ATP 4-11

Army Motor Transport Operations

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Preface

Army Techniques Publication (ATP) 4-11 provides detailed information on Army Motor Transport Units and their operations. It discusses the principles and fundamentals of motor transportation as well as the responsibilities of key personnel assigned to Army motor transport units at the brigade combat team level and above.

The principal audience for ATP 4-11 is all members of the profession of arms. Commanders and staffs of Army headquarters serving as joint task force or multinational headquarters should also refer to applicable joint or multinational doctrine concerning the range of military operations and joint or multinational forces. Trainers and educators throughout the Army will also use this manual.

Commanders, staffs, and subordinates ensure their decisions and actions comply with applicable U.S., international, and, in some cases, host-nation laws and regulations. Commanders at all levels ensure their Soldiers operate in accordance with the law of war and the rules of engagement. (See Field Manual [FM] 27-10.)

ATP 4-11 uses joint terms where applicable. Selected joint and Army terms and definitions appear in both the glossary and the text. Terms for which ATP 4-11 is the proponent publication (the authority) are marked with an asterisk (*) in the glossary. Definitions for which ATP 4-11 is the proponent publication are boldfaced in the text. For other definitions shown in the text, the term is italicized and the number of the proponent publication follows the definition.

ATP 4-11 applies to the Active Army, Army National Guard/Army National Guard of the United States, and United States Army Reserve unless otherwise stated.

The proponent of ATP 4-11 is the United States Army Combined Arms Support Command (USACASCOM). The preparing agency is the G3 Doctrine Division, USACASCOM. Send comments and recommendations on a DA Form 2028 (Recommended Changes to Publications and Blank Forms) to Commander, U.S. Army Combined Arms Support Command and Ft. Lee, ATTN: ATCL-TDD (ATP 4-11), 2221 A Avenue, Fort Lee, VA 23801 or submit an electronic DA Form 2028 by e-mail to: usarmy.lee.tradoc.mbx.leee-cascom-doctrine@mail.mil

Introduction

Army Techniques Publication (ATP) 4-11, *Army Motor Transport Operations*, is the Army's doctrine for the use of motor transportation in support of operations. The doctrine discussed in this manual is nested with FM 55-1, *Transportation Operations,* and supports the principles of transportation. Motor transport units are the link between the supply hub and the end user in the distribution chain. The inherent flexibility of motor transport units provide extended lines of communications which allow combatant commanders the freedom to plan and conduct operations far forward of distribution management centers.

In a theater of operations, all modes of transport--air, rail, inland waterways, and motor--are used to move personnel, cargo, and unit equipment. Of these modes, motor transport is the most flexible. Motor transport supports movement requirements ranging from port clearance, tactical displacement, and distribution and retrograde of supplies and equipment across the area of operations. It serves as the link between the other modes to support combat forces as far forward as possible enabling operational reach and prolonged endurance.

Army motor transport operators are a vital link in the distribution process, providing sustainment material throughout the area of operations. However, they are more than just truck drivers and delivery personnel ensuring the protection of cargo and the safety of their passengers. Motor transport operators are an intelligence collecting asset able to recognize and communicate changes in conditions across the area of operations through vehicle mounted automation systems. Motor transport operators can immediately respond to changes in the tactical situation, effectively engaging threats while simultaneously coordinating fires and air support.

ATP 4-11 contains significant changes from Field Manual 55-30, *Army Motor Transport Units and Operations*. The most significant changes are the new motor transport principles and establishing the functions of motor transportation. It includes information on current motor transport units which have been established through the Army's transformation to the modular force. ATP-11 does not contain information on convoy operations and battle drills now published in FM 4-01.45, *Multi-Service Tactics, Techniques, and Procedures for Tactical Convoy Operations*.

ATP 4-11 contains three chapters:

Chapter 1 discusses the fundamentals of motor transportation. It gives the audience an overview of motor transportation, and discusses the functions and principles of motor transportation.

Chapter 2 discusses motor transport operations. This chapter details how support requirements are created, planned, and executed. It provides details on all other types of motor transportation operations and the types and methods of hauling as they pertain to motor transportation operations.

Chapter 3 details motor transportation units and headquarters elements which provide mission command in unified land operations. It discusses transportation units above and below the brigade combat team level and their vehicle composition and capabilities. Finally, this chapter provides information on the roles and responsibilities of personnel assigned to motor transport units.

Based on certain doctrinal changes, terms for which ATP 4-11 is the proponent have been added, or modified for the purposes of this manual. The glossary contains acronyms and defined terms.

Introductory table-1. New Army terms

Term	*Remarks*
direct haul	New term and definition
hub	New term and definition
interzonal operation	New term and definition
intrazonal operation	New term and definition

Introductory table-1. New Army terms

Term	*Remarks*
line haul	New term and definition
local haul	New term and definition
motor transportation	New term and definition
relay	New term and definition
shuttle	New term and definition
spoke	New term and definition
throughput distribution	New term and definition
unit distribution	New term and definition
supply point distribution	New term and definition

Chapter 1

Fundamentals of Motor Transportation

Motor transport provides mobility in the sustainment and movement of forces. Motor transport units move personnel, munitions, replacement vehicles, petroleum products, critical supply items, casualties, and more throughout the area of operations. This chapter provides a motor transportation overview, the application of motor transport principles and functions.

MOTOR TRANSPORTATION OVERVIEW

1-1. ***Motor transportation*** **is a ground support transportation function that includes moving and transferring units, personnel, equipment and supplies by vehicle to support the operations.** Motor transportation provides essential distribution capabilities for organizations, to sustain forces, prolong endurance, and extend operational reach. Army transportation units are the single largest provider of land surface movement within joint forces and include organic and contracted resources. Motor transport is an integral aspect of the Army's support and force sustainment. Transportation units are required to support various operations providing mobility throughout the operational environment.

1-2. Army transportation units support US Armed Forces and their allies across a range of military operations. These operations may be conducted anywhere in the world, and transportation units should be ready to deploy on short notice. Also, they should be prepared to remain after operations terminate to support the redeployment of maneuver and other support forces. Motor transport is the predominant mode of transportation for the reception, onward movement, and sustainment of forces. Motor transport units should be highly trained, rapidly deployable, and capable of sustaining themselves for long periods of time.

1-3. Motor transportation by its sheer nature relies heavily on energy sources to accomplish its mission. Operational energy is the power source and associated systems, information, and processes required to train, move, and sustain forces and systems for military operations. All efforts should be made to reduce energy requirements during all phases of planning and execution. This can be accomplished by properly managing assets and personnel, and configuring loads for optimal carrying capacity.

PRINCIPLES OF MOTOR TRANSPORTATION

1-4. The principles of motor transportation adhere to the principles of transportation and are essential to maintaining combat power, enabling strategic and operational reach, and providing Army forces with endurance. The principles of motor transportation are below.

EFFECTIVE USE OF ASSETS

1-5. Effective use of assets is key while conducting motor transport operations. Movement managers, leaders, vehicle operators, and supported units all have roles in ensuring effective use of assets including ensuring effective use of carrying capacity, reducing turnaround time, and performing maintenance.

1-6. Movement managers should select the best vehicle platform for a given load based on the capabilities and availability of equipment and units to perform the required task. Plan for assets to be fully loaded, and consider the factor of weighing out the vehicle's capability versus cubing out. Empty, or partially empty, vehicles that have not reached the weight or cube capacity represent an inefficient use of valuable ground support assets potentially putting Soldiers at risk unnecessarily. Load compatibility conflicts or critical command directed movements should be the only logical rationales to under utilize carrying capacities. Utilize the method of backhauling by never returning a vehicle to its origin empty.

1-7. When inefficiencies cause equipment shortages, total tonnage can be increased by decreasing turnaround time. This may be accomplished by increasing the march rate over routes, increasing the hours of operations, or reducing offload time, all of which require strict judgment to ensure the end result does not cause unsafe operations or vehicle accidents. Vehicle platforms such as the palletized load system (PLS), heavy expanded mobility tactical truck (HEMTT), load handling System (LHS), enhanced container handling unit (ECHU), container transfer enhancement, and container roll-in/roll-out platform (CROP) reduce the handling requirements forward on the battlefield and extend throughput capability. It is normally the supported unit's responsibility to provide material handling equipment (MHE) and personnel to load and unload cargo at the originally specified time, which is critical to plan in order to reduce turnaround time. Close coordination between the motor transportation unit headquarters, mode operator, and the supported unit will alleviate potential problems and expedite the return of transportation assets to the distribution system.

1-8. Performing maintenance is important to the operational success of motor movement. Motor transportation unit commanders are responsible to ensure all assigned equipment is maintained according to appropriate technical manuals (TMs) and AR 750-1. Vehicle operators are responsible to perform preventive maintenance checks and services. These unit-level maintenance functions will prevent and expedite the return of non-mission capable transportation assets to the distribution system.

FORWARD SUPPORT

1-9. Distribution-based logistics embraces the principle of rapid delivery of personnel and supplies as far forward as the tactical situation permits. By providing forward support, including the distribution function of throughput, units can decrease transloading, and move commodities quickly and efficiently to support forward units.

IN-TRANSIT VISIBILITY

1-10. Army Transportation assets should possess the long-range, near real-time communications capability necessary to operate within the global transportation network. In-transit visibility (ITV) is an absolutely critical capability required to track units, equipment, personnel, supplies, and distribution assets as they move through the distribution system. Transportation assets should be fully interoperable and interconnected with all elements of the Joint Force, capable of gathering information from all appropriate sources (including automated information systems) in order to maintain near real-time ITV across the theater and global transportation systems. This includes the capability to maintain near real-time monitoring and communication with transportation assets, in-transit visibility of cargo, and the ability to redirect movements based on shifting operational requirements, threats, or priorities.

INTEROPERABILITY

1-11. Army transportation organizations and assets should be capable of supporting and interfacing with joint, multi-national, and multi-agency movement operations in the conduct of operations. Army motor transportation operations are fully capable of integrating disparate resources, as required to meet the joint force commander's operational requirements. Further, the systems and organizations that comprise motor transportation capability can seamlessly and effortlessly operate in conjunction with or as part of Joint, multi-national, or multi-agency forces or organizations. For example, while operating in a joint environment, Army motor transport units should have the ability to operate with different services, including the interoperability of couplings on vehicles and trailers to ensure proper towing capabilities in the execution of assigned missions. Motor transportation units should be fully interoperable with joint, multi-national, non-governmental organizations, host-nation and commercial operators.

MOTOR TRANSPORT FUNCTIONS

1-12. Motor transport operations support a variety of missions depending on unit locations and situations. Whether in the continental United States (CONUS) or outside the continental United States, motor transport units are usually employed in a general support role within a specified area or along specific

routes. The use of motor transport assets facilitates the distribution of goods and movement of forces and equipment throughout a theater.

MOVEMENT OF FORCES

1-13. Motor transport units are an important link in enabling operational reach for the maneuver commander. Motor transport units contribute to building combat power by increasing the maneuver commander's capability to quickly and efficiently shift forces across the area of operations, and delivering forces in a high state of readiness at the destination. In a tactical mobility role, motor transport units move forces and equipment in the corps area as far forward as Mission, enemy, terrain and weather, troops, time and civil considerations (METT-TC) factors permit.

DISTRIBUTION

1-14. *Distribution* is the operational process of synchronizing all elements of the logistics system to deliver the right things to the right place at the right time to support the combatant commander (ADRP 4-0). Army motor transportation supports distribution by ensuring materiel and personnel arrive at the right places and right times as required by the combatant commander through the use of motor transport vehicles. Motor transportation represents the vital link between sustainment arriving and moving forward in theater.

Throughput Distribution

1-15. ***Throughput distribution*** **is a method of distribution which bypasses one or more intermediate supply echelons in the supply system to avoid multiple handling**. For example, the sustainment brigade may provide throughput of ammunition directly to a forward support company (FSC), if mission determines transloading the supply would incur more time and resources compared to a direct delivery. METT-TC is a major consideration when deciding to utilize throughput distribution.

Unit Distribution

1-16. ***Unit distribution*** **is a method of distributing supplies by which the receiving unit is issued supplies in its own area, with transportation furnished by the issuing agency.** The distributor is responsible for filling supply requests and transporting items to a location predetermined by the receiving unit. The receiving unit is responsible for the download and storage of the supplies in their area of responsibility. For example, the brigade support battalion (BSB) will load and deliver supplies to the FSC, then return to their original location. The FSC is responsible to download the supplies from the BSB, and further responsible to store and distribute as necessary.

Supply Point Distribution

1-17. ***Supply point distribution*** **is a method of distributing supplies to the receiving unit at a supply point, railhead, or truckhead.** The distributor is responsible for breaking down supplies received from higher for distribution to subordinate units. The receiving unit is responsible for transportation to and from the supply point. For example, an FSC assembles a convoy to pickup supplies from the BSB, and then returns to its original location. The BSB will load supplies at the supply point, but has no other responsibility in this method.

SUMMARY

1-18. Motor transportation units play a key role in facilitating the distribution of goods and sustainment, and function through three methods of distribution. Motor transportation ensures that Army and joint forces are sustained in operations, and provide additional support as requested. Motor transportation units provide a wide range of capabilities, provided by its equipment and Soldiers, and in joint operations, they provide a full range of capabilities needed to permit joint and Army commanders to achieve their operational objective.

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Chapter 2

Motor Transport Operations

There are a variety of motor transportation assets available to provide effective and efficient transportation support. To ensure success, one should be knowledgeable in all aspects of motor transportation operations. This chapter discusses how support requirements are created, planned, and executed, and also provides details on all other types of motor transportation operations.

TRANSPORTATION SUPPORT REQUIREMENTS

2-1. Transportation support requirements are assigned to motor transport units through movement control channels using the transportation movement release process. Depending on what level of support is requested, the theater sustainment command (TSC), expeditionary sustainment command (ESC), sustainment brigade, combat sustainment support battalion (CSSB), or brigade support operations (SPO) officer can assign transportation taskings as a tasking authority. A tasking is the assignment of a support requirement, and there are two types of support requirements: programmed and immediate. Through the use of a movement request, a tasking authority will fulfill requests by assigning movements to transportation units under their control.

2-2. The TSC, ESC, sustainment brigade or CSSB at the theater level, or the SPO of a BSB and the brigade S4 at the BCT level develop movement programs within their area of operations (AO). These plans are then synchronized with the movement control battalions (MCB) to de-conflict movement requirements among all transportation modes. *Movement control* is the dual process of committing allocated transportation assets and regulating movements according to command priorities to synchronize the distribution flow over lines of communications to sustain land forces (ATP 4-16). It is a continuum that involves synchronizing and integrating sustainment efforts with other programs that span the spectrum of military operations. Movement control is a tool used to help allocate resources based on the combatant commander's priorities and to balance requirements against capabilities (see ATP 4-16, *Movement Control* for more information on movement control).

PROGRAMMED

2-3. Programmed movements are identified in advance of operations to allow for allocation of transportation requirements among all available modes. Programmed movements are usually requested through logistics channels, including the battalion or brigade S4. Shippers request transportation support through the movement manager. The movement manager consolidates all support requests and balances these requests against the capabilities of the mode operators in their area of operation. They assign the appropriate mode for each requirement and publish the movement program. The program is distributed to the shippers, mode operators, and movement control units. When requirements for trucks exceed capabilities, adjustments are made by the movement manager based on priorities for support. The movement program may be changed when the movement requirement no longer exists, when origins or destinations change, when a different mode is required, or when priorities change.

2-4. When a shipper wants to change or delete a programmed movement, the shipper informs the movement manager. The movement manager adjusts the movement program and informs the motor transport headquarters. The motor transport headquarters relays the change or deletion to subordinate truck units.

IMMEDIATE

2-5. Immediate movements are urgent requests completed through the operations officer (S3). Immediate movements can include vital resupply of Classes I or V, or other materiel categorized as a priority. Immediate movements will usually take precedence over programmed movements. Once requested by the operations officer, movement managers are required to program the movement and reprioritize assets to assign mode operators the immediate task.

MOTOR TRANSPORTATION PLANNING

2-6. Planning ensures the proper allocation of transportation assets to fulfill mission requirements based on command priorities and to identify and mitigate shortfalls. When planning motor transportation operations, managers should compare capabilities versus requirements, which will identify excesses or shortfalls. When excess or shortfalls exist, planners can mitigate these by changing vehicle types to effectively utilize carrying capacity.

2-7. To maximize efficiency and properly balance capabilities and requirements, motor transportation planners should analyze multiple factors, including the service performed, load and types of cargo to be carried and terrain. Availability rates, vehicle payload capacity and operational shift hours are factors to consider in early stages of planning to assess capabilities. To further develop capabilities, planners should consider the method of requested delivery, distances, march rates, delay times, threats and protection requirements, all of which are essential considerations. The following are more considerations for planning motor transportation operations:

- Availability of MHE, capacities of routes, and available areas for truck units, convoy support centers (CSCs) and trailer transfer points (TTPs).
- Developed AO, austere AO or early entry operations.
- Convoy support requirements, such as fuel, military police escorts, security, medical, maintenance, communications, Class I requirements, and overnight locations if required.
- Driver documentation, such as travel orders, driver's licenses, motor vehicle documents, and dispatch.
- Units should properly plan road movements, prepare march tables, submit movement bids, coordinate en route support, and assess the tactical situation, including weather and terrain.

TYPES AND METHODS OF HAULING

2-8. Motor transport operations utilize specific hauling methods to best accomplish mission requirements. Operations are characterized as intrazonal and interzonal. Within each category, they may be further defined as local or line haul.

INTRAZONAL AND INTERZONAL OPERATION

2-9. Boundaries are defined between brigade and division, division and corps, corps and theater army, and between adjacent brigades, divisions, and corps. These boundaries also correspond to movement control boundaries. ***Intrazonal operations*** **occur within a specific transportation organization's area of operation.** ***Interzonal operations*** **occur outside specific transportation organization's boundaries and operate under the area control of multiple headquarters.**

TYPES OF HAULS

2-10. There are two different types of hauls, categorized by time and distance. Local hauls are shorter movements and can occur multiples times a day while line hauls are longer movements and typically require an operating shift or more to accomplish.

Local

2-11. ***Local hauls*** **are operations in which vehicles can make two or more round trips per day based on distance and transit time.** Local hauls have short running times compared to loading and unloading. A

local haul is usually an intrazonal movement, within the Brigade AO for example. Vehicles typically used for local hauls include the Family of Medium Tactical Vehicle (FMTV) cargo trucks and the HEMTT–LHS.

Line

2-12. ***Line hauls*** **are operations in which vehicles cannot make more than one round trip per day due to distance, terrain restrictions, or transit time.** Line hauls have long running times compared to loading and unloading and usually involve one trip or a portion of a trip per operating shift. Line hauls are more frequently interzonal, commonly crossing movement control boundaries (for example, across BCT, divisional and national areas of responsibility) and may require additional coordination and support when transiting operational boundaries. Throughput operations from ports or theater storage areas to BSB are usually line haul operations. Vehicle types typically used for line hauls include tractor/trailer combinations, heavy equipment transporters (HET), and PLS.

HAULING METHODS

2-13. Hauling is the movement of a load by transportation assets. Four general methods are used in moving cargo and personnel: direct haul, shuttle, relay, and hub and spoke (see figure 2-1).

Direct Haul

2-14. A ***direct haul*** **is a single transport mission completed by the same vehicle(s).** It does not involve a transfer of supplies or exchange of equipment, as does hub and spoke (see below). Direct hauls can be used in local or line haul operations.

2-15. Direct hauls used for line haul operations are referred to as express operations. Express operations are established before trailer transfer or cargo transfer points have been set up. CSCs are established to support direct line haul operations. They may also be used when there is a need for rapid movement of tonnage over long distances.

Shuttle

2-16. A ***shuttle*** **is a single transport mission completed in repeated trips by the same vehicles between two points.** This method is commonly used in local hauls.

Relay

2-17. A ***relay*** **is a single transport mission completed in one trip and utilizes multiple vehicles without transferring the load.** It involves the continuous movement of supplies or troops over successive segments of a route. It is done by changing drivers, powered vehicles (tractors), or both for each segment. Containerized or cargo on flat racks increases the effectiveness of this system and better uses the tonnage capabilities of vehicle platforms. In addition to rapid throughput of cargo, the relay system allows for command supervision and supporting services in each segment of the route. A relay distribution system will have prepositioned drivers or vehicles at transfer points, minimizing stationary time for loads.

Hub and Spoke

2-18. Hub and spoke method is a physical distribution system developed and modeled on industry standards to provide cargo management for a theater. A ***hub*** **is an organization that sorts and distributes inbound cargo from multiple supply sources.** An example of a hub terminal is a distribution center, trailer transfer point, Centralized Receiving and Shipping Point, CSC, Logistics Support Area or Brigade Support Area (BSA). ***Spoke*** **is a portion of the distribution system that refers to the transportation mode operator's responsibility for scheduled delivery to a receiving unit.**

2-19. The hub and spoke is similar to a relay in that it is a single transport mission completed in one trip by multiple vehicles, but differs by transferring loads at hubs. This method is designed from a hub, moving cargo to and between several spokes, and intended to increase transportation efficiencies and in-transit visibility. Hub and spoke involves moving supplies or troops through a hub terminal and between segments

of multiple routes (spokes). Like a relay, it is done by changing drivers, powered vehicles (tractors) and/or loads at the hub. This method is used in local and line haul operations.

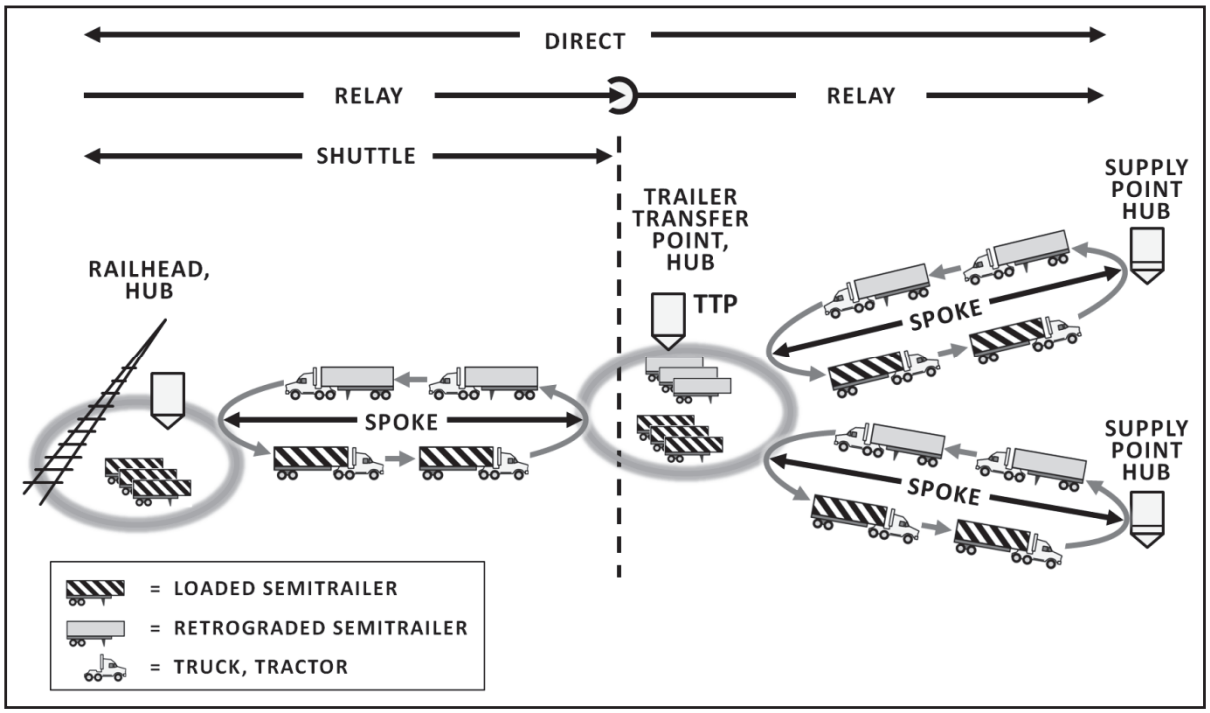

Figure 2-1. Direct, relay, shuttle, and hub and spoke

CONSIDERATIONS

2-20. There are multiple considerations in planning and utilizing hauling techniques. Most importantly, routes should be planned to accommodate the anticipated traffic volume. Some main supply routes (MSRs) can be reserved for line haul operations if adequate routes are available for other movements. The crossing of movement control boundaries should be cleared in advance with the movement control organization serving the destination area. Routes should be well-marked to assist drivers and described in detail during convoy briefings. Driver training should include route familiarization. Drivers should have strip maps or other maps showing the route to be followed. See ATP 4-16, *Movement Control* for details on route synchronization. MSRs should be in good condition and have good connecting and access roads. The TSC/BSBs should work closely with their servicing MCB or movement control team (MCT) to verify:

- Adequate routes and control measures are established for line haul operations.
- Planning for line haul operations supports movement and distribution requirements.

2-21. At the same time, the MCB should evaluate all available route information and, when possible, a ground reconnaissance is conducted to determine critical points and the ability of vehicles to negotiate difficult grades, bridges, tunnels and terrain. An engineer reconnaissance will assist in developing an estimated route capacity, feasible march rates, time distances between hubs, average travel time and route maintenance or upgrade requirements prior to operations. See FM 3-34.170, *Engineer Reconnaissance* for more information.

2-22. Reports from the MCTs enable the movement control organization and motor transport staff to maintain control of movements. MCT reports help to ensure priorities are followed, to make adjustments in routing, and to coordinate travel over the route in response to changing tactical situations. MCTs may be established at movement control boundaries, terminals, CSCs, and other locations as necessary.

2-23. Traffic control using military police or host nation police should be set up at critical points and congested areas when possible. Close coordination is essential between the movement control organization, motor transport units, MPs, the TSC and Brigade operations center to ensure route conditions are current.

2-24. The motor transport unit committed to an operation normally provides security and reconnaissance support required for movements. However, when convoys need security and reconnaissance support beyond organic resources, it may be furnished on a mission basis by the unit's higher headquarters.

TYPES OF OPERATIONS

2-25. Motor transport units perform a number of missions. Motor transportation is an imperative asset during intermodal operations, which includes port/terminal operations and clearance. Motor transportation provides a service of moving and transferring personnel, equipment and supplies via local or line haul movements in tactical convoys, and utilize CSCs and TTPs to execute operations. Motor transport units also execute retrograde, area support, transfer and drive-away operations. The next two sections will explain different types of operations and how they relate to motor transportation.

INTERMODAL OPERATIONS

2-26. *Intermodal operations* is the process of using multiple modes (air, sea, highway, rail) and conveyances (i.e. truck, barge, containers, pallets) to move troops, supplies and equipment through expeditionary entry points and the network of specialized transportation nodes to sustain land forces (ADRP 4-0). It uses movement control and specific planning to balance requirements against capabilities, resulting in synchronizing terminal and mode operations to ensure an uninterrupted flow through the transportation system. It consists of facilities, transportation assets and material handling equipment required to support the deployment and distribution enterprise.

PORT/TERMINAL OPERATIONS

2-27. *Terminal operations* is the reception, processing, and staging of passengers; the receipt, transit storage and marshalling of cargo; the loading and unloading of modes of transport conveyances; and the manifesting and forwarding of cargo and passengers to a destination (JP 4-01.5). Terminal operations are a key element in support of operational reach and endurance, especially within intermodal operations. There are three types of terminals; air, water, and land. Terminal operations enable the loading, unloading, and handling of materiel, cargo, and personnel. Terminal operations are essential in supporting deployment, redeployment and sustainment operations.

Port/Terminal Clearance

2-28. Motor transport units move personnel and cargo out of air, water, and land terminals. Rapid clearance allows for similarly rapid discharge of aircraft or ships that may otherwise be hampered by congestion within the terminal area. The terminal operator is responsible for off-loading the ships or planes. An MCT should be located at the terminal to plan and coordinate clearance. The transportation terminal battalion may assist in planning, setting up truck operations, and regulating the flow of vehicles in the terminal area. Ideally, heavy maneuver units move their tracked vehicles from the port of debarkation to forward assembly areas by HET system, but it can be augmented by other transportation modes. When tactical considerations are not paramount, it may be ideal to move heavy units by rail, but in a tactical environment that requires immediate movement, the use of HETs should be maximized. The division transportation officer (DTO) coordinates for these assets through the MCB or sustainment brigade (if in a direct support role) and HETs are allocated in accordance with mission priorities.

2-29. In-transit storage may be required at the origin port, destination port, intermediate terminals, or TTPs. In-transit storage on vehicle platforms should be discouraged because it reduces the capability of recipient units by delaying receipt of their equipment, while also increasing the number of vehicles required.

Railhead to Motor Transport

2-30. During intermodal operations, specifically between railheads and motor transport, equipment is removed from a railhead and transferred to vehicles or vice versa, to support continuous operations. Normally vehicles, trailers, and containers are transferred between railheads and motor transport, but

palletized equipment or supplies can also be transferred with proper MHE. The following are two types of operations used to move trailers or containers from motor transport to railheads.

- Trailer on a flat car. In a trailer on a flat car operation, semitrailers are moved in local haul to a railhead, placed on railcars, and moved by rail to the railhead servicing the destination area. They are then unloaded from the railcars, coupled to suitable towing vehicles, and moved to their destination. Rail combines the economy of rail hauls with the door-to-door service of the truck. Where large amounts of cargo are involved, the rail operation becomes one segment of a relay.
- Container on a Flat Car. The Container on a flatcar operation parallels the trailer on a flat car method except that containers are involved instead of semitrailers. Containers may be mounted on chassis and then loaded on flatcars or loaded directly onto the deck of the transporting flatcars.

Sea Port of Deparkation to Motor Transport

2-31. Intermodal operations are prevalent with motor transport to and from sea ports of debarkation. Various ships move large amount of equipment and supplies, and motor transport is a common intermodal option used to transport materiel. Vehicles, trailers, and containers are often transferred between sea ports of debarkation and motor transport by utilizing the following operations.

- Roll-On, Roll-Off. In roll-on, roll-off operations, vehicles or semitrailers are loaded aboard roll-on, roll-off watercraft and moved to a destination water terminal. At the destination terminal, they are coupled to towing vehicles while still aboard ship and moved by highway to their destination.
- Lift-On, Lift-Off. In lift-on, lift-off operations, loaded trailers or containers are moved to a water terminal, uncoupled from their prime movers, and crane-loaded aboard ship. Upon arrival at the destination terminal, the trailers are unloaded by crane, coupled to prime movers, and moved to their destination by highway.
- Lighter aboard ship. In lighter aboard ship operations, vehicles, semitrailers, or containers aboard lighterage are launched from ships. They are especially useful where deep water port facilities are not available.

Aerial Port of Debarkation to Motor Transport

2-32. Motor transport works closely with aerial ports of debarkation, not usually in line haul movements, but in local hauls. Personnel, vehicles, trailers, containers and palletized materiel are often transported by vehicles to aircraft at embarkation air terminals or airfield logistics pads. Once transported by the aircraft to the destination air terminal or airfield, the personnel and equipment is offloaded then immediately loaded onto vehicles for movement to its final destination or a hub.

Truck Park

2-33. A truck park is a centralized area established to route, dispatch and control vehicles engaged in a bare beach, sea port of debarkation, aerial port of debarkation, or railhead clearance operation. The number of truck units required to operate will determine the command and control relationships between the truck park and the port. If multiple truck units are required, a CSSB or a functional transportation battalion may be the HQ element for the truck park. The truck park includes a dispatch facility, parking area, and other appropriate support facilities. A truck park operates in a manner similar to that of a convoy support center in a line haul operation. All vehicles supporting a terminal operation move into and out of the site through the truck park. Several truck parks may be required in a clearance operation, as the number established depends on the size and characteristics of the area, availability and conditions of preexisting roads into and from the beach, the areas suitable for truck park establishment and the number of vehicles necessary to support the ongoing operation.

