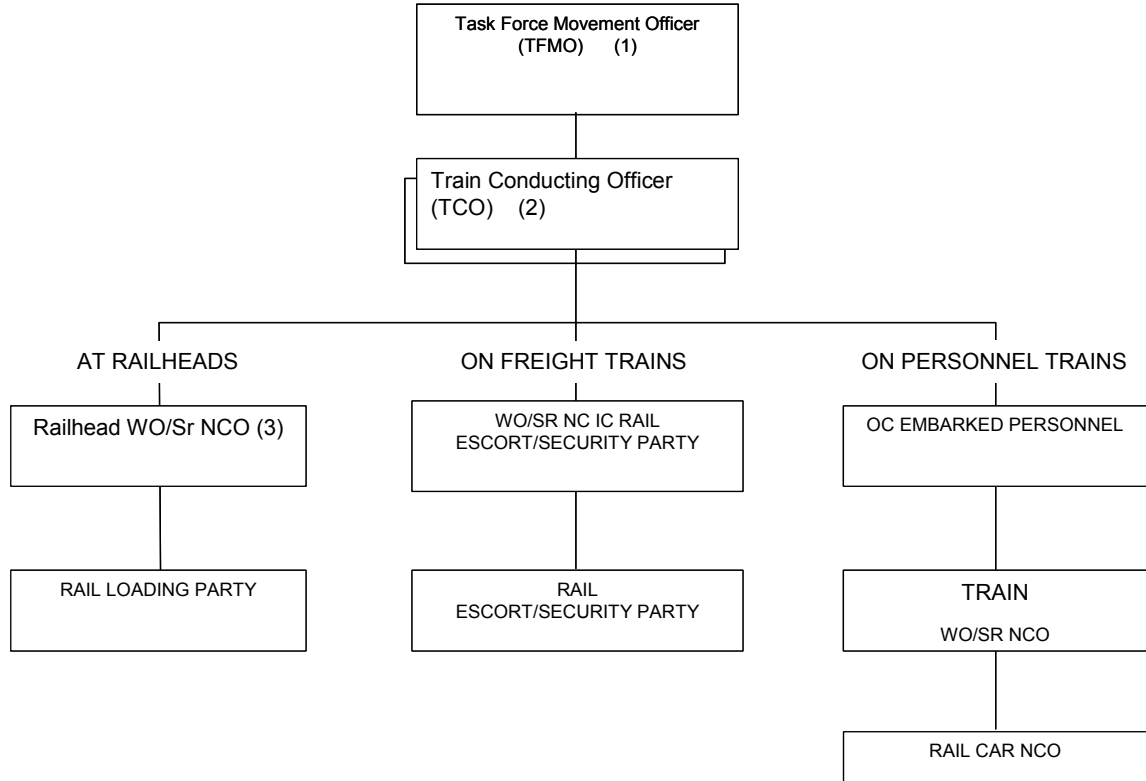
NOTES

1. This will normally be the tasked Rail Mov Con Det.
2. When directed to do so in Mov O.
3. Movement credits are explained in Chapter 3, Section 2, subsection 316 paragraphs 1-4.