2-34. A line haul operation may be established in conjunction with a truck park within a port clearance mission. A line haul operation allows the throughput movement of cargo as far forward as possible. Vehicles are loaded at the port, proceed to the destination where they are unloaded, and then return to the

port to repeat the cycle. Truck parks exercise and maintain control over the port clearance motor transport operation. Fixed-port operations are usually more efficient than bare beach operations. This is based on the availability of berthing facilities, cargo-handling equipment, staging and parking areas, and improved roads. If a port sustains damages, tonnage capability and the movement of vehicles within the port area may be substantially reduced.

2-35. Vehicles arriving for loading and vehicles carrying return (retrograde) materiel for unloading at the terminal are checked in through the truck park dispatcher. These vehicles are dispatched directly to a loading or unloading site on the port or directed to a holding area within the truck park. Departing loaded vehicles are also checked in at the truck park dispatcher prior to onward movement. Based on route control measures and capabilities of the receiving unit to unload, vehicles may be dispatched directly to their destination either individually or in convoys. If tractor trailers are used in the clearance operation, a shuttle system can be used. Shuttle tractors move empty semitrailers between the motor park and port sites and return loaded semitrailers to the motor park. Line haul tractors then move the loaded semitrailers from the motor park to their destination and return.

MOTOR TRANSPORT SERVICE AND OPERATIONS

2-36. Motor transport units provide the ability to perform line haul movements operated for extended distances over MSRs that can serve the entire theater. Motor transport operations require centralized control provided by a TSC, ESC or sustainment brigade. The appropriate command for line haul operations depends on the mission. A CSSB or functional transportation battalion usually provide mission command when truck companies are operating in the theater. The HQ may be responsible for operating specific segments of the route or the entire route. The mission drives the number and type of motor transportation, CSCs, and cargo transfer units required. Medium truck companies can be used for line haul operations because tractor trailers are the most effective equipment for line hauls. The HET company adds the dimension of operational and tactical relocation of combat units within the area of operation. It is effective in supporting operational mobility moving armored brigade combat teams (ABCTs) and other heavy or large equipment. The semitrailer relay method may be used in line haul operations. This type of line haul operation includes an origin and destination truck terminal and may include a CSC, TTPs, or hubs located at intermediate points along the route.

2-37. At the origin terminal, shuttle tractors move empty semitrailers from the origin terminal to the supported units where they are loaded. The shuttle tractors return loaded semitrailers to the origin terminal where they are staged and prepared for movement. Line haul tractors from the unit assigned to operate the first segment of the route picks up these loaded semitrailers at the origin terminal and moves them forward to the first TTP or hub. Here, the loaded semitrailers are exchanged for retrograde semitrailers that are returned to the terminal of origin for reuse. Line haul tractors of the unit assigned to the second segment of the route transport the forward moving semitrailers from the first TTP or hub to the next TTP or hub, where similar exchanges are conducted. The relay is continued until the forward-moving semitrailers arrive at the destination terminal. Shuttle tractors then move the loaded semitrailers from the destination terminal to their ultimate destination for unloading. If empty or return loaded semitrailers are available at the ultimate destination, the destination shuttle tractors should return them to the destination terminal. There they can be documented, staged, and prepared for retrograde relay movement (see figure 2-2).

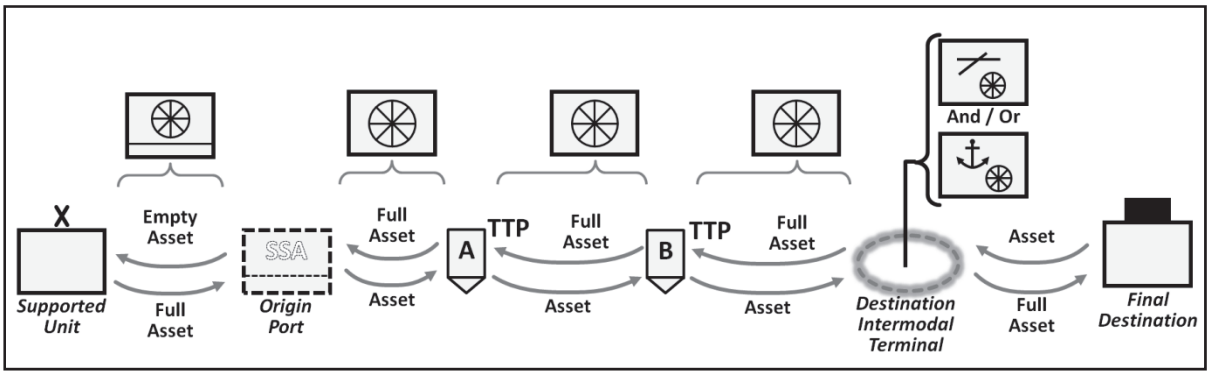

Figure 2-2. Cargo movement through the transportation network

2-38. A semitrailer relay creates a continuous flow of loaded semitrailers moving from general support units and support agencies to forward areas. At the same time, retrograde semitrailers are moving rearward where they can be reloaded and sent forward again. Retrograde capability should be maximized and every effort made to obtain loads for returning empty semitrailers. The relay system should be designed to provide the command, supervision, and support services the operation requires. This may include establishing facilities for messing, vehicle service and repair, quartering, administrative support, and logistic services. Mobile maintenance teams and recovery service should be located at strategic points to repair and recover disabled vehicles. Often, the field support maintenance unit in the area supports the operation.

CONVOY SUPPORT CENTERS

2-39. Convoy support centers are usually located in or near centers of concentrated trucking activities at both ends of a line haul or at intermediate locations. CSCs form the connecting link between local haul and line haul operations. They constitute assembly points and dispatch centers for motor transport equipment. They should not be used for in-transit storage or freight sorting. They are usually located forward of cargo pickup points and to the rear of delivery points. In selecting CSC sites the size, complexity and duration of the operations should be considered. The number and type of vehicles employed is also vital in selecting a location, along with the facilities required at the terminal and anticipated backlog of semitrailers at these sites.

2-40. CSCs may be established at intermediate points along the line haul route, or co-located at major hubs. The locations and number of these centers depend upon the organization of the line haul operation and the location of supported units. CSCs should be strategically located to support operations, facilitate drivers, and provide an area for resupply and/or rest over night. The area should be large enough and have an acceptable internal road network to allow space for parking and marshalling incoming and outgoing semitrailers and tractors. The area should be level and well-drained. It should have a suitable hardstand that can withstand heavy vehicular traffic. The CSC should be located near supported activities and the MSR. Space requirements may not make it feasible to establish truck terminals and TTPs adjacent to the MSR. If this is the case, and if good feeder routes are available, establish them off the MSR. CSCs may also be co-located with motor transport units in motor park areas within a hub. Security should be provided for both the operating area and the vehicles and cargo handled within the area. The motor transport unit at the location provides security. When the terminal is part of an operating base, the operating base commander coordinates added security based on the threat level.

2-41. The CSC is usually operated and controlled by a motor transport battalion or CSSB, with the corps of personnel consisting of the TTP. The battalion either supports or coordinates support to the terminal. CSCs need facilities for dispatching, messing, maintenance, servicing, fueling, and sleeping. If refrigeration vans and containers are used in the system, electrical facilities and refrigerator unit maintenance services are needed.

TRAILER TRANSFER POINTS

2-42. Trailer transfer points are established along the line haul system to divide the line haul into legs. At TTPs, semitrailers or flatracks are exchanged between line haul vehicles operating over adjoining legs of a line haul route. TTP functions also include reporting, vehicle and cargo inspections, documentation, and dispatching. TTPs are often co-located at hubs or operating bases. Based on the availability of local support or if functioning independently, TTPs may provide mess, maintenance, and other support for TTP personnel and line haul drivers. Line haul vehicles arriving from rear areas deliver semitrailers or flatracks to a TTP and pick up semitrailers or flatracks for retrograde. Line haul vehicles coming in from forward areas drop their empty or retrograde loaded semitrailers or flatracks and pick up the forward-moving loads for further movement towards their ultimate destinations. Shuttle tractors may be used within the TTP to stage and prepare cargo for movement. This action reduces turnaround time of line haul tractors and makes the operation more efficient. TTPs are not used for pickup and delivery of cargo, but act as a point to create a feasible driving leg for Soldiers.

Assignment of Semitrailer Equipment

2-43. Efficient use of motor transportation assets enables company-size units to perform a variety of tasks under different circumstances. Units are often separated geographically from their parent HQ. The medium truck company may be assigned flatbed, bulk petroleum, or other types of semitrailers to perform its assigned mission. This variety of semitrailers enables the company to move general cargo, bulk liquid, petroleum, refrigerated cargo, and containerized cargo without a change in basic organization or operational procedures. Often, truck companies not normally assigned tractor trailers are augmented with additional equipment to perform a deployed mission.

Accounting Procedures for Semitrailers and Flatracks

2-44. Accounting for semitrailers and PLS flatracks can be solved several ways. If relay operations are of short duration, semitrailers or flatracks can remain assigned to companies and accounting procedures established to retain control. Another method is to transfer accountability to a higher HQ and to maintain property books and control records at that level. AR 710-2 authorizes the brigade commander to establish a control office for the accountability of semitrailers or flatracks for organizations involved in line haul operations. When the provisions of AR 710-2 are in effect, the truck company commander is relieved of accountability for semitrailers and/or flatracks assigned to the unit, as a separate property book can be created to account for this equipment. However, the truck company commander and subsequent leaders, are charged with direct responsibility for the semitrailers and flatracks with which their unit is operating. Adequate care should be given to all equipment in the custody of the truck company.

2-45. The motor transport HQ in charge of relay or line haul operations should establish accountability for all semitrailers used and maintain property records in its supply section. Through its operations section, the HQs should also establish report and control procedures. To pinpoint the location of semitrailers within the system, the HQ should be able to identify and establish the responsibilities of a unit or person having custody of the equipment at any time. The HQs unit in charge of the relay or line haul operation establishes a trailer accounting office within its supply section. Data is recorded in a consolidated trailer property book. Upon completion of the operation, return of a unit to routine operations, or transfer of a unit to another command, the property book is adjusted to reflect the change in status. Hand receipts are also adjusted by reassigning on-hand semitrailer equipment to the companies.

Control of Semitrailer Equipment

2-46. In the centralized relay or line haul operation, accountability and control of semitrailer equipment are vested in the commander of the HQs unit providing mission command of the operation. The supply section of the HQ unit assumes property responsibility for the equipment, and the operations section of the HQs assumes responsibility for operational control. Control is maintained through reports from units and maintenance of records. Maximum use of reliable communications is imperative to maintaining control.

2-47. At the operating level, the unit or convoy commander is directly responsible for the semitrailer or flatrack equipment employed in the operation. Reports forwarded to the HQs operations section from TTPs,

truck terminals, airfields, and other customers provide a daily check on the location of all semitrailer equipment and on the status and condition of that equipment. See appendix F for more information.

CONTAINER OPERATIONS

2-48. Containers are specially designed cargo carriers that permit the packaging of small and loose cargo items into a single unit for security and ease of handling. Containers are a safe, secure means for loading cargo at a supply source. The container is sealed at the source, with no need to open it or handle the cargo until it is delivered to its destination. Cargo security is enhanced and cargo can be expected to be received intact and in serviceable condition. For more information on container management see ATP 4-12, *Army Container Operations* .

Container Transport

2-49. Containers are hauled in any of the types of transport operations. Containers transported by trucks are handled as any other cargo. Pickup, movement, and delivery are made according to the type haul for which the motor transport is committed. However, the movement of containers requires consideration of the capabilities of MHE at the origin and destination.

2-50. The control of containers moving through the motor transport system is of prime importance. Personnel should abide by all theater and local policies governing the handling and use of containers. (During non-hostile activities, the using agencies should make every effort to abide by these policies to control detention and demurrage costs and return containers to the transportation system.) Movement control organizations ensure that using agencies rapidly load and unload container cargo. Automatic identification technology (AIT) is used for reporting in-transit visibility.

2-51. Containers are routinely moved as far forward as the division area, consistent with availability of MHE. Containers are not "grounded" in the division area. Containers on chassis will be unloaded as soon as possible, while on the chassis, and the chassis and container returned immediately. The CROPs inside the container continue to move forward into the brigade area. CROPs are extracted from containers in the corps storage area and corps hub and loaded onto trucks with the load handling system for onward movement to the division area. Upon arrival in the division AO, flatrack management responsibility passes to the BCT movement manager. A flatrack control point is established at the division support area and the division ammunition storage area in the vicinity of their supply support activities.

2-52. Containers may be off-loaded from chassis onto the ground to permit continuous use of the chassis. Some containers may be transported on conventional military cargo semitrailers as well as on a container chassis. In either case, the following policies apply:

- Containers designated for storage purposes or for other use by the consignee are removed immediately from the transporting chassis or semitrailer at destination. The chassis is returned to transportation use.
- In operations where containers require lifting or placing from or onto other transporting vehicles, sufficient MHE should be made available to accomplish these tasks.
- Each transfer point should establish an external container inspection program.

2-53. External container inspections aid in determining liability for container damage and loss. Inspections should be made at the time of pickup and delivery to cover the time the containers are in the hands of the motor transport service. Inspection forms should be required and may be prepared and reproduced locally.

RETROGRADE

2-54. *Retrograde* is the process for the movement of non-unit equipment and materiel from a forward location to a reset (replenishment, repair, or recapitalization) program or to another directed area of operations to replenish unit stocks, or to satisfy stock requirements (JP 4-09, *Distribution Operations*). Retrograde includes turn-in, classification, preparation, packing, transporting and shipping. Its main purpose is to return containers, repairable equipment, and other cargo back to the supply or transportation systems for reuse, alternate use, or repair. It is also a means for carrying human remains, enemy prisoners of war, and personnel.

2-55. Retrograde is not a type of motor transport operation. Rather, it is a means and technique to increase the efficiency of the transportation system by taking advantage of vehicles that would otherwise be returned empty. Returning loaded equipment offers enhanced use of motor transport capabilities through the increase of tonnage hauled and ton-miles accomplished.

2-56. Retrograde movements should be coordinated through movement control channels. Requirements are identified, requested, or programmed like any other movement requirement. Synchronization is also required to ensure drivers receive accurate information. Communications forward is essential to reroute or divert vehicles in the forward area. Drivers may report to a different loading site some distance from their unloading point to pick up return loads. They may also pick up or deliver return loads anywhere along the return route. Vehicles can be used specifically to pick up retrograde loads if unacceptable delays are experienced due to either the requirement for vehicles to travel to a different location or a long delay in reloading.

MAINTENANCE AND REPAIR SERVICES

2-57. Vehicles engaged in line haul and relay operations may operate up to 20 hours a day for extended periods depending on truck crew availability. Such heavy usage increases maintenance requirements. To provide maintenance services at truck terminals, battalions (or other motor transport HQ) may detach the required maintenance personnel, tools, and equipment from assigned companies or request augmentation maintenance teams. Battalions may establish consolidated maintenance facilities that pool unit maintenance skills and resources, to either supplement or support unit level maintenance operations. Depending on the situation, a consolidated maintenance facility may be established by consolidating all unit maintenance personnel into one centralized area or pool under battalion supervision. Consolidation can also occur by tasking only the mechanics required to perform certain maintenance tasks under battalion supervision, or rotating company mechanics to the battalion maintenance service.

2-58. Semitrailers used in relay operations are away from the parent unit most of the time. Individual units cannot retain maintenance records and individual vehicle files for semitrailers used in the system. The central accounting office may maintain these files, and all other maintenance papers.

AREA SUPPORT OPERATIONS

2-59. In addition to clearance and line haul operations, motor transport units support local requirements that originate in and support the operations of bases at each echelon. These units provide supply, maintenance, and services to units stationed in or passing through their respective areas. Movement requirements are passed through normal movement control channels. These operations frequently involve the movement of small quantities of cargo and personnel to and from dispersed sites. As a result, light trucks up to 5-tons are normally most suitable for this function. Engineer track, heavy, or oversized equipment and Class IV materials may require specialized equipment such as 60-ton semitrailers, 25-ton low-bed trailers, pole trailers, as well as medium and heavy semitrailers.

DRIVE-AWAY OPERATIONS

2-60. Drive-away operations involve over-the-road movement of vehicles, other than assigned task vehicles of the motor transport unit. These operations include such over-the-road movements as —

- Driving pipeline and maintenance float stock vehicles coming into theater from points of entry to either supply activities or directly to receiving units.
- Driving such vehicles to points of exit from theater for re-deployment.

2-61. Drive-away operations vary in size. They may involve a one-time movement requiring driver support of truck company strength or less. They can also be extended operations requiring driver support by one or more motor transport units. The method of carrying out a drive-away movement depends on the distance involved and the duration and scope of the operation. This type of movement normally involves the standard convoy organization and operation. Driver requirements in a drive-away operation can be reduced by double-stacking semitrailers and loading smaller vehicles onto larger vehicles. The use of tow bars or tandem semitrailers is prohibited unless authorized by the HQ directing the move.

TRANSFER OPERATIONS

2-62. Transfer operations are conducted when conditions require transfer of cargo from one transportation mode or conveyance to another. Transfer points may be established at rail facilities, pipeline takeoff points, air terminals, ports, beach sites, or inland waterway terminals. Transfer operations are conducted by cargo transfer companies. Operations and required facilities for motor transport service at a transfer point are similar to those of a truck terminal.

CONVOY CONTROL

2-63. Convoy Control is exercised in two ways. The first type of control is organizational control, which is exercised by the unit executing the motor movement. The second is by the commander of the area through which the convoy moves, defined as area control.

Organizational Control

2-64. Organizational control is exercised by the moving unit before, during, and after movement. Effective organizational control requires march discipline. March discipline is a command responsibility that comes from effective organizational control and training. It is essential to the effectiveness of the march column to prevent conflict with other movements in the area. It can only be attained by thorough training, supervision of operations by technically competent leaders, and attention to detail.

2-65. To be successful in organizational control, the unit should maintain march discipline. There are many requirements in maintaining march discipline, including the proper use of qualified drivers to operate equipment safely under a variety of driving conditions. Soldiers should adhere to unit standard operating procedures (SOP) that specify tactics and techniques for movement, immediate action drills, and communications techniques. March discipline demands that units meet start point (SP), en route check point (CP), and release point (RP) times without failure by following prescribed routes, while strictly following traffic regulations, laws, speed limits and time and distance gaps. March discipline also requires effectively using protective measures, including vehicle intervals, radio discipline and blackout driving during night convoys. The proper observation and execution of safety policies and regulations is also vital to march discipline.

Area Control

2-66. Area control is exercised by the commander who controls the area and terrain through which convoys move. Area control is normally exercised through movement control channels and is known as route synchronization. Route synchronization is planned by the DTO for the division area or the Corps Transportation Office for the corps area, and is supervised by movement control teams assigned to the MCB and by MPs for traffic control.

2-67. Division, corps, and theater army distribution network designs and route synchronization plans specify the control measures applied to MSRs. Convoy commanders are responsible for ensuring that they follow policies in areas through which they will pass. Controlling traffic in an area of operations is difficult even under the best of conditions. There will always be competing demands for the available road network. Units cannot expect to be able to use all routes without requesting permission. Route synchronization planners establish control measures to ensure order and prevent congestion.

2-68. One method used to establish control is classifying MSRs and alternate supply routes (ASRs). These classifications are based mainly on the ability of a route to support the expected traffic volume and types of vehicles that will use the route. The classifications specify the degree of control required and whether moving units should submit a movement bid (clearance request) to use a route. The classifications will be specified in the route synchronization plan. There are five route classifications:

- *Open route*. The route is open to all types of traffic and the moving unit does not need to submit a movement bid to use the route.
- *Supervised route*. The route is open to most types of traffic. However, convoys of certain size, vehicles of certain characteristics, and certain slow-moving vehicles may require a movement

credit to use the route. The synchronization plan will specify the size of convoys or types of vehicles that require a movement credit.

- *Dispatch route*. Full control is exercised over a dispatch route. Priorities are set for use of this type route. A movement credit is required for the movement of any vehicle or group of vehicles.
- *Reserved route*. This type route is set aside for the sole use of certain units, specified operation, or type of traffic. If a route is reserved for a unit, then the commander of that unit decides how much and what kind of control is required.
- *Prohibited route*. No traffic is allowed over a prohibited route.

CONVOY OPERATIONS

2-69. A convoy is a group of vehicles moving from the same origin to a common destination and organized under a single commander for the purpose of control. Convoy operations provide flexibility and operational reach to the maneuver commander by allowing personnel, supplies, and equipment to be transported far forward on the battlefield.

Convoy Elements

2-70. Vehicles in a convoy are organized into groups to facilitate mission command. A convoy may be as small as a six vehicle march unit or as large as a 300 vehicle column. Whenever possible, convoys are set up along organizational lines, such as squad, platoon, company, battalion, and brigade. Convoy elements include march units, serials, and columns (see figure 2-3).

- *March units.* A march unit is the smallest element of a convoy. As the smallest subdivision of a column, march units may have up to 25 vehicles assigned. A march unit usually represents a squad to platoon size element. Each march unit has a march unit commander.
- *Serials.* A serial is a group of two to five march units. It represents approximately a company to battalion size element. Each serial has a serial commander.
- *Columns.* A column is a group of two to five serials. It represents approximately a battalion to brigade size element. Each column has a column commander.

2-71. For example, a medium truck company commander can organize his convoy as a serial by dividing the 60 task vehicles by platoons into three march units of 20 vehicles each. The company commander would then serve as the convoy commander and the platoon leaders would serve as march unit commanders. Remaining vehicles would be added to each march unit for mission command and convoy support.

2-72. Convoy commanders should not generally subdivide march units of 20 or fewer vehicles into smaller march units because of road space considerations. This will reduce the amount of road space taken up by the gaps between small march units. If the convoy commander determines that security requirements warrant greater separation between convoy elements, he could divide the 60 task vehicles by platoons into three serials of 20 vehicles each and further subdivide each serial by squads into two march units of 10 vehicles each. In this example, the platoon leaders would serve as serial commanders and the squad leaders as march unit commanders.

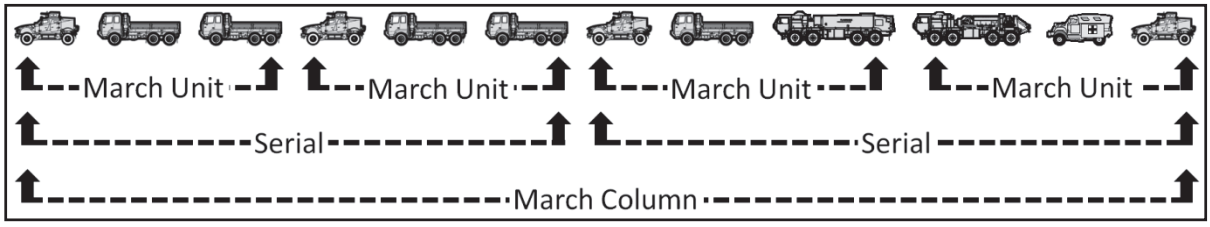

Figure 2-3. Convoy elements

Convoy Sections

2-73. Leaders must know how to position vehicles within the elements. All columns, serials, and march units, regardless of size, have three parts: a head, a main body, and a trail (see figure 2-4). Each of these parts has a specific function.

- *Head.* The head is the first vehicle of each column, serial, and march unit. Each head should have its own pacesetter. The pacesetter rides in this vehicle and sets the pace needed to meet the scheduled itinerary along the route. The officer or noncommissioned officer at the head ensures that the column follows the proper route. They may also be required to report arrival at certain checkpoints along the route. With the head performing these duties, the convoy commander has the flexibility to move up and down the column to enforce march discipline.
- *Main body.* The main body follows immediately after the head and consists of the majority of vehicles moving as part of the convoy. This is the part of the convoy that may be subdivided into serials and march units for ease of control.
- *Trail.* The trail is the last sector of each march column, serial, and march unit. The trail officer/NCO is responsible for recovery, maintenance, and medical support. The recovery vehicle, maintenance vehicles, and medical support vehicles/teams are normally located in the trail. The trail officer/NCO assists the convoy commander in maintaining march discipline. They may also be required to report clear time at checkpoints along the route. In convoys consisting of multiple march units and serials, the convoy commander may direct minimum support in the trail of each serial or march unit and a larger trail party at the rear of the column. As the trail party may be left behind to conduct repairs or recovery, the convoy commander should provide trail security and communications.

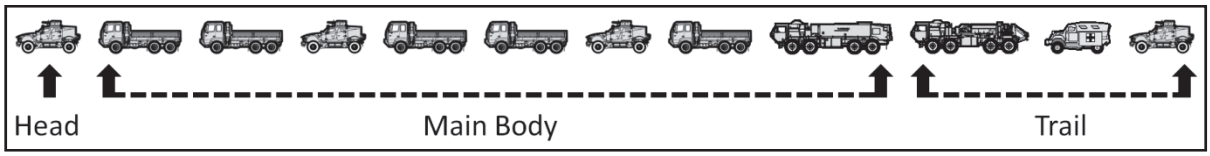

Figure 2-4. Sections of a convoy

Tactical Coordination

2-74. Tactical coordination is initiated when the concept of operations or convoy request is submitted. Tactical coordination through the operations officer allows the convoy commander to leverage battlefield assets, such as air support and artillery, along designated portions of the convoy route. It also ensures ground support by the tactical commander while transiting their AO if needed. It is important to have current frequencies and maintain scheduled convoy start point times when these assets are supporting the convoy.

Convoy Security

2-75. Convoy security is the responsibility of the convoy commander, though it may be delegated to another leader in the convoy. The convoy commander ensures the proper ratio of security vehicles or gun trucks to other vehicles in the convoy based on local or theater requirements and SOPs. If security is being provided by another unit the convoy commander is still overall responsible for the convoy's security and convoy operations. Battle drills for most likely and most dangerous enemy courses of action should be rehearsed prior to the convoy departing on its mission, at the very least talked through during the convoy brief.

Host Nation and Contracted Truck Integration

2-76. Supporting unified land operations may require the integration of host nation or contracted vehicles into convoys to assist with the transport of materiel across the AO. When integrating these vehicles into military convoys it is important to ensure security for the vehicles as they travel with the convoy. Placement of these vehicles may depend on organic vehicle composition of the convoy and the host nation

or contracted vehicles condition and cargo. It may be necessary to position these vehicles towards the front of the convoy to ensure the convoy's spacing and rate of march are manageable. This integration of host nation vehicles may require an interpreter to ensure the vehicle operators understand what is required of them. Based on operational security and local SOPs host nation vehicle operators may not be authorized to attend the convoy briefing or carry communication devices while on the convoy. General information should be shared in order to make the convoy operation run smoothly though specifics should be left out for operational security.

Note. For more detailed information on Convoy Planning, Operations, and Battle Drills see FM 4-01.45, *Multi-Service Tactics, Techniques, and Procedures for Tactical Convoy Operations* and NATO Standardization Agreement (STANAG) 2614 (Allied Tactical Publication 76, *Convoy Operations).*

SUMMARY

2-77. Motor transport units may be used in direct support of tactical operations or in intermodal operations. Truck companies function through various types and methods of hauling while supporting movement requests created by the supported units. Divisions may use organic or request augmented motor transport support where and when needed to displace heavy forces, move light forces, or provide mobility to HQs and equipment that is not road capable. Motor transport units are required to be as mobile as the supported unit at each echelon.

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Chapter 3

Motor Transport Units

This chapter outlines the mission and composition of truck companies and the relationship with their potential headquarters elements and provides a description of transportation units at the brigade combat team level. This chapter also details the duties and responsibilities of key leaders and personnel assigned to motor transport units.

THEATER SUSTAINMENT COMMAND

3-1. The theater sustainment command serves as the senior Army sustainment HQ for the Theater Army. The TSC provides mission command of units assigned, attached, or under its operational control. The mission of the TSC is to provide theater sustainment (less medical). It employs sustainment brigades to execute theater opening, theater sustainment, and theater distribution operations, and utilizes MCBs to regulate transportation networks. See ATP 4-94 for more information on the TSC.

3-2. The MCB controls the movement of sustainment resources into, within, and out of its assigned AO. The MCB commands between four and ten MCTs and is responsible to the highest level of sustainment HQs for the execution of the movement program and the performance of the transportation system. The MCB provides in-transit visibility of programmed moves and coordinates for the use of common user assets, including containers, 463L pallets, flatracks and trailers (see ATP 4-16, *Movement Control*).

EXPEDITIONARY SUSTAINMENT COMMAND

3-3. Expeditionary sustainment commands are force pooled assets that coordinate sustainment operations in designated areas of a theater. It normally deploys to provide mission command when multiple sustainment brigades are employed or when the TSC determines that a forward command presence is required. The ESC plans, prepares, executes, and assesses sustainment, distribution, theater opening, and reception, staging, and onward movement operations for Army forces in theater. It provides operational reach and span of control. It may serve as a basis for an expeditionary command for joint logistics when directed by the geographic combatant commander or designated multinational or joint task force commander. This capability provides the TSC commander with the regional focus necessary to provide effective operational-level support to Army or Joint task force missions (see ATP 4-94, *Theater Sustainment Command*). The ESC provides mission command of sustainment brigades and the MCBs assigned to the AO.

SUSTAINMENT BRIGADE

3-4. When deployed, the sustainment brigade is a subordinate command of the TSC, or by extension, the ESC. The sustainment brigade is a flexible, multifunctional sustainment organization, tailored and task organized according to METT-TC. It plans, prepares, executes, and assesses logistics operations within an area of operations. It provides mission command and staff supervision of sustainment operations and distribution management. As a result it serves as a single operational echelon providing operational level control of logistics support .

3-5. Sustainment brigades are primarily employed in a support relationship. Under certain METT-TC conditions, they may be under operational control of the Army forces commander when operating as the senior sustainment command or tactical control for operational area security or other types of operations. To accomplish a support mission, sustainment brigades are assigned combat sustainment support battalions or functional battalions, based on mission requirements.

3-6. The SPO mobility branch of the sustainment brigade receives movement requests from a DTO, MCB, or MCT, and can assign tasks to subordinate battalions. The SPO will also maintain communications with the

MCB for visibility and route deconfliction. The mobility branch determines transportation requirements for supported units; manages transportation capability and coordinates movement control to the brigade. The mobility branch balances transportation requirements against transportation capabilities to meet mission requirements.

COMBAT SUSTAINMENT SUPPORT BATTALION

3-7. The combat sustainment support battalion is a flexible and responsive unit that executes logistics throughout an area of operations providing transportation, maintenance, ammunition, supply, mortuary affairs, airdrop, field services, water, and petroleum. The mission of the CSSB is to provide mission command to organic and attached units, provide training and readiness oversight, and provide technical advice, equipment recovery and mobilization assistance to supported units. The CSSB is attached to a sustainment brigade and is the building block upon which the sustainment brigade capabilities are developed. The CSSB is tailored to meet specific mission requirements. Employed on an area basis, the CSSB plans, prepares, executes, and assesses logistics operations within an area of operations. The CSSB may also support units passing through its designated area.

3-8. Three to seven subordinate battalions may be attached to a single sustainment brigade. CSSBs may operate remotely from the sustainment brigade and therefore maintain communication capabilities with the sustainment brigade. The CSSB establishes voice communications to support mission command, convoy operations, and to monitor, update, and evaluate the logistics posture.