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ANNEX K - TYPICAL ORGANIZATIONS FOR RAIL MOVEMENT

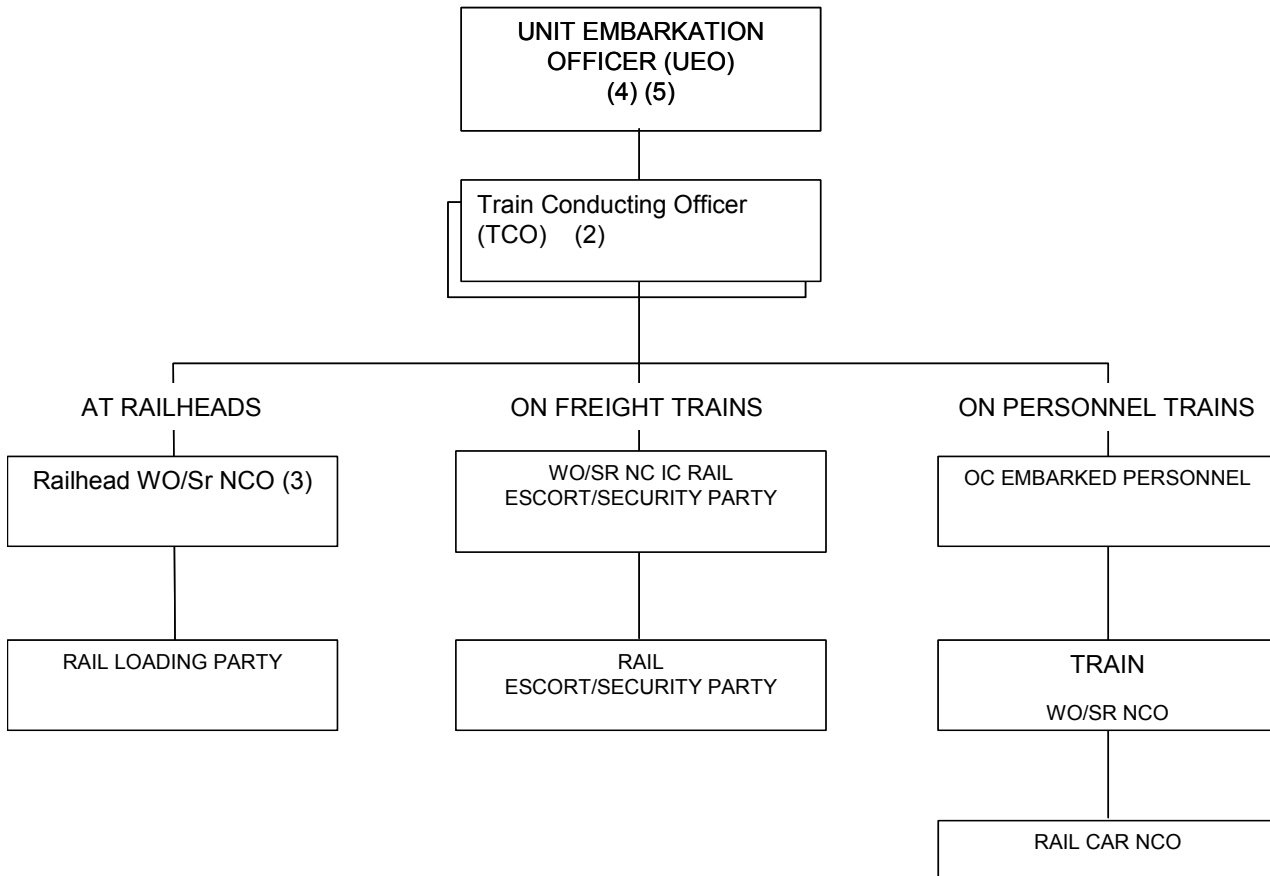
FORMATION/TASK FORCE MOVE



NOTES

1. There is one TFMO appointed for a formation/Task Force who co-ordinates the formation/Task Force movement planning. The TFMO advises the Comd on movement matters and the Comd directs the formation/Task Force Chain of Command to work in support of the movement plan. For example a Battalion CO may have his/her Battalion tasked to operate a particular railhead or provide support to the railhead operation
2. The Train Conducting Officer/s (TCOs) is/are appointed to assist the TFMO. At Formation/Task Force level the TCO/s could be Unit Embarkation Officers (UEOs), or other officers detailed by the CO.
3. The Railhead/Train WO/Sr NCOs and other supporting personnel are appointed by their COs in accordance with the Comds Orders.

INDEPENDENT UNIT MOVES



NOTES

4. The essential duties of the TFMO are at appendix 1, the UEO at appendix 2 and the TCO at appendix 3 to this Annex.
5. There is one UEO appointed, by the CO, for a Unit who co-ordinates the unit's movement planning. The UEO advises the CO on movement matters and the CO directs the unit Chain of Command to work in support of the movement plan. For example a Company Commander may have his/her Company tasked to operate a particular railhead or provide support to the railhead operation.

ANNEX K - APPENDIX 1 - RESPONSIBILITIES OF THE TASK FORCE MOVEMENT OFFICER (TFMO)

1. For CF operations where a Task Force is formed, from more than one unit, a Task Force Movement Officer (TFMO) and a deputy are to be appointed for that Task Force by the Task Force Comd. The TFMO has the following responsibilities:
 - a. co-ordinates the planning and execution of all the movement aspects for the deployment of that Task Force, including preparation of the Task Force Movement Order (Mov O) and conduct of reconnaissance;
 - b. is to be fully conversant with the Task Force Comd's plan and priorities so that he/she is able to make decisions in accordance with those plans and priorities;
 - c. is responsible for the preparation of the Task Force Movement Table (TFMT) using the Joint Establishment and Movement Management System (JEMMS);
 - d. establishes and maintains liaison with the Unit Embarkation Officers (UEOs) of the units in the Task Force;
 - e. is to remain in the deploying theatre until all the Task Force has deployed/redeployed. This will normally require early deployment of the Deputy TFMO (or another designated appointment) to oversee reception;
 - f. is the initial point of contact with Rail Mov Con Det for specialist technical matters pertaining to the Task Force. In particular he/she must work together with the UEOs and Mov Con Det Comd for preparation of rail loading plans and tables;
 - g. is to keep the movement control (Mov Con) organization informed, at all times, on the movement aspects of the deployment;
 - h. must confirm that a deputy has been appointed, and if one has not is to ensure that one is, and establish liaison with him/her. The deputy must be able to act for the TFMO in all capacities, when required, and be prepared to deploy early to oversee reception; and
 - i. must ensure that supporting personnel are tasked, and if able to be present at the railhead, execute the duties of the Train Conducting Officer (TCO) which are at appendix 3. If unable to be present, must ensure that a TCO is appointed and that the TCO is fully aware of his/her duties and responsibilities.
2. Both the TFMO and deputy should be Movement Officers' Course qualified.

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ANNEX K - APPENDIX 2 - RESPONSIBILITIES OF THE UNIT EMBARKATION OFFICER (UEO)

1. The Unit Embarkation Officer (UEO) is an officer or Snr NCO responsible for the planning, training, organising and documenting of his unit for deployment.
2. Every field unit Commanding Officer is to appoint a UEO. Personnel selected for UEO duties need to be qualified on the Unit Embarkation Officer Course (AIES) given at the Canadian Forces School of Administration and Logistics (CFSAL) Trade Training Company.
3. When appointed, the UEO is responsible for the following:
 - a. establish and maintain liaison with the Controlling Headquarters Task Force Movement Officer(TFMO)/Movement Staff (Mov Staff) and/or Rail Movement Control Detachments (Rail Mov Con Det), and respond to their direction on all aspects of the embarkation;
 - b. develop or update Unit Mounting Standing Operating Procedures (SOPs) to cover in detail the warning, deployment and redeployment phases of unit rail movement.
 - c. select and/or train personnel required to man the Unit Embarkation Party and, specifically for rail movement, the Rail Loading Party;
 - d. maintain the Unit Staff Table (UST) in Joint Establishment and Movement Management System (JEMMS) format;
 - e. prepare Movement Request for Dangerous Goods as required; and
 - f. conduct reconnaissance of the following, as required:
 - (1) routes to and from the embarkation railhead,
 - (2) embarkation railhead layout, and
 - (3) embarkation railhead facilities.
4. During the Warning Phase, the UEO is to:
 - a. ensure that Unit Movement Staff Tables (UMST) and Load Lists are accurately prepared and presented when requested, and co-ordinate the preparation of the unit's input to a Task Force Movement Table (TFMT) when appropriate;
 - b. liaise with the Rail Mov Con Det Comd/TFMO assigned to his embarkation railhead to arrange for the joint preparation of Loading Tables;
 - c. submit Movement Requests for Dangerous Goods as required;
 - d. with the TFMO, determine the quantity of loose cargo that should be delivered to the embarkation railhead and held for use as "filler cargo" whenever space is available. Priorities of delivery must be given to all loose cargo so that it may arrive at destination in the desired sequence. This will not always be possible but these priorities will at least indicate to the Rail Mov Con Det the degree of urgency for the shipment of every loose cargo item;
 - e. liaise with the Rail Mov Con Det to outline and co-ordinate requirements at the embarkation railhead;
 - f. confirm arrangements with Rail Mov Con Det for the preparation of personnel/freight/cargo loading plans and "manifests";
 - g. arrange, if practical, for the reconnaissance of the embarkation railhead by all sub-unit commanders of the Unit Rail Loading Party and other support personnel:

- h. plan, with the Mov Con Det and the TFMO, the movement of loads to the embarkation railhead;
 - i. produce the Unit Movement Order (Mov O); and
 - j. brief the unit, before they move to the embarkation railhead, on the following:
 - (1) railhead conduct, rail safety regulations and daily routine;
 - (2) movement discipline;
 - (3) traffic circuits;
 - (4) train timings;
 - (5) embarkation procedure;
 - (6) duties and location of train staff; and
 - (7) security, including provision of guards;
 - k. ensure that appropriate documentation has been completed as required.
5. During the Deployment Phase, the UEO is to:
- a. maintain liaison with the Rail Mov Con Det to ensure that personnel, freight and cargo are presented for embarkation when required;
 - b. arrange for the delivery of filler cargo to the embarkation railhead as required by the Rail Mov Con Det;
 - c. provide personnel to operate vehicles within the embarkation railhead as required/directed and arrange for the positioning of alternate/replacement vehicles;
 - d. ensure that all vehicles and cargo are properly prepared for movement prior to departure from the unit's home location and that all personnel (specifically the Rail Loading Party and the Rail Escort/Security Party) have been briefed on their conduct, duties and responsibilities;
 - e. ensure that the order of movement specified by the TFMO is followed as closely as possible;
 - f. provide the Rail Mov Con Det with a copy of the nominal roll for embarked personnel or the Rail Escort/Security Party;
 - g. ensure that the Train Conducting Officer (TCO)/OC Embarked Personnel, when appointed, or IC Rail Escort/Security Party for each train are provided with copies of the personnel and cargo loading lists (manifests);
 - h. ensure that a high standard of discipline is maintained with respect to:
 - (1) safety perimeters,
 - (2) traffic circuits, and
 - (3) out of bounds areas.
 - i. immediately prior to commencing embarkation, accompany the Rail Mov Con Det Comd and railway officials on an inspection of the rail equipment, including personnel and freight rail cars, (a similar inspection is conducted on the completion of the task at the destination railhead). If the UEO is present he should accompany the destination Rail Mov Con Det Comd on this inspection;

- j. provide overall supervision of the embarkation of his unit(s) or sub-unit(s)(to accomplish this he should not leave until the last train has departed); and
 - k. if required complete a report for the move, (normally the TCO's report is sufficient) on completion of the task;
6. Further responsibilities may be assigned to UEOs in the pertinent Operation/Movement Order, according to specific requirements, for example he/she may be identified to act as the TCO as part of a Formation/Task Force Rail move.

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ANNEX K - APPENDIX 3 - DUTIES OF TRAIN CONDUCTING OFFICERS

1. A Train Conducting Officer/s (TCO) may be appointed in 2 primary roles:
 - a. by the Formation/Task Force Commander to act on site for the Task Force Movement officer (TFMO) as part of a Formation/Task Force rail operation; or
 - b. by a unit's Commanding Officer to assist and be subordinate to the Unit Embarkation Officer (UEO) (see Appendix 2 to Annex K) as part of a unit move.
2. A TCO is only normally required for more complicated movements, or when the TFMO/UEOs other duties prevent his/her attendance on site. If a TCO is not appointed, his duties are executed by the TFMO/UEO.
3. The TCO is responsible for:
 - a. briefing any rail loading party or rail escort/security party that is required for a specific train;
 - b. accompanying the TFMO/UEO on the reconnaissance of the embarkation railhead and access routes;
 - c. assisting the TFMO/UEO in preparing the loading/embarkation plan;
 - d. preparing the berthing plan and berthing cards as directed by the TFMO/UEO;
 - e. inspecting the train prior to the embarkation and after disembarkation;
 - f. supervising the inspection of vehicles and equipment being moved as detailed in Chapter 3, subsection 306 1, paragraphs 1 and 2;
 - g. supervising the embarkation and disembarkation (if travelling on the train) of vehicles, equipment and baggage;
 - h. organizing the messing arrangements for personnel as directed by the TFMO/UEO;
 - i. completing the TCO's report; and
 - j. carrying out any other duties assigned by the TFMO/UEO and perhaps either acting as, or briefing the OC Embarked Personnel.