3-9. The CSSB SPO transportation section plans and coordinates transportation operations and develops the movement plan for CSSB distribution operations. Movement requests are received by the CSSB SPO transportation section. The CSSB SPO transportation section consolidates the movement requests, verifies the requirements, and assigns the tasks to a motor transport company assigned to the CSSB.

3-10. Transportation assets of the CSSB provide mobility of personnel and all classes of supplies. When tasked to provide theater distribution, sustainment brigades will be heavily weighted with transportation assets assigned to CSSBs, which would consist of heavy, medium or light-medium truck companies. These companies typically operate between the operational and tactical levels by distributing supplies to the BSB .

SECTION I – MOTOR TRANSPORT UNITS ABOVE THE BCT

3-11. Transportation companies provide lift capability for the operational sustainment mission of the sustainment brigade. Truck companies move personnel and materiel throughout the distribution system, while inland cargo transfer companies provide capabilities essential to the theater opening, port operations, and hub operations. Transportation companies are typically assigned to the CSSB or functional transportation battalions attached to sustainment brigades. This section of the chapter identifies and provides information on the general capabilities of transportation companies that might be attached to a CSSB or functional transportation battalion.

MOTOR TRANSPORT COMPANIES

3-12. Truck companies provide transportation for the movement of break-bulk cargo, containers, bulk water, petroleum products, preconfigured loads on flatracks, heavy lift combat systems, and personnel by motor transport. There are three basic types of truck companies: light-medium, medium, and heavy. For detailed information on vehicle capabilities see appendix J.

LIGHT-MEDIUM TRUCK COMPANY

3-13. Light-medium truck companies provide transportation support for the movement of bulk cargo, containers and personnel using the FMTV, which is comprised of the light medium tactical vehicle (LMTV) and the medium tactical vehicle (MTV). FMTVs are based on a common chassis that vary by payload and mission requirements. The LMTV has a 2.5-ton capacity (cargo and van models), while the MTV has a 5-ton capacity (cargo and long-wheelbase cargo with and without material handling equipment, tractor, van, wrecker, and dump truck models). The M1078 LMTV is a two axle, four wheel drive (4x4) vehicle designed to transport cargo and Soldiers. It has a payload capacity of 5,000 pounds and can be outfitted with MHE or a self-recovery

winch kit. The M1083 MTV is a three axle, six wheel drive (6x6) vehicle also designed to transport cargo and Soldiers, but with additional weight capacity of 10,000 pounds. These vehicles both perform local and line haul operations, are rapidly deployable worldwide and operate on primary and secondary roads, trails and cross-country terrain in all climatic conditions. Commonality of parts across varied truck chassis simplifies logistics requirements and significantly reduces operating and support costs. The organization of a light-medium truck company is depicted in figure 3-1.

3-14. The light-medium truck company has three FMTV truck variants, including the LMTV, MTV cargo and the MTV tractor. The M1088 MTV tractor truck is designed on the same chassis as the M1083 MTV, but is the prime mover for the M871 22.5T trailer. The M1088 can be equipped with a self-recovery winch. For every two FMTV cargo vehicles, there is one companion trailer assigned with the same cube and payload capacity as their prime movers. Also, for every MTV tractor assigned, there are two M871 22.5T tailors assigned.

3-15. Assuming a 100% total vehicle availability rate (TVAR), the light-medium truck company can provide 50 five-ton cargo vehicles with 25 trailers and 10 tractor semi-trailer combinations. See table 3-1.

Table 3-1. Light-medium truck company one time lift capability

Type	***100% TVAR***
Breakbulk General Cargo	313 STONS
Breakbulk Ammunition	563 STONS
Pallets	590
463L Pallets	105
Containers, Twenty foot (TEU)	10
Containers, Forty foot (FEU)	0
Water (SMFT)	30,000 GALS
Water (HIPPO)	20,000 GALS
Personnel (with equipment)	900

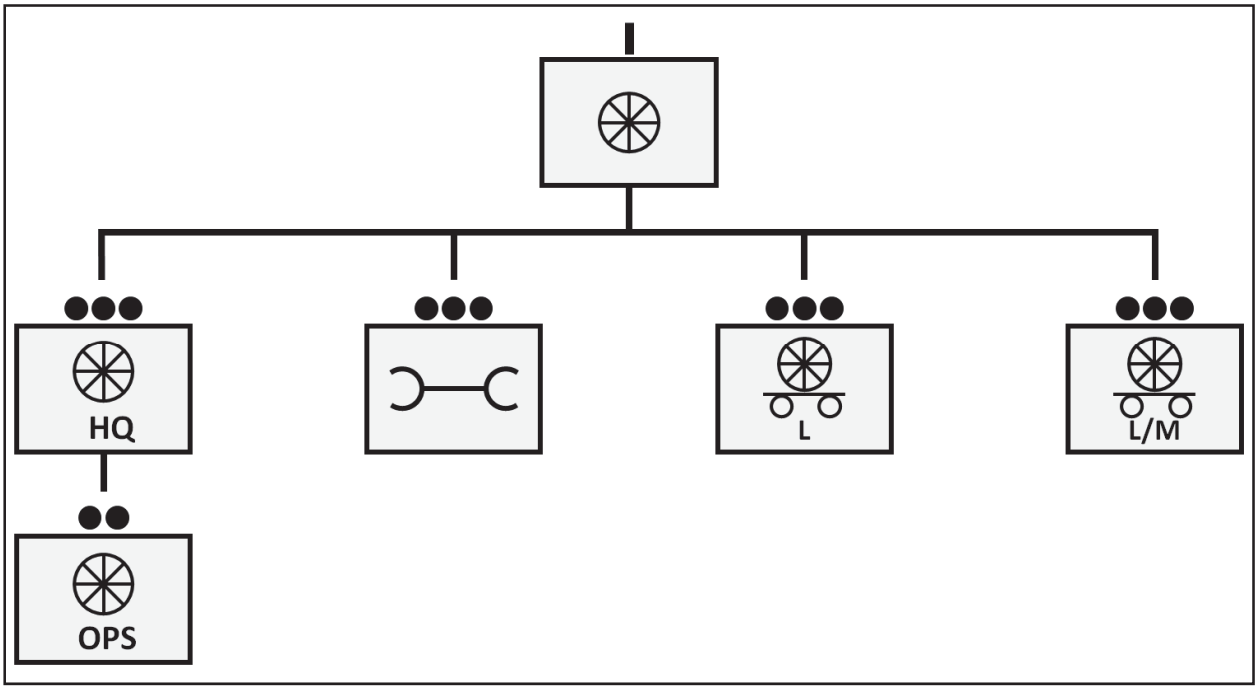

Figure 3-1. Light medium truck company

MEDIUM TRUCK COMPANY

3-16. There are several types of medium truck companies, including the PLS, general cargo or petroleum, oil, and lubricants (POL). The PLS company is comprised solely of PLS platforms, the general cargo company can be outfitted with the M915 series of line haul tractors or the MTV tractor with associated trailers, and the POL company contains MTV tractors with fuel trailers. The organization of a medium truck company is depicted in figure 3-2. The following provides a description of the different types of medium truck companies.

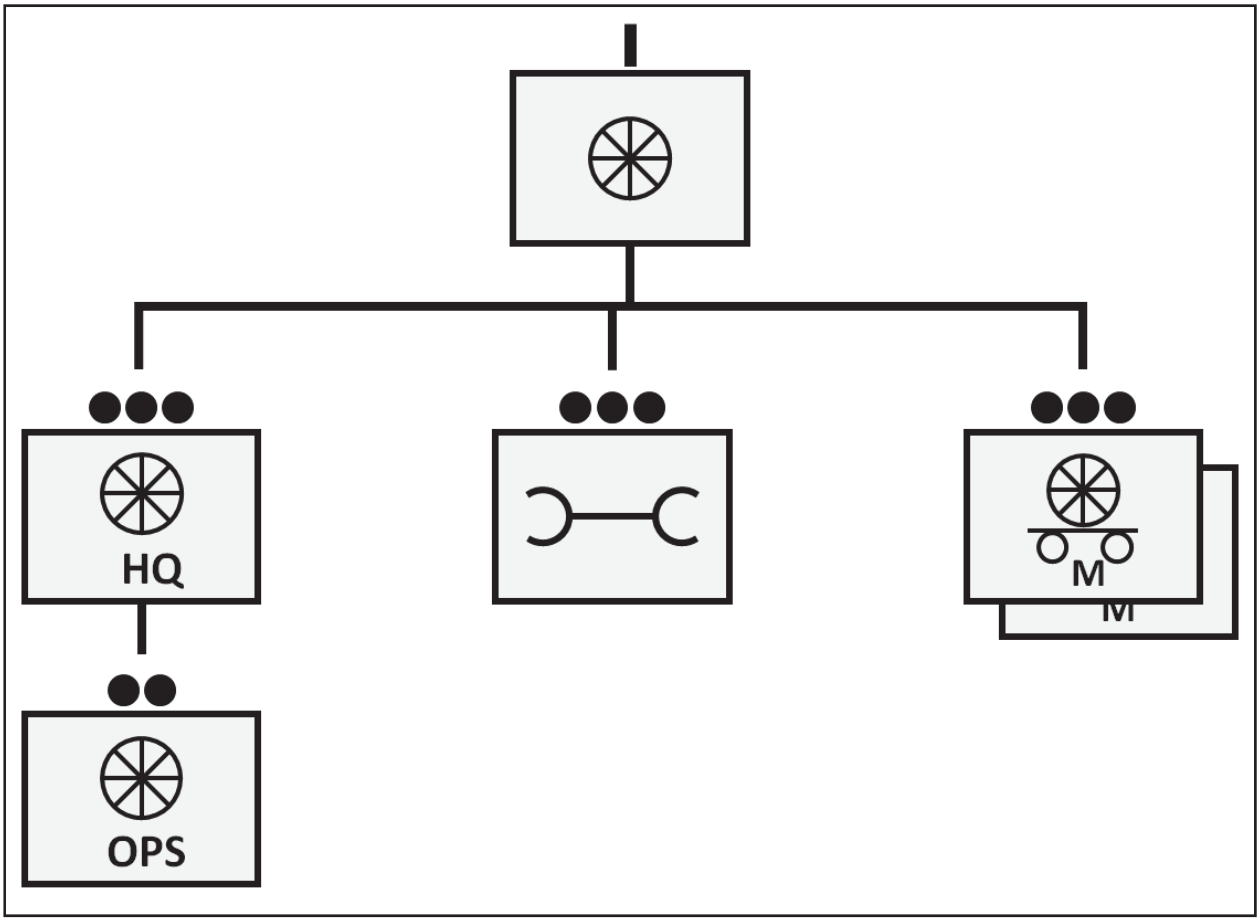

Figure 3-2. Medium truck company

PLS Truck Company

3-17. The PLS truck company's mission is to provide ground transportation for the movement of dry and refrigerated containerized cargo, and other breakbulk cargo, ammunition, and bottled water on PLS flatracks. PLS trucks have a self-load/off-load capability with a flatrack or a CROP, a central tire inflation system to enhance mobility, and are air transportable via C-5, C-130 and C-17, as well as deployable by rail and sea. CROP is NATO-interoperable and fits inside a single ISO container. The PLS is a tactical wheeled vehicle with a truck bed and flatrack that has a 16 1/2 ton maximum weight capacity. It can pull a PLS trailer that also has a 16 1/2 ton weight capacity for a total carrying capacity of 33 tons. The PLS truck has a hydraulic lifting system that loads and unloads both truck and trailer flatracks. A medium truck company (PLS) is authorized 60 trucks, 60 trailers, and 360 flatracks or CROPs. The PLS can be fitted with an ECHU attachment to load and unload the 20-foot container without using a flatrack. The ECHU cannot be used to load a container on to the M1076 trailer on its own, a flatrack or container transfer enhancement must be used. When the PLS is equipped with tank racks or HIPPOs, it can transport bulk petroleum products or bulk water based on the type of tank loaded. The self-load/unload capability of PLS, coupled with variations of the flatrack configuration, makes the system well-suited for a number of potential missions. These missions include cargo and shelter transport, unit mobility

and resupply, authorized stock listing mobility, recovery and evacuation, liquid cargo transport, and engineer bridge transport.

3-18. Assuming a 100% TVAR, the PLS truck company provides 60 vehicles and 60 trailers for mission operations, and when properly outfitted for the mission, has a one-time lift capability as indicated below in table 3-2.

Table 3-2. PLS truck company one-time lift capability

Type	*100% TVAR*
Breakbulk General Cargo	421 STONS
Breakbulk Ammunition	757 STONS
Pallets	960
463L Pallets	240
Containers, Twenty foot (TEU)	120
Containers, Forty foot (FEU)	0
Bulk Water	240,000 GALS
Bulk Fuel	300,000 GALS

Medium Truck Company Cargo

3-19. The medium truck company cargo's mission is to provide transportation for the movement of containerized, non-containerized, palletized, bulk water products, dry and/or refrigerated cargo. This company is employed in both local and line haul operations, primarily in the corps or division area of operations, in direct support of the theater movement plan. The cargo companies are authorized 60 vehicles and 120 trailers. There are two types of medium truck cargo companies, the 34T or the 22T.

Medium Truck Company Cargo (34T)

3-20. The Medium Truck Company Cargo (34T) is equipped with the M915 series tractor truck that tows the M872 40ft 34T semi-trailer. The M915 series tractor is generally utilized to support line haul operations, including efficient port clearance and intermodal operations, but can also support local hauls. The M915 series is a 14 ton, three axle, six wheel, four drive (6x4) tractor with a 52,000lbs gross vehicle weight rating and a 105,000lbs combined gross vehicle weight. The M872 trailer is a platform style, three axle, dual-purpose semi-trailer with a rated payload of 68,000 pounds. The 34T capacity and can support 40 feet of containerized or non-containerized cargo, including two twenty foot equivalent unit (TEU) containers or one forty foot equivalent unit (FEU) container on its open deck. The trailer can be equipped with a 5K Semi-Trailer Mounted Fabric Tank (SMFT), and can provide transportation capabilities for 4,750 gallons of bulk water. It could also be equipped with Load Handling System Compatible Water Tank Rack, commonly referred to as HIPPO, which is a 2,000 gallon potable water tank with an integrated pump, engine, alternator, filling stand, and a 70 foot hose reel with bulk suction and discharge hoses. The HIPPO is equivalent to one TEU; one M872 trailer can accommodate two HIPPOs. A trailer mounted with a SMFT cannot haul any other commodity. The unit is equipped with 60 M915s and 120 M872 trailers, but can only provide lift capabilities for 60 trailers at one given time.

3-21. Assuming a 100% TVAR, the Medium Truck Company Cargo (34T) provides 60 vehicles/trailers for mission operations and has a one-time lift capability indicated in table 3-3 below.

Table 3-3. Medium truck company cargo (34T) one-time lift capability

Type	*100% TVAR*
Breakbulk General Cargo	447 STONS
Breakbulk Ammunition	803 STONS
Pallets	1080
463L Pallets	240
Containers, Twenty foot (TEU)	120

Table 3-3. Medium truck company cargo (34T) one-time lift capability

Type	*100% TVAR*
Containers, Forty foot (FEU)	60
Water (SMFT)	285,000 GALS
Water(HIPPO)	240,000 GALS

Medium Truck Company Cargo (22T)

3-22. The medium truck company cargo (22T) is equipped with the M1088 MTV tractor that tows the M871 30ft 22.5T trailer. The M1088 MTV tractor truck is the same vehicle authorized in the Light-Medium Truck Company. The M871 trailer is similar to the M872 trailer, but is shorter and has less payload capacity (45,000 pounds). The trailer can be equipped with the 3K SMFT that provides transportation capabilities for 3,000 gallons of bulk water. It can also be equipped with the HIPPO (2,000 GALS), which is equivalent to one TEU and still have remaining cargo space. The unit is equipped with 60 M1088 MTV Tractors and 120 M871 trailers, but can only provide lift capabilities for 60 trailers at one time.

3-23. Assuming a 100% TVAR, the medium truck company cargo (22T) provides 60 vehicles/trailers for mission operations and has a one-time lift capability as indicated in table 3-4 below.

Table 3-4. Medium truck company cargo (22T) one-time lift capability

Type	*100% TVAR*
Breakbulk General Cargo	288 STONS
Breakbulk Ammunition	517 STONS
Pallets	840
463L Pallets	180
Containers, Twenty foot (TEU)	60
Containers, Forty foot (FEU)	0
Water (SMFT)	180,000 GALS
Water (HIPPO)	120,000 GALS

Medium Truck Company Petroleum, Oil, and Lubricant

3-24. The medium truck company POL's mission is to provide transportation for the movement of bulk petroleum products through the utilization of the MTV tractor with associated semi-trailer tanks. This company is employed in both local and line haul operations, primarily in the Corps or Division area of operations and provides either bulk or retail fuel distribution. There are two variants of the semi-trailer tank, the M1062 7.5k tanker and the M967 5k tanker. The medium truck company POL is authorized 60 MTV tractors (M1088), which is the same tractor authorized in the light-medium truck company. For every tractor assigned, there is one semi-trailer tank assigned, either a 7.5k or a 5k.

3-25. Assuming the medium truck company POL (7.5K) has a TVAR of 100% (60 vehicle platforms) and utilizing the 7.5k trailers to max capacity (7,500 GALS), the unit can provide a onetime lift capability for bulk fuel of 450,000 GALS.

3-26. Assuming the medium truck company POL (5K) has a TVAR of 100% (60 vehicle platforms) and utilizing the 5k trailers to max capacity (5,000 GALS), the unit can provide a onetime lift capability for bulk fuel of 300,000 GALS.

HEAVY EQUIPMENT TRANSPORT COMPANY

3-27. The heavy equipment transport company can provide a one-time lift of 96 tracked combat vehicles (one tracked vehicle per HET system). The mission of the HET company is port clearance, onward movement and tactical displacement of heavy maneuver forces. The HET company also performs recovery and evacuation

missions for equipment to higher levels of repair. One HET company can relocate an ABCT maneuver force in one lift.

3-28. Management and visibility of HET systems, which consist of the M1070 truck tractor and the M1000 heavy equipment transporter semi-trailer, are particularly critical when supporting a heavy force. HETs are designed to transport payloads of up to 70 tons (primarily Abrams tanks). Maneuver commanders rely heavily on the capabilities the HET company brings to an operation, which includes transport, recovery and evacuation of combat-loaded main battle tanks and other heavy tracked and wheeled vehicles across the area of operations. Movement control interface and movement planning is essential because routes should be able to accommodate the weight and width of HETs. The organization of the HET company is depicted in figure 3-3.

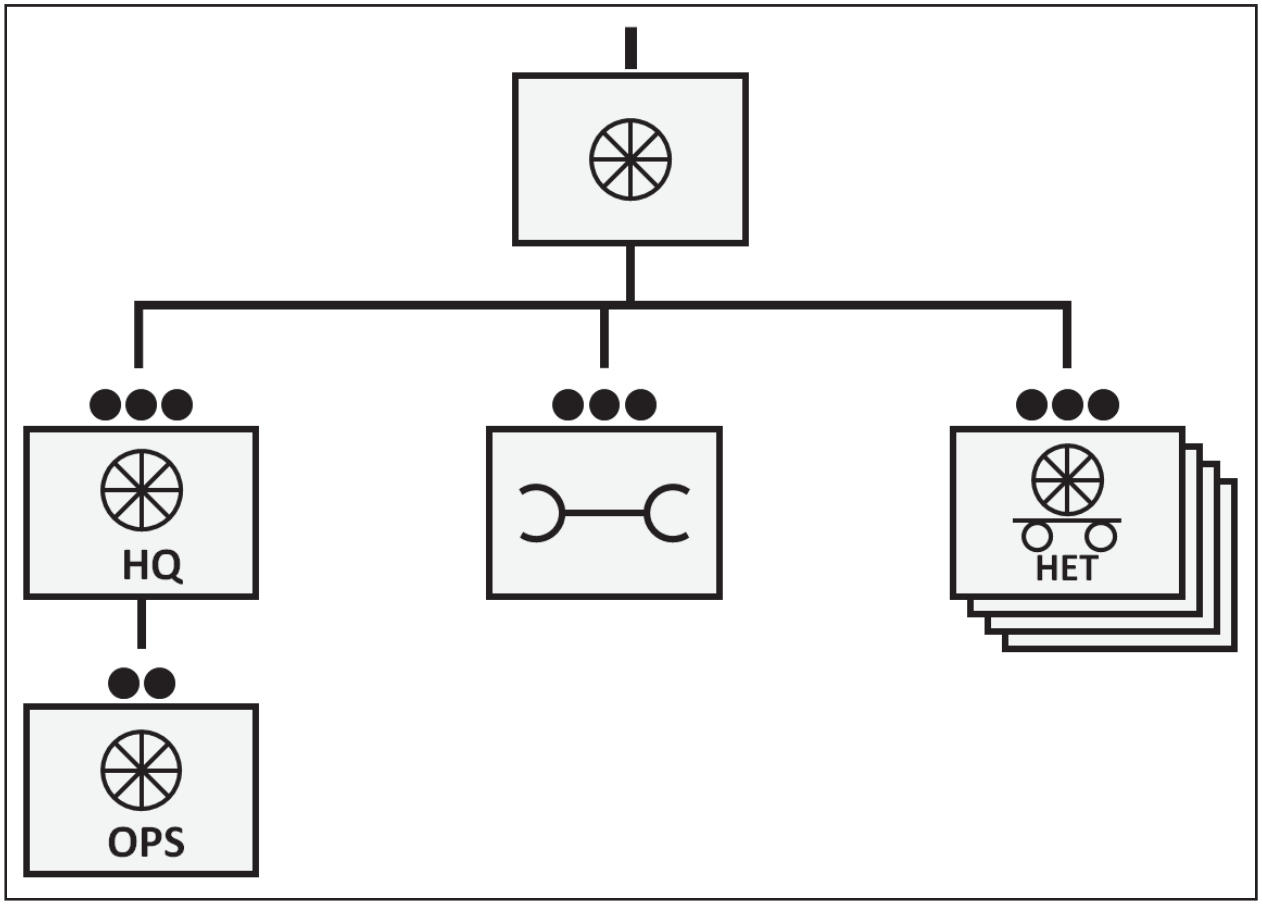

Figure 3-3. Heavy equipment transport (HET) company

COMPOSITE TRUCK COMPANIES

3-29. Being fielded in Fiscal Year 2015, the composite truck company (CTC) consists of two designs: heavy and light. Each is designed to maintain efficiencies at the theater and corps, and provide tailored direct and area support to the division and corps elements. Comprised of four truck platoons, each organized with a single type of task truck and embedded convoy protection platforms under a standard headquarters.

Composite Truck Company (Heavy)

3-30. Designed to support armored divisions the CTC (Heavy) consists of 40 PLS trucks and 40 PLS trailers, 18 HET systems, 20 MTV Cargo trucks and 20 trailers, and 20 Mine Resistant Ambush Protection Vehicles. This company performs transportation and convoy security support to sustainment brigade operations for a heavy division. It provides transportation assets for the movement and distribution of dry and refrigerated containerized cargo, general non-containerized cargo, ammunition, bottled water, and bulk water (when

equipped with tank racks/hippos). The CTC assists with unit moves and transports heavy equipment, tanks, and oversized loads. It may also provide security escort for contracted trucks. This company is employed in the brigade and division area of operations. It is capable of conducting both line haul and local haul missions in all threat environments. The organization of a composite truck company (heavy) is depicted in figure 3-4.

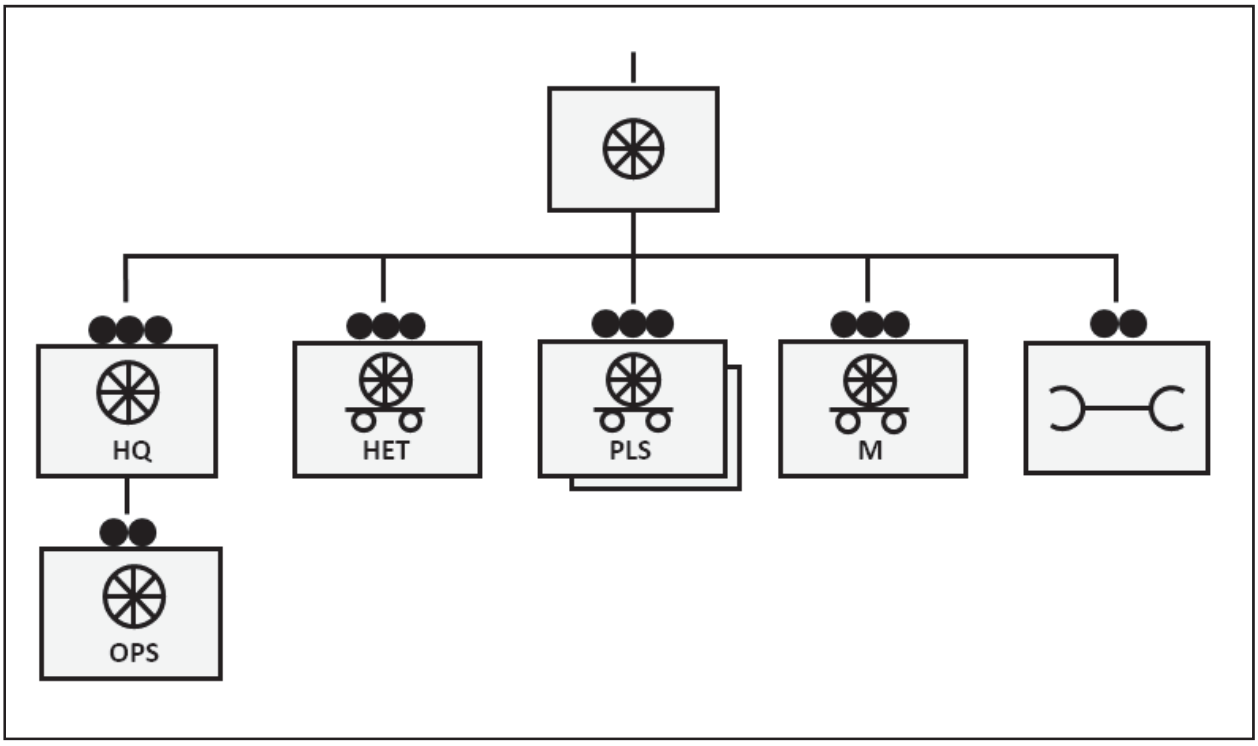

Figure 3-4. Composite truck company (heavy)

Composite Truck Company (Light)

3-31. Designed to support light divisions and corps headquarters the CTC (Light) is equipped with 40 PLS trucks and 40 PLS trailers, 40 MTV Cargo Trucks and 40 trailers, and 20 Mine Resistant Ambush Protection Vehicles. The CTC Light performs transportation and convoy security support to Sustainment Brigade operations for a Light Division or Corps Headquarters. Provides transportation assets for the movement and distribution of dry and refrigerated containerized cargo, general non-containerized cargo, ammunition, bottled water, and bulk water (when equipped with tank racks/hippos). Assists with unit moves, transports personnel, and provides security escort for contracted trucks. The organization of a composite truck company (light) is depicted in figure 3-5.

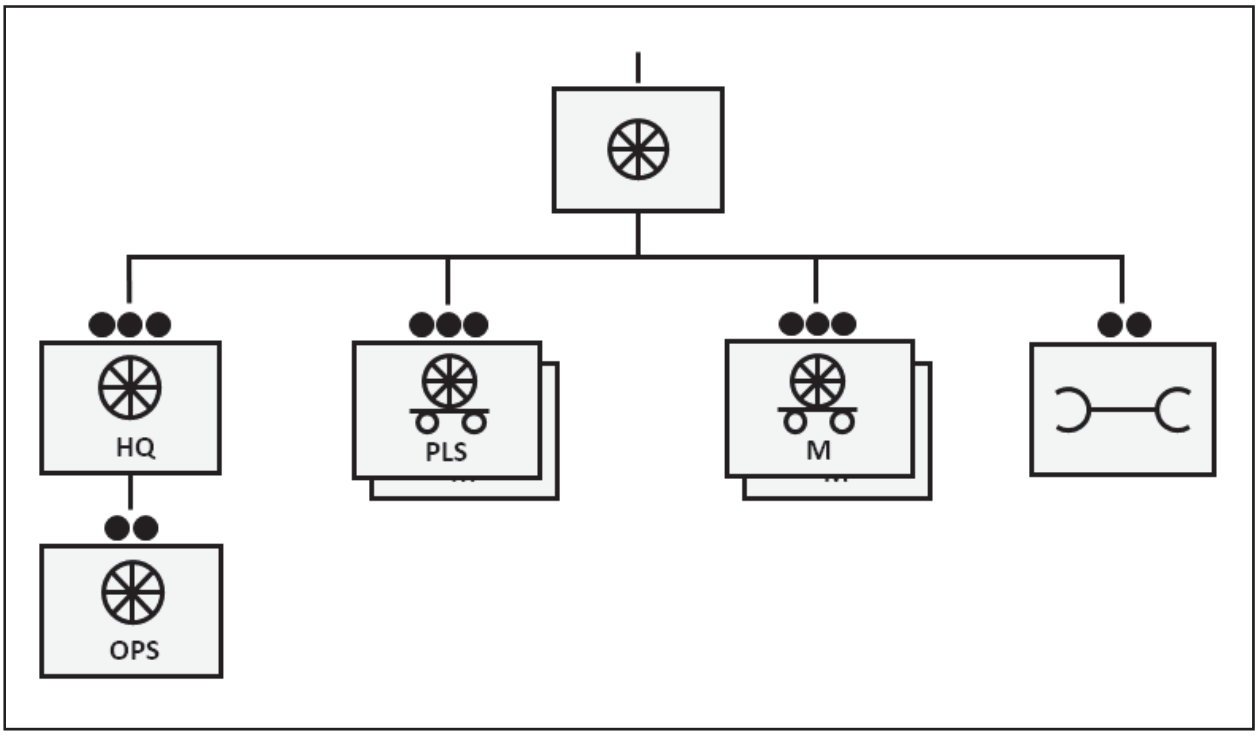

Figure 3-5. Composite truck company (light)

SECTION II – MOTOR TRANSPORT UNITS BELOW THE BCT

3-32. The BCT is the primary maneuver force and BSBs provide a variety of capabilities organized for decisive action. To meet requirements of the BCT, logisticians utilize actionable data provided by automation systems such as Battle Command Sustainment Support System (BCS3). Logisticians are linked to decisive operations with near real time information allowing staff officers and commanders the ability to plan transportation operations.

3-33. Transportation requirements at the BCT are accomplished through the utilization of the BSB and associated FSCs. BSBs and FSCs are specifically designed and task organized to meet the transportation requirements for multifunctional brigades. CSSBs transportation units provide support to the BSB and the BSB provides support to the FSCs.

SPO TRANSPORTATION SECTION

3-34. Transportation support to the BCT is accomplished through the BSB SPO transportation section. Movement requests are submitted from the brigade S4, or maneuver battalion S4 if external support is needed, to the SPO transportation officer. The SPO transportation officer verifies the requirements and asset availability, then sends the tasking to the BSB S3 who tasks the distribution company to support the brigade's requirements.

DISTRIBUTION COMPANY IN A BRIGADE SUPPORT BATTALION

3-35. The mission of the distribution company is to provide transportation, supply, Class III, and water support to the BCT. This unit is employed in the BSA and operates as part of the BSB with subordinate elements that operate throughout the BCT area. BSB distribution companies have three platoons consisting of a distribution platoon, supply platoon and a fuel and water platoon. Distribution companies in the different types of BSBs are similar, with the major difference being a more robust fuel section in the ABCT BSB, a more robust ammunition transfer and holding point section in the maneuver enhancement brigade BSB, and a mobility section added in the infantry brigade combat team BSB for movement of personnel. The distribution company

has the capability to conduct replenishment operations in support of the BCTs tactical mission by providing unit distribution to FSCs. The distribution company receives supplies coming from the supporting sustainment brigade with the capability to store these supplies and issue them to units within the BSA and to the FSCs.

3-36. This unit provides the planning, direction, and supervision of supply distribution and transportation support to the BCT, daily receipt, temporary storage, and issue of supply classes I, II, III, IV, V and IX to the BCT. The distribution company also provides for the transportation of cargo and the water purification and distribution for the brigade, including the brigade's authorized stocks list. For more information, see FM 4-90, *Brigade Support Battalion*.

3-37. The distribution company performs their mission through the utilization of a variety of equipment. Based on the BCT it supports, it can be equipped with the PLS, variants of the HEMTT or FMTVs. The most typical variants of the HEMTTs prevalent in the distribution company are the M1120 HEMTT LHS and the M977 HEMTT Cargo. The LHS is similar to the PLS, but differs in payload capabilities, as its maximum capacity is 13 tons. The LHS is also a four axle, eight wheel drive vehicle (8x8) compared to the PLS (10x10). The LHS uses the same flatracks, CROPs, ECHU, container transfer enhancement, and trailer (M1076) as the PLS and can be equipped with water or fuel racks to transport bulk products as necessary. The HEMTT Cargo is a 10 ton, 8x8 vehicle that is equipped with a material handling crane (lift capacity varies based on model).

TRANSPORTATION PLATOON

3-38. The transportation platoon provides direct transportation support to the brigade and distribution of supplies to the FSCs. There are a differing number of truck squads in the transportation platoons of the supported BCTs; the ABCT and Stryker brigade combat team BSBs each have four, the infantry brigade combat team BSBs have three, maneuver enhancement brigade BSBs have two and the Fires brigade BSBs have one. The infantry brigade combat team BSB also has mobility squads to move personnel around the area of operations.

DISTRIBUTION PLATOON IN A FORWARD SUPPORT COMPANY

3-39. The FSC provides its maneuver battalion with field feeding, water, bulk fuel, general supply, transportation, ammunition, and field maintenance in a direct and habitual support relationship. The distribution platoon consists of the platoon headquarters, Class III section, general supply section and the Class V section. The Class III section provides retail Class III bulk fuel distribution to the battalion. The general supply section provides the distribution of classes II, III(P), IV and IX to the supported battalion. The Class V section provides the distribution of ammunition to the supported battalion (for more information, see FM 4-90, *Brigade Support Battalion*).

3-40. Distribution platoons, similar to distribution companies, are equipped with a variety of vehicles to support their mission. They can be authorized to have the PLS, LHS and variants of the HEMTT based on the unit it is designed to support.

3-41. Some exceptions to the distribution platoon include the Stryker brigade combat team, whose BSB does not have FSCs. The other more noticeable difference in the organization of the distribution platoon is that the airborne infantry brigade combat teams have a specific transportation section in their distribution platoons for the movement of infantry Soldiers. Figure 3-4 illustrates general distribution from the BSA to the FSC and forward.

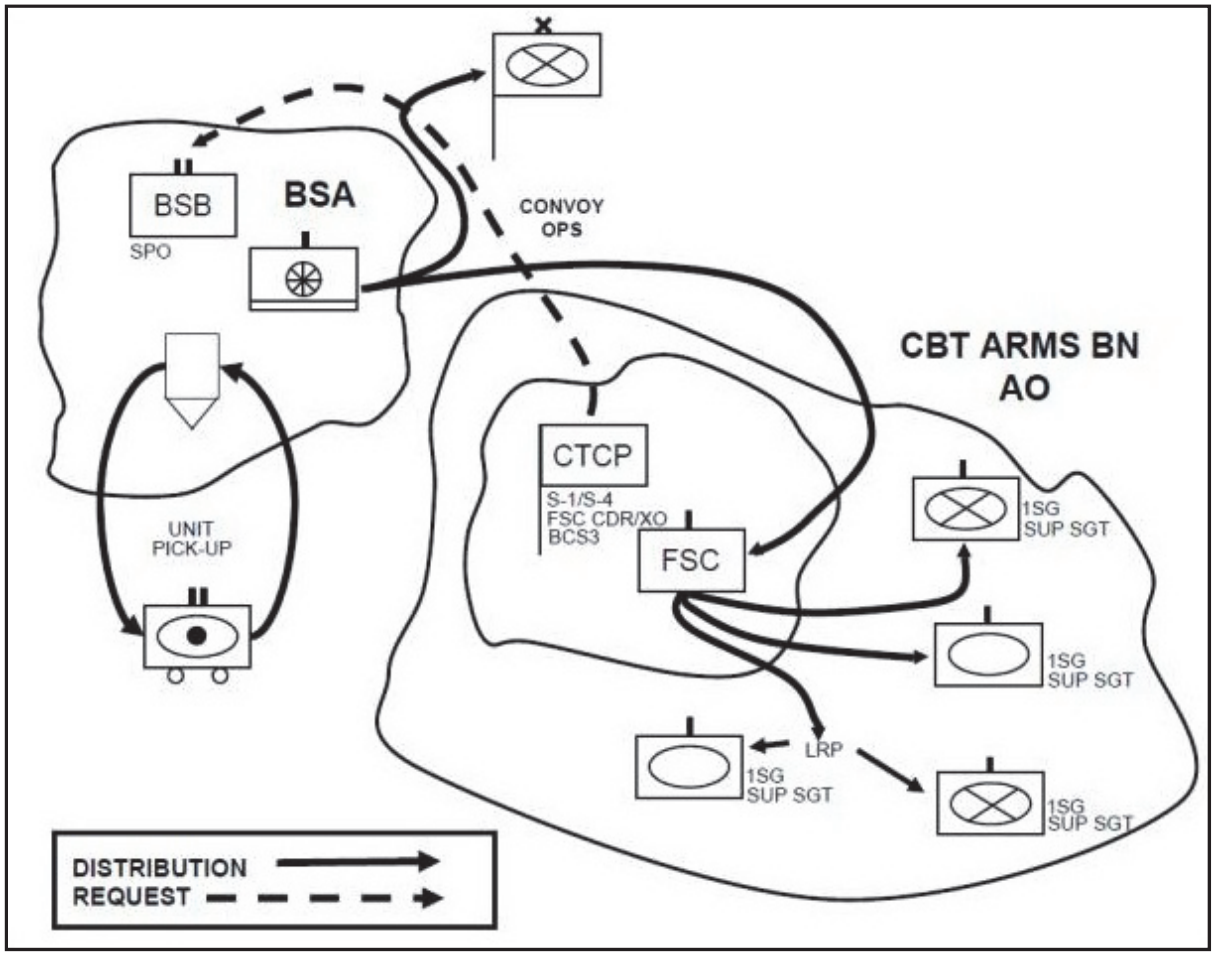

Figure 3-4. General distribution concept

SECTION III – PERSONNEL ROLES AND RESPONSIBILITIES

3-42. Motor transport units vary in the type of assets authorized and the capabilities of assigned equipment. Key leaders and personnel generally have the same duties and responsibilities, regardless of authorized equipment. The following describes the duties and responsibilities of key personnel in a motor transport unit.

COMPANY COMMANDER

3-43. The company commander is overall responsible for mission accomplishment and the training, safety, security, and discipline of assigned Soldiers. The commander leads the company by planning, directing and supervising company operations to accomplish the mission. The commander guides the unit in carrying out its primary mission of providing efficient and effective transportation support. The commander is the key individual in mission command and understands, visualizes, describes, directs, leads, and assesses throughout all phases of operations and employment of the unit. The commander maintains accountability and visibility of employed company assets and personnel, and maintains a high degree of operations security. The commander establishes unit policies, procedures and SOPs. The commander also enforces the principles of supply economy through proper use, care, maintenance, and accountability of individual and organizational equipment and material. Standards and practices are emplaced to ensure a high degree of unit readiness is achieved and maintained. The commander is assisted and advised by company officers and key noncommissioned officers in performing required duties, and is responsible to instruct, develop and mentor subordinates. In a brigade combat team, the company commander's responsibilities are to execute the BCT and BSB commanders' distribution plans in support of the BCT commander's scheme of maneuver. The commander should manage task

organization and employment of all distribution assets, collaborate and coordinate with the BSB SPO and BN S4 to determine the best distribution concept of support.

FIRST SERGEANT

3-44. The first sergeant (1SG) is the senior noncommissioned officer in the company and assists the company commander in providing efficient and effective transportation support. At the direction of the commander, the 1SG is employed throughout operations to extend command influence, assess morale of the force, adjust administrative requirements to aid in mission accomplishment, and assist during critical events. The 1SG carries out policies and enforces standards for the performance, individual training, conduct and discipline of enlisted Soldiers. The 1SG maintains accountability and visibility of employed company assets and personnel and is responsible for the health, welfare, morale, readiness, and professional development of all assigned Soldiers. The 1SG is the senior enlisted advisor to the commander on all matters, to include operations, administration, promotion, retention, awards, and physical readiness training. The 1SG also supervises and enforces maintenance and accountability of individual and company assigned equipment. The 1SG is the commander's primary logistics and tactical advisor and is an expert in collective skills. The 1SG helps the commander and executive officer (XO) plan, coordinate, and supervise all logistics activities that support the company mission. The 1SG collects data for the company logistics situation report and personnel status report and forwards each to the battalion administrative and logistics operation center. The 1SG will conduct training and ensure proficiency in individual and collective tasks, while executing and supervising routine operations. The 1SG will receive incoming personnel, assigns the personnel to subordinate elements and maintain foundations for company discipline. The 1SG will also coordinate for the movement of Soldiers killed in action to the supporting mortuary affairs collection point.

OPERATIONS SECTION

3-45. The operations section provides coordination between operating elements of the truck platoons, maintenance platoon, and tasking unit. The operations section consists of an operations officer, truckmaster, and dispatcher. The following describes their positions and duties.

Executive Officer or Operations Officer

3-46. Under the guidance and direction of the commander, the operations officer prepares and executes operational plans for the company. The operations officer assists the commander in coordinating, supervising, and controlling company operations. The operations officer coordinates logistics, maintenance, medical, and food service support. Coordination is conducted directly with the battalion S3 and operating elements of the truck platoons, maintenance platoon, and tasking unit to provide efficient, effective and timely support. The operations officer receives requests for motor transport support, conducts planning, and, with the commander's approval, assigns specific operational tasks to subordinate platoons. The operations officer maintains visibility on mission progress by operating the company's communication net control station. The operations officer prepares operational SOPs, maintains visibility over all employed company assets, and maintains situational awareness of current road network data.

3-47. Depending on the task organization and mission of the unit, a Lieutenant is assigned in the company headquarters with either the title XO or Operations Officer, both of which act in the same capacity (for simplicity, this description will use the title XO). The XO is the company second in command and is the primary internal logistics planner and coordinator. He and the company headquarters section serve as the company staff and operate the company command post. The company XO conducts continuous battle tracking and ensures that timely tactical reports are sent to the tactical operations center. The XO, in conjunction with the 1SG, plans and supervises the company logistics and defense effort before, during, and after the battle. He will plan the company OPORD for the commander, and conduct tactical and logistics coordination with higher, adjacent and support units. The XO will also assume command of the company in the absence of the commander.

3-48. The operations officer also:

- Receives and distributes vital intelligence information to subordinate platoons.

- Maintains and forecasts operational readiness data and vehicle availability rates with assistance from the maintenance control officer.
- Establishes procedures for dispatching, security and performs inspections as necessary.
- Responsible to request road clearance for convoys and for the movement of oversized loads.

Truckmaster

3-49. The truckmaster is the operations assistant to the operations officer and the company commander. The truckmaster assists in the coordinating, supervising, and controlling of company transportation. The truckmaster participates in convoy planning and enforces march discipline. Truckmasters supervise, through the unit dispatchers, all dispatching and routing of company vehicles. They assist the operations officer in creating operational plans, preparing reports, conducting inspections, and maintaining visibility of employed company assets and personnel. The truckmaster coordinates with platoon sergeants and the maintenance officer on all maintenance related matters and coordinates to ensure complete knowledge of statuses, vehicle availability and maintains documentation on unit accident reports. The truckmaster also enforces environmental laws, regulations, and reconnoiters routes.

3-50. The truckmaster supervises vehicle operations and enforces safety rules, and reports evidence of vehicle neglect, abuse or operator carelessness. The truckmaster maintains driver qualification records on unit personnel, ensures each Soldier is properly trained before being licensed and should be satisfied that training is conducted according to standards. For this reason, the truckmaster is normally assigned the additional duty of the company master driver. The truckmaster records safe driving mileage accumulated by unit drivers and advises the commander of personnel eligible for safe driving awards. The truckmaster is required to be licensed on all available company vehicles and conducts road testing and qualifications.

Dispatcher

3-51. The dispatcher, under the supervision of the truckmaster, operates the company vehicle operations center. Dispatchers assemble transportation requests and work with the operations officer and truckmaster to assign the requests to platoons. After validated requests are assigned, the dispatcher will maintain visibility on the vehicles and drivers selected to execute the mission. The dispatcher will also note the requestor, type and quantity of cargo requested for movement, number of vehicles needed, length of time necessary for the mission, and disseminate applicable information to platoon leadership as necessary. The dispatcher will also maintain a vehicle dispatch board with important information, to include number and type of assigned vehicles, detailed vehicle maintenance statuses, current and projected vehicle and personnel asset availability with locations, and should note amount of drivers with specific qualifications by platoon.

3-52. Dispatchers are normally the custodians of vehicle logbooks. They verify entries and ensure that records are maintained manually and electronically as prescribed by DA Pamphlet 750-8 and local directives. Dispatchers are responsible to check departure and return times for vehicles, and issues, collects and ensure the completion of trip records. They maintain records of miles traveled, fuel and oil consumed, trip frequency, elapsed time, cargo and tons moved and anything else directed by superiors. The dispatchers report vehicle and record discrepancies and assist the operations section in maintaining visibility of employed company assets.

MOTOR TRANSPORT PLATOONS

3-53. The motor transport platoon contains a platoon leader, platoon sergeant, squad leaders, and drivers. The motor transport platoon provides the personnel and equipment the company requires in order to fill vehicle task requirements. The platoon provides supervision and technical guidance to truck squads in the execution of motor transport duties.

Platoon Leader

3-54. The platoon leader is responsible for overall accomplishment of any mission directed by the commander, normally including hauling cargo and personnel. The platoon leader is responsible to ensure the commander's intent and end-state are met in completing assigned missions. The platoon leader is responsible for the training, discipline, health, welfare and morale of his Soldiers. Most importantly, the platoon leader is responsible for the

overall readiness of his platoon. He is also responsible for the proper use, care, maintenance and accountability of individual and organizationally assigned equipment.

3-55. The platoon leader supervises the platoon training and operations. They also conduct inspections on vehicle preventive maintenance checks and services and consistently maintain accountability and availability of assets and personnel. The platoon leader is responsible for supervising platoon personnel in convoy operations and enforces discipline and control as the convoy commander. They ensure drivers are practicing safe driving techniques and will perform preliminary investigations when platoon personnel are involved in accidents. The platoon leader also enforces environmental laws and regulations.

3-56. The platoon leader should emplace standards and practices to ensure a high degree of readiness is achieved and maintained, as the platoon can be deployed as a separate entity to the company. The platoon leader should make certain the platoon's ability to function autonomously. Inspections of platoon member's individual clothing and equipment for serviceability and accountability are conducted as required. They maintain records of individual readiness, to include overall health and physical readiness, and will maintain individual qualifications. If deployed separately, the platoon leader may be required to integrate the platoon into a new unit, or function in a capacity similar to the commander. In such a situation, the platoon leader is responsible for the administration, operations, supply and security of the platoon. The platoon leader should also be encouraged to act on initiative to exercise those command and leadership qualities required of the position.

Truck Platoon Sergeant

3-57. The platoon sergeant is the assistant to the platoon leader, and is the senior NCO in charge of the platoon. The platoon sergeant assists in training the platoon and supervises both its tactical and technical operations. The platoon sergeant coordinates the duties of the squad leaders, and directs the drivers of the platoon in truck and convoy operations. The platoon sergeant coordinates platoon operations with other platoon sergeants and the truckmaster. The platoon sergeant also trains, supervises, inspects and validates training, driver maintenance and vehicle loading techniques. The platoon sergeant is responsible to manage squad training and operational activities. The platoon sergeant provides guidance on military regulations and civil laws pertaining to motor vehicle operations, including training, to the platoon leader. The platoon sergeant is responsible for coordinating with the maintenance sergeant for the repair of vehicles that need service beyond the platoon's capability, and is required to inspect vehicles to ensure the performance of driver maintenance. The platoon sergeant coordinates administrative requirements for the platoon and maintains visibility of employed platoon assets and personnel. The platoon sergeant enforces and trains all Soldiers on safety rules, driving techniques, environmental laws and regulations. The platoon sergeant also is responsible for the use, care, and accountability of assigned equipment, including the accountability of vehicle basic issue items. During operations when the platoon is deployed separate of the company, the platoon sergeant assumes all administrative duties usually performed by the first sergeant.

Squad Leader

3-58. Each truck squad is assigned personnel to operate assigned vehicle platforms. Squad leaders are responsible for their assigned Soldiers and responsible to the platoon leader and platoon sergeant for their training, discipline, and performance. They train and direct squad personnel in driver maintenance, correct loading techniques, safe driving practices, and supervise the maintenance of equipment. They report vehicle deficiencies beyond their squad's capacity to the platoon sergeant for corrective measures. Squad leaders develop individual training that directly compliments and relates to the platoon collective tasks and the company mission essential task list. Squad leaders maintain visibility of employed assets and personnel and are responsible for the use, care and accountability of their squad's equipment. Prior to missions, squad leaders ensure each Soldier is familiar with route, destination and mission, and supervise mission execution.

Distribution Platoon Leader in the Forward Support Company

3-59. The distribution platoon leader in the FSC is responsible for training, discipline, morale, health and welfare of their platoon, and to provide direct transportation support to their maneuver battalion. The platoon leader provides mission command of his platoon and is responsible to manage the transportation and distribution of Class II, III, IV, V, and IX to the supported battalion, and manages transportation assets, including material readiness and logistics package operations. The distribution platoon leader provides retail

Class III (B) to the supported battalion and Class V unit distribution to battalion maneuver units. The distribution platoon leader is responsible to receive and issue Class V from the BSB ammunition holding and transfer point to the supported battalion. The platoon can conduct simultaneous Class III and Class V retail support. The platoon leader also provides order, receipt, and issue capability for classes II, III(P), IV, and IX from the distribution company. The platoon headquarters is not augmented with dispatchers and the FSC does not have a truckmaster; therefore, the platoon leader is responsible for their roles and can delegate as appropriate. See paragraphs 3-49 and 3-51 for more details on the truckmaster and dispatcher, respectively. However, the platoon leader is assigned a material control specialist to assist in the receipt, issue and constant accountability of all pertinent classes of supplies.

Material Control Specialist

3-60. The material control specialist is assigned to the distribution platoon headquarters and assists in the overall accountability of classes II, III, IV, V and IX. The material control specialist will establish and maintain stock records and other necessary documents to verify inventory, material control, accounting and supply reports. The Soldier can help load, unload, inspect, verify, segregate, palletize and store incoming supplies and equipment to facilitate the platoon's mission. All other duties are at the discretion of the platoon leader and the platoon sergeant.

TRUCK CREW

3-61. A truck crew consists of two Soldiers; one driver and an assistant driver. The positions for each Soldier is described below:

Driver

3-62. Well-trained and responsible drivers are the backbone of an efficient motor transport unit. They should know their vehicle, driver maintenance, convoy operations, and proper loading and uploading techniques. Drivers are responsible for the safe operation of their vehicles and for the safe and prompt delivery of their loads. The driver is responsible to operate assigned vehicles and effectively transport cargo or personnel between designated points, following routes and instructions given by their squad leader. The driver should be able to operate the vehicle under blackout conditions and over difficult terrain, and be familiar with the winch of the vehicle, if equipped. Although drivers may not physically load their vehicle or trailer, they are responsible to ensure loads are properly secured against inclement weather, pilferage, and damage due to terrain. The driver is required to be knowledgeable on the operation of radios, various types of communications systems and all weapons mounted to the vehicle. The driver is required to perform preventive maintenance checks and services on their assigned vehicle and correct or report all vehicle deficiencies. They will support mechanics as necessary and are responsible to service the vehicle with oil, fuel, water and other lubricants or coolants as prescribed. The driver will maintain tire pressure and change tires as needed. The driver is also responsible to prepare the vehicle for any type of operation, including movement by air, rail or vessel. The driver completes individual driver trip records, gathers information for accident reports, camouflages their vehicle, and complies with environmental laws and regulations. The driver may also perform vehicle self-recovery.

Assistant Driver

3-63. The assistant driver should be licensed and able to perform the same duties as the primary driver. Overall, the assistant driver provides support for the driver and maintains constant vigilance and situational awareness during operations. The assistant driver also assists the driver as the ground guide and relays signals to other vehicles in the convoy. The assistant driver observes routes, highway markers, and the driver for signs of fatigue. The assistant driver is the primary operator for radios, communication and navigation systems while en route. The assistant driver is also responsible to assist the driver with tasks before, during, and after movements.

MASTER DRIVER TRAINER

3-64. Master driver trainers (MDTs) provide commanders at the brigade/battalion level the capability to develop, execute, and maintain the echelon of driver's training required to safely and efficiently execute war

time missions. MDTs are responsible for managing standardized training programs that trains, executes and maintains unit level driver's training required to safely and efficiently execute unit missions. They advise commanders on developing and implementing training programs IAW Army regulations including: operator safety, risk management, accident avoidance, field expedients, vehicle recovery, operation of MHE, convoy operations and security, vehicle loading and security, load planning, transportation of hazardous materials, driver's training aids, devices, simulators and simulations integration and new equipment training. MDTs are the subject matter expert that bridges the training gap and are the single point of reference for the execution of the Army Drivers' Training Strategy within commands.

SUMMARY

3-65. Motor transport units are designed to provide a wide range of transportation support, depending on their organization. There are multiple types of motor transport units that are all specifically designed and equipped to effectively support transportation requests. Motor transport units support the maneuver concept of operations by providing the movement of tracked and wheeled vehicles, containerized, non-containerized, palletized, bulk water or petroleum products, dry and/or refrigerated cargo, and personnel by utilizing a myriad of vehicles.

Appendix A

Organization and Occupation of the Truck Company Area

A truck company does not normally occupy a field site for extended periods of time. Units move to maintain consistent support, in response to a change of mission, and to enhance survivability. When a unit relocates, procedures are divided into three phases: reconnaissance and selection of positions; moving the company; and occupying, organizing, and improving the position. This appendix explains the basic steps for moving a truck company to a new location, including requirements and operational considerations for planners, and can be modified to fit a specific tactical situation. This appendix outlines the requirements and operational considerations that determine what methods planners should employ to establish a truck company area of operations.

BASIC AREA REQUIREMENTS

A-1. During certain operations, motor transport companies may establish truck company areas of operations from which to originate missions. This will occur under widely varying conditions and at all echelons. Proper planning, preparation, and execution are required to ensure mission success. In determining a proper location, there are basic area requirements that should be considered such as road network, size of location, defensibility, terrain, existing facilities, and local directive (see figure A-1).

- Road network: A proper road network is essential to a transportation unit's mission. It should provide accessibility and accommodate vehicles of various sizes and weights. Consideration should also be given to its location relative to the ASRs and MSRs.
- Size of AO: All motor transport units need large field sites, especially those with numerous vehicles and trailers. There should be enough room to safely park and maneuver equipment within the area, and provide sufficient space for a convoy staging area.
- Defensibility: Protection of personnel and equipment is vital. Intelligence reports regarding local enemy threats should be considered when choosing a location. If possible, the site should also provide some level of concealment.
- Terrain: The AO should provide enough flat, open area to stage vehicles. It should also have sufficient drainage, and not be located in low-lands, to prevent the risk of floods from hindering mission operations.
- Existing facilities: The use of existing facilities will significantly decrease time spent on establishing a new AO. Using existing facilities will accelerate both occupation and organization for the headquarters and it may decrease costs.
- Local directive: Host nation laws or local policies may determine where a company may or may not be allowed to locate. When required the commander ensures coordination with appropriate agencies has been conducted prior to occupying a site.

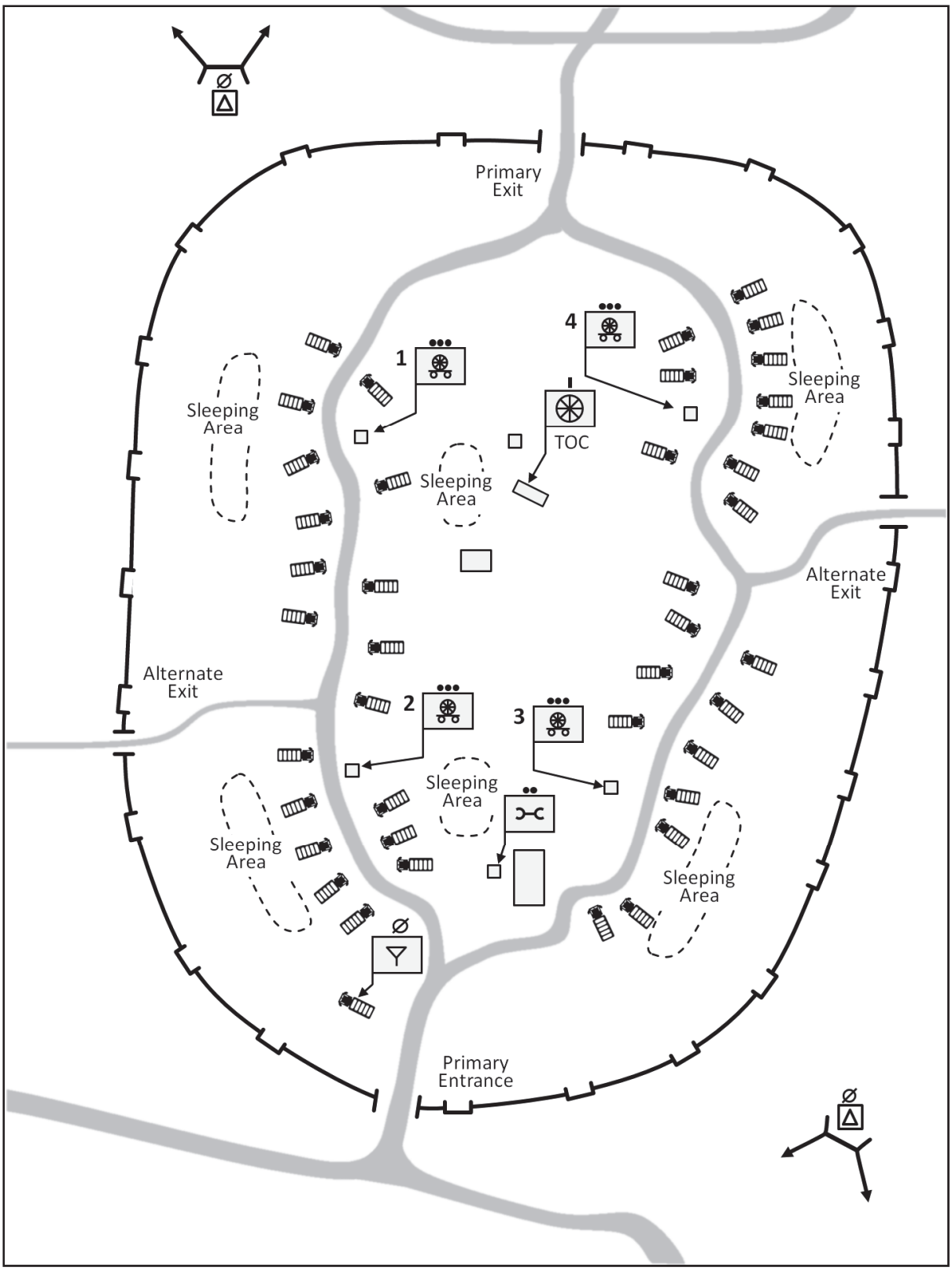

Figure A-1. Possible layout of a truck company area

POSITIONS

A-2. Positions for essential elements of the truck area are selected based on individual requirements. Optimizing available space, fields of fire, communications, accessibility, and survivability are integral aspects in selecting positions, as each element should be located where it can operate most effectively. The following will describe potential elements of the truck company with planning considerations for locations.

- Command Post: The command post is centrally located within the perimeter where it can exercise control over the company, remain well defended, and have lines of communication with sub-elements.
- Operations: The operations section, including the operations officer, truckmaster and dispatcher are centrally located, adjacent to the command post, to allow accessibility for all platoon leadership.
- Maintenance Area: The selection of the maintenance location depends on its accessibility to entry and exit routes. The area should be located within the perimeter, near the entrance, to simplify operations for maintenance personnel. The maintenance area within the company area should have an entrance and exit within the perimeter.
- Petroleum: Fuel tankers and tank and pump units should be located adjacent to the primary entrance, inside the perimeter, to effectively provide retail distribution to returning vehicle platforms. A distribution network design is essential to optimize retail distribution, to avoid congestion. Also, secondary containment systems are necessary to contain spills, and fuel tankers should be positioned away from field feeding areas and water points.
- Platoon Areas: The number of platoon areas is dependent upon the number of platoons within the company and consists of two areas; the troop area and the vehicle area. The troop area consists of the platoon headquarters and the designated areas for sleeping. The vehicle area is the location where vehicles are parked or staged, camouflaged, and is where operator maintenance is conducted. Vehicles should not move within the company area without ground guides, especially in close proximity of sleeping locations.
- Field Feeding Operations/Facilities**:** Transportation units have limited number of cooks assigned and are usually detached to another unit to establish a consolidated messing capability. Units will either go to the consolidated messing facility for distribution or sustenance is delivered to the unit area. When providing Class I at the company location, it should be centrally located within the perimeter, away from interior roads to avoid contamination. The field feeding area should be adjacent to the water point, have hand washing stations, and be at least 90 meters away and uphill from latrines and at least 500 meters from any fuel point. The serving line(s) should take advantage of available cover and concealment.
- Latrines: Latrines are located on the downwind side of the operations area at least 90 meters from the water supply, and close in proximity to all Soldier sleeping areas. Latrines should be able to accommodate at least eight percent of the unit at a time and planners should ensure there are sufficient male and female latrines. Hand-washing facilities should be located near the exits.

TYPES OF OPERATING BASE AREAS

A-3. From an operational viewpoint, and considering the requirements for dispersion of vehicles and facilities as dictated by the tactical situation, the operating base area requirements for motor transport units are classified as minimum, average, or maximum. Prior to establishing an operating base, the commander and planners take into account the basic area requirements, including the disposition of friendly forces. The following discusses the three types of operating base areas.

A-4. A minimum operation is a low-intensity operation. During a minimum operation, a motor park may be established without dispersing unit equipment more than necessary because the possibility of hostile action is remote. Vehicles are parked in the unit motor park and a minimum distance is maintained between vehicles and other unit facilities, as prescribed by the commander.

A-5. Average operation is a mid-intensity operation. During average operations, a field setup operates under tactical conditions where friendly forces have air superiority and the possibility of hostile attack isn't

likely, but possible. An approximate 50-foot (15-meter) dispersion between unit vehicles and facilities is maintained to protect against losses from hostile ground action including enemy indirect fire.

A-6. Maximum operation is a high-intensity operation. During a maximum operation, the unit is required a maximum field setup with about a 150-foot (46 meters) dispersion between unit vehicles and unit facilities as protection against hostile air attack or indirect fire.