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ANNEX K - APPENDIX 4 - TRAIN CONDUCTING OFFICER'S REPORT

(FORMAT)

Train No.: _____ Rail Carrier: _____

Operated from _____ to _____
 Point of Origin Final Destination

Unit/Formation Embarked: _____

TCO: _____
 Svc No, Rank, Name

Train placed for loading _____
 Date/Time Group

Remarks

Loading	Commenced: _____	Completed: _____	
Departure	ETD: _____	ATD: _____	
Arrival	ETA: _____	ATA: _____	
Unloading	Commenced: _____	Completed: _____	

Rail equipment released to carrier: _____

**TRAIN CONSIST
(FORMAT)**

CONTENTS	RAIL CAR NUMBERS										TRAIN TOTALS
Personnel											
Freight											
Vehicles											

Remarks:

(Note: This section to include details such as:

- a. noteworthy incidents;
- b. personnel disembarked short of final train destination, and reason;
- c. receipts for warrants issued;
- d. details of meals consumed (bulk not individual) for which payment has not yet been tendered;

- e. any other disbursements by TCO enroute, and
- f. any other detail TCO wishes to include.

Date

TCO

Railway Representative

Train Conducting Officer

Note

1. Form to be completed in four copies and distributed as follows:
 - a. Original (copy 1) -NDHQ J4 Mov
 - b. Copy 2 - Command/Formation HQ Controlling Movement (MCC)
 - c. Copy 3 - Destination Rail Mov Con Det Comd
 - d. Copy 4 – Retained by originating TCO

**ANNEX L - REPORT OF INSPECTION OF TRAIN EQUIPMENT
(FORMAT)**

DATE: _____

UNIT: _____ TRAIN NO.: _____ (Railway)

MOVEMENT CREDIT NUMBER: _____

FROM (location): _____ TO (location): _____
DEPARTURE DTG _____ DESTINATION DTG _____

(List all rail cars and damaged/missing items)

Rail Car Number and Type	Condition Prior to Embarkation	Condition After Disembarkation
	(See Notes below)	

Inspected prior to Embarkation	Inspected upon Disembarkation
Rail Mov Con Det Comd	Rail Mov Con Det Comd
Signature &Date	Signature &Date
Train Conducting Officer	Train Conducting Officer
Signature &Date	Signature &Date
Railway representative	Railway representative
Signature &Date	Signature &Date

Notes

1. The form is prepared in four copies to be distributed as follows:
 - a. Original (Copy 1) - Railway Company,
 - b. Copy 2 -NDHQ J4 Mov (to be passed to DLBM TM 6),
 - c. Copy 3 - Command/Formation Headquarters Controlling Movement (MCC), and
 - d. Copy 4 -Destination Rail Mov Con Det Comd.

2. Notes for inspecting personnel:
 - a. Rail Car floors are free from dirt and in sanitary condition.
 - b. Seats are clean and free from tears.
 - c. No broken windows or doors.
 - d. Ventilators/heaters are functioning correctly.
 - e. Washrooms are in working order and properly supplied with water.
 - f. Toilets are clean and sanitary; flushing apparatus is in working order with sufficient quantity of toilet paper.
 - g. Water tanks are filled (and iced when applicable).
 - h. Lighting fixtures are functioning properly and rail car(s) properly illuminated for night travel.
 - i. Platforms and steps of rail cars are safe and secure.
 - j. Passages used by passengers between rail cars are the vestibule type or at least covered with hand rail.
 - k. Emergency cord is available.
 - l. Fire fighting equipment is available.

ANNEX M - VEHICLE DELIVERY INSPECTION SHEET

CFR	VEHICLE TYPE	DATE SHIPPED	DATE RECEIVED
ORIGINAL CARRIER	DELIVERING CARRIER	RAIL CAR NUMBER	
CARRIER'S PROBILL NUMBER	CONSIGNEE	CONSIGNOR	
DETAIL	1st RECEIVER	2nd RECEIVER	3rd RECEIVER
4th RECEIVER			
1 FRONT BUMPER			
2 SIGNAL LIGHT ASSY (L/R)			
3 HEADLIGHT ASSY (L/R)			
4 GRILLE			
5 WINDSHIELD			
6 WINDSHIELD WIPERS			
7 FENDER (L/R) FRONT			
8 DRIVER'S DOOR			
9 DOOR WINDOWS (L/R)			
10 MIRROR OUTSIDE LEFT			
11 REAR VIEW MIRROR			
12 DASH GAUGES			
13 FENDER, LEFT, REAR			
14 REAR BUMPER			
15 TAIL LIGHT ASSY (L/R)			
16 TAIL GATE			
17 REAR WINDOW			
18 CLEARANCE LIGHTS			
19 FENDER RIGHT, REAR			
20 PASSENGER DOOR			
21 MIRROR OUTSIDE RIGHT			
22 TIRES			
23 STANDARD TOOL KIT			
24 JACK			
25 SPARE TIRE			
26 SEAT BELTS			
27 CAB INTERIOR			
28 HOOD			
29 BATTERY			
30 ENGINE			
31 UNDERCARRIAGE			
32 OTHER/AVGP/TRACKED/ETC			
DAMAGE CODE IDENTIFICATION CHART			
A BENT B BROKEN	C CUT D DENTED	E CRACKED F MISSING	G SMASHED H SCRATCHED
ACCEPTED (1st RECEIVER) DATE	ACCEPTED (2nd RECEIVER) DATE	ACCEPTED (3rd RECEIVER) DATE	ACCEPTED (4th RECEIVER) DATE
MOV CON DET REP SIGNATURE	MOV CON DET REP SIGNATURE	MOV CON DET REP SIGNATURE	MOV CON DET REP SIGNATURE
CARRIER INSP REP SIGNATURE	CARRIER INSP REP SIGNATURE	CARRIER INSP REP SIGNATURE	CARRIER INSP REP SIGNATURE
RECEIVED IN APPARENT GOOD ORDER EXCEPT AS NOTED			