PLANNING A COMPANY MOVE

A-7. When a transportation unit receives a movement warning order, the unit commander initiates actions to prepare for movement. First, the commander conducts a mission analysis and initiates troop leading procedures. A map reconnaissance is conducted to determine time-distance factors. During this process, the commander gathers pertinent tactical information.

A-8. Upon completion, the commander issues a warning order to the company to include the reconnaissance party officer in charge (OIC) and key leaders. The reconnaissance party OIC performs detailed map reconnaissance and begins development of strip maps of primary and alternate routes and distributes these maps to key leaders. After completion of route and site reconnaissance, the commander may issue a fragmentary order based upon information obtained. Tentative future positions may then be identified for each platoon or section.

A-9. While reconnaissance is being conducted, the unit begins preparations to clear an area as soon as it receives the movement warning order. The sequence used to clear the area varies based on the situation, and is determined by company leadership. During a company move, unless the unit is released from its mission, the unit will continue to provide support. Leaders should be aware of ongoing missions and vehicles dispatched, to develop a plan and procedure to ensure properly dispersed information. Also, planning for all non-operational vehicles should be included in the unit movement plan. The evacuation of non-operational vehicles should be accomplished timely, as the situation permits, prior to moving the main body. Perimeter security should not be compromised in the preparation for movement.

A-10. While loading vehicles in preparation for the unit move, vehicles should be loaded so they are prepared for unloading at the new site. Non-mission essential equipment, including individual clothing, is loaded first, so essential equipment can be off-loaded first at the new site. Proper loading and tie-down procedures are necessary to secure loads during transit (see Appendix E for more information). Once the main body is prepared to depart and vehicles are staged, the entire area should be inspected. The inspection is vital to ensure equipment wasn't overlooked, garbage is properly disposed of, and intelligence information, including information about the unit, cannot be recovered by enemy forces.

METHODS OF OCCUPATION

A-11. When a company is issued a movement order, it is critical to keep move time to a minimum to limit exposure and risk. The occupation of a new location poses risk, as the new area is unfamiliar and most likely unsecure. Therefore, tactical SOPs are essential to unit preparations and procedures and should be implemented for ease of purpose, as a guide for execution. Either the two-party occupation method or the reconnaissance, selection, occupation party (RSOP) method may be used to select and prepare unit operations areas.

TWO-PARTY METHOD

A-12. The two-party occupation method is normally used when the commander has little warning of movement. This method employs a reconnaissance party to aid in site selection and an advance party to occupy and prepare the AO. The function of the reconnaissance party ends once the commander has selected an acceptable location, based on information gathered. The job of the advance party begins with its arrival at the site and ends with the arrival of the last vehicle.

Reconnaissance Party

A-13. At a minimum, the unit commander makes a map reconnaissance before employing the reconnaissance party. The reconnaissance party's objective is to select the best location for the unit. The

reconnaissance party will also provide information to the commander for the selection of routes and sites, to facilitate orderly, rapid, and safe movement and emplacement at the designated location.

A-14. The composition of the reconnaissance party is governed by METT-TC, and is at the discretion of the commander. The reconnaissance party usually consists of an OIC, truckmaster, and a security team, but can also include other key leaders in the unit. The reconnaissance party determines the acceptability of proposed sites and makes recommendations to the commander. Site selection is based on defensibility, size, and proximity to a capable road network.

Advance Party

A-15. The company commander organizes an advance party to occupy and prepare the site for future occupation by the main body. The advance party typically consists of the first sergeant, assistant truckmaster, chemical, biological, radiological, and nuclear (CBRN) noncommissioned officer, a senior wheeled vehicle mechanic, and added troops for labor and security. Troops assigned to the advance party are assigned specific tasks. The makeup and size of the advance party is governed by the tactical situation, the amount of work required in preparing the site for occupation, and other considerations deemed appropriate by the commander.

A-16. The first task of the advance party is to clear and secure the site, providing security for the entire footprint. Troops are divided into fire teams which search the area hazards, monitor for CBRN contamination, gather intelligence information, and other signs of enemy activity. Once the teams have cleared the area, a light security screen is conducted around the site. Observation posts and checkpoints along likely avenues of approach are established to ensure early warning and limited protection.

A-17. Tentative locations of the company and platoon command posts are identified and provisions are implemented for communications. Platoon and maintenance section areas are selected and marked, including other appropriate sites for necessary company functions. Roads and trails that allow for way traffic are selected. Alternate exits are selected and marked to allow emergency departure if the main exit becomes blocked. Individual parking areas are selected based on capacities for assigned equipment, including vehicles and trailers. After selecting future sites, platoon representatives thoroughly reconnoiter their assigned area and initiate setup.

A-18. As the main body of the company arrives, vehicles rapidly clear the approach route and are guided into the site and parked. Drivers should quickly camouflage their vehicles and then establish hasty fighting positions on the perimeter, to provide necessary security for the entire unit.

RECONNAISSANCE, SELECTION, OCCUPATION PARTY METHOD

A-19. The RSOP method combines the functions of the reconnaissance and advance parties. It is generally used when the commander has sufficient warning of the move or when the company is moving as part of a larger unit. The RSOP performs all functions required to successfully occupy a site. An officer in charge or noncommissioned officer in charge (NCOIC) directs and teams that carry out specialized activities accomplish its mission. The unit SOP generally establishes RSOP organization and equipment. Changes are made by the company commander as needed and in accordance with the tactical situation.

Teams and Individual Responsibilities

A-20. The OIC has overall responsibility for the RSOP and for its detailed layout. The OIC ensures that the party is properly briefed and verifies the acceptability of the new position. The OIC is normally a commissioned officer, for example the operations officer or the executive officer, but may be a senior NCO.

A-21. The NCOIC assists the OIC and ensures that specific teams execute their assigned missions. The NCOIC ensures the new position is properly cleared of mines and secure prior to entry by the main RSOP element. The NCOIC ensures that RSOP members have local security, that they conduct a chemical and radiological survey, and that the parent unit is notified as to the acceptability of the new site.

A-22. The organization of the reconnaissance, selection, occupation party is METT-TC dependent. The tactical situation determines the number and types of teams necessary to clear and secure an area.

Individuals may be on more than one team, and some teams may have concurrent missions. Teams should be proficient in operating the equipment necessary to perform their function. At a minimum, the following teams should be established.

A-23. The organization of a security team is vital to the safety of the RSOP. Until the area has been cleared and a light security screen established, everyone is a member of this team. The light security screen may be in the form of strong points placed in the four cardinal directions or along likely avenues of approach. If needed, roving patrols may augment the light security screen and act as a quick reactionary force. The security team also includes the CBRN specialist, and employs chemical alarms and conducts readings of the area. A minesweeping team also augments the security element, to operate mine detectors as part of the initial clearing of the proposed area.

A-24. Ground guides assist in a smooth initial occupation, by establishing parking and/or staging areas, and are designated to meet their units at the dismount point upon arrival. Prior to the arrival of the main body, these personnel assist the OIC and other teams with the layout of the site or other duties determined by the RSOP leadership.

A-25. If the RSOP encounters enemy forces en route to or at the new location, depending on the situation, it may not become decisively engaged and can break contact. If contact is broken, the OIC advises the commander of the situation. The commander will issues a fragmentary order directing movement to the alternate position or to the rally point area. If chemical or radiological contamination is present, the RSOP should move to the rally point area, notify the commander, and request necessary decontamination.

Equipment

A-26. The reconnaissance, selection, occupation party should have equipment sufficient to successfully accomplish the reconnaissance, layout, and security of the new position. They normally require cargo vehicles with sufficient communications equipment to maintain contact with the main body. The vehicle can also operate as the RSOP command post, or the OIC can utilize other available equipment to effectively mission command the party. Sufficient crew served weapons, ammunition, Class IV materiel, mine and chemical detecting equipment is necessary for the security team in the execution of their duties. The OIC may also utilize marking stakes for planning the location of unit elements within the AO, to expedite occupation during the main body entrance. Maps and other information of the AO is important, to conduct reconnaissance and know locations of MSRs, ASR and routes adjacent to the AO. The RSOP should also ensure sufficient Class I and III products are available for the duration of their assigned mission.

Reconnaissance

A-27. The RSOP OIC conducts three types of reconnaissance, to include map, route, and site. Upon receipt of the movement warning order, the OIC will conduct an immediate map reconnaissance. During the map reconnaissance, the OIC will attempt to identify the primary and alternate route, a new location based on information from the command, clearances for routes, bridge classifications, route trafficability, roadway width, rally points along all routes, and will determine the proximity to built-up areas. After the map reconnaissance, the OIC should have a tentative plan on if, how and where the unit will move.

A-28. Route reconnaissance is conducted en route to the new position, based on a thorough map reconnaissance. Based on the previously mentioned considerations, the OIC will determine the validity of the routes, including roadway width, trafficability and bridge classifications. If possible, the OIC will also make certain that the designated area provides adequate space for unit occupation. During the planning, a tentative rally point is selected based on a map reconnaissance, but is also validated during the route reconnaissance. A rally point is an easily identifiable and locatable point on the ground at which units can reassemble and reorganize if they become dispersed. It should be large enough for the entire main body, should be off an MSR or ASR, have cover and concealment, and is easy to defend for a short period. Typically, it should be located halfway between the old and new sites, terrain permitting.

A-29. If the tactical situation warrants, a site reconnaissance is necessary to ensure adequacy for the unit. To execute a site reconnaissance, two security team members use the mine detector to clear the access road, and two personnel conduct a radiological and chemical survey. The entire team then moves tactically to the

new site looking for signs of enemy activity. Upon reaching the new site, the RSOP OIC or NCOIC should place a two-man team to designate the dismount site, and then emplace security personnel along likely avenues of approach to provide security for the entire element. The leadership can also augment the security personnel with roving patrols, either mounted or dismounted, while conducting a thorough site reconnaissance.

Plan the Occupation and Prepare Positions for Occupation

A-30. After determining the layout of the new site, the RSOP OIC ensures that all ground guides know exactly where they are to go and where equipment is to be placed, and may utilize markers to designate areas. Preparations include marking the location of major sub-elements of the unit and implementing security measures to ensure safe proceedings for the main body. The OIC should update all members of the RSOP of any changes to the original order or deviations to the SOP, and the order of march and approximates arrival time of the main body.

Occupy, Organize, and Improve Positions

A-31. During the initial occupation of the main body, the unit is extremely vulnerable to enemy attack. When the main body arrives at the new location, a ground guide meets each major sub-element and leads it to its location. All vehicles are moved off the MSR and access road into the position area as quickly as possible; maintaining intervals if possible. Once the main body arrives, the unit focuses all its efforts on rapidly establishing a defensive perimeter, camouflaging, establishing communications to higher headquarters, internal communications, and starting operations. Work priorities are established and unit personnel are given specific tasks, including establishing a defense perimeter with any Class IV available.

OPERATING IN AN URBAN ENVIRONMENT

A-32. Truck companies may be required to operate from urban areas. The basic principles of occupying an area remain, but with significant differences. Among these differences are camouflaging vehicles and equipment, establishing a defensive perimeter, and controlling civilians.

Unit Operations Areas

A-33. In both rural and urban terrain operations, the unit operations area should contain a minimum of two entrance routes and two exit routes, sufficient parking areas for tactical dispersion, camouflage of vehicles and equipment, and a maintenance area. Normal unit security measures should be modified for the urban operations environment. Factors include the nature of the terrain, presence of existing facilities and buildings, and the possible presence of civilians.

Terrain Types

A-34. Urban terrain types are categorized roughly by size of area, type and arrangement of buildings, and population. There are five major urban terrain types including large cities, small cities and towns, villages, residential areas, and strip areas.

A-35. Large cities usually have multistory buildings with wide streets laid out in a fairly regular pattern. The populations are large, numbering into the hundreds of thousands or more, and vegetation is limited. Whenever possible, avoid using cities as operations areas. Indirect fire or air strikes can easily block streets with rubble or debris and can prevents transportation units from moving through or out of the area. Units required to operate in large cities should locate near the outskirts, close to the industrial section. Industrial sections have large factories, warehouse buildings, and sufficient parking that is well-suited to transportation units. Road networks in these areas are usually in good condition.

A-36. Small cities and towns are the most common urban terrain in which transportation units operate. They generally have good road networks, and most have an adequate number of paved vehicle parking areas and large buildings for concealment. However, some of the roads may be narrow and laid out in an irregular pattern, restricting movement.

A-37. Villages consist of a combination of closely positioned residential houses and small family farms. Few have areas or buildings large enough to be used by transport units, but can have large fields available for transportation units to occupy.

A-38. Residential areas consist of mostly houses and do not afford good positions for concealing large task vehicles and equipment. Residential buildings are usually arranged in a regular pattern with straight streets. Scattered trees and low vegetation also make it difficult to camouflage equipment.

A-39. Strip areas consist of commercial or residential buildings. They are often found along highway routes connecting two cities or between towns and cities. Strip areas lack depth. Most of the buildings are one or two stories high or too small to conceal vehicles inside. Such areas generally allow for early detection of enemy forces, but do not offer a transportation unit with the best concealment. However, the road network and design allows for the easy movement of vehicles.

Operational Considerations

A-40. With a few modifications, the procedures for setting up an operations area in urban terrain are similar to those used in rural terrain. Transportation units are usually not alone in an urban environment as civilians usually remain in the area. The fact that civilians are in the area should be considered when planning and executing mission support. Close coordination with nearby units in the area and the local populace is essential to prevent breeches of security.

Billeting

A-41. The physical layout of urban terrain allows for billeting Soldiers and concealing vehicles with limited use of tents or camouflage screening systems. The decision to pool or disperse is METT-TC dependent. Preexisting billets should give adequate protection and, ideally, all billets should be in the basement to protect troops from aerial or artillery attacks. Windows should be covered to prevent entry by enemy forces and to protect against shattered glass.

Vehicles

A-42. The best method of camouflaging vehicles and pieces of equipment is to store them inside buildings or existing facilities. If building contents should be moved outside to make way for unit vehicles and equipment, ensure that the contents fit the surroundings and do not draw undue attention. Whenever possible, limit visibility of assigned equipment and do not permit vehicle engines to run inside buildings without adequate ventilation.

Security

A-43. Operating in urban terrain and in close proximity to local civilians increases the possibility of security compromise. The degree of security depends on the available security resources, type of urban terrain, and extent of terrain occupied. Security precautions should be taken against the use of sewers or interconnected cellars by infiltrators, saboteurs and various types of improvised explosive devices. Commanders should use military police or host nation police when possible to augment unit internal security. Buildings also offer good visibility for likely avenues of approach, and are ideal locations for observation posts. (For more information on operational area security, see ADRP 3-37, *Protection*.)

A-44. The defense of the urban operations area perimeter should be organized for both ground, indirect and air threats. Fighting positions should be identified and constructed, including bunkers to protect from indirect fire. The best defense technique in an urban operations area is concealment.

Command Post

A-45. The company command post should be centrally located inside the perimeter, to provide the most effective means to mission command. The building should be well-constructed and large enough to accommodate the quick reaction or reserve force during periods of increased security. Take all measures to conceal the command post position, including antennas, other visible communication systems, and limit the amount of vehicles or other identifiable equipment surrounding the command post. Preexisting electrical

power from the area may be present, however, generators should be prepared, utilized and maintained to provide an effective means of power.

Field Feeding Operations

A-46. The dining facility should be positioned centrally, but not next to the command post. Consider using existing civilian mess facilities, if available. Also consider putting the mobile kitchen trailer inside a building and operating from that location. The location chosen should accommodate the amount of assigned Soldiers, and provide adequate concealment.

UNIT MOTOR PARK

A-47. Organization of the motor park is one of the most important factors in motor transport operations. The following will discuss basic characteristics and considerations for tactical type motor parks. In planning for a unit motor park, always plan for the most efficient and economical use of available facilities, while constantly improving site location as operating conditions change.

A-48. The company commander has overall responsibility for the unit motor park. As the commander's operations assistant, the truckmaster supervises the motor park and is responsible for the efficient conduct of related activities. Unit commanders establish procedures for the controlled dispatch of vehicles after duty hours.

EMERGENCY EVACUATION

A-49. Motor parks may be prime targets for enemy aircraft or indirect fire. Upon receipt of an attack warning, vehicles and personnel should be evacuated to the dispersal area over previously selected routes. Rapid evacuation of the motor park may not be possible using regular exits. By designating emergency exits, commanders can facilitate evacuation and reduce traffic congestion. These exits may be gates that are secured during routine operations or areas where the fence may be temporarily removed. Since emergency evacuation may involve different units, the installation commander should coordinate the evacuation plan. Evacuation priorities should be based on unit missions. The truckmaster should be thoroughly familiar with the evacuation plan and should brief unit personnel on the order of evacuation, assigned exits, and routes to an alternate motor park or dispersal area.

COMMUNICATIONS

A-50. Reliable communications with the company command post simplifies motor park operations. Communications speed the transfer of information on routine matters as well as alert notices and other emergencies. Field phones, radios or digital communications can be used to connect the motor park and the command post. Do not rely on commercial telephone circuits, as their use is unreliable; they are an alternate means of communication for daily operations.

LOCATION

A-51. The unit commander selects the best possible site for the motor park in his area of operation. The truckmaster reconnoiters the area and recommends the location of the motor park to the unit commander. The truckmaster bases this recommendation on interoperability, terrain, enemy considerations, size and existence of facilities.

Interoperability

A-52. The motor park should be located as close as possible to depots, railheads, terminals, or other facilities that require truck support, to maximize interoperability. The unit's mission is the key consideration in selecting the tactical motor park site, and can be collocated with aerial ports of debarkation, sea ports of debarkation, or railheads, depending on the assigned mission. Easy access routes, all-weather roads, and separate entrances and exits to the area are all highly desirable to maximize the effectiveness of interoperability.

Terrain and Enemy

A-53. The location should have good drainage and stable soil or hardstand with little danger of fire. Abandoned schoolyards, factory storage areas, or recreational areas are ideal if the tactical situation permits their use. Make use of natural obstacles and use artificial camouflage materials to augment natural foliage. Considerations for the location of a unit motor park should heavily depend on enemy composition, activity and capability. Planners should carefully consider dispersion, concealment, overhead cover for vehicles, along with the ability to secure the motor park against enemy attack or cargo pilferage

Size

A-54. The site should be large enough to accommodate unit vehicles, tentage, maintenance facilities, POL storage and any other assigned unit equipment. The selection of the site should be large enough for equipment, but not excessive to degrade internal security measures.

Existing Facilities

A-55. The motor park should be located near permanent buildings when possible, especially when the position will be occupied for an extended period. Prior to use, abandoned buildings should be inspected for structural flaws, enemy presence, and sanitary conditions.

A-56. When possible, the dispatch office should be located at the motor park exit. The operations office and driver's briefing room should be in the same building. This allows the dispatcher to see departing vehicles and to give final instructions to drivers when necessary. Locate the truckmaster and dispatcher together for easier control over vehicles. Individual units rarely choose their buildings or location, so the most effective use of the available facilities is essential.

TRAFFIC PLAN

A-57. The motor park traffic plan should be designed to maximize the effective use of existing facilities. Local conditions will determine the exact details of the traffic plan, but it should be clearly marked and labeled to prevent congestion. Vehicle traffic should be one-way, to simplify vehicle movements. The traffic plan should prevent vehicles from crossing the maintenance shop aprons when maneuvering, entering or leaving the motor park. Entrance lanes should be established to provide easy access to POL, water and the field feeding section.

FIRE PREVENTION

A-58. Fires in motor parks are usually caused by hazardous operations, including carelessness or unsafe use of maintenance equipment in close proximity to flammables. To mitigate the risk and reduce the effects of motor park fires, one should plan to have adequate fire protection equipment available, and Soldiers should be trained on the equipment. Soldiers should also be trained on fire prevention techniques. Smoking areas should be designated, and strategically placed away from fuel pumps, POL storage, and other flammable areas. To maintain safe operations in the maintenance facility, separate containers for the disposal of waste POL should be utilized, oily rags and trash should be placed in covered metal containers, and all containers should be marked appropriately. Also, a fire marshal should conduct periodic checks of the motor park, to ensure safe operations.

SECURITY

A-59. Normally, the guard provides perimeter security for the motor park. This includes guards at the entrance and exit gates. The unit commander who occupies the motor park should ensure that auxiliary gates in his area of responsibility are locked and the fence is secure. The unit commander should also provide security for classified cargo, government property within areas of responsibility, and for staged loaded vehicles. The commander should also designate and secure an area for parking dangerous loads, and implement a key control program according to security directives. When host nation vehicles are incorporated into the convoy, appropriate security measures according to local and unit SOPs should be followed.

ENVIRONMENTAL PROTECTION

A-60. It is essential that environmental protection procedures are established and followed in unit motor parks. POL and hazardous materials should be stored correctly, including secondary containment systems to contain spills. Maintaining a spill response SOP and materials is imperative in quickly reacting to environmentally hazardous spills. It is also important to plan for waste storage and the proper disposal, and ensure it is correctly contained prior to removal. The commander should designate an environmental representative to conduct periodic inspections for compliance with environmental practices.

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Appendix B

Preventive Maintenance

The primary mission of motor transport companies is to support combat units, but transportation units cannot conduct their mission with non-mission capable equipment. Operator care can greatly reduce common problems with motor vehicles by conducting timely preventive maintenance. Leadership should supervise preventive maintenance and ensure Soldiers understand the importance of operator maintenance. This appendix discusses preventive maintenance responsibilities, and should be used for a guide for company leadership and equipment operators.

RESPONSIBILITIES

B-1. The object of preventive maintenance is to avert equipment failure by finding and fixing minor problems before major defects occur. The company commander is responsible for preventive maintenance on all organic equipment, and can disseminate maintenance responsibility, as an additional duty, to a subordinate officer. Preventive maintenance requires the use of POL and hazardous materials, and it is the commander's responsibility to ensure proper actions are taken for environmental concerns. The commander should implement policies and procedures to cover the proper storage, disposal, spill response and compliance with applicable environmental regulations.

B-2. Platoon leaders, aided by platoon sergeants and squad leaders, are responsible to the company commander for supervising preventive maintenance, providing technical advice and assistance to operators performing preventive maintenance, and reporting required repairs that are beyond the scope of preventive maintenance. The equipment operator is responsible for doing the required preventive maintenance on his equipment. When possible, all operators should be permanently assigned to their equipment and no one else should operate the equipment except in an emergency.

PLATOON LEADER

B-3. The platoon leader is responsible for the maintenance of assigned platoon equipment. This includes the platoon's weapons, protective masks, communications equipment, rolling stock and ground support equipment. The proper implementation of a strict preventive maintenance program is imperative, as failure will severely impact unit readiness. Although it may seem daunting to establish a maintenance schedule that covers all assigned equipment, it can be completed by establishing priorities and understanding the requirements for each piece of equipment.

B-4. To be successful in maintaining assigned equipment, the platoon leader will have to delegate supervisory responsibility for preventive maintenance to the platoon sergeant and the squad leaders. By explaining the impact of a good maintenance program, and by gaining the acceptance of platoon leadership, Soldiers will clearly understand expectations. Also, responsibility for assigned equipment should be designated to the lowest level, to foster a sense of ownership within Soldiers. The platoon leader should know how to perform preventive maintenance, and conduct inspections. The platoon leader should have operators present during technical inspections and ensure operator maintenance is complete prior to equipment undergoing field level maintenance from the maintenance platoon. Also, operators can assist mechanics during scheduled or unscheduled field maintenance, to gain a better understanding of the piece of equipment and to expedite its service or repair.

OPERATOR

B-5. Preventive maintenance performed by the operator is accomplished according to the 10 level TM commonly referred to as the -10. The -10 is the primary guide to use in preventive maintenance, and are specific to types of equipment. The technical manual gives information needed to find and fix problems

discovered during preventive maintenance checks or equipment operation. It lists possible problems, explains what may cause them, and suggests how to correct them. Problems not covered in the -10 TM should be reported to unit maintenance. Preventive maintenance performed by the operators includes cleaning, inspecting, servicing, preserving, lubricating, adjusting, and spot-painting. It also includes making minor replacements that can be accomplished with basic issue item (BII) tools. Operators perform preventive maintenance checks and services as follows:

Before Operations

B-6. Operators perform services prior to operating assigned equipment. The service includes checks and services done at the start of each day's operation, in accordance with the 10 level TM for the piece of equipment. By checking the equipment prior to operation, it ensures that the equipment is safe for use, fully functional, has no deadlining faults, and that no major damage has resulted since the last service.

During Operations

B-7. Operators should also perform services while operating equipment. This service mainly includes observation of the equipment during use, by monitoring vital gauges and listening for unusual noise. The operator can look for malfunctions while operating, and correct, if possible. The operators will report faults upon return of the equipment, if anything is noted. If the equipment sustains a malfunction unable to be corrected and can further damage the equipment or personnel, the operator should cease use and immediately report the deficiency.

After Operations

B-8. Upon completion of a mission, the operator should perform an after action service. This type of service should include an inspection, cleaning, refueling, and the operator should conduct a service on the equipment as needed. If faults are identified, the operator should report deficiencies on the appropriate maintenance worksheet and to platoon leadership.

Scheduled Service

B-9. Scheduled services are conducted by maintenance personnel assigned to the maintenance platoon. Scheduled services are usually conducted semi-annually and annually, based on the type of equipment. Operators have a vested interest in assisting a scheduled service, to facilitate maintenance personnel, return the equipment quickly, and gain knowledge of the piece of equipment.

Note. For information containing details on forms and records used to document maintenance services, see DA Pamphlet 750-8.

Appendix C
Road Network Evaluation

Road network evaluation at any level is more than a review of the road network, surface treatments, and bridge capacities. It encompasses all aspects of sustainment preparation of the operation environment (such as friendly and enemy activity, weather, and terrain). This appendix addresses factors that should be considered in evaluating a road network.

MAPS AND OTHER DATA

C-1. Movement planning begins by studying maps of the area that offer general alignment, comparative surfacing, and information on bridges and tunnels. If operations are to be sustained, add data from other sources such as the following:

- Satellite imagery
- Internet based mapping programs
- Topographic maps
- Aerial photographs
- Ground reconnaissance
- Reports of travelers or inhabitants
- Construction plans of highways and bridges
- Engineers, military police, and movement control units

ROAD CHARACTERISTICS

C-2. Road characteristics include elements of design and construction that influence vehicular travel. Turns, including sharp hairpin turns, are particularly found in mountainous terrain and may restrict the use of some larger military vehicles based on turn radiuses. The width of the road determines the size of vehicles and the number of traffic lanes that can be accommodated. Engineers classify routes into three basic types:

- Type X, all-weather.
- Type Y, limited, all-weather.
- Type Z, fair weather.

C-3. The classification of a road is based on the road's ability to withstand weather effects. It considers road surface material, type of construction, alignment, grades, and other features. Route type is determined by the worst section of road on the entire route.

Military Load Classification

C-4. Military load classification is a load capacity rating system that assesses the effects of vehicle weight and type upon roads and bridges. The entire road network's class is determined by the minimum load classification of a road or a bridge within the network. The broad categories are:

- Class 50, average-traffic route
- Class 80, heavy-traffic route
- Class 120, very heavy-traffic route

Obstructions

C-5. Obstructions are natural or manmade obstacles, or a combination of the two (including obstacles created by enemy action), that hinder or stop movement over a given section of road. Obstructions are critical points that include:

- Reductions in overhead clearance. Look for overhead wires, low overhanging tree branches, overpasses, underpasses, clearances, bridges, and tunnels.
- Reductions in road width. Look for narrow tunnels and bridges and overhanging or encroaching buildings.
- Reductions in road capacity. Look for bridges, fords, or ferries having less capacity than the road.
- Steep grades (7 percent or greater) and sharp curves (radius less than 25 meters).
- Weather restrictions, such as fog, flooding, ice, snow, and mud slides.
- Contaminated or damaged areas.

CLIMATE AND WEATHER

C-6. Climate is a condition produced by temperature, humidity, precipitation, wind, and light in an area over an extended period. Climate influences long-range plans for an area of operations. Weather is the local, day-to-day condition of the atmosphere. Daily operations are concerned with weather. Extremes of climate and weather impact motor operations by their effects on personnel and equipment. Cold climates reduce the efficiency of personnel. Bulky clothing limits movement in performing maintenance and operational duties. Hot, humid climates reduce energy and increase physical discomfort and the likelihood of disease. Over time, heat and high humidity reduce the life expectancy of all equipment and add to the problems of maintenance, repair, and replacement. Rust and corrosion are also accelerated in this type of climate. Mildew and rot rapidly attack unprotected clothing and leather products.

C-7. Extremes of weather affect the daily maintenance and operation of motor vehicles. Low temperatures require protection of cooling systems to prevent freezing, fuel additives to prevent frozen fuel lines, and protection to make starting easier. Tire life may be reduced and metals may become brittle and break. Batteries lose efficiency and may freeze or crack. Severe freezing may require extensive road repairs after each thaw, particularly in early spring. Extremely high temperatures may increase the number of breakdowns from overheating.

TERRAIN EVALUATION

C-8. Climate and terrain should be considered together, as their greatest effect is on off-road or cross-country motor movement operations. Terrain evaluation is the study of how soils, vegetation, climate, and land forms help or hinder the employment of military units and equipment. Road movement planners evaluate terrain to determine the ability to move vehicles and equipment without interruption and with minimum exposure to observation and direct fire.

C-9. Terrain evaluation considers all factors of the operational environment in relation to the capabilities and limitations of the task equipment. In all military motor transport operations, terrain evaluation should be done for every new mission. The source of information, the techniques, and the results of terrain evaluation vary with the operational environment. Terrain evaluation at unit level is made to select the most suitable route to accomplish the mission most effectively under the circumstances.

C-10. A terrain evaluation is based on information gained from observation and ground reconnaissance, aided and expanded by maps, photos, and local intelligence. Carefully weigh this information against known capabilities and limitations of the vehicles and the training or experience of the drivers. Weather, rather than climate, is the most important variable. Even in a well-developed area with a good road network, a driver may be required to make an off-road detour to bypass a roadblock or section of damaged highway. The habit of constant terrain evaluation enables him to make a quick decision and prompt selection of the most practical route.

COMBINED EFFECTS

C-11. Adverse conditions for motor vehicle operation and military motor movement are usually caused by combinations of terrain, climate, and weather. The effects of climate on terrain include the amount of vegetation, frequency of precipitation, moisture content of soils and size of water obstacles.

C-12. Weather conditions may reduce highway speeds, increase congestion, and be a major cause of accidents. Fog, rain, snow, ice, and high winds restrict movement on highways as well as travelling cross-country. In planning off-road movement and movement on unimproved roads and trails, consider the type and character of soils along with climate and weather. Vegetation may serve as an indicator of soil type and trafficability. It may also be an obstacle to movement even though it provides cover and concealment. Soils are made up of disintegrated rock in the form of sand or clay (structure) and disintegrated organic material (humus). Their capacity to support traffic depends on both structure and the amount of moisture present.

C-13. The condition of the soil is important when planning for off-road movement. The following briefly outlines major soil characteristics and the effects of climate and weather. Snow characteristics are also included since the effects of snow on motor movement are considered in the same manner as soil effects. Normal topsoil is a mixture of clay, silt, or sand and decomposed vegetation. Mud is clay and silt. All soils containing large amounts of these substances will become soft and pliable when wet. Silty soil becomes dusty and loose when dry. Clay soil dries hard and firm, making a good road surface, but may become powdery during heavy use. Rain has little effect on silty soil but may make clay roads greasy, reducing trafficability. When on terrain that includes steep grades, weather conditions and soil may make the route impassable.

Sand

C-14. Fine sand gives excellent support and traction when firmly compacted and dampened. Coarse sand does not compact well. It dries rapidly and will present an obstacle in motor movement.