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ANNEX N - TRAIN ORDERS FOR CANADIAN FORCES PERSONNEL

**(BRIEFING - SAFETY, SANITATION AND DISCIPLINE ON RAIL MOVES)
SUGGESTED FORMAT**

1. The Unit Embarkation Officer (UEO), Train Conducting Officers (TCOs), or OC Embarked Personnel (where appointed), are to conduct a briefing for all personnel involved in a rail move prior to commencing operations. As a minimum the following points are to be covered:

ACTIVITY AT THE RAILHEAD

2. The standard of conduct, and attention to safety that is expected of Canadian Forces (CF) personnel at the railhead and on trains;

3. The loading and unloading procedures that are to be followed including the following specific points:

- a. responsibilities and authority of the key personnel including Mov Con Det, Rail carrier employees and other officials,
- b. location of medical treatment facilities within the railhead,
- c. orientation to the railhead and related safety issues, e.g. overhead electric wires are normally shut off during loading and off-loading, but they are live at all other times. Therefore personnel must not climb over vehicles during halts or while the train is moving and they should avoid accidental contact with these wires
- d. clothing and safety equipment to be worn/used,
- e. routes within the railhead, and marshalling areas, and procedures for the safe movement of vehicles,
- f. role and responsibilities of guides,
- g. preparation of vehicles and equipment to be loaded or off-loaded,
- h. security of equipment and loads in vehicles,
- i. securing of loads/vehicles on rail cars and the use of vehicle tie-downs; and
- j. actions in the event of an emergency.

ORDERS FOR EMBARKED PERSONNEL (WHERE APPLICABLE)

1. The following portion of the orders is applicable to embarked personnel and is to be read to personnel before embarkation. Copies are also to be issued to each Rail Car NCO and posted in each rail car when required.

- a. Rail Car No.:_____ Train No.:_____ Rail Car NCO.
- b. OC Embarked Personnel:_____ is located in Rail Car No.
- c. Train WO/ Sr NCO:_____ is located in Rail Car No.
- d. Train MO/NCO:_____ is located in Rail Car No

Sick Parade will be held daily at ___ hrs.

2. All embarked personnel are to adhere to the following orders:

- a. Rail Car NCOs command their rail cars at all times.
- b. Personnel are to maintain military discipline, reflecting credit upon themselves, their unit and the CF at all times.
- c. Messing arrangements, halts, exercise and other daily routine are to be explained by Rail Car NCOs.
- d. Personnel are not to consume alcoholic beverages during the move.
- e. Personnel are not to board or leave trains, which are in motion, are to keep the seat and berth assigned to them and are not to exchange seats or move from rail car to rail car unless authorised to do so.
- f. Personnel are not to extend arms, legs or any other part of the body out of rail car windows or doors except for authorised embarkation/disembarkation. Personnel are not to ride on the top, on the steps, in the vestibule of rail cars, or near open side doors of baggage cars.
- g. Personnel are not to throw anything from rail car windows or doors.
- h. Rail cars are cleaned daily and after each meal and are to be kept clean at all times. Personnel are not to wash dishes or other equipment in drinking fountains or washrooms. Garbage is not to be disposed of in toilets.
- i. Personnel are to keep themselves neat and tidy at all times.
- j. When smoking is authorised, ashes and cigarettes are to be carefully disposed of to maintain cleanliness and avoid fire. Smoking in berths is prohibited.
- k. Toilets are not to be flushed while the train is in a station, or passing through a city or town, and personnel are not to waste water on trains.
- l. The emergency cord is primarily for the use of railway company personnel. Embarked military personnel are only to pull the cord when there is a genuine emergency.
- m. Damage or loss of railway property is to be avoided. Should damage or loss occur, it is to be reported to Rail Car NCOs, who in turn are to report details to Train WO/ Tp Sr NCM/ OC Embarked Personnel for further action.
- n. Berths may be prepared by a "porter", or other nominated personnel, at a designated time each night. Overhead lights are to be extinguished at night.

- o. Upon arrival at the station of disembarkation, personnel are to remain seated until ordered to disembark by Car Rail NCOs.
 - p. Personnel are to direct queries, complaints or problems to their Rail Car NCOs and are not to approach the OC Embarked Personnel or railway company personnel directly, except in an emergency.
 - q. actions on etc.
3. Normal precautions and common sense are the keys to safety. Understanding the local rules and peculiarities and supervision by commanders are also essential. No list of points can be exhaustive enough to cover all possibilities or eventualities, and the final briefing given by the OC Embarked Personnel is based not only on the points listed, but also on local conditions and the experience of those involved in the move. If the rail carrier provides specific safety rules they may take precedence over this appendix if they exceed the CF standard:

DATE: _____

OC Embarked Personnel

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**ANNEX N - APPENDIX 1 - EN ROUTE SAFETY RULES FOR CANADIAN FORCES RAIL
ESCORT/SECURITY PARTIES (ON OPERATIONS ONLY)**

1. The following are general safety rules that are to be followed by CF rail security/escort parties when riding in rail cars. Where the rail carrier provides specific safety rules they may take precedence over this appendix, if they exceed the CF standard:
 - a. Always keep safety uppermost in your mind. If there is any doubt about any operation, ask the railway personnel in charge for guidance.
 - b. Do not get on or off any rail car while it is in motion.
 - c. When getting on or off a stationary rail car, make sure you have a firm grip on the handgrip; have good footing and have a safe place to put your feet.
 - d. Do not climb on any railway equipment to make an inspection without first notifying the railway conductor, or railway person responsible, of your intentions.
 - e. If travelling in a moving rail car, remain within the rail car itself and do not linger unnecessarily on any external platform. Always move carefully within the rail car and have a secure hold.
 - f. Do not stick your head out of the vestibule window. You can safely observe your portion of the train through the window.
 - g. When sitting in the vestibule, do fasten the seat belt when provided.
 - h. If you are equipped with a railway radio, contact the railway conductor or railway personnel before you leave the rail car for any reason.
2. The train conductor, or other duly appointed railway company nominee, has the final authority on any matter regarding the train. All members of a rail party must be thoroughly briefed on these safety rules if accidents and injuries are to be avoided.

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ANNEX O - EQUIPMENT LIST FOR RAIL LOADING PARTIES

1. CF members of rail loading (and unloading) parties require the following clothing items for reasons of safety and efficiency:
 - a. work gloves;
 - b. coveralls (as appropriate);
 - c. hard hats for head protection;
 - d. safety glasses with permanent or detachable side shields;
 - e. safety boots, a minimum 150 mm(6 ins) high, laced, with a defined heel having a minimum depth of 16 mm (5/8 in), dielectric non skid soles and protective shank;
 - f. reflective apparel, either reflective vests or harness/suspenders; and
 - g. flashlight.
2. The following is a list of some of the tools required by a rail loading/unloading party:
 - a. hammer, claw, common;
 - b. club, hammer (maul), 2-3 lb;
 - c. pry bar, 60";
 - d. crow bar (nail puller);
 - e. bolt cutter, 4 ft, 1 pair;
 - f. fencing pliers;
 - g. slave cables;
 - h. tow cables;
 - i. extension cord, 100 ft;
 - j. screw driver, flat slot;
 - k. pipe wrench, 3 ft;
 - l. portable 110 volt power source;
 - m. tape measure, 16 ft;
 - n. fire extinguisher, 10 lb, dry chemical;
 - o. water cans;
 - p. first aid kit;
 - q. chain saw, including extra chains;
 - r. 3/4 inch ratchets; and
 - s. tie wraps or wire.

3. If there are insufficient tie-down chains available the following additional tools may be required:
 - a. sockets deep drive –1/2 ", 15/16 ", 11/16", 9/16", 7/16", 3/4";
 - b. extensions, 6" for 3/4" drive ratchets;
 - c. cable cutters;
 - d. 3/4 ton CM hoist serial 640 "come-along";
 - e. impact wrenches (up to 95 lbs torque);
 - f. sand bags;
 - g. Boston cable clamps for "come-alongs";
 - h. ratchets, 1/2" and 3/4" drive; and
 - i. speed handles 1/2" drive, 18".
4. The following is a list of some of the materials required for a rail loading party:
 - a. reusable, metal, lateral restraints;
 - b. spare clevises to replace missing or damaged vehicle clevises;
 - c. 2" x 6" lumber (for dunnage). If insufficient chocks or lateral restraints are available more lumber will be required;
 - d. wire, 8 gauge, ensure a pliable type is used as steel wire is impossible to work with, (only if administratively loading trailers on pedestal cars);
 - e. 3 ½ " double headed nails, for securing chocks and lateral restraints;
 - f. 3 ¼ " nails (12 d), and
 - g. 4 ¼ " nails (20 d).
5. Planners should note that requirements for moves outside Canada may be different and should check with the appropriate Host Nation (HN) Movement Authority or Rail carrier direct where necessary. In certain circumstances, with an immediate enemy threat to rail loading/unloading parties, it may be acceptable to wear normal combat clothing rather than the safety items listed in paragraph 1. However this is a judgement call that is made by the commander on the ground and is to be based on a full Threat and Risk Assessment.

ANNEX P - TRAIN BERTHING CARD
(FORMAT)

<p style="text-align: center;">CANADIAN FORCES TRAIN BERTHING CARD</p> <p>RAIL CAR NUMBER:</p> <p>COMPARTMENT NUMBER:</p> <p>UPPER BERTH:</p> <p>LOWER BERTH:</p> <p style="text-align: center;">This card to be retained by the CF member after allocation of accommodation.</p>

Figure P-1 Train Berthing Card

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ANNEX Q - CONVERSION FACTORS

1. The following appendices contain the conversion factors indicated:
 - a. Appendix 1 - Table of Weight Equivalents.
 - b. Appendix 2 - Table of Volume Equivalents.
 - c. Appendix 3 - Table of Volume Conversion.
 - d. Appendix 4 - Table of Distance Equivalents.
 - e. Appendix 5 - Table of Surface Equivalents.
 - f. Appendix 6 - Table of Velocity Equivalents.
 - g. Appendix 7 - Table of Speed Conversion.
 - h. Appendix 8 - Tables of Temperature Conversion and Equivalents.
 - i. Appendix 9 - Table of Angular Equivalents

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ANNEX Q - APPENDIX 1 - TABLE OF WEIGHT EQUIVALENTS

Serial	Unit	Long Tons	Metric Tons	Short Tons	Kilograms	Pounds
(a)	(b)	(c)	(d)	(e)	(f)	(g)
1	One long ton	1	1.0160	1.12	1016.05	2240
2	One metric ton	0.9842	1	1.1023	1 000	2204.62
3	One short ton	0.8929	0.9072	1	907.18	2 000
4	One kilogram	-	-	-	1	2.2046
5	One pound	-	-	-	0.4536	1