Snow

C-15. The effects of snow are unpredictable and vary with temperature changes. Trafficability in snow depends on its strength, traction, and resistance. Light, new-fallen snow up to 20 inches (50 centimeters) deep may offer no serious obstacle to the average military vehicle. However, 8 inches of grainy, sand like “sugar snow” may make wheeled vehicle operations difficult. In extreme cold, snow has the same traction as dry soil. Near- or slightly above freezing temperatures drastically reduce traction on hard-packed snow surfaces.

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Appendix D

Road Movement Planning

Units that move convoys on MSRs, ASRs, or other controlled routes should understand how these routes are controlled and how to use them. Convoy operations require two types of control (area and organizational) and are explained in Chapter 2. This appendix focuses on road movement planning in an area controlled environment.

AREA CONTROL

D-1. The commander who controls the area/terrain through which convoys move exercises area control. Area control is normally exercised by the TSC, by utilizing the movement control battalion. The MCB employs MCTs to supervise specific areas, and ensure compliance with route synchronization.

ROUTE SYNCHRONIZATION

D-2. Route synchronization involves planning, routing, scheduling, and deconflicting the use of routes to facilitate movement control. It seeks to provide order, prevent congestion, and enforce movement priorities. The goal of route synchronization is to sustain movements according to the commander's priorities and make the most effective and efficient use of road networks. Responsibility for route synchronization rests with commanders having area jurisdiction. The route synchronization mission is performed by:

- The MCB and transportation battalions.
- The Corps Transportation Office in the corps area.
- The DTO in the division area.
- The brigade S4 in the brigade area.

D-3. Movement control teams may perform route synchronization when assigned a geographical area of responsibility within the corps area. The movement control battalions and DTO monitor route synchronization in subordinate command areas. Based upon the tactical situation, they may also regulate some of these routes.

CLEARANCE REQUESTS

D-4. A request to move on a controlled route is known as a movement bid. A movement bid is a form or message that details the itinerary of the move, the number and types of vehicles, and movement planning information. The authority to move is passed to the moving unit as a movement credit. A movement credit is an alphanumeric identifier. Units needing to move on controlled routes that require a movement credit must request and receive clearance before beginning movement. Units use the distribution network design and the route synchronization plan to obtain information on the road networks and determine if a movement bid is required. The request is submitted through logistics channels to the DTO or MCT within whose area the movement originates. Based on procedures established in SOPs, the request may be transmitted in hard copy, electronically, or verbally.

D-5. The MCB reviews and considers movement bids based on command priorities for the type of movement and the unit requiring movement. They either schedule the movement as requested or, if a movement credit cannot be granted, notify the unit and schedule the move at a different time or on a different route. Movement credits are returned to the requesting unit through the same channels used for the request.

PLANNING FACTORS

D-6. Planning factors are basic to the process of planning and organizing convoys. This section provides the formulas and information necessary to plan highway movements and develop movement tables.

MOVEMENT MEASUREMENT

D-7. Movements are measured by calculating how long it takes to move a convoy over a route. These calculations involve time and distance factors. Movement planners should use rate of march in performing movement calculations. The rate of march is the average number of kilometers expected to be traveled in any specific time period. Since the rate of march is an average, it compensates for short periodic halts and short delays caused by congestion. It does not include long halts, such as those for consuming meals or for overnight stops. March rate is expressed in kilometers in the hour (KMIH) or miles in the hour.

DISTANCE AND TIME FACTORS

D-8. Distance and time factors are used to perform a wide range of calculations for planning highway movements and to develop movement bids or movement tables.

Distance Factors

D-9. Distance factors are expressed in kilometers or meters. The terms used to describe distance factors are as follows:

- *Road distance*--the distance from point to point on a route, normally expressed in kilometers.
- *Gap*--the space between vehicles, march units, serials, and columns. It is measured from the trail vehicle of one element to the lead vehicle of the following element. The gap between vehicles is normally expressed in meters. The gap between march elements is normally expressed in kilometers.
- *Road space*--the length of roadway that a convoy occupies. It is measured from the front bumper of the lead vehicle to the rear bumper of the trail vehicle and includes all gaps inside the column. Road space is normally expressed in kilometers.

Time Factors

D-10. Time is expressed as a quantity of hours or minutes. The following are terms used to describe time factors:

- *Time distance*--the amount of time required to move from one point to another at a given rate of march. It is the time required for the head of a column or any single vehicle of a column to move from one point to another at a given rate of march.
- *Time gap*--the amount of time measured between vehicles, march units, serials, or columns as they pass a given point. It is measured from the trail vehicle of one element to the lead vehicle of the following element.
- *Pass time*--the amount of time required for a convoy or its elements to pass a given point on a route.

ARRIVE AND CLEAR TIME CALCULATIONS

D-11. To complete a movement bid, the moving unit should calculate the arrive and clear time at SPs, en route CPs, and RPs. Arrive and clear times are not the same as time factors. Time factors measure a quantity of time. Arrive and clear times are actual times as displayed on a clock.

D-12. The arrive time is the time the first vehicle in the column will arrive at an SP, CP, or RP. The arrive time is derived from the time distance. The clear time is the time the last vehicle in the column will clear that SP, CP, or RP. The clear time is derived from the pass time. The planner should determine the arrive and clear time for the entire column, consisting of the serials and march units within that column.

D-13. Calculate arrive times as follows: The arrive time at the SP is the same as the SP time. To calculate the arrive time at the first CP, take the distance from the SP to the first CP, divide by the planned rate of march, and multiply by 60 (minutes). Add this amount of time distance to the arrive time at the SP to determine the arrive time at the first CP.

EXAMPLE: Distance from SP to first CP: 10 km
March rate: 50 KMIH

Solution: 10 ÷ 50 = .20 hours x 60 = 12 minutes

If the arrive time at the SP is 0800, then the arrive time at the first CP will be 0812.

D-14. To calculate the arrive time at the second CP, take the distance from the first CP to the second CP, divide by the planned rate of march, and multiply by 60 (minutes). Add this amount of time distance to the arrive time at the first CP to determine the arrive time at the second CP.

EXAMPLE: Distance from first to second CP: 15 km
March rate: 50 KMIH

Solution: 15 ÷ 50 = .30 hours x 60 = 18 minutes

If the arrive time at the first CP is 0812, then the arrive time at the second CP will be 0830.

Note. Continue this method to calculate the arrive time at succeeding CPs to the RP.

D-15. To calculate the clear times at each CP, planners should determine the pass time. Calculating pass time requires four calculations: density, time gaps, road space, and pass time.

$$\text{Density} = \frac{1{,}000 \text{ (meters)}}{\text{vehicle gap + avg length of vehicle}}$$

Note. Vehicle gap is expressed in meters, representing the gap between vehicles. Average length of vehicle is expressed in meters, representing the average length of the most common vehicle in the column.

EXAMPLE: If the vehicle gap is 100 meters and the average vehicle length is 18 meters, then—

$$\text{Density} = \frac{1{,}000}{100 + 18} = \frac{1{,}000}{118} = 8.5 \text{ vehicles per km}$$

Time gaps = [(number of march units - 1)
x march unit time gap]
+ [(number of serials - 1)
x (serial time gap - march unit time gap)]

EXAMPLE: If a column has two serials with two march units in each, the time gap between march units is 5 minutes and the time gap between serials is 10 minutes, then--

Time gaps = [(4 - 1) x 5] + [(2 - 1) x 5] =
[3 x 5] + [1 x 5] = 15 + 5 = 20 minutes

$$\text{Road space} = \frac{\text{number of vehicles}}{\text{density}} + \frac{\text{time gaps x rate}}{60 \text{ (minutes)}}$$

Note. Time gaps in the road space calculation are the total time gaps calculated for the column.

EXAMPLE:

number of vehicles	= 87
density	= 8.5 per km
rate	= 50 KMIH
time gaps	= 20

$$\text{Road space} = \frac{87}{8.5} + \frac{20 \times 50}{60} = 10.2 + 16.7 = 26.9 \text{ km}$$

Note. In this example, the column will occupy 26.9 km of road space.

$$\text{Pass time} = \frac{\text{road space x 60}}{\text{rate}}$$

EXAMPLE: (Continuation from above)

$$\text{Pass time} = \frac{26.9 \times 60}{50} = \frac{1{,}614}{50} = 32.2 \text{ or } 33 \text{ minutes}$$

Note. Always round up pass time regardless of the decimal value.

D-16. In this example, the clear time at the SP is 33 minutes after the first vehicle crosses the SP. If the arrive time at the SP is 0800, the clear time at the SP will be 0833. If the arrive time at the first CP is 0812, the clear time at the first CP will be 0845. Use this same method to calculate the arrive and clear times at succeeding CPs to the RP. This movement can be depicted as follows:

CP	ARRIVE TIME	CLEAR TIME
1	0800	0833
2	0812	0845
3	0830	0903

D-17. The pass time will stay the same throughout the route as long as the march rate and density do not change. If the march rate or density changes, then recalculate the pass time to determine the new clear time.

REST HALTS

D-18. While the march rate compensates for short halts, it does not include scheduled rest halts. Scheduled rest halts should be planned for during the movement planning process. Rest halts can either be scheduled at a CP or between CPs. Planners should understand that scheduled rest halts require time to get vehicles off the road and staged, time to rest, and time to get vehicles back on the road. If 10 minutes is to be allowed for the rest halt, then 15 minutes should be scheduled. The extra time is needed to get vehicles on and off the road.

D-19. If a rest halt is scheduled at a CP, the arrive time at the CP does not change. The only thing that will change is the clear time at that CP and the arrive and clear time at succeeding CPs. The clear time should be adjusted by the scheduled halt time. If a rest halt is scheduled between CPs, then arrive and clear times at the next CP should be adjusted by the scheduled halt time. Continuing with the previous example, if a 15-minute rest halt is planned between CP 2 and CP 3, the following adjustments to CP 3 are needed:

CP	ARRIVE TIME	CLEAR TIME
1	0800	0833
2	0812	0845
3	0845	0918

D-20. Note the 15-minute delay in arriving and clearing CP 3 in the chart above. If the rest halt was planned at CP 2, the following adjustment to the clear time at CP 2 and both the arrive and clear times at CP 3 are necessary. In the following chart, note the 15 minute delay in clearing CP 2, arriving at CP 3, and clearing CP 3.

CP	ARRIVE TIME	CLEAR TIME
1	0800	0833
2	0812	0900
3	0845	0918

MOVEMENT TABLES

D-21. The procedures just described are used to calculate the arrive and clear times for an entire unit movement. That information is of no use to subordinate serial and march unit commanders. They will need to know the specific arrival and clear times for their serials and march units. Therefore, the movement planner should develop movement tables for these subordinate elements of the column.

D-22. Continuing with the example, you are assigned to the 150th Medium Truck Company, equipped with M915 tractors and M872 semitrailers. The company is augmented with an additional medium platoon. The unit will move from its present location to a new area and you should plan the move. You have read both the route synchronization plan and the distribution network design and selected a route. The route requires that you submit a movement bid. The route you select is MSR DART. You will SP at CP 4 and RP at CP 13. You intend to SP at 0800. The following represents your route and the distances involved.

(SP) CP 4 to CP 8 = 10 km
CP 8 to CP 5 = 15 km
CP 5 to CP 1 = 10 km
CP 1 to CP 13 (RP) = 5 km

You calculate your time distance as follows:

Time Distance:
SP to CP 8 = 10/50 x 60 = 12 minutes
CP 8 to CP 5 = 15/50 x 60 = 18 minutes
CP 5 to CP 1 = 10/50 x 60 = 12 minutes
CP 1 to RP = 5/50 x 60 = 6 minutes

Your augmented company has 87 vehicles, which you divide into two serials with two march units in each serial. (You could have chosen to have all four march units in one serial.) The first march unit has 22 vehicles with vehicles having an 18 meter average length. Calculate pass time for this march unit as follows:

Density = 1000/100 + 18 = 1000/118 = 8.5 vehicles per kilometer
Time Gaps = 0 (because you are calculating for only one march unit)
Road Space = $\frac{22}{8.5} + \frac{0 \times 50}{60}$ = 2.6 kilometers
Pass Time = $\frac{2.6 \times 60}{50}$ = 3.1 minutes = 4 minutes

REMINDER: Round up pass time regardless of the decimal value.

You then develop a movement table for the company movement. The completed movement table showing the arrive and clear times for each march unit in the company follows.

150 Trans Co

March Unit 1	Arrive	Clear	
CP 4	0800	0804	
CP 8	0812	0816	
CP 5	0830	0834	
CP 1	0842	0846	NOTE 5-MINUTE TIME GAP
CP 13	0848	0852	BETWEEN MARCH UNITS
March Unit 2			
CP 4	0809	0813	
CP 8	0821	0825	
CP 5	0839	0843	
CP 1	0851	0855	NOTE 10-MINUTE TIME GAP
CP 13	0857	0901	BETWEEN MARCH UNITS
March Unit 3			
CP 4	0823	0827	
CP 8	0835	0839	
CP 5	0853	0857	
CP 1	0905	0909	NOTE 5-MINUTE TIME GAP
CP 13	0911	0915	BETWEEN MARCH UNITS
March Unit 4			
CP 4	0832	0836	
CP 8	0844	0848	
CP 5	0902	0906	
CP 1	0914	0918	
CP 13	0920	0924	

D-23. Note how the time distance is used to determine the arrive times. Also, that the pass time is added to each arrive time to obtain the clear time. If you compare the arrive and clear times of this movement table with the arrive and clear times calculated for the entire convoy, you will notice a slight deviation in the clear time at the RP. This is due to the rounding up of each march unit's pass time.

DIVERTING AND REROUTING

D-24. Convoy commanders should realize that not all scheduled convoys will move according to scheduling. Traffic disruptions may be caused by host nation civilians or enemy action that destroys bridges, damages MSRs, or contaminates MSRs. They may also be caused by refugees clogging an MSR, breakdowns, weather, or degradation of road surfaces. Route synchronization authorities may issue instructions to units to hold movements that have not begun or to issue new routing instructions, hold movements at a staging area or CP if they have already begun, or reroute movements at a CP. Units should comply with these instructions as issued.

COMPLETING A MOVEMENT BID

D-25. Movement bids should contain all information pertaining to the unit movement. The following guidance will assist you in completing a movement bid with all required information.

1. TO: The appropriate movement manager responsible for route synchronization in your area. This organization may be the DTO, MCB, or MCT.
THRU: The higher headquarters or MC detachment servicing your area.
FROM: The unit submitting the movement bid.

2. MOVING UNIT: Name of the moving unit.

3. CONVOY CDR: Convoy commander's name.

4. START POINT/RELEASE POINT: The SP should be located at a point along the MSR that will allow a march unit to be at the proper interval and rate. The RP should be at a point along the MSR that will allow the march unit to clear the RP without bunching up or slowing from planned rate of march. Include a six-digit grid coordinate and the nearest town or other quickly identifiable location.

5. TYPE OF MOVEMENT: Identify the kind of movement; for example, unit move or resupply convoy.

6. MOVEMENT DATE/SP TIME: Date and time the convoy will arrive at the SP.

7. MOVEMENT CREDIT: This space is reserved for the movement control unit that will issue the movement credit. When you receive permission to move, this will be returned and a movement credit number will be assigned. This number will be written on each vehicle in the convoy.

8. CONVOY ORGANIZATION: Identify the number of serials and march units that you will need to control your convoy. You also establish the time gaps between serials and march units as well as the vehicle gap.

9. RATE OF MARCH: Enter the rate of march you used to plan the movement.

10. CHECKPOINTS: List the CPs you will use along your route. Ensure the CPs are known to the movement agency. These may be established as part of the distribution network design and should be used by all units moving through the area of operations.

11. DISTANCE BETWEEN POINTS: This is the measured distance between your SP, CPs, and RP.

12. ARRIVAL AND CLEAR TIMES: Identify the arrival time and clear time at each checkpoint. Use the times calculated with the planning formulas as explained earlier in this appendix.

13. ROUTE DESCRIPTION: Use the MSR names identified in the route synchronization plan or the distribution network design. When MSRs are not previously identified, use the local highway or road designation.

14. CRITICAL POINTS/HALTS: Identify planned halts for refueling or driver rest. These locations may be at a checkpoint or between checkpoints. Also identify any critical points that you want to bring to the attention of the movement planner.

15. NUMBER OF TRACKS: Identify the total number of tracked vehicles that will travel in the convoy.

16. NUMBER OF WHEELS: Identify the total number of wheeled vehicles that will travel in the convoy.

17. HEAVIEST VEHICLE/WEIGHT/MILITARY LOAD CLASSIFICATION (VEH/WT/MLC): Identify by model the heaviest vehicle class that will be in the convoy. Include the vehicle weight and military load classification. Vehicle weight may be found in TB 55-46-1. The military load classification should be affixed to the right front of the vehicle.

18. VEHICLE CHARACTERISTICS AND INFORMATION: List the total number of vehicles of each model type that will travel in the convoy. Vehicle data may be found in TB 55-46-1. Include peculiar load information that will assist movement managers in routing the convoy. All hazardous material should be identified.

19. REQUESTER'S NAME: Identify a point of contact with telephone number in case there are questions and changes to be coordinated. This point of contact should be familiar with the convoy organization and the data that was used in filling out the form.

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Appendix E

Loads and Loading Techniques

To successfully support military operations, motor transport unit operating personnel should be trained in and be aware of the principles of vehicle loads and cargo loading. This chapter addresses these principles, with emphasis on shipper and receiver responsibilities, hazardous material, oversize and overweight loads, and methods of loading and unloading.

RESPONSIBILITIES OF UNIT PERSONNEL

E-1. All motor transport company personnel have some responsibility for vehicle loads and cargo loading. A discussion of individual responsibilities follows. For specific information on loading, see the vehicle's technical manual.

COMPANY COMMANDER

E-2. The company commander is responsible for the unit and develops training plans for the unit. He ensures that company personnel are qualified to safely operate all equipment and are thoroughly trained in the principles of loading, securing, and transporting cargo. He also ensures that company training plans support individual driver skills, the required mission essential task list, and military occupational speciality training.

PLATOON LEADER AND PLATOON SERGEANT

E-3. The platoon leader and platoon sergeant develop the platoon's training plans based on their assessment of training needs. Plans include both individual and collective tasks. The platoon leader and platoon sergeant also implement company training plans and policies and ensure that squad leaders are qualified. They review driver testing and qualification records and observe driver training. They keep the commander informed of the platoon's level of training.

TRUCKMASTER

E-4. The truckmaster maintains driver qualification records and ensures that personnel are properly trained before being licensed. He should be satisfied that training is conducted according to standard. For this reason, the truckmaster regularly observes driver training. Based on the type of equipment in the unit, he may incorporate load and loading criteria in testing. The truckmaster also screens commitments that involve unusual or hazardous loads and highlights them for the tasked platoon.

SQUAD LEADER

E-5. The squad leader trains drivers to properly load and secure cargo on their vehicles. He ensures that operators know what they are carrying and that both drivers and vehicles are prepared to move the types of loads specified in taskings. The squad leader also supervises maintenance and ensures that vehicles meet operational standards.

DRIVER

E-6. The driver supervises the loading of his vehicle and ensures that his cargo is properly loaded and secured against movement. He further ensures that the load is balanced and does not exceed the vehicle capacity as noted on the data plate. He uses the vehicle tarpaulin to protect the load from the weather and pilferage. Once the driver accepts the load from the shipper, he alone is responsible for its safe delivery. The driver should not accept an unsafe load and should resolve any dispute before moving.

SHIPPER

E-7. Unless the vehicle has a self loading mechanism (i.e. PLS) or attached MHE, such as a crane, the shipper normally loads the vehicle. The shipper provides all tie-down devices, dunnage, blocking and bracing materials, and special tools required to secure the load. An exception is loading containers on semitrailers equipped with locking devices. The shipper also prepares any necessary shipping documents.

CARGO CHARACTERISTICS

E-8. The shipper's request for transportation identifies the characteristics of the cargo with its description, dimensions, and weight. This data is used by unit operations personnel to plan the number and types of vehicles needed to support the movement and tells drivers what they need to prepare for the movement (such as the requirement for a tarpaulin, placards, protective clothing, and fire extinguishers). If transporting hazardous material, this information alerts drivers to prepare vehicles for certain inspections and to seek guidance on loading techniques from squad leaders, platoon sergeants, or truckmasters.

CARGO AREA

E-9. The vehicle cargo area is measured in cubic feet. (To calculate cubic feet, take the length times width times height.) Cargo dimensions should not exceed the dimensions of the cargo area of the vehicle. An exception is made for certain outsize loads where there is an overhang from the sides or tail end. To make efficient use of assets, transportation units should try to maximize the weight and cube of vehicles and send only the number of vehicles that can safely carry the load. Theoretically, a perfect cargo load is one that exactly matches the cubic measurement of the vehicle's cargo area and its allowable weight. For example, if the maximum payload capacity of an M1083 5-ton cargo truck traveling on a highway was fully used, the load (piled no higher than the side racks) would occupy about 242 cubic feet and weigh 10,000 pounds. These conditions are seldom met. The weight, bulk, shape, and compatibility of the cargo, along with road conditions, affect how the vehicle will be loaded.

WEIGHT

E-10. When loading dense cargo such as ammunition or machinery, the vehicle weight limit may be reached before the cargo space is filled. In other words, it may weigh out before it cubes out. In such cases, the load should be blocked and braced to prevent shifting. With most military cargo loads, however, the vehicle will cube out before it weighs out. The weight of most military cargo is usually stenciled on the package and noted on the transportation request. The total shipment weight equals the sum of the individual package weights. If the weight is not stenciled on the cargo, the driver should ask the shipper to weigh it before loading. If this is not feasible, the driver should try to have the vehicle weighed after loading. This will ensure that the vehicle is not overloaded. If the cargo weight (total weight minus vehicle weight = cargo weight) exceeds the maximum cargo weight for the vehicle capacity and the anticipated driving conditions, the driver will return to the shipper for resolution.

E-11. When these options are not possible, the driver should require the shipper to provide an estimated weight and annotate the estimated weight on the shipping document. If the driver has doubts about the vehicle's ability to transport the load safely, it should not be accepted.

CARGO COMPATIBILITY

E-12. Shippers are required to identify commodities that should not be shipped together on the same vehicle. If there is any doubt and before the driver transports the cargo, shippers should consult appropriate references for guidance. For shipments within CONUS, use Title 49 Transportation Code of Federal Regulation (49 CFR), Part 177. When operating overseas, rules of the host country apply. The rules of each country transited, as well as international agreements, govern international shipments of hazardous cargo by highway. If the driver has any doubt about the safety of the load, he should contact the nearest transportation officer, movement control team, or his unit. In the absence of host country standards, comply with guidance in 49 CFR.

ROAD CONDITIONS

E-13. Every road can be classified based on its construction. Engineers normally classify roads. Classification includes bridges, tunnels, and other features that limit width, height, or weight. The payload capacity of a vehicle may be too great for existing roads or bridges. Light surface, loose surface, or fair weather roads may not bear the weight of a fully loaded vehicle. Accordingly, a driver should be familiar with the road he will travel and how its condition affects the allowable payload. For example, an unimproved mountainous road dictates a reduced load compared to a flat hard-surfaced highway. The nature of the road surface may also affect the amount of blocking and bracing needed to secure the load.

LOADING PROCEDURES

E-14. Proper loading procedures are essential to safe operations. They also support successful mission accomplishment by ensuring operational economy and efficiency. Truck unit capability is specified by TOE. See AR 385-10 for more information on requirements for transporting passengers in tactical vehicles.

IMPROPER LOADING PRACTICES

E-15. Underloading and overloading are improper loading practices. Though underloading does not affect vehicle operation or safety, it does affect operational efficiency. Underloading requires more vehicles than necessary to do the job. It wastes vehicles and personnel and causes unnecessary expenditures of fuel and lubricants. It also creates added route synchronization and traffic control problems that can affect all highway movements in the area. Underloading a vehicle is acceptable for compatibility purposes only. Vehicle overloading is a serious concern because it can damage the vehicle and is unsafe. Drivers should not accept loads that are greater than the authorized payload.

LOADING CARGO

E-16. The amount of cargo that can be loaded lengthwise into a truck varies by truck size and model. The length and width of cargo trucks and semitrailer bodies is listed in TB 55-46-1. If it is necessary for pipes, lumber, or other cargo to hang over the front and rear of the vehicle, the cargo should be blocked to keep the weight off the tailgate. A red flag should also be placed at each end of the load in the daytime (a red light at night) to warn other motorists that the vehicle needs added road space. The amount of overhang allowed varies from state to state and country to country. Units should know local traffic rules.

E-17. There are generic rules for loading cargo, to make certain the proper distribution of weight and overall safety of the cargo and vehicle. When loading cargo, place heavier items evenly distributed on the bottom and lighter cargo on top to maintain safe weight distributions. Block, brace and secure cargo with lumber or other materials to keep the load from shifting or falling off the vehicle while transporting. While loading, ensure the load is as low as possible to the vehicle bed, as an unnecessarily high load may make the vehicle difficult to control. While planning for multiple stops and distribution, separate the cargo loaded by destination to facilitate offloading. Also, and if possible, load items of uniform size and weight together to simplify operations. When loading drums or barrels on their sides, their length should be parallel to the sides of the truck and properly secured to prevent rolling.

TROOPS AND THEIR EQUIPMENT

E-18. Certain vehicles designed for cargo may also carry troops and enemy prisoners of war. The number of troops carried varies with the size of the truck and duration of the trip. Only authorized individuals may ride in military vehicles. Passengers should stay seated with all parts of their bodies inside the truck, especially while riding in the cargo bed on troop seats. As passengers in the cargo bed, all Soldiers should wear head protection and the troop safety strap should be utilized during travel. If the tactical situation permits, a tarpaulin should be used to protect Soldiers from weather, but proper ventilation is essential to protect them from exhaust gases. Soldiers should mount or dismount only after the driver or assistant driver has lowered the tailgate and disconnected the troop safety strap.

E-19. To prevent injury during loading or unloading and if the tactical situation permits, a Soldier should not mount or dismount the vehicle with their weapon. The Soldier should pass it to someone already on

board or to the person behind waiting to mount. Each Soldier should take back their weapon once on board. Likewise, a Soldier should not mount or dismount the vehicle carrying their individual equipment. Once on board, the Soldier should stack their equipment on the bed of the truck or under the seats. The number of ruck sacks or duffel bags that accompany Soldiers will reduce the number of troops that can be loaded on each vehicle. However, loading Soldiers with their personal equipment reduces the risk of lost equipment. Individual equipment not needed on the march may be loaded in separate trucks or trailers. This practice relieves Soldiers of added responsibility and is less fatiguing. It also ensures that, if the enemy attacks, Soldiers will not be burdened with nonessential equipment. Passengers and cargo are never hauled on the same vehicle.

TRANSPORTING HAZARDOUS MATERIAL

E-20. Hazardous material is a material or substance capable of posing an unreasonable risk to health, safety, and property when transported, as determined by the Secretary of Transportation. Hazardous materials are designated in Title 49 CFR and include explosives, ammunition, flammable liquids and solids, oxidizing materials, corrosive liquids, compressed gases, poisons, radioactive material, and chemical agents. Vehicles hauling passengers should be separated from any vehicle hauling hazardous cargo.

REFERENCES

E-21. In CONUS, Army vehicles carrying special loads should comply with Title 49 CFR and AR 190-11. When operating overseas, local regulations and policies apply. For detailed instructions on hauling arms, ammunition, and explosives refer to AR 190-11. For information on transporting radioactive materials, see AR 385-10 and TM 55-315. For information on transporting chemical agents, see AR 50-6. For information on transporting nuclear weapons and materials. For instructions on the handling and storage of hazardous material, see TM 38-410. The proper marking and placement of placards on vehicles carrying hazardous cargo is covered by 49 CFR within CONUS (see 49 CFR, Parts 100-199) or by overseas regulations.

SHIPPER RESPONSIBILITIES

E-22. Any shipper who offers a hazardous material for transportation should describe the hazardous material on the shipping documents. The driver of a motor vehicle containing hazardous material should ensure that the shipping document is readily available in the event of an accident or inspection. At origin, the shipper should inspect vehicles before they are loaded with hazard Classes 1.1 through 1.3 ammunition, explosives, poisons, radioactive "Yellow III" material, and chemical agents. Military shippers use DD Form 836 (Dangerous Goods Shipping Paper/Declaration and Emergency Response Information for Hazardous Materials Transported by Government Vehicles) to instruct drivers transporting hazardous material. The form outlines precautions to take in event of fire, accident, or breakdown. The shipper or transportation officer can add information related to the specific movement. When the shipper uses DD Form 626, each item on the form should be completed. The driver should ensure all deficiencies are corrected before the vehicle is loaded.

RECEIVER RESPONSIBILITIES

E-23. If the destination is a restricted area, the vehicle is inspected before unloading using the DD Form 626 (Motor Vehicle Inspection (Transporting Hazardous Material)). A restricted area is any area to which entry is subject to special restrictions or control for security reasons or to safeguard property or material. An example is an ammunition supply point. Deficiencies should be corrected at the time of inspection if practicable and if necessary for safe delivery to the unloading point. If a correction is necessary but impracticable, proper action should be taken to ensure safe delivery of the shipment. This could include use of ground guides, reduced speed, or escort vehicles. Drivers should get a copy of DD Form 836 from the shipper or ammunition supply point before departure. The driver should read the DD Form 836 before departure and ask questions if he does not understand it.

LOADING AND UNLOADING HAZARDOUS MATERIAL

E-24. There are many general requirements for loading and unloading hazardous materials. The operator should ensure the vehicle is safe to operate and free of fire hazards. By conducting preventive maintenance checks and services, the driver can identify any obvious faults with the vehicle to rectify prior to loading material. The driver should check to make certain there are no exposed wires and clean off excess oil or grease that has accumulated on the vehicle. The driver should also check the fuel system for leaks. During loading and unloading, the hand break should be engaged, with chock blocks bracing the wheels. The load is required to be inspected during rest or refueling stops, and should never be left unattended. During shipment, hazardous cargo should be marked with the proper shipping name, identification number and appropriate labels per 49 CFR. Placards should also be placed on the vehicle on the front, sides and rear indicating the appropriate hazard. The driver should also verify the shipper has properly loaded the hazardous material and utilized blocking and bracing methods to prevent shifting during transit.

SPECIFIC TYPES OF HAZARDOUS MATERIAL

E-25. Besides cargo that requires DD Form 626 and DD Form 836, specific types of hazardous material have other requirements that should be met for transporting. Personnel involved should know and observe current safety regulations and policies contained in AR 385-10, 49 CFR, as well as in local policies.

Ammunition

E-26. There are specific rules involved with ammunition shipments. When transporting ammunition, personnel should ensure tops of boxes are marked THIS SIDE UP. As a safety precaution, do not smoke within 25 feet, or use open flames within 25 feet, while loading, unloading, or transporting ammunition. The engine should be turned off during loading and unloading, and Soldiers should always ensure ammunition is handled with care. Since ammunition is dense, personnel should verify vehicle payload capacity and make certain to never overload the vehicle. Two serviceable fire extinguishers with at least a 10 BC rating should be carried with the vehicle, and vehicle operators need to be fully versed in their operations. Also, close and secure the tailgate; never load ammunition on the tailgate. While transporting ammunition, do not push or tow a truck also carrying explosives. Always follow a planned route that minimizes exposure in densely populated areas and never park in congested areas. While driving, protect cargo from shifting by not making sudden stops or turns. Never transport detonating caps with other explosives. When transporting artillery ammunition, load the rounds on their sides, so the size of the projectile is parallel with the truck's side, unless they are vertically prepackaged by the ammunition supply point. Fuses, primers and artillery ammunition can be carried in the same vehicle, but not assembled into a complete round.

Flammable Liquids

E-27. While transporting flammable liquids, personnel should exercise caution. When working around any hazardous material, never smoke within 25 feet, or use open flames within 25 feet, during loading, unloading or the transit of the cargo. Always turn off the engine during loading and unloading, and have two serviceable fire extinguishers with at least a 10 BC rating available for use. Prior to loading, personnel should inspect electrical connections on petroleum semitrailers and filling apparatus to make sure they are properly grounded. Also, prior to loading, remove tarpaulins and properly store them for future use. Personnel should never wear hobnail or metal-cleated boots to prevent sparks from igniting liquids.

Flammable Solids and Oxidizing Materials

E-28. While transporting flammable solids and oxidizing materials, there are special rules to consider. The load should be protected from adverse weather and kept dry at all costs. The proper use of a tarpaulin, including tie downs, is vital in the movement of this type of cargo. Also, personnel should provide ventilation for the load, but not allow it to be subjected to adverse weather.

Corrosive Liquids

E-29. There are also special rules that apply to the transportation of corrosive liquids. Personnel should inspect containers for leaks prior to loading, and if a leak is present, never load the container. Whether a container is full or empty, personnel should make sure that each container is tightly closed. While transporting batteries, personnel should ensure they are protected from movement and from contacting one another. The battery terminals should also be protected against short circuits.

Compressed Gases

E-30. While transporting compressed gases, personnel should ensure that all cylinders are on flat surfaces. The cylinders should be blocked and braced to prevent movement, and tied down appropriately. Ensure the engine is turned off during loading and unloading.

Poisons

E-31. During the transportation of poisons, personnel should inspect containers to ensure leaks do not exist. Also, never transport poisons in the same vehicle with food or edible substances.

Radioactive Materials

E-32. Radioactive materials should be handled with care, and packages containing said items should be properly marked with yellow or white labels in accordance with 49 CFR. Prior to loading, ensure the cargo area of the vehicle is free of protruding nails or bolts. Partitions can be utilized in cargo compartments to separate different packages. The separation distance on the total transport index shown on yellow labels should be utilized. The label also indicates the degree of control the driver should use while transporting cargo. Never load more than 50 transport indexes on one truck, which can be determined by adding all the indexes on the yellow labels. After adding the transport indexes, personnel should verify the separation distance with the shipper to ensure it is properly loaded. Never transport hazard Class 1.1, 1.2 or 1.5 explosives with radioactive materials, and never transport personnel in the same cargo compartment. If monitoring for radioactivity is required, the shipper should provide the monitoring device and an individual skilled in its use. The ITO should have a copy of the Department of Transportation regulations that govern radioactive shipments.

Chemical Agents and Chemical Ammunition

E-33. Prior to the transportation of chemical agents and chemical ammunition, personnel should inspect the cargo area for protruding nails or bolts. Also, personnel should carry individual CBRN defense equipment, know proper first aid and emergency procedures, and utilize any protective equipment or clothing provided by the shipper. Operators should also know the signs and symptoms produced by CBRN hazards and proper steps to follow if symptoms occur. According to AR 50-6, shipments of certain categories of chemical surety material should be accompanied by technical escorts who are qualified.

OVERSIZE AND OVERWEIGHT LOADS

E-34. Civil authorities determine limitations on the weight and dimensions of vehicles using public highways. Consequently, restrictions vary considerably for shipments in the United States and in overseas areas. Unit personnel should know the applicable regulations for the area in which they are operating. During combat operations, the movement control headquarters issues instructions for determining oversize and overweight loads. These limitations are established to prevent damage to MSRs and to allow for safe movement of vehicles.

Clearance Permit

E-35. The unit or activity planning to move oversize or overweight cargo requests a DD Form 1266 (Request for Special Hauling Permit). This form furnishes the ITO with complete information on the cargo and vehicles to be used. The ITO requests a special hauling permit from the authorities. The requesting unit should furnish the type of equipment, cross-weight, axle loads, height, width, length, origin, destination,

date, time and nature of the cargo to the ITO. See Appendix I for information regarding military vehicle axle weight distribution formulas and percentages. Also, while transporting oversized or overweight loads, warnings should be visible on the sides and rear of the cargo or vehicle to warn other traffic.

Escort Vehicles

E-36. If transporting an oversized or overweight load, escort vehicles may be required in the front and rear of the load. When escort vehicles are required, the vehicles should either have warning lights or be driven with vehicle headlights on. When required, the lead escort vehicle carries a WIDE LOAD FOLLOWS sign on the front. The rear escort vehicle should be equipped with a WIDE LOAD AHEAD sign on the back.

CARGO SECURING PROCEDURES

E-37. To secure the load for safe delivery to its destination, the shipper should follow procedures to lash and/or block and brace cargo. The shipper is responsible for blocking and bracing a load. However, since the driver should deliver the load safely to its destination, some general rules apply to the driver. The operator should block crates, boxes and barrels to keep them from shifting during transport. Crib blocking can be used whenever possible. The crib blocking does not need to be nailed to the floor or sides if it is placed tightly against the other cargo to secure the lumber. When using lumber for blocking, it should be free of knots and be strong enough to provide a rigid and stable support system for loads en route. If the load is required to be protected from weather, pad corners of boxes, crates or other sharp objects to prevent damage to the tarpaulin.

DOUBLE-STACKING TRAILERS

E-38. Problems may arise when stacking one trailer onto another for transport, especially if loading facilities or equipment (such as ramps, loading docks, and gantry cranes) aren't available. Several methods can be used to solve these problems. When semitrailers are stacked and shipped as cargo or moved as a matter of convenience, be sure to coordinate with the receiving authority to ensure that the shipment can be unloaded. Experienced drivers should be used when tractors are positioning semitrailers onto or removing them from other semitrailers.

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Appendix F
Motor Transport Equipment Control

Various records and reports are used to control motor transport equipment and analyze unit operations. This appendix discusses the purpose and disposition of each of these documents.

TRAILER ACCOUNTABILITY

F-1. When a trailer is being moved by multiple units through the distribution system a DA Form 2062 (Hand Receiot/Annex Number) establishes responsibility for trailers and serves as a receipt for trailers. It is prepared by the unit delivering the trailer. The DA Form 2062 is retained until the trailer is returned to the issuing unit or the unit carrying the piece of equipment on their property book is otherwise relieved of physical responsibility for the trailer. Two copies of the DA Form 2062 are made and distributed as follows:

- *Original* -- used to show acceptance from one convoy commander or individual driver to another convoy commander, individual driver, terminal or transfer point OIC.
- *Second* -- retained by the driver or column commander.

DAILY YARD CHECK

F-2. The daily yard check is made at a designated hour each day by units responsible for terminal operations. This report provides information on the location of empty and loaded trailers, including the destination of loaded trailers, and also shows deficiencies. It is divided into two sections: section 1, empty trailers; and section 2, loaded trailers. Deficiencies are noted in the remarks column and specified by section (1 or 2). This report is forwarded to the operations section of the next higher headquarters.

DAILY OUTGOING TRAILER REPORT

F-3. The daily outgoing trailer report shows all semitrailers dispatched since the previous day's report. It includes the load class, departure time, and destination of each trailer. The report is sent to the operations section of the next higher headquarters along with the daily yard check.

WEEKLY TRAILER LOCATION REPORT

F-4. The weekly trailer location report is completed by the senior motor transport command. It shows the status, by battalion, of all semitrailers controlled by the command. The report may include information on trailer location, length of time at present location, and whether they are loaded or empty. The report is filled out on a specific day each week. Battalion commanders can use the report to determine if, where, and how trailers are being mismanaged, misused or how to optimize efficiency.

CONSOLIDATED OPERATIONS REPORT

F-5. The consolidated operations report is used to analyze unit performance and plan future operations. It is completed daily by each battalion engaged in line haul and forwarded to the senior motor transport command. Commanders use report data to compute unit performance. For example, a commander can compare the performance of one truck company with another. Most entries to the consolidated operations report are taken from truck company reports. Unit averages are figured to the nearest round number (for example, an average of 7.7 would be raised to 8).

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Appendix G
CONUS Military Convoys

Convoy operations conducted in the contiguous United States are similar to convoys conducted in support of unified land operations. However, they require planning and coordination with the ITO for the active component, the defense movement coordinator of the Army National Guard State Area Command for reserve and National Guard forces, and local civil authorities (law enforcement and Department of Transportation) of the state or states being transited. Their times traveling to or through an area may be regulated based on size, vehicle composition, and the cargo transported.

CONVOY PLANNING AND COORDINATION

G-1. Convoy planning is conducted in the same manner for CONUS operations as those conducted for unified land operations. In CONUS, each state establishes rules, procedures, and laws that govern the use of public highways. Counties, cities, and municipalities may establish added restrictions for the use of their respective county or city routes. No vehicular movement that exceeds these legal limitations or regulations, or that subjects highway users to unusual hazards (including movement of explosives or other dangerous cargo), will be made over public highways without prior permission from the appropriate state, local, or toll authority. These terms require that military convoys have an approved convoy clearance to travel on public highways and roads. In CONUS, a military convoy can be defined as one of the following:

- Any group of six or more vehicles temporarily organized to operate as a column, with or without escort, proceeding together under a single commander.
- Ten or more vehicles per hour dispatched to the same destination, over the same route (except during mobilization and deployment, then all movements to a mobilization station will require a convoy clearance).
- Five or fewer vehicles operating as a column, with or without escort, proceeding under a single commander (if one or more vehicles require the submission of a DD Form 1266 (Request for Convoy Clearance)).

The two primary entities for coordinating for a convoy clearance number are the ITO for active components and the Army National Guard State Area Command for the National Guard and reserve components. These organizations coordinate with the state and local authorities to ensure convoy routes are feasible and clear for travel for the convoy according to the information submitted on the convoy request. Convoy requests are made using DD Form 1265 or DD Form 1266 when appropriate. Active component units submit convoy requests to their ITO not later than 30 days prior to the convoy. The ITO coordinates convoys with the defense movement coordinator of the Army National Guard State Area Command. Reserve component units submit convoy requests to their higher headquarters not later than 60 days prior to the convoy. The higher headquarters coordinates convoys with the defense movement coordinator of the Army National Guard State Area Command. The ITO or defense movement coordinator may have other documents or special requirements needed when submitting a convoy request.

CONVOY IDENTIFICATION

G-2. Each column should be identified by a blue flag on the lead vehicle and a green flag on the rear vehicle. Flags should be mounted on the left of the vehicles, either front or rear. They should be positioned so that they do not interfere with driver vision or functional components of the vehicle. When movement is at night, the lead vehicle shows a blue light and the rear vehicle a green light. The vehicle of the convoy commander and the march unit commanders should display a white and black diagonal flag on the left front bumper. This flag is divided diagonally from the lower left corner to the upper right corner with the upper left triangle white and the lower right triangle black. Trail party vehicles carry an international orange

safety flag. State and local police escort vehicles do not display convoy identification flags. The convoy movement order includes a convoy clearance number which identifies the convoy during its entire movement. The convoy clearance number is placed on both sides of each vehicle in the convoy and, if possible, on the front and back of each vehicle. It is also placed on the top of the hood of the lead and rear vehicles of each march unit.

G-3. Plan night moves in the same manner as daylight moves. However, night moves take longer and there is greater chance for mistakes. When planning a night move, determine if the convoy will operate in an area that requires blackout drive. This decision will be made by the area commander.

HIGHWAY CONVOY OPERATIONS

G-4. Main convoy routes, such as major highways and expressways, are usually characterized by heavy, fast-moving traffic. Entering, driving, and halting on these routes require prior planning and coordination with civilian authorities.

CAUTION

Instruct convoy vehicle drivers NOT to give "clearance signals" to civilian vehicle operators. Responsibility for determining safe passing conditions rests with the driver desiring to pass.

Entering Convoy Routes

G-5. The convoy should depart the assembly area at the time given in the movement order. Police support will reduce interference with other traffic and ensure the integrity of the convoy. Use the close column formation, 25-50 meters between vehicles, when moving from the assembly area to the main convoy route.

Note. Risk can be significantly reduced when civilian police assist by controlling civilian traffic. If a civilian police escort is not available, MPs or other military personnel may provide escort vehicles. However, military escorts have no authority to instruct military drivers to disregard traffic control devices or signs.

G-6. Most expressways are equipped with entrance and exit ramps and acceleration and deceleration lanes that are designed to allow vehicles to enter and leave without interfering with other traffic. When used properly, these lanes greatly reduce the risk of traffic accidents and help in the movement of the convoy. The following instructions apply both to the initial point of entry to the expressway and the return to it from a rest halt area:

- When appropriate, civilian police assistance should be obtained to direct convoy vehicles onto the expressway and to control civilian traffic. When civilian police are not present, use military police or other military personnel to signal military vehicles when it is safe to enter the expressway. Military traffic should not interfere with civilian traffic.
- Before driving onto the entrance ramp, reduce distance between convoy vehicles to a maximum distance of 20 yards. This reduces the time the entrance ramp is blocked to normal traffic. Upon reaching the acceleration lane, increase convoy speed to equal as closely as possible that of other traffic on the expressway. The maximum speed authorized for military vehicles on expressways is 50 MPH. Military vehicles moving on controlled access highways will maintain the posted minimum speed or 40 MPH if a minimum speed is not posted. Vehicles that cannot maintain the posted minimum speed will be routed over an alternate noncontrolled access road (refer to AR 55-162). Do not exceed the minimum speed unless directed by the convoy commander. Under no circumstances will the posted maximum speed limit be exceeded.
- When moving into the traffic lane and before merging, the driver should ensure that lanes are clear of oncoming traffic.

- After entering the traffic lane, drivers should not immediately try to move to the prescribed distance for expressway convoy operations but continue for a distance equal to the road space of the column. Drivers should then gradually attain the distance between vehicles for expressway driving or as given by the operation order and the final briefing.

Note. Vehicles should not slow down or close up while in a traffic lane of the expressway.

Driving on Expressways

G-7. All vehicles should remain in the right lane once the convoy has entered the expressway. Where the right lane is reserved for traffic turning off at the next exit ramp, the convoy should use the next adjacent lane. Drivers should be alert and prepared to slow down or take other evasive action to avoid vehicles entering the expressway from acceleration lanes.

G-8. If a vehicle develops mechanical trouble, the driver should turn on the appropriate turn signal to alert the vehicle behind him and move onto the shoulder of the road or into a parking area and wait for the arrival of the trail party. The remaining convoy vehicles should continue past the halted vehicle, leaving maintenance to be done by the trail party.

G-9. The following actions will help drivers to avoid drowsiness or "highway hypnosis":

- Keep cab windows open.
- Shift body positions frequently.
- At rest halts, get out of the cab and move about.

Exiting an Expressway

G-10. To exit an expressway, either to enter a rest area or take another route, move vehicles to the deceleration lane at the earliest opportunity. Reduce speed to posted exit speed limit.

Rest and Meal Halts on Conventional Highways

G-11. When feasible, schedule rest halts so that the convoy will halt for 15 minutes at the end of the first hour of operation and 10 minutes every 2 hours thereafter. When a suitable area is not available at these periods, minor adjustments may be made to this schedule. On conventional highways with adequate off-shoulder parking space, rest and meal halts normally do not present a problem. However, the following precautions should be taken:

- Do not select rest areas located in urban or heavily populated areas.
- Avoid areas on curves or reverse sides of hills.
- Leave enough room to allow the vehicles to park off the paved portion of the road and return to the road safely.
- Maintain a minimum distance of 3 feet between parked vehicles.
- Place warning kit devices at the head and tail of the column unless the vehicles are completely off the highway and shoulder. Leave the flashing warning lights in operation and the headlights on. Post a guard behind the trail party with proper warning devices to alert, but not direct, approaching traffic.
- Do not permit convoy personnel, with the exception of guards posted at the head and tail of each halted march element, on the traffic side of vehicles except to perform prescribed maintenance.
- Make sure drivers and assistant drivers perform prescribed at-halt maintenance and check the security of cargo. Deficiencies that cannot be corrected by the vehicle crew should be reported to the serial commander.
- Check drivers for illness and fatigue.
- Post guards at least 50 yards behind the last vehicle to warn traffic when departing a rest area. When police support is provided, this step may not be required. Convoy vehicles should return to the highway as rapidly and safely as possible.

Rest and Meal Halts on Expressways.

G-12. Information on the location of rest areas and their truck parking capacities on expressways over which the convoy will move is available at each ITO. The designated federal or state rest areas planned for convoy use should be entered in item 20 of DD Form 1265.

G-13. Only emergency stopping is authorized on expressways. Official rest areas or parking areas may be used for scheduled halts of military convoys. On most expressways, these areas are located at 25- to 30-mile intervals. Normally, separate parking areas within the rest area are designated for truck and passenger car parking. Convoys should use the portion reserved for trucks. Ensure that there is space for other vehicles. Convoy vehicles should not occupy more than 50 percent of the truck parking space at any time. If the number of trucks in a convoy will exceed 50 percent of the truck parking area, organize the column into serials. Maintain a sufficient time gap between serials to allow one to clear a rest area before the following serial arrives. Or, you may schedule convoy serials into different rest areas; however, this separates serials to such an extent that control is reduced. Normally, acceleration lanes are provided at rest areas to facilitate merging of vehicles with other traffic. The same procedures are used when departing a rest area as when making an initial entry onto an expressway. Meal halts on expressways require careful planning because of their longer duration. If the selected rest area cannot accommodate all of the convoy vehicles, one of the following options can be taken:

- Phase the convoy into a rest area in serials with enough time gap to allow the preceding serial to eat and clear before the arrival of the next serial.
- Have all serials halt at about the same time but at different rest areas. However, this will require excessive gaps between elements, thus reducing the commander's control.
- Use the leapfrog method by requiring the first serial to halt at a rest area while the second serial continues on to the next area, usually 25 to 30 miles ahead. By the time the first serial has completed its halt and arrived at the area where the second serial stopped, the second serial should be ready to join the column.
- Leave the expressway and use a previously selected area. This option allows all personnel to take a meal halt at the same time.

Refueling Halts

G-14. The majority of military vehicles can travel 300 miles without refueling. Since this exceeds the distance a convoy normally travels in one day, arrangements for mass refueling before reaching the overnight halt are unnecessary. Vehicles with limited range should be refueled during the scheduled halts as well as during regular refueling halts.

Toll Roads, Bridges, and Tunnels

G-15. A convoy representative should be assigned to clear the convoy at the initial entrance to toll facilities and any intermediate points where tolls are collected. When possible, obtain toll tickets before the convoy departs from its point of origin. When this is not feasible, the convoy representative should arrive at the toll facility entrance in advance to purchase tickets and arrange for the uninterrupted movement of the convoy through the toll facility.

Halts Due to Mechanical Failure.

G-16. A vehicle disabled because of mechanical failure should immediately be moved from the traffic lane to a location where it will not be a hazard to other traffic. If a breakdown occurs while driving on an expressway or highway, the driver should take immediate action appropriate to the time of day and degree of visibility in the area.

Sunset to sunrise.

G-17. During the time that lights are required (sunset to sunrise) and when forward visibility is reduced to 500 feet or less, a reflector should be placed either in the obstructed lane or on the shoulder of the road if

the vehicle is on or over the shoulder. Place the reflector to face the traffic using that lane. Do this before any attempt is made to repair the vehicle. Reflectors should be placed in the following order:

- One reflector in the center of the lane of traffic occupied by the vehicle and not less than 40 paces (approximately 100 feet) from it in the direction of traffic approaching in that lane. If the vehicle is on or over the shoulder and does not occupy a traffic lane, the warning device should be placed on the edge of the roadway so that the traffic lane is not blocked.
- One reflector on the traffic side of the vehicle, four paces (approximately 10 feet) to its rear facing the traffic in that lane.
- One reflector 40 paces from the vehicle in the opposite direction.
- If the vehicle is stopped within 300 feet of a curve, crest of a hill, or other obstruction to view, the warning device in that direction should be placed so as to give ample warning to other users of the highway. However, the device should be placed not less than 80 paces or more than 120 paces from the vehicle.

Sunrise to sunset.

G-18. During the time lights are not required (normally sunrise to sunset), place red flags or reflectors with mounted flags at the distances prescribed for night. Since most warning kits contain only two flags, the reflector placed 10 feet behind the vehicle will not have a flag mounted on it. DO NOT use military personnel to warn drivers by manual flagging except where emergency warning devices do not give adequate warning to civilian traffic.

Accident Procedures.

Note. These are guidelines to be used in the absence of local and unit SOPs.

G-19. If an accident occurs, every effort should be made to reduce its effects and to keep the convoy moving. If an accident happens in the convoy, the following steps should be taken:

- *Keep moving*. Only the vehicle immediately behind the vehicle should stop and render assistance.
- *Give first aid*. Give immediate attention to injuries according to FM 4-25.11.
- *Wait for assistance*. Do not move the damaged vehicle until an accident investigation has been completed. Report any accident IAW DA Pam 385-40.
- *Clear the traffic lane*. The crew of the affected vehicle should make every effort to clear the traffic lane as soon as possible. In case of injuries, the crew of the assisting vehicle may be required to move the damaged vehicle.
- *Prepare the accident report*. Whenever a military vehicle is involved in ANY accident, the driver will prepare a SF 91 (Motor Vehicle Accident Report). In the event of an accident, photographs should be taken of the vehicles involved, any damage to property, and the accident scene. The photographs should be retained with the SF 91. When possible every convoy vehicle should have a camera.

G-20. On-the-spot information will be recorded on the form by the operator involved. If the operator is unable to prepare the report at the scene of the accident, it will be prepared by anyone so directed. The report should be completed and delivered to the operator's immediate supervisor as soon as possible for use in preparing DA Form 285 (Technical Report of US Army Ground Accident).

G-21. Before any accident report is sent to a state or local agency, the report will be submitted first to the appropriate claims officer for review to ensure that the rights of the United States government are not prejudiced by admission of liability.

G-22. It is essential that personnel be trained to obtain all vital information at the scene of the accident and to complete all entries on the form. Information will often be unavailable after witnesses have left or vehicles have been removed from the scene of an accident. Each item of the report should be checked to make sure it gives a complete picture of facts leading to the accident and what occurred in the accident. If

there is any question as to the validity of information obtained for the report, a notation should be made to this effect.

Note. When a civilian driver is involved in the accident, their name should be obtained from their driver's license.

G-23. The first officer or noncommissioned officer to arrive at the scene of the accident will take charge by supervising emergency aid, directing military traffic, warning civilian traffic, and directing placement of warning devices until the trail officer arrives. The assistant convoy commander or trail officer, aided by available medical and maintenance personnel, will supervise and direct care of the injured and disposition of the damaged vehicles. Further assistance needed should be requested from the agencies listed in the convoy operation order.

Vehicle Accidents Causing a Fire or Creating an Electrical or Fire Hazard

G-24. Motor convoys travel mostly over highways in rural areas. Fire departments in these areas are widely scattered, and firefighters may have to travel a long distance to respond to an emergency. This means that convoy control personnel will probably be the first to arrive at the scene of the accident and should be prepared to rescue endangered personnel, attempt to control the fire, or take steps to prevent a fire. If the accident results in a vehicle fire, convoy supervisory personnel should take the following actions:

- Halt the control vehicle a safe distance from the fire. Direct the driver or other convoy personnel to notify the nearest fire department and police department, using the most expeditious means; for example, roadside emergency, service station, or private residence telephone. If radio communication is available, notify the convoy commander.
- Remove injured personnel from burning vehicles as quickly as possible, even when it means subjecting a person to further injury. Follow established first aid procedures in caring for the injured before attempting to control fire in unoccupied vehicles.
- Keep spectators at a safe distance.
- Attempt to extinguish the fire with the control vehicle extinguisher, extinguishers from other vehicles, or with sand or mud.

G-25. In the event of an accident involving a truck carrying either explosives or hazardous cargo, supervisory personnel should take the following actions:

- Approach cautiously. Resist the urge to rush in; people involved in the accident cannot be helped or rescued until the hazards are known.
- Move and keep people away from the scene.
- Immediately notify all assisting agencies and personnel of the hazards involved.

G-26. If the accident results in a fire hazard, supervisory personnel should do the following:

- Halt the control vehicle a safe distance from the accident. Direct the driver or other convoy personnel to notify police and fire departments by the fastest means. When radio communication is available, notify the convoy commander.
- Turn off the ignition and lights of the vehicles involved. Because of the possibility of sparks, do not remove battery cables unless absolutely necessary.
- Notify nearby residents when spillage may place them in danger.

G-27. If the accident involves high-tension power lines, an extremely dangerous situation exists. The danger is even greater when the downed lines are touching a vehicle. Convoy supervisory personnel will take the following steps:

- Contact police immediately and explain the situation. The police will be able to contact power company personnel for emergency assistance more quickly than convoy personnel.
- If wires are touching any of the vehicles involved, direct the occupants to remain in place until power company workers can cut off the electricity and remove the wires.

- In case of serious injury where death may be imminent unless rescue is affected, attempt to remove the wires, assist the injured from the vehicle, render first aid, and obtain medical assistance.

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Appendix H

Communications and Communications Security

The Army has developed and fielded a number of automated information systems that have revolutionized the way motor transport units conduct their operations. One category of automated information systems, situational awareness systems, provide motor transportation unit commanders, planners and mode operators with an unprecedented level of visibility of vehicle platforms and cargo moving through the distribution system. This increased visibility facilitates better assessment of, and planning for, mission requirements in support of operations. Army motor transport units use situational awareness systems to great effect, achieving improved mission command of logistics operations and increased survivability for Soldiers. This appendix provides an overview of different communication systems that facilitate motor transport operations.

AUTOMATED INFORMATION SYSTEMS

H-1. DOD automated information systems are designed to interface with commercial transportation information systems to receive and pass required personnel, unit, and cargo movement data and other transportation information to appropriate commands and agencies throughout the DTS. This capability exists to the extent commercial carriers have formatted their Electronic Data Interchange reports to DOT standards.

AUTOMATIC IDENTIFICATION TECHNOLOGY

H-2. Automatic Identification Technology is the basic building block in the Defense Department's efforts to provide timely asset visibility in the logistics pipeline, whether in-process, in-storage, or in-transit. AIT media includes barcodes, radio frequency identification (RFID), satellite tracking systems, smart cards/CAC, optical memory cards, and contact memory buttons. By enabling data collection and transmission to automated information systems, Automatic Identification Technology provides the Soldier with the capability to track, document, and control the deployment of personnel and materiel.

Total Asset Visibility

H-3. Total asset visibility (TAV) obtains data on all classes of supplies from various Standard Army Management Information System and other source systems; providing visibility of materiel in use, in storage, in process, or in-transit. TAV enables logisticians and managers to provide near-real time information to commanders, allowing them to make informed decisions using the most current logistics information. TSC materiel managers use TAV to identify, cross level, ship, or redirect assets throughout the theater. Sub-elements of TAV are asset visibility and ITV.

Asset Visibility

H-4. Asset visibility provides logisticians with timely and accurate information on the location, movement, status and identity of units, personnel, equipment, and supplies flowing throughout the theater. This enables logisticians to act upon that information to improve the overall performance of the intra-theater distribution system.

H-5. Within the theater, asset visibility is achieved by linking AIT, such as RFID tags, memory buttons, smart cards, and barcode readers with automated information systems. These can also be linked with ground and satellite transmission stations, providing the means to influence the flow of materiel throughout the distribution system.

H-6. The TSC materiel managers maintain theater-wide asset visibility for the following commodities:

- Class III bulk petroleum.
- All Class VII materiel (less communications security items).
- Class IX theater level repairables.
- Selected items of interest.
- Theater level conventional ammunition, guided missiles, and large rockets.

In-Transit Visibility

H-7. ITV is visibility over those portions of the distribution system encompassing the flow of assets from the consignor to the consignee, port, servicing airhead, supply support activity, or other destination. This includes force tracking and visibility of convoys, containers and pallets, transportation assets, and other cargo.

H-8. At the strategic level, the Integrated Data Environment Global Transportation Network Convergence provides accessible and accurate information on materiel movements within CONUS and outside continental United States.

H-9. At the theater level, a suite of fully integrated AIT and automated information system capabilities provide the TSC with the means to achieve the in-transit visibility required for the seamless flow of supplies, personnel, equipment, and units throughout the intra-theater distribution system.

Radio Frequency Identification

H-10. The need to know what you have, where it is, and how to find it anywhere in the logistics system is critical in projecting and sustaining the force. RFID is a proven technology platform that has significantly enhanced the effectiveness and efficiency of the battlefield distribution system. Whether in a port, SSA, staging area, cargo transfer point, or ammunition storage activity, RFID technology offers advantages which are essential to effective distribution. Commanders should stress the importance of RFID tag technology in total asset visibility and ITV, emphasizing its use in tracking materiel in the logistics pipeline.

H-11. Radio frequency identification uses radio wave transmission and reception to pass Military Standard Requisitioning and Issue Procedures (MILSTRIP)/Military Standard Transportation and Movement Procedures (MILSTAMP) shipment information about objects that need to be identified or tracked. These objects can be vehicles, pallets, containers, or other intermodal equipment. The information is stored on the tag with media storage capability similar to a computer's random access memory. Antennas or "interrogators" can read the information contained on the tag attached to the item and pass it back to a central database. Under certain conditions, it will also be desirable to write to the tag from an interrogator in order to update information concerning the tagged item. It is this remote "stand-off" read/write capability that sets the RFID tag apart from other automatic identification technologies such as bar coding and optical memory cards. Currently these tags can be manipulated at a range of approximately 250 feet between the RFID tag and interrogator.

H-12. RFID tags, by the nature of their construction, allow a greater flexibility than traditional bar coding in placement on the tagged item. Omni-directional radio wave propagation allows the tag to be read even when the interrogator is not in a direct line of sight with the tag. It is possible to read identification information off the tag while the item is moving. The identification information, in conjunction with RFID tag MILSTRIP/MILSTAMP initial "write" records, provides near-real time nodal ITV via Integrated Data Environment Global Transportation Network Convergence and ultimately TAV. This means that the distribution process is not interrupted because in-transit items no longer have to be stopped and physically accounted for on arrival or departure. RFID tags can also assist in locating/identifying commodities placed in a physically inaccessible location (for example stacked containers and during hours of darkness or obscured vision). However, tag reading can be disrupted or degraded by distance and metal obstructions that prevent the radio waves from reaching the tags.

Unit Planning Considerations

H-13. RFID technology should be used during peacetime operations so Soldiers are comfortable with the equipment. RF tags should be used during combat training center training scenarios and during installation and deployment operations. It is a unit responsibility to order and attach RFID tags on their equipment to maintain visibility. RFID tags are available through existing supply channels.

MOVEMENT TRACKING SYSTEM

H-14. Movement tracking system (MTS) is a commercial off-the-shelf satellite-based tracking and communications system. Through military global positioning systems and long band (L-band) satellite two-way messaging, MTS provides worldwide coverage and positive control of movements. Because MTS is based on satellite communications, it does not depend on existing landlines, which makes it a more secure system that is less vulnerable to interruptions. MTS contains an embedded military global positioning system card and an embedded RFID interrogator within the new L-band satellite receiver. The embedded global positioning system card in the transceiver improves the system's anti-jamming characteristics and eliminates the need for a separate, external global positioning system device. MTS computer systems come in two configurations: a mobile system that can be mounted in any tactical wheeled vehicle and a laptop control station for use at levels of the theater distribution management system. MTS interfaces with other automated information systems, such as RFID, to achieve a common operating picture and near TAV.