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ANNEX Q - APPENDIX 2 - TABLE OF VOLUME EQUIVALENTS

Serial	Unit	Imp Gallons	US Gallons	Litres	Cu Inches	Cu Feet	Cu Yards	Cu Metres
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(j)
1	One imperial gallon	1	1.2010	4.546	277.42	0.1605	0.00595	0.00455
2	One US gallon	0.8327	1	3.785	231	0.1337	0.00495	0.00378
3	One litre (cu decimetre)	0.2200	0.2642	1	61.025	0.0352	0.00131	0.001
4	One cubic inch	0.00361	0.00433	0.01639	1	0.00058	-	-
5	One cubic foot	6.229	7.481	28.317	1 728	1	0.03704	0.0283
6	One cubic yard	168.184	201.97	764.56	46 656	27	1	0.7646
7	One cubic metre	219.98	264.18	1 000	61 024	35.3146	1.30794	1

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ANNEX Q - APPENDIX 3 - TABLE OF VOLUME CONVERSION

Imperial Gallons	Litres
(a)	(b)
1	4.546090
2	9.092
3	13.638
4	18.184
5	22.730
6	27.276
7	31.822
8	36.368
9	40.914
10	45.46
20	90.92
30	136.40
40	181.80
50	227.30
60	272.80
70	318.20
80	363.70
90	409.10
100	454.60

Litres	Imperial Gallons
(a)	(b)
1	0.219975
2	0.440
3	0.660
4	0.880
5	1.100
6	1.320
7	1.540
8	1.760
9	1.980
10	2.20
20	4.40
30	6.60
40	8.80
50	11.00
60	13.20
70	15.40
80	17.60
90	19.80
100	22.00

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ANNEX Q - APPENDIX 4 - TABLE OF DISTANCE EQUIVALENTS

Serial	Unit	Nautical Miles	Statute Miles	Kilometres	Metres	Yards	Feet	Inches	Centimetres
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(j)	(k)
1	One nautical mile	1	1.1516	1.8532	1 853.2	2 026.8	6 080.27	72 963	185 318
2	One statute mile	0.8684	1	1.6093	1 609.3	1 760	5 280	63 360	160 934
3	One kilometre	0.5396	0.6214	1	1 000	1 093.6	3 280.6	39 370	100 000
4	One metre	-	-	0.001	1	1.0936	3.281	39.37	100
5	One yard	-	-	-	0.9144	1	3	36	91.44
6	One foot	-	-	-	0.3048	0.3333	1	12	30.48
7	One inch	-	-	-	0.0254	0.02778	0.0833	1	2.54
8	One centimetre	-	-	-	0.0100	0.0109	0.0328	0.3937	1

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ANNEX Q - APPENDIX 5 - TABLE OF SURFACE EQUIVALENTS

Serial	Unit	Square Miles	Square Kilometres	Hectares	Acres	Square Metres	Square Yards	Square Feet
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(j)
1	One square mile	1	2.59	259	640	2 589 945	3 097 600	-
2	One square kilometre	0.3861	1	100	247.1	1 000 000	1 196 010	-
3	One hectare	0.00386	0.0100	1	2.471	10 000	11 960	107 641
4	One acre	0.00156	0.00405	0.4047	1	4 047	4 840	43 560
5	One square metre	-	-	0.0001	0.00025	1	1.1960	10.764
6	One square yard	-	-	-	0.00021	0.8361	1	9.0
7	One square foot	-	-	-	-	0.0929	0.1111	1

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ANNEX Q - APPENDIX 6 - TABLE OF VELOCITY EQUIVALENTS

Serial	Unit	Feet Per Second	Metres Per Second	Kilometres Per Hour	Miles Per Hour	Nautical Miles Per Hour
(a)	(b)	(c)	(d)	(e)	(f)	(g)
1	One foot per second	1	0.30480	1.09728	0.68182	0.59209
2	One metre per second	3.28083	1	3.6	2.23693	1.94254
3	One kilometre per hour	0.91134	0.27778	1	0.62137	0.53959
4	One mile per hour	1.46667	0.44704	1.60935	1	0.86839
5	One knot	1.68894	0.51479	1.85325	1.15155	1

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ANNEX Q - APPENDIX 7 - TABLE OF SPEED CONVERSION

Serial	Miles Per Hour	Feet Per Second	Metres Per Second	Kilometres Per Hour	Knots
(a)	(b)	(c)	(d)	(e)	(f)
1	1	1.4667	0.44704	1.609344	0.8684
2	2	2.93	0.894	3.22	1.74
3	3	4.40	1.34	4.83	2.61
4	4	5.87	1.79	6.44	3.47
5	5	7.34	2.24	8.05	4.34
6	6	8.80	2.68	9.66	5.21
7	7	10.27	3.13	11.27	6.08
8	8	11.73	3.58	12.87	6.95
9	9	13.20	4.02	14.48	7.82
10	10	14.67	4.47	16.09	8.68
11	20	29.33	8.94	32.19	17.37
12	30	44.00	13.41	48.28	26.05
13	40	58.67	17.88	64.37	34.74
14	50	73.34	22.35	80.47	43.42
15	60	88.00	26.82	96.56	52.10
16	70	102.67	31.29	112.65	60.79
17	80	117.34	35.76	128.74	69.47
18	90	132.01	40.23	144.84	78.16
19	100	146.67	44.70	160.93	86.84