Capabilities

H-15. Movement tracking system provides communications and tracking capabilities for sustainment forces; capabilities needed to complete and survive their missions. MTS directly impacts the efficiency and readiness of motor transportation units by providing planners and mode operators with data on the location and status of their logistics convoys in near-real-time. MTS systems fielded in sustainment unit vehicle platforms helps overcome the limitations of FM radio line-of-site communications caused by long range or mountainous terrain. Leaders can pass critical information, such as route and mission changes, and other information, to their Soldiers while the Soldiers are on the road conducting missions. Leaders can now expedite the process of requesting quick reaction forces, engineer support, and recovery assets.

H-16. The embedded RFID interrogator is another feature of significance to logisticians. The interrogator can read active RFID tags placed on cargo or containers loaded onto the back of a vehicle. Active RFID tag data are transmitted through the MTS server to MTS control stations and fed to the RFID in-transit visibility server. Other control stations can track cargo as it moves across the battlefield, and commanders can redirect shipments on the move as the mission dictates. This capability significantly enhances asset management by providing positive cargo tracking and control and asset visibility to the final destination.

H-17. MTS supports Army standard operating procedures by allowing users to send pre-formatted text messages, such as: operations orders; logistics situation reports; maintenance support requests; medical evacuation requests; accident reports; mission-delay reports; repair parts requests; vehicle diagnostic problem reports; and dispatch requests.

H-18. MTS gives users the ability to identify positions of MTS-equipped vehicle platforms, track their progress, and communicate with their operators and control stations. As the Army moves toward the goal of achieving total asset visibility, efforts are underway to interface MTS with other systems in order to better coordinate mission support requirements.

Note. Since not all sustainment vehicle platforms have MTS installed, it is important to position vehicles with MTS throughout the convoy.

FORCE XXI BATTLE COMMAND BRIGADE AND BELOW-BLUE FORCE TRACKING (FBCB2-BFT)

H-19. Although designed to operate at the brigade level and below, FBCB2-BFT systems are deployed at all echelons, from individual vehicles up through theater-level commands. It comes in two variants: one

that is based on the ground force's ultra-high frequency radio network, the enhanced position location reporting system, and one that utilizes a commercial satellite communications network.

H-20. FBCB2-BFT provides on-the-move, real-time, and near-real-time information to sustainment unit leaders and Soldiers, allowing them to more effectively plan and execute logistics operations. FBCB2-BFT is a key component of Army Battle Command System (ABCS) and seamlessly integrates with the other components of ABCS at the brigade level and below. FBCB2-BFT supports situational awareness down to the Soldier and platform level across all battlefield functional areas and echelons. FBCB2-BFT allows brigade- and battalion-level commanders to exercise command when they are away from their TOCs by interfacing with subordinate commanders and leaders who also are equipped with FBCB2-BFT. FBCB2 allows sustainment forces to be digitally linked to the platforms and organizations that they support.

Figure H-1. FBCB2-BFT components: key board, monitor, and central processing unit

H-21. FBCB2's primary functions are to send and receive automatic position location reports derived from its interface with the Global Positioning System and to send and receive mission command message traffic via digital over-the-air radio transmissions. The tactical internet is the network of radios and routers that provide linkages to connect the myriad FBCB2 platforms (both vertically and horizontally) across the combined arms force. The tactical internet consists of the enhanced position location reporting system, the single-channel ground and airborne radio system - advanced system improvement program, and the internet controller router.

H-22. Blue Force Tracker transmits, receives and displays situational awareness messages and the location of friendly forces, enemy forces and improvised explosive devices (IEDs) in relation to the convoy. Satellite communications report suspicious items like abandoned cars, tires, tank charges and claymore mines beyond the Soldier's line-of-sight. Information about the enemy is reported and convoys will receive audible and screen banner warnings when they are in close proximity to the threat.

Figure H-2. FBCB2-BFT installed

BATTLE COMMAND SUSTAINMENT SUPPORT SYSTEM

H-23. BCS3 is the Army's logistics mission command system. As the sustainment element of ABCS, it is a windows-based, lightweight, portable system that is highly platform independent. BCS3 provides battle command services including commodity tracking, convoy operations and tracking, and management of reception, staging, onward movement, and integration. BCS3 also provides a sustainment common operating picture.

H-24. BCS3 aligns sustainment, in-transit, and force data to provide actionable information that aids the commander in making critical decisions. BCS3 also gives logisticians and other personnel access to the latest available information on a map-centric view with logistics common data, in-transit visibility alert features, and input to combat power computations.

H-25. BCS3 enables commanders and logisticians to plan, rehearse, integrate, and sustain missions utilizing the same system. The following is a list of BCS3 functional capabilities:

- Provides near-real time maneuver sustainment command and control on a map-based display.
- Provides flexible situational assessment products in response to queries from sustainment brigades and combat sustainment support battalions which are made available via secret internet protocol router network.
- Provides reports and input forms for units, supply points, echelon status, and combat power.
- Enables dynamic unit task organization to reflect changing organizational relationships and full color mapping.
- Provides reception, staging, onward movement, and integration visibility and status.
- Accommodates electronic messaging and data exchange with ABCS.

- Provides access to critical items roster and command selected items roster (unit-selected items flagged for monitoring).
- Enables distribution management.
- Provides combat power data to maneuver control system.

H-26. BCS3 operators can view the supply stock levels in warehouses and track the movement of supplies as they travel through the distribution systems via air, land, and sea. These capabilities provide a platform for a logistics common operating picture, which is the most important feature of the system.

BCS3 TRANSLOG WEB

H-27. BCS3 TransLog Web is a web-based application that provides a single point of entry for movement requests and publishes a consolidated movement program for distribution operations. It can build march credits, de-conflict convoy routes, produce Gantt charts, and track movements using ITV. It can run on either the unclassified but sensitive internet protocol router network or the secret internet protocol router network, depending on the security requirements. TransLog Web works hand-in-hand with BCS3 to provide an end-to-end solution.

RADIO COMMUNICATIONS

H-28. Digital communications systems are supplemented by comparatively short-range FM radio sets. These sets are used for mobile operations or to supplement common-user communications facilities. The communication requirements of the unit's mission, personnel and equipment authorized determines the type and extent of radio equipment authorized, including vehicle mount types. See the applicable TOE for specific types and quantities of radio equipment authorized. Companies are normally provided FM voice radio sets to supplement digital communication systems, and preexisting wire systems. The FM voice sets are utilized in motor transport units to facilitate the control of road movements, mission command of company elements operating a distance from the company area, and to provide effective communication with higher headquarters when distance permits.

H-29. The single channel ground and airborne radio system – advanced system improvement program is a single net, short-range, FM radio transceiver that can be configured for a man pack, or utilized with a vehicular radio communications (VRC) mount. There are multiple variants of the VRC mount, which can provide a vehicle with one or two radios and subsequently a single or dual net. The VRC mount can also turn the original radio from a short range to a long range radio with use of a vehicle mounted long-range antenna. FM radios are authorized for use by motor transport companies, and each company varies in its authorization for VRC mounts. VRC mounts are utilized to maintain communications internally within convoys, and externally to the company TOC. Radios are particularly vulnerable to enemy electronic warfare since they radiate electromagnetic energy and may be readily detected, intercepted, analyzed and exploited.

Communications Security

H-30. Communications security is the protection resulting from all measures designed to deny unauthorized persons information of value that might be derived from the possession and study of telecommunications and to ensure the authenticity of such communications. The following qualifies as COMSEC:

- Crypto-security
- Emission security.
- Transmission security.
- Physical security of COMSEC materials and information.

H-31. The unit commander should ensure that COMSEC measures are understood and observed by all unit personnel using communications equipment. Motor transport unit personnel are concerned with all types of COMSEC. However, transmission security and physical security are of primary concern.

Transmission Security

H-32. Transmission security is that component of COMSEC that results from all measures designed to protect transmissions from interception and exploitation by means other than crypto-analysis. Radio is particularly susceptible to interception, direction finding, traffic analysis, and deception. Thus, radio operators should be thoroughly trained in correct communications procedures. They should also be constantly alert so as not to divulge information to the enemy through faulty operating procedures and techniques. Personnel preparing messages for transmission should be aware of the ability of the enemy to obtain information from radio traffic.

Physical Security

H-33. Physical security is the component of COMSEC that results from all physical measures taken to safeguard classified equipment, material, and documents from access or observation by unauthorized personnel. Before vacating a command post or other facility used for communications purposes, check thoroughly for copies of messages or carbons and copies of maps or orders that might prove beneficial to the enemy. Give special attention to signal operating instructions items, including their production, distribution, storage, and final disposition when superseded or no longer needed. When a signal operating instruction item or an extract of a signal operating instruction item is believed to be lost or otherwise compromised, the fact should be reported and the item replaced immediately. The unit commander should specify in the unit SOP precisely how the report is to be made. As a minimum, security violations will be reported immediately through communications and command channels.

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Appendix I

Military Vehicle Axle Weight Distribution Formulas and Percentages

Vehicle weight scales are not always available to military field units that are moving truck convoys over CONUS public highways. Therefore, the Army has developed loaded vehicle axle weight distribution formulas and percentages to help units prepare required forms. Percentages of maximum gross vehicle weight (GVW) are given for estimating the axle weight distribution for a loaded vehicle. Whenever possible, units should use actual axle loads obtained by weighing the loaded vehicle.

LIMITATIONS

I-1. Percentages can be used for any loaded cargo truck and tractor semitrailer combination. However, to determine vehicle axle load distribution, the following should be available:

- TMs or vehicle data sheet for the particular cargo truck, tractor, and semitrailer.
- Weight of empty vehicle.
- Weight of payload.
- Other necessary dimensions obtained from vehicle TM or data sheet.

PROCEDURE

I-2. Follow these steps to determine axle weight distribution using the percentages in this appendix:

- Step 1. Determine GVW.
- Step 2. Choose applicable percentages from the table for the number of axles and type of vehicle (see table below).
- Step 3. Multiply GVW by each percentage to determine various axle weight distributions.
- Step 4. Record each weight.

Example: (The percentage method) The GVW for an M916A2/M872A4 tractor-semitrailer combination is 95,700 pounds. This is a six-axle vehicle. Therefore, in the first column labeled “Number of Axles per Vehicle,” find 6. To the right of 6 under “Type of Vehicle” is semitrailer and under the “Axle 1” column is 8. Multiply the GVW by 8 percent to find the front axle weight distribution. The “Axle 2” and “Axle 3” columns show 22 percent. Multiply the GVW by 21 percent to determine the weight distribution on each of the second and third axles. The “Axle 4”, “Axle 5” and Axle 6 columns show 16 percent. Multiply the GVW by 16 percent to determine the weight distribution on each of the fourth, fifth and sixth axles. Record each axle weight distribution.

GVW for M916A2/M872A4 = 95,700 lb
GVW = 95,700 lb x 8 percent = 7,656 lb (front axle weight distribution)
GVW = 95,700 lb x 22 percent = 21,054 lb (2d and 3d axle weight distribution)
GVW = 95,700 lb x 16 percent = 15,312 lb (4th, 5th, and 6th axle weight distribution)

*Formulas and percentages in this appendix (see table I-1 and figure I-1, page I-2) are used in lieu of ATA weight limits only when American Trucking Associations, INC data is not available.

Table I-1. Percentages for axle weight distribution

Number of Axles per Vehicle	*Type of Vehicle*	*Axle 1*	*Axle 2*	*Axle 3*	*Axle 4*	*Axle 5*	*Axle 6*
3	2 ½ Ton	32	34	34			
	5 Ton	26	37	37			
5	Semitrailer	14	21	21	22	22	
6	Semitrailer	8	22	22	16	16	16

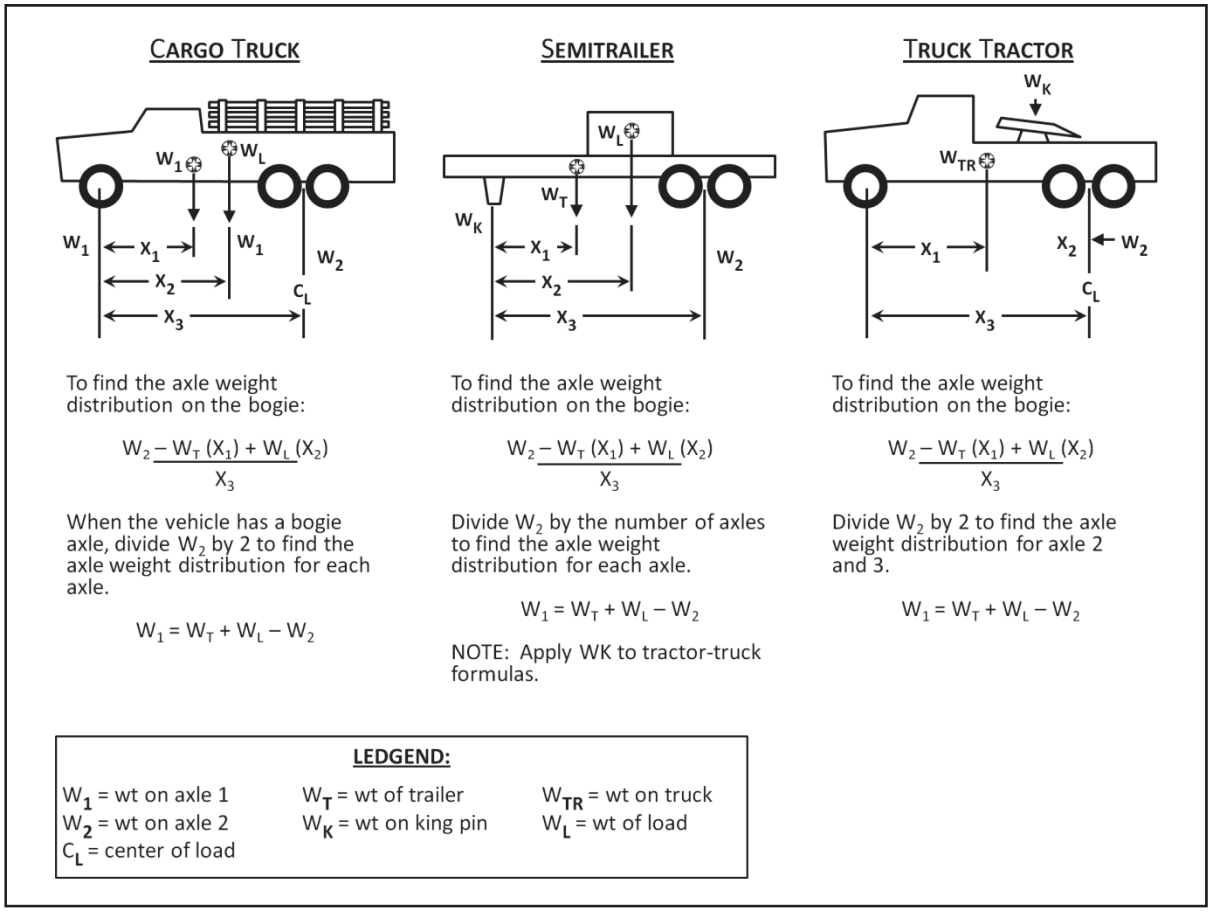

Figure I-1. Formulas for axle load weight distribution

Appendix J

Detailed Vehicle Information

This appendix provides links to the Logistics Support Activity website for Army Transportation Vehicle Technical Manuals (TM). For the specifics regarding the operation and capabilities of Army Vehicles always consult the vehicles TM. If a specific vehicle isn't linked in this appendix, its TM can be located on the Logistics Support Activity website.

ARMY TB 55-46-1

https://www.logsa.army.mil/etmpdf/files/000000/009220.pdf

LOGSA ELECTRONIC TECHNICAL MANUAL SEARCH ENGINE:

https://www.logsa.army.mil/etms/index.cfm?fuseaction=viewsearchform&CFID=1440135&CFTOKEN=d8aae2c9bcfc1b2d-22B07AC0-EEE3-64CC-85458EAA915CB99D

FAMILY OF MEDIUM TACTICAL VEHICLES

M1078 Light Medium Tactical Vehicle (LMTV)
https://www.logsa.army.mil/etmpdf/files/070000/074000/074408.pdf
M1083 Medium Tactical Vehicle (MTV)
M1088 Truck Tractor, MTV
M1085 Long Wheel Base, MTV
M1084 MTV w/MHE
https://www.logsa.army.mil/etmpdf/files/070000/076000/076880.pdf
https://www.logsa.army.mil/etmpdf/files/070000/076000/076873.pdf

HEAVY EXPANDED MOBILITY TACTICAL TRUCK (HEMTT)

M977 Truck, Cargo 8x8
https://www.logsa.army.mil/etmpdf/files/080000/084787.pdf
M985 Truck, Cargo 8x8
https://www.logsa.army.mil/etmpdf/files/080000/084792.pdf
M1120 Truck, Load Handling System (LHS), 8x8
https://www.logsa.army.mil/etmpdf/files/080000/084794.pdf

PALLETIZED LOAD SYSTEM (PLS)

M1074 Truck, Tractor, Palletized Load System (PLS)
M1075 Truck, Tractor, Palletized Load System (PLS)
https://www.logsa.army.mil/etmpdf/files/080000/084794.pdf
M1076 Palletized Load System Trailer (PLST)
https://www.logsa.army.mil/etmpdf/files/080000/087202.pdf
M1077 Palletized Load System (PLS) Flatrack
https://www.logsa.army.mil/etmpdf/files/080000/084912.pdf

HEAVY EQUIPMENT TRANSPORT (HET)

M1070 Truck, Tractor 8x8, Heavy Equipment Transporter
https://www.logsa.army.mil/etmpdf/files/070000/072000/072604.pdf
M1000 Semitrailer, Transporter, Heavy Equipment 70 Ton
https://www.logsa.army.mil/etmpdf/files/080000/085502.pdf

LINE HAUL EQUIPMENT

M915 Truck Tractor, Line Haul, 50,000 GVWR, 6x4
https://www.logsa.army.mil/etmpdf/files/040000/045000/045568.pdf
M916 Truck, Tractor, Light Equipment Transporter (LET) 68,000 GVWR 6x6
https://www.logsa.army.mil/etmpdf/files/070000/078000/078098.pdf
M871 Semitrailer, Tactical, Drop Deck Breakbulk/Container Transporter, 22 ½ Ton
https://www.logsa.army.mil/etmpdf/files/080000/080713.pdf
M872 Semitrailer, Flatbed, Breakbulk/Container Transporter, 34 Ton
https://www.logsa.army.mil/etmpdf/files/080000/081958.pdf

FUEL TRANSPORT AND DISTRIBUTION EQUIPMENT

M1062 Semitrailer, Tank, Fuel, 7500 Gallon
https://www.logsa.army.mil/etmpdf/files/040000/045000/045817.pdf
M967 Semitrailer, Tank, 5000 Gallon, Bulk Haul, Self-Load/Unload
https://www.logsa.army.mil/etmpdf/files/040000/045000/045819.pdf
M978 Truck, Tank, 8x8
https://www.logsa.army.mil/etmpdf/files/080000/084811.pdf

Appendix K

Conversion Tables

This appendix gives the linear and liquid measure and weight equivalents of US units to metric units and vice versa. The metric system is a decimal system of weights and measures in which the gram (.0022046 pound), the meter (39.37 inches), and the liter (61.025 cubic inches) are the basic units of weight, length, and capacity respectively. Also included are conversion factors for the most commonly used measurements and weights.

LINEAR MEASURE

Kilometers to miles (km x .621 = mi) (km ÷ 1.609 = mi)	Miles to kilometers (mi x 1.609 = km) (mi ÷ .621 = km)
1 = 0.62	1 = 1.61
2 = 1.24	2 = 3.22
3 = 1.86	3 = 4.83
4 = 2.48	4 = 6.44
5 = 3.10	5 = 8.05
6 = 3.72	6 = 9.66
7 = 4.34	7 = 11.27
8 = 4.96	8 = 12.88
9 = 5.58	9 = 14.49
10 = 6.21	10 = 16.10
20 = 12.42	20 = 32.20
30 = 18.63	30 = 48.30
40 = 24.84	40 = 64.40
50 = 31.05	50 = 80.50

LIQUID MEASURE

Gallons (US) x 3.785 = liters
Gallons (US) x 0.8327 = gallons (imperial)
Gallons (US) x 3.332 = quarts (imperial)
Quarts (US) x 0.946 = liters
Quarts (US) x 0.2082 = gallons (imperial)
Quarts (US) x 0.8327 = quarts (imperial)
Pints (US) x 0.473 = liters
Liters x 0.2642 = gallons (US)
Liters x 1.057 = quarts (US)
Liters x 0.2201 = gallons (imperial)
Liters x 0.8804 = quarts (imperial)
Gallons (imperial) x 1.201 = gallons (US)
Gallons (imperial) x 4.802 = quarts (US)
Gallons (imperial) x 4.545 = liters
Quarts (imperial) x 0.3001 = gallons (US)
Quarts (imperial) x 1.201 = quarts (US)
Quarts (imperial) x 1.136 = liters

WEIGHTS

Short ton (US) = 0.91 metric ton
Long ton (US) = 1.02 metric tons
Pound (US) = 0.45 kilogram

SIMPLIFIED CONVERSION FACTORS FOR QUICK COMPUTATION

The following are accurate to within 2 percent:

- Inches to centimeters -- Multiply by 10 and divide by 4.
- Yards to meters -- Multiply by 9 and divide by 10.
- Miles to kilometers -- Multiply by 8 and divide by 5.
- Gallons to liters -- Multiply by 4 and subtract 1/5 of the number of gallons.
- Pounds to kilograms – Multiply by 5 and divide by 11.

Appendix L

Force Design Updates Fielding 2015

Sustainment units require the organic capability to defeat threats during convoy operations. In order to meet this requirement, active component units are projected to be fielded Mine Resistant Ambush Protection All Terrain Vehicles (M-ATV) to be used as convoy protection platforms beginning in fiscal year 2015. These vehicles will replace 12 current mission vehicles reducing overall cargo capacity, but increasing overall mission effectiveness. This appendix provides the projected capabilities for the active component companies discussed in Chapter 3, Section I, Motor Transport Units above the BCT projected to receive CPPs.

ACTIVE COMPONENT MOTOR TRANSPORT UNITS 2015

L-1. Motor transport companies in the active component are projected to reduce the overall cargo capacity by 20% by replacing two vehicles per squad with two M-ATVs, except for the HET companies. HET companies will replace the platoon leader and platoon sergeant vehicles with M-ATVs. This addition of the M-ATVs enables the motor transport companies to perform convoy security with organic assets, and enhances training opportunities and expertise.

MEDIUM TRUCK COMPANIES

PLS Truck Company

L-2. Assuming a 100% TVAR, the PLS truck company provides 48 vehicles and 48 trailers for mission operations, and when properly outfitted for the mission, has a one-time lift capability as indicated below in table L-2.

Table L-2. Projected PLS truck company one-time lift capability

Type	*100% TVAR*
Breakbulk General Cargo	337 STONS
Breakbulk Ammunition	606 STONS
Pallets	768
463L Pallets	192
Containers, Twenty foot (TEU)	96
Containers, Forty foot (FEU)	0
Bulk Water	192,000 GALS
Bulk Fuel	216,000 GALS

Medium Truck Company Cargo

L-3. Assuming a 100% TVAR, the Medium Truck Company Cargo (34T) provides 48 vehicles/trailers for mission operations and has a one-time lift capability indicated in table L-3 below.

Table L-3. Projected Medium truck company cargo (34T) one-time lift capability

Type	*100% TVAR*
Breakbulk General Cargo	358 STONS
Breakbulk Ammunition	642 STONS

Table L-3. Projected Medium truck company cargo (34T) one-time lift capability

Type	*100% TVAR*
Pallets	864
463L Pallets	192
Containers, Twenty foot (TEU)	96
Containers, Forty foot (FEU)	48
Water (SMFT)	198,000 GALS
Water(HIPPO)	192,000 GALS

Medium Truck Company Petroleum, Oil, and Lubricant

L-4. Assuming the medium truck company POL (5K) has a TVAR of 100% (48 vehicle platforms) and utilizing the 5k trailers to max capacity (5,000 GALS), the unit can provide a onetime lift capability for bulk fuel of 240,000 GALS

HEAVY EQUIPMENT TRANSPORT COMPANY

L-5. The HET Companies are projected to be receiving M-ATVs in lieu of the platoon leaders' and platoon sergeants' vehicles. Each active component HET company is projected to receive eight M-ATVs. Eight M-ATVs were determined to be sufficient given their mission normally requires direct support to the BCTs where additional Soldiers and armored platforms are available for convoy security operations.

Glossary

SECTION I – ACRONYMS AND ABBREVIATIONS

ABCS	Army Battle Command System
ABCT	armored brigade combat team
AIT	automatic identification technology
AO	area of operations
ASR	alternate supply route
BCS3	Battle Command Sustainment Support System
BCT	brigade combat team
BSA	brigade support area
BSB	brigade support battalion
CBRN	chemical, biological, radiological, and nuclear
CFR	Code of Federal Regulation
COMSEC	communications security
CONUS	continental United States
CP	check point
CROP	container roll-in/roll-out platforms
CSC	convoy support center
CSSB	combat sustainment support battalion
CTC	composite truck company
DTO	division transportation officer
ECHU	enhanced container handling unit
ESC	expeditionary sustainment command
FBCB2-BFT	Force XXI Battle Command Brigade and Below – Blue Force Tracking
FEU	forty foot equivalent unit
FMTV	family of medium tactical vehicles
FSC	forward support company
GVW	gross vehicle weight
HEMTT	heavy expanded mobility tactical truck
HET	heavy equipment transporter
HQ	Headquarters
ITO	installation transportation office
ITV	intransit visibility
KMIH	kilometers in the hour
LHS	load handling system
LMTV	light medium tactical vehicle
M-ATV	mine resistant ambush protection all terrain vehicle
MCB	movement control battalion
MCT	movement control team
METT-TC	mission, enemy, terrain and weather, troops, time, and civil considerations

MHE	material handling equipment
MSR	main supply route
MTS	movement tracking system
MTV	medium tactical vehicle
NCOIC	noncommissioned officer in charge
OIC	officer in charge
PLS	Palletized Load System
POL	petroleum, oil, and lubricants
RFID	radio frequency identification
RP	release point
RSOP	reconnaissance, selection, occupation party
SMFT	semi-trailer mounted fabric tank
SOP	standard operating procedures
SP	start point
SPO	Support Operations
TAV	total asset visibility
TEU	twenty foot equivalent unit
TSC	theater sustainment command
TTP	trailer transfer point
TVAR	total vehicle availability rate
VRC	vehicular radio communication
XO	Executive Officer
1SG	First Sergeant

SECTION II – TERMS

***direct haul**

single transport mission completed by the same vehicle(s).

distribution

the operational process of synchronizing all elements of the logistics system to deliver the right things to the right place at the right time to support the combatant commander (See ADRP 4-0).

***hub**

an organization that sorts and distributes inbound cargo from multiple supply sources.

intermodal operations

the process of using multiple modes (air, sea, highway, rail) and conveyances (i.e. truck, barge, containers, pallets) to move troops, supplies and equipment through expeditionary entry points and the network of specialized transportation nodes to sustain land forces(ADRP 4-0).

***interzonal operations**

operations which cross area of operation boundaries of a specific transportation organization and operate under the area control of more than one head quarters or command.

***intrazonal operations**

operations confined within a specific transportation organization’s area of operation.

***line haul**

an operation in which vehicles cannot make more than one round trip per day due to distance, terrain restrictions, or transit time.

***local haul**

an operation in which vehicles can make two or more round trips per day based on distance and transit time.

***motor transportation**

a ground support transportation function that includes moving and transferring units, personnel, equipment and supplies by vehicle to support the operations.

movement control

the dual process of committing allocated transportation assets and regulating movements according to command priorities to synchronize the distribution flow over lines of communications to sustain land forces (ATP 4-16).

***relay**

a single transport mission completed in one trip and utilizes multiple vehicles without transferring the load.

retrograde

the process for the movement of non-unit equipment and materiel from a forward location to a reset (replenishment, repair, or recapitalization) program or to another directed area of operations to replenish unit stocks, or to satisfy stock requirements (JP 4-09).

***shuttle**

a single transport mission completed in repeated trips by the same vehicles between two points.

***spoke**

a portion of the distribution system that refers to the transportation mode operator's responsibility for scheduled delivery to a receiving unit.

***supply point distribution**

a method of distributing supplies to the receiving unit at a supply point, railhead, or truckhead.

terminal operations

the reception, processing, and staging of passengers; the receipt, transit storage and marshalling of cargo; the loading and unloading of modes of transport conveyances; and the manifesting and forwarding of cargo and passengers to a destination(JP 4-01.5).

***throughput distribution**

a method of distribution which bypasses one or more intermediate supply echelons in the supply system to avoid multiple handling.

***unit distribution**

a method of distributing supplies by which the receiving unit is issued supplies in its own area, with transportation furnished by the issuing agency.

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REQUIRED PUBLICATIONS

ADRP 1-02. *Operational Terms and Graphics*. 31 August 2012

ADP 4-0. *Sustainment*. 31 July 2012

ADRP 4-0. *Sustainment.* 31 July 2012

FM 55-1. *Transportation Operations*. 3 October 1995

RELATED PUBLICATIONS

These documents contain relevant supplemental information

JOINT PUBLICATIONS

Joint publications are available online; http://www.dtic.mil/doctrine

JP 4-01. *Joint Doctrine for the Defense Transportation System*. 19 March 2003

JP 4-09. *Distribution Operations*. 05 February 2010

JP 4-01.5. *Joint Terminal Operations*. 06 April 2012

NATO PUBLICATIONS

NATO publications are available online at http://nsa.nato.int/nsa/

Allied Tactical Publication 76. *Convoy Operations*. February 2012

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AR 190-11. *Physical Security of Arms, Ammunition, and Explosives*. 15 November 2006

AR 385-10. *Army Safety Program*. 23 August 2007

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AR 750-1. *Army Materiel Maintenance Policy*. 20 September 2007

ATP 4-12. *Army Container Operations*. 10 May 2013.

ATP 4-16. *Movement Control*. 5April 2013

ATP 4-94. *Theater Sustainment Command*. 28 June 2013

FM 27-10. *The Law of Land Warfare*. 18 July 1956

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TM 38-410. *Storage and Handling of Hazardous Materials*. 13 January 1999

TM 55-315. *Transportation Guidance for Safe Transport of Radioactive Material*. 23 June 1989

DA Pamphlet 385-40. *Army Accident Investigation and Reporting*. 6 March 2009

DA Pamphlet 750-8. *The Army Maintenance Management System Users' Manual.* 22 August 2005

REFERENCED FORMS

Except where otherwise indicated below, the following forms are available as follows: DA Forms are available on the APD Web site (http://www.apd.army.mil) and DD Forms are available on the Office of the Secretary of Defense Website (http://www.dtic.mil/whs/directives/infomgt/forms/formsprogram.htm). Standard Forms are available on the GSA Web site (http://www.gsa.gov)

DA FORM 285. *Technical Report of US Army Ground Accident.*

DD FORM 626. *Motor Vehicle Inspection (Transporting Hazardous Material).*

DD FORM 836. *Dangerous Goods Shipping Paper/Declaration and Emergency Response Information for Hazardous Materials Transported by Government Vehicles.*

DD FORM 1265. *Request for Convoy Clearance*.

DD FORM 1266. *Request for Special Hauling Permit.*

DA FORM 2028. *Recommended Changes to Publications and Blank Forms.*

DA FORM 2062. *Hand Reciept/Annex Number.*

Standard Form 91. *Motor Vehicle Accident Report.*

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ATP 4-11(FM 55-30)
5 July 2013

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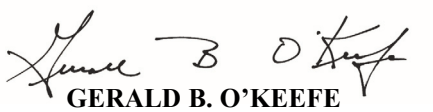
Chief of Staff

Official:



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