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ANNEX Q - APPENDIX 8 - TABLE OF TEMPERATURE CONVERSION

Serial	To Convert		Formula
	From	To	
(a)	(b)	(c)	(d)
1	°F	°C	$(°F - 32) \times 5/9$
2	°F	°R	$(°F - 32) \times 4/9$
3	°F	°K	$(°F + 459.67) \times 5/9$
4	°C	°F	$(°C \times 9/5) + 32$
5	°C	°R	$°C \times 4/5$
6	°C	°K	$°C + 273.15$
7	°R	°C	$°R \times 5/4$
8	°R	°F	$(°R \times 9/4) + 32$
9	°K	°C	$°K - 273.15$
10	°K	°F	$(°K \times 9/5) - 459.67$

Notes

1. The following temperature scales are used:
 - a. F - Fahrenheit;
 - b. C - Celsius;
 - c. R - Reaumur; and
 - d. K - Kelvin or Absolute.
2. The equivalent freezing and boiling points of water are:

B-GJ-005-404/FP-020

- a. freezing point $-32^{\circ}\text{F}/0^{\circ}\text{C}/0^{\circ}\text{R}/273.15^{\circ}\text{K}$; and
- b. boiling point $-212^{\circ}\text{F}/100^{\circ}\text{C}/80^{\circ}\text{R}/373.15^{\circ}\text{K}$.

TABLE OF TEMPERATURE EQUIVALENTS

Degrees		Degrees		Degrees		Degrees	
°C	°F	°C	°F	°C	°F	°C	°F
(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
-40	-40.0	-17	1.4	6	42.8	30	86.0
-39	-38.2	-16	3.2	7	44.6	32	89.6
-38	-36.4	-15	5.0	8	46.4	33	91.4
-37	-34.6	-14	6.8	9	48.2	34	93.2
-36	-32.8	-13	8.6	11	51.8	35	95.0
-35	-31.0	-12	10.4	13	55.4	36	96.8
-34	-29.2	-11	12.2	14	57.2	37	98.6
-33	-27.4	-10	14.0	15	59.0	38	100.4
-32	-25.6	-8	17.6	16	60.8	39	102.2
-31	-23.8	-6	21.2	17	62.6	40	104.0
-30	-22.0	-5	23.0	18	64.4	41	105.8
-29	-20.2	-4	24.8	19	66.2	42	107.6
-27	-16.6	-3	26.6	20	68.0	43	109.4
-25	-13.0	-2	28.4	21	69.8	44	111.2
-24	-11.2	-1	30.2	22	71.6	45	113.0
-23	-9.4	0	32.0	23	73.4	46	114.8
-22	-7.6	1	33.8	24	75.2	47	116.6
-21	-5.8	2	35.6	25	77.0	48	118.4
-20	-4.0	3	37.4	26	78.8	49	120.2
-19	-2.2	4	39.2	27	80.6	50	122.0
-18	-0.4	5	41.0	28	82.4	100	212.0

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ANNEX Q - APPENDIX 9 - TABLE OF ANGULAR EQUIVALENTS

Serial	Unit	Circle	Radians	Degrees	Grades	Mils	Minutes
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
1	One circle (Note 1)	1	6.283184	360	400	6 400 (Note 2)	21 600
2	One radian	0.159155	1	57.2958	63.662	1 018.6	3 437.75
3	One degree	0.002778	0.017453	1	1.1111	17.776	60
4	One grade	0.0025	0.015708	0.9	1	16	54
5	One mil	0.000156	0.000982	0.05625	0.0625	1	3.375
6	One minute	0.000046	0.000291	0.01667	0.0185	0.2963	1

Notes

1. Circle = 360° = 2 radians = 6,400 mils = 3.141592
2. By definition a mil is 0.001 of a radian. Therefore there are 6,283.2 mils in a circle. For ease of calculation, a circle is considered to be 6,400 mils. The resultant 1.8 per cent error rate is considered insignificant for small angles.

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ANNEX R - VEHICLE AIR / RAIL / SEA MOVE ACCEPTANCE SHEET

1. GENERAL SHIPPING DATA

UNIT _____ DATE _____

CHALK (FLT)/ TRAIN / VESSEL NO. _____
 CARRIER _____

AIR / RAIL / SEA POINT OF EMBARKATION _____

AIR / RAIL / SEA POINT OF DISEMBARKATION _____

2. CERTIFICATION

This shipment complies with applicable CFP 117 / IATA - TDG/CTC-IMO regulations, and applicable placards have been installed where required for dangerous goods; and all vehicles trailers/equipment on attached list delivered/loaded, unloaded/received in apparent good order and without any significant damage (\$ 100.00 or above), except as noted for vehicles, trailers, and equipment listed below and for which separate Vehicle Delivery Inspection Sheet (VDIS) have been completed and are herein attached.

A. Vehicle Exception - Type/CFR:

Loading _____

Unloading _____

B. Trailer Exception - Type/CFR:

Loading _____

Unloading _____

C. Equipment Exception

Loading _____

Unloading _____

PRIOR TO LOADING	AFTER UNLOADING
SIGNATURE UEO	

ACCEPTANCE

All tie-down/lashing - blocking/restraint-dunnaging have been installed applied in accordance with pertaining regulations.

LOADING AT ORIGIN		UNLOADING AT DESTINATION	
PRIOR	AFTER		
DATE	DATE	DATE	DATE
SIGNATURE TRAFFIC/MOV CON DET			
SIGNATURE CARRIER INSP			

DISTRIBUTION:

Origin Traffic/MOV CON Det

(1 copy each) With the Vehicles Consolidated Documentation - Carrier

With the Destination Document - Unit

GLOSSARY

1. Refer to the general glossary, document “GJ404-050 MovementSupportGlossary –e”.

